Q1 Lifting gears while robot is supporting the gear

Q: Is the pilot able to operate the lift if the peg is through the gear, but the gear is supported by the robot. In this dituation the peg would not touch the robot.

A: Yes. There are no restrictions on a PILOT operating the LIFT while a ROBOT is placing a GEAR.

(Asked by **2875** at Jan 11th 17)

Q2 What's the capacity of the low goal?

Q: How many balls can the low goal hold in total while process?

A: Per Section 3.11.4 (as added in Team Update 1), "The capacity of the Low Efficiency GOAL is seventy (70) FUEL."

(Asked by **2708** at Jan 11th 17)

Q3 Gear removal

Q: If the gear is on the peg but still within the robot can the pilot pull it up to them?

A: We believe !Q1 answers your question. If it does not, please rephrase your question and resubmit.

(Asked by **2708** at Jan 11th 17)

Q4 Frame Perimeter and Bumper Rule

Q: At any point can the robot extend beyond the frame perimeter thus above the bumper?

A: There are no rules that require a ROBOT remain within its FRAME PERIMETER beyond the start of the MATCH (required per !G1-C combined with !R2). Rule !G4 requires only that it remain within the volume constraints defined in !R3 during the MATCH.

(Asked by **2713** at Jan 11th 17)

Q5 Gear Sliding

Q: Is the coefficient of friction between the gear and the shoot such that the gear will slide without any user force?

A: Yes, the slope of the LOADING STATION chute is such that a GEAR slides when placed on the surface. This can be seen in the [Loading Lanes Field Tour Video](https://www.youtube.com/watch?v=IYX5dRa_uYk).

(Asked by **2713** at Jan 11th 17)

Q6 velcro usage on rope

Q: Can a team use Velcro on a rope that they bring to the field? Can they place Velcro above the 4 inches that secures the rope end? Can it be place on the 4 inches that secures the rope?

A: Please see Team Update 2. Non-adhesive-backed hook and loop fastener may be part of, or the entirety of, a legal ROPE, provided that the ROPE is entirely made of "flexible, non-metallic fibers twisted, tied, woven, or braided together" per I04 (e.g. something stuck to or wrapped around the outside of the ROPE does not satisfy this requirement unless it's whipping as permitted per I04 part D).

(Asked by **1880** at Jan 14th 17)

Q7 Does a robot need to stay on far side of baseline to get autonomous points?

Q: After breaking the BASE LINE in autonomous, can the robot then move away from the baseline and back toward the alliance station without sacrificing autonomous points?

A: Yes, a ROBOT can move away without sacrificing point. Per Table 4-1 the ROBOT must "break the BASE LINE vertical plane with their BUMPER by T=0," there is no requirement that they actively break the plane at T=0.

(Asked by **484** at Jan 11th 17)

Q8 Legality of launching a gear as shown in game animation

Q: Rule G24 states that gears cannot be thrown, yet the game animation (at time=1:55) shows a robot launching a gear at a peg. Would this action be a violation of rule G24?

A: Yes, that would be a violation. As noted at the end of the animation, the animation is intended to be a general overview of the game. The Game and Season Manual is the source of official rules.

(Asked by **484** at Jan 11th 17)

Q9 Are knots included in the length of a rope?

Q: Is the length of a rope measured before knots are added or after knots are taken into account?

A: The measurements dictated per !I04 are made as the ROPE is intended to be placed onto the FIELD (i.e. with any knots or loops in place, measure the ROPE end-to-end for !I04 B and C)

(Asked by **484** at Jan 11th 17)

Q10 Rope materials

Q: Can teams use standard 1" cargo strap webbing as their rope and inter weave cotton fibers into it?

A: We will not provide rulings on specific designs/materials. There are no rules that prohibit a Team from doing the twisting, tying, braiding, or weaving described in !I04-D or that require a ROPE to be made of a single uniform material.

(Asked by **3218** at Jan 13th 17)

Q11 Overflow Loading Station

Q: 3.11.2 has an illustration showing a gear slot in the loading station yet I am not sure how a team would have a gear to load using this overflow station b/c the manual indicates gears will only be placed at the return loading station. Will gears somehow be available at the overflow station?

A: The GEAR slot in the Overflow LOADING STATION is present ~~only~~__primarily__ for the purpose of interchangeable parts. __With the exception of circumstances described in !Q49,__ there are no GEARS available to an ALLIANCE inside the ALLIANCE STATION.

(Asked by **5676** at Jan 11th 17)

Q12 Robot design

Q: Can an part of a robot extend outside the robot frame as long as it does not extend past the bumper perimeter?

A: We believe !Q4 answers your question. If it does not, please rephrase your question and resubmit.

(Asked by **155** at Jan 11th 17)

Q13 Rope length clarification

Q: Rule I04 states that ROPE length is "measured end to end". If, for example, a rope had a loop in the middle (like ----o-----), is the length measured as if a measuring tape is placed from one end to the other of the so-configured rope?

A: We believe !Q9 answers your question. If it does not, please rephrase your question and resubmit.

(Asked by **857** at Jan 11th 17)

Q14 End of Match using your own rope

Q: At the end of the match can a robot with it's team supplied rope be removed together from the field allowing the robot and rope to be separated after leaving the field?

A: Yes, per the Blue Box beneath !R08, "a Team provided ROPE may be removed from the FIELD and is no longer considered a FIELD element once removed from the DAVIT." .

(Asked by **3545** at Jan 11th 17)

Q15 Electrical Custom PCB

Q: Is is legal to route power and signal from all devices (PDP, motor controllers, roborio, etc) through a custom PCB? Basically, do traces under an insulated coating satisfy R57 assuming the traces are of the appropriate width?

A: No, a trace would not be considered an appropriately sized insulated wire per !R57.

(Asked by **4627** at Jan 12th 17)

Q16 Score Match points with fuel balls and KPA

Q: There is a question that come up about score There are in score Table for each 3 fuels in high efficency and 9 fuel for the lower one. It says 1MP+1Kpa. Now, The question is. The kpa in counted as the 1 mp or it is added additonally at end game. For each 3 fuels you can get 2 Match Points? (1 by the 3 on high goal and 1 by the kpa level it gave you). or it is just 1 MP because of the kpa added. 1) 2 points on high - 5 points gave one kpa =1MP2) 5points high+5points low= 3MP->2KPA+1MP(From 3 High

A: For every one (1) kPa of pressure accumulated, teams are awarded one (1) MATCH point. The amount of FUEL required in a given GOAL during a given MATCH phase to earn a kPa is specified in Table 4-1. For example, six (6) FUEL in the Low Efficiency GOAL during AUTO will result in two (2) kPa of pressure accumulated, which earns a total of two (2) MATCH points.

(Asked by **4320** at Jan 12th 17)

Q17 Use of forced air to propel ball.

Q: My question refers specifically to G28. The rule, while intended to prevent robots from redirecting fuel in mid flight either into or away from an intended target, also prevents the use of air, forced or otherwise, to affect any fuel anywhere outside the robot volume. Question: Can forced air be used, to generate a vacuum using a bernoulli effect, to draw fuel from outside the robot to the interior of the robot?

A: No. Use of forced air to affect FUEL outside the ROBOT is a violation of !G28.

(Asked by **1915** at Jan 11th 17)

Q18 Distance from base of airship to rope

Q: What is the distance from the face of the base of the airship to the point where the rope will be hanging. (I can see that the davit extends 11 inches from the edge of the airship rail, but I cannot see how far the airship rail is from the face of the base of the airship.)

A: The purpose of this Q&A is to answer questions regarding the rules of _FIRST_ STEAMWORKS. Any measurements or materials information can be derived from the Field Drawings available at: http://www.firstinspires.org/resource-library/frc/competition-manual-qa-system

(Asked by **2839** at Jan 12th 17)

Q19 Use of forced air to propel ball from robot

Q: My question refers specifically to G28. Question: Can forced air be used to propel fuel from the robot, provided that the straight barrel included a muzzle brake to ensure, at the moment that the fuel departs the barrel, that the velocity of air outside of the end barrel would be less than the velocity of the propelled fuel, and the newly launched fuel (ball) would therefore not be directed or redirected by the forced air?

A: We won't rule/bless a particular design or application, but provided forced air only affects FUEL while inside the volume of the ROBOT and not once it's left the volume of the ROBOT, !G28 is not violated.

(Asked by **1915** at Jan 11th 17)

Q20 Adding a second gear to a peg.

Q: If a gear is on a peg, can a robot add a second gear to said peg? Is there penalty if the prior gear on the peg is pushed back using the gear being added by the robot?

A: There are no rules that prohibit multiple GEARS being on the same LIFT at a given point in the MATCH. There are no rules that specifically restrict interaction with GEARS already on a LIFT.

(Asked by **2557** at Jan 11th 17)

Q21 Strap with velcro

Q: If we choose to use our own rope can we use a 1" strap with velcro sewn on the last 4 in of the rope?

A: ## Edited Mar 10, 2017 to agree with [Team Update 02] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate16.pdf). Please see [Team Update 02](https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate16.pdf). I04-D explains how the last 4" of your rope may be treated, and this treatment must be 'only to prevent fraying'. Hook and loop fastener ~~would be an odd choice to 'only prevent fraying', and would invite more questions from Inspectors.~~ **is permitted, provided it meets requirements in !I04.**

(Asked by **5440** at Jan 16th 17)

Q22 Multiple Rope Materials?

Q: Are ropes allowed to be composed of multiple different materials (each of which comply with I04)? If composed of multiple materials, must those materials be twisted/woven/stitched/braided together to satisfy I04-D, or may they be attached together by other methods? If composed of multiple materials, must each material span the entire length of the rope?

A: Yes, there are no rules which require a ROPE to be composed of uniform material. Yes, a ROPE must be twisted, tied, woven, or braided, per !I04-D. There is no requirement that any component material of a ROPE span the entire length of the ROPE.

(Asked by **1712** at Jan 13th 17)

Q23 Player Stations Numbering

Q: Please provide an explanation of the numbering for both alliance player stations. 10.5.3 details at which station playoff alliances will be assigned but these numbers are never mapped to the field. Which player stations are closest to the boiler? Is the numbering asymmetric like the field? Are they in order at all?

A: When viewing the PLAYER STATIONS from within the ALLIANCE STATION, they are in numeric order with PLAYER STATION one on the left.

(Asked by **3847** at Jan 11th 17)

Q24 Multiple Gears on Lift

Q: May multiple gears by placed on the same lift simultaneously?

A: We believe !Q20 answers your question. If it does not, please rephrase your question and resubmit.

(Asked by **1712** at Jan 11th 17)

Q26 Would a non-kit/FC fan added for cooling a coprocessor be allowed?

Q: We are planning to use a phone for vision, and phones can heat up with heavy processing. Is it allowed to add a small fan for cooling if that fan is not from the kickoff kit or First Choice, and is not strictly "part of" the phone?

A: No, a fan that is not "included in any Kickoff Kit, distributed via *FIRST* Choice, part of a legal motor controller (including manufacturer provided accessories), or part of a legal COTS computing device" is not an item allowed per !R32 and is therefore prohibited.

(Asked by **2877** at Jan 12th 17)

Q27 Supplying Ropes for Alliance Partners

Q: May teams bring additional ropes for other teams at their event to use? If allowed, would the receiving team have to get the rope re-inspected, or would the inspection by the original team be sufficient?

A: Yes, Teams may share ROPES. No, a Team does not need to get a borrowed ROPE reinspected; the most recent Inspection (at that event) is sufficient provided no changes have been made to the ROPE (per !I06).

(Asked by **1712** at Jan 12th 17)

Q28 Maximum Volume Constraint Shifting

Q: Is it the intent of R03 to restrict the maximum volume for the simultaneous activation/deployment of all extensions, or, if the extensions are mutually exclusive, and enforced mechanically or in software, can the volumes defined by the extensions be measured in their game playing combinations? An example to clarify the question: If a robot has an extension on the front and the back and only one is able to extend at a time, and the maximum volume of the robot is never exceeded, is this legal?

A: The purpose of this Q&A is to clarify questions related to *FIRST* STEAMWORKS, not provide detail on the intent of specific rules. Per Section 1.5: "Please avoid interpreting the text based on assumptions about intent." While we cannot rule absolutely on hypothetical ROBOT designs, a ROBOT with "extension on the front and the back and only one is able to extend at a time" (via hardware or software) is legal so long as !G04 is not violated.

(Asked by **2468** at Jan 11th 17)

Q29 Rope Question

Q: Is it possible to replace the rope with 1in tubular webbing?

A: We will not rule on specific designs/materials. If the material meets the requirements outlined in !I04 it is

legal. If it doesn't, or you can't confirm it does, we recommend considering a different, more obviously compliant material.

(Asked by **5421** at Jan 16th 17)

Q30 Does obstructing a lift violate G15?

Q: Would a robot with a static defensive mechanism designed to be held above an opponent's lift peg to prevent the upward movement of the lift be in violation of G15?

A: We cannot comment absolutely on hypothetical scenarios. The ultimate decision would be determined by the Head REFEREE at your event as to whether a particular ROBOT action is violating a rule. That being said, in and of itself, the action of a "static defensive mechanism designed to be held above an opponent's LIFT peg to prevent the upward movement" does not violate !G15. As an additional caution regarding !G15, if a PILOT is using a LIFT in its normal fashion, and a ROBOTS "static defensive mechanism designed to be held above an opponent's LIFT peg" (as an example) were to result in damage to the FIELD, the ROBOT is subject to !G15-H.

(Asked by **8** at Jan 12th 17)

Q31 Can a PILOT move pre-populated GEARS?

Q: Per rule H10, the PILOT cannot remove a gear that has been used to start a ROTOR. Can a pre-populated GEAR, whose associated ROTOR has not started, be moved to engage a different ROTOR? If the PILOT can do this, can they do it in AUTO?

A: Please see !H15, from Team Update 1, "A pre-populated GEAR may not be removed from its AXLE. Violation: RED CARD."

(Asked by **4263** at Jan 11th 17)

Q32 Must Bumper Mounting Hardware be inside the Bumper Zone?

Q: Can bumper mounting hardware extend vertically outside of the Bumper Zone? In other words, can bumper mounting hardware disregard R23 while complying with R28 and remaining exempt under R21.C?

A: All mounting hardware that is part of the BUMPER (that which is part of the BUMPER assembly and removable fasteners as described in !R29, part G) must remain within the BUMPER ZONE.

(Asked by **619** at Jan 17th 17)

Q33 Robot size limit with extensions at both ends

Q: Assume a robot has two extensions on opposite sides with each extension BY ITSELF not violating the max. size envelope. Yet if both were deployed SIMULTANEOUSLY they WOULD EXCEED the max. size envelope. If a provision were to be made either through software or through mechanical linkage so that only ONE OR THE OTHER extension could extend at any one time, would that be considered a legal robot from a size envelope perspective. Please specify if software or or hardware interlock is acceptable.

A: We believe !Q28 answers your question. If it does not, please rephrase your question and resubmit.

(Asked by **4004** at Jan 12th 17)

Q34 Can removal of the gear be used as a control input in autonomous?

Q: Per the response to Q1, if a PILOT uses the LIFT to remove a GEAR from a ROBOT, can the robot use the presence, non-presence, or removal of the gear as a control input? In other words, if the ROBOT senses the presence of the GEAR, does the detection of the removal of the GEAR from the ROBOT constitute and indirect interaction with the ROBOT by the DRIVE TEAM under A02?

A: If the ROBOT makes a control decision without the input of the PILOT (such as with a sensor detecting the presence of a GEAR) there is no violation of !A02. However, if the PILOT were to use a control device, such as an IR signal or colored marker, !A02 would be violated.

(Asked by **6357** at Jan 11th 17)

Q35 Interaction between robot and pilot involving gear placement

Q: Does the robot have to be clear of the gear for the pilot to pull up on the lift? To clarify, may the robot remain in contact with the gear as the pilot pulls up the lift?

A: We believe !Q1 answers your question. If it does not, please rephrase your question and resubmit.

(Asked by **5690** at Jan 11th 17)

Q36 Length of Rope above DAVIT

Q: I04 specifies a minimum length for the Rope of 5'3", but does not specify how much of the rope is above the DAVIT interface point. Is there a limit on how much of the rope can be above the DAVIT interface? For purposes of min/max length, should it be measured from the DAVIT Interface, and not the “end“? For example, I could put the DAVIT Interface at the mid-point of a 5'4" rope, leaving only 2'8" hanging below the DAVIT.

A: Yes, please see Team Update 02 Team Update 02 for modified requirements on ROPE measurement.

(Asked by **2202** at Jan 14th 17)

Q37 Further Clarification on Answer to Q11

Q: Question 11 and its associated answer seem to either be at odds with or just divorced from the game logic introduced under section 4.6, where GAME PIECES that leave the LOADING LANE and end up in the ALLIANCE STATION would be then "'owned' by the ALLIANCE in the space now occupied by the GAME PIECE." Under 4.6, any member of the DRIVE TEAM that isn't the COACH would be allowed to insert a GEAR through the Overflow LOADING STATION were a gear to leave the opponent's LOADING LANE, correct?

A: We believe !Q49 answers your question. If it does not, please rephrase your question and resubmit.

(Asked by **422** at Jan 12th 17)

Q38 Pilot using lifter in autonomous

Q: According to answer to Q1 on Section 7.7 Human Action rules, the pilot can raise the lifter to help engage the gear. Can this also be done in autonomous, or does the robot have to fully engage the gear itself before the human can interact with the lifter?

A: The answer to !Q1 is not specific to a period of the MATCH.

(Asked by **433** at Jan 11th 17)

Q39 Scoring of Rotors

Q: When scoring rotors. Do Rotors turning at the end of autonomous count for 60 match point get counted a second time at 40 each at he end of the match? in effect Rotors get assessed twice for match scoring.

A: No, please read [Team Update 01] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate01.pdf). Per updated Table 4-1, "For each ROTOR turning by period's T=0, that's not previously been scored"

(Asked by **3218** at Jan 11th 17)

Q40 Do team supplied ropes become part of the field indefinitely?

Q: Section 4.2 states that a DRIVE TEAM may switch one of the ROPES on their AIRSHIP with their own ROPE and that ROPE, once installed, becomes part of the FIELD. Does the rope remain part of the field indefinitely or only for the duration of that match?

A: No, the ROPE does not become part of the FIELD "indefinitely." If a DRIVE TEAM does not remove the ROPE with their ROBOT at the end of the MATCH, it will be removed by FIELD STAFF and the default ROPE re-installed.

(Asked by **6357** at Jan 11th 17)

Q41 No restrictionson Pilot/Lift Interaction

Q: In 7.7, nor anywhere else, I did not see a limitation on Pilot interaction with the Lift. Can the Pilot operate the Lift at any time, regardless of robots? Questions have been asked about operating the lift while a gear is in contact with a robot. How about raising the lift to assist in the placement of a Gear onto the Peg by the Robot? Seems like almost any operation of the Lift at any time by the Pilot is allowed.

A: We believe !Q38, !Q35, and !Q1. answers your question. Please also utilize the "Search Q&A" button on the navigation bar before submitting. If those answers do not resolve your question, please rephrase your question and resubmit.

(Asked by **2202** at Jan 12th 17)

Q42 Is a human player allowed to feed a gear through the Overflow Loading Station?

Q: If a GEAR were to inadvertently become displaced from a LOADING LANE into the opposite ALLIANCE'S ALLIANCE STATION, could that ALLIANCE'S HUMAN PLAYER use the overflow LOADING STATION to feed the GEAR onto the FIELD?

A: Yes, per 4.6 "GAME PIECES that roll, slide, or otherwise transfer from a LOADING LANE to an ALLIANCE STATION (or vice versa) are considered “owned” by the ALLIANCE in the space now occupied by the GAME PIECE."

(Asked by **4206** at Jan 11th 17)

Q43 Team supplied rope - width

Q: Per 3.8 ROPE "These default ROPES are three (3), 1 in. (nominal) thick by 7 ft. 2 in. (~218 cm) long polypropylene “Manila” style ROPES" Does a team supplied rope have to be 1in. nominal or can it be 3/4 in.?

A: Per !I04 one inch is the nominal _maximum_. 3/4" is within the requirements of !I04-A

(Asked by **4466** at Jan 12th 17)

Q44 Team supplied rope - type.

Q: re: Figure 9-1 Rope examples Figure 9-1 shows a flat strap as an example of a "rope". Does this mean that flat ratchet-strap style "ropes" would be allowed? If so, can velcro be attached to this "rope" at a height appropriate for our robot to "grab" it.

A: There are no rules requiring that a ROPE be round. Please see !Q6 regarding attaching hook and loop fastener to a ROPE.

(Asked by **4466** at Jan 15th 17)

Q45 Does a strip of Velcro count as a ROPE?

Q: To expand on Q6, which asks about adding Velcro to an existing rope: Would a strip of Velcro itself be considered a valid and legal ROPE? By , a rope must "consist entirely of flexible, non-metallic fibers twisted, tied, woven, or braided together". A strip of Velcro where both the fabric backing and the loop surface consist of a series of fibers woven together seems like it fully meets the definition of a legal ROPE, provided all other rules are met of course.

A: There are so many configurations and styles of hook and loop fastener that it would be impossible for us to say that every single one meets the requirements of !I04. However, we feel the elements required to meet !I04 (with Team Update 2 and the answer to !Q6) are pretty clear. If there is some specific element of the definition that concerns you, please rephrase and ask again (once the Q&A system is back up, of course).

(Asked by **228** at Jan 14th 17)

Q46 Pulling an empty lift into the airship during the end game

Q: During the end game, when a robot is trying to climb the rope nearest the alliance station, can a pilot pull the center lift up into the airship, without a gear on it, to get it out of the way of the robot trying to climb?

A: There are no rules that prohibit a PILOT from operating a LIFT without a GEAR, thus this is allowed (assuming of course that rules such as !G15-H are not violated) by the process.

(Asked by **2839** at Jan 12th 17)

Q47 First logos on bumpers

Q: Are the first logos that came with kop required per R26 or R27, if so how many sides of the robot must the logos be on?

A: !R26-C allows, but does not require, *FIRST* logos to be placed on the BUMPERS.

(Asked by **4557** at Jan 12th 17)

Q48 What are the restrictions on modifying the rope?

Q: What are the restrictions on modifying a rope of our own to bring to competition? Is there anything you can do to it or does it have to be exactly like the rope provided by the event host? i.e. Could we tie additional knots or add metal to it?

A: Please see Rule !I04 for restrictions on Team provided ROPES.

(Asked by **5541** at Jan 12th 17)

Q49 Can HUMAN PLAYERS feed GEARS onto the FIELD through the Overflow LOADING STATION?

Q: Clarification on Q42. per 3.11.2 "An Overflow LOADING STATION is used to feed FUEL from the OVERFLOW BIN on to the FIELD". Whereas 3.11.3 states "A Return LOADING STATION is used to feed FUEL and GEARS on to the FIELD". It would seem that even if a GEAR were to be in the ALLIANCE STATION, a HUMAN PLAYER would still be unable to feed it onto the field via the Overflow LOADING STATION because it explicitly states that it may be used to feed FUEL, but makes no mention of GEARS. Is this correct?

A: Under normal gameplay, 3.11.2 is true, the Overflow LOADING STATION is used to feed FUEL onto the FIELD. However, per !H08 a GEAR that inadvertently ends up in an ALLIANCE STATION can still be legally entered through the Overflow LOADING STATION.

(Asked by **4206** at Jan 12th 17)

Q50 Use of Pathfinding Algorithms on Co-Processors

Q: When using pathfinding algorithms, can all pathfind computations be done on a co-processor while the roboRio controls the motors or does the pathfinding algorithm need to run on the roboRio?

A: Per the Blue Box below !R61, "no rules that prohibit co-processors, provided commands originate from the roboRIO to configure, enable, and specify all operating points for all power regulating devices."

(Asked by **4330** at Jan 12th 17)

Q51 Can we use retroreflective rope with glass beads in it?

Q: There was some argument on CD. We could not figure out if glass beads in rope counted as "flexible" or "fiber".

A: No, glass beads are neither flexible nor a fiber.

(Asked by **1339** at Jan 12th 17)

Q52 Is there any limit to the amount of ropes that can be customized by an alliance?

Q: Is there any limit to the amount of ropes that can be customized by an alliance? (by "customized" i mean to change the field rope to a personal rope)

A: Each DRIVE TEAM may replace a ROPE on the AIRSHIP for a total of 3 on an ALLIANCE. Additionally, there is no limit on the number of MATCHES in which a DRIVE TEAM may load their Team ROPE in place of the default FIELD ROPE.

(Asked by **3339** at Jan 12th 17)

Q53 Rope Material

Q: Can teams use Velcro in their own customized ropes?

A: We believe !Q45, !Q21, and !Q6 are similar enough to your question that they answer it. If not, please rephrase your question and resubmit.

(Asked by **4099** at Jan 17th 17)

Q54 Is moving a GEAR out of the way considered controlling the GEAR?

Q: A GEAR is sitting in front of and blocking a peg on the LIFT, for example, and it prevents your ROBOT from accessing the peg. Is moving that GEAR out of the way for the sole purpose of accessing the peg considered controlling the GEAR as described in G27?

A: Yes, the definition of control does not take into account the intent. Your description of "intentionally moving a GEAR out of the way," is herding. If a ROBOT possesses a GEAR while herding another, !G27 would be violated. Keep in mind as well that intentionally placing GEARS in front of an opponent's LIFTS would violate !G21.

(Asked by **6493** at Jan 12th 17)

Q55 about fuels that were thrown from the game field to the loading lane/alliance station

Q: Do fuels that were shot from the game field to the loading lane/alliance station still count as viable? "MATCH PLAY",4.6 "Any GAME PIECES that leave the FIELD will not be returned to MATCH play."

A: No, as you quote, "Any GAME PIECES that leave the FIELD will not be returned to MATCH play" and would be removed by FIELD STAFF for the remainder of the MATCH.

(Asked by **3339** at Jan 12th 17)

Q56 Deliberate bumping = impeding game play?

Q: If one robot deliberately bumps another robot to alter its course, or to cause it to miss a target or reloading opportunity, is that legal, or is it considered impeding game play?

A: There are no rules that prohibit a ROBOT from playing defense or attempting to get in the way of an opposing ROBOT. However, we cannot comment absolutely on hypothetical scenarios. The ultimate decision would be determined by the REFEREES at your event, with the final call made by the Head REFEREE. If you have a question about a particular rule, please rephrase and submit.

(Asked by **3407** at Jan 15th 17)

Q57 Rope: Splice = Knot?

Q: Is a splice considered a knot for the purposes of altering the rope?

A: No, a splice is not a knot. Splicing is defined as "join or connect (a rope or ropes) by interweaving the strands." Thus, a spliced ROPE does consist of fibers woven together (per !I04-D), but would need to satisfy the 1 in. maximum width specified in !I04-A

(Asked by **3407** at Jan 16th 17)

Q58 Are the use of semicircle bumpers legal?

Q: R29-C says the bumpers may not be: -deformed -of differing diameters -of differing cross-section -of differing density And that the cushioning material may extend UP TO 2.5". (No minimum is stated) If I cut round pool noodles in half to make a semicircle, the noodles will still be the same height of 2.5" each, the noodle isn't deformed, the diameter is still the same, all noodles would have the same cross section, and all would have the same density. Would this be considered legal?

A: A semicircular noodle does not meet the requirement in !R29, part C because it is not round, petal, or hex-shaped.

(Asked by **1323** at Jan 15th 17)

Q59 Extensions beyond Bumper still Legal?

Q: Is this legal? We have designed a robot that is 30x30x20" that is legal within the 36x40x24" size. Can we have an extension mounted on the top that extends 5" beyond the bumpers but is still within the 36x40x24" cube?

A: We believe !Q4 answers your question. If it does not, please rephrase your question and resubmit.

(Asked by **5424** at Jan 15th 17)

Q60 Reusing old parts

Q: Can we reuse our old frame components, wheels, and gearboxes from our last years robot?

A: While we cannot rule absolutely on specific ROBOT components, please review !R13. COTS items can be

re-used in 2017 given they have not been modified prior to Kickoff (modified items would be considered FABRICATED ITEMS and thus violate !R13).

(Asked by **2148** at Jan 12th 17)

Q61 Field Elements

Q: Are there any structures under the field carpet that would interact with the robot wheels? this would be bumps from plates etc.

A: Due to the number of venues in which *FIRST* STEAMWORKS is played, we cannot comment absolutely on the potential structures or surfaces underneath the FIELD carpet. Generally speaking, all FIELDS will be assembled on surfaces with as consistent a surface beneath as possible (such as a flat concrete floor, or basketball court). However, some venues such as hockey arenas or basketball courts, require the use of plywood or plastic tiles to protect the floors. These protective surfaces may cause bumps, gaps or other inconsistencies. The FIELD, assembled in its designed configuration, does not contain support plates or floor protectors that would introduce bumps.

(Asked by **155** at Jan 12th 17)

Q62 Bumper Height

Q: R23 says that bumpers must be no higher than 7 inches off the ground. Is there a minimum height that the bumpers must be above as well?

A: No, there is no lower bound to the BUMPER ZONE.

(Asked by **2993** at Jan 14th 17)

Q63 Are custom ROPE(s) required to be bagged with the ROBOT on Stop Build Day?

Q: R15 covers what is to be included in the bag and sealed on Stop Build Day. It includes "all ROBOT elements" excluding the WITHHOLDING ALLOWANCE, BUMPERS, and COTS items. ROBOT is defined as "[including] all of the basic systems required to be an active participant in the game". Given that climbing a ROPE is an element of participation in the game, and the ROPE is not specifically excluded in R15, but possibly included in the ROBOT definition, do ROPES need to be bagged with the bot under R15?

A: No, ROPES are not ROBOT elements and thus not affected by !R15.

(Asked by **5881** at Jan 14th 17)

Q65 Team PLAYER STATION Assignments

Q: Section 10.4.2 of the Game Manual goes into depth on the criteria and selection process for Qualification Match scheduling. Given the field layout, and the significant sightline impairment of the second PLAYER STATION, compared to PLAYER STATIONS 1 and 3, will the FMS attempt to balance distribution of PLAYER STATION assignments across the schedule? Secondly, during eliminations, will ALLIANCES be able to choose which TEAM will be at which PLAYER STATION, either per round or per MATCH?

A: The assignments for Qualification MATCHES at a given event are done by the FIELD Management System (FMS) using software called "MatchMaker." FMS runs MatchMaker on "Best" Quality mode, which generates about 5 million schedules and selects the best one possible. Details about MatchMaker can be found on the vendor's website [here](https://www.idleloop.com/matchmaker/). The assignments for Playoff MATCHES are based upon selection order (see 10.5.3). Teams are required to be in their assigned stations, and there is no provision to "trade" stations with other members of an ALLIANCE (see 10.11 for exceptions regarding the _FIRST_ Championship Playoff MATCHES).

(Asked by **5881** at Jan 12th 17)

Q66 four teams in an alliance

Q: In the Manual, at section 4 MATCH play and 11 Glossary, it refers to an alliance of including up to four team members. What role does the forth member of the alliance play? Are we able to have a forth member in our alliance prior to eliminations?

A: At most events, ALLIANCES will consist of three (3) Teams. However, at the *FIRST* Championship only, Playoff ALLIANCES consist of four (4) Teams. These Playoff ALLIANCES do not have the option of an additional BACKUP TEAM.

(Asked by **484** at Jan 12th 17)

Q67 Frame Perimeter and Bumpers

Q: In past years teams have utilized and open section of bumper for intake of game pieces. Is there a rule against this for Steamworks?

A: We will not declare a particular design legal or illegal, i.e. we won't comment on hypothetical ROBOT designs, and the final decision as to legality of a particular ROBOT lies with the Lead ROBOT Inspector (LRI) at each event. We will confirm that there is no rule that prohibits an "open section of bumper", provided all other BUMPER requirements are met.

(Asked by **5937** at Jan 16th 17)

Q68 can the game pieces (Fuel and Gears) extend outside the robot volume.

Q: Can the pile of Fuel or Gear on top of the robot extend beyond the 24" height for the short robot or 36" for the tall robot as long as there are no robot parts IE. Nets, guides, force fields extending out side the constrained box. If the robot used the entire 36 in. by 40 in. by 24 in. and the gear was set on top would there be a violation?

A: GAME PIECES are not part of the ROBOT, and thus do not count in regards to measuring the ROBOT Volume.

(Asked by **3244** at Jan 12th 17)

Q69 Frame perimeter bumper rule

Q: If a robot has a frame shaped like the letter M which is closed on the bottom, with the inside angles of the top of the M about 80 degrees, can the bumpers turn less than 90 degrees. Due to the definition of frame perimeter

using a string and in the bumper rule that the bumper must be supported along the frame perimeter, we want to verify weather, in this case, bumper protection can follow an 80 degree turn to protect this corner.

A: We cannot rule absolutely on hypothetical ROBOT designs, and the final decision as to legality of a particular ROBOT lies with the Lead ROBOT Inspector (LRI) at each event. Please review !R22 and !R29. If you have a question about a specific rule, please resubmit.

(Asked by **343** at Jan 12th 17)

Q70 Can the Coach of the drive team set up the Drivertation

Q: H01. COACHES and other Teams: hands off the controls. A ROBOT shall be operated solely by the DRIVERS and/or HUMAN PLAYERS of that Team. Can the coach set up the Driverstation and test any USB controls using the Driverstation USB Monitoring tab? Also can they boot up the Smartdashboard or other approved applications and test them as well as the game is setting up. Control of the robot is not enabled.

A: !H01 does not apply before the MATCH begins. There are no rules that prohibit a COACH from setting up an OPERATOR CONSOLE prior to the MATCH. However, once AUTO has begun, a COACH must be "hands off" (meaning they cannot handle GAME PIECES, change tabs within the Driver Station Software, etc)

(Asked by **3244** at Jan 12th 17)

Q71 Adjusting height of LIFT while robot is aligning?

Q: I believe Q1 answers this, but just to be clear, is the HUMAN PLAYER allowed to pull the LIFT up and down to help align to the robot for loading a GEAR?

A: We believe !Q1, !Q35, !Q38 answer your question. If they does not, please rephrase your question and resubmit.

(Asked by **3138** at Jan 12th 17)

Q72 Gear "stealing"

Q: After looking through the manual, there is no rule against knocking GEARS off of the opposing alliance's LIFT or taking them to score them on your own airship. Would knocking (or picking) GEARS off of the opposing alliance's LIFT be penalized in some way?

A: The action of removing GEARS off the opposing alliance's LIFT, on its own, is not a rule violation.

(Asked by **3138** at Jan 12th 17)

Q73 Early Rope Release and Climb

Q: Rule H11 prohibits early ROPE release with the only penalties being a FOUL or TECH FOUL. After searching the rule book, I found no rule against climbing a rope that was released early. For example, your robot can climb the rope in 40 sec, outside of end game. HUMANPLAYER deploys the ROPE 40+ sec before match ends, and the robot climbs before end game, and properly scores. This would result in a 25-45 net gain. Would there be extra penalty (possibly T03?) for working this into your strategy?

A: We cannot comment absolutely on hypothetical scenarios. The ultimate decision would be determined by the

REFEREES at your event, with the final call made by the Head REFEREE. However, intentionally releasing a ROPE before it is permitted to do so can be a violation of !T03 and is subject to a YELLOW or RED CARD.

(Asked by **3138** at Jan 14th 17)

Q74 Can the PLIOT remove the pre-populated GEARs to get more ROTORs turning?

Q: As the question is shown above, can the PILOT do this in AUTO or TELEOP?

A: We believe !Q31 answers your question. If it does not, please rephrase your question and resubmit. In the future, please use the "Search Q&A" button on the top bar before submitting.

(Asked by **6353** at Jan 12th 17)

Q75 Pneumatic Air Venting

Q: Are COTS air nozzles rated at the specified working pressure in the game manual allowed? If not, are teams allowed to direct vented air from a solenoid to atmosphere through a .165" ID pneumatic hose instead of venting through a particle trap/muffler? if not, can a sleeve be placed around a particle trap/muffler without making contact with the muffler such as a duct as long as it is venting to atmosphere and not being used to recirculate air and or build pressure? Thanks! Rob

A: Legal pneumatic components are detailed in !R82, if a component is not listed in !R82 it is not legal for use in the pneumatic system of a ROBOT. There are no rules that prevent a team from venting any part of their pneumatic system to atmosphere.

(Asked by **1027** at Jan 15th 17)

Q76 2 part gears?

Q: In the KOP, teams were supplied with a gear. These gears are in 2 pieces. Does this mean that the gears for play will also be in 2 pieces? If not, will the 2 piece gears be locked together so they don't fall apart on the field?

A: For manufacturing purposes, each GEAR is two (2) pieces that are locked together with 20 8-15 x 0.625" Philips head screws prior to use. Per 3.12.2, each assembled GEAR "has 10 teeth, an 11 in. (~28 cm) diameter, 10 in. (~25 cm) pitch diameter, and is 2 in. (~5 cm) thick."

(Asked by **3577** at Jan 12th 17)

Q77 Bumpers included in Maximum Robot size?

Q: Could you please confirm that the Bumpers are to be _included_ in the Maximum Robot size, as is indicated in R03. This is a significant change from all previous years, and will reduce Robot Sizes by about 6" length and width each. Thank-you

A: Please read [Team Update 1] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate01.pdf) where we verify that, yes, BUMPERS are included in the ROBOT volume.

(Asked by **811** at Jan 12th 17)

Q78 Can we have multiple ropes inspected at once

Q: May we have more than one rope through inspection or do you need to reinspect for every time we swap out ropes

A: There is no maximum number of ROPES a given Team may have inspected at a given event. Please keep in mind though that there are limited inspection resources at an event, and we kindly ask that you have a reasonable number of ROPES inspected.

(Asked by **272** at Jan 12th 17)

Q79 Rope materials

Q: May a teams weave other fibers into their rope if it does not exceed the 1" nominal thickness?

A: ROPES must meet the requirements of !I04 to pass inspection. As long as the "other fibers" do not violate !I04 (specifically !I04-D), they are permitted.

(Asked by **3218** at Jan 16th 17)

Q80 Bumpers and Volume

Q: Do the bumpers have to be within the volume defined in the game manual. In previous years the bumpers were not included in the volume.

A: We believe !Q77 and [Team Update 1] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate01.pdf) both answer your question. If it does not, please rephrase your question and resubmit. Please also review section 1.5: "Please avoid interpreting the text based on assumptions about intent, implementation of past rules [...]"

(Asked by **4573** at Jan 18th 17)

Q81 Are the amount of Fuel that goaled in a match phase earn extra points?

Q: Q16 stil doesnt clear, The kpa and match point system are clear, but, in the Table 4-1 It says for an every 3 points in high goal or 9 points on low goals, you can earn 1 + 1kPa. we know the 1 kPa give 1 Match Point, but, for every 3 fuels in high efficancy goal (for example) are giving us an extra 1 match Point (Not related to the kpa just generated). (or 9 in the low. for an extra Example.)

A: With the exception of the 40 kPa threshold, MATCH Points are not awarded for kPa. Pressure (kPa) is tracked for the purpose of assessing the 40 kPa threshold. For example, Table 4-1 says that if an ALLIANCE scored a total of three FUEL counted in the High Efficiency GOAL during TELEOP, and nothing else during the entire match, the ALLIANCE would be awarded one (1) MATCH point and one (1) kPa. The ALLIANCE'S final score would be one (1) MATCH point.

(Asked by **4320** at Jan 16th 17)

Q82 Do the gear train revolutions need to be continuous?

Q: For example, if a gear train is rotated 1.5 times early in the match, left static for a period of time, and then rotated another 1.5 revolutions later in the match, would that rotor begin turning?

A: ## Updated per [Team Update 06] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate06.pdf) on Jan 27, 2017. **No.** Per 3.4.2 **as updated in [Team Update 06] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate06.pdf)**: "It takes three (3) full rotations to engage the ROTOR. **If a GEAR set corresponding to the next sequential unengaged ROTOR remains idle for more than ten (10) seconds, the rotation count resets to zero (0).**"- ~there is no prescribed amount of time in which the rotations must be made.~ Please remember that "ROTORS only start if GEARS are installed in ROTOR order." In other words, you won't be able to start ROTOR 4 until all other ROTORS have been started, etc.

(Asked by **3184** at Jan 15th 17)

Q84 Metal and Magnet for Rope Climber

Q: Can we include metal on the tip of our personalized rope then use a magnet on our rope climber to latch onto the rope?

A: No, please see !I04-D as modified in [Team Update 02] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate02.pdf).

(Asked by **2151** at Jan 15th 17)

Q85 Rope Retaining Feature

Q: Does the "retaining feature" have to be comprised of only the rope, or can something, such as a large washer, be added to the rope to provide a more secure engagement with the field?

A: All "retaining features" of a ROPE are still part of the ROPE and thus subject to the Inspection rules (!I04 most notably) and thus could not be, in your example, a large washer.

(Asked by **3974** at Jan 14th 17)

Q86 How many ropes may be changed per alliance?

Q: Section 4.2 states "A DRIVE TEAM may elect to switch one of the ROPES on their AIRSHIP for their own ROPE that meets the criteria defined in I04 of Section 9 Inspection & Eligibility Rules and has a serialized Inspection tag". Does this mean that only one rope of the three for the entire alliance may be switched, or may all three ropes be switched by an alliance

A: We believe !Q52 answers your question. If it does not, please rephrase your question and resubmit. In the future, please use the "Search Q&A" button on the top bar before posing a new question.

(Asked by **219** at Jan 14th 17)

Q87 Non-Steamacrit involvement in the game?

Q: Why is the only listing of Stemacrit in the glossary?

A: The inclusion of STEAMACRIT in the Glossary is a joke by the manual authors. It can also be used as a helpful tool to see if your team members are reading the manual closely! The word and definition have no direct correlation to *FIRST* Steamworks gameplay.

(Asked by **1915** at Jan 18th 17)

Q88 Would this be a legal Rope

Q: Our team would like to use http://www.gates.com/products/industrial/industrial-belts/synchronous-belts/powergrip-htd-twin-power-belts as our rope to climb. It is a timing belt, made of Fiberglass tensile cord woven together. This seems to meet the requirements of IO4D, and the diameter of the teeth from one side to the other would be less than 1 inch, which would seem to meet IO4A. Would this be legal to uses as a rope for competitions?

A: The purpose of this Q&A is to answer questions regarding the rules of *FIRST* STEAMWORKS. We will not rule on hypothetical ROPE designs, and the final decision as to legality of a particular ROPE lies with the Lead ROBOT Inspector (LRI) at each event. We will note that !I04 requires that a ROPE (emphasis added) "consist **entirely** of flexible, non-metallic fibers". If you have a question about what a rule means, please re-submit.

(Asked by **4946** at Jan 15th 17)

Q89 Diameter of the rope

Q: Does the diameter of the rope have to be constant throughout the length of the rope or can it vary? Eg a rope that is 1in in diameter at the top, but shrinks to 1/4in diameter at the bottom.

A: !I04 does not require the diameter of the ROPE to be consistent across its length.

(Asked by **4946** at Jan 14th 17)

Q90 Recommended Static IP Address Configuration

Q: In section 3.14 the manual lists port configurations for communications. Can you please provide an additional set of recommended static IP configurations for teams that wish to use static IP addresses for secondary processors, switches, cameras, and their driver station?

A: The purpose of this Q&A is to answer questions regarding the rules of _FIRST_ STEAMWORKS. For technical assistance, please visit the [FIRST Forums](http://forums.usfirst.org/forumdisplay.php?23-FIRST-Robotics-Competition).

(Asked by **900** at Jan 14th 17)

Q91 No restrictionson Pilot/Lift Interaction - Followup to Q41

Q: Q38, Q35, and Q1 discuss what a Pilot can do when a robot is near. Is there any restrictions when a Robot is not near? For example, let's say that Robot A requires the Peg to be a 24" in order to place the Gear on the Peg. Can the Pilot operate the Lift to raise the peg to 24" (before or as the robot arrives at the lift), hold the lift peg at 24", Robot A places the gear on the raised peg, and then at any time, the Pilot further operates the lift to raise the

Gear to the Airship.

A: There are no restrictions on operating the LIFT without a ROBOT present.

(Asked by **2202** at Jan 15th 17)

Q92 Outer Wheels - Frame Perimeter and Bumper Coverage QUestion

Q: Figure 8.1 indicates a portion of the frame perimeter that would not require bumper coverage beyond the 6" on each corner. Are wheels that run on the outside of the chassis considered to be part of the frame perimeter? And can a wheel then be uncovered by a bumper if it is outside of that 6" corner coverage requirement?

A: !R01 requires that the FRAME PERIMETER be comprised of fixed, non-articulated structural elements (a wheel would not meet this). See the Blue Box below !R01 for assistance with determining the FRAME PERIMETER of a ROBOT.

(Asked by **1557** at Jan 15th 17)

Q93 Manipulating Gears Inside the Robot

Q: So according to G27, holding a gear inside the confines of the robot is not allowed and considered a foul. What is considered inside the robot and can a gear be "inside" the robot at any time during transportation. Also, is positioning the gear in order to pick it up considered herding the gear.

A: !G27 prohibits a ROBOT from controlling more than one (1) GEAR at any given time. There are no rules prohibiting a ROBOT from "holding a GEAR inside the confines of the ROBOT." Positioning a GEAR in order to pick it up would be an example of herding.

(Asked by **3570** at Jan 15th 17)

Q95 Material for Loading Station

Q: What material is used for the loading stations?

A: The purpose of this Q&A is to answer questions regarding the rules of _FIRST_ STEAMWORKS. Any measurements or materials information can be derived from the Field Drawings available at:
[http://www.firstinspires.org/resource-library/frc/competition-manual-qa-system]
(http://www.firstinspires.org/resource-library/frc/competition-manual-qa-system)

(Asked by **2141** at Jan 14th 17)

Q96 Definition of "LAUNCH" of a Gear

Q: Is there any level of forced movement of a GEAR for the purpose of moving the GEAR from the robot to the LIFT peg which would not break rule G24? I'm specifically looking for a clarification between "placement" and "launching" of a GEAR. For example, if a team used a mechanism to help force a gear out of the robot while the LIFT peg is already within one of the GEAR's holes, would that violate G24? Or can robots only use passive maneuvers to transition the GEAR from robot to LIFT peg?

A: Per the Blue Box below !G23, "LAUNCHING is defined as shooting in the air, kicking or rolling across the floor with an active mechanism, or throwing in a forceful way."

(Asked by **4327** at Jan 14th 17)

Q97 What material is the loading station ramp made out of?

Q: The manual indicates that the ramp is a fiberglass reinforced plastic. This is very vague and makes it hard for our team to figure out how exactly the gear will slide off of the ramp. What is the coefficient of friction between the gear and the ramp and what is the exact material it is made of?

A: The Game Manual and [Field Components] (https://firstfrc.blob.core.windows.net/frc2017/Drawings/2017FieldComponents.pdf) drawing package specify the LOADING STATION chute surface as HDPE, not fiberglass reinforced plastic. The drawing package has been updated as of [Team Update 03] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate03.pdf) to provide additional detail on the exact HDPE surface texture used. The [Team Versions] (https://firstfrc.blob.core.windows.net/frc2017/Drawings/2017TeamVersions.pdf) drawing package specifies fiberglass reinforced plastic as a more commonly available material with similar texture to the field component. This drawing package has also been updated as of [Team Update 03] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate03.pdf) to specify which side of the FRP should face up.

(Asked by **2605** at Jan 17th 17)

Q98 Claification about G28. Don't use air to direct/redirect fuel

Q: If the fuel starts within my robot and exits using the air to be shot into the boiler would that be a voilation of G28

A: We believe !Q17 and/or !Q19 answer your question. If they do not, please rephrase your question and resubmit.

(Asked by **272** at Jan 14th 17)

Q99 What is the angle of the PEG's tip?

Q: What is the angle of the PEG's tip?

A: The purpose of this Q&A is to answer questions regarding the rules of _FIRST_ STEAMWORKS. Any measurements or materials information can be derived from the Field Drawings available at: [http://www.firstinspires.org/resource-library/frc/competition-manual-qa-system] (http://www.firstinspires.org/resource-library/frc/competition-manual-qa-system)

(Asked by **3339** at Jan 15th 17)

Q100 Multiple Gears on a Peg

Q: As per G27, robots may not control more than one gear at a time. Going by the blue box under this rule, that includes "trapping" a gear against a field element. If a robot were to put a second gear on the peg, resulting in the first gear being pushed against the airship, would this count as the robot controlling both gears and result in a

violation of G27 and give the alliance a penalty?

A: We appreciate your close and analytical reading of the rule. While there are elements and context to a hypothetical scenario we can't possibly consider, the description of "trapping" per the blue box in G27 includes intent to hold a GEAR in place to shield or guard it. If, in the judgement of the REFEREE, the GEAR is now trapped as a result of a Team trying to deliver multiple GEARS simultaneously, a FOUL is unlikely. On the other hand, if, in the judgement of the REFEREE, the ROBOT is attempting to trap a GEAR on a peg while also controlling another GEAR, for some other reason like shielding it from an opponent's reach, a FOUL is warranted.

(Asked by **4006** at Jan 17th 17)

Q101 Perimeter/Bumper Question

Q: Are all of the attachments on the robot limited to the inside edge of the bumpers or the outside edge of the bumpers? I was wondering since bumpers are now included in the volume the robot must fit in.

A: We believe !Q4 answers your question. If it does not, please rephrase your question and resubmit. Please be sure to use the Search Q&A function before posting questions.

(Asked by **4608** at Jan 14th 17)

Q102 Keep out time on Key

Q: Rule G17 says a robot can't be in an opponents key for more than 5 seconds, does this timer reset as soon as the robot exits? Can a defender be in the one for 5 seconds, leave for .1 seconds, be in for 5, etc... repeated for the entire match?

A: Yes, the 5 second count will reset as soon as it is clear to the REFEREE that the ROBOT has completely left the KEY.

(Asked by **973** at Jan 15th 17)

Q103 Number of gears on robot

Q: Can the robot be in posession of more than one gear at a time during tele-op?

A: No, this is a violation of !G27.

(Asked by **3259** at Jan 15th 17)

Q104 High an Low Goal capacicty on kPa or scoring or both?

Q: With the 1st update, "The capacity of the Low Efficiency GOAL is seventy (70) FUEL. The capacity of the High Efficiency GOAL is one-hundred and fifty (150) FUEL. FUEL that exceeds GOAL capacities will fall back on to the FIELD." If fuel is shot and made into the boiler after the capacity limit is reached, do the extra fuel count for any points or any kPa or are fuel after capacity worth nothing?

A: The capacity information added to Section 3.11.4 refers to the physical holding capacity of the BOILER GOALS. If the GOAL is at capacity, additional FUEL will not fit in the GOAL and will fall back onto the FIELD. As described in Section 3.11.4 the BOILER will continuously process FUEL throughout the MATCH.

clearing space for additional FUEL.

(Asked by **4121** at Jan 15th 17)

Q106 Gear Lift used to lift gear out of robot

Q: Dose the robot have to back away from the lift peg and release the gear before a human player can lift the gear? Or can the human player use the lift to pull the gear out of the robot as long as the gear is on the peg?

A: Please use the Search Q&A button on the navigation bar before submitting a question. We believe !Q76, !Q46, !Q41, !Q35 and !Q1 answer your question. If they do not, please rephrase your question and resubmit.

(Asked by **4608** at Jan 16th 17)

Q107 Rope release in last 30 seconds

Q: Does the rope have to be released in right when the last 30 seconds of the match starts or can it be released after such as 15 seconds before the match ends?

A: Per !H11 ROPES may be released when "there are 30 **or fewer** seconds left in the MATCH." (emphasis added)

(Asked by **4608** at Jan 15th 17)

Q108 Detaching Robot from Rope

Q: If the robot has scaled a team-provided rope, may the rope be removed from the davit with the robot still suspended? So, may the robot stay attached to the rope when removing the rope from the field, or must the robot be separated from the rope before both pieces are taken off-field? In question 14, a reference was made to a rule explaining that team-provided rope is not considered a game piece after removal from the davit, but must the robot be detached from the rope before removing the rope?

A: There is no rule requiring that a ROBOT be removed from a team-provided ROPE before the ROPE is removed from the FIELD.

(Asked by **1245** at Jan 15th 17)

Q109 Verification of Gear Loading Stations

Q: Would you please verify where gears may be loaded. On page 33 of the manual it sates" Return LOADING STATIONS are located in each of the two (2) corners of the FIELD opposite the BOILERS." However, the picture on page 30 of the Alliance Wall shows a RETURN LOADING STATION between Player Station 1 and Players Station 2. Can gears be loaded from the RETURN LOADING STATION on the Alliance Wall?

A: The image you are referring to had incorrect labeling and was corrected in [Team Update 1] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate01.pdf). The LOADING STATION inside the ALLIANCE STATION is the Overflow LOADING STATION. Also, please see !Q11 and !Q37 for additional information regarding GEARS and the Overflow LOADING STATION.

(Asked by **938** at Jan 15th 17)

Q110 Clearance of parts that are in the perimeter of the robot.

Q: We understand that the bumpers must have a 2" clearance, but how about the internal part of the robot, if we are trying to pick something up, we'd like those parts to be closer to the ground than 2". Besides the wheels, can parts be closer (within 1') to the ground?

A: There are no rules restricting the spacing between ROBOT elements and the ground. We also recommend reviewing !R23 as there is no restriction requiring the BUMPERS to have 2" of clearance.

(Asked by **6519** at Jan 15th 17)

Q111 Bluetooth Scouting System

Q: In the game manual, only 802.11a/b/g/n/ac wireless connections are marked as illegal in the stands. We would like to use a Bluetooth connection (802.15) between laptops (in the stands only) in lieu of wireless hotspots. Is this allowed?

A: Yes. !C05 applies only to 802.11a/b/g/n/ac wireless networks. There are no rules prohibiting Bluetooth networks used only in the stands. However, some venues may have specific requirements that prohibit Bluetooth (or other) communications.

(Asked by **2485** at Jan 16th 17)

Q112 Peg Measurements

Q: What are the measurements of the peg in the lift? Section 3.5 of the manual mentions the distance from the FIELD carpet, how much it protrudes from the carriage and how wide it is; however we don´t know how long it is and how wide it is seen from the front. Specifically for the small triangle that secures the gears.

A: The purpose of this Q&A is to answer questions regarding the rules of _FIRST_ STEAMWORKS. Any measurements or materials information can be derived from the Field Drawings available at:
[http://www.firstinspires.org/resource-library/frc/competition-manual-qa-system]
(http://www.firstinspires.org/resource-library/frc/competition-manual-qa-system)

(Asked by **3354** at Jan 15th 17)

Q113 Fuel capacity in robot

Q: How much fuel can a robot handle at any certain point in the match?

A: There is no rules limiting the amount of FUEL a particular ROBOT may handle at a given point in the MATCH.

(Asked by **3354** at Jan 15th 17)

Q114 R27 Team Numbers Visible / Covered

Q: R27 states that an observer should be able to clearly see team numbers from any angle. This years game will have many teams with mechanisms over and in front of the bumpers during match play. Please clarify whether R27 requires bumpers to remain visible from all angles, or if they may be hidden. If team numbers are hidden by

robot elements, are extra team numbers required nearby on the same side of the robot? If so, please indicate rules for placement and background colors behind the numbers.

A: It is permissible for BUMPERS to have obstructions during a MATCH (such as a MECHANISM or "element") without violating !R27.

(Asked by **3225** at Jan 15th 17)

Q115 Does Table 10-2 apply after 1 Overtime MATCH, or after 3?

Q: Section 10.5's last sentence says "In the case where the Overtime MATCH scores for both ALLIANCES are equal, the win for that Overtime MATCH is awarded based on the criteria listed in Table 10-2." Does Table 10-2 apply after the first Overtime MATCH, or the third (which we'll never see because Table 10-2 all but ensures a winner)? If all 3 available Overtime MATCHes reach the 6th Sort Order (MATCH is replayed), what happens? (PS: All us Einstein 2016 spectators thank you for Overtime!)

A: It is not possible for an Overtime MATCH to end in a tie. If the MATCH Points are equal for the ALLIANCES in an Overtime MATCH, Table 10-2 is invoked, including, if necessary, replaying the MATCH per sort order 6. MATCH replays take the place of the original match, they do not count as an additional MATCH (e.g. replaying Overtime MATCH 1 does not make it Overtime MATCH 2). Your second question does not apply, as it is not possible for three (3) Overtime MATCHES to be played without an ALLIANCE winning two (2) MATCHES. The provision for up to three (3) Overtime MATCHES is necessary in the event that the first Overtime MATCH is reached without either ALLIANCE having won a MATCH.

(Asked by **5402** at Jan 17th 17)

Q117 Costing of an item partially obtained with a PDV?

Q: In the event that a VENDOR has supplied a PDV (thus items via that PDV are a KOP item), however the COTS items purchased cost more than the value of the PDV (the PDV was used to offset the cost), does that item now become a KOP item, particularly for the purposes of R10 and R11? Say that the PDV was $40, but an item cost $100. Is the cost not reported per R10 since this is now a KOP item? Another example: the cost is $1000. Is this legal per R11 since it is now a KOP item?

A: Apologies for the confusion! We have updated the language in Section 8.1 in [Team Update 03] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate02.pdf) to more clearly specify that for an item to be considered part of the KOP it must be "paid for completely, except shipping, with a Product Donation Voucher (PDV)."

(Asked by **4263** at Jan 17th 17)

Q118 Pressure Accumulation

Q: In various points in the manual (ex. Overview), the ranking point is awarded as when an alliance "reaches a 40 kPa pressure threshold", but in Table 4-1, it is "exceeds a threshold pressure of 40 kPa". Does kPa have to reach 40 or exceed 40?

A: Good catch. The threshhold is *at least* 40 kPa and has been corrected in [Team Update 2] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate02.pdf).

(Asked by **5471** at Jan 16th 17)

Q119 HP Loading Station chute material

Q: Please provide more information on the HDPE used for the floor of the chute. We want to get material that exactly matches the chute slide for friction.

A: In looking for the answer to your question, we noticed that the drawing for the chute (GE-17362) was missing from the [Field Components] (https://firstfrc.blob.core.windows.net/frc2017/Drawings/2017FieldComponents.pdf) drawing package. We have updated the drawing packaged to include this drawing which contains additional detail on the texture of HDPE used on the part ("orange peel"). Sorry for the omission!

(Asked by **1523** at Jan 17th 17)

Q120 Robot Opening

Q: Our team is proposing a chassis that has a frame that is 40”x36”. If we had 9” of bumper from each corner, could we have an opening across our robot on the 40” side that is 22” across to pick up fuel? Our team could not find any rules in the manual that say we cannot.

A: We cannot rule absolutely on hypothetical ROBOT designs and bless them as legal (the final decision as to legality of a particular ROBOT lies with the Lead ROBOT Inspector (LRI) at each event), there's no rule that prohibits opening in BUMPERS. Please see !R31 for details and examples regarding openings in the FRAME PERIMETER.

(Asked by **2439** at Jan 18th 17)

Q121 Gear Capture

Q: If there is a gear in our robot’s gear collection mechanism, and the gear is secured to the peg on the airship, could a pilot pull on the rope to disconnect the gear from our robot?

A: We believe !Q1 answers your question. If not, please rephrase your question and resubmit.

(Asked by **2439** at Jan 17th 17)

Q122 C07: TEAM without ROBOT

Q: In C07, "the team should inform the Lead Queuer if the Team's ROBOT is not able to participate", but "must send at least 1 member of its DRIVE TEAM to the FIELD". Can member(s) of a DRIVE TEAM participate in a match without a ROBOT, and thus neither receive a RED CARD or be DISQUALIFIED?

A: Please follow the flowchart in Figure 6-1. If a Team's ROBOT has passed its initial, complete inspection, the Team is required to send at least one (1) member of their DRIVE TEAM to the FIELD for each of their assigned MATCHES in order to avoid Cards or DISQUALIFICATION. If the ROBOT has not passed an initial, complete inspection, the Team must not send any members of their DRIVE TEAM to the MATCH or their entire ALLIANCE would receive RED CARDS (via !I02)

(Asked by **5471** at Jan 14th 17)

Q123 Is the action of triggering the TOUCHPAD transitive through field elements such as ROPEs?

Q: Provided the force to initiate the action originates from a ROBOT, for the intent of scoring, is that action transitive through field elements such as ROPEs?

A: There are no specific rules regarding what may or may not trigger a TOUCHPAD; however, we will note that, per the Blue Box in !I04 ROPES are meant to be pulled, not pushed.

(Asked by **5012** at Jan 16th 17)

Q124 Actively placing gears

Q: It is illegal to throw a gear, but it is not clearly defined. As long as the robot is in contact with the gear until it goes on the peg, so that it is touching one or the other at all times, would this be allowed or considered throwing?

A: We believe !Q96 answers your question. If it does not, please rephrase your question and resubmit.

(Asked by **649** at Jan 15th 17)

Q126 Boiler High Goal Height (Video Wrong)

Q: Please confirm that the measurements given in the field tour video for the boiler regarding the high goal are incorrect. Both game manual and field part drawings show a height of 8'-1" or 97 +- 0.25. The video shows text and audio that give a height of 9' from the floor. There is also a 1/4" discrepancy on the setback.

A: Good catch, you're correct the High Efficiency GOAL opening is 8 ft. 1 in. from the carpet and set back from the face of the BOILER by 1 ft. 5 1/2 in., as documented in the manual and the drawings. We will add a note to the video description. Our apologies for the discrepancy!

(Asked by **3225** at Jan 16th 17)

Q127 Legal Fans for use on a Robot

Q: In R32, it states, under Table 8-1: Motor allowances, the following: "Hard drive motors or fans that are: included in any Kickoff Kits ..... or part of a legal COTS computing device". My attention is drawn to the last portion of this statement. This implies that fans that are bought standalone (i.e. on their own) are not permitted on competition bots. Is this interpretation correct? Are computer fans that are bought standalone allowed on a competition robot?

A: We believe !Q26 answers your question. If it does not, please rephrase your question and resubmit.

(Asked by **5333** at Jan 16th 17)

Q128 Pre-Match Fuel Counting

Q: 4.6 Logistics: "There will not be an ARENA FAULT called for MATCHES that accidentally begin with an incorrect number of GAME PIECES...". Would a team be allowed to count the number of balls placed in a specific hopper before the start of a match to be sure there are 50? Are the balls placed in the hoppers going to be counted by the field staff before the match, or is a standardized alternative method of filling the hoppers based

upon volume going to be implemented? Finally: Whole, 2%, or Skim?

A: Although there's no rule prohibiting Teams from counting FUEL before a MATCH, consider !G02. FIELD STAFF are expected to make sure GAME PIECES are staged as defined, and if a Team has removed FUEL from an already setup HOPPER, FIELD reset will likely have to recheck to make sure that HOPPER is compliant (thus a very likely violation of !G02).

(Asked by **3314** at Jan 16th 17)

Q129 Bumper mounting

Q: Can the hard backing of the bumper (the 3/4" plywood) be recessed into the robot? So that the pool noodles are outside of the robot perimeter but the plywood is inside of the robot perimeter?

A: No, per !R31 BUMPERS must be backed by the FRAME PERIMETER. Placing the BUMPER inside the FRAME PERIMETER would violate this requirement.

(Asked by **157** at Jan 15th 17)

Q130 Playoff Bumper Colors

Q: Can you please elaborate on the bumper colors of playoff alliances as they will be assigned during playoff tournaments. For the quarterfinals is the higher seeded alliance always Red? As we progress in rounds is the top of the bracket (figure 10-3) always Red or is it based on your initial seed? During the "FIRST Championship Playoffs " which division will be Red and which division will be Blue for each match of the round robins? Thank You, Spectrum FRC#3847

A: For Quarterfinal MATCHES, the higher seeded ALLIANCE will be in Red BUMPERS. Beyond the Quarterfinal MATCHES, the alliance on the top of each MATCH in Figure 10-2 will be in Red BUMPERS, regardless of whether they are the higher seeded ALLIANCE in that particular MATCH.

(Asked by **3847** at Jan 18th 17)

Q131 Loading station surface gear friction

Q: We have built a loading station with the correct angle and a smooth polycarbonate surface. The gear will not slide down the surface on it's own. Is there going to be anything done to remedy the friction problem?

A: GEARS slide easily down the chute, which is not made of polycarbonate. For reference, please refer to the [Loading Lane](https://www.youtube.com/watch?v=IYX5dRa_uYk&index=8&list=PLZT9pIgNOV6bL3rQJQ06LdulQOTBCJv9t) field tour video. Meanwhile, the drawing package has been updated to include the chute drawing with material specification.

(Asked by **3545** at Jan 17th 17)

Q132 Length of usable rope from scoring plate to end? Or How high off the ground is the rope?

Q: We know the rope must be 5'3" to 8' (Rule: I04 and Team Update 2) from the retaining knot to the end. So the question is what is the distance from the davit retaining feature to the point the robot scores the climb

(touchpad). I assume less than 29" since no knots can be in this zone. I haven't been able deduct the range the end of the rope can be presented for the robot to gather into the climb subsystem. Another way to ask: How high and how low to the ground must the rope hang?

A: There's no explicit spec for the range of distances between the lower end of the ROPE and the TOUCHPAD, however implicit dimensions can be derived from [drawings] (https://firstfrc.blob.core.windows.net/frc2017/Drawings/2017FieldComponents.pdf).

(Asked by **3244** at Jan 18th 17)

Q133 Peg (spring) Discrepancies

Q: According to the game manual in sec. 3.5 it says the peg is 1.1" from the carpet which is 13"; however, the scematics say 13 1/4" - Also the game manual says the peg is 1 3/8" wide, but the scematic drawings show 1.2 in - do these differences matter and if so which is it?

A: Any measurements or materials information can be derived from the Field Drawings available at: [http://www.firstinspires.org/resource-library/frc/competition-manual-qa-system] (http://www.firstinspires.org/resource-library/frc/competition-manual-qa-system) Dimensions in the Game Manual are nominal.

(Asked by **4265** at Jan 17th 17)

Q134 Retro Reflective Rope

Q: Is retro reflective rope allowed if it consists entirely of flexible, non-metallic fibers twisted, tied, woven or braided together? Example at https://www.gmesupply.com/rr125yg-pmi-retro-reflective-12-5mm-1-2

A: We will not rule absolutely on hypothetical ROBOT/ROPE designs, and the final decision as to legality of a particular ROBOT/ROPE lies with the Lead ROBOT Inspector (LRI) at each event. However there is no explicit rule that prohibits retro-reflective materials in ROPES.

(Asked by **1557** at Jan 16th 17)

Q135 Knots in the Rope

Q: Can you please provide a formal definition of a knot?

A: There is no *FIRST* Robotics Competition specific definition of knot, so a more colloquial version from Merriam-Webster.com will have to do: an interlacement of the parts of one or more flexible bodies forming a lump or knob (as for fastening or tying together).

(Asked by **3200** at Jan 18th 17)

Q136 Must the ends of BUMPER greater than 6 inches have square-cut noodles?

Q: If a given BUMPER extends 7 inches to satisfy the 6 inch covering requirement, can the last 1 inch of the bumper noodle be cut diagonally such that it forms a funnel?

A: No, this would be a deviation from the vertical cross section depicted in Figure 8-5 and would not meet !R29-C.

(Asked by **5817** at Jan 18th 17)

Q137 Frayed rope

Q: If the end of an otherwise legal rope becomes frayed, is it still a legal rope?

A: There is no rule that prohibits a ROPE from being frayed, either intentionally or accidentally. If the fraying (accidental or deliberate) occurs after the ROPE has passed Inspection and it's extensive enough that it could be considered a modification to the ROPE, it must be reInspected per !I06.

(Asked by **3322** at Jan 18th 17)

Q138 Knots coming undone

Q: Consider a rope of legal length with a knot. If, during a match, a knot in the rope comes undone such that, if the rope were remeasured, the rope would be longer than 8 ft., would this be a violation of Rule I04c.

A: Teams should take reasonable steps to ensure knots (or any other portion of their ROPE) does not come undone during a MATCH. That being said, if a knot were to accidentally come undone, it would not violate !I04, but would need to be repaired to a legal state (including re-inspection if required) before being used in a future MATCH. Keep in mind that !T03 prohibits a knot from coming undone on purpose, or strategically.

(Asked by **3322** at Jan 18th 17)

Q139 Sewing Velcro and Rope Retention Methods

Q: My team intends to sew loop-type velcro to the sides of our 1 inch non-metalic strap. Would this be considered a legal modification to the rope? Also, for attaching our rope to the airship, we would like to use a metal piece or bar instead of a knot. Does the mechanism for attaching the rope to the airship have to be made of the same material as the rope?

A: !I04-D has been modified in [Team Update 03] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate02.pdf) to add sewing as an allowable method of fiber attachment for a legal ROPE. Per !I04-D, the entire ROPE must be made of 'non-metallic fibers', you may not add metal to the ROPE for any reason.

(Asked by **2667** at Jan 18th 17)

Q140 Purposely fraying the end of the rope

Q: Can we purposely fray the end of our rope, but have a knot further up to prevent the fray from spreading? like this: https://goo.gl/OSdhp6

A: We believe the answer to !Q137 answers your question. If not, please rephrase and resubmit.

(Asked by **2550** at Jan 18th 17)

Q142 Rope Retaining Feature continued from Q85 Larks Head Knot around steal ears?

Q: Can the rope pass through the steal ears with a loop and wrap around the ears? The rope knot would look similar to a "Larks Head" Knot.

A: ## Second paragraph updated per [Team Update 05] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdates-combined.pdf). We cannot rule absolutely on hypothetical ROBOT or ROPE designs, and the final decision as to legality of a particular ROBOT or ROPE lies with the Lead ROBOT Inspector (LRI) at each event. Generally, loops which wrap around the DAVIT fingers would constitute engaging "securely with the FIELD" per !I04-E provided that the ROPE still passes between the fingers (secured by the pin) to ensure that it does not slip off the fingers. Please note that placing any knot used to form loops, as described above, **that extends more than 2 in.** below the DAVIT fingers ~~would~~ violate**s** I04-F.

(Asked by **3244** at Jan 18th 17)

Q143 Maximum Robot Size

Q: Does R03 mean the Robot cannot reach over the bumpers to pickup gears from the floor or place gears on the peg?

A: There are no rules that explicitly prohibit a ROBOT from reaching beyond its BUMPERS.

(Asked by **5589** at Jan 18th 17)

Q144 Using Laser for robot setup on the field.

Q: Can a laser that is attached to the robot be used to align the robot for autonomous? It would be turned on while setting up the robot on the field before the match begins. The laser would be a permanent part of the robot.

A: Per !R07-D the laser must be Class I in order to be permissible on a ROBOT. Please also be aware of !G02 and !R37.

(Asked by **4216** at Jan 18th 17)

Q145 pilot / rope / robot interaction

Q: May the pilot help guide the rope into the robot?

A: Please see !S07 as updated in [Team Update 03] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate03.pdf). Per the update, PILOTS may not "contact any part of a deployed (i.e. any part of the ROPE is below the deck of the AIRSHIP) ROPE.". Contact with a ROPE that is not "deployed" (as described above) is permitted.

(Asked by **5502** at Jan 18th 17)

Q147 Custom softwares

Q: Is it possible to create a custom software on the driver station computer and communicate with the robot using UDP sockets? I've read in the FMS whitepaper that ports 5800-5810 are open for team usage, but there was nothing about using custom softwares that were created by the team. To be specific: I'm currently working on a custom dashboard for the field team that communicates with the robot using UDP sockets on port 5800, but am unsure if the communication won't get blocked by the FMS. Thanks!

A: There are no rules that prohibit team custom made dashboards from communicating with the ROBOT via the permitted ports. For technical assistance, please consult the [*FIRST* Forums](http://forums.usfirst.org/forumdisplay.php?1338-Control-System).

(Asked by **3388** at Jan 16th 17)

Q148 Loops in rope

Q: Is there a prohibition from having multiple loops in a rope as long as the other rules are followed? If this is permissible, what about the diameter of the loops? The rule limits the total diameter to 10 inches. Does this mean 5 inches per loop if there are 2 loops, or can each be 10 inches?

A: There is no rule that prohibits multiple loops in the same ROPE. !I04-G applies to the ROPE as a whole, not additive of each component or modification of the ROPE, thus !I04-G defines the maximum diameter of a loop.

(Asked by **433** at Jan 16th 17)

Q149 Playing Defense (aka: Becoming a pain in the bumper for your opponent)

Q: Is a robot permitted to travel to the opponents side of the field and disrupt, harass and prevent the opposition from placing gears, collecting and dumping balls and shooting balls?

A: While we cannot comment absolutely on all defensive scenarios, there are no rules that prohibit "travel to the opponents side of the field" or "playing defense." However there are a number of rules limiting the ways in which you can do so- if you have a specific question about one of those rules, please re-phrase and re-submit.

(Asked by **5181** at Jan 16th 17)

Q150 string test perimeter on inspection?

Q: what will be the length of the string during robot inspection when checking the perimeter?

A: There is no prescribed FRAME PERIMETER length in *FIRST* Steamworks. Any string used to aid in determining FRAME PERIMETER at inspection will be long enough to assess the maximum possible FRAME PERIMETER length that fits in the volume(s) specified in !R03.

(Asked by **4042** at Jan 16th 17)

Q151 Shifting Between Volume Costraints

Q: Are robots allowed to change which orientation of volume constraints it follows during a match? i/e, can the 30x32x36 volume be rotated around the robot to allow an extending arm sideways then rotated to allow an extending arm up? As long as the volume is never broken by both at once, can the orientation be switched?

(prompted by question 28)

A: No, the "tall" dimension specified in !R03 and !G04 is always measured vertically from the floor. If the ROBOT is at an angle (such as may happen when climbing), the measurement is made as if the ROBOT were virtually transposed onto the flat floor.

(Asked by **3006** at Jan 18th 17)

Q152 Variable Length Rope

Q: Would a rope with a knot which allowed the overall length of the rope to change during the match (e.g. an adjustable bend) be allowed, provided that both the minimum and maximum length of the rope remains in the allowable range of 63" to 96", and that it meets the other critera?

A: There are no rules that prohibit a ROPE changing lengths during the MATCH provided it remains compliant with all specifications.

(Asked by **3946** at Jan 18th 17)

Q153 Does propelling FUEL through the air between robot mechanisms count as LAUNCHING?

Q: If FUEL is propelled by one part of the ROBOT through the air to another part of the ROBOT while maintaining control and possession of the FUEL the entire time, does it constitute a violation of G23?

A: As long as the FUEL remains within the ROBOT'S volume, it does not violate !G23 or !G28.

(Asked by **1306** at Jan 15th 17)

Q154 Starting configuration and game pieces

Q: In the starting position, may a game piece that is on the robot, fuel or gear, exceed the frame perimeter? Is the game piece that is under control of the robot considered part of the robot or can it be outside the volume perimeter?

A: A GAME PIECE is never considered part of the ROBOT, before or during the MATCH. The only requirements for the ROBOT state pre-MATCH are defined in !G01 (where there is no requirement that a GAME PIECE be within the FRAME PERIMETER)

(Asked by **2515** at Jan 16th 17)

Q155 Key violation up to 9.99s with only one foul

Q: Q102 asked if the KEY violation timer reset to zero seconds once an opponent left the KEY. However, the rule G17 states "Violation: FOUL. For every five (5) seconds in which the situation is not corrected, FOUL." This seems to imply that the first 5 seconds constitutes an initial FOUL, and an additional 5 seconds would constitute a second FOUL. Would a robot which has been flagged as violating G17 only be penalized once if they spent 9.99s in their opponent's KEY?

A: Yes, a ROBOT that were only in the KEY for 9.99 seconds would only violate !G17 one time. When a

ROBOTS BUMPERS enter their opponent's KEY, REFEREES will being counting, which continues until it is clear that the ROBOT has removed their BUMPERS from the KEY. Please remember most notably that our REFEREES are human, and distinguishing between 9.99 and 10 seconds, for example, is unlikely (i.e. being in the opponent's KEY is assuming the risks associated with doing so).

(Asked by **4276** at Jan 16th 17)

Q156 Velcro on rope - is sewing ok?

Q: With regards to making a rope with velcro, would sewing the Velcro to the rope assembly be counted as tying it?

A: Please refer to !Q139.

(Asked by **4466** at Jan 18th 17)

Q157 Moving alliance robots from assigned stations

Q: The answer for Q65 states that "...there is no provision to "trade" stations with other members of an ALLIANCE..." However, on page 40 & 41 the manual seems to say that if the order placement of ROBOTS or ROPES matters to either or both ALLIANCES, the ALLIANCE must notify the Head REFEREE during setup for that MATCH, and that then changes can be made with either ROBOT or ROPE placement. Please clarify.

A: 4.2: MATCH Setup states "If order placement of ROBOTS or ROPES matters to either or both ALLIANCES the ALLIANCE must notify the Head REFEREE during setup for that MATCH." This refers to placement of ROBOTS or ROPES on the FIELD, not Teams in particular PLAYER STATIONS (those are assigned).

(Asked by **957** at Jan 16th 17)

Q158 Use of davit pin to hold rope

Q: The part GE-17081-05 has a 0.27 hole for a removable pin which keeps the knot from sliding off the davit. The pin is seen in the airship field tour video. Instead of a knot, can a rope have a loop which wraps around the pin? This would be similar but different than what is asked in question 142.

A: The DAVIT's retaining pins are not designed to hold the weight of a ROBOT and therefore attachment to them would not be considered engaging "securely with the FIELD" per !I04-D.

(Asked by **58** at Jan 18th 17)

Q159 Dropping Rope on a Robot

Q: Is it legal to drive your robot under the rope and drop your rope on top of your robot?

A: Provided all rules are followed (e.g. !H11), PILOTS may deploy a ROPE by releasing the ROPE'S retention strap (per Section 3.8) regardless of where the ROBOT is.

(Asked by **5666** at Jan 16th 17)

Q160 Lifting gear from Robot

Q: Is it legal for the human player to start pulling up the lift while the gear is still in contact with both the lift and the robot?

A: We believe !Q1 answers your question. If it does not, please rephrase your question and resubmit.

(Asked by **5666** at Jan 17th 17)

Q161 Sharing mechanisms with alliance members

Q: If a team has a simple and functional gear handler with a quick bolt on design, could they build two with the idea to share one with alliance members who may be without, or without a functional one? If so:would the second rig count against the 30lbs spare parts amount? Also the alliance robot would need to be reinspected after the rig was bolted on.even if the rig was 'approved' previously. right?

A: As per !R21, any FABRICATED ITEMS brought into an event in addition to bagged items must be accounted for in the Team's WITHHOLDING ALLOWANCE. Also per !R21, Teams are allowed, with the consent of both parties, to share FABRICATED ITEMS from their WITHHOLDING ALLOWANCE for repairs and upgrades. Finally, please see !I05 to determine if a ROBOT needs to be reinspected after a modification.

(Asked by **4064** at Jan 16th 17)

Q162 104 E rope engaging securely with the field

Q: 104 E indicates the rope must secure safely with the field. In place of a stopper knot, can the team tie the line securely to the release pin? For small diameter lines this may be more secure than a knot. Alternatively, could a team secure a wooden block or other object to the top of the line so it does not pass through the davit?

A: We believe !Q158 answers your first question and that !Q85 answers your second question. If they do not, please rephrase your question and resubmit.

(Asked by **2084** at Jan 18th 17)

Q163 Removal of robot at end of match when suspended from davit

Q: Can the team pull out the release pins and remove the robot with the rope still attached to climbing mechanism at the end of the match? This would save time at the end of the match but would require team members holding the robot while the pin is removed.

A: If you're asking about a Team supplied ROPE, we believe !Q108 answers your question. If your ROBOT has climbed a FIELD ROPE, however, !G06 and !R08 apply.

(Asked by **2084** at Jan 17th 17)

Q164 Inquiry regarding Rule G07

Q: G07 states that "ROBOTS may not contact an opposing ROBOT, regardless of who initiates the contact, if the opposing ROBOT is in contact with one of its own ALLIANCE'S ROPES". Does this rule still apply if the contact occurs before 30 seconds are left in the match? This circumstance could occur if the pilot of the opposing team released the rope before the 30 second mark.

A: !G07 is not limited to a specific period of time during a MATCH.

(Asked by **3238** at Jan 16th 17)

Q165 What is source/specification for Return Loading Station FRP Board?

Q: Can you please give a source or more detailed specification for the .08" FRP board called out in the Team Version Field Drawings at the return Loading Station? (page 36 of 37). The .09" FRP material available at Home Depot has a bumpy side and a smooth side. Is this material comparable? If not, where can we find it? If yes, which side goes up - bumpy or smooth? Home depot FRP link http://www.homedepot.com/p/4-ft-x-8-ft-White-090-FRP-Wall-Board-MFTF12IXA480009600/100389836.

A: Good point, our apologies for the omission. The [Team Versions] (https://firstfrc.blob.core.windows.net/frc2017/Drawings/2017TeamVersions.pdf) drawing package has been updated to specify that the textured side faces upwards.

(Asked by **4910** at Jan 17th 17)

Q166 Moving Gears blocking the Lift considered Herding

Q: If there are multiple gears blocking a robot's ability to reach the peg for the lift or the rope to climb, is it considered herding provided the bot is not carrying a gear at that time? Consider if it is not possible to move one Gear at a time (they are stacked on each other).

A: Yes, just like in the answer to !Q54, the definition of control does not take into account the intent. It does not matter if you are carrying a gear or not, if the ROBOT is in control of multiple GEARS regardless of the means it is a violation of !G27. Please note also that deliberately placing GAME PIECES in front of an opponent's LIFT (for example) could result in a violation of !G21.

(Asked by **3604** at Jan 16th 17)

Q167 Team supplied rope sticking to hook and loop retaining strap.

Q: If a team uses a fuzzy rope that passes inspection, what would happen should the rope stick to the hook and loop retaining strap on deployment? Would the pilot be allowed to manually disengage the team rope from the airship hook and loop retaining strap or would this be a violation of S07? Assuming the pilot disengaging a rope stuck to the hook and loop retaining strap will be a violation of S07; will the airship hook and loop retaining strap be modified to prevent ropes from sticking to it?

A: !S07 has been updated in [Team Update 03] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate03.pdf) to add clarity regarding unacceptable contact with ROPES. As long as the PILOT does not contact the DAVIT or the ROPE after it is deployed (below the deck of the AIRSHIP) !S07 would not be violated. That being said, we highly recommend you ensure your ROPE is designed/created in such a way as to prevent sticking to the release mechanism (thus lowering the odds of accidentally violating !S07 or other rules)

(Asked by **364** at Jan 17th 17)

Q168 Tools on The Field

Q: At the end of the match can a wrench be brought on to the field to remove the robot from the rope?

A: Bringing a wrench or other non-powered hand tool onto the FIELD at the end of a MATCH is permitted, provided that the process of removal does not violate !G02.

(Asked by **5348** at Jan 16th 17)

Q169 Davit extension through the TouchPad?

Q: Does the Davit extend through the TouchPad such that a robot might contact it while depressing the TouchPad? If so, can you provide a picture of the lower portion of the TouchPad showing the portion of the Davit that is exposed when the TouchPad is fully depressed? How much of the lower portion of the Davit is exposed when the TouchPad is fully depressed?

A: The DAVIT extends through the entire height of the TOUCHPAD, and is flush to the bottom of the 10 in. polycarbonate plate of the TOUCHPAD. When the TOUCHPAD plate is displaced by a ROBOT, an equal amount of the DAVIT is exposed (assuming the pressure around the plate is uniform allowing the plate to remain horizontal) through the inner portion of the TOUCHPAD plate's rectangular cutout.

(Asked by **3847** at Jan 17th 17)

Q170 Where does the unused Pre-load gears and fuel go if a alliance robot does not use them?

Q: If an alliance decides to not pre-load a gear or fuel into a robot for the autonomous period, does the gear/fuel stay in that teams driver station? Can that gear/fuel be sent into the playing field via the overflow loading station? (Ex. Blue alliance loads 2 gears into their robots, one robot decides not to. Will that one gear stay in the blue alliances driver stations, and can that gear be loaded using the overflow loading station?)

A: As per Section 4.2, any GEARS not pre-loaded onto ALLIANCE ROBOTS are transferred to the ALLIANCE'S LOADING LANE, and any FUEL not pre-loaded onto ALLIANCE ROBOTS are transferred to a RETURN BIN in the ALLIANCE'S LOADING LANE.

(Asked by **3244** at Jan 16th 17)

Q171 Is there a vertical height to the player station this year?

Q: Is there a vertical height to the player station this year? What is the height limit for pole mounted cameras this year?

A: We believe you're asking if there is a maximum height for the OPERATOR CONSOLE, not the PLAYER STATION. !R99 specifies the requirements for the OPERATOR CONSOLE, part C explicitly sets a vertical height limitation - this limitation, ironically enough, is the exact height of the PLAYER STATION wall.

(Asked by **364** at Jan 16th 17)

Q172 Rope end position

Q: Does the rope hang just above the floor as pictured in the manual or drape on the floor because of the length specified in the manual.

A: We believe you're asking about the default FIELD ROPES. In which case, the specifications are outlined in 3.8 as 7 ft 2 in (~218 cm) and therefore does make contact with the floor.

(Asked by **4573** at Jan 17th 17)

Q173 Changing Rope Length During A Match

Q: Is the length of a ROPE allowed to change during a match, provided it stays within the length requirements at all times? If so, how would it be inspected (in its original length, final length, or both)?

A: We believe !Q152 answers your question. If it does not, please rephrase your question and resubmit. Please use the Search Q&A button on the top bar before posing a new question.

(Asked by **639** at Jan 18th 17)

Q174 Rope With Multiple Sections

Q: Is it permissible for a loop in a ROPE to consist of multiple sections of nonmetallic fibers? For example, could a rope be folded over to create a bite then have a small section of another rope tied between the primary rope's legs, forming a loop?

A: There are no rules requiring a ROPE to consist of a uniform material; however, note that any tying done to form the ROPE from constituent fibers would be part of the ROPE and must conform to the 1 in. maximum diameter per !I04-A.

(Asked by **639** at Jan 18th 17)

Q175 Inspection Policy If Rope Is Untied Then Retied Identically

Q: If the actions of a ROBOT result in a knot in a ROPE being untied, and the rope is then retied in the same way it originally was, would that rope have to be reinspected?

A: If the ROPE were re-tied in an identical manner, it would not need to be re-inspected. If there were any change in knot location, materials, etc, it would require a new inspection.

(Asked by **639** at Jan 16th 17)

Q176 Hook and loop fasteners

Q: Can hook and loop fasteners be considered as a rope?

A: We believe !Q45 answers your question. If it does not, please rephrase your question and resubmit. Please use the Search Q&A button on the navigation bar before posing a new question.

(Asked by **2070** at Jan 16th 17)

Q177 Assignment of rope to teams

Q: Will be be assigned a rope station based on our placement in the player station or is that up to each alliance to determine?

A: Section 4.2 does not prescribe specific DAVITS for Teams in given PLAYER STATIONS, it is up for each ALLIANCE to decide. If there are unresolvable conflicts, as per Section 4.2, ROPE locations will be determined in order by PLAYER STATION number.

(Asked by **5215** at Jan 17th 17)

Q178 Area of the robot?

Q: If the robot is smaller than the area. Can we extend an arm to fill in the rest of the area?

A: We believe !Q4 answers your question. If it does not, please rephrase your question and resubmit. Please use the Search Q&A button on the navigation bar before posing a new question.

(Asked by **3163** at Jan 17th 17)

Q179 Drive Team Field Limit

Q: How many drive team members are allowed on the field to retrieve and position the robot in between matches?

A: There is no limit to the number of DRIVE TEAM members that may assist in position/retrieval of the ROBOT. However, please keep in mind that there is a number of tasks that must be completed (such as setup of the OPERATOR CONSOLE) and all tasks must be completed in a reasonable amount of time (per !G02).

(Asked by **4330** at Jan 17th 17)

Q180 Active Placement of Gears

Q: By using an active gear "kicker" such as a linear actuator would the robot break G23? As long as the actuator is in continual contact with the gear before fully supported by the lift the robot would not break G23. Or would this be considered launching, violating G23?

A: We believe you mean !G24. In which case, as long as the ROBOT is in contact with the GEAR, it has not LAUNCHED the GEAR.

(Asked by **4618** at Jan 18th 17)

Q181 Wheel Assembly

Q: Does the wheel have two part and have to be assembled with screws?

A: We assume you mean GEAR, in which case we believe !Q76 answers your question. If it does not, please rephrase your question and resubmit.

(Asked by **3163** at Jan 17th 17)

Q182 R13 - COTS motor may used fabricated materials to secure from pre-build season???

Q: R13- states OK to use... D. FABRICATED ITEMS consisting of one COTS electrical device (e.g. a motor or motor controller), and any materials used to secure and insulate those connectors ARE ALLOWED??? Therefore a past robot bracket is made for the COTS motor & Tough Gearbox, this CAN be used to Secure the motor since its part of the any materials...Is this understanding correct in the part is under $400US. Or must this bracket be remade for the season???Wheel mount bracket to frame.

A: No, a FABRICATED ITEM (such as a bracket) used to mount a motor to another part is not used to secure or insulate the connectors and therefore would not meet the !R13-D exemption.

(Asked by **6330** at Jan 17th 17)

Q183 R37 - COTS Device Batteries

Q: Can you please clarify the intent and meaning of Rule R37 in regards to batteries that are integral to and part of a COTS computing device or camera? Must it be packaged with the COTS device? Can batteries for COTS devices be changed out? Must the battery be sold with the COTS device or can it be purchased separately? What characteristics make a battery "integral to and part of" a COTS device?

A: We cannot rule absolutely on hypothetical ROBOT components, and the final decision as to legality of a particular ROBOT lies with the Lead ROBOT Inspector (LRI) at each event. Generally, Merriam-Webster defines integral as "essential to completeness". For example, most laptops are designed to have a battery, this would make the battery "essential to completeness".

(Asked by **900** at Jan 18th 17)

Q184 Rope Fraying

Q: Can the last 4 inches of the rope be frayed on purpose? Are the last 4 inches of rope REQUIRED to be whipped, fused or covered?

A: For your first question, we believe !Q140 covers the answer. If it does not, please rephrase your question and resubmit. For the second portion, no, per !I04-D: "except for the last 4 in. (~10 cm) of any cut end (E) which __may be__ whipped [...]" (emphasis added)

(Asked by **5268** at Jan 18th 17)

Q185 Human Players and their positions

Q: So, there are three human elements per alliance. There can be two in the airship and one in the loading lane or one in the airship, one in the loading lane, and one behind the alliance wall, correct? Well, if there is no human element behind the alliance wall with the overflow bin--like if there were two human elements in the airship, who would be in charge of the overflow bin? Would the opponent human element in the loading lane be able to take the overflow bin or would it just sit there?

A: There are no prescribed minimum quantities for HUMAN PLAYERS or DRIVERS of a particular Team/ALLIANCE. There are maximums, as defined in 4.5, both in quantity and location. It is up to the ALLIANCE to determine the way in which they will distribute their HUMAN PLAYERS. However, an

opponent will never "take over" for any position left "unattended" (i.e. the Red ALLIANCE cannot "take over" the Blue ALLIANCE LOADING LANE if Blue elects not to place any HUMAN PLAYERS there)

(Asked by **3581** at Jan 17th 17)

Q186 Robot perimeter

Q: In previous years the bumpers were not included in the robot perimeter. Why was this rule changed? For reference R03.

A: The purpose of this Q&A is to answer questions regarding the rules of _FIRST_ STEAMWORKS, not to question why a rule exists. If you have feedback about a particular rule or procedure, please contact [FRC Team Support](mailto:frcteams@firstinspires.org)

(Asked by **2148** at Jan 17th 17)

Q187 Is a composite rope allowed?

Q: Many ropes are composites made up of a braided outer cover containing a parallel fiber core. These parallel fibers are not braided, twisted or woven together, but are an integral part of the rope, sometimes acting as the primary load-bearing member, and sometimes merely supporting the load-bearing cover. Would such rope be a violation of I04 -D? Examples of ropes of this design include New England Ropes' Sta-Set X, clothesline, cheap hardware store polypropylene ropes, and even bungee cords.

A: A rope that does not "consist entirely of flexible, non-metallic fibers sewn, twisted, tied, woven, or braided together" does not meet the requirements of a ROPE in *FIRST* STEAMWORKS. However, if knotted, it is "tied...together," and meets the requirement of !I04-D.

(Asked by **2903** at Jan 19th 17)

Q188 Discrepancy in Ranking Score?

Q: In 10.4.3 Ranking Score is defined as: Ranking Points earned...divided by the number of MATCHES they've been scheduled to play... is their Ranking Score (RS). Glossary Ranking Score defined as: RS Ranking Score, the total number of Ranking Points earned by a Team throughout their Qualification Which is correct? 10.4.3 divided by matches or Glossary just total ranking points Scheduled 10 matches, but only play 9 due to event time constraints, still divided by 10? Why divide by matches?

A: Good catch! The Glossary is updated per [Team Update 03] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate03.pdf) to reflect the information contained within Section 10.4.3. The Ranking Score (RS) is the total number of Ranking Points earned divided by the number of MATCHES the Team has been scheduled to play (after considering the exceptions, et. al.).

(Asked by **399** at Jan 17th 17)

Q189 Method of Knot Measurement?

Q: For the purposes of I04-F how will the distance between the retaining feature and the top knot be measured? Between centers of knot masses lengths of straight rope segments between knot edges, or some other method?

A: The measurement for !I04-F should be between the nearest edges of the knots (similar, but not identical to "lengths of straight rope segments between knot edges").

(Asked by **5012** at Jan 17th 17)

Q190 Figure 9-2 Measurement: With or Without Gravity?

Q: Given the flexibility definition of I04-D's blue box, the possibility of rope stretching a bit under forces, and the pesky nature of gravity, it feels important to ask: Are the measurements of Figure 9-2 to be taken while the rope is laying on the floor, hanging in the air, or in any arbitrary configuration?

A: The intent of !I04 is to regulate the ROPE as it will be used on the FIELD. If there is any question regarding compliance with !I04, measurements should be taken with the ROPE as close to the FIELD configuration as possible (i.e. hanging in the air). If the ROPE is elastic, Inspectors are likely to check its two extreme lengths to ensure compliance.

(Asked by **5402** at Jan 20th 17)

Q192 Matthew Walker's knot (follow up to Q57 : "splice = knot?")

Q: Some knots involve unlaying the strands of a rope and knotting the individual strands together. Examples include the Matthew Walker's knot, the manrope knot, and the footrope knot. Would these knots be considered knots or part of the ROPE?

A: Such a knot would be considered to be fibers "tied" together per !I04-D and subject to the 1 in. maximum diameter per !I04-A

(Asked by **2903** at Jan 17th 17)

Q193 Block by Opposition the Lift - Alliance Response Pilot lifts - lift breaks-who penalized

Q: Is blocking the oppositions lift and lift then breaks when Pilot lifts, a penalty for the Pilot - you should not have pulled, or for Blocking Opposition, and the Pilot responded by a strategy to counter the blocking move-creating penalty for opposition? Similarly can an alliance push the opposition away from its own lift or is their a clearing zone like the Key??? Otherwise how can alliance ever score gears around a stopped robot? By drawing penalties only???

A: Please see !Q30 regarding blocking LIFTS and FIELD damage. There is no rule prohibiting an ALLIANCE from pushing the opposition away from their LIFT. Note that an ALLIANCE has 3 LIFTS and completely blocking all of them using a coordinated effort of two or more ROBOTS would be a violation of !G10.

(Asked by **6330** at Jan 17th 17)

Q194 Reflective Tape on the Ropes

Q: Are we allowed to place reflective tape in the ropes that we bring to the games?

A: Please see !Q134 regarding legality of retro-reflective material in ROPES. Because the word "tape" is suggestive of adhesive backing, we will caution you that adhesive does not consist of "flexible, non-metallic

fibers".

(Asked by **3242** at Jan 17th 17)

Q195 G20 - Opposition touches Alliance rope in last 30 seconds - triggered pad counts...

Q: Scenario - opposition blocks rope, so Alliance as counter strategy pushes opposition into rope. Is this scored as a triggered pad for the Alliance since the Opposition touched the rope, the opposition is not pinned, and the opposition is obstructing the natural path of the Alliance wanting to go for the rope??? Suggesting that gear ratios of strength just as valuable as speed ratios. Otherwise Opposition robots that can't climb would simply block Alliance...

A: We cannot comment absolutely on hypothetical scenarios. The ultimate decision would be determined by the REFEREES at your event, with the final call made by the Head REFEREE. Per the Blue Box below !C08, "C08 does not apply for strategies consistent with standard gameplay." If a ROBOT is attempting to get to it's ROPE in order to climb, that would likely be considered standard gameplay. If a ROBOT goes out of it's way to corral an opponent in order to push them into a ROPE, that would likely not be "standard gameplay" and may be considered a violation of !C08.

(Asked by **6330** at Jan 17th 17)

Q196 Rotation of the Rotors

Q: Does it matter which way you turn the rotor when attempting to get it going? Either clockwise or counter-clockwise?

A: No, there is no specified direction that the GEAR chain must be rotated in order to start the ROTOR.

(Asked by **5550** at Jan 17th 17)

Q197 Bumpers vs. Robot Structure

Q: Are we able to build the robots frame over the top of the bumpers, if we do not exceed the volumes specified in the rule book?

A: If by "frame" you mean a permanent non-articulating component of your ROBOT, no, per !R02, your ROBOT must be inside the vertical projection of the FRAME PERIMETER in it's STARTING CONFIGURATION. If you are using "frame" to refer to any part of the ROBOT, please see !Q4 regarding extension of the BUMPERS.

(Asked by **3242** at Jan 17th 17)

Q198 Reserve Gear

Q: Can the reserve gear in the airship be used to start a rotor?

A: Yes, the only restriction specific to the reserve GEAR is !A05. After AUTO, the reserve GEAR is no different than any other GEAR.

(Asked by **3242** at Jan 17th 17)

Q200 Attaching Velcro onto our rope further 4 inches from the end of the rope

Q: Can we sew Velcro 5 inches from the end of the rope?. Is the end of the rope the ground end or the human player station end?

A: Non-adhesive backed hook and loop fastener, which also meets all other requirements of !I04, may be sewn 5 inches from the end of a ROPE. Please see !I04, as well as [Team Update 03] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate03.pdf). !I04 also defines what is meant by 'end' of a ROPE.

(Asked by **5087** at Jan 18th 17)

Q201 position of vision targets for lift peg

Q: Peg vision target Rule 3.14 p 37. The text gives the height and the distance between them, but is silent on where they are placed in the third dimension. On page 37, the targets appear to be floating in empty space. On page 19 and 24 they appear to be supported by the clear Plastic Airship Base panel, GE-17075, 1/4" thick. Can you confirm that the vision targets are mounted to the outside surface of the sheet of clear plastic? The 'Z' axis? Or the front to back distance from the base of the peg

A: Yes, the Vision Tape is attached to the Plastic Airship Base panel, GE-17085.

(Asked by **423** at Jan 17th 17)

Q202 G 15 Game Piece Marking

Q: Rule G15 states in the blue box "Game pieces are expected to undergo a reasonable amount of wear and tear as they are handled by ROBOTS, such as scratching or marking. Gouging, tearing off pieces, or routinely marking Game pieces are violations ....." Line one states that scratching and marking are expected. Line 2 states routinely marking is a violation. Can a differentiate the difference between marking and routinely marking?

A: A MECHANISM or COMPONENT that, for example, is designed to grasp GEARS so tightly that it crushes or marks them or isn't designed to do that, but does "routine marks" or "routinely damages" GAME PIECES. However, its possible (and expected) that from time to time a GAME PIECE is marked inadvertently through typical game play, which does not violate !G15. Keep in mind that we cannot comment absolutely on hypothetical scenarios. The ultimate decision would be determined by the REFEREES at your event, with the final call made by the Head REFEREE.

(Asked by **2495** at Jan 18th 17)

Q203 Fuel manipulation outside of the robot.

Q: According to g28 robots cannot manipulate fuel outside of their frame. Does a leaf blower as a shooter for the high goal violate g28?

A: We believe !Q17 and/or !Q19 answers your question. If it does not, please rephrase your question and

resubmit.

(Asked by **753** at Jan 18th 17)

Q204 Rope & Secondarty Materials

Q: On YouTube (https://youtu.be/UIMjzOVA_dg), one can see a “three day robot” demonstrating a climb using a strap that had Velcro attached to it. The rope/strap tail has the (a) hook or (b) loop material side while the robot has a rotating reel with the corresponding opposite (a) loop or (b) hook Velcro material. Is it allowable to add this Velcro or any secondary material to the rope or “strap”?

A: We believe your question is answered by some combination of !Q10, !Q22, !Q6, and !Q45. If it is not, please rephrase your question and resubmit.

(Asked by **175** at Jan 18th 17)

Q205 Spilling Balls from Hoppers

Q: Would it be against any rule to deliberately spill all the balls from the hoppers without collecting any as a defensive measure?

A: No, this does not violate a rule.

(Asked by **6070** at Jan 17th 17)

Q206 Split numbers on bumpers

Q: We are a 4 number team planning to have 6in bumpers on the front left and right of robot. Can we put half of our team number on one side and second half on other side. For example: 12 34.

A: Please read the blue box under !R27, which explicitly allows this.

(Asked by **2960** at Jan 17th 17)

Q207 S07 Lost Lift Pull Cord Outside Port

Q: Looking at the field drawings and field tour videos, it seems that it would be very easy for a pilot to drop or kick the handle and rope of the pull cord out the port. There doesn't seem to be any mechanism to keep the pull cord from falling all the way down to the field carpet. Please indicate if there is a safe way to keep the cord from dropping, if there is a safe way to retrieve it without violating S07, or if the lift is rendered useless for the remainder of the match.

A: It is the responsibility of the PILOTS to keep the handles of the LIFTS on-board the AIRSHIP during a MATCH. Reaching outside a PORT for any reason, including to retrieve a LIFT handle, during a MATCH, is a violation of !S07. This is a serious safety concern.

(Asked by **3225** at Jan 19th 17)

Q208 Are ferrules allowed on robot wiring?

Q: We would like to add ferrules to some of the wiring used on the robot. We believe this would improve durability and reliability for the contacts into components such as the PDP.

A: Ferrules are a "COTS connector" permitted per !R58.

(Asked by **1592** at Jan 17th 17)

Q210 Shooting from within the Key

Q: Is a robot allowed to shoot fuel into the High Efficiency Goal while it is sitting within its own key?

A: Yes, the KEY is within the LAUNCHPAD so there are no rules prohibiting a ROBOT from LAUNCHING FUEL into the High Efficiency GOAL of its BOILER from its own KEY.

(Asked by **5348** at Jan 18th 17)

Q211 Minimum required amount of rotors/steam pressure?

Q: My team would like to know if there is a minimum amount of steam pressure or rotors turning required for "liftoff." It seemed implied in one of the introductory videos, but there is no mention of a minimum amount in the manual.

A: The concept of "liftoff" (which is mentioned in the Game Animation) is used purely for the story of a _FIRST_ STEAMWORKS MATCH. There is no official definition for "liftoff", and the concept of "liftoff" is not material to game play.

(Asked by **2840** at Jan 18th 17)

Q212 Additional Hardware

Q: Could we include additional hardware with the robot?, i.e. Raspberry PI We would like to add hardware such as Rasp BERRY PI, in order to control Vision Devices. Please, let us know if this is possible

A: There is no specific prohibition of co-processors. Please see !R61 and its Blue Box for more information.

(Asked by **6694** at Jan 18th 17)

Q213 Bumpers and frame exposure

Q: If the robot bumpers are at a height of 7 inches (top of bumper) and the majority of the frame is above this height will it pass inspection?

A: We cannot rule absolutely on hypothetical ROBOT designs, and the final decision as to legality of a particular ROBOT lies with the Lead ROBOT Inspector (LRI) at each event. Please review Section 8.5, especially the images and detail of !R22 as well as !R23. If you have a specific question about a rule, please resubmit.

(Asked by **263** at Jan 18th 17)

Q214 Outer field dimensions

Q: Can you please supply the outer field dimensions/angles especially for the corner areas?

A: The purpose of this Q&A is to answer questions regarding the rules of _FIRST_ STEAMWORKS. Any measurements or materials information can be derived from the Field Drawings available at: [http://www.firstinspires.org/resource-library/frc/competition-manual-qa-system] (http://www.firstinspires.org/resource-library/frc/competition-manual-qa-system)

(Asked by **1741** at Jan 18th 17)

Q215 Velcro in Robot

Q: Are we able to place velcro in our robot for use in climbing our own rope?

A: There are no rules that explicitly prohibit hook-and-loop tape as part of the ROBOT, provided all other ROBOT rules are met.

(Asked by **6451** at Jan 18th 17)

Q216 How to inspect R03?

Q: How will inspectors measure robots for compliance to the dimensions of R03? Measuring pool noodle stuffed fabric covers will be very subjective.

A: The purpose of this Q&A is to answer questions regarding the rules of _FIRST_ STEAMWORKS, not discuss the processes or procedures that will be used at events. If you have a specific concern or comment, please direct it to [FRC Teams](mailto:frcteams@firstinspires.org)

(Asked by **3546** at Jan 18th 17)

Q217 For the purposes of R29 A, is OSB considered chipboard?

Q: For the purposes of R29 A, is OSB considered chipboard?

A: While OSB is a different material than chipboard, !R29-A only permits plywood or solid wood (not OSB).

(Asked by **348** at Jan 18th 17)

Q218 Action camera on pilot

Q: Assuming wireless is disabled and it is securely attached to the pilot in the airship, would it be legal for the pilot to wear an action camera such as a GoPro or other brand on their body during the match?

A: We won't answer questions about a specific item's legality. If the item isn't listed in !H12, it's not allowed in the ARENA.

(Asked by **1111** at Jan 18th 17)

Q219 What is the maximum force a robot can apply to the touchpad when climbing?

Q: As per section 3.9 in the manual. Teams may wish to consider a reasonable “safety factor” for TOUCHPAD activation and assume that no more than 3 lbs. (~1.4 kg) of vertical force is required. Does this mean the maximum force that can be applied is 3lbs when lifting a 120lbs robot? If not what is the maximum force that can be applied before damage will occur to the touchpad?

A: Please see [Team Update 06] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate06.pdf).

(Asked by **5086** at Jan 27th 17)

Q220 Knot Tightening

Q: Related to unanswered questions Q135, Q152, Q173, and Q190, but more specific... May knots be 'loose' (but less than 10" dia) such that, applying force to the free end of the rope during the match, they 'tighten' (in the process changing the "length measured from the side of the ROPE’S retaining feature (per I04-E) that abuts the DAVIT fingers (L), to the farthest point on the ROPE from this feature.")?

A: We believe !Q152 answers your question. If it does not, please rephrase your question and resubmit. Please use the Search Q&A button on the navigation bar before posing a new question.

(Asked by **4027** at Jan 18th 17)

Q221 Can bumper numbers look different on different sides?

Q: Due to the potential for smaller bumpers on certain sides, is it legal for the bumper numbers on a side of the robot to look slightly different than the numbers on another side? For instance, a six inch side would have the numbers more compressed than on a 20 inch long bumper that would have them be less compressed? All numbers would still meet the criteria specified in R27.

A: There are no rules requiring all BUMPER numbers to look identical.

(Asked by **1111** at Jan 18th 17)

Q222 Driver station has no robot communications

Q: We have a rookie configuration. We flashed/updated all the hardware. Everything on the robot looks OK based on the status lights of the devices. When we run the Driver Station application however, we get NO ROBOT COMMUNICATIONS. The Robot Radio button is green, we can ping the robot via USB and Ethernet cable. We are trying to run tethered. We have downloaded basic code generated via Robot Builder. What is missing??

A: The purpose of this Q&A is to answer questions regarding the rules of _FIRST_ STEAMWORKS. For technical assistance, please visit the [FIRST Forums](http://forums.usfirst.org/forumdisplay.php?23-FIRST-Robotics-Competition).

(Asked by **3851** at Jan 18th 17)

Q223 Thickness of the Bottom Plate in the TOUCHPAD assembly.

Q: What is the thickness of the Bottom Plate of the TOUCHPAD assembly? The CAD model shows that it is 0.25 inch thick polycarbonate. The field tour video entitled, The Ropes, appears to show the thickness of the

bottom plate to be greater than 0.25 inch. It looks like 2 thicknesses of 0.25 thick polycarbonate.

A: Our apologies for the omission of the TOUCHPAD drawings from the [Field Components drawing package](https://firstfrc.blob.core.windows.net/frc2017/Drawings/2017FieldComponents.pdf). They have been added as of [Team Update 04](https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate04.pdf), where you'll see that the thickness of the plate is 1/2 in.

(Asked by **2848** at Jan 22nd 17)

Q224 Extension of the Bottom plate of the TOUCHPAD

Q: Is the bottom plate of the TOUCHPAD assembly held down solely by gravity or is it assisted by a spring?

A: Gravity; there's no spring. A drawing of the TOUCHPAD assembly is now included in the [Field Component drawing package](https://firstfrc.blob.core.windows.net/frc2017/Drawings/2017FieldComponents.pdf) as of [Team Update 04](https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate04.pdf).

(Asked by **2848** at Jan 22nd 17)

Q225 Depressing the Bottom plate of the TOUCHPAD.

Q: Do all 3 of the TOUCHPAD plungers need to be depressed to start the counter or will depressing only 1 of the plungers start the counter to be READY FOR FLIGHT?

A: The TOUCHPAD is designed such that only the movement of the TOUCHPAD plate should be of consequence to its operation by a ROBOT - displacement of the TOUCHPAD plate by 1/2 inches on any part of the plate will activate the TOUCHPAD.

(Asked by **2848** at Jan 18th 17)

Q227 Legality of rope fusing technique

Q: Is it allowed to use heat along the length of a rope to fuse the edges and prevent fraying?

A: Fusing a rope along the entire length would not meet the exception for the "last 4 in. of any cut end" and would therefore not meet !I04-D.

(Asked by **4506** at Jan 18th 17)

Q228 Electrical panel accessibility

Q: We are wondering if the electrical panel can be placed under clear plexiglass in a drawer that could be pulled out for inspection. The panel will still be visible when the drawer is closed.

A: We cannot rule absolutely on hypothetical ROBOT designs, and the final decision as to legality of a particular ROBOT lies with the Lead ROBOT Inspector (LRI) at each event. There are no rules that explicitly prohibit clear plastic over ROBOT elements, but be aware of rules that require specific elements be readily accessible (e.g. !R47).

(Asked by **4632** at Jan 19th 17)

Q229 Can we use sheet metal for our robot body?

Q: Does the robot body need to be covered in transparent material such as plexiglass, or is it allowed to use thin sheet metal to cover exposed robot framework? We plan on using the sheet metal to create a hopper to hold the fuel for the game in.

A: There is no rule expressly prohibiting the use of sheet metal.

(Asked by **5720** at Jan 19th 17)

Q230 Discontinuous change in bumper height.

Q: We can't find anything against this, but it's strange enough to ask now rather than at inspection. Are discontinuous changes in bumper height allowed, provided both sides of the discontinuity fit within the 0-7" criterion from the floor level? As an example: a rectangular robot has bumpers along three faces LOW within the bumper zone (perhaps 1/2" of clearance), but along the fourth "rear" face, extending into the corner, the clearance is near the maximum allowed to fit in the bumper zone.

A: There are no rules requiring all BUMPERS to be at the same height, provided they all reside within the BUMPER ZONE per !R23.

(Asked by **3946** at Jan 19th 17)

Q231 Legality of adhesive ATTACHMENTS onto the rope

Q: Hi there, various previous questions have been answered regarding the use of adhesive materials (velcro, tape, etc.) and their legality. Most responses claim that adhesives are not legal due to them not being "flexible, non-metallic fibers." However, if the primary rope construction did consist of "flexible, non-metallic fibers," would the inclusion of an adhesive material on the outer layer of the robe be allowed?

A: The outer layer of the ROPE is still the ROPE, and thus must still entirely consist of "flexible, non-metalic fibers". A chemical adhesive (e.g. glue) would not meet this definition. But some types of hook-and-loop fastener do entirely consist of "flexible, non-metallic fibers", and would be legal per !I04.

(Asked by **5763** at Jan 19th 17)

Q232 LED on robot

Q: Would it be okay to have LED's on the robot that activate when a button is pushed by the drivers for the purpose of letting the pilot know when to drop the rope.

A: There are no rules that prohibit "an LED from activating" based on a "button press by the drivers" provided that all other ROBOT and OPERATOR CONSOLE rules are followed.

(Asked by **5508** at Jan 19th 17)

Q233 Re: R32, is a automotive linear door lock actuator considered a door motor

Q: Re: R32, is a automotive linear door lock actuator considered a door motor

A: Yes, a door lock actuator would be considered a door motor provided it is powered by a motor and not an electric solenoid.

(Asked by **348** at Jan 19th 17)

Q236 paracord as rope for climbing

Q: Can 550 paracord be used for rope to climb the airship? Our paracord includes a twisted core within a braided sheath. Is this within regulations?

A: We believe !Q187 answers your question. If not, please rephrase and resubmit.

(Asked by **3006** at Jan 20th 17)

Q237 rope flexibility

Q: In rule 104i it states the rope "be flexible such that it’s not capable of being pushed to activate the TOUCHPAD" and in the blue box it states "Flexible means that if the ROPE is held at any point, it should not extend more than 12 in. above the point where it is held. ROPES are meant to be pulled, not pushed" Does this mean that under no circumstances may a rope be able to extend 12" above the held point, or just that the rope just can't be able to push the Touchpad, or both?

A: Ultimately, the !I04, part I requires that the ROPE not be constructed in a way that pushing it activates the TOUCHPAD. The Blue Box offers a general, relatively simple test to make sure that's not going to be the case.

(Asked by **5348** at Jan 20th 17)

Q238 Velcro "rope"

Q: At the risk of being redundant..please settle a this discussion...are the plastic "loops" on Velcro branded strips legal as "fibers"?...our team is looking at using the hook & loop strip for the entirety of our rope.

A: No. Just kidding. Yes.

(Asked by **2723** at Jan 22nd 17)

Q239 Does anyone had the full dimensions of the gear pegs head?

Q: In the manual it has how far off the ground the gear peg is, but not very detailed dimensions. Does anyone know where we can find these?

A: The purpose of this Q&A is to answer questions regarding the rules of _FIRST_ STEAMWORKS. Any measurements or materials information can be derived from the Field Drawings available at: [http://www.firstinspires.org/resource-library/frc/competition-manual-qa-system] (http://www.firstinspires.org/resource-library/frc/competition-manual-qa-system)

(Asked by **3336** at Jan 20th 17)

Q240 Distance of rope on DAVIT?

Q: Concerning the regulation of having a minimum of 29" between the securing knot and any possible loops or knots in the climbing rope: What is the length of the rope between the securing knot and the bottom touchpad surface that goes through the DAVIT?

A: The purpose of this Q&A is to answer questions regarding the rules of _FIRST_ STEAMWORKS. Any measurements or materials information can be derived from the Field Drawings available at: [http://www.firstinspires.org/resource-library/frc/competition-manual-qa-system] (http://www.firstinspires.org/resource-library/frc/competition-manual-qa-system)

(Asked by **3006** at Jan 20th 17)

Q241 Lowering bot after bot

Q: How are the robots going to be lowered after they climb the rope for takeoff (post match)?

A: Each DRIVE TEAM is responsible for retrieving their ROBOT from the FIELD, including FIELD ROPES, per !G06 after the lights on the field go green (per !S04). If a ROBOT has climbed the Team's supplied ROPE, the team may remove the ROPE/ROBOT pair from the FIELD together.

(Asked by **4579** at Jan 20th 17)

Q242 Can the radio be powered through passive 12V on the 18-24V port.

Q: Can the required Ethernet cable between the RoboRIO and the Radio, per R63, be constructed such that the radio can be powered by the passive PoE on the Radio's 18-24V Ethernet port. This configuration is implied in R51's blue box.

A: Yes, splitting the appropriate conductors, or using a pigtail that does so, would meet both !R63 and !R51.

(Asked by **340** at Jan 20th 17)

Q243 Are fans made with a propeller and legal motor allowed?

Q: It states in R32 that fans aside from those in the kickoff kit and computing devices are prohibited. Would a device consisting of a metal propeller, attached to the shaft of a legal motor (such as a member of the CIM family) be considered a fan? If not, are there safety concerns that would prohibit usage of such a device?

A: !R32 lists legal motors and actuators. There is no rule against taking a motor listed in !R32 and using it to create some type of fan-like device. Per !S03 though, as you note, ROBOTS must be safe. The determination on whether or not a ROBOT is safe will be made at the event by the inspection crew. You should be prepared to explain to inspectors at your event why you believe your particular design is safe.

(Asked by **5333** at Jan 20th 17)

Q244 Number of AndyMark NeverRest motors allowed per Motor Controller?

Q: How many AndyMark NeverRest motors are allowed per motor controller? The motor specs are comparible with the rest of the motors listed under "Yes(up to 2 per controller)", but the NeverRest motor itself is not listed anywhere in the table in R35.

A: You are correct that the NeveRest was missing from Table 8-2. Sorry about that! Please see [Team Update 04](https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate04.pdf) where the NeveRest has been added to the table.

(Asked by **5012** at Jan 20th 17)

Q245 Can we place magnetic materials on our ROPE?

Q: As I04-D in Section 9 describes, the ROPE must be made of non-metallic fibers. However, we wonder whether we can place a compound of iron which has magnetic force instead of monatomic iron. In other words, does the word "non-metallic" refers to materials that don't contain any metal elements in the compound or just refer to materials that don't contain monatomic metal and their alloy?

A: No metal of any kind, regardless of form or type, may be used in the ROPE.

(Asked by **6353** at Jan 20th 17)

Q246 Robot Configuration Limits

Q: Can robot end effectors extend past the frame perimeter and into the bumper area? For example, the Ri3D Team Indiana had their ball collector and sorter extend above and into the bumper area: https://www.youtube.com/watch?v=mg1wLnnqFZ0&t=1m49s

A: We believe !Q4 answers your question. If it does not, please rephrase your question and resubmit. Please use the Search Q&A button on the navigation bar before posing a new question.

(Asked by **5472** at Jan 22nd 17)

Q247 Legality of aerosol coatings on the rope

Q: If the rope were legally made from "flexible, non-metallic fibers," is it legal to coat the rope in an aerosol coating such as paint? Would it only be legal in the bottom portion of the rope that is allowed to prevent fraying?

A: No, an aerosol spray is not a flexible, non-metallic fiber. No, coating in aerosol spray is neither whipping nor fusing.

(Asked by **5763** at Jan 20th 17)

Q248 Will the FRC manual application be available for 2017?

Q: The FRC manual application on Android (and possibly iOS) has not been updated with the 2017 FRC competition manual and updates. The application has also apparently disappeared from Google Play. In particular it was useful for getting the competition manual updates pushed out to the teams. Will it again exist or perhaps there's an alternate rather than downloading PDFs?

A: No, the PDF downloads are the only official source of the 2017 Game Manual.

(Asked by **2619** at Jan 20th 17)

Q249 Multiple Sections of Rope Tied Together As The DAVIT Knot

Q: Follow-up to Q174. If we choose to use multiple sections of rope, but connect the sections at the DAVIT knot (RF) such that one section of rope is the only non-metallic fibrous material below the RF, is the DAVIT knot subject to the maximum width (W) answer of Q174? The intent would be to create a thin section for climbing, mated at the retaining knot made of a thicker/stronger non-metallic fibrous material at the DAVIT while maintaining legality of S, RF, W, and the answer to Q174.

A: If the only place the materials are held together is the knot, then the knot must be considered to be tying the materials together per !I04-D and thus part of the ROPE itself. This make's it subject to the maximum width per !I04-A.

(Asked by **1885** at Jan 20th 17)

Q250 What happens to fuel that overflows a overflow bin?

Q: 3.11.5 RETURN & OVERFLOW BINS . Are there spare overflow bins to use while emptying your overflow bins. And what happens to fuel that ends up on the floor if it does not land in a overflow bin? Can it be picked up and put in the bin when it is available?

A: Per Section 3.11.5 there are two (2) OVERFLOW BINS in each ALLIANCE STATION. How these OVERFLOW BINS are used is up to the ALLIANCE. There are no rules that prohibit a HUMAN PLAYER from picking FUEL up off the ground in their areas. However, per Section 4.6, "GAME PIECES that roll, slide, or otherwise transfer from a LOADING LANE to an ALLIANCE STATION (or vice versa) are considered “owned” by the ALLIANCE in the space now occupied by the GAME PIECE." and retrieval of such a GAME PIECE is a violation of !H07.

(Asked by **5086** at Jan 22nd 17)

Q251 Corner Bumpers 4 or 8?

Q: Is a corner bumper of 6" on each side considered 2 bumpers or 1 bumper?

A: Considering there are no rules concerning the number of BUMPER segments, we are not sure we understand the question. Please clarify and resubmit.

(Asked by **5474** at Jan 21st 17)

Q252 R31. BUMPER Gaps

Q: Can the 8" gap of R31 wrap around the corner of the frame or is it just allowed along one side?

A: Per !R22, ROBOTS are required to use BUMPERS to protect all outside corners of the FRAME PERIMETER.

(Asked by **5474** at Jan 22nd 17)

Q253 Can teams use a smoke machine in the pit area?

Q: Are teams allowed to construct decorative items for their pit area that incorporate an element that releases non-toxic steam into the air periodically? It wouldn't be a constant release, but just occasional and made out of water vapor.

A: There's no explicit rule against such an item, however if event management deems it a safety hazard (e.g. it affects visibility), it will need to be removed per [E58](http://www.firstinspires.org/resource-library/frc/event-experience).

(Asked by **4019** at Jan 22nd 17)

Q254 Battery Charger- SB50 - SB120 converter

Q: R38 says _Any battery charger used to charge a ROBOT battery must have the corresponding Anderson SB connector installed._ If we're using an SB120 connector on our ROBOT, but our battery chargers come with an SB50 connector installed, can we use an SB50 to SB120 converter? It will be insulated from end to end (charger to battery).

A: Yes, that would meet the requirements of !R38.

(Asked by **2468** at Jan 22nd 17)

Q255 LIFT specifications (spring source and shaft collar)

Q: In testing the McMaster spring order called out in the field components (9664K68) to one from century with identical specifications (http://www.centuryspring.com/extension-springs-e-41.html) substantial differences were found in deflection and springiness. Will all field spring be solely sourced from McMaster? Additionally, the field tour video shows a collar, while field components drawing does not.

A: All FIELD springs have been sourced from McMaster-Carr, however Practice Field springs and springs used as spares for official fields may be an alternate part (and if so, we'll update the manual and publish in a Team Update when that information is available). Regarding the collar, the [Field Tour Video] (https://youtu.be/ZeOevMTC_rw) is correct, and has been added as of [Team Update 06] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate06.pdf). Thank you for noticing that!

(Asked by **5414** at Jan 30th 17)

Q256 2017 Inspection Checklist

Q: Will there be a "2017 Inspection Checklist" similar to the one created for 2016? Where / when can we find this?

A: Similar to previous seasons, the Inspection Checklist will be released near the end of the Build Season. The intent behind releasing the Inspection Checklist is not to replace the Robot section of the Game and Season Manual, but to allow teams to perform their own "pre-inspection" on their completed, or nearly completed, robots.

(Asked by **5585** at Jan 22nd 17)

Q257 Rope Retaining Feature

Q: Can the ROPE's retaining feature (per I04-E) be a loop that wraps around the DAVIT fingers? If this is allowed, is the RF considered to be the entire loop to satisfy the 1 in. requirement of I04-E or just the knot that forms the loop ? Similarly, for the purposes of I04-H, how is the parameter S measured relative to the loop and/or the knot that forms the loop?

A: Please see !Q142 regarding loops and the DAVIT fingers. I04-E requires that a ROPE engage securely with the FIELD. The Blue Box provides a guideline about how to do so. The dimension required per !I04-H is measured from where the retaining feature abuts the DAVIT fingers to the farthest point on the near end of the ROPE.

(Asked by **4079** at Jan 22nd 17)

Q258 Motor Visibility

Q: Our team was planning on putting an Andymark planetary motor within some PVC piping. We were wondering if we could do this or if it had to be visible? If it doesn't have to be visible, does it have to be easy to disassemble or remove so that we may show the inspectors that it is a legal motor that has been unmodified and matches the part number?

A: There are no rules requiring motors to be visible. However, you are correct in your assumption that inspectors need to check the legality of the motors you used before they will pass you. Making it easy for inspectors to see your motors is highly recommended, for both your sake and theirs.

(Asked by **3654** at Jan 22nd 17)

Q259 Airship sidewall dimension

Q: We were trying to figure out the length of one wall of the base of the airship. We were using measurements off of the blueprints that you've provided and found that the dimensions given to us from GE-17026 do not physically create a perfectly symmetrical hexagon (all angles equal to 120 degrees). The lengths we calculated for that sidewall also do not match that of the CAD drawings. Could you provide clarification for these dimensions?

A: CAD models are provided by *FIRST* Suppliers, the Field Components drawing package are the official drawings that are used to construct the playing fields. A perfectly symmetrical hexagon can be constructed from any length side so we do not understand your question regarding side length.

(Asked by **128** at Jan 23rd 17)

Q260 Making Q & A more readable and easier to search

Q: Listing all of the previous questions and answers the way you have it is fine if your reader is searching it with a computer (or a smart phone). Is there some way to compile the list of Q&A so that they can be easily searched and/or printed out. If I try to print out the pages as they are, I can only get about half a page with characters large enough to read without a magnifying glass. There has to be a way to save them so that I could print any or all of the pages with one command.

A: This forum is only for answering rules-related questions, However, we are interested in team feedback on all issues related to the program. Please send your comments to frcteams@firstinspires.org.

(Asked by **386** at Jan 22nd 17)

Q261 VEX 393 Motors

Q: Are they allowed this year? I know when have used them in the past.

A: These motors are not listed in !R32 and so are not allowed.

(Asked by **867** at Jan 22nd 17)

Q262 Structural Adhesive to bond two parts

Q: Are we allowed to use structural adhesive to bond two parts together? It would be non-toxic after it sets.

A: There are no rules that prohibit use of adhesives on the ROBOT, but adhesives are not compliant with !I04.

(Asked by **5480** at Jan 22nd 17)

Q263 Knot type for support

Q: Can we use a delrin ball or bar with a slot cut thru it, with a strap going thru it then knotted. use the ball or bar with the knot on the lower end to go into the DAVIT fingers?

A: We believe !Q85 answers your question. If it does not, please rephrase your question and resubmit. Please use the Search Q&A button on the navigation bar before posing a new question.

(Asked by **3458** at Jan 22nd 17)

Q264 Interior Bumpers

Q: OnBumper figure 8-1, the first robot perimeter has an interior cutout. For this, will we need to cover the corners via overhang of our bumpers or put bumpers inside?

A: The first ROBOT depicted in Figure 8-1 has a concave feature, however its FRAME PERIMETER is the black, bold rectangle (imagining the string helps differentiate between the two concepts). Per !R22, ROBOTS are required to use BUMPERS to protect all *outside corners* (emphasis added) of the FRAME PERIMETER. No element not on the FRAME PERIMETER needs to be protected by BUMPERS, and only outside corners need to be protected. This same rule give requirements for how much protection is required. If you still have questions after considering this, please rephrase and ask again.

(Asked by **3336** at Jan 22nd 17)

Q265 Pneumatics - Solenoïds

Q: Can we connect two pneumatic cylinders to only one solenoïd knowing the consequences?

A: There are no rules that prohibit this.

(Asked by **5553** at Jan 22nd 17)

Q266 Are the balls preloaded in the two hoppers?

Q: The two hoppers that are located around the field. Are those preloaded? With 100-200 balls?

A: Yes, the HOPPERS are pre-loaded with FUEL by FIELD STAFF before the MATCH starts, with one hundred (100) in each HOPPER (i.e. fifty (50) in each HOPPER container). Please see details in [Section 4.2] (https://firstfrc.blob.core.windows.net/frc2017/Manual/Sections/04-MatchPlay.pdf). Also, there are five (5) HOPPERS around the FIELD. See Figure 4-1, same section.

(Asked by **4965** at Jan 22nd 17)

Q267 Can retroreflective tape be used at the loading station?

Q: Would it be allowed to bring a vision target (retroreflective tape on a board) onto the field and put it against the loading station wall so the robot can line up to the loading station? The retroreflective tape would be a clearly different shape than the lift target and the high boiler target. If retroreflective tape would not be allowed, would it be allowed instead to bring a brightly colored non-retroreflective board and put it against the loading station wall?

A: Teams may not leave anything on the FIELD per !G01, part B. While there's no rule that explicitly prohibits a non-powered signalling device that uses retro-reflective tape, if it interferes with the remote sensing capabilities of another ROBOT, it's a violation of !H12.

(Asked by **2877** at Jan 23rd 17)

Q268 Position of Drive Team Members Operating the Robot

Q: I can not find a clear answer to the restrictions on the locations of the drivers during a match. I know from past years that the coaches are allowed to move around the alliance station freely. Are drivers allowed to do the same?

A: Please see !H07 regarding DRIVE TEAM member location. This covers the location of the actual DRIVE TEAM members themselves. If you are asking about whether DRIVE TEAM member can get a significant distance from their PLAYER STATION while operating their ROBOT, please see !C12, paying special attention to the blue box.

(Asked by **3624** at Jan 22nd 17)

Q269 Do FPV goggles count as acceptable safety glasses for the drive team?

Q: Would, for example, a pair of Fatshark FPV Goggles (http://www.getfpv.com/fatshark-dominator-v3-fpv-goggles.html), be legal to be used by a driver or operator in lieu of safety glasses while driving?

A: Only if the FPV goggles are also ANSI-approved, UL Listed, or CSA rated non-shaded safety glasses as required Per !S01 .

(Asked by **1391** at Jan 22nd 17)

Q270 loading station question

Q: when you put a gear into the slot in the loading statiom, are you allowed to push it down or do you have to let it just slide with gravity?

A: There is no prohibition against pushing a GEAR into the LOADING STATION, but be careful not to violate !S08.

(Asked by **2851** at Jan 23rd 17)

Q271 Can the pneumatic system be used to inflate a balloon

Q: Can we use a pneumatic solenoid be used to control the inflation and deflation of a short piece of surgical tube. We are aware that the surgical tube may burst if we have a malfunction, but we have tested this and feel it does not create a robot or personnel safety issue since any small fragments, if any, are soft and will loose energy rapidly over a few feet.

A: No, please see !R43 and !R82.

(Asked by **3588** at Jan 22nd 17)

Q272 Touchpad at T=0

Q: Figure 3-21 Touchpad activation illustrates holding the touchpad for a minimum of 1 second, but, it also shows the touchpad being held slightly past T=0. If at T=0 the power is cut and the robot begins to descend back to mother earth are the points still awarded? The switch was still activated at T=0.

A: In order to be awarded the "Ready for Takeoff" points, as per Section 3.9, the TOUCHPAD plate must be continuously displaced at least 0.5 inches for at least one second, and during that time T=0 must happen. Therefore even if the TOUCHPAD plate is sufficiently displaced at T=0, if the continuous time that the TOUCHPAD plate was sufficiently displaced is not at least one second, the "Ready for Takeoff" points will not be awarded.

(Asked by **4248** at Jan 23rd 17)

Q273 Can we use multiple sensors on a co processor?

Q: Are we allowed to use sensors on a coprocessor (lab view) in addition with the DIO on the roboRIO? and to be activated along side those sensors connected to the DIO? has anyone ever tried this or know how to do this? (both programming and setup) we are trying to use multiple sensors past the 10 DIO limit with the possible use of a coprocessor instead of a DIO extension (DIO mxp).

A: We believe !Q50 answers your question. If it does not, please rephrase your question and resubmit. Please use the Search Q&A button on the navigation bar before posing a new question. As for the second part of your question, the purpose of this Q&A is to answer questions regarding the rules of _FIRST_ STEAMWORKS. For technical assistance, please visit the [FIRST Forums](http://forums.usfirst.org/forumdisplay.php?23-FIRST-Robotics-Competition).

(Asked by **4641** at Jan 22nd 17)

Q274 R48 "easily visible"

Q: Assuming that all other R## requirements are satisfied (particularly R47), what constitutes "EASILY visible"? [emphasis added] To clarify the question, does it require that the components be available for visual inspection with zero physical interaction with the robot, or can it require a panel, drawer, or access door to be actuated by hand to expose the components (ex: such as used with commercial heavy equipment or household fuse boxes) to view them? How easy is easy enough?

A: It's expected that some simple manipulation of the ROBOT may be required for inspectors be able to complete their work. Having to simply actuate a panel, drawer, or access door is 'easy' enough.

(Asked by **2506** at Jan 22nd 17)

Q275 G28 Air propelled FUEL

Q: Assuming that all propulsion and direction actions and mechanisms employed to do so are within the confines of the robot's permitted volume (G04), is it permissible to use forced air to propel FUEL with the intention of securing a deposit in a BOILER for scoring purposes? Note that G28 only specifies a FUEL outside these confines and does not specify if a FUEL already in motion within these confines constitutes a violation upon breaking the dimensional pane of a robot's permitted volume.

A: We believe !Q19 answers your question. If it does not, please rephrase your question and resubmit. Please use the Search Q&A button on the navigation bar before posing a new question.

(Asked by **2506** at Jan 22nd 17)

Q276 Retaining Device / Knot at Davit Fingers

Q: In Q142, you stated that placing a knot that formed a loop for the retaining device (RD) below the davit fingers (DF) would violate I04-F, implying that above it it would be ok. If the knot is considered part of the RD (in this case), there seems to be no rule stating that the retaining feature must be fully above the DF. Also, if it is not part of the RD, then placing it above the davit fingers would still violate I04-F, as it would not be 29" below the retaining fingers. Which is it?

A: Please see [Team Update 05] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate05.pdf).

(Asked by **3302** at Jan 24th 17)

Q277 Hook and Loop

Q: In reference to all the hook and loop questions, after scouring the internet and contacting several suppliers, it appears that most if not all brands of hook and loop (Velcro, Industrial Webbing, Dura-Grip, WBC, etc.) have applied a "binder coat" to all of their sew-on (non-adhesive) products to prevent fraying when cut. This appears to violate rule I04-D for use as part of a rope. What is the official ruling on this?

A: Please see [Team Update 05] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate05.pdf).

(Asked by **3302** at Jan 24th 17)

Q278 R31 BUMPER Gaps

Q: If we cover the corner with a bumper of 6" on each leg supported by 2" one each end, do we need a frame support in the corner of 1/2" x 1/2" or can the 8" gap be 4" on one side and continue an additional 4" on the other side of the frame.

A: Each end of each BUMPER wood segment must be supported. Please see !R31 as updated in [Team Update 05](https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate05.pdf).

(Asked by **5474** at Jan 25th 17)

Q279 Is it legal to use a servo that has no documented stall maximum current?

Q: My team is using a servo in our robot, but we can't find a document regarding its maximum current (in stall). This data is required for the inspection due to the fact that "rev robotics servo power module" is capable of supplying up to 15A for all its servos, and we're using two servos, so we need to prove that each one consumes a maximum of 7.5A. can we show the inspector a live test with a current measurement with multimeter as a proof for those servo's legality?

A: There is no rule limiting the stall current of servos. The limit you have referred to is a functional limitation of the device, not a rule.

(Asked by **2230** at Jan 22nd 17)

Q281 Can a composite rope be braided along a short segment or must the entire rope be braided?

Q: Does the term "consist entirely" in 104D mean that all fibers of a composite rope (see Q187) be braided (or twisted, tied, woven...) along the entire length of the rope, or would braiding (or knotting- see answer to Q187) one end of a composite rope such that the inner core fibers and outer fibers are braided together for a short segment of the rope meet 104D? In other words does the term "entirely" only apply to flexible, non-metallic fibers, or does it also apply to twisted, tied, woven...?

A: The ROPE must consist entirely of fibers that are attached together in one of the ways specified in !I04, but they do not need to be attached in that manner along their entire length.

(Asked by **3189** at Jan 23rd 17)

Q282 multiple touchpads by a single robot

Q: The red alliance has one robot that is able to climb, a robot from blue is blocking a rope on defense and touches it. An untriggered touchpad is now activated as per rule G07. Can the red bot still climb the same rope that blue touched, trigger the touchpad, and now the foul counts for either of the other two untriggered touchpads resulting in 2 touchpads triggered? Or must the red robot climb one of the two remaining ropes that have not been touched as the first one already has been triggered?

A: If a REFEREE determines that !G07 has been violated during the MATCH, the assignment of an untriggered TOUCHPAD is assessed at the end of the MATCH. If the Red ALLIANCE (in your example) has one ROBOT "ready for takeoff" at the end of the MATCH (regardless of which ROBOT it is), the free TOUCHPAD for the !G07 violation is awarded for one of the two positions left un-triggered, thus scoring a total of two ROBOTS as "ready for takeoff." If a !G07 violation occurs and all ROBOTS on the affected ALLIANCE become "ready for takeoff," there is no un-triggered TOUCHPAD, and thus no additional TOUCHPAD awarded.

(Asked by **5216** at Jan 23rd 17)

Q283 Clarification of Battery Terminal Restrictions

Q: R37-F specifies "Nut and bolt style" terminals. Are batteries with integral nuts permitted? Example: PowerSonic PS-12180HD-M5 http://www.power-sonic.com/images/powersonic/sla_batteries/ps_psg_series/12volt/PS12180HDM5.pdf

A: No. Batteries with integral nuts do not meet the requirement of !R37 part F.

(Asked by **2399** at Jan 24th 17)

Q284 Additional Battery

Q: We are using a Raspberry PI for Vision this year. Can we use an approved USB battery for the PI. My concern when the power is shutoff from the Raspberry PI without issuing a propper shutdown command it might corrupt the operating system on the PI

A: No, a seperate USB battery is not integral to the Raspberry Pi and thus is not allowed per !R37.

(Asked by **20** at Jan 23rd 17)

Q285 If multiple loops are in the rope, are there restrictions on where these loops can be?

Q: In section 9, it says that the rope can have ‘some modifications … (e.g. tying knots)’ Are we allowed to have a loop (or loops) instead of a knot that is part of the way up the rope instead of at the bottom? Is there a restriction as to how far UP the rope it can be (other than 104-F saying it must be 29" below retaining knot.)

A: All parameters for Team supplied ROPES are listed in !I04. If any of those are unclear, please rephrase your question and resubmit.

(Asked by **1512** at Jan 24th 17)

Q286 Confetti Poppers?

Q: To help cheer on my team, are we allowed to use confetti party poppers? Like those ones that pop out streamers and confetti when you pull out the string.

A: While the spirit of your question is appreciated, please see [E06](http://www.firstinspires.org/resource-library/frc/event-experience), particularly the noisy items. Additionally confetti is likely to make a mess of the venue/arena and is strongly discouraged.

(Asked by **4980** at Jan 24th 17)

Q287 Can the pilot lift a gear from the robot during the autonomous period?

Q: Since the pilot can operate the lift to remove the gear from the robot during the game, we were wondering whether they can do this during the autonomous period as well, provided that the robot drives to the lift and secures the gear on the lift without human help.

A: We believe !Q38 answers your question. If it does not, please rephrase your question and resubmit. Please use the Search Q&A button on the navigation bar before posing a new question.

(Asked by **4179** at Jan 24th 17)

Q288 Can the output of one solenoid valve be the input of another?

Q: R95. states "The outputs from multiple solenoid valves must not be plumbed together." does this only refer to in parallel operation? Would it be legal plumb one solenoid such that it supplies pressure to the second solenoid or it vents it. The intent is to have a cylinder with 3 states; direction A, direction B and free/vented"

A: !R95 does not prohibit plumbing the output of a pneumatic solenoid to the input of another solenoid. However, take care to make sure the resulting configuration complies with !R94.

(Asked by **5059** at Jan 24th 17)

Q289 Vendor of pneumatic cylinders?

Q: In R82-A, it states that items must be available in the KOP in order to be legal in the pneumatic system. Does this restrict us to using only Bimba cylinders available via the PDV? Or may we use cylinders from any VENDOR?

A: !R82 provides a list of pneumatic components that are allowed on a ROBOT. Item A states that all pneumatic components provided in the KOP, with the exception in Item K, are allowed on a ROBOT - even if it is not found in any of the other items in the list. Item J specifically allows pneumatic cylinders, and no requirement of VENDOR is stated.

(Asked by **4263** at Jan 24th 17)

Q290 Bumper Construction requirements for areas of the bot that do not require a bumper.

Q: Can you have any bumper in a position that does not require a bumper, but does not meet the bumper height. We want to build a bumper that is the 5" full height 6" from the ends, per rule R29, but only 1.5" high between the 6" ends. So between the 6" ends, where no bumper is required per R29, can we build a 1.5" bumper that provides some protection to the our bot and other bots?

A: No, assemblies which do not meet the full listed requirements of a BUMPER are not a BUMPER and therefore would be included in the exemptions\exclusions for BUMPERS in !R01 and !R02, resulting in the described configuration being illegal.

(Asked by **2137** at Jan 24th 17)

Q291 Bumper Thickness

Q: Bumpers thickness the rules read that they need to be 3/4 inch plywood and 2.5 inch pool noodles meaning the bumpers should be 3.25 inch. However the rules then go onto say "Noodle compression as a result of smoothing BUMPER fabric is not considered deformed. Any compression beyond that , e.g. for the purposes of flattening the noodle, is deformation and a violation of R29-". Since this is very arbitrary on the thickness could we please get a ruling on minimum thickness of bumpers

A: No, no specific minimum will be provided beyond the rules you have already cited.

(Asked by **1756** at Jan 26th 17)

Q292 Frame Perimeter

Q: Once the match starts, can the robot extend past the frame perimeter? As in dumping a hopper into the boiler.

A: We believe !Q4 answers your question. If it does not, please rephrase your question and resubmit. **Please use the Search Q&A button on the navigation bar before posing a new question**.

(Asked by **3242** at Jan 24th 17)

Q293 Usage of knots with team brought rope

Q: Are we allowed to have a loose knot in the rope that we provide that will intentionally come undone during the match but will not exceed the length limitation when both tied and undone?

A: We believe !Q152 answers your question. If it does not, please rephrase your question and resubmit.

(Asked by **2141** at Jan 24th 17)

Q294 360 degrees Camera

Q: Could we use a 360 degrees camera? We could not find any specifications about the camera, so any other information involving cameras will be appreciated.

A: There are no rules which explicitly allow or restrict cameras on the ROBOT. All cameras used must meet all applicable ROBOT Rules. !H12 specifies what elements DRIVE TEAM members may have/use during the MATCH.

(Asked by **6694** at Jan 24th 17)

Q295 Round Rope vs. Flat Rope

Q: Does a teams' custom rope have to be round for its thickness or can it be flat? Figure 9-1 shows a flat rope and a round rope but is not specific on whether the flat rope is legal or not.

A: There are no restrictions in !I04 requiring a ROPE to be round.

(Asked by **2444** at Jan 24th 17)

Q296 wrapping versus twisting velcro - clarification of Q6

Q: In your response to Q6, you state "something ... wrapped around the outside of the ROPE does not satisfy this requirement". Can you please clarify the difference between "wrapped" and "twisted ... together" which is allowed per I04? I can unwrap / untwist the strands of plain manila rope to make 2 separate smaller ropes the same way I can unwrap / untwist manila rope with an extra stand of Velcro to make 3 separate smaller ropes.

A: There's no *FIRST* STEAMWORKS specific definition of those two terms, so a dictionary comparison will have to do. From Merriam Webster, for "wrapped," intransitive verb #1: "to wind, coil, or twine so as to encircle or cover something." "Twisted together" isn't a dictionary term, but if you consider the term "twist," transitive verb #1: "to unite by winding ," the inherent contrast is that the former describes a superficial application while the latter is a weaving together of strands such that the applied material is embedded in the base material.

(Asked by **2973** at Jan 25th 17)

Q297 Do we have to connect can-bus between the PDP and the NI roboRIO?

Q: Since our motor controllers don't involve can-bus, it seems useless for us to connect can-bus between the PDP and the NI roboRIO. But it seems necessary since it is written in Wiring_the_2017_FRC_Control_System.pdf. So if we omit the can-bus connection, will we pass the inspection?

A: ### Updated to address difference between title question and body question, added text in bold (1/25/17). Yes, **the PDP and the roboRIO must be connected via CAN,** please see !R77. **A ROBOT without that connection is not compliant with !R77 and will not pass Inspection.**

(Asked by **6353** at Jan 24th 17)

Q298 R 06 and Robot Rope Climbing Mechanisim

Q: With regard to R06 and Robot safety -- Would it be a violation if the surface of the take-up spool is covered with very rough small sharp metal protrusions that that engage with a team supplied rope? This surface would be covered during transport, but exposed while on the field in competition. There would also be clear labeling around the area. Additionally if there is picking and fraying caused by this to the teams rope, but no other field element is this a violation of R06 - R09?

A: We cannot rule absolutely on hypothetical ROBOT designs, and the final decision as to legality of a particular ROBOT lies with the Lead ROBOT Inspector (LRI) at each event. !R06 makes no accommodation for shielding or labeling.

(Asked by **1598** at Jan 24th 17)

Q299 Damage to Team Provided rope.

Q: With regard to R06 - R09 and Arena Damage -- If there is picking and fraying caused by Velcro hooks on the climbing spool to the teams rope, but no other field element is damaged is this a violation of R06 - R09? We understand our rope might be subject to re-inspection and might have to be replaced with a fresh rope. GDC says "Why did we let them bring their own rope" :) -- Thanks for all you do!!

A: We actually don't feel like we need to govern what happens to Team supplied ROPES. Please see [Team Update 06](https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate06.pdf).

(Asked by **1598** at Jan 27th 17)

Q300 Lowering robots from the ropes after the match ends

Q: Are teams allowed to remove their robots from the ropes, after the match ends, by untying the ropes themselves from the davits?

A: Per the Blue Box attached to !R08, if a Team brings their own ROPE, yes. !R08 does not accommodate Teams removing FIELD elements, e.g. a default FIELD ROPE, from the FIELD.

(Asked by **4191** at Jan 25th 17)

Q301 Knitted fibers for Rope?

Q: I04-D permits non-metallic fibers that are "woven". Are "knitted" fibers permitted? While similar to "woven", there is a technical difference.

A: Yes, "knitted" fibers are permitted. Please see [Team Update 06] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate06.pdf).

(Asked by **2202** at Jan 27th 17)

Q302 Driving over a gear while holding a gear

Q: In relation to Q166 and Q54, if there is a GEAR blocking the LIFT, would our ROBOT draw a foul by driving over it, while holding another GEAR onboard, to place a GEAR on the blocked LIFT? In other words, if we were to contact a second GEAR (without intentionally moving it out of our way) while trying access the lift, would that be considered "trapping"/"herding" (a foul under G27) or "bulldozing"?

A: We cannot comment absolutely on hypothetical scenarios. The ultimate decision would be determined by the REFEREES at your event, with the final call made by the Head REFEREE. If a ROBOT makes "inadvertent contact with GEARS while in the path of the ROBOT moving about the FIELD" (generally including driving over) it is bulldozing. If a ROBOT is "holding a GEAR against a FIELD element" or "intentionally pushing a GEAR" it has violated !G27.

(Asked by **4028** at Jan 25th 17)

Q303 Follow-Up on Q183 and R37 Implications

Q: There is a laptop with battery essential to its operation on a robot. If all components were stripped except for its integrated battery and motherboard, would this modified device meet R37?

A: No, the device is no longer a COTS computing device if it is modified, which means it would not meet the exception in !R37.

(Asked by **422** at Jan 24th 17)

Q304 Must the Bumper touch the Corner?

Q: R31: Bumper is "supported" by 1/2" of the Frame Perimeter (FYI: "PERMIETER" is misspelled in R31). A gap of 1/4" between the Bumper and the FP is allowed. Assume the Bumper covers the entire side of the Robot, the mounting hardware is 5" from each end, and no part of the Bumper is more than 1/4" away from the Frame.

Perimeter. Due to the mounting hardware, there is a 1/8" gap between the bumper and the FP. Can the corner of the FP not be in contact with the Bumper?

A: Yes, 1/8 in. is less than the 1/4 in. required per !R31-A.

(Asked by **2202** at Jan 24th 17)

Q305 Bumper Corner not in contact with the Frame

Q: R31 requires "a minimum of 1/2 in. at each end of the BUMPER must be backed by the FRAME PERMIETER.". However, R30 requires Corners to be filled with pool noodle material (the "Overhang"). The Overhang of the end of the Bumper is not backed by the Frame Perimeter. I believe R31 should have an exception for the Overhang.

A: Please see [Team Update 05]
(https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate05.pdf)

(Asked by **2202** at Jan 24th 17)

Q306 What level of fraying constitutes damage under [G15], and when would it be called?

Q: In our hook-and-loop winch drum tests many of our ropes fray, and how much seems to depend on many factors. The fraying in some tests happens a few fibers each time. In other tests, the fraying is more obvious. Is any level of fraying considered normal wear and tear? To a referee what approximately separates damage from wear and tear with respect to fraying while interacting with any robot component (hook-and-loop or not). At what point in the match would [G15] be called for fraying?

A: We cannot comment absolutely on hypothetical scenarios. The ultimate decision would be determined by the REFEREES at your event, with the final call made by the Head REFEREE. There is no *FIRST* Robotics Competition specific definition of wear-and-tear, if the REFEREE(S) determine the damage is the direct result of a ROBOT action or MECHANISM it is possible that !G15 would be called. Teams should design carefully to ensure they do not cause any damage when attempting to climb a FIELD ROPE. If you're not referring to a FIELD ROPE, please see !G15, as updated in [Team Update 06]
(https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate06.pdf).

(Asked by **1885** at Jan 30th 17)

Q307 Airship Dividers

Q: What is the distance between the dividers on the airship as well the angle of the interior divider between the airship wall.

A: The purpose of this Q&A is to answer questions regarding the rules of _FIRST_ STEAMWORKS. Any measurements or materials information can be derived from the Field Drawings available at:
[http://www.firstinspires.org/resource-library/frc/competition-manual-qa-system]
(http://www.firstinspires.org/resource-library/frc/competition-manual-qa-system)

(Asked by **3468** at Jan 25th 17)

Q309 R35 - Gearmotors with a relay

Q: In Update 4, R35 was updated with the addition of Banebot motors to Electrical Loads that can operate with a motor controller but not a relay module. If a Banebot motor is used with one of the Banebot gearboxes would that fall into the second gearmotor/window motor category like an AndyMark PG (can use motor controller or relay) or is that still considered just a Banebot motor (motor controller only)?

A: Attaching a gearbox to a motor has no impact on it's status with regards to Table 8-2 and !R35.

(Asked by **4048** at Jan 25th 17)

Q310 Q297 Conflicting Answer

Q: In Q297, the question reads, "So if we omit the can-bus connection, will we pass the inspection?", to which the answer reads, "Yes, please see R77." R77 reads, "The PDP CAN interface must be connected to the CAN-bus on the roboRIO...". I believe this answer was made in error. Can you please verify that either R77 is correct, the CAN bus must be used between the PDP and roboRIO, or the answer to Q97 is correct that it can be omitted (and that R77 would then be updated in a future Team Update).

A: Thank you for pointing out this conflict. The question title in !Q297 is "Do we have to connect can-bus between the PDP and the NI roboRIO?" which is what the "Yes" referred to. The answer to !Q297 will be updated to clarify.

(Asked by **5881** at Jan 25th 17)

Q311 Meaning of serialized inspection tag for rope

Q: What exactly is the serialized inspection tag on page 45 in the manual? Is it something we will receive after our rope is inspected at an event or does it have another meaning? Thanks.

A: After passing Inspection, a serialized inspection tag will be attached to the ROPE near the retaining feature, such that it will not get in the way of a ROBOT interacting with the ROPE.

(Asked by **316** at Jan 25th 17)

Q312 Can we put our retention pin through the loop on our rope?

Q: Can we put our retention pin through the loop of our rope? Or do we have to rely on the knot to keep the rope in place?

A: We believe !Q158 answers your question. If it does not, please rephrase your question and resubmit. Please use the Search Q&A button on the navigation bar before posing a new question.

(Asked by **2081** at Jan 25th 17)

Q313 gear rotor

Q: Is the gear rotor removable, or does each gear train have its own rotor? If so, and the rotor is dropped to the floor, is there a penalty?...how does the team return it to the pilot?

A: Sorry, but we're unable to understand your question. ROTORS are attached to the FIELD and it's not possible for them to be dropped to the floor. Please rephrase and resubmit using the Glossary terms from the Manual where applicable.

(Asked by **4060** at Jan 25th 17)

Q321 Autonomous Period - Fuel & Gears

Q: Each robot starts Autonomous with 10 fuel and 1 gear: Can 1 robot transfer the 10 fuel to another robot in autonomous and that robot scores all 20 fuel pieces? If yes. Can 1 robot transfer in Autonomous their gear and one robot then places both gears on to the lift? Or even in Autonomous 1 gear moved per robot at one time?

A: There are no rules that prohibit one ROBOT from giving its GAME PIECES to another ROBOT once the MATCH has started. However, keep in mind that !G27 applies at all times, including AUTO.

(Asked by **6330** at Jan 25th 17)

Q322 District Model Timeline? Ontario...

Q: Does each event follow the same time line for the district model? If so what is each day's itinerary? Day 1 is only at 4pm? to drop off parts??? Any work or testing this day? When does Day2 start? Describe itinerary to clarify for teams with 30 lbs allowance, for planning ahead purposes & clarification. Open pits times, what can be done when? Robot out of bag to work on when? Into bag when? A team out of competition can at the event they still work on robot until closing?

A: Each event will post a public agenda on its [Event Information page](http://firstinspires.org/team-event-search#type=events&sort=name&programs=FRC&year=2016&from=2017-02-01&to=2017-12-16). Please see !R18, part G and !R19 for specifics regarding teams attending 2-day (i.e. District) events.

(Asked by **6330** at Jan 26th 17)

Q323 District teams 6 hours bag unlock for back to back districts

Q: For teams who have back to back districts (Districts 2 starts the day after District 1 ends), will a combined 12 hour window of our of the bag and tag be allowed?

A: Per !R19, District teams may only use the ROBOT Access Period for a total of six (6) hours during the 7-day period preceding any 2-day event in which their Team will be competing with their ROBOT. Since your events are back-to-back, the 7-day period preceding each would overlap, and if you wish you may use both six (6) hour access periods during that overlap, for a total of twelve (12) hours.

(Asked by **3211** at Jan 27th 17)

Q324 BOILER Netting Details

Q: What are the specifications for the netting above the BOILER? The field component drawings for GE-17371 omit the net, and section 3.11.4 of the Game Manual only lists relative dimensions. Can you share any product details like cord size, mesh width, or material type, to help teams accurately simulate competition conditions?

A: As noted in the Field Tour Video ["The Boiler"](https://www.youtube.com/watch?v=bJQ4kMwOGtI), the netting around the Boiler is not intended to behave consistently. As such, there are no specific drawings

published, and no guarantees of the exact "competition conditions" of a given Boiler net (though it will meet the relative dimensions mentioned in the manual).

(Asked by **148** at Jan 25th 17)

Q325 Game Pieces Transfer from Loading Zone to Alliance Station

Q: Ref section 4.6, "GAME PIECES that roll, slide, or otherwise transfer from a LOADING LANE to an ALLIANCE STATION (or vice versa) are considered “owned” by the ALLIANCE in the space now occupied by the GAME PIECE. " What constitutes a GAME PIECE to "occupy" the Alliance Station. Must the GAME PIECE complicatedly be in the volume of the Alliance Station, or is "breaking the plane" (i.e. football touchdown) satisfy the "occupy" standard?

A: A GAME PIECE is considered available to an ALLIANCE if any part of the GAME PIECE is breaking the plane of the ALLIANCE STATION volume. However, per !H07, DRIVE TEAM Members may only contact the portion of the GAME PIECE that is inside their zone.

(Asked by **1369** at Jan 27th 17)

Q326 Follow up to Question 259

Q: On Drawing GE-17026, 2 dimensions are provided. Per our calculations, in order for the airship to be perfectly hexagonal, the height must be 69.34265 in. This number was found using the Pythagorean theorem where side A is 40.035 in (length provided by CAD drawing) and C is 80.07 in (diameter of hex). If you use trig with the height (70.5 in) you get a side length of 40.703 in. Using these 2 measurements, we are not able to construct a perfectly symmetrical hexagon to build. Can you clarify?

A: As noted in !Q259, CAD drawings are provided by the individual software Suppliers. We will also note that the AIRSHIP is constructed from three-dimensional shapes, not lines, so we encourage teams to be careful about where measurements are referenced from.

(Asked by **128** at Jan 25th 17)

Q327 Sponsor machining cost in the CAW

Q: Could you clarify the intent of R12 Blue Box Example 5? If the company is listed as a sponsor and donates machine time and labor, but only some of the machinists are directly involved with mentoring the students while others are not, can we exclude the cost of the donated labor and machine time from the CAW?

A: Per the !R12 Blue Box, Example 5, "If the machinists are considered members of the Team, their labor costs do not apply." If you do not consider the machinists members of the team, then labor costs would need to be accounted for. The intent of this is described in the next paragraph of the Blue Box.

(Asked by **5842** at Jan 25th 17)

Q328 Gearbox issue

Q: Can we use gearboxes with allowed motors. Specifically, can we use gearbox PG188 with AndyMark motor am2161. The combination is listed as am2924 on the AndyMark webpage.

A: There are no explicit restrictions regarding which gearboxes may be used with which motors on the ROBOT.

with the exception of the integral gearboxes for the previous KOP Window motors and Bosch motor. These two motors must use the integral gearbox.

(Asked by **3036** at Jan 26th 17)

Q330 Are Ethernet switches legal?

Q: My team would like to place an Ethernet switch on the robot in order to provide more ports for interfacing the RoboRIO, the wireless radio, and multiple network cameras together. Is using such a device legal?

A: There are no specific restrictions with regard to Ethernet switches, however, please make sure your configuration follows !R63 (in addition to all other Robot Rules).

(Asked by **5557** at Jan 26th 17)

Q331 Dropping a rope on a robot of the opposing alliance

Q: Consider a rope of the red alliance being dropped and landing on a blue robot on its way back to its own airship during the last 30 seconds of the match. Did the red alliance pilot who dropped the rope violate C08 (Don't expect to gain by doing others harm) by forcing the blue robot to violate G20 (Let 'em climb: don't touch their ROPES)? This is a distinctly different question from Q159 because that asks about dropping a rope onto ones own robot.

A: If a REFEREE is able to determine that the intent of dropping the ROPE was solely to cause the opposing ALLIANCE to violate a rule, then this would be a violation of !C08. If the REFEREE cannot determine this, the ALLIANCE will be given the benefit of the doubt that dropping the ROPE was part of normal gameplay and the opposing ROBOT would be assessed a FOUL per !G20.

(Asked by **1257** at Jan 26th 17)

Q332 R37: TX1+J140 integrated LiPo charger essential for manufacturer intended drone operation

Q: We intend to use an Nvidia TX1 "CPU" mated to an Auvidea J140 "mother board" that in addition to TX1 voltage regulators, integrates a laptop 2S LiPo battery charger and connector - essential for intended drone applications. The LiPo is charged by the J140 from the robot battery. The J140+TX1 "ISP" will process data from 3 CSI cameras & interface to roboRIO via ethernet. No actuators connected to the ISP; ISP powered by intended battery. Is this unmodified drone ISP classified as a laptop?

A: Whether the resulting combination is "classified as a laptop" or not is irrelevant to legality for the 2017 FRC. Neither the TX1 nor the J140 appear to be sold with an integrated battery in any configuration that we can find. The inclusion of battery charging capability does not make a battery integral to device. The intent of the exception in !R37 is to allow teams to utilize devices, such as laptops, GoPro cameras, cell phones, etc. which contain batteries (the entire solution including battery, connection, etc) without violating !R37. The intent is not to allow teams to take devices such as Raspberry Pi's or Nvidia Jetson TX1's which are not designed or sold with batteries and attach some other COTS battery to them.

(Asked by **1559** at Jan 26th 17)

Q333 Robot size

Q: With reference to R03 stating that the bumpers are included in the frame measurement. Does that me that the robot frame must be (referencing cube "B") six and one half inches less than the described 30 in. by 32 in. by 36 in. tall to accommodate the bumpers outsides to be inside the cube?

A: There is no prescribed size for the ROBOT frame, or an exact specified size for the BUMPERS. If your robot is rectangular, it is expected that your FRAME PERIMETER should be approximately 6.5 in, or more, smaller than the maximum volume in each dimension in order to allow for BUMPERS (nominally .75 in plywood + 2.5 in. pool noodle + fabric).

(Asked by **3323** at Jan 26th 17)

Q334 Error message when running sample program

Q: Hi, we are running the benchtop test program for our robot using Java running on Eclipse. When we run the sample program, we get the error message: "Caught exception: scp: /usr/local/frc/lib/User_Libraries.properties: No such file or directory" We have followed every direction leading up to this point, so cannot figure out why this error appears when we run this code with the RoboRIO attached. Please advise. Thank you.

A: The purpose of this Q&A is to answer questions regarding the rules of _FIRST_ STEAMWORKS. For technical assistance, please visit the [FIRST Forums](http://forums.usfirst.org/forumdisplay.php?23-FIRST-Robotics-Competition).

(Asked by **6636** at Jan 26th 17)

Q335 Gears and Fuel during Match Setup

Q: In section 4.2 of the game manual, it says that teams may elect to: A. pre-load one gear in or on their robot AND B. pre-load up to ten fuel in or on their robot. this has stirred some discussion amongst member of my team because we have watched the kickoff video multiple times and the video shows robots with only one of the two choices. Please clarify this section so we know if we are able to load both into our robot without recieving any penalties.

A: The Manual is the governing body, thus a Team may load both types of GAME PIECES in their ROBOT per *Section 4.2 MATCH Setup*. The game animation is intended to describe game play through information and examples, and not intended to be an authority on the rules.

(Asked by **4006** at Jan 26th 17)

Q336 Knots Coming Undone

Q: To clarify Q293/Q152 and Q138, can a knot intentionally come undone provided that the rope always meets the length and other requirements?

A: Yes, please see !Q152.

(Asked by **3974** at Jan 27th 17)

Q337 End of Match and Robot

Q: Once the match ends, the power to the robots is cut off. Are we allowed to take off the rope if the rope belongs to the team and carry the robot away with the rope still attached?

A: We believe !Q14 answers your question. If it does not, please rephrase your question and resubmit. **Please use the Search Q&A button on the navigation bar before posing a new question.**

(Asked by **4579** at Jan 26th 17)

Q338 Touchpad force leeway?

Q: This question is similar to #219. My team would like to know if there is an additional leeway to the 1-3 lb force to trip the touchpad. For example, if we are 1-2 pounds over (or several) when we stop climbing the rope will this damage any of the field components?

A: We believe !Q219 answers your question. If it does not, please rephrase your question and resubmit. Please use the Search Q&A button on the navigation bar before posing a new question.

(Asked by **2840** at Jan 27th 17)

Q339 Horizontal distance from the rope to the veritcal wall of the airship

Q: What is the horizontal distance from the rope to the vertical wall of the airship?

A: The purpose of this Q&A is to answer questions regarding the rules of _FIRST_ STEAMWORKS. Any measurements or materials information can be derived from the Field Drawings available at: [http://www.firstinspires.org/resource-library/frc/competition-manual-qa-system] (http://www.firstinspires.org/resource-library/frc/competition-manual-qa-system)

(Asked by **3624** at Jan 26th 17)

Q340 How is the length of the rope measured?

Q: If there were to be slack behind the retaining feature of the rope, would it be included in the length of the rope?

A: Per !I04 parts B and C, the length of the ROPE will be measured "from the side of the ROPE'S retaining feature (per I04-E) that abuts the DAVIT fingers (L), to the farthest point on the ROPE from this feature." Note that per !I04-H the ROPE may not extend more than 5 in. from "the side of the ROPE'S retaining feature (per I04-E) that abuts the DAVIT fingers, to the closest end on the ROPE from this feature (S)."

(Asked by **3624** at Jan 26th 17)

Q341 Multiple Knots in the Rope

Q: If we were to have multiple knots in the rope, is there a minimum required distance between each knot (besides the 29 in. between the retaining feature knot and the knot right below that)?

A: There are no specific restrictions on knots below the 29 in. requirement; however, note that the ROPE must remain flexible as configured to comply with !I04-I.

(Asked by **2444** at Jan 27th 17)

Q342 Retaining Feature

Q: If a loop spliced in the end of the rope engages securely with the field by looping around one of the davit fingers, per Q142, does part of it need to be greater than one inch in diameter? Since the splice is not a knot, per Q57, and the splice itself meets the specifications of a rope, is it ok that part of the splice extends more than 2" below the davit fingers?

A: No, provided it engages securely with the FIELD, there is no requirement that a retaining feature be greater than 1 in. in diameter. Yes, per !I04, part E as updated in [Team Update 05] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdates-combined.pdf) any retaining feature may extend up to 2 in. below the DAVIT fingers. However, while one DAVIT finger is capable of supporting the weight of a ROBOT, it does not mean that a ROBOT is incapable of applying enough force to damage the DAVIT finger. A team that damages a DAVIT finger will be in violation of !G15.

(Asked by **3974** at Feb 2nd 17)

Q343 Bumpers are NOT part of Perimeter of ROBOT defined in G04 and R03

Q: There seems to be continued confusion about bumpers in the two variants of ROBOT volume (frame and effectors ONLY). It seems clear to our team that only the robot frame and extending robot components must remain within the chosen variant perimeter at ALL times, but bumpers are not in this equation (otherwise the B Variant could not use the stock chassis in the KOP without modification). Is it true that bumpers are NOT part of the perimeter dimensions defined in G04 and R03? Thanks. :)

A: Bumpers are included in the maximum volume, we believe !Q77 makes this clear. If it does not, please rephrase your question and resubmit. Please use the Search Q&A button on the navigation bar before posing a new question.

(Asked by **5477** at Jan 27th 17)

Q344 Boiler High Goal

Q: What is the horizontal distance between the boiler's high goal and the alliance wall? We tried to find this distance (or any information about the boiler's position) in both the rules and the field assembly (https://firstfrc.blob.core.windows.net/frc2017/Drawings/2017FieldAssembly.pdf), but without any success. It is possible that we missed this information. We would appreciate it if you could provide us an answer.

A: The purpose of this Q&A is to answer questions regarding the rules of _FIRST_ STEAMWORKS. Any measurements or materials information can be derived from the Field Drawings available at: [http://www.firstinspires.org/resource-library/frc/competition-manual-qa-system] (http://www.firstinspires.org/resource-library/frc/competition-manual-qa-system)

(Asked by **1574** at Jan 26th 17)

Q345 Is there a graphic/logo available for the Gear game piece?

Q: Is there a graphic/logo file available for the Gear game piece? The image incorporated in the Manual is an angled side view image. Our team would like a front view only, vector image.

A: The purpose of this Q&A is to answer questions regarding the rules of _FIRST_ STEAMWORKS. Please send your question to Team Support.

(Asked by **5110** at Jan 26th 17)

Q346 Can I use this?

Q: Are we allowed to use Velcro as a material for our climbing rope?

A: We believe a combination !Q45, !Q21, and !Q6 answer your question. If it does not, please rephrase your question and resubmit. Please use the Search Q&A button on the navigation bar before posing a new question.

(Asked by **4980** at Jan 27th 17)

Q347 Clarify: Sewing velcro to outside of Rope

Q: Team Update 3 (Jan 17) permitted non-metallic fibers to be sewn together with the rope. Can answers prior to Jan 17 (such as Q6, Q21, Q45) be considered "revised" or "superseded" regarding sewing a non-metallic fiber form of Velcro to the outside of the rope for non-whipping purposes and outside of the 4" whipping zone?

A: We have reviewed the answers to !Q6, !Q21, and !Q45 and have found no conflicts with the current rules (including the changes made in [Team Update 03] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate03.pdf)).

(Asked by **2202** at Jan 27th 17)

Q348 About the use of a pixie camera

Q: We are new to this competition and we were wondering if we could use a pixy camera as a part of our hardware since we believe it could be useful for our design our options are Pan/Tilt Kit for Pixy CMUcam5 Image Sensor or Pixy CMUcam5 Image Sensor Thanks for your time.

A: There are no rules that govern what kind of camera that may be added to a ROBOT. However, pay special attention to !R36 with respect to any Pan/Tilt mechanism.

(Asked by **6406** at Jan 27th 17)

Q349 Robot size specifications

Q: What is the exact process the officials go through to determine if the volume of a robot meets specifications?

A: The purpose of this Q&A is to answer questions regarding the rules of _FIRST_ STEAMWORKS, not discuss the processes or procedures that will be used at events. If you have a specific concern or comment, please direct it to Team Support at [firstroboticscompetition@firstinspires.org] (mailto:firstroboticscompetition@firstinspires.org).

(Asked by **3323** at Jan 30th 17)

Q350 robot extend over bumper

Q: the robot hopper is being designed to extend over the bumpers, but not past the bumpers. Is this allowed if we stay within the parameters of the assigned volume space.

A: We cannot rule absolutely on hypothetical ROBOT designs, and the final decision as to legality of a particular ROBOT lies with the Lead ROBOT Inspector (LRI) at each event. Please consider !R02.

(Asked by **263** at Jan 27th 17)

Q351 Entry on Cost Accounting Worksheet

Q: On the sheet is it enough to put Chassis Kit 2 - Axle Bolt (orange) for the description and KOP for the Source or do we need to itemize each item that is in that Kit?

A: Per the Blue Box below !R10, "If the item is a KOP item, it does not need to be on the CAW."

(Asked by **5679** at Jan 27th 17)

Q352 Picking up fuel in auto.

Q: Provided that a robot never has more than ten fuel at any moment, can a robot A. pick up fuel in auto and B. score said fuel in the boiler. Also if a robot can pick up fuel in auto, may it pick up more than ten at one time and score them?

A: !G01-F applies only at the start of the MATCH. Once the MATCH has started, there is no restriction on the number of FUEL a ROBOT may possess. Therefore, A) yes and B) yes.

(Asked by **3244** at Jan 27th 17)

Q353 Using Hinges on Bumpers

Q: As said in R29:F, you are allowed to use aluminum brackets to fasten bumpers together at a 90-degree angle. Would it be acceptable to use a metal hinge for the same purpose, given that both bumpers will be fastened to the frame 90 degrees from each other?

A: No, hinges are not aluminum sheet or angle and thus do not meet !R29-F.

(Asked by **1245** at Jan 28th 17)

Q356 What Does "Breaking" and "Crossing" the baseline mean? The more specific the better pls.

Q: According to pages: #13 -Section 2 Overview. Table 2-1 Auto Point Values V1., #41 -Section 4 MATCH Play 4.1 Periods V2, and #44 -Section 4 MATCH Play Table 4-1 FIRST STEAMWORKS Rewards V2 What does the robot have to do in Auto to get the points? Does the robot have to "cross the baseline" completely or does part of the bumper just have to "break the baseline"?

A: There are several ways to earn points during AUTO, per Table 4-1. For the "AUTO mobility" points specifically, a ROBOT'S BUMPERS must break the vertical plane defined by the BASE LINE before the end of AUTO.

(Asked by **5854** at Jan 30th 17)

Q357 Climbing and the bumper zone

Q: When it come to the climbing rules, when it says "Example 1: A ROBOT that is at an angle while navigating a ROPE has its BUMPERS outside the BUMPER ZONE. If this ROBOT were virtually transposed onto a flat floor, and its BUMPERS are in the BUMPER ZONE, it meets the requirements of R23." Is the transposition in reference to the field floor, or the bottom of the robot? Thanks.

A: The transposition described in the example is virtually "undoing" any rotation and displacement caused by climbing the ROPE, but **not** undoing any changes to the ROBOT itself. This means that a ROBOT that does not change shape at all while climbing, but rotates so the BUMPERS are perpendicular to the floor does not violate !R23 because the BUMPERS would be in the BUMPER ZONE if this ROBOT were place back on the flat floor. If, instead, a ROBOT starts pushing a mechanism down against the floor, lifting itself up onto the ROPE, but also taking the BUMPERS outside the BUMPER ZONE this would violate !R23 as the BUMPERS are now outside the BUMPER ZONE even when the ROBOT is place on a flat floor.

(Asked by **4132** at Jan 30th 17)

Q359 Robot volume inspection?

Q: Section 9 (inspection & eligibility) does not give any indication on how robots will be inspected for compliance with R03? Will it be a tape measure, do tolerances exist? If it will be an inspection box, can/will FIRST release the box specifications? If a box is used, what will be the criteria of passing inspection. e.g. 1. Robot not touching the box at all. 2. Robot only fits the box with extreme compression of bumpers. This is information teams need to know to ensure they pass inspection.

A: A ROBOT that requires "extreme compression of the BUMPERS" to comply with !R03 does not comply with !R03. ROBOTS must fit within the volume specified in !R03; teams should not be counting on any particular procedure or tolerance to make sure they fit within that volume.

(Asked by **364** at Jan 28th 17)

Q360 May a robot include fabricated items from another team's tagged bag?

Q: R21 specifically allows teams to use fabricated items from another team's withholding allowance, but not from their robot bag (or bags). R15 through R20 do not appear to explicitly forbid use of fabricated items from another team's bag, but the use of "their robot" and "your robot" throughout these rules imply that the parts in a team's bag may only be used on their robot. May a robot include fabricated items from another team's tagged bag?

A: Yes, a ROBOT element that was bagged "by 04:59 UTC on Stop Build Day, Wednesday, February 22, 2017" meets the requirements of !R15 regardless of which Team's bag it was in.

(Asked by **3946** at Jan 30th 17)

Q361 Preloaded Game Pieces

Q: If we start the autonomous round with fuel and/or gear, do we need to do something with them? If so, must they be used in AUTO or can they be used in TELEOP?

A: There are no rules specifically restricting the usage of preloaded GAME PIECES once they have been legally loaded onto a ROBOT per Section 4.2. Once the MATCH has started these GAME PIECES are treated just like any other GAME PIECE.

(Asked by **5471** at Jan 28th 17)

Q362 Multiple launchers

Q: Any restrictions with multiple launchers on a single robot to project fuel?

A: We cannot rule absolutely on hypothetical ROBOT designs, and the final decision as to legality of a particular ROBOT lies with the Lead ROBOT Inspector (LRI) at each event. However, there are no rules prohibiting multiple devices capable of "launching" FUEL on a single ROBOT, provided all other ROBOT rules are satisfied.

(Asked by **5141** at Jan 30th 17)

Q363 Breaking the Baseline at the Middle Lift Station

Q: Is it possible to break the baseline at the middle lift station. For example, if a robot were to drive from the alliance station wall directly to the wall of the middle airship lift, would that robot earn the mobility points for breaking the baseline in auto?

A: Yes, it is possible to break the BASELINE at the middle LIFT position. However, the ultimate decision would be determined by the REFEREES at your event, with the final call made by the Head REFEREE.

(Asked by **1507** at Jan 30th 17)

Q364 Winch Motor Legal?

Q: Under rule 8.6(Motors and Actuators), would a motor on a purchased winch be considered to be a "Select Automotive Motor" and therefore a legal motor?

A: No, a winch motor is not a "Window, Door, Windshield wiper, Seat, Throttle" as listed in !R32, and thus not permitted.

(Asked by **5658** at Jan 30th 17)

Q365 Actuators limitations

Q: Under 8.6 R32. Rule states "Electrical solenoid actuators, no greater than 1 in. (nominal) stroke and rate electrical input not greater than 10 watts (W) continuous duty at 12 volts (VDC). We currently an AndyMark 3515 but its stroke is 50mm...illegal?? or Legal?? If Illegal, where can we get one that is Legal??

A: We will not rule definitively on individual ROBOT parts. We will note that the referenced part is sold as a "linear servo" and is not an electric solenoid actuator.

(Asked by **5155** at Jan 30th 17)

Q366 Taking the robot down after a match

Q: Once the match is over and the robots are hanging on the ropes, 1. Will we be penalized if our robot unwinds itself because it has been turned off after the match is over? 2. Can we lift the robot to unhook the rope that our team will provide and take our robot off the field with the rope still attached? Thanks!!

A: There is no penalty for a ROBOT that descends once DISABLED at the end of the MATCH (although the "Ready for Takeoff" bonus may not be granted if requirements outlined in *Section 3.9 TOUCHPAD* aren't met). Please see !Q300 for the second part of your inquiry.

(Asked by **3636** at Jan 30th 17)

Q367 Perimeter protrusions

Q: Under Sec. R02, will small extremely flexible plastic members, such as wire tie tails up to maybe three inches long, be considered "minor protrusions"?

A: We cannot rule absolutely on hypothetical ROBOT designs, and the final decision as to legality of a particular ROBOT lies with the Lead ROBOT Inspector (LRI) at each event. A protrusion that is 3 in. long is very unlikely to be considered minor.

(Asked by **4073** at Jan 30th 17)

Q368 Alliance Wall to Baseline and other Measurements

Q: I was wondering what the official distance was from the alliance wall to the baseline I seem to see conflicting information. The rule book says 9' 4" but the drawings I printed says it is 2x 93.3. and the same goes for the distance to the launchline. Also I am wondering how big one of the sides of the base of the airship is. From what we are gathering it is just under 40 inches is that correct? Thanks

A: The purpose of this Q&A is to answer questions regarding the rules of FIRST STEAMWORKS. Any measurements or materials information can be derived from the Field Drawings available at: http://www.firstinspires.org/resource-library/frc/competition-manual-qa-system The most recent version of the manual matches the drawings.

(Asked by **6056** at Jan 30th 17)

Q369 Is a servo a servo a servo?

Q: To me this is simple, but there seems to be some difficulty on Chief Delphi, so here are the questions: Traditionally, servos are rotational devices which provide rotation-angle internal closed-loop control but do not provide feedback for "external" control. Are devices sold as "linear servos" which provide linear motion using servo standard PWM controls but producing linear rather than rotational motion considered servos under the 2017 rules?

A: If it is sold by a VENDOR as a "servo", linear or otherwise, it's a servo.

(Asked by **3946** at Jan 30th 17)

Q370 ROBOTs adhering to GAME PIECES?

Q: Provided this adhesive does not leave any marks, residue, or otherwise damage on GAME PIECES, is there any restriction on adhesive ROBOT components' interactions with game pieces?

A: There are no rules that explicitly prohibit using adhesives to interact with GAME PIECES.

(Asked by **5012** at Jan 30th 17)

Q371 Rope stowage hook & loop item

Q: During most of the match the ropes are stowed with a "hook & loop" strap, released by the Pilot towards the end of the match. This strap is not included in the field drawings and barely mentioned in the videos. Is the main part of the strap the hook or the loop portion? If the material of a team's rope was snared by the strap, can the pilot lift up the strap to free the rope?

A: Good point. That element has been added to [*GE-17025, Airship Assembly*] (https://firstfrc.blob.core.windows.net/frc2017/Drawings/2017FieldComponents.pdf) per [Team Update 07] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate07.pdf). Please see !S07 part D for the legality of contacting a "snared" ROPE.

(Asked by **4064** at Feb 2nd 17)

Q372 Weighing bumpers during inspection

Q: Assuming R25 compliance, may the robot be weighed WITH the bumpers on during inspection? In other words: If the entire robot+bumper assembly weighs less than 120lbs, can it be asserted that the robot would weigh less than 120lbs without the bumpers?

A: No. The ROBOT and BUMPERS will be weighed separately to assess compliance with !R05 and !R28.

(Asked by **619** at Jan 30th 17)

Q373 Does the Andymark assembly pn am-2971 comply with r32 for motor useage?

Q: Does the Andymark assembly pn am-2971 comply with r32 for motor useage? The am-2971 states that the motor is a banebot RS775 series but nothing more specific as identified in R32?

A: The legal motors are listed in Table 8-1. If you're not sure of a VENDOR'S part number, we recommend you contact the VENDOR directly to clear up any ambiguity.

(Asked by **240** at Jan 30th 17)

Q374 Did Team Update 05 change the comment in the answer to Q142?

Q: The second paragraph of the answer to Q142 reads "Please note that placing any knot used to form loops, as described above, below the DAVIT fingers would violate I04-F.". However, Team Update modified I04-F such by appending "with a Retaining Feature (RF) that does not extend more than 2 in. (~5 cm) below the DAVIT fingers." Provided that the knot was within 2 inches of the DAVIT fingers, does this update modify that second paragraph? If not, why not?

A: Good catch! Please see !Q142 as updated per [Team Update 05] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdates-combined.pdf).

(Asked by **3946** at Jan 30th 17)

Q375 Can a robot drop its gear deliberately into the opponents loading station?

Q: Can we use our extra gears to drop into the opponents loading zone? I don't believe we would not be violating G08 Don't tear others down to lift yourself up - "NOT DESTRUCTIVE, NOT ON ROBOT" G27 One-GEAR limit.{Blue box not control ."A" "bulldozing "} - "They would not be penalized so we are not either" G24 Don't throw GEARS This one may put the stop to it BUT WOULD IT? G21 GAME PIECES: use as directed... but "Return LOADING STATIONS" are not listed?

A: Just like in the answer to !Q166, please note that deliberately placing GAME PIECES in front of any FIELD elements (for example, but not limited to, the opponent's Return LOADING STATION) could result in a violation of !G21.

(Asked by **3244** at Jan 30th 17)

Q376 Non-metallic, non-fibrous debris in/on rope

Q: During our climb practice, we noticed that small (< 1mm) non-metallic but non fibrous pieces of the robot tore off the robot upon removal of the rope from the robot, and the debris became embedded in the rope. This debris does not provide an advantage to subsequent climbing. We are planning to use a team-supplied rope. Would the presence of such debris render the rope unusable in match play until it is completely removed?

A: We cannot rule absolutely on hypothetical ROPE situations, and the final decision as to legality of a particular ROPE lies with the Lead ROBOT Inspector (LRI) at each event. When in doubt, however, Teams should ask for the ROPE to be re-inspected.

(Asked by **3946** at Jan 30th 17)

Q377 Does the bumper have to be the same length as the frame b4 the frame returns into the robo

Q: Figure 8-1 top image shows an opening of the robot. The top right frame is >=6 so the bumper is >= 6". If the frame was 9" but the bumper still satisfied the >=6 would this still be legal? This image looks to have a 1/2" of frame before "not a Bumper". This edge is somewhere between the not ok second image and the >=6" in the same image. If you envision the top image top two bumpers, between these bumpers 2" past the end of the >= 6" bumper the frame 90deg returned into the bot 4" with a 10" gap

A: The "ROBOT frame" has no impact on compliance with !R22 except to the extent that it defines the FRAME PERIMETER. The presence, or absence, of "ROBOT frame" in sections of the FRAME PERIMETER which do not have to be covered with BUMPER to comply with !R22 do not change legality.

(Asked by **3244** at Jan 30th 17)

Q378 Cost Accounting - R10(B) KOP clarification - "Yellow Tote" items obtained by other means

Q: Does R10(B) exclusion apply to "Yellow Tote" items even if we didn't get them from a "Yellow Tote" ? We used some parts from previous years and bought some parts directly from AndyMark later. Are they exempt or listed at full retail value?

A: Any item that meets the definition of KOP, even if your team did not acquire it that way (with the exception of PDV items which require your team to have acquired them in a specific manner to qualify as KOP) may be omitted from the CAW, or listed with a $0 cost per !R10-B.

(Asked by **2813** at Jan 30th 17)

Q379 Bumper Edge Rabbeting

Q: The bumper side view in the annual shows the angle aluminum surface mounted to the plywood. Since the bumpers are part of the robot volume, can the bumper plywood edges be rabbeted (inset) so the aluminum angle surface will be flush to the surface of the plywood that mounts to the robot frame?

A: No, "rabbetting" is not an exception permitted in !R29, part A.

(Asked by **175** at Jan 30th 17)

Q380 Section 3.9 - Touchpad

Q: In the latest update section 3.9, it is stated, "...less than 75 pounds of pressure..." General usage (albeit incorrect) of pounds of pressure would indicate pounds per square inch of pressure. Since pressure is force times unit area, I believe that you meant to write force, not pressure.

A: Good catch. The manual has been updated per [Team Update 07] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate07.pdf).

(Asked by **3302** at Feb 1st 17)

Q381 Using devices to lower robots safely at the end of a match

Q: Are teams allowed to use additional equipment to safely lower hanging robots at the end of a match? The desire is to take the load off of the team-supplied rope in a way that does not rely entirely on direct human lifting of the robot, in order to reduce the risk of injury to the person detaching the rope. Would it be permissible to use a stool to support the weight of the robot while a team-supplied rope is removed from the DAVIT? Or a block-and-tackle for controlled lowering?

A: There are no rules that expressly prohibit a DRIVE TEAM from bringing and using equipment to aid in placement or removal of a ROBOT from the FIELD, provided it doesn't violate !G15, delay the field reset process (!G02), or cause an unsafe condition (like bulky items or trip hazards). Please note a PILOT may assist from the AIRSHIP by releasing the ROPE.

(Asked by **2399** at Feb 2nd 17)

Q382 Is rope with multiple I04.D techniques legal?

Q: From I04.D: "A ROPE must... D. consist entirely of flexible, non-metallic fibers sewn, twisted, tied, woven, knitted, crocheted, intertwined, or braided together" A tight interpretation of "or" allows only one of the above options. A less strict interpretation could allow any or all of the options. A strict interpretation would disallow all of the above techniques with typical COTS woven, non-adhesive, sew-on hook-and-loop strips, as the strip itself was woven by the manufacturer.

A: It is not the intent of the manual to use an exclusive-OR relationship with any use of the word "OR," unless specifically noted.

(Asked by **1915** at Feb 1st 17)

Q383 District Points for Digital Animation Award

Q: Is the Digital Animation Award considered a "judged Team award" as noted in Section 10.12.3.4, for the purposes of being awarded District Points? It appears to qualify, and the awards page (http://www.firstinspires.org/resource-library/frc/2017-digital-animation-award-sponsored-automationdirect) indicates that it is a Team award which is handed out at the regional and district level, however it also indicates that the award winners will be announced prior to any competitions.

A: No. The intent was for District points for awards to be earned only for awards actually judged at events, though this was not clear in the manual. This has been clarified with [Team Update 08] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate08.pdf).

(Asked by **5803** at Feb 4th 17)

Q384 Does GEAR placement on an out-of-order GEAR SETs matter?

Q: There is some confusion around the word "installed" w.r.t. individual GEARs in section 3.4.2. "ROTORS only start if GEARS are installed in ROTOR order". Does it matter if higher-order GEAR SETs have GEARs installed before low-order ROTORs are installed / activated? E.g., if ROTOR 2's GEAR SET has no GEARs placed on it, and a PILOT places a GEAR on the GEAR SET attached to ROTOR 3, then places all required GEARs on the GEAR SET for ROTOR 2, will ROTOR 2 still activate after turning 3 times?

A: Please see [Team Update 07] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate07.pdf). The placement of GEARS within a GEAR set, or across GEAR sets, is inconsequential. Remember, however, that once a ROTOR has started, any GEARS used to start it cannot be removed per !H10.

(Asked by **1885** at Feb 1st 17)

Q385 are we allowed to push fuel

Q: are we allowed to push or bulldoze the fuel across the field to the boiler or are we required to pick it up and hold it what is the consequences if we are not allowed to push it

A: There are no rules specifically prohibiting bulldozing or pushing FUEL.

(Asked by **322** at Jan 31st 17)

Q386 Starting postion

Q: We know that we have to be up against the wall but do we have to be flushed? Could we be at an angle?

A: The only requirement of !G01-E, is that the ROBOT must be " in contact with its ALLIANCE WALL diamond plate"

(Asked by **272** at Jan 31st 17)

Q387 Rules for detachment of robot from rope

Q: I was wondering if there is a time limit to how long we have of taking our robot down after it has hung? If there is, how long? And is there any rule about sewing a layer of Velcro over a layer of ratchet strap that is over another layer of Velcro as a rope? Velcro- Ratchet Strap -Velcro.

A: In the future, please submit only one question at a time unless the questions are directly related. Regarding your ROPE question, please use the Search Q&A button to review the previously asked ROPE material questions and resubmit a question specific to a particular rule if you need additional clarification. We will not rule on particular ROPE or ROBOT designs. Regarding your time limit question, there is no prescribed amount of time that a DRIVE TEAM has to remove their ROPE/ROBOT after the MATCH. However, DRIVE TEAMS should be prepared to remove their ROPE/ROBOT promptly to allow for FIELD reset per !G02

(Asked by **3381** at Feb 1st 17)

Q388 Bagging a second ROBOT

Q: If a team were to bag a second, legal robot in addition to their first robot, could that team then give that robot to an alliance partner at competition, provided that the robot is inspected and identified in accordance to the alliance partner?

A: No, this would not meet the requirements of !I01 which requires the ROBOT to be "built by the _FIRST_® Robotics Competition Team". It may also be a violation of !C04 which prohibits a Team from entering more than one (1) ROBOT into the event.

(Asked by **5817** at Feb 1st 17)

Q389 Does current to an aesthetic device count the same as current to an operational device?

Q: Does a raspberry pi controlling lights count as an active device? When it talks about current in the manual, does a current to an aesthetic device count the same as a current to an operational device?

A: We're not completely sure which rule or rule(s) you're referring to, but it's assumed you're referring to !R49. A Raspberry Pi controlling lights on your ROBOT is, indeed, classified as a CUSTOM CIRCUIT per !R49 and is governed by all ROBOT rules that apply.

(Asked by **2811** at Feb 1st 17)

Q391 Can you transfer fuel between robots?

Q: I've seen many questions regarding G28 or controlling fuel outside of your frame. However, I haven't seen anyone ask if unloading into another robot is allowed. Would the brief period that fuel is being transferred be a

rule violation? Also, if robots transfer fuel while in the neutral zone, would that be a violation of G23? Please clarify.

A: Please remember that we cannot comment absolutely on hypothetical scenarios. The ultimate decision would be determined by the REFEREES at your event, with the final call made by the Head REFEREE. However, if a REFEREE believes that !G23 is being violated, it will be enforced.

(Asked by **2395** at Feb 1st 17)

Q393 What does R29A mean by 3/4" nominal plywood?

Q: R29A says that bumpers should "be backed by ¾ in. (nominal) thick (~19mm) by...". Could we have clarification regarding the meaning of the nominal portion? Most hardware stores do not sell 3/4" wood, instead selling 23/32", with 3/4" requiring a special and expensive order. Would small deviations from this designated thickness be acceptable (i.e. less than 1/16" to account for manufacturing differences), or is the intent to require a particular thickness.

A: Nominal lumber/plywood dimensions refer to the wood's size prior to drying/treatment/curing, at which point the wood shrinks due to moisture loss (this is also why a 2x4 is not 2"x4"). Lumber stores typically sell 3/4" plywood that is, in fact, 23/32" when actually measured due to shrinkage. As long as it's sold as 3/4" plywood, it satisfies !R29 part A.

(Asked by **1458** at Feb 2nd 17)

Q394 Bumpers for less than six-inch side on frame perimeter

Q: If a robot has a less than six-inch side extending from the corner of a frame perimeter, would bumpers need to cover just the entirety of the less than six-inch side or should this side be elongated to reach six inches?

A: As per !R22, "If a FRAME PERIMETER side is shorter than 6 in. (~16 cm), that entire side must be protected by BUMPER (see Figure 8-2)." Note that this specifically refers to a "FRAME PERIMETER side", if the FRAME PERIMETER (described in !R01) side is longer than 6", even if the "frame" is shorter than 6", the full 6" must be protected and the BUMPER must be appropriately backed per !R31. See Figure 8-1 for examples.

(Asked by **4099** at Feb 1st 17)

Q395 How is the rope coiled?

Q: We would like to know how the rope is coiled. We know it's deployed during the last thirty seconds of the match, but we need to know specifically how the rope is configured. It's not very descriptive within the manual, and we'd like some direct clarification. Thank you.

A: There is no detailed spec about how the ROPES are "coiled" or stowed for a MATCH. Please see the [2017 Field Tour Video: In the Airship](https://youtu.be/K1mM_amcQZk) to get an idea for what to expect.

(Asked by **5641** at Feb 2nd 17)

Q396 Angled Bumpers

Q: R23 states "Bumpers do not need to be parallel to the floor." Does that mean the bumpers can be angled along the side of the frame perimeter so that the front of the bumper is facing an upward angle and extending into the

frame perimeter? Assuming the bumpers follow all construction rules, remain inside the bumper zone and are connected as specified in R23.

A: No, BUMPERS must be mounted with the plywood backing nominally vertical to meet the requirements of !R31. The quote you referenced allows for the BUMPER to be angled relative to the floor in the left-to-right dimension when looking at any given face of the FRAME PERIMETER (e.g. the left side of the BUMPER could have the top at 7 in. and the right side could have the top at 6 in.).

(Asked by **4132** at Feb 1st 17)

Q397 Starting in your own key

Q: As long as you are still touching the alliance wall, may you start angled in your own key?

A: The only requirement of !G01-E, is that the ROBOT must be " in contact with its ALLIANCE WALL diamond plate"

(Asked by **6056** at Feb 1st 17)

Q398 Davit Dimensions - GE-17081 (Detail for -02)

Q: The real field drawings for the Davit GE-17081have conflicting dimensions which affect any rope knot retention. The detail for 17081-02 shows it as 1.00 square tubing but the material callout shows 1.125 tubing. Which is correct?

A: Good catch! The material note on *GE-17081, Upper Arm* has been corrected in [Team Update 08] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate08.pdf) to reflect that it's 1 in. tubing.

(Asked by **175** at Feb 4th 17)

Q399 Davit member turn edge condition>

Q: What is the condition of the edge on the Davit member where the rope makes a 90 degree turn? Is it rounded off, simple deburred, or cut sharp? This could be a serious rope fraying point.

A: The corner is as depicted in *GE-17081, Upper Arm*. There is no radius to the corner about which you inquire, but the ends of all FIELD elements are deburred. This DAVIT is also powder coated after assembly.

(Asked by **175** at Feb 2nd 17)

Q400 Rope/Davit retention pictorial

Q: FIRST has given several answers addressing rope retention on the Davit but still leave many wondering what is being said. Let me ask it this way; if a flat strap or thin cord is being used as a teams rope does it need a large 'granny' knot as the retention feature or can a loop be used which positively engages the fingers? Suggest FIRST send out a pictorial view/diagram showing how a loop could be acceptably used with a strap or thin rope. This would set a standard that inspectors could follow.

A: Please note that !I04, part D requires a team's ROPE "be configured such that it engages securely with the FIELD with a Retaining Feature (RF) that does not extend more than 2 in. (~5 cm) below the DAVIT fingers."

While the Blue Box offers one way to do this (a large-ish knot that rests on the far side of the DAVIT fingers), it's not the only way.

(Asked by **175** at Feb 4th 17)

Q401 Bumper Question Regarding Plywood Backing Placement and Noodle Diameters

Q: Our robot is in compliance with rule R29, but we noticed that the plywood backings are not aligned from a side view(Some of the plywood boards were placed a little higher than others) is this ok? We also want to know if we are allowed to use 2.25 inch diameter noodles?

A: Yes, per !R23, "BUMPERS do not have to be parallel to the floor." Per !R29-C pool noodles must be "approximately 2½ in. (nominal) round". A 2.25 inch (nominal) pool noodle would not meet this requirement.

(Asked by **6664** at Feb 2nd 17)

Q402 Inspection

Q: What paperwork does the team need to present during inspection. Is a list of COTS materials required?

A: There's no explicit requirement for certain paperwork to be presented, however note that a Team must be able to present their CAW (!I07) either on paper or displayed on a tablet or netbook. Meanwhile, it's in the Team's best interest to be prepared with specification sheets on any item they believe might invite extra scrutiny from an Inspector (e.g. to prove that an item is sold as a "servo").

(Asked by **4573** at Feb 2nd 17)

Q403 About purposefully fraying a ROPE in compliance with I04a:

Q: If a team-supplied ROPE is purposefully frayed in a certain section (in compliance with Q137) and the individual strands from the fray may pull apart to a maximum width of over 1 inch depending on how the ROPE falls during a match, but can be easily compressed by hand to less than 1 inch wide for inspection, would the ROPE still be in compliance with rule I04a? If not, would a loop under 10 inches width made entirely out of frayed rope over 1 inch wide in a standalone setting be legal?

A: Yes, a 1 in. nominal ROPE whose knotted or frayed diameter is still less than that required in !I04, part G (as updated in [Team Update 08] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate08.pdf)) is permitted (provided it doesn't violate any other rules, of course).

(Asked by **834** at Feb 4th 17)

Q404 PPE standard

Q: Hello, we are attending from Europe & we have difficulty in finding ANSI approved PPE. Is it possible to use CE approved PPE instead of ANSI? Looking forward to receive your reply. Thanks

A: Yes, CE EN166 safety glasses are approved per [Team Update 09] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate09.pdf).

(Asked by **6697** at Feb 7th 17)

Q406 Do non-articulated components extending outside the robot´s count as the frame perimeter?

Q: Some of our components are fixed outside the frame of the robot (e.g. pieces of metals, motors) but are still within the robot´s dimension limit, even above the bumpers. Should we move this components?

A: Most definitely. Please see !G01 and !R02.

(Asked by **6694** at Feb 3rd 17)

Q407 Business plan Pictures

Q: Could you please give more details in regards of the "pictures" field in the business plan template, in the entrepernuership award soponsored by Kleiner, Perkins, Caufield and Byers?

A: Information on picture requirements for the Entrepreneurship Award sponsored by Kleiner, Perkins, Caufield, & Byers can be found [here](http://www.firstinspires.org/resource-library/frc/submitted-awards)

(Asked by **6694** at Feb 7th 17)

Q408 Is an infrared device allowed on the robot if the infrared is not used during a match.

Q: Scenario 1: If an IR device and it's corresponding remote are permanently mounted on the robot such that the IR Rx and Tx are completely contained in an enclosure that can't communicate with anything outside of the enclosure or robot is it legal? Scenario 2: If an IR device is mounted on the robot such that it's IR receiver is completely covered during match play can the cover be removed and the IR remote be used in the pit and when powering the robot up on the field prior to the match.

A: We don't have enough context to be able to unequivocally rule items legal or illegal, and the final decision as to legality of a particular ROBOT lies with the Lead ROBOT Inspector (LRI) at each event. If you have a question about how to interpret a specific rule or what it means, please rephrase and resubmit.

(Asked by **2481** at Feb 3rd 17)

Q410 Manufacturer installed loop on rope for retaining feature

Q: May we use a rope that has a manufacturer installed loop that is woven into the rope to use as a retaining feature. We would then use the loop in a Lark's Head Knot (question 142) only the retaining feature would already exist. There would not be a knot below the davit fingers because it is woven in a loop with an 8 inch diameter. The rope we are looking at is one like this. http://www.homedepot.com/p/Crown-Bolt-1-2-in-x-15-ft-White-and-Beige-Double-Braid-Nylon-Dock-Line-65782/203481778

A: A splice created by the manufacturer is no different than a splice created by the Team. Please see !Q57 and !Q342 for answers regarding splice classification and splices as part of a retaining feature.

(Asked by **5216** at Feb 4th 17)

Q411 Building over but not beyond bumpers

Q: If our bumpers are at their max length, can we build over the bumpers and start the match that way?

A: No. Please see !G01 and !R02.

(Asked by **4024** at Feb 4th 17)

Q412 No arms, extensions, fuel pick up beyond original volume?

Q: On page 52 of 128 in the game manual it states: "A ROBOT may not exceed the volume for which it passed inspection during the MATCH. So a robot that is part of Volume A as shown in the diagram on the same page is not allowed to have an arm or other extension of any kind during the match? Even a pickup arm that swings over the edge to pick up the fuel would cause the overall length to exceed the 36" x 40" size. Am I misreading this? Thanks.

A: A ROBOT may reach beyond it's BUMPERS during the match (see !Q4), but **only** if it remains within the maximum allowed volume, per !R03 and !G04 while doing so. To do this, the ROBOT would have to initially be smaller than the maximum allowed volume.

(Asked by **5882** at Feb 4th 17)

Q413 Woodie Flowers and Dean's Award

Q: Hello.We will register to these 2 awards but we have few questions.First of all where we can register to woodie flowers?Through mentors account or a student can register it?Second one in the deans list award submission theres two nominator option but if you go to the second one it says deadline expired.But the deadline is 16 february we can only add one studen to award what should we do

A: Information on the entry process for the Woodie Flowers Award can be found [here](http://www.firstinspires.org/resource-library/frc/submitted-awards). For your second question, please contact *FIRST* support through one of the methods shown [here](http://www.firstinspires.org/about/contact-us).

(Asked by **6472** at Feb 7th 17)

Q414 Chairman's award video requirement

Q: When submitting the application for the award. Do we have to download the video with the application? Or can we bring and add that at the regional?

A: The video is not required to be submitted on Thursday, February 9, 2017. Teams must bring the video to any Event where they are interviewing for the Chairman's Award. Please see [this page](http://firstinspires.org/resource-library/frc/submitted-awards) for detailed information about the Chairman's Award Submission, including the video requirements.

(Asked by **5464** at Feb 4th 17)

Q415 Refering Q153

Q: Referring to Q153: If, while not in its LAUNCHPAD, a ROBOT gently propels FUEL a few inches above the ROBOT'S volume, into another part of the ROBOT, does it constitute a violation of G23?

A: Yes, this would be a violation !G23. LAUNCHING does not have a minimum - propelling FUEL "a few inches above the ROBOT" is still LAUNCHING.

(Asked by **20** at Feb 4th 17)

Q416 G09 violation caused by BUMPER contact into an open FRAME PERIMETER

Q: Does G09 still apply to inadvertent/accidental damage to mechanisms inside the FRAME PERIMETER that was caused by the BUMPER contact of another robot? This is the first year in a while with a wide-open field and many likely open-frame designs with rollers at the opening of the frame. Here's an example that ignores intent like G09 implies. What if the damaged robot made a defensive move against a high-speed robot which inadvertently caused roller damage after contact with its bumpers was made?

A: Yes.!G09 applies regardless of what part of the offending ROBOT caused the damage. Note that the rule requires the offending ROBOT to have initiated the contact.

(Asked by **1885** at Feb 4th 17)

Q417 Bumpers and velcro covers

Q: There are bumpers for sale that use velcro to attach a blue or red cover for a rapid switch. Are these FRC legal? While our bumpers will be built according to rules, we would use a velcro attached cover for the second color. For example, we would build traditional blue bumpers, and make red covers that are attached with abundant velcro.

A: Yes, with restrictions; please see !R26-B.

(Asked by **4509** at Feb 5th 17)

Q421 Can we use a dye on the rope for aesthetic reasons? Dye must chemically bond to the rope.

Q: We would like to know whether it is acceptable to use a "universal" dye such as RIT. This is a "direct dye" and bonds to the fibers of the rope, but we do not believe this affects the operating characteristics of the rope in any meaningful way.

A: No, Team-applied dye is not permitted in !I04 (although dye applied by a manufacturer is permitted as of [Team Update 09](https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate09.pdf)).

(Asked by **2813** at Feb 7th 17)

Q422 Chairman's Essay

Q: Can we use portions of our old essays and just update information, particularly if we like the way it communicates our thoughts? i.e. metaphors we've used?

A: Yes, there are no rules against that.

(Asked by **4265** at Feb 7th 17)

Q423 Cutting team supplied rope

Q: If at the end of a match, a robot cannot be released from the rope for whatever reason. Would a team be allowed to cut their team supplied rope to remove the robot from the field without a penalty?

A: There are no rules that prohibit a Team cutting their own supplied ROPE. As with all other activities, please keep safety in mind if you decide to do this.

(Asked by **364** at Feb 5th 17)

Q424 Laser use.

Q: We have been given a class 2 distance laser by Balluff Canada - can we use it?

A: Item D in the Blue Box under !R07 specifies that any exposed lasers other than Class 1 lasers will be a violation of !R07.

(Asked by **4343** at Feb 5th 17)

Q426 Pneumatic air tanks

Q: Are we allowed to air up a couple of identical 125 psi air tanks and change out the air tanks on our system between matches? May we use an external compressor to charge the On-board tanks? May we use a separate battery to air up an on-board tank between matches OR are we required to use the on-board battery to charge the tanks?

A: Question 1: No, per !R86, "No stored air pressure intended for the ROBOT may be located off-board the ROBOT." Question 2: Yes, provided you are doing so in compliance with all applicable rules (e.g. !R84, !R85, !R90, and !R91). Question 3: You may change the battery after pressurizing any pneumatic storage tanks, but you must be using a battery plugged into your ROBOT for the entire process per !R85. In the future, please submit individual questions separately. This helps speed up response and make the Q&A more easily readable and searchable. Thank you!

(Asked by **3492** at Feb 5th 17)

Q427 Where are the forms for 2017?

Q: Where's the robot lock up form? Robot inspection form?

A: Those forms are not yet posted, but when they are, they'll be announced in a Team Update.

(Asked by **3654** at Feb 5th 17)

Q428 USB Camera Limit

Q: Is there a limit to how many USB cameras we can have on the robot? If there isn't a limit, are USB hubs legal.

A: There are no restrictions to the number of cameras allowed on the ROBOT, nor are there any restrictions on using USB hubs.

(Asked by **4630** at Feb 4th 17)

Q429 PWM connections

Q: Is it permissible to control two motor controllers via a single robo Rio PWM output using a Y-cable? Does this meet the R23 intent of "directly" connecting?

A: Yes, and yes (assuming you mean !R73, not !R23).

(Asked by **386** at Feb 5th 17)

Q431 Andy Mark am-2971

Q: Can we use am-2971 even though the motor is am-0939 which is not on the current list of allowed motors? The gearmotor am-2971 has the same specs as an allowed gearbox with an allowed motor.

A: Motors not listed in !R32 are not permitted. We recommend contacting the VENDOR if you need additional clarity on which motor(s) is used in a particular product.

(Asked by **3036** at Feb 5th 17)

Q432 R29B & F Aluminium Bracket Size Limits

Q: Are there any size limitations, besides those established in R29B, on the aluminium brackets allowed under R29F? The limit is 1 inch away from the frame perimeter, but no limitation parallel to the frame perimeter is established. Figure 8-4 shows a tiny extrusion, while our team has an angle bracket which extends several inches away from the corner. However, the rules do not have any limitations on how long the corner brackets can be, meaning you could have a metal belt in the bumpers

A: There are no limits to how far the aluminum brackets allowed by !R29 part F may run parallel to the FRAME PERIMETER, so long as the brackets are being used for the intended purpose specified in !R29 part F.

(Asked by **1458** at Feb 5th 17)

Q434 Distance between the base line and the airship

Q: Is the base line closer to the alliance wall than the airship's closest (to the alliance wall) lift? If so - will putting a gear in the lift during the autonomous period (robot touching the lift) count as crossing the base line? To be specific - what is the distance between the airship's closest lift and the base line?

A: The purpose of this Q&A is to answer questions regarding the rules of _FIRST_ STEAMWORKS. Any measurements or materials information can be derived from the Field Drawings available at:
[http://www.firstinspires.org/resource-library/frc/competition-manual-qa-system]
(http://www.firstinspires.org/resource-library/frc/competition-manual-qa-system)

(Asked by **4586** at Feb 9th 17)

Q436 Please clarify the phrase "included in any Kickoff Kit"

Q: In Table 8-1 there is the phrase "included in any Kickoff Kit". Could you please clarify, does this literally mean "any" kickoff kit? For example kickoff kits going all the way back to 1992 (not sure if there were kickoff kits in 1992) or only kickoff kits distributed for the 2017 Game

A: "Any Kickoff Kit" means "any Kickoff Kit" and is not restricted to the 2017 Kickoff Kits. Please note, you may be asked to provide documentation that an item was in a Kickoff Kit, especially for older items that Inspectors may not be familiar with.

(Asked by **662** at Feb 7th 17)

Q437 FRC Age Requirements

Q: Are there official age requirements and/or age limits for students on an FRC team? I see the marketing materials for Grades 9 - 12 and ages 14 - 18, but I was told these were only recommendations, not requirements and/or rules

A: The purpose of this Q&A is to answer questions regarding the rules of _FIRST_ STEAMWORKS. For other comments or questions, please [contact us](mailto:firstroboticscompetition@firstinspires.org)

(Asked by **314** at Feb 7th 17)

Q438 Previous Year's KOP Parts

Q: As our team works on the Bill of Materials for this year, do parts included in previous year's kit of parts count as exempt from the cost of the this year's robot? Examples of this question would include the roboRIO, voltage regulator, and pneumatic control module, which we recieved in last year's kit of parts from the rookie kit, but not this year's.

A: Yes, the definition of Kit of Parts (KOP) includes "any Kickoff Kit Checklists" which includes the Kickoff Kit Checklist for the Rookie Tote you received last year.

(Asked by **5816** at Feb 7th 17)

Q439 Electrical linear actualtors

Q: Per R82 pneumatic linear actuators are allowed; would a COTS electrically driven linear actuator (not a solenoid or sold as a servo) be allowed?

A: A COTS electric linear actuator is not a pneumatic linear actuator and therefore !R82 would not apply. If the motor or actuator is not permitted per !R32, it is not allowed.

(Asked by **4064** at Feb 7th 17)

Q440 using a reducer which wasn't in the kit of parts

Q: We were wondering if it was ok to use the reducers from the link below; www.li-ming.com/english/index.php?option=com_content&view=rticle&id=374&Itemid=357 thanks in advance,

A: We cannot rule absolutely on hypothetical ROBOT designs, and the final decision as to legality of a particular ROBOT lies with the Lead ROBOT Inspector (LRI) at each event. If you have a question about a specific rule, please rephrase and resubmit.

(Asked by **6415** at Feb 6th 17)

Q441 Fastness on the robot frame protrude past those on the drive chasey

Q: We have used 80/20 extrusion in each corner of our robot. We have just discovered that the fasteners used in the extrusion sit 4mm further out than the thickest bolt head on the chassey ie the wheel axel which protudes 6.5mm. These fasteners we have used while slightly outside the chassey frame are inside the permitted volume. Is this an issue?

A: We cannot rule absolutely on hypothetical ROBOT designs, and the final decision as to legality of a particular ROBOT lies with the Lead ROBOT Inspector (LRI) at each event. !R02 does contain a provision for minor protrusions, but we cannot definitively state whether your 10.5mm bolt heads qualify as we lack the complete context your LRI will have to make that call.

(Asked by **5087** at Feb 7th 17)

Q442 Davit locking pin reoval

Q: Can the locking pin on the Davit fingers be removed to allow for the rope loop to be installed? If not can your rope loop (obviously shorter than 250mm) pass through the davit fingers and around both fingers to create your retaining feature. ?

A: Yes, the DAVIT retaining pins are intended to be removed in order to install or remove a ROPE.

(Asked by **5087** at Feb 7th 17)

Q443 When does the T=0 check occur relative to the time when the robot is disabled?

Q: Consider a robot which climbs the rope, displaces the touchpad for >1 second, and holds position until the robot is disabled, at which point it immediately back-drives and releases the touchpad. Does the T=0 scoring check occur before, after, or during the instant the robot is disabled? Will a robot that behaves in this way score the TAKEOFF bonus? In other words, is it at all possible for a robot to get the TAKEOFF bonus if it cannot hold position without power?

A: ROBOTS are not expected to continue displacing the TOUCHPAD plate past T=0 without power in order to be awarded "Ready for Takeoff," assuming they have adequately displaced the TOUCHPAD plate continuously for at least 1 second up to and including T=0.

(Asked by **228** at Feb 7th 17)

Q445 Gear used in robot construction

Q: Hello, We were looking to use a partial gear in the construction of one of the manipulators of our robot that would be permanently attached. We would consider painting the gear if this could cause confusion. Thanks, Kevin

A: There are no rules that prohibit using a GEAR as a part of your ROBOT. Distinguishing the GEAR used on your ROBOT from the GEARS used as GAME PIECES is recommended to avoid any confusion when assessing how many GEARS your ROBOT is carrying per !G27.

(Asked by **3637** at Feb 7th 17)

Q446 Is Lift Peg Painted

Q: Is the spring portion of the lift peg painted or is it the standard silver/gray color as sourced from McMaster-Carr?

A: The peg is not painted.

(Asked by **1557** at Feb 7th 17)

Q447 Do the Bumpers on all four sides of the robot need to be bolted on?

Q: We know that the outside corners have to be covered with at least 6 inches of bumper, but does the bumper need to be bolted/pinned in on all 4 sides, as in there needs to be a supports device holding the bumpers on every side of the robot?

A: Yes, per !R26-G BUMPERS "must attach to the FRAME PERIMETER of the ROBOT with a rigid fastening system". Also pay special attention to !R31 as updated in Team Update 05, which specifies, "... a minimum of ½ in. (~12.7 mm) at each end of each BUMPER wood segment must be backed by the FRAME PERMIETER."

(Asked by **2335** at Feb 7th 17)

Q448 Clearance for Hanging rope

Q: If a robot pulls into the climbing area until its bumpers meet resistance, how far from the edge of the robot (including bumpers) will the rope hang? I want to verify how far back the climbing mechanism can be positioned and still make contact with the rope. I don't see this 'hanging' dimension anywhere in the manuals.

A: The purpose of this Q&A is to answer questions regarding the rules of _FIRST_ STEAMWORKS. Any measurements or materials information can be derived from the Field Drawings available at: [http://www.firstinspires.org/resource-library/frc/competition-manual-qa-system] (http://www.firstinspires.org/resource-library/frc/competition-manual-qa-system)

(Asked by **3748** at Feb 7th 17)

Q449 Lenght of Rope

Q: When interpreting I04 does this rule mean that part of your rope must be in contact with the floor after it is released?

A: No, there is no requirement in !I04 that the ROPE contact the floor when released.

(Asked by **4011** at Feb 7th 17)

Q450 Monkeys Fist knot in rope contents

Q: If we tie a monkeys fist knot in our rope, can we use a marble/golfball in the center of that knot? The rope we are using is Para cord (if you need to know).

A: No, this would violate !I04-D

(Asked by **3848** at Feb 7th 17)

Q452 Can a "youth" over 18 submit the Chairman's Award?

Q: I have a "youth" who is over 18. How will I get her into the youth registration to be able to submit the chairman's award. I cannot find the directions.

A: The purpose of this Q&A is to answer questions regarding the rules of _FIRST_ STEAMWORKS. For awards assistance and other questions, please [contact us](mailto:firstroboticscompetition@firstinspires.org)

(Asked by **6164** at Feb 7th 17)

Q453 FIRST Choice items count toward overall BoM costs?

Q: Do the items obtained from FIRST Choice count towards our overall expenditures taken into account for the Bill of Materials? (i.e., does it subtract from the overall amount we are allotted to spend on the robot?)

A: As per Section 8.1, "the Kit of Parts (KOP) ... is the collection of items listed on any Kickoff Kit Checklists, distributed via _FIRST_ Choice, or paid for completely, except shipping, with a Product Donation Voucher (PDV)." Therefore items distributed via _FIRST_ Choice are part of the KOP, which are exempt from the Cost Accounting Worksheet (CAW) per !R10.

(Asked by **6325** at Feb 7th 17)

Q455 Rope Retaining Feature not to extend more than 50mm BELOW the DAVIT fingers.

Q: I need clarification on 104 E E. " be configured such that it engages securely with the FIELD with a Retaining Feature (RF) that does not extend more than 2 in. (~5 cm) below the DAVIT fingers." Do you mean to say FROM rather than BELOW?.The distance from the davit fingers is a horizontal measurement of 2.45 Inches (57mm) (See field components sheet GE-17081 sheet 2) before the vertical c channel. I am assuming you don't want the rope retaining feature entering the VERTICAL C channel?

A: "Above" (as used in the Blue Box in !I04 part I) and "below" (as used in !I04 parts E and F) are directional references to the DAVIT fingers with respect to the AIRSHIP. "Above" refers to the portions of the DAVIT between the AIRSHIP and the DAVIT fingers, and "below" refers to the remaining portions of the DAVIT on the other side of the DAVIT fingers.

(Asked by **5087** at Feb 8th 17)

Q456 Do Overall District Points Matter?

Q: With the announcement of Michigan having 160 teams at states, I went looking back at tiebreakers to determine sort order. When I look at table 10-8, it says the sort order is Total Playoff Round Performance Points, Best Playoff Round Finish at a single event, etc. Since total district points are not on this list, do they matter? I did look at 10.12.3.6, and it does mention total points, but doesn't say if all teams tied make it. 10.12.3.7 doesn't mention sort order or total.

A: Good catch! We weren't clear that Table 10-8 is used to break ties in case teams have equal accumulated point totals. This has been corrected in [Team Update 10] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate10.pdf).

(Asked by **6013** at Feb 10th 17)

Q457 Motor Modification for Shaft Position Encoder

Q: R33 limits modifications to a motor. Sub item A allows modifications for connecting "the motor to the ROBOT and actuated part". Can that rule be adjusted to specifically allow motor modifications for the purpose of mounting a shaft position encoder directly to the motor?

A: The purpose of this Q&A is to clarify questions related to _FIRST_ STEAMWORKS. If you have rule suggestions or comments, please contact [Team Support](mailto:firstroboticscompetition@firstinspires.org).

(Asked by **5099** at Feb 7th 17)

Q458 Incidental carpet attachment

Q: Consider a robot that has a strip of hook fastener (the hook part of hook-and-loop). This strip drags against the field carpet as the robot drives around such that it doesn't really attach to the field carpet (no impact on robot mobility). The intent of this strip would be to attach to loose rope on the ground. Would this be considered illegal attachment to a field element under G15-C?

A: We cannot comment absolutely on hypothetical scenarios. The ultimate decision would be determined by the REFEREES at your event, with the final call made by the Head REFEREE. However, the intended use of a MECHANISM or COMPONENT has no impact on !G15. If a piece of hook-and-loop fastener, as in your example, were to attach to the FIELD (including the carpet), !G15 would be violated.

(Asked by **3322** at Feb 8th 17)

Q461 Rubber Bands

Q: Are we allowed to use rubber bands on our robot?

A: We will not approve specific products or ROBOT designs. If you have a question about a specific rule, please rephrase and resubmit.

(Asked by **6451** at Feb 9th 17)

Q462 bumpers for frames with breaks in them

Q: Does a break in the frame require a bumper if it is not an outside corner? Supposing our robot is square and had a length of 30 in and within one of the 30 in span there is a 6 in break in the frame ---- ----- would the inside edges of that break require a bumper?

A: No. Per !R22, BUMPERS must protect "all outside corners of the FRAME PERIMETER." Note that the FRAME PERIMETER is defined by the hypothetical string wrapped around the ROBOT as described in the Blue Box of !R1, not the actual ROBOT frame elements.

(Asked by **484** at Feb 10th 17)

Q463 Can the pool noodle part of the bumper be compressed after the start of the match?

Q: R29-C states that pool noodles cannot be deformed in the construction of the bumper. However, it does not specify if this only applies to permanent compression. Would a mechanism that extends outside the perimeter frame after the start of the match be allowed to move the pool noodle, so long as it can return to its original shape? R29-A allows clearance pockets in the plywood backing, which would not be particularly useful if the noodles could not be compressed.

A: Per !G05, "ROBOTS must be in compliance with BUMPER Rules throughout the MATCH." While incidental deformation of the BUMPERS due to interaction with a ROBOT'S extension, other ROBOTS, and FIELD elements is expected (i.e. compression that's not a deliberate attempt to flatten the noodle), any other deformation of the BUMPERS is a violation of !G05 because of noncompliance with !R29, part C. We're unclear on how clearance pockets in the plywood backing that allow the BUMPER to sit flat over minor protrusions such as bolt heads are related to compression of the noodle.

(Asked by **1160** at Feb 9th 17)

Q464 Hard Parts

Q: On figure 8-5, it shows that the hard parts are the angles and the wood, but it does not say if the fastener system counts as a "hard part". please clarify

A: If a part is hard (i.e. not soft like a pool noodle or fabric), it is a "hard part".

(Asked by **6694** at Feb 8th 17)

Q465 Field components -- vinyl decal goes on which side of poly?

Q: The poly plastic panels at the base of the airships -- in the 2017 Field Components.pdf, drawing GE-17085, it lists "WILL HAVE VINYL DECAL ON ONE SIDE". We have a sensor that would benefit from looking at this vinyl, but the return signal is different if the light has to go through 1/4" poly first. Will the decal be on the outside (facing a robot approaching an elevator) or on the inside of the poly? Thank you!

A: The decal is on the ROBOT side of the polycarbonate. Please be aware that while the decals have a scratch-resistant coating, they are subject to damage, and we can't guarantee every decal on every AIRSHIP will be pristine for every event.

(Asked by **955** at Feb 9th 17)

Q466 R29A, Small Clearance Pocket Size

Q: R29A allows small clearance pockets in bumpers. Is this designed to allow clearances for fasteners and bearings only or can small sheet metal parts be given clearance as well? How deep can a pocket be?

A: We cannot rule absolutely on hypothetical ROBOT designs, and the final decision as to legality of a particular ROBOT lies with the Lead ROBOT Inspector (LRI) at each event. In general, the clearance pocket allowance is to allow for the BUMPER to sit flat over minor protrusions allowed per !R01 (e.g. " bolt heads, fastener ends, weld beads, and rivets" no greater than 1/4 in.). In general, a sheet metal component of the ROBOT is unlikely to be considered a "minor protrusion".

(Asked by **854** at Feb 8th 17)

Q467 Is 3M Dual Lock Reclosable Fastener considered a 'hook and loop' fastener?

Q: Can we use 3M Dual Lock Reclosable Fasteners to attach our bumpers? It is technically not considered a hook and loop fastener according to the spec sheet. It can hold 60 lbs/square inch. Can we use it? http://multimedia.3m.com/mws/media/349929O/dual-locktm-reclosable-fasteners-sj3551-sj3552-sj3550.pdf

A: We cannot rule absolutely on ROBOT designs, and the final decision as to legality of a particular ROBOT lies with the Lead ROBOT Inspector (LRI) at each event. However, 3M Dual Lock Reclosable Fastener is not a "rigid fastening system" as required by !R29 part G.

(Asked by **5619** at Feb 9th 17)

Q468 Rope Color

Q: Our driver is Red/Green color blind. We can only find the rope we have selected for climbing in olive-drab (nylon paracord). Can we paint the rope ("bright" neon yellow) stripes to aid in visibility. Finish would be dry - with no intent to change surface friction.

A: No, that would be in violation of !I04 part D.

(Asked by **5436** at Feb 9th 17)

Q469 Spark Motor Controller

Q: As per R34, teams can use the Spark Motor Controller on their robots. Are teams allowed to use the limit switch inputs that are on the controller or do we still have to read limit switches through programming?

A: Provided all _commands_ to "configure, enable, and specify all operating points for all power regulating devices" originate from the roboRIO there are no rules explicitly prohibiting use of the limit switch inputs on any legal motor controller.

(Asked by **4006** at Feb 9th 17)

Q471 Clarification on "computing device"

Q: Could you expand on the definition of a computing device, as referenced in several rules, including R37? What constitutes a computing device?

A: We feel the dictionary definition of a "Computing Device" is sufficient to describe what constitutes a computing device. However, the final decision as to the legality of any ROBOT component lies with the Lead Robot Inspector (LRI) at each event.

(Asked by **3322** at Feb 9th 17)

Q472 Is the AndyMark L16-R linear actuator legal under ?

Q: The AndyMark L16-R [AM-3517] is an electric linear actuator. Per the product webpage, "this linear servo operates as a direct replacement for standard analog rotary servos." Per we believe this meets the line regarding "PWM COTS servos with a retail cost < $75. The AM-3517 is $70 and is described as such as a servo. It does use a standard PWM 3-pin cable for signal and power.

A: We will not rule on the legality of specific parts or ROBOTS. If you have a question about a specific rule, please rephrase and resubmit.

(Asked by **2656** at Feb 9th 17)

Q473 Pneumatic Approval for specific part number

Q: We have two pneumatics made by Control Line out of Cleveland Ohio (Part number CP311-0004A) and we want to make sure these are FIRST approved to have in competition.

A: We will not rule on the legality of specific parts or ROBOTS. If you have a question about a specific rule, please rephrase and resubmit.

(Asked by **4226** at Feb 9th 17)

Q474 Bumper mounts extending INTO frame perimeter

Q: R29-B states that hard bumper parts must not extend more than 1 in. beyond the frame perimeter. Is this implying that hard bumper parts can only extend OUTWARDS from the frame perimeter? Or can parts attached to the wood backing (such as mounting brackets) extend INTO the frame perimeter so long as the wood backing remains completely outside of the frame perimeter? Figure 8-5 shows an illustration of the 1 in. limit, but it does not address parts extending INTO the frame perimeter.

A: There's no intended rule or implication that elements used to fasten the BUMPER to the ROBOT frame, including brackets, can't extend inside the FRAME PERIMETER. Figure 8-5 shows an example of this in the "example fastener system allowing blind attachment" call out.

(Asked by **342** at Feb 10th 17)

Q475 Can a relay be used as part of a CUSTOM CIRCUIT?

Q: As the title asks, can a relay module, not used to control motors, solenoids or the compressor, be considered part of a CUSTOM CIRCUIT? Rules R35, R49, R60, R71, and R73 are not clear on this situation, as they state (in various ways) that relays are not CUSTOM CIRCUITS and must be controlled via the roboRIO. This prevents teams from utilizing a relay as part of an otherwise legal CUSTOM CIRCUIT, for example by using a

co-processor to turn 12V LED's on and off via a relay module.

A: [Team Update 10](https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate10.pdf) clarifies !R60, !R71, and !R73 to only apply to Relays listed in !R34-B. These devices must be used in compliance with these rules regardless of whether they are controlling a motor, actuator, or CUSTOM CIRCUIT. Other relays may be used in CUSTOM CIRCUITS and controlled by devices other than the roboRIO, but may not be used to control motors or actuators.

(Asked by **2177** at Feb 10th 17)

Q476 Linear Actuators being used

Q: I was looking at the rules, this being our first year we are still learning the in and outs of it. Hopefully we didnt do something agaist them..... If we did we will have to revamp a few ideas. On page 79 of the rule book it talks about motors and actuators. It does talk about using electrical solenoid actuators, no greater than 1in. I did not see this right away, as this is now my problem and question. We used two Thomson linear actuators, one with a 4 in stroke and a 6 in stroke.

A: Per !R32, the only electric linear actuators allowed on the robot are servos which meet the requirements in !R32, actuators powered by motors listed in !R32, and electric solenoid actuators which meet the requirements in !R32.

(Asked by **6732** at Feb 9th 17)

Q478 Spray Painting Plexiglass

Q: We have a visible plexiglass element on our robot that we would like to spray paint red (our school color). Is this in violation of any rules? Will it be allowed to show when we are on the blue alliance?

A: There are no rules explicitly prohibiting paint, but we cannot rule absolutely on specific items/applications, and the final decision as to legality of a particular ROBOT lies with the Lead ROBOT Inspector (LRI) at each event who has the full context of the item and implementation. If you have a question about what a specific rule means, please rephrase and resubmit.

(Asked by **5720** at Feb 10th 17)

Q479 Rope retention on the davit

Q: If the rope has a loop tied in the end, can the rope be wrapped around the davit horizontal bar above the davit fingers then fed back through its own loop and between the davit fingers? This would retain the rope much like a necktie around your neck, very secure.

A: There are no rules that prevent a Team from securing their ROPE around the main horizontal arm of the DAVIT "above" the DAVIT fingers.

(Asked by **1051** at Feb 13th 17)

Q480 Specifications on Dimentions

Q: My team is attempting to recreate some field elements so that we can practice on. We have replicated the Human Fed Hoppers, and have found conflicting sizes. On Page 147 of the Field Components, the opening is

listed as 24 inches, however in section 3.11.2 OVERFLOW Loading Station, the opening is listed as 2' 1", or 25 inches, wide. Which is correct?

A: The correct width is 24 in., this has been corrected in [Team Update 10] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate10.pdf). We will note that the drawing you are referring to is of the Return LOADING STATION, the Overflow LOADING STATION drawing is missing which has also been added in [Team Update 10] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate10.pdf).

(Asked by **3242** at Feb 11th 17)

Q481 Where can we find this year's blank BOM spreadsheet?

Q: We've been trying to locate the template for this year's BOM.

A: Please see the Blue Box in !I07 for a link to a recommended template.

(Asked by **4624** at Feb 10th 17)

Q483 Can the rope retaining feature RF enter the vertical C Channel?

Q: Can the Rope Retaining Feature (RF) enter the VERTICAL C channel?

A: While there's no rule that expressly prohibits a Retaining Feature from being in the vertical C-channel of the DAVIT assembly, !I04, part E restricts how far a retaining feature can extend below the DAVIT fingers, and thus indirectly prohibiting such a geometry.

(Asked by **5087** at Feb 12th 17)

Q484 Software optimization after stop building day

Q: On stop building day, the robot is sealed and baged. What about the software development? Is a team free to write on the software code even after the date of stop building has evolved?

A: Per !R18 part D, "After Kickoff, there are no restrictions on when software may be developed."

(Asked by **6417** at Feb 10th 17)

Q486 Using forced air to move piffle balls out of the way

Q: If I want to move a piffle ball which is inside the volume of the robot and is preventing me from placing a gear,can I use forced air to move it out of the way?

A: We cannot comment absolutely on hypothetical scenarios. The ultimate decision would be determined by the REFEREES at your event, with the final call made by the Head REFEREE. However, please pay special attention to !G28 and the answer to !Q19.

(Asked by **5087** at Feb 10th 17)

Q487 Drive Coach Movement

Q: Are drive coaches allowed to move outside their driver station like in previous seasons, or must they stay within the area in which is their driver station?

A: Please note that !C12 doesn't restrict the movement of COACHES. !H07 has detail about restrictions on DRIVE TEAM members during the MATCH.

(Asked by **6595** at Feb 13th 17)

Q489 When is the official Stop Build time for Pacific / West Coast?

Q: I've seen some vague information about the stop build time being different this year, and it being relative to eastern standard time. Normally its been midnight no matter where you are. Our team is in southern California, and I just want to be 100% sure what time we must stop building on the 21st. Is it midnight or 9pm our time? Thanks!

A: Please see !R15 in Section 8.4 'Budget & Fabrication Schedule'. All teams worldwide have a simultaneous stop build time. You will need to calculate your local stop build time based on the UTC (Universal Time) given in the rule.

(Asked by **4019** at Feb 12th 17)

Q490 Clarification on G24 (LAUNCHING during scoring)

Q: Would pushing a GEAR, with the GEAR momentarily (for a split second) leaving contact with the pushing ROBOT, while the LIFT peg is surrounded by the GEAR, be considered LAUNCHING? (i.e. is it legal to "shove" a GEAR towards the back of the LIFT peg)

A: We cannot comment absolutely on hypothetical scenarios. The ultimate decision would be determined by the REFEREES at your event, with the final call made by the Head REFEREE. However, pushing or "shoving" a GEAR onto (or further onto) a LIFT peg is unlikely to be deemed LAUNCHING.

(Asked by **610** at Feb 12th 17)

Q491 How low does the rope dangle above the ground?

Q: My build team is beginning to have the robot climb their practice rope. I understand the length of the rope is 7' 2" however I'm having difficulty finding the information that states how long is the rope actually HANGING from the airship? They want to make sure their robot's "hook" can catch the rope.

A: Good question! Please see Section 3.8 as updated in [Team Update 11] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate11.pdf). With that, critical dimensions can be derived from the [2017 Game and Season Manual] (https://firstfrc.blob.core.windows.net/frc2017/Manual/2017FRCGameSeasonManual.pdf) and the [Field Component drawing package] (https://firstfrc.blob.core.windows.net/frc2017/Drawings/2017FieldComponents.pdf).

(Asked by **3700** at Feb 14th 17)

Q492 Starting Configuration

Q: We just received the Robot Inspector form. It states Starting configuration is inside the BUMPER ZONE . However, R02 in the manual states starting configuration is inside FRAME PERIMETER. Please confirm which is correct.

A: It's actually a Zen Koan. "What is the sound of one hand clapping?" "What was your face before your parents were born?" "What is the vertical projection of your BUMPER ZONE, which is defined only using horizontal planes?" It's intentionally designed [to provoke "the great doubt"](https://en.wikipedia.org/wiki/K%C5%8Dan). OK, actually, it was a mistake. Good catch! The Robot Inspector form will be updated to correctly reflect !R02

(Asked by **4009** at Feb 13th 17)

Q493 CAW Listing

Q: The Overview of Section 8.1 and Q453 indicates that items distributed from FIRST Choice do not need to be included on the Bill of Materials. That said, is this limited to a number of items listed as available per team? For example, the AM-9015 is available on FIRST Choice with a max of 2 available per team. Would this rule cover all AM-9015 motors on the robot and none need to be listed, or would it only cover 2, and any additional ones will need to be listed on the CAW?

A: There is no quantity restriction on items exempt from the Cost Accounting Worksheet (CAW) per !R10.

(Asked by **1405** at Feb 13th 17)

Q494 Articulated frame perimeter extrusion

Q: Hello. Our team has an articulated climbing mechanism that extrudes from the frame perimeter while on its starting state but it can get fully inside of the frame perimeter while in use. İt does not enter the 17 cm bumper zone ever during the match. Should we move it fully inside of the frame perimeter or is it ok since it is articulated. Reference: 8.2 - R01 to R03 , 8.5 R22 and R23

A: We believe !Q406 also answers your question, regardless of whether the components are articulated or not.

(Asked by **6384** at Feb 13th 17)

Q495 Frame Perimeter Vertical Extension

Q: With respect to R02, minor protrusions are allowed beyond the vertical extension of the FRAME PERIMETER when the robot is in the STARTING CONFIGURATION. Would a gusset on the outer face of an upper structure that is otherwise entirely contained within the FRAME PERIMETER when in the STARTING CONFIGURATION fall into the "etc." specified in the rule, or would that be left to the mercy of the LRI?

A: The judgement about whether or not an element on your ROBOT is a 'minor protrusion' per !R02 needs to be made at your event by the Inspection team. The more 'minor' the protrusion is, the more likely it is to meet !R02. Generally, a gusset is not a minor protrusion allowed by !R02 (particularly as clarified by the added blue box text as of [Team Update 11] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate11.pdf)).

(Asked by **999** at Feb 14th 17)

Q496 Location of Velcro on the strap

Q: Can our team put Velcro on the strap at any location?

A: We're unable to conclusively determine what you're referring to. If you're referring to the ROPE'S retention strap, Teams are not allowed to modify the ROPE'S retention strap on the AIRSHIP. If you're referring to a Team-supplied ROPE, please use the Search Q&A button to review the previously asked ROPE material questions and resubmit a question specific to a particular rule if you need additional clarification.

(Asked by **5031** at Feb 12th 17)

Q497 Non-Electrical energy storage - aka Springs

Q: Are springs allowed per R43-C as a deformed robot part? Can they be under tension at the beginning of the match, as they would store energy in that state?

A: Yes, springs under tension are allowed per !R43 part C.

(Asked by **4064** at Feb 12th 17)

Q499 Are Retaining Rings Sticking Outside of Frame Perimeter Legal

Q: My team had a question about the frame perimeter rules. We have a few roller shafts sticking outside our frame perimeter about a 10th of an inch with a retaining ring and was wondering if this is legal. We were wondering if retaining clips are considered fasteners? It's basically like a bold head, which would be acceptable based on (R01). These shafts are not driven and wouldn't be rotating.

A: The judgement about whether or not an element on your ROBOT is a 'minor protrusion' per !R02 needs to be made at your event by the Inspection team. The more 'minor' the protrusion is, the more likely it is to meet !R02. Generally, a shaft extension, minimally, secured with a retaining clip is allowed by !R02 (particularly as clarified by the added blue box text as of [Team Update 11] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate11.pdf)).

(Asked by **3452** at Feb 14th 17)

Q502 The definition of "supported bumpers".

Q: Hi, The inspection checklist got us a little bit confused: If our bumpers touch the frame perimiter (our chassis) at all time, do we need to attach the bumpers to the robot every 8" or less? does "supported" mean attached?

A: Please note that the [2017 FRC Inspection Checklist] (https://firstfrc.blob.core.windows.net/frc2017/AuxDocs/2017FRCInspectionChecklist.pdf) is a short-hand tool used to check ROBOT compliance, and if there's any disparity between it and the [Game & Season Manual] (https://firstfrc.blob.core.windows.net/frc2017/Manual/2017FRCGameSeasonManual.pdf), the manual takes precedence. In this case !R31 details parameters for backing BUMPERS; if any of that is unclear, please rephrase your question and resubmit.

(Asked by **2679** at Feb 14th 17)

Q503 How Many Human Players Are Allowed to Operate The Loading Lane?

Q: In Q185, it appeared that an alliance is allowed to station Human Players as they wish. However, I am wondering if there is a maximum number of players per alliance allowed to operate the Loading Lane and Return Loading Station? Thanks.

A: While there's no rule that expressly limits the number of DRIVE TEAM members from each Team that can be in an ALLIANCE'S LOADING LANE and Return LOADING STATION, Section 4.5 provides practical limits on the configuration of a single Team's DRIVE TEAM.

(Asked by **4501** at Feb 13th 17)

Q506 Height limit for non-powered signalling devices?

Q: Provided they don't violate any other rules or pose unnecessary safety risks to field volunteers or drive team members, is there a maximum height limit for the non-powered signalling devices allowed in H12-C?

A: While there are no rules that expressly limit the height of non-powered signalling devices allowed by !H12 part C, the ultimate decision regarding safety and interference would be determined by the REFEREES at your event, with the final call made by the Head REFEREE.

(Asked by **5012** at Feb 14th 17)

Q507 ROBOT Lock-up Form

Q: Where can we get our ROBOT Lock-up Form? I googled it, only to find the 2016 version. Is it identical to the previous version or do we need a new type of form? And where can I find it?

A: The ROBOT Lock-Up form for 2017 has just been released, and it can be found [here] (https://firstfrc.blob.core.windows.net/frc2017/AuxDocs/2017FRCRobotLockupForm.pdf).

(Asked by **6353** at Feb 14th 17)

Q508 Copper tubing use

Q: Can we use copper tubing for our pneumatic lines?

A: No, as that is not an allowed pneumatic part per !R82.

(Asked by **1506** at Feb 14th 17)

Q509 Operator Console Dimensions

Q: Can an operator console be made to extend after the beginning of the match to fit a driving wheel? The dimensions of the wheel is larger than the allowed 14" depth. Is it possible to have the wheel tilted or swivel into position after the match begins so that its size will not provide any strategic advantage, but would allow us to still use it? The configuration before the match will conform to allowed dimensions, but when in use, the wheel would need to extended further than the 14" depth.

A: No, the OPERATOR CONSOLE limitations specified in !R99 must be observed at all times regardless of the MATCH phase.

(Asked by **773** at Feb 13th 17)

Q510 Motor Modification

Q: Would notching the end cap (or end bell) of a 217-2000 motor to allow room for mounting screws be a violation of R33? Thanks.

A: Yes, this would violate !R33 as this modification does not match any of those allowed per !R33 A-E.

(Asked by **3257** at Feb 13th 17)

Q511 Clarification on Bumper Zone would be helpful

Q: In the past the Bumper Zone was a true zone. This year it appears as though the bumpers are restricted to less than 2 inches from the floor as a maximum height. So would it not be clearer to say the bumpers (that are 5 inches high) must be between 0 and 2 inches above the floor. Or maybe a picture would help?

A: The purpose of this Q&A is to clarify questions related to _FIRST_ STEAMWORKS. If you have rule suggestions or comments, please contact [Team Support](mailto:firstroboticscompetition@firstinspires.org).

(Asked by **4624** at Feb 13th 17)

Q512 Do all bumpers need to cross the baseline plane in Autonomous?

Q: Your earlier answer for crossing the baseline during autonomous was that the Robots's Bumpers must break the vertical plane to score 5 points. Does that mean ALL bumpers have to cross the plane? Does a single set of bumpers need to cross that plane ? Or does breaking mean that any portion of any bumper must break though the plane ?

A: No. No. Yes. Please see *Section 4.3 Scoring* for the manual's description of the scoring effort. Specifically, it's awarded for any ROBOT that "breaks the BASE LINE vertical plane with their BUMPER by T=0."

(Asked by **4859** at Feb 14th 17)

Q514 Clarification on how far in the bumper backing must be supported by the frame perimeter.

Q: In Q304, the mounting hardware is mentioned to be 5" away from the ends (corner) and the answer doesn't seem to disallow it. However, R31 states that "a minimum of ½ in. (~12.7 mm) at each end of each BUMPER wood segment must be backed by the FRAME PERMIETER". Does that mean that the supporting element must at least 1/2 inch away from the corner of the frame perimeter, and no more? Or is the supporting element allowed to be more than 1/2 inch away from the corner ? If so, is there a maximum?

A: There are no rules that specify where BUMPER mounting hardware must be used; !R29, part G only requires a "tight, robust connection" between the BUMPERS and the rest of the ROBOT and doesn't prescribe how to do that. This is a separate requirement from that which requires BUMPER ends be supported (i.e. backed, not necessarily secured/fastened) by the ROBOT frame elements in !R31. The 1/2 in. dimension refers to the extreme ends of the BUMPER (see the top right part of Figure 8-7), not to the distance the BUMPER can be from the FRAME PERIMETER.

(Asked by **6135** at Feb 14th 17)

Q515 Is there allowed to be anything in the 1/4 space between the bumper wood and frame perimet

Q: In R31, it mentions that any gap "must not be greater than ¼ in. (~6 mm) deep". Are we allowed to have the side of an L-Bracket in this gap, between the frame perimeter and the bumper wood? I've heard conflicting opinions on whether it's supposed to be only "Bumper Wood - Chassis" or whether "Bumper Wood - Metal Sheet (less than 1/4 inch) - Chassis" is allowed.

A: The presence of any material in the "gap" would mean that there's no longer a "gap." Anything attached to the outside of the ROBOT frame then redefines that ROBOT'S FRAME PERIMETER.

(Asked by **6135** at Feb 14th 17)

Q516 globe motors

Q: As per rule R32 I do not see Globe Motors listed. However it does read "Hard drive motors or fans that are: included in any Kickoff Kit, distributed via FIRST Choice, part of a legal motor controller (including manufacturer provided accessories), or part of a legal COTS computing device". Do Globe Motors from an older Kit of parts fit in this category since it reads "any kit of parts" and therefore allowed this season?

A: The globe motor is neither a hard drive motor nor a fan, so that particular language does not apply.

(Asked by **28** at Feb 14th 17)

Q517 Bumper mounting bracket?

Q: We fabricated our frame with 3/4" horizonal bumper mounting tabs along the bottom edge. Is this allowed? The bracket is part of the robot not the bumper.

A: We cannot rule absolutely on hypothetical ROBOT designs, and the final decision as to legality of a particular ROBOT lies with the Lead ROBOT Inspector (LRI) at each event. We recommend you carefully review !R1, !R2, and !R29, part G.

(Asked by **3707** at Feb 14th 17)

Q518 Can a drive team member "coach"?

Q: Our team has a long tradition of having a student-only drive team. We are concerned about removing the robot from the rope at the end of the match, and may need an adult to help lift the robot and disengage the rope from the davit. Can an adult mentor wear the "coach" button, but stand aside and allow a third student driver to function as the coach during the match? This would ensure that we can remove our robot from the field in a timely manner yet preserve our "student only" drive team.

A: Yes. There are no requirements that the COACH actually coach, nor any prohibitions on other DRIVE TEAM members coaching.

(Asked by **433** at Feb 14th 17)

Q519 Adult mentor on field to help disengage robot

Q: Can and adult mentor who is not part of the drive team enter the field at the end of the match to help disengage our robot from the rope and airship? We are trying to ensure that we have a student-only drive team, but are not sure about the feasibility of the disengaging since we do not have a regulation airship to practice with. An adult mentor on the field would help us ensure quick removal of the robot, at least in the beginning. I asked a local head ref, and asking Q and A was recommended.

A: No, per !H05 only those on the DRIVE TEAM may be in the ARENA, regardless of the portion of the MATCH.

(Asked by **433** at Feb 14th 17)

Q520 Is the spinning of rotors dependent on fuel?

Q: In Q211, a similar question regarding liftoff was answered. I would just like to double check whether or not fuel is required for the engagement & spinning of the gears or rotors? Also, is the scoring of fuel needed for any other function or is it simply to gain points? Thank you.

A: No, there is no requirement that any FUEL be scored in order for an ALLIANCE to be eligible for "ROTOR engagement" MATCH or Ranking points. Scoring of FUEL is not a prerequisite for anything other than scoring "Pressure accumulation" MATCH and Ranking points.

(Asked by **4079** at Feb 14th 17)

Q521 compressor cooling fan

Q: If the compressor is installed on the robot cart. and we install a fan to cool it. does that fan have to be powered by the robot?

A: !R84 and !R85 require the compressor to be controlled and powered by the ROBOT. However, there is no requirement that any "fans" would also need to be powered by the ROBOT.

(Asked by **5314** at Feb 14th 17)

Q522 Clarification on Q515, L-Bracket used to mount bumpers allowed between wood and robot?

Q: To add onto Q515, does that mean an L-bracket being used to mount the bumpers (part of the bumpers, not attached to robot until the bumpers are mounted) is allowed if it will be in between the bumper wood and chassis (Bumper Wood - Bumper Mounting L-Bracket - Chassis)?

A: Yes, it is permissible for other BUMPER parts (aluminum angle per!R29-E or !R29-F, attachment system elements per !R29-G, etc.) to be located in the gap allowed by !R31-A.

(Asked by **6135** at Feb 14th 17)

Q526 Is it legal to use servo reversers on a robot?

Q: We are trying to wire two servo motors to the same pmw to open doors on the robot, but we are unsure if it is within the rules to use a servo reverser to make one servo go the opposite direction of the other.

A: No, this would be a violation of !R36.

(Asked by **648** at Feb 15th 17)

Q527 Robot Lock-up Form

Q: Does the content of the Robot Lock-up Form have to be printed? Can it be hand-written? Or both are accepted?

A: The form must be printed out (color optional), then the appropriate fields filled in and signed, and then the form in its entirety must be presented during inspection.

(Asked by **6353** at Feb 15th 17)

Q528 A system that does not extends beyond the bumper zone

Q: We have a system that does not extend beyond the bumper zone but some of the pieces extend beyond the frame perimeter but when we turn the axle its not extends beyond the frame perimeter? ist a violation of team update 11 new rules?

A: [Team Update 11](https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate11.pdf) did not change any rules regarding "minor protrusions beyond the FRAME PERIMETER," it merely provided additional clarification of intent regarding how a "minor protrusion" is defined. The final decision regarding the legality of a "minor protrusion" lies with the Lead Robot Inspector (LRI) at each event.

(Asked by **6472** at Feb 15th 17)

Q529 New Motor Withholding Allowance

Q: If we get a replacement motor for our robot and work on the wires for that motor, do we need to include its weight in the 30 pound WITHHOLDING ALLOWANCE?

A: Yes, once an item is altered or modified, it has evolved from a COTS item to a FABRICATED ITEM, and must be included in the ROBOT bag or WITHHOLDING ALLOWANCE in order to be used on a ROBOT at an event.

(Asked by **3618** at Feb 15th 17)

Q530 G14 Violations Not Associated with Ready For Takeoff Bonus.

Q: G14: Don’t climb on each other. ROBOTS may neither fully nor partially support the weight of other ROBOTS strategically or repeatedly. Does a robot attempting to right a fallen alliance partner constitute a G14 violation, as it is strategic? In a pushing match, if one robot's bumpers get underneath the other robot's bumpers, lifting them slightly off the ground in the process, does this also constitute a G14 violation? Would it be a G14 violation if the pushing robot did not back away?

A: No, as updated in [Team Update 12] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate12.pdf), a ROBOT that intentionally supports the weight of another ROBOT in an effort to right it is permitted (and, assuming permission from that ROBOT'S DRIVE TEAM, encouraged!). While the ultimate decision would be determined by the REFEREES at your event, with the final call made by the Head REFEREE, in general a ROBOT

incidentally supporting another ROBOT as a result of BUMPER to BUMPER contact is not a violation of !G14. Intentionally maintaining support of another ROBOT, even if the initial action was unintentional, may be considered strategic and therefore a violation of !G14.

(Asked by **228** at Feb 17th 17)

Q531 Can either CB185P-120 or CB185F-120 be used For main breaker?

Q: R44 lists P/N CB185-120 for the main breaker, but the datasheet for the breaker specifies a different part numbering system, requiring either Panel mount or Flush mount to be specified. Can either CB185P-120 or CB185F-120 be used?

A: No. Only the surface mount version of the circuit breaker is permitted, as updated in [Team Update 12] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate12.pdf).

(Asked by **2526** at Feb 17th 17)

Q533 fuel spills

Q: If, while not in its LAUNCHPAD, a ROBOT spills FUEL out of the ROBOT'S volume onto the floor, does it constitute a violation of G23 (not launching fuel)? Examples would be: if we pick up too much fuel and overflow our hopper, we stop fast and fuel spills, or we are struck by another robot and spill fuel? I realize In todays world fuel spills are a great environmental hazard, but in an era where steam power reigned, fuel spills were common and not given much concern.

A: Spilling is not "shooting in the air, kicking or rolling across the floor with an active mechanism, or throwing in a forceful way," and thus not LAUNCHING.

(Asked by **5086** at Feb 16th 17)

Q534 technical rope question

Q: Per Q142 it appears that a rope may be tied in such a way as to loop around both davit ears and be secured by the pin. If using a "lark's head" knot (http://www.animatedknots.com/cow/index.php?LogoImage=LogoGrog.png&Website=www.animatedknots.com#ScrollPoint) the end of the rope ("S" in 104 H) extends below the davit fingers. Would the length of this end be governed by 104 H (<= 5") or by 104 E (e.g. would this tail be considered part of the retaining feature and only be able to extend no more th

A: If a knot is used as a Retaining Feature, any tail that comes off it is subject to constraints applied to ROPE anatomy element S.

(Asked by **5675** at Feb 15th 17)

Q535 Diamond plate

Q: Can you please define the diamond plate that the robots must be in contact with at the start?

A: Please see Section 3.11 for a description of the ALLIANCE WALL including the diamond plate.

(Asked by **3036** at Feb 15th 17)

Q536 Consistency of bumper color

Q: For our blue colored bumpers, one (1) of our bumpers is a darker shade of blue than the other (3) bumpers. Is it legal, meeting bumper requirements, if the consistency of the bumper color is slightly off (one is slightly, noticeably darker than the others)?

A: There are no rules requiring all BUMPERS be the same shade of Red or Blue.

(Asked by **611** at Feb 15th 17)

Q537 Duck Tape Question

Q: Can we use duck tape on our robot? Are there any rules about the use of duck tape?

A: There are no rules prohibiting specific types of tape on the ROBOT, however there are many rules which may apply to its use in specific locations or applications (e.g. BUMPERS, pneumatics, etc.) which must be followed.

(Asked by **5467** at Feb 16th 17)

Q538 technical rope question

Q: Similar to Q410, please consider a loop that is formed by sewing a strap together such that a loop may be hooked over each davit finger. Where would the “retaining feature” end, and the rope resume? Would it be exactly where the strap comes together and this must be no more than 2” below the davit? Therefore, the section where the strap is sewn together is considered rope and is not subject to the 2” limit below the davit?

A: Any part of a ROPE'S Retaining Feature (e.g. loops, knots, thread, splices, etc.) is subject to Retaining Feature constraints detailed in !I04.

(Asked by **5675** at Feb 16th 17)

Q539 Davit fingers to floor length

Q: What is the length of the davit fingers, the horizontal distance to the channel, and the distance from the horizontal to the floor? In figure 3-20 we can see how far it is from the touchpad to the floor but we need to know the added distance of the davit.

A: The purpose of this Q&A is to answer questions regarding the rules of FIRST STEAMWORKS. Detailed measurements or materials information can be derived from the Field Component Drawings available at: https://firstfrc.blob.core.windows.net/frc2017/Drawings/2017FieldComponents.pdf Please pay special attention to drawing GE-17081.

(Asked by **3636** at Feb 16th 17)

Q540 two working pressures

Q: does rule R87 restrict you from adding a second regulator that lowers a section of the device to less than 60psi. for example can we have one regulator that reduces the pressure to 60psi have some cylinders work at that pressure. then have a second regulator that reduces the pressure to 20psi for other cylinders to work at.

A: Additional adjustable, relieving, pressure regulators downstream of the "working" air pressure regulator are allowed.

(Asked by **5314** at Feb 16th 17)

Q541 Instructions for the FIRST iron-on logos

Q: The FRC 2017 KOP included 8 FIRST iron-on logos. There are different types of iron-on materials and methods. Where can instructions be found for applying the logo to fabric (e.g. cold peel, hot peel)?

A: Good question. The recommended process is now posted in a [*FIRST* Bumper Logo] (http://wpilib.screenstepslive.com/s/4485/m/63630/l/699679) article in the [Other KOP Item Resources] (http://wpilib.screenstepslive.com/s/4485/m/63630) section of the Screensteps resource page.

(Asked by **578** at Feb 21st 17)

Q542 bumper fabric

Q: Can vinyl be used for bumper fabric?

A: We cannot rule absolutely on specific materials, and the final decision as to legality of a particular ROBOT element lies with the Lead ROBOT Inspector (LRI) at each event. Generally, fabrics that are easily ripped, abraded, or torn by sharp objects do not meet the requirements of !R29 part D.

(Asked by **4057** at Feb 16th 17)

Q543 Colored Panels above Lifts

Q: We are tuning our autonomous vision tracking and trying to understand what the material above the lift/pegs is made out of as it does not seem to be documented in the field manuals: http://i.imgur.com/rxEySrF.png It looks like a colored panel with vinyl sticker featuring a patterned image with gears. What is this made out of and how can we re-create it for testing? Thanks!

A: Please see drawing number GE-17085 in the [Field Components drawing package] (https://firstfrc.blob.core.windows.net/frc2017/Drawings/2017FieldComponents.pdf) for material detail. The decal is present for aesthetic purposes only, and graphics files are not publicly available.

(Asked by **3958** at Feb 16th 17)

Q544 Lever Nuts

Q: Are lever nuts (am-2576) legal to use on the electrical board this year?

A: We cannot rule definitively on specific ROBOT components, the final decision regarding the legality use of a particular ROBOT component lies with the Lead ROBOT Inspector (LRI) at each event. There are many rules governing the electrical system of the ROBOT and may allow the use of lever nuts in some applications but not in others.

(Asked by **5505** at Feb 17th 17)

Q545 Qualified replacement for the Spike Relay Module

Q: Given that the Spike Relay Module is a discontinued product, is there an effort underway to qualify a replacement device for future seasons? I understand that the primary use cases for the Spike have been replaced by the numerous variable motor controllers and the PCM, but there are still some applications for which a relay module is desirable, e.g. a non-pneumatic solenoid.

A: The purpose of this Q&A is to clarify questions related to FIRST STEAMWORKS. If you have rule suggestions or comments, please contact [Team Support](mailto:firstroboticscompetition@firstinspires.org).

(Asked by **4999** at Feb 17th 17)

Q546 G07/G20 overlap - Touching Robot that is touching their rope

Q: G07 is a penalty for touching an opposing robot that is touching their rope. G20 is a penalty for touching an opposing Alliance's rope. Ex C of G20 is a duplicate of G07. Should Ex C be removed and the text below updated to: "Violation: FOUL. If an opposing ROBOT contacts a ROPE that is in contact with an opposing ROBOT, and if a G07 penalty has not been assessed for the same ROBOT/ROPE combination, the opposing ROBOT is considered to have triggered ...".

A: No. In Figure 7-2, you can see a Red ROBOT touching the Red Rope, this is the prerequisite for the Blue ROBOT contact with the Red ROBOT violating !G07. In Figure 7-3 Ex. C, the Red ROBOT is touching a Blue Rope which is a violation of !G20. Figure 7-3 Ex. C, the Blue ROBOT has then contacted the Red ROBOT (which is already violating !G20) which triggers the violation escalation of !G20 to the TOUCHPAD violation. If both robots (Red and Blue) are in contact with both the ROPE and each other, then both !G07 and !G20 (with the violation escalation) have been violated and up to two (2) un-triggered TOUCHPADs will be considered triggered for the ALLIANCE that was affected.

(Asked by **2202** at Feb 16th 17)

Q547 Rope construction

Q: Can the rope be comprised of two different types of rope, tied end to end to form one rope? Given that the rope fits within all other constraints.

A: There are no rules prohibiting this.

(Asked by **5348** at Feb 17th 17)

Q548 Are there any visibility requirements for the roboRIO?

Q: It appears as if the roboRIO is not required to be visible for inspection, as the inspection checklist only requires that "PDP and breakers must be easily visible for inspection." If a robot mounted their roboRIO underneath materials such as it is unable to be viewed easily for inspection, would this be in violation of any rules?

A: There are no rules prohibiting this. However, please remember that if the roboRIO is not visible to FIRST STAFF (like the FTA) it may make it more difficult for them to assist you with troubleshooting any problems.

your ROBOT may encounter.

(Asked by **4501** at Feb 17th 17)

Q549 Bumper weight included in 30 lbs. outside of bag?

Q: Does the weight of the bumpers count towards the extra 30 lbs. of items outside of the bagged robot?

A: No. !R21 Part C provides an exemption for BUMPERS from the WITHHOLDING ALLOWANCE.

(Asked by **2444** at Feb 17th 17)

Q550 Improve hand signal communication

Q: As a new team we are not using sensors. Can we use signal lights like what people use on the tarmac at airports to signal our driver across the field? The lights would not be able to light up the field or interfere with other drivers as they would be covered with colors so the drivers can determine left/right, forward, backward. We are finding our drivers have trouble seeing the hand signals of gear/fuel loaders so far away.

A: No. This would be a violation of !H12, which only allows for non-powered signaling devices (!H12 Part C) - your signal lights would be considered a powered signaling device.

(Asked by **6519** at Feb 17th 17)

Q551 BUMPERS‘ backed thick

Q: R29。BUMPERS be backed by ¾ in. (nominal) thick (~19mm) But we bought wood thick 0.669in （17mm）。 Can we used it on BUMPERS‘ backed thick?

A: No, !R29 requires 19mm (nominal) plywood.

(Asked by **6028** at Feb 17th 17)

Q552 Releasing the Rope

Q: If we climb the field rope, may we release the davit to lower the robot, remove the rope with the robot safely on the ground, and then replace the field rope to the davit. We would not remove the field rope from the field. Q300 does not fully clarify this since the rope would not be removed from the field.

A: If by "release the DAVIT" you mean "release the ROPE from the DAVIT", then yes, there are no rules prohibiting this as long as the operation is completed in a timely manner. The DAVIT itself is fixed to the AIRSHIP and cannot be removed.

(Asked by **3637** at Feb 17th 17)

Q553 deploying rope

Q: Per rule 3.8 the rope is "coiled and stowed on the outside of the AIRSHIP" at the beginning of the match. Does it have to "coiled and stowed" or can a team choose to let it hang during the entire match? If it can't hang from the beginning of a match, when can it legally be deployed?

A: Yes, the ROPE must be stowed until it is ready to be deployed, !Q395 provides more information. Please review !H11 for information about deploying ROPES, as well as !Q73.

(Asked by **1051** at Feb 17th 17)

Q554 rope question

Q: with regard to 104 D and 104 E, please consider a 1" wide strap as a rope. If we tie a monkey fist knot as our retaining feature, may we use a section of strap, rolled up, as the center of our knot? This section would not be a contiguous section of our rope, but a separate piece "tied" internally via the RF knot.

A: We cannot rule on ROPE designs, and the final decision as to legality of a particular ROPE lies with the Lead ROBOT Inspector (LRI) at each event. Generally, if a core material is non-metallic fibers, and is joined with the ROPE (i.e. sewn, twisted, __tied__, woven, knitted, crocheted, intertwined, or braided together," the criteria in !I04, part D is met.

(Asked by **5675** at Feb 23rd 17)

Q555 Elastic Shower cap bumper covers?

Q: We used an Andymark elastic bumper cover (like a shower cap) several years ago for quick color changes in the pit. I don't see anything in the rules that says we cannot use this system again adapting it to fit our corner based bumper system. I understand the rules spells out velcro and will use it if required. Wanted to use a faster, simpler system for my younger team. Please advise. Thanks! Steve Miller-coach 3355

A: There is no prohibition to using elastic to secure BUMPER covers. !R26 part B provides an exemption that allows the use of Hook and Loop fastener, but in no way requires it.

(Asked by **3355** at Feb 19th 17)

Q556 Surgical Tubing for Reversable Bumpers

Q: Can we use surgical tubing sewn inside one edge of our reversible bumper covers in lieu of hook and loop fasteners for a quick bumper color change? It would not be visible at any time and would stretch behind the hard parts of the bumper.

A: There are no rules that prohibit this method of secure BUMPER covers.

(Asked by **1551** at Feb 20th 17)

Q557 Light for communication

Q: We want to use a light on our robot to tell the human players when to pick up gears, release balls in the hopper, or drop a gear through the hopper. If our light is powered using a spike and turned on and off by code, is it a violation to use it as a signal light?

A: We cannot rule absolutely on hypothetical ROBOT features, and the final decision as to legality of a particular feature lies with the Lead ROBOT Inspector (LRI) at each event. There are no rules prohibiting use of a light on the ROBOT to signal members of your DRIVE TEAM, but there are implementations that may not be within ROBOT rules. If there is a specific rule (or set or rules) that are unclear, please rephrase, resubmit a

question that helps us understand which rule you find unclear.

(Asked by **4630** at Feb 20th 17)

Q558 Launching fuel into an opponents robot.

Q: Is there any rule against launching fuel into an opponents robot from our own launchpad?

A: There are no rules explicitly prohibiting legally LAUNCHING FUEL with the intent of getting in it "in" an opponent's ROBOT, however, depending on your intent, or more importantly, a REFEREES inference of your intent, it could be a violation of !C08.

(Asked by **832** at Feb 20th 17)

Q559 Bumpers after last build day

Q: Can the bumper be worked on after the last build day or do they have to be bagged with robot

A: Yes. BUMPERS may be considered part of the WITHHOLDING ALLOWANCE, but their weight does not need to be applied to the max WITHHOLDING ALLOWANCE weight limit, per !R21

(Asked by **4573** at Feb 20th 17)

Q562 Bumper rules/Inspection list

Q: In the bumper rules it states that the plywood backing can be ¾ in. (nominal) thick (~19mm) by 5 in. ± ½ in, but on the inspection list it says that it has to be 3/4 in. by 5 in. tall. Was this a mistake, and can we still keep our 4 1/2 in. plywood backing?

A: The [2017 FRC Inspection Checklist]
(https://firstfrc.blob.core.windows.net/frc2017/AuxDocs/2017FRCInspectionChecklist.pdf) is a shorthand summary of the ROBOT rules created for and used by Inspectors to assess ROBOTS at an event, and the [2017 Game & Season Manual]
(https://firstfrc.blob.core.windows.net/frc2017/Manual/2017FRCGameSeasonManual.pdf) supersedes this (and any other) auxiliary document.

(Asked by **2148** at Feb 20th 17)

Q563 Velcro usage for rope

Q: Can we use an adhesive backed 2in. strip of velcro, and fold it in half to adhere it to itself if we still fall under the 1in max?

A: Any ROPE with tacky adhesive (either exposed or otherwise) is non-compliant with !I04, part D.

(Asked by **3179** at Feb 20th 17)

Q565 Powering a subsystem of a robot after a match

Q: In reference to R08, would it be within the rules to use an external battery to power only a subsystem of a ROBOT (e.g. motors of a ROPE climber) to enable removal of a ROBOT from the FIELD or removal of GAME PIECES while the ROBOT is disconnected from it's own battery at the end of a match? Does this fit the definition of "powered off"? If not, what is the definition of "powered off"?

A: No, please see !G06 (also, there is no formal definition of "powered off" but if power is applied to the ROBOT, you can assume that it not considered "powered off")

(Asked by **2655** at Feb 20th 17)

Q566 Using Xbox One Controllers connected by USB

Q: Can we use a Xbox One Controller connected to our Operator Console using a USB cable? Xbox One controllers cannot connect wirelessly to a computer except with an adapter or Bluetooth (for latest generation controllers), and we intend to disable all Bluetooth communication on our Operator Console. The Controller will be connected via USB cable at all times during the match. Is a PS4 controller also acceptable under these conditions?

A: It depends. If the device is capable of wireless communication, it's non-compliant with !H02. If the wireless feature can be disabled, such that it's not capable of wireless communication, then there are no rules the prohibit such a device.

(Asked by **702** at Feb 20th 17)

Q567 Missing bag

Q: We can't seem to locate the bag needed for bag & tag day, and want to know what to do. I emailed FRC about a week ago and got no reply. When I called the office, they suggested posting the question here. ... At this late date, I don't think we could get a new bag shipped to us. Would it be allowed to use a painting tarp to create a bag that would fully encapsulate the robot, and use the regular seals to close it? If not, do you have an alternative suggestion?

A: If you can't find the bag you that was supplied in your Kit of Parts, you may use any other large plastic bag you can find or construct one, as you suggests, from a plastic sheet you can seal appropriately. You will need to explain the situation to inspectors at your event.

(Asked by **611** at Feb 20th 17)

Q568 Non-powered Signaling Device Clarification

Q: To clarify Question 550 and rule H12, would two inert pieces of PVC, of a reasonable length, painted safety orange, be allowable on the airship or in the loading lane as a non-powered signaling device?

A: There are no rules that prohibit such a device/strategy, however please note !H12 as updated in [Team Update 13](https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate13.pdf). If a REFEREE perceives that the device or the use of the device poses risk of injury, it will not be allowed.

(Asked by **6352** at Feb 21st 17)

Q569 bringing sponsors banners

Q: We have a sponsor that would like us to bring one of their company banners to the competition. We would put it in our booth. Is that allowed?

A: There are no rules that prohibit hanging banners in your pit space (sponsor related or otherwise), provided it's not done in a way that violates any pit rules included in the [Rules & Expectations for *FIRST* Robotics Competition Events](http://www.firstinspires.org/resource-library/frc/competition-manual-qa-system).

(Asked by **6491** at Feb 20th 17)

Q570 "Nominal" size vs actual for bumper noodles - clarification needed

Q: In the answer to question 401, you mentioned that "2.25 in nominal diameter" would not meet bumper requirements. We noticed that AndyMark has a pool noodle product (part # am-0837) approved for FRC bumpers that is listed as being " approximately 2.3-2.5 inches" in diameter (link: http://www.andymark.com/bumper-p/am-0837.htm). Our pool noodles measure 2.35" - are they allowed by FRC rules?

A: If the actual measured dimension is different from the nominal dimension, that's not an issue (we don't expect a particularly tight tolerance on water toys), provided the product is sold as a $2\ ^{1}/_{2}$ in. noodle, per !R29.

(Asked by **5970** at Feb 21st 17)

Q571 IP camera connected to radio

Q: Is a wifi-capable IP camera allowed to be associated to the onboard radio for network connectivity? This would obviate the need for a wired ethernet connection to the radio, which would also necessitate the installation of an ethernet switch-- since the port on the radio is occupied by the roborio connection.

A: No, please see !R68.

(Asked by **6518** at Feb 20th 17)

Q572 Bumpers height while climbing the rope

Q: Is there a maximum/minimum height that the bumpers must be within while our robot is climbing the rope? In R23 it talks about a bumper zone that has a height of 7 in. but does this apply while the robot is climbing the rope?

A: Yes, the BUMPER ZONE applies to the ROBOT, in reference to the ROBOT, throughout the MATCH and whether a ROBOT is climbing or not. For examples, please see the Blue Box below !R23.

(Asked by **2444** at Feb 20th 17)

Q573 Definition of Frame Perimeter

Q: We have the metal drive base frame provided by AndyMark. Bolted to the outside of this is the perspex box which forms the functional frame of our robot. It is smaller than the allowed frame perimeter limit. We were defining our frame as the outside of this perspex box and our bumpers are bolted on the outside of this. Nothing protrudes beyond this frame perimeter. At a scrimmage this weekend the inspector thought that the perspex was

OK in this configuration, but advised us to check. Please help

A: We cannot rule absolutely on hypothetical ROBOT designs, and the final decision as to legality of a particular ROBOT lies with the Lead ROBOT Inspector (LRI) at each event. However, if you are looking for the definition of FRAME PERIMETER, please see !R01, paying special attention to the blue box. If this does not answer your question, please rephrase and resubmit, with a focus on what/how a rule is unclear.

(Asked by **5893** at Feb 21st 17)

Q576 Player station question

Q: If our team is using X-Box controllers attached to our driver station, can a drive team member have the controller in their hands and walk closer or behind an alliance drive team to obtain a better view of the robot location during the match?

A: Please see the Blue Box associated with !C12.

(Asked by **5675** at Feb 21st 17)

Q577 field drawing question

Q: Clarification please: The field drawings, ("2017FieldAssembly.pdf", https://firstfrc.blob.core.windows.net/frc2017/Drawings/2017FieldAssembly.pdf) pages 3 & 4, show that there is 114.3" from the alliance wall to the base of the airship, and 93.3" from the alliance wall to the baseline. This means the baseline is 11" back from the airship base. However, the game intro videos and animations (http://imgur.com/a/BQcEq) seem to show the baseline at the base of the airship wall. Which is correct?

A: The location of the BASELINE as described in the [2017 Game & Season Manual] (https://firstfrc.blob.core.windows.net/frc2017/Manual/2017FRCGameSeasonManual.pdf) and [Field Assembly drawings](https://firstfrc.blob.core.windows.net/frc2017/Drawings/2017FieldAssembly.pdf) is correct. As noted in [Team Update 01](https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdates-combined.pdf), its position in the [Field Tour Videos](https://www.youtube.com/playlist?list=PLZT9pIgNOV6bL3rQJQ06LdulQOTBCJv9t) is incorrect and has been noted in the video description. Our apologies for any confusion! _(also note that 114.3" - 93.3" = 21", not 11")_

(Asked by **5675** at Feb 21st 17)

Q578 Follow up to Q566

Q: To clarify the answer to Q566 with regards to disabled wireless communication, do we have to disable the wireless functionality on the controller itself or is rendering the operator console unable to interact with the controller wirelessly sufficient? For example, if the controller has an integral wireless communicator that cannot be independently disabled, but requires a special dongle to be plugged in to the computer in order to communicate wirelessly, is omitting the dongle sufficient?

A: Any device that has an integral wireless communicator that cannot be independently disabled can not be compliant with !H02.

(Asked by **702** at Feb 21st 17)

Q579 Robot and Boiler Interaction

Q: When scoring fuel into the low efficiency goal, is there a penalty associated with a part of our Robot entering the boiler for easier access? For example, when we pour fuel into the low efficiency goal, there is a flap that extends--not past the maximum perimeter-- that allows the fuel to roll into the boiler easier, however the lip of the flap does land a bit within the slot of the boiler--is this legal?

A: Per !S05, "brief incursions into the GOALS" are an allowed exception. Please note that you will likely want to keep this incursion minimal and at or above the height of the GOAL opening to avoid contact with moving BOILER elements which may cause damage to your ROBOT and/or the BOILER.

(Asked by **3581** at Feb 21st 17)

Q580 We need to know if the design of these numbers will be legal

Q: My team wants to do cool numbers this year and our sign shop tells us we can adhere color printed vinyl to the nylon. I need to know if this design will pass inspection. You can see a sample here: https://goo.gl/cqo7Ep

A: We cannot rule absolutely on hypothetical ROBOT designs, and the final decision as to legality of a particular ROBOT lies with the Lead ROBOT Inspector (LRI) at each event. If you have a specific question about the BUMPER numbering rules, please rephrase and ask again.

(Asked by **3941** at Feb 21st 17)

Q582 Are snap fasteners permitted to secure second color bumper covers?

Q: R26 (b) says: BUMPER Markings visible when installed on the ROBOT, other than the following, are prohibited... hook-and-loop fastener backed by the hard parts of the BUMPER. This seems to prohibit any other form of visible fastener on the bumpers, regardless of location, so long as they are visible. Would snap fastener (like windbreaker button snaps) placed on the inner-facing face of the bumpers be considered "visible" and thus be prohibited? Secondly, does R26(b) conflict with R29(e)?

A: No, markings on the ROBOT facing side of the BUMPERS are not "visible markings". No, we do not believe the rules conflict; !R29-E allows for hard bumper parts to extend up to 1 in. beyond the FRAME PERIMETER, and !R26-B allows you to place hook-and-loop fastener in areas backed by those hard parts, even if it is a visible marking (e.g. on the top surface of the bumper plywood).

(Asked by **4276** at Feb 21st 17)

Q583 Outlined Numbers

Q: Are 4" black numbers in a 5" white rectangle considered legal?

A: No, a white rectangle is not the outline of a numeral as required for non-white numbers per !R27.

(Asked by **4657** at Feb 21st 17)

Q584 Specs for locking pin

Q: The field specifications don't describe the davit locking pin in detail. Will the surface of the pin be threaded or will it be smooth? What is the shape of the end of the pin (for pulling/pushing it) through fingers? In our testing

we made an approximation of the davit with fingers, etc. We used a threaded bolt as the locking pin and realized that if there is a lot of tension on the rope with the robot hanging on it, it is very difficult to remove the bolt. If it was smooth it would be easier.

A: Good question, our apologies for the omission. The pins used throughout the *FIRST* STEAMWORKS FIELD (unless otherwise specified with a complete drawing) are wire locking retaining pins (McMaster P/N: 98416A120 is an example, but the exact part used may vary). *Section 3.7 DAVIT* has been updated to include this information as of [Team Update 14] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate14.pdf).

(Asked by **4639** at Feb 24th 17)

Q585 FRC radio configuration utility 17.3

Q: When we updated to the radio configuration utility 17.3, it caused our camera to not send an image to the driver's station in LabView. We have been unable to fix this. Are there any corrective measures we can make?

A: The purpose of this Q&A is to answer questions regarding the rules of _FIRST_ STEAMWORKS. For technical assistance, please visit the [FIRST Forums](http://forums.usfirst.org/forumdisplay.php?23-FIRST-Robotics-Competition).

(Asked by **5612** at Feb 21st 17)

Q586 Where do we submit the lock up form on stop build day?

Q: when we have our robot bagged up and the lock up form filled out, how are we supposed to notify FIRST of this? Thank you.

A: Per the blue box in !R15, "The ROBOT Lock-up Form must be signed by an adult, 18 years old or older, who is not a student on the team. This form must be brought with you to the event" . An inspector will review it before the team is allowed to unbag their robot.

(Asked by **6491** at Feb 21st 17)

Q587 Can there be a gap in between bumpers?

Q: Last year we found ourselves dealing bumper issues. Just for clarification R22 says we must have 6" of the frame covered form each corner. Does this mean that as long as there is 6" covered there can be a gap in the bumpers as shown in figure 8-1 with the upper set of bumpers?

A: Yes, as long as at least 6 in. of the FRAME PERIMETER extending from each corner is covered, the rest of the FRAME PERIMETER side may be uncovered.

(Asked by **4630** at Feb 21st 17)

Q588 Legality of a Specific Design for Robot Numbers

Q: My team wants to do cool numbers this year and our sign shop tells us we can adhere color printed vinyl to the nylon. It appears that the numbers would pass according to the rules (size, outline, etc.) We wanted to confirm that the coloring would not be a problem. Please see the sample. You can see a sample here: https://goo.gl/cqo7Ep

A: We cannot rule absolutely on hypothetical ROBOT designs, and the final decision as to legality of a particular ROBOT lies with the Lead ROBOT Inspector (LRI) at each event. The color requirements for BUMPER numbering are outlined clearly in !R27-A as "either white in color or outlined in white".

(Asked by **3941** at Feb 21st 17)

Q589 Dislodging trapped fuel (Clarification for Q533/Rule G23)

Q: If fuel gets trapped on a robot (such as in a gear loading chute), is it allowed to move quickly to dislodge the fuel, or is that considered "launching" fuel outside of the launchpad as per G23?

A: Without having witnessed the action, we can't rule one way or another. If it's not perceived by a REFEREE, per the Blue Box affiliated with !G23, as "shooting in the air, kicking or rolling across the floor with an active mechanism, or throwing in a forceful way," it's not a violation of !G23.

(Asked by **5970** at Feb 21st 17)

Q590 Gears and Fuel during Teleop period of match

Q: The Game Manual makes it clear that teams are allowed to have both a gear and fuel in their robots during Autonomous. My team is wondering if this ruling carries over into Teleop. Would a team be able to load a single gear and as much fuel as their robot can hold at the same time during the teleoperated period of the match?

A: There are no rules prohibiting a ROBOT controlling both a GEAR and any number of FUEL simultaneously during any portion of the MATCH.

(Asked by **4006** at Feb 21st 17)

Q591 Wire that is exempt from R57

Q: According to R57, Wires from the manufacturer attached to legal items are exempt from R57. CIM motors have 14AWG wire installed by the manufacturer. According to the sources I've researched, it is acceptable to have a 30 amp breaker on a 14 AWG 12VDC circuit. We currently have our CIM dirve motors wired using 14AWG from the motor to spark motor controls then 14AWG from the spark to a 40AMP Mx-5 breaker. Will this pass inspection?

A: We cannot rule absolutely on hypothetical ROBOT designs, and the final decision as to legality of a particular ROBOT lies with the Lead ROBOT Inspector (LRI) at each event. That being said, please note that the exception in !R57 accommodates wires directly supplied with the device by the vendor (or wires recommended by the device manufacturer). All other wires in every other part of the circuit must be compliant with !R57, which minimally requires 12 AWG wire with a 40A breaker.

(Asked by **5462** at Feb 22nd 17)

Q592 tetrix motor

Q: Can we use a Tetrix MAX DC Motor

A: No, !R32 lists all legal motors for the 2017 season.

(Asked by **4598** at Feb 22nd 17)

Q593 can we leave the circuit board out for the lock down bagging?

Q: can we take out the circuit board and continue working on it after the robot has been bagged. and include it in the 30 pounds were allowed to bring?

A: Yes, there are no restrictions on what FABRICATED ITEMS may be used for the WITHHOLDING ALLOWANCE.

(Asked by **6491** at Feb 22nd 17)

Q596 Bringing a new mechanism to competition

Q: Per rule R21 (Withholding allowance), are we allowed to build a mechanism in the off time that weighs less than 30lbs and bring it to competition to be added to the robot if there is no similar mechanism already on the robot. We were wondering because R15 says that alternate configurations need to be bagged on stop build day.

A: Yes, there is no restriction on what FABRICATED ITEMS a team may include as part of their WITHHOLDING ALLOWANCE. The text you cited from !R15 is intended to emphasize that all FABRICATED ITEMS, even if they are not currently on the ROBOT, that you do not want to include in your WITHHOLDING ALLOWANCE should be bagged.

(Asked by **2141** at Feb 22nd 17)

Q597 Does modifying software on a COTS computing device constitute it as a "fabricated item"?

Q: Does modifying the software (ex: uploading code, installing a new operating system, etc.) on a COTS computing device make it classified under a "fabricated item" (such as a motor with leads added)? And thus, would a COTS computing device therefore be included in the 30lb withholding allowance when brought in to an event?

A: ### Updated per [Team Update 14] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate14.pdf) on Jan 27, 2017. No, per [Team Update 14](https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate14.pdf) software installation or modification does not cause a device to be considered modified. ~~Yes, loading software intended to be used for use in competition would make the item no longer in an "unaltered, unmodified state" which is a requirement for it to be a COTS part.~~

(Asked by **5940** at Feb 22nd 17)

Q598 Rope Retaining Feature and Davit Fingers

Q: For safety, we request a rule to require that the rope must not be able to be installed or removed without the davit finger retaining pin being removed or the retaining feature must be untied. While testing, we have determined that it is possible to use a loop as a retaining feature that fully passes below the retaining pin and around the fingers without need for removal of the pin. We have found that it can be released without removal of the pin, possibly during gameplay if not set fully.

A: The purpose of this Q&A is to clarify questions related to FIRST STEAMWORKS. If you have rule suggestions or comments, please contact Team Support.

(Asked by **3302** at Feb 22nd 17)

Q599 Preventing Gear Lift From Falling?

Q: Is the PILOT allowed to bring a long cord to attach to the gear lift to prevent it from falling?

A: No, please see !H12 and !G15.

(Asked by **3618** at Feb 22nd 17)

Q600 Location and Size of Team Sign and Team LED in Player Station

Q: In 3.11.1, much of the player station is very well defined, but we're wondering what the size and location of the Team Sign and Team LED is in each station.

A: Each Team Sign is approximately 20 inches wide, 8 inches tall, and is located at the top of each PLAYER STATION justified to the side closest to the scoring table. Each stack light is approximately 3 inches wide, 12 inches tall, and is located in the top middle of each PLAYER STATION.

(Asked by **488** at Feb 24th 17)

Q601 Is a Bluetooth operated device in violation of wireless communication rules?

Q: We are looking at using Bluetooth operated lights and wondering if that would be in violation of using a wireless network. The Bluetooth is only used to change the colors/brightness of the LED lights. The lights would be set in the pits before a match. Are we in violation of any rules?

A: Bluetooth networks are not a violation of !C05, but use on the ROBOT is a violation of !R68.

(Asked by **6318** at Feb 23rd 17)

Q602 What constitutes "modifying software" per Q597?

Q: In response to Q597: 1. Is a roboRIO no longer a COTS item if the firmware has been updated per FIRST instructions? Is it no longer COTS if it has user code on it? 2. Is a Talon SRX no longer a COTS item if the firmware has been updated per manufacturer instructions? Is it no longer COTS if it has been given a name, device ID, or PID constants? 3. Is the robot radio no longer a COTS item if it has been configured with the team number?

A: We originally answered !Q597 according to the wording that was in the manual at the time. We have since realized the issues caused by this interpretation and have therefore update the definition of COTS in [Team Update 14](https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate14.pdf) and modified the answer to !Q597 accordingly. Per the updated definition the device is still COTS in all of your proposed scenarios.

(Asked by **228** at Feb 27th 17)

Q603 Auton Gear fully supported?

Q: At the beginning of a match, if a gear is on the bumper of a robot but also touching the driver station wall, is it considered to be fully supported by the robot?

A: We cannot comment absolutely on hypothetical scenarios. The ultimate decision would be determined by the REFEREES at your event, with the final call made by the Head REFEREE. Generally, if a GEAR is merely touching the ALLIANCE WALL such that, if the wall weren't there, the GEAR would not move, it meets the requirements of !G01.

(Asked by **107** at Feb 27th 17)

Q605 Stop Build Day Violation (following old 11:59pm local time)

Q: What is the penalty for teams that continue working on the robot past the stop build day time deadline? This is an especially important question this season due to the significant change to set a universal stop build time and some teams will still mistakenly work until 11:59pm local time.

A: Teams that violate stop build time can expect, at a minimum, to have the un-bagging of their ROBOT at the event be delayed. However, as the range of this violation is very broad (from "we missed by an hour" to "what's Stop Build Day?"), the exact nature of the penalty will be determined by the Lead Robot Inspector at each event in consultation with *FIRST* Headquarters.

(Asked by **2204** at Feb 27th 17)

Q607 Retieing knots or loops after every match

Q: We are currently usung a type of slip knot on our rope. After our bot climbs up it undoes the knot. May we retie the knot after every match? If yes do we need to get it reinspected every time?

A: A ROPE that changes configuration during a MATCH does not need to be reinspected if it is returned, prior to the next MATCH, to the same state it was in when it was inspected.

(Asked by **2906** at Feb 27th 17)

Q608 Robot alignment

Q: Please clarify item H under rule G02, "use of alignment devices that are external to the ROBOT". As an example, can we use a measuring tape, a stick or a piece of string to place the robot a certain distance from a field feature such as a tape if we don't cause any delays?

A: The Blue Box under !G02 merely provides a few examples of actions by DRIVE TEAMS that typically cause delays. If delays are caused due to any DRIVE TEAM action !G02 will be enforced.

(Asked by **4079** at Feb 27th 17)

Q609 Which rung is the bottom rung of the AIRSHIP ladder?

Q: As per S12, the PILOT is not allowed to skip a rung. Does this apply to the very bottom rung of the ladder, the one touching the floor?

A: Per [Team Update 15] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate15.pdf), use of the bottom rung in climbing the ladder is now optional.

(Asked by **2655** at Feb 28th 17)

Q610 G26: Gear transferred between Pilots

Q: Should G26 read: "Any GEAR transferred to an AIRSHIP during the MATCH must be done so via a LIFT."? As it is currently written, a PILOT could not transfer a Gear to another PILOT on the same Airship. The change would allow PILOTS to manipulate Gears on the Airship without worrying about violating G26.

A: !G26 has been updated in [Team Update 15] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate15.pdf) to clarify that PILOTS can hand gears to each other.

(Asked by **2202** at Feb 28th 17)

Q613 Post Match Rope Retaining Pin

Q: As answer to Q442 says the retaining pin can be removed to help remove a rope. As it may be difficult to reach the pin from the competition floor. Please clarify as to whether, at the end of a match, a team member can climb onto the airship to facilitate the removal of the pin?

A: Provided that all appropriate rules are followed (e.g. no more than 2 people in the AIRSHIP, wait for FIELD Reset to lower the ladder, etc.), a team member may release the DAVIT pin from inside the AIRSHIP after the MATCH is over.

(Asked by **175** at Feb 28th 17)

Q614 Legality of am-0195 motor? --> "old" p/n for am-2194, but only the 2194 is included in R32

Q: For Q373 and 431, you re-iterated that motors not listed in R32 are not permitted. You recommend contacting VENDORs re questionable part numbers. am-2194 is listed as a legal motor; am-0195 is not. We just received a shipment from the VENDOR , intending to replace our am-0195's with the am-2194, since Chief Delphi and LRI's have regularly questioned the legality of 0195's in the past. However, we received a mix of 0195's and 2194's -- clearly the VENDOR considers them interchangeable. Are they?

A: Only motor part numbers listed in !R32 are legal for use on the ROBOT. We encourage you to reach out to the VENDOR to clarify any confusion regarding motor part numbers, and what you may have received in an order.

(Asked by **3407** at Feb 28th 17)

Q615 Using a sharpie on rope to mark strategically

Q: Can we use a sharpie marker on the rope to make stragetic markings for our drive team.

A: No, as this would violate !I04-D.

(Asked by **4265** at Feb 28th 17)

Q616 Should we stay with CTRE Lib Suite 4.4.1.9 or should we move to the latest CTRE 4.4.1.12?

Q: Should we stay with CTRE Lib Suite 4.4.1.9 or should we move to the latest CTRE 4.4.1.12? Previously I have read some where on the WPI FRC website that we should ONLY update the software if it's explicitly mentioned on WPI Screensteps Live website. But we also see that on the CTRE website that the CTRE Lib need to be updated to CTRE Lib 4.4.1.12 for FRC. Please let us know if we should go with CTRE Lib 4.4.1.12. Thank you, Suren

A: The purpose of this Q&A is to answer questions regarding the rules of _FIRST_ STEAMWORKS. For technical assistance, please visit the [FIRST Forums](http://forums.usfirst.org/forumdisplay.php?23-FIRST-Robotics-Competition).

(Asked by **5422** at Mar 1st 17)

Q617 Knot at end of Rope

Q: Can you add anything to the inside of the knot at the end of the rope to make the knot bigger? We are trying to make the knot big enough to be stopped at the top of the retaining feature.

A: Please see !Q450. If this does not answer your question, please ask again, referencing a specific rule or element of a rule on which you need clarification.

(Asked by **5316** at Mar 1st 17)

Q618 3D Printed Parts CAW

Q: How should the cost of 3D printed parts, printed at our school and by our students, be indicated on the CAW? Is it just the cost of Cu in of material?

A: Yes, if Team members did all of the fabrication, the part should be accounted using raw material cost. Note that you cannot simply divide the cost of a roll of material by the amount used, you have to account for the cost of the smallest unit of raw material available for purchase that could create the part (see Example 7 of the !R12 Blue Box). This unit may account for multiple parts of the robot which would then have a single cost on the CAW.

(Asked by **6538** at Mar 2nd 17)

Q619 Pneumatic hose size

Q: Are we allowed to use smaller than 1/4" pneumatic hose on the robot? R82 E is somewhat confusing as it refers to the KOP items, but we have not received pneumatic tubing in the KOP for the last several years. We would like to use 5/32" hose, would this be legal?

A: Any pneumatic tubing with an a maximum 0.165 in. (nominal) inside diameter that is functionally equivalent to the tubing provided in the Kit Of Parts (i.e. flexible pneumatic tubing, not rigid metal pipe or tube) per !R82-E, which also meets the !R80 pressure requirements, and is unmodified except as indicted in !R81 is allowed. The Kit Of Parts consists to more than just the Kickoff Kit. It also includes _FIRST_ Choice and the Virtual Kit. Here is a link to one example of pneumatic tubing from _FIRST_ Choice: http://firstchoicebyandymark.com/fc17-043.

(Asked by **4917** at Mar 7th 17)

Q620 Damaged (destroyed) spring replacement?

Q: After going through the manual, team updates, and Q and A system, I cannot seem to find if there is any protocol in place for the replacement of springs that are destroyed beyond being able to use them during matches. My question is: Is there a protocol for replacing springs that are absolutely unusable? And if so, what would that protocol be?

A: Any ARENA element, including the springs, that becomes damaged in a way that non-trivially affects gameplay will be repaired or replaced. FIELD STAFF will be keeping an eye out for such damage, but if you see something on the field that is a concern, please point it out to the FTA or another member of the FIELD STAFF.

(Asked by **4961** at Mar 2nd 17)

Q621 Please clarify: Is the 4" height of numbers including the white border

Q: Please clarify: Is the 4" height of numbers including the white border or must the white border be in addition to the main number at 4" making the entire number 4.25 inches hight. We've had some debate about this. And, can the FIRST log be in color? Please see this live example. The numbers are 4" to the outside of the white. https://goo.gl/QalcKJ

A: !R27 specifies that the team numbers "consist of numerals at least 4 in. (~11 cm) high" - this is the entire numeral, including the outline (if one is present). !R26 part C specifies "solid white _FIRST_ logos" (only).

(Asked by **3941** at Mar 2nd 17)

Q622 Is there a minimum required firmware level for the PDP in 2017?

Q: Is there a minimum required firmware level for the PDP in 2017? I can not find any reference for it in either R08 version 09, or on the inspection checklist v1.2.

A: No, there is not.

(Asked by **3620** at Mar 2nd 17)

Q623 Can non Class I laser pointer be used for robot positioning?

Q: Can a Class IIIa laser pointer be used by the Drive Team to manually position a robot? The laser pointer would not be part of the robot nor left on the robot. Example: Laser pointer is set in C-channel by Drive Team and momentarily used to verify position with a field element. I am aware of rules R07(restricting use of Class I

lasers on robots), and G02 (prompt game play).

A: No. Exposed lasers other than Class I have time limits for safe eye exposure, and these limits can be exceeded even if only used when positioning the ROBOT.

(Asked by **578** at Mar 2nd 17)

Q624 Use of sound generating devices on robot

Q: R07-B notes that "Speakers, sirens, air horns, or other audio devices that generate sound at a level sufficient to be a distraction" are considered hazardous materials that are not allowed on a robot. Is this targeted at sustained and/or excessively loud sounds, or would a (for examples sake) commercially available air horn from a store (versus one for industrial applications) be acceptable? Would there be a range of audibility that would be considered too excessive?

A: As !R07 part B states, "devices that generate sound at a level sufficient to be a distraction" are not allowed. That goes for all devices.

(Asked by **1405** at Mar 7th 17)

Q625 Pressure switch wiring with a relay based compressor

Q: Can the pressure switch be connected to the PCM, rather than the RoboRIO, when the compressor is powered through a relay? Specifically, is this allowed under R93-C as long as the compressor operation still follows R93-D. (i.e. the compressor is controlled by the state of the pressure switch through the RoboRIO code)

A: !R93 Part D is only valid if the Pressure Switch is connected directly to the roboRIO. If the Pressure Switch is connected to the PCM, the PCM must control the compressor (as per !R93 Part C).

(Asked by **340** at Mar 7th 17)

Q626 Are we allowed not to contain PCM on our Robot if we are not using pneumatic system?

Q: Neither the Inspection List nor the Game Manual said that we are allowed not to contain PCM in our Robot, but it really seems unnecessary. So, can we omit wiring the PCM?

A: There are no rules that require a PCM to be used on the ROBOT.

(Asked by **6353** at Mar 7th 17)

Q627 removal of the rope when there is zero slack

Q: If the robot has climbed the rope and is pressed hard against the touch pad -- i.e. all 1.5" of travel is used up -- it is still possible to pull the pin on the davit and remove the rope without first introducing a bit of slack into it? Looking at the davit geometry, this doesn't seem obvious. Is the davit is designed to allow removal of the rope when there is zero slack in it?

A: There are no designed features of the DAVIT that will allow a rope under tension to be removed easily. Teams should design their ROBOT to allow removal from the ROPE, not use all of the TOUCHPAD travel, or have a

plan to remove their Retaining Feature from the DAVIT in this scenario.

(Asked by **100** at Mar 7th 17)

Q628 3.11.6 STEAM PIPE - % vs "

Q: In the Arena description, 3.11.6 STEAM PIPE refers to the STEAM PIPE as being "It is constructed from 2⅜ in. (nominal) diameter". Our team assumes this is "It is constructed from 2" in. [50.8mm] (nominal) diameter"? Please correct us if we are incorrect.

A: No, that's a 3/8 not a %.

(Asked by **6237** at Mar 9th 17)

Q629 After G07/G20 violation, should affected ROBOT/ALLIANCE attempt to climb ROPE?

Q: Regarding G07, G20, and the answer to Q546: If an opposing Red ROBOT violates G07 and/or G20 and, assuming an untriggered TOUCHPAD will be considered triggered at the end of the MATCH, must a Blue ROBOT attempt to climb the ROPE if possible, or is the Blue ROBOT free to play other aspects of the game and still have the untriggered TOUCHPAD considered triggered at the end of the MATCH?

A: There is no requirement in !G07 or !G20 for the 'opposing ROBOT', listed in the violation section of those rules, to take any specific action for the violation to be applied. Nor is it prohibited from engaging in other normal game play activities.

(Asked by **6493** at Mar 7th 17)

Q630 Gap between davit fingers

Q: Section 3.7 of the game manual states, "These fingers are 1¼ in. (~3 cm) apart and have a hole for a wire locking retaining pin (McMaster P/N: 98416A009 or similar)." But when looking at the latest field component drawings (page 76) it shows the square tube for part GE-17081-02 as being 1" wide. If the finger plates are welded to this, the gap between them would be 1 inch. Which gap is correct?

A: Good catch! Our apologies for the discrepancy. The drawing is correct and the distance between the fingers is corrected to 1 in. in [Team Update 17] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate17.pdf).

(Asked by **4488** at Mar 14th 17)

Q631 If a rope has cut ends more than four inches from either end, can they be fused?

Q: Two "sub-ropes" are braided together to form one "combined-rope." If one end of one of the "sub-ropes" is more than 4 inches from either end of the "combined-rope," (in the middle of the rope essentially), can the end of the "sub-rope" be fused etc. according to rule I04 D. Thank you.

A: Yes, !I04-D allows "any cut end" to be fused, provided it is only done to prevent fraying.

(Asked by **2471** at Mar 7th 17)

Q632 Sharp hooks on rope winding device

Q: We are considering updating our rope winch with sharp barb-like protrusions around a cylindrical hub. We know that FIRST does not like sharp edges in general, but we saw several teams using things like this to catch the end of their rope/strap. Please confirm if it's ok to have sharp protrusions in this confined area. Thanks.

A: We cannot rule absolutely on hypothetical ROBOT designs, and the final decision as to legality of a particular ROBOT lies with the Lead ROBOT Inspector (LRI) at each event. That being said, please take note of !R06.

(Asked by **5854** at Mar 7th 17)

Q633 Ropes cut by davit

Q: Since we saw rope being cut during week 1 play, can we coat the upper section of our rope that is held in the davit with something to protect the rope from being cut. I don't think FIRST's intent was to have robots fall due to cut ropes.

A: You cannot coat the upper section of a rope with any material not allowed per !I04-D, but you may make sections of your rope more durable by adding material allowed by that section using the methods allowed by that section.

(Asked by **2028** at Mar 9th 17)

Q634 End Game Time

Q: Is the end game 20 seconds or 30 seconds?

A: "End Game" is not a defined term in _FIRST_ STEAMWORKS. Please note rule !H11.

(Asked by **4024** at Mar 7th 17)

Q635 How to determine "intent"

Q: Rules G22 and G25 assign fouls and cards if a robot "intentionally" puts fuel on an airship or launches it outside the field. By what standard is "intent" determined? If (i) a robot is in the general vicinity of the boiler and launches, but (ii) the fuel is launched in a different direction than toward the boiler and, as a result, (iii) fuel lands outside the field or on the airship, does that automatically mean that G22 or G25 have been violated? What if the event occurs during auto?

A: We cannot comment absolutely on hypothetical scenarios. The ultimate decision would be determined by the REFEREES at your event, with the final call made by the Head REFEREE. This is especially true for rules that involved intent. That being said, it's important that your robot be designed to get FUEL into BOILERS.

(Asked by **5607** at Mar 7th 17)

Q636 Item for securing rope in davit

Q: I have two part question. First can an item such as a golf ball be used within a knot to increase the diameter of the knot? (i.e. a golf ball inside of a Monkey's fist) Can a golf ball be drilled through and a rope run through it to be used as the item that connects it into the davit? In both cases the rope would be completely fibrous with no metal objects or strands wove into the rope.

A: No. No. Per rule !I04-D, a golf ball does not " consist entirely of (except for dye or adhesive applied by the VENDOR as part of the normal manufacturing process for a COTS item and no longer tacky, e.g. a “binder coat”) flexible, non-metallic fibers sewn, twisted, tied, woven, knitted, crocheted, intertwined, or braided together...".

(Asked by **4608** at Mar 7th 17)

Q637 Ref R32, Electrical solenoid actuators; and, R34 part B / i Vex Spike Relay:

Q: With the spike relay discontinued is there a legal COTS solenoid driver allowed. If not, is it legal to use discrete components (e.g. transistor, diode, opto isolator, LED, resistors) to drive the legal mechanical solenoid actuator in Rule 32?

A: Legal power regulating devices for actuators (other than the exceptions specifically listed) are listed in !R34. Devices not listed in !R34 may not be used to control actuators other than those exempted in !R34. !R35 details which devices may control which types of actuators.

(Asked by **5402** at Mar 7th 17)

Q638 Robot Alignment Devices within the ARENA

Q: With reference to Q608, and assuming G02 is not violated, would a robot alignment device placed in your own teams loading lane soley, and assuming H12 is not violated would this be legal? If not, would such a device be able to be considered a non powered signalling device provided it is placed on the floor? Would placing it on the floor, supported by the field perimeter poly-carbonate directly under the chute be considered it attaching to the FIELD or ARENA?

A: We cannot comment absolutely on hypothetical scenarios. The ultimate decision would be determined by the REFEREES at your event, with the final call made by the Head REFEREE. Please note that !H12 is only in reference to what's legal "...during a match...". Please keep in mind that Robot Alignment Devices must not delay the start of the match. This includes interfering with the Field Reset process, as well as the setup of your Alliance Partners' robots. We are unclear about your last question above. If this does not answer your overall question, please rephrase and resubmit.

(Asked by **5036** at Mar 8th 17)

Q639 Is leather allowed under I04 part D?

Q: Is leather considered a "flexible, non-metallic fiber"? If so, may it be sewn onto the rope within the retaining feature and the first 29 inches in order to help prevent wear along the contact points with the DAVIT?

A: We cannot rule absolutely on hypothetical ROBOT designs, and the final decision as to legality of a particular ROBOT lies with the Lead ROBOT Inspector (LRI) at each event. That being said, leather would probably not be considered a 'fiber' and so would be a violation of !I04-D.

(Asked by **2177** at Mar 8th 17)

Q640 What day does the 7 Day robot access period start?

Q: T19 states "Teams permitted to use the ROBOT Access Period per R18-G may only unlock their ROBOT for a total of six (6) hours during the 7-day period preceding any 2-day event in which their Team will be competing with their ROBOT." What day does the 7 day countdown start in terms of event day? We are unsure if this starts the day you load in or the day matches start (for example load-in on Thursday, quals on Friday, which day would we be able to open the robot?)

A: An event has considered "started", if Robot Inspection, practice matches, or access to the practice field are available.

(Asked by **4513** at Mar 7th 17)

Q641 Marking a rope for identification

Q: !Q615 asked if it was legal to mark a rope by writing on it with a marker to make strategic markings on the rope. It was answered as an !I04 -D violation. Other then embroidering our ropes, or using other woven threads/fabric to mark our ropes, can we use a sharpie to mark the ropes above the DAVIT for identification purposes, eg 5881#1, 5881#2, etc.

A: No. This is still a violation of !I04-D.

(Asked by **5881** at Mar 7th 17)

Q642 Bumper Number Stroke Width

Q: With regards to bumper numbers and R27-a, how is the stroke width of a number measured? In the case of a font that has different widths at different locations, is the stroke width the minimum width of the line? The maximum width of the line? A nominal dimension?

A: If the selected font has different widths in different locations, the stroke width requirement should be met at the minimum width of the numbers.

(Asked by **4028** at Mar 10th 17)

Q643 Last 4 inches of rope and Q21 clarification

Q: Q139 specifically allows sewing hook and loop onto a rope. I04D defines the materials to be used in the rope and then makes an exception for the last 4” specifically for the prevention of fraying using the key words “may be”. From these I would assume that having anti-fraying treatment on the last 4” is optional and that it is acceptable to sew on hook and loop to the last 4 in. of the rope. But Q21 indicates otherwise. Can you please clarify?

A: Thank you! The answer to !Q21 is a bit outdated, as it was not updated when [Team Update 02] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate02.pdf) was released. We apologize for this, and we'll make the correction soon! !I04 part D, with the changes in [Team Update 02] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate02.pdf), specifies that only the last 4 inches may be whipped or fused only to prevent fraying - otherwise the last 4 inches of the ROPE may be

treated as any other part of the ROPE.

(Asked by **4488** at Mar 10th 17)

Q644 C08 vs G13 When the strategy is to force a foul on the opposing team.

Q: Clarify that the specific condition of pushing a robot INTO a retrieval zone to create a foul is a violation of C08 and thus G13 does not apply in such cases. No actual verbiage change in the rules is required as C08 is worded well. After asking the Northern Lights Referee this specific question, he claimed any opposing robot clear of the zone (by many feet) and shoved into the zone by a robot of the zones color should be assigned a G13 foul and did so multiple times during multiple matches.

A: We won't comment on specific calls at events, however, for !C08 to be called, there must be a strategy aimed *solely* at forcing a rule violation. (in other words, the *only* reason a ROBOT is doing what it's doing is to force penalty). The blue box in the rule can help explain this.

(Asked by **3130** at Mar 7th 17)

Q645 Motor 05n100 with gear supplied in kickoff kit, what are motor specs and gear specs

Q: What are Motor and gear specs for 05n100 with gear in kickoff kit, specs or part number for matching gears.

A: Information about 2017 KOP motors can be found here: http://www.firstinspires.org/resource-library/frc/motors

(Asked by **6571** at Mar 7th 17)

Q646 Are Noisemakers allowed.

Q: Our team has created noisemakers that are beads in a bottle that an audience member would shake to create noise. In the Event Expectations E06 it says that you cannot bring any noisemakers, and we were wondering if these would be ok, as the examples given by E06 are things like air horns and/or whistles.

A: Any device designed to make noise would be considered a 'noisemaker' per E06, and should not be used.

(Asked by **5431** at Mar 7th 17)

Q647 Unbagging Robot for Publicity Event

Q: My team is currently in between competitions, and therefore, our robot is bagged. Our school is hosting an open house this week and we would like to display our robot so that any interested kids would be able to see it. Is there a way that we would be able to unbag the robot only for this open house event without it being a part of our allotted 6 hours of open bag time?

A: Yes. Please see !R18-iii.

(Asked by **1517** at Mar 8th 17)

Q648 Extra time to fix manufacturer error before or at competition?

Q: Recently, AndyMark sent out a notification to all teams that purchased the EvoShifter gearbox that there was a detrimental design flaw that caused a team to experience a gearbox failure at a week 0 competition. Due to the amount of time that this kind of problem would take to fix and that this was a manufacturer design flaw, would it be acceptable to unbag the robot and replace the defective part before our first competition? If not, could we get early pit access at our first competition?

A: No, this does not fall under the exceptions of !R18. We understand this issue was out of teams' control, but many teams need to deal with challenges in this category every season.

(Asked by **3624** at Mar 9th 17)

Q649 In the case of an eye splice in the rope, is the eye constrained to a 1 inch diameter?

Q: As per Q57 a splice in the rope is not a knot and may not exceed the 1 inch diameter laid out in I04. In the case of an eye splice, does this 1 inch diameter constraint apply to the loop created by the eye splice or only where the rope joins back together?

A: We believe !Q57 and !Q342 answers your question. If it does not, please rephrase your question and resubmit. Please use the Search Q&A button on the navigation bar before posing a new question.

(Asked by **4645** at Mar 9th 17)

Q650 How are match points calculated?

Q: I can't find a specific description of how match points are calculated. Can you tell me how this is done during competition?

A: Please see [Section 4.3](https://firstfrc.blob.core.windows.net/frc2017/Manual/Sections/04-MatchPlay.pdf) of the Game & Season Manual.

(Asked by **3654** at Mar 9th 17)

Q651 Robot Alignment Devices within the ARENA during a Match

Q: As a follow up to Q638, and with reference to H12, is it required that a non powered signalling device be under the control of a member of the DRIVE TEAM? Would a non powered signalling device that helps a ROBOT align with a FIELD element be legal? Would placing this non powered signalling device in the ARENA consider it a violation of H12 part F ii. In other words, would placing it in the ARENA supported by FIELD perimeter be a violation of H12?

A: There is no rule that requires a non-powered signaling device, allowed by !H12, to be in the constant possession of a DRIVE TEAM member as long as it doesn't cause any safety hazards within the ARENA. Placing a non-powered signaling device in the ARENA supported by the FIELD perimeter (such as under the shelves in the Return LOADING STATION, as was mentioned in !Q638) is legal, so long as its use doesn't violate !G02.

(Asked by **5036** at Mar 14th 17)

Q652 Rope Retaining Feature Proposal

Q: During week 1 events, teams tied off ropes to the DAVIT fingers, which is currently an illegal retaining method. Many legal rope choices (including example ropes included in Figure 9-1) do not seem capable of producing secure retaining features within the current rules. Could the area of rope above the retaining feature be exempted from rule section 9.D in order to legalize more robust retaining features? Example: https://goo.gl/photos/tyHwNUQCYiD3tiAS8 (McMaster #98416A019)

A: We're not sure what rule you're referencing. Please see !Q142, and if this does not answer your question please rephrase and resubmit. If resubmitting, please provide a reference to applicable rules.

(Asked by **111** at Mar 10th 17)

Q653 Leather Sleeve Legality

Q: In answer Q639, you said "leather would probably not be considered a 'fiber.'" However, natural leather comes from animal dermis. The dermis is comprised of very strong fibers made of a protein called collagen. The collagen fibers are exquisitely woven into a very complex tissue that in animals, serves as source of leather. It appears to us (Palmetto LRI agreed) that a leather sleeve when sewn in rope would consist of a flexible, non metallic fiber (I04D) and be deemed legal. Request re-ruling

A: The intent of the specification presented in !I04 is to describe parameters that can be assessed by an Inspector at an event. While, to your point, skin (and *many* other materials like wood) are fibrous at a protein/microscopic level, that kind of analysis is not something Inspectors are expected to do. Generally, leather is not considered a fibrous material, and thus not considered fibrous for the purposes of *FIRST* STEAMWORKS.

(Asked by **1369** at Mar 13th 17)

Q656 6 hours unbagging the robot

Q: During the unbagg period can we make repairs to our robot? This period is strictly for practicing.

A: There are no restrictions on what progress can be made with the ROBOT during the ROBOT Access Period. Upgrades, practice, repairs, etc. are all permitted (per !R18-G and !R19).

(Asked by **5031** at Mar 10th 17)

Q657 Tethering in Queue

Q: Is it acceptable for a member of the drive team to tether the driver station to the robot to deploy/upload/change (NOT enabling the robot, e.g.: NOT running the robot or its actuating devices) the robot's code while in queue for matches?

A: There are no rules that prohibit this.

(Asked by **900** at Mar 10th 17)

Q658 Rope Retaining Feature Proposal (v2)

Q: Currently section 9.D of the rules explicitly prohibits non-metallic, non-flexible elements along the entire length of rope. However, the retaining method allowed in Q142 poses many rope durability and field reset time concerns, particularly when the rope is supporting a robot. Would the GDC considered exempting the retaining feature of the rope from section 9.D to allow for safer, easier to remove rope retaining features? Example: https://goo.gl/photos/tyHwNUQCYiD3tiAS8 (McMaster #98416A019)

A: No, the entire Rope is subject to !I04-D.

(Asked by **111** at Mar 11th 17)

Q659 Can multiple sections of BUMPERS be used on a side?

Q: !R22 notes that all BUMPERS must cover at least 6" of each corner (unless a side is <6 in), and figure 8-1 shows an "OK" side (top of picture) with bumpers just on the corners. Using the top of page side of figure 8-1 as a reference, could we add one or more sections of bumpers in between the 2 corner pieces such that as a result there are gaps between the corner pieces and the added pieces? If so, are there restrictions on the width of the added pieces of BUMPER?

A: Additional segments of BUMPERS may be included, in addition to the BUMPER segments required by !R22, so long as they are compliant with all other BUMPER rules (they must be legal BUMPERS). There is no minimum width of a segment of BUMPER.

(Asked by **5881** at Mar 13th 17)

Q661 Unbag time

Q: Can Teams unbag their robot before their first 2-day competition and work on it for the allotted 6hrs per R19?

A: !R19 permits unbagging the ROBOT for a maximum of 6 total hours during the week (7 days) preceeding the start of a Team's 2-day event. If you're within the one week (7 day) period prior to the start of any event you're registered for, you are allowed to unbag the ROBOT and work on it for a total of 6 hours per !R19.

(Asked by **4132** at Mar 11th 17)

Q662 Fixing bent point on gear lift peg

Q: If the point on the end of the gear spring (gear lift peg) becomes bent durring a match, can a pilot (durring the match) pull the carriage up past the floor of the air ship and reach out to straighten it?

A: There are no rules that prohibit straightening FIELD elements such that they're returned to their specified state. However, !S07 only accommodates brief and incidental excursions outside the port. Rework of a FIELD element is unlikely to be brief and its definitely not incidental. For effort like this, the carriage must be brought inside the AIRSHIP.

(Asked by **2550** at Mar 14th 17)

Q663 G13 Retrieval Zone Foul

Q: G13 states that a foul occurs when you touch an opponents robot while you're inside their retrieval zone. Is it also a foul if you touch an opponents robot when they're in their retrieval zone but you are not?

A: !G13 only applies to ROBOTS with any part inside their opponent's RETRIEVAL ZONE. If a ROBOT is completely outside its opponent's RETRIEVAL ZONE, it is not a violation of !G13 to contact a ROBOT of the opposing alliance anywhere on the FIELD. Be careful not to violate any other rules in the process, though.

(Asked by **832** at Mar 13th 17)

Q666 Clarification on Rules R18, R19, R21

Q: Is there a total of 6 hours of time for Robot Access preceeding EACH 2-day District Event? Is it a total of 30lbs of Withholding Allowance for EACH event or for the whole season?

A: Those rules apply to _each_ event a Team goes to.

(Asked by **6135** at Mar 13th 17)

Q667 G21 and fuel through hoppers/loading stations?

Q: Is the act of activating the hopper near the opposing retrieval zone with the intent of obstructing opposing robots' path to their loading station with fuel a violation of G21? Is the act of dumping fuel into a loading station with the intent of obstructing opposing robots' paths to their lift pegs or ropes a violation of G21?

A: In and of itself, the act of triggering a HOPPER using it's polycarbonate panel is not a violation of !G21 regardless of intent. That being said, ROBOT actions that may be taken after that point involving FUEL (such as herding FUEL into the opponent's RETRIEVAL ZONE) may violate !G21 if, in the judgement of the REFEREE/Head REFEREE, the action taken was to amplify a challenge on the FIELD.

(Asked by **8** at Mar 14th 17)

Q668 Heating retaining feature knot

Q: Can the knot be heated so the rope material slightly melts to fuse knot together?

A: No. Only the last four (4) inches of the ROPE may be fused, and only to prevent fraying (as per !I04 part D). Please also see the Blue Box under !I04 part H.

(Asked by **4608** at Mar 13th 17)

Q669 Team banner requirement

Q: Is it required to have a team banner or is it optional? Thanks

A: There are no rules that require a Team have a Banner.

(Asked by **6491** at Mar 14th 17)

Q670 Pit dimensions

Q: Where can we find the dimensions for the pit areas? Thank you

A: Pit dimensions can vary from event to event based on available space. Please contact your local event

management or RD for information specific to your event.

(Asked by **6491** at Mar 14th 17)

Q671 30-inch wide cart, 30-inch wide door, 36-inch wide robot

Q: The cart should fit through a 30-inch normal sized door (as some venues do not have double doors). The robot has dimensions constraint 34in x 40in x 24in as an option. Can the cart be as wide as the robot? What happens to robots that fit within the volume constraint in R03 but are too fat for 30-inch doors?

A: Per the Blue Box below !R03 "be sure to consider the size of the ROBOT on its cart to make sure it will fit through doors". If you have to travel through a 30-inch door and your ROBOT does not fit with the BUMPERS installed you may need to remove the BUMPERS or rotate the ROBOT to fit through the door.

(Asked by **2204** at Mar 14th 17)

Q672 Would an elastic strap containing rubber or latex be legal material as part of a rope?

Q: A product similar to elastic waistband webbing appears legal as it is: flexible, non-metallic & woven together. We can find no other restrictions are listed as to what material the rope "fiber" is made of. Thin strands of rubber or latex appear to also meet the dictionary definition of fiber: a slender and greatly elongated natural or synthetic filament.

A: Elastic fibers woven together meet the criteria included in !I04-D.

(Asked by **68** at Mar 20th 17)

Q673 The answer to Q666 was incomplete. Do we get a new withholding allowance between matches?

Q: Suppose we have a 30 pound fabricated item we bring to the first match as our withholding allowance and install it so that it on the robot when it is bagged at the end of the competition. Can we bring 30 more pounds of fabricated items to the second match or is our withholding allowance zero at that point? Your answer to Q666 was clear about having an additional 6 hour unbagging period before the second match, but it did not address the withholding allowance.

A: Yes. Teams have 30 pounds of WITHHOLDING ALLOWANCE before each competition attended. Note that this is not additive such that a team would get 60 lbs of WITHHOLDING ALLOWANCE for their 2nd event; it can be the same items in the 30 lbs or different items in the 30 lbs, but it can't be an additional 30 lbs.

(Asked by **151** at Mar 15th 17)

Q674 Acceptable Tags for Bagging Robot

Q: Our team is currently using two bags to bag our robot and is part of a district with the 6 hrs of unbag time between events. We're concerned about running out of the tags issued to us in our KOP. Rule R15 does not seem to require the use of a specific tag, and we've heard from other teams that using tags from past years or borrowing tags from other teams is allowed. Is this the case? If so, would any serialized/"numbered" tag be acceptable? Thanks! Team 5160, the Chargers

A: There are no rules requiring a specific tag for the Robot Bagging process. As long as the tag is serialized/numbered, that is a legal way to show the Bagging process on the Robot LockUp Form.

(Asked by **5160** at Mar 14th 17)

Q675 Intentional Bulldozing

Q: RED 1 has a GEAR in its possession. Fallen gears impede its path to each of the LIFTS. Can RED 1 "intentionally" bulldoze the impeding GEARS to place its gear onto the lift? No advantage is gained since it is already in possession of a gear.

A: "Bulldozing" is, by definition, an unintentional action. A ROBOT that inadvertently moves a 2nd GEAR while attempting to place a GEAR on the LIFT is "bulldozing" and has not violated !G27. If, instead, a ROBOT ("carrying" a GEAR) intentionally pushes a 2nd GEAR on the floor to a desired location, it is "herding" and a violation of !G27.

(Asked by **2056** at Mar 20th 17)

Q676 Climbing Interference

Q: Can the same robot at the same ROPE be awarded multiple triggered TOUCHPADS if the same opposing robot violates multiple combinations of G7, G20 Ex B, and/or G20 Ex C? For example: - RED 1 grasps its ROPE. BLUE 1 also grasps the RED rope (1 trigger for G20 Ex B) - RED 1 attempts to re-position to climb and contacts BLUE 1, still grasping the RED ROPE (1 trigger for G20 Ex C) - BLUE 1 lets the ROPE go and RED 1 begins climbing. BLUE 1 contacts RED 1 to slow the climb (1 trigger for G07)

A: Yes, one ROBOT may be awarded multiple triggered TOUCHPADS.

(Asked by **2056** at Mar 14th 17)

Q677 G11 and G17

Q: A defensive robot is in the opposing KEY. Before the 5 second count is complete it switches to a pin. Before the pin count reaches 5, the defensive robot leaves the KEY. Since the blue box says that the G17 count will be disregarded once a pin begins, will the robot receive no FOULS even though it may have spent more than 5 seconds in the KEY?

A: Correct.

(Asked by **2056** at Mar 14th 17)

Q678 Strategic Launching of Gears by Human Player

Q: Is it a violation of G21 or other rule for the HUMAN PLAYER to load gears (in accordance with H08) with clear strategic intent to clutter the opponent's LAUNCHPAD? By strategic we mean clearly sliding gears with as much force as possible and at a very high rate during the last 30 seconds with no alliance robots nearby. The strategic intent appears to get GEARS stuck under opponent robots or draw G27 fouls when opponents go to climb (Q166 says moving multiple GEARS out the way would violate G27).

A: It's not possible for a human to violate !G21, as it specifies "ROBOTS may not..." Additionally, !H08 does

not take into account intent. !C08 prevents strategies aimed at forcing an opponent to violate a rule, but the act of a HUMAN PLAYER putting a GEAR through a LOADING STATION slot does not violate !C08 in and of itself. If, for example though, a HUMAN PLAYER were to load a GEAR into an opposing ROBOT through the LOADING STATION in an effort to cause them to violate !G27, then !C08 would apply.

(Asked by **1410** at Mar 15th 17)

Q679 Use of Wearable Heads-Up Display

Q: Is use of a wearable heads-up display permissible, providing that it is removed before and during autonomous, fits over approved safety glasses, and does not block driver vision. Previous discussions have concluded that Oculus Rift is not allowed because it blocks the drivers vision and the ability to see the driver's eyes. Technologies such VuFine echo the display screen in a heads-up display, but still allow for visibility around the display. Link: https://www.vufine.com/

A: Provided that all applicable Safety and Gameplay rules are satisfied (such as !S01, !A02 and !A03) a "heads-up" display is permissible. Keep in mind though that "event staff have the final decision authority for all safety-related issues within a venue."

(Asked by **1876** at Mar 15th 17)

Q680 adhesive velcro

Q: There were several teams at our regional that used adhesive velcro. Has this rule been changed? Any ROPE with tacky adhesive (either exposed or otherwise) is non-compliant with I04, part D. Some were told as long as they leave the backing on, it was legal. The point is the adhesive velcro is a much better product than the sew-on thus giving them an advantage over those of us that use the sew-on. Please clarify. Next, Can we use material compliant sleeves up to 29" long?

A: We cannot comment on Inspection at any particular event. All rule changes are published in Team Updates and the latest copy of the Game Manual can be found here: https://www.firstinspires.org/resource-library/frc/competition-manual-qa-system We don't fully understand what you are asking with respect to "material compliant sleeves". If you still have a question about this, please elaborate in a new question.

(Asked by **2783** at Mar 16th 17)

Q681 Pilots descend during Purple Lights - Yellow Card?

Q: S04 states that drive team members may only enter the field when the LEDs are green (or instructed by HR or FTA). S12 (Pilots descending from the Airship) has no Green LED requirement. Is it an S04 yellow card if a Pilot descends the Airship, after the ladder has been released by Field Staff (facing airship, one rung at at time), but before lights have turned Green? Since the Pilot is already on the field (Airship is part of the field), it does not seem that S04 would apply.

A: ## Edited Mar 21, 2017. A PILOT exiting the AIRSHIP before the LED strings are green is considered a violation of !S04. ~~given the definition of FIELD in the glossary, however, we recognize that this is not completely clear, and we will be making a number of tweaks to the rules to clarify this and ensure all other rules related to this are consistent.~~ Please see [Team Update 18] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate18.pdf).

(Asked by **2202** at Mar 16th 17)

Q682 Do zip ties that are not included in the KOP have to be accounted for in the CAW?

Q: Our robot uses colored ZIP ties that are not included in the KOP. Rule R10 states that individual COTS items that are less than $5 USD each do not have to be included in the CAW. The manual also states in section 8.1 that COTS items must be left in an unaltered, unmodified state (with the exception of installation). During installation of a zip tie, any excess material is routinely cut off. Is cutting off the excess material considered part of installation for the purposes of the CAW?

A: For CAW purposes, the price of an item is that of the smallest commercially available quantity of that product. Excess material being cut-off is considered "labor provided by Team members" per !R12 and thus excluded from the CAW.

(Asked by **6343** at Mar 15th 17)

Q683 Follow-up to Q676

Q: Thank you for your prompt response! We wanted to ask a follow-up: can you clarify if multiple triggered TOUCHPADS may occur at the same ROPE as a result of actions by the same opposing ROBOT? For example, could the actions of one ROBOT at one ROPE result in the same ROBOT being awarded two or three triggered TOUCHPADS?

A: Yes. Yes.

(Asked by **2056** at Mar 24th 17)

Q684 Gears through the Loading Station

Q: In a week 2 regional event, we noticed multiple teams throwing gears onto the field through the top area of the loading station above the gear slot. Is this a violation as the gears are a) not delivered through the gear slot as designated by the pictures in 3.11.2 and 3.11.3 and b) being thrown?

A: There are no rules requiring the use of the "Gear Slot" in the LOADING STATION. There are no rules that prohibit a HUMAN PLAYER from throwing a gear through the LOADING STATION opening.

(Asked by **1259** at Mar 21st 17)

Q685 Defense via Human Players

Q: In Q166 you state that placing gears in front of an opponent's lift could be considered a violation of G21. What if those gears are placed by human players 'throwing' gears through the top of the loading station? Many teams are deliberately throwing large quantities of gears to block access to the lifts and the area between the loading station and the airship. Any attempt to move the gears or pass through in such limited quarters would be a violation of G27. Would this be a violation of C08?

A: We cannot comment absolutely on hypothetical scenarios. The ultimate decision would be determined by the REFEREES at your event, with the final call made by the Head REFEREE. Generally an action which could have another game purpose (such as making it difficult to access the LIFTS) is not a violation of !C08 which prohibits strategies "aimed solely at forcing the opposing ALLIANCE to violate a rule". ROBOTS bulldozing gears (not intentionally moving them out of the way) while attempting to access the LIFT is not a violation of

!G27.

(Asked by **1259** at Mar 22nd 17)

Q686 Drive team coach manipulation of non-powered signalling devices?

Q: Are there any restrictions on a drive team's COACH's interactions with non-powered signalling devices?

A: No, there are no restrictions that are specific to a COACH using a non-powered signalling device.

(Asked by **5012** at Mar 21st 17)

Q687 Audience Signaling Devices

Q: It has been observed on the live streams that some teams are holding up signs with the number of gears remaining for the 4th rotor. Since the signs aren't in the ARENA, but rather, in the stands, does this violate H12-F-iv, or any other rules? What about similar situations of non-ARENA communication, such as when the audience starts yelling "ROPE"? What if the team with the sign(s) did this every match, for both alliances?

A: No, this does not violate !H12-F as the device in question is not a device brought into the ARENA by the DRIVE TEAM, it is in the stands. There are no rules prohibiting this.

(Asked by **1885** at Mar 21st 17)

Q688 Rope made of sticky back velcro

Q: If a rope is made of three braided strands of sticky backed Velcro where each strand has been folded back on itself prior to braiding, does this constitute a legal rope or does it need to specifically be made out of woven back Velcro?

A: Material containing adhesive that is still tacky when received from the manufacturer does not meet the requirements of !I04-D.

(Asked by **5072** at Mar 21st 17)

Q689 Non-powered signaling device compliance with H12

Q: We would like to have a retro-reflective non-powered signaling device that does not mimic the field vision guides (for example, an "X" shape). We cannot predict how the vision systems of other robots would react to this. However, if it ends up interfering with the vision systems of an opponent robot despite not mimicking the vision guides, would we be required to stop using it? Would we be required to stop using it permanently, or only for matches where that specific opponent robot is present?

A: If a device is determined to "interfere with the remote sensing capabilities of another Team" it will be prohibited in matches where it may interfere (i.e. matches where the specific ROBOT or another Team who was indicated it will interfere with their remote sensing capabilities is present) per !H12.

(Asked by **2877** at Mar 21st 17)

Q690 First 29 Inches of Compound Rope

Q: If a rope consists of more than one material, is there any stipulation that each material of the rope must extend at least 29 inches beyond the retaining feature? Does this change depending on how the material are knotted (ie all knots must be 29" beneath the retaining feature)? If the two materials are only knotted at the retaining feature, does this change the ruling?

A: No, there is no requirement that any one ROPE material have any minimum length. Per !I04-F there may not be any knots in the first 29 in. below the Retaining Feature. Two or more ROPE materials allowed per !I04-D and joined at the Retaining Feature per one of the methods described in !I04-D do not need to be joined anywhere else to meet the requirements of !I04-D.

(Asked by **1712** at Mar 21st 17)

Q692 One robot, multiple ropes

Q: Can a robot scale multiple ropes (its own, and an alliance partner's), scoring multiple TOUCHHPADS?

A: Per Table 4-1, to receive Ready for Takeoff points a TOUCHPAD must be triggered by a ROBOT at T=0. The ROBOT size constraints prevent a single ROBOT from triggering multiple TOUCHPADS at the same time (not factoring those awarded due to !G07/!G20).

(Asked by **619** at Mar 21st 17)

Q693 Dashboard Camera

Q: My team has been having difficulty getting a USB camera to work. The camera works fine, at competition, while it's tethered both via USB or ethernet. When we connect to the field is another story. When we connect to the field the camera doesn't display on the the dashboard. If you could offer some assistance that would be very helpful. Thanks, Graham Macomber (2611)

A: The purpose of this Q&A is to answer questions regarding the rules of _FIRST_ STEAMWORKS. For technical assistance, please visit the [FIRST Forums](http://forums.usfirst.org/forumdisplay.php?23-FIRST-Robotics-Competition).

(Asked by **2611** at Mar 21st 17)

Q694 herding or bulldozing?

Q: clarification of answer to Q675 - You said: "Bulldozing" is an *unintentional action*. A ROBOT that inadvertently moves a 2nd GEAR while attempting to place a GEAR on the LIFT is "bulldozing" & has not violated G27." However, when moving a GEAR that is blocking access to a LIFT, it seems like this move could be deemed *intentional*. The team would not be moving the gear for strategic advantage, only moving it to place the GEAR they are already carrying on a LIFT. Is this herding or bulldozing?

A: We cannot comment absolutely on hypothetical scenarios. The ultimate decision would be determined by the REFEREES at your event, with the final call made by the Head REFEREE. The definitions of "herding" and "bulldozing" in the Blue Box below !G27 will be used in making this decision.

(Asked by **5675** at Mar 22nd 17)

Q695 Rope failure

Q: If a ROPE breaks while a robot is attempting to climb, are all parts of it still a ROPE?

A: No. Per the definition of ROPE: "... used to secure robots for flight at the end of the match". Any portions of a ROPE that are no longer capable of securing a ROBOT for takeoff at the end of the MATCH are no longer ROPE.

(Asked by **619** at Mar 22nd 17)

Q696 Length of Steal Conduit in Team Update 18

Q: What is the length of the flexible steel conduit (Item 10) that has been added in Team Update 18? This is GE-17047 Lift Assembly, Rev A. I can't find the length of this piece anywhere. Is it the same length as the spring?

A: The conduit is 6.75" long and constructed from 3/8" Flexible Steel Conduit (Home Depot Internet P/N: 202819645). A drawing update was included with [Team Update 19] (https://firstfrc.blob.core.windows.net/frc2017/Manual/TeamUpdates/TeamUpdate19.pdf) (GE-17448).

(Asked by **5010** at Mar 29th 17)

Q697 Can an Alliance choose interernaly each team's driver station location?

Q: Can an Alliance(both in elimination abd quals) choose interernaly each team's driver station location? Ex: my team is assigned to blue 3 but we want to drive in blue 1, all our Alliance agreed, can we swap the location?

A: No, this would be a violation of !C12.

(Asked by **2230** at Mar 24th 17)

Q699 Tethering a Phone to Our Board On the Field Before a Match

Q: We are using a Jaguar One Board coprocessor for vision processing. Does tethering in to the board with my phone on the field before the match starts in order to configure vision settings violate G02? The phone would be used as the desktop screen of the board only.

A: Your coprocessor is part of your ROBOT, and !G06 strictly forbids tethering to your ROBOT for any reason before or after a Match.

(Asked by **217** at Mar 29th 17)

Q700 Can bumper mounting brackets extend horizontally into a gap between two bumper segments?

Q: Can bumper mounting brackets extend horizontally into a gap between two bumper segments?

A: !R29 part B requires that "hard BUMPER parts ... must not extend more than 1 in. (~25 mm) beyond the FRAME PERIMETER." BUMPER mounting brackets are considered a hard BUMPER part (as per !R29), so as

long as the brackets do not extend more than 1 inch beyond the FRAME PERIMETER then !R29 is not violated.

(Asked by **2846** at Mar 27th 17)

Q701 Clarifying Rule G27: "if strategic"

Q: Please clarify "if strategic" in rule G27. If a GEAR becomes lodged in a ROBOT (with no hope of delivering it) and the ROBOT collects a second GEAR and delivers it, is this a FOUL or TECH FOUL? If the ROBOT then goes back for another GEAR, would an additional penalty be imposed?

A: If a GEAR becomes lodged in a ROBOT (with no hope of delivering it), each time the ROBOT controls a second gear, it will be assessed a foul per !G27. That being said, if the original GEAR that was lodged in a ROBOT suddenly finds the hope to get delivered, that GEAR would be subject to the Tech Foul and Yellow Card noted in the "if strategic" part of !G27.

(Asked by **5332** at Mar 27th 17)

Q703 Can an Alliance choose interernaly each team's driver station location with the fms pos?

Q: Can an Alliance(both in elimination abd quals) choose interernaly each team's driver station location? Ex: my team is assigned to blue 3 but we want to drive in blue 1, all our Alliance agreed, can we swap the location without violation of C12, can we talk woth the FTA and swap the connection station so there will be no loose cables in the driver stations. My team will connect its operator console on the new position in blue 1 instead of blue 3 as assigned

A: No, !C12 requires that the assigned PLAYER STATION, indicated by the Team Sign, be used. These assignments are also indicated by the Match Schedule in Qualifications (described in Section 10.4) and are dictated by the Alliance Selection in Playoffs (described in Section 10.5.3). The only exception is at the 2017 *FIRST* Championship, the process for this event is described in Section 10.11.

(Asked by **2230** at Mar 30th 17)

Q705 Proper driver response during match when a foreign object was left on field

Q: What should team drivers do when a match is started despite a sizeable non-gameplay-object remaining on the field? Semi-final match: During match countdown, a tote used by reset crew to refill balls was noticed in launchpad. Announcer called wait, match was started anyway. When drivers began teleop, they believed authorities were already aware of object. Drivers avoided tote in their launchpad (losing time) for fear of damaging it/being penalized. Did drivers have any rights to stop match?

A: We won't comment on specific situations. However, if a MATCH is started and continues, TEAMS should continue to play the MATCH to the best of their ability. If afterwards, a TEAM believes a MATCH should be replayed under Section 10.8, the TEAM should send one (1) pre-college student to the question box to discuss this with the Head REFEREE per !C09 and Section 10.6.

(Asked by **2795** at Mar 27th 17)

Q706 3 day District Event Unbagging

Q: R18-G says "2-day events for the 2017 season include District Qualifier events for the following areas", then goes on to list Ontario district events. We are attending the Windsor district qualifier, which we would call a 3 day event, since we can load in Wednesday night. Does it still qualify for the 6 hours of unbag time before the event?

A: Yes. Load-in day is not considered an official event day. Therefore, all District Qualifiers (but *not* most District or State Championships - check your schedules and ask if you have questions) are considered 2-day events.

(Asked by **4917** at Mar 27th 17)

Q707 Can a team that has won a District Chairman's Award edit their Chairman's Video?

Q: Our team won the Chairman's Award at the Perry Meridian District Event in Indiana. However, our Chairman's Video has aspects that we wish to change, such as clearing up some audio issues and additions/removals to make it better fit with FIRST's guidelines. I can not find anything forbidding this in the Game Manual or the Chairman's Submission Guide. Thanks in advance.

A: Yes. Teams are allowed to edit their videos between events.

(Asked by **135** at Mar 29th 17)

Q708 Overflow Bins

Q: Section 3.11.5 of the manual, “RETURN AND OVERFLOW BINS”, describes 3 bins, a return bin (singular) and 2 overflow bins (total 3). However it is also stated, “to prevent overflowing, HUMAN PLAYERS may replace it with an empty RETURN BIN. Where does this “empty RETURN BIN” come from, and can more than 1 “empty RETURN BIN” be placed at the boiler exit at any time?

A: Section 3.11.5 states that "Each loading lane has three (3) RETURN BINS." There are no rules that prohibit placing multiple RETURN BINS on the platform, provided that all of them remain within the LOADING LANE.

(Asked by **346** at Mar 30th 17)

Q709 Adhesive backed velcro in the last 4 inches of the rope

Q: I know that adhesive is not allowed as part of our rope. But there seems to be an exception for the last 4 inches. Can it be used on the last 4 inches. Our rope has adhesive backed velcro sewn to the last 3.5 inches.

A: Adhesive-backed hook-and-loop fastener is never legal for use on a ROPE. Moreover, adhesive-backed hook-and-loop fastener is not exempted in !I04 part D by the words, "... which may be whipped (with material that is flexible and non-metallic) or fused only to prevent fraying."

(Asked by **5470** at Apr 6th 17)

Q710 Can a painted white bumper number be outlined with black Sharpie or other marker?

Q: For the past few years we have painted white fabric paint numbers on our bumpers. To make them appear crisp we have used black Sharpie marker to outline the numbers. These outlines just make the edges of numbers look crisp and are no more than an eighth of an inch. We recently had an inspector say that a white number was legal but Not the black outline. We had to paint over the black marker. Others at the same event were not held to this standard.

A: It is not a violation of !R27 part A to have a black outline surrounding white numerals on BUMPERS, though the final decision to the legality of BUMPERS at an event lies with the Lead Robot Inspector (LRI) at the event.

(Asked by **2928** at Apr 6th 17)

Q711 Do gears falling from climbing robots get yellow cards?

Q: If a gear falls out of a robot while the robot is climbing, does this count as "launching" the gear and result in a yellow card?

A: We cannot comment absolutely on hypothetical scenarios. The ultimate decision would be determined by the REFEREES at your event, with the final call made by the Head REFEREE. That being said, the definition of LAUNCHING is "shooting in the air, kicking or rolling across the floor with an active mechanism, or throwing in a forceful way." A GEAR that "falls" our of a ROBOT while climbing would not be LAUNCHING unless it was "thrown from the ROBOT in a forceful way."

(Asked by **3865** at Apr 6th 17)

Q712 Clarification of Blockading Action in the Key

Q: If Red Robot A and Red Robot B of the opposing alliance cordon off Blue Robot A, trying to shoot in the key, and prevent Blue Robot A from exiting the key without pinning, does that constitute blockading? The MAJOR game element of fuel is prevented from being access by Blue Robot A.

A: We cannot comment absolutely on hypothetical scenarios. The ultimate decision would be determined by the REFEREES at your event, with the final call made by the Head REFEREE. That being said, intentionally coordinating a blockade of an opponent(s) into a small area of the FIELD (such as the KEY) does put you at risk of violating !G10. The existence, or lack of, pinning, does not factor into the situation.

(Asked by **900** at Apr 6th 17)

Q713 Clarification Regarding Real Time Scoreboard Accuracy

Q: Is the real-time scoreboard considered to be part of the ARENA, for purposes of the ARENA FAULT rules? Is it considered an ARENA FAULT if the score showing on the real-time scoreboard were different from the actual score at a given point of the match (understanding that there is a slight delay between an action occurring and a score appearing on the scoreboard), whether due to discrepancies in points scored or foul points incorrectly assigned?

A: The Audience Display is considered part of the ARENA, but a discrepancy between what is displayed on the Audience Screen and what the "real" score is at a particular point in a MATCH (such as a delay in assigning of FOUL points, in your example) is not an ARENA FAULT.

(Asked by **2761** at Apr 6th 17)

Q717 Custom Switch With Exposed Contacts

Q: Is it legal to have 2 exposed peices of aluminum tape, acting as a switch. i.e. they get pushed together so that the roboRio senses/detects they are in contact? They are connected to ground and signal on the roboRio using the internal pull up resistor.

A: There are no rules prohibiting this, though you should take care to make sure that the exposed elements, particularly the ground contact, cannot contact other conductive elements of the ROBOT.

(Asked by **4265** at Apr 11th 17)