

Q&A

VRC 2022-2023: Spin Up

Tagged: Robot Rules and Inspection

Welcome to the official VEX Robotics Competition Question & Answer system, where all registered teams have the opportunity to ask for official rules interpretations and clarifications. This Q&A system is the only source for official VRC Spin Up rules clarifications, and the clarifications made here from the Game Design Committee (GDC) are considered as official and binding as the written [Game Manual](#) itself.

Please review the [Q&A Usage Guidelines](#) before posting. This system is only intended for specific VRC Spin Up rules questions.

- For event, registration, or other competition support questions, please contact your [REC Foundation Manager](#).
 - For VEX technical support, contact support@vex.com or sales@vex.com.
- For game questions, suggestions, or concerns outside of specific and official rules questions, contact GDC@vex.com.

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1483: SD Cards

28-Feb-2023

Robot Rules and Inspection

Can the SD card be in the microcontroller when it is on the court?

Answered by committee

There is no rule about whether a V5 microcontroller may contain an SD card during a Match, so this would be legal.

1455: Using pneumatic cylinders as gas shocks

14-Feb-2023

Robot Rules and Inspection R17

[<R17>](#)

<R17> Pneumatics are limited. A Robot's pneumatic sub-system must satisfy the following criteria:

- a. Teams may use a maximum of two (2) legal VEX pneumatic air reservoirs on a Robot.
- b. Pneumatic devices may be charged to a maximum of 100 psi.
- c. The compressed air contained inside a pneumatic sub-system can only be used to actuate legal pneumatic devices (e.g., cylinders).

The intent of R17a and R17b is to limit Robots to the air pressure stored in two reservoir tanks, as well as the normal working air pressure contained in their pneumatic cylinders and tubing on the Robot. Teams may not use other elements for the purposes of storing or generating air pressure. Using cylinders or additional pneumatic tubing solely for additional storage is in Violation of the spirit of this rule.

The intent of R17c is to ensure that pneumatics are being used safely. Pressurized systems, such as a Robot's pneumatic sub-system, have the potential to be dangerous if used incorrectly. This rule ensures the safety of participants, and prevents potentially unsafe uses in the future.

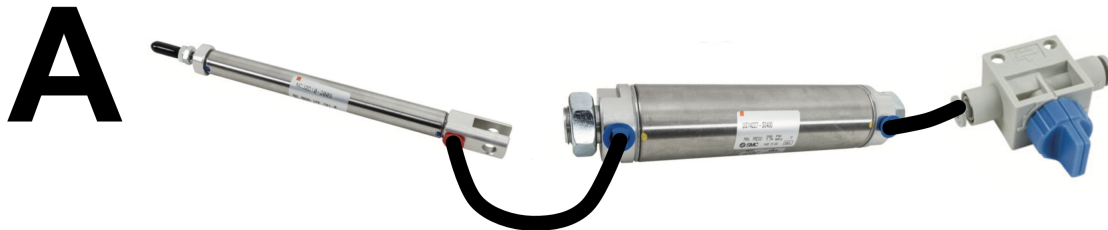
Another way of thinking of R17c is that pneumatics should only be used with pneumatics. Teams should not use compressed air as a means of actuating non-pneumatic devices such as screws, nuts, etc. For example, pulling a pin with a pneumatic cylinder is okay, but using air to actuate the pin itself is not.

The attached image shows two configurations of pneumatic components with no solenoid. When the shutoff valves are closed, the cylinders essentially behave as gas shocks. The force of the gas shock can be great enough to replace rubber bands in some robot applications, particularly if configuration "B" is used and the system is first charged to greater-than-atmospheric pressure.

Questions:

1. If the system is charged to 100psi or below with the cylinder fully extended before a match, but exceeds 100psi when the cylinder is compressed, would that be a violation of R17b? If so, how should inspectors/referees determine whether the pressure exceeds 100psi when the cylinder is compressed?
2. If the cylinder is compressed using power from a V5 motor (e.g. when pulling back a catapult), would this be considered an element "generating air pressure" as prohibited by the R17 red box?

3. Would configuration "B" in the attached image (where the cylinder is connected directly to a shutoff valve with no reservoir) be legal? [Q&A 1209](#) concerns using pneumatic components without a reservoir, however this configuration is somewhat different to the use case described in that question.
4. If configuration "B" is used on a robot, but there is also a reservoir elsewhere on the robot connected to different cylinders, is the answer any different? In other words, do all of the cylinders used on a robot need to be connected to a reservoir?



Answered by committee

As noted in Q&A 1209, the use of pneumatic tubing and/or cylinders solely for the purposes of storing air without pneumatic tanks is not permitted. Therefore, example "B" would not be legal.

Example "A" satisfies this requirement and would therefore be legal.

1423: <R7e> concerning metal rope

3-Feb-2023

Robot Rules and Inspection

R7e allows for the use of non-elastic rope/string measuring 1/8-1/4 at it's thinnest point, would this include the use of wire rope as seen in the link below. If it does, is it permissible to used the loop crimped connectors to fasten the rope to the robot?

<https://www.homedepot.com/p/Everbilt-1-4-in-x-100-ft-Galvanized-Steel-Uncoated-Wire-Rope-803132/203958865>

[<R7>](#)

Answered by committee

As described in [Q&A 1117](#) and rule [<R3f>](#), the final determination of whether a specific material can be used on a Robot will be made by the Head Referee.

Depending on its use on the Robot, and on the Head Referee's discretion, the metal rope you've linked may be legal for use on VRC Robots. The crimped connectors are *not* legal for use on VRC Robots. [Q&A 1140](#) addresses a related topic, and ruled that ferrules are not legal for use with steel ropes.

1391: Modifying the Gear Box / Motor

17-Jan-2023

Robot Rules and Inspection

Are you allowed to modify the gear boxes? As in, are you allowed to either totally remove the gearboxes; from the V5 motors, and run without them or modify the gearboxes so that they have a different gear ratio?

I know we can swap between the blue, green, and red gearboxes. However, can we open up a gearbox cartridge and modify their contents?

Answered by committee

Per rule [<R20d>](#), "... the gear cartridges found within the V5 Smart Motor are considered "part of the motor". Therefore, any physical or functional modifications to official gear cartridges is not permitted."

For additional "edge case" clarifications regarding this rule, please also see these related Q&A's:

<https://events.vex.com/VRC/2022-2023/QA/1115>

<https://events.vex.com/VRC/2022-2023/QA/1138>

<https://events.vex.com/VRC/2022-2023/QA/1189>

1379: Legality of RGB controllers for addressable LED light strips

11-Jan-2023

Robot Rules and Inspection R12 R14

[<R12b>](#) states

"Small cameras are permitted as non-functional decorations, provided that any transmitting functions or wireless communications are disabled. Unusually large cameras being used as ballast are not permitted."

[<R12g>](#) states

"Decorations which provide visual feedback to Drive Team Members (e.g., decorative lighting) are permitted, provided that they do not violate any other rules and serve no other function (e.g., structural support)."

[<R14>](#) states

"Robots have one microcontroller. Robots must ONLY use one (1) VEX V5 Robot Brain (276-4810). Any other microcontrollers or processing devices are not allowed, even as non-functional Decorations. This includes microcontrollers that are part of other VEX product lines, such as VEX Cortex, VEX EXP, VEXpro, VEX RCR, VEX IQ, VEX GO, or VEX Robotics by HEXBUG. This also includes devices that are unrelated to VEX, such as Raspberry Pi or Arduino devices."

Cameras contain microcontrollers and per [<R12b>](#) are legal for use as a non-functional decoration without an exception stated for [<R14>](#). [<R12g>](#) permits the use of LEDs and also does not contain an exception for [<R14>](#), however addressable LED light strips can use microcontrollers, such as the one in the picture below.



Scenario A: a robot uses an LED light strip with an RGB controller but without a remote, no wireless communication is used for the LEDs.

Scenario B: a robot uses an LED light strip with an RGB controller and with a remote. Wireless communication is used from the remote to the RGB controller.

Scenario C: a robot uses an LED light strip with an RGB controller that connects to both the LED light strip and the V5 brain through one or more 3-Wire ports. The V5 brain sends a signal to the RGB controller, which is used to set the LEDs.

Scenario D: a robot uses an LED light strip without an RGB controller and is connected directly to the V5 brain through one or more 3-Wire ports. The V5 brain is used to set the LEDs.

In which scenarios would LEDs be considered non-functional decorations?

Answered by committee

Cameras contain microcontrollers and per [<R12b>](#) are legal for use as a non-functional decoration without an exception stated for [<R14>](#). [<R12g>](#) permits the use of LEDs and also does not contain an

exception for [<R14>](#), however addressable LED light strips can use microcontrollers, such as the one in the picture below.

These are all correct statements.

In which scenarios would LEDs be considered non-functional decorations?

Scenarios A, B, and C would all be considered violations of R14, since they include a microcontroller.

Scenario D is legal.

1347: Using suggested replacement for retired/legacy part.

18-Dec-2022

Robot Rules and Inspection R7

I'm currently trying to purchase more of the Pneumatics on/off switches, VHK3-04F-04F.

On SMC, and other sites such as Radwell PLC have all suggested to use this part: www.smcpneumatics.com/VHK3A-04F-04F.html as a replacement.

Would using this part be considered legal in for VRC Spin-Up?

Answered by committee

Thank you for your question. Because part # VHK3-04F-04F has been discontinued by SMC, part # VHK3A-04F-04F is an acceptable alternative for use in VRC Spin Up. The [Legal VEX Pneumatics Summary document](#) will be updated to reflect this additional legal part #.

1342: Legality of Field parts on robots

13-Dec-2022

Robot Rules and Inspection R6 R11

I have noticed in recent tournaments that some teams appear to have been using parts that originate from VRC field kits. I understand that polycarbonate can be legal assuming that it fits within the sizing restrictions but our question specifically centers around Nuts. Rule R11 gives a detailed explanation of legal fasteners for robots as listed which seems pretty straightforward.

[<R11>](#)

I've noticed that some teams may be using larger nuts as part of their endgame expansion projectiles that look like they could be the 1/4" lock nuts used in the VRC field perimeter. What I would like to clarify is whether these nuts are competition legal. The vex website lists the field perimeter as being VRC Legal under the V5 platform; however, I am unsure if this might fall into the bounds of the red box in rule R6 as listed below due to being "competition support materials".

[<R6>](#)

Clarification would be appreciated, thank you!

Answered by committee

Thank you for your question! 1/4" nuts, whether from the VRC field perimeter or any other source, are not legal for use on VRC Robots.

As you noted, 1/4" screws and nuts are not included in the list of legal commercially-available fasteners in rule [<R11>](#), and the use of competition support materials is prohibited by the red box following rule [<R6>](#).

1336: VEX EXP Wheels legal for VRC?

9-Dec-2022

Robot Rules and Inspection

[<R6>](#) In Spain a team is asking if they are able to use the wheels included in the VEX EXP Kit for building the intake of their robot. The wheels are the following:



Answered by committee

Thank you for your question. Rule [<R6a>](#) limits use of VEX EXP products to those that are specifically allowed by rule [<R7>](#) or cross-listed for V5.

The 1.75" and 2.75" Balloon Tires (and associated Wheel Hubs) included in the VEX EXP Education Kit cannot be used for Robot construction in VRC Spin Up.

1315: Discrepancy Between R7e and Q&A 1296

30-Nov-2022

Robot Rules and Inspection R7

Hello,

Recently, rule R7e has been changed to place further constraints on string diameter such that:

An unlimited amount of rope / string, with a thickness / diameter between 1/8" (**3.175mm**) and 1/4" (6.35mm).

A [recent Q&A answer \(1296\)](#) seems to contradict this new rule, with the GDC making the statement:

String must measure at least 1/8"/**3mm** (at its narrowest point) while on the Robot

(Emphasis mine)

We recall that the Q&A is intended to be an extension of the game manual, meaning the answers given here will always take precedence along with the contents of the game manual.

This question may feel a bit unnecessary, even pushing the borders of rule G3... but we were curious if with that answer, the GDC intends to officially **lower the legal string diameter to 3mm** instead of the specified 3.175mm, or if the usage of "3mm" in that answer was a mistake/shorthand way to say 3.175mm.

Thank you for your time.

Answered by committee

Thank you for your question. As described near the end of the response to [Q&A 1275](#), this was an intentional change made to reflect the standard string diameter in regions that use metric measurements. Rule [<R7e>](#) will be revised in the scheduled 12/6 game manual update to reflect that Robots may use an unlimited amount of non-elastic rope / string, with a thickness / diameter between 1/8" (imperial standard) / 3mm (metric standard) and 1/4" (6.35mm), and that string must measure at least 1/8" / 3mm in diameter at its narrowest point while on the Robot under no load.

1298: Q and A 1275 clarification

14-Nov-2022

Robot Rules and Inspection R7

I apologize in advance for the quantity of questions, but I believe that all questions asked in this Q and A are important clarification questions.

in [Q and A #1275](#), it was stated that

it has come to our attention that the standard metric equivalent of 1/8" string is 3mm rather than the 3.175mm specified in the November 1 Game Manual update. The next Game Manual update will be updated to indicate that the minimum dimension of string is 1/8" / 3mm.

1. Due to competitions in my state using digital calipers to measure string diameter, the difference of 0.175 mm can be a big difference, and for clarification, under this ruling string we were going to use in a competition just last Saturday which was 3 mm and not 1/8" would have been legal? or because it is under 1/8" would it be considered illegal?

it was also stated that (emphasis mine)

Using unbraided string is permissible, as long as the resulting thinner string used on the Robot has a minimum diameter of 1/8"/3mm. For example, **unbraiding a legal 1/8" string to create smaller strings will result in multiple illegal strings** that cannot be used on VRC Robots.

which seems to directly contradict the ruling that

(braiding string) would only be legal if each of the thinner strings also had a minimum diameter of 1/8"/3mm before being braided, and if the final braid is not wider than 1/4" in any direction.

2. the first quote states that there is legal 1/8" string that is braided, whereas the second quote states that braided string must be made with string thicker than 1/8". is the difference in who braided the string?

if so:

a) how should inspectors be able to tell if the string was braided by the student vs. the manufacturer when there are many different machines students can have access to that can braid the string almost as efficiently as the manufacturer would? (i know that "it is outside the scope of this Q&A system to provide detailed explanations of the nuances and human judgments involved in the inspection process.", but I believe if this is the correct interpretation of the rule, this point must have been considered when making the original decision and your answer can help clarify the extent of this rule)

b) would it be then be illegal to unbraid legal string than rebraid the string?

if not:

a) what is the difference/ where is the line drawn between legal and illegal braided string?

3. according to the ruling "(braiding string) would only be legal if each of the thinner strings also had a minimum diameter of 1/8"/3mm before being braided, and if the final braid is not wider than 1/4" in any direction.", what is to be considered "braiding"? would connecting multiple lengths of string together (so that they run parallel to each other) with zipties or other means of connection be considered braiding as it serves the same functional purpose that braiding would thus making any string connected this way to be treated as one string? would tying a knot at the end of the rope or knots throughout the rope be considered "braiding"?

Thank you for your time,

Team 7996B

Answered by committee

The answer to [Q&A 1275](#) has been updated to clarify the difference between "braided string" and "manufactured multi-strand string." We believe this addresses all of the questions in your post. If it does not, please feel free to rephrase and resubmit.

1285: Legal string being modified after purchase.

7-Nov-2022

Robot Rules and Inspection

Rule R7 reads

An unlimited amount of rope / string, with a thickness / diameter between 1/8" (3.175mm) and 1/4"(6.35mm).

Rule R11 reads

All specific dimensions listed in this rule are intended to be 'nominal' references

Rule R22 reads

Physical modifications, such as bending or cutting, of legal metal structure or plastic components are permitted. d. Fusing / melting the end of legal nylon rope / string (see <R7e>) to prevent fraying is permitted.

Question:

At the last event my teams attended I noticed some teams have purchased 1/8" paracord and pulled the internal stings out of the paracord essentially changing the diameter of the cord. As rule R11 states that specific dimensions are intended to be nominal references, does this modification fit Rule 22 as a physical modification making it permissible or is the modification an violation of rule R7 as the diameter no longer meets the required minimum diameter?

Answered by committee

Thank you for your question. Provided the actual string used on the Robot—whether it is a 1/8" strand of a larger string/cord/rope or the "stringlike" outer casing of a cord—has a diameter of at least 1/8"/3mm when measured at its narrowest point and a diameter of no more than 1/4" at its widest point, this modification to string is permissible.

1283: Clarification on previous game element usage

4-Nov-2022

Robot Rules and Inspection

Are we allowed to use and cut the 2021-2022 Tipping Point ramp plastic on our robot? Is it legal if we cut a 12"(inches) by 24"(inches) off the ramp and use the cut section on our robot?

Rule R-9 E; E.) Shattering plastic, such as PMMA (also called Plexiglass, Acrylic, or Perspex), is prohibited

Answered by committee

Thank you for your question. Rule [<R9>](#) allows Robots to include custom-made parts cut from non-shattering plastic up to 0.070" thick.

The material used for the tops of the Tipping Point platforms is 0.063" polycarbonate, which is legal for use on VRC Robots provided the total amount of plastic used on the Robot could fit within a single 12"x24" sheet.

1279: List of Banned VEX Parts for VRC Competition

3-Nov-2022

Robot Rules and Inspection

Our team's use of the steel case to a swerve drive (pn 276-0506) was questioned at inspections at our local meet. Although this part is no longer sold, is there a list of forbidden VEX parts?

Answered by committee

Our team's use of the steel case to a swerve drive (pn 276-0506) was questioned at inspections at our local meet. Although this part is no longer sold, is there a list of forbidden VEX parts?

Thank you for your question. Rules [<R6>](#) and [<R7>](#) in Section 3 of the Spin Up Game Manual define the legal and illegal components for construction of VRC Robots. Rules [<R6a>](#) through [<R6g>](#) list specifically-disallowed parts. Rule [<R6h>](#) indicates that all official VEX Robotics products are listed on www.vexrobotics.com.

The specific part you referenced (276-0506: Swerve Drive Kit) is not listed on the VEX Robotics site, and is therefore not legal for use in the VEX Robotics Competition. However, some of its components (for example, the 60-tooth High Strength Gear) are listed separately on the site and are legal for use.

1275: Legal String Modifications and Sizes

2-Nov-2022

Robot Rules and Inspection

Rule R7 reads

An unlimited amount of rope / string, with a thickness / diameter between 1/8" (3.175mm) and 1/4"(6.35mm).

Rule R11 reads

All specific dimensions listed in this rule are intended to be 'nominal' references

Rule R22 reads

Physical modifications, such as bending or cutting, of legal metal structure or plastic components are permitted. d. Fusing / melting the end of legal nylon rope / string (see <R7e>) to prevent fraying is permitted.

1. How is the diameter of string measured? Would [this ribbon](#) be legal to use?
2. Is it a legal physical modification to unbraid legal string in order to make it thinner than the legal diameter as this is all that some manufactures do before selling the string? If the answer is that it must be sold by a manufacturer pre-braided, what constitutes a manufacturer? (ex. would someone selling homemade string count manufacturer?)
3. Is it legal to braid together thinner than legal string so that a strand is a legal diameter?
4. Are string sizes nominal references as with screw sizes? (ex. 1/8" string is bought yet is becomes stretched through use and measures 0.12 inches when sized, but the team can provide proof they bought legal string)
5. Is it legal to use string less than 1/8" in diameter for purposes other than covering tiles for the endgame?

Answered by committee

The answer to question #2 in this post has been revised slightly to differentiate between "braided string" and "manufactured multi-strand string."

We'll start by pointing out that the red box note you've quoted from rule [<R11>](#) only applies to fasteners. **The dimensions listed for the minimum and maximum sizes of string are not nominal.** The only measurement of string that matters in Spin Up is the actual diameter when measured across the narrowest point of the string; package labels in some cases may be accurate, but for others the actual measurement will differ wildly from the nominal measurement (e.g., hand-spun fibers like yarn). It is the Team's responsibility to determine the actual size of the string that is in use on the Robot.

1. How is the diameter of string measured? Would [this ribbon](#) be legal to use?

This question was asked and answered in [Q&A 1271](#). String must measure between 1/8"/3mm & 1/4" in every dimension but length.

2. Is it a legal physical modification to unbraid legal string in order to make it thinner than the legal diameter ...?

Deconstructing manufactured multi-strand string is permissible, **as long as the resulting thinner string used on the Robot has a minimum diameter of 1/8"/3mm.** For example, deconstructing a legal 1/8" string to create smaller strings will result in multiple illegal strings that cannot be used on VRC Robots.

3. Is it legal to braid together thinner than legal string so that a strand is a legal diameter?

This would only be legal if each of the thinner strings also had a minimum diameter of 1/8"/3mm before being braided, and if the final braid is not wider than 1/4" in any direction.

4. Are string sizes nominal references as with screw sizes?

No. However, it has come to our attention that the standard metric equivalent of 1/8" string is 3mm rather than the 3.175mm specified in the November 1 Game Manual update. The next Game Manual update will be updated to indicate that the minimum dimension of string is 1/8" / 3mm.

5. Is it legal to use string less than 1/8" in diameter for purposes other than covering tiles for the endgame?

No. As specified in rule [<R7e>](#) and clarified here and in Q&A 1271, only string with a minimum diameter between 1/8"/3mm and 1/4" is permitted for use on the Robot.

1274: Colored Rubber Bands

2-Nov-2022

Robot Rules and Inspection

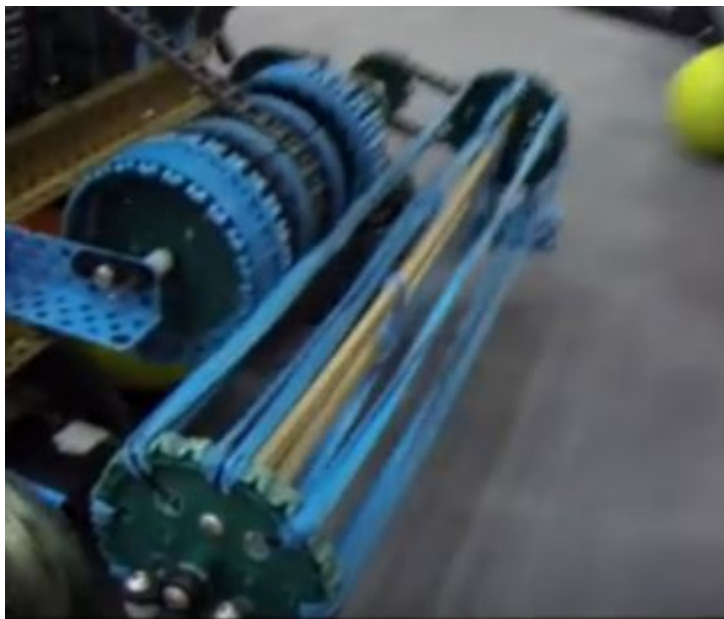
Teams are using rubber band intakes on their robot utilizing colored rubber bands, like blue and red. They are legal size and follow rule: R7. h. Rubber bands that are identical in length and thickness to those included in the VEX V5 product line (#32, #64 and 117B).

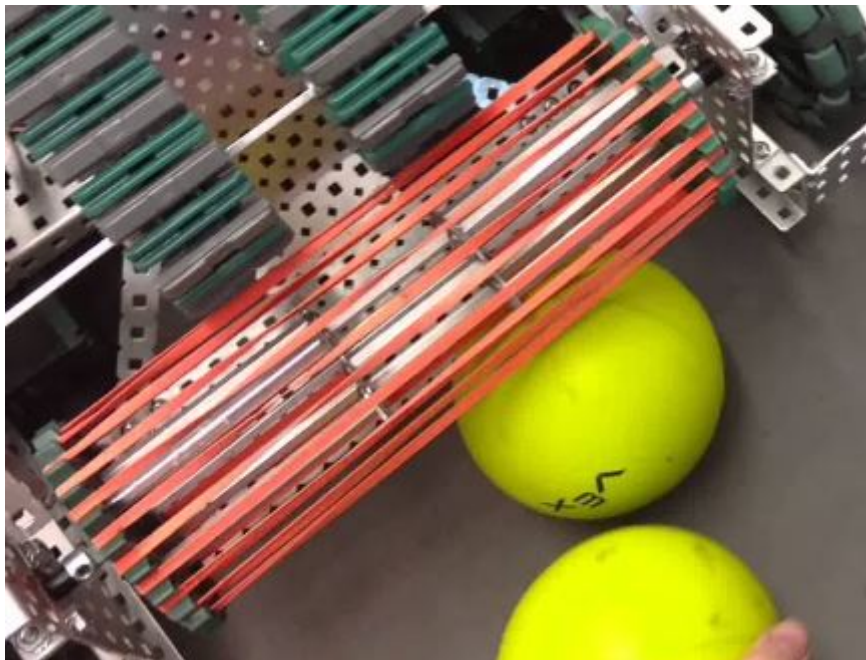
However, they can interfere with the vision sensor of robots. They are using large gears and are similar to the size of the Rollers (Field elements- 2in diameter or larger). This would mean that their intake roller is similar to the Roller and would violate: R12. d. Decorations that visually mimic Field Elements, or could otherwise interfere with an opponent's Vision Sensor, are considered functional and are not permitted.

The argument is that the rubber bands on the rollers are "functional" parts of the robot and are not considered decoration so R12 would not apply because it does not fall under the ruling of decoration. The team also argued that they past inspection and the Head Referee did not comment on the "violation" until reported several matches in the tournament. It is clearly stated that R12. d. part b The Inspector and Head Referee will make the final decision on whether a given decoration or mechanism violates this rule.

The Head Referee can rule anytime regardless of the timing of reported violation and their decision is final.

Is this a violation of R12?





Answered by committee

Teams are using rubber band intakes on their robot utilizing colored rubber bands, like blue and red. ...
Is this a violation of R12?

Thank you for your question. Rule [<R7h>](#) limits the length and thickness of rubber bands that may be used on a VRC Robot, but does not require or disallow any color or colors of rubber band. Because a rubber band intake is a standard functional VRC mechanism, rule [<R12>](#) does not apply.

1271: definition of diameter of string for expansion

2-Nov-2022

Robot Rules and Inspection

in R7e it states that : An unlimited amount of rope / string, with a thickness / diameter between 1/8" (3.175mm) and 1/4" (6.35mm).

The definition of Diameter is stated as:

1. a straight line passing from side to side through the center of a body or figure, especially a circle or sphere.

Would a cord or rope with the dimensions of 1.5mm and 5mm which be considered legal? The cord has a diameter between 1/8" and 1/4" but is also flat.

Answered by committee

Thank you for your question. Rule [<R7e>](#) will be revised in the next Game Manual update to indicate that other than length, every measurement of string must between 1/8"/3mm and 1/4", regardless of the shape of the string. For example, a flattened string would be legal **only** if it is at least 1/8"/3mm thick and no more than 1/4" wide.

1263: Nuts on string/End Game

27-Oct-2022

I have attached a video of a team launching string. The nut on the end is from the pneumatic tank. Legal use of nut??

<https://youtube.com/shorts/9Wy9OkfzXk?feature=share>

R11 & VUR7

Answered by committee

Thank you for your question! The type of Endgame mechanism you describe is potentially legal. Teams, Inspectors, and Head Referees must apply judgment to determine whether any specific mechanism is unsafe as described in rule <R4>, and in particular <R4d>:

<R4> Robots must be safe. The following types of mechanisms and components are NOT allowed:

- a. Those that could potentially damage Field Elements or Discs.
- b. Those that could potentially damage other competing Robots.
- c. Those that pose an unnecessary risk of Entanglement with other Robots or the Net.
- d. Those that could pose a potential safety hazard to Drive Team Members, event staff, or other humans.

Additionally, as a further and consistent means to ensure the safety of participants, spectators, and event venues, The November 1 Game Manual update included the following additions and changes to rules <S2>, <SG4>, and <R7>:

<S2> was expanded to indicate that a Robot which comes in contact with anything outside of the field during the Endgame period or due to an early expansion, including the floor or the outside face of the Field Perimeter, will automatically receive a Disqualification for that Match. <SG4> will reference this addition to rule <S2>.

<R7> limits rope/string to a minimum size of 1/8" diameter and will strongly recommend the use of Alliance-colored string or highly visible string that is periodically marked with the current Alliance color.

1244: R7e & Fishing Line

18-Oct-2022

Robot Rules and Inspection

GDC,

Rule R7: e states the following:

R7> Certain non-VEX components are allowed. Robots are allowed the following additional "non-VEX" components: e. An unlimited amount of rope / string, no thicker than 1/4" (6.35mm)

Is fishing line allowed? IE is fishing line considered a rope / string?

It is being used by a number of robots as part of endgame expansion and I'd hate to have inconsistent calls by head refs from one tournament to another causing a team to have their endgame mechanism allowed or disallowed.

Thank you for your time and consideration.

Answered by committee

Thank you for your question! As a means to improve referees' and scorekeepers' ability to efficiently score the Endgame, decrease the resulting long Match cycles, and improve the overall safety of the Endgame, the November 1

Game Manual update included the following additions and changes to rule <R7>:

<R7> limits rope/string to a minimum size of 1/8" diameter and strongly recommends the use of Alliance-colored string or highly visible string that is periodically marked with the current Alliance color.

With this revision to <R7>, fishing line is not acceptable for use in Spin Up.

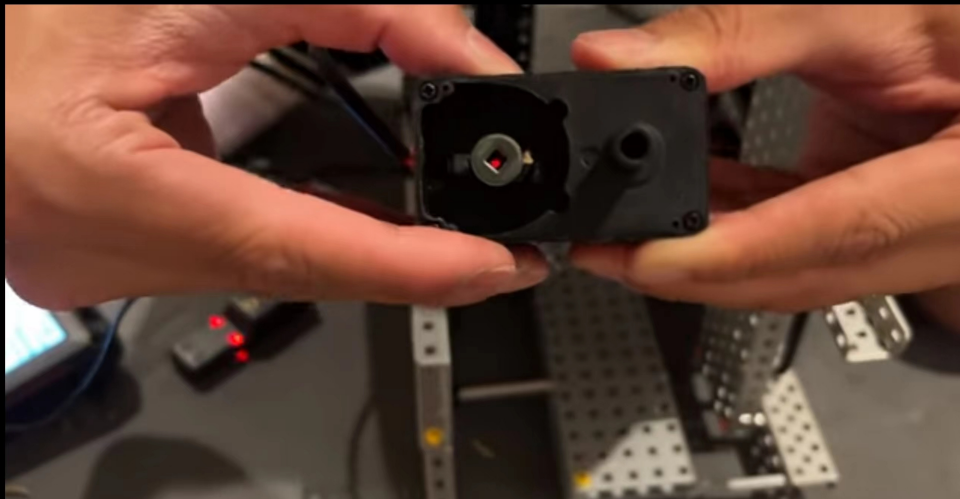
.....

1230: Is it illegal if I change smart motor cartridge like this?

11-Oct-2022

Robot Rules and Inspection

Is it illegal if I change smart motor cartridge like this?





Thank you for your time.

Answered by committee

Is it illegal if I change smart motor cartridge like this?

We believe that this question was previously asked and answered in [Q&A 1189](#). Provided all of the parts shown in these images are legal VRC robot components, this is legal.

1229: Robot parts leaving the field and S1/S2/R4

10-Oct-2022

Robot Rules and Inspection

Rule S1 reads as follows:

"If at any time the Robot operation or Team actions are deemed unsafe [...] the offending Team may receive a Disablement and / or Disqualification at the discretion of the Head Referee."

Rule S2 reads:

"mechanisms which cross the field perimeter intentionally and / or repeatedly [...] during the Endgame may be considered a Violation of S1 at the Head Referee's discretion. "

And rule R4 reads:

"The following types of mechanisms and components are NOT allowed [...] Those that could pose a potential safety hazard to Drive Team Members, event staff, or other humans. [...] However, this interpretation does not extend to rule R4d. Any mechanism or component which is deemed to pose an unnecessary / egregious safety risk may still be considered in violation of , <S1, and / or G1 at the Head Referee's discretion. "

The enforcement of these rules are at the head referee's discretion. This has led to a wide variation in rulings at events. Some events make a team remove a string shooter when it leaves the field. Some events have automatically DQed teams whose robot contacts a human, regardless of any other factors. Others have not given out DQs at all unless a person is actually injured.

I have 3 questions with considerations regarding the scope of a potential S1 violation (warning, disablement, disqualification, and/or removal/modification of the mechanism) for each of the following scenarios.

1. Does the type of projectile and how it exits the field affect the ruling? Should referees consider the size, shape, weight, sharpness of the object? It seems that a disk leaving the field could be as unsafe as many of the string launchers but disks leaving the field aren't usually considered unsafe. Should blanket rulings be made? ie any projectile leaving the field is a Warning/DQ/Disablement
2. Does G14 "You can't force an opponent into a penalty" affect the ruling? A robot is shoved as it fires its projectile. Causing the projectile to leave the field. A robot launches its projectile. The projectile ricochets off a defensive robot and leaves the field.
3. Does contact with a human affect the ruling?

A projectile touches a person in the leg. The person is unharmed. Is this potentially a "safe" action if it is unintentional and a first offense or is it automatically "unsafe."?

Thank you for your time and consideration.

Answered by committee

Thank you for your questions! Teams, Inspectors, and Head Referees must apply judgment to determine whether any specific mechanism is unsafe as described in rule <R4>, and in particular <R4d>:

<R4> Robots must be safe. The following types of mechanisms and components are NOT allowed:

- a. Those that could potentially damage Field Elements or Discs.
- b. Those that could potentially damage other competing Robots.
- c. Those that pose an unnecessary risk of Entanglement with other Robots or the Net.
- d. Those that could pose a potential safety hazard to Drive Team Members, event staff, or other humans.

Additionally, as a further and consistent means to ensure the safety of participants, spectators, and event venues, the November 1 Game Manual update included the following additions to rules <S2> & <SG4>:

<S2> was expanded to indicate that a Robot which comes in contact with anything outside of the field during the Endgame period or due to an early expansion, including the floor or the outside face of the Field Perimeter, will automatically receive a Disqualification for that Match. This interaction will be exempted from rule <G14>, and Teams will be responsible for the effects of their own Endgame expansions, although <G1> will still apply. <SG4> references these additions to rule <S2>.

Because the overall intent of this change to <S2> is safety, an expansion that contacts the top of the Field Perimeter will not automatically receive a Disqualification. However, an expansion that extends through a Net **is** in violation of <S2> (as well as <SG3>) and will automatically receive a Disqualification.