

Q&A

VRC 2023-2024: Over Under

Tagged: R15

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 Over Under 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 Over Under 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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811: Is the new GPS sensor legal for VRC 2021-2022: Tipping Point?

19-Jun-2021

R15

With the new GPS sensor released by VEX? Is it legal to use it in competition? What's the requirements for EP to host event now? Does all fields need to have GPS code with opaque field walls?

Answered by committee

With the new GPS sensor released by VEX? Is it legal to use it in competition?

Yes. Rule R15 reads as follows:

<R15> New VEX parts are legal. Additional VEX components released during the competition season on www.vexrobotics.com are considered legal for use.

Some "new" components may have certain restrictions placed on them upon their release. These restrictions will be documented in the official Q&A forums, in a Game Manual Update, or on their respective product web pages.

The v1.0 Game Manual Update included the following addition to Appendix B:

In Programming Skills Matches, the VEX GPS code strip must be installed on the field. This field modification will be recommended for all events beginning August 1, and required for all events beginning October 1.

71: V5 and Cortex robot inspection checklist differences

10-Sep-2018

G3 R8 R15

In the new V5 Robot Inspection checklist it specifically calls out <R8g> but the Cortex inspection checklist does not. Should it be considered that Cortex robots can not violate <R8g>

In the V5 checklist, it specifies that the sensor has been calibrated on competition fields - does this imply teams calibrate before inspect? on practice fields? home fields? before each match? If before a match, how much time should be allowed for teams to calibrate? This item does not have a rule associated with it. If we are to consider that the variance of lighting conditions is significant between fields, then it suggests this should be before each match and a <G> rule should be associated with it. V5 is all new to us, so <G2> is not there yet :)

In V5 check list it is implied that teams are allowed one controller - yet for Cortex two... <R15> does not make distinction between the two systems with regards to number of controllers.

I would recommend that the V5 inspection checklist be sorted in numerical order consistent with cortex, and that a single document (two sided) be provided so that the inspectors only need to pull one sheet and fill out accord to system.

thanks for the getting out the V5 checklist: <https://www.roboticseducation.org/documents/2018/09/vrc-v5-brain-robot-inspection-checklist.pdf>

Answered by committee

It would be impossible for teams to calibrate robots on the field before each match. Event Partners should take lighting conditions into consideration when planning for an event. The added statement "If Vision Sensor is used, it has been calibrated & tested on competition fields or team accepts responsibility for doing so" reminds teams that it is their responsibility to calibrate their robot matches begin so that they come to their first match prepared.

The V5 Robot Inspection Checklist has been updated to include up to 2 V5 Controllers, and rule <R8g> has been added to the Cortex Checklist. Keep in mind, all rules from the Game Manual still apply regardless if they are called out on the Robot Inspection Checklists. Please check www.RoboticsEducation.org for the latest versions.

3038: Using soap to troubleshoot pneumatics

15-Jan-2026

R15

Can teams use a mix of soap and water to find leaks in pneumatic systems if it is wiped away and fully dried before a robotics match? Using soap and water would allow teams to troubleshoot leaks quickly, however we are worried that it may break rule R15, the prohibition of lubricants.

<R15> Prohibited items. The following types of mechanisms and components are NOT allowed

c. Grease, oil, graphite, and/or any other lubricant or plastic additive.

[<R15>](#)

Answered by committee

Soap should be considered a lubricant in this instance, as it is possible to leave a slippery residue on the Robot. Additionally, it is always recommended to keep water away from all VEX electronics to prevent any unintended damage to the electronics.

Teams should note that the VEX IQ Pneumatics System is not designed to be a perfectly closed air system, and it will inherently have some leaks. The system relies on the slip fit of the tubing over plastic connectors to ensure it does not become over-pressurized. The tubes will always "blow off" of the connectors instead of reaching an unsafe pressure. In order to accomplish this safety feature, there will inevitably be some minor leaks or pressure loss exhibited in almost all implementations. To minimize the potential of leaks, use sharp scissors or a blade to cut the tubing as straight as possible with a single motion. Jagged cuts or tears in the tubing are likely to make leaks and pressure loss more immediate, apparent, and catastrophic.

2966: Traction link pads

5-Dec-2025

R14 R15

For the 2025–2026 VIQRC Mix & Match season, is it legal to mechanically abrade (sand or roughen) the surface of an official VEX IQ rubber traction-link pad to improve friction, or is any surface modification of this part considered an illegal modification?

Answered by committee

The exceptions listed in [<R19>](#) are the only legal modifications of parts. Your suggested part modification is not included in that list of exceptions, and is therefore illegal.

2862: Is marking a part on the robot with a sharpie/pen to aid a driver in operating the robot illegal?

19-Oct-2025

R15 R17

I was talking with a coach who's team's robot has an elevator. He said they are using a sharpie to mark on the beams where to stop the elevator. My gut reaction was, "Oooh... I think that would be considered a functional decoration or modifying a part and thus would be illegal." My research and thoughts are as follows:

<R15d> Prohibited Items: Tape and/or any other material that adheres to or changes a legal part, other than non-functional decorations as permitted by <R17>. *** Does the Sharpie "adhere" to the part? Does it "change a legal part?" I think we can argue that it does since it is placed for a competitive purpose. <R17> Decorations are allowed. Teams may add non-functional decorations, provided that they do not affect Robot performance in any significant way or affect the outcome of the Match. *** Does this sharpie "decoration" affect performance or the outcome of the Match? Again, I think we can argue that it does. b. To be considered "non-functional," any decorations must be backed by legal materials that provide the same functionality. A simple way to check this is to determine if removing the decoration would impact the performance of the Robot in any way. *** Performing this simple check would impact the team's ability to drive the robot but not the robot's performance, per se, so is that "impacting the performance of the robot?" I feel that it is.

In conclusion, I feel that adding Sharpie to help you align something is illegal. BUT at the same time, I feel nit-picky for possibly reading too much into the rules I referenced, since they seem written to address a physical part addition and not some writing on a beam AND because I received mixed answers when I posted on the Referee forum on Facebook.

So the net question of all this is: Is marking a part on the robot with a sharpie/pen to aid a driver in operating the robot illegal?

Answered by committee

Thanks for your question, Curt.

Because the mark in your example is specifically being used to affect the outcome of the Match, it is a Violation of rule <R17>. There are numerous legal ways a Team could achieve the same effect with legal VIQRC components (e.g., adding a pin to a beam to mark where the Driver should stop moving the elevator).

2814: Tape for "Paper License Plates"

24-Sep-2025

R6 R15

<R15> Prohibits the use of Tape and/or any other material that adheres to or changes a legal part, other than non-functional decorations. <R6> Requires teams to have 2 license plates on their robot and provides options for using a paper printed license plate in replacement of the plastic license plate: <https://viqrc-kb.recf.org/hc/en-us/articles/28277975906199-Printable-VEX-IQ-Robotics-Competition-License-Plate>

Context: All of the participating teams are fully registered with robotevents and have paid for their registration; however, many teams choose not to accept the welcoming package which gives the physical plastic license plates because it costs money to have it shipped.

Since the license plate serves a function for the robot, as an identifier for the judges, can tape be used for the sole purpose of affixing the paper license plate to the robot?

Answered by committee

Hello, Jon, and thanks for your question!

As you pointed out in your question, rule [<R15>](#) prohibits tape except as part of non-functional decorations. This includes attaching a Team's License Plates, which per clause C of rule [<R6>](#) are functional Robot components.

If a Team uses plain paper versions of License Plates, they must be attached using other functional parts that are legal for use on VIQRC Robots. [Capped connectors](#) are a great choice, and [standard connector pins](#) work well, too---especially when used in combination with [IQ beams](#) to "sandwich" the edges of a paper License Plate on a Robot. Teams that use paper License Plates should have extras on hand to replace copies that become damaged or illegible during a Match.

We hope this gives you some ideas of how Teams can legally attach paper License Plates to their Robots!

2780: Clarification of R15h

11-Sep-2025

R15

[<R15>](#)

Can we clarify if license plates will fall under this ruling? I know this rule has been in effect in previous years and not been applied to license plates.

Answered by committee

As stated in clause A of rule [<R6>](#), "License Plates are considered functional components, and must meet the requirements of all Robot rules." [<R15>](#) clause H applies to license plates.

3D printed License Plates are not legal VIQRC Robot components.

2589: V5 Smart Motor Cap use vs modification

28-Feb-2025

R15 R16

[<R15>](#)[<R16>](#)According to rule R15, motor caps do not count as electrical components, therefore allowing them to be modified and be in accordance with rule R16 which states that modifications to non-electrical components are permitted. However, R15, section e, states that V5 Smart Motor Cap is not considered part of the motor. Does this allow us to take the motor cap off and replace it with one made of polycarbonate in order to reduce weight and spacing, or do we have to have an official V5 Smart Motor Cap attached to the motor.[<R15>](#)

Answered by committee

Does this allow us to take the motor cap off and replace it with one made of polycarbonate in order to reduce weight and spacing?

Yes.

2397: Laser Etching for Inventory Control

18-Dec-2024

R15

We are trying to inventory control our sensors and other sensitive items for our teams. Currently, we have no way of estimating the longevity of these items or a way to predict their life-cycle. We are looking at etching the outer plastic portions, similar to writing in permanent marker. The etching would be clear and not interfere with any of the main components of electronics. When looking at the parts labeled, it would also be clear that the function of the etching would not benefit the part, as in a ported hole for a motor to cool off faster. If this would not be allowed, I would then argue that a partially broken sensor would fall into an illegal category, possibly making it lighter, etc. Below I have listed the part c.iv Aesthetic/Non-Functional Labeling because this "etching" would simply be identified as such, falling into the "etc" portion of the clause. No benefit or modification to the electronics, and not modifying the "inside" of the sensors themselves. The etching is simply for a team's ability to track who has what parts, and for tracking how long it has lasted. Please let me know what you think or decide on this one. [<R15>](#) c. Teams may make the following modifications to the V5 / EXP Smart Motor's user-serviceable features. This list is all-inclusive; no other modifications are permitted. iv. Aesthetic/non-functional labeling (e.g., markers, stickers, paint, etc.).

Answered by committee

Provided that the Students are able to demonstrate to the Inspector's and Head Referee's satisfaction that the labeling is aesthetic/non-functional, this would be legal under clause Civ of rule [<R15>](#).

2357: R15 & Damaged Pneumatics

7-Dec-2024

R15

[<R15>](#)

Hello!

I just wanted to seek clarifications on whether teams can use damaged pneumatic components or if this would be considered a modification, for instance take the following scenarios:

1. An air pressure gauge with a crack in it
2. An air pressure gauge with a broken casing
3. A 4mm plug with a snapped edge

If a robot contains any of the above should they pass inspection? If it is noticed after a match that they have a broken pneumatic component (that did not break during a match), should they be disqualified from the match for failing robot inspection?

Answered by committee

We're unable to provide a blanket answer that will encompass all possible scenarios and parts. The final decision about whether a damaged pneumatic component should or should not pass inspection (or be removed after damage is identified) must be made by the event inspectors and the Head Referee. Any decision to disallow a damaged part should be made based on reasonable and realistic safety concerns. For example, a damaged pneumatic tank or regulator could present a legitimate safety concern depending on the location and extent of the damage. Cracked plastic on a pressure gauge might not be a safety concern.

In general, a damaged part is different than an illegal part, and should not lead to a Disqualification.

2173: Micro USB port in VEX Brain

2-Oct-2024

R15

[<R15><R15>](#)As many people have probably experienced, the micro USB port in the Vex brain easily breaks after repeated use. In the past the brains would be able to be sent back to Vex to be fixed, but that is not an option anymore as they have discontinued that program. Having Vex fix the ports is the only way to ensure that the brains are still legal for competition as teams cannot tamper with the electronics. Would it be ok to have the brains sent to another company to replace the micro USB port or to fix them ourselves?

Answered by committee

Having a VEX Brain repaired by another company, or fixing it yourself, is not legal for parts used in competition and would be considered a willful Violation of rules [<R15>](#) and [<R28>](#).

2161: [<R15>](#) Shortening a rope by cutting it and re-tying it, or re-tying a broken rope?

30-Sep-2024
[R15](#)

Can a VEX IQ rope be shortened or repaired by re-tying it?

If not, I would propose considering this as an additional exception to the [<R15>](#) modification of parts rule, to allow ropes to be cut and re-tied in order to shorten the rope, or to repair the rope in case of a breakage. This seems within the "spirit" of some of the other exceptions (e.g. shortening metal shafts and cutting pneumatic tubing to custom lengths). It seems like the "spirit" of these exceptions are to allow certain parts to be shortened for fit, not for unfair advantage. The "Winch and Rope Pack" (currently unavailable with no ETA of re-stock) is the only way to purchase replacement ropes or different length ropes, and also the hero bot itself calls for a specific length rope which is not included in any other kits.

Answered by committee

Can a VEX IQ rope be shortened or repaired by re-tying it?

Shortening a legal VEX IQ rope by tying knots in its length is a legal modification. Cutting it is not. The ropes included with the Winch and Rope Pack and the VEX IQ Education and Competition Kits are the only rope or string legal for use in competition. These must be used in a non-cut form, and must include the built-in connectors on both ends.

1964: [R14e](#) Clarification

21-Feb-2024
[R14](#) [R15](#)

[R14e](#) states:

For the purposes of this rule, the V5 Smart Motor Cap is not considered "part of the motor." Therefore, [<R15>](#) applies.

[R15](#) states:

- Most modifications to non-electrical components are allowed. Physical modifications, such as bending or cutting, of legal metal structure or plastic components are permitted.
- [R14e](#) states that [R15](#) applies to the V5 Smart Motor Cap. Is it correct to say that [R15](#) applies to the V5 Smart Motor Cap and that physical modifications to the cap, such as bending or cutting, are legal?
 - [R14e](#) states that the V5 Smart Motor Cap is not considered part of the motor for its purposes. Therefore, is it correct to say that the absence of the V5 Smart Motor Cap would not be a violation of [R14](#)?

Thank you.

Answered by committee

R14e states that R15 applies to the V5 Smart Motor Cap. Is it correct to say that R15 applies to the V5 Smart Motor Cap and that physical modifications to the cap, such as bending or cutting, are legal?

Yes

R14e states that the V5 Smart Motor Cap is not considered part of the motor for its purposes. Therefore, is it correct to say that the absence of the V5 Smart Motor Cap would not be a violation of R14?

This is correct.

1757: Controller modification with VEX IQ parts

8-Nov-2023

R15

[<R15>](#) Can we modify the Gen 2 controller with VEX parts?

Answered by committee

No physical or electrical modifications are legal for the VEX IQ controller (e.g., drilling, gluing, dismantling, rewiring). An externally-attached piece (e.g., scuff controller or other piece that doesn't require alteration of the controller) would be allowed subject to Head Referee judgment and only if no other rules are violated.

If this does not answer your question, please feel free to rephrase and resubmit.

1645: Can the rubber bands be cut and joined with others? <R15>

11-Sep-2023

R15

[<R15>](#)

Can the rubber bands be cut and joined with others? That is to say, doing this to extend the piece and be used in collectors, for example, <R15> is not very clear at this point.

Answered by committee

Thank you for your question. Rule [<R15>](#) provides a full list of the VEX IQ parts that can be modified for use on competition Robots. This list does not include rubber bands, which cannot be cut for use on a Robot.

1611: In rule <R15>, are the subsections exemptions?

10-Aug-2023

R15

I've heard conflicting interpretations in conversation with others and was hoping for official clarification.

<R15> Modifications of parts. Parts may NOT be modified unless specifically listed as an exception in this rule. Examples of modifications include, but are not limited to, bending, cutting, sanding, gluing, or melting.

- a. Cutting metal VEX IQ or VEX V5 shafts to custom lengths.
- b. Bending parts which are intended to be flexible, such as string, rubber bands, or thin plastic sheets.
- c. Cutting VEX IQ pneumatic tubing to custom lengths

[<R15>](#)

Answered by committee

Thank you for your question! Yes, the subsections of rule [<R15>](#) are the permitted exceptions to the rule. This will be clarified in the next game manual update.

1563: <R15> Most modifications to non-electrical components are allowed. (permit all nut types)

20-Jun-2023

R15

[<R15>](#) Last bullet (f) adds liquid nut tighteners. This should also include other types of lock nuts. Add: Jam, Nylon Lock, KEPS/K-lock, Flange and Serrated nuts are all permitted; T-nuts are excluded. (What about Wing?)

Answered by committee

The Q&A platform is intended to be a communication channel for questions such as "is this interpretation of a rule legal?", not a discussion forum to post questions such as "I disagree with this rule, can it be changed?" For those comments, please use the official VEX Forum or email GDC@vex.com.

(What about Wing?)

Please see rule [<R20>](#), quoted here for reference.

<R20> Certain non-VEX fasteners are allowed. Robots may use the following commercially available hardware:

- a. #4, #6, #8, M3, M3.5, or M4 screws up to 2.5" (63.5mm) long.
- b. Shoulder screws cannot have a shoulder length over 0.20" or a diameter over 0.176".
- c. Any commercially available nut, washer, standoff, and/or non-threaded spacer up to 2.5" (63.5mm) long which fits these screws.

124: R15 3D printed Scuff Controller

23-Oct-2018

R15 VEX U

- a. Does the ruling from last year carry over concerning adding 3D printed (or other, not legal for competition material) paddles to the controller that physically press the existing buttons, without modifying the electrical functions in anyway.

b. If yes on (a), does the same apply to the V5 controller.

c. If yes on (b), does the mounting method matter, since the V5 controller does not have the (2) 6-32 threaded holes available for mounting. Are adhesives allowed for mounting, or should any paddles be designed to snap over or mechanically clamp around the V5 controller.

And rather than making them ask again: d. Do any of these rulings change for VEX U teams?

Answered by committee

This is legal, provided that the VEXnet Joystick and/or V5 Controller are not modified in any way.

Bear in mind that the best way to demonstrate to an inspector, referee, or EP that the controller has not been invasively modified is to be able to remove the addition if asked to do so. Thus, permanent attachments like glue would not be recommended, even though they may technically not be considered "modifications".