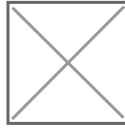


# Q&A

## VEXU 2018-2019: Turning Point



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 Turning Point 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 Turning Point rules questions.

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

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## 59: Toggled Low Flags When Raised

24-Aug-2018

Flags

According to the definition of *toggled*: "A Flag status. A Flag is Toggled when the Flag's pointer is not nested in the Detent and the Flag is not touching a robot of the color Alliance for which the Flag would award points. When Toggled, points are awarded to the red Alliance if the pointer is to the left of the Detent, and awarded to the blue Alliance if the pointer is to the right of the Detent. In the case that the Flag pivots beyond the containing PVC structure, the Flag is no longer Toggled. See Figures 18-20 on the following page."

It is possible for a robot that is below the legal height limit to raise a flag above the detent structure as there is nothing preventing a flag from being raised up the PVC pipe.

Say a low flag is currently toggled for the blue alliance. A red robot drives into the blue flag with the intent to rotate the flag such that it becomes toggled for the red alliance. When driving into the blue flag, the flag incidentally gets raised on top of the robot (say on a wedge). The match timer ends and the red robot becomes disabled holding the flag in a raised position.

When scoring the match, the low flag appears very close to either being toggled for the blue alliance or not being toggled for either alliance (neutral). According to the definition of toggled "A Flag is Toggled when the Flag's pointer is not nested in the Detent... When Toggled, points are awarded to the red Alliance if the pointer is to the left of the Detent, and awarded to the blue Alliance if the pointer is to the right of the Detent" Because the flag is raised too high up, It is unclear if the pointer is to the right and scored for the blue alliance.

Because the pointer is not nested in the detent, is it scored for the blue alliance? Or would this scenario fall under the case of "In the case that the Flag pivots beyond the containing PVC structure, the Flag is no longer Toggled"

### Answered by Game Design Committee

It is impossible to provide a blanket ruling on a hypothetical scenario. In this close situation, the Referee would need to make a visual determination whether the pointer was to a side of the Detent or not. As you quoted, from the definition of Toggled:

points are awarded to the red Alliance if the pointer is to the left of the Detent, and awarded to the blue Alliance if the pointer is to the right of the Detent

So, if a referee determines that the pointer is not "to the right of the Detent" (or if it is too close to call), then no points would be awarded.

## 214: Subsystem removal

17-Jan-2019

R1

Rule

<R1> Only one (1) robot will be allowed to compete per team in the VEX Robotics Competition. Though it is expected that teams will make changes to their robot at the competition, a team is limited to only one (1) robot. As such, a VEX robot, for the purposes of the VEX Robotics Competition, has the following subsystems:

Subsystem 1: Mobile robotic base including wheels, tracks, legs, or any other mechanism that allows the robot to navigate the majority of the flat playing field surface. For a stationary robot, the robotic base without wheels would be considered Subsystem 1.

Subsystem 2: Power and control system that includes a legal VEX battery, a legal VEX control system, and associated motors for the mobile robotic base.

Subsystem 3: Additional mechanisms (and associated motors) that allow manipulation of game objects or navigation of field obstacles. Given the above definitions, a minimum robot for use in any VEX Robotics Competition event (including Skills Challenges) must consist of 1 and 2 above. Thus, if you are swapping out an entire subsystem of either item 1 or 2, you have now created a second robot and are no longer legal.

- a. Teams may not compete with one robot while a second is being modified or assembled.
- b. Teams may not switch back and forth between multiple robots during a competition. This includes using different robots for Skills Challenge and Qualification / Elimination Matches.
- c. Multiple teams may not use the same robot. Once a robot has competed under a given team number at an event, it is “their” robot - no other teams may compete with it for the duration of the competition season.

Question: Our team would like to clarify that we can compete with and without our lift under the ruling of R1 We understand that we will have to have the robot reinspected when a subsystem 3 is removed and put back on. We operate using V5 with 8 motors with the lift (4 motors used for our lift) and 6 without the lift (we add two motors to our drive train) The purpose of removing the lift is because it's so heavy and we want to add speed.

### Answered by Game Design Committee

Yes, this would be legal within <R2>, quoted here for reference and bolded for emphasis.

<R2> Every robot will be required to pass a full inspection before being cleared to compete. This inspection will ensure that all robot rules and regulations are met. Initial inspections will take place during team registration/practice time.

a. If significant changes are made to a robot, such as a partial or full swap of Subsystem 3, it must be re-inspected before it will be allowed to compete.

**b. If a robot has multiple functional configurations, all possible configurations must be inspected before being used in competition.**

c. Teams may be requested to submit to random spot-inspections by event personnel. Refusal to submit will result in Disqualification.

d. Referees or inspectors may decide that a robot is in violation of the rules. In this event, the team in violation will be disqualified and the robot will be barred from the playing field until it passes re-inspection.

## 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 Game Design 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".

## 107: <R16> Clarification for VEX U

15-Oct-2018

R16 VEX U

In VRC rule <R16> f. it is stated that "Welding, soldering, brazing, gluing, or attaching in any way that is not provided within the VEX EDR platform will NOT be allowed." However, in <VUR3> it states that VEX U teams are allowed to use "An unlimited amount of steel and aluminum." for their designs. Would this mean that soldering or brazing is allowed for VEX U if the team uses steel or aluminum as a filler metal? Furthermore, due to the encouragement of using advanced manufacturing techniques for VEX U, would welding, soldering, brazing, or gluing in general be legal? If not is soldering specifically allowed on additional electronics used for sensing or processing for VEX U?

### Answered by Game Design Committee

Welding, brazing, and gluing can be considered acceptable "fabrication" methods within the context of VUR3, and are permitted in VEX U. We will keep this distinction in mind when revising VEX U rules in the future to be more clear.

Soldering additional electronics within the constraints of VUR6 is permitted. However, VEX electronics (including Robot Brains, Motors, Batteries, etc) may still not be modified in any way, including via soldering.

## 41: Hardware specified by VEXpro, but not available from VEXpro.

24-Jul-2018

R7 VEX U

Sorry to be so nitpicky, but there are a couple points on hardware that was not clarified on the June 15th update:

"Answered by Game Design Committee That being said, **rivets and hardware** found inside of VEXpro kits are considered legal fasteners for VEX U. We will be sure to clarify this in the June 15th update." (emphasis mine).

There are six references to a McMaster Carr part within the vexpro product specifications, two for master links, three for screws, and one for a washer.

On the page for roller chain: <https://www.vexrobotics.com/roller-chain.html> "Note: VEXpro does not offer a #35 master link for purchase separately. We recommend McMaster-Carr part number 6261K191 as a suitable replacement. The #25 Roller Chain requires a standard master link. VEXpro does not offer a standard #25 master link. We recommend McMaster-Carr part number 6261K108 as a suitable replacement."

And on the page for the linear gussets:

<https://content.vexrobotics.com/vexpro/pdf/217-4399-20180116.PDF> "(Note: Some McMaster parts required)" and the BOM lists the following: McMaster P/N 91251A555 1/4-20 x 3.250" Screw

McMaster P/N 91251A553 1/4-20 x 2.750" Screw

McMaster P/N 91251A550 1/4-20 x 2.000" Screw

McMaster P/N 92141A029 9/32" ID x 5/8" OD Washer

Additionally, the versaframe page notes using 5/32 rivets for assembly (<https://www.vexrobotics.com/versaframestock.html>), but these are not sold by VEXpro, only 1/8 rivets are available.

Do the references to McMaster-Carr parts, and to a 5/32 rivet, make these McMaster-Carr parts legal for VEX-U?

If so, then would the legality of a 1/4-20 x 3.250" screw (McMaster 91251A555) make any shorter screw lengths of 1/4-20 screw legal also (since long screws can obviously be cut shorter). In the same way, VEXpro sells a #10-32 x 2.5 long screw and 10-32 locknut (in kit 217-4824), so would this make #10 screws up to 2.5 long also be legal?

Thank you for your time and consideration.

### Answered by Game Design Committee

Sorry to be so nitpicky, but there are a couple points on hardware that was not clarified on the June 15th update.

No apology needed, these types of questions are beneficial to all teams as we work through the nuanced implications of this year's VEX U rules.

Do the references to McMaster-Carr parts, and to a 5/32 rivet, make these McMaster-Carr parts legal for VEX-U?

For the most part, yes.

The #25 master link (6261K108) is legal for this purpose (alongside VEXpro #25 chain).

The following items will be clarified in the August 17th manual update:

- All rivets up to 1/4" will be legal
- 1/4-20 screws, washers, and nuts will be legal
- #10 screws, washers, and nuts will be legal (in addition to the #4, #6, and #8 screws as specified in R7-c)

## 47: Non-Vex Screws & Nuts - aluminum / nylon

9-Aug-2018

R7

<R7> Robots are allowed the following additional "non-VEX" components: c. Any commercially available #4, #6, #8, M2, M2.5, M3 or M4 screw up to 2" long (nominal), and any commercially available nut and/or washer to fit these screws. The intent of the rule is to allow teams to purchase their own commodity hardware without introducing additional functionality not found in standard VEX equipment. It is up to inspectors to determine whether the non-VEX hardware has introduced additional functionality or not.

Are we allowed to use aluminum and nylon/plastic screws & nuts (examples below) as long as they are commercially available, are sizes listed above, and are only up to 2" long?

<https://www.mcmaster.com/#93143a194/=1e2q1gl>

<https://www.mcmaster.com/#94735A737>

<https://www.robosource.net/aluminum-screws-nuts/253-alu-screw-0500.html>

<https://www.mcmaster.com/#94812A400>

### Answered by Game Design Committee

Yes, these would be legal.

In general, as long as the screws do not provide additional functionality beyond a standard screw (such as an eye bolt), "any screw" means "any screw". Properties like material type or color are irrelevant.

## 123: Vacuum cups for VEX-U and SG-10.

23-Oct-2018

SG10 VEX U

Now that the ruling on WPI's question about vacuum has officially expanded pneumatics to include vacuum devices as well as pressure devices, are commercially available suction cups, such as those typically used for robotic material handling legal for use, and if so, does attaching a suction cup to a field element violate SG-10?

### Answered by Game Design Committee

Commercially available suction cups would be considered commercially available pneumatic devices, if integrated with a legal VEX U pneumatic system and provided that no other rules are violated in the process.

Using these suction cups to attach to a field element would be considered a violation of <SG10>.

**<SG10> Don't clamp your Robot to the field. Robots may not intentionally grasp, grapple or attach to any Field Elements, including the Platforms.** Strategies with mechanisms that react against multiple sides of a Field Element in an effort to latch or clamp onto said Field Element are prohibited. **The intent of this rule is to prevent Teams from both unintentionally damaging the field and/or from anchoring themselves to the field.**

## 44: VUR3c Legal Plastic

7-Aug-2018

VEX U

VUR3 states: "Teams are allowed to fabricate their own unique components from the following additional raw materials for each of their robots:" VUR3c continues: "An unlimited number of plastic 3D printed parts."

Specific types of plastic are not defined in VUR3c.

Are the plastics in these Q&As from last season still legal for this season?

<https://www.vexforum.com/index.php/27581-answered-vexu-allowed-3d-printing-materials/0>

<https://www.vexforum.com/index.php/32739-answered-3d-printing-materials/0>

In addition, is NinjaFlex filament considered legal this season? The product description states the material is a variation of thermoplastic polyurethane (TPU). <https://ninjatek.com/products/filaments/ninjaflex/>

### Answered by Game Design Committee

Yes, these would be legal.

## 58: VUR4 Question

23-Aug-2018

VEX U

VUR4 states "Each Robot must utilize one (1) V5 Robot Brain microcontroller and one (1) V5 Robot Radio. No other types of VEX microcontrollers or wireless communication protocols are permitted."

With the delay in the shipping of the V5 Robot Brains and peripherals, can VEXU teams use the old microcontroller cortex for qualification events?

#### Answered by Game Design Committee

We are monitoring the V5 rollout, and at this time there are no plans to change the VEX U robot rules in this way.

If this stance changes and such an update is made, it will be communicated via a manual update, VEXforum.com post, and email blast to VEX U teams.

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### 98: <VUR3> Casting Silicone, Polyurethane or Rubber

4-Oct-2018

VEX U VUR3

Our team is interested casting uncured resins of silicone, polyurethane, or rubber into parts for our robot. While these are not legal materials listed in <VUR3>, we believe this is in the spirit of the rule because we developing our own fabrication process for these materials and not using prefabricated commercial parts. Would fabricating parts out of these materials in this fashion be legal and in the spirit of the rule?

#### Answered by Game Design Committee

As you noted, these are not materials or fabrication processes that are currently included in VUR3. Thus, they would not be legal. However, we will take this into consideration for future seasons.

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### 106: <VUR8> COTS Spacers

15-Oct-2018

VEX U VUR8

<VUR8> Allows for "Any commercially available #4, #6, #8, #10, M2, M2.5, M3, M4, or 1/4-20 screw (of any length), and any commercially available nut and/or washer to fit these screws" Would any COTS spacer for the screw sizes listed be legal, as the only spacers sold on VEXRobotics.com are for #8 screws?

#### Answered by Game Design Committee

Yes, this is legal.

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### 122: Conflict between VEX-U Appendix E and "Robot Inspection Checklist"

23-Oct-2018

VEX U



From the VEX-U Appendix, the rules allow for any commercial storage tanks, and give no limit on size or number, just the 100 psi limit:

<VUR10> Teams may utilize commercially available pneumatic components from the following list: Cylinders, actuators, valves, gauges, storage tanks, regulators, manifolds, and solenoids.

However, the newly released robot inspection checklist, VEX Parts Inspection point 20, specifies VEX air reservoirs and limits it to two, in conflict with the rules stated in VUR10.

[http://link.roboticseducation.org/vexu\\_inspectionchecklist201819](http://link.roboticseducation.org/vexu_inspectionchecklist201819)

Please clarify which rule is correct, and correct the incorrect one. Thanks!

#### Answered by Game Design Committee

Thanks for pointing this out! The VEX U inspection checklist will be revised accordingly.

In the future, for errors in non-Game-Manual documents that do not require specific rules clarifications, feel free to email [GDC@vex.com](mailto:GDC@vex.com).

### 184: <VUR5> <VUR6> Legality of CPU Cooling Fans

15-Dec-2018

VEX U VUR5 VUR6

<VUR5>"There is no restriction on the number of V5 Smart Motors that Robots may use. No other motors, servos, or actuators are permitted, including those sold by VEX." <VUR6>"There is no restriction on sensors and other additional electronics that are used for sensing and processing, except as follows: a. Sensors and electronics MUST be connected to the V5 Robot Brain via any of the externally accessible ports. b. Sensors and electronics CANNOT directly electrically interface with the VEX motors or solenoids. c. The additional sensors and electronics may only receive power from any of the following: i. Directly from the V5 Robot Brain via any externally accessible port. ii. From an additional VEX 7.2V Robot Battery or from a VEX 9.6V Transmitter Battery."

With these rules in mind, would a CPU cooling fan be legal in VEX U? The fan motor, which is not used for any physical robot mechanism actuation, would be attached to and powered off of a single board computer. The computer would be connected to and receive power from the V5 Robot Brain via an externally accessible port.

#### Answered by Game Design Committee

No, this would not be legal.

### 237: Using 3D Printer filament

7-Feb-2019

VUR3

I know we can use unlimited 3d printed parts but can we also use the filament itself? Say our printer uses 1.75mm filament. From my understanding of the rules we could not use the filament directly off the spool because it has not yet been 3d printed. My question is if we were to get a 1.75mm nozzle on our 3d printer and extrude the 1.75mm plastic filament would it then be legal? Thanks, Bison1

#### Answered by Game Design Committee

| Yes, this would be legal.