

Q&A

VEX V5 Robotics Competition 2024-2025: High Stakes

Tagged: R9

Welcome to the official VEX V5 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 V5RC High Stakes 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 V5RC High Stakes rules questions.

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 - 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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389: Attaching plastic sheet pieces to each other

21-Oct-2019

R9

I'm not clear about whether it is permissible to attach Lexan pieces to each other using glue. Would that be considered "chemically treated" per R9 and therefore prohibited?

Answered by committee

R22f states the following:

Welding, soldering, brazing, gluing, or attaching in any way that is not provided within the VEX EDR platform is NOT permitted.

Therefore, gluing plastic sheets to each other would not be legal.

331: Use of Vex Gray Tinted polycarbonate sheets

20-Aug-2019

R5 R9

Now that VEX sells the Gray Tinted Polycarbonate sheets, does the use of this product fall under <R5>? This would imply a team could use as much of the tinted polycarbonate sheets as they want provided they still abide by the 18 x 18 x 18 size requirements. Or will it still fall under <R9>? This would imply a team can still only use a single piece or combination of pieces with initial overall dimension of 12" x 24". How shall I instruct my teams this year regarding the Tinted Polycarbonate sheets (p/n: 217-6626 and 217-6627)? Thank you.

Answered by committee

This is a good question! Let's take a look at a few rules which work together here:

<R9> is the rule which covers polycarbonate legality:

<R9> A limited amount of custom plastic is allowed. Robots may use non-shattering plastic from the following list; polycarbonate (Lexan), acetel monopolymer (Delrin), acetal copolymer (Acetron GP), POM (acetal), ABS, PEEK, PET, HDPE, LDPE, Nylon (all grades), Polypropylene, FEP; as cut from a single 12" x 24" sheet up to 0.070" thick.

However, <R5a> explicitly states that VEXpro products cannot be used.

<R5> Robots are built from the VEX EDR system. Robots may be built ONLY using official VEX EDR components, unless otherwise specifically noted within these rules. Teams are responsible for providing documentation proving a part's legality in the event of a question. Examples of documentation include receipts, part numbers, official VEX websites, or other printed documentation.

a. Products from the VEXpro, VEX IQ, or VEX Robotics by HEXBUG product line cannot be used for Robot construction, **unless specifically allowed by a clause of <R7>** or cross-listed as part of the VEX EDR product line.

However, the bolded portion above does point us to R7 for a possible exception:

d. **Any parts which are identical to legal VEX parts are permitted.** For the purposes of this rule, products which are identical in all ways except for color are permissible. It is up to inspectors to determine whether a component is “identical” to an official VEX component.

The gray polycarbonate you refer to would fall under <R9>, because even though it happened to be purchased from VEXpro, it is functionally similar to any other vendor's legal polycarbonate, per <R5d>. Therefore, it is legal (provided no other rules are violated, such as the 12” x24” restriction in <R9>).

325: Use of VEX IQ Bankshot ramp on robot

24-Jul-2019

R9

Hello!

Is it ok for my teams to use the plastic ramp from the VEX IQ Bankshot game as lexan/plastic on their robot? We are not sure what material it is made out of. Thank you!

Answered by committee

Rule R9 is quoted below for reference:

<R9> A limited amount of custom plastic is allowed. Robots may use non-shattering plastic from the following list; polycarbonate (Lexan), acetel monopolymer (Delrin), acetal copolymer (Acetron GP), POM (acetal), ABS, PEEK, PET, HDPE, LDPE, Nylon (all grades), Polypropylene, FEP; as cut from a single 12” x 24” sheet up to 0.070” thick.

The ramp from VIQC Bank Shot is made of 1.6mm thick polycarbonate, so it would fall within this list of permitted materials, provided that no other rules are violated (such as the 12"x24" overall dimension limit).

2487: R20 and tape for tournament spot repairs

31-Jan-2025

R3 R9 R20

[<R20>](#)

Is the use of duct or gaffers tape (for example) forbidden for spot-repairing damage to a team's robot over the course of a tournament?

For example, many teams this year use plastic as a ramp into a conveyor mechanism from a ring intake. Over the course of battles over the positive corners and interactions with other robots and field elements, the plastic can snap or crack. In some instances we've seen mid tournament spot repairs of such damage with tape, because a team may not have had a spare piece of this plastic.

This does not appear to be a legal way to repair the damage after looking at:

<R20> A limited amount of tape is allowed. Robots may use a small amount of tape for the following purposes:

To secure any connection between the ends of two (2) VEX cables. To label wires and motors. To cover the backs of license plates (i.e., hiding the “wrong color”). To prevent leaks on the threaded portions of pneumatic fittings. This is the only acceptable use of Teflon tape. In any other application that would be considered a “non-functional decoration” per <R9>. As an aglet at the end of rope/string to prevent fraying.

<R9> 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

Clearly if holding the broken pieces of plastic together, the tape becomes functional. Not performing this sort of spot repair though could easily end the day for the damaged robot/team. It seems unlikely such a repair conveys a strategic advantage over the original piece of plastic.

What should referees do in this situation? Should robots with tape repairs like this be removed from the field, and the team told to find another legal repair method before they may return? Or do they be allowed to compete with the bandaged robot the rest of the day, given its likely not in as good a shape as it could have been with fully intact plastic?

Answered by committee

Is the use of duct or gaffers tape (for example) forbidden for spot-repairing damage to a team's robot over the course of a tournament?

Tape is illegal for uses beyond those described in [<R20>](#), including as a way to repair legal parts. Tape used for this purpose does not qualify as a non-functional decoration.

What should referees do in this situation? Should robots with tape repairs like this be removed from the field, and the team told to find another legal repair method before they may return?

Yes. Clauses C.i or E of rule [<R3>](#) would apply, and the Robot should not be allowed to participate in Matches until the Robot meets the requirements of all Robot rules.

2416: License plates for functional purposes

27-Dec-2024

R7 R9 R10

My question is whether visible license plates and additional painted plates can be used for functional purposes.

R10 says "license plates are considered non-functional decorations" but rule R7 says "Product pages on the VEX Robotics website should be used as the official definitive source for determining if a product is a V5 component," so because the official license plates are listed as V5 components on the store page they are considered legal parts. I am only asking about the official vex license plates from the V5RC License Plate Kit (part number SKU 276-3938)

These seem to be conflicting rules. So can you use license plates for functional purposes or strictly decoration. Is it possible to use additional plates that are painted black (assuming additional plates are painted in compliance with r9 and r10) and have the additional ones be functional while also having separate plates only used for decoration?

Answered by committee

Per clause C of rule [<R10>](#), License Plates are non-functional decorations, and must fulfill all relevant Robot rules. License Plates cannot be used as functional parts on a Robot for the VEX V5 Robotics Competition, whether they're painted black, green, or any other color.

2301: <R9> Is a 3D Printed Screen Protector a functional part or non-functional decoration?

16-Nov-2024

R9

According to [<R9>](#) non-functional decorations are permitted as long as they do not affect robot performance in any significant way or affect the outcome of the match. So can a 3D printed screen protector be used?

[Image 1 Link](#)

[Image 2 Link](#)

Our Problem: The polarity on our brain somehow has changed (or new brains have a different polarity than the old ones?) which prevents any screen protectors from attaching properly. Playing matches without a screen protector at all is a huge risk! Right now the ruling by inspectors at our event is that our 3D printed screen protector counts as functional because it is not backed by legal materials that serve the same purpose. But additionally in R9 it says that "A simple way to check this is to determine if removing the decoration would impact the performance of the robot in any way". Because adding or removing the 3d printed screen protector does not result in an impact in the robot's performance, our team believes that it should be permitted (we would further argue that even standard screen protectors are not "functional" according to the above definition).

We would appreciate an official ruling as this would be very helpful for us and other teams who might also have lost their screen protectors! It also allows more fun customization and decorative options for teams.

Sincerely, ~ 9181C

Answered by committee

As described in our answer to [Q&A 2283](#), the V5 Brain cover is considered a part of the V5 Brain. The V5 Brain cover is considered to be a functional component, and cannot be replaced with a team-created version.

2279: <R9g> 3D Printed Components for Visual Feedback

10-Nov-2024

R9

[<R9>](#)

As per R9g:

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)

Would it be considered functional for teams to 3D print custom motor caps / casings using a filament that changes colour based on temperature to provide drivers with visual feedback on motors overheating?

Would the fact this motor cap fully encases a motor be seen as providing the motor with extra support / insulation?

If the above is considered non-functional, would it be considered functional for teams to not screw in motor screws to doubly use these casings as "Hot-swappable motor caps" to easily change cartridges without the need to unscrew motors, or would this additional functionality now make it a functional component?

Answered by committee

The final determination about whether a specific part is or is not legal for use on a competition Robot must be made by the inspectors and Head Referees at an event. Teams must be prepared to remove any component of their Robot that is deemed illegal by the inspector or Head Referee, including decorations.

That said, we can provide some general guidance on the examples you provided.

Would it be considered functional for teams to 3D print custom motor caps / casings using a filament that changes colour based on temperature to provide drivers with visual feedback on motors overheating?

Generally speaking, a custom 3D printed piece that is attached to a motor to provide visual feedback about that motor's temperature would be legal under clause G of rule [<R9>](#), which reads, "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).

Would the fact this motor cap fully encases a motor be seen as providing the motor with extra support / insulation?

If the 3D printed part provides any structural support it would no longer qualify as a non-functional decoration and would be illegal for use on a competition robot. Fully encasing a motor is likely to be considered extra support. A good rule of thumb to apply would be to imagine whether or not the motor would remain intact with the 3D printed part attached and the assembly screws not included. We believe insulation, if any is provided by this 3D printed part, would not give the Robot a competitive advantage.

If the above is considered non-functional, would it be considered functional for teams to not screw in motor screws to doubly use these casings as "Hot-swappable motor caps" to easily change cartridges without the need to unscrew motors, or would this additional functionality now make it a functional component?

This would be a clearly functional use of the 3D printed part, and would not be legal in the VEX V5 Robotics Competition under any circumstances.

2248: Does license plate not backed by any legal functional structure contacting ladder satisfy AWP criteria

2-Nov-2024

R9 R10 SC8

[<SC8>](#) The fourth criteria says robot contacting ladder.

In R10 [<R10>](#)

License plates are considered non-functional decorations (per [<R9>](#)), and must fulfill all relevant Robot rules (e.g., they must fit within the 18" cube,

[<R9>](#)

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. These decorations must be in the spirit of the competition. Inspectors will have final say in what is considered "non-functional." Unless otherwise specified below, non-functional decorations are governed by all standard Robot rules. To be considered "non-functional," any guards, decals, or other decorations must be backed by legal materials that provide the same functionality.

Following the guidance of R10 and R9 we came to the conclusion that if the license plate was not there, there was no contact with the ladder.

That said, Grant might say I am overthinking it. If so, what additional considerations should we put into interpreting SC8.

Thank you.

Answered by committee

Does license plate not backed by any legal functional structure contacting ladder satisfy AWP criteria?

No.

1897: License Plate - Parking

27-Jan-2024

SC7 R9

[<SC7><R9>](#) License Plate – A physical component on the Robot that displays the Team's VEX IQ Robotics Competition number. The License Plate must have a length and height of 3.5" x 1.5" (88.9mm x 38.1mm) and must not exceed a width of 0.25" (6.35mm) per <R9>.

An Official License Plate, being a physical component of the robot, is the only part of the robot breaking the plane would the robot be counted as partially parked?

Would a Printed Plate, that counts only as a non-functional decorations, count as partially parked if it was only part breaking the plane?

Answered by committee

Non-functional decorations are still considered part of the Robot, and are therefore bound by standard rules, such as starting size.

Yes, a Robot with a License Plate that is partially in the Supply Zone would receive credit for being Partially Parked.

Similarly, if a Robot were Fully Parked in all ways *except* for its License Plate, it would only receive credit for being Partially Parked.

1859: License Plates and Paper Plates

8-Jan-2024

R9

[<R9><R9>](#)

I host quite a few events for first time teams with first time coaches. We always keep some extra license plates for teams who forget theirs, but I can only keep so many on hand. Last year, there was a paper template of temporary license plates that could be cut out and attached to the robot. I have been all over the REC library and good old Google and cannot find the VIQRC template anywhere, only the VRC one. Can you please share this template?

Thank you

Answered by committee

Ultimately, the only requirements for an unofficial License Plate is that it follows the dimensions listed in R9:

Any custom-made License Plates used must be the same length and height as the official License Plate (3.5" x 1.5" [88.9mm x 38.1mm]). They must not exceed the width of the official License Plate (0.25" [6.35mm]).

Although we do not have an official template to provide, cutting a piece of paper or cardstock to a 3.5" x 1.5" rectangle would meet these requirements.

1845: LEDS on robots

28-Dec-2023

R8 R9

<R8><R9> Small blinking lights or LEDs are legal on the robot, however if they are turned up so bright that they make it difficult to read the license plate wouldn't they be violating R9?

Answered by committee

Per rule <R8>, "all non-functional decorations are governed by all standard Robot rules".

One primary goal of <R9>, especially clause "C", is to ensure that license plates are clearly legible by Head Referees and event staff. If a non-functional decoration is causing difficulty, then yes, it should be adjusted.

For all intents and purposes, this question / answer would apply just as equally if a non-functional decorative opaque cover were placed over the license plate.

1759: Do license plates need to be on opposing sides?

9-Nov-2023

R9

Over Under Robot Inspection Checklist <https://roboticseducation.org/documents/2023/05/robot-inspection-checklist-vrc-over-under.pdf/>

Robot displays colored Robot License Plates on at least two (2) opposing sides, with only one (1) color visible and the team number displayed legibly in white text.

Rule R9 from the manual

<R9> Officially registered Team numbers must be displayed on Robot License Plates. To participate in an official VEX Robotics Competition event, a Team must first register on robotevents.com and receive a VRC Team number. This Team number must be displayed on a minimum of two (2) sides of the Robot using License Plates. Teams may choose to use the official VRC License Plate Kit, or may create their own.

So the manual says 2 sides and the checklist says 2 opposing sides. Do they need to be on opposing sides?

<R9>

Answered by committee

Please review the [Q&A Usage Guidelines](#) before posting, specifically point 2, "Read and search existing Q&As before posting". We believe the following post answers your question; if it does not, please feel free to rephrase and re-submit.

<https://www.robotevents.com/VRC/2023-2024/QA/1730>

1730: <R9> Do robot license plates have to be on opposing sides?

29-Oct-2023

R9

<R9> states that "Team numbers must be displayed on a minimum of two sides of the Robot using License Plates." However, the [VRC inspection checklist](#) states that License Plates must be displayed on at least two opposing sides of the robot. Given that the Game Manual should take precedence, are license plates required to be installed on opposing sides of a robot? Furthermore, does the top of a robot count as a side?

Context: We put one of our license plates on a visible, rotating surface that faces either upwards or forwards. The other license plate faced backwards, and so per the Game Manual, we met the requirement for the License Plates to face different sides. Before an Elimination Match, our opponents pointed out that per the checklist, we should not have passed inspection because our plates did not always face opposing sides. The referees told us to re-situate both license plates before we could start the match.

Answered by committee

Thank you for this question. In general, you are correct - the Game Manual takes precedence over other supporting materials.

In this case, rule [<R9>](#)'s red box contains the following clarification:

The intent of this rule is to make it immediately apparent to Head Referees which Alliance and which Team each Robot belongs to, at all times.

The easiest way to meet this intent is to place the License Plates on two opposing sides of the Robot. (if placed on adjacent sides, there would be orientations in which the Head Referee could not see them)

We will be sure to clarify this further in an upcoming Game Manual update.

1486: Pre-bent plastic

3-Mar-2023

[R9](#)

[<R9>](#) When using plastic from last years field components, we ran into issues when we used the side of the balance platform. It is already bent at a 90 degree angle, so we did not bend it. Is this allowed?

Answered by committee

Clause C of rule [<R9>](#) permits bending of non-shattering plastic up to 0.070" thick. Using pre-bent pieces of non-shattering plastic from previous field sets is allowed, provided the plastic meets all requirements of rule [<R9>](#).

1339: Is using a mix of different custom plastics types legal?

9-Dec-2022

[R9](#)

Are we allowed to use more than one type of custom plastic on a single robot as long as all parts meet the other criteria listed in R9 a-f?

[<R9>](#)

In the past, I believe that different types of custom plastic were allowed on a single robot as long as all the size constraints were met. R9 looks to have been updated from the previous year's R10 to clarify the nuances of cutting from different sheets, etc., but it also changed some important wording that could change the legality of using different plastic types. Specifically, the second sentence of R9 states that for custom pieces "it must be possible to have cut all of the plastic parts on the Robot from a single 12" x 24" sheet, up to 0.070" thick."

A strict interpretation of this would indicate that different plastics types would be illegal because even if the parts met all the other requirements of R9, they could never have been cut from a single sheet. They would have to be cut from different sheets of different materials.

My instinct is that this was not the intended Interpretation, but I don't really know. Could you please make a definitive statement on this issue?

Thank You.

Answered by committee

You are correct. The intent of the language in [<R9>](#) is to limit the amount of custom plastic on a robot (as described in <R9b>), not the combination of multiple types of plastic. Any or all plastics in <R9d> are legal for use on Spin Up Robots, in any combination, provided all other Robot rules are followed.