

Q&A

VIQRC 2023-2024: Full Volume

Tagged: G5

Welcome to the official VEX IQ 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 VIQRC **Full Volume** 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 VIQRC Full Volume rules questions.

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Index

[Is the robot tilt legal?](#)

[Can the sizing requirements rotate with the bot?](#)

[Leaving Parts on the Field](#)

[Blocks on tower](#)

[Robot Size and Starting Position Problem](#)

[Detaching robots and entanglement](#)

[Robot Height Restrictions](#)

[Where can we preload a ball on the field in autonomous skills?](#)

[Preload Height Restrictions?](#)

[<G5> Robot Length While Rotating](#)

[Robot Sizing Tool vs G5](#)

[Is the size limit a specific LxWxH or a volume?](#)

[Can a motor be running at start?](#)

[Starting position clarification please](#)

[Prematch Setup G5: Can a robot touch a sidewall and the inner wall farthest from the fence?](#)

[Sizing Box Violations With a Tipped Robot](#)

[Placing robot during autonomous period](#)

[Starting location - can robots extend beyond the wall and field?](#)

849: Is the robot tilt legal?

20-Aug-2021

G5

If the robot tilts during driving and its diagonal exceeds 19 inches, will it violate the G5 rule?

<https://www.bilibili.com/video/BV1Bb4y1r7LG?from=search&seid=15436717150755639022>

Answered by committee

Please see the answer posted in this similar Q&A: <https://www.robotevents.com/VIQC/2021-2022/QA/828>

If this does not answer your question, please feel free to rephrase and re-submit.

828: Can the sizing requirements rotate with the bot?

25-Jul-2021

G5

The rule in question is G5:

G5 Expansion is limited during a Match. During the Match, Robots may not expand beyond the following restrictions: a. Horizontally, beyond an 11" x 19" (279.4mm x 482.6mm) area. b. Vertically, beyond 19" (482.6mm) high. This is the same height as the top of the teal T-shaped VEX IQ parts in the center of the Field. This expansion limit does not require that the Robot stay in the same configuration as it was when it began the Match. It simply means that, at any given moment during the Match, it should be able to fit within an 11" x 19" x 19" (279.4mm x 482.6mm x 482.6mm) rectangular prism. Robots will be tested for compliance with this rule, alongside rule R6, during inspection.

Is height always measured perpendicular to the field? Or, can the 11x19x19 rectangular prism twist with the robot if it attempts to switch its length and height?

Answered by committee

Is height always measured perpendicular to the field? Or, can the 11x19x19 rectangular prism twist with the robot if it attempts to switch its length and height?

Height should always be measured perpendicular to the field.

The "blue box" in rule G5 states the following:

The intent of testing compliance with this rule during inspection is to reduce the need for judgment calls during a Match. The 19" height restriction is not a "virtual ceiling"; for example, it is legal for a portion of the Robot to extend beyond the T-shaped VEX IQ markers while Hanging, **so long as it never momentarily extends beyond 19" along the way**. If a Head Referee is unsure of a Robot's compliance with this rule, they may request a field-side height check for the configuration that was seen momentarily during the Match.

A more verbose way of clarifying the bolded portion would be as follows:

"...so long as a measurement taken from the "top" of the Robot to the "bottom" of the Robot never exceeds 19", where "top" and "bottom" represent the portions of the Robot which are farthest from and nearest to the Floor,

| respectively."

469: Leaving Parts on the Field

23-Dec-2019

G5

<G5> Keep your Robots together. Robots may not intentionally detach parts during the Match or leave mechanisms on the field. Minor violations of this rule that do not affect the Match will result in a warning. Match Affecting offenses will result in a Disqualification. Teams that receive multiple warnings may also receive a Disqualification at the Head Referee's discretion. Multiple intentional infractions may result in Disqualification for the entire competition.

At an event I watched teams that had a slide out mechanism that would release using rubber bands and the rubber bands would fly off the robot and fall on the field. Would this be a concern of G5?

Answered by committee

A Robot intentionally detaching a part and leaving it on the field is always considered a violation of G5. The specific scenario you have described would likely be considered a minor (non-Match-Affecting) violation, and result in a warning. Teams that receive multiple warnings may receive a Disqualification at the Head Referee's discretion.

407: Blocks on tower

6-Nov-2019

G5

Can a robot flip a block over the top of itself to place it on the tower? The robot meets the 15" maximum for height but the top of the block is above that.

Answered by committee

There are no rules preventing this, thus it legal, provided that no other rules are violated in the process.

391: Robot Size and Starting Position Problem

24-Oct-2019

G5 R4

Hi all, I spoke with are regional rep, and he directed me here for this question. I notice that there have been similiar problems but people didn't seem to realize what is causing the difficulties.

As stated in the following rules, the robot must be 11 x 19.

<G5> Expansion is limited during a Match. During the Match, Robots may not expand beyond the following restrictions: a. Horizontally, beyond an 11" x 19" (279.4mm x 482.6mm) area. b. Vertically, beyond the 15" (381mm) high starting requirement.

Also as stated by the following rule, it must fit inside the starting area of 11 x 19.

<R4> Robots must fit in the sizing box. At the start of each Match, the Robot must be able to satisfy the following constraints: a. Only be contacting the Floor and/or the Field Perimeter. b. Fit within an 11" x 19" (279.4mm x 482.6mm) area, bounded by the Starting Position. c. Be no taller than 15" from the Floor.

The problem that I have discovered is the following. The starting areas are NOT 11 x 19. On our two fields bought two years apart the starting areas for length and width are both about a 32nd of an inch short in either directions as shown in the two following pictures.

! [img] (https://www.robotevents.com/storage/markdown/uploads/V1LBoQXTadECev05s71ZmG1bLwNoDcZmln6DZ

! [img] (https://www.robotevents.com/storage/markdown/uploads/8N9M2WQn1YB0lJz9LdjfXkG6bPfk6NUE35JmC

In previous years and games, this was not a problem. This year though the tolerances are very sma

Making the robot size smaller would not work. The way the pieces are made, the robot would have t

A rule addition allowing the robots to be slightly (thickness of an axel) outside the starting ar

Thanks for the time.

Sam Schursky
Team 6277
The Harvey School
Katonah, New York

Answered by committee

First, please review this similar Q&A. Although it is asking a slightly different question than yours, it includes some relevant background information regarding Robot size rulings and tolerances.

<https://www.robotevents.com/VIQC/2019-2020/QA/382>

It looks like your root question is the following:

We have groups that have robots that are exactly 11 by 19. They would pass inspection (assuming the measuring device does not rely on the field which might have the same problems) but be ever so slightly outside of the starting positions. Their definitely needs to be a rules clarification on this.

A rule addition allowing the robots to be slightly (thickness of an axel) outside the starting area as long as it passes inspection of course would be a good solution.

Thank you for your suggestion, but this rule addition will not be made. The intents of VIQC's sizing rules are for Robot size to be checked during inspection and then enforced at the beginning of each Match. Having a different sizing rule for a Match vs inspection would negate the purpose of the inspection process.

They would pass inspection (assuming the measuring device does not rely on the field which might have the same problems) but be ever so slightly outside of the starting positions.

The official [VIQC Sizing Tool](#) does utilize the field as its reference. Relying on a common field ensures a standardized expectation for Teams, inspectors, and Head Referees, regardless of which event they attend. Some manufacturing variance is to be expected in any physical product, as is variance if using different measuring methods.

For example, the VIQC Field Perimeter has a very slight draft angle as an injection molded plastic part; so, if you lay a ruler from the perimeter to the black line, a difference of less than 1mm could easily occur depending on where you rest the ruler against the wall.

So, as an overarching answer to this question, we are going to refer to rule G3:

<G3> Use common sense. When reading and applying the various rules in this document, please remember that common sense always applies in the VEX IQ Challenge.

The intent of G4, G5, R5, and R6 is to provide a design constraint in the form of Robot size that is reasonably observable by a volunteer inspector/referee, and consistently enforceable across all events worldwide. It is not a reasonable expectation for an event to use digital calipers to measure Robot size; it *is* a reasonable expectation for an event to use the tools that are available to all Teams, such as a standard field, a publicly available physical sizing tool, and human observation. To avoid potential conflicts, we would advise Teams remind mindful of these realities

when designing their VEX IQ Robots such that they do not rely on a possible variance of 0.03" to determine their legality.

348: Detaching robots and entanglement

4-Sep-2019

G5 R3

One of my students wants to build a robot similar to the ones featured in the following video but wants to make sure the design is legal before building it. Specifically in the video we are looking at designs that build a wall that detaches from the robot and the only connection is rope/string. <https://www.youtube.com/watch?v=Rznndditly0>

They are concerned firstly that rule G5 is being violated.

<G5> Keep your Robots together. Robots may not intentionally detach parts during the Match or leave mechanisms on the field.

The designers of these robots have defended at length on forums that their designs don't detach mechanisms on the field."

Secondly if this sort of design is allowable within G5 they are also concerned that it would viol

<R3> Robots must be safe. The following types of mechanisms and components are NOT allowed: c. Those that pose an unnecessary risk of Entanglement.

Would leaving behind a trail of 20 feet of rope/string be considered an unnecessary risk of entan

Thanks in advance!

Answered by committee

The designers of these robots have defended at length on forums that their designs don't detach because they are connected by rope/string. Is that enough to consider your robot parts still attached?

When there is no VRC-specific definition for a term, a dictionary definition should be used. The Oxford dictionary definition for "attached" is "joined, fastened, or connected to something".

Parts connected by rope/string are, by definition, considered "attached" to the Robot. Therefore, G5 is not being violated if a mechanism is attached solely via rope/string.

Would leaving behind a trail of 20 feet of rope/string be considered an unnecessary risk of entanglement?

In addition to R3, Entanglement is also referenced in G12 (i.e. it is possible for a Robot to pass R3 in inspection, but still violate G12 during a Match).

< G12 > Don't destroy other Robots. But, be prepared to encounter defense. Strategies aimed solely at the destruction, damage, tipping over, or Entanglement of opposing Robots are not part of the ethos of the VEX Robotics Competition and are not allowed. If the tipping, Entanglement, or damage is ruled to be intentional or egregious, the offending Team may be Disqualified from that Match. Repeated offenses could result in Disqualification from the entirety of the competition.

< G12b > VEX Robotics Competition Tower Takeover is an interactive game. Some incidental tipping, Entanglement, and damage may occur as a part of normal gameplay without violation. It will be up to the Head Referee's discretion whether the interaction was incidental or intentional.

Note: A Robot which has expanded horizontally in an effort to obstruct the field, or is legally covering the top of a Tower in a solely defensive manner, should expect vigorous interactions from opponent

Robots. Damage that is caused by opponent Robots pushing, tipping, or Entangling with them would not be considered a violation of < G12 >. Gratuitous damage or dangerous mechanisms may still be considered a violation of <R3>, <S1>, or <G1> at the Head Referee's discretion.

Bearing both R3 and G12 in mind, it is impossible to provide a blanket ruling that would cover all possible hypothetical Robot designs and/or on-field interactions. This is the type of question that requires a human observing the context of a specific Robot and/or Match to provide a judgment call.

So, we will provide the following overarching guidelines as starting points for Head Referees, inspectors, and Teams to use when determining whether a given design/interaction is legal.

1. When inspecting for R3, has the Team done their due diligence in the engineering design process to mitigate the risks of unnecessary Entanglement? While it is outside the scope of this Q&A to provide specific design advice, we would recommend that Teams wishing to utilize this strategy test different thicknesses, attachment methods, lengths, etc in different types of robot-to-robot interactions to minimize unnecessary, egregious, or intentional Entanglement.
2. Does the string on the field pose a likely or strategic possibility of Entangling another Robot? That is to say - is Entangling a primary function of the string (is it a "dragnet" mechanism), or is it simply a means-to-an-end?
3. Any Robot with a mechanism such as the one in the linked video would be taking on some risk of incidental Entanglement. Therefore, if incidental Entanglement occurs, was the Entanglement egregious or intentional? If it was not egregious or intentional, was it the result of vigorous interactions from opponent Robots (per the Note in G12)?

2349: Robot Height Restrictions

5-Dec-2024

G5

Can a robot's catapult extend past the 15" height restriction during game play if it is well below the 15" height when collapses, such as before game play.

The official Rapid Relay Game video appears to show a robot catapult extending past 15", but the rules are unclear.

At 1min34sec [https://youtu.be/aa0B7kNHpg8?si=jpR-Dy7_3lrWVpKI&t=94\[&t;G5>\]\(https://www.robotevents.com/storage/game_manual/VEX_IQ_Robotics_Competition_2024-2025_Rapid_Relay/rules/G5.html\)](https://youtu.be/aa0B7kNHpg8?si=jpR-Dy7_3lrWVpKI&t=94[&t;G5>](https://www.robotevents.com/storage/game_manual/VEX_IQ_Robotics_Competition_2024-2025_Rapid_Relay/rules/G5.html))

Answered by committee

<SG2> Robot expansion is limited. Robots may not expand beyond the 23" x 73" horizontal or 15" vertical starting size limits at any time during a Match. The 15" height limit is a "virtual ceiling," meaning that no part of a Robot may exceed 15" above the Floor, regardless of Robot orientation.

The rule clearly states that no part of a Robot may *ever* exceed 15" above the Floor. As described on page 4 of the game manual, if there are any conflicts between the game manual and other materials, including the game reveal video, the current version of the game manual takes precedence.

2346: Where can we preload a ball on the field in autonomous skills?

4-Dec-2024

G5

[<RSC3>](#) Where can we preload a ball on the field in autonomous skills? Under RSC3 it says that in skills matches start the ball in Zone 1. However if all of autonomous is Rapid Load (RSC4-C) and the Rapid load zone is Zone 2, [<RSC3>](#) does that mean you need to start the ball in Zone 2 on the field?

Answered by committee

Rule [<RSC3>](#) applies in all Autonomous Coding Skills Matches and Driving Skills Matches. The Preload starts in contact with the Robot in Starting Zone 2. Placement of the optional second ball (in Starting Zone 1) prior to a Skills Match is addressed by [Q&A 2109](#).

2157: Preload Height Restrictions?

26-Sep-2024

G5

[<G5>](#)

Per [<G5>](#) Robots begin the match in the starting size

Can the preloaded ball exceed the 15" height ceiling for the requirements? IE - if the robot build itself is below the height threshold but a preload ball is sitting on TOP of the robot and would break the 15" plane, is that a violation?

Answered by committee

The Preload Ball is not part of the Robot, and is not subject to the 15" height limit for the Robot.

2078: [<G5>](#) Robot Length While Rotating

31-Jul-2024

G5

The note of [<SG2>](#) states: "Horizontal expansion is measured from the Robot's perspective; i.e., it does 'rotate with the Robot.' Robots that tip over, or rotate while Climbing, are still restricted to expanding from the chosen "side" that was measured during inspection."

Does this same logic apply to [<G5>](#) and the Robot's 18"x18"x18" starting volume (mainly as it pertains to rotating while Climbing)?

I have included two figures below of different interpretations. Figure A is for reference; it represents an 18"x18"x18" Robot on the Floor. Figure B depicts a Robot vertically rotated 45°, measured relative to the base of the Robot. Figure C also depicts a Robot vertically rotated 45°, but it is still measured relative to the Floor, putting it an illegal 25.5" length. Would Figure B or C be the correct interpretation?

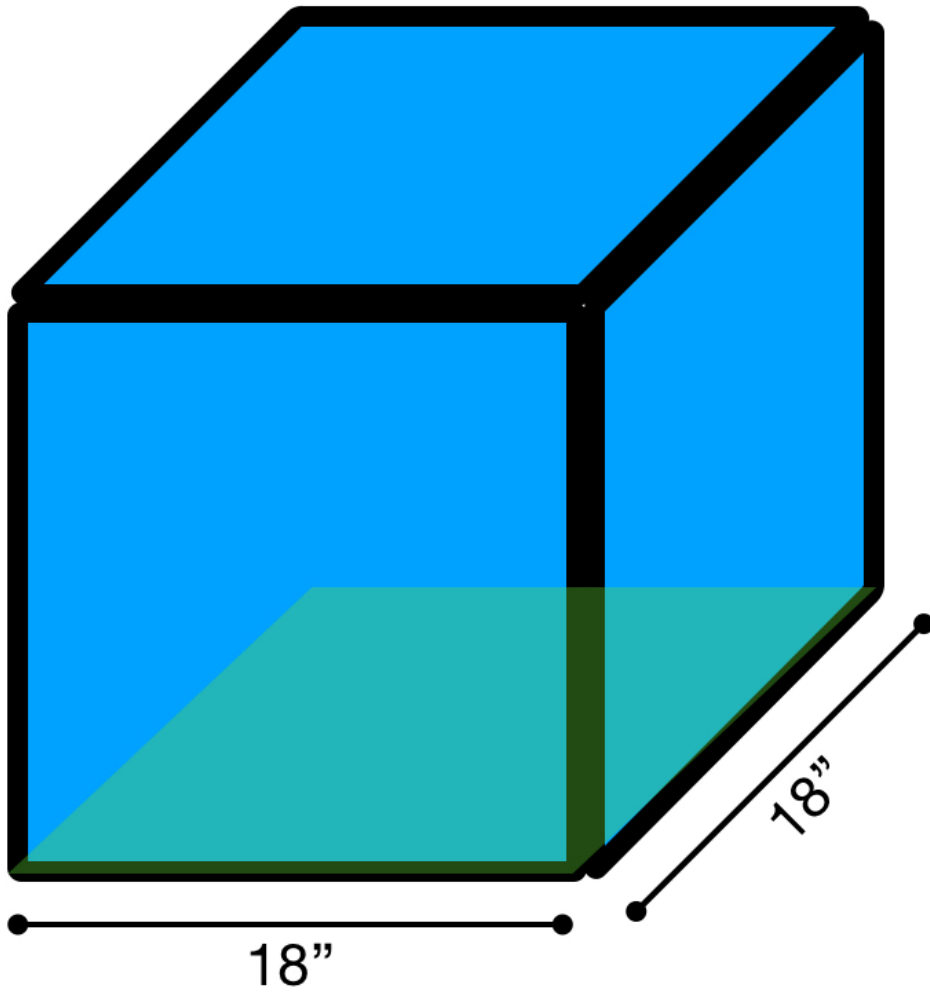
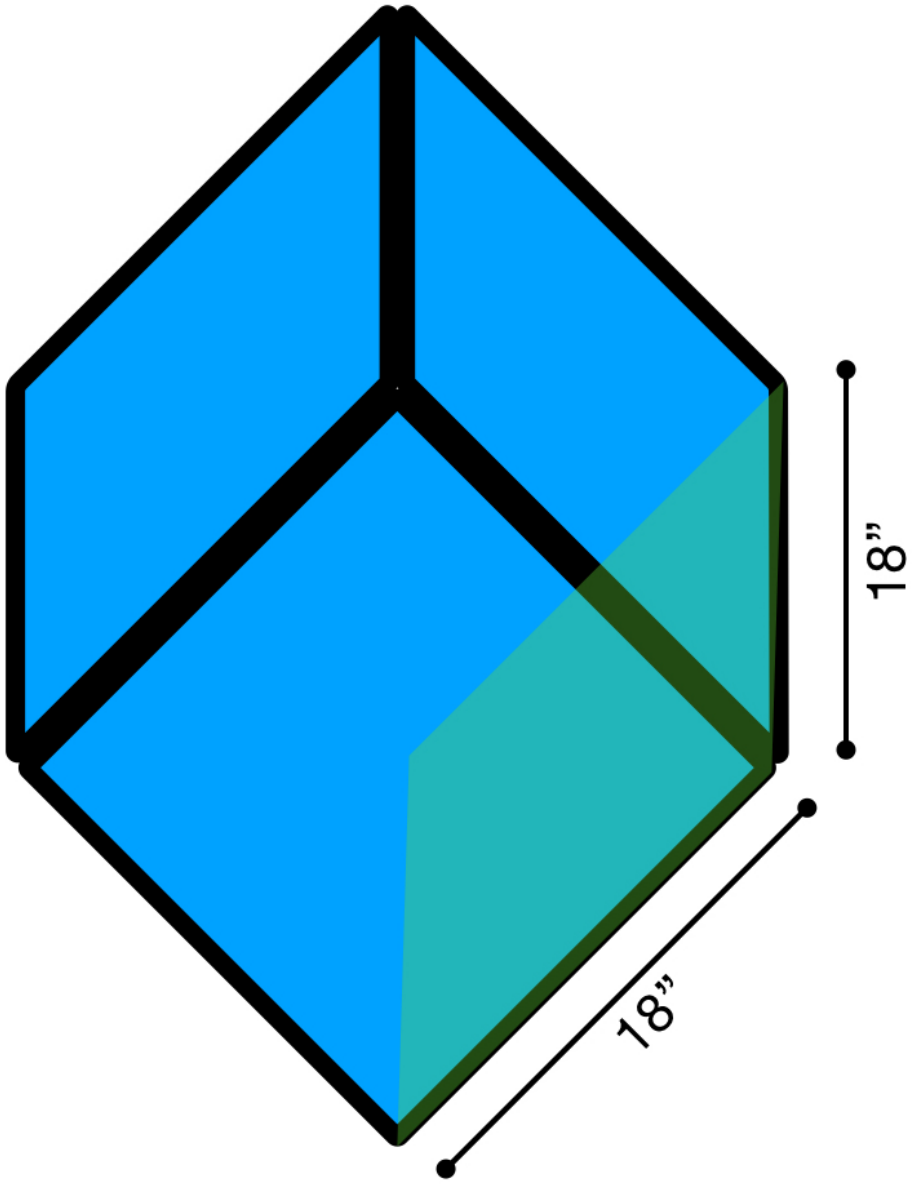
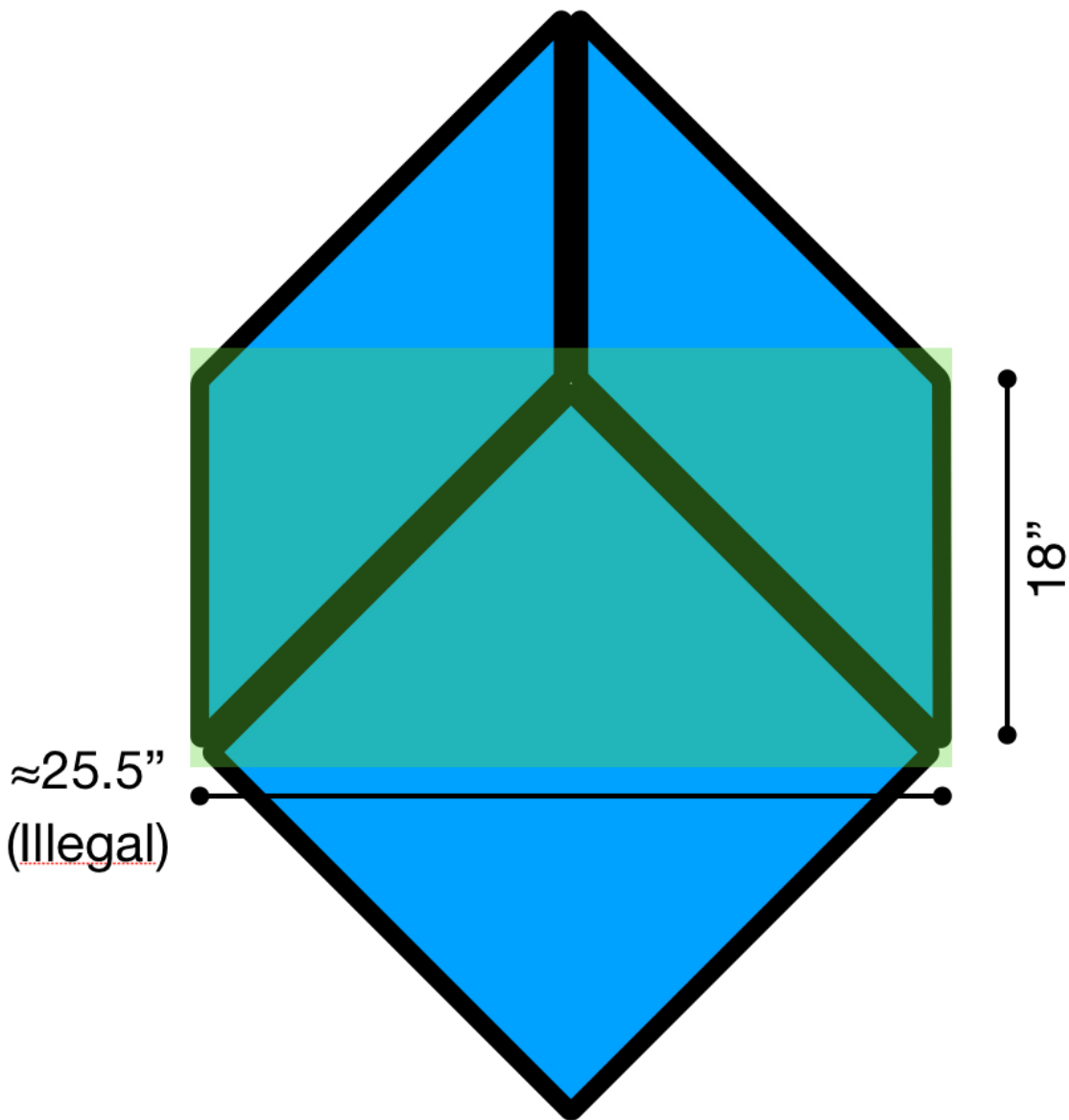


Figure B:





Answered by committee

Does this same logic apply to <G5> and the Robot's 18"x18"x18" starting volume (mainly as it pertains to rotating while Climbing)?

No. The full text of <G5> reads as follows, with a few portions bolded for emphasis: "Robots begin the Match in the starting volume. At the beginning of a Match, each Robot must be smaller than a volume of 18" (457.2 mm) **long** by 18" (457.2 mm) **wide** by 18" (457.2 mm) **tall**."

A common-sense interpretation (<G3>) of the words "long", "wide", and "tall" make it clear to any reasonably astute inspector / Head Referee that the sizing "cube" in question is resting flat on a foam tile.

Therefore, your Figure C would be closest to the correct interpretation, and would be both illegally long and illegally tall in that starting configuration.

1718: Robot Sizing Tool vs G5

23-Oct-2023

G5

<G5>

G5 limits length to 20 inches this year but the Robot Sizing Tool and assembly instructions are set to 19 inches still. Will you provide revised assembly instructions to ensure robots are consistently inspected at tournaments?

Answered by committee

Thank you for bringing this to our attention. Updated instructions are now available:
https://www.vexrobotics.com/228-5293.html#attr-vex_docs_downloads

1447: Is the size limit a specific LxWxH or a volume?

11-Feb-2023

G5

The rule G5 states, "Fit within an 11" x 19" x 15" (279mm x 483mm x 381mm) volume, as checked during inspection per R5." R5 also states "volume." Only a volume is stated, not a specific LxHxW maximum requirement. In other words, 11Lx19Hx15W or 19Lx15Hx11W or 15Lx11Hx19L

Some events are stating the rule is a max height of 15 inches with length and width of 11x19. Previous games with specific height limits state those limits, they haven't used "volume." This seems to be a confusion because the starting position on the field is listed as 11x19. My understanding is that this a field spec and not listed as a robot size spec.

Could I get clarification on G5 and R5 robot size limits?

Answered by committee

Rule <G13> states that Robots may only expand horizontally past the 11" x 19" starting dimension while contacting the Expansion Zone, and that there are no restrictions on vertical expansion once the match starts.

Point #2 of rule <G5> will be revised in the next game manual update to clarify that the 11" x 19" measurement refers to the Robot's starting width and length, and the 15" measurement to its starting height.

1404: Can a motor be running at start?

23-Jan-2023

G5

When the robot is in the starting position before the game has started can an internal motor which does not drive the robot be running? The internal motor:

- Does not move the robot off the starting position
- Does not interact with any game elements prior to the game
- Is triggered by starting the program on the brain, not by a button on the controller

Answered by committee

Thank you for your question. No part of the robot is allowed to be in motion before the start of the match.

1361: Starting position clarification please

3-Jan-2023

G5

In rule G5, there are three criteria given for the starting position.

1. Not contacting any Discs, other Field Elements, or other Robots.
2. Fit within an 11" x 19" x 15" (279mm x 483mm x 381mm) volume, as checked during inspection per R5.
3. Contacting the inner wall of the Field Perimeter that is furthest from the Fence.

We have seen two different interpretations of the starting position. At a local Northern CA tournament, the referee stated that the entire back side needs to touch the furthest inner wall as shown in Figure 14. At the RiverBot Signature event in Monroe, MI, teams were allowed position the bot diagonally with just one part of the bot touching the furthest inner wall.

Can the start position be at an angle from the furthest inner wall as long as part of the bot is in contact? Or does the entire back side need to touching the wall?

Thanks for the clarification. [<G5>](#)

Answered by committee

Thank you for your question. Rule [<G5>](#) does not specify how much of a Robot must be in contact with the inner wall at the beginning of a Match. A Team may choose to start a Match with an entire side of the Robot in contact with the inner wall (as shown in Figure 16 of the Slapshot Game Manual), with a single protruding component in contact with the inner wall (as described by your 'diagonal' scenario), or anything in between.

1353: Prematch Setup G5: Can a robot touch a sidewall and and the inner wall farthest from the fence?

22-Dec-2022

G5

[<G5>](#)

G5.1. States "Not contacting and Discs, 'other field elements' or other robots. "Field Elements" is defined as All elements that make up the field, INCLUDING THE FIELD PERIMETER....

G5.3. specifically states the wall farthest from the fence. But doesn't mention any other perimeter wall.

So Would a robot touching the farthest wall AND a side wall be legal?

Answered by committee

Thank you for your question! Rule [<G5>](#) specifies that at the beginning of a Match the Robot must be touching the inner wall of the Field Perimeter that is furthest from the Fence; the Robot may also touch the Floor ([<G3>](#)).

A Robot may not be in contact with any other Field Element—including the side walls of the Field Perimeter, the top edge of the Field Perimeter, or the outer wall of the Field Perimeter—at the beginning of a Match.

1327: Sizing Box Violations With a Tipped Robot

6-Dec-2022

G5

[<G5>](#) Rule g5 says that the robot must "Fit within an 11" x 19" x 15" (279mm x 483mm x 381mm) volume, as checked during inspection per [<R5>](#)." If a robot were to vertically expand, and then tip over, would that be considered a violation of this rule, or would the robot be allowed to continue operation while in a tipped state, with the sizebox rotated to accommodate for the new state of the robot?

Answered by committee

Because rules [<G5>](#) and [<R5>](#) only describe a Robot's size at the beginning of a VIQC Slapshot Match, they do not apply to a Robot during the Match, whether that Robot remains upright or tips over.

However, were a Robot to tip over as described (even within the maximum starting size with no vertical expansion), if its new horizontal measurements were larger than 11" x 19" it would be in violation of rule [<G13>](#). The "sizebox" does not rotate with the Robot, and the Robot's actual horizontal measurements must meet the limitations of [<G13>](#) when the Robot isn't contacting an Expansion Zone.

If the Team stops playing the game (and stops scoring points) when the Robot tips over, they could reset the Robot as described in rule [<G12>](#) and would then only be issued a Minor Violation of rule [<G13>](#) for the momentary violation of horizontal expansion. If the Team continued to play the game and score points while tipped over and in violation of [<G13>](#), they would be issued a Major Violation and a Disqualification.

1305: Placing robot during autonomous period

19-Nov-2022

G5 G12 RSC5

Hello there,

Hope you are doing great!

Is there any specific point to place the robot just before starting the Programming Skills match, or as mentioned criteria at [<G5>](#) is enough?

During autonomous period, can a team member manually place the robot at the specified starting point which is mentioned above and start another code sequence before the time runs out regarding [<RSC5>](#)?

Thank you in advance.

Answered by committee

Thank you for your questions! As long as all of the criteria listed in rule [<G5>](#) are met, the Robot can be started in any position or orientation for any type of Slapshot Match.

As described in rule [<RSC5>](#), a Team can handle, reset, and adjust the Robot as many times as desired during a Programming Skills Match. The Team may use the same starting position for each reset, or may move the Robot to any legal starting position. Any Discs being controlled by the Robot while being handled, as well as any Discs in the new starting position, must be removed from the Field. Teams may continue to run segments of the program while time remains on the Match clock, but when the clock hits zero, the Match will end as described in rule [<SC1c>](#).

1236: Starting location - can robots extend beyond the wall and field?

14-Oct-2022

G5

In rule G5, there are three criteria given for the starting position.

1. Not contacting any Discs, other Field Elements, or other Robots.

2. Fit within an 11" x 19" x 15" (279mm x 483mm x 381mm) volume, as checked during inspection per R5.
3. Contacting the inner wall of the Field Perimeter that is furthest from the Fence.

However, if a robot is contacting the inner wall and part of the robot extends over the wall and out of the field, is that an illegal starting position despite meeting all 3 criteria of rule G5?

Answered by committee

In rule G5, there are three criteria given for the starting position.

1. Not contacting any Discs, other Field Elements, or other Robots.
2. Fit within an 11" x 19" x 15" (279mm x 483mm x 381mm) volume, as checked during inspection per R5.
3. Contacting the inner wall of the Field Perimeter that is furthest from the Fence.

However, if a robot is contacting the inner wall and part of the robot extends over the wall and out of the field, is that an illegal starting position despite meeting all 3 criteria of rule G5?

Thank you for your question! The starting position you describe (part of the Robot extending over the Field Perimeter and out of the Field) is legal, providing the Robot meets all conditions of rule <G5> and that the Robot's position will not cause damage to the Field, Field Elements, other Robots, or participants.