2022

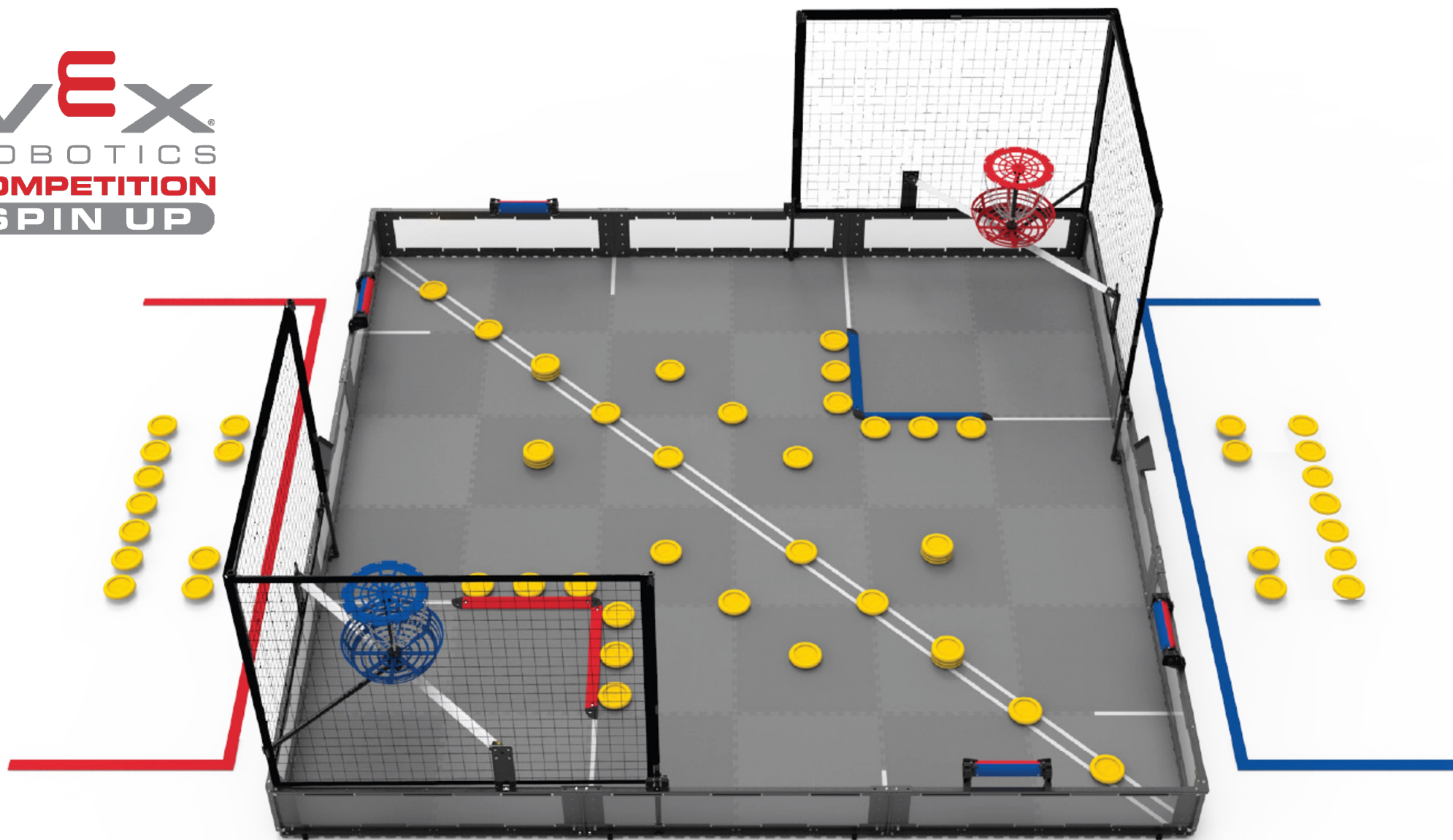## REC FOUNDATION
EVENT PARTNER
SUMMIT

VRC Spin Up Game Discussion

Grant Cox
Chairman of the VEX Game Design Committee

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Game Overview & Scoring
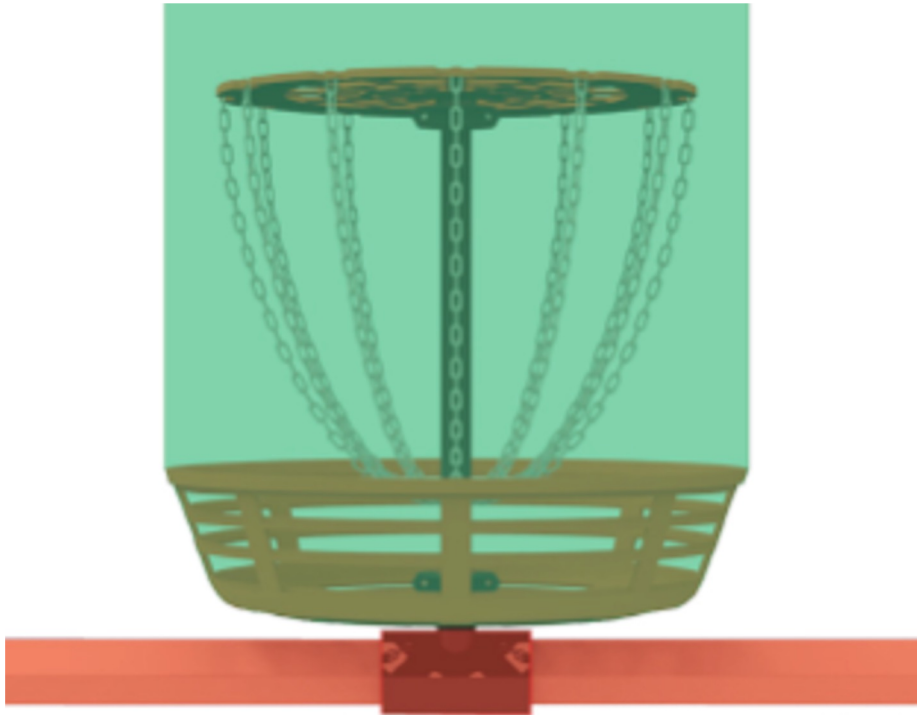## High Goals

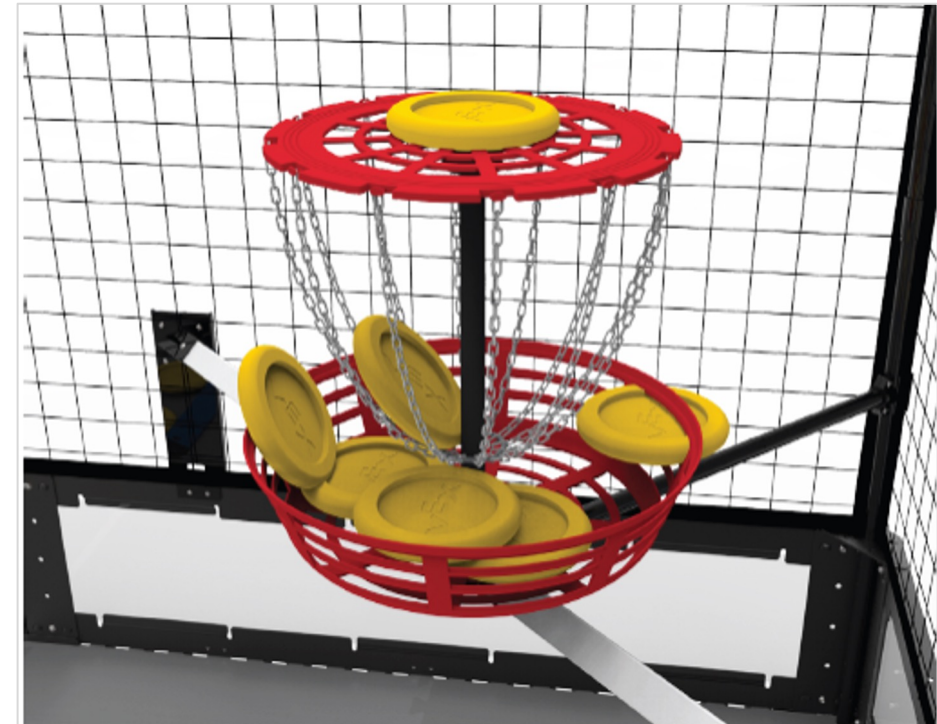**Figure 12:** *A visual representation of the 3-dimensional volume in which Discs are considered Scored in the High Goal*

Figure 13: *A High Goal with Discs*

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Game Overview & Scoring
Low Goals

<SC3> A Disc is considered **Scored in the Low Goal** for the *Alliance* corresponding to the color of the adjacent *Barrier* if it meets the following criteria:

a. Not fully supported by a Robot of the same color Alliance as the *Low Goal*.
b. At least partially contained within the vertical projection of the *Low Goal* (i.e., "breaking the plane" of the *Low Goal*).
c. Not contacting any field tiles outside of the Low Goal.
d. Not contacting the *Net*.
e. Not contacting the *High Goal*, or any of the supporting structure underneath the *High Goal*.

Note: *Discs which are Scored in a High Goal may not also count as being Scored in a Low Goal.*
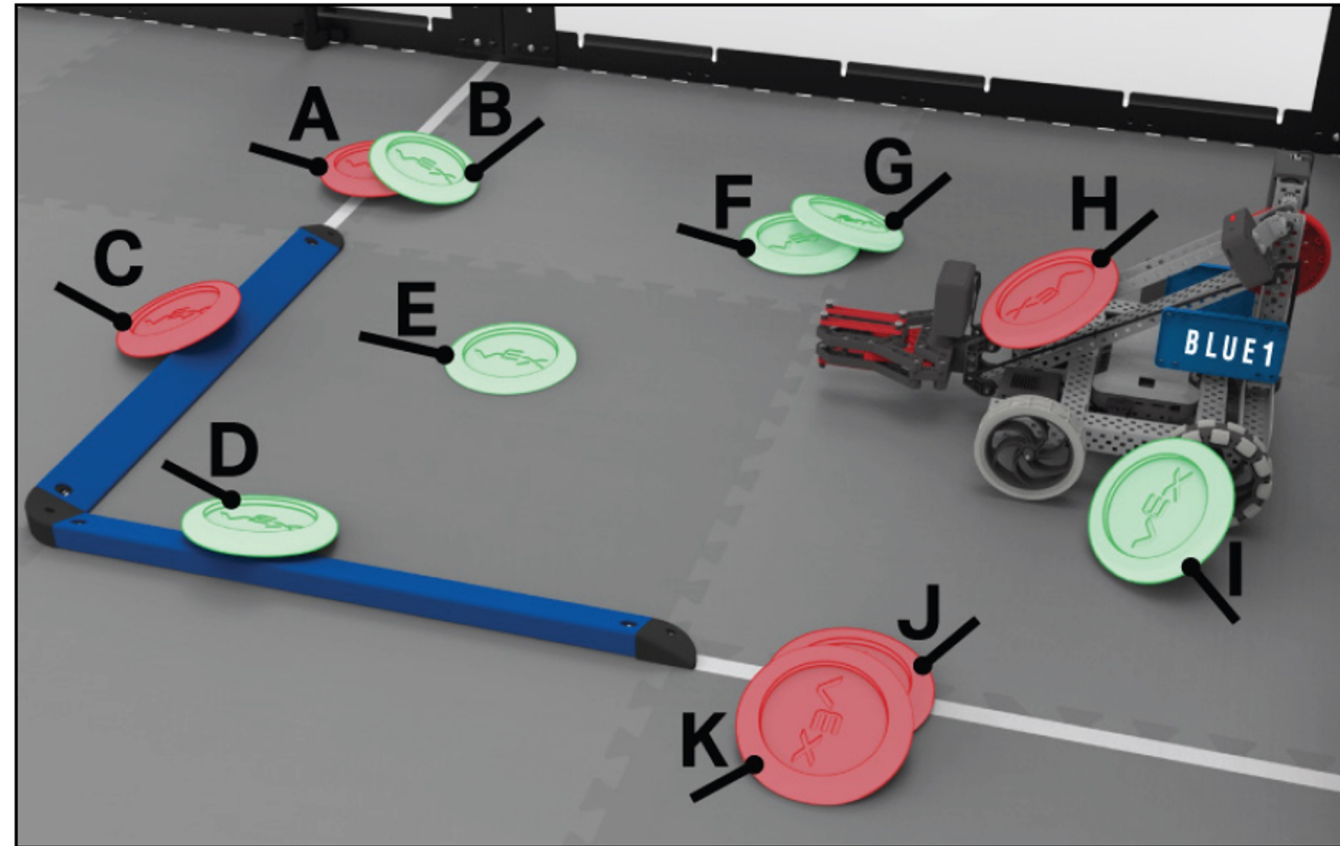

Figure 15: *A Low Goal with Discs highlighted to indicate Scored statuses*

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Game Overview & Scoring
Rollers

The Roller use a "ratchet and pawl" - style mechanism for rotating in predefined increments; they are not free-spinning. If assembled correctly, a *Roller's Owned* state should always be clearly visible to a *Head Referee*.

If a *Roller* is "too close to call" between two states, then referees are advised to give the "benefit of the doubt" to the color that is within the two pointers. For example, in **Figure 16**, if either Roller was positioned such that the color boundary was directly beneath the pointer and it was "too close to call", then it should be considered *Owned* by the blue *Alliance*.
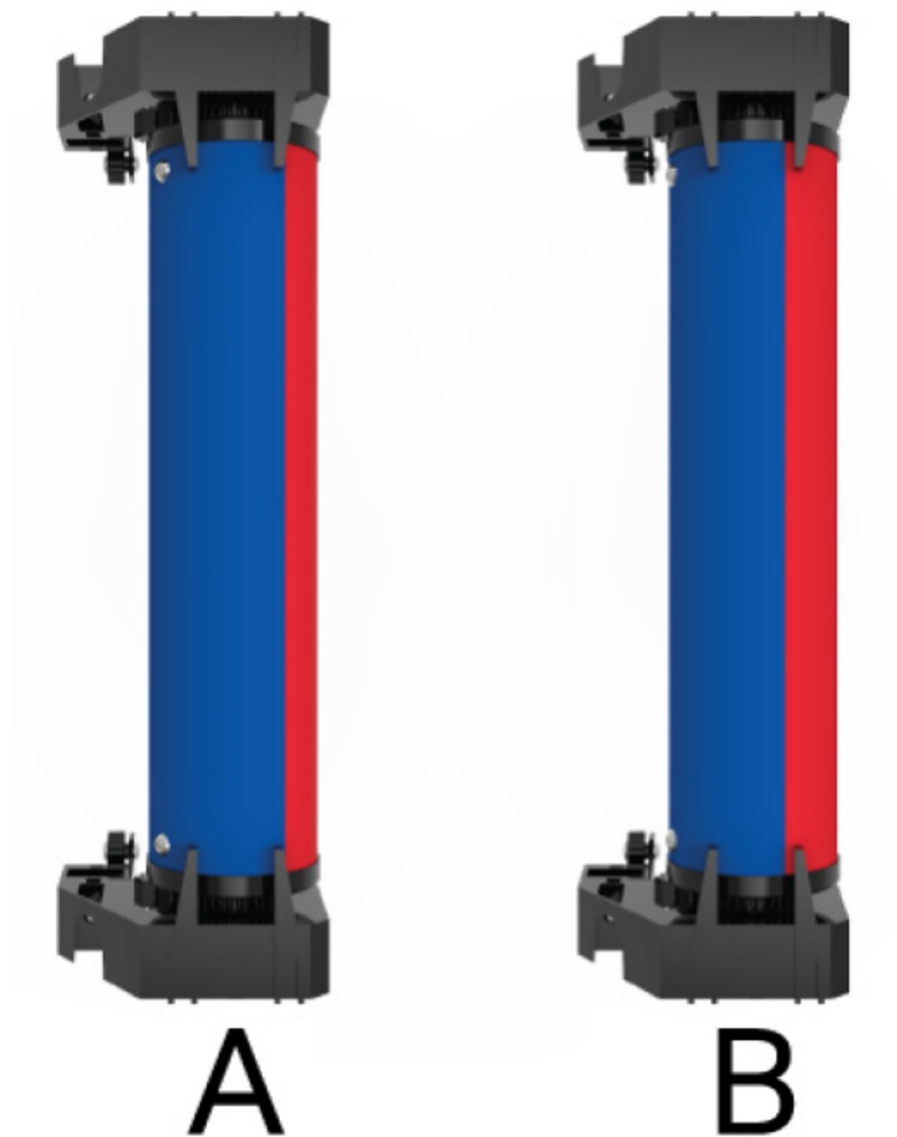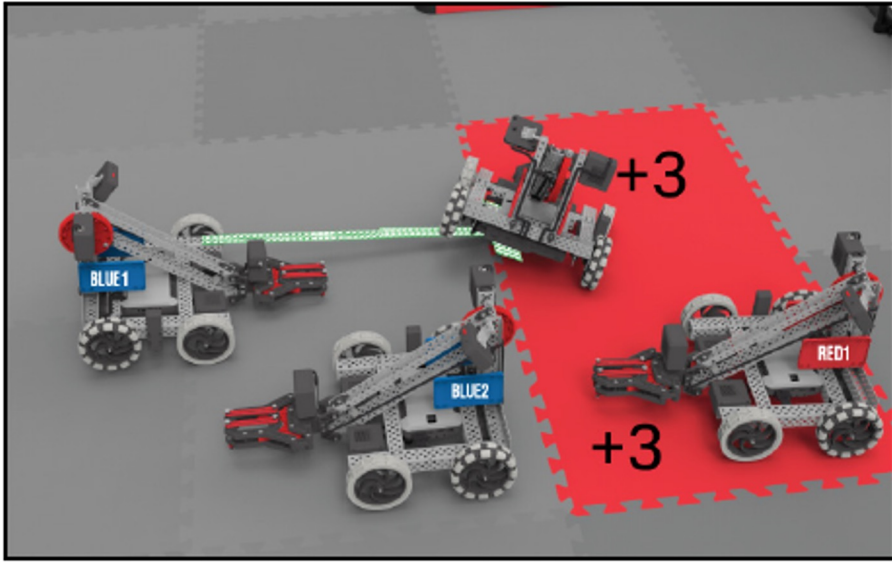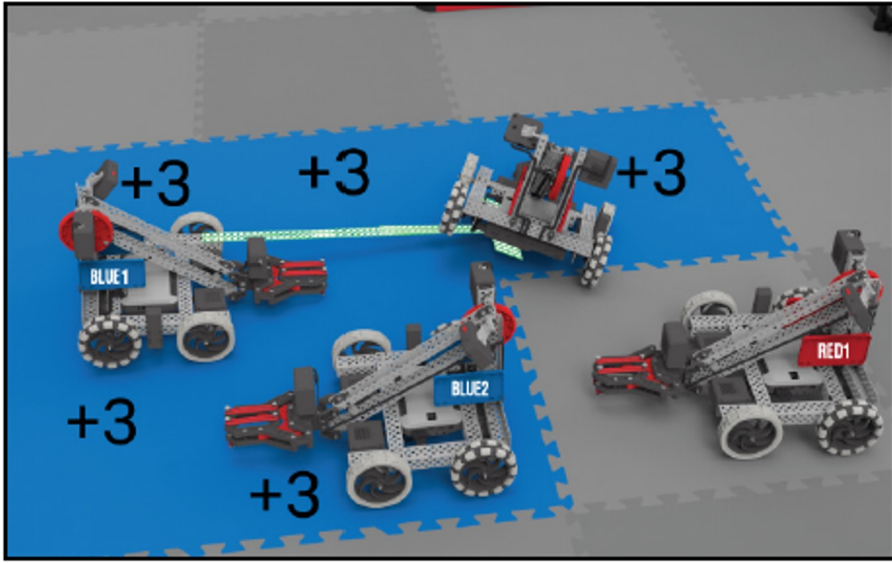

Figure 16: Example of Roller states

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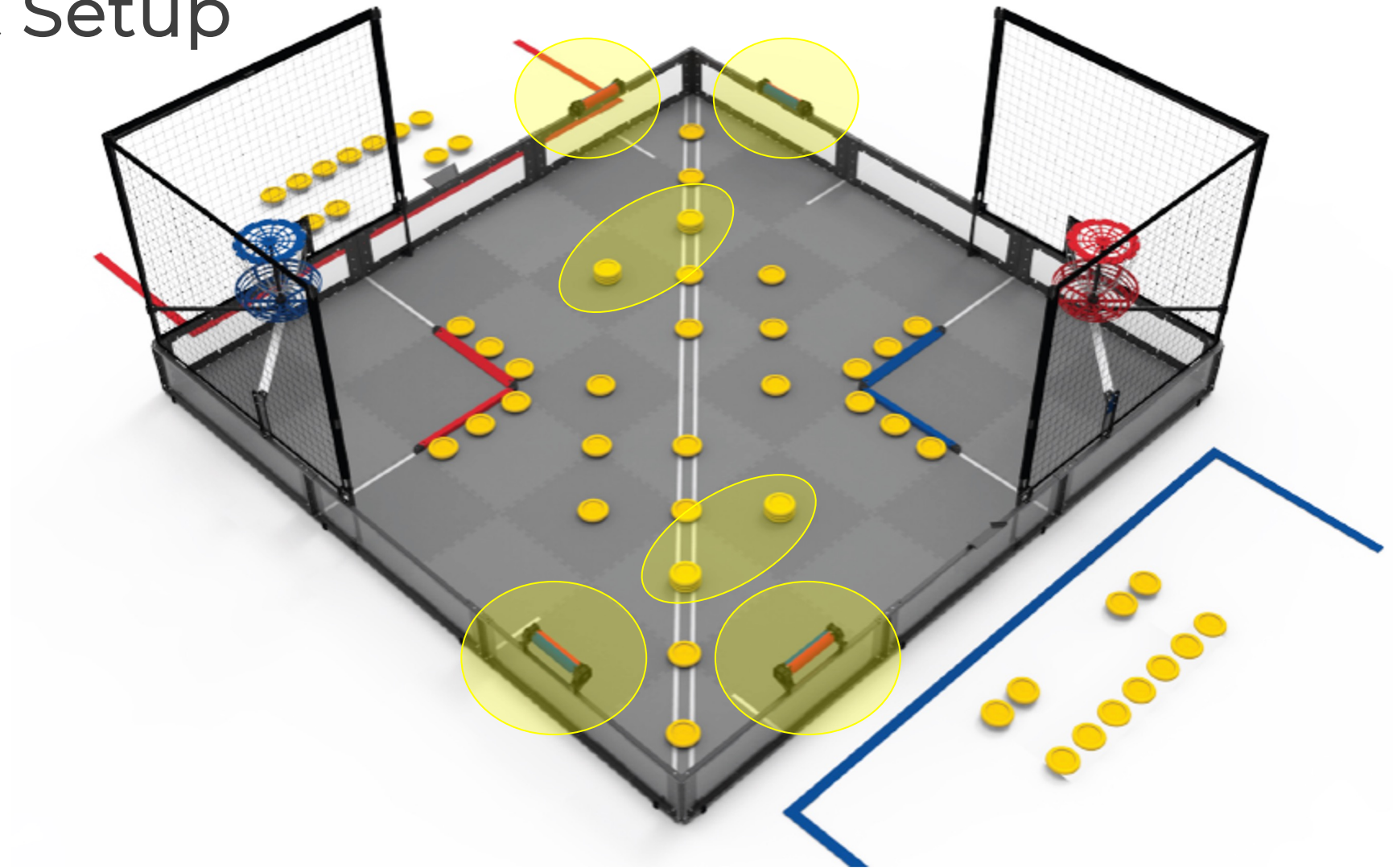
Game Overview & Scoring
Covered Tiles

<SC5> **A field tile is considered Covered** if it is being contacted by a *Robot* at the end of a *Match*.

a. A field tile may be *Covered* by both *Alliances*.

b. Each *Alliance* may only receive points for one *Cover* per field tile, regardless of how many of their *Robots* are contacting that field tile.

c. The field tiles located in the *Low Goals* do not count towards *Cover* points (i.e., they will not be *Covered* by either *Alliance*).

d. *Covered* field tiles are only counted for points at the end of the *Driver Controlled Period*. They are not *Scored* at the end of the *Autonomous* Period.

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Field Layout & Setup
Field Reset

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Field Layout & Setup
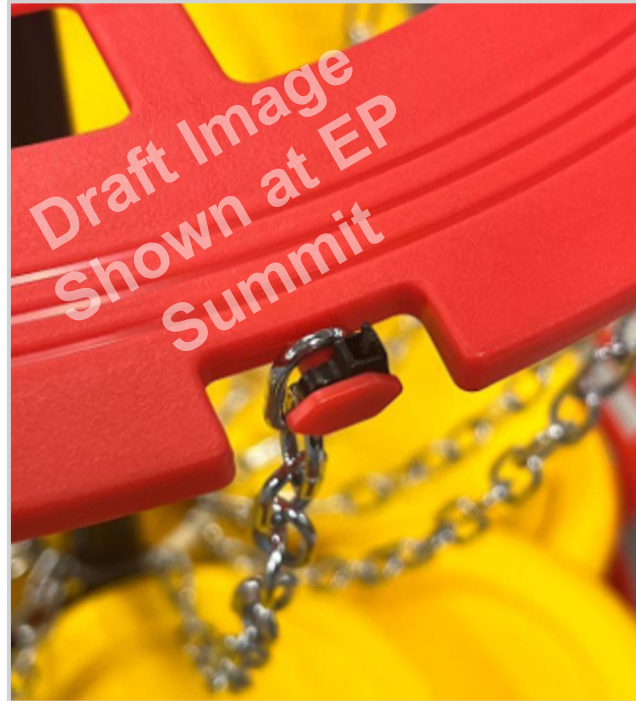## Rollers and Q&A 1135

Answered by committee

Questions: It is unclear from the field specifications in appendix A of the game manual weather this behavior is intended. Can the GDC please clarify if it is intended?

Answer: Yes, the Roller in the linked video appears to be assembled correctly, and this is an intended function of the Roller design.

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Field Layout & Setup
High Goal Chains

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Endgame
G12 & Q&A 1110

<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.

  d. During the *Endgame*, *Robots* should expect the possibility of vigorous interactions with opponent *Robots*. Incidental damage that is caused by pushing, tipping, or Entangling during the *Endgame* will not be considered a *Violation* of <G12>. Intentional damage or dangerous mechanisms may still be considered a *Violation* of <R4>, <S1>, or <G1> at the *Head Referee's* discretion.

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Endgame
G12 & Q&A 1110

✅ **Answered by committee**

would mechanisms that have a risk of entanglement also be legal to deploy in the last 10 seconds of the match? Some examples of such mechanisms:

- A net made out of legal rope
- Legal string/rope on its own

Yes, these would generally be legal for use in the Endgame, provided that no other rules are violated.

This question is largely answered by G12-d, which has already been quoted in the question, but we are going to re-quote and explain further to clarify intent:

During the Endgame, Robots should expect the possibility of vigorous interactions with opponent Robots.

Intent: "Robots are responsible for their own actions - which means that during the Endgame, they should be aware that opponent Robots may try to expand into them"

Incidental damage that is caused by pushing, tipping, or Entangling during the Endgame will not be considered a Violation of G12.

Intent: "During this period, pretty much anything goes."

Intentional damage or dangerous mechanisms may still be considered a Violation of R4, S1, or G1 at the Head Referee's discretion.

Intent: "Even though pretty much anything goes, this still isn't combat robots. Teams causing G12-d questions should still be at least attempting to play the Endgame, not merely driving around causing havoc on the field."

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Vertical Expansion

<SG5> **Vertical expansion is limited.** *Robots* may expand vertically within the following conditions:

a.   The *Robot* must not be contacting the gray field tiles in either *Low Goal.*

b.   No part of the *Robot* may exceed an overall height of 24". This height limit is a "virtual ceiling", meaning that no part of the *Robot* may ever exceed 24" anova the foam tiles, regardless of *Robot* orientation.

c.   Any extensions or combinations of extensions above 18" must fit within a vertical cylinder 2" in diameter.

d.   There are no vertical expansion limits during the *Endgame.*

e.   *Robots* may not contact the *High Goal, Discs* which are Scored in the High Goal, or the horizontal supporting structures directly underneath the *High Goal.* This rule applies to all times, regardless of *Alliance / High Goal* color.
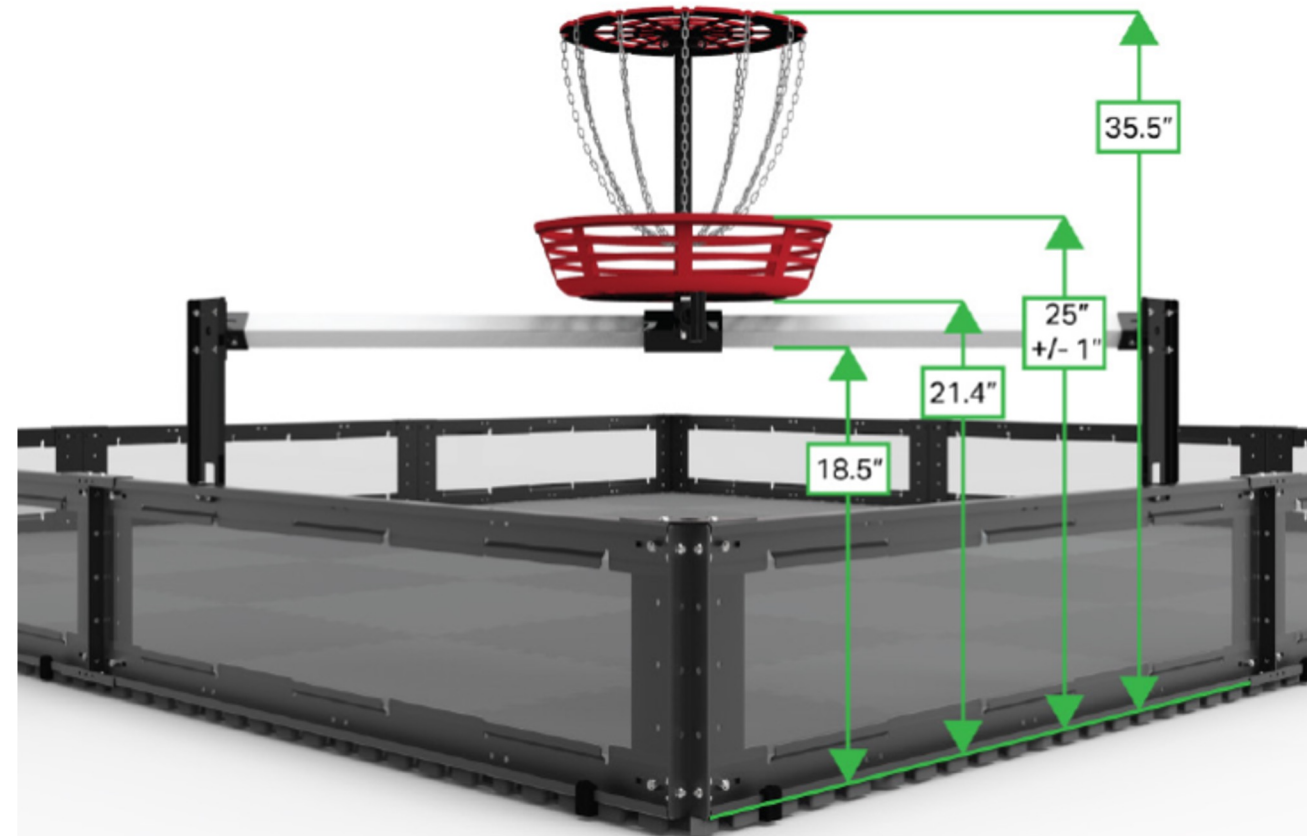

Figure 20: Vertical dimensions of the High Goal

Possession

<SG7> **Possession is limited to three (3) Discs.** *Robots* may not have greater-than-momentary *Possession* of more that three (3) *Discs* at once. Robots in *Violation* of this rule must immediately stop all *Robot* actions except for attempting to remove the excess *Disc(s)*.

Note: This rule applies to both intentional and accidental Possession.

Violation Note:

- Any intentional Violation by an Alliance who wins the Match will be considered Match Affecting.
- Egregious Violations, such as continuing to play other portions of the Game (e.g., Rollers or Endgame) without attempting to remove excess Discs for the majority of the Match, or "accidentally" Possessing an egregious amount of Discs, may also be considered Major Violations at the Head Referee's discretion.

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General Game Manual Changes
Major & Minor Violations

Violation - The act of breaking a rule in the Game Manual.

- **Minor Violation** - A Violation which does not result in a *Disqualification*.

    ○ Accidental, momentary, or otherwise non-*Match Affecting* Violations are usually *Minor Violations*.

    ○ *Minor Violations* usually result in a verbal warning from the *Head Referee* during the *Match*, which should serve to inform the *Team* that a rule is being Violated before it escalates to a *Major Violation*.

- **Major Violation** - A *Violation* which results in a *Disqualification*.

    ○ Unless otherwise noted in a rule, all *Match Affecting Violations* are *Major Violations*.

    ○ If noted in the rule, egregious or intentional *Violations* may also be *Major Violations*.

    ○ Multiple *Minor Violations* within a *Match* or tournament may escalate to a *Major Violation*, at the *Head Referee's* discretion.

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General Game Manual Changes
Major & Minor Violations

<G4> 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. Using *Field Elements*, such as the field perimeter wall, to maintain starting size is only acceptable if the *Robot* would still satisfy the constraints of <R5> and pass inspection without the *Field Elements*.

> *Violation Notes: Any Violation of this rule will result in the Robot being removed from the field prior to the start of the Match, and rules <R3d> and <T5> will apply until the situation is corrected.*

<SG4> Horizontal expansion is limited until the Endgame. *Robots* may not expand beyond a horizontal area of 18″ x 18″ at any point during the *Match* prior to the *Endgame*.

There are no horizontal expansion limits during the *Endgame*.

> *Violation Notes:*
> - *Teams can prevent an accidental or momentary expansion from becoming a Major Violation by immediately moving to rectify the Violation, and / or removing themselves from gameplay (e.g., parking in a corner of the field without impacting gameplay for other Robots).*
> - *Even if an expansion was accidental, it can still be considered a Major Violation if the Head Referee judges that the expansion was intentional, strategic, and / or Match Affecting.*

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General Game Manual Changes
Update Frequency

Updates

This manual will have a series of "major" and "minor" updates over the course of the season. Each version is official and must be used in official VRC events until the release of the next version, upon which the previous version becomes void.

Known release dates are as follows:

May 5, 2022	Version 0.1	Initial game release
May 31, 2022	(N/A)	Official Q&A system opens
June 14, 2022	Version 0.2	Minor typographical errors or formatting issues found in the initial release; very few rule changes, if any
June 28, 2022	Version 1.0	May include critical gameplay or rule changes inspired by input from the official Q&A system and the VEX community
August 2, 2022	Version 2.0	May include gameplay or rule changes inspired by early-season events
October 4, 2022	Version 2.1	Clarification update only
December 6, 2022	Version 2.2	Clarification update only
January 31, 2023	Version 3.0	May include gameplay or rule changes inspired by mid-season events
April 4, 2023	Version 4.0	May include critical gameplay or rule clarifications pertaining specifically to the VEX Robotics World Championship

In addition to these known major updates, there may also be unscheduled updates released throughout the season if deemed critical by the VEX GDC. **Any unscheduled updates will always be released on a Tuesday, no later than 5:00 PM CST (11:00 PM GMT).** These updates will be announced via the VEX Forum, automatically pushed to the VRC Hub app, and shared via VEX Robotics / REC Foundation social media & email marketing channels.

Game Manual updates are effective immediately upon release; it is every *Team's* responsibility to be familiar with all rules and updates. There are no "grace periods" if an update prohibits a previously legal part, mechanism, or strategy.

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General Game Manual Changes
Field Consistency

<T21> Fields at an event must be consistent with each other. There are many types of permissible aesthetic and / or logistical modifications that may be made to competition fields at the *Event Partner's* discretion. If an event has multiple Head-to-Head competition fields, they must all incorporate the same permissible / applicable modifications. For example, if one Head-to-Head field is elevated, then all Head-to-Head competition fields must be elevated to the same height.

Examples of these modifications may include, but are not limited to:

- Elevating the playing field off of the floor (common heights are 12" to 24" [30.5cm to 61cm])
- Field control systems (see <T22>)
- Field display monitors
- Field perimeter decorations (e.g., LED lights, sponsor decals on polycarbonate panels)
- Field perimeter type (see <T23>)
- Utilizing the VEX GPS Field Code Strips

Note: If an event uses a set of dedicated fields for Robot Skills Matches, there is no requirement for them to have the same consistent modifications as the Head-to-Head fields. See <RSC6> for more details.

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General Game Manual Changes
Pneumatic Parts Detail

Pneumatic Parts List

Part Number	Description	Image
US14227-S0400 or NCMZ5-U1Z001-320	Reservoir Note: Only 2 Reservoirs are allowed	
NCJ2D10-200S	Cylinder Single Acting	
NCJ2D10-200	Cylinder Double Acting	
SYJ3120-SMO-M3-F	Solenoid, Fwd, Reverse	
SY113-SMO-PM3-F	Solenoid On/Off	
275-1417	Solenoid Driver	
TUO425B-X81US1696	Tubing	

i. Pneumatic components with identical SMC manufacturer part numbers to those listed on the VEX website.

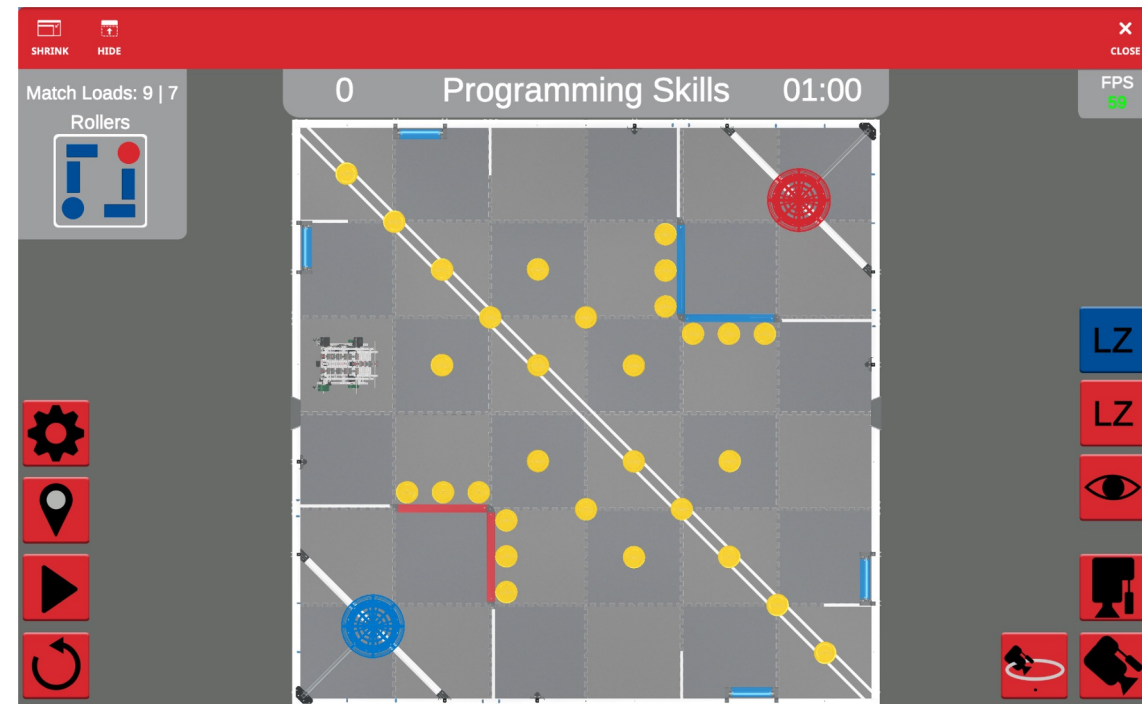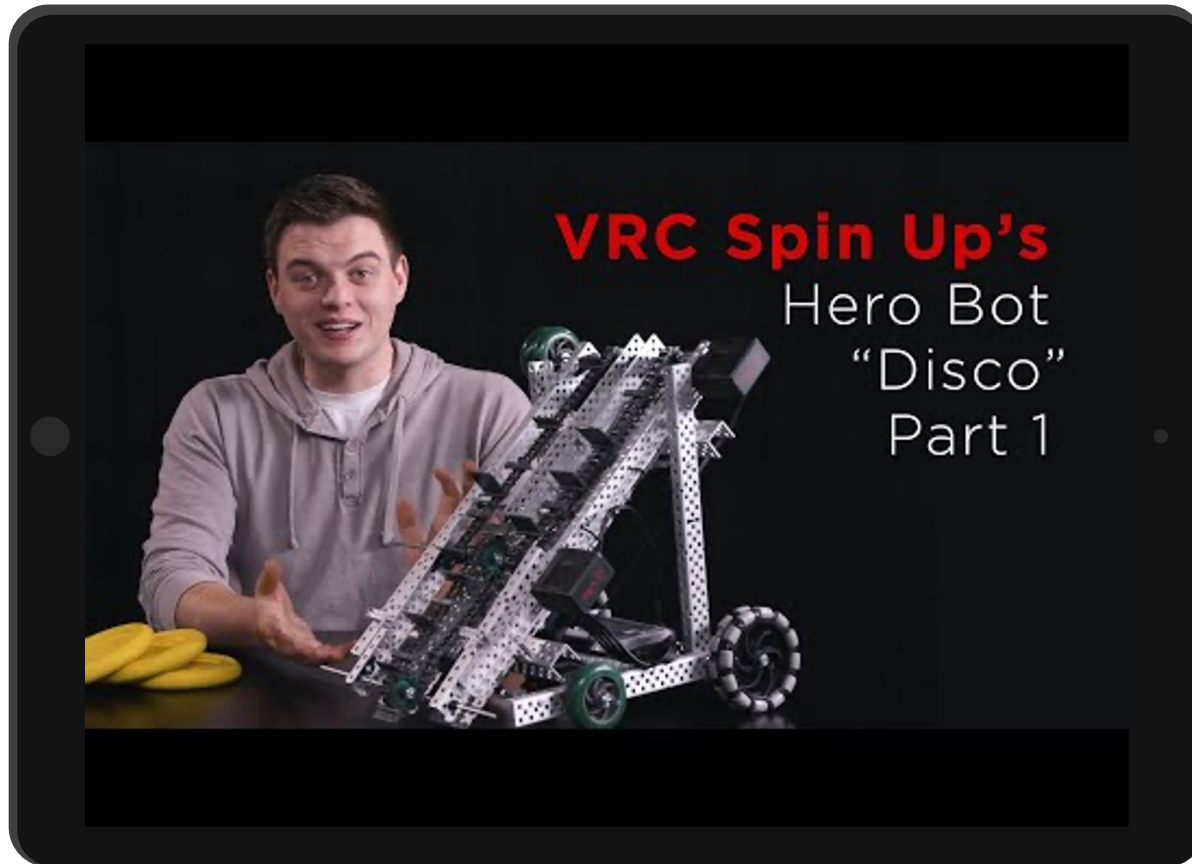For more detail regarding legal pneumatic components, see the Legal VEX Pneumatics Summary document:
https://content.vexrobotics.com/docs/2022-2023/vrc-spin-up/legal-pneumatics.pdf

Adobe Acrobat | legal-pneumatics

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Additional Game Resources
VR Skills & Hero Bot

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