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Section: Award Overview

The FFIA will be judged by a panel of leading experts in the fields of engineering and patent law, including Dean Kamen, and representatives from Abbott and others, to determine the winning idea.

The winner will be announced at the *FIRST* Championship. The winning student(s) will be granted an award sponsored by the Abbott Fund and also will have the opportunity to meet with a venture capitalist firm for a real-world experience in discussing their invention and possible business application.

The FFIA competition is open to all FRC and FTC teams officially registered for the current 2012/2013 *FIRST* competition season. Teams may apply at the [FFI PORTAL](#). The FFIA portal for student submissions will open at **Noon Eastern Time on Thursday, November 8, 2012 and close for submissions at Noon Eastern Time on Thursday, February 21 March 14, 2013.**

Administrative Manual - Team UPDATE - 2013-02-22

Section: COMPLETE AWARDS LIST

Award	Description	Selected By	Regional	District	State/Region CMP	CMP Division	FIRST CMP
<p>Media and Technology Innovation Award*</p> <p>Digital Media Award</p> <p>*Sponsored by Comcast</p> <p>Replacing Website Award</p>	<p>Award celebrates teams that look beyond the team website, taking into account the numerous ways people search for and consume content.</p>	<p>TBD</p>					<p>X</p>

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Section:AWARDS SUBMISSION PROCESS

The Chairman's Award, the Woodie Flowers Award, ~~and the Entrepreneurship Award,~~ and the Media and Technology Innovation Award must be submitted through the *FIRST* Student Team Information Members System (STIMS) <https://my.usfirst.org/stims/site.lasso>. The Main or Alternate contact for your team must assign at least one (1) and up to four (4) student award submitters in FRC TIMS. Those students will be notified of their status via email and may then log into the STIMS and be able to view the awards submission section on their main page.

The *FIRST* Dean's List Award must be submitted by the team's main or alternate contact through TIMS, <https://my.usfirst.org/frc/tims/site.lasso>.

The *FIRST*[®] Future Innovator Award (FFIA) must be submitted via the FFIA portal. <http://www.allthingspatent.com/FRC/>

Submission for awards, with the exception of the Media and Technology Innovation Award, will open at **Noon Eastern Time on Thursday, November 8, 2012** and close for submissions at **Noon Eastern Time on Thursday, February 21, 2013**.

Submission for the Media and Technology Innovation Award will open at **Noon Eastern Time on Friday, March 1, 2013** and closed for submissions at **Noon Eastern Time on Friday, March 22, 2013**.

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Section: MEDIA AND TECHNOLOGY INNOVATION AWARD Sponsored by Comcast (Replaces Website Award)

This award recognizes the team that develops and implements an outstanding marketing strategy, complete with rationale for digital channels/devices to disseminate content.

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Section:Judging Criteria

Submissions will be reviewed and evaluated by a Comcast designated judge panel. This is independent of current *FIRST* Program competition season judged awards.

At the 2013 Championship, the winner of the **Media and Technology Innovation** Digital Media Award will be announced at the awards ceremony.

Submission will be judged on the following criteria:

- **Strategy**
 - Target right audience with right message
 - Develop a clear strategy for choice of distribution channels and content creation
 - Must use at least two channels. More channels are not necessarily better
- **Overall Experience** - Ensure content and channels fit together in look and feel
 - Are you promoting a positive impression of *FIRST* and its mission?
- **Visual Design**
 - Appealing
 - Easy to read
 - Visual fit with *FIRST* - Even though the team has its own identity, is it clear that this team is a part of *FIRST*?
- **Navigation** - Content organization and prioritization
 - Simple
 - Intuitive
- **Content** - Is information compelling and optimized for consumption. More than just text. (Think about using sound, video.) Good content should be engaging, relevant, appropriate
 - Was original content created?
 - Content is kept up-to-date and refreshed
 - Action-oriented
 - Use of live links
 - Appropriately cited and not infringing on others' trademarks or copyrights
- **Functionality** - Content loads quickly. Works with multiple major browsers
 - Ease of use
 - Efficiency - Able to complete required tasks easily
 - Utility
- **Engagement**
 - Did your digital media engage an audience to find out more about your team or about *FIRST*?
 - How did you track the results?

Administrative Manual - Team UPDATE - 2013-02-19

Section:Overview

The FRC Website Award was started in 2003 to recognize excellence in student designed, built and managed websites. Given the new digital possibilities to spread the *FIRST* message, FRC has expanded the website award to include other digital media. With the Media and Technology Innovation Award, students are encouraged to look beyond building a team website, taking into account the numerous ways people search for and consume content. Students should think broadly, considering channels (traditional sites, mobile, apps), devices (smart phones, tablets), and content (social, rich, and viral* media). Be Imaginative!

Administrative Manual - Team UPDATE - 2013-02-15

Section:AWARDS SUBMISSION PROCESS

The *FIRST*[®] Future Innovator Award (FFIA) must be submitted via the FFIA portal.

<http://www.allthingspatent.com/FRC/> ~~LINK COMING SOON~~. Submission for awards will open at **Noon Eastern Time on Thursday, November 8, 2012** and close for submissions at **Noon Eastern Time on Thursday, February 21, 2013**.

Administrative Manual - Team UPDATE - 2013-01-29

Section:INSTRUCTIONS FOR "BAG AND TAG"

As was pointed out in [Question 344](#) on the [FRC Game Q&A](#), there was a discrepancy between [R21](#) and Administrative Manual Section 5.4 on bagging BUMPERS. This change is to bring the Administrative Manual in line with [R21](#).

- ~~3. The team may bag their bumpers separately from their robot. However, the separately bagged bumpers must be sealed with their own tag, and that tag number must be entered on the Robot Lock Up Form.~~

Administrative Manual - Team UPDATE - 2013-01-25

Section: Business Plan Submission

A formal business plan must be completed and entered through the *FIRST* Student Team Information Members System (STIMS) <https://my.usfirst.org/stims/site.lasso>.

The Awards Submission section of STIMS will open for submissions at **Noon Eastern Time on Thursday, November 8, 2012** and close for submissions at **Noon Eastern Time on Friday, February 22, 2013** **Thursday, February 21, 2013.**

Game Manual - Team UPDATE - 2013-02-22

Section:Game Manual

The following field drawings have been updated to reflect current designs:

- Goal Bottoms
- Goal Chains
- Pyramid Cap Locking Mechanism

Updated drawings can be found on the [Manual Homepage](#)

Game Manual - Team UPDATE - 2013-02-19

Section:G35

The most recent [FRC Blog](#) describes the observations and lessons learned about ULTIMATE ASCENT game play during the two Week 0 scrimmages attended by FRC staff. One observation in particular is the basis for an edit, shown below, to Rule [G35].

During the creation and refinement of ULTIMATE ASCENT, we anticipated DISCS to occasionally and accidentally be shot off the FIELD by ROBOTS and FEEDERS. However, we underestimated the intensity and degree to which FEEDERS would launch DISCS at the opposite ends of the FIELD. The aggressive throws plus the propensity for DISCS to leave the FIELD at high velocity caused a more distracting, and more notably hazardous, environment than anticipated for participants and equipment in and around the ARENA.

We strongly resist any significant rule changes after games are released, but this change is required to improve the safety for all FRC event participants. After discussing several options, we believe this particular change is the most effective and efficient way to mitigate risks. We apologize for our error and for having to make this game modification.

DISCS may be fed onto the FIELD only under the following circumstances:

- A. during TELEOP through the FEEDER SLOTS for any DISCS and
- B. during the last thirty (30) seconds of TELEOP over the FEEDER STATIONS for Red and Blue DISCS.

Violation: FOUL

Game Manual - Team UPDATE - 2013-02-19

Section:Game Manual

As a reminder to Teams, a [required Driver Station update](#) was released on February 5. All Teams must update their Driver Station software to at least version 1.29.13.00.

Teams should not touch the GOALS at any point as this could impact the weight sensors used to score DISCS. Teams will be reminded of this during the Drivers' Meeting, and the GOALS will be labeled with "Do not touch" stickers.

Game Manual - Team UPDATE - 2013-02-15

Section:Game Manual

Driver Station Update

There is a new version of the Driver Station software, and we strongly recommend that teams install this update.

This is not a mandatory update because the 01.29.2013 version will function at a competition; however, it fails to log or plot actual packet communications loss and latency data. The Field Management System (FMS) does report this data to the field crew correctly, but the team will not see it on their Driver Station machine. The new version, 2.12.13.00, of the Driver Station software corrects this, and the charts tab shows the blue packet loss plot and the green packet latency. Additionally, the DS logged data will include those values so they can be viewed in the DS Log File Viewer.

Such data reported in the Driver Station is extremely useful to teams evaluating their wireless traffic at home and on the practice fields. It will also be very helpful to CSAs or others attempting to trouble-shoot control issues.

In addition to correcting the data issue, the Dashboard window position will be docked properly while in the Driver account.

FMS Twitter Feed

At the conclusion of each match, the Field Management System posts the results to [Twitter](#). Specific details on the data included in each tweet and the format can be found in the [2013 FMS Twitter Feed document](#) posted on the [Manual homepage](#).

Pre-Field Checklist

In order to help teams have a smooth experience with their Control System on the competition field, FRC has compiled [a list of tips and tricks](#) that teams should use to help prepare for the event. We recommend you use this as punch list before you head to the field for a match; either at home, in your pit, and/or on the practice field.

If you run in to any issues, please ask about them using the [FRC Technical Q&A](#) if still at home or, if at an event, contact the Control System Advisor (CSA) using [National Instruments' Parkway System](#) (via the Parkway kiosks or a mobile device). A short guide to using NI Parkway is available [here](#) if you wish to familiarize yourself with the system before your event.

Good luck to all teams participating in week 0 events!

Game Manual - Team UPDATE - 2013-02-12

Section:R48

All active circuits shall be wired with appropriately sized insulated wire:

Table 4-3: Legal Wire Size

Application	Minimum Wire Size
30 - 40A circuit	12 AWG (2.052mm)
20 - 30A circuit	14 AWG (1.628mm)
5 - 20A circuit	18 AWG (1.024mm)
Between the PD Board and the Analog and/or Solenoid Breakout Boards (even though they are protected by a 20A circuit breaker per R47)	
Between the PD Board and the cRIO	20 AWG (0.8128mm)
Between the PD Board and the wireless bridge	
≤5A circuit	
Pneumatic valves	24 AWG (0.5106mm)

Wires that are **recommended by the device manufacturer or** originally attached to legal devices are **considered** part of the device and by default legal as supplies. Such wires are exempt from [R48](#).

Game Manual - Team UPDATE - 2013-02-12

Section:R51

The only power regulating devices for actuators permitted on the ROBOT include:

- A. Jaguar motor controller (P/N: MDL-BDC, MDL-BDC24, and 217-3367),
- B. Victor 884 motor controller (P/N: VICTOR-884-12/12),
- C. Victor 888 motor controller (P/N: 217-2769),
- D. Talon motor controller (P/N: CTRE_Talon and am-2195),
- E. VEX motor controller (P/N: 276-2193) for controlling VEX 2-wire Motor 393 (P/N: 276-2177) only,
and
- F. Spike H-Bridge Relay (P/N: 217-0220 and SPIKE-RELAY-H).

Game Manual - Team UPDATE - 2013-02-08

Section:R21

The intent of the [Robot Access Period](#) is to provide Teams attending 2-Day Events comparable ROBOT access to that which Teams attending 3-Day Events receive during practice day. R21 has been updated to improve parity in the use of FABRICATED ITEMS between Teams attending 2-Day Events and Teams attending 3-Day Events.

Teams may bring a maximum of 30 lbs of FABRICATED ITEMS to each event to be used to repair and/or upgrade their ROBOT.

For Teams attending 2-Day Events, these FABRICATED ITEMS may be used during the Robot Access Period and/or brought to the Event, but the total weight may not exceed 30 lbs. FABRICATED ITEMS constructed during the Robot Access Period and bagged with the ROBOT are exempt from this limit.

The OPERATOR CONSOLE, BUMPERS, and any ROBOT battery assemblies (as described in [R05-A](#)) are exempt from this limit.

Game Manual - Team UPDATE - 2013-02-08

Section:Game Manual

An optional update has been released for [C++](#) and [Java](#) that corrects a few bugs in the SmartDashboard and RobotBuilder and fixes an issue with the PIDController class in C++. Full release can be found at the bottom of the [2013 Software Notes](#) page.

Game Manual - Team UPDATE - 2013-02-05

Section:R32

Not all BaneBots motors ship with the BaneBots part numbers on them. Table 4-1 has been edited to include alternate part numbers that are printed on the motors received by Teams.

The only motors and actuators permitted on 2013 FRC ROBOTS include the following:

Table 4-1: Legal Motors

Motor Name	Part Numbers Available	Max Qty Allowed
CIM	FR801-001 M4-R0062-12 AM802-001A 217-2000 PM25R-44F-1005 PM25R-45F-1004 PM25R-45F-1003 PMR25R-45F-1003 PMR25R-44F-1005	6
BaneBots	M7-RS775-12 / RS775WC-8514 M7-RS775-18 / RS775PH-6221 M5-RS555-12 / RS555PH-4136F M5-RS550-12 / RS550VC-7527 M5-RS550-12-B / RS550VC-7527L M5-RS545-12 / RS545PH-5125F M5-RS540-12 / RS540BA-5040 M3-RS395-12 / RS395PH-3328 M3-RS390-12	4
AndyMark 9015	am-0912	4
Denso Throttle Control	AE235100-0160	4
VEX BAG and/or mini-CIM	217-3351	4

217-3371

AndyMark PG	am-2161	3
	am-2194	
Window Motors	262100-3030 262100-3040 Various from <i>FIRST</i> ® Choice	2
VEX 2-wire Motor 393	276-2177	2
Snow Blower Motor	am-2235	1
Electrical solenoid actuators, no greater than 1 in. stroke and rated electrical input power no greater than 10 watts (W) continuous duty at 12 volts (VDC)		Unlimited
Drive motors or fans that are part of a motor controller or COTS computing device		Unlimited
Fans included in the 2013 Kickoff Kit, <i>FIRST</i> ® Choice, or as a Talon motor controller accessory		Unlimited
COTS servos with a maximum power rating of 4W each at 6VDC		Unlimited
Per the Servo Industry,		
Servo Max Power Rating = (Stall Torque) X (No Load Speed)		

This is the total number of each motor a Team may use on their ROBOT, not the quantity per part number. For example, each team may use up to six (6) CIM motors on their ROBOT, regardless of the quantity or combination of each individual part number used.

Given the extensive amount of motors allowed on the ROBOT, Teams are encouraged to consider the total power available from the ROBOT battery during the design and build of the ROBOT. Stalling many motors at the same time could lead to drops in ROBOT battery voltage that will result in loss of power to core Control System components.

Game Manual - Team UPDATE - 2013-02-05

Section:R90

The Driver Station software provided on the [Kit of Parts website](#) is the only application permitted to specify and communicate the operating mode (i.e. Autonomous/Teleop) and operating state (Enable/Disable) to the ROBOT. The Driver Station software must be revision ~~12.19.12.00~~ **1.29.13.00** or newer.

Teams are permitted to use a portable computing device of their choice (laptop computer, PDAs, etc.) to host the Driver Station software while participating in competition MATCHES.

Game Manual - Team UPDATE - 2013-02-05

Section:T22

The only equipment, provided it does not jam or interfere with the remote sensing capabilities of another Team, including vision systems, acoustic range finders, sonars, infrared proximity detectors, etc. (e.g. including imagery that, to a reasonably astute observer, mimics the VISION TARGET), that may be brought in to the ALLIANCE STATION are as follows:

- A. the OPERATOR CONSOLE,
- B. non-powered signaling devices,
- C. reasonable decorative items,
- D. special clothing and/or equipment required due to a disability
- E. devices used solely for the purpose of planning or tracking strategy provided they meet all of the following conditions:
 - i. do not connect or attach to the OPERATOR CONSOLE
 - ii. do not connect or attach to the FIELD or ARENA
 - iii. do not connect or attach to another ALLIANCE member
 - iv. do not communicate with anything or anyone outside of the ARENA.
 - v. do not include any form of enabled wireless electronic communication (e.g. radios, walkie-talkies, cell phones, Bluetooth communications, Wi-Fi, etc.)
 - vi. do not in any way affect the outcome of a MATCH, other than by allowing PLAYERS to plan or track strategy for the purposes of communication of that strategy to other ALLIANCE members.

Game Manual - Team UPDATE - 2013-02-05

Section:ULTIMATE ASCENT Terms

DISQUALIFIED: the status of a TEAM, as determined by the Head Referee, in which they receive zero (0) Qualification Points in a Qualification MATCH or receive zero (0) points in, **and lose,** an Elimination MATCH.

Game Manual - Team UPDATE - 2013-02-05

Section:Game Manual

A required update has been released for the [FRC Driver Station](#). This update must be installed by all teams. This update fixes issues with DS-FMS diagnostics and includes the new Log File Viewer.

The [2013 Inspection Checklist](#) is posted on the [Manual Homepage](#). Teams can use this to practice going through Inspection with their ROBOT prior to Stop Build Day to help them better prepare for their events.

Game Manual - Team UPDATE - 2013-02-01

Section:Game Manual

An optional update, Version 5.10, has been released for [LabVIEW](#). This update addresses an issue with downloading new code with the Dashboard open and an issue with using the SPI bus.

Game Manual - Team UPDATE - 2013-01-29

Section:Game Manual

The [Kit of Parts](#) Checklist for the [Black Tote](#) has been updated to correct the part number of the Analog Breakout Board.

Game Manual - Team UPDATE - 2013-01-25

Section:R32

The BaneBots M5-RS555-12 was omitted from Table 4-1, but included in Table 4-4. This omission was identified in [this Q&A](#) and is being corrected in this Team Update.

The only motors and actuators permitted on 2013 FRC ROBOTS include the following:

Table 4-1: Legal Motors

Motor Name	Part Numbers Available	Max Qty Allowed
CIM	FR801-001	6
	M4-R0062-12	
	AM802-001A	
	217-2000	
	PM25R-44F-1005	
	PM25R-45F-1004	
	PM25R-45F-1003	
	PMR25R-45F-1003	
	PMR25R-44F-1005	
BaneBots	M7-RS775-12	4
	M7-RS775-18	
	M5-RS555-12	
	M5-RS550-12	
	M5-RS550-12-B	
	M5-RS545-12	
	M5-RS540-12	
	M3-RS395-12	
	M3-RS390-12	
AndyMark 9015	am-0912	4
Denso Throttle Control	AE235100-0160	4

VEX BAG and/or mini-CIM	217-3351 217-3371	4
AndyMark PG	am-2161 am-2194	3
Window Motors	262100-3030 262100-3040 Various from <i>FIRST</i> ® Choice	2
VEX 2-wire Motor 393	276-2177	2
Snow Blower Motor	am-2235	1
Electrical solenoid actuators, no greater than 1 in. stroke and rated electrical input power no greater than 10 watts (W) continuous duty at 12 volts (VDC)		Unlimited
Drive motors or fans that are part of a motor controller or COTS computing device		Unlimited
Fans included in the 2013 Kickoff Kit, <i>FIRST</i> ® Choice, or as a Talon motor controller accessory		Unlimited
COTS servos with a maximum power rating of 4W each at 6VDC Per the Servo Industry, Servo Max Power Rating = (Stall Torque) X (No Load Speed)		Unlimited

This is the total number of each motor a Team may use on their ROBOT, not the quantity per part number. For example, each team may use up to six (6) CIM motors on their ROBOT, regardless of the quantity or combination of each individual part number used.

Given the extensive amount of motors allowed on the ROBOT, Teams are encouraged to consider the total power available from the ROBOT battery during the design and build of the ROBOT. Stalling many motors at the same time could lead to drops in ROBOT battery voltage that will result in loss of power to core Control System components.

Game Manual - Team UPDATE - 2013-01-25

Section:Game Manual

An issue has been reported with the FRC Bridge Configuration Utility where a team may end up with two IP addresses set on a network interface after using the utility, interfering with the operation of other FRC Tools. For information on how to check for and fix this issue, please see [this page](#).

The *Bill of Materials (BOM) Template* for 2013 is now posted on the [Manual Homepage](#).

Game Manual - Team UPDATE - 2013-01-22

Section: The PYRAMIDS

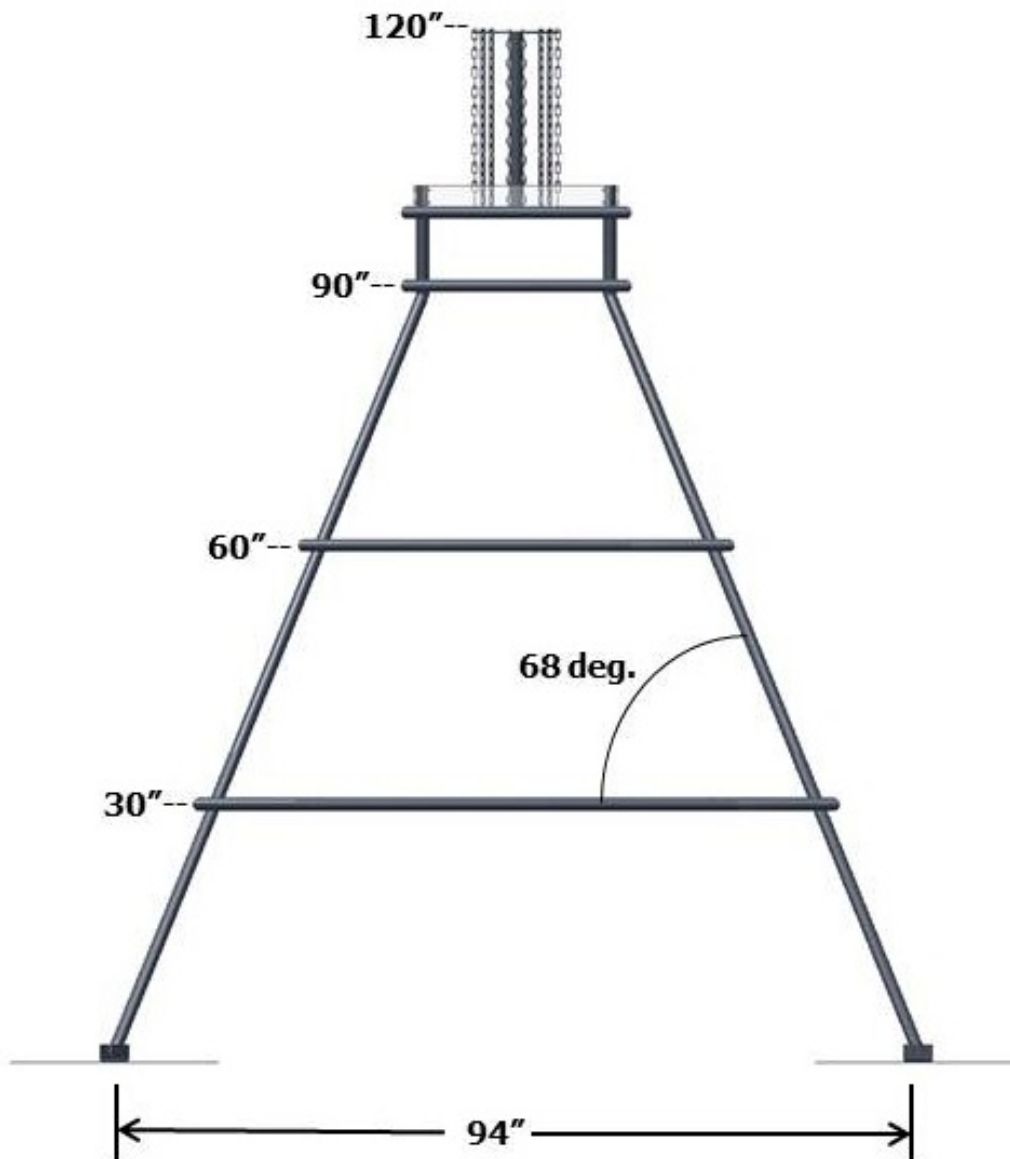


Figure 2-7: The PYRAMIDS

An ALLIANCE specific PYRAMID is located in each half of the FIELD. The PYRAMID is made out of 1 1/2 in. diameter steel tubing and powder coated Red or Blue. It is 94 in. wide at the base and each side slanted at a 68-degree slope. The rungs are located 30 in., 60 in., and 90 in. off of the floor. At the top of the PYRAMID is the PYRAMID GOAL, detailed in Section 2.2.4 The GOALS.

The PYRAMID has four (4), 24 in. square, 11 GA. (.120 in.) steel bases with hook and loop tape ("hook" side) on the bottom. These bases secure the PYRAMIDS to the carpet. To prevent damage to venue

floors, these metal bases are surrounded by floor protectors. These floor protectors are made from $\frac{1}{8}$ in. thick hardboard. The floor protectors begin 12 in. outside of all the PYRAMID bases and continue to cover the floor underneath the PYRAMID (not including the bases themselves). Additional carpet covers both bases and floor protectors and is held to the carpet using 2 in. wide, Black gaffers tape. The protectors and carpet create a $\frac{1}{4}$ - $\frac{3}{8}$ in. lip around the PYRAMID.

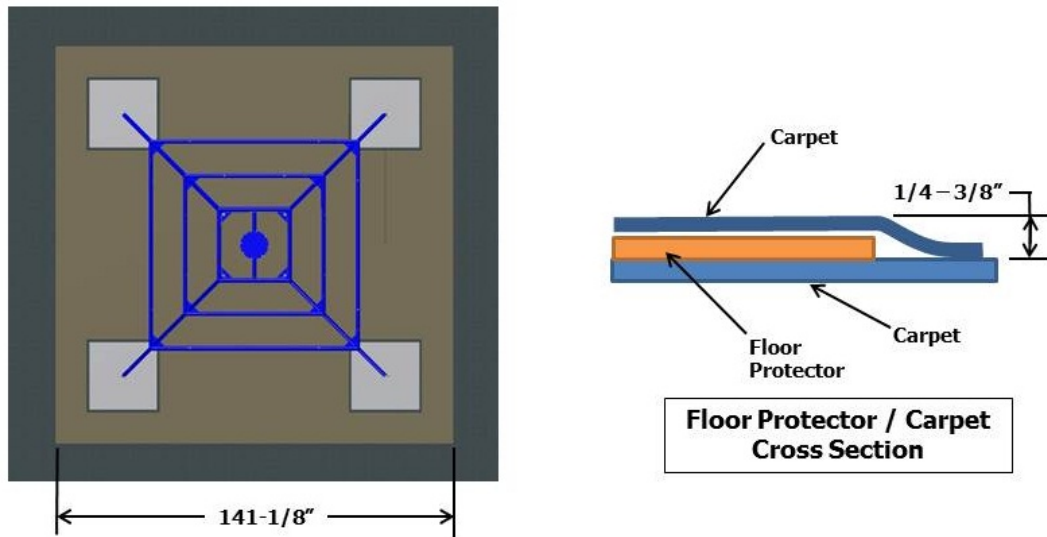


Figure 2-8: PYRAMID Floor Protectors

Teams may have to remove their ROBOT from the PYRAMID after the MATCH is over with the aid of a *FIRST* supplied belay system, per [G04](#). The belaying device acts as a brake to prevent accidentally dropped ROBOTS from causing injuries to teams. The device attaches to the ROBOTS with two carabiners or loops of rope. Teams must supply two attachment points for the belaying device to mount to their ROBOTS, per R10. The belaying rope is fed through a brake that is anchored to the lowest rung on the opposite side of the PYRAMID from the ROBOT. It is then fed through the PYRAMID top and down the other side to be attached to the ROBOT. There is a "bridle" that splits the rope into two sections, which are 90 in. long.

Only trained event staff are allowed to use the belaying device.

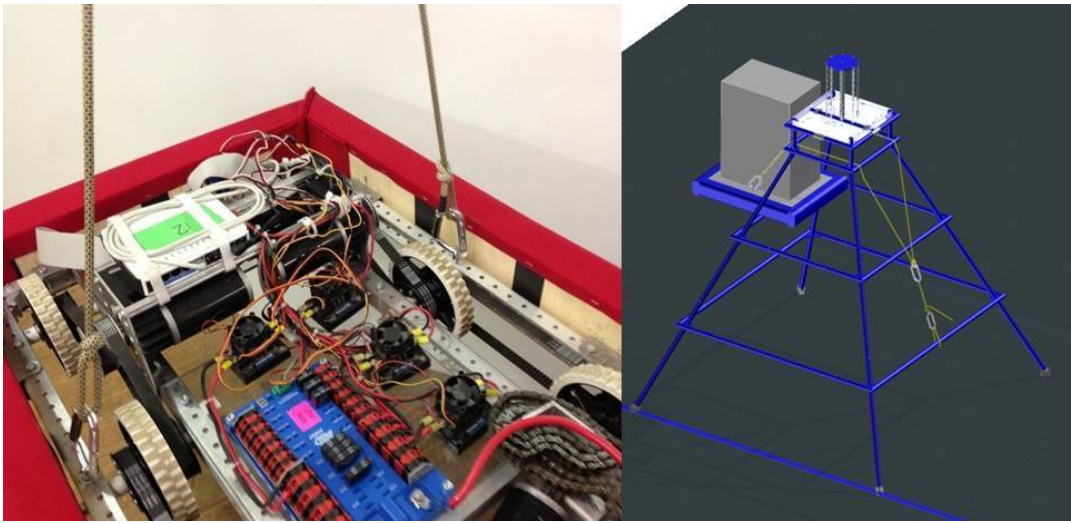


Figure 2-9: ROBOT Using Belay Device (UPDATED)

Game Manual - Team UPDATE - 2013-01-22

Section:R52

Each power regulating device may control electrical loads per [Table 4-4](#). Unless otherwise noted, each power regulating device may control one and only one electrical load.

Table 4-4: Legal Power Regulating Device Use

Electrical Load	Jaguar, Victor, or Talon motor controller	Spike H-Bridge Relay	VEX motor controller	Solenoid Breakout
am PG motor	Yes	Yes	No	No
M3-RS390-12	Up to 2 per controller			
M3-RS395-12				
M5-RS545-12				
M5-RS555-12				
M7-RS775-12				
262100-3030				
262100-3040				
ARA Window motors				
AE235100-0610				
am-2235				
CIM	Yes	No	No	No
am-0912				
M5-RS540-12				
M5-RS550-12				
M5-RS550-12-B				
M7-RS775-18				
217-3351				
217-3371				
276-2177	Yes	Yes	Yes	No
	Up to 2 per			

	controller			
Compressor	No	Yes	No	No
Pneumatic Solenoids	No	Yes*	No	Yes
Electric Solenoids	No	Yes	No	Yes

*Multiple low-load, pneumatic solenoid valves or lights may be connected to a single relay module. This would allow one (1) relay module to drive multiple pneumatic actions or multiple lights. No other electrical load can be connected to a relay module used in this manner.

Game Manual - Team UPDATE - 2013-01-22

Section:Game Manual

General Updates

In order to make the Classmate images available in time for Kickoff, the Wind River Workbench installations were installed using the 2012 licensing. Teams who wish to use an imaged Classmate for C++ development beyond Jan. 31st will need to update to the 2013 license. Instructions for updating to the 2013 license have been posted [here](#).

Game Manual - Team UPDATE - 2013-01-18

Section:Game Manual

General Announcements

We wanted to make teams aware of two recent posts on the FRC Blog. A [post from Wednesday](#) clarifies the intent of [G23-1]. A [post from Thursday](#) announced changes to the answers to four questions on the [Q&A](#).

Optional updates have been released for both [C++](#) and [Java](#). These updates make it easier to use the new Test mode and fix a few minor bugs discovered after the kickoff release. More detailed notes can be found on the [2013 Software Notes](#) page.

Game Manual - Team UPDATE - 2013-01-15

Section:G23

While not in contact with the PYRAMID, a ROBOT'S horizontal dimensions may never exceed a 54 in. diameter vertical cylinder.

Violation: FOUL. If continuous or repeated violations, TECHNICAL FOUL.

In other words, a ROBOT must always fit inside a cylinder with a diameter of 54 in. This method for restricting ROBOT size requires extra diligence if a ROBOT'S geometric center shifts as various appendages are extended and retracted.



Figure 3-5a: ROBOT inside 54 in. diameter cylinder

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Section:G23-1

While in contact with the PYRAMID, a ROBOT

- A. may not have its horizontal dimensions exceed a 54 in. diameter vertical cylinder relative to the ROBOT and
- B. may not extend any part of itself beyond a vertical plane defined by a perimeter offset from the base of the PYRAMID by 54 in., see Figure 3-5b and Figure 3-5c.

Violation: FOUL. If continuous or repeated violations, TECHNICAL FOUL.

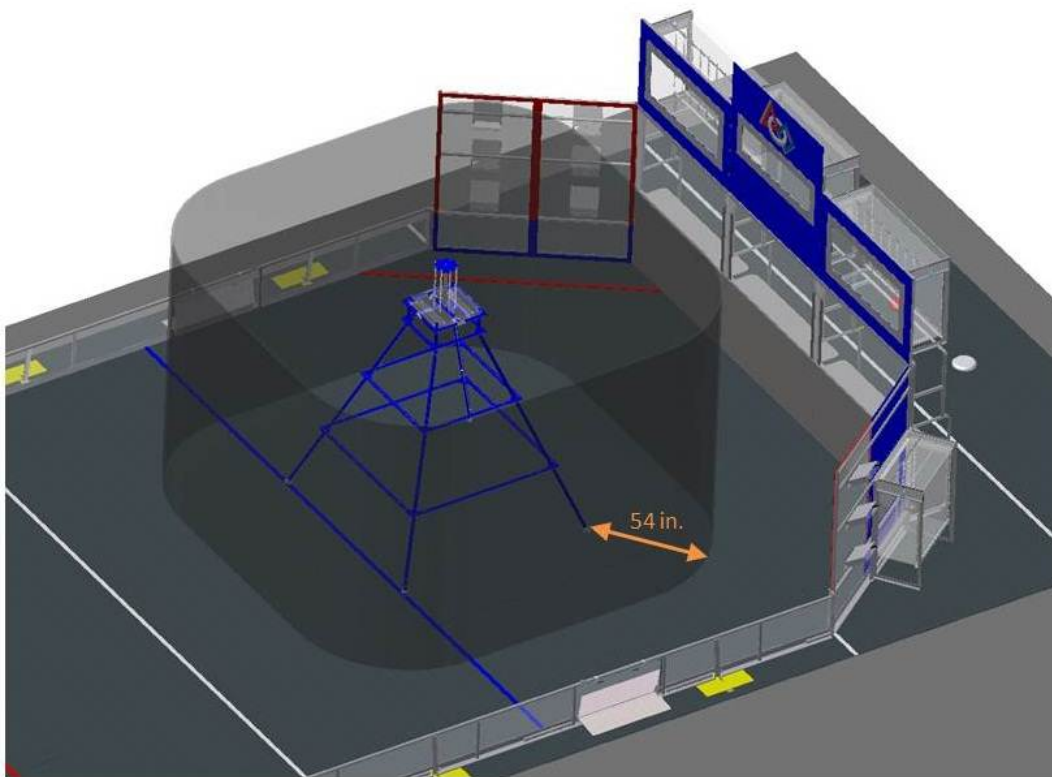


Figure 3-5b: Offset Plane from PYRAMID Base

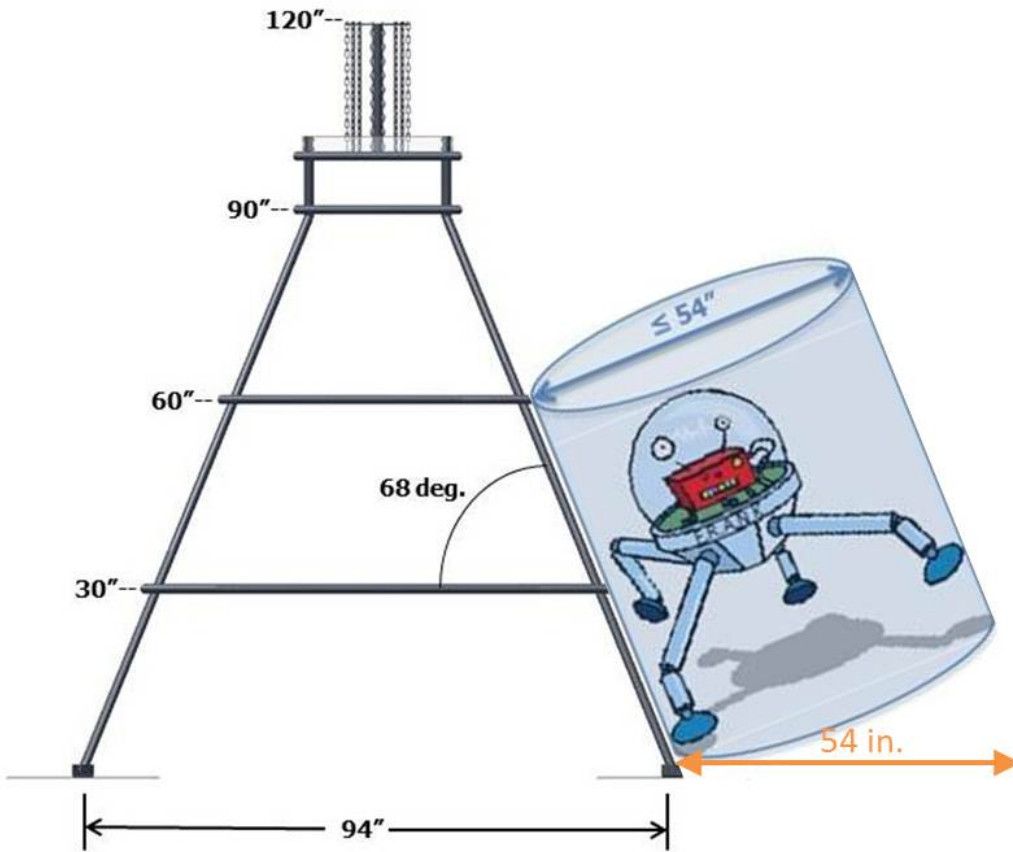


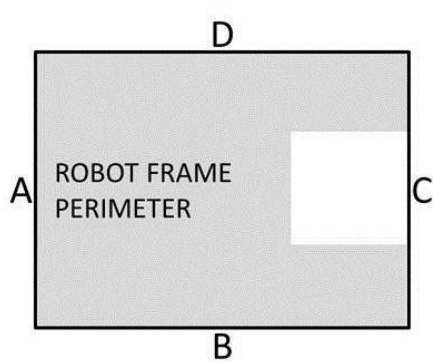
Figure 3-5c: ROBOT Contacting PYRAMID

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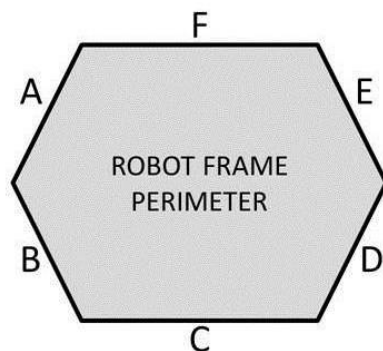
Section:R03

The ROBOT must satisfy the following size constraints:

- A. total length of the FRAME PERIMETER sides may not exceed 112 in. (see [Figure 4-1](#) for examples),
- B. PLAYING CONFIGURATION horizontal dimensions may never exceed a 54 in. diameter vertical cylinder (see [G23](#) and [G23-1](#)), and
- C. height may never exceed 84 in. tall.



$$\text{FRAME PERIMETER LENGTH} = A+B+C+D \leq 112 \text{ in.}$$



$$\text{FRAME PERIMETER LENGTH} = A+B+C+D+E+F \leq 112 \text{ in.}$$

Figure 4-1: FRAME PERIMETER Length Calculations

Consider [G22](#) restricting ROBOT height on various parts of the FIELD during the MATCH when designing and building the ROBOT.

Expect to have to demonstrate a ROBOT'S ability to constrain itself per B above during Inspection. PLAYING CONFIGURATION constraints may be implemented with either hardware or software.

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Section:R22

ROBOTS are required to use BUMPERS to protect all outside corners of the FRAME PERIMETER. For adequate protection, at least 8 in. of BUMPER must be placed on each side of each outside corner (see [Figure 4-2](#)).

The dimension defined in R22 is measured along the FRAME PERIMETER. The portion of the BUMPER that extends into the corner is not included in the 8 in. requirement.

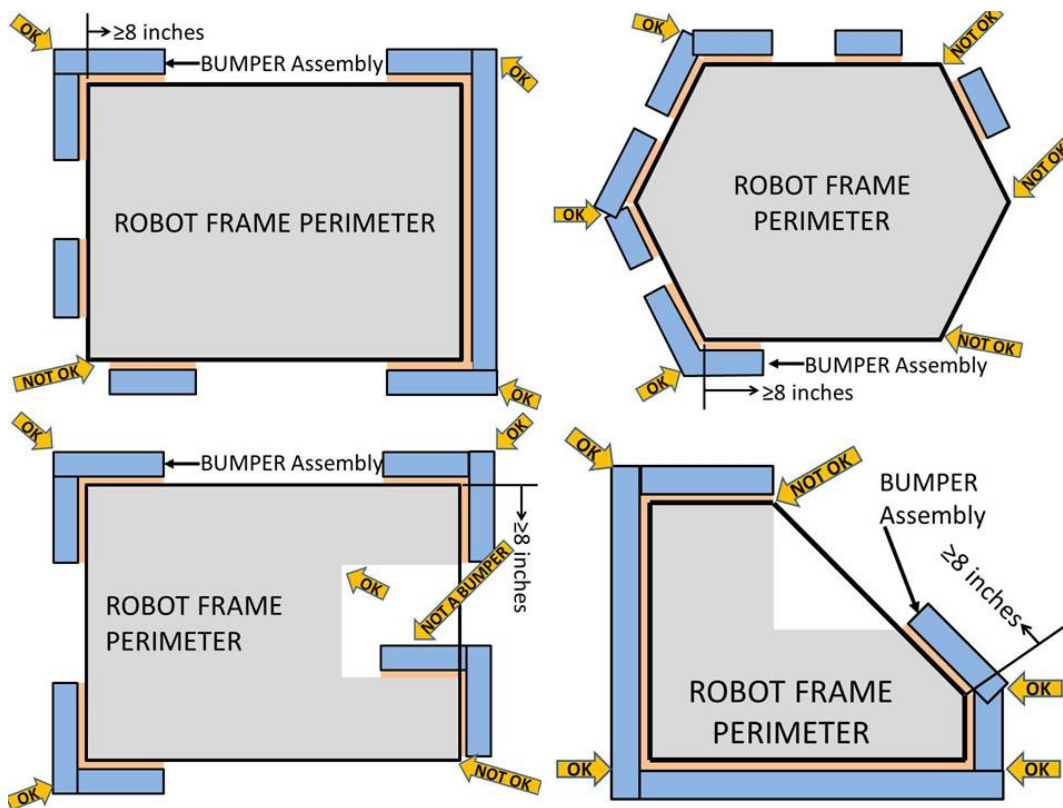


Figure 4-2: BUMPER Corner Examples (UPDATED)

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Section:R32

The only motors and actuators permitted on 2013 FRC ROBOTS include the following:

Table 4-1: Legal Motors

Motor Name	Part Numbers Available	Max Qty Allowed
CIM	FR801-001	6
	M4-R0062-12	
	AM802-001A	
	217-2000	
	PM25R-44F-1005	
	PM25R-45F-1004	
	PM25R-45F-1003	
	PMR25R-45F-1003	
BaneBots	PMR25R-44F-1005	4
	M7-RS775-12	
	M7-RS775-18	
	M5-RS550-12	
	M5-RS550-12-B	
	M5-RS545-12	
	M5-RS540-12	
	M3-RS395-12	
M3-RS390-12		
AndyMark 9015	am-0912	4
Denso Throttle Control	AE235100-0160	4
VEX BAG and/or mini-CIM	217-3351	4
	217-3371	
AndyMark PG	am-2161	3
	am-2194	
Window Motors	262100-3030	2

	262100-3040 Various from <i>FIRST</i> ® Choice	
VEX 2-wire Motor 393	276-2177	2
Snow Blower Motor	am-2235	1
Electrical solenoid actuators, no greater than 1 in. stroke and rated electrical input power no greater than 10 watts (W) continuous duty at 12 volts (VDC)		Unlimited
Drive motors or fans that are part of a motor controller or COTS computing device		Unlimited
Fans included in the 2013 Kickoff Kit, <i>FIRST</i> ® Choice, or as a Talon motor controller accessory		Unlimited
COTS servos with a maximum power rating of 4W each at 6VDC		Unlimited
Per the Servo Industry, Servo Max Power Rating = (Stall Torque) X (No Load Speed)		

This is the total number of each motor a Team may use on their ROBOT, not the quantity per part number. For example, each team may use up to six (6) CIM motors on their ROBOT, regardless of the quantity or combination of each individual part number used.

Given the extensive amount of motors allowed on the ROBOT, Teams are encouraged to consider the total power available from the ROBOT battery during the design and build of the ROBOT. Stalling many motors at the same time could lead to drops in ROBOT battery voltage that will result in loss of power to core Control System components.

General Announcements

FIRST HQ hosted some of the Lead ROBOT Inspectors for training last weekend. It was an excellent opportunity for us to get feedback on the ROBOT Rules. One thing they wanted to be sure we remind teams of is that all ROBOTS must be compliant with R10.

The Inspectors also asked for clarification on the 8 in. BUMPER requirement of R22. As stated in the Blue Box on R22, the dimension is measured along the FRAME PERIMETER. In Figure 2013-01-15 below, the edge of the FRAME PERIMETER between Corner A and Corner B is only 6 in. To satisfy the 8 in. requirement for Corner A, there must be at least 8 in. of BUMPER in each direction. Thus, the measurement along the 6 in. side would continue past Corner B for 2 more inches.

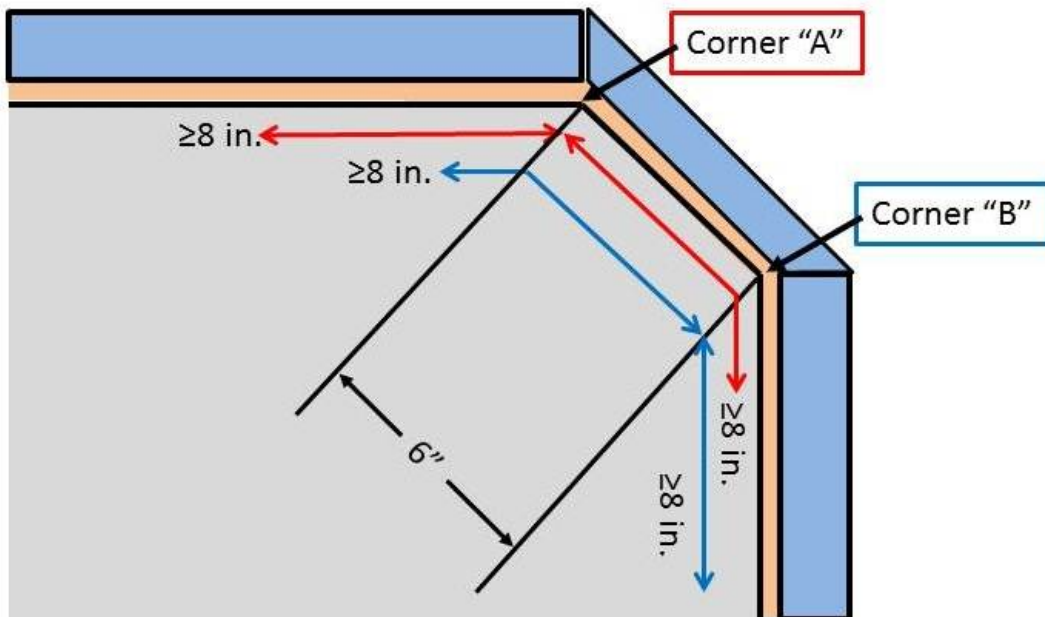


Figure 2013-01-15

Game Manual - Team UPDATE - 2013-01-11

Section:G04

After the MATCH, ROBOTS may only be removed from a PYRAMID under the following conditions:

- A. by the TEAM while standing on the floor without special equipment,
- B. unpowered,
- C. and under the supervision of a *FIRST* Technical Advisor (FTA), FTA Assistant, Referee, or Field Supervisor.

Additionally, if any part of the ROBOT is in Level 3, TEAMS are required to attach a *FIRST* supplied belay line, detailed in [Section 2.2.5](#), to their ROBOT to spot a ROBOT while the TEAM removes it from the PYRAMID.

Violation: YELLOW CARD

Game Manual - Team UPDATE - 2013-01-11

Section:G18-1

Strategies aimed solely at forcing the opposing ALLIANCE to violate a rule are not in the spirit of FRC and are not allowed. Rule violations forced in this manner will not result in assessment of a penalty on the target ALLIANCE .

Violation: TECHNICAL FOUL

Game Manual - Team UPDATE - 2013-01-11

Section:R05

The ROBOT weight may not exceed 120 lbs. When determining weight, the basic ROBOT structure and all elements of all additional MECHANISMS that might be used in different configurations of the ROBOT shall be weighed together.

For the purposes of determining compliance with the weight and volume limitations, the items listed below are not included in the weight assessment:

- A. the ROBOT battery and its associated half of the Anderson cable quick connect/disconnect pair (including no more than 12 in. of cable per leg, the associated cable lugs, connecting bolts, and insulation) and
- B. BUMPERS (including BUMPER covers, if appropriate).

Game Manual - Team UPDATE - 2013-01-11

Section:R78

The only pneumatic system items permitted on 2013 FRC ROBOTS include the items listed below.

- A. Items available in the 2013 KOP,
- B. Pneumatic pressure vent plug valves functionally equivalent to those provided in the KOP,

Parker valves PV609-2 or MV709-2 are recommended.

- C. Solenoid valves with a maximum $\pm \frac{1}{8}$ in. NPT port diameter, and a maximum Cv of 0.32,
- D. Solenoid valves that are rated for a maximum working pressure that is less than 125 psi rating mandated above are permitted, however if employed, an additional pressure relief valve must be added to the low pressure side of the main regulator. The additional relief valve must be set to a lower pressure than the maximum pressure rating for the solenoid valve,
- E. Additional pneumatic tubing, with a maximum 0.160 in. inside diameter, functionally equivalent to that provided in the KOP,
- F. Pressure transducers, pressure gauges, and connecting fittings,
- G. Pressure regulators with a maximum bypass pressure of no more than 60 psi,
- H. Pneumatic cylinders,
- I. Pneumatic storage tanks, and
- J. Compressors compliant with [R80](#).

The following devices are not considered pneumatic devices and are not subject to pneumatic rules (though they must satisfy all other rules):

- A. a device that creates a vacuum
- B. closed-loop COTS pneumatic (gas) shocks
- C. air-filled (pneumatic) wheels

Game Manual - Team UPDATE - 2013-01-11

Section:Game Manual

General Updates

Classmate Image Downloads

The Intel site hosting the Classmate Images is once again live. Teams can find it at: <http://www.intel.com/content/www/us/en/intel-learning-series/first-frc-image-system-overview.html>

Optional FRC Utilities Update

An optional FRC Utilities Update (v2) has been released which removes the menu bar and run controls from the cRIO Imaging Tool to allow it to fit on the Classmate screen. Teams may still need to hide the Taskbar to see the Imaging Tool buttons by: right-clicking on the Taskbar, selecting Properties, checking the box to "Auto-hide the taskbar", then clicking OK to exit the dialog. No other changes have been made in this update. This update may be found via the [2013 Technical Resources](#) page.

Game Manual - Team UPDATE - 2013-01-08

Section: The DISCS

The DISCS are Wham-O part number 53214 (custom colored Red, White, or Blue) and have a nominal diameter of $10\frac{5}{8}$ 1.1 in., a nominal height of $1\frac{3}{4}$ 1.4 in., and a weight of 180 ± 5 grams.

Game Manual - Team UPDATE - 2013-01-08

Section:CLIMB Points

Points are awarded for the highest Level achieved for every ALLIANCE ROBOT that CLIMBS its PYRAMID. The Level to which a ROBOT has CLIMBED is determined by the lowest point of the ROBOT (in relation to the FIELD) **at the point in which final scores are assessed per [Section 3.2.4](#)**. CLIMB point values and Levels are defined in [Figure 3-4](#).

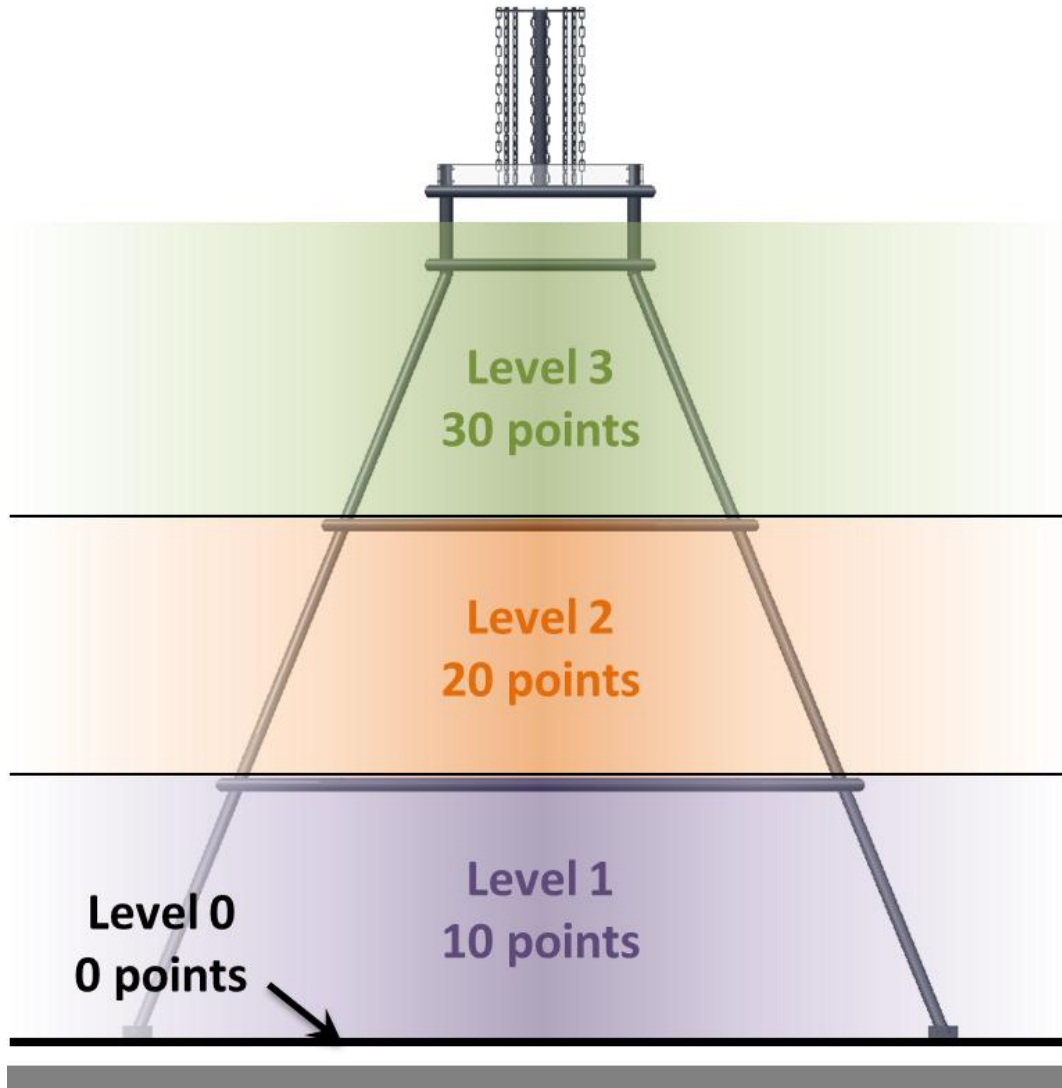


Figure 3-4: PYRAMID Levels

As competition at the *FIRST* Championship is typically different from that during the competition season, *FIRST* may alter the value of CLIMBING at the *FIRST* Championship by up to ten (10) points per Level.

A ROBOT has CLIMBED its PYRAMID if it contacts the PYRAMID and/or the floor (Level 0) in

- A. sequential order (Level 0, 1, 2, 3) during ascent and
- B. no more than two (2) Levels simultaneously.

Game Manual - Team UPDATE - 2013-01-08

Section:G04

ROBOTS may only be removed from a PYRAMID under the following conditions:

- A. by the TEAM,
- B. unpowered,
- C. and under the supervision of a *FIRST* Technical Advisor (FTA), FTA Assistant, Referee, or Field Supervisor.

Additionally, if any part of the ROBOT is in Level 3, TEAMS are required to attach a *FIRST* supplied belay line, detailed in ~~Section 2.2.6~~ [Section 2.2.5](#), to their ROBOT to spot a ROBOT while the TEAM removes it from the PYRAMID.

Violation: YELLOW CARD

Game Manual - Team UPDATE - 2013-01-08

Section:G30

Regardless of who initiates the contact, a ROBOT may not contact an opponent ROBOT

- A. contacting its PYRAMID or
- B. touching the carpet in its LOADING ZONE.

Violation: FOUL. If purposeful or consequential, TECHNICAL FOUL. If an opponent's CLIMB is affected, each affected opponent ROBOT will be awarded points for a successful Level 3 CLIMB.

Game Manual - Team UPDATE - 2013-01-08

Section:R48

All active circuits shall be wired with appropriately sized insulated wire:

Table 4-3: Legal Wire Size

Application	Minimum Wire Size
30 - 40A circuit	12 AWG (2.052mm)
20 - 30A circuit	14 AWG (1.628mm)
5 - 10 20A circuit	18 AWG (1.024mm)
Between the PD Board and the Analog and/or Solenoid Breakout Boards (even though they are protected by a 20A circuit breaker per R47)	
Between the PD Board and the cRIO	20 AWG (0.8128mm)
Between the PD Board and the wireless bridge	
≤5A circuit	
Pneumatic valves	24 AWG (0.5106mm)

Wires that are originally attached to legal devices are part of the device and by default legal as supplies. Such wires are exempt from [R48](#).

Game Manual - Team UPDATE - 2013-01-08

Section:Game Manual

General Updates

Bridge Configuration Utility Update

A new version, 01.08.13.195, of the FRC Bridge Configuration Utility is now available for download on the [Technical Resources](#) page. This updated version provides support for firmware version 2.02, which has been found on some of the D-Link DAP1522 Rev B units included in the 2013 Kickoff Kits. Teams who have already downloaded the previous version of the utility can download and run the new installer to update the utility on their computer.

LabVIEW 2012 Update

National Instruments has [released an update for LabVIEW 2012](#), the version included in the 2013 Kickoff Kits. The update is not required, however Teams using the Robot Simulator can expect improved performance when sending the simulated camera image to the Dashboard.

Known Bug List

FRC has published, and will maintain, a list of any control system issues of which *FIRST* is currently aware and the corresponding fixes. The document, *2013 Software Notes*, is found [here](#).

Classmate Image Downloads

We are aware of the current error teams are seeing when trying to download the Classmate Images from the Intel site. We are working with Intel to resolve the issue and will [Blog](#) again when it is available. As a reminder, only Rookie Teams need to image their Classmates for 2013, and USB Keys were included in the Rookie Kit of Parts to allow them to do so without having to download the image.

In the meantime, please do not re-host the images as this would violate *FIRST's* End User License Agreement with Microsoft.