

# Game Manual - Team UPDATE - 1358294763

## 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.

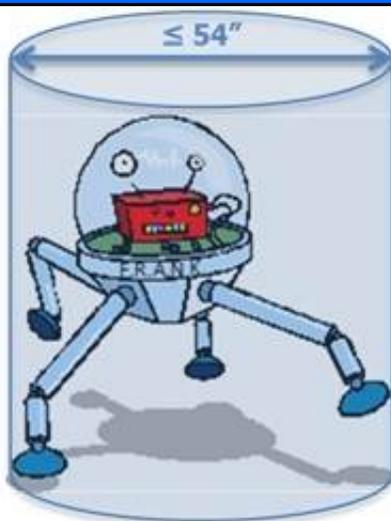


Figure 3-5a: ROBOT inside 54 in. diameter cylinder

## 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.

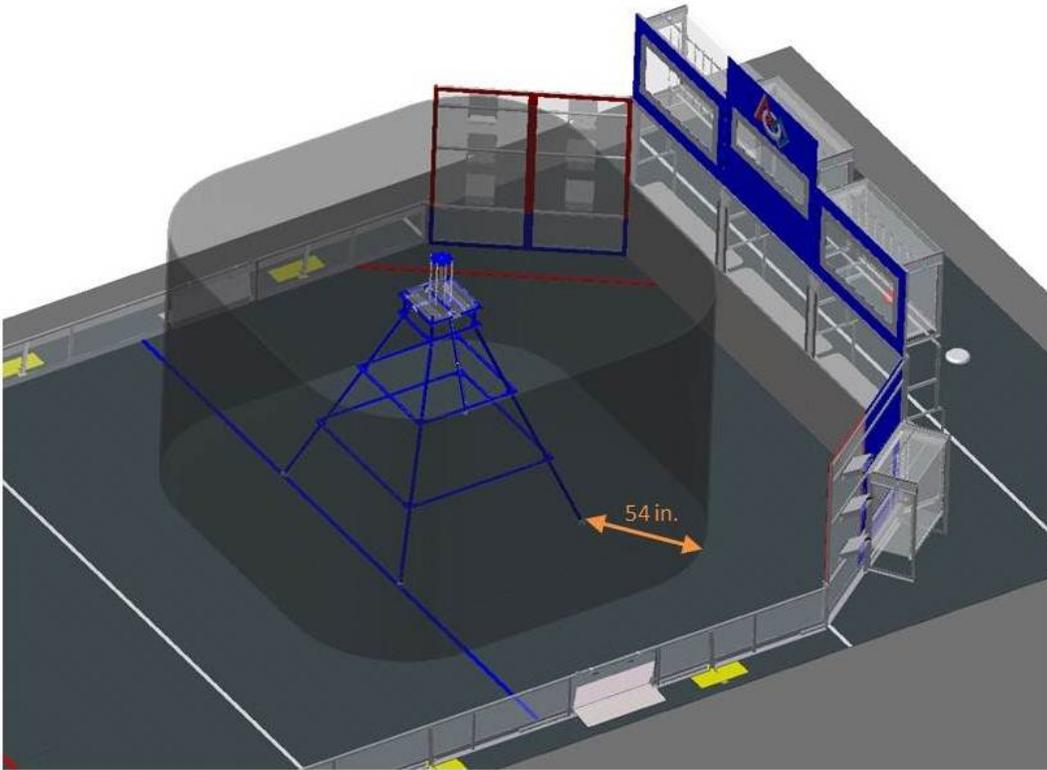
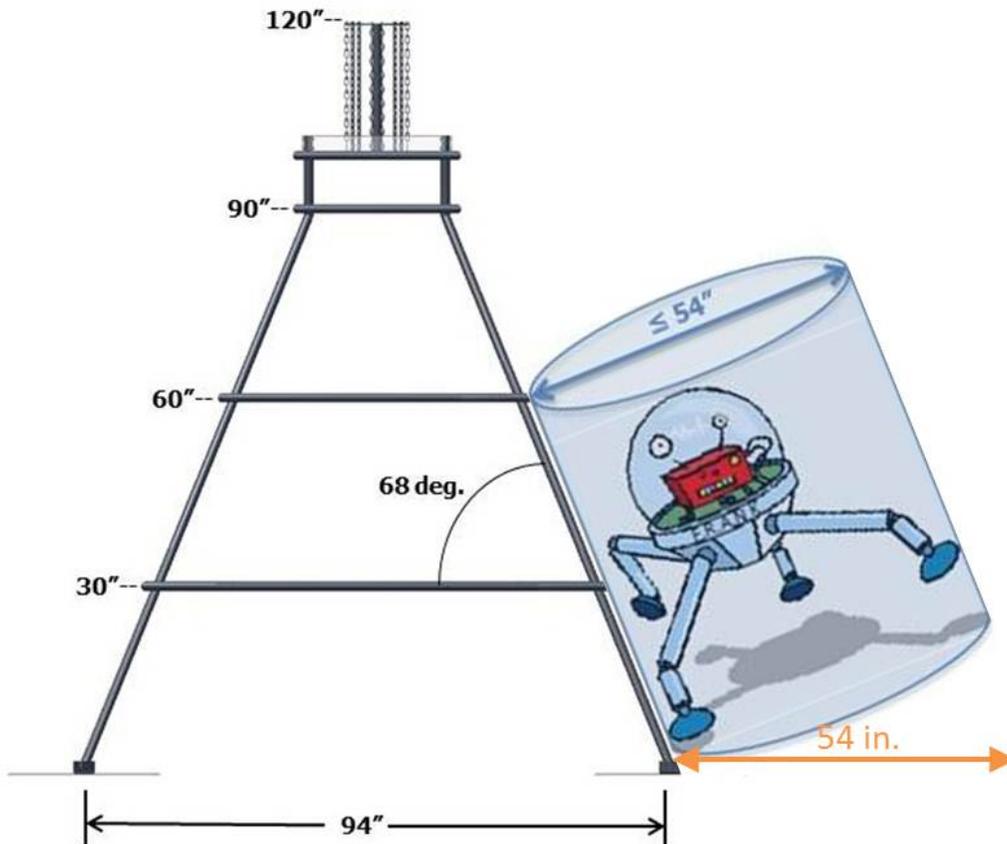


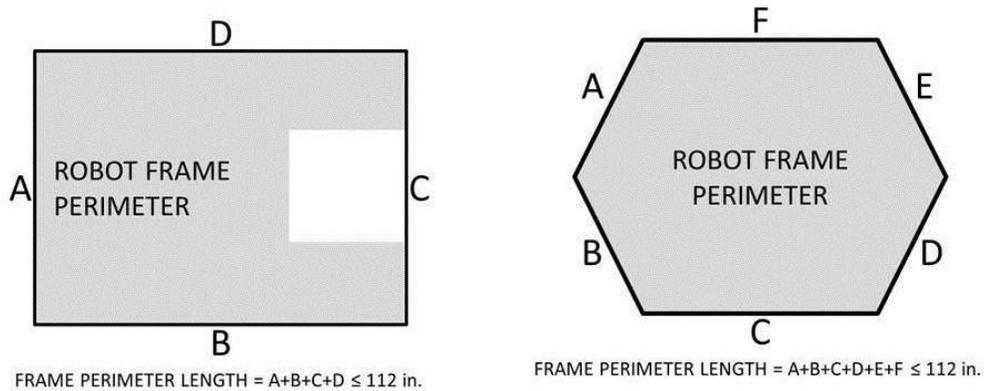
Figure 3-5b: Offset Plane from PYRAMID Base



## 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.



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.

## 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.

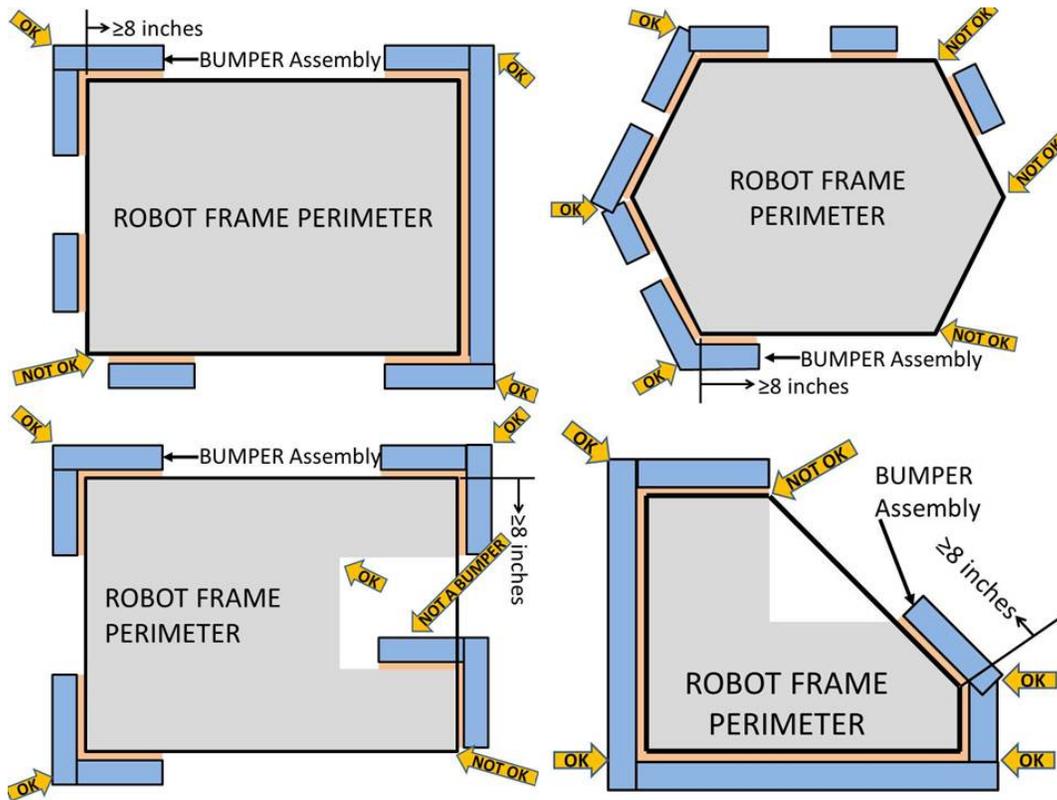


Figure 4-2: BUMPER Corner Examples (UPDATED)

## 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 PMR25R-44F-1005	
BaneBots	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	4
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.

## Section:Game Manual

### 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.

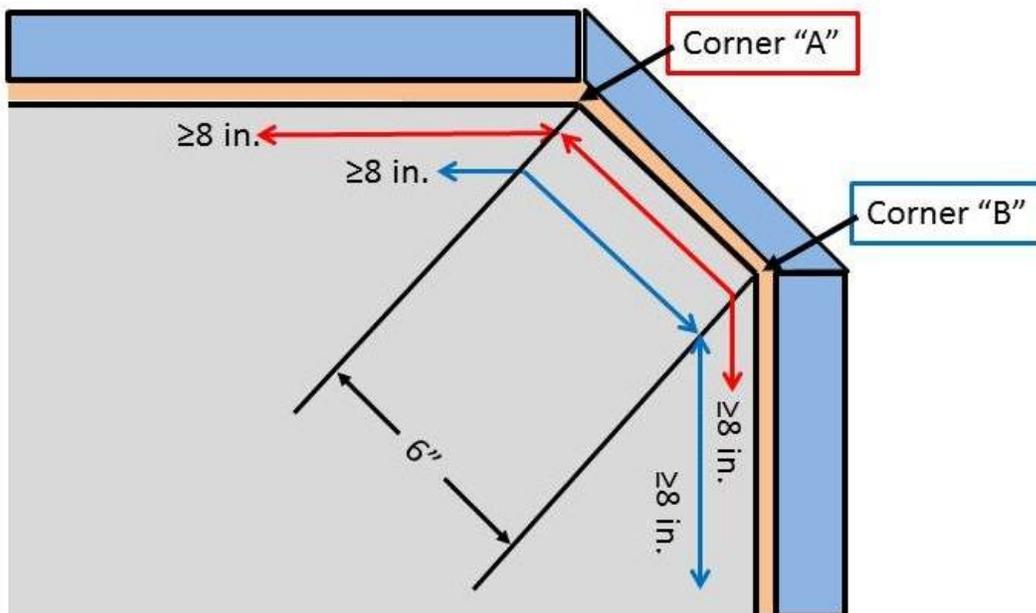


Figure 2013-01-15