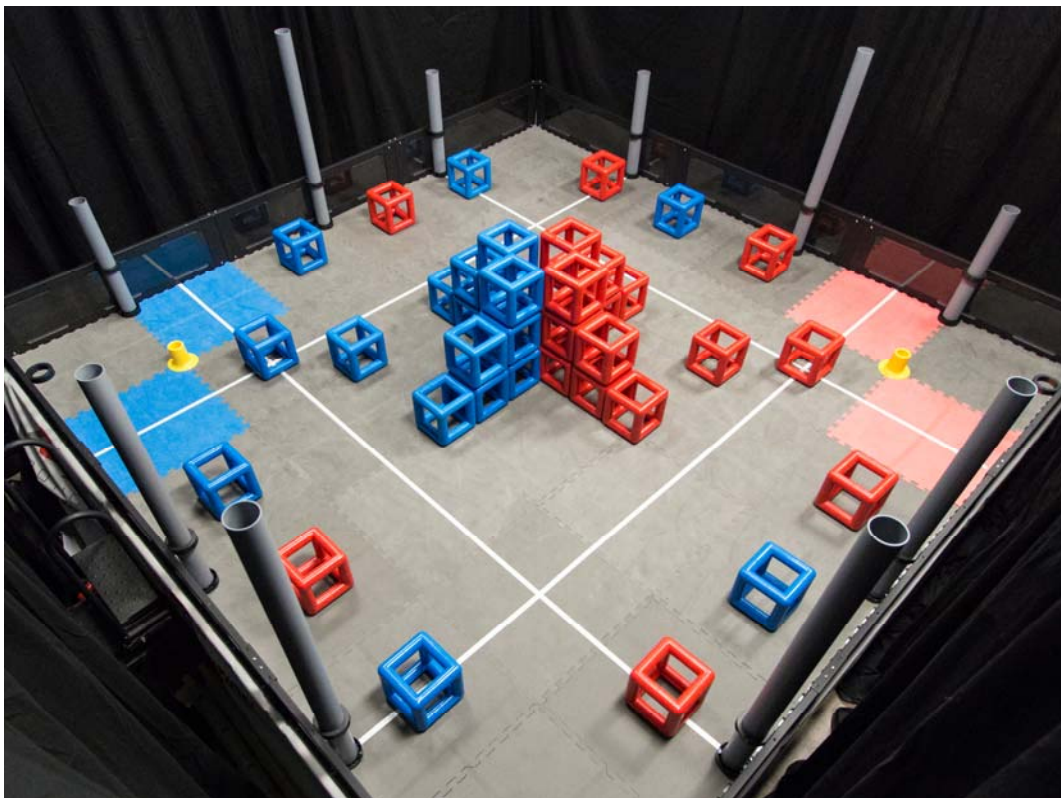




VEX
ROBOTICS
COMPETITION
SKYRISE

Field Specs & Assembly Instructions





A
P
P
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N
D
I
X

Game Field

Introduction

This document will provide detailed specifications, BOM information, and assembly instructions for the Official Competition Field.

Teams who do not need an “official” field should refer to the separate low-cost field guide for cost-reduction options.

Please note: this field utilizes the VEX Competition Field Perimeter (278-1501) developed by VEX Robotics. Instructions and specifications for this field perimeter are available in a separate document, and are also important for the field assembly.

This document is divided up into four sections:

1. Field Overview
2. Field Bill of Materials
3. Field Specifications
4. Field Assembly Instructions

There is also an accompanying STEP file which can be imported into most 3D modeling programs (i.e. Autodesk Inventor). This 3D model not only shows the “official” setup of a *VEX Skyrise* Competition field, but it also includes detailed models of all the individual field elements.

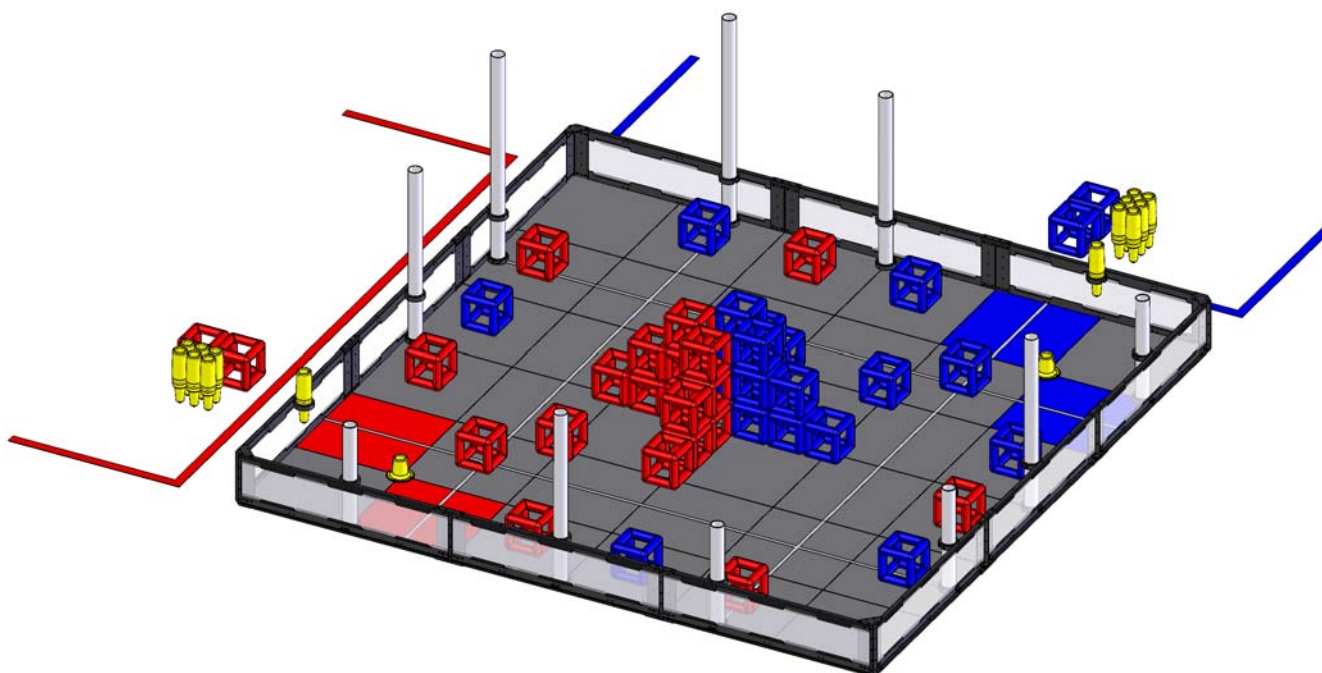
For additional game-play detail, please refer to the *VEX Skyrise* competition manual.

For more information on reducing costs on unofficial field construction, refer to the accompanying “Low Cost Field” section of this Appendix.

Field Overview

The game *VEX Skyrise* is played on a 12 ft x 12 ft foam-mat, surrounded by a sheet-metal and lexan perimeter. Surrounding the field are ten Posts of different heights (Low, Medium & High) which are attached to the field wall with round clamping collars. Adjacent to each Alliance's Starting Tiles are *Skyrise Bases*, plastic "volcano" shaped structures into which robots can place *Skyrise Sections* and build *Skyrises*. On the field there are blue and red colored cubes that robots can manipulate. Each alliance also has an autoloader into which they can use to make *Skyrise Sections* available for their robots.

For more details and specific game-play rules, please refer to the *VEX Skyrise* competition manual.



Game Objects & Field Bill of Materials

All these items are available for purchase from:
www.VEX.com



Generic Field Elements - Reuseable Each Year

Part Number	Description	Price
278-1501	VRC Field Perimeter Frame & Hardware	\$ 799.99
278-1502	VRC Foam Field Surface - (36) Grey, (2) Red, (2) Blue Tiles	\$ 189.99
275-1401	VRC VEXnet Field Controller	\$ 149.99

Total Price \$ 1,139.97

Official VEX Skyrise Specific Elements

Part Number	Description	Price
276-3144	ALL Official VEX Skyrise Field & Game Objects	\$ 499.99

- (2) High Posts
- (4) Medium Posts
- (4) Low Posts
- (22) Collars - For Post Attachment & Autoloaders
- (1) Roll 2" Wide Red Tape
- (1) Roll 2" Wide Blue Tape
- (1) Roll 3/4" Wide White Tape
- (22) Red and (22) Blue Cubes
- (14) Skyrise Sections & (2) Skyrise Bases w/ Metal Attachment Plates
- (20) Red & (20) Blue Robot Identification Flags
- All necessary assembly hardware

Total Price \$ 499.99

Practice Elements

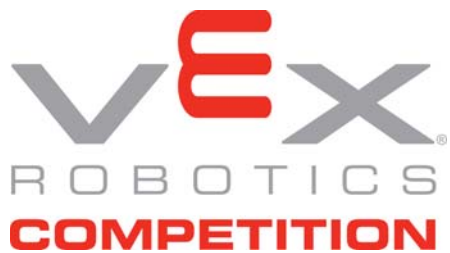
Part Number	Description	Price
276-3787	VRC 2014-2015 Cube & Collar Kit	\$ 49.99

- (3) Red and (3) Blue Cubes
- (3) Collars w/ Clamping Screws

276-3993	VRC 2014-2015 Skyrise Section & Base Kit	\$ 49.99
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- (7) Skyrise Sections
- (1) Skyrise Base - Note: Metal attachment plate not included





Field Specifications

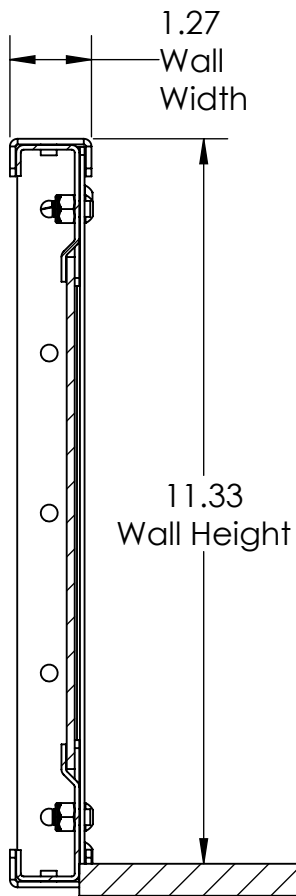
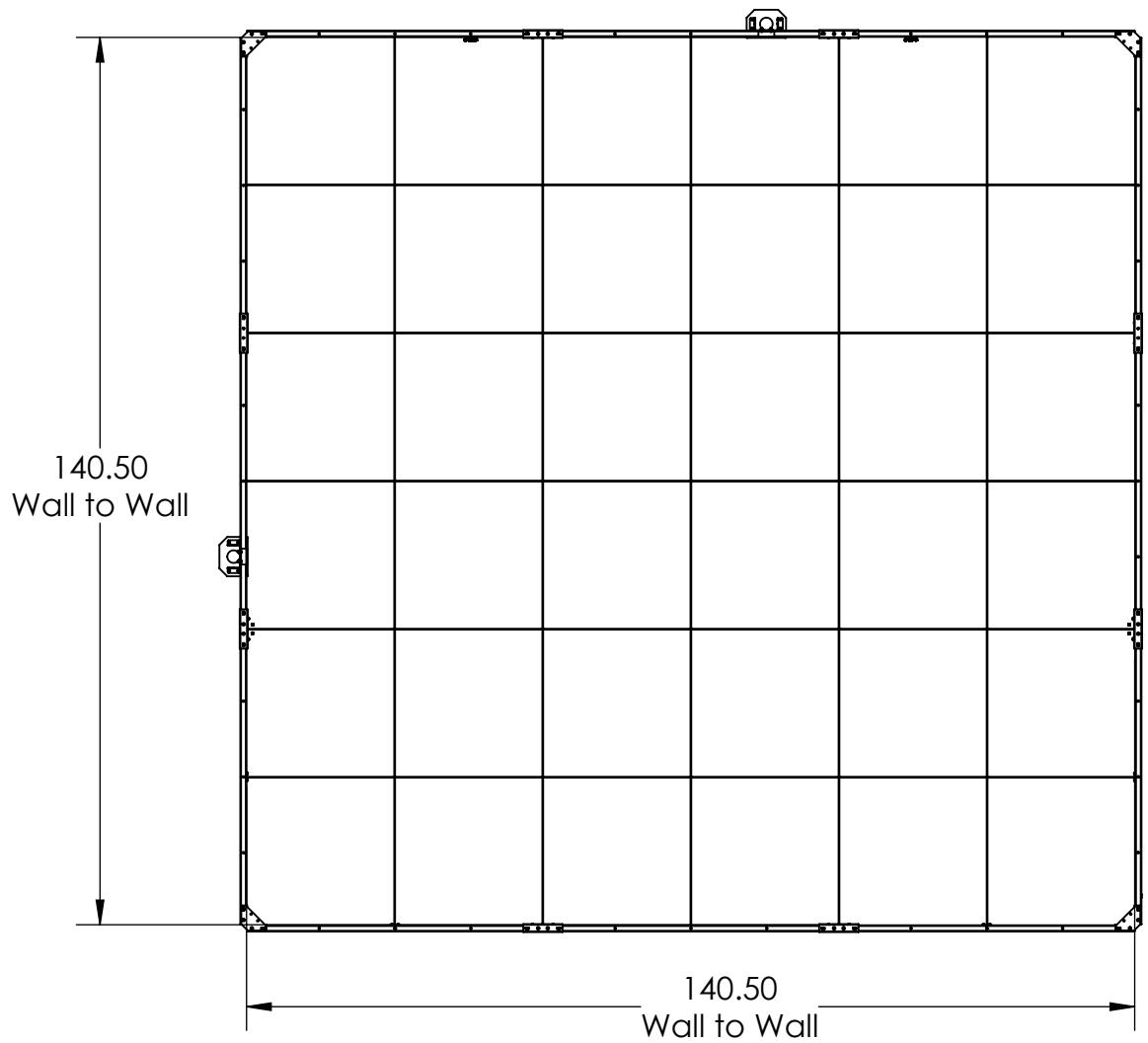
Introduction



This section will outline the specifications which are most important to teams designing a robot to compete in the VEX Robotics Competition – *Skyrise*. Though many of the critical dimensions are included in this section, it may be necessary to consult the separate assembly guide and 3D-CAD models of the field for an additional level of detail (if you can't find a dimension in the specifications, we include a FULL model of the field – “virtually” measure whatever you need).

Field components may vary slightly from event to event. This is to be expected; teams will need to adapt accordingly. It is good design practice to create mechanisms capable of accommodating variances in the field and game pieces.

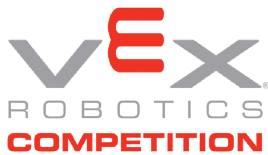


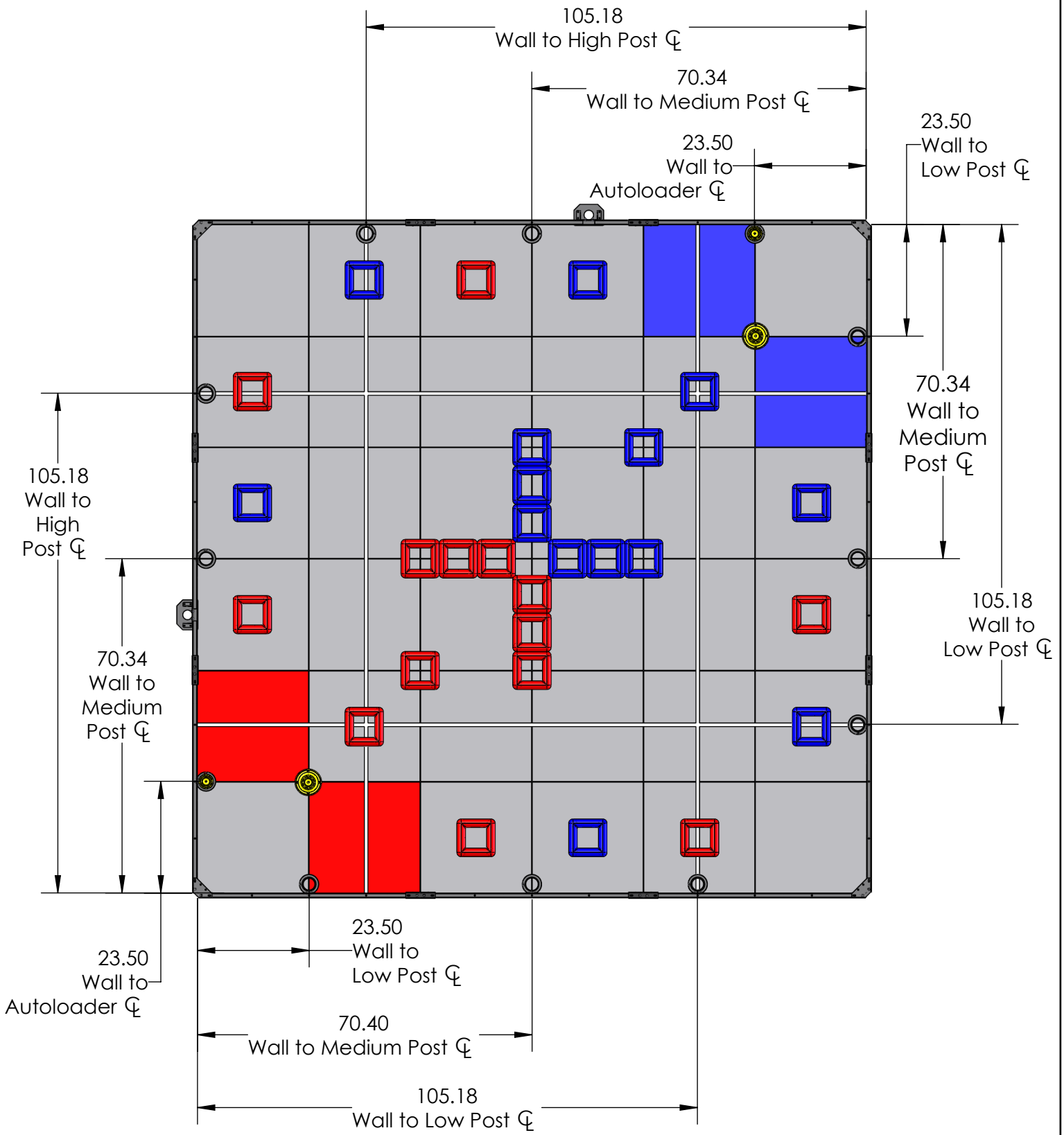


Field Critical Dimensions:

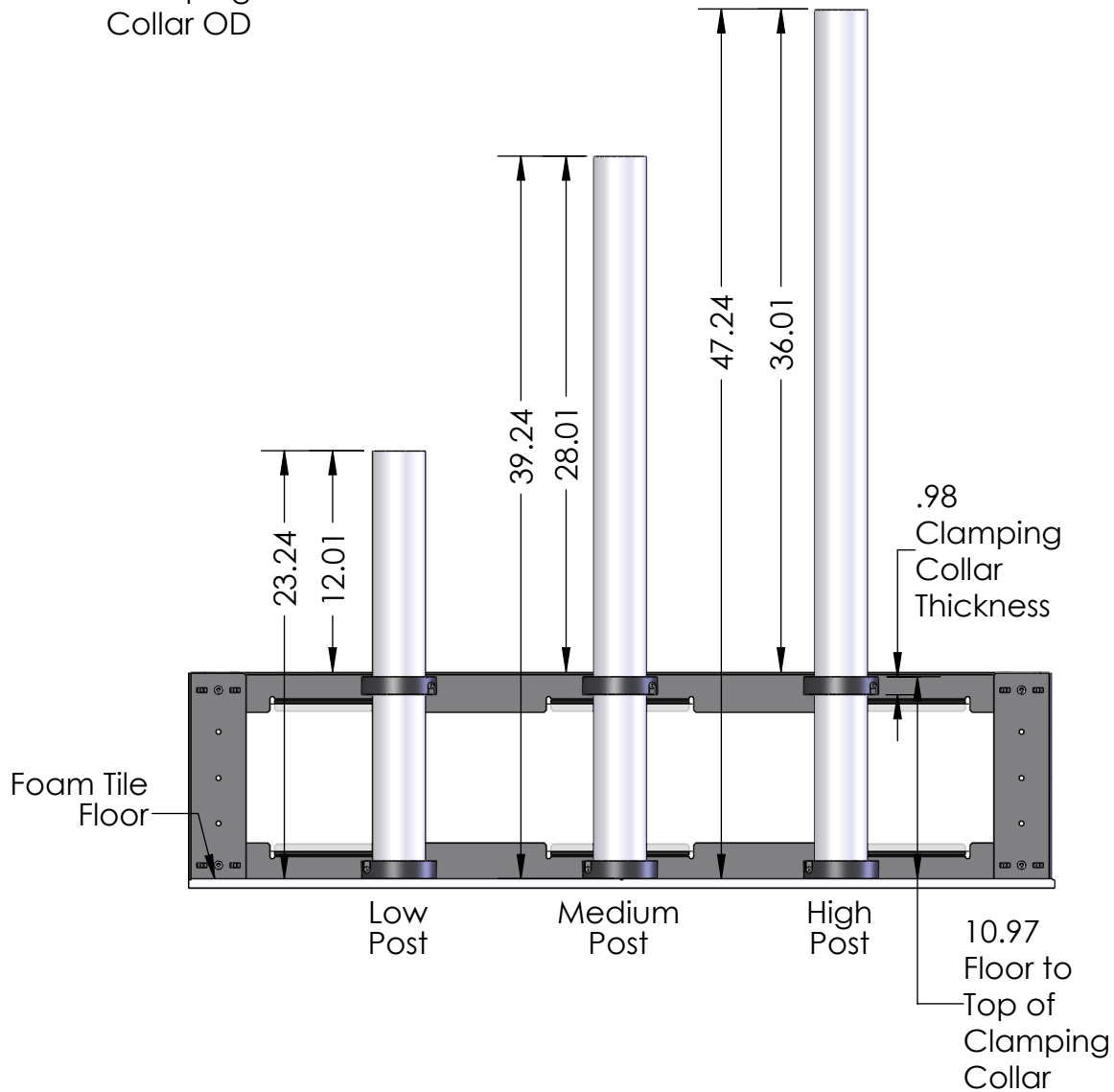
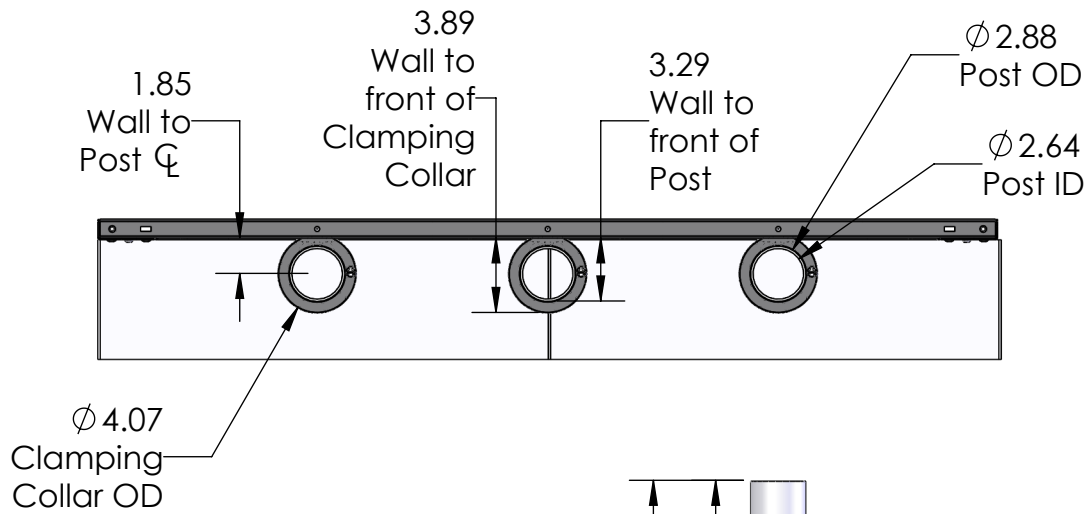
- ~140.5" Square Wall - Wall, Inside
- 11.33" Wall Height
- 1.27" Wall Thickness

Description	Field Perimeter Specs	
Dwg No	14-15 Field Specs Rev2	
Competition	VRC 2014-2015	Sheet 1 of 10
Release	5/27/2014	ALL DIMENSIONS ARE IN INCHES.





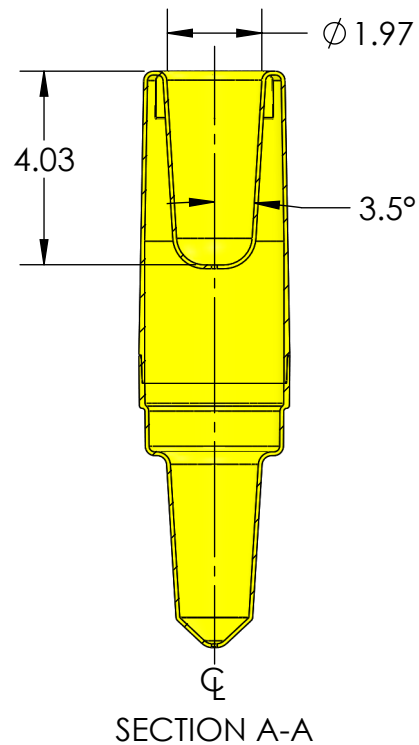
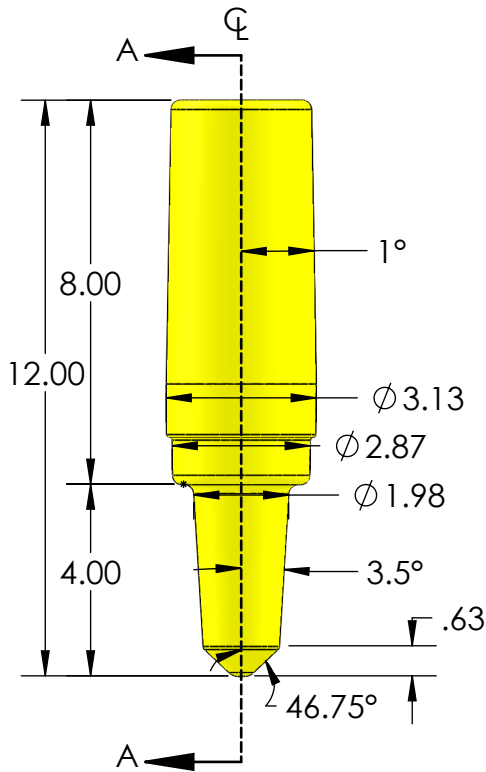
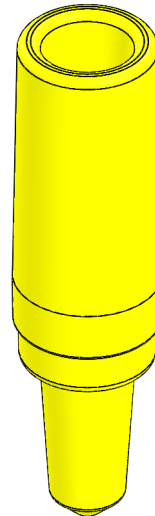
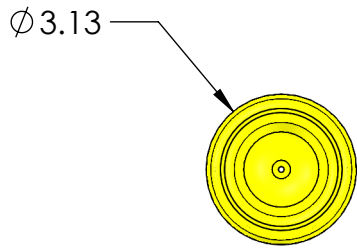
Description	Post Layout	
Dwg No	14-15 Field Specs Rev2	
Competition	VRC 2014-2015	Sheet 2 of 10
Release	5/27/2014	ALL DIMENSIONS ARE IN INCHES.



NOTE:

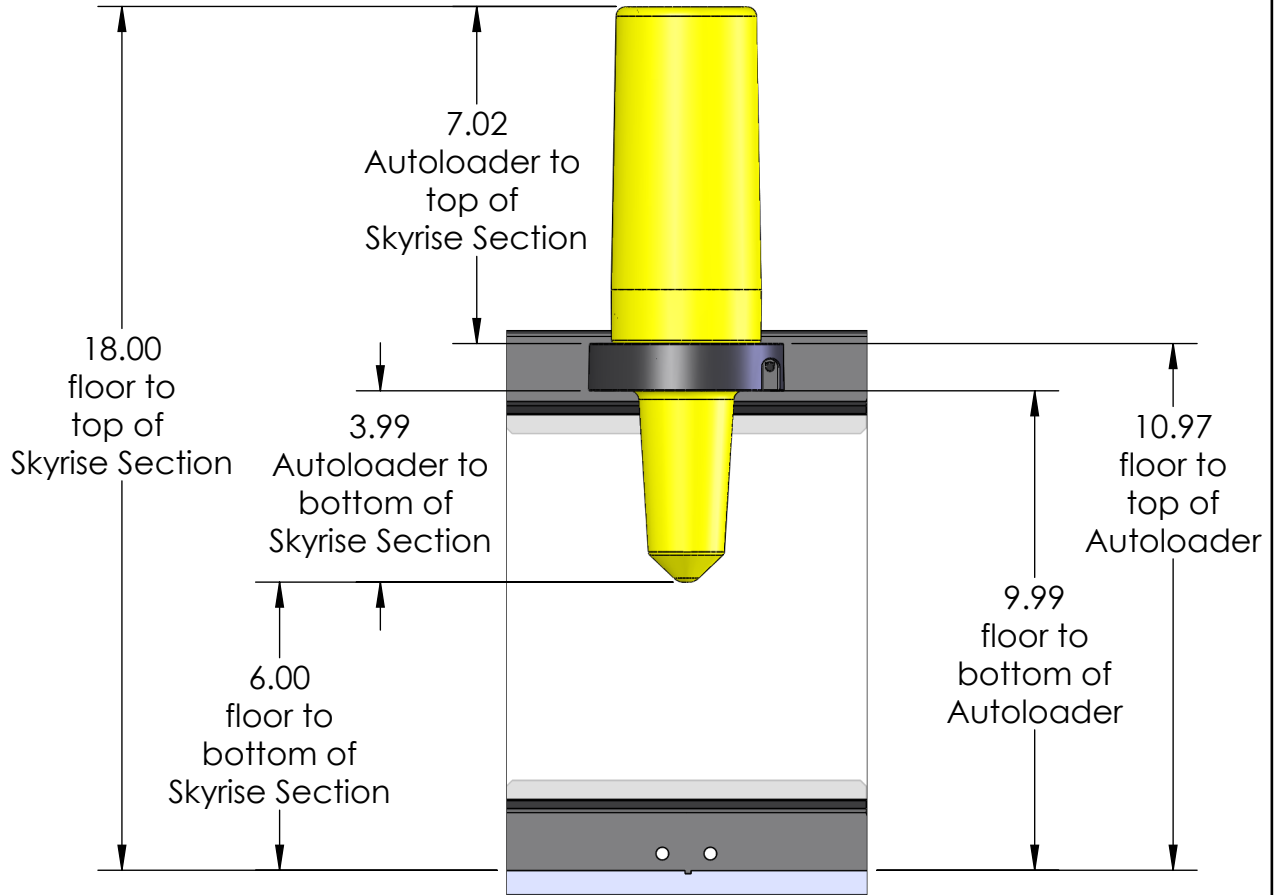
This arrangement of Posts does not exist on the Skyrise field. This arrangement of Posts is shown for illustrative purposes only. Vertical dimensions may vary by as much as 1/4".

	Description Post Details	
	Dwg No 14-15 Field Specs Rev2	
	Competition VRC 2014-2015	Sheet 3 of 10
	Release 5/27/2014	ALL DIMENSIONS ARE IN INCHES.




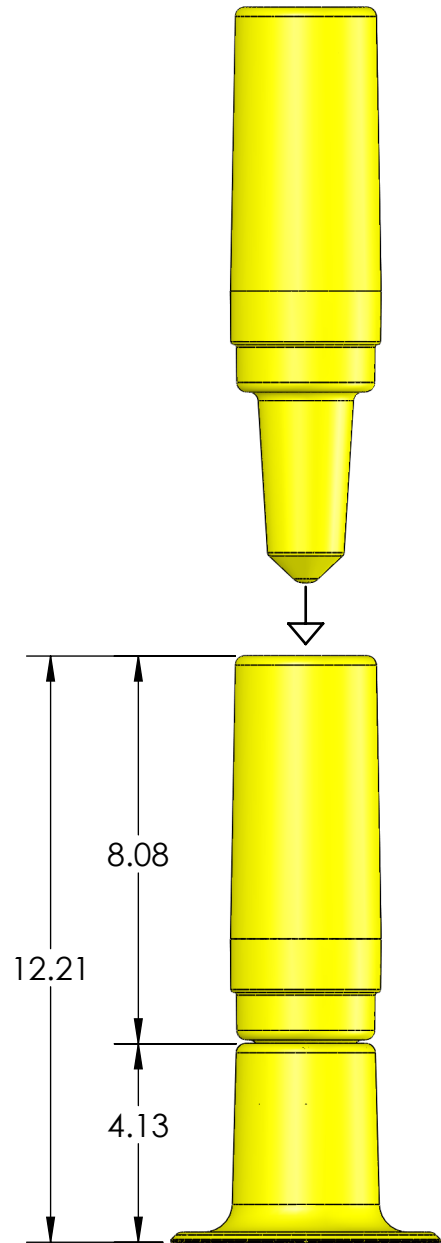
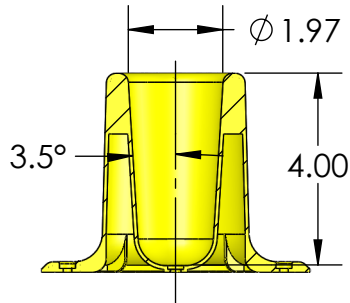
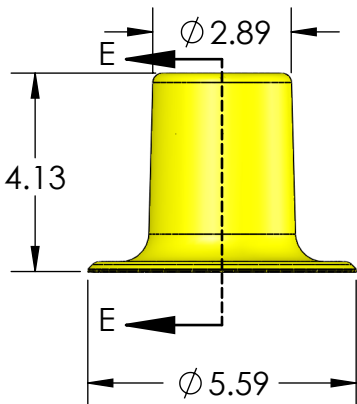
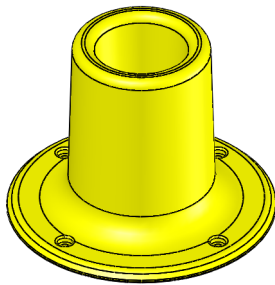
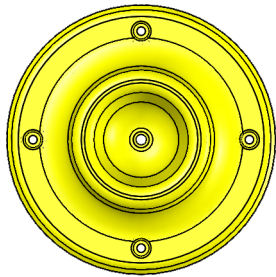
There are (14X) Skyrise Sections available on each Field. Skyrise Sections are hollow plastic and weigh 0.39lbs \pm 10% each. Skyrise Section dimensions may vary by as much as 1/8".

Description		Skyrise Section Details	
Dwg No		14-15 Field Specs Rev2	
Competition		VRC 2014-2015	Sheet 4 of 10
Release	5/27/2014	ALL DIMENSIONS ARE IN INCHES.	



The Skyrise Sections can be placed in the Autoloaders as shown. All dimensions from the floor may vary by up to 1/4".

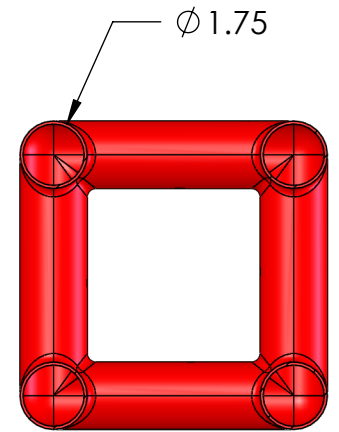
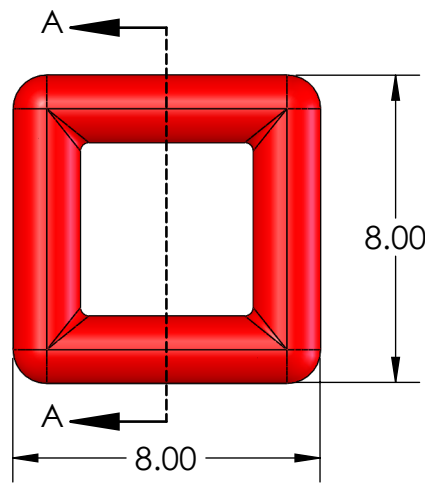
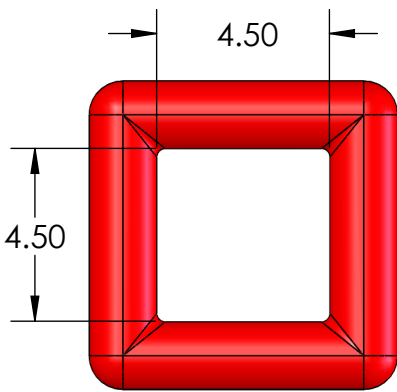
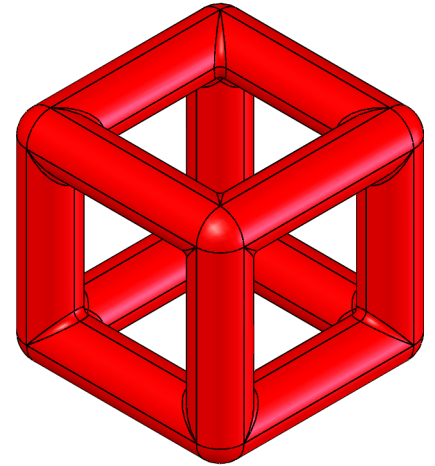
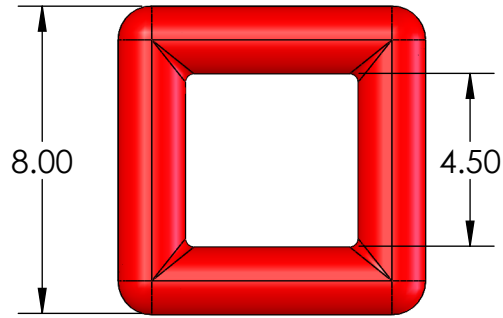
	Description Skyrise Section Details	
	Dwg No 14-15 Field Specs Rev2	
	Competition VRC 2014-2015	Sheet 5 of 10
	Release 5/27/2014	ALL DIMENSIONS ARE IN INCHES.



There are (2X) Skyrise Bases bolted to the Foam Tile Floor of each field.

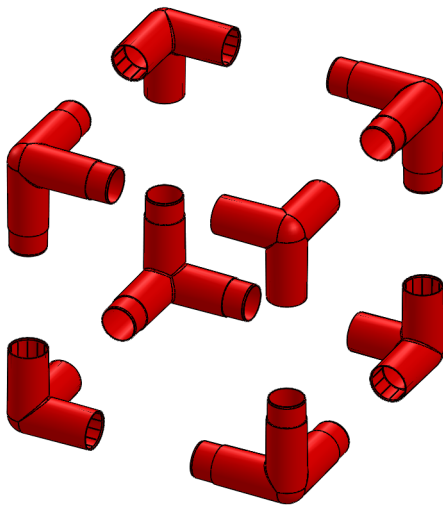
Skyrise Sections can be stacked in the Skyrise Bases, then in each other. Each stacked Skyrise Section adds ~8" to the height of the Skyrise.

	Description Skyrise Base Details	
	Dwg No 14-15 Field Specs Rev2	
	Competition VRC 2014-2015	Sheet 6 of 10
	Release 5/27/2014	ALL DIMENSIONS ARE IN INCHES.



SECTION A-A

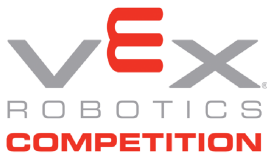
There are (44X) Cubes on the Field - (22X) Red and (22X) Blue. Cubes are hollow plastic and weigh 1.12lbs ± 10% each. Cube dimensions may vary by as much as 1/8".



Note:

Each Cube is constructed of (8X) Corner Pieces that are permanently assembled by the manufacturer.

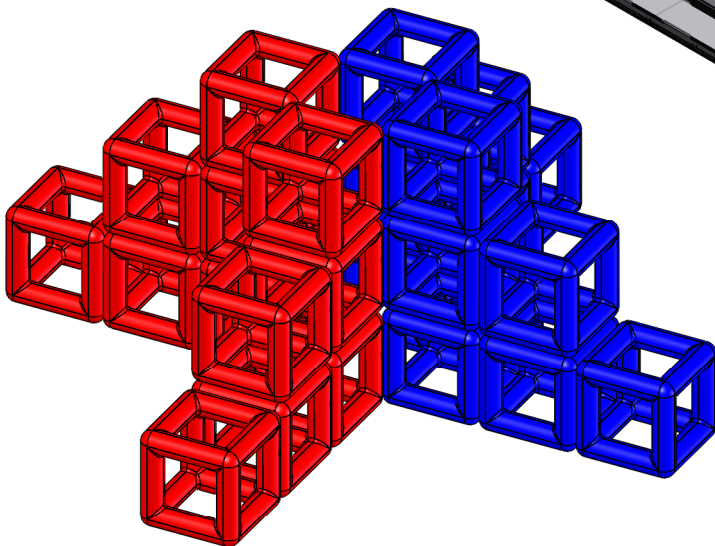
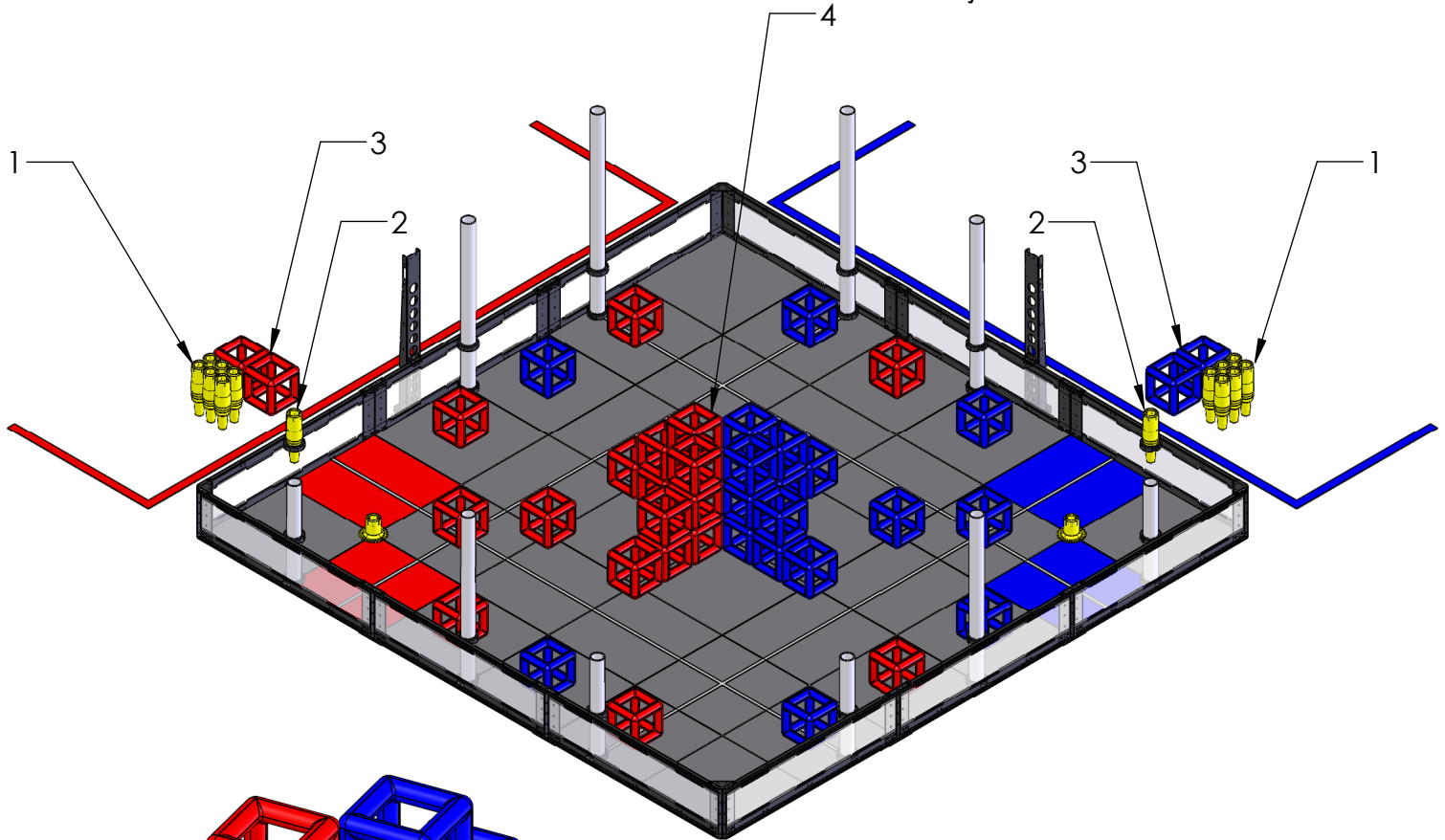
If a Cube becomes disassembled during use, re-assemble it and use plastic glue to reinforce the connection.




Description	Cube Details	
Dwg No	14-15 Field Specs Rev2	
Competition	VRC 2014-2015	Sheet 7 of 10
Release	5/27/2014	ALL DIMENSIONS ARE IN INCHES.

The Cubes and Skyrise Sections are placed as follows before the start of each match.

1. There are (6X) Skyrise Sections placed in each Alliance Station.
2. There are (1X) Skyrise Sections placed in each Autoloader.
3. There are (2X) Cubes placed in their corresponding Alliance Stations.
4. There are (12X) Red Cubes and (12X) Blue Cubes in the Cube Pyramid.
5. There are (8X) Red Cubes and (8X) Blue Cubes placed around the Field, as shown. These Cubes are either centered on their Tile or centered on Tile junctions.

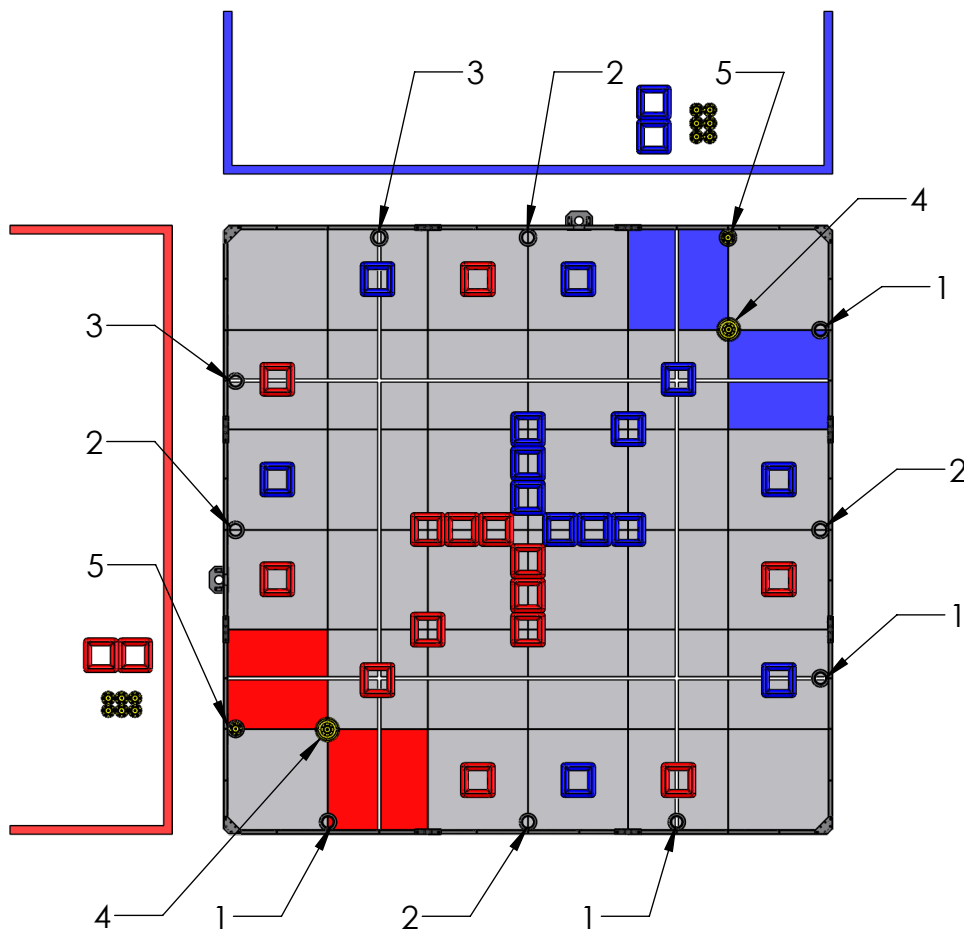
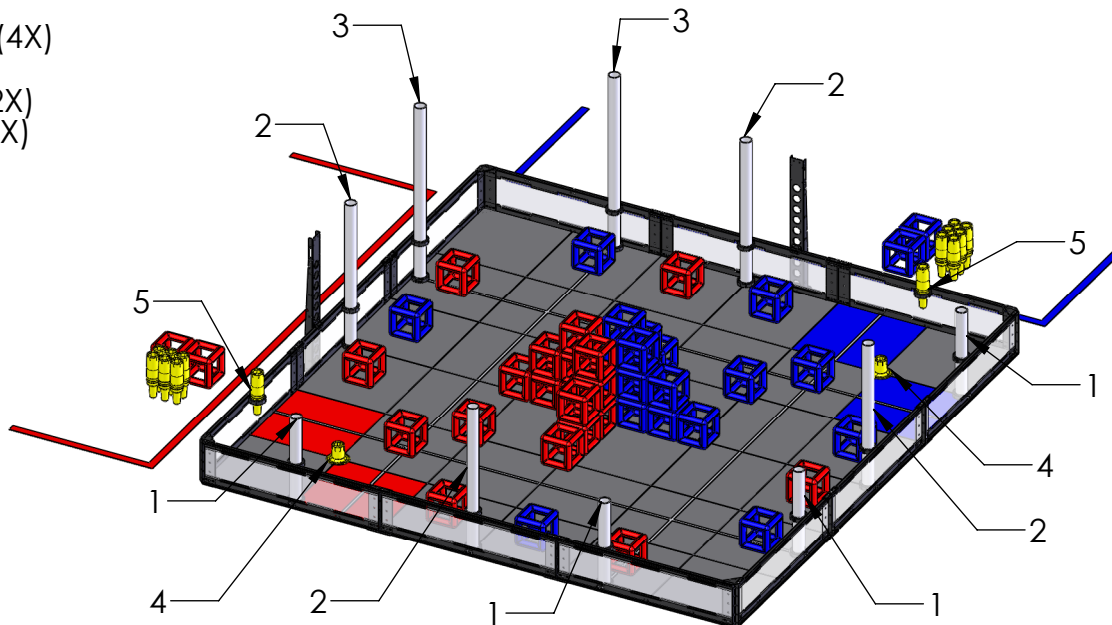



Cube Pyramid

	Description		Game Object Layout
	Dwg No		14-15 Field Specs Rev2
	Competition	VRC 2014-2015	Sheet 8 of 10
	Release	5/27/2014	ALL DIMENSIONS ARE IN INCHES.

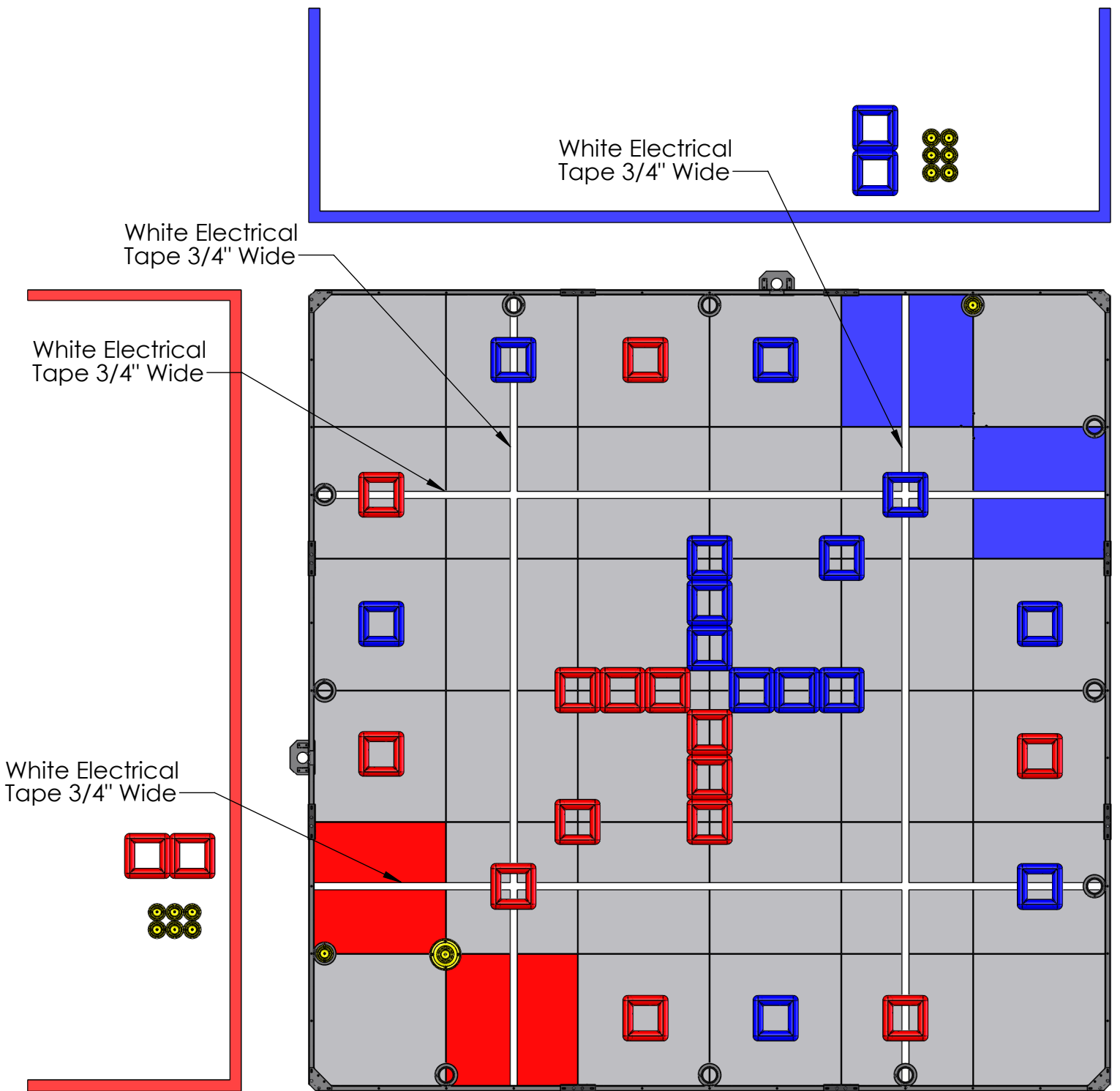
Posts are placed in (10X) locations, and there are (3X) different heights.
 There are also (2X) Skyrise Bases.

1. Low Posts (4X)
2. Medium Posts (4X)
3. High Posts (2X)
4. Skyrise Bases (2X)
5. Autoloaders (2X)

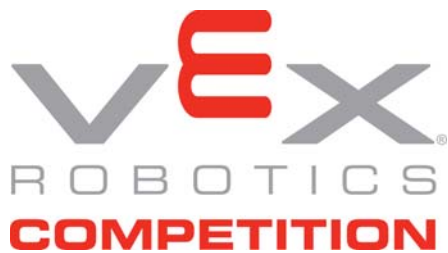


	Description Post Layout	
	Dwg No 14-15 Field Specs Rev2	
	Competition VRC 2014-2015	Sheet 9 of 10
	Release 5/27/2014	ALL DIMENSIONS ARE IN INCHES.

There are (4X) strips of 3/4" White Electrical Tape running across the Field, as shown below.



Description	Tape Line Layout	
Dwg No	14-15 Field Specs Rev2	
Competition	VRC 2014-2015	Sheet 10 of 10
Release	5/27/2014	ALL DIMENSIONS ARE IN INCHES.



Field Assembly

Introduction

This section will detail the steps required to construct the competition field for the VEX Robotics Competition *Skyrise*. The VRC *Skyrise* field utilizes the "VEX Competition Field Perimeter" (278-1501). For specifications and instructions for assembling this frame, please refer to the separate "VEX Competition Field Perimeter" manual.

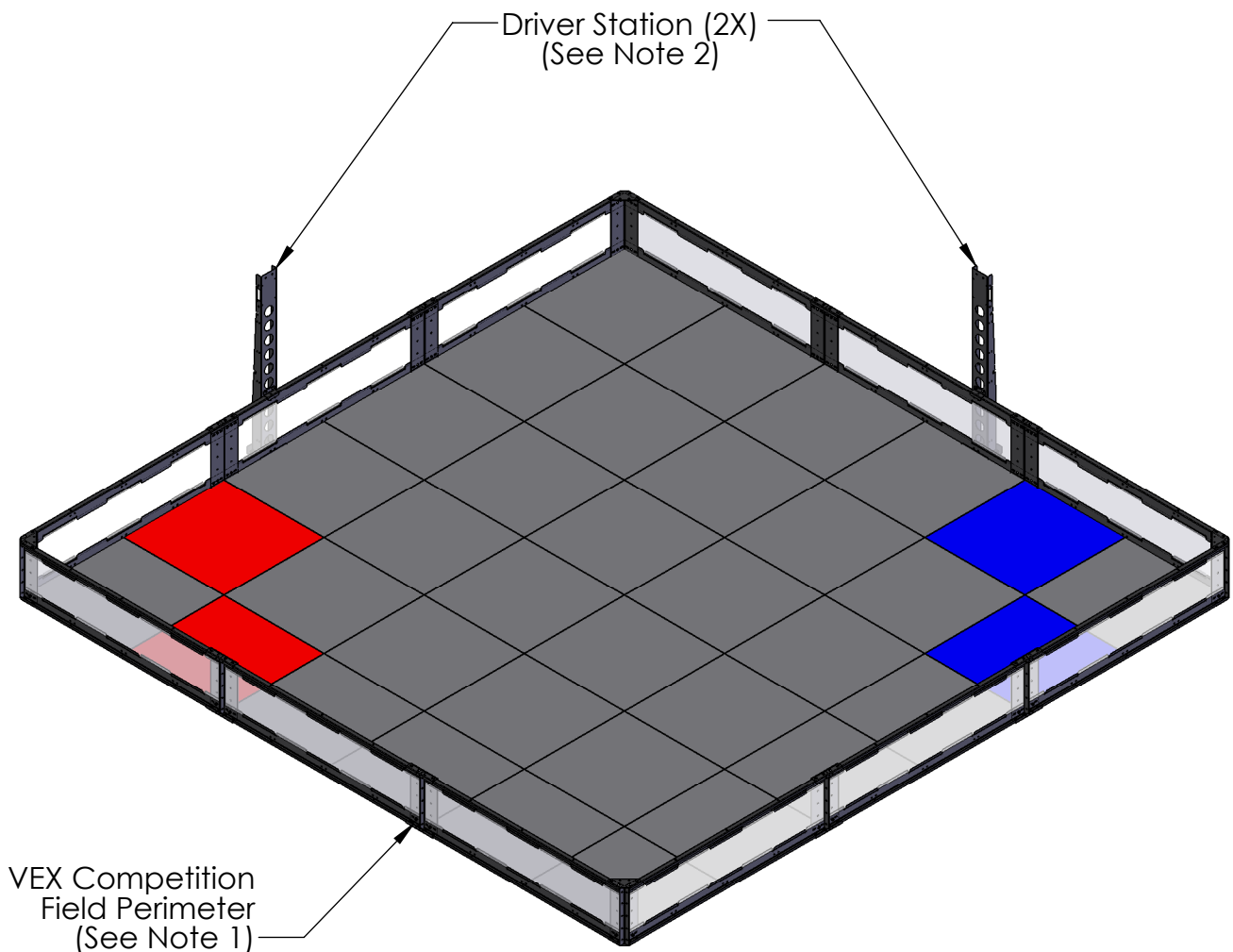
Also refer to the separate low-cost field document, which provides lower cost options to teams not needing a full "official" competition field.

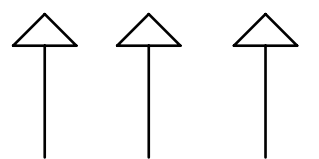


Tools Required

The following tools are required for assembly of the official *VEX Skyrise* field:


- 5/32" Allen Wrench
- 3/32" Allen Wrench (standard VEX Allen Wrench)
- Sharp Knife or Razor Blade




CROWD VIEW

Notes:

1. Assemble the VEX Competition Field Perimeter (see separate VEX Competition Field Perimeter assembly instructions.) Position the Perimeter such that one corner is “facing” the crowd.
2. Attach the Driver Station Posts as shown. (~1ft off center on the walls opposite of the crowd.) Instructions for assembly are included with the VEX Competition Field Perimeter Instructions.
3. Assemble the Foam Tiles inside the Perimeter. Refer to sheets 2-4 of this document for instructions.

	Description VRC 2014-2015 Field	
	Dwg No 14-15 Field Assy Rev2	
	Competition VRC 2014-2015	Sheet 1 of 12
	Release 5/28/2014	ALL DIMENSIONS ARE IN INCHES.

Before assembling the Foam Tile Floor, some Tiles will need to be modified. There are 3 types of Tiles.

IMPORTANT:
BEFORE MODIFYING ANY TILES, CHECK TO ENSURE YOUR SET OF TILES NEEDS MODIFICATION.

Foam Tile modification has changed since previous years. Use a razor or sharp knife to remove only 1/2 of each tab as described below.

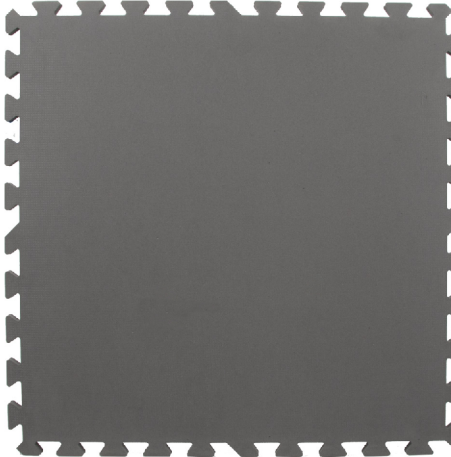
Cut off 1/2 of each tab on this side



Cut off 1/2 of each tab on this side

(4X) Corner Tiles (C)

Corner tiles have their interlocking tabs cut away on TWO adjacent edges. These will be used in the (4) corners of the Field.

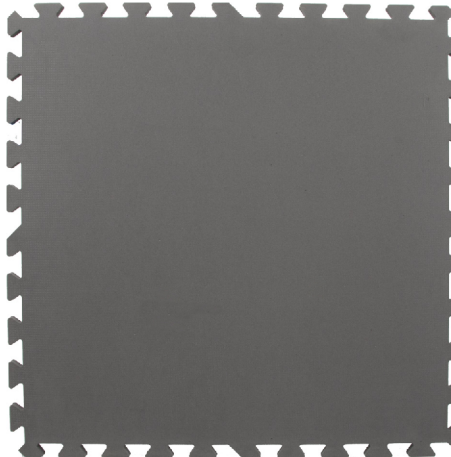


Cut off 1/2 of each tab on this side

(16X) Edge Tiles (E)

- (2X) Red Edge Tiles
- (2X) Blue Edge Tiles
- (12X) Gray Edge Tiles

Edge Tiles have their interlocking tabs cut away on ONE edge. These will be used along the edges of the Field.



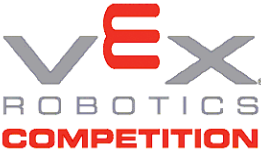
(16X) Normal Tiles (N)

Normal Tiles are unmodified. Normal Tiles are used on the "inside" of the Foam Tile Floor.

Note:

Older Tiles may need more than 1/2 of each outside tab removed.

Letters in parenthesis are for reference on next page.

	Description		Foam Tile Modification
	Dwg No		14-15 Field Assy Rev2
	Competition	VRC 2014-2015	Sheet 2 of 12
	Release	5/28/2014	ALL DIMENSIONS ARE IN INCHES.

	A	B	C	D	E	F
1	C	E	E	E	E	C
2	E	N	N	N	N	E
3	E	N	N	N	N	E
4	E	N	N	N	N	E
5	E	N	N	N	N	E
6	C	E	E	E	E	C

Assemble Foam Tiles as shown above.

The "smooth" side of the Tiles should be up, and the "textured" side down. The Tiles should be assembled "in-place", with the Field Perimeter.

The "Blue" and "Red" Edge Tiles should be placed as shown above.


The grid-lines are for reference only.

Note:

The Tile grid can be labeled on a coordinate system horizontally with letters A-F and vertically with numbers 1-6.

If you label the back of your Tiles in this manner it will make it easier to reassemble your Field later.

Continue to the next page before starting the Foam Tile Floor assembly.

	Description		Foam Tile Assembly
	Dwg No		14-15 Field Assy Rev2
	Competition	VRC 2014-2015	Sheet 3 of 12
	Release	5/28/2014	ALL DIMENSIONS ARE IN INCHES.

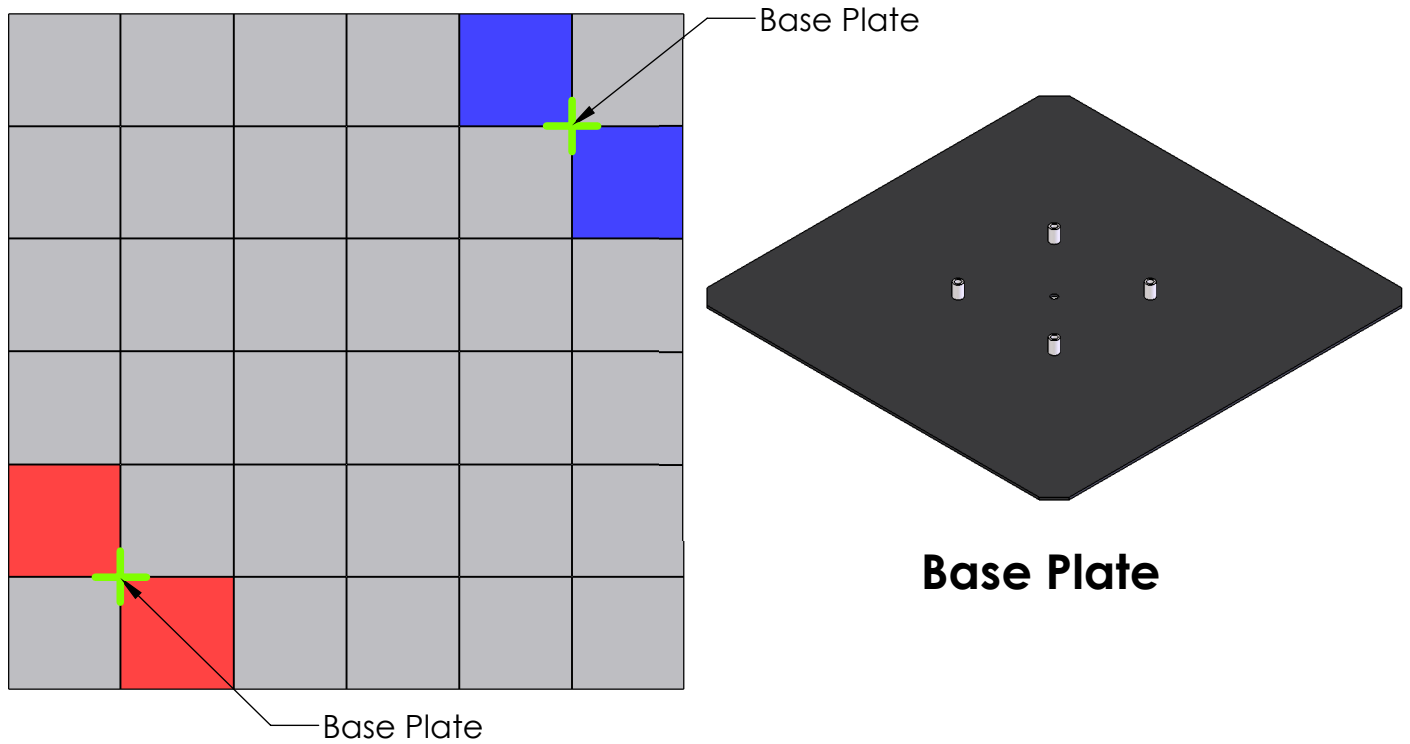


Image A

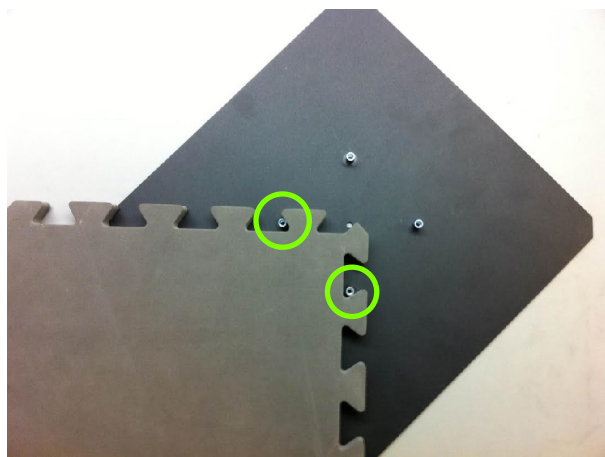


Image B

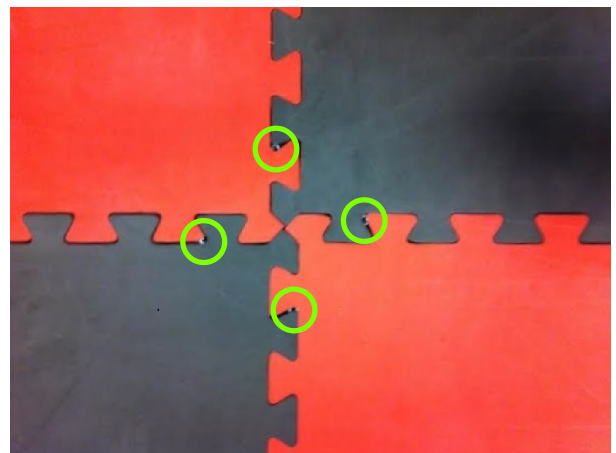
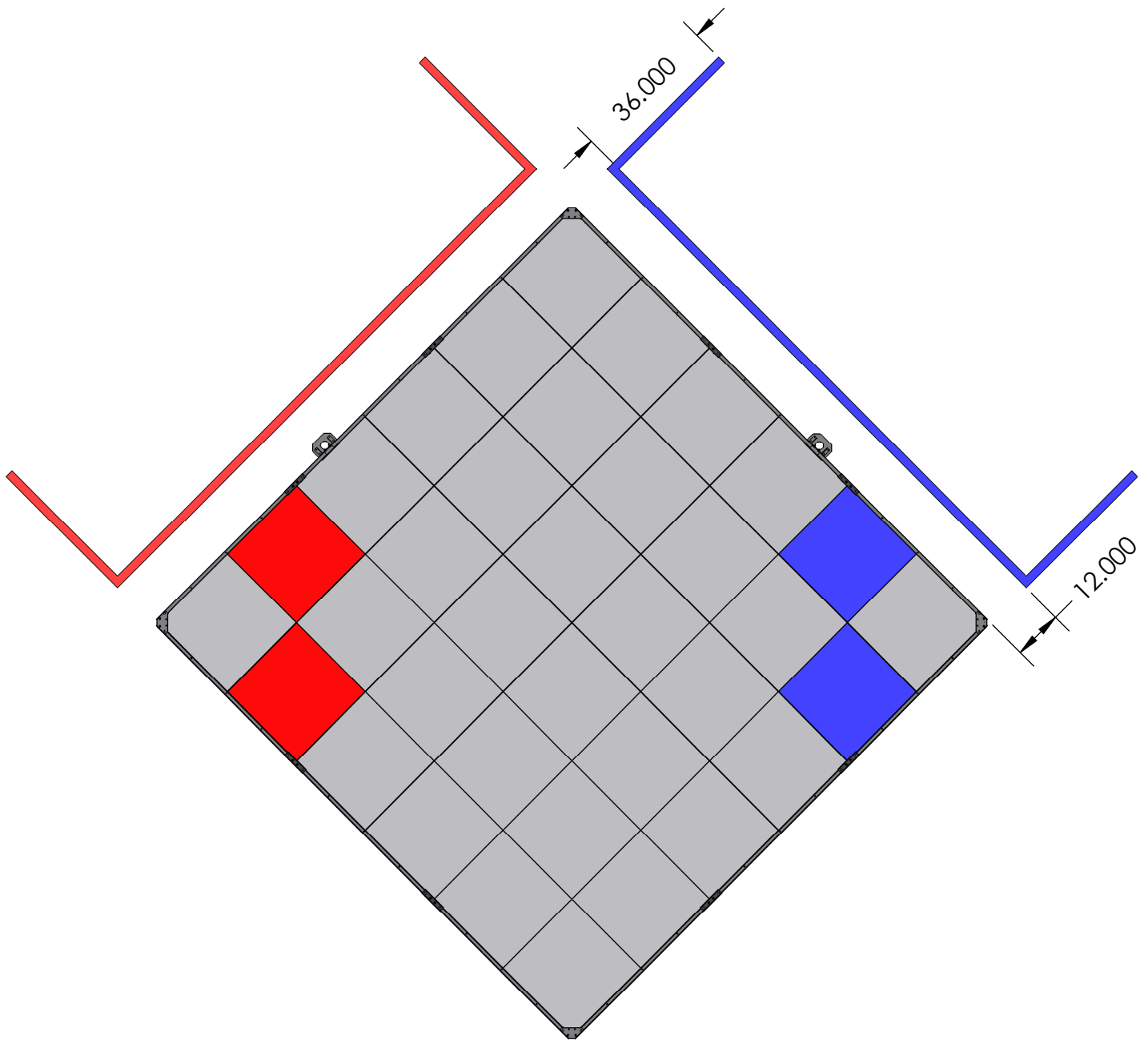


Image C

When assembling the Field, (2X) Base Plates must be placed under the Foam Tiles at the seams highlighted in Image A.

To install the Base Plates, lay down a single Tile that makes up the highlighted seam and position a Base Plate under it as shown in Image B. It is crucial that the Studs are positioned between the interlocking tabs as shown in Image B. After the Base Plate has been positioned, lay down the adjacent Tiles. The Studs should be visible between the (4X) Tiles as shown in Image C.

	Description		Base Plate Installation
	Dwg No		14-15 Field Assy Rev2
	Competition	VRC 2014-2015	Sheet 4 of 12
	Release	5/28/2014	ALL DIMENSIONS ARE IN INCHES.

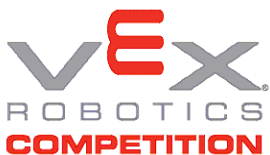


CROWD

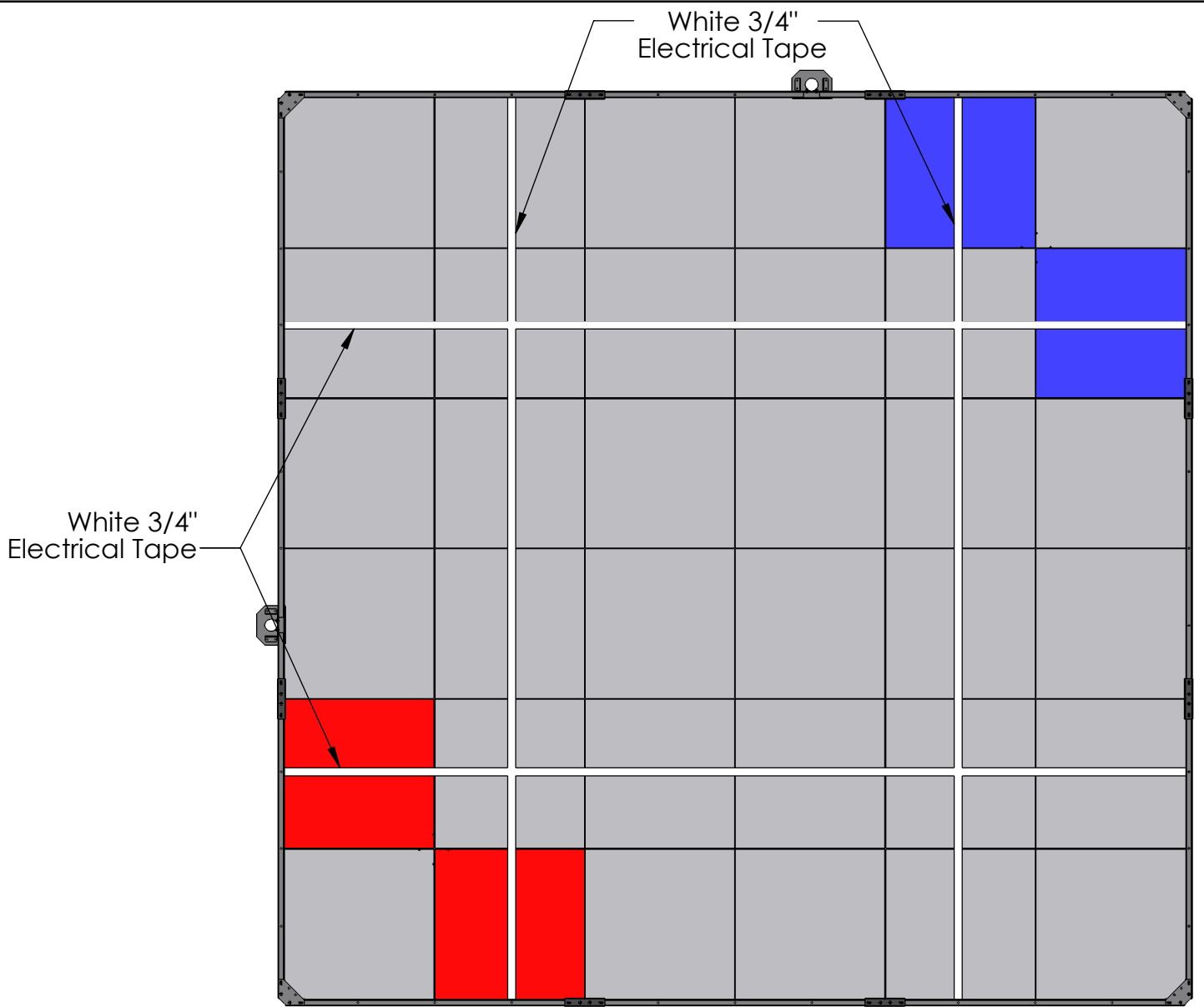
Once the Field Perimeter is in place, mark off the Alliance Stations using Red and Blue Tape as shown above.

Do not close the Alliance Stations.

The edges of the Alliance Stations should be in line with the edges of the Field Perimeter.



Description	Alliance Station Layout	
Dwg No	14-15 Field Assy Rev2	
Competition	VRC 2014-2015	Sheet 5 of 12
Release	5/28/2014	ALL DIMENSIONS ARE IN INCHES.



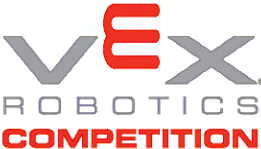
IMPORTANT NOTE:

DO NOT stretch the Tape when applying to the Foam Tile Floor. For best results, smooth out any bubbles that form during application.

The Tape should be laid out on the Field as shown above. The Tape Lines should be centered on the Tiles that they lay on.

Pro-Tip:

If the Tiles are to be used at multiple events, it is not necessary to remove the Tape. Simply cut the Tape at the Tile seams and note the order of the Tiles when they are stored.

	Description		Tape Lines
	Dwg No		14-15 Field Assy Rev2
	Competition	VRC 2014-2015	Sheet 6 of 12
	Release	5/28/2014	ALL DIMENSIONS ARE IN INCHES.

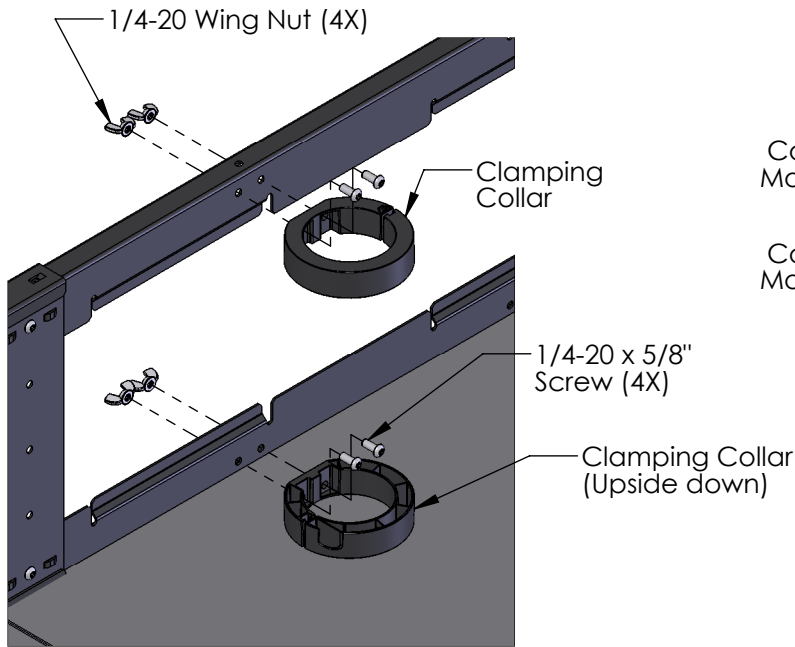


Image A

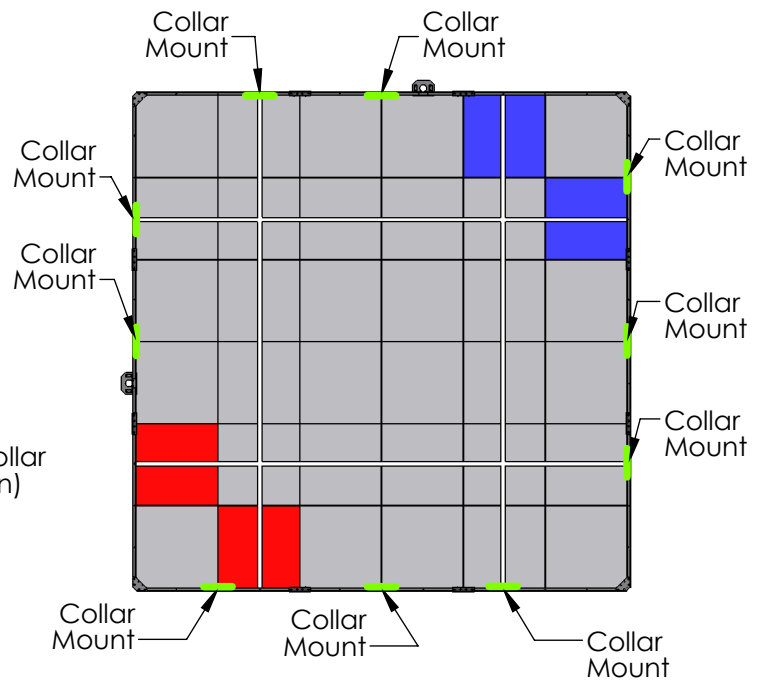
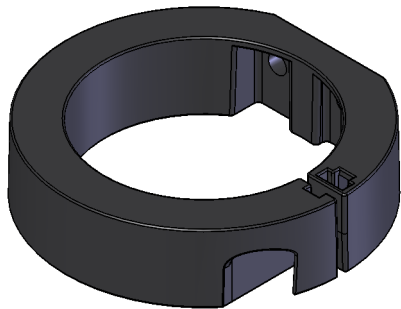


Image B



Clamping Collar

Each Post is mounted using (2X) Clamping Collars. Use (4X) 1/4-20 x 5/8" Screws and (4X) 1/4-20 Wing Nuts to mount (2X) Clamping Collars, as shown in Image A, to each of the locations annotated in Image B.

Note:

The bottom Clamping Collars will compress the Foam Tiles they sit on.

	Description		Clamping Collar Installation
	Dwg No		14-15 Field Assy Rev2
	Competition	VRC 2014-2015	Sheet 7 of 12
	Release	5/28/2014	ALL DIMENSIONS ARE IN INCHES.

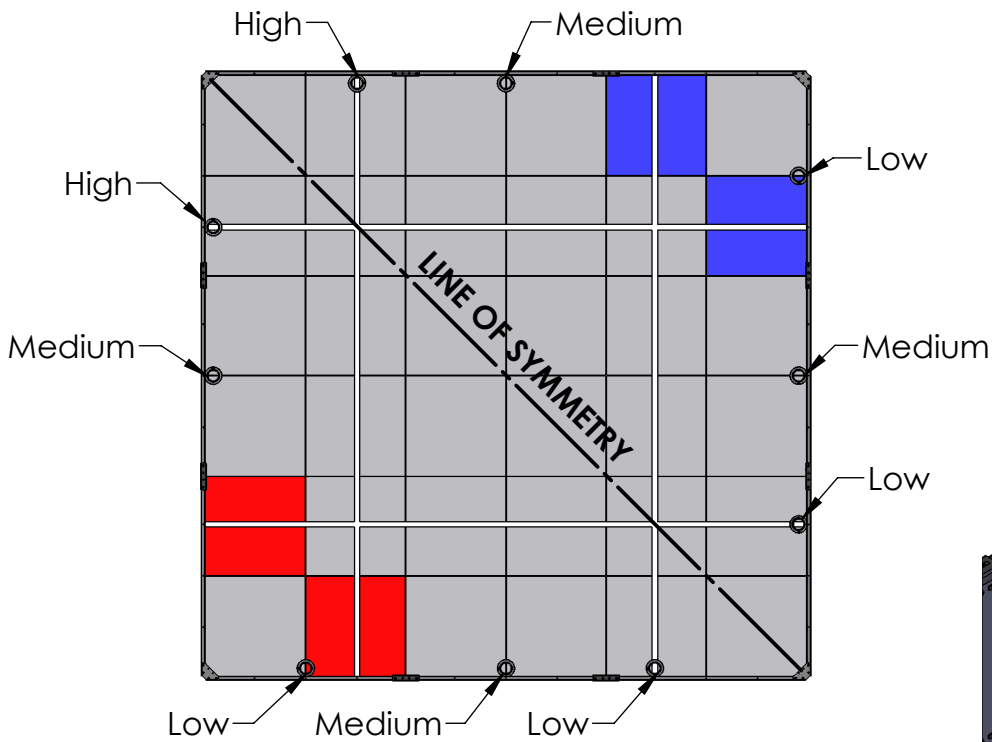


Image A

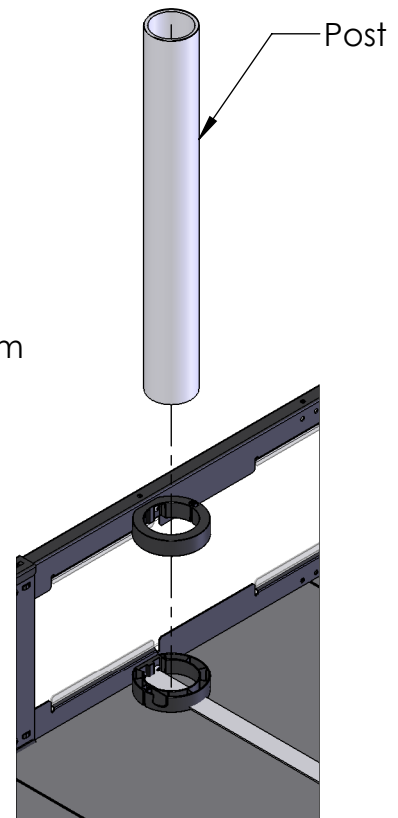


Image B

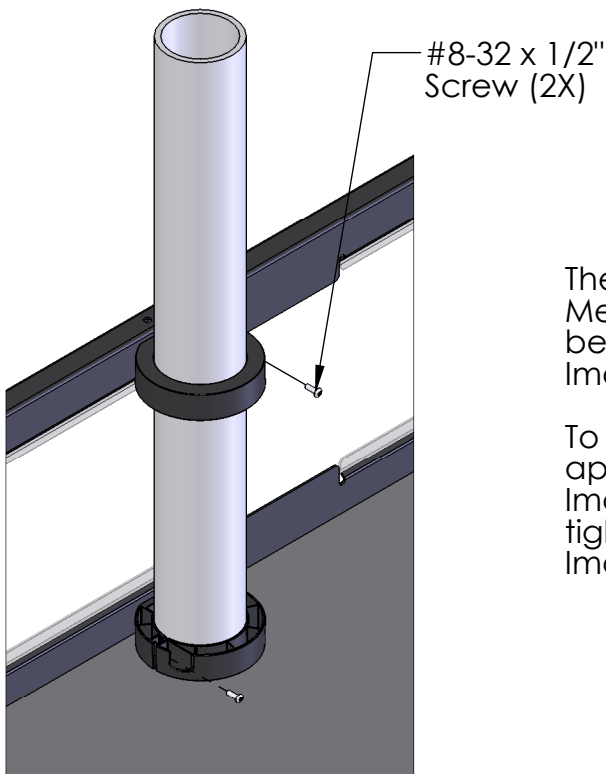


Image C

There are (3X) heights of Posts, Low (4X), Medium (4X), and High (2X). Posts must be installed in the locations indicated in Image A.

To install each Post, first slide it into the appropriate Clamping Collars as shown in Image B. Then, use (2X) #8-32 x 1/2" Screws to tighten each Clamping Collar as shown in Image C.

Description	Post Installation	
Dwg No	14-15 Field Assy Rev2	
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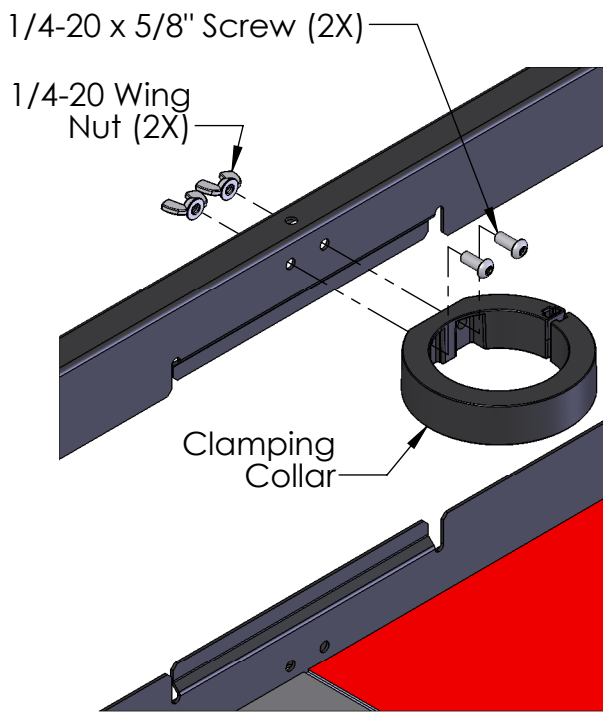


Image A

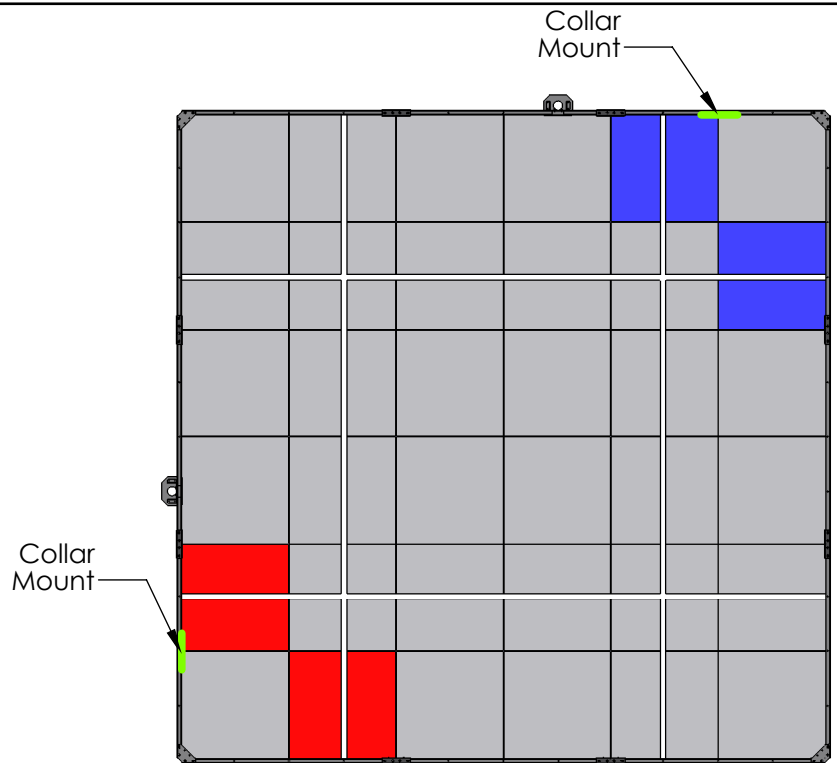
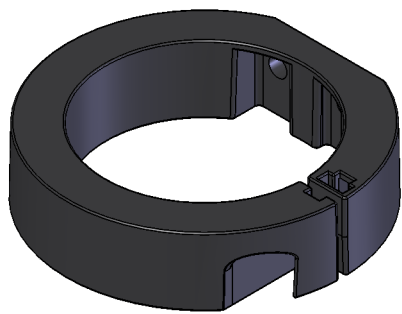


Image B



Clamping Collar

Clamping Collars are also used as the Autoloaders.

Use (2X) 1/4-20 x 5/8" Screws and (2X) 1/4-20 Wing Nuts to mount a single Clamping Collar, as shown in Image A, to each of the (2X) locations annotated in Image B.

DO NOT use a #8-32 Screw to tighten these Clamping Collars; they are used to loosely hold the Skyrise Sections.

	Description Autoloader Installation	
	Dwg No 14-15 Field Assy Rev2	
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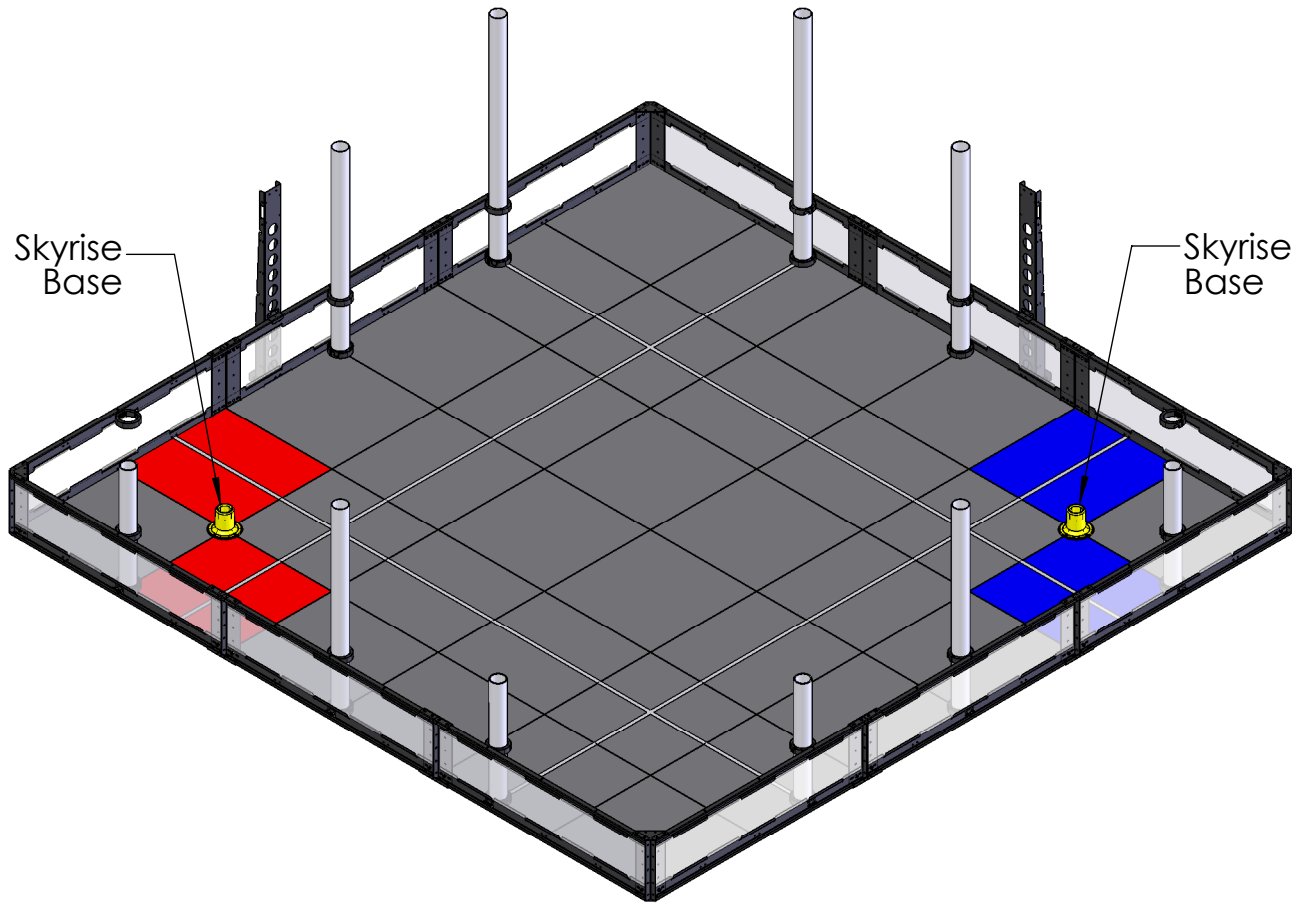


Image A

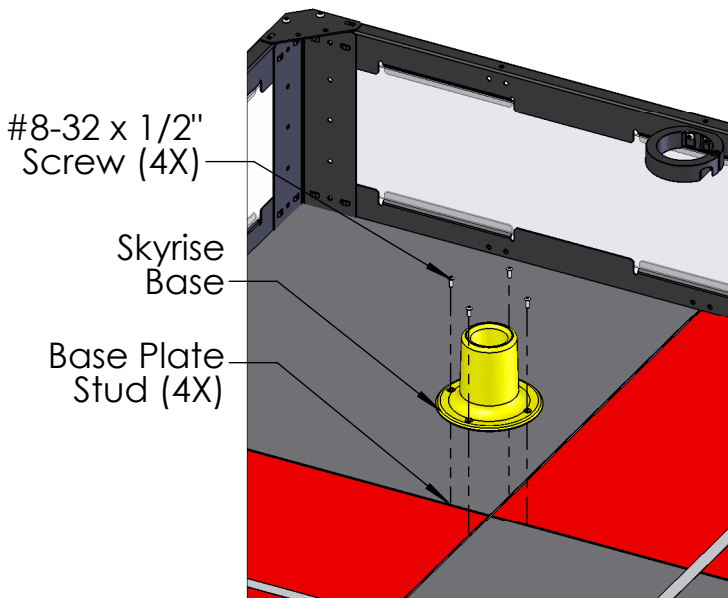
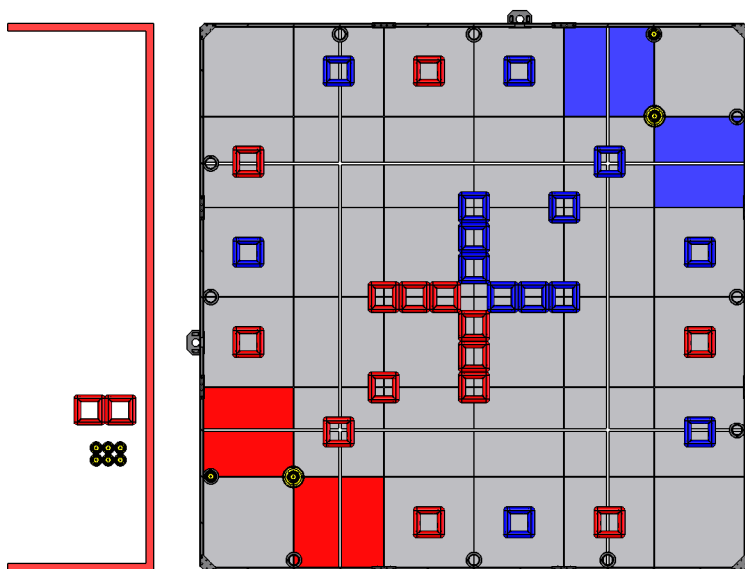
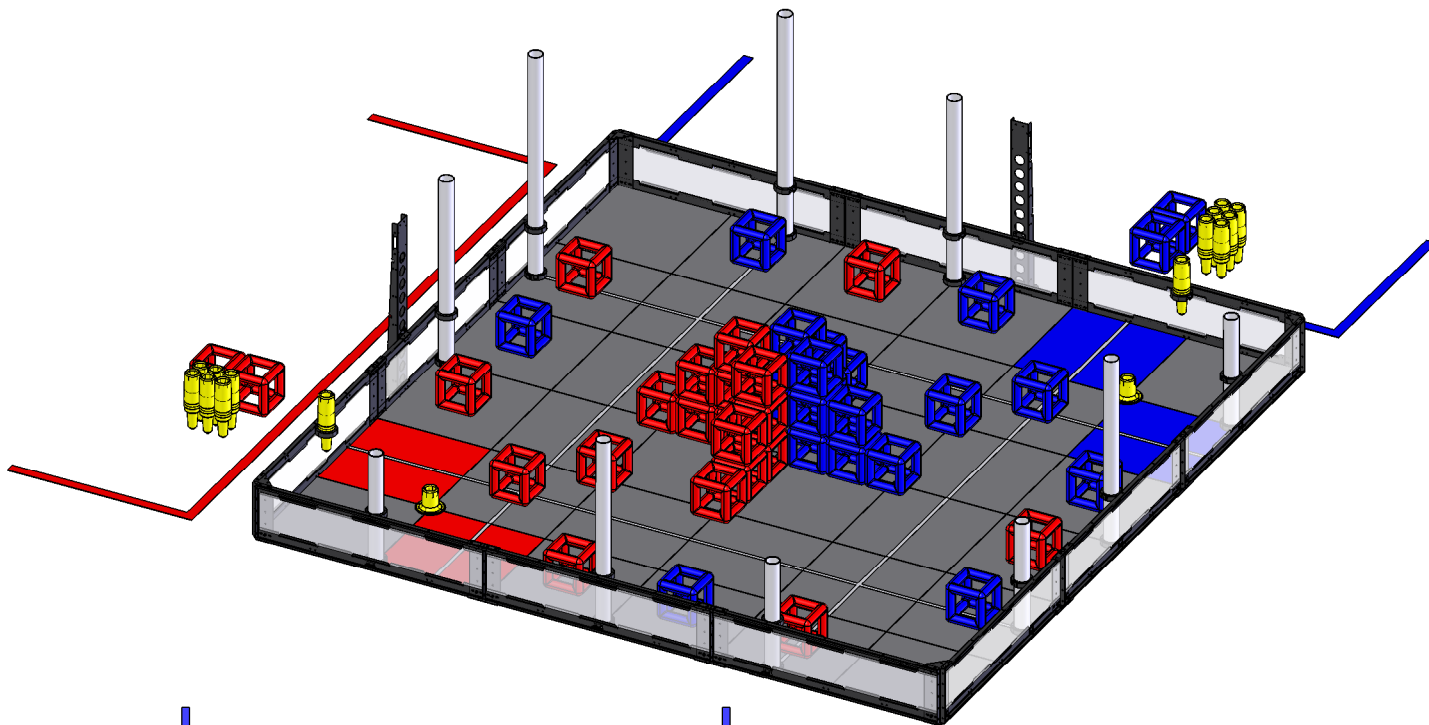


Image B

Use (4X) #8-32 x 1/2" Screws to mount a Skyrise Base at each of the (2X) locations shown in Image A.



Place the Cubes on the Field, in the positions shown.

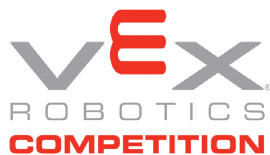
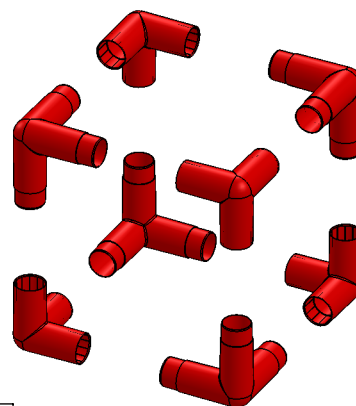
Place (2X) Cubes and (6X) Skyrise Sections in their respective driver stations as well as (1X) Skyrise Section in each Autoloader.

Refer to the next page for details on the Cube Pyramid.

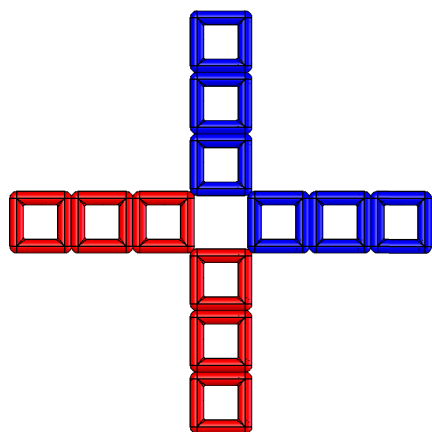
Note:

Each Cube is constructed of (8X) Corner Pieces that are permanently assembled by the manufacturer.

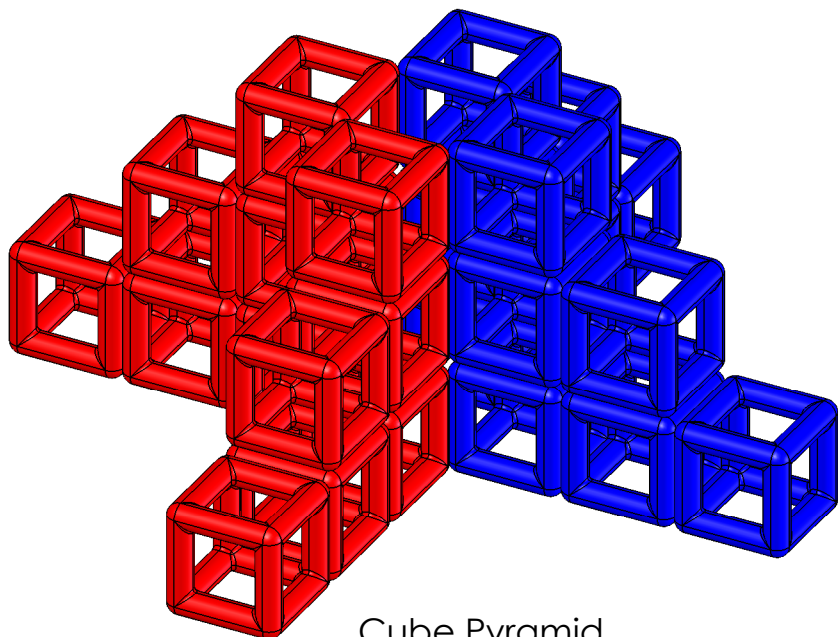
If a Cube becomes disassembled during use, re-assemble it and use plastic glue to reinforce the connection.



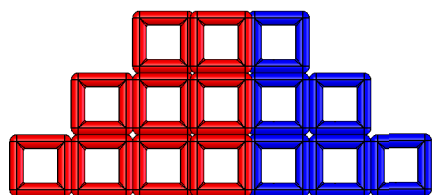
Description	Game Object Layout	
Dwg No	14-15 Field Assy Rev2	
Competition	VRC 2014-2015	Sheet 11 of 12
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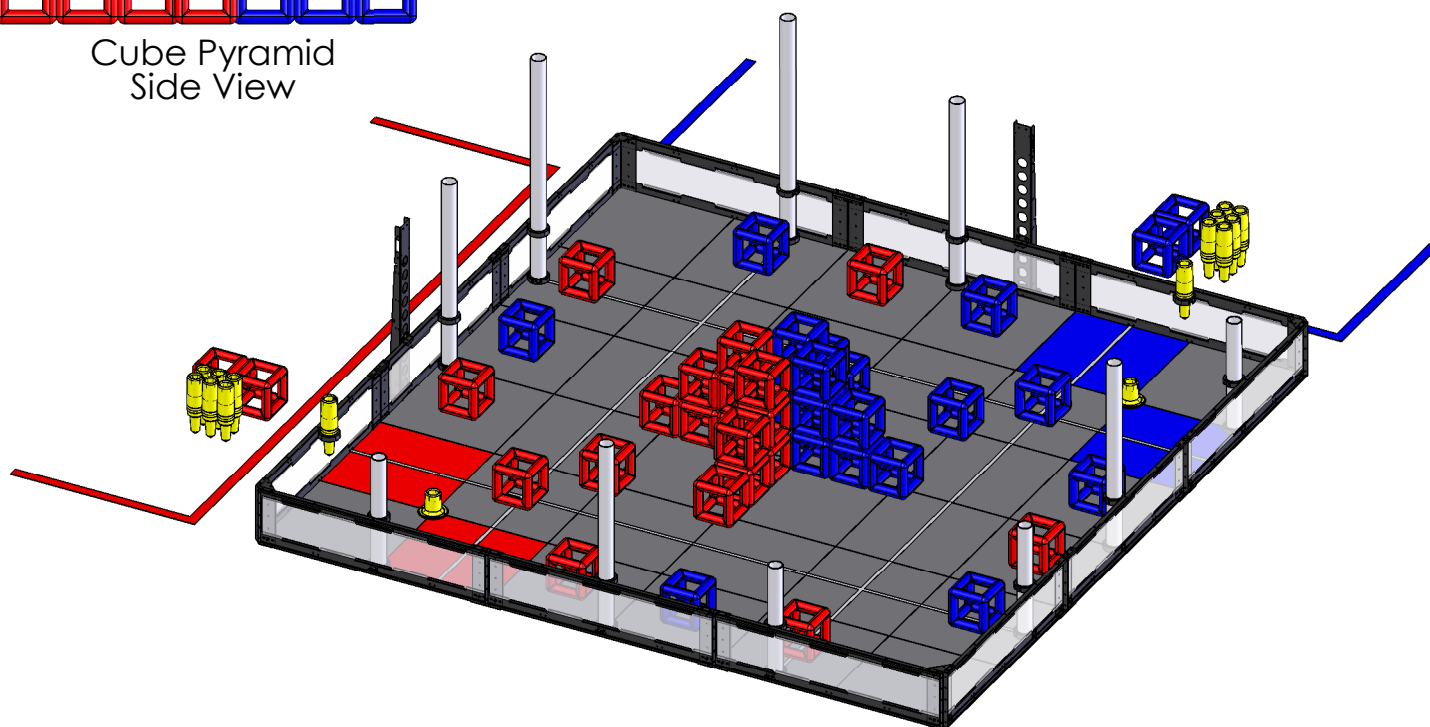
Cube Pyramid
Top View



Cube Pyramid
Trimetric View



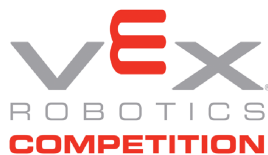
Cube Pyramid
Side View



Use (12X) Red Cubes and (12X) Blue Cubes to build the Cube Pyramid in the center of the field as shown. Note the orientation of the Cube Pyramid before starting construction.

Refer to the VRC Skyrise Game Manual for more details, including all official rules and regulations.

Use the 3D CAD model of the VRC Skyrise Field for additional details not shown in the Field Drawings.



Description	VRC 2014-2015 Field	
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