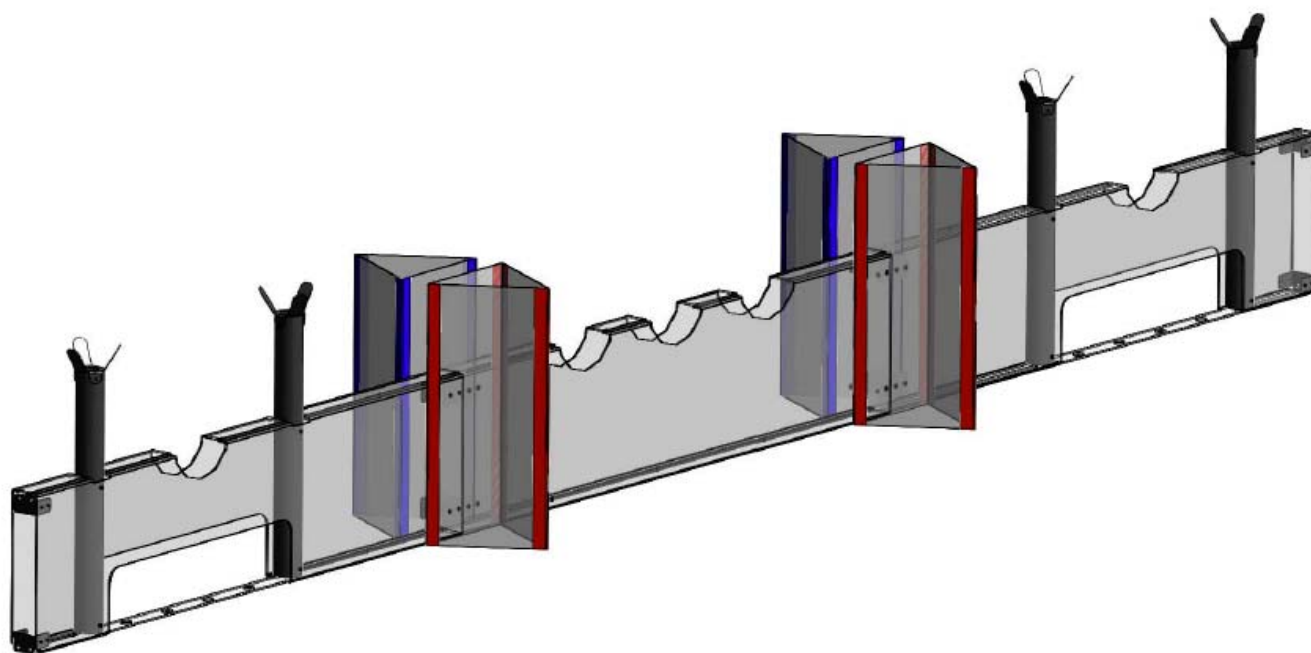


Field Specs & Assembly Instructions



Think. Create. Build. Amaze. **Vex.**





APPENDIX

Game Field

Introduction

This document will provide detailed specifications, BOM information, and assembly instructions for the “*Clean Sweep*” 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 VL-FIELD competition field frame developed by VEX Robotics. Instructions and specifications for this field perimeter are available in a separate document, and are also important for the *Clean Sweep* 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

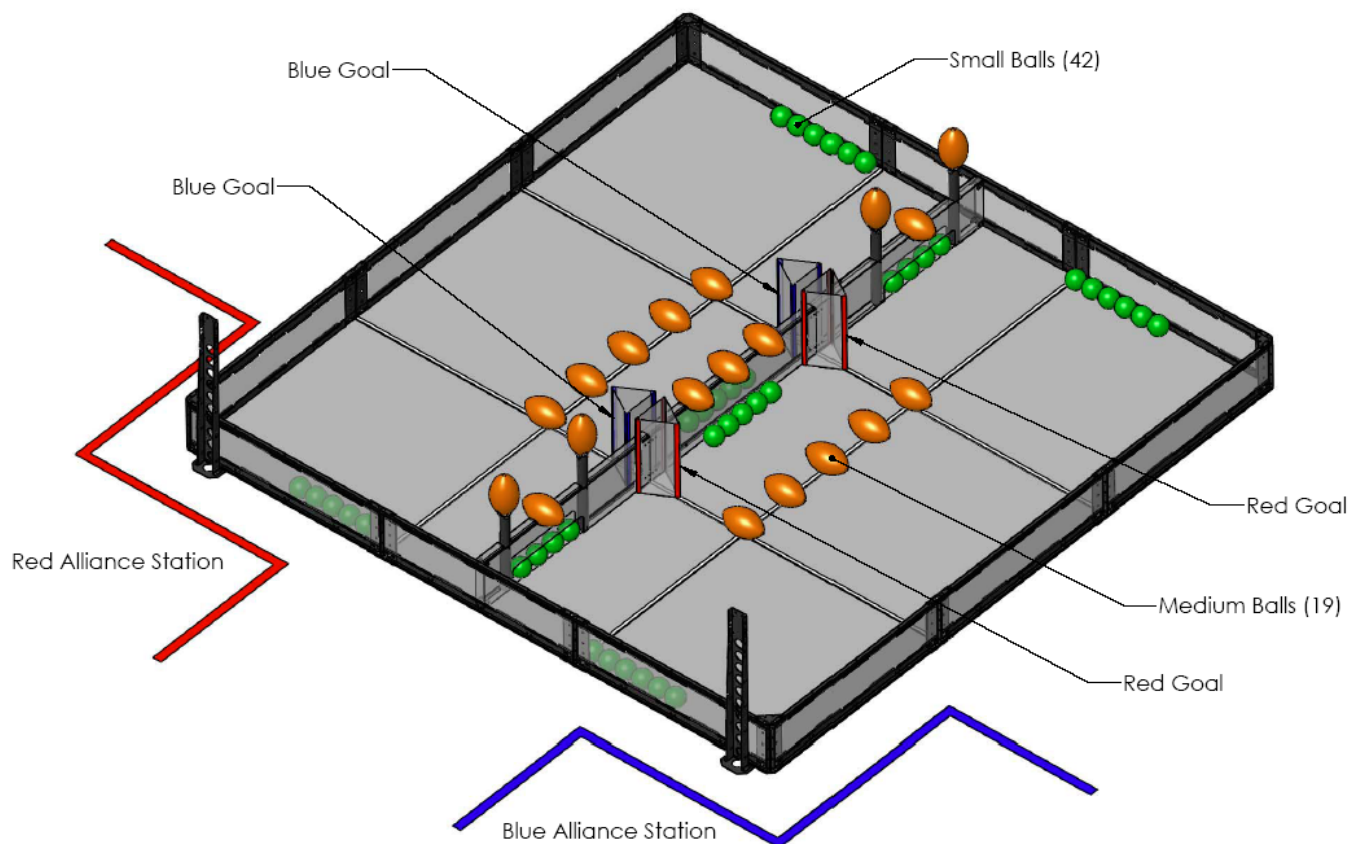
There is also an accompanying SolidWorks eDrawing Viewer file, which shows the field as a 3D solid model. Designers can take dimensions directly off this model if they require an additional level of detail not provided in this document. This eDrawing Viewer file is a self contained executable which will open on most computers without any CAD software.

For additional game-play detail, please refer to the “*Clean Sweep*” competition manual.

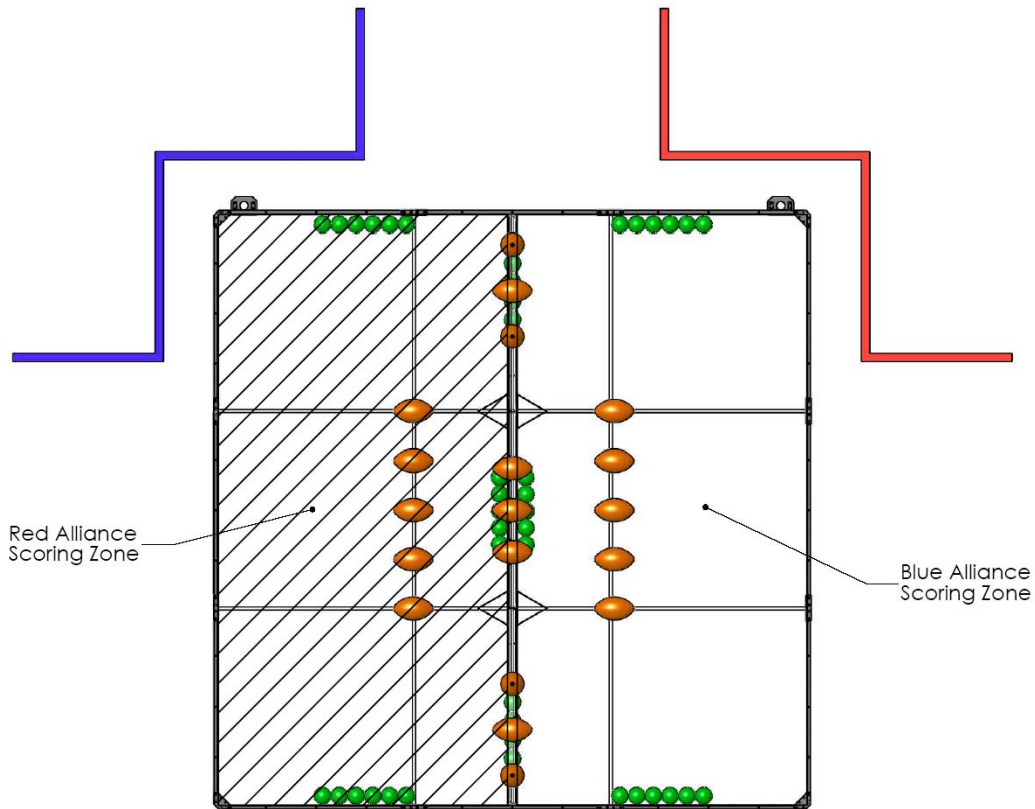
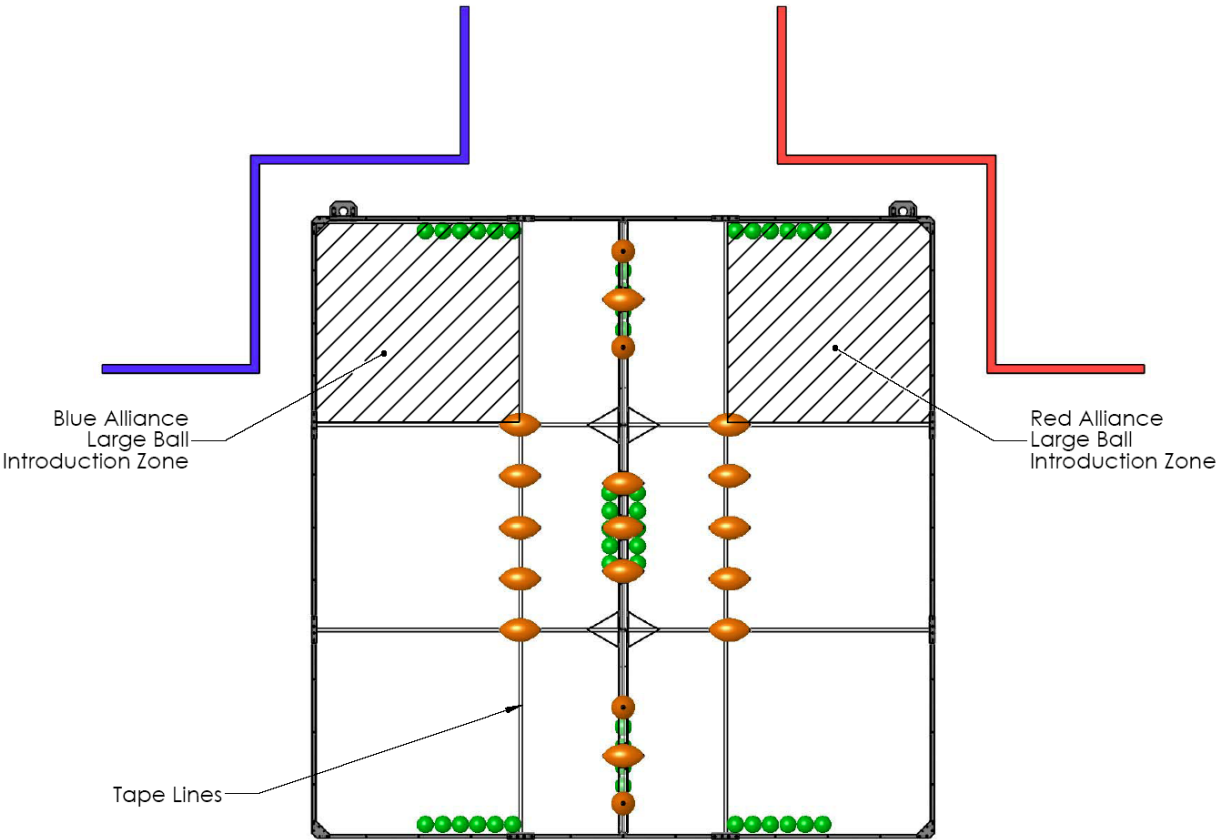
For more information on cutting costs on unofficial field construction, refer to the accompanying “Low Cost Field” section of this Appendix.

Field Overview

The game VEX Clean Sweep is played on a 12 ft x 12 ft foam-mat, surrounded by a sheet-metal and lexan perimeter. The field is divided down the center by an 11.5" tall lexan wall. This wall separates the two alliances of two robots onto opposite sides of the field. There are four 18" high triangular goals attached to the wall which robots can place small balls into. There are two slots in the wall which robots can roll small balls through. At the start of the match small & medium balls are positioned on the center wall, and around the field. The game is played by moving balls onto your opponent's side of the field or into the goals. For more details and specific game-play rules, please refer to the VEX Clean Sweep competition manual.



VEX Robotics Competition - *Clean Sweep*



Game Objects & Field Bill of Materials

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



Generic Field Elements - Reuseable Each Year

Part Number	Description	Price
VL-FIELD-FRAME-KIT	VRC Field Perimeter Frame & Hardware	\$ 799.99
FIELD-TILES	VRC Foam Field Surface - (36) Grey, (2) Red, (2) Blue Tiles	\$ 189.99
275-1401	NEW! - VRC VEXnet Field Controller	\$ 199.99

Total Price \$ 1,189.97

Official VEX Clean Sweep Specific Elements

Part Number	Description	Price
278-1001	ALL Official VEX Clean Sweep Field & Game Objects	\$ 499.99

(1) Field Wall Assembly
 (4) 18" Goal Assemblies
 (1) Roll 2" Wide Red Tape
 (1) Roll 2" Wide Blue Tape
 (1) Roll 3/4" Wide White Tape
 (51) Green Small Balls
 (22) Orange Medium Balls
 (3) White Large Balls
 (40) Red & (40) Blue Robot Identification Flags

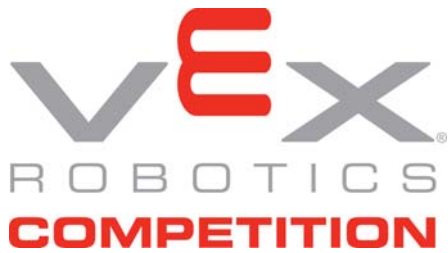
Total Price \$ 499.99

Practice Elements

Part Number	Description	Price
275-1399	VEX Clean Sweep Game Elements	\$ 49.99

(10) Green Small Balls
 (4) Orange Medium Balls
 (1) White Large Ball
 (1) VRC Clean Sweep Ball Tee





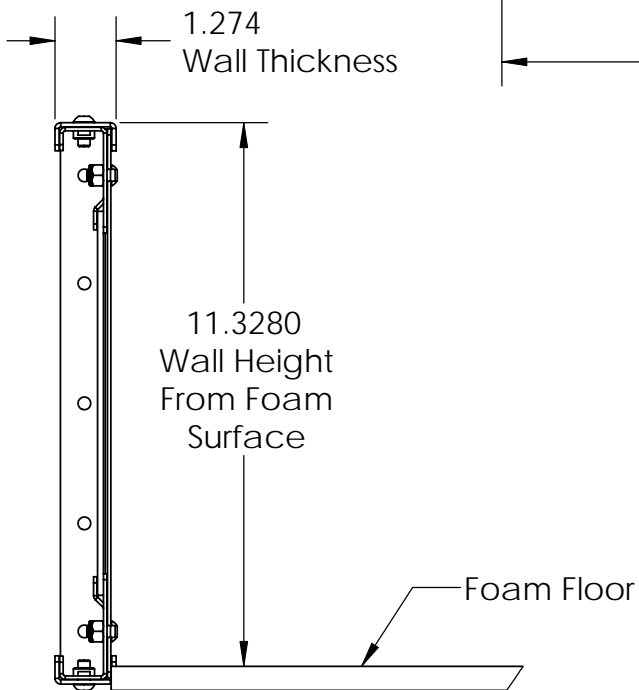
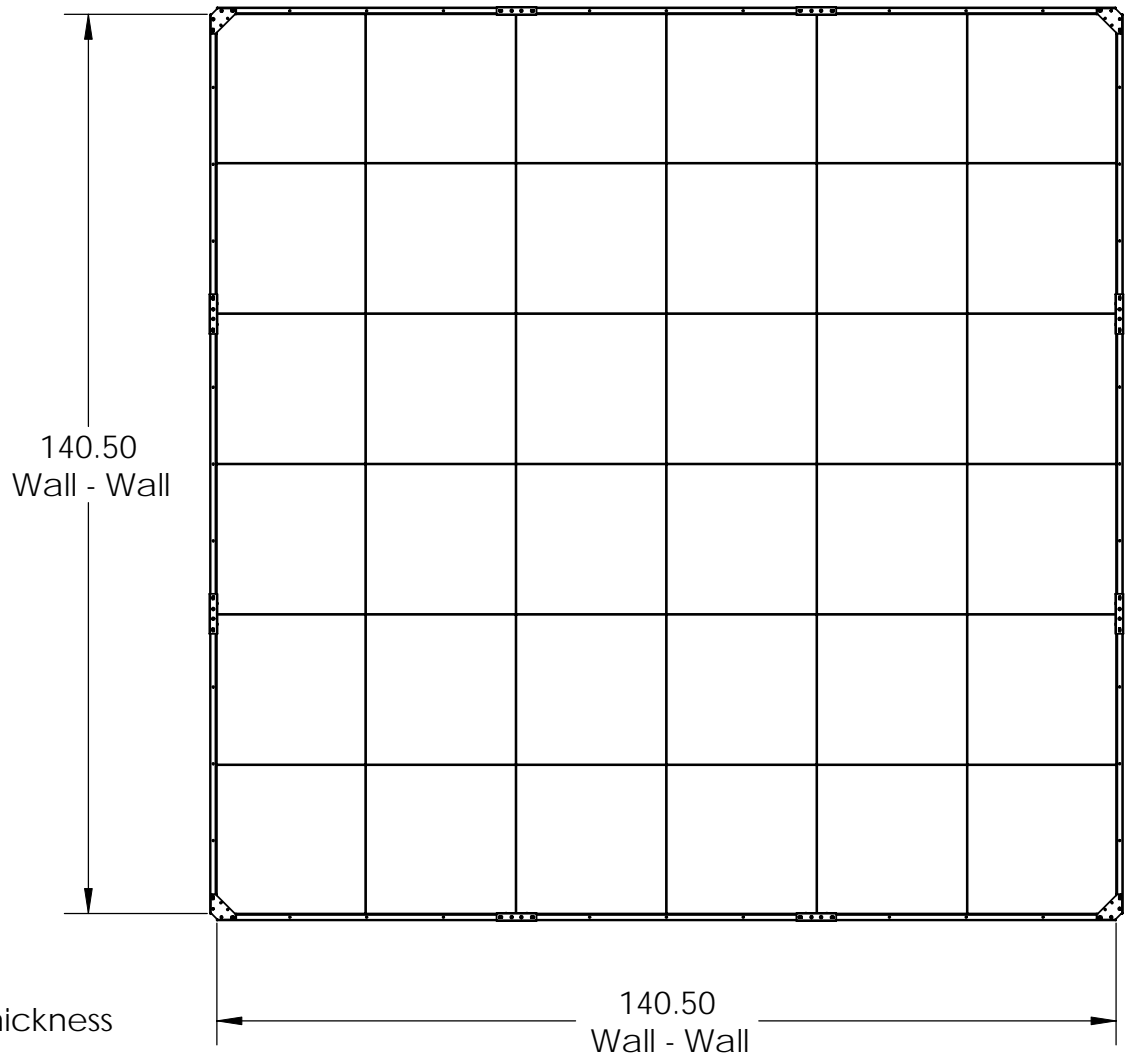
Field Specifications

Introduction

This section will outline the specifications which are most important to teams designing a robot to compete in the VEX Robotics Competition – *Clean Sweep*. 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.

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.

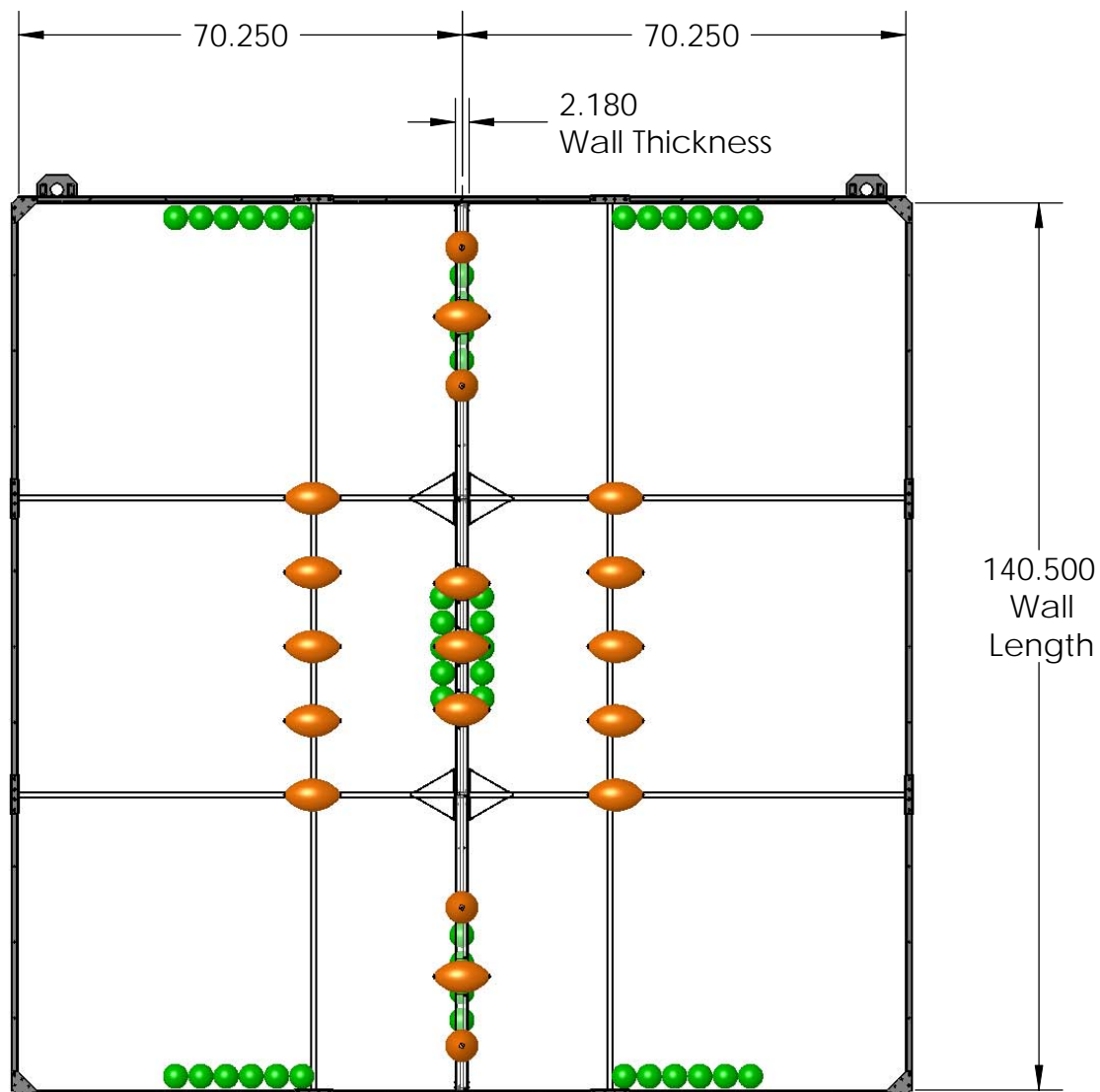


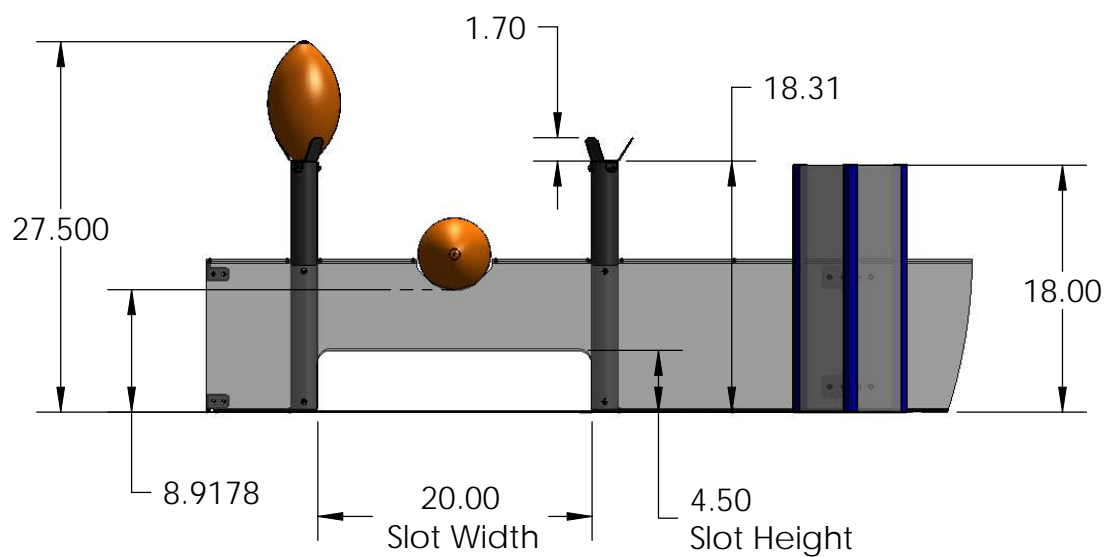
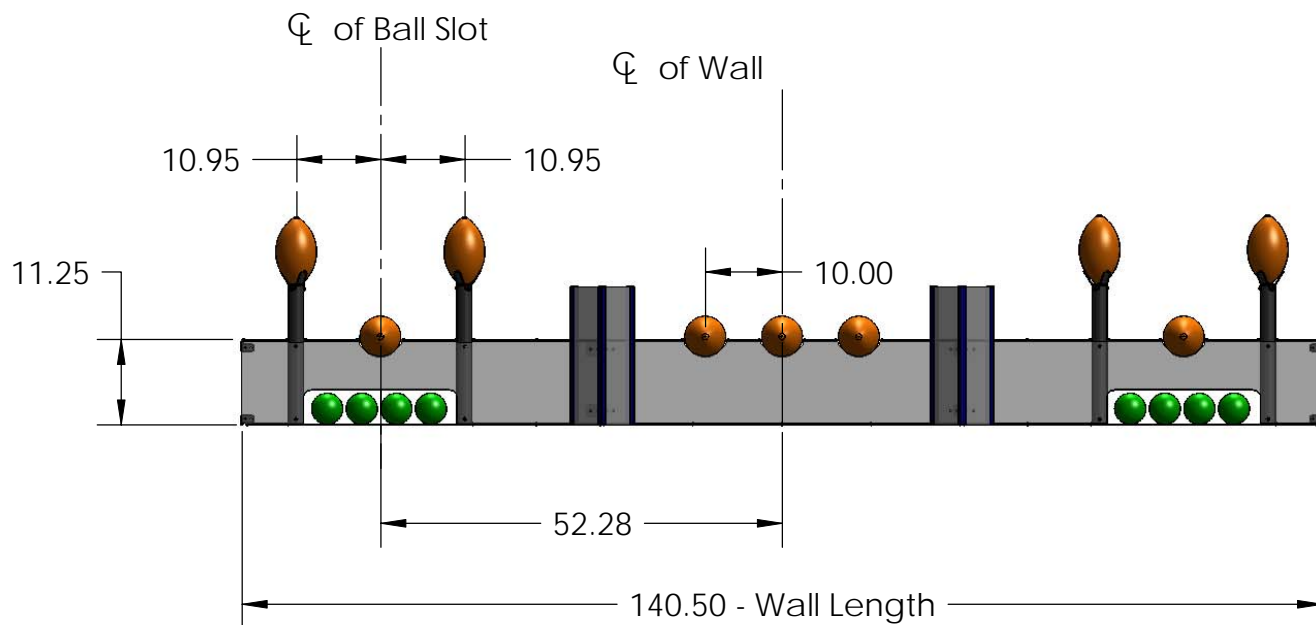
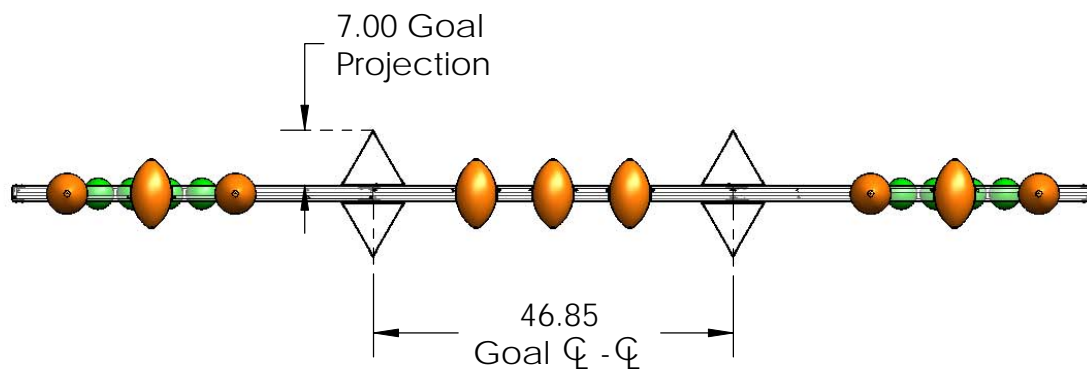


Field Critical Dimensions:

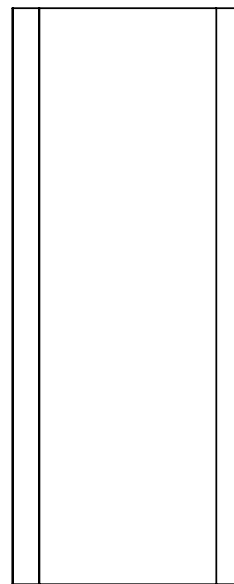
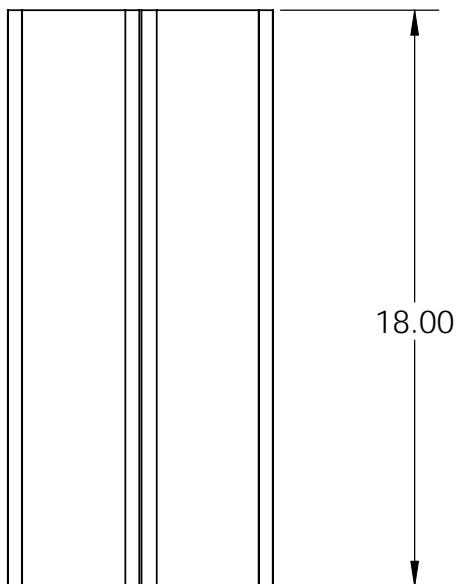
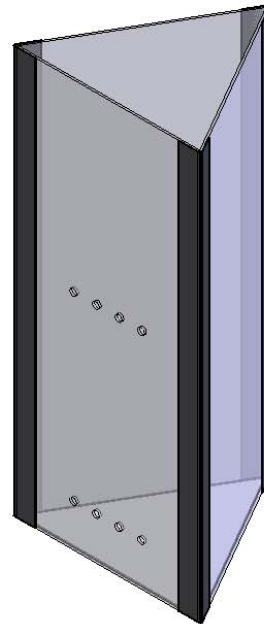
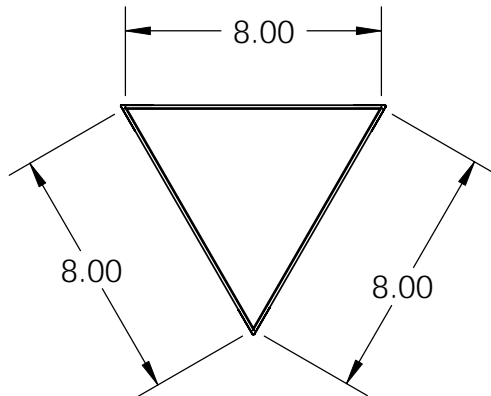
- ~140.5" Square Wall-Wall, Inside
- 11.328" Wall Height
- 1.27" Wall Thickness

A wall divides the field in half, the wall is 2.18" thick and is located exactly at mid-field.





There are (4X) Goals on the Field - (2X) Blue and (2X) Red.
These goals are all identical except for color.





The Small & Medium Balls are made from a polyurethane foam. The Large ball are made from a PVC rubber.

Every school will receive a sample set of game objects in their team welcome kit when they register as a VEX Robotics Competition team.

Additional Game Objects are available for purchase from www.VEXROBOTICS.com on the VEX Clean Sweep Competition page.

Small Balls:

Size - approximately 4.0" in diameter
Weight - approximately 0.125 lbs

Medium Balls:

Width - approximately 5.25" wide
Length - approximately 9.0" long
Weight - approximately 0.4 lbs

Large Balls:

Size - inflated to about 9.5" in diameter
Weight - approximately 0.55 lbs

Tolerances:




The Small and Medium balls may vary by $\pm 1/8$ "

The Large Balls are inflatable so their size can vary, but at competition events should be held within $\pm 1/2$ " of their specified size. These balls may not be perfectly round -- teams should take this into account when designing mechanisms to accomodate the Large Balls.

Note: As listed above, Game Objects may vary in size; teams need to accomodate this.

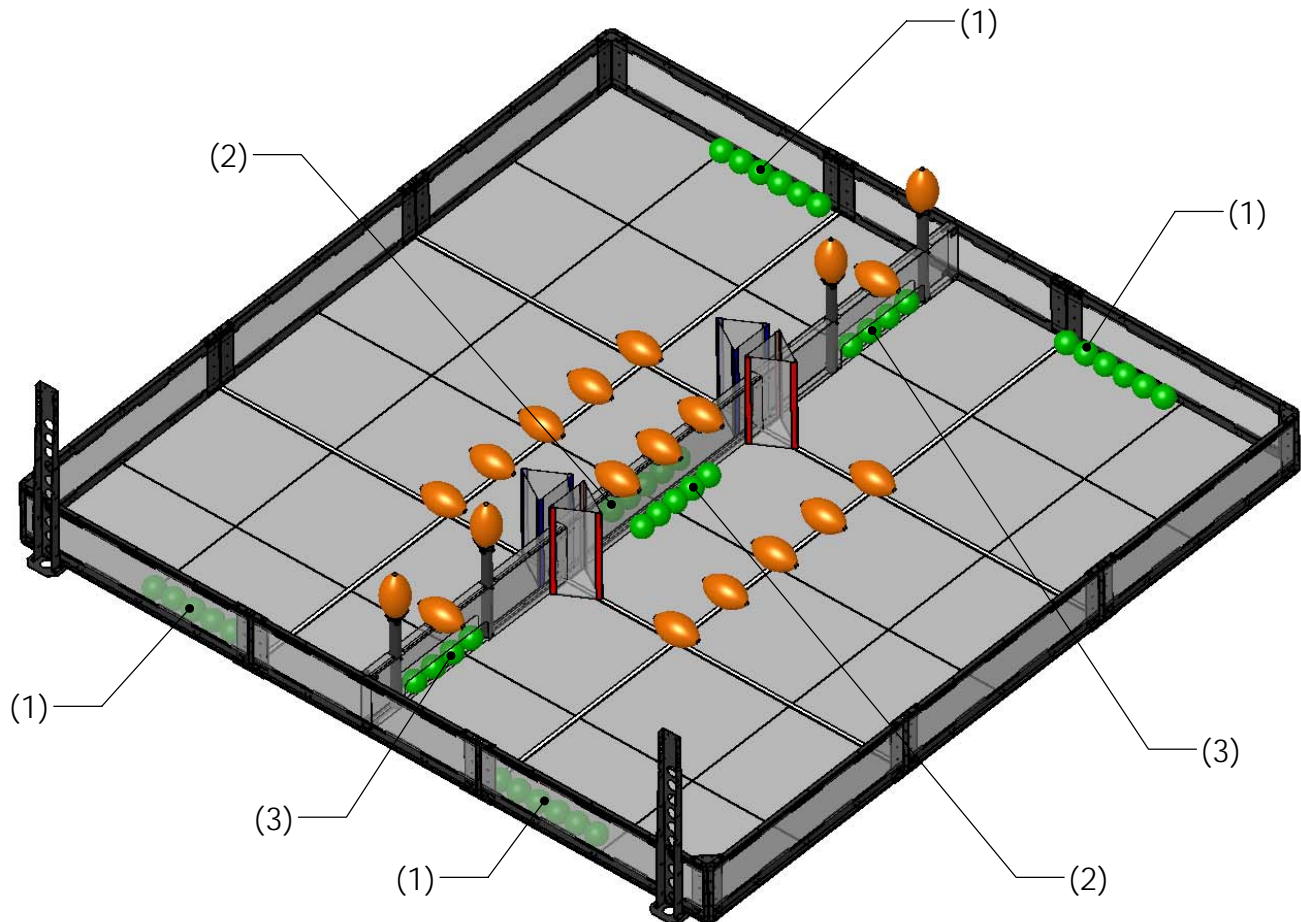
It is always a good practice to develop mechanisms capable of adapting to this potential variance.



	Description Game Objects Overview		
	Dwg No VRC10-FIELD-SPECS		
	Competition VRC - Clean Sweep	Sheet 5 of 8	
	Release 4/27/2009	ALL DIMENSIONS ARE IN INCHES.	

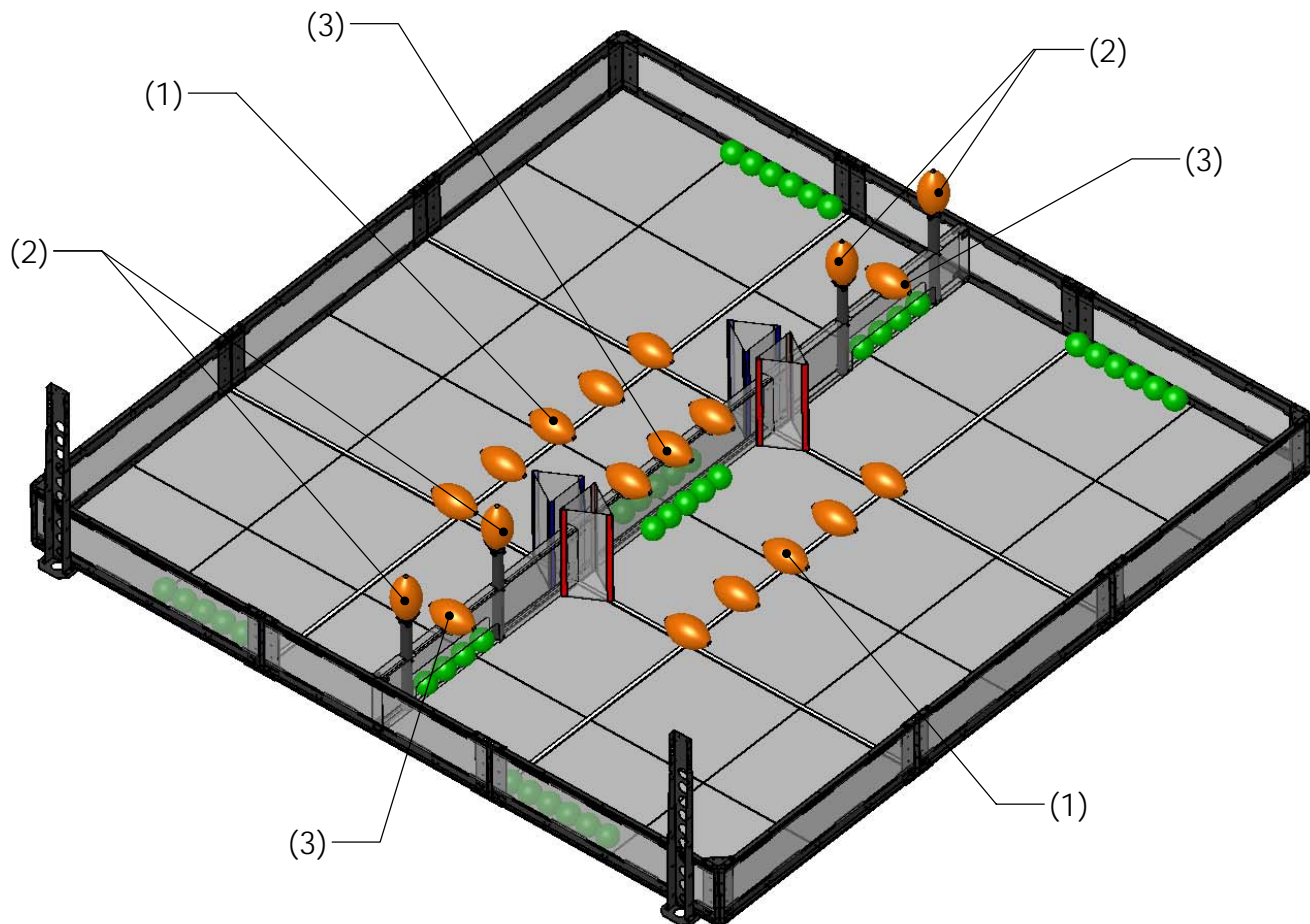
The Small Balls are placed on the field in (3) different ways at the start of the match:

1. There are (4) rows of (6) balls placed on the sides of the field. These rows are each centered on a foam tile.
2. There are (2) rows of (5) balls placed on the center wall. (1 on each side of the wall) These rows are centered on the wall.
3. There are (2) rows of (4) balls placed in the slots of the wall. These balls are placed on "tees" inside the slot.



The Medium Balls are placed on the field in (3) different ways at the start of the match:

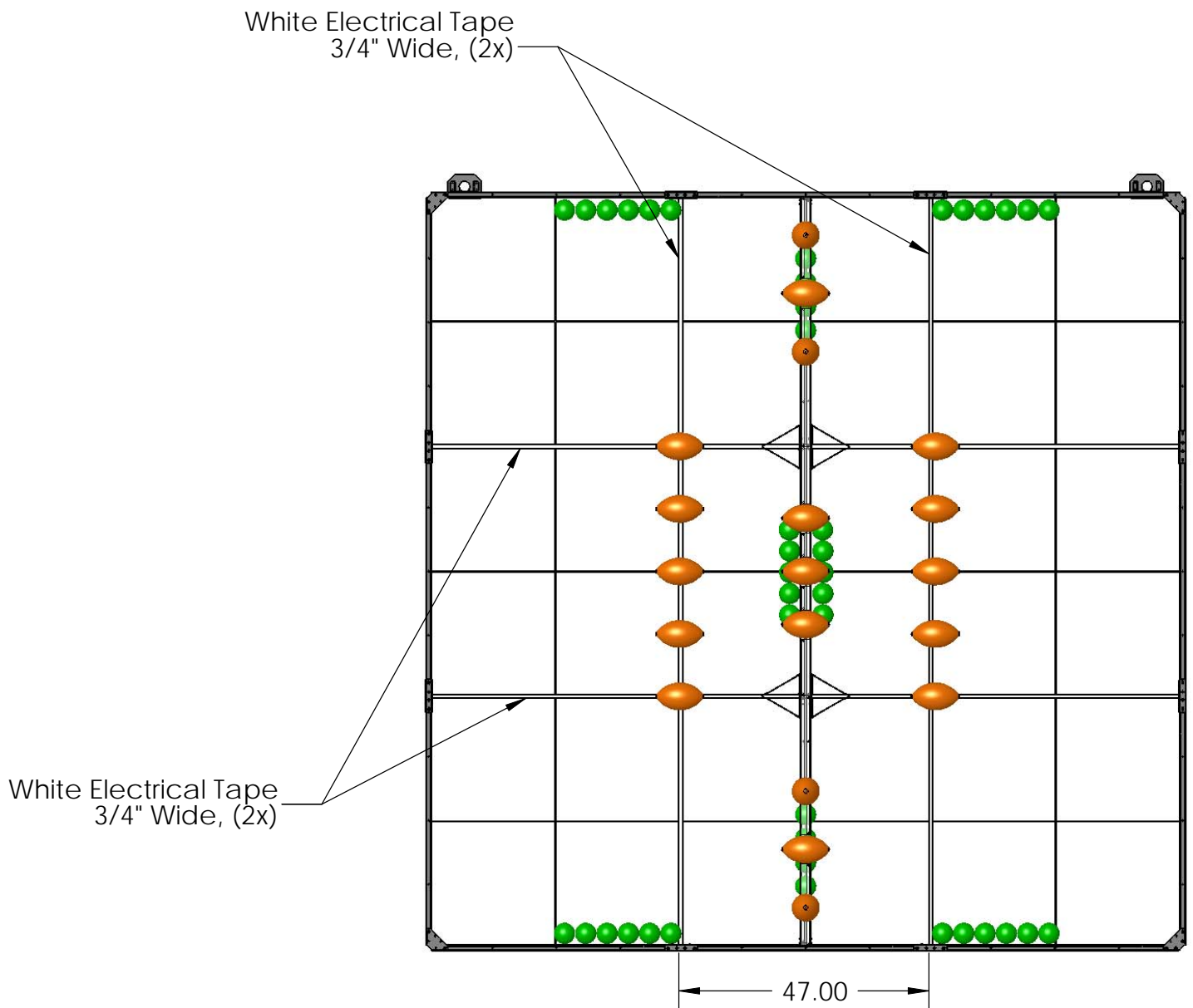
1. There are (2) rows of (5) balls placed on the sides of the field. These rows are arranged based on the foam tile junctions, as shown.
2. There are (4) balls placed vertically on tees on the center wall.
3. There are (5) balls placed horizontally on top of the center wall. The wall has cutouts along it's top edge to hold these balls.

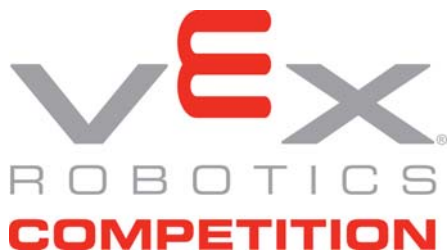


The Large Balls are NOT placed on the field at the beginning of the match. These balls are introduced by the alliance coaches with 30 seconds left in the match.

The Field has (4) strips of 3/4" Wide White Electrical Tape running across it. (2) of these strips run parallel to the center wall, and (2) of these strips run perpendicular to the center wall. These tape strips are provided for robot line following.

The tape strips run along the seams in the Foam Field Tiles, as shown below.



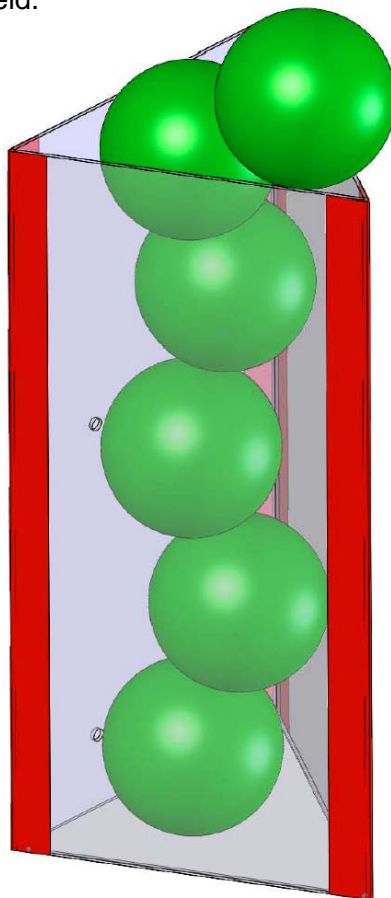


Field Assembly

Introduction

This section will detail the steps required to construct the competition field for the VEX Robotics Competition Clean Sweep. The VRC Clean Sweep field utilizes the VEX VL-FIELD generic field perimeter frame. For specifications and instructions for assembling this frame, please refer to the separate VL-FIELD manual.

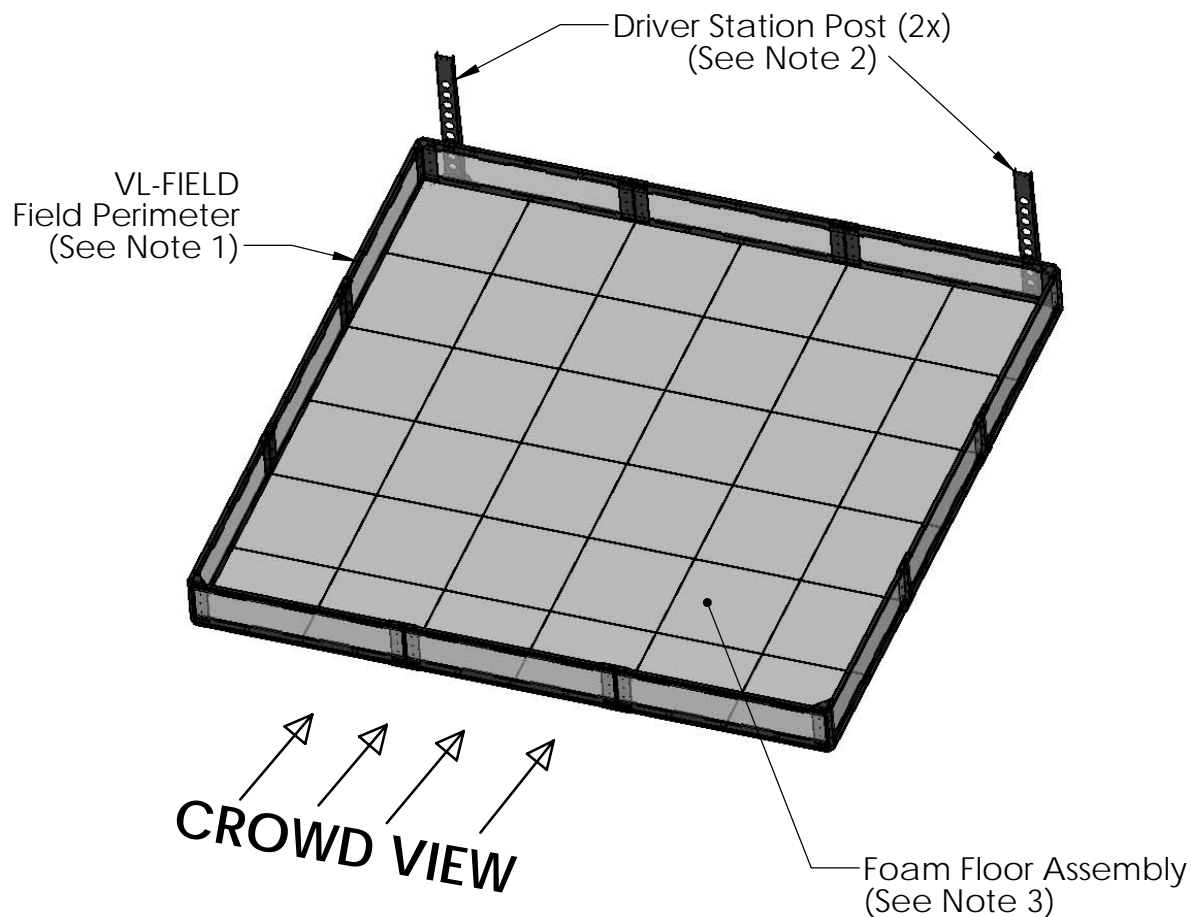
Also refer to the separate low-cost field document, which provides lower cost options to teams not needing a full "official" competition field.



Tools Required

The following tools are required for assembly of the official VEX Clean Sweep field:

- 5/32" Allen Wrench
- #2 Phillips Screwdriver (or drill with #2 Phillips Bit)
- 3/32" Allen Wrench (standard VEX Allen Wrench)
- 11/32" Open Ended Wrench (standard VEX Open Ended Wrench)




Notes:

1. Assemble the VL-FIELD Perimeter (see separate VL-FIELD assembly instructions.)
Position the Perimeter such that one face is toward the crowd.
2. Attach the Driver Station Posts as shown (at the tips of one edge, opposite the crowd). Instructions for assembly are included with the VL-FIELD instructions.
3. Assemble the Foam Floor inside the perimeter.
Refer to Sheets 2 & 3 of this document for instructions.

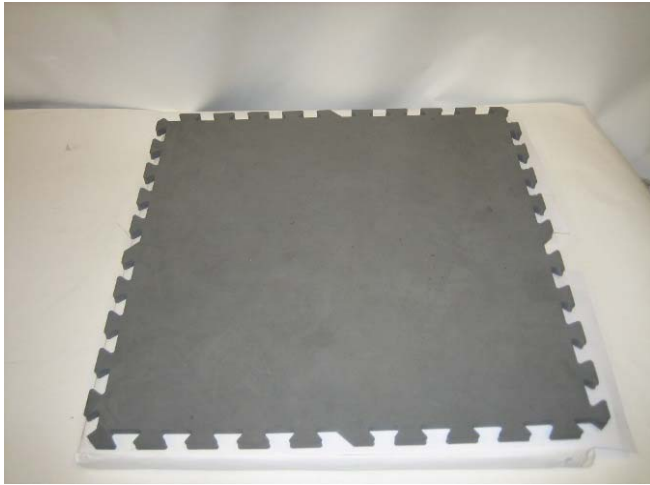
IMPORTANT!:

It is important to assemble the field on a flat, level surface. Some venues may wish to install floor protection underneath the field.

	Description Perimeter Placement	
	Dwg No VRC10-FIELD-ASSY	
	Competition VRC - Clean Sweep	Sheet 1 of 13
	Release 4/27/2009	ALL DIMENSIONS ARE IN INCHES.

www.VEXROBOTICS.com





Before assembling the foam tile floor some tiles will need to be modified.

There are 3 main types of tiles.

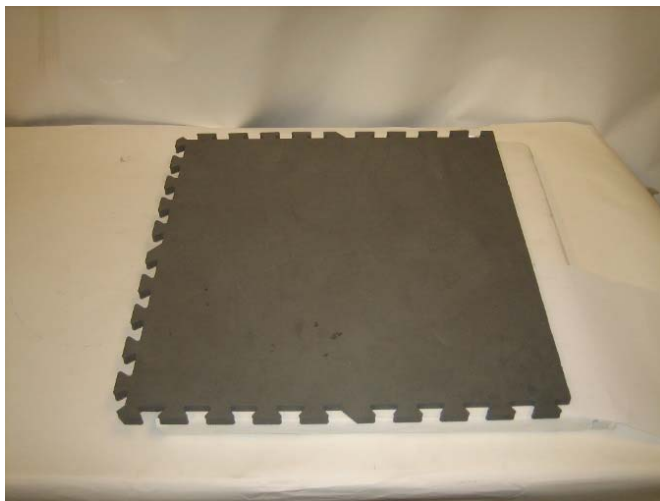
(16x) Normal Tiles

Normal tiles, are unmodified. These will be used on the "inside" of the field. There should be (16) of these per field.



(4x) Corner Tiles

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



(16x) Edge Tiles

Edge tiles have their interlocking tabs cut away on ONE edge. These will be used along the edges of the field. There are (16) per field.

Tabs should be easily removed with a sharp knife or razor blade. When the tiles are assembled, there should be a smooth edge around the entire perimeter.

Important:

Before modifying ANY tiles, check to ensure your set of tiles NEEDS modification.




C	E	E	E	E	C
E	N	N	N	N	E
E	N	N	N	N	E
E	N	N	N	N	E
E	N	N	N	N	E
C	E	E	E	E	C

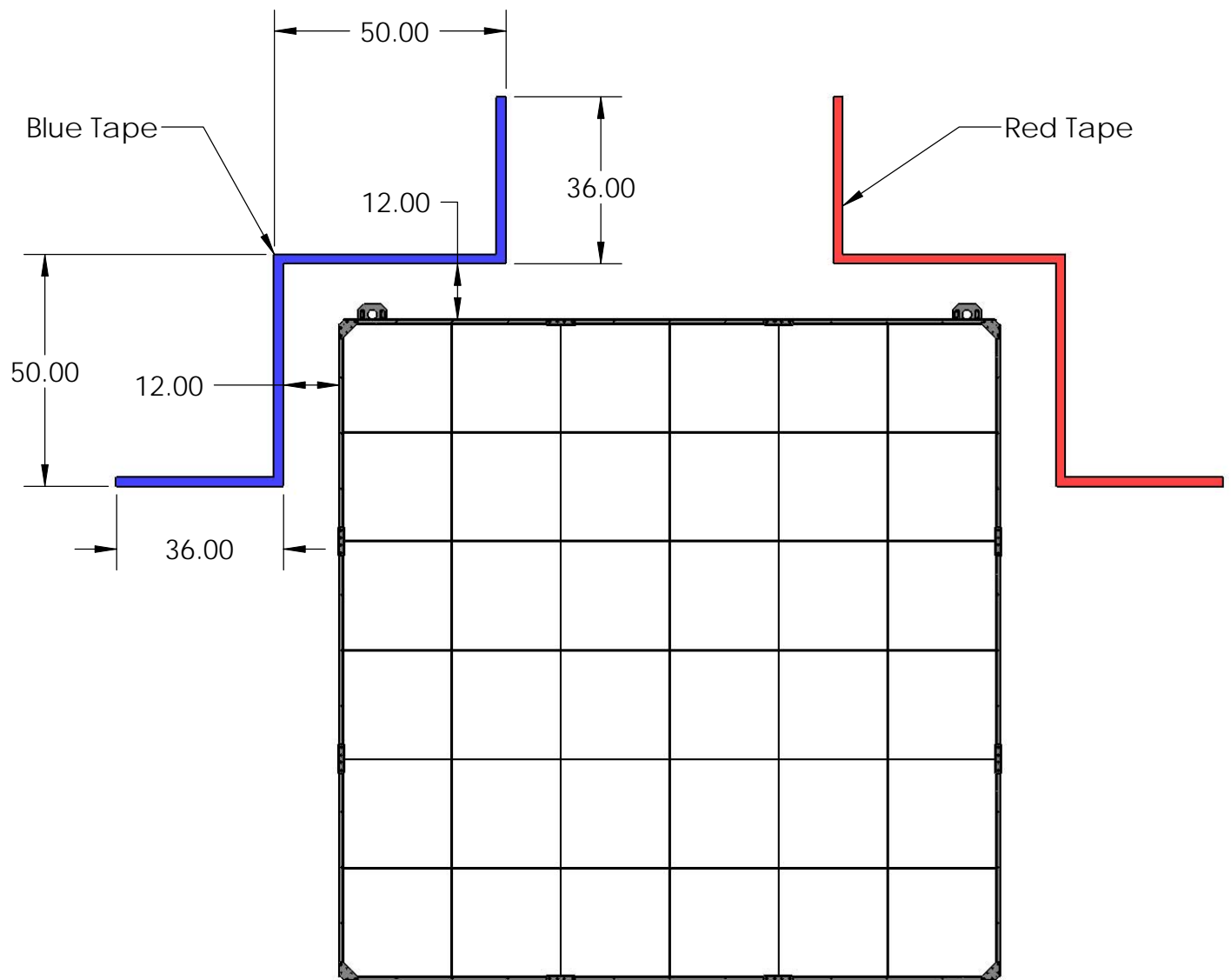
N = Normal Tile (16X)
C = Corner Tile (4X)
E = Edge Tile (16X)

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", within the field perimeter.

The grid-lines shown are for reference only.

	Description Tile Floor Assembly		 
	Dwg No VRC10-FIELD-ASSY		
	Competition VRC - Clean Sweep	Sheet 3 of 13	
	Release 4/27/2009	ALL DIMENSIONS ARE IN INCHES.	





CROWD

Once the Field Perimeter is in its final position, mark off the Driver Stations using red and blue tape. One station should be blue, and one should be red.

Apply the tape as shown above, do not close the back of the driver-boxes.

The Driver Stations should wrap around two adjacent corners.

	Description Driver Station Layout		www.VEXROBOTICS.com
	Dwg No VRC10-FIELD-ASSY		
	Competition VRC - Clean Sweep	Sheet 4 of 13	
	Release 4/27/2009	ALL DIMENSIONS ARE IN INCHES.	

Important Note:
Apply tape carefully and slowly for best result.
Smooth out all bubbles.



Step 1




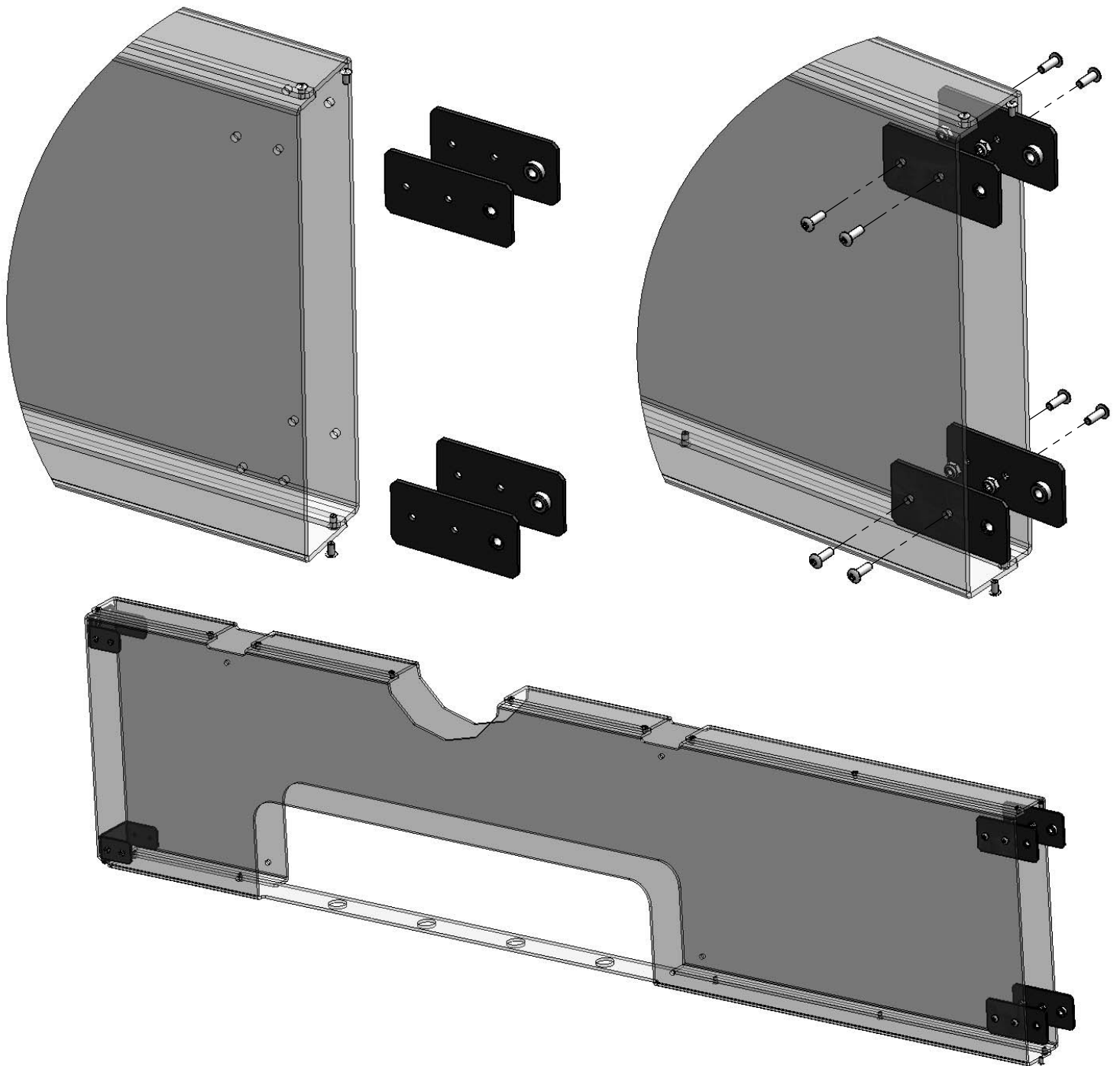
Step 2 & 3



Step 4 & 5

1. Remove the paper cover from the Lexan Goal Panels.
 2. Lay out (3) Lexan Panels on a flat surface as shown above. Ensure that ONE panel has mounting holes in it.
- Leave a 1/4" gap between the panels (about the width of a pencil).
3. Place a strip of colored gaffers tape between each panel. Place the tape directly centered over the gap.
 4. Flip the panel over, and repeat step 2 on the back side. Ensure the tape on the "back side" is lined up over the tape on the "front side".
 5. Bend the assembly along the seams such that it forms an equilateral triangle. Apply tape along the outside edge to complete the triangle.
 6. Apply a strip of tape to the inside seam to reinforce the assembly.
 7. One field consists of :
 - (2x) Red Goals - (2x) Blue Goals

	Description		Goal Assembly	www.VEXROBOTICS.COM	
	Dwg No		VRC10-FIELD-ASSY		
	Competition		VRC - Clean Sweep	Sheet 5 of 13	
	Release		4/27/2009	ALL DIMENSIONS ARE IN INCHES.	

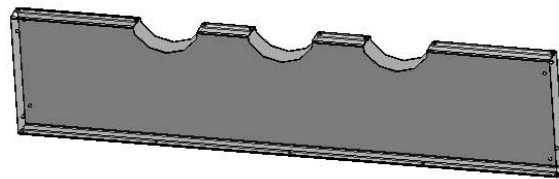
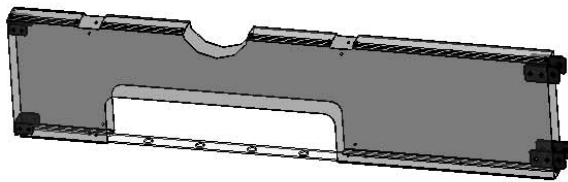


Install the Wall Joint Plates into the Side Wall Assemblies.

Attach (4X) Wall Joint Plates using (2X) 8-32 x 1/2" Long Button Head Screws and (2X) 8-32 Nylock Nuts on each plate.

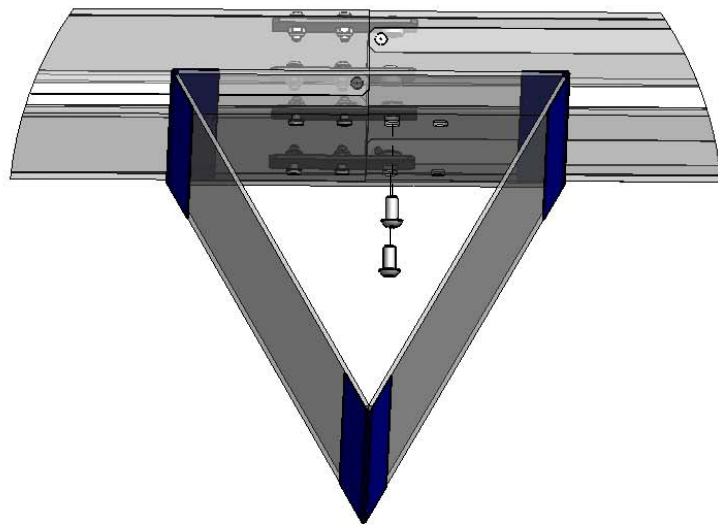
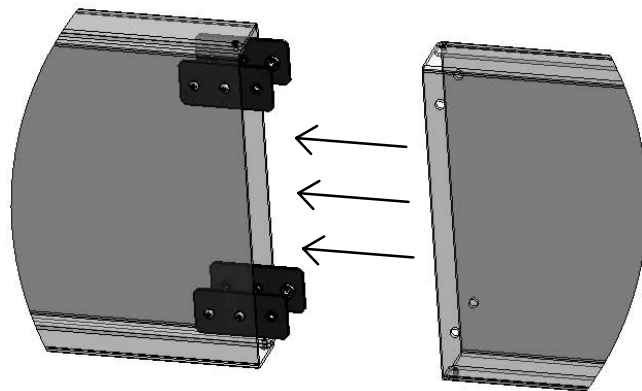
Ensure to install the plates in the orientation shown with the pre-installed PEM nuts facing inwards.

Repeat for (2X) Side Wall Assemblies per Field!



Slide the Center Wall Assembly onto one of the Side Wall Assemblies from Page 6.

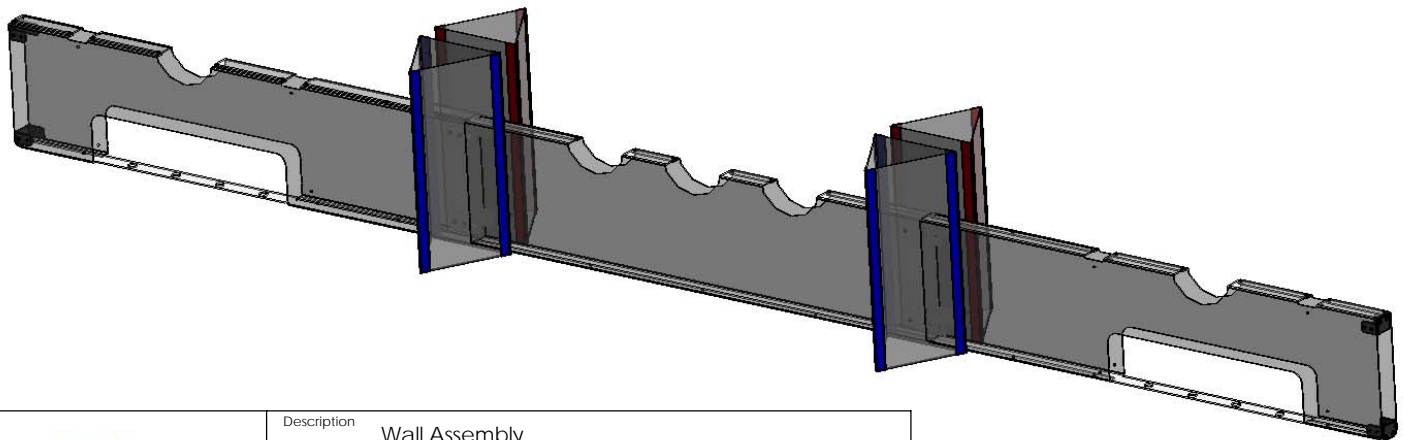
The screws that hold these wall sections together are the same screws used to attach the triangular goals built on Page 5.

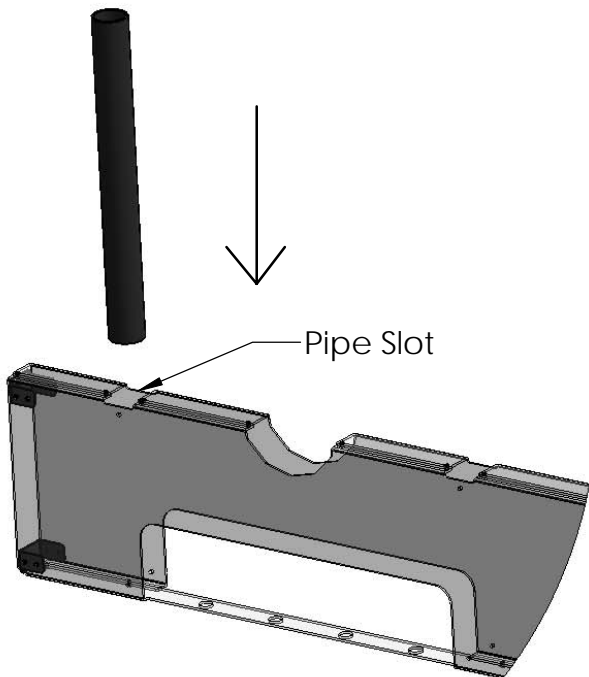


Using (2X) 1/4-20 x 1/2" Long Bolts attach the triangular goal to the wall while joining the Side Wall Assembly with the Center Wall Assembly.

Screw these bolts into the 1/4-20 PEM Nuts which are pre-installed in the Wall Joint Plates.

Repeat (4X) to complete the Wall Assembly. Ensure that both Blue Goals are on one side of the wall, and both Red Goals are on the other side.



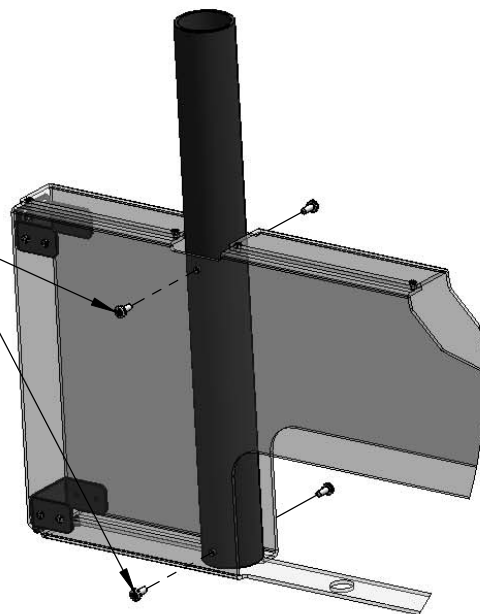


Slide one of the 18" Long 1-1/2" PVC pipes into one of the slots on top of the Side Wall Assembly.

The bottom of the pipe should be flat on the lexan at the bottom of the Side Wall Assembly.

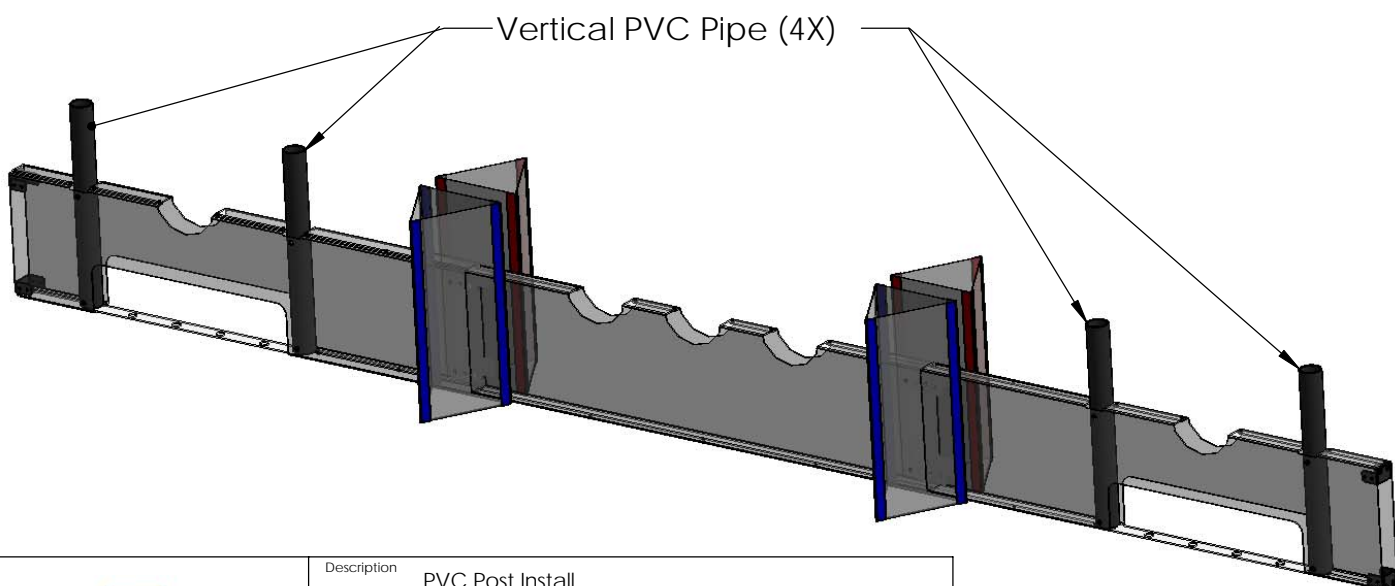
Ensure the pipe is placed vertically. Use the side of the ball slot in the wall as a reference edge. The pipe should be flush with the edge of the ball slot.

#10 Sheet Metal Screw (4x)

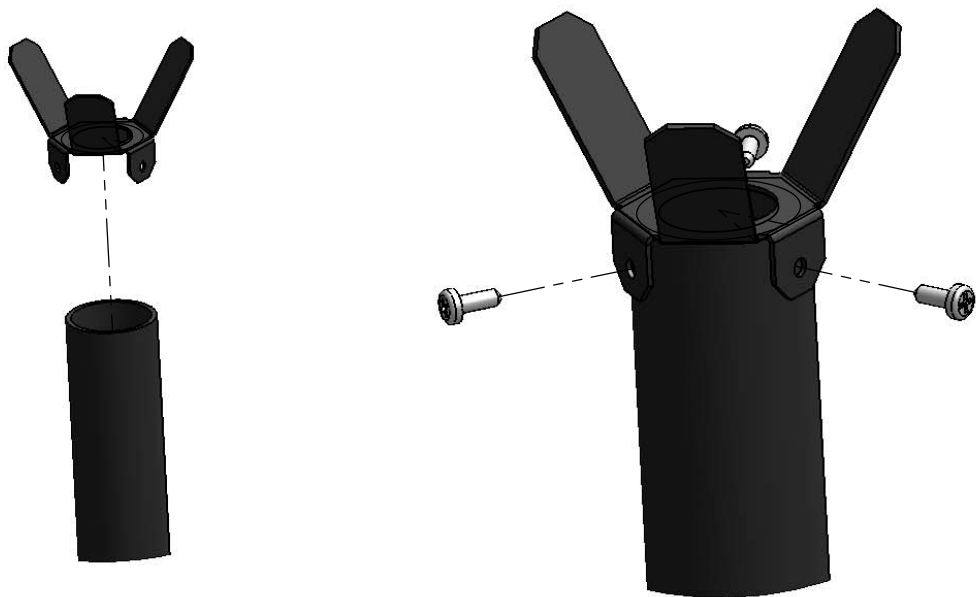


Using a #2 Phillips Head Screwdriver, install (4x) #10 x 1/2" Long Sheet Metal Screws through the holes in the Side Wall Assembly and into the PVC pipe. These (4X) Screws will hold the pipe in place.

Repeat this process for (4X) PVC pipes, as shown below.



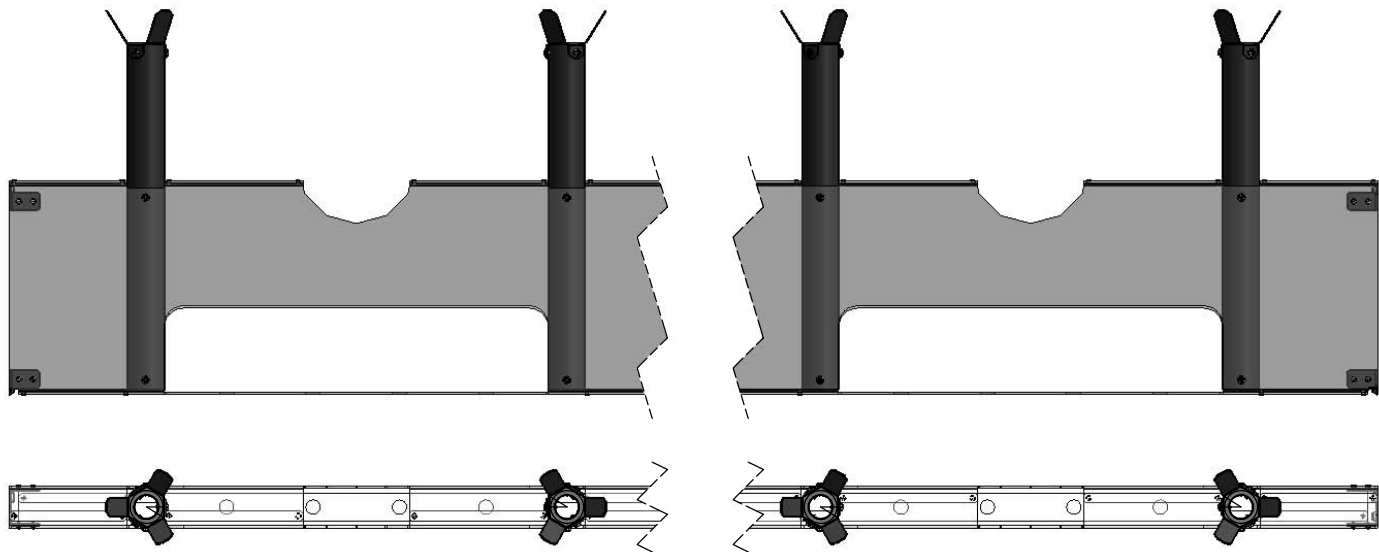
Install a Medium Ball Tee Sheetmetal Bracket onto the tip of one of the PVC posts from page 8. The bracket should easily slide over the top of the post, as shown below. Ensure the bracket is fully seated on the pipe, and is in the correct orientation (per overall view, below).



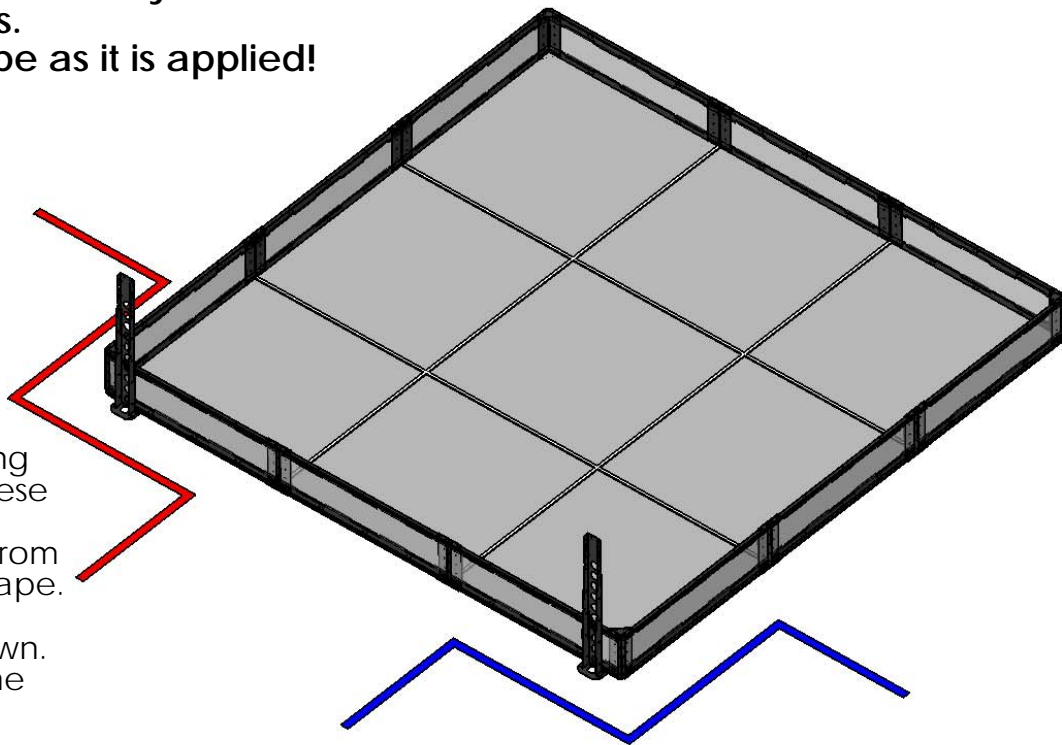
Attach the Ball Tee Bracket to the PVC post using (3X) #10 x 1/2" Long Sheet Metal Screws. Thread these screws through the mounting holes in the sheet metal bracket into the PVC pipe using a #2 Phillips Head screwdriver.

Before installing screws, ensure the tee bracket is in the correct orientation! (See below).

Repeat for (4X) Ball Tee Brackets in the orientations shown.



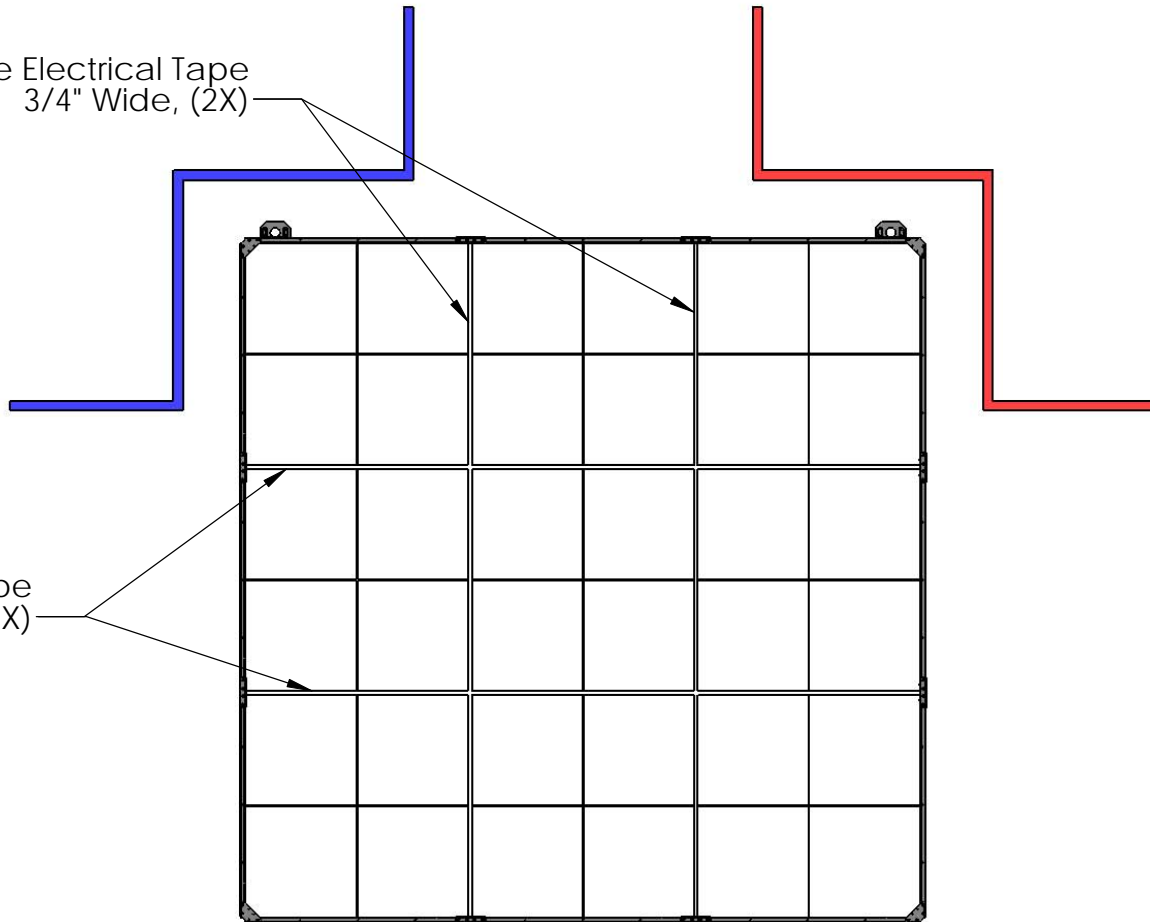
Important Note:
 Apply tape carefully and slowly for best result.
 Smooth out all bubbles.
 Do not "stretch" the tape as it is applied!



There are (4X) lines stretching across the playing field. These lines are used for robot line following. They are made from 3/4" wide White Electrical Tape.

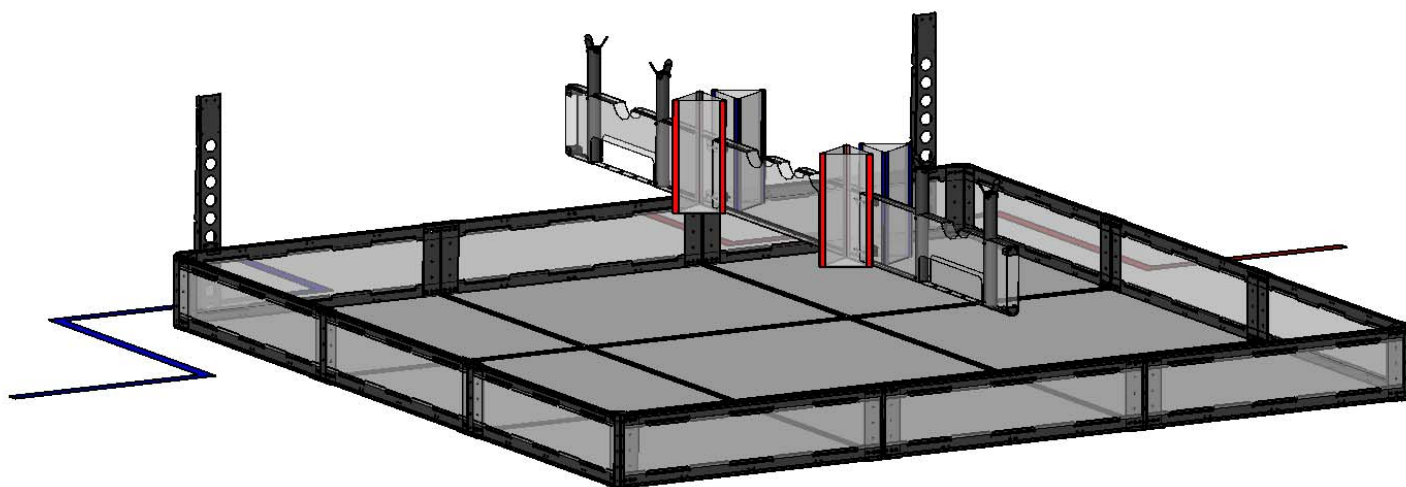
Apply the tape lines as shown. They should lay on top of the foam tile seams.

White Electrical Tape
 3/4" Wide, (2X)



White Electrical Tape
 3/4" Wide, (2X)

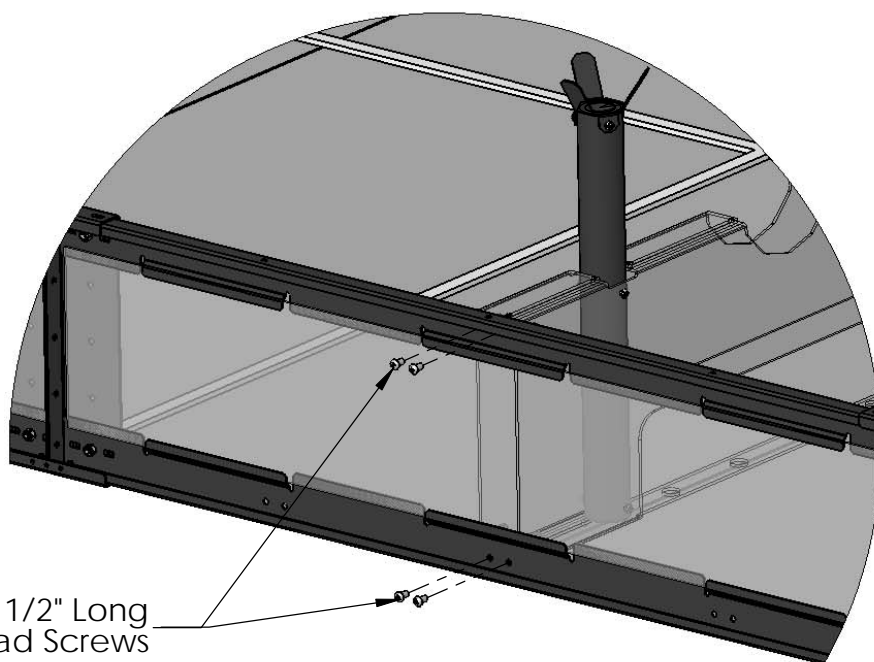
Install the Wall Assembly into the VL-FIELD perimeter frame. The Wall should divide the field in half, as shown. Ensure the colored goals are on the correct side of the field (they should be opposite their respective alliance stations).



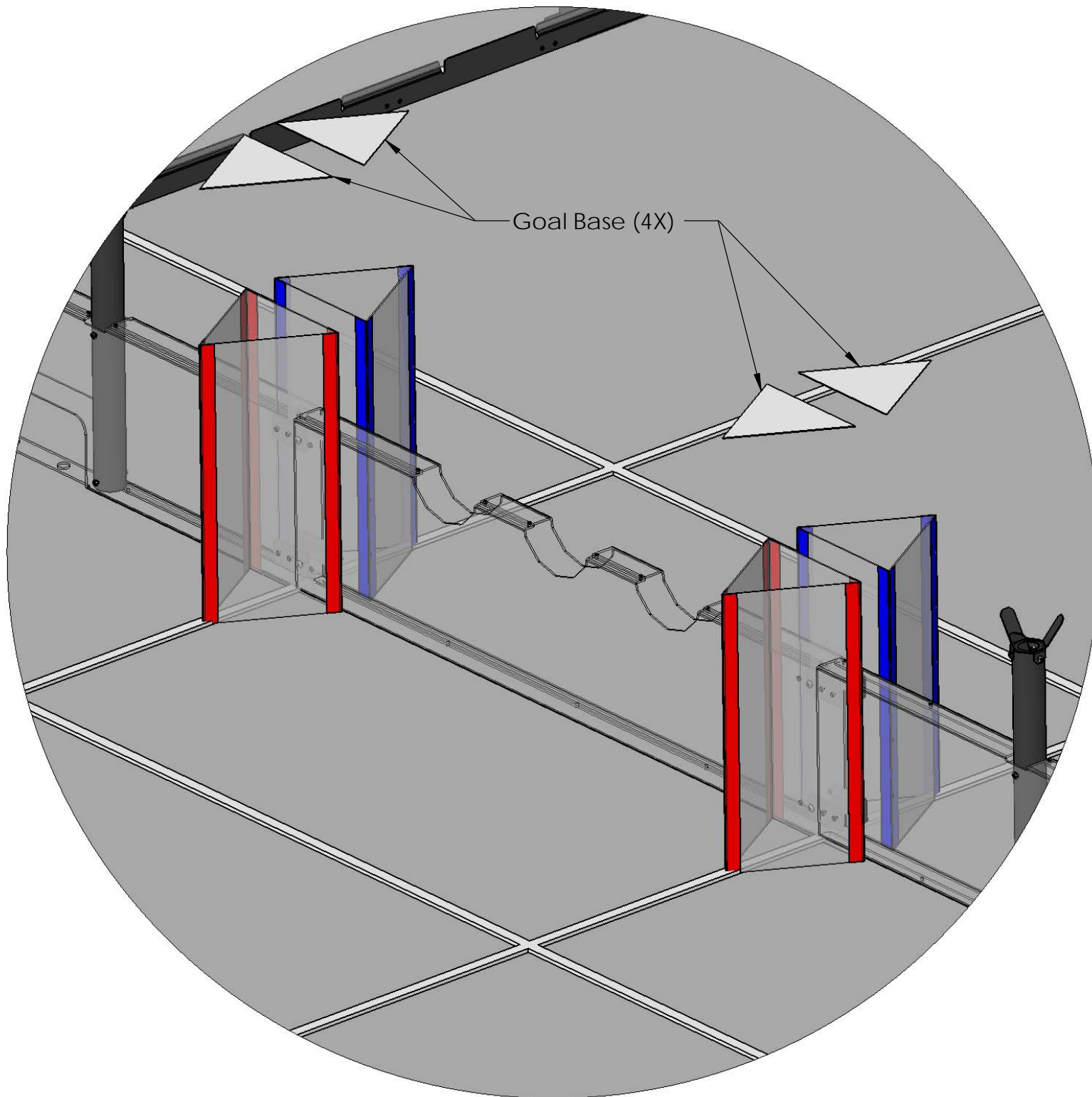
Attach the Wall Assembly to the VL-FIELD Perimeter using (8X) 1/4-20 x 1/2" Long Button Head Screws.

These screws install into PEM nuts which are mounted in brackets of the Side Wall Assemblies.

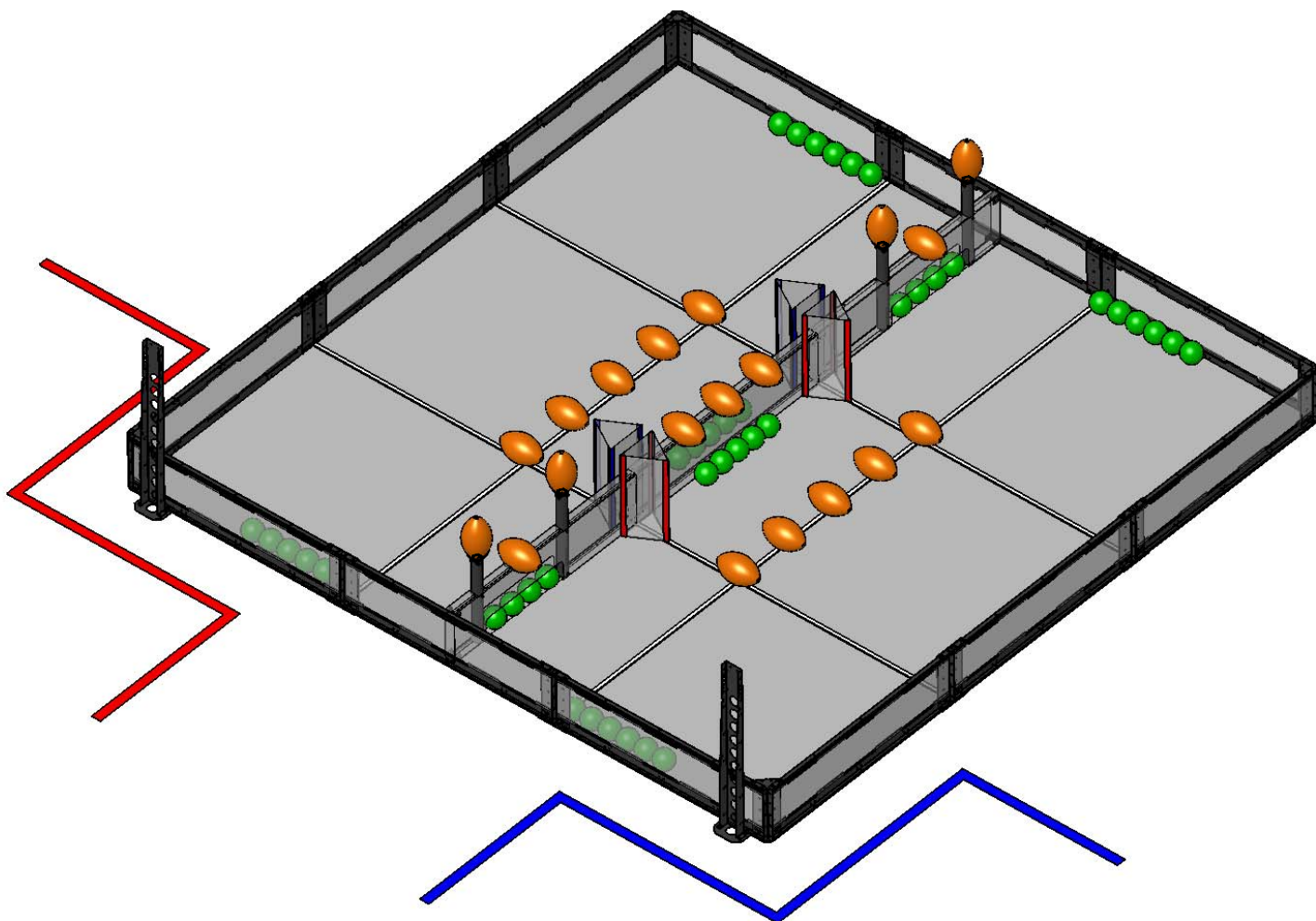
(4X) Screws are used on each side of the wall.



(8X) - 1/4-20 x 1/2" Long
Button Head Screws



Insert Triangular Cardboard Goal Bases into all (4X) Goals.
Place them with the white finished surface facing upwards.



Place Medium Balls & Small Balls on the field in the locations shown.

Refer to the VEX Clean Sweep Game Manual for more details including all official rules and regulations.

Use the 3D CAD model of the VEX Clean Sweep field for additional details not shown in the Field Drawings.

