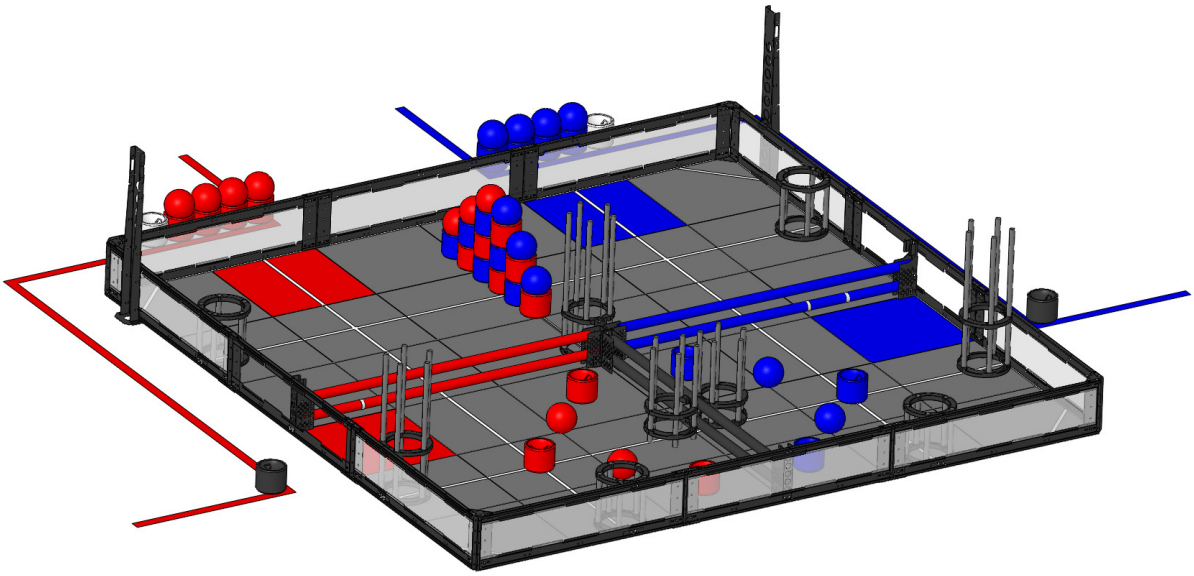
VEX ROBOTICS COMPETITION GATEWAY

Field Specs & Assembly Instructions



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A APPENDIX

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 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 (if you don't see a dimension on one of our drawings, measure it virtually in the CAD model). 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 *VEX Gateway* competition manual.

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

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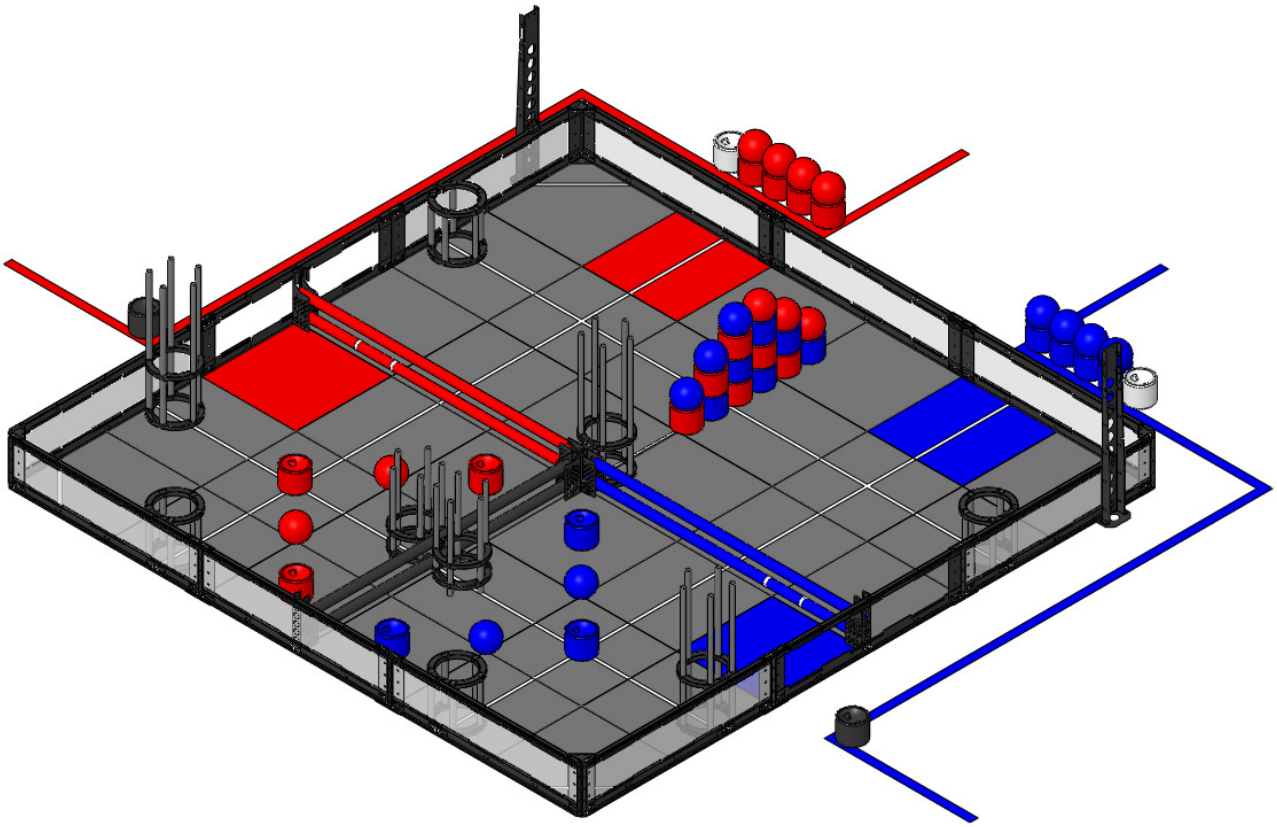
Field Overview

The game *VEX Gateway* is played on a 12 ft x 12 ft foam-mat, surrounded by a sheet-metal and lexan perimeter. The field is divided into three sections by a stationary fence and two gates which are raised during match play. Attached to the fence and to the field perimeter are circular goals which robots may place game objects into. Spread around the field, and in the alliance starting positions are plastic balls and barrels. For more details and specific game-play rules, please refer to the *VEX Gateway* competition manual.



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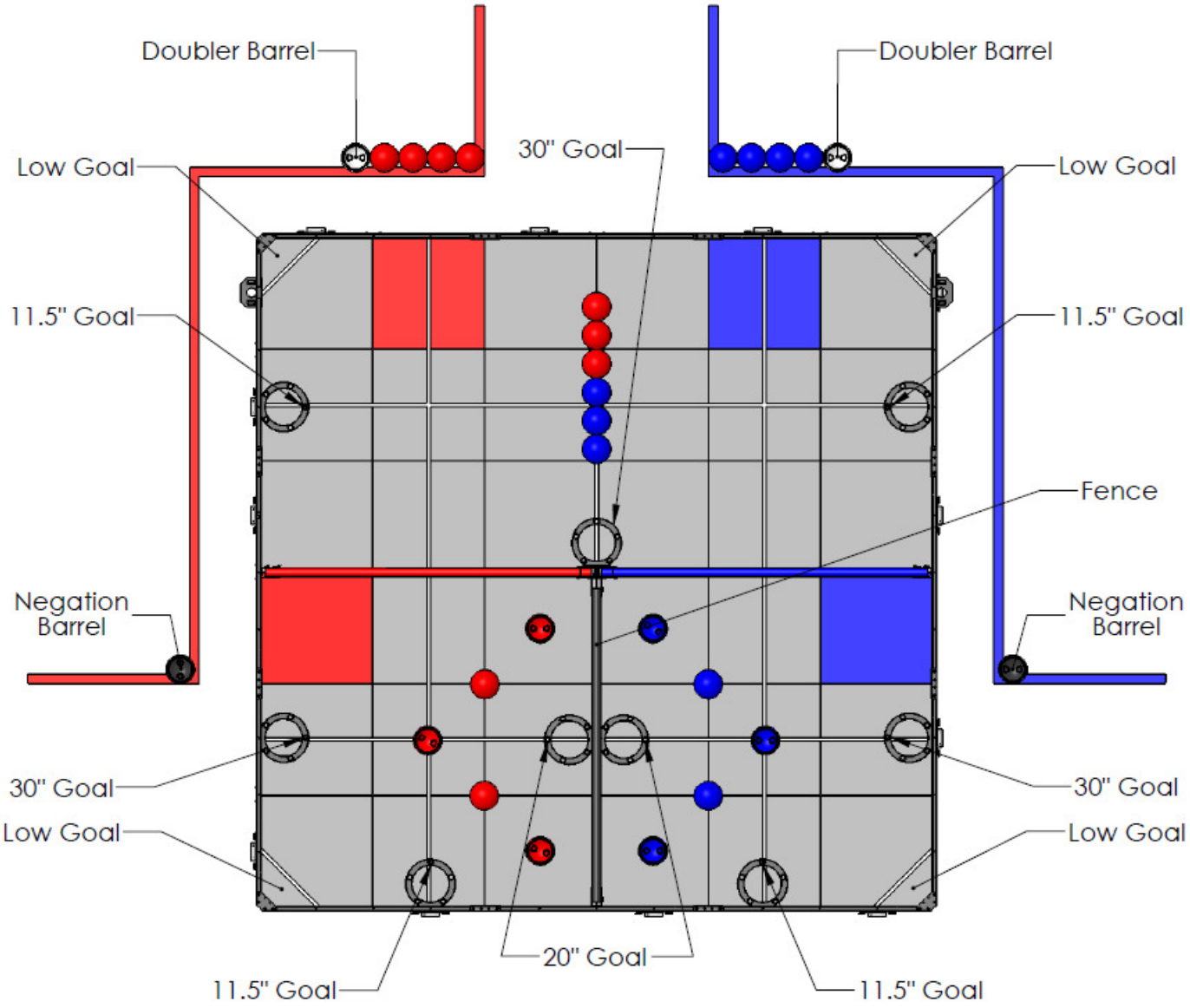

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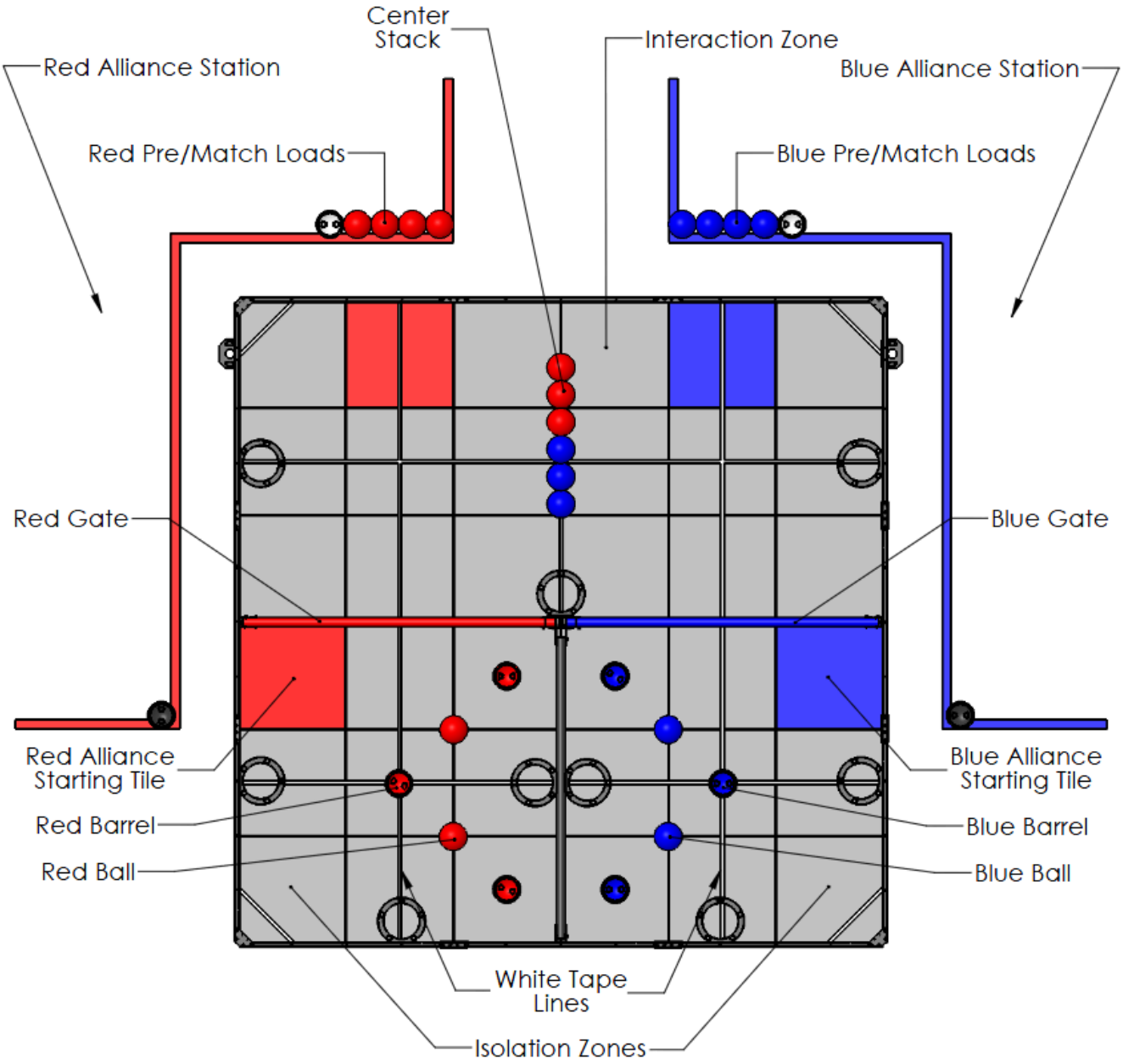
VEX Robotics Competition – *Gateway*



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VEX Robotics Competition

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
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	$ 199.99

Total Price $ 1,189.97

Official *VEX Gateway* Specific Elements

Part Number	Description	Price
276-1355	ALL Official *VEX Gateway* Field & Game Objects	$ 499.99

(1) Fence Assembly
(2) Lifting Gate Asseblies
(9) Circular Goals
(1) Roll 2" Wide Red Tape
(1) Roll 2" Wide Blue Tape
(1) Roll 3/4" Wide White Tape
(13) Red, (13) Blue, (2) Black, & (2) White Barrels
(9) Red & (9) Blue Balls
(40) Red & (40) Blue Robot Identification Flags

Total Price $ 499.99

Practice Elements

Part Number	Description	Price
276-2102	VEX Gateway Goal & Object Kit	$ 49.99

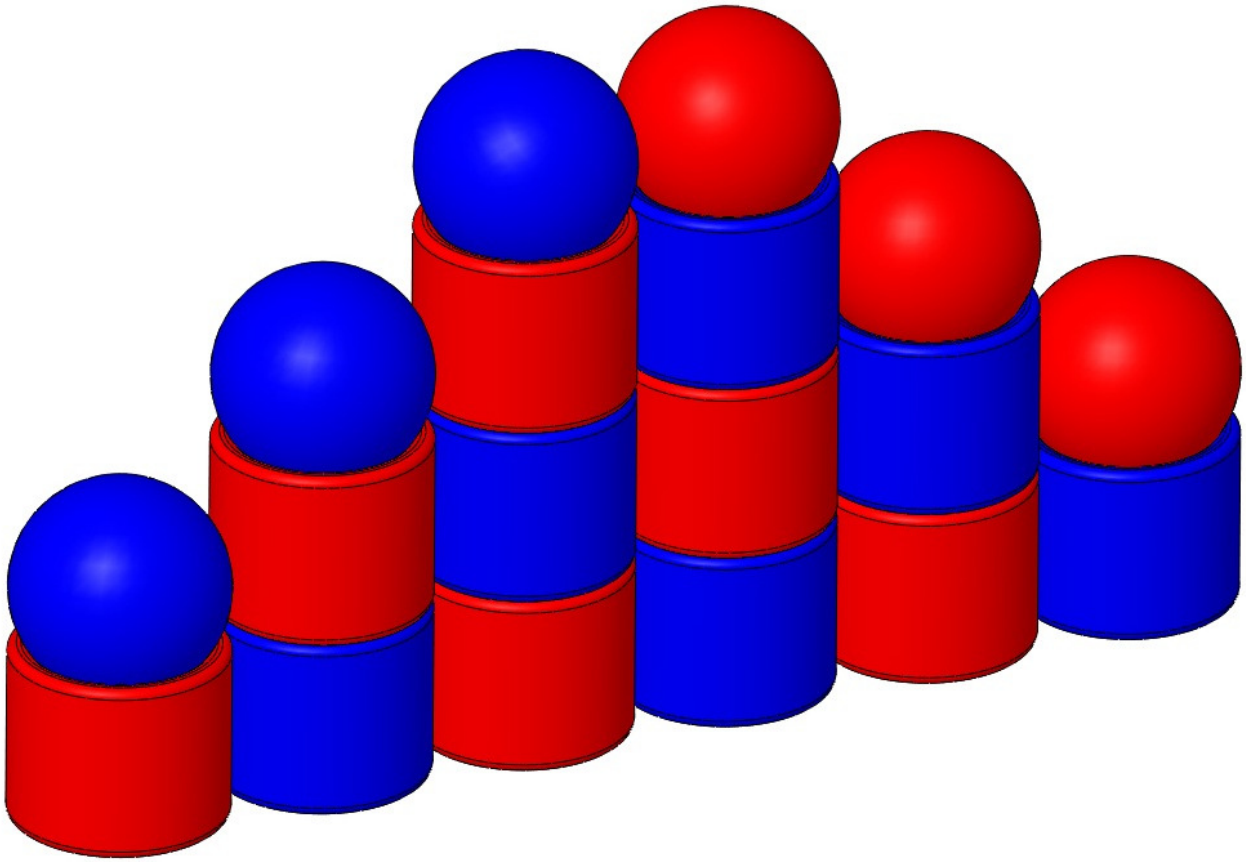
(2) Red & (2) Blue Barrels
(2) Red & (2) Blue Balls
(1) 30" Tall Circular Goal -- includes (2) Goal Rings & (5) 30" Posts

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 – *Gateway*. 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.



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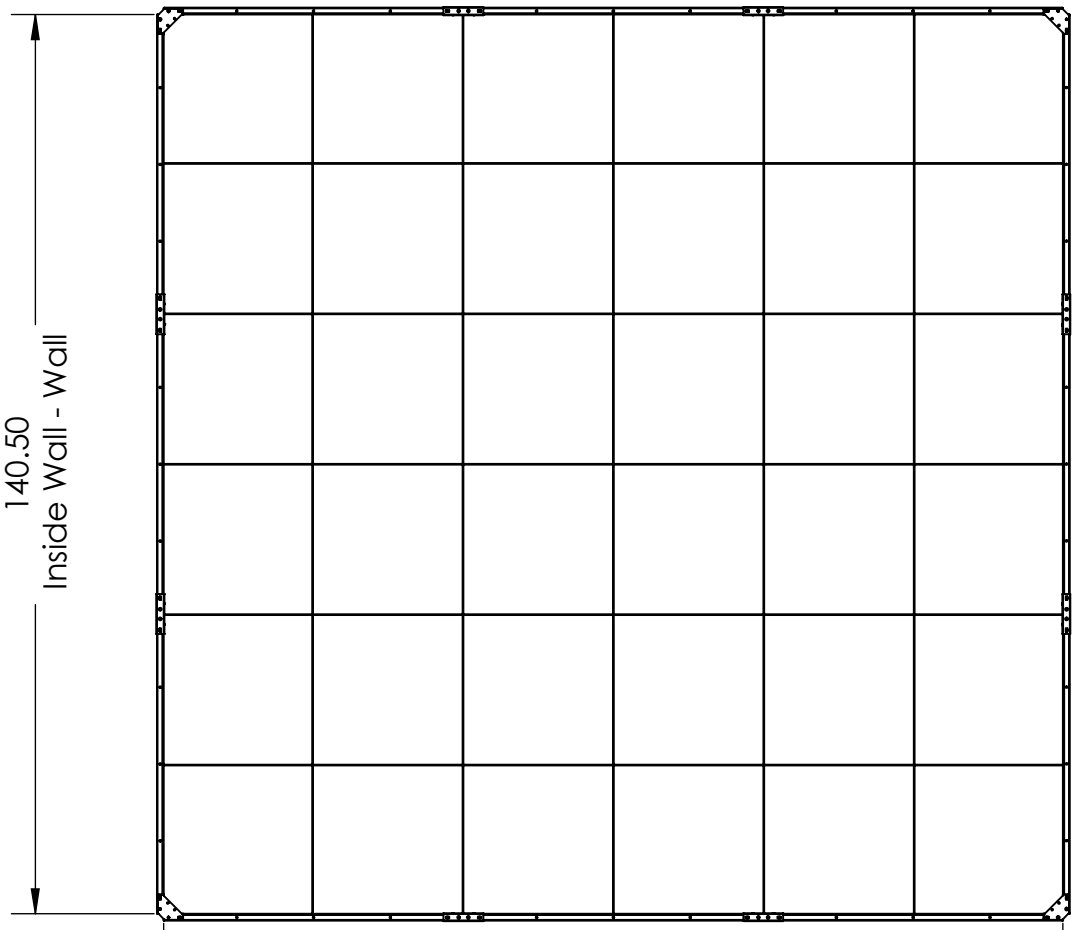
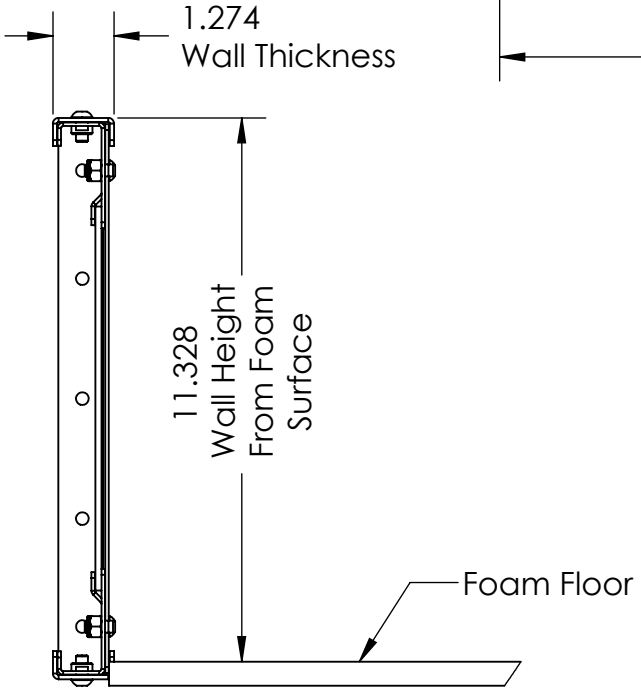




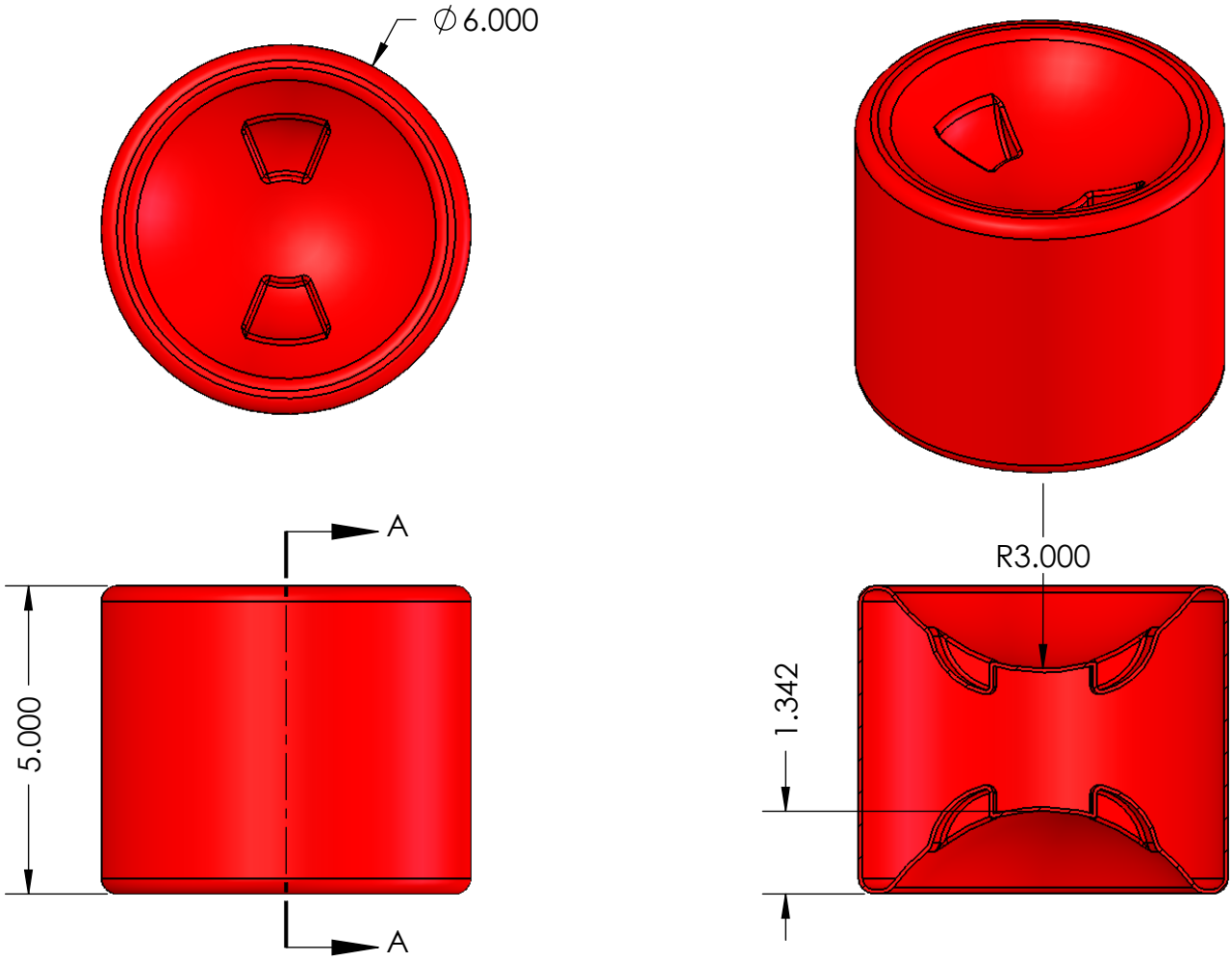
Field Critical Dimensions:

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

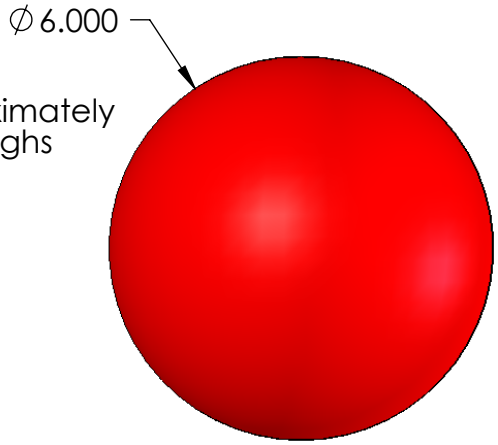
VEX ROBOTICS COMPETITION	Description	Field Perimeter Details	
	Dwg No	VRC12-FIELD-SPECS REV1	
	Competition	VRC - Gateway	Sheet 1 of 10
	Release	2/15/2011	**ALL DIMENSIONS ARE IN INCHES.**

There are nine (9) barrels and five (5) balls of each color on the field, not including pre-loads and match loads. Additionally, there are two (2) black barrels and two (2) white barrels.

Game Object dimensions may vary by as much as 1/4".

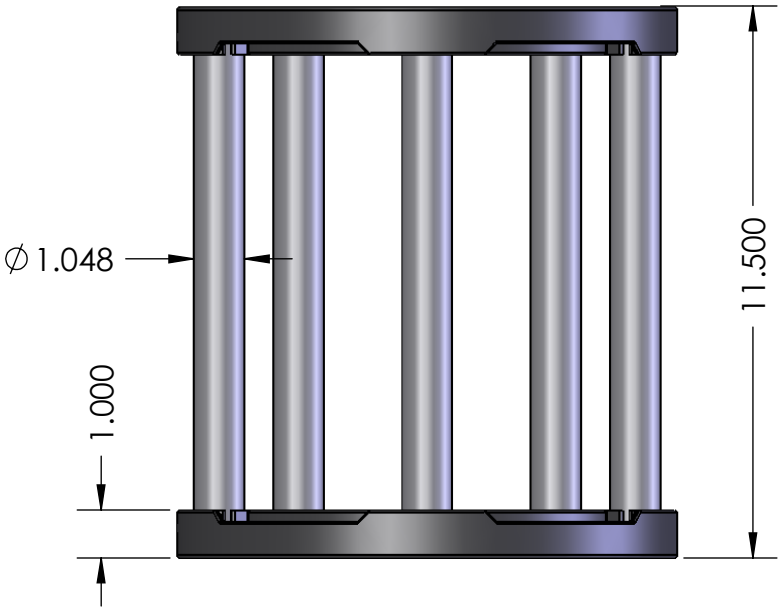


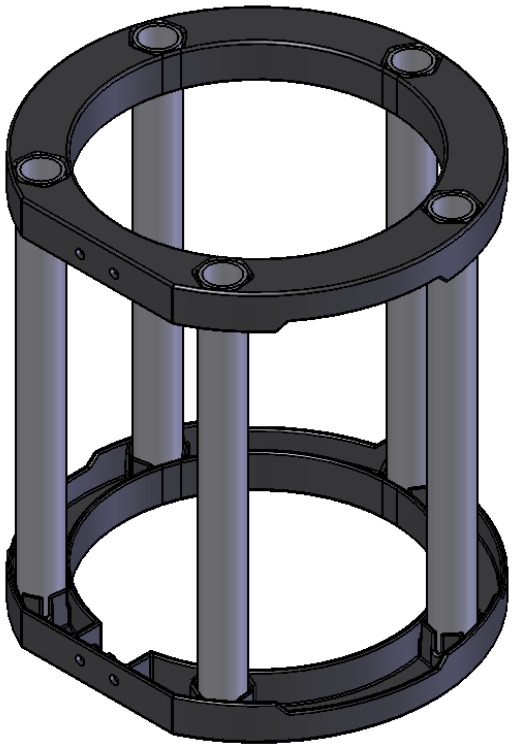
SECTION A-A
SCALE 1 : 3

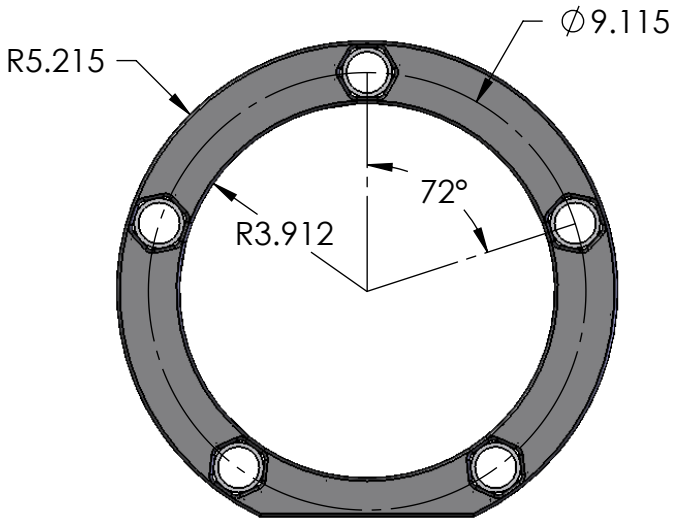


Each Barrel weighs approximately 0.53 lbs. and each Ball weighs approximately 0.24 lbs.

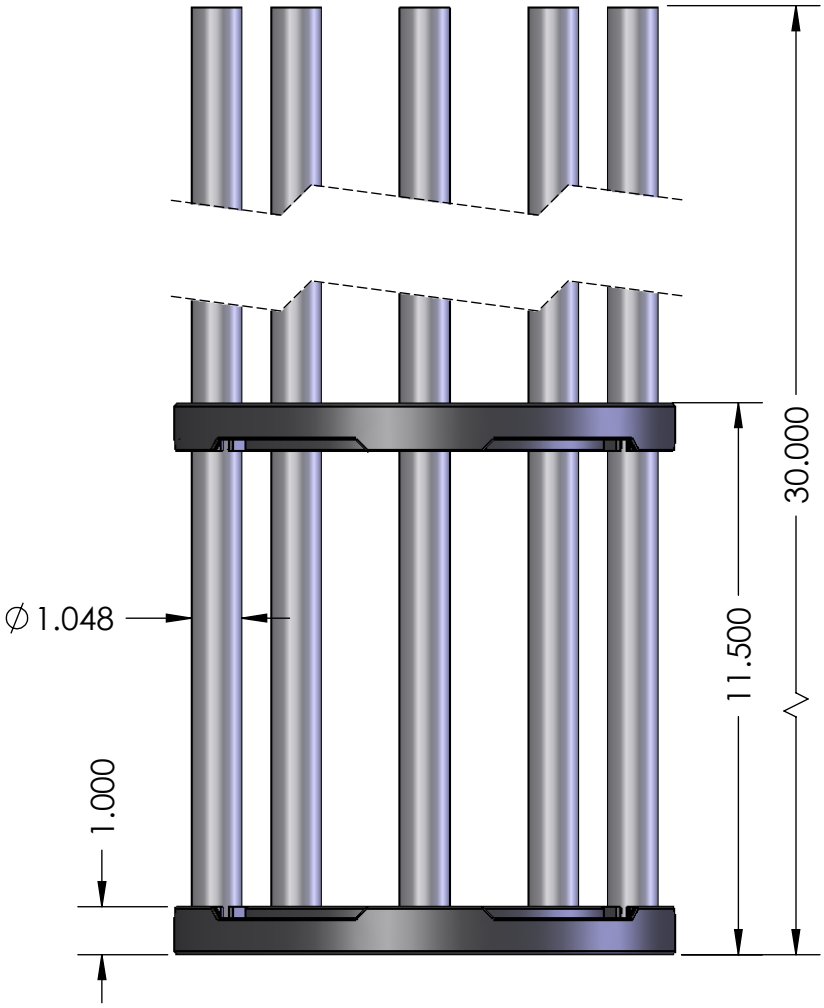
VEX ROBOTICS COMPETITION	Description	Game Object Details	
	Dwg No	VRC12-FIELD-SPECS REV1	
	Competition	VRC - Gateway	Sheet 2 of 10
	Release	2/15/2011	ALL DIMENSIONS ARE IN INCHES.

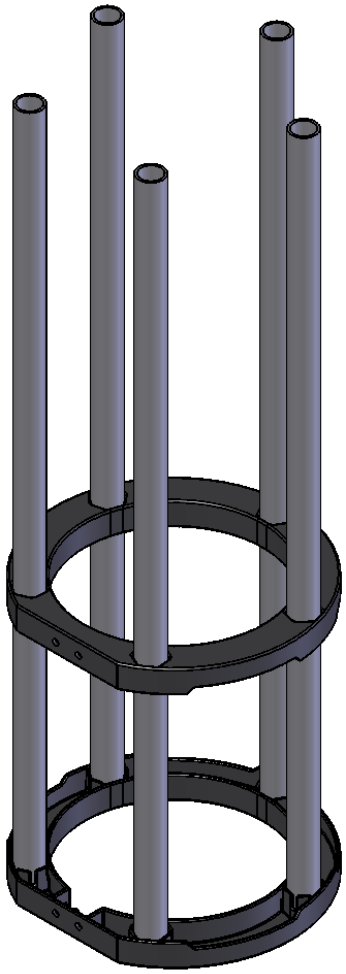


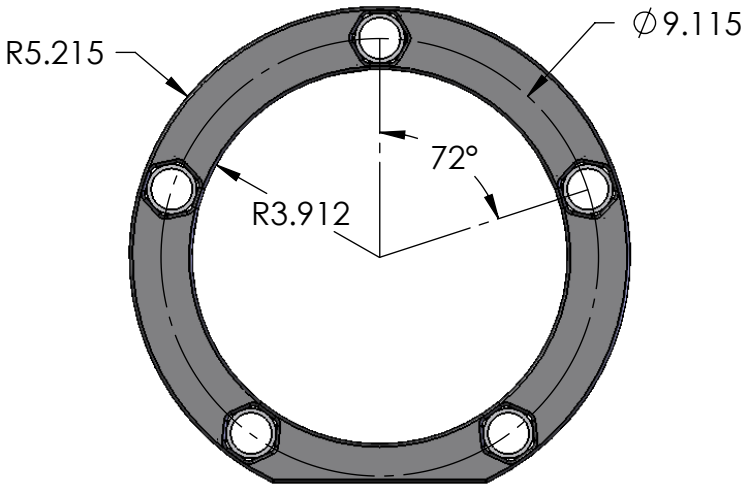




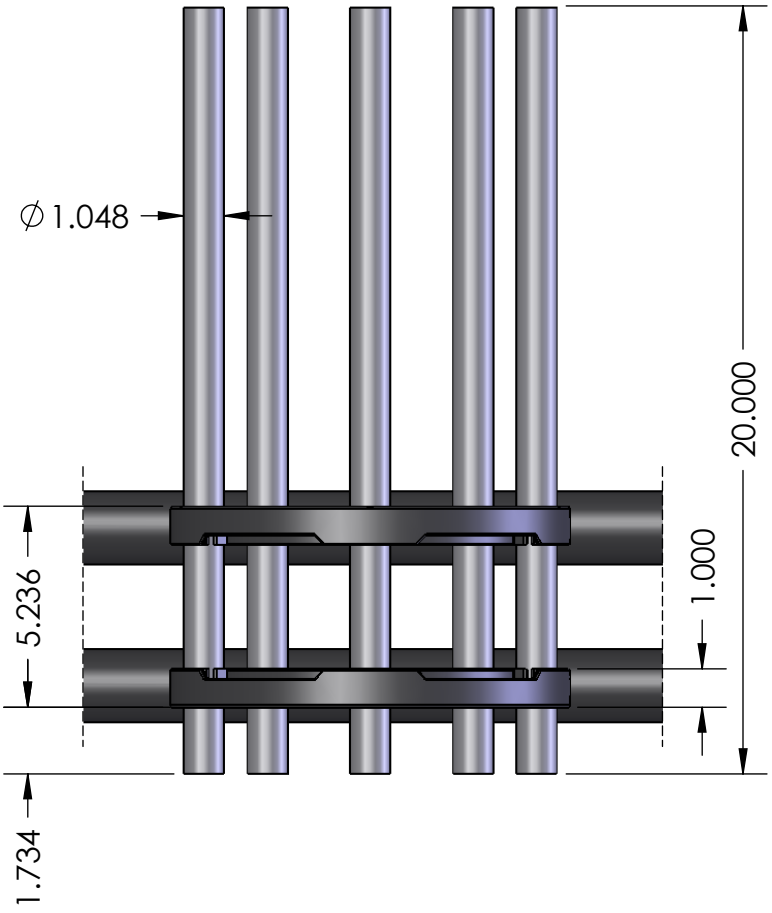
VEX ROBOTICS COMPETITION	Description	11.5" High Goal Details	
	Dwg No	VRC12-FIELD-SPECS REV1	
	Competition	VRC - Gateway	Sheet 3 of 10
	Release	2/15/2011	**ALL DIMENSIONS ARE IN INCHES.**

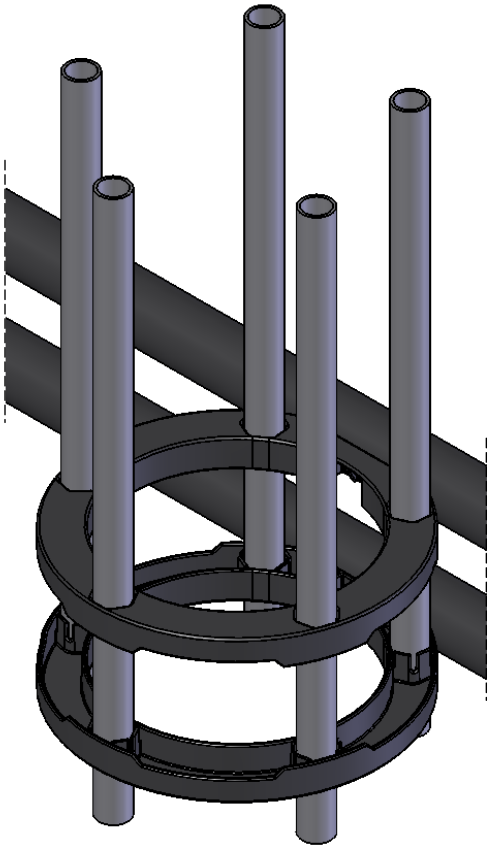


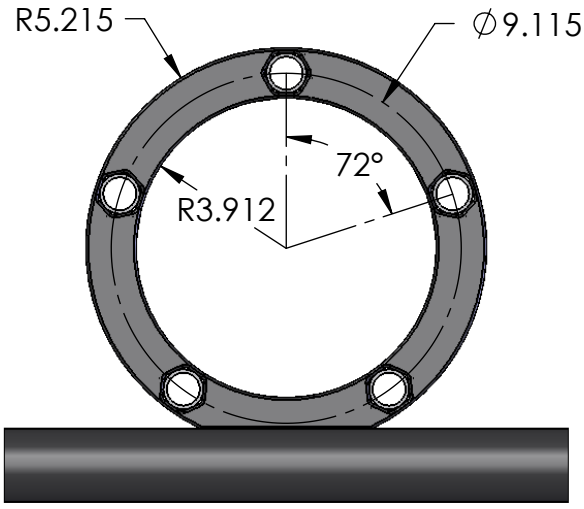




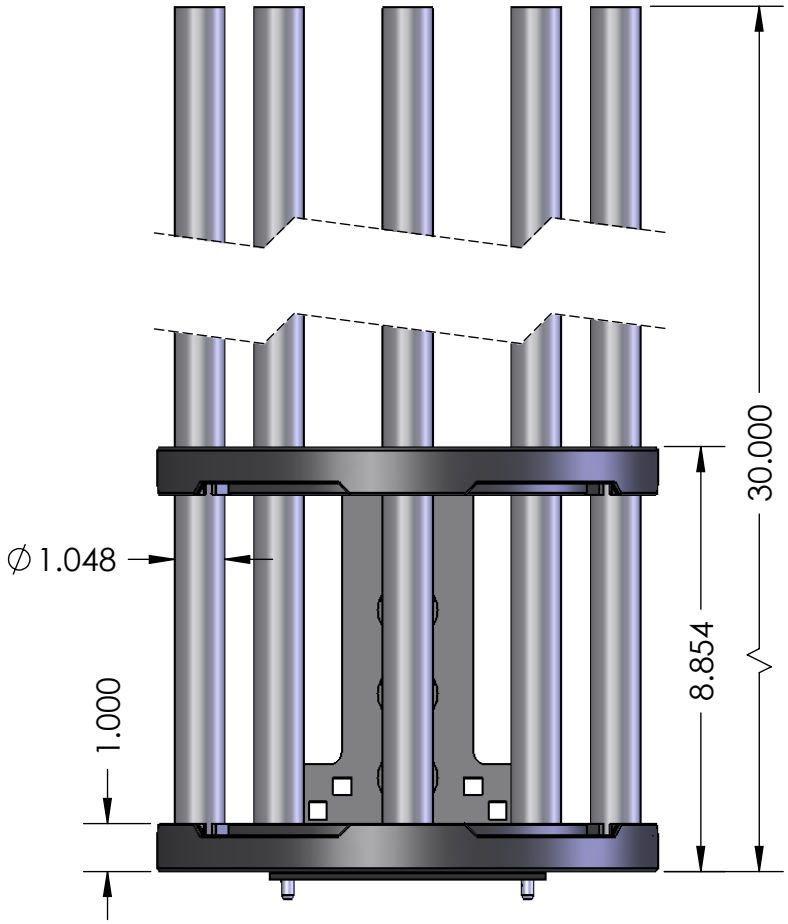
VEX ROBOTICS COMPETITION	Description	20" High Goal Details	
	Dwg No	VRC12-FIELD-SPECS REV1	
	Competition	VRC - Gateway	Sheet 4 of 10
	Release	2/15/2011	**ALL DIMENSIONS ARE IN INCHES.**

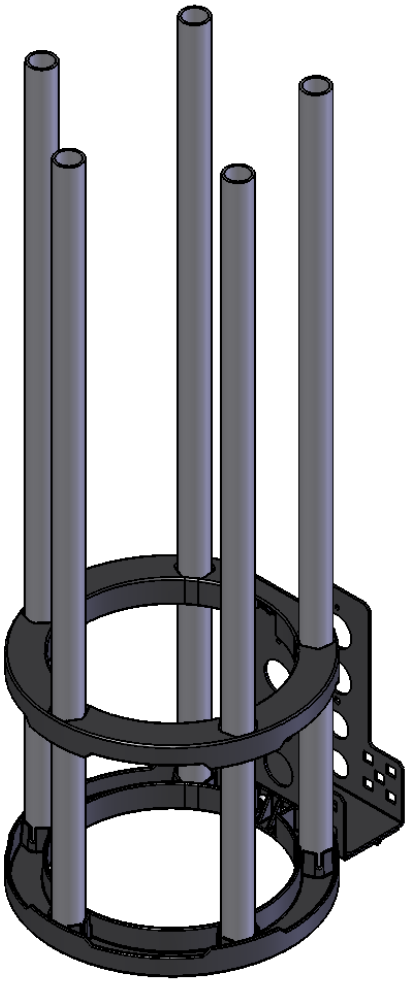


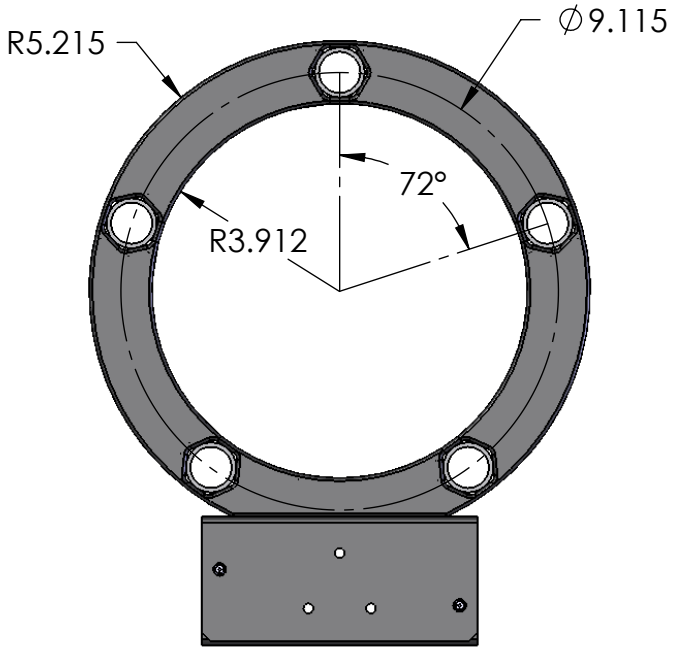




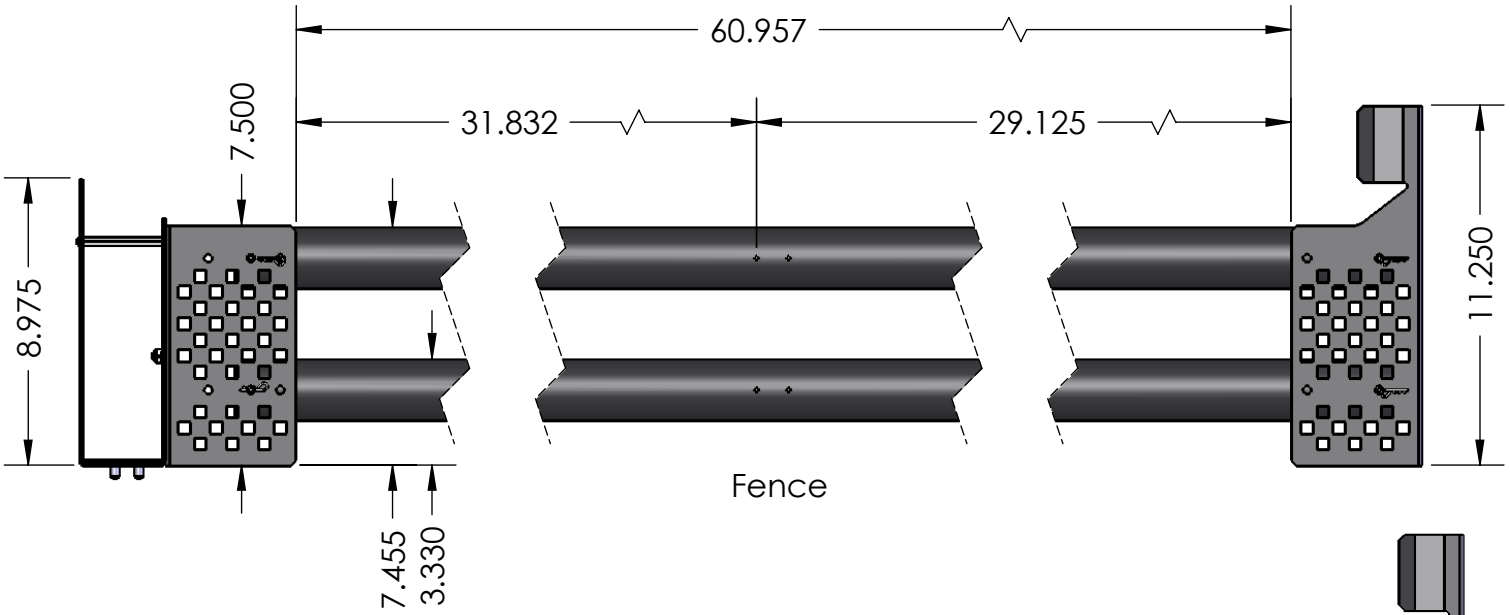
VEX ROBOTICS COMPETITION	Description	Fence Goal Details	
	Dwg No	VRC12-FIELD-SPECS REV1	
	Competition	VRC - Gateway	Sheet 5 of 10
	Release	2/15/2011	**ALL DIMENSIONS ARE IN INCHES.**

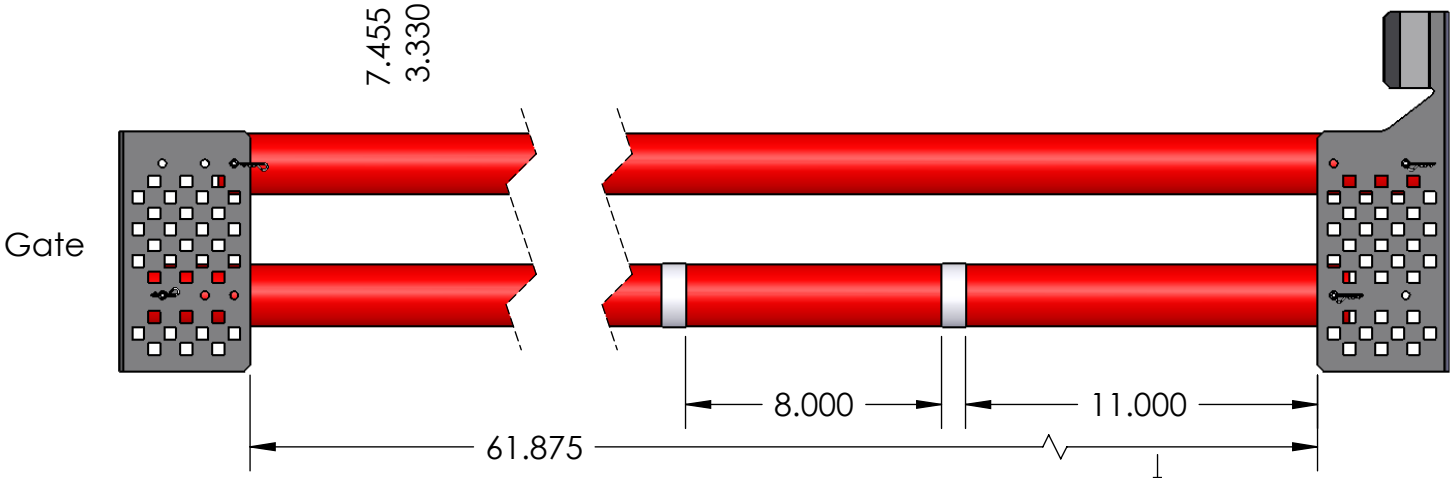


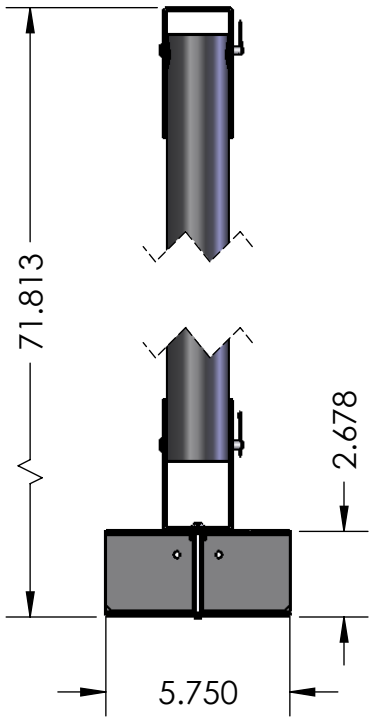




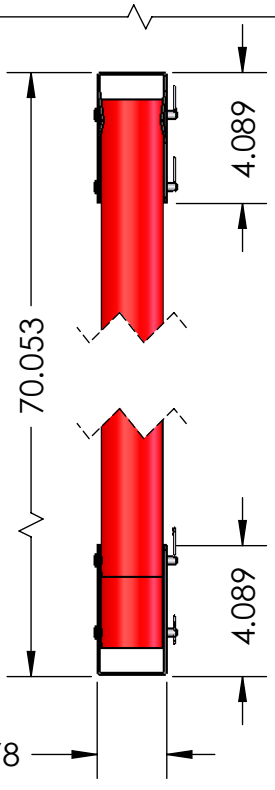
VEX ROBOTICS COMPETITION	Description	Center Post Goal Details	
	Dwg No	VRC12-FIELD-SPECS REV1	
	Competition	VRC - Gateway	Sheet 6 of 10
	Release	2/15/2011	ALL DIMENSIONS ARE IN INCHES.







Fence

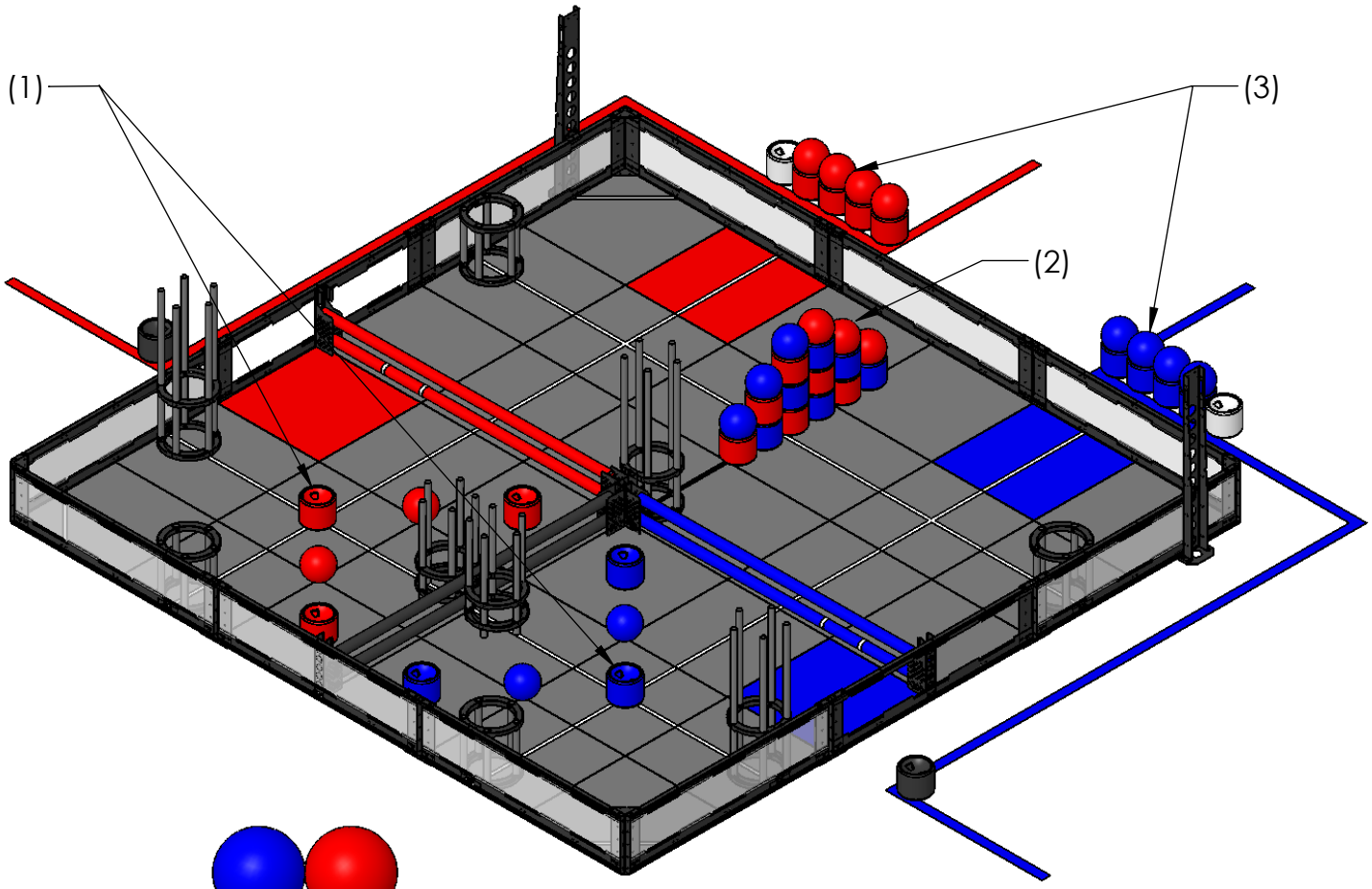


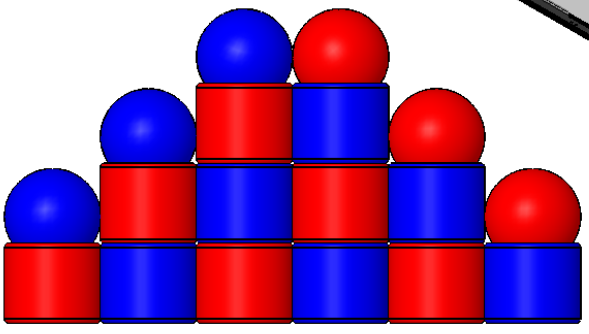
Gate

VEX ROBOTICS COMPETITION	Description	Fence and Gate Details	
	Dwg No	VRC12-FIELD-SPECS REV1	
	Competition	VRC - Gateway	Sheet 7 of 10
	Release	2/15/2011	ALL DIMENSIONS ARE IN INCHES.

The Balls and Barrels are placed on the field in as follows for the start of each match.

1. There are three (3) barrels and two (2) balls of the corresponding color within each of the Isolation Zones.
2. There are six (6) barrels and three (3) balls of each color assembled into a wall in the center of the Interaction Zone.
3. There are four (4) balls and four (4) barrels available for match and/or preloads within the driver station of each alliance.



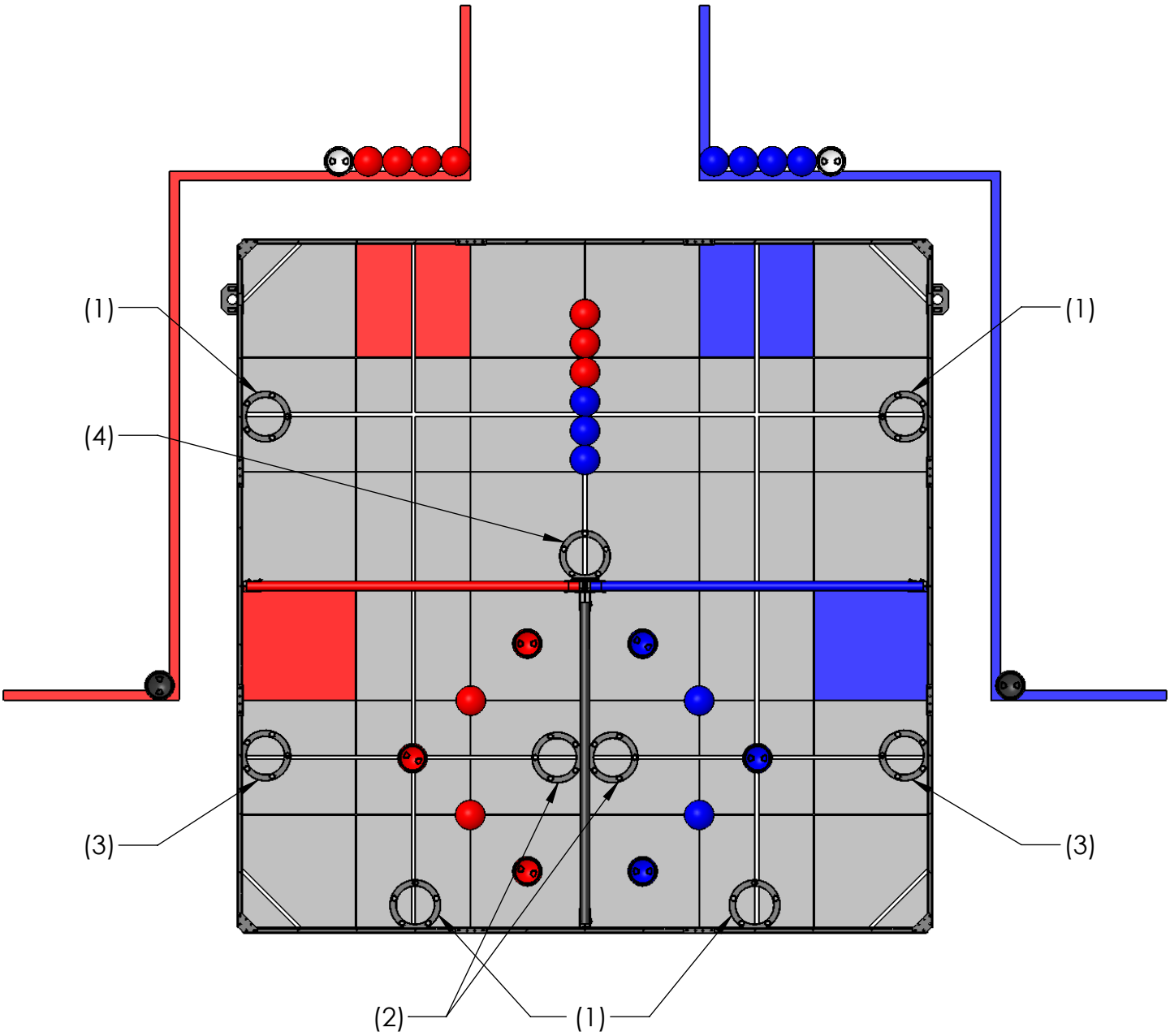


Center Stack

Balls and Barrels are placed at the junction of Foam Field Tiles, or at the center of tiles as shown.

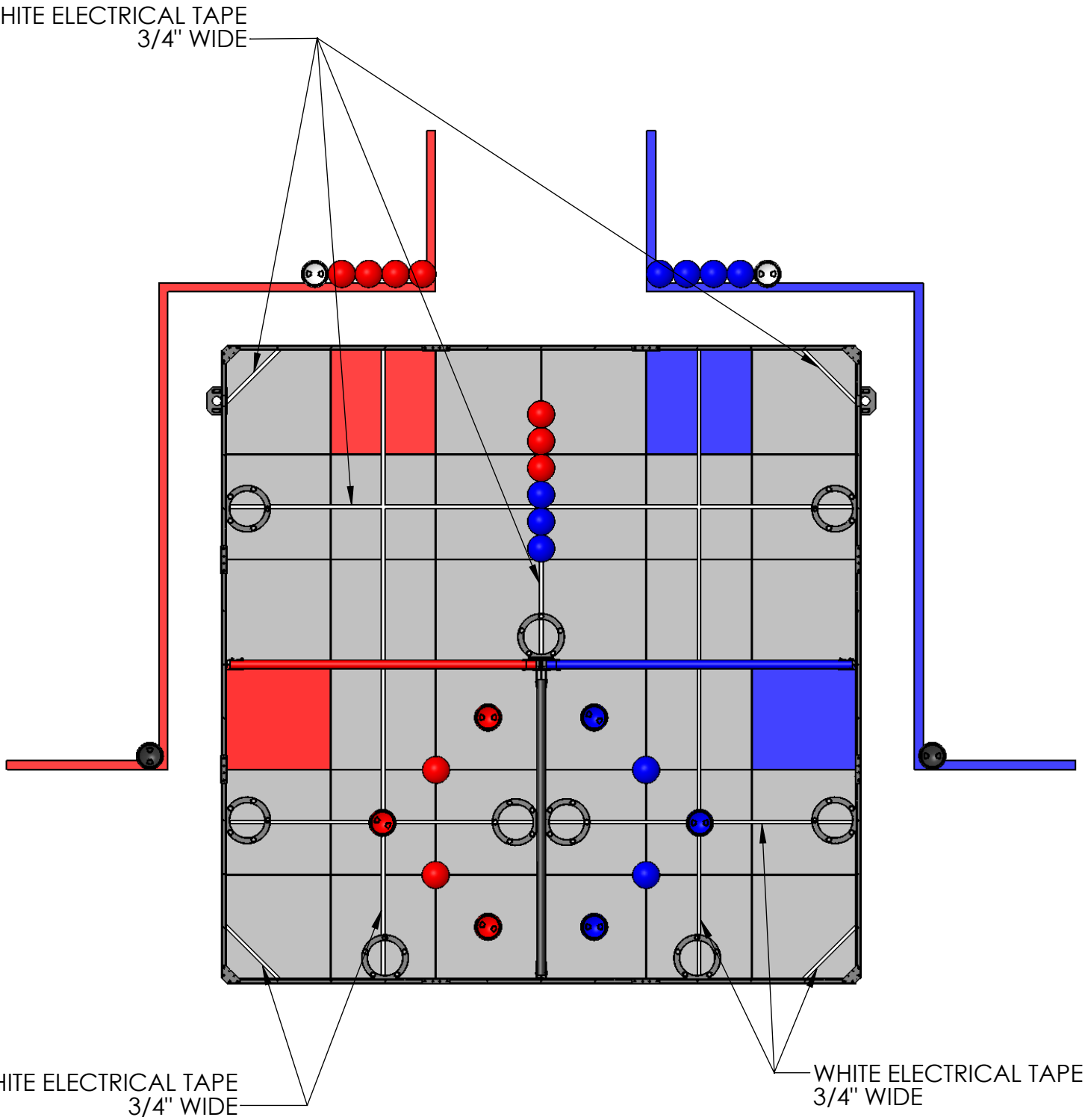
The Goal are placed in nine (9) locations and are of three (3) heights.

1. 11.5" High Goals, mounted to the field perimeter.
2. 20" High Goals, mounted to the Fence Pipes.
3. 30" High Goals, mounted to the field perimeter.
4. 30" High Goal, mounted to the Center Post.



VEX ROBOTICS COMPETITION	Description	Goal Layout	
	Dwg No	VRC12-FIELD-SPECS REV1	
	Competition	VRC - Gateway	Sheet 9 of 10
	Release	2/15/2011	**ALL DIMENSIONS ARE IN INCHES.**

The field has nine (9) strips of 3/4" wide white electrical tape running across it, as shown below.



VEX ROBOTICS COMPETITION	Description	Tape Line Layout	
	Dwg No	VRC12-FIELD-SPECS REV1	
	Competition	VRC - Gateway	Sheet 10 of 10
	Release	2/15/2011	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 *Gateway*. The VRC *Gateway* 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 Gateway* field:

- 5/32" Allen Wrench
- 7/16" Open Ended 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)

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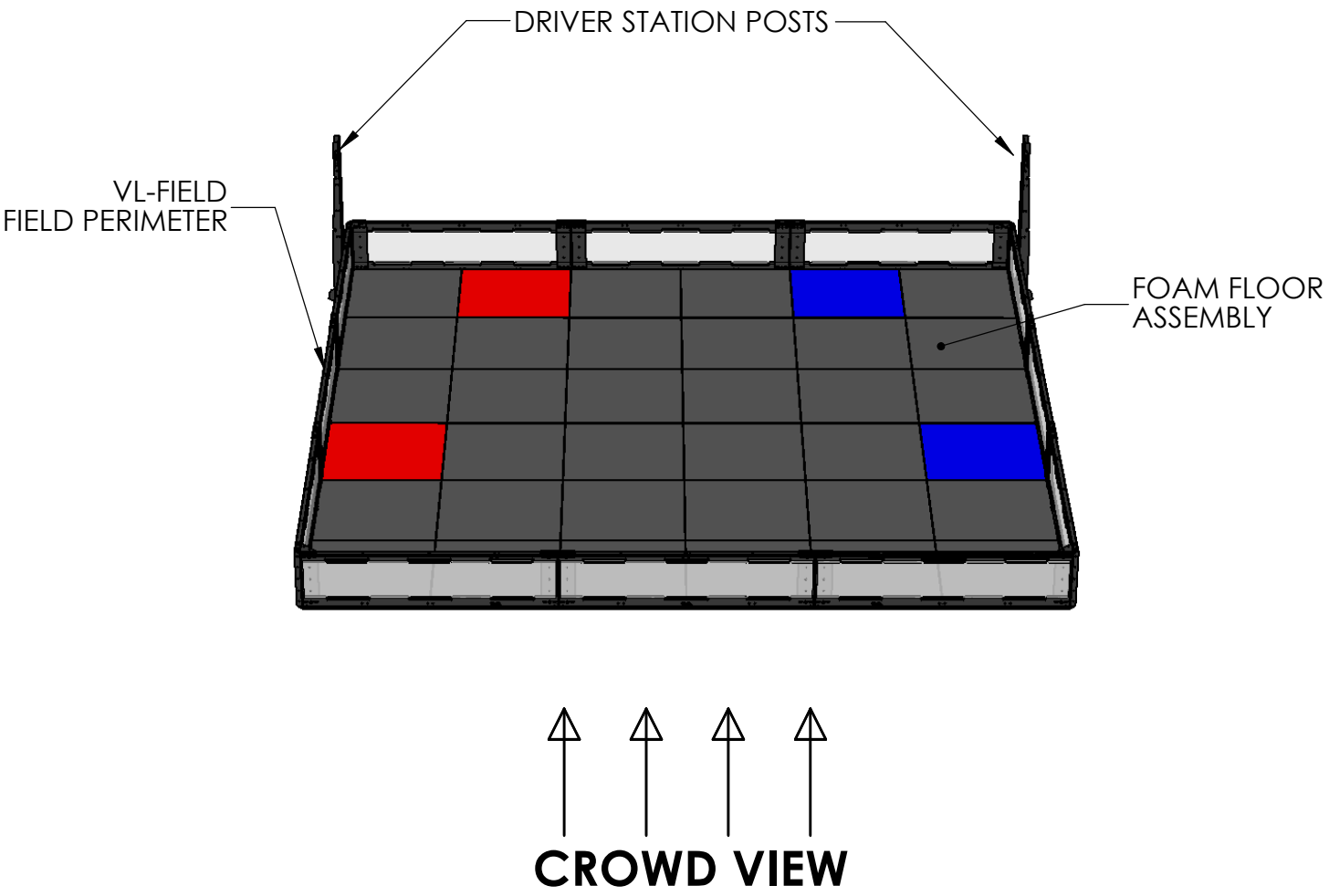
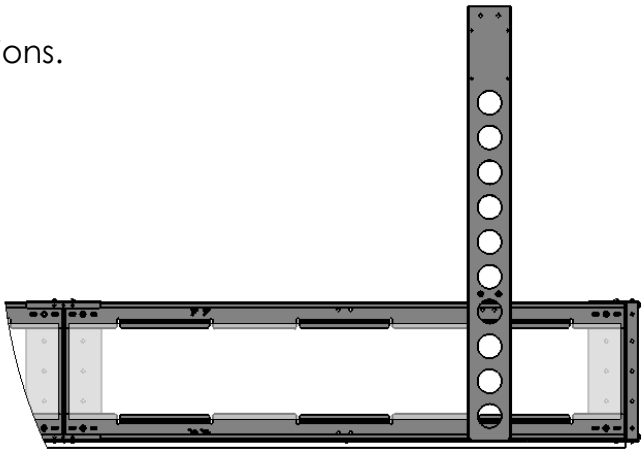


Notes:

1. Assemble the VL-FIELD Perimeter (see seperate VL-FIELD assembly instructions.)
   Position the perimeter such that one side is toward the crowd.

2. Attach the Driver Station Posts as shown below (in the middle of the foam tile farthest from 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.



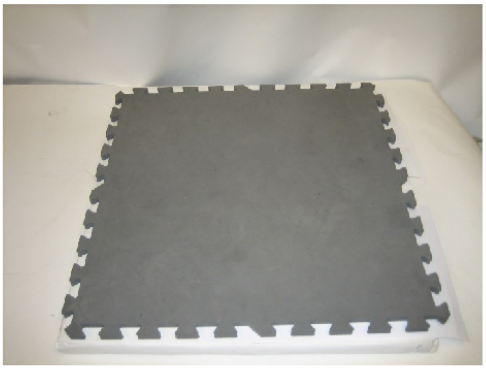
IMPORTANT:
It is important to assemble the field on a flat, level surface. Some venues may wish to install floor protection underneath the field.

Note:
No one should be on the field when the Gateway Gates are lifted!
Lower gates before going onto the field!

VEX ROBOTICS COMPETITION	Description	Perimeter Placement	
	Dwg No	VRC12-FIELD-ASSY REV3	
	Competition	VRC - Gateway	Sheet 1 of 17
	Release	8/29/2011	ALL DIMENSIONS ARE IN INCHES.

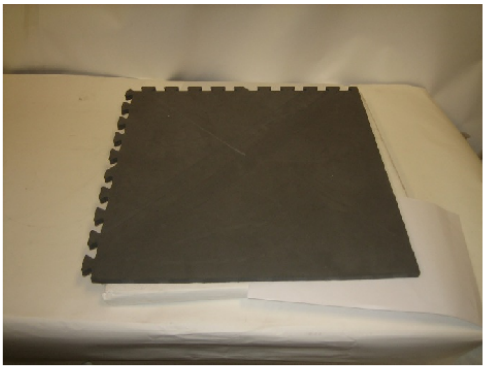
Before assembling the foam tile floor some tiles will need to be modified.

There are 3 main types of tiles.



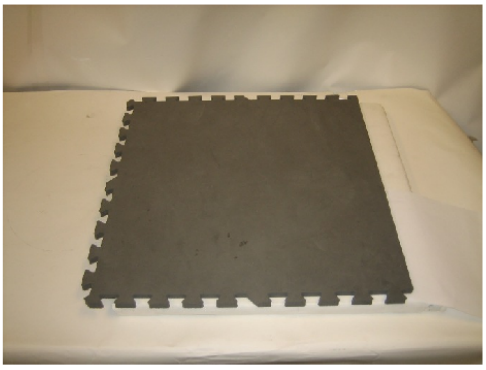
(16X) Normal Tiles

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



(4X) Corner Tiles

Corner tiles have their interlocking tabs cut away on two (2) adjacent edges. These will be used in the four (4) corners of the field.



(16X) Edge Tiles

Edge tiles have their interlocking tabs cut away on one (1) edge. These will be used along the edges of the field. There are sixteen (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.

Note:
No one should be on the field when the Gateway Gates are lifted!
Lower gates before going onto the field!

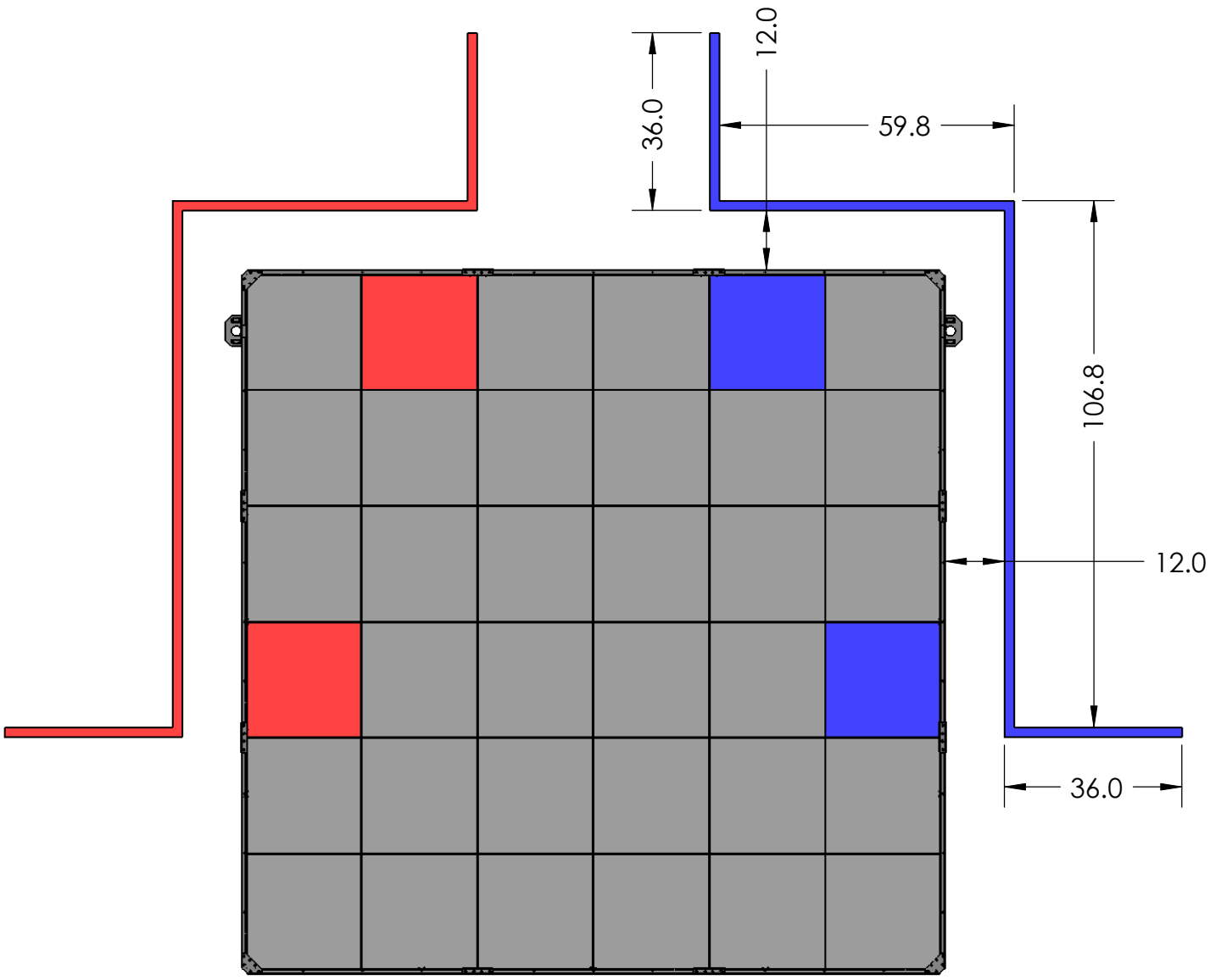
C	E	E	E	E	C
E	N	N	N	N	E
E	N	N	N	N	E
E	N	N	N	N	E
E	N	N	N	N	E
C	E	E	E	E	C

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.

Note:
No one should be on the field when the Gateway Gates are lifted!
Lower gates before going onto the field!



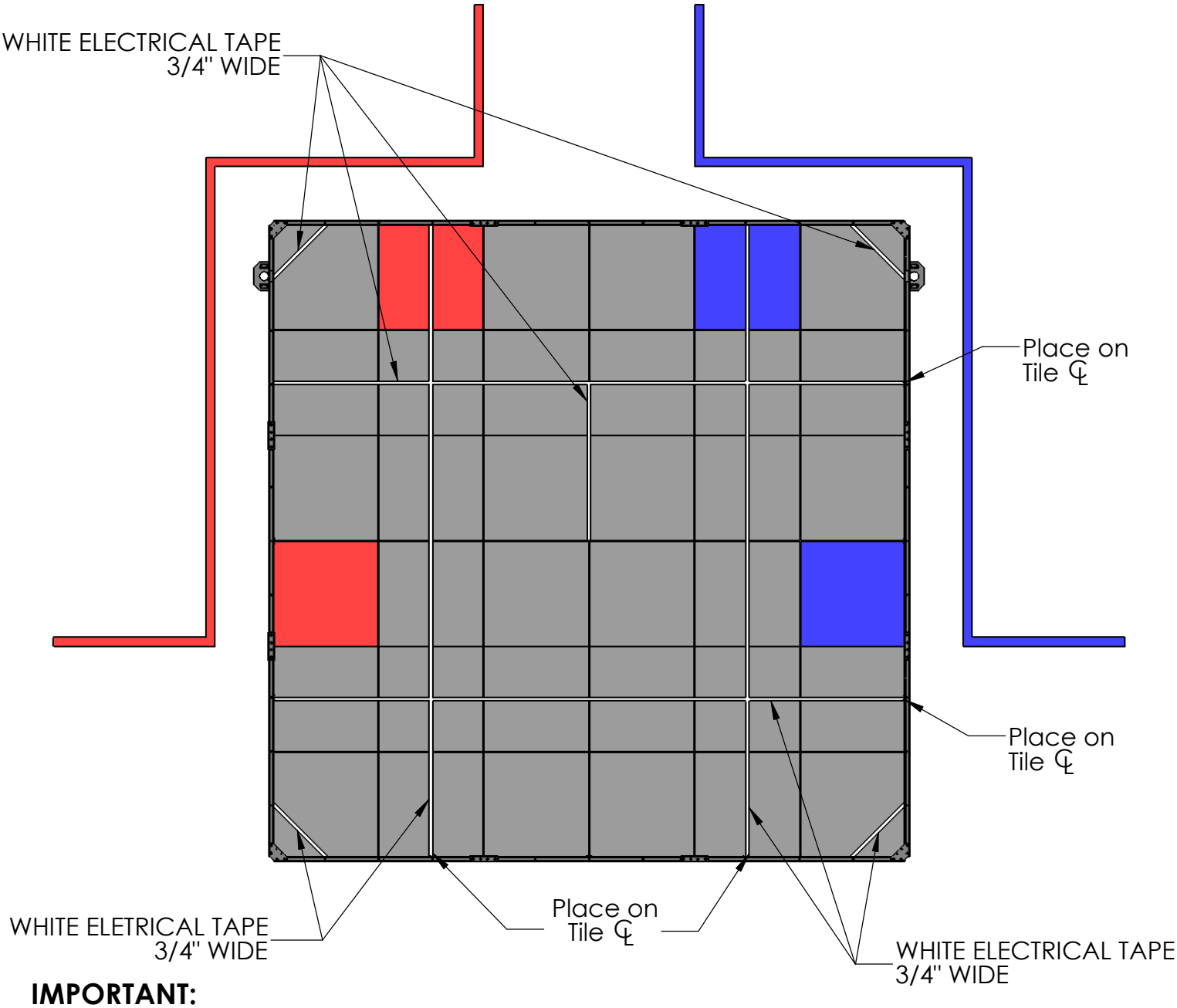
Once the Field Perimeter is in its final position, mark off the Driver Stations using red and blue tape. One station should be blue, and one should be red.

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

The Driver Stations should extend to the edges of its corresponding colored tiles.

Note:
No one should be on the field when the Gateway Gates are lifted!
Lower gates before going onto the field!

VEX ROBOTICS COMPETITION	Description	Driver Station Layout	
	Dwg No	VRC12-FIELD-ASSY REV3	
	Competition	VRC - Gateway	Sheet 4 of 17
	Release	8/29/2011	ALL DIMENSIONS ARE IN INCHES.



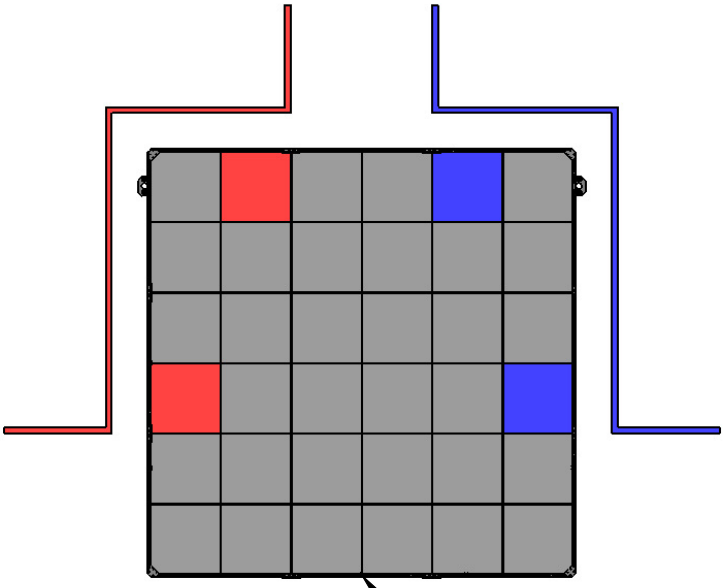
IMPORTANT:
Apply tape carefully and slowly for best result.
Smooth out all bubbles.
Do not "stretch" the tape as it is applied!

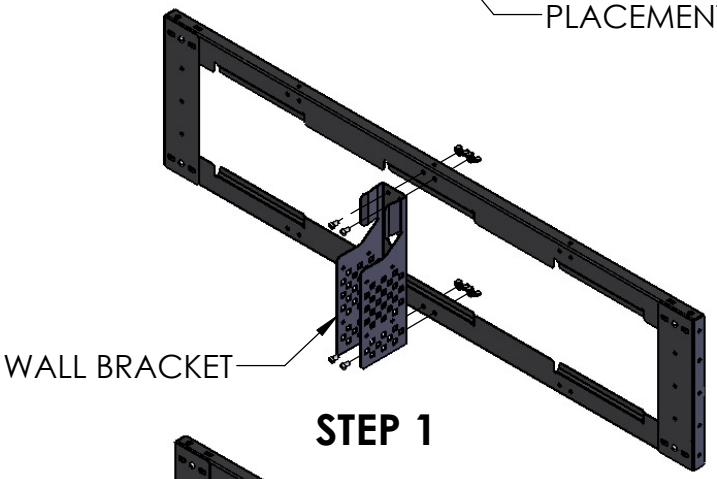
There are nine (9) lines stretching across the playing field. These lines are used for robot line following, and to indicate the Low Goals. The tape is layed out on the field as shown above. The lines are made from 3/4" wide white electrical tape.

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

Note:
No one should be on the field when the Gateway Gates are lifted!
Lower gates before going onto the field!

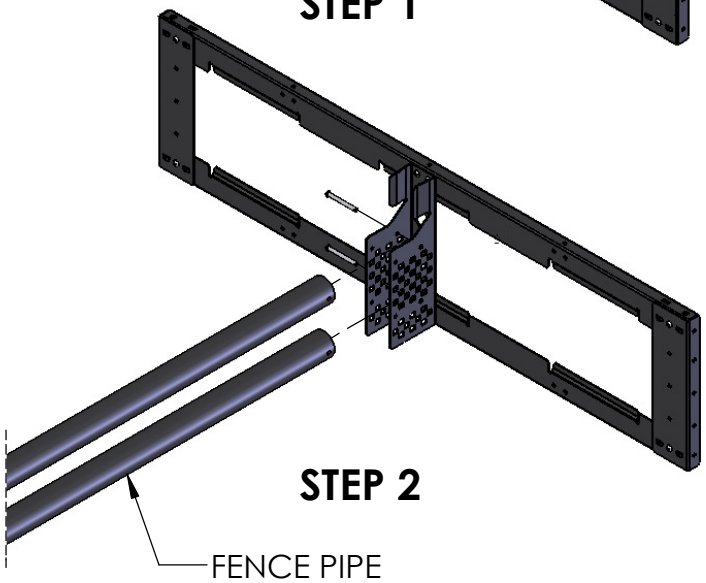
VEX ROBOTICS COMPETITION	Description	Tape Line Layout	
	Dwg No	VRC12-FIELD-ASSY REV3	
	Competition	VRC - Gateway	Sheet 5 of 17
	Release	8/29/2011	ALL DIMENSIONS ARE IN INCHES.





STEP 1

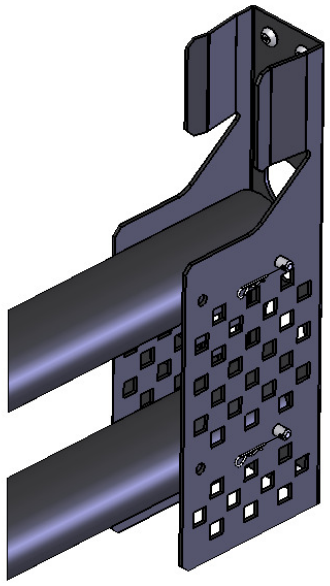
1. Install one (1) Wall Bracket to the VL-FIELD perimeter in the locations shown above using four (4) 1/4-20 x 5/8" bolts and four (4) 1/4-20 wing nuts.



STEP 2

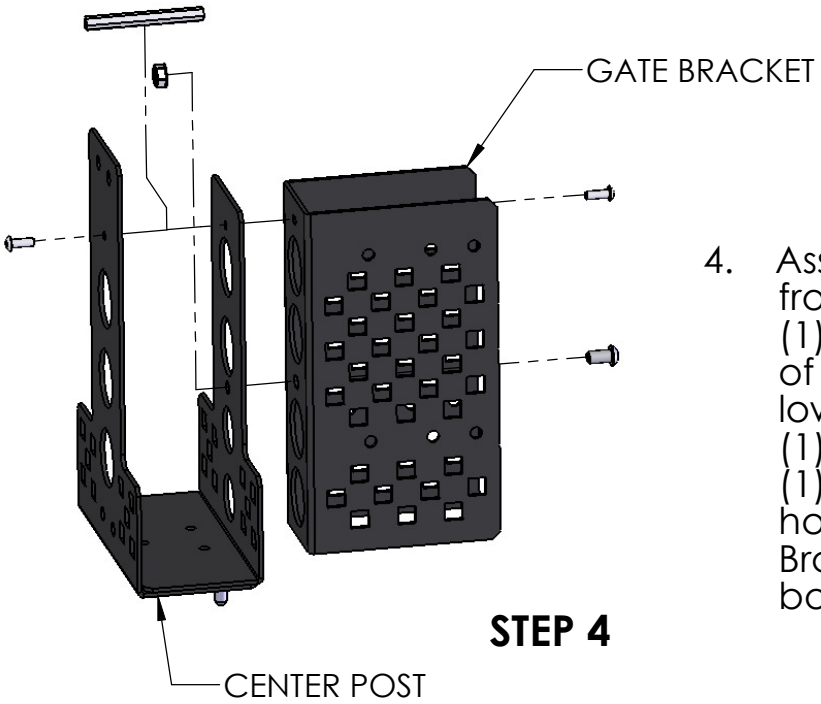
2. Slide two (2) black Fence Pipes into the Wall Bracket and insert two (2) 1/4" x 2-1/2" Clevis Pins into the rear holes of the Wall Bracket and through the Fence Pipe. **It is critical that the small holes near the center of the Black Wall Pipe are closest to the field's center!**

Note:
No one should be on the field when the Gateway Gates are lifted!
Lower gates before going onto the field!



STEP 3

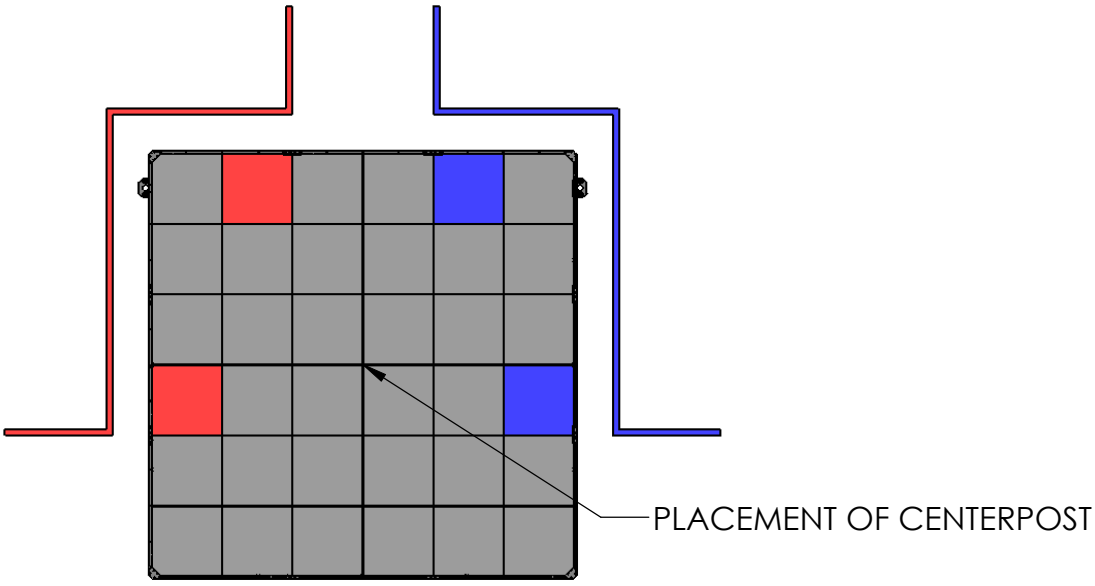
3. Insert two (2) Hairpins into the 1/4-20 Clevis Pins.

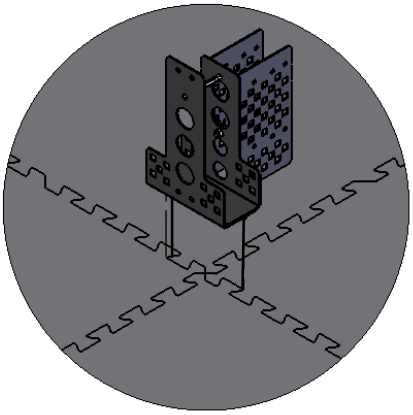


STEP 4

4. Assemble the Center Post separately from the wall. Begin by installing one (1) 1/4-20 x 1/2" bolt into the lower hole of the Gate Bracket and through the lower hole of the Center Post with one (1) 1/4-20 Keps nut. Next, insert one (1) 2-1/2" Standoff between the upper holes of the Center Post and Gate Bracket. Install using two (2) 8-32 x 1/2" bolts.

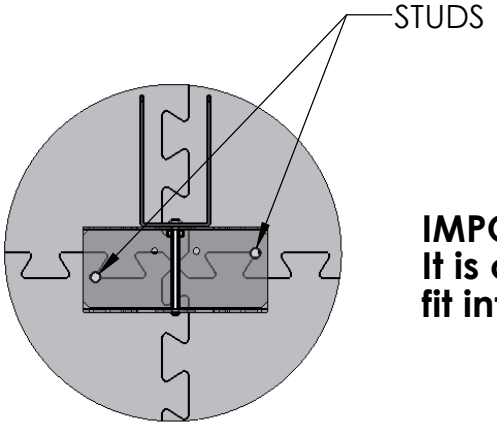
Note:
No one should be on the field when the Gateway Gates are lifted!
Lower gates before going onto the field!





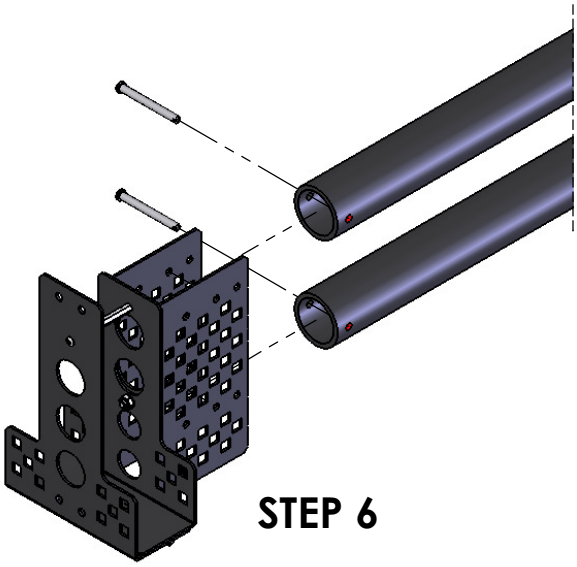
5. Place the Center Post in the location indicated above with the Gate Bracket facing away from the Driver Stations.

STEP 5



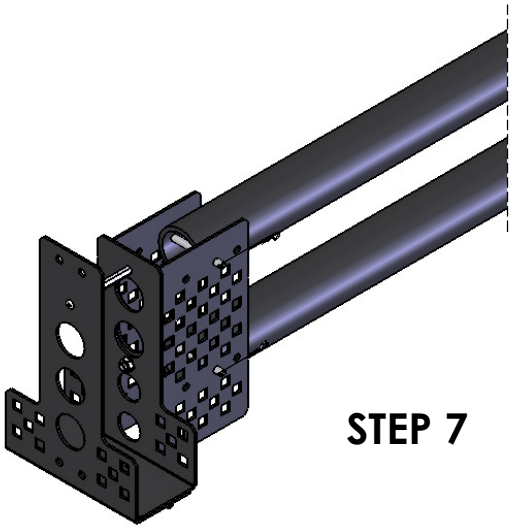
IMPORTANT:
It is critical that the studs on the Center Post fit into the seams of the tiles as indicated.

Note:
No one should be on the field when the Gateway Gates are lifted!
Lower gates before going onto the field!



STEP 6

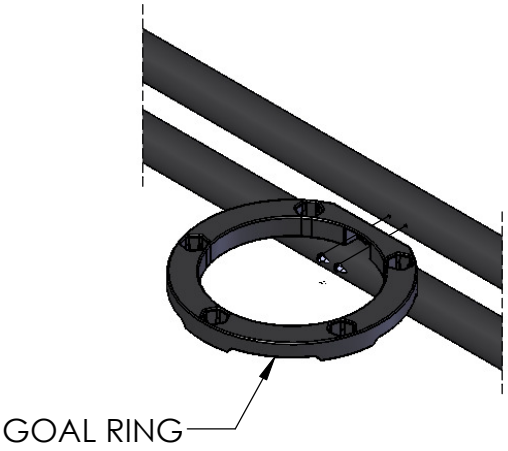
6. With the Center Post in position, slide the black Fence Pipes into the Gate Bracket. Insert two (2) 1/4" Clevis Pins into the middle hole in the Gate Bracket and through the black Fence Pipes.



STEP 7

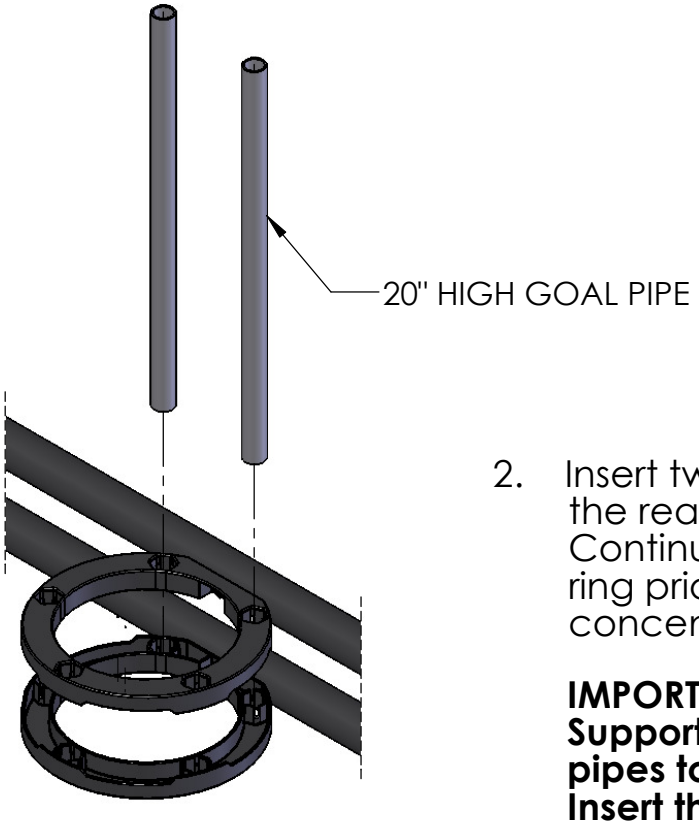
7. Insert two (2) Hairpins into the 1/4-20 Clevis Pins.

Note:
No one should be on the field when the Gateway Gates are lifted!
Lower gates before going onto the field!



STEP 1

1. Install a Goal Ring to the top black Fence Pipe by screwing two (2) #10 x 1/2" Sheet Metal Screws into the small holes located near the center of the black Fence Pipe.

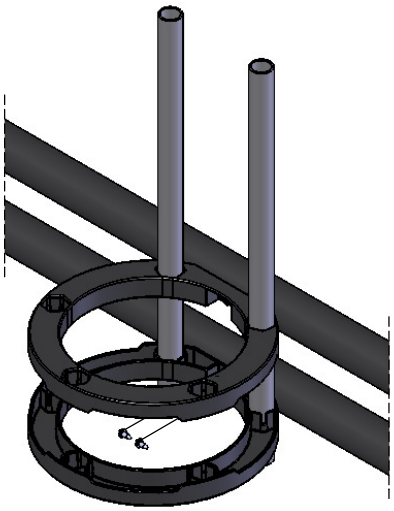


STEP 2

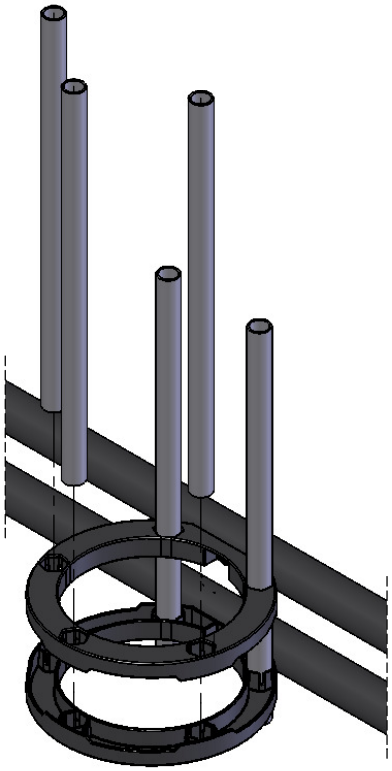
2. Insert two 20" High Goal Pipes into the rear holes of the Goal Ring. Continue to insert them into a second ring prior to its mounting. This ensures concentric goals.

IMPORTANT:
Support the Goal Rings while inserting pipes to prevent breaking of the rings! Insert the pipes using a twisting motion for the easiest installation.

Note:
No one should be on the field when the Gateway Gates are lifted!
Lower gates before going onto the field!



STEP 3



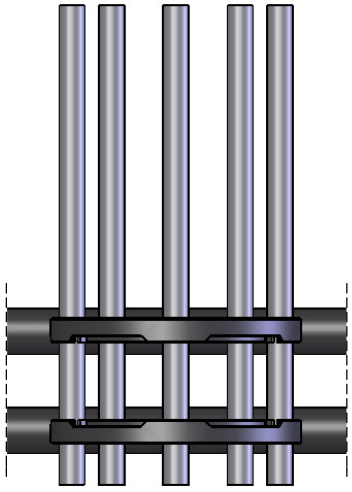
STEP 4

3. Finish installing the second ring with two (2) #10 x 1/2" Sheet Metal Screws.

4. Insert the remaining three (3) 20" High Goal Pipes into the Goal Rings.

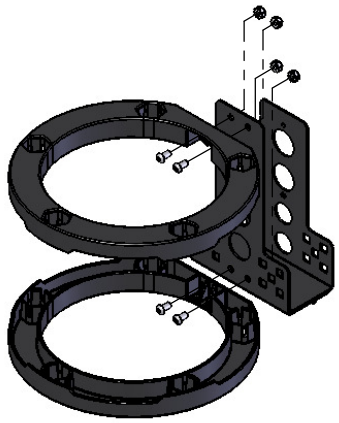
IMPORTANT:
Support the Goal Rings while inserting pipes to prevent breaking of the rings! Insert the pipes using a twisting motion for the easiest installation.

5. Repeat STEPS 1-4 for the opposite side of the black Fence Pipes.



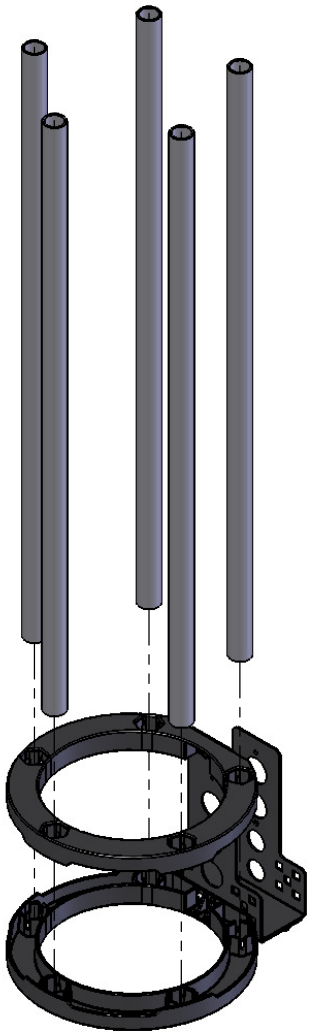
CORRECTLY ASSEMBLED GOAL

Note:
No one should be on the field when the Gateway Gates are lifted!
Lower gates before going onto the field!



STEP 1

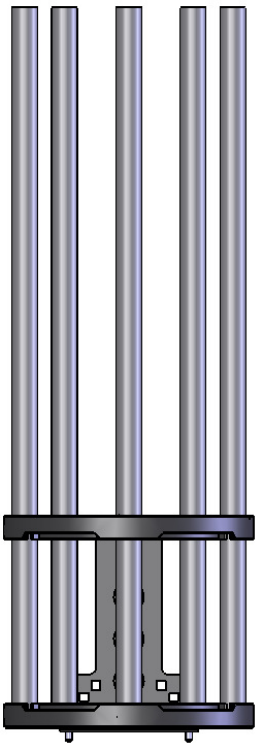
1. Install two (2) Goal Rings to the Center Post with four (4) 1/4-20 x 1/2" bolts and four (4) 1/4-20 Keps nuts.



STEP 2

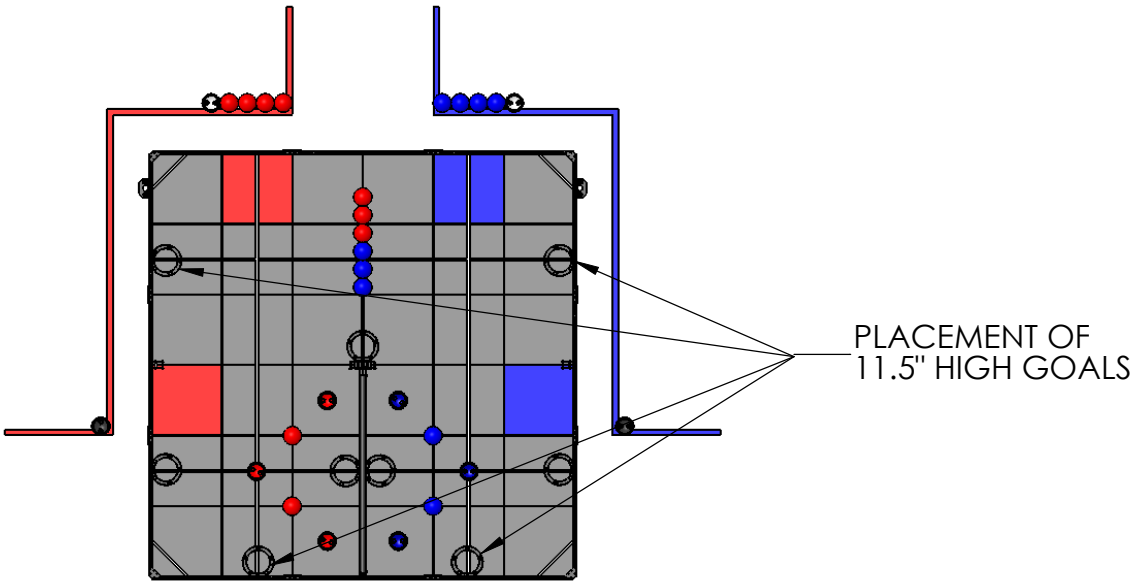
2. Insert five (5) 30" High Goal Pipes into the Goal Rings.

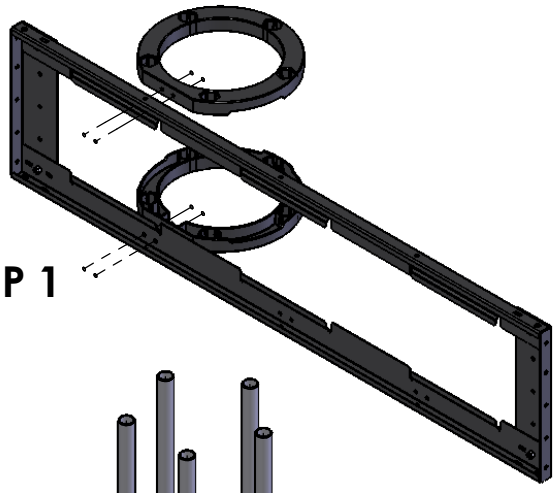
IMPORTANT:
Support the Goal Rings while inserting pipes to prevent breaking of the rings! Insert the pipes using a twisting motion for the easiest installation.



CORRECTLY ASSEMBLED GOAL

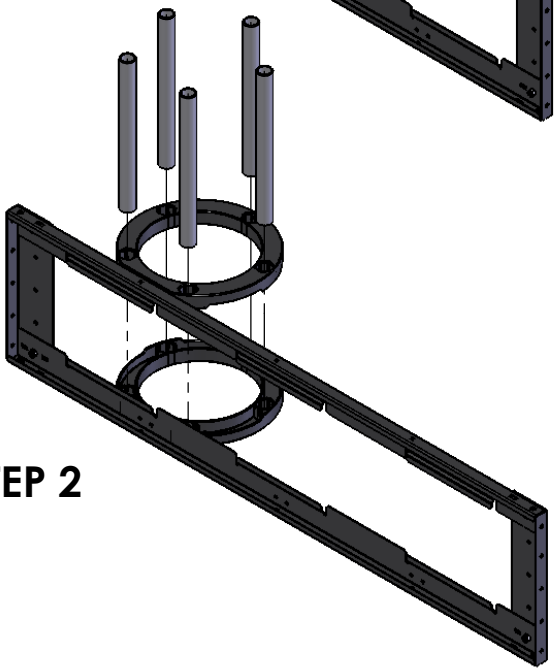
Note:
No one should be on the field when the Gateway Gates are lifted!
Lower gates before going onto the field!





STEP 1

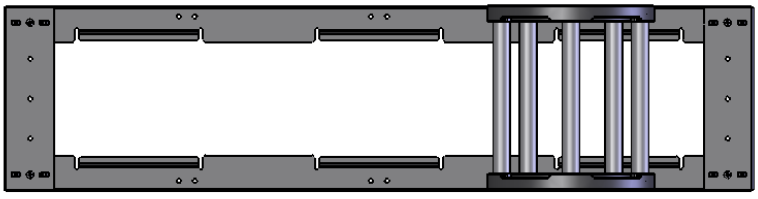
1. Install two (2) Goal Rings to the VL-FIELD perimeter in the locations indicated above with four (4) 1/4-20 x 5/8" bolts and four (4) 1/4-20 wing nuts.



STEP 2

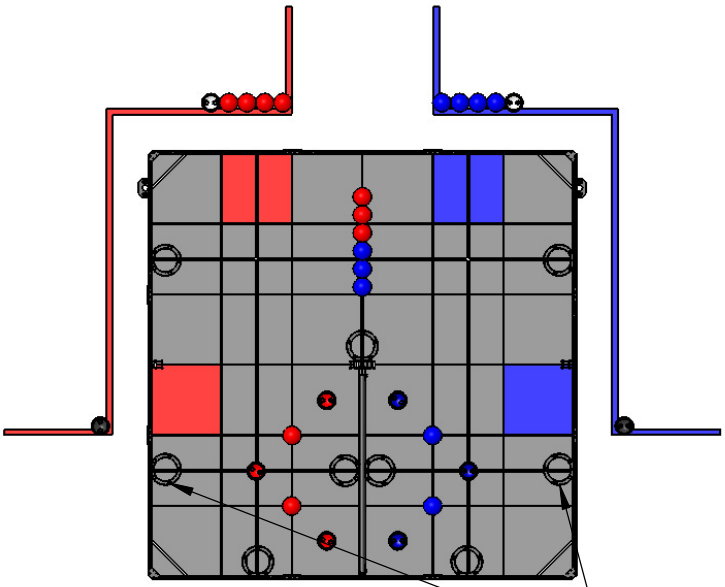
2. Insert five (5) 11.5" High Goal Pipes into the Goal Rings.

IMPORTANT:
Support the Goal Rings while inserting pipes to prevent breaking of the rings! Insert the pipes using a twisting motion for the easiest installation.



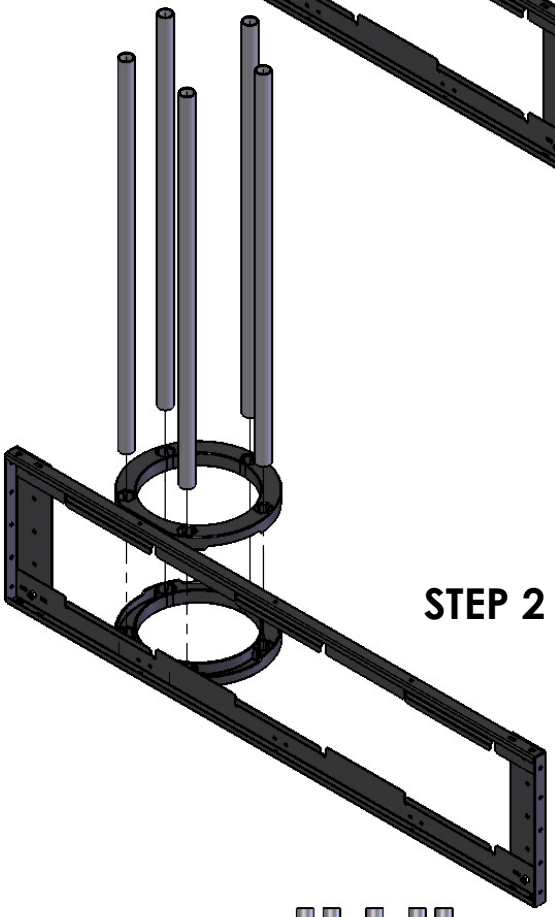
CORRECTLY ASSEMBLED GOAL

Note:
No one should be on the field when the Gateway Gates are lifted!
Lower gates before going onto the field!



PLACEMENT OF
30" HIGH GOALS

STEP 1



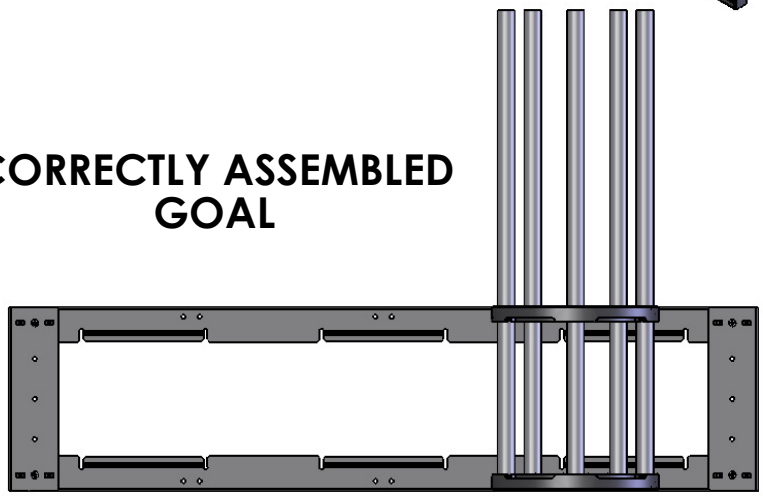
STEP 2

1. Install two (2) Goal Rings to the VL-FIELD perimeter in the locations indicated above using four (4) 1/4-20 x 5/8" bolts and four (4) 1/4-20 wing nuts.

2. Insert five (5) 30" High Goal Pipes into the Goal Rings.

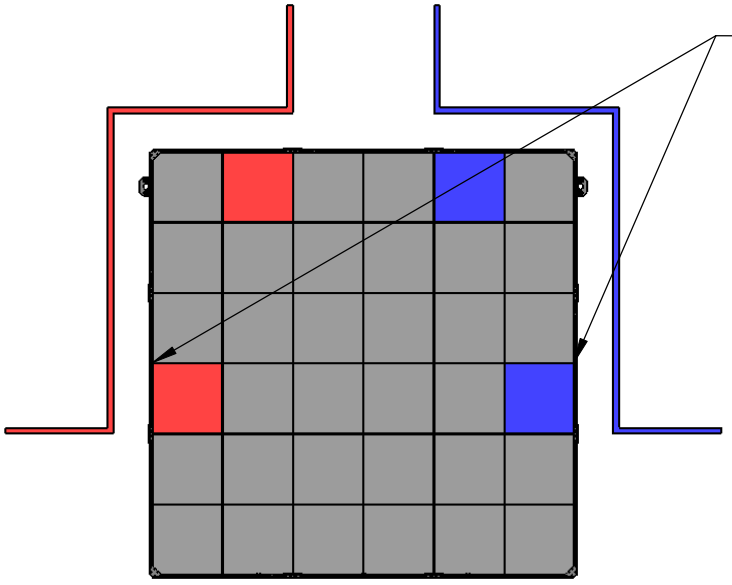
IMPORTANT:
Support the Goal Rings while inserting pipes to prevent breaking of the rings! Insert the pipes using a twisting motion for the easiest installation.

CORRECTLY ASSEMBLED GOAL



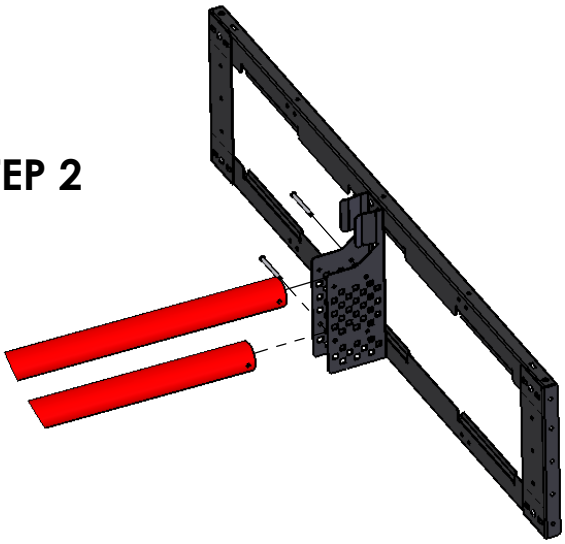
Note:
No one should be on the field when the Gateway Gates are lifted!
Lower gates before going onto the field!

VEX ROBOTICS COMPETITION	Description	30" High Goal Assembly	
	Dwg No	VRC12-FIELD-ASSY REV3	
	Competition	VRC - Gateway	Sheet 14 of 17
	Release	8/29/2011	**ALL DIMENSIONS ARE IN INCHES.**



1. As in STEP 1 of the Fence Assembly, install the Wall Brackets in the locations indicated above.

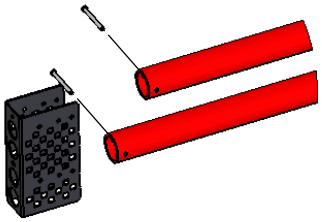
STEP 2



2. Slide the Gate Pipes into the Wall Bracket and insert the 1/4" Clevis Pins into the Wall Bracket and through the Gate Pipes. The top pipe installs into the rear hole, and the lower pipe installs into the front hole.

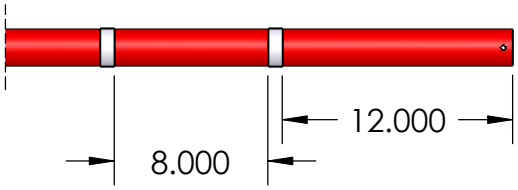
3. Slide the Gate Bracket into place and insert the 1/4" Clevis Pins into the Wall Bracket and through the Gate Pipes. The top pipe installs into the front hole, and the lower pipe installs into the rear hole.

STEP 3



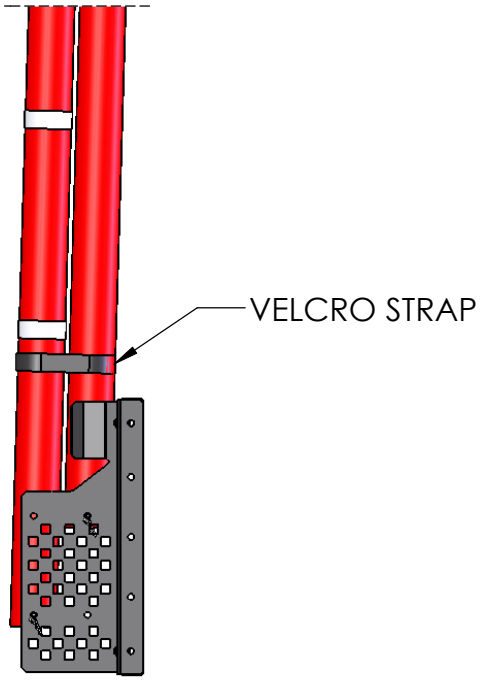
Note:
No one should be on the field when the Gateway Gates are lifted!
Lower gates before going onto the field!

VEX ROBOTICS COMPETITION	Description	Gate Assembly	
	Dwg No	VRC12-FIELD-ASSY REV3	
	Competition	VRC - Gateway	Sheet 15 of 17
	Release	8/29/2011	ALL DIMENSIONS ARE IN INCHES.



STEP 4

4. Add two tape rings to the lower Gate Pipe at the dimensions specified on the field perimeter side.



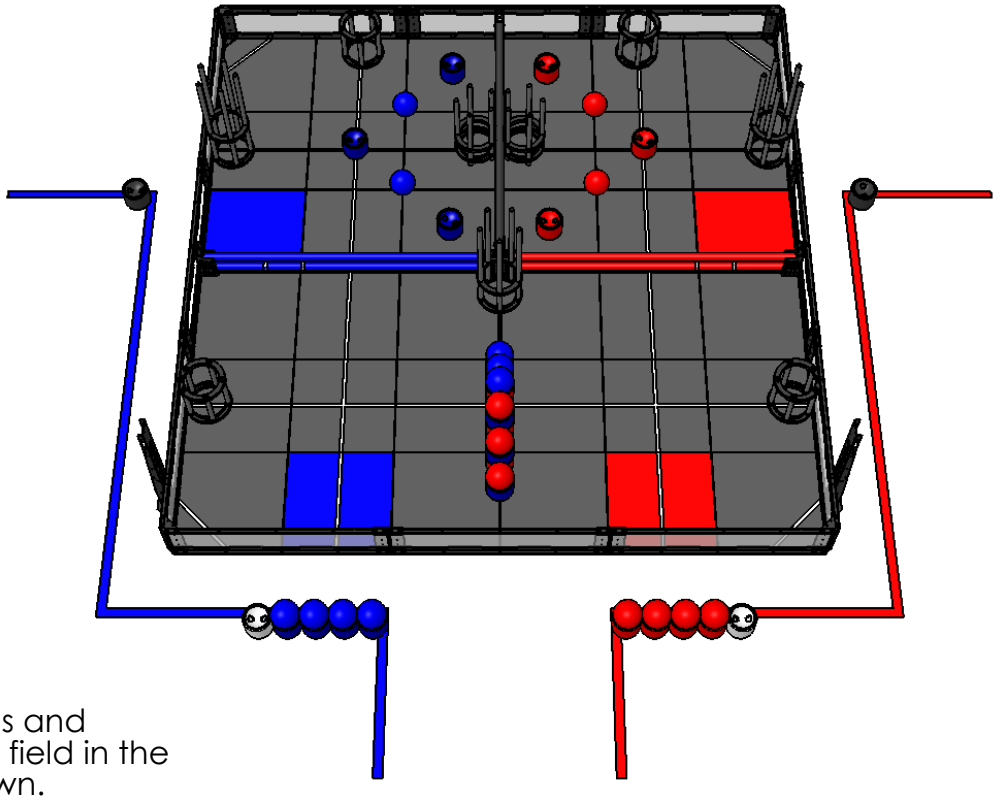
STEP 5

5. Place the 14" length of one-wrap Velcro near the gate bracket. During gameplay, the Velcro should be used in the manner as shown to secure the gate from falling down.

   Optional: Attach the Velcro strap to the pipe using (1) Self-threading Screw (not included)

6. Repeat STEPS 1-5 for the second gate.

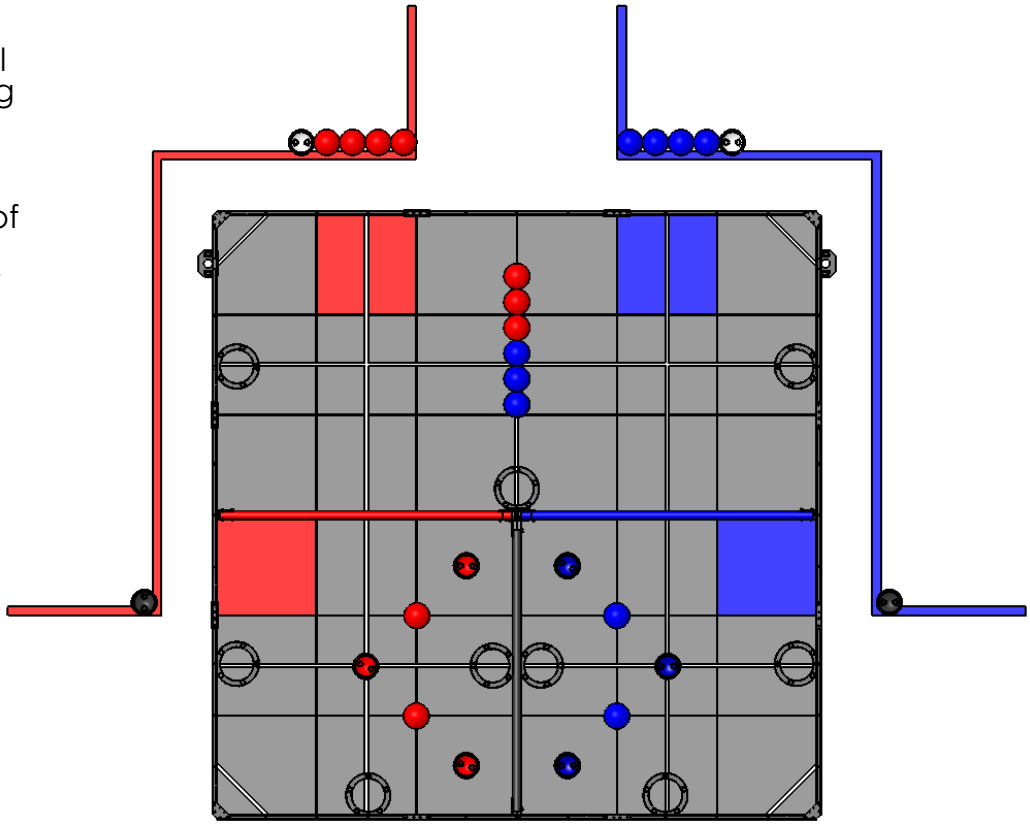
Note:
No one should be on the field when the Gateway Gates are lifted!
Lower gates before going onto the field!

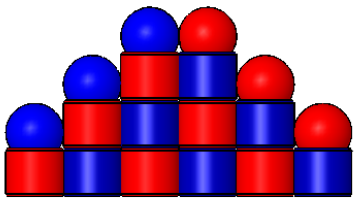


Place the balls and barrels on the field in the locations shown.

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

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





CENTER STACK

Note:
No one should be on the field when the Gateway Gates are lifted!
Lower gates before going onto the field!

VEX ROBOTICS COMPETITION	Description	Game Object Layout	
	Dwg No	VRC12-FIELD-ASSY REV3	
	Competition	VRC - Gateway	Sheet 17 of 17
	Release	8/29/2011	**ALL DIMENSIONS ARE IN INCHES.**