

FRP Ship Stair Crossovers

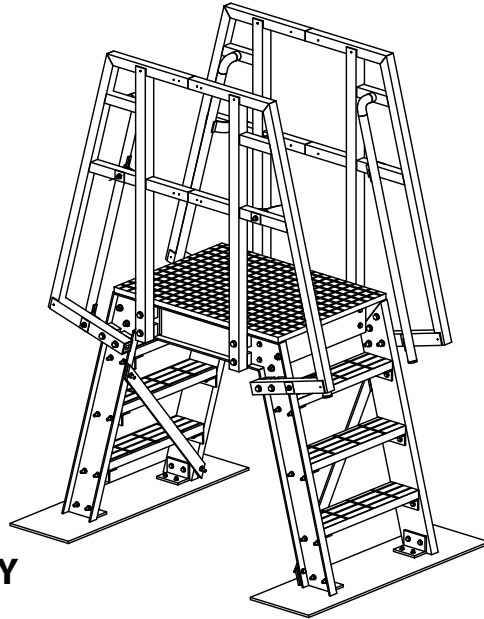


Estimated Installation Time: 2 Man Crew, 2 Hours

ASSEMBLY INSTRUCTIONS

ITEM DESCRIPTION	PART NUMBER
FRP Ship Stair Crossover - 10" Clearance	866110.01
FRP Ship Stair Crossover - 19-1/2" Clearance	866119.01
FRP Ship Stair Crossover - 29" Clearance	866129.01
FRP Ship Stair Crossover - 38-1/2" Clearance	86138.01
FRP Ship Stair Crossover - 48" Clearance	866148.01
FRP Ship Stair Crossover - 67" Clearance	866167.01

COMPLETED FRP SHIP STAIR CROSSOVER LADDER WITH OPTIONAL ROOF PLATE (POST ASSEMBLY ILLUSTRATION)



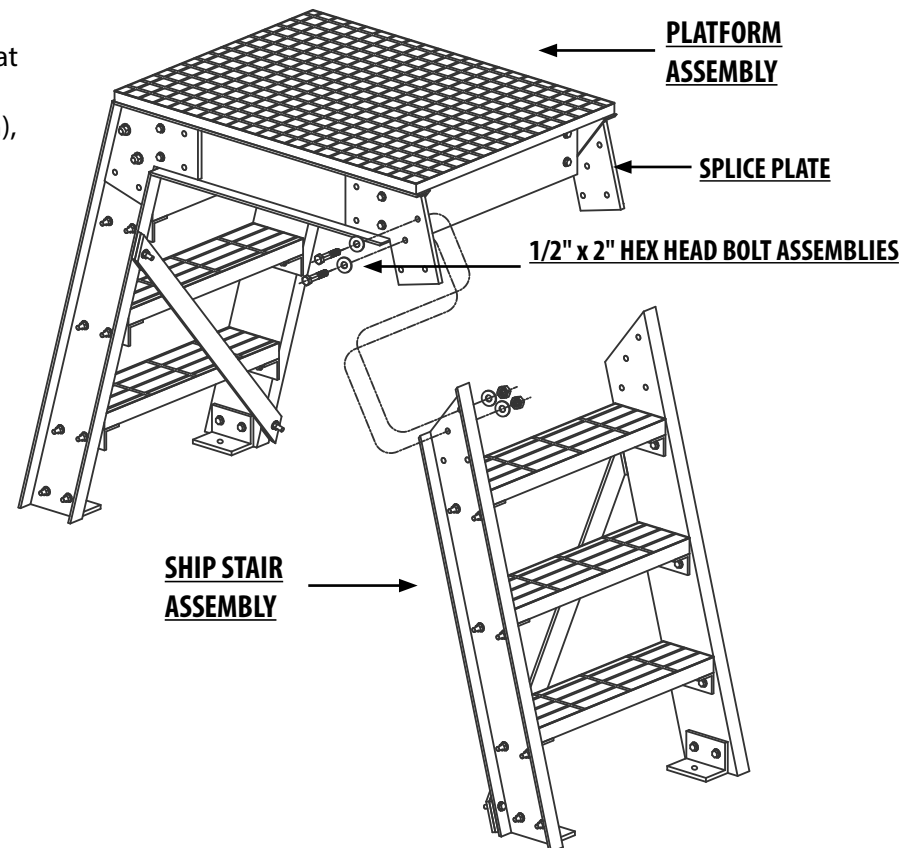
STEP 1: ATTACH SHIP STAIR ASSEMBLIES TO PLATFORM ASSEMBLY

A) Slide channels of Ship Stair Assembly inside of Splice Plates on Platform Assembly and line up the holes. Refer to Drawing B-02822 Rev 1 dated 4/5/17 for the exact configuration of the crossover. The illustration shown in these instructions may vary from the crossover you are assembling.

B) For the 19-1/2 inch (495 mm) (PN866119.01) clearance crossover only: At each splice plate, install two each 1/2" x 2" hex head bolt assemblies (1/2" x 2" bolt, 2 each flat washers, and 1/2" nut) and one each 3/8" x 2" hex head bolt assembly (3/8" x 2" bolt, 2 each flat washers, and 3/8" nut) in the holes indicated. Use a flat washer under the bolt head and the nut. Torque the 1/2 inch nuts to 45 ft-lb (5.1 N-m), the 3/8 inch nuts to 30 ft-lb (3.9 N-m). Leave the holes for the guardrail posts open until Step Three.

C) For the 10 inch (254 mm) (PN 866110.01) and 29 inch (736mm) clearance crossover (PN 866129.01) and deeper: At each splice plate, install three each 1/2" x 2" hex head bolt assemblies (1/2" x 2" bolt, 2 each flat washers, and 1/2" nut) and one each 3/8" x 2" hex head bolt assembly (3/8" x 2" bolt, 2 each flat washers, and 3/8" nut) in the holes indicated. Use a flat washer under the bolt head and the nut. Torque the 1/2 inch nuts to 45 ft-lb (5.1 N-m), the 3/8 inch nuts to 30 ft-lb (3.9 N-m).

D) Repeat for second Ship Stair Assembly.



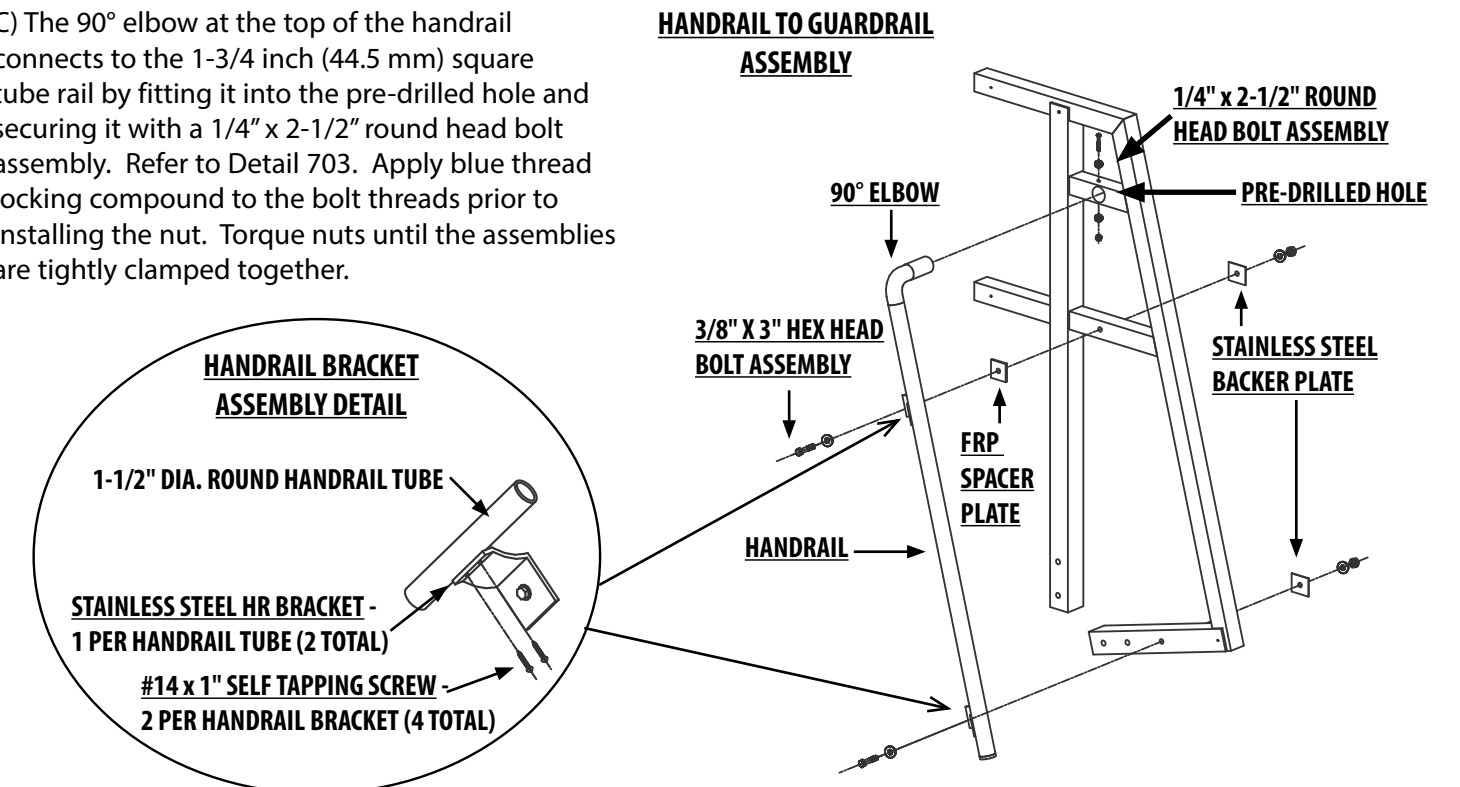
Ship Stair Crossover Assembly Instructions

STEP 2: ASSEMBLE HANDRAIL TO GUARDRAILS

A) Attach the stainless steel handrail brackets to the 1-1/2 inch dia. round handrail tubes using two #14 x 1 inch self-tapping screws per handrail bracket. The pilot holes for the screws are shop drilled into the handrail tubes. Be careful not to over-torque the screws to prevent stripping the holes. Note that you will be assembling a left hand and a right hand set of handrails for each ship stair.

B) Attach the handrail to the guardrail by following Details 701, 702, and 703 in Drawing B-02822 (on page 11). The stainless steel handrail brackets connect to the 2-1/8 inch (54 mm) post and 1-3/4 inch (44.5 mm) rail with a 3/8" x 3" hex head bolt assembly (3/8" x 2" bolt, 2 each flat washers, and 3/8" nut), and backer plate. A 1/4 inch (6 mm) thick FRP spacer plate is used between the stainless steel handrail bracket and the 1-3/4 inch (44.5 mm) square tube rail. Apply blue thread locking compound to the bolt threads prior to installing the nuts. Torque nuts until the assemblies are tightly clamped together.

C) The 90° elbow at the top of the handrail connects to the 1-3/4 inch (44.5 mm) square tube rail by fitting it into the pre-drilled hole and securing it with a 1/4" x 2-1/2" round head bolt assembly. Refer to Detail 703. Apply blue thread locking compound to the bolt threads prior to installing the nut. Torque nuts until the assemblies are tightly clamped together.



STEP 3: REFER TO GUARDRAIL ASSEMBLY ILLUSTRATION ON PAGE 3

INSTALL GUARDRAILS

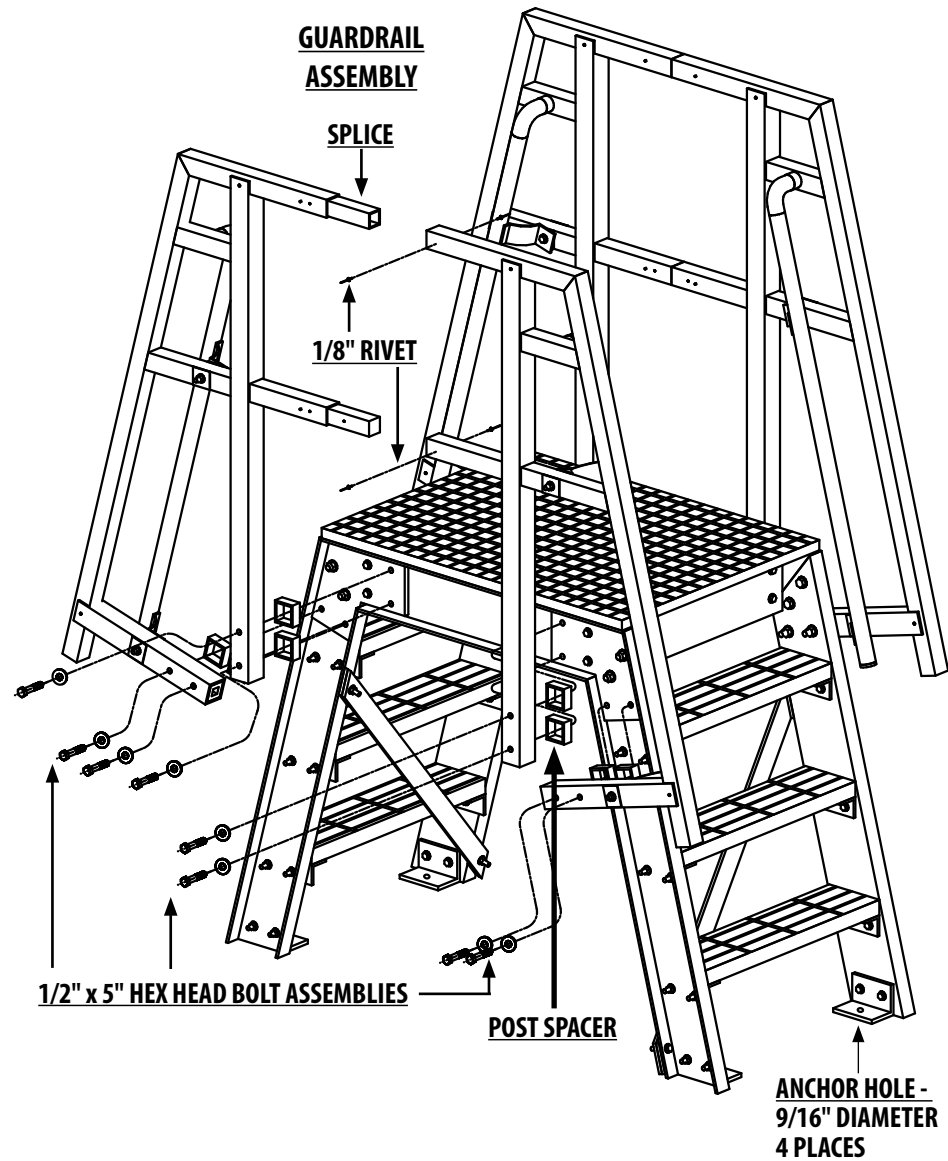
A) Assemble Guardrails - Slide the two halves of each Guardrail Assembly together at the splices as shown in the diagram. Holding the joints tightly together, drill each side of the top and bottom rail with a 1/8 (3 mm) diameter drill bit and install 1/8 inch diameter pop rivets as shown.

B) Install each finished Guardrail Assembly to the Crossover by sandwiching the 2-1/8" x 3/16" Square Tube Post Spacers between the Guardrail Assembly and the Crossover and Installing the 1/2" x 5-1/2" hex head bolt assemblies (1/2" x 5" bolt, 2 each flat washers, and 1/2" nut) in the holes indicated. Where the post falls on a splice plate, use the shorter spacer. The longer spacers are for the locations where the post is bolted directly to the web of the channel. Use a flat washer under the bolt head and the nut. Hold Post Spacers in alignment before torquing nuts. Torque the nuts to 45 ft-lb (5.1 N-m).

C) Repeat for second Guardrail Assembly.



Ship Stair Crossover Assembly Instructions



STEP 4: ANCHOR SHIP STAIR CROSSOVER

A) Prior to use, the Ship Stair Cross Over must be anchored to the supporting surface to prevent tipping. Anchor holes are 9/16 inch (14.3 mm) diameter and located at the bottom of the ship stair in four locations. Anchoring hardware is not included.

B) Concrete Floors: Anchor Ship Stair Cross Over to concrete floors using 4 each 1/2" diameter expansion or adhesive concrete anchors. A minimum embedment of 2-1/2" is required. D) Repeat for second Guardrail Assembly.

C) Wood Floors: Anchor Ship Stair Crossover to wooden floors with four each 1/2" x 3" lag bolts.

D) For other support conditions, contact a qualified engineer to develop adequate anchoring details. For installations on roofs or other areas where the supporting surface cannot be penetrated by fasteners, install the Roof Plate Kit following Step Five below.

Ship Stair Crossover Assembly Instructions

STEP 5:

OPTIONAL ROOF PLATE KIT

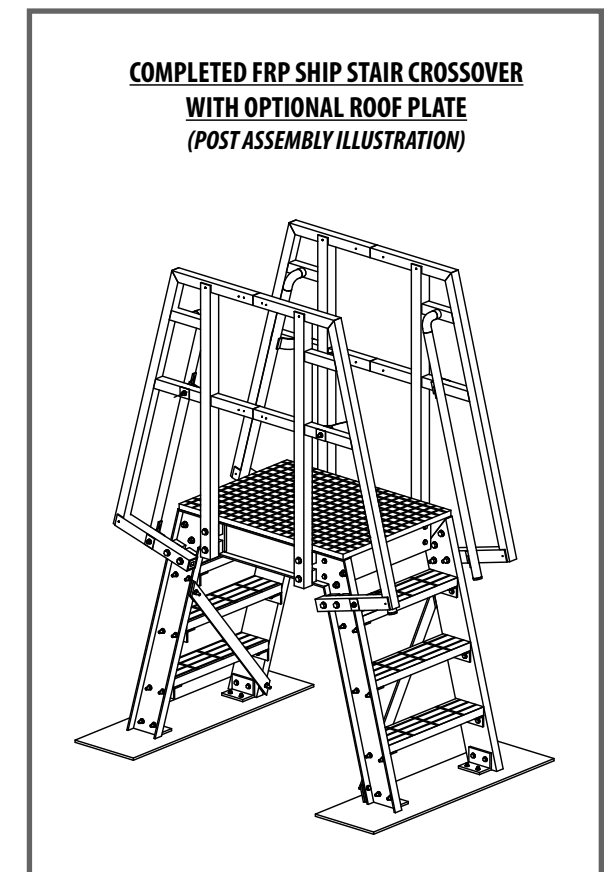
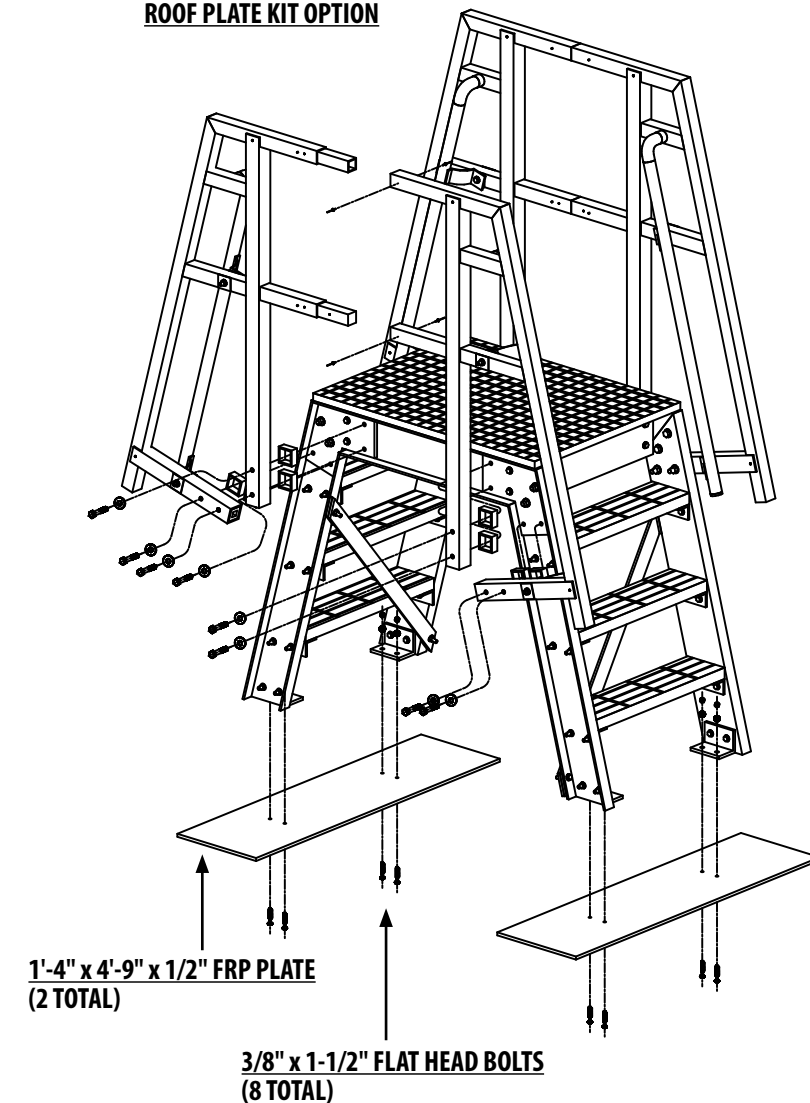
A) Remove the four 3" x 3" x 3/8" x 6" long angles at the bottom of the ship stairs by removing the two factory installed 3/8" x 1-1/2" hex head bolts at each angle. Retain the bolts, discard the angles. The angles removed in this step will have a total of three holes each.

B) Attach the four 3" x 3" x 3/8" x 6" long angles supplied with the kit to the bottoms of the ship stair stringers using the 3/8" x 1-1/2" hex head bolt assemblies removed in Step 1. The angles installed in this step will have a total of four holes each.

C) Turn the ship stair onto its side and attach the 1'-4" x 4'-9" x 1/2" thick FRP plate to these angles using the 3/8" x 1-1/2" long flat head bolts supplied with the kit. Repeat for the second plate. Torque the bolts to 30 lb-ft (3.9 N-m).

D) Before placing the finished crossover onto the roof surface, protect the roof from abrasion following the roof manufacturer's recommendations. Add ballast as required to the locations indicated in Drawing B-02822.

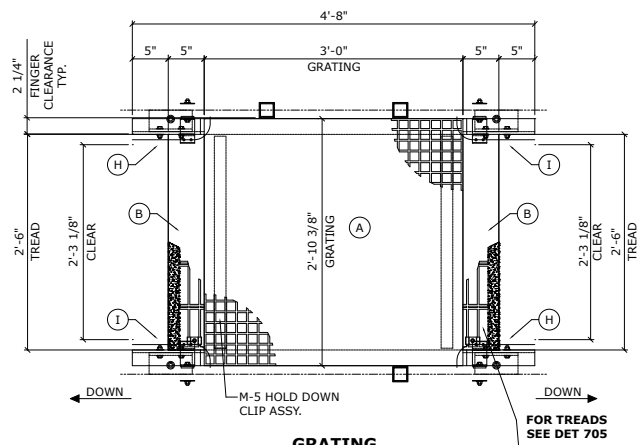
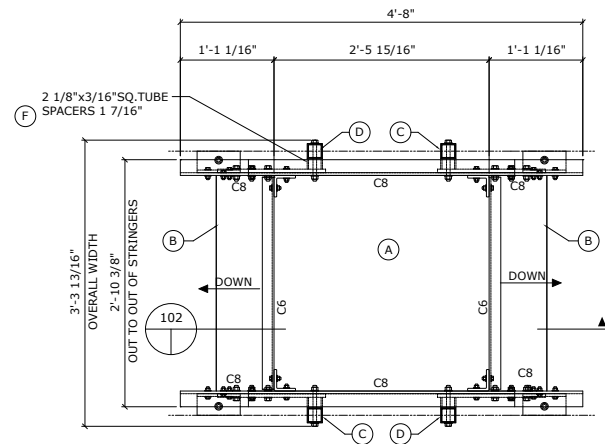
ROOF PLATE KIT OPTION



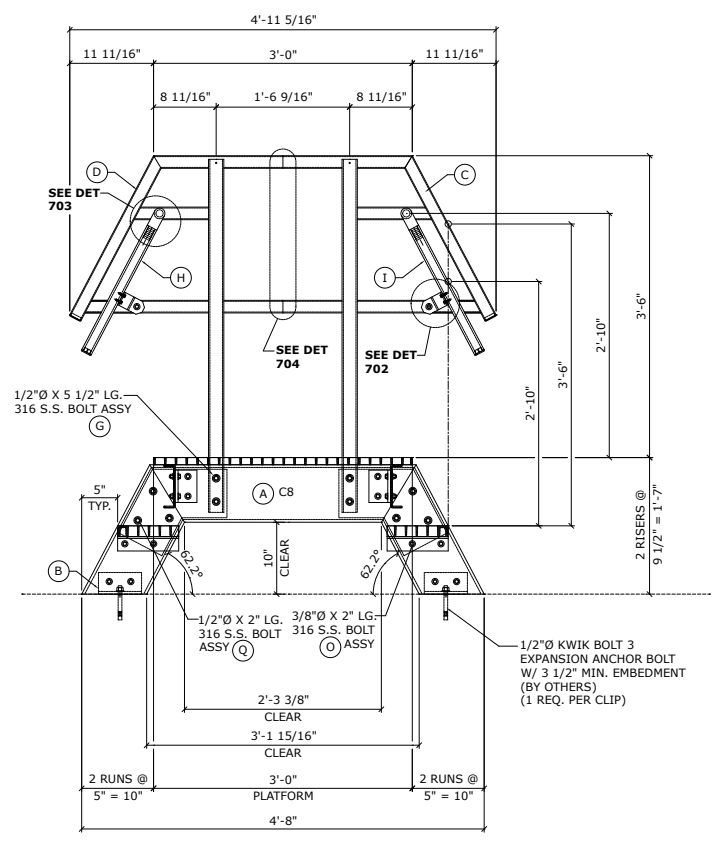
866110.01 FRP Ship Stair Crossover

10" Clearance

Weight = 105Lbs



101 PLAN - FRP STAIR WALKOVER



102 ELEVATION - FRP STAIR WALKOVER

ASSY. NO.	P/N	QTY.	DESCRIPTION
1000000	T	1	FRP Ship Stair Crossover Assembly Instructions
1000000	S	8	Rivets
1000000	R	1	Bond Kit
1000000	Q	12	1/2" Dia. x 2" Lg. 316 S.S. Bolt Assy.
1000000	P	4	3/8" Dia. x 3" Lg. Hex Head Bolt Assembly
1000000	O	4	3/8" Dia. x 2" Lg. 316 S.S. Bolt Assy.
1000000	N	4	1/4" Dia. x 2 1/2" Lg. Round Hd S.S. Bolt Assy
1000000	M	8	#14 x 1" Lg. S.S. Self Tap Screw
1000000	L	4	1 3/4"x1 3/4"x1/4" Thick FRP Spacer Plate
1000000	K	4	2" x 1 3/4" x 14 GA. 316 S.S. Plate
1000000	J	4	S.S. Handrail Bracket
1000000	I	2	1 1/2" Dia. Round Tube Handrail
1000000	H	2	1 1/2" Dia. Round Tube Handrail
1000000	G	8	1/2" Dia. x 5 1/2" Lg. 316 S.S. Bolt Assy.
1000000	F	8	2 1/8"x3/16" Sq. Tube Post Spacer (1 7/16" Lg.)
1000000	E	-	2 1/8"x3/16" Sq. Tube Post Spacer (1 7/16" Lg.)
1000000	D	2	Sq. Tube Guardrail Assembly
1000000	C	2	Sq. Tube Guardrail Assembly
1000000	B	2	Ship Stair Assembly
1000000	A	1	Platform Assembly

BILL OF MATERIALS

LEGEND:

A2=2"x2"x1/4" ANGLE	□ = GUARDRAIL POST
A3=3"x3"x3/8" ANGLE	■ = GUARDRAIL RETURN
C8=8"x2 3/16"x3/8" CHANNEL	— = FB BRACE
FB=3/8" THICK FLAT BAR	— = HANDRAIL

NO.	BY	DATE	REVISION	CHKD. BY	DATE
3					
2	SLV/JM	04/04/17	NEW OSHA RULES ECN-171	EAL	04/05/17
1	BH	05/14/14	FOR PRODUCTION	EAL	05/14/14

FABRICATION TOLERANCES (U.N.O.)

	MOLDED GRATING	PULTRUDED GRATING	DYNAFORM SHAPES
LENGTH	+1/8, -5/16	+1/8	+1/8
WIDTH	+1/8, -5/16	+1/8	+1/8
HOLE LOC.	+1/16	+1/16	+1/16
CIRC. CUTS	+3/16	+3/16	N/A
NOTCHES	+1/8	+1/8	N/A
SQUARE OF CUT ANGLE/ARTY	1°	1°	2°
	+2	+2	+2

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CONTRACTOR: 10" FRP SHIP STAIR CROSSOVER DRAWING # B-02822

DATE: 05/14/14 **STRUCTURAL DESIGNER:** Ethan Love P.E. **PROJECT COORDINATOR:**

Drawn by: BH

Fibergrate Composite Structures Inc.
Fiberglass Grating • Structural • Fabrication

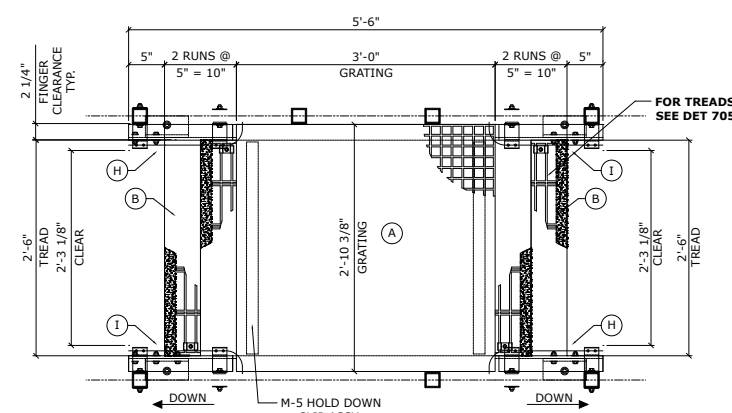
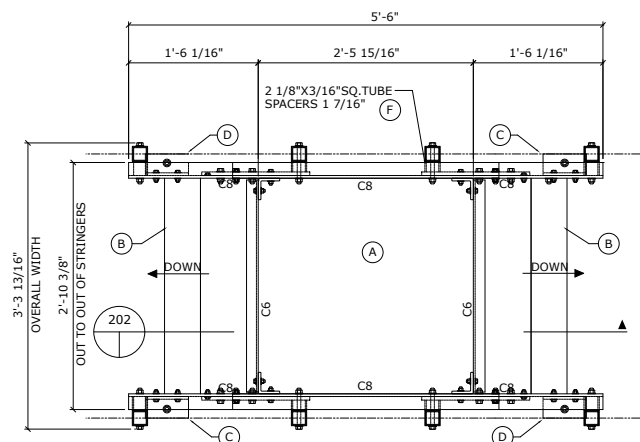
Fibergrate
Composite Structures
900 FM 205 • STEPHENVILLE, TEXAS 76401

SCALE: N.T.S.
DWG. SHT.: 1 OF 7

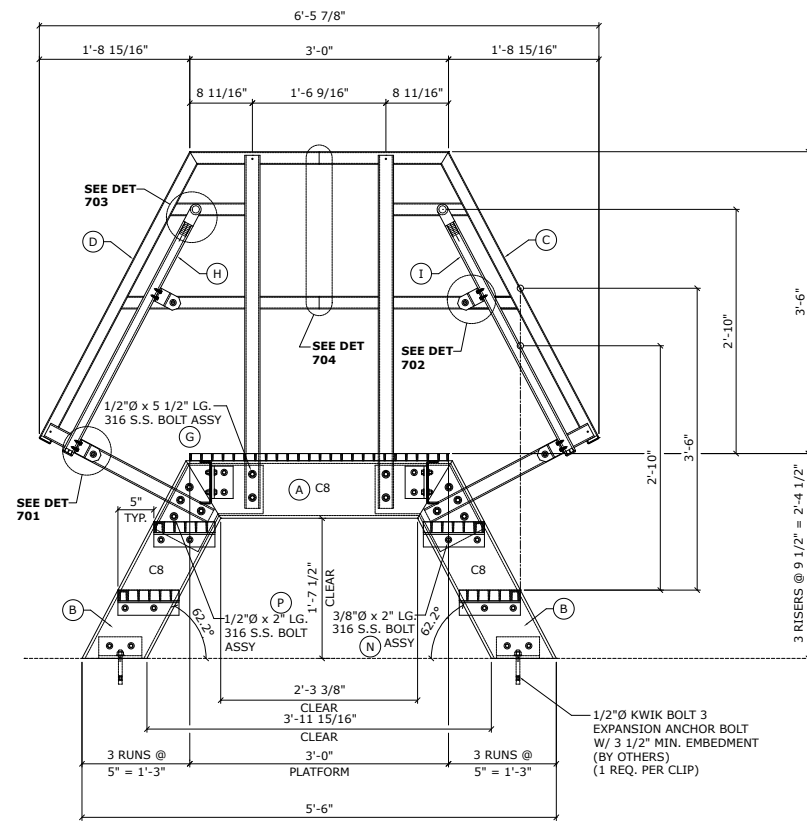
866119.01 FRP Ship Stair Crossover

19 1/2" Clearance

Weight = 111Lbs



201 PLAN - FRP STAIR WALKOVER



202 ELEVATION - FRP STAIR WALKOVER

ASSY. NO.	P/N	QTY.	DESCRIPTION
1000000	T	1	FRP Ship Stair Crossover Assembly Instructions
1000000	S	8	Rivets
1000000	R	1	Bond Kit
1000000	Q	8	1/2" Dia. x 2" Lg. 316 S.S. Bolt Assy.
1000000	P	8	3/8" Dia. x 3" Lg. Hex Head Bolt Assembly
1000000	O	4	3/8" Dia. x 2" Lg. 316 S.S. Bolt Assy.
1000000	N	4	1/4" Dia. x 2 1/2" Lg. Round Hd S.S. Bolt Assy
1000000	M	16	#14 x 1" Lg. S.S. Self Tap Screw
1000000	L	4	1 3/4"x1 3/4"x1/4" Thick FRP Spacer Plate
1000000	K	8	2" x 1 3/4" x 14 GA. 316 S.S. Plate
1000000	J	8	S.S. Handrail Bracket
1000000	I	2	1 1/2" Dia. Round Tube Handrail
1000000	H	2	1 1/2" Dia. Round Tube Handrail
1000000	G	16	1/2" Dia. x 5 1/2" Lg. 316 S.S. Bolt Assy.
1000000	F	16	2 1/8"x3/16" Sq. Tube Post Spacer (1 7/16" Lg.)
1000000	E	-	2 1/8"x3/16" Sq. Tube Post Spacer (1 15/16" Lg.)
1000000	D	2	Sq. Tube Guardrail Assembly
1000000	C	2	Sq. Tube Guardrail Assembly
1000000	B	2	Ship Stair Assembly
1000000	A	1	Platform Assembly

BILL OF MATERIALS			
CONTRACTOR: 19.5" FRP SHIP STAIR CROSSOVER			
DRAWING # B-02822			
DRAWN BY: BH	DATE: 05/14/14	STRUCTURAL DESIGNER: Ethan Love P.E.	PROJECT COORDINATOR:
Fibergate Composite Structures Inc.			
Fiberglass Grating • Structurals • Fabrication			
Fibergate			
Composite Structures			
900 FM 205 • STEPHENVILLE, TEXAS 76401			

LEGEND:

A2=2"x2"x1/4" ANGLE
A3=3"x3"x3/8" ANGLE
C8=8"x2 3/16"x3/8" CHANNEL
FB=3/8" THICK FLAT BAR

— = GUARDRAIL
□ = GUARDRAIL POST
■ = GUARDRAIL RETURN
— = FB BRACE
— = HANDRAIL

NO.	BY	DATE	REVISION	CHKD. BY	DATE
3					
2					
1	SLV/JM	04/04/17	NEW OSHA RULES ECN-171	EAL	04/05/17
0	BH	05/14/14	FOR PRODUCTION		05/14/14

FABRICATION TOLERANCES (U.N.O.)

	MOLDED GRATING	PULTRUDED GRATING	DYNAFORM SHAPES
LENGTH	+1/8, -5/16	#1/8	#1/8
WIDTH	+1/8, -5/16	#1/8	#1/8
HOLE LOC.	#1/16	#1/16	#1/16
CIRC. CUTS	#3/16	#3/16	N/A
NOTCHES	#1/8	#1/8	N/A
SQUARE OF CUT	1"	1"	2"
ANGULARITY	#2	#2	#2

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GRATING: Corvex 1" Deep 1 1/2" Sq. Mesh Molded Grating

COLOR: Dk. Gray SURFACE: Meniscus

TREADS: Corvex Fibertred 1 1/2" Deep 1 1/2"x6" Rect. Mesh

COLOR: Dk. Gray

DYNAFORM SHAPES: ISOFR

DYNAFORM GUARDRAIL: ISOFR

COLOR: SL. GRAY

COLOR: YELLOW

HARDWARE: 316 S.S.

GRATING H.D.C. ASSYS: M-2 & M-5

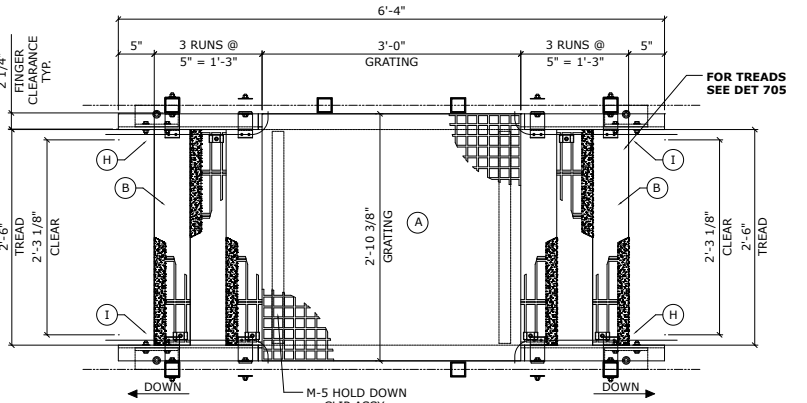
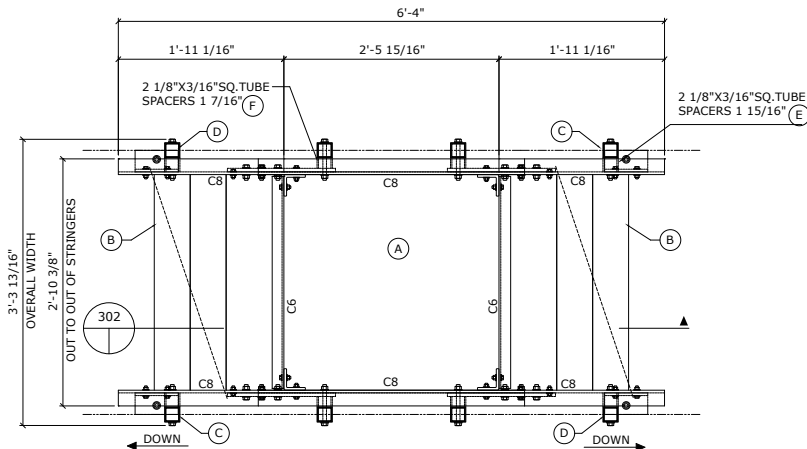
COATING: FLATSHEET: 1/2"

REFERENCE DWGS.:

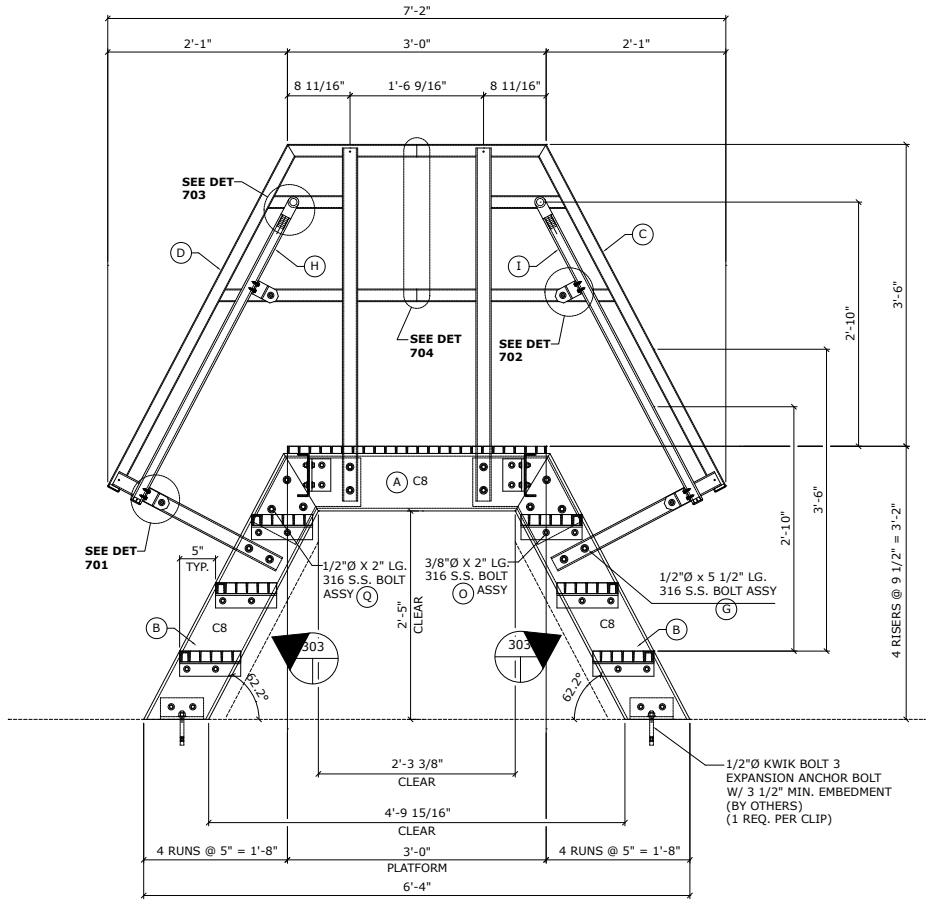
866129.01 FRP Ship Stair Crossover

29" Clearance

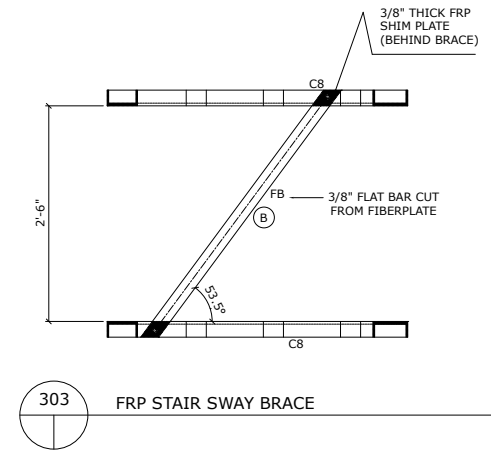
Weight = 125Lbs



301 PLAN - FRP STAIR WALKOVER



302 ELEVATION - FRP STAIR WALKOVER



ASSY. NO.	P/N	QTY.	DESCRIPTION
1000000	T	1	FRP Ship Stair Crossover Assembly Instructions
1000000	S	8	Rivets
1000000	R	1	Bond Kit
1000000	Q	12	1/2" Dia. x 2" Lg. 316 S.S. Bolt Assy.
1000000	P	8	3/8" Dia. x 3" Lg. Hex Head Bolt Assembly
1000000	O	4	3/8" Dia. x 2" Lg. 316 S.S. Bolt Assy.
1000000	N	4	1/4" Dia. x 2 1/2" Lg. Round Hd S.S. Bolt Assy
1000000	M	16	#14 x 1" Lg. S.S. Self Tap Screw
1000000	L	4	1 3/4"x1 3/4"x1/4" Thick FRP Spacer Plate
1000000	K	8	2" x 1 3/4" x 14 GA. 316 S.S. Plate
1000000	J	8	S.S. Handrail Bracket
1000000	I	2	1 1/2" Dia. Round Tube Handrail
1000000	H	2	1 1/2" Dia. Round Tube Handrail
1000000	G	16	1/2" Dia. x 5 1/2" Lg. 316 S.S. Bolt Assy.
1000000	F	8	2 1/8"x3/16" Sq. Tube Post Spacer (1 7/16" Lg.)
1000000	E	8	2 1/8"x3/16" Sq. Tube Post Spacer (1 15/16" Lg.)
1000000	D	2	Sq. Tube Guardrail Assembly
1000000	C	2	Sq. Tube Guardrail Assembly
1000000	B	2	Ship Stair Assembly
1000000	A	1	Platform Assembly

BILL OF MATERIALS			
CONTRACTOR: 29" FRP SHIP STAIR CROSSOVER			
DRAWING # B-02822			
CONTRACTOR:	DATE:	STRUCTURAL DESIGNER:	PROJECT COORDINATOR:
BH	05/14/14	Ethan Love P.E.	
DRAWN BY:			DATE:
Fibergrate Composite Structures Inc.			DATE:
Glass Grating • Structural • Fabrication			DATE:
Fibergrate			DATE:
Composite Structures			DATE:
900 FM 205 • STEPHENVILLE, TEXAS 76401			DATE:

LEGEND:

A2=2"x2"x1/4" ANGLE	□ = GUARDRAIL POST
A3=3"x3"x3/8" ANGLE	■ = GUARDRAIL RETURN
C8=8"x2 3/16"x3/8" CHANNEL	— = FB BRACE
FB=3/8" THICK FLAT BAR	— = HANDRAIL

NO.	BY	DATE	REVISION	CHKD. BY	DATE
3	SLV/JM	04/04/17	NEW OSHA RULES ECN-171	EAL	04/05/17
4	BH	05/14/14	FOR PRODUCTION	EAL	05/14/14

FABRICATION TOLERANCES (U.N.O.)

LENGTH	WIDTH	HOLE LOC.	CIRC. CUTS	NOTCHES	SQUARE OF CUT	ANGULARITY
+1/8, -5/16	+1/8, -5/16	+1/16	+3/16	+1/8	±2	±2

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GRATING: Corvex 1" Deep 1 1/2" Sq. Mesh Molded Grating

COLOR: Dk. Gray SURFACE: Meniscus

TREADS: Corvex Fibertred 1 1/2" Deep 1 1/2"x6" Rect. Mesh

COLOR: Dk. Gray

DYNAFORM SHAPES: ISOFR

COLOR: SL. GRAY

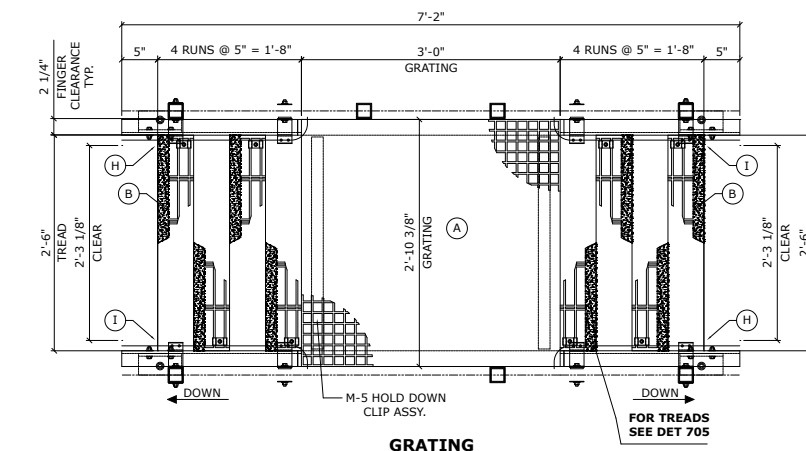
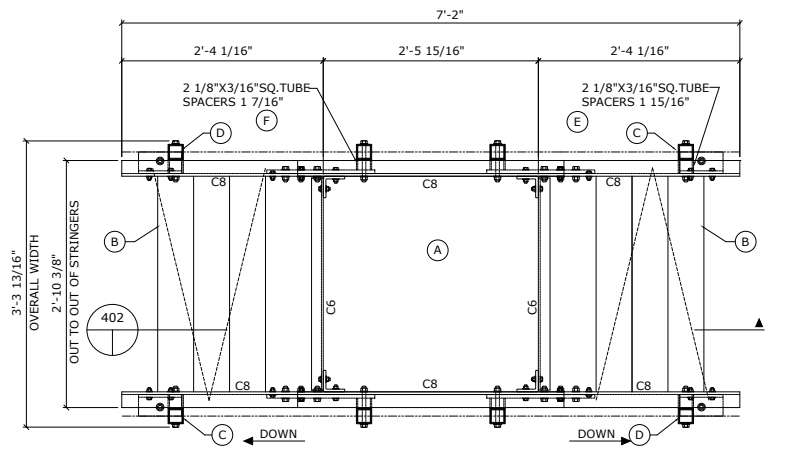
HARDWARE: 316 S.S.

COATING: FLATSHEET: 1/2"

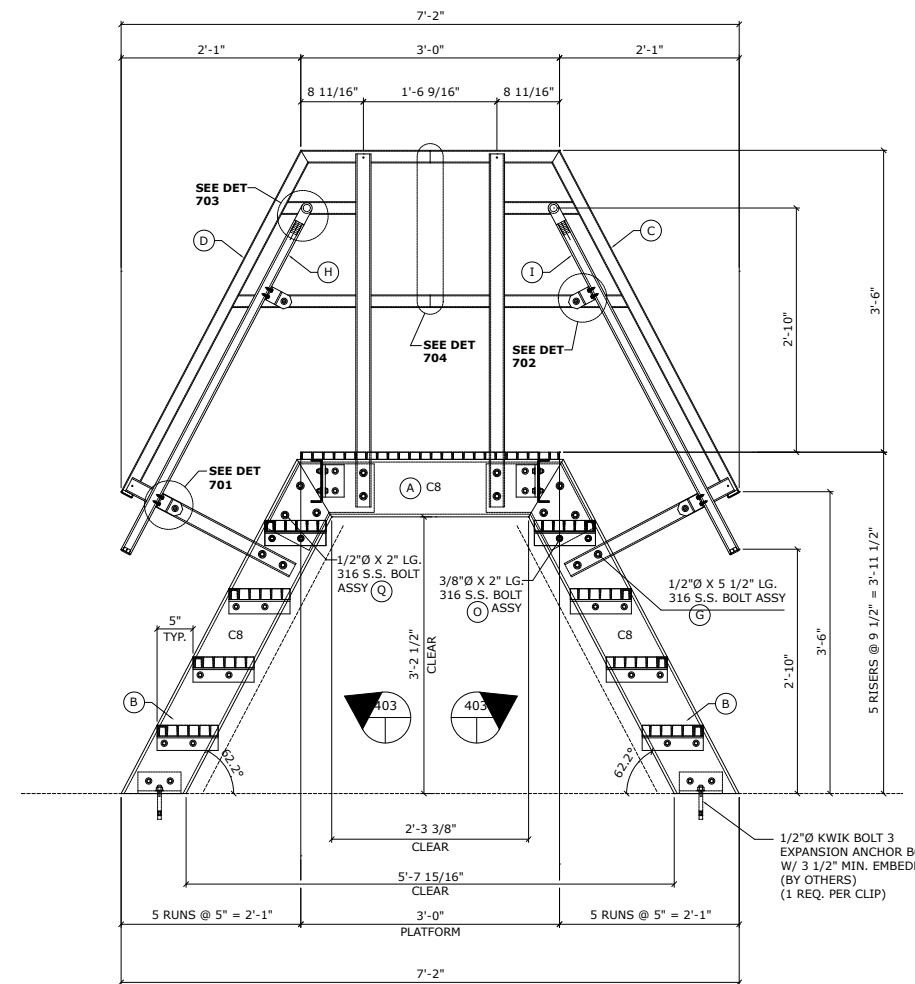
866138.01 FRP Ship Stair Crossover

38 1/2" Clearance

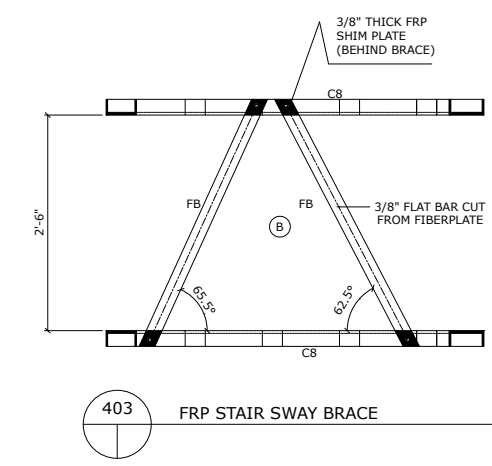
Weight = 158Lbs



401 PLAN - FRP STAIR WALKOVER



402 ELEVATION - FRP STAIR WALKOVER



ASSY. NO.	P/N	QTY.	DESCRIPTION
1000000	T	1	FRP Ship Stair Crossover Assembly Instructions
1000000	S	8	Rivets
1000000	R	1	Bond Kit
1000000	Q	12	1/2" Dia. x 2" Lg. 316 S.S. Bolt Assy.
1000000	P	8	3/8" Dia. x 3" Lg. Hex Head Bolt Assembly
1000000	O	4	3/8" Dia. x 2" Lg. 316 S.S. Bolt Assy.
1000000	N	4	1/4" Dia. x 2 1/2" Lg. Round Hd S.S. Bolt Assy
1000000	M	16	#14 x 1" Lg. S.S. Self Tap Screw
1000000	L	4	1 3/4"x1 3/4"x1/4" Thick FRP Spacer Plate
1000000	K	8	2" x 1 3/4" x 14 GA. 316 S.S. Plate
1000000	J	8	S.S. Handrail Bracket
1000000	I	2	1 1/2" Dia. Round Tube Handrail
1000000	H	2	1 1/2" Dia. Round Tube Handrail
1000000	G	16	1/2" Dia. x 5 1/2" Lg. 316 S.S. Bolt Assy.
1000000	F	8	2 1/8"x3/16" Sq. Tube Post Spacer (1 7/16" Lg.)
1000000	E	8	2 1/8"x3/16" Sq. Tube Post Spacer (1 15/16" Lg.)
1000000	D	2	Sq. Tube Guardrail Assembly
1000000	C	2	Sq. Tube Guardrail Assembly
1000000	B	2	Ship Stair Assembly
1000000	A	1	Platform Assembly

BILL OF MATERIALS			
CONTRACTOR: 38 1/2" FRP SHIP STAIR CROSSOVER			
DRAWING # B-02822			
DRAWN BY: BH	DATE: 05/14/14	STRUCTURAL DESIGNER: Ethan Love P.E.	P.O. NO.:
PROJECT COORDINATOR:		Cust. NO.:	
Fibergrate Composite Structures Inc. Fiberglass Grating • Structurals • Fabrication Fibergrate Composite Structures 900 FM 205 • STEPHENVILLE, TEXAS 76401			
W.O. NO.:		SCALE: N.T.S.	
DWG. SHEET: 4 OF 7		0.0833	

LEGEND:

—	= GUARDRAIL
□	= GUARDRAIL POST
■	= GUARDRAIL RETURN
—	= FB BRACE
—	= HANDRAIL

A2=2"x2"x1/4" ANGLE
 A3=3"x3"x3/8" ANGLE
 C8=8"x2 3/16"x3/8" CHANNEL
 FB=3/8" THICK FLAT BAR

NO.	BY	DATE	REVISION	CHKD. BY	DATE
△	SLV/JM	04/04/17	NEW OSHA RULES ECN-171	EAL	04/05/17
△	BH	05/14/14	FOR PRODUCTION	EAL	05/14/14

FABRICATION TOLERANCES (U.N.O.)

LENGTH	MOLDED GRATING	PULTRUDED GRATING	DYNAFORM SHAPES
	+1/8, -5/16	#1/8	#1/8
WIDTH	+1/8, -5/16	#1/8	#1/8
HOLE LOC.	#1/16	#1/16	#1/16
CIRC. CUTS	#3/16	#2/16	N/A
NOTCHES	#1/8	#1/8	N/A
SQUARE OF CUT	1°	1°	2°
ANGULARITY	#2	#2	#2

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GRATING: Corvex 1" Deep 1 1/2" Sq. Mesh Molded Grating
 COLOR: Dk. Gray SURFACE: Meniscus
 TREADS: Corvex Fibertred 1 1/2" Deep 1 1/2"x6" Rect. Mesh
 COLOR: Dk. Gray

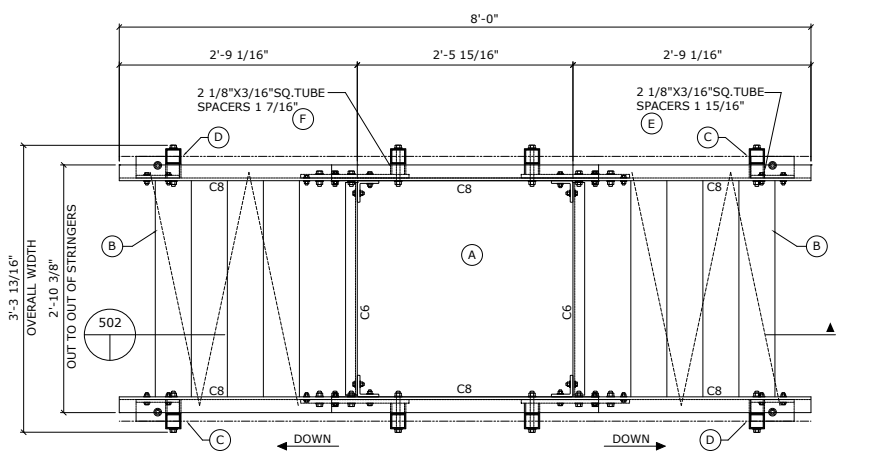
DYNAFORM SHAPES: ISOPR
 DYNAFORM GUARDRAIL: ISOPR
 COLOR: SL. GRAY GRATING H.D.C. ASSYS.: M-2 & M-5
 COLOR: YELLOW
 HARDWARE: 316 S.S.
 COATING: FLATSHEET: 1/2"

REFERENCE DWGS.:

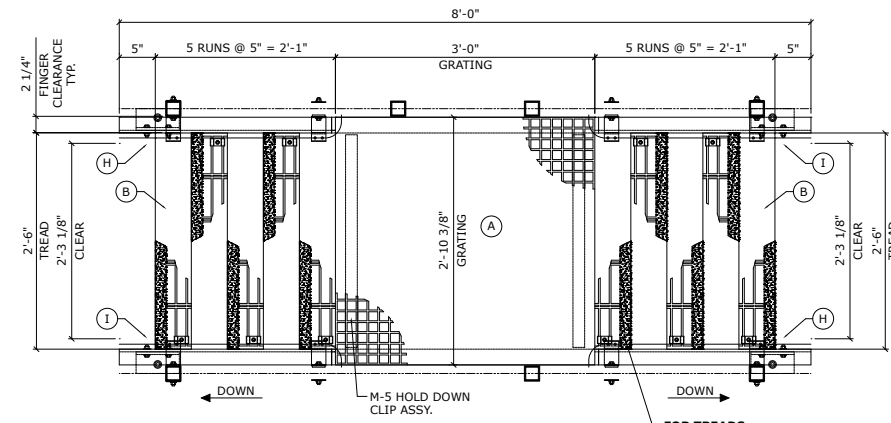
866148.01 FRP Ship Stair Crossover

48" Clearance

Weight = 174Lbs

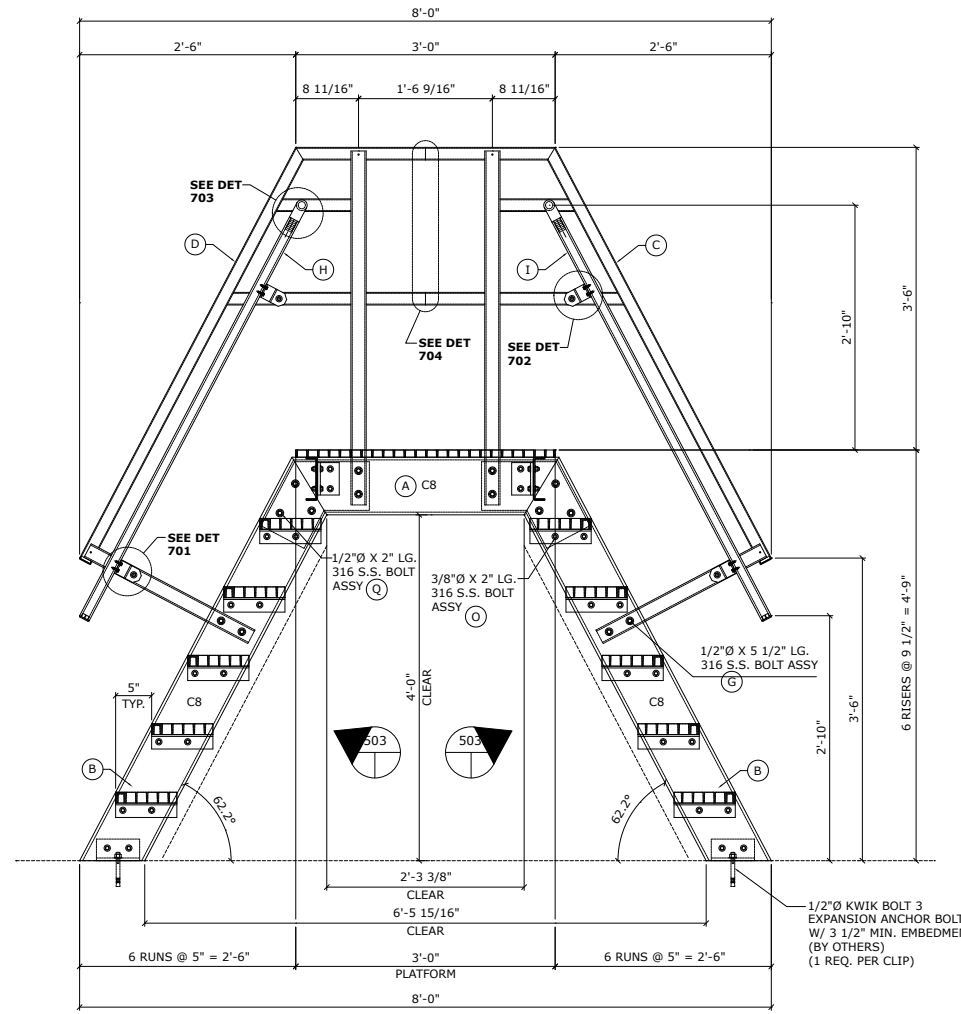


STRUCTURE

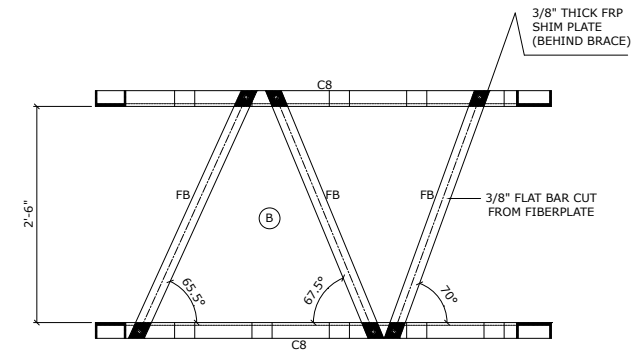


GRATING

501 PLAN - FRP STAIR WALKOVER



502 ELEVATION - FRP STAIR WALKOVER



503 FRP STAIR SWAY BRACE

ASSY. NO.	P/N	QTY.	DESCRIPTION
1000000	T	1	FRP Ship Stair Crossover Assembly Instructions
1000000	S	8	Rivets
1000000	R	1	Bond Kit
1000000	Q	12	1/2" Dia. x 2" Lg. 316 S.S. Bolt Assy.
1000000	P	8	3/8" Dia. x 3" Lg. Hex Head Bolt Assembly
1000000	O	4	3/8" Dia. x 2" Lg. 316 S.S. Bolt Assy.
1000000	N	4	1/4" Dia. x 2 1/2" Lg. Round Hd S.S. Bolt Assy
1000000	M	16	#14 x 1" Lg. S.S. Self Tap Screw
1000000	L	4	1 3/4"x1 3/4"x1/4" Thick FRP Spacer Plate
1000000	K	8	2" x 1 3/4" x 14 GA. 316 S.S. Plate
1000000	J	8	S.S. Handrail Bracket
1000000	I	2	1 1/2" Dia. Round Tube Handrail
1000000	H	2	1 1/2" Dia. Round Tube Handrail
1000000	G	16	1/2" Dia. x 5 1/2" Lg. 316 S.S. Bolt Assy.
1000000	F	8	2 1/8"x3/16" Sq. Tube Post Spacer (1 7/16" Lg.)
1000000	E	8	2 1/8"x3/16" Sq. Tube Post Spacer (1 15/16" Lg.)
1000000	D	2	Sq. Tube Guardrail Assembly
1000000	C	2	Sq. Tube Guardrail Assembly
1000000	B	2	Ship Stair Assembly
1000000	A	1	Platform Assembly

BILL OF MATERIALS

LEGEND:

	= GUARDRAIL
	= GUARDRAIL POST
	= GUARDRAIL RETURN
	= FB BRACE
	= HANDRAIL

A2=2"x2"x1/4" ANGLE
A3=3"x3"x3/8" ANGLE
C8=8"x2 3/16"x3/8" CHANNEL
FB=3/8" THICK FLAT BAR

NO.	BY	DATE	REVISION	CHKD. BY	DATE
3					
2	SLV/JM	04/04/17	NEW OSHA RULES ECN-171	EAL	04/05/17
1	BH	05/14/14	FOR PRODUCTION	EAL	05/14/14

FABRICATION TOLERANCES (U.N.O.)

LENGTH	MOLDED GRATING	PULTRUDED GRATING	DYNAFORM GRATING
LENGTH	+1/8, -5/16	+1/8	+1/8
WIDTH	+1/8, -5/16	+1/8	+1/8
HOLE LOC.	+1/16	+1/16	+1/16
CIRC. CUTS	+3/16	+3/16	N/A
NOTCHES	+1/8	+1/8	N/A
SQUARE OF CUT	1°	1°	2°
ANGULARITY	#2	#2	#2

DO NOT STACK TOLERANCES
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GRATING: Corvex 1" Deep 1 1/2" Sq. Mesh Molded Grating

COLOR: Dk. Gray SURFACE: Meniscus

TREADS: Corvex Fibertred 1 1/2" Deep 1 1/2"x6" Rect. Mesh

COLOR: Dk. Gray

DYNAFORM SHAPES: ISOFR

COLOR: SL. GRAY

DYNAFORM GUARDRAIL: ISOFR

COLOR: YELLOW

HARDWARE: 316 S.S.

GRATING P.D.C. ASSYS.: M-2 & M-5

FLATSHEET: 1/2"

REFERENCE DWGS.:

CONTRACTOR: 48" FRP SHIP STAIR CROSSOVER DRAWING # B-02822

PROJECT COORDINATOR: _____

STRUCTURAL DESIGNER: **Ethan Love P.E.**

DATE: **05/14/14**

DRAWN BY: **BH**

Fibergrate Composite Structures Inc.
Fiberglass Grating • Structural • Fabrication

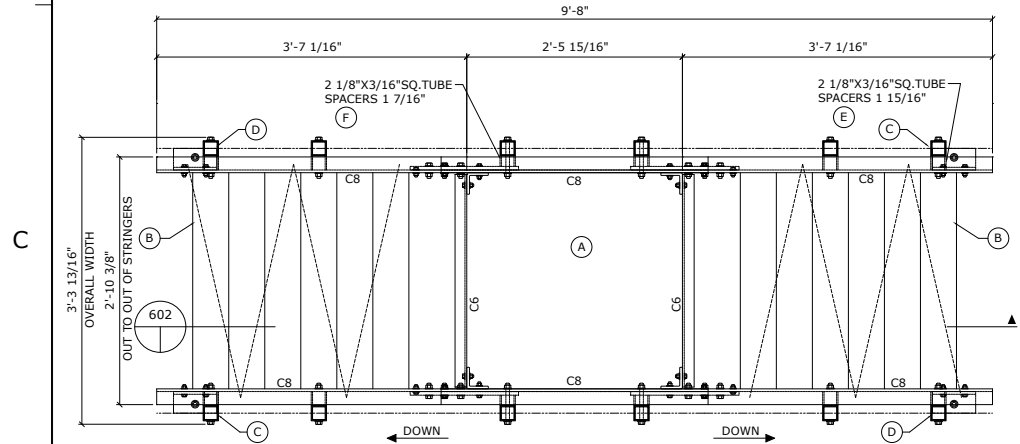
Fibergrate
Composite Structures
900 FM 205 • STEPHENVILLE, TEXAS 76401

CUT NO.: _____
W.O. NO.: _____
SCALE: **N.T.S.**
DWG. SHT.: **5 OF 7**

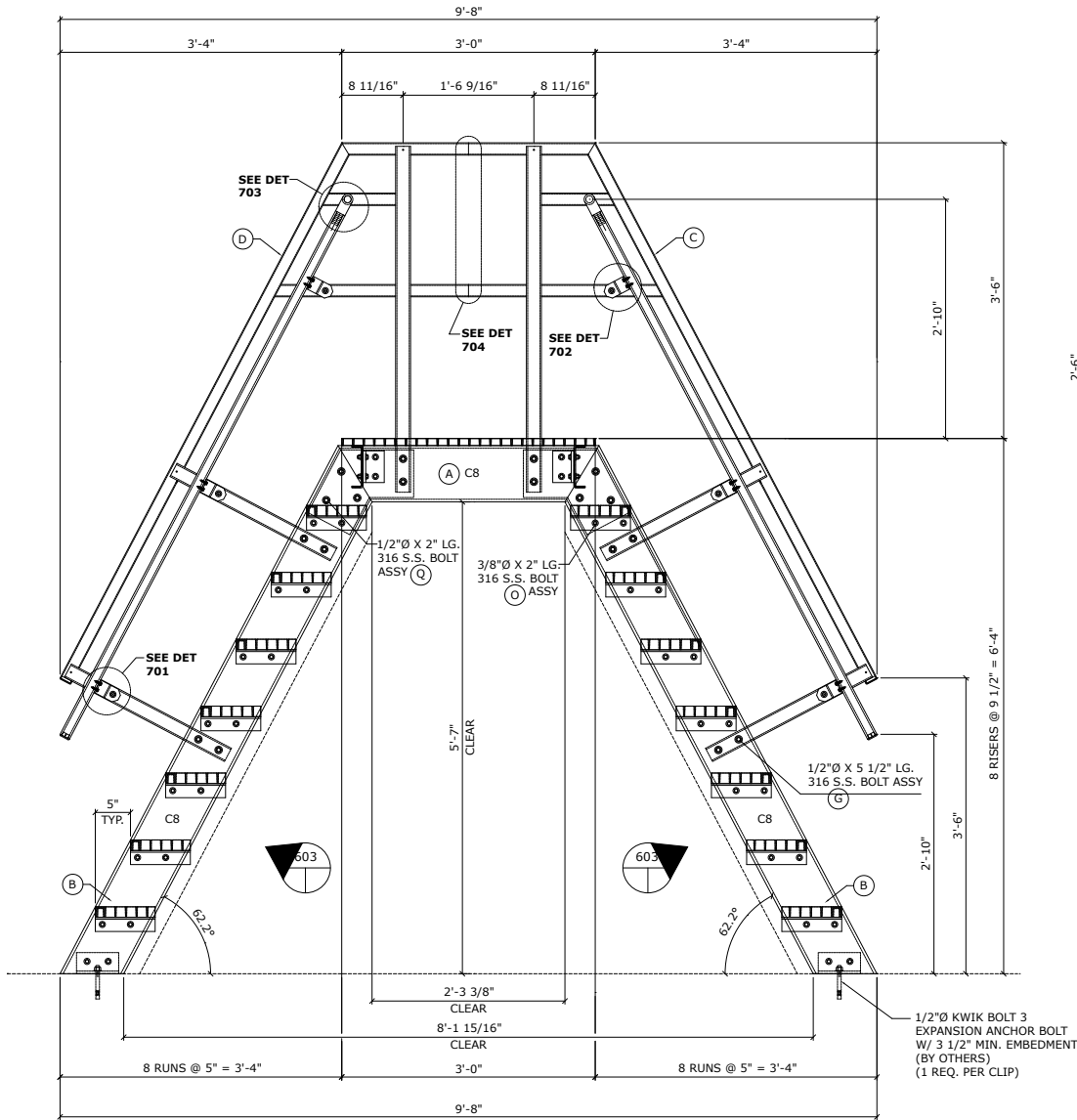
866167.01 FRP Ship Stair Crossover

67" Clearance

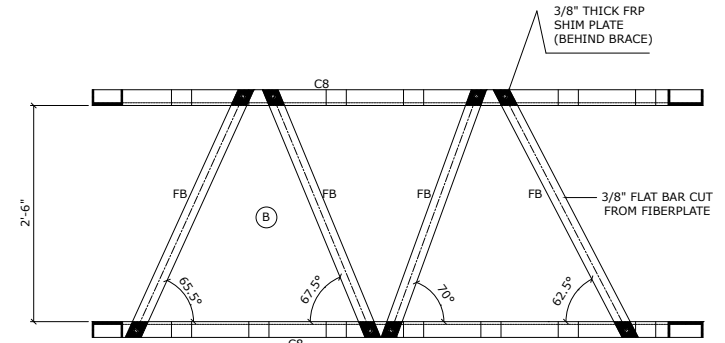
Weight = 204Lbs



601 PLAN - FRP STAIR WALKOVER



602 ELEVATION - FRP STAIR WALKOVER



603 FRP STAIR SWAY BRACE

ASSY. NO.	P/N	QTY.	DESCRIPTION
1000000	T	1	FRP Ship Stair Crossover Assembly Instructions
1000000	S	8	Rivets
1000000	R	1	Bond Kit
1000000	Q	12	1/2" Dia. x 2" Lg. 316 S.S. Bolt Assy.
1000000	P	12	3/8" Dia. x 3" Lg. Hex Head Bolt Assembly
1000000	O	4	3/8" Dia. x 2" Lg. 316 S.S. Bolt Assy.
1000000	N	4	1/4" Dia. x 2 1/2" Lg. Round Hd S.S. Bolt Assy
1000000	M	24	#14 x 1" Lg. S.S. Self Tap Screw
1000000	L	4	1 3/4"x1 3/4"x1/4" Thick FRP Spacer Plate
1000000	K	12	2" x 1 3/4" x 14 GA. 316 S.S. Plate
1000000	J	12	S.S. Handrail Bracket
1000000	I	2	1 1/2" Dia. Round Tube Handrail
1000000	H	2	1 1/2" Dia. Round Tube Handrail
1000000	G	24	1/2" Dia. x 5 1/2" Lg. 316 S.S. Bolt Assy.
1000000	F	8	2 1/8"x3/16" Sq. Tube Post Spacer (1 7/16" Lg.)
1000000	E	16	2 1/8"x3/16" Sq. Tube Post Spacer (1 15/16" Lg.)
1000000	D	2	Sq. Tube Guardrail Assembly
1000000	C	2	Sq. Tube Guardrail Assembly
1000000	B	2	Ship Stair Assembly
1000000	A	1	Platform Assembly

BILL OF MATERIALS

<p>CONTRACTOR: 67" FRP SHIP STAIR CROSSOVER DRAWING # B-02822</p>			
DRAWN BY:	DATE:	STRUCTURAL DESIGNER:	PROJECT COORDINATOR:
BH	05/14/14	Ethan Love P.E.	
<p>Fibergrate Composite Structures Inc. <i>Fiberglass Grating • Structurals • Fabrication</i></p>			
<p>900 FM 205 • STEPHENVILLE, TEXAS 76401</p>			

LEGEND:

- A2=2"x2"x1/4" ANGLE
 - A3=3"x3"x3/8" ANGLE
 - C8=8"x2 3/16"x3/8" CHANNEL
 - FB=3/8" THICK FLAT BAR
- = GUARDRAIL
 - = GUARDRAIL POST
 - = GUARDRAIL RETURN
 - = FB BRACE
 - = HANDRAIL

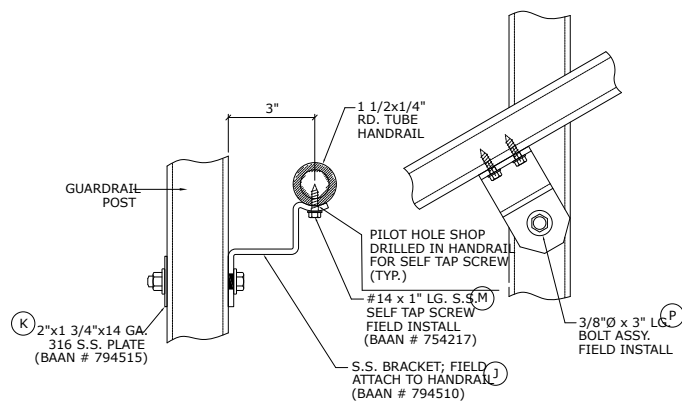
FABRICATION TOLERANCES (U.N.O.)

	MOLDED GRATING	PULTRUDED GRATING	DYNAFORM SHAPES
LENGTH	+1/8, -5/16	#1/8	#1/8
WIDTH	+1/8, -5/16	#1/8	#1/8
HOLE LOC.	+1/16	#1/16	#1/16
CIRC. CUTS	#3/16	#3/16	N/A
NOTCHES	#1/8	#1/8	N/A
SQUARE OF CUT	1°	1°	2°
ANGULARITY	#2	#2	#2

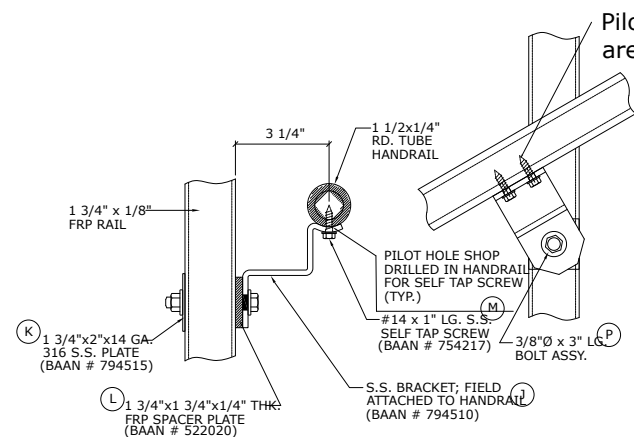
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NO.	BY	DATE	REVISION	CHKD. BY	DATE
3					
2	SLV/JM	04/04/17	NEW OSHA RULES ECN-171	EAL	04/05/17
1	BH	05/14/14	FOR PRODUCTION	EAL	05/14/14

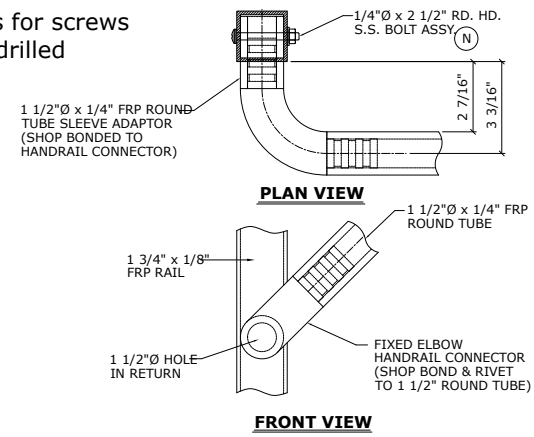
FRP Ship Stair Crossover Additional Details



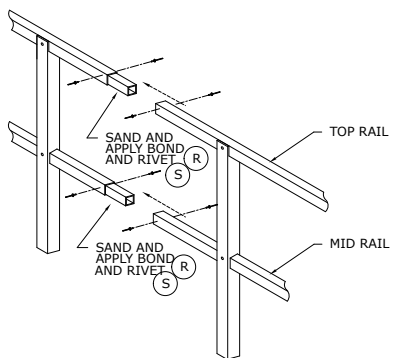
701 S.S. HANDRAIL BRACKET TO POST



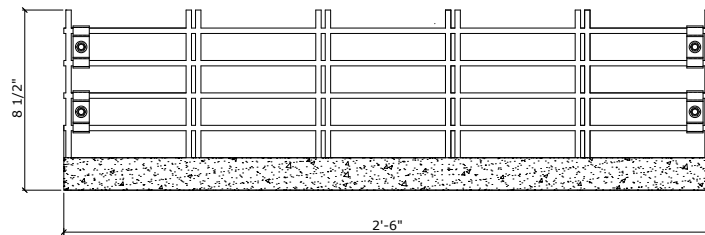
702 S.S. HANDRAIL BRACKET TO RAIL



703 DETAIL - HANDRAIL TO RAIL CONNECTION



704 DETAIL - IN LINE HANDRAIL SPLICE



705 FIBERTRED

LEGEND:	
	= GUARDRAIL
	= GUARDRAIL POST
	= GUARDRAIL RETURN
	= FB BRACE
	= HANDRAIL

A2=2"x2"x1/4" ANGLE
A3=3"x3"x3/8" ANGLE
C8=8"x2 3/16"x3/8" CHANNEL
FB=3/8" THICK FLAT BAR

NO.	BY	DATE	REVISION	CHKD. BY	DATE
3					
2					
1	JM	04/04/17	NEW OSHA RULES ECN-171	EAL	04/05/17
0					

FABRICATION TOLERANCES (U.N.O.)			
LENGTH	+1/8, -5/16	±1/8	±1/8
WIDTH	+1/8, -5/16	±1/8	±1/8
HOLE LOC.	±1/16	±1/16	±1/16
CIRC. CUTS	±3/16	±3/16	N/A
NOTCHES	±1/8	±1/8	N/A
SQUARE OF CUT	1°	1°	2°
ANGULARITY	±2	±2	±2

GRATING:	Corvex 1" Deep 1 1/2" Sq. Mesh Molded Grating
COLOR:	Dk. Gray SURFACE: Meniscus
TREADS:	Corvex Fibertred 1 1/2" Deep 1 1/2"x6" Rect. Mesh
COLOR:	Dk. Gray
DYNAFORM SHAPES:	ISOFR GUARDRAIL: ISOFR SL. GRAY
DYNAFORM SHAPES:	ISOFR GUARDRAIL: ISOFR SL. GRAY
HARDWARE:	GRATING H.D.C. ASSYS.: M-2 & M-5
COATING:	FLATSHEET: 1/2"
REFERENCE DWGS.:	

CONTRACTOR:
**FRP Ship Stair Crossover
Additional Details**

P.O. NO.:

DRAWN BY: BH DATE: 05/14/14 STRUCTURAL DESIGNER: Ethan Love P.E. PROJECT COORDINATOR:

Fibergrate Composite Structures Inc. Cust NO.:

Fiberglass Grating • Structurals • Fabrication

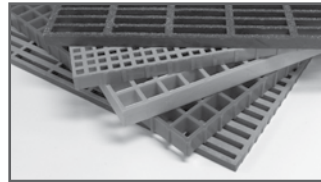
Fibergrate
Composite Structures
900 FM 205 • STEPHENVILLE, TEXAS 76401

W.O. NO.:

SCALE:
N.T.S.

DWG. SHT.:
7 OF 7

Fibergrate Products & Services



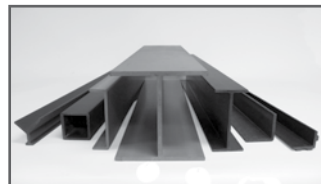
Fibergrate® Molded Grating

Fibergrate molded gratings are designed to provide the ultimate in reliable performance, even in the most demanding conditions. Fibergrate offers the widest selection in the market with multiple resins and more than twenty grating configurations available in many panel sizes and surfaces.



Safe-T-Span® Pultruded Industrial and Pedestrian Gratings

Combining corrosion resistance, long-life and low maintenance, Safe-T-Span® provides unidirectional strength for industrial and pedestrian pultruded grating applications.



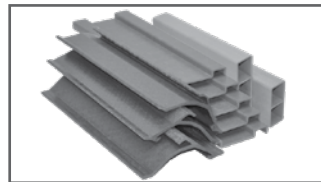
Dynaform® Structural Shapes

Fibergrate offers a wide range of standard Dynaform pultruded structural profiles for industrial and commercial use, including I-beams, wide flange beams, round and square tubes, bars, rods, channels, leg angles and plate.



Dynarail® & DynaRound™ Guardrail, Handrail & Ladders

Easily assembled from durable components or engineered and prefabricated to your specifications, Dynarail square tube and DynaRound round tube railing systems and Dynarail safety ladder systems meet or exceed OSHA and strict building code requirements for safety and design.



Custom Composite Solutions

Combining Fibergrate's design, manufacturing and fabrication services allows Fibergrate to offer custom composite solutions to meet our client's specific requirements. Either through unique pultruded profiles or custom open molding, Fibergrate can help bring your vision to reality.



Design & Fabrication Services

Combining engineering expertise with an understanding of fiberglass applications, Fibergrate provides turnkey design and fabrication of fiberglass structures, including platforms, catwalks, stairways, railings and equipment support structures.



Worldwide Sales & Distribution Network

Whether a customer requires a platform in a mine in South Africa to grating on an oil rig in the North Sea, or walkways in a Wisconsin cheese plant to railing at a water treatment facility in Brazil; Fibergrate has sales and service locations throughout the world to meet the needs and exceed the expectations of any customer.

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