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NOTES:

1. The generic installation guide is for information purpose only, to illustrate typical seakeeper installations. The arrangements presented herein are based on the following Seakeeper 4 / 4.5 resultant forces acting at each corner:

- Vertical Force (Fz) = 2989 lbs up and down (13.30 kN)
- Longitudinal Force (Fx) = 1785 lbs fore and aft (7.82 kN)
- Lateral force (Fy) = 182 lbs port and starboard (0.81 kN)

Design criteria requires the loads applied simultaneously and are fully reversing in each axis to an infinite number of cycles. These forces do not include vessel motion accelerations or vertical slam loads which can be significant for high-speed vessels. Seakeeper suggests a safety factor of 3.0 (yielding a safety margin of 2.0) this factor of safety may need to be increased depending on the operational profile of the vessel.

2. Additional installation documentation for the Seakeeper 4 / 4.5 models will be made available prior to production.

3. The Deck Mount Installation drawing concept is preliminary and for conceptual purposes only. Installers must conduct their own detailed design review for deck mount installations.

4. All dimensions are given in: MM [IN].

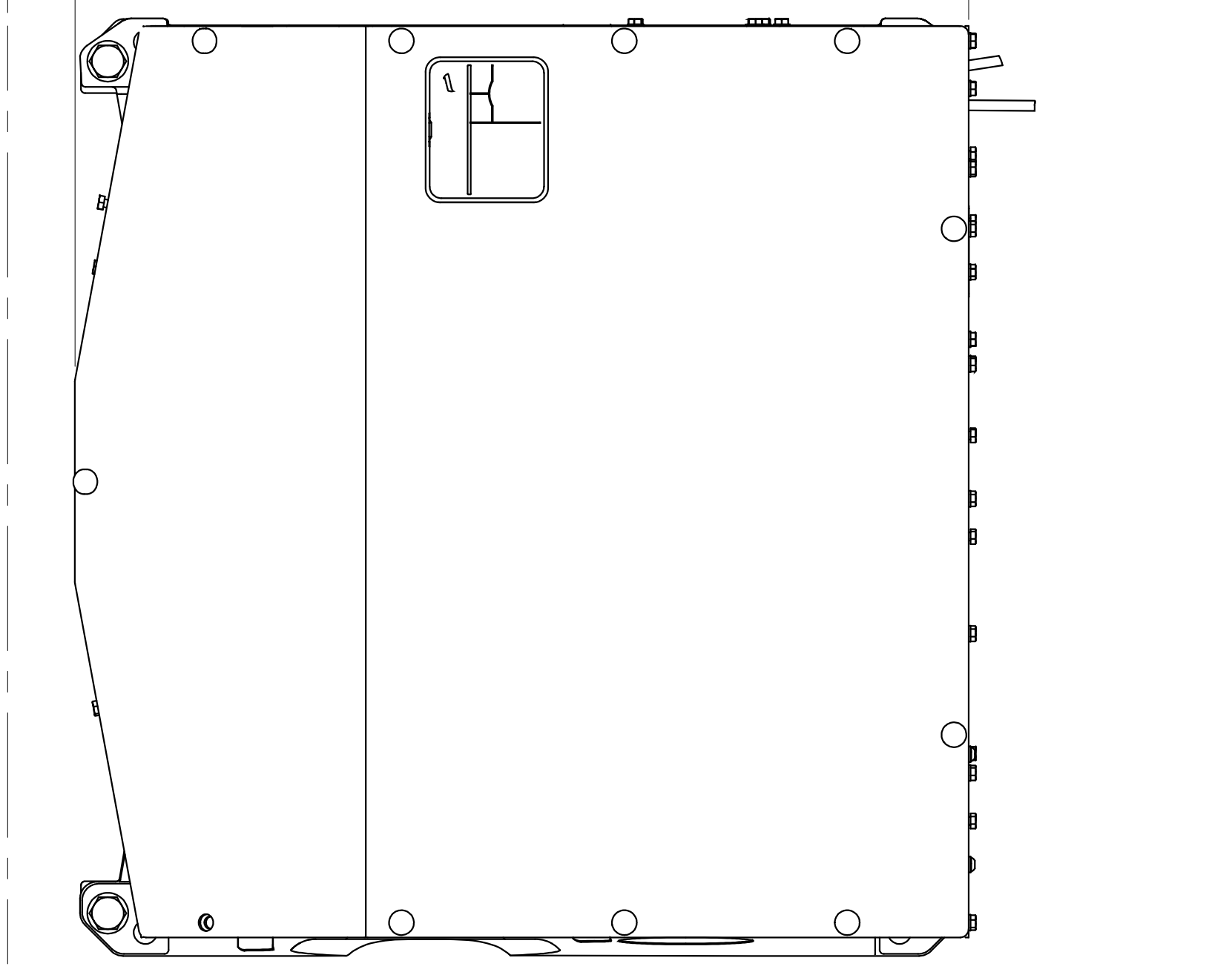
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0	---	---	PRELIMINARY	09/20/2022	
1	---	---	ISSUED	12/01/2022	
2	---	---	UPDATE	06/28/2023	

MINIMUM REQUIRED
DISTANCE FOR TOOL AND
SERVICE CLEARANCE

51
[2.00]

203
[8.00]

MINIMUM REQUIRED
DISTANCE FOR TOOL AND
SERVICE CLEARANCE

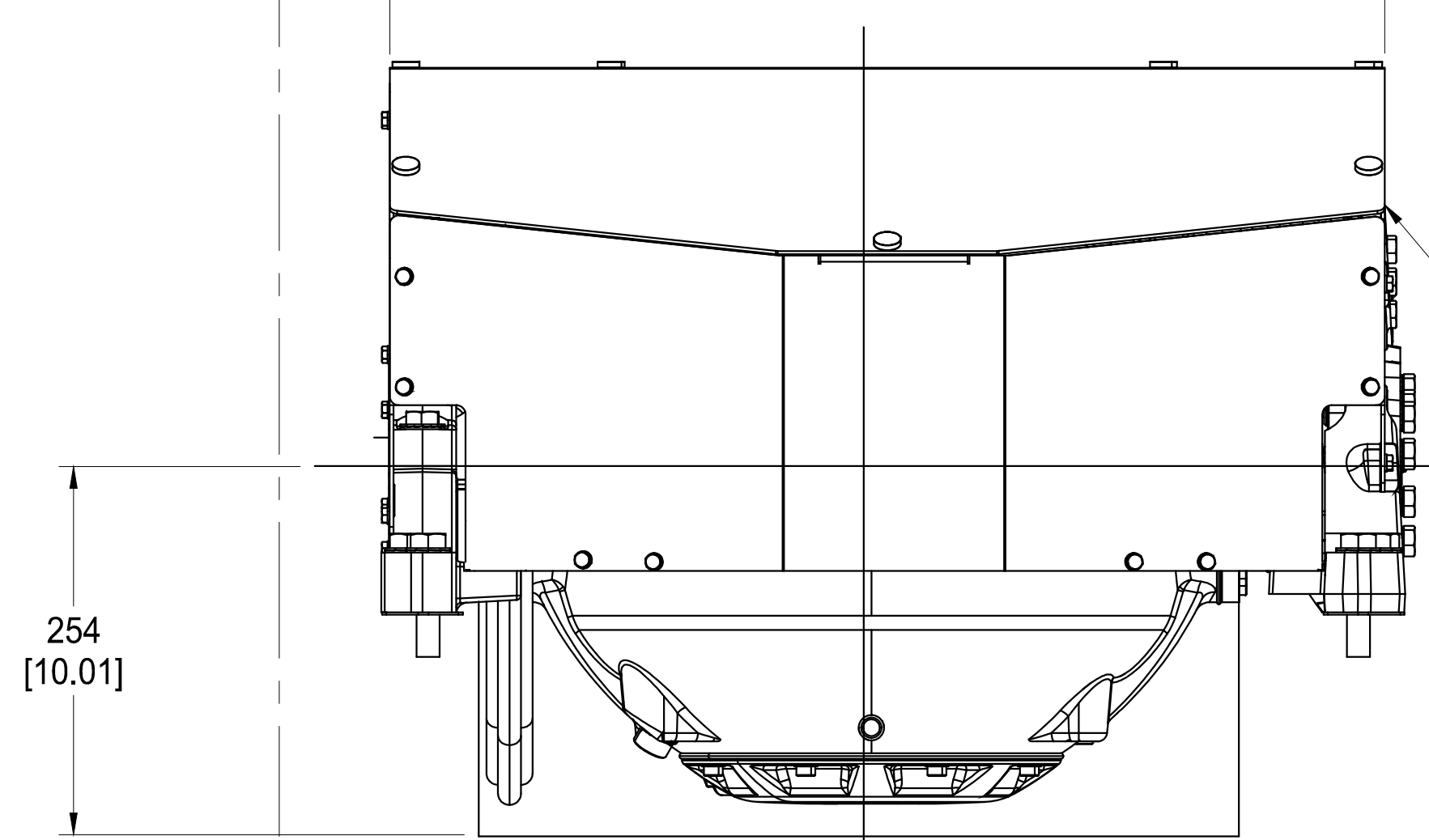


MINIMUM REQUIRED
DISTANCE FOR TOOL AND
SERVICE CLEARANCE

76
[3.00]

152
[6.00]

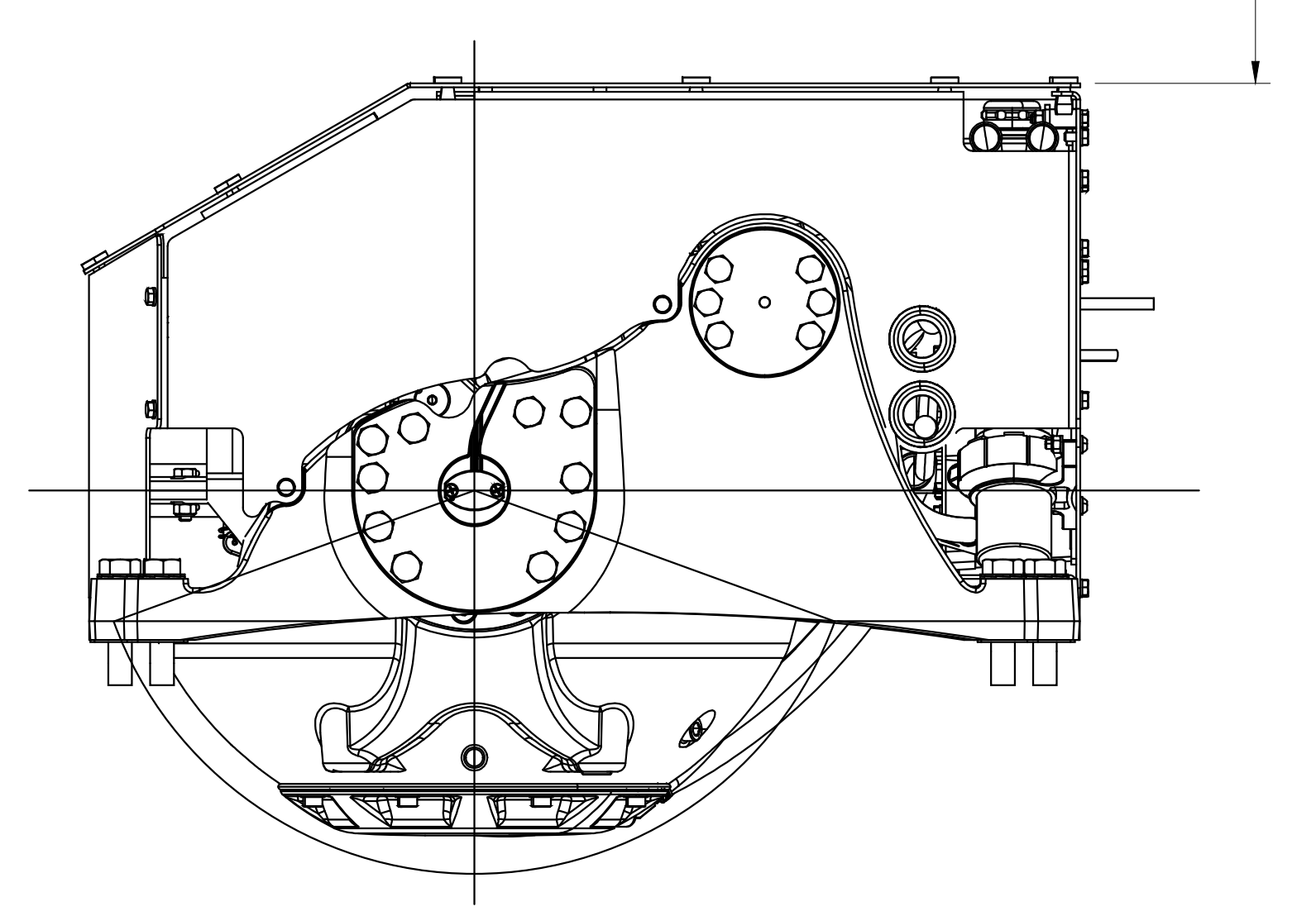
MINIMUM REQUIRED
DISTANCE FOR TOOL AND
SERVICE CLEARANCE



BRAKE SIDE

MINIMUM REQUIRED
DISTANCE FOR TOOL AND
SERVICE CLEARANCE

203
[8.00]



MINIMUM REQUIRED
DISTANCE FOR HOSES
AND CABLES MOVEMENT

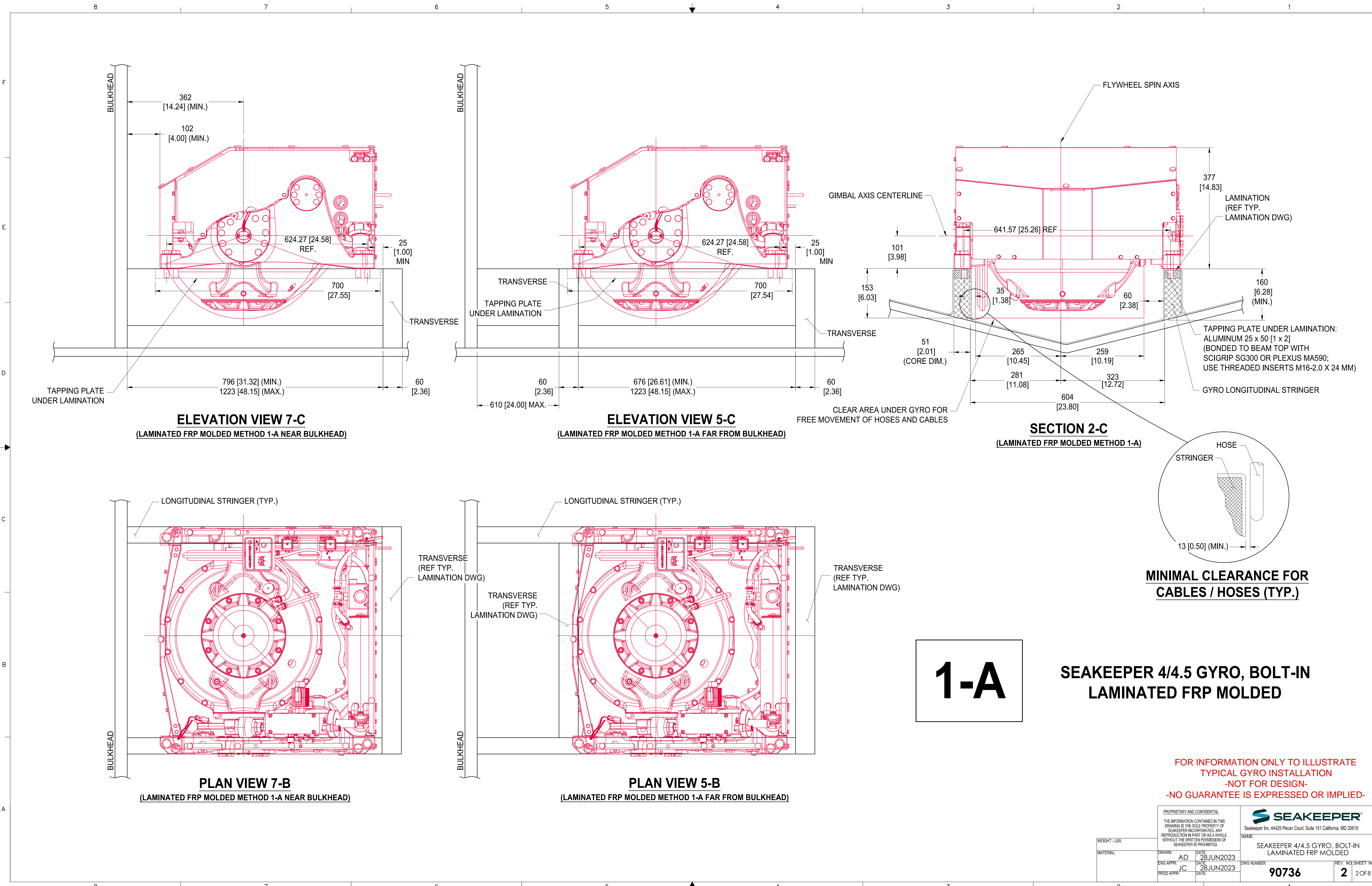
265
[10.45]

259
[10.19]

254
[10.01]

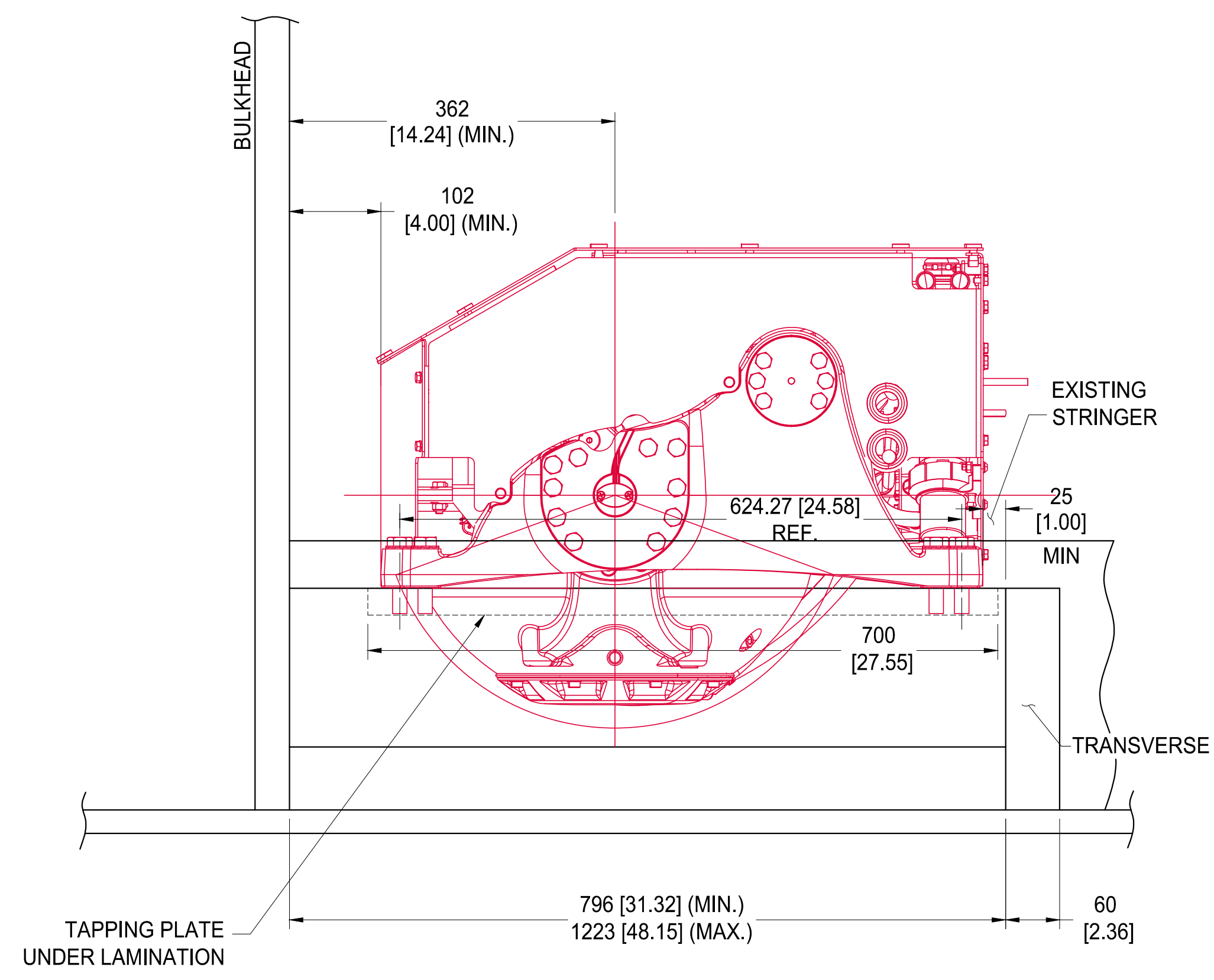
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TYPICAL GYRO INSTALLATION
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WEIGHT - LBS: MATERIAL:	DRAWN: AD DATE: 28 JUN 2023 ENG APPR: JC DATE: 28 JUN 2023 PROD APPR:	NAME: SEAKEEPER 4/4.5 GYRO CLEARANCES	DWG NUMBER: 90736
		REV. NO. SHEET NO. 2 1 OF 8	

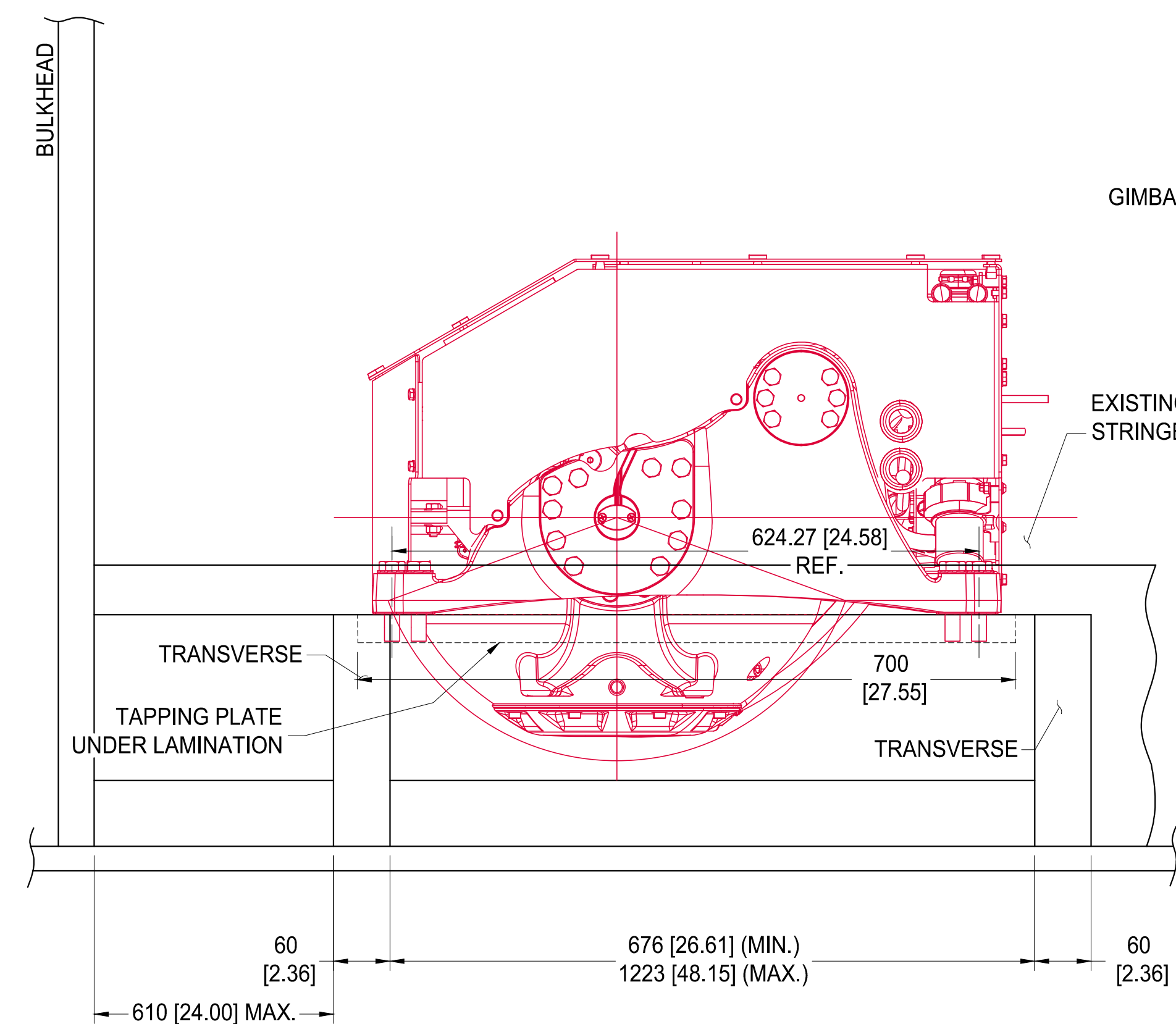


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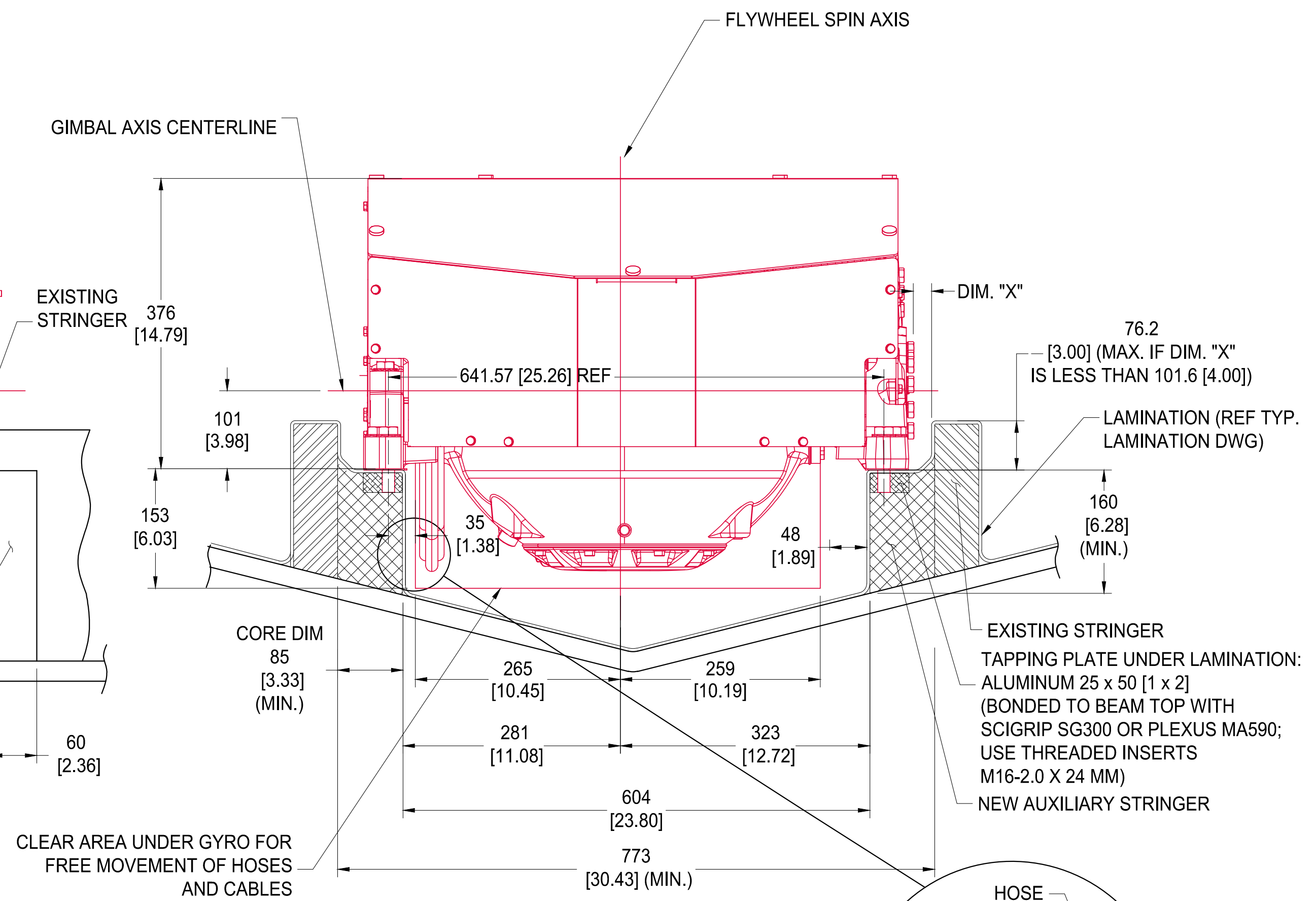
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WEIGHT - LBS: MATERIAL:	DRAWN: AD ENG APPR: JC PROD APPR:	DATE: 28 JUN 2023 DATE: 28 JUN 2023 DATE:	NAME: SEAKEEPER 4/4.5 GYRO, BOLT-IN LAMINATED FRP MOLDED DWG NUMBER: 90736 REV. NO. SHEET NO.: 2 2 OF 8



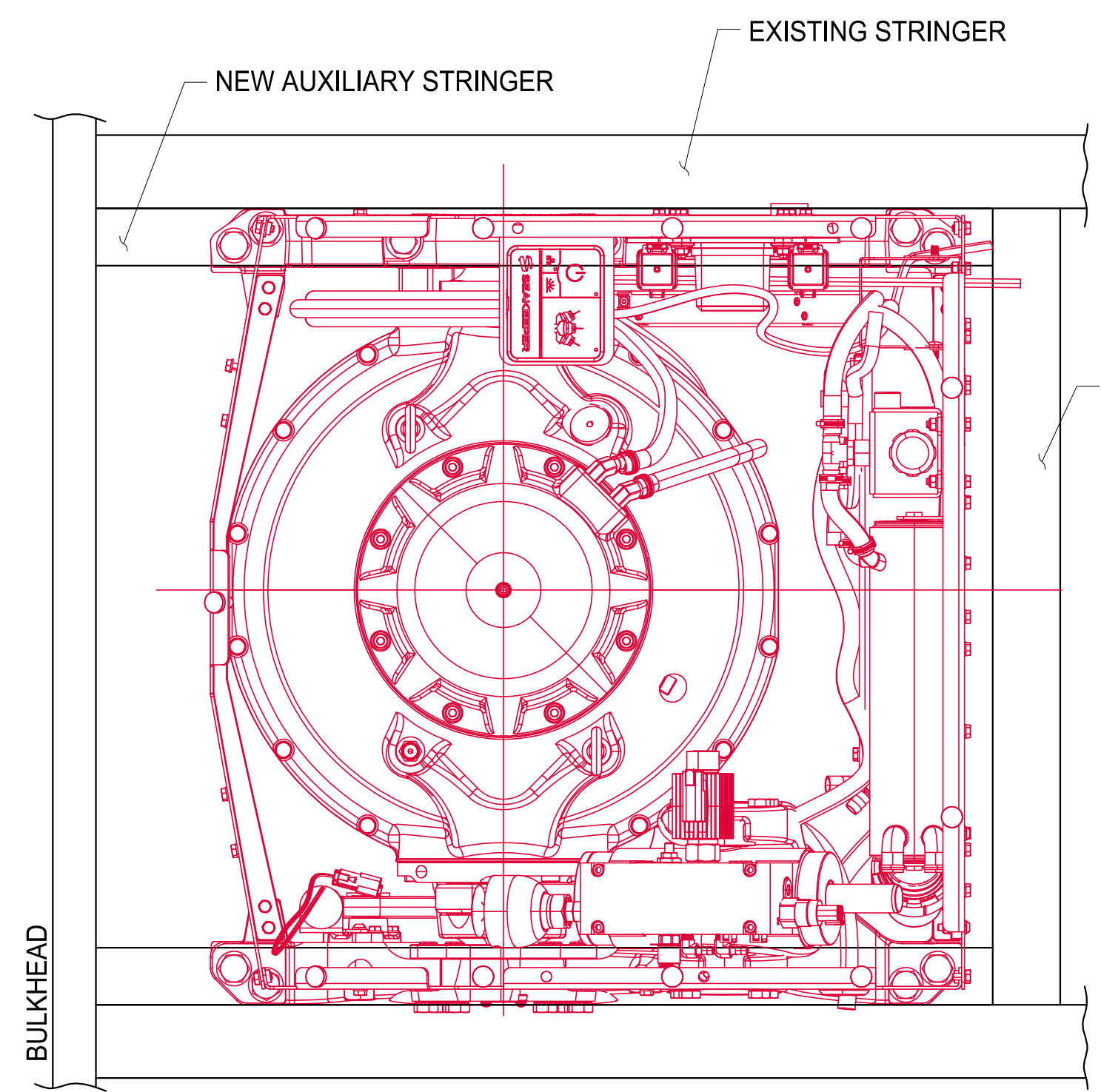
ELEVATION VIEW 7-C
(LAMINATED FRP MOLDED METHOD 1-B NEAR BULKHEAD)



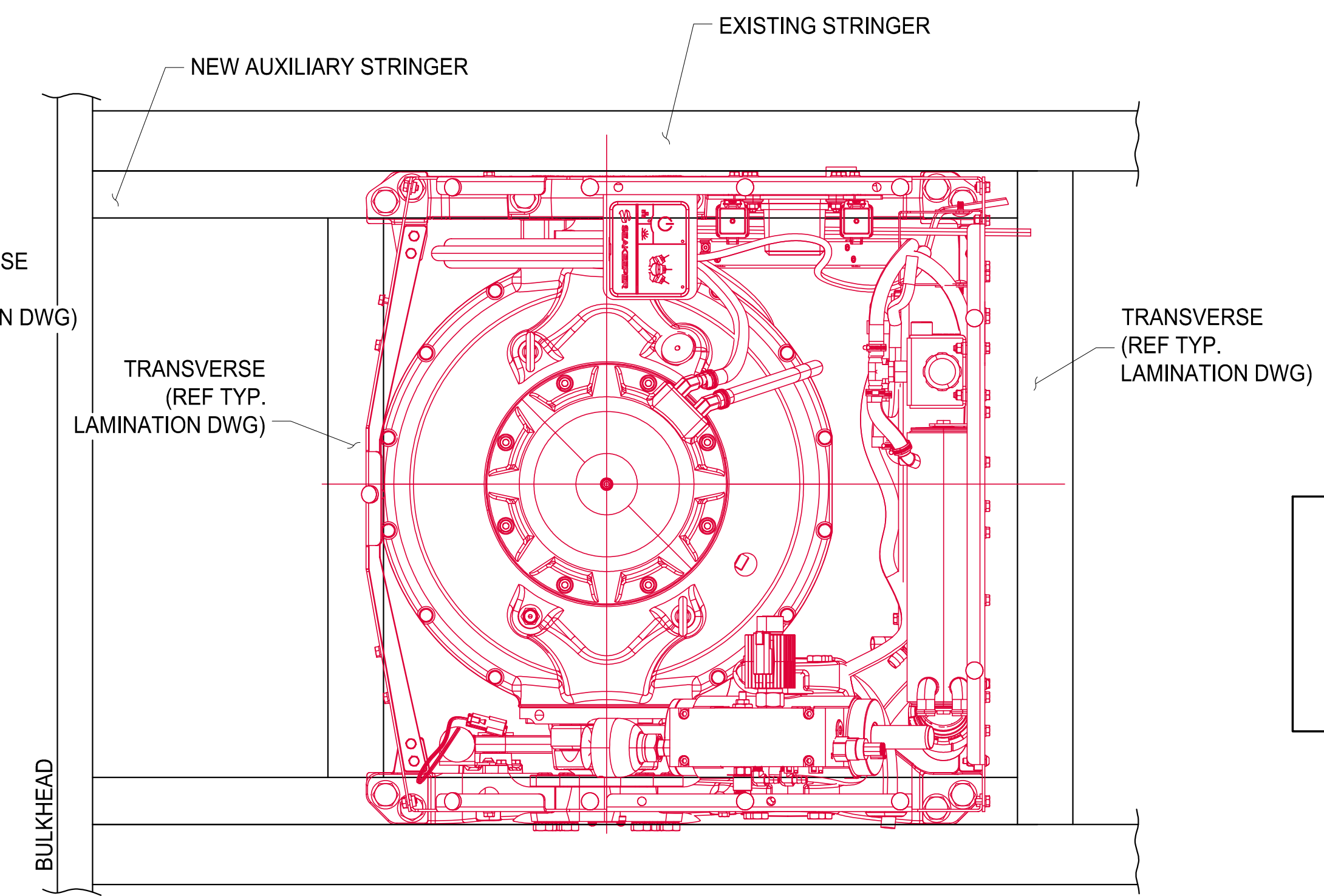
ELEVATION VIEW 5-C
(LAMINATED FRP MOLDED METHOD 1-B FAR FROM BULKHEAD)



SECTION 2-C
(LAMINATED FRP MOLDED METHOD 1-B)



PLAN VIEW 7-B
(LAMINATED FRP MOLDED METHOD 1-B NEAR BULKHEAD)



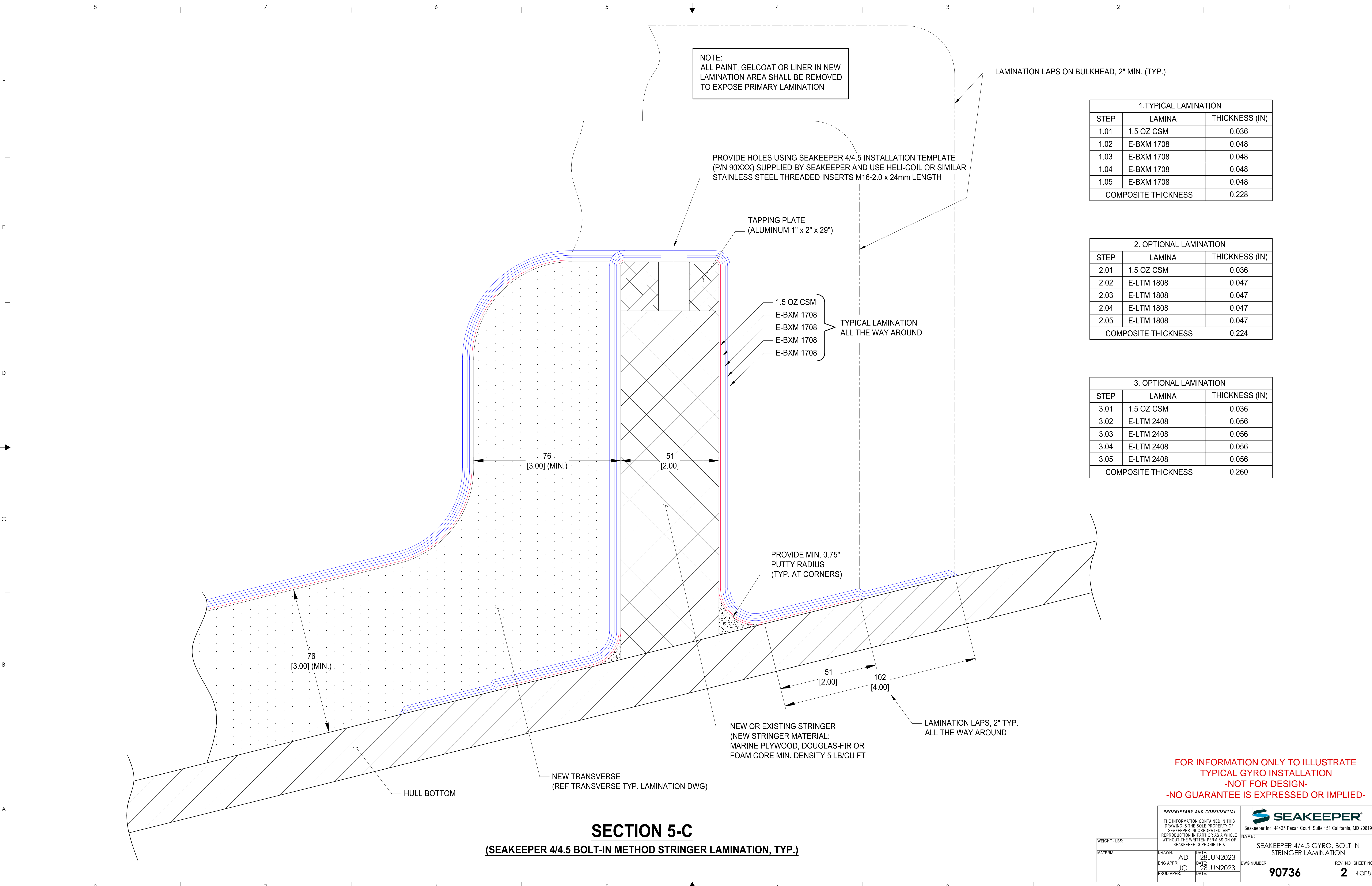
PLAN VIEW 5-B
(LAMINATED FRP MOLDED METHOD 1-B FAR FROM BULKHEAD)

1-B

SEAKEEPER 4/4.5 GYRO, BOLT-IN LAMINATED FRP REFITTED

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WEIGHT - LBS:	DRAWN: AD	DATE: 28 JUN 2023	NAME: SEAKEEPER 4/4.5 GYRO, BOLT-IN LAMINATED FRP REFITTED
MATERIAL:	ENG APPR: JC	DATE: 28 JUN 2023	DWG NUMBER: 90736
	PROD APPR:	DATE:	REV. NO. SHEET NO. 2 3 OF 8



NOTE:
ALL PAINT, GELCOAT OR LINER IN NEW LAMINATION AREA SHALL BE REMOVED TO EXPOSE PRIMARY LAMINATION

LAMINATION LAPS ON BULKHEAD, 2" MIN. (TYP.)

PROVIDE HOLES USING SEAKEEPER 4/4.5 INSTALLATION TEMPLATE (P/N 90XXX) SUPPLIED BY SEAKEEPER AND USE HELI-COIL OR SIMILAR STAINLESS STEEL THREADED INSERTS M16-2.0 x 24mm LENGTH

TAPPING PLATE
(ALUMINUM 1" x 2" x 29")

1.5 OZ CSM
E-BXM 1708
E-BXM 1708
E-BXM 1708
E-BXM 1708

TYPICAL LAMINATION
ALL THE WAY AROUND

PROVIDE MIN. 0.75"
PUTTY RADIUS
(TYP. AT CORNERS)

NEW OR EXISTING STRINGER
(NEW STRINGER MATERIAL:
MARINE PLYWOOD, DOUGLAS-FIR OR
FOAM CORE MIN. DENSITY 5 LB/CU FT

LAMINATION LAPS, 2" TYP.
ALL THE WAY AROUND

NEW TRANSVERSE
(REF TRANSVERSE TYP. LAMINATION DWG)

HULL BOTTOM

1. TYPICAL LAMINATION		
STEP	LAMINA	THICKNESS (IN)
1.01	1.5 OZ CSM	0.036
1.02	E-BXM 1708	0.048
1.03	E-BXM 1708	0.048
1.04	E-BXM 1708	0.048
1.05	E-BXM 1708	0.048
COMPOSITE THICKNESS		0.228

2. OPTIONAL LAMINATION		
STEP	LAMINA	THICKNESS (IN)
2.01	1.5 OZ CSM	0.036
2.02	E-LTM 1808	0.047
2.03	E-LTM 1808	0.047
2.04	E-LTM 1808	0.047
2.05	E-LTM 1808	0.047
COMPOSITE THICKNESS		0.224

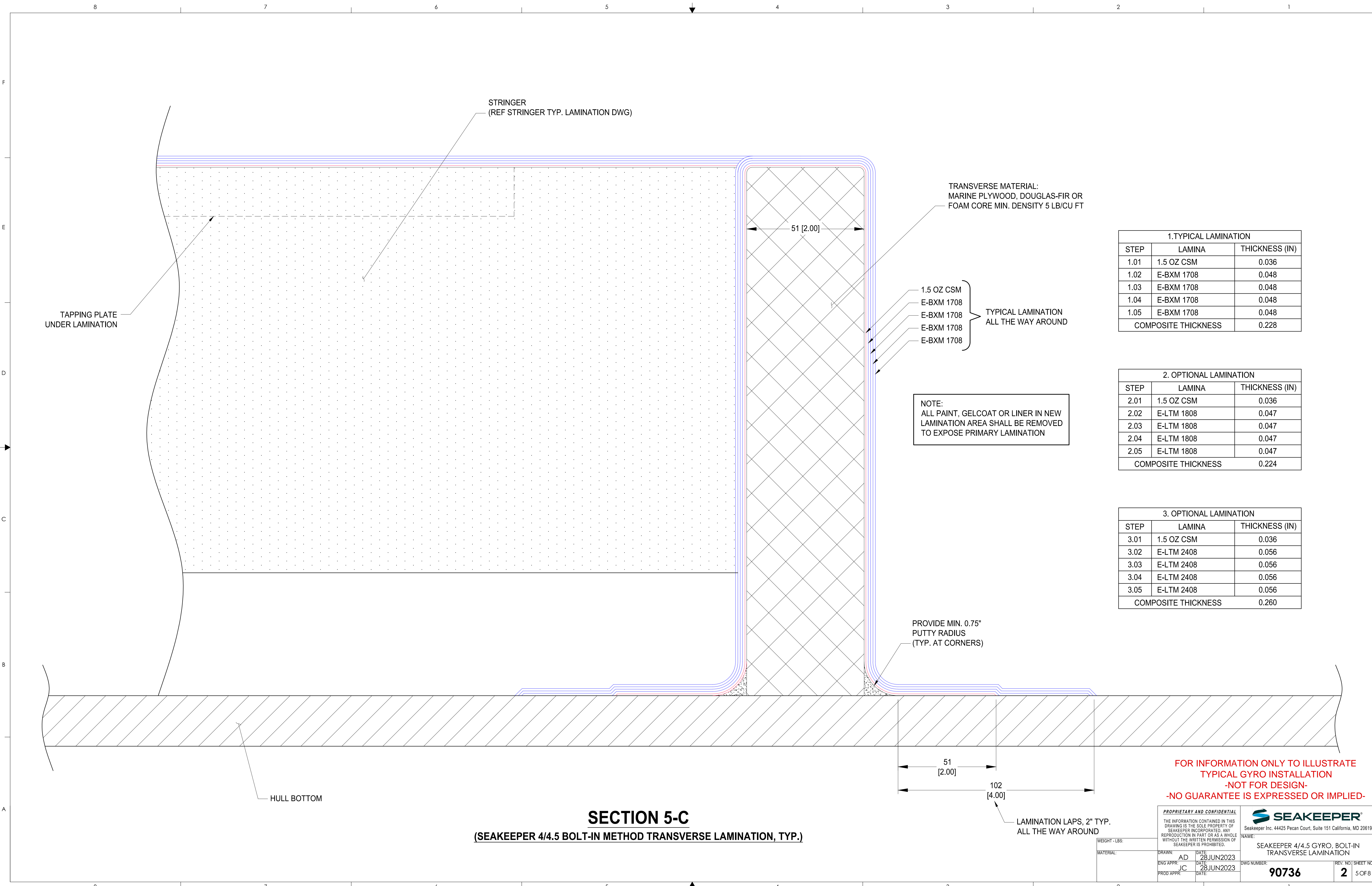
3. OPTIONAL LAMINATION		
STEP	LAMINA	THICKNESS (IN)
3.01	1.5 OZ CSM	0.036
3.02	E-LTM 2408	0.056
3.03	E-LTM 2408	0.056
3.04	E-LTM 2408	0.056
3.05	E-LTM 2408	0.056
COMPOSITE THICKNESS		0.260

SECTION 5-C

(SEAKEEPER 4/4.5 BOLT-IN METHOD STRINGER LAMINATION, TYP.)

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DRAWN: AD DATE: 28 JUN 2023 ENG APPR: JC DATE: 28 JUN 2023 PROD APPR: JC DATE: 28 JUN 2023	NAME: SEAKEEPER 4/4.5 GYRO, BOLT-IN STRINGER LAMINATION DWG NUMBER: 90736 REV. NO: 2 SHEET NO: 4 OF 8	WEIGHT - LBS: MATERIAL:	NAME:



TRANSVERSE MATERIAL:
MARINE PLYWOOD, DOUGLAS-FIR OR
FOAM CORE MIN. DENSITY 5 LB/CU FT

STRINGER
(REF STRINGER TYP. LAMINATION DWG)

TAPPING PLATE
UNDER LAMINATION

HULL BOTTOM

PROVIDE MIN. 0.75"
PUTTY RADIUS
(TYP. AT CORNERS)

LAMINATION LAPS, 2" TYP.
ALL THE WAY AROUND

NOTE:
ALL PAINT, GELCOAT OR LINER IN NEW
LAMINATION AREA SHALL BE REMOVED
TO EXPOSE PRIMARY LAMINATION

1.5 OZ CSM
E-BXM 1708
E-BXM 1708
E-BXM 1708
E-BXM 1708
TYPICAL LAMINATION
ALL THE WAY AROUND

1. TYPICAL LAMINATION		
STEP	LAMINA	THICKNESS (IN)
1.01	1.5 OZ CSM	0.036
1.02	E-BXM 1708	0.048
1.03	E-BXM 1708	0.048
1.04	E-BXM 1708	0.048
1.05	E-BXM 1708	0.048
COMPOSITE THICKNESS		0.228

2. OPTIONAL LAMINATION		
STEP	LAMINA	THICKNESS (IN)
2.01	1.5 OZ CSM	0.036
2.02	E-LTM 1808	0.047
2.03	E-LTM 1808	0.047
2.04	E-LTM 1808	0.047
2.05	E-LTM 1808	0.047
COMPOSITE THICKNESS		0.224

3. OPTIONAL LAMINATION		
STEP	LAMINA	THICKNESS (IN)
3.01	1.5 OZ CSM	0.036
3.02	E-LTM 2408	0.056
3.03	E-LTM 2408	0.056
3.04	E-LTM 2408	0.056
3.05	E-LTM 2408	0.056
COMPOSITE THICKNESS		0.260

SECTION 5-C
(SEAKEEPER 4/4.5 BOLT-IN METHOD TRANSVERSE LAMINATION, TYP.)

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NAME: SEAKEEPER 4/4.5 GYRO, BOLT-IN TRANSVERSE LAMINATION
DWG NUMBER: 90736
REV. NO: 2
SHEET NO: 5 OF 8


DATE: 28 JUN 2023
DATE: 28 JUN 2023

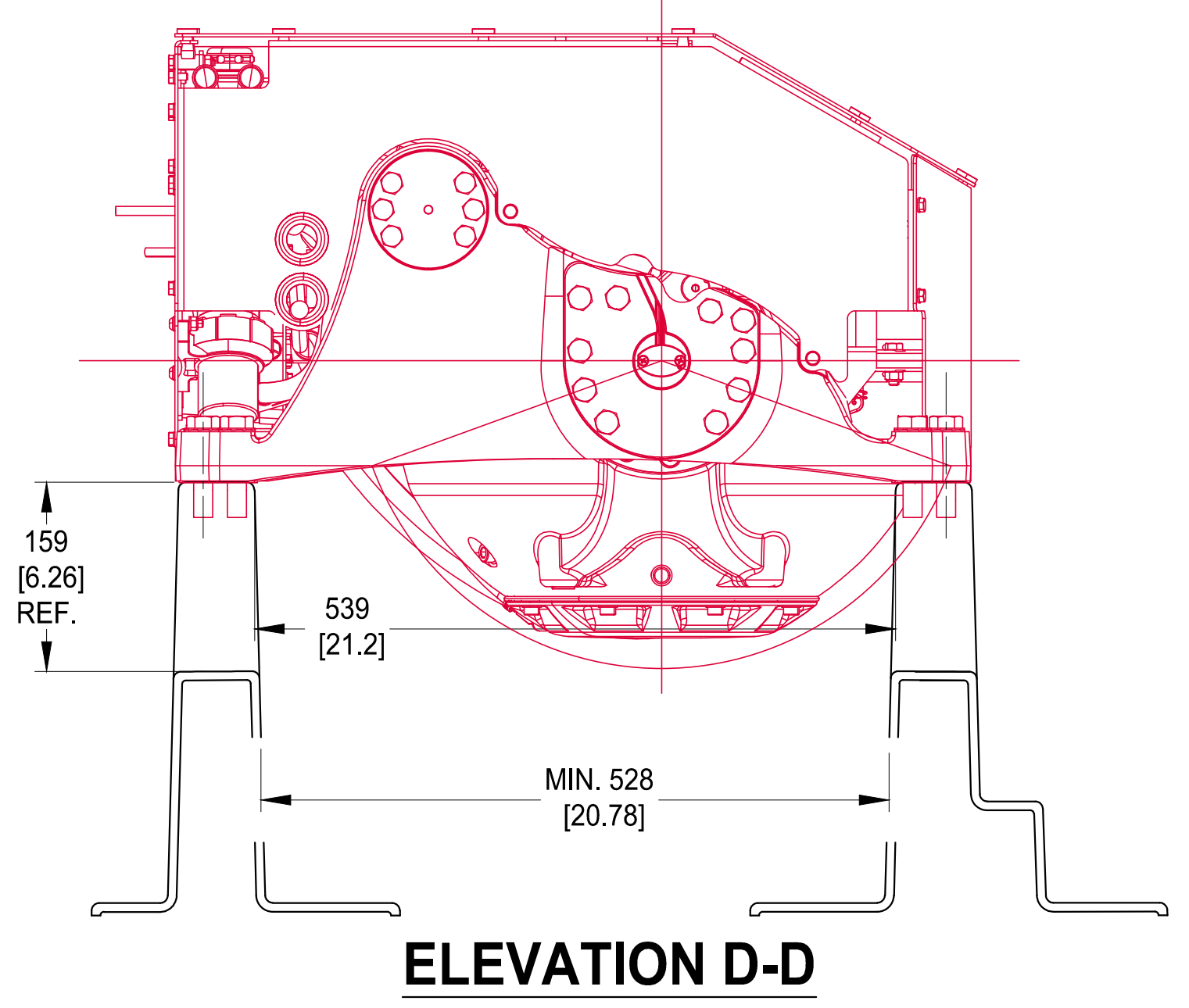
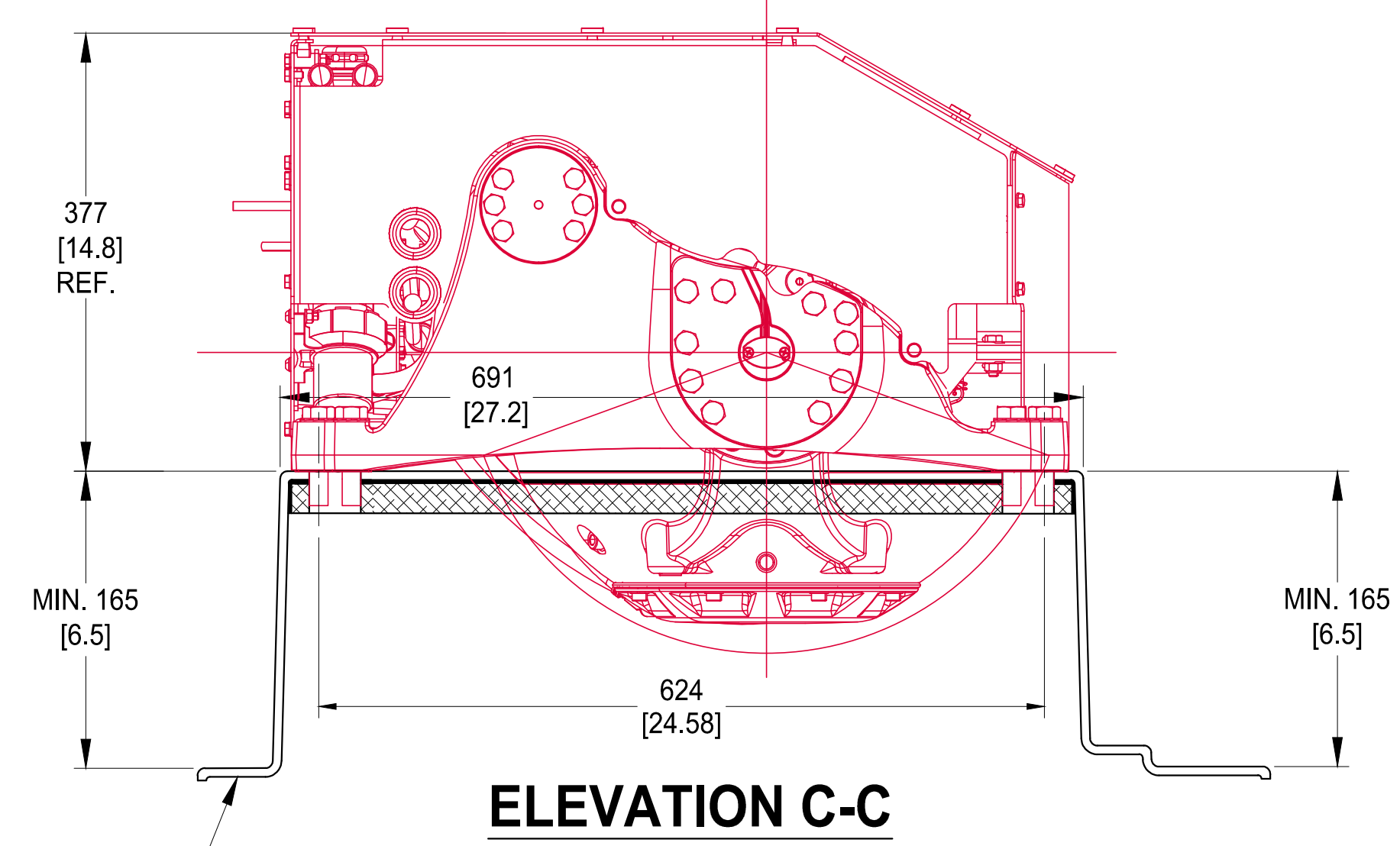
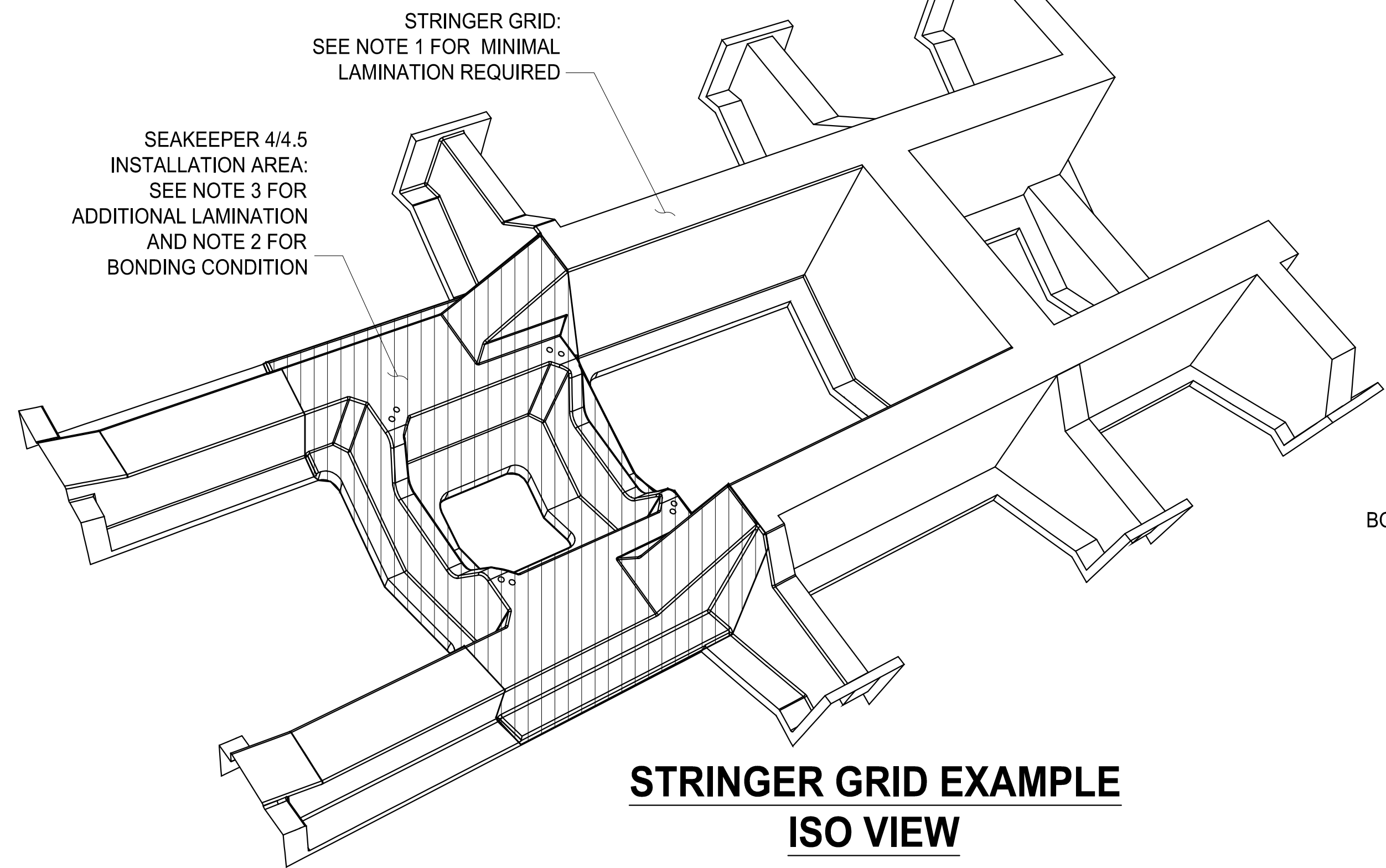
DRAWN: AD
ENG APPR: JC
PROD APPR:

SEAKEEPER 3			SEAKEEPER 4/4.5		
1. TYPICAL LAMINATION					
STEP	LAMINA	THICKNESS (IN)	STEP	LAMINA	THICKNESS (IN)
1.01	0.5 OZ CSM	0.012	1.01	1.5 OZ CSM	0.036
1.02	E-BXM 1708	0.048	1.02	E-BXM 1708	0.048
1.03	E-BXM 1708	0.048	1.03	E-BXM 1708	0.048
1.04	E-BXM 1708	0.048	1.04	E-BXM 1708	0.048
			1.05	E-BXM 1708	0.048
COMPOSITE THICKNESS		0.156	COMPOSITE THICKNESS		0.228
2. OPTIONAL LAMINATION					
STEP	LAMINA	THICKNESS (IN)	STEP	LAMINA	THICKNESS (IN)
2.01	0.5 OZ CSM	0.012	2.01	1.5 OZ CSM	0.036
2.02	E-LTM 1808	0.047	2.02	E-LTM 1808	0.047
2.03	E-LTM 1808	0.047	2.03	E-LTM 1808	0.047
2.04	E-LTM 1808	0.047	2.04	E-LTM 1808	0.047
			2.05	E-LTM 1808	0.047
COMPOSITE THICKNESS		0.153	COMPOSITE THICKNESS		0.224
3. OPTIONAL LAMINATION					
STEP	LAMINA	THICKNESS (IN)	STEP	LAMINA	THICKNESS (IN)
3.01	0.5 OZ CSM	0.012	3.01	1.5 OZ CSM	0.036
3.02	E-LTM 2408	0.056	3.02	E-LTM 2408	0.056
3.03	E-LTM 2408	0.056	3.03	E-LTM 2408	0.056
3.04	E-LTM 2408	0.056	3.04	E-LTM 2408	0.056
			3.05	E-LTM 2408	0.056
COMPOSITE THICKNESS		0.180	COMPOSITE THICKNESS		0.260

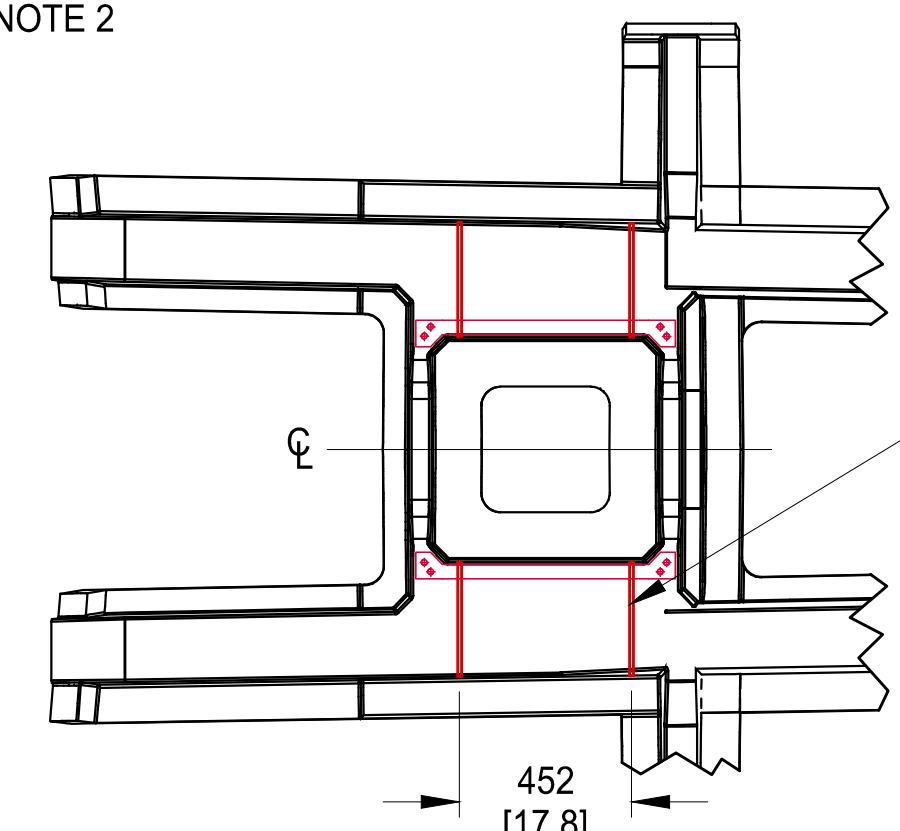
COMPARISON TABLE
(SEAKEEPER 3 VS SEAKEEPER 4/4.5)

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WEIGHT - LBS:	DRAWN: AD	DATE: 28 JUN 2023	NAME: SEAKEEPER 3 VS 4/4.5 GYRO LAMINATION COMPARISON
MATERIAL:	ENG APPR: JC	DATE: 28 JUN 2023	DWG NUMBER: 90736
	PROD APPR:	DATE:	REV. NO: 2 SHEET NO: 6 OF 8



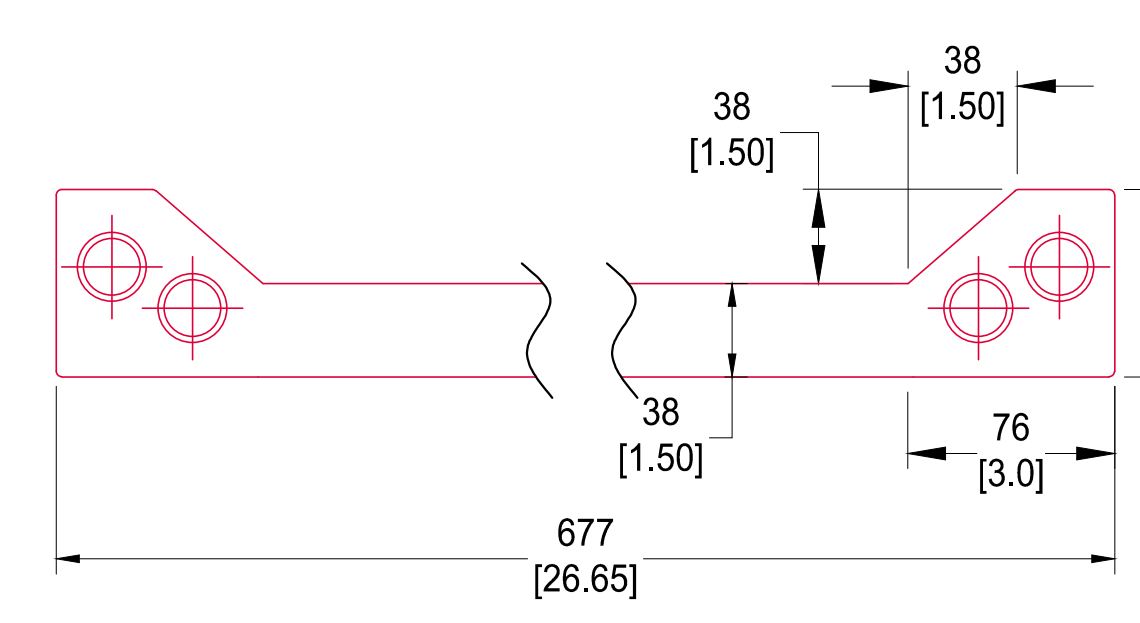
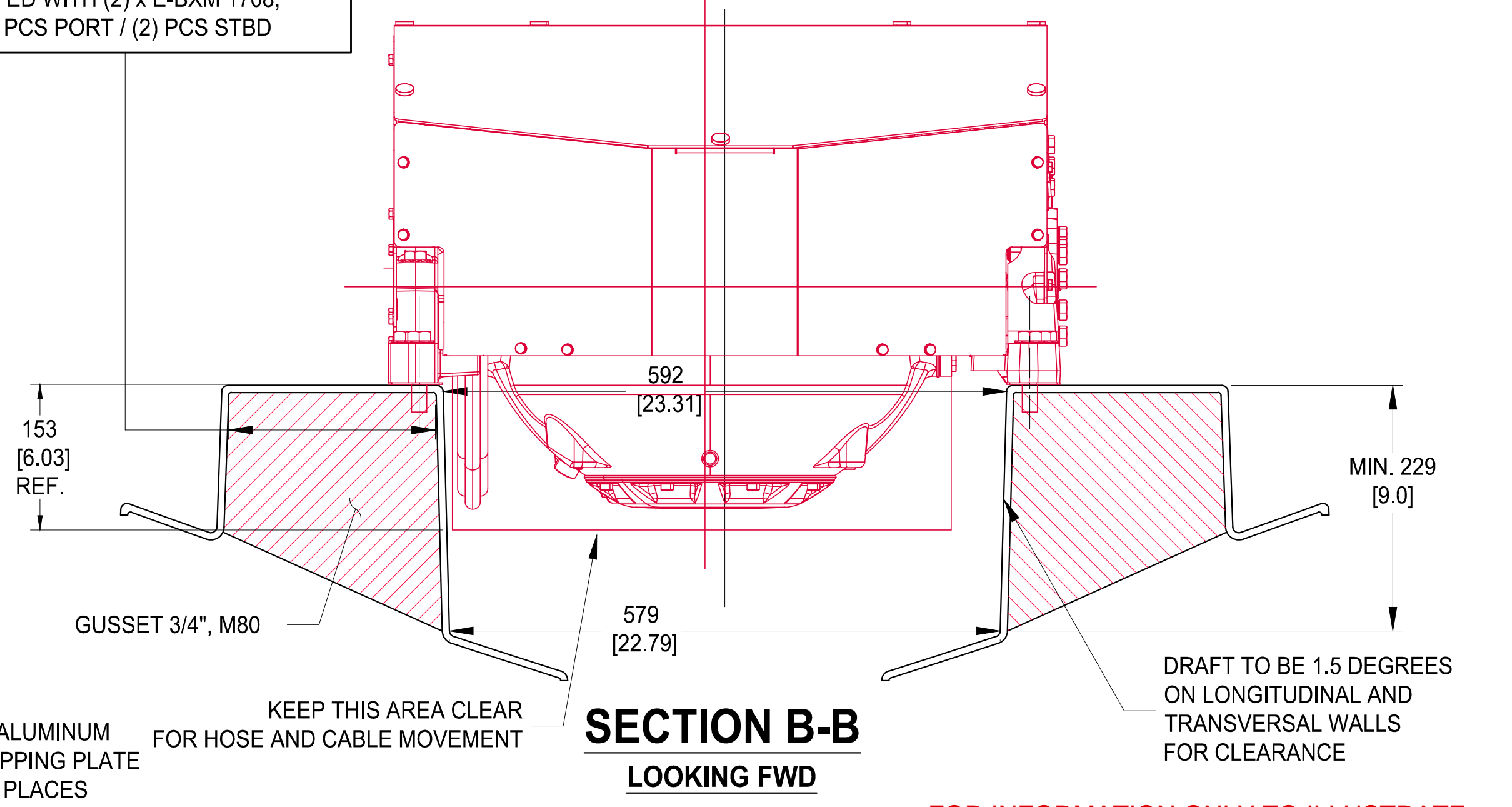
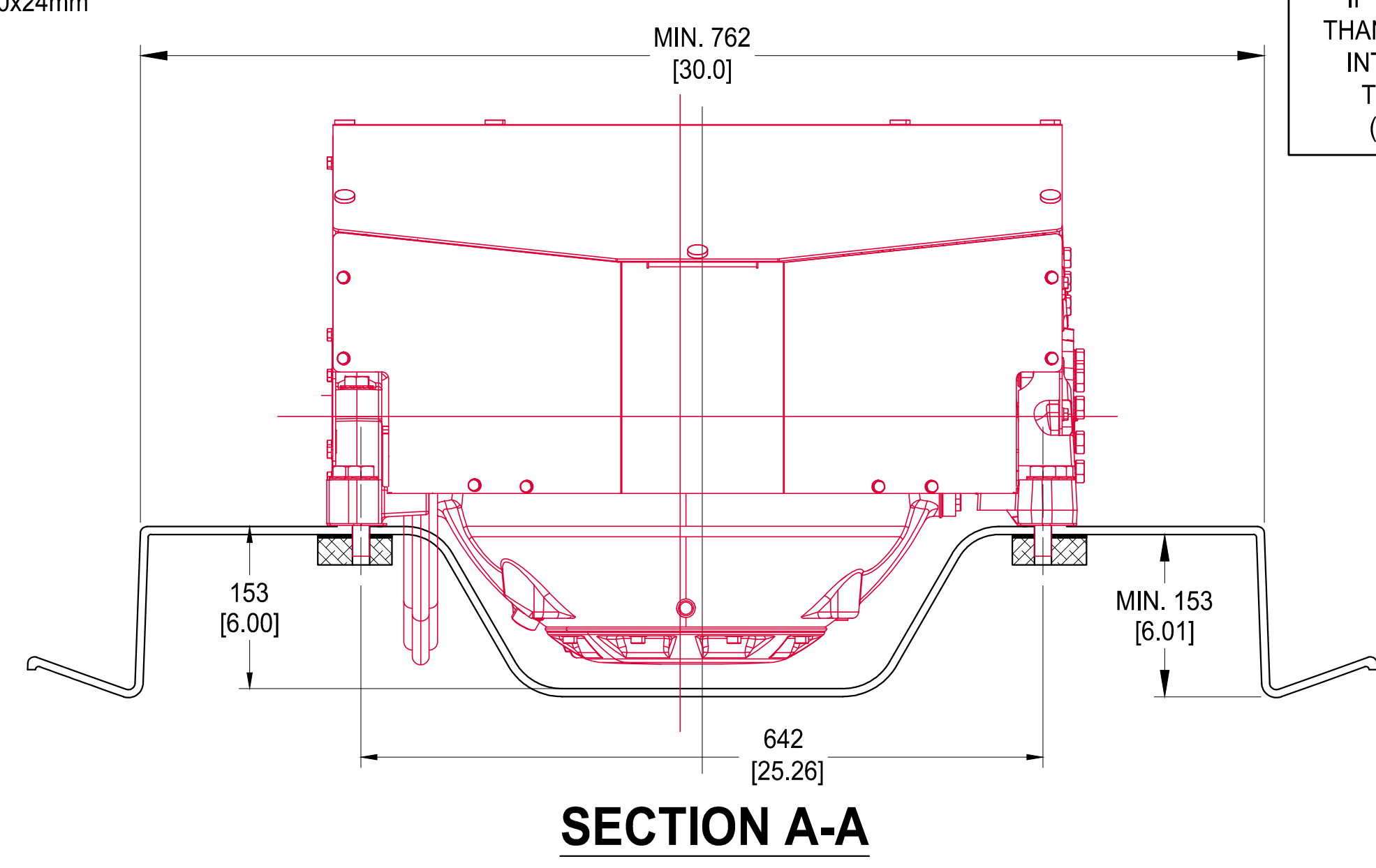
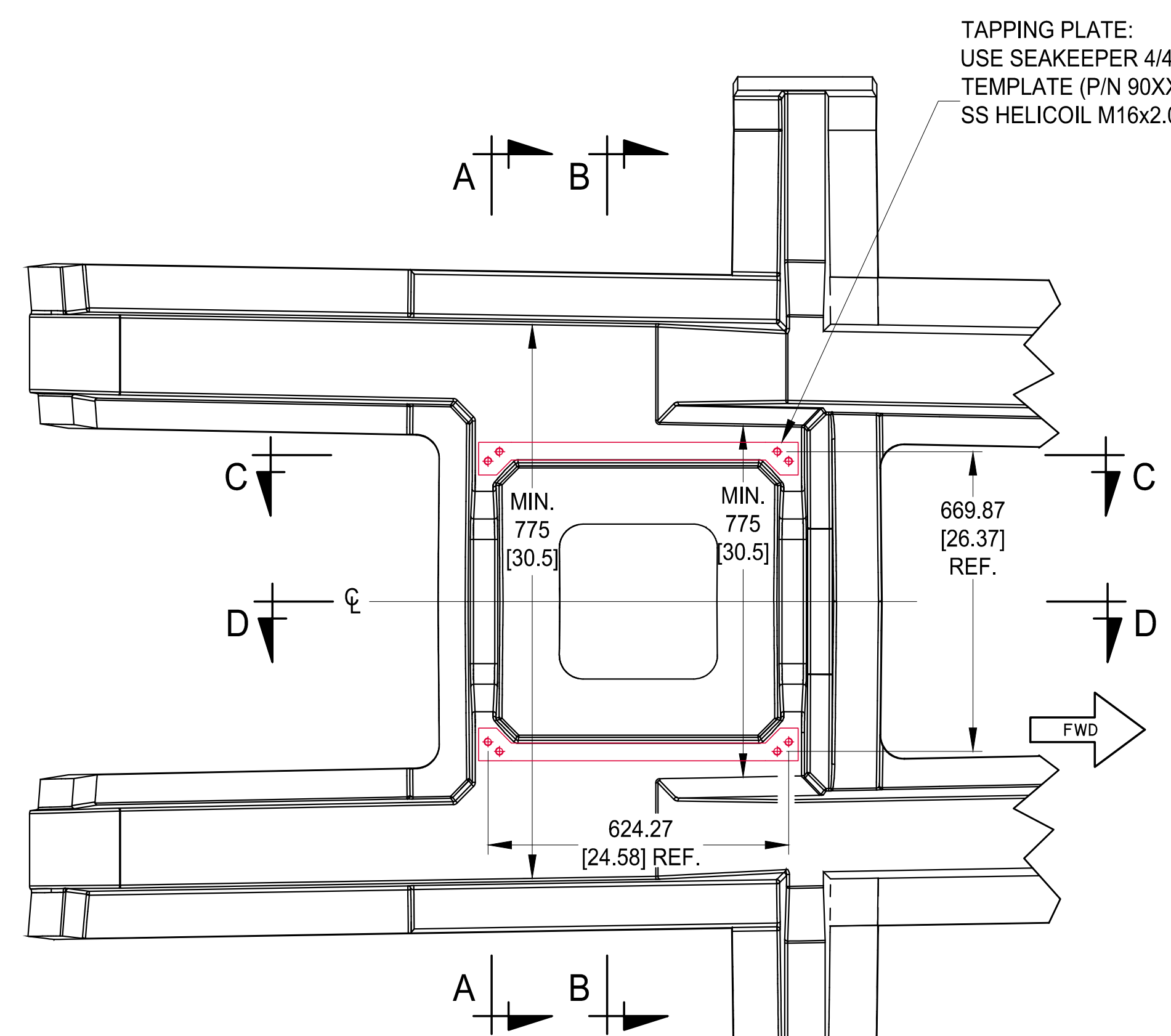
BONDING FLANGE (TYP.): SEE NOTE 2



GUSSET 3/4", M80, (4) PLACES: SEE SEC. B-B

IF THIS DIMENSION IS GREATER THAN 5", INSTALL 3/4" M80 GUSSETS INTERNALLY, AND LAMINATED & TAPED WITH (2) x E-BXM 1708; (2) PCS PORT / (2) PCS STBD

- GENERAL NOTES:**
1. STRINGER GRID MINIMAL LAMINATE EQUIVALENT TO 3 OZ CSM AND (2) x E-WMV 2415.
 2. STRINGER GRID SHALL BE APPROPRIATELY BONDED TO HULL. SEAKEEPER AREA SHALL BE FULLY BONDED USING SCIGRIP SG300 OR PLEXUS MA590 ADHESIVES WITH MINIMAL THICKNESS OF 1/8".
 3. STRINGER GRID IN SEAKEEPER INSTALLATION AREA SHALL RECEIVE ADDITIONAL LAMINATION EQUIVALENT TO 0.5 OZ CSM AND (7) x E-BXM 1708.
 4. INSTALLATIONS OUTSIDE OF THE RECOMMENDED REQUIREMENTS NEED TO BE ANALYZED ON A CASE BY CASE BASIS.
 5. INSTALL UNIT IN ACCORDANCE WITH SEAKEEPER INSTALLATION MANUAL.



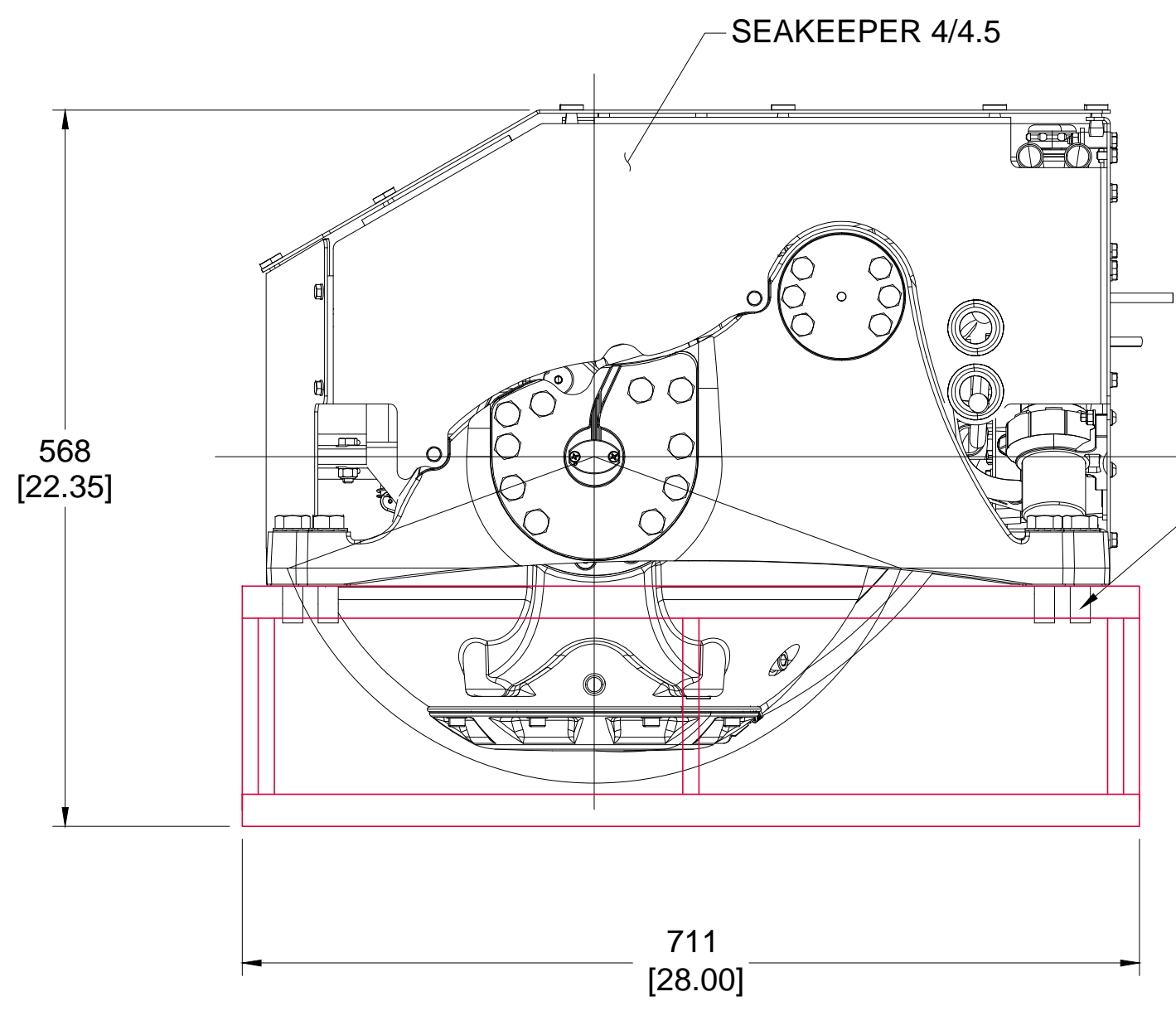
TAPPING PLATE ALUMINUM 6061-T6, 1" (2) PCS

TAPPING PLATE TO BE BONDED WITH PLEXUS MA590 AND GLASSED W/ (2) x E-BXM 1708 (USE M16-2.0 X 24 MM THREADED INSERTS)

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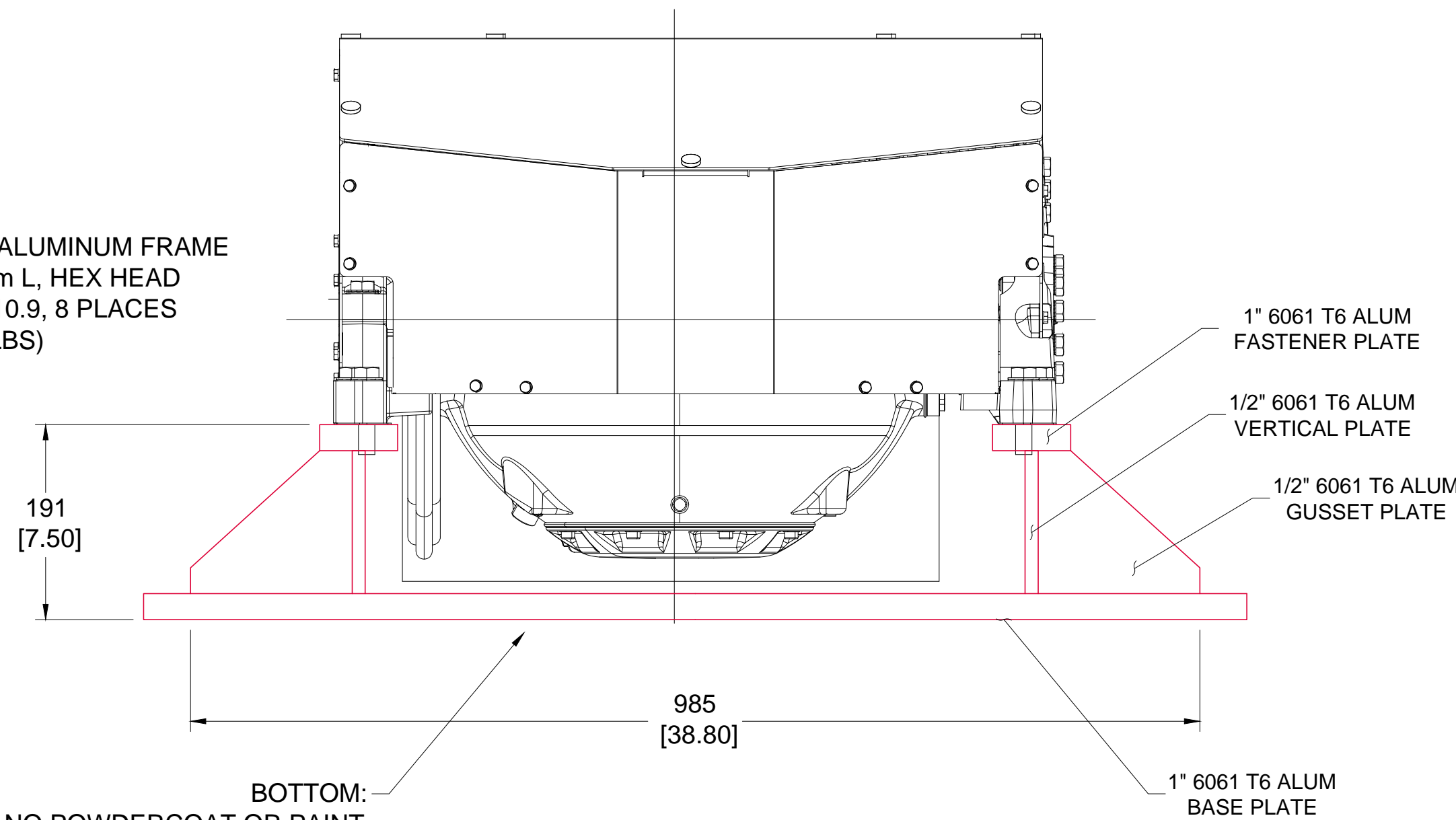
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WEIGHT - LBS: MATERIAL:	DRAWN: AD ENG APPR: JC PROD APPR:	DATE: 28 JUN 2023 DATE: 28 JUN 2023 DATE:	NAME: SEAKEEPER 4/4.5 GYRO, BOLT-IN MOLDED STRINGER GRID INSTALLATION DWG NUMBER: 90736 REV. NO: SHEET NO: 2 OF 8

8 7 6 5 4 3 2 1



ELEVATION

GYRO IS BOLTED TO ALUMINUM FRAME USING M16x2.0x100mm L, HEX HEAD CAP SCREW, CLASS 10.9, 8 PLACES (TORQUE TO 135 FT-LBS)

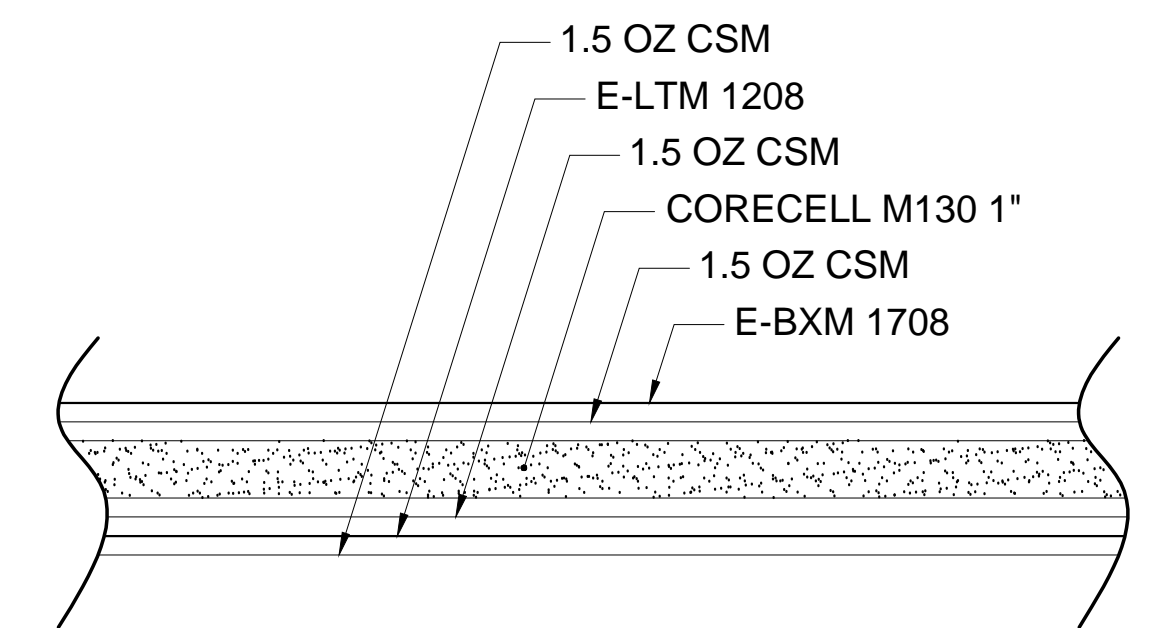


FRONT VIEW

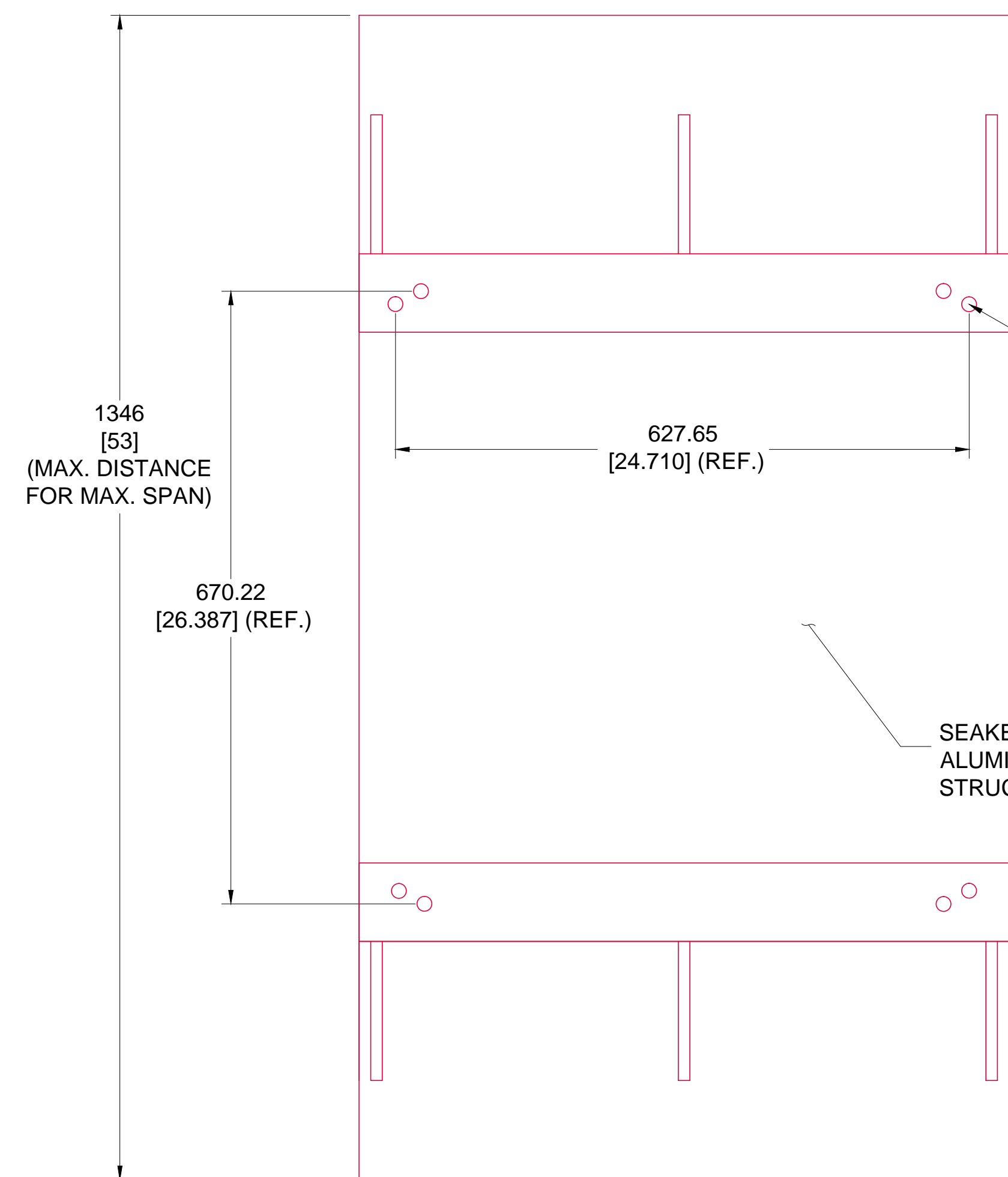
NO POWDERCOAT OR PAINT (TO BE BONDED ON DECK / SEE NOTE 1)

GENERAL NOTES:

1. SEAKEEPER 4/4.5 ALUMINUM FOUNDATION SHALL BE BONDED TO DECK SOLE WITH SCIGRIP SG300 OR PLEXUS MA590 ADHESIVE (MIN. TENSILE STRENGTH OF 2000 PSI). ANY PAINT, GELCOAT OR NON-SKID PRESENT IN DECK BOND AREA SHALL BE SANDED TO EXPOSE PRIMARY LAMINATION.
2. FOUNDATION SHALL BE POWDER-COATED AND THE BOTTOM SURFACE SANDED BARE.
3. BOND ENTIRE FOUNDATION BOTTOM SURFACE ENSURING 0.04" TO 0.12" OF BOND THICKNESS.
4. MAXIMUM SPAN IN DECK BASED IN DECK SOLE LAMINATION WITH MINIMAL LAMINATE EQUIVALENT TO 1.5 OZ CSM / E-LTM 1208 / 1.5 OZ CSM / CORECELL M130 1" / 1.5 OZ CSM / E-BXM 1708.
5. AREA FOR SEAKEEPER INSTALLATION MAY HAVE TO BE DE-CORED AND LAMINATED TO THE CONDITION DESCRIBED IN NOTE 4.
6. INSTALLATION CONDITION REQUESTS STRINGERS AND BULKHEAD FULLY BONDED TO DECK USING SCIGRIP SG300 OR PLEXUS MA590 ADHESIVE (MIN. TENSILE STRENGTH OF 2000 PSI).
7. LAMINATION OF STRINGER & BULKHEAD TO DECK USING 2 x E-BXM 1708 TAPE IS HIGHLY RECOMMENDED.



DECK LAMINATION CONDITION DESCRIBED IN NOTE 4

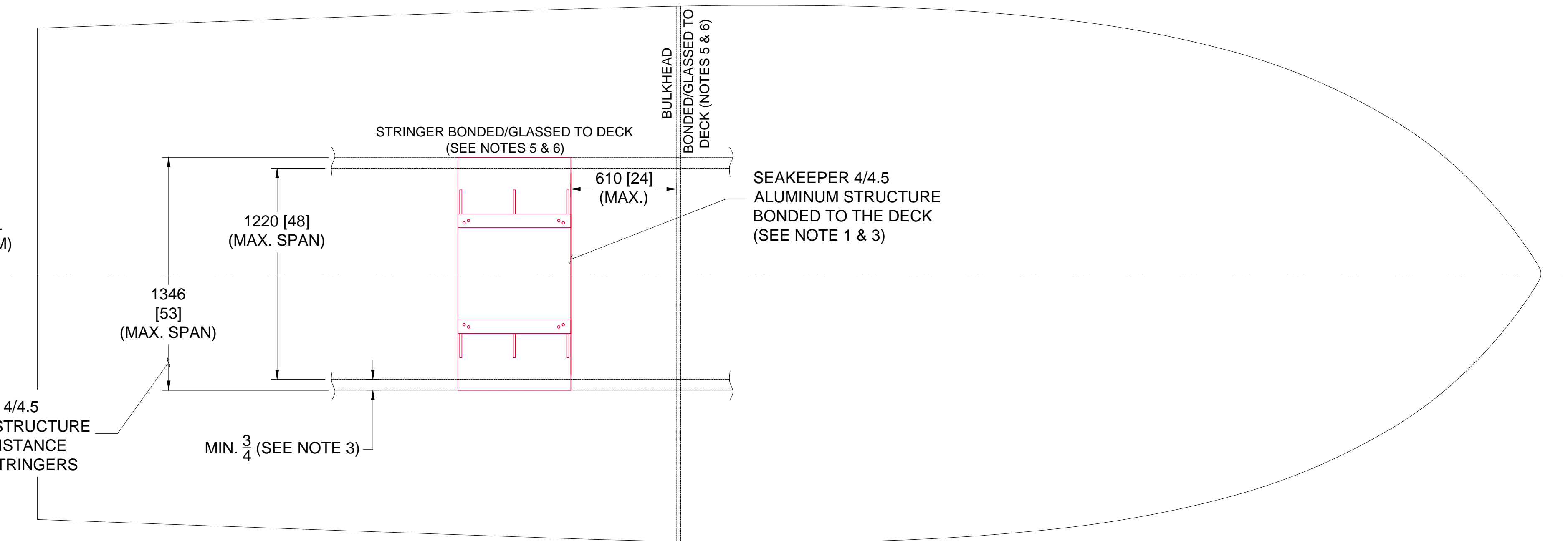


PLAN VIEW

SEAKEEPER 4/4.5 HOLES FROM TEMPLATE FOR M16 BOLTS (INSTALL HELICOILS M16-2.0 X 24MM)

AFT OR FWD

SEAKEEPER 4/4.5 ALUMINUM INSTALLATION STRUCTURE



DECK INSTALLATION MINIMUM CONDITION

SEAKEEPER 4/4.5 ALUMINUM STRUCTURE SPAN THE DISTANCE BETWEEN STRINGERS

MIN. 3/4 (SEE NOTE 3)

PRELIMINARY CONCEPT
-DO NOT BUILD-

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NAME:	SEAKEEPER 4/4.5 GYRO, BOLT-IN DECK MOUNT INSTALLATION	REV. NO:	2
WEIGHT - LBS:		DWG NUMBER:	90736
MATERIAL:		REV. NO:	2
DRAWN: AD	DATE: 28 JUN 2023	SHEET NO:	8 OF 8
ENG APPR: JC	DATE: 28 JUN 2023		
PROD APPR:	DATE:		