

ROSCOMMON EQUIPMENT CENTER

Project Number 72

May 2016



OshKosh R11 Tanker Conversion

National Association of State Foresters
in Cooperation with
Michigan's Forest Fire Experiment Station

**REC Project No. 72
OshKosh R11 Tanker
Conversion**

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Disclaimer

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Introduction

The Florida Division of Forestry (FDF) has been looking for an economical solution to carry large quantities of water to wildfires. Their agency needs a water tender with the ability to shuttle water, resupply smaller engines, fill dip sites and for other structural fire uses.

The OshKosh R11 Fuel Tanker, available through the Federal Excess Property Program is a vehicle that would be ideally suited as a water tender if it were converted from transporting and dispensing fuel to transporting and dispensing water safely.

In order to help meet this need, the Roscommon Equipment Center (REC) has worked closely with FDF to procure, transport to REC headquarters and convert an OshKosh R11 fuel tanker into a safe and effective water tender.

REC strives to meet all standards and requirements for each project selected for design-work & fabrication. In the case of this project, the main goal was to achieve an economical plan for fabrication. National Fire Protection Association (NFPA) standards were met where economically possible, but the end product is not fully NFPA compliant.

Design Intent

The basic objective of this water tender conversion project was to assess the suitability of the OshKosh R11 Fuel Tanker for wildfire and structural firefighting use and if suitable, design a fire package that is safe and efficient.

The design objectives proposed to REC to meet were::

- 1.) Remove excess fuel plumbing and machinery
- 2.) Install water pumping capabilities as well as a dump valve
- 3.) Create a PPE and tool storage area onboard the vehicle
- 4.) Determine the safe water hauling capabilities of the tanker
- 5.) Create engineering drawing plans and a modification process for economical project replication by other agencies

REC Findings

REC has found that this conversion can be completed for approximately \$5,600.00 plus acquisition cost and paint. The converted vehicle can safely transport 4,600 gallons of water and is not intended for off-road use.

Overall Design

The vehicle's original fluid to be transported and dispensed is jet fuel (JP-8). JP-8 weighs less per gallon than water, so to avoid overloading of the axles with the additional weight of water vs. jet fuel, a reduction in the transported volume of water was needed to make sure the tanker's axle weight ratings wouldn't be exceeded.

REC economically achieved this volume reduction by installing a large diameter overflow prevention pipe positioned in the geometric center of the water tank. The inlet of this pipe is on the same horizontal level as the maximum amount of water height that will be allowed within the tank. Any additional water added to the tank beyond this level will enter the overflow pipe and be made to drain out onto the ground behind the rear axles of the tanker. The decision to install this overflow pipe was made from an economy and ease of fabrication standpoint. FDF and many other state agencies without access to specialized heavy equipment, can complete the volume reduction without the need to cut down the volume of the tank and re-weld the tank back together.

Besides the overflow prevention plumbing, the water handling equipment added to the vehicle included 3 pressurized discharges. A 1.5" and 2.5" on the passenger side and a 2.5" on the driverside. These were located within the pump control panel area immediately behind the vehicle's cab. By removing the un-needed fuel handling equipment such as the hour meter (*be sure to remove this component. It depends on the lubricity of fuel, which water cannot provide for proper operation*), filter separator assembly and large hose reel from the pump control panel area, a PPE storage cargo area was able to be produced using this space. REC also repurposed a 1.5" pressurized hose reel assembly immediately behind the cargo space on the driverside of the vehicle. This item was drained, cleaned & re-spoiled with water hose and serves as the 1.5" pressurized discharge on the driverside. A Newton quick-dump valve was added to the rear of the tank.

* "JP-8 equals 6.7 pounds per U.S. gallon"

Ref. <http://www.state.gov/documents/organization/105791.pdf>

** Water weight @ 40 Deg. F was used throughout this project @ 8.35 lbs. per gallon.

Ref. http://www.engineeringtoolbox.com/water-density-specific-weight-d_595.html

PTO driven Pump:

The OshKosh R11 Tanker makes use of a Hale brand PTO centrifugal pump, Model No. 4DGK4-30. This pump is suitable for pumping jet fuel as well as water and is capable of a flow rate of 600 Gallons per Minute (GPM). * See Appendix A for the pump performance curve.

Plumbing System:

The vehicle's original fuel plumbing system is composed of pipes and fittings that used victaulic type connections. Victaulic connections are essentially butted and clamped together with special collars and bolts. To build the new water plumbing system, REC adapted some of the Victaulic water plumbing connections to galvanized schedule 40 National Pipe Thread (NPT). NPT pipe fittings are widely available and this helped to keep costs low and to create a simpler design.

As written above, REC designed & fabricated the plumbing system by adapting the original vehicle's Victaulic type plumbing components to widely available and cost effective schedule 40 galvanized water pipe. Due to this, the system plumbing pressure needed to be controlled to stay within the working pressure of this type of pipe. The source where these pipe & fittings were purchased, (McMaster Carr), indicated that the maximum working pressure of schedule 40 galvanized steel pipe/ & fittings was 150 pounds per square inch (PSI).

REC controlled the system plumbing pressure by physically limiting the stroke of the throttle control built into the pump control panel (See Step 8).

Caution: *The system plumbing pressure can be exceeded by pressing on the gas pedal within the vehicle's cab while the PTO pump is engaged even though the control panel throttle has been limited. This should be avoided! REC has placed several warning labels regarding this issue on both the pump control panel and within sight of the driverside position of the vehicle's cab.*



Modification Process:

The modification process that REC used begins with the assumption that the vehicle is mechanically sound and that all original vehicle systems and components are in good working order. The prep work done to the tanker included completely draining the tank and all plumbing lines/hose reels of fuel. REC contracted a professional fuel tanker cleaning service to clean the inside of the tank free of fuel residue and to render it safe for flame cutting and welding operations. The process below describes the physical modifications that REC has completed.

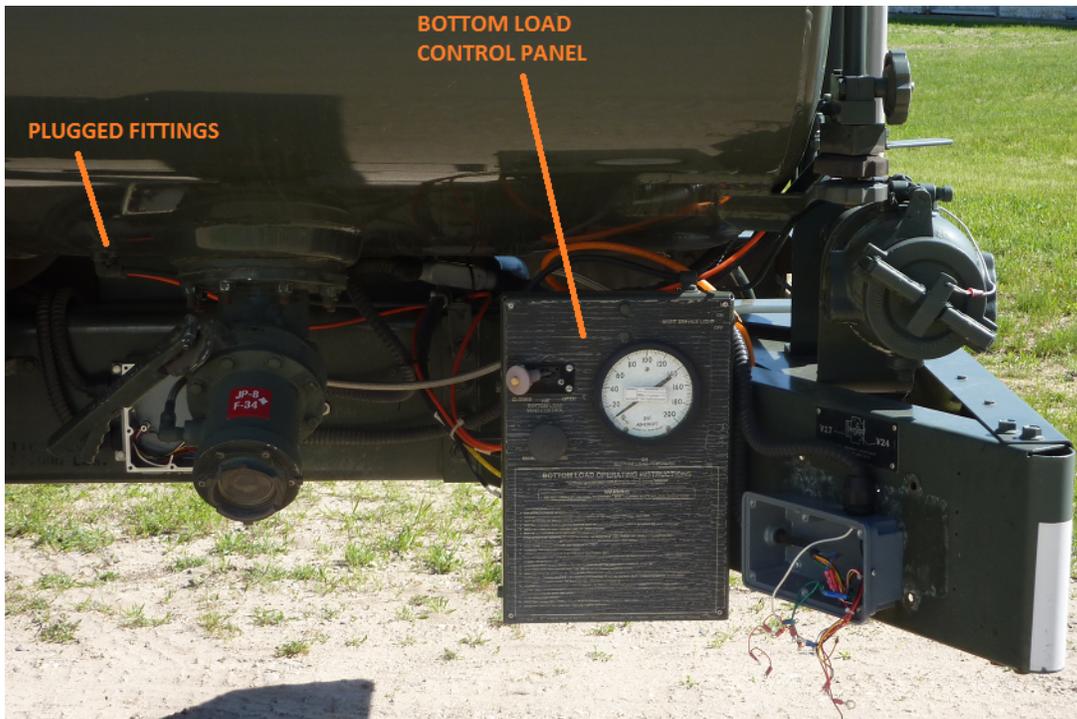
REC Step 1:

Remove both sets of doors that enclose the pump control compartment and set them aside for future re-installation. Due to the fabrication equipment that REC has at hand, some of the top door frame structure of the pump control compartment was cut away and welded back together at re-installation. Cutting this away allowed for REC to use an overhead crane to facilitate the removal of the large hose reel and fuel separator assembly.



REC Step 3:

Remove the un-needed rear bottom load control panel and associated lines/fittings. Two of these lines operated a bottom load vent control valve that was located within the rear of the tank. This valve was removed and the airline ports that entered the tank were plugged. The night service light switch was removed from the control panel, re-installed and guarded on the rear bumper.



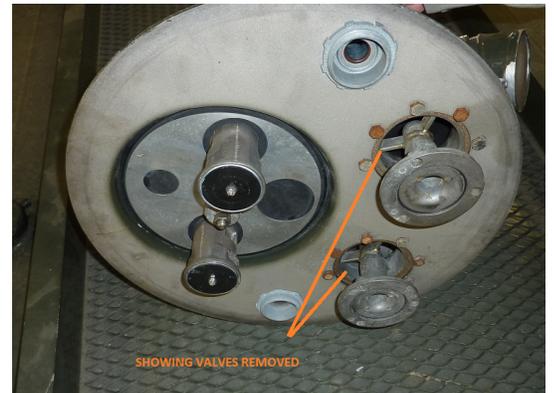
REC Step 4:

The manhole opening in the top center of the tank is equipped with a sophisticated fuel vapor recovery system as well as air controlled vent valves. REC removed the fuel vapor recovery system, associated plumbing and the vent control valves but left the vents themselves in place. REC added a guard across this opening as a safety feature to help prevent a person from falling into this opening if the manhole cover is ever removed.

Manhole cover on original vehicle

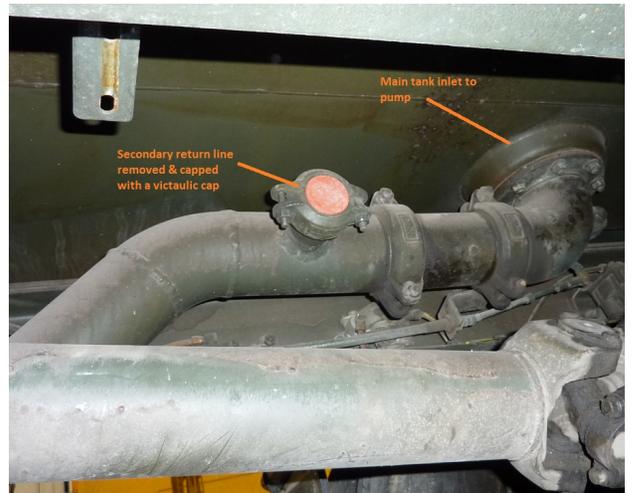
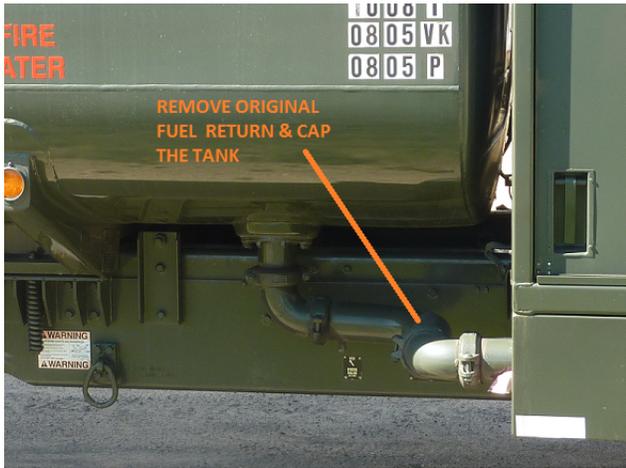


Manhole & cover after REC modifications:



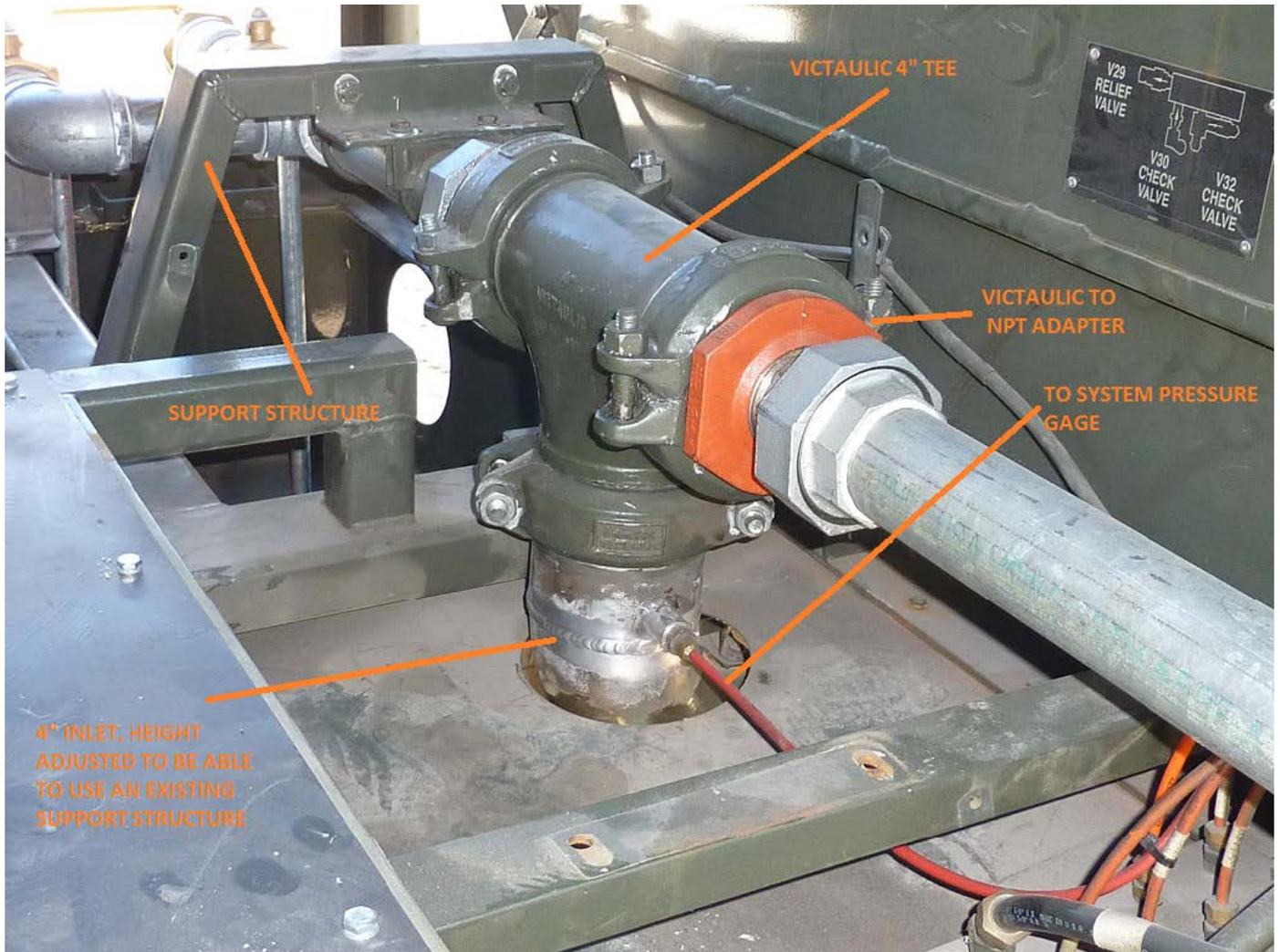
REC Step 5:

REC removed and reconfigured much of the original fuel plumbing from this vehicle to accommodate the water handling features that FDF desired in their project proposal.



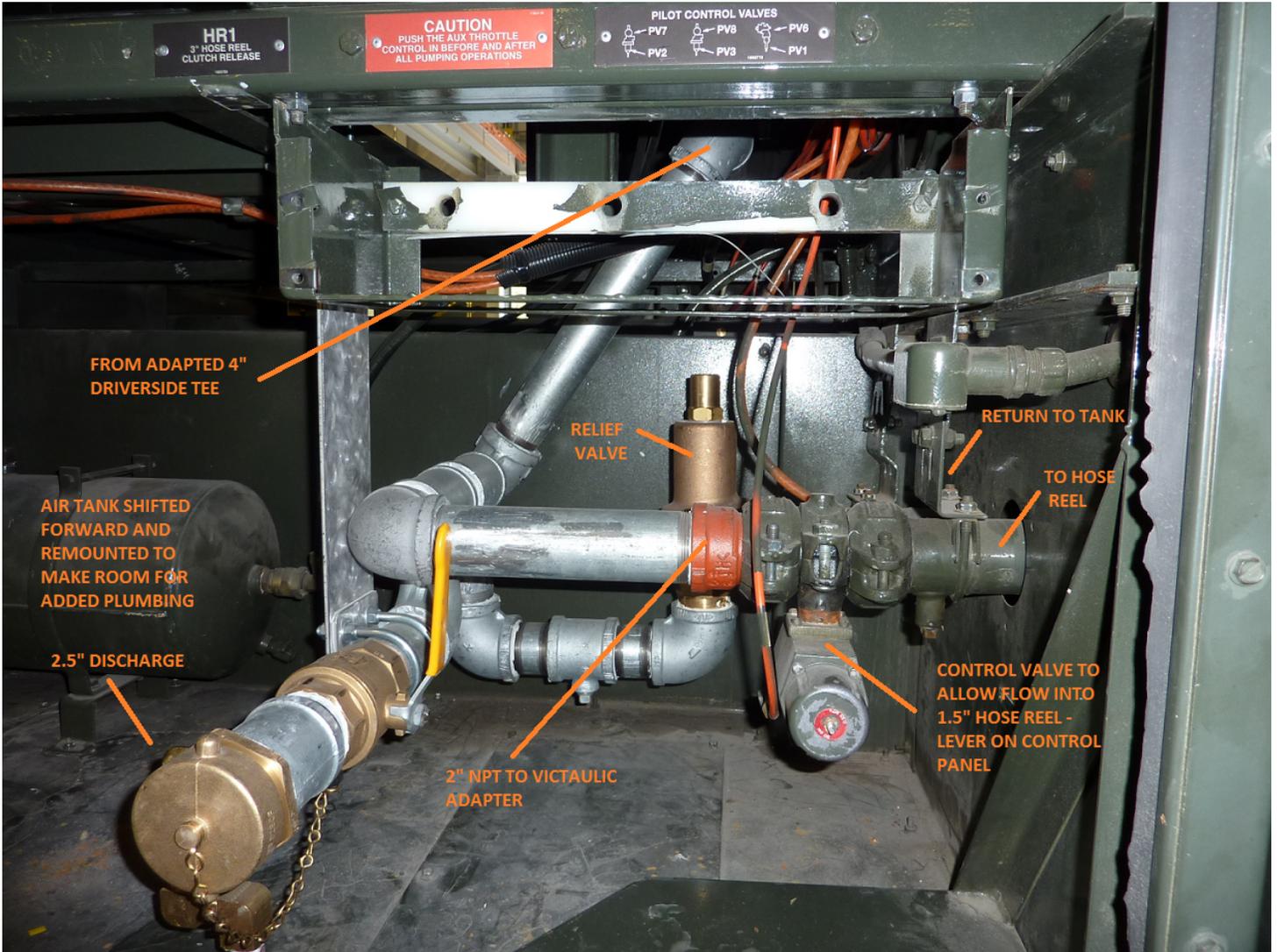
REC Step 6:

As with any water tender, the main features of the water tank are a pump suction port, a return to tank port, a filling port and a dump valve & tank drain. As mentioned in the overall design paragraph, REC was tasked to provide two pressurized discharges per side of the water tender. The design for this began with removing the un-needed fuel distribution system. Beginning inside the pump panel control compartment, REC took apart this system, re-used a 4" Victaulic type Tee plumbing fitting and placed it onto the main water inlet to direct waterflow to both sides of the compartment. REC then adapted this Tee from Victaulic connections to NPT connections by use of 2 adapters attached on both ends of the Tee fitting.



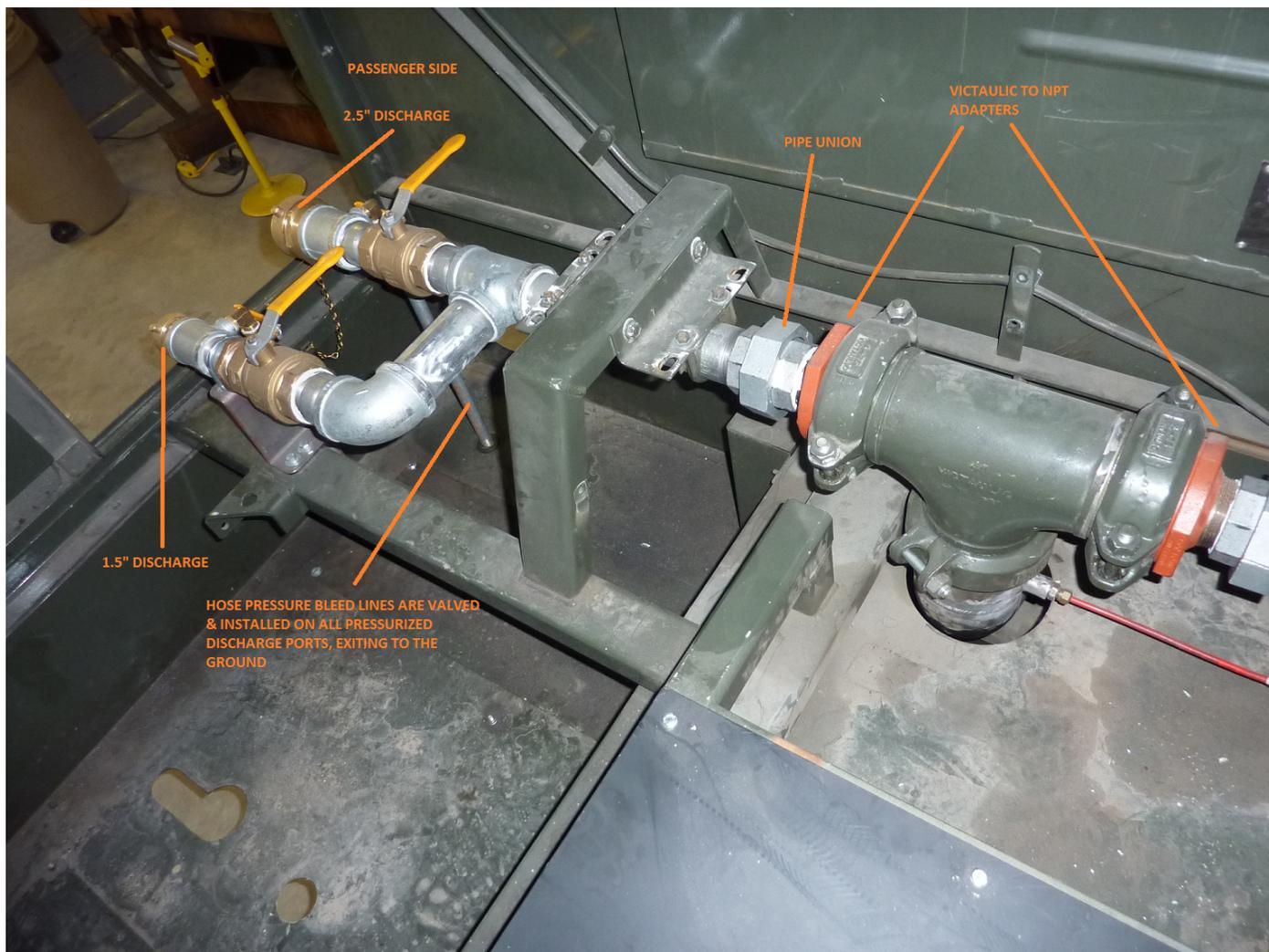
REC Step 6 (Continued):

Downstream of the adapter placed on the driverside of the inlet Tee, a piping system was created to produce a 2.5" water connection port, feeding water into the 1.5" hose reel and returning water back to the vehicle's tank through a pressure relief valve set to approximately 140 PSI. Plumbing was braced vertically with some added structure as shown in the below picture.



REC Step 6 (Continued):

Downstream of the adapter placed on the passenger side of the inlet Tee, a piping system was created to produce a 2.5" and a 1.5" pressurized water discharge port. This plumbing was braced against some of the original structure in this compartment.



REC Step 7:

After the pressurized plumbing ports were installed, a surface was added in the front of the newly created PPE storage area. This surface will facilitate the securement of items placed in the cargo area and can be equipped with tie-down rings and accessories to help with item storage.

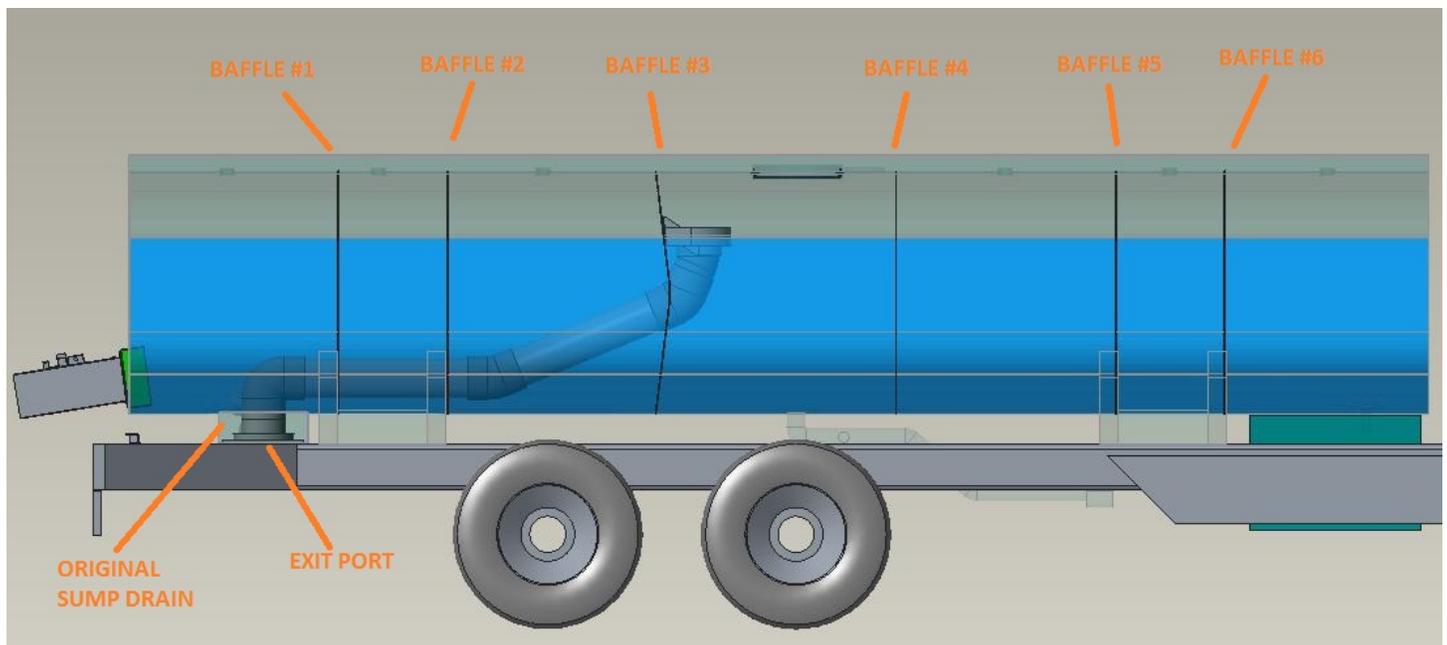


REC Step 7:

It is important to note at this point that all the fasteners REC used to connect components to the tank are aluminum or brass. Because the tank is originally constructed from aluminum, REC used these type of fasteners to avoid dissimilar metal (Galvanic corrosion) from taking place inside the tank.

REC designed the overflow plumbing system piping large enough to be able to expel water at the highest possible flow rate that a municipal water hydrant could fill the tank. This was done this way so that the possibility of being overweight even temporarily with water or allowing the hydrant to accidentally pressurize the tank were avoided. REC used schedule 80 heavy wall plastic piping for this system for economy and durability.

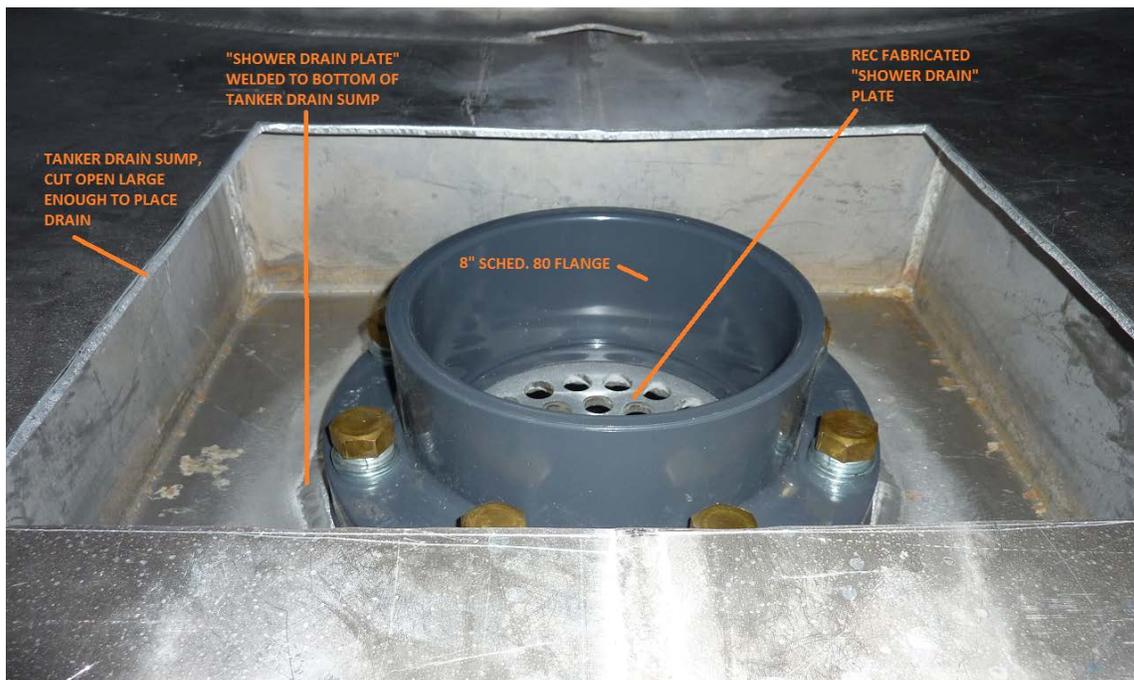
The overflow pipe has been routed through several of the tanks' baffles to be able to keep it centered along the axis of the tank. A secondary 18" Dia. hole was cut into baffle #3 on the passenger side of the tank centerline next to the original hole to be able to keep the proper volume of water able to flow through these baffles between compartments and to assist with workman access to complete the installation of the overflow pipe.

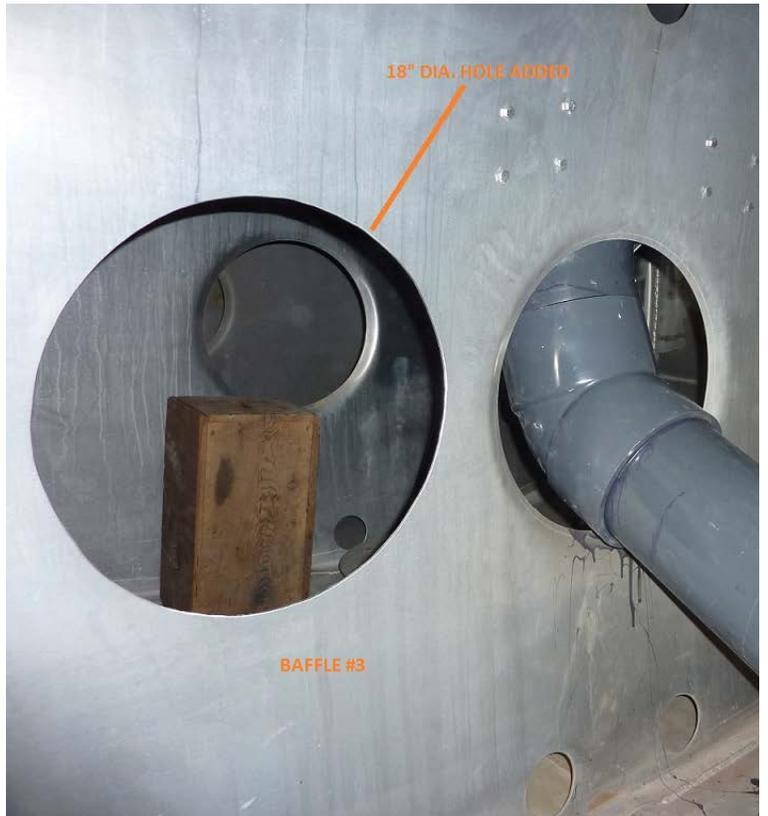


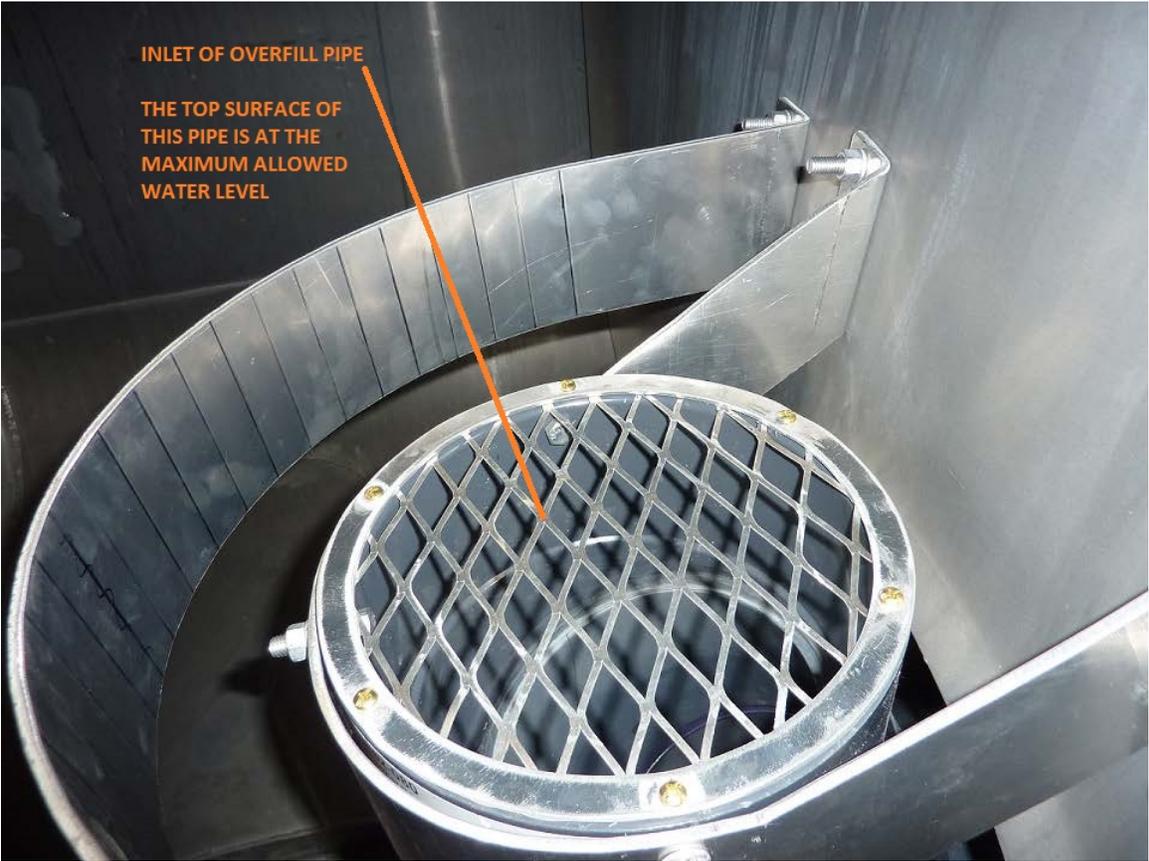
The overflow piping was designed to transport additional water to the shower drain type exit port that REC fabricated making sure that this port was behind the rear axle of the vehicle. This exit port is located inside the original tanks' sump drain, forward of the manual sump drain and excess water exits the vehicle at this point. The exit port was designed similar to a shower drain with many holes placed in it to help prevent it from being easily capped off and allowing the tank to be filled beyond its safe water carrying capacity.



Pictures depicting the overflow pipe construction process are shown below:



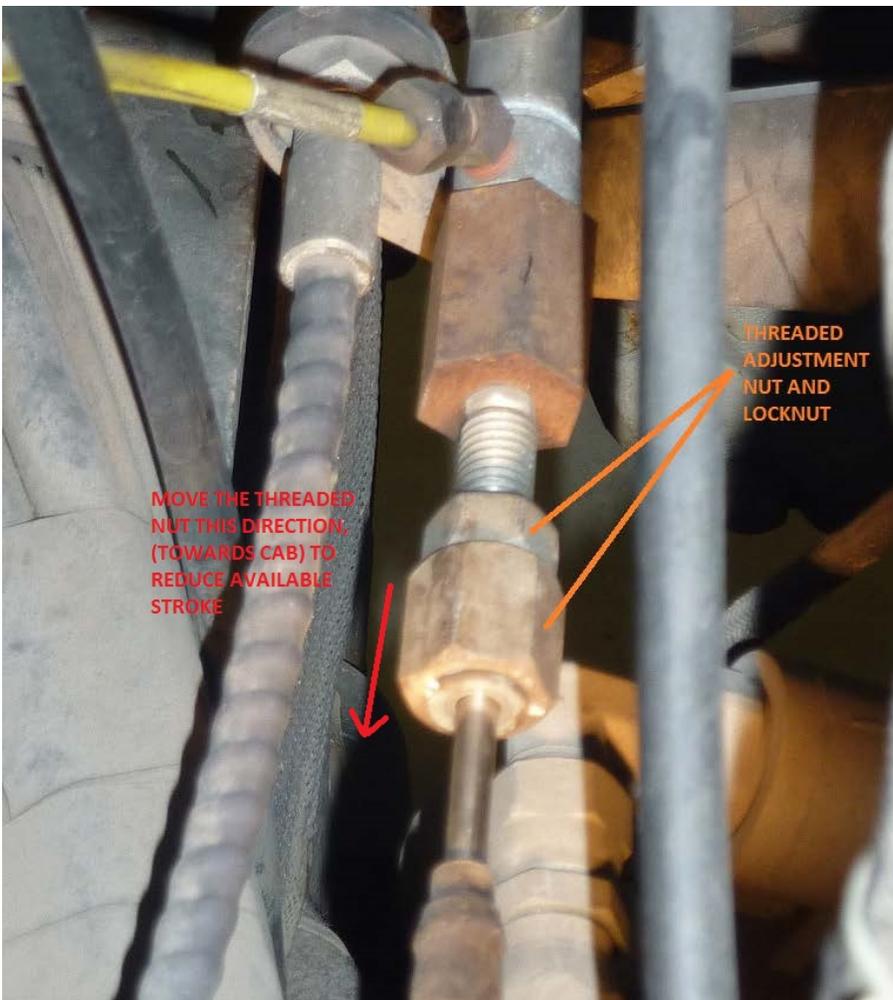




REC Step 8:

As mentioned previously, REC controlled the system plumbing pressure by physically limiting the stroke of the throttle control built into the pump control panel. The below pictures illustrate how this was accomplished.





Adjusting the nut and locknut will restrict the control panel throttle by limiting the amount of cable stroke available

Step 9:

REC at FDF's request, made provision for and installed a Newton brand quick dump valve for the rear of the OshKosh Tanker. It was necessary to re-route the ladder to accommodate this valve and avoid the possibility of a truck operator using the valve body as a stepping surface.







REC STAFF
VERIFYING PROPER
VALVE FUNCTION

System Pressure & Flow Test Results:

REC governed the control panel throttle to achieve a system pressure of 130 PSI (to protect sched. 40 plumbing components) and 1300-1500 RPM (of pump PTO). Using the pump performance curve from HALE, the system flow rate was calculated at 250 GPM with all discharges closed and water recirculating back to the water tank.

Non-pressurized Newton Quick-Dump Valve Testing:

At a beginning tank capacity (4600 Gallons): - ** Note however that as the water level inside the tank drops, the flow rate through this valve will also drop accordingly, below is shown a Maximum flow rate value.

USING THE NEWTON VALVE & BEGINNING WITH A FULL TANK (4600 GAL)OF WATER	GPM	TIME (Min)	VOLUME FILLED (GAL)
	2992	0.25	748

Pressurized Discharge Testing:

At a fixed control panel pressure of 130 PSI and 1300 RPM:

DRIVER SIDE	PRESSURE (PSI) AT DISCHARGE POINT	GPM	TIME (MIN)	VOLUME FILLED (GAL)
1.5" DISCHARGING BY ITSELF	-	144	1.73	249
2.5" DISCHARGING BY ITSELF	50	470	0.53	249
ALL PRESSURE PORTS OPEN BOTH SIDES OF VEHICLE	SYSTEM PRESSURE (PSI)	GPM	TIME (MIN)	VOLUME FILLED (GAL)
	20	665	2.25	1496

APPENDIX:

The HALE pump Installation, Operation and Maintenance guide can be downloaded from:
<http://www.industrycortex.com/datasheets/profile/506475802>

HALE PUMPS

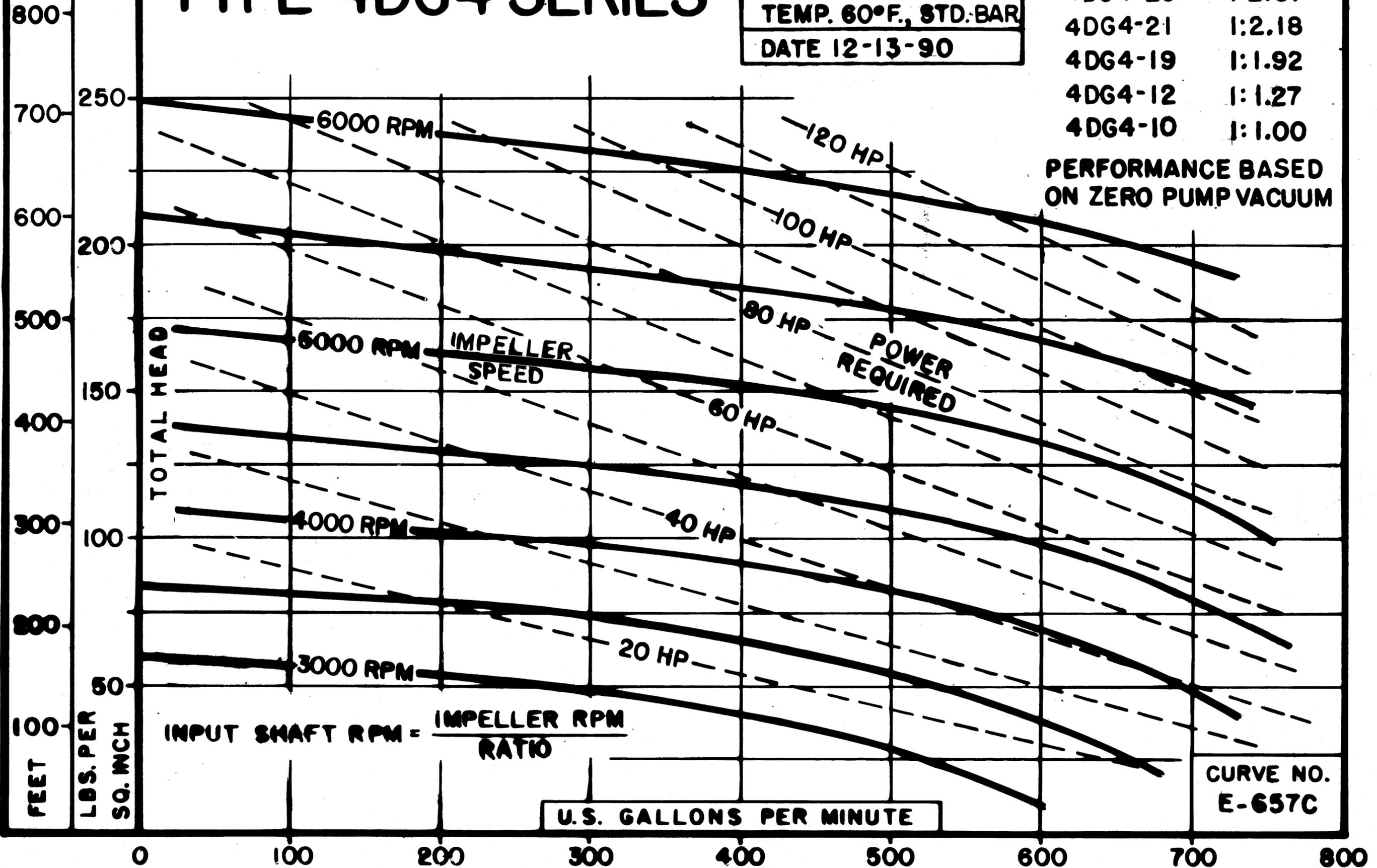
TYPE 4DG4 SERIES

HALE FIRE PUMP CO. Conshohocken, PA.

SUCTION	4"
DISCHARGE	4"
LIQUID SP. GR.	0.8
TEMP.	60°F, STD. BAR
DATE	12-13-90

MODEL NO.	RATIO
4DG4-30	1:3.00
4DG4-26	1:2.67
4DG4-21	1:2.18
4DG4-19	1:1.92
4DG4-12	1:1.27
4DG4-10	1:1.00

PERFORMANCE BASED ON ZERO PUMP VACUUM



E-657C

CURVE NO.
E-657C

PURCHASED PARTS	PRICES CURRENT AS OF NOVEMBER 2015
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DESCRIPTION	VENDOR PART NUMBER	QTY	COST EACH	EXTENDED COST
1060 GATE STYLE DUMP VALVE, LEFT SIDE MOUNTED HANDLE, 10" x 10" x 24", mild steel, w/.125" gasket	1060	1	\$740.00	\$740.00
mating installation tube - ALUMINUM	105090	1	\$168.00	\$168.00
.1875" GASKET	101029C	1	\$18.00	\$18.00
3M - 08612 WINDO-WELD ROUND RIBBON SEALER, 3/8" X 15ft.	-	1	\$22.23	\$22.23
Viton® Chemical-Resistant Flange Gasket for 8 Pipe Size, Class 150, Full Face-1/8" thickness	9473K624	1	\$53.50	\$53.50
Thick-Wall Dark Gray PVC Unthreaded Pipe Fitting, 8 Pipe Size x 13-1/2" OD, Flange, Schedule 80	4881K224	1	\$71.28	\$71.28
Thick-Wall Dark Gray PVC Unthreaded Pipe, 8 Pipe Size x 10' Length, Schedule 80	4885K53	1	\$199.74	\$199.74
Thick-Wall Dark Gray PVC Unthreaded Pipe Fitting, 8 Pipe Size, 90 Degree Elbow, Schedule 80	4881K283	1	\$80.10	\$80.10
Thick-Wall Dark Gray PVC Unthreaded Pipe Fitting, 8 Pipe Size, 22-1/2 Degree Elbow, Schedule 80	4881K172	1	\$140.03	\$140.03
Thick-Wall Dark Gray PVC Unthreaded Pipe Fitting, 8 Pipe Size, 45 Degree Elbow, Schedule 80	4881K313	1	\$75.72	\$75.72
Thick-Wall Dark Gray PVC Unthreaded Pipe Fitting, 8 Pipe Size, 22-1/2 Degree Elbow, Pipe End x Socket, Schedule 80	4881K783	1	\$179.04	\$179.04
Plastic Pipe Cement for PVC with Up to 12" Pipe Diameter, Gray-32 OUNCES	74605A16	1	\$18.00	\$18.00
Plastic Pipe Cement, Primer, Purple-32 OUNCES	74605A26	1	\$19.62	\$19.62
LOW-PRESSURE GALV. 2" NPT UNION	4638K738	2	\$31.54	\$63.08
STANDARD WALL GALV. 2" X 12" PIPE NIPPLE	4549K784	1	\$25.26	\$25.26
LOW PRESSURE GALV. 2" NPT TEE	4638K128	3	\$25.00	\$75.00
LOW PRESSURE GALV. 2" 90 DEG. ELBOW	4638K138	4	\$17.36	\$69.44
STANDARD WALL GALV. 2" DIA. X 6" LENGTH PIPE NIPPLE	4549K679	1	\$11.61	\$11.61
STANDARD WALL GALV. 2" DIA. X 3" LENGTH PIPE NIPPLE	4549K873	7	\$6.35	\$44.45
Low-Pressure Brass Threaded Pipe Fitting, 2 Male x 1-1/2 Female Pipe Size, Hex Reducing Bushing	4429K427	1	\$23.87	\$23.87
Brass Ball Valve, 2" NPT Female Connections	47865K28	3	\$63.66	\$190.98
Low-Pressure Galvanized Iron Threaded Pipe Fitting, 2 x 1/2 x 2 Pipe Size, Inline Reducing Tee	4638K276	3	\$29.36	\$88.08
Low-Pressure Galvanized Iron Threaded Pipe Fitting, 1-1/2 x 1/2 x 1-1/2 Pipe Size, Inline Reducing Tee	4638K273	1	\$19.06	\$19.06
Medium-Pressure Brass Threaded Pipe Fitting, 1/2 Pipe Size, 90 Degree Male Elbow	50785K125	3	\$10.19	\$30.57
Brass Ball Valve, 1/2" NPT Female Connections	47865K23	4	\$9.47	\$37.88
Galvanized Steel Welded Pipe - Schedule 40, 1/2 Pipe Size x 18" Length, Threaded Ends	4499K114	2	\$10.68	\$21.36
Standard-Wall Galvanized Welded Steel Thread Pipe Nipple, 1/2 Pipe Size x 12" Length	4549K586	1	\$7.68	\$7.68
Low-Pressure Galvanized Iron Threaded Pipe Fitting, 2-1/2 x 3/4 x 2-1/2 Pipe Size, Inline Reducing Tee	4638K771	1	\$96.54	\$96.54
High-Pressure Forged Galvanized Steel Thread Pipe Fitting, 1/2 Pipe Size, Hex-Head Plug	7739K184	1	\$1.08	\$1.08
Standard-Wall Galvanized Welded Steel Thread Pipe Nipple, 2-1/2 Pipe Size x 3" Length	4549K883	1	\$17.60	\$17.60
Precision High-Pressure Brass Thread Pipe Fitting, 3/4 Pipe Size, 90 Degree Male Elbow	9171K250	1	\$41.22	\$41.22
Brass Ball Valve, 3/4" NPT Female Connections	47865K24	1	\$13.36	\$13.36
High-Pressure Forged Black Steel Thread Pipe Fitting, 2-1/2 Pipe Size, Low Profile Coupling	4513K419	1	\$18.60	\$18.60
CAP PLATE GASKET FOR RETURN LINE INTO TANK FRONT PASS. SIDE	8516T143	1	\$3.64	\$3.64
Extended-Life Adjustable Relief Valve, Bronze Body, Precision Adjustable 131-150 PSI, 2 NPT	4703K59	1	\$337.78	\$337.78
Standard-Wall Aluminum Threaded Pipe Nipple, 2 Pipe Size x 4" Length	44665K287	1	\$11.75	\$11.75
Low-Pressure Galvanized Iron Threaded Pipe Fitting, 2 Pipe Size, 90°Female x Male Elbow	4638K228	1	\$23.60	\$23.60
Standard-Wall Galvanized Welded Steel Thread Pipe Nipple, 1-1/2 Pipe Size x 3" Length	4549K654	1	\$4.81	\$4.81
Galvanized Steel Welded Pipe - Schedule 40, 2 Pipe Size x 72" Length, Threaded Ends - 6FT LENGTH	4499K85	1	\$108.66	\$108.66
Zinc Plated Steel U-Bolt, 3/8"-16 Thread Size, 2 7/16" ID, 4 7/16" Height	8875T859	4	\$1.90	\$7.60
Zinc Yellow-Chromate Plated Steel Flat Washer, Grade 8, 3/8" Screw Size, 0.406" ID, 0.812" OD - 50 PK	98023A031	1	\$5.72	\$5.72
Zinc-Plated Steel Split Lock Washer, 3/8" Screw Size, 0.385" ID, 0.680" OD-100PK	91102A760	1	\$4.42	\$4.42
Low-Strength Steel Hex Nut, Zinc Plated, 3/8"-16 Thread Size, 9/16" Wide, 21/64" High-100PK	90473A031	1	\$5.58	\$5.58
Low-Strength Zinc-Plated Steel Cap Screw, 3/8"-16 Fully Threaded, 1-1/2" Long - 25 PK	91309A628	1	\$4.33	\$4.33
Pipe Thread Sealant, Loctite® with PTFE, #1527514, 16 oz.	8149K22	1	\$17.81	\$17.81
Aluminum Hex Head Cap Screw, 3/8"-16 Thread, 1-1/2" Long, Fully Threaded - package of 25 pcs	93306A628	1	\$14.92	\$14.92
Aluminum Hex Nut, 3/8"-16 Thread Size, 9/16" Wide, 21/64" High - 100 PCS	90670A031	1	\$14.19	\$14.19
Combination Drive Screw for Sheet Metal, Brass, Pan Head, Number 10 Size, 3/4" Length	90077A910	1	\$13.52	\$13.52
Corrosion-Resistant Formable 3003 Aluminum, .125" Thick, 12" x 12"	8973K89	1	\$13.46	\$13.46
Lightweight Aluminum Sheet with Diamond Openings, Type 3003, 0.040" Thick, 0.122" Wide Strand	9305T214	1	\$13.61	\$13.61
Aluminum Flat Washer, 3/8" Screw Size, 0.391" ID, 0.625" OD - 5 PACK	93286A045	3	\$2.50	\$7.50
Brass Hex Head Cap Screw, 3/4"-10 Thread, 2-1/2" Long	92941A845	8	\$12.00	\$96.00
Medium-Strength Grade 5 Zinc-Plated Steel Cap Screw, 5/16"-18 Fully Threaded, 3/4" Long-100PK	92865A581	1	\$13.12	\$13.12
Zinc Yellow-Chromate Plated Steel Flat Washer, Grade 8, 5/16" Screw Size, 0.344" ID, 0.688" OD-50PK	98023A030	1	\$4.83	\$4.83
Zinc-Plated Steel Split Lock Washer, 5/16" Screw Size, 0.322" ID, 0.583" OD-100PK	91102A755	1	\$2.73	\$2.73
Grade 5 Steel Hex Nut, Zinc Plated, 5/16"-18 Thread Size, 1/2" Wide, 17/64" High-100PK	95462A030	1	\$6.44	\$6.44
Zinc-Plated Steel Split Lock Washer, 3/4" Screw Size, 0.766" ID, 1.265" OD - PACK OF 50	91102A036	1	\$12.67	\$12.67
Zinc-Plated Steel SAE Flat Washer, 3/4" Screw Size, 0.812" ID, 1.469" OD - PACKS OF 21	90126A036	1	\$4.20	\$4.20
Black-Oxide Steel U-Bolt, 5/16"-18 Thread Size, 2-1/2" ID	3201T190	1	\$1.23	\$1.23
Aluminum Split Lock Washer, 3/8" Screw Size, 0.385" ID, 0.680" OD-50 PACK	91013A727	1	\$10.75	\$10.75
3/16" X 36" X 24" 3003 ALUMINUM SHEET	8973K44	1	\$106.86	\$106.86
3/8" X 18" X 18" MULTIPURPOSE 6061 ALUMINUM PLATE	89155K28	1	\$128.86	\$128.86
BLIND WELD FLANGE, .31" THICK, 6.63"OD, BOLT CIRCLE: 5.88", 8 BOLT HOLES, BOLT HOLE DIA:.44"	BETBWF401MS	1	\$38.63	\$38.63
CAP PLATE FOR RETURN LINE INTO TANK FRONT PASS. SIDE	BETBSF401AL	1	\$36.96	\$36.96
GASKET-(NOT A RING SO CENTER WILL NEED TO BE CUTOUT) FOR CAP PLATE	BETG15266CB	1	\$4.85	\$4.85
ALUMINUM BOLTED FLANGE EXTENSION	DF4AL2-88	1	\$117.77	\$117.77
2" FEMALE NPT ADAPTER TO VIC - FOR RETURN TO TANK (STEEL GALV.)	32000	1	\$65.49	\$65.49
VIC 52, 4" VIC X 2" MALE NPT REDUCER MALE THREAD SMALL END PAINTED	2280	2	\$66.57	\$133.14
VIC 60 2 GRV CAP PAINTED	77907	1	\$26.27	\$26.27
BRASS PIN LUG 2.5" NH CAP W CHAIN	FC250F	2	\$16.00	\$32.00
BRASS 2.5" NH TO 2.5" NPT DOUBLE MALE	DMH2525F	2	\$30.20	\$60.40
BRASS PIN LUG 1.5" NH CAP W/ CHAIN	FC150F	1	\$13.25	\$13.25
BRASS 1.5" NH TO 1.5" NPT DOUBLE MALE	DMH1515F	1	\$15.63	\$15.63
4" X 1/4" HR STEEL BAR, A-36, 20FT. STICK LENGTH	06502320	1	\$54.71	\$54.71
4FT X 8 FT SHEET 14 GAGE STEEL, P&O	08000750	1	\$38.00	\$38.00
3/16" X 4" 6061-T6511 EXT ALUM - 12ft length	21429140	1	\$44.86	\$44.86
CROSS LINKED POLY HEAT SHRINK TUBING, HEAVY WALL ADHESIVE LINED	CFW-2700-D	1	\$30.30	\$30.30
1-1/2" RED ORTAC 300 PSI HOSE, 75 FT LENGTH	ORTAC-300	1	\$715.50	\$715.50

TOTAL COST:	\$5,110.33
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TANK CLEANING SERVICE :.....\$519.50

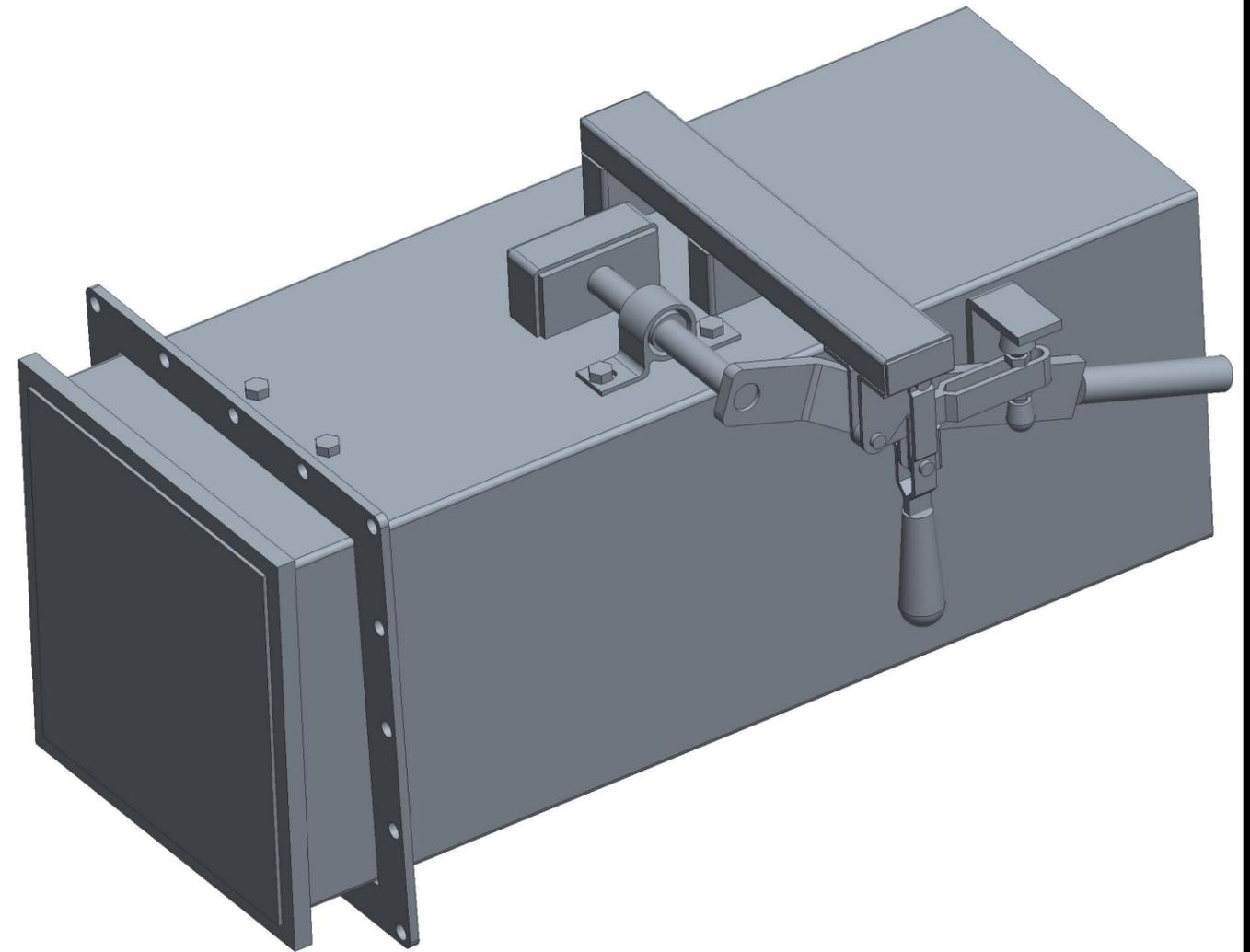
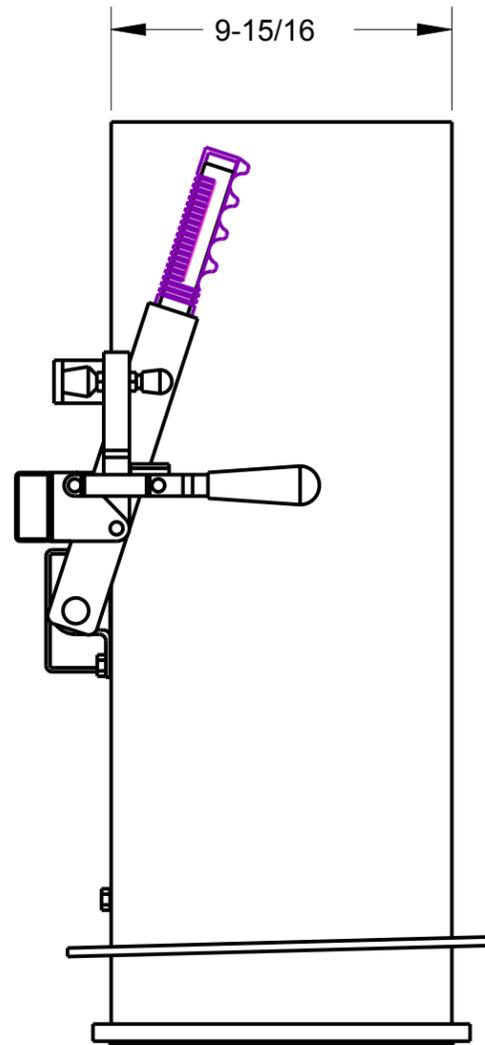
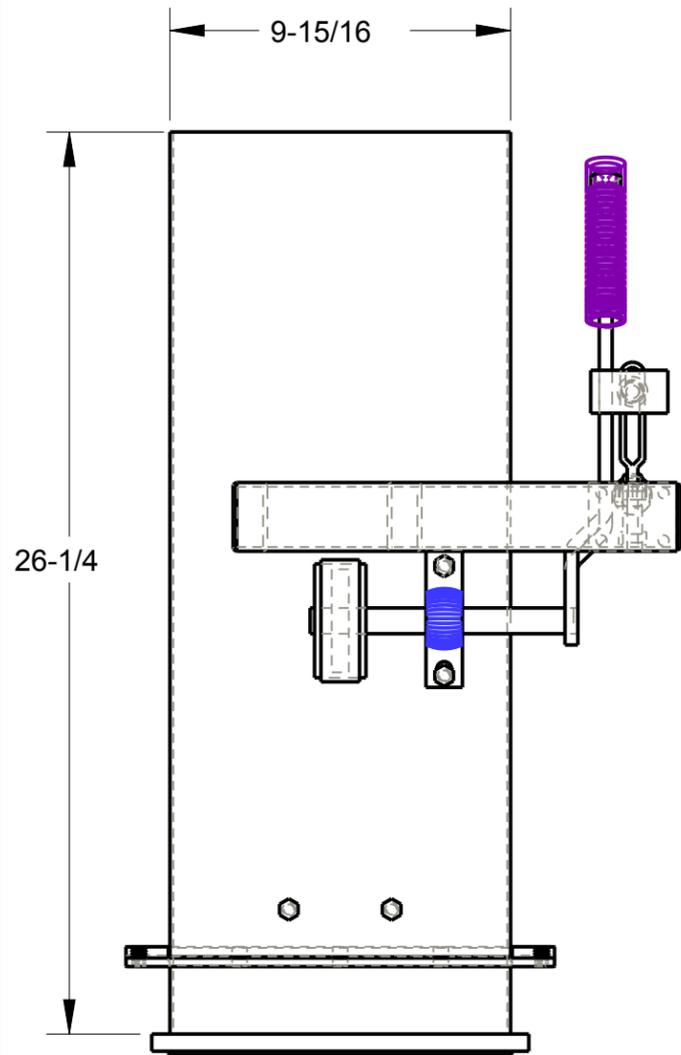
QUALAWASH
(CORPORATE HEADQUARTERS)
P.O. BOX 534698
ATLANTA, GA 30353-4698

PURCHASED PARTS

VENDOR	VENDOR CONTACT	DESCRIPTION	VENDOR PART / DRAWING NUMBER
http://ahstockmfg.com/	http://ahstockmfg.com/	1060 GATE STYLE DUMP VALVE, LEFT SIDE MOUNTED HANDLE, 10" x 10" x 24", mild steel, w/.125" gasket	1060
http://ahstockmfg.com/	http://ahstockmfg.com/	mating installation tube - ALUMINUM	105090
http://ahstockmfg.com/	http://ahstockmfg.com/	.1875" GASKET	101029C
AMAZON.com	WWW.AMAZON.COM	3M - 08612 WINDO-WELD ROUND RIBBON SEALER, 3/8" X 15ft.	-
MCMaster CARR	WWW.MCMaster.COM	Viton® Chemical-Resistant Flange Gasket for 8 Pipe Size, Class 150, Full Face-1/8" thickness	9473K624
MCMaster CARR	WWW.MCMaster.COM	Thick-Wall Dark Gray PVC Unthreaded Pipe Fitting, 8 Pipe Size x 13-1/2" OD, Flange, Schedule 80	4881K224
MCMaster CARR	WWW.MCMaster.COM	Thick-Wall Dark Gray PVC Unthreaded Pipe, 8 Pipe Size x 10' Length, Schedule 80	4885K553
MCMaster CARR	WWW.MCMaster.COM	Thick-Wall Dark Gray PVC Unthreaded Pipe Fitting, 8 Pipe Size, 90 Degree Elbow, Schedule 80	4881K283
MCMaster CARR	WWW.MCMaster.COM	Thick-Wall Dark Gray PVC Unthreaded Pipe Fitting, 8 Pipe Size, 22-1/2 Degree Elbow, Schedule 80	4881K172
MCMaster CARR	WWW.MCMaster.COM	Thick-Wall Dark Gray PVC Unthreaded Pipe Fitting, 8 Pipe Size, 45 Degree Elbow, Schedule 80	4881K313
MCMaster CARR	WWW.MCMaster.COM	Thick-Wall Dark Gray PVC Unthreaded Pipe Fitting, 8 Pipe Size, 22-1/2 Degree Elbow, Pipe End x Socket, Schedule 80	4881K783
MCMaster CARR	WWW.MCMaster.COM	Plastic Pipe Cement for PVC with Up to 12" Pipe Diameter, Gray-32 OUNCES	74605A16
MCMaster CARR	WWW.MCMaster.COM	Plastic Pipe Cement, Primer, Purple-32 OUNCES	74605A26
MCMaster CARR	WWW.MCMaster.COM	LOW-PRESSURE GALV. 2" NPT UNION	4638K738
MCMaster CARR	WWW.MCMaster.COM	STANDARD WALL GALV. 2" X 12" PIPE NIPPLE	4549K784
MCMaster CARR	WWW.MCMaster.COM	LOW PRESSURE GALV. 2" NPT TEE	4638K128
MCMaster CARR	WWW.MCMaster.COM	LOW PRESSURE GALV. 2" 90 DEG. ELBOW	4638K138
MCMaster CARR	WWW.MCMaster.COM	STANDARD WALL GALV. 2" DIA. X 6" LENGTH PIPE NIPPLE	4549K679
MCMaster CARR	WWW.MCMaster.COM	STANDARD WALL GALV. 2" DIA. X 3" LENGTH PIPE NIPPLE	4549K873
MCMaster CARR	WWW.MCMaster.COM	Low-Pressure Brass Threaded Pipe Fitting, 2 Male x 1-1/2 Female Pipe Size, Hex Reducing Bushing	4429K427
MCMaster CARR	WWW.MCMaster.COM	Brass Ball Valve, 2" NPT Female Connections	47865K28
MCMaster CARR	WWW.MCMaster.COM	Low-Pressure Galvanized Iron Threaded Pipe Fitting, 2 x 1/2 x 2 Pipe Size, Inline Reducing Tee	4638K276
MCMaster CARR	WWW.MCMaster.COM	Low-Pressure Galvanized Iron Threaded Pipe Fitting, 1-1/2 x 1/2 x 1-1/2 Pipe Size, Inline Reducing Tee	4638K273
MCMaster CARR	WWW.MCMaster.COM	Medium-Pressure Brass Threaded Pipe Fitting, 1/2 Pipe Size, 90 Degree Male Elbow	50785K125
MCMaster CARR	WWW.MCMaster.COM	Brass Ball Valve, 1/2" NPT Female Connections	47865K23
MCMaster CARR	WWW.MCMaster.COM	Galvanized Steel Welded Pipe - Schedule 40, 1/2 Pipe Size x 18" Length, Threaded Ends	4499K114
MCMaster CARR	WWW.MCMaster.COM	Standard-Wall Galvanized Welded Steel Thread Pipe Nipple, 1/2 Pipe Size x 12" Length	4549K586
MCMaster CARR	WWW.MCMaster.COM	Low-Pressure Galvanized Iron Threaded Pipe Fitting, 2-1/2 x 3/4 x 2-1/2 Pipe Size, Inline Reducing Tee	4499K771
MCMaster CARR	WWW.MCMaster.COM	High-Pressure Forged Galvanized Steel Thread Pipe Fitting, 1/2 Pipe Size, Hex-Head Plug	7739K184
MCMaster CARR	WWW.MCMaster.COM	Standard-Wall Galvanized Welded Steel Thread Pipe Nipple, 2-1/2 Pipe Size x 3" Length	4549K883
MCMaster CARR	WWW.MCMaster.COM	Precision High-Pressure Brass Thread Pipe Fitting, 3/4 Pipe Size, 90 Degree Male Elbow	9171K250
MCMaster CARR	WWW.MCMaster.COM	Brass Ball Valve, 3/4" NPT Female Connections	47865K24
MCMaster CARR	WWW.MCMaster.COM	High-Pressure Forged Black Steel Thread Pipe Fitting, 2-1/2 Pipe Size, Low Profile Coupling	4513K419
MCMaster CARR	WWW.MCMaster.COM	CAP PLATE GASKET FOR RETURN LINE INTO TANK FRONT PASS. SIDE	8516T143
MCMaster CARR	WWW.MCMaster.COM	Extended-Life Adjustable Relief Valve, Bronze Body, Precision Adjustable 131-150 PSI, 2 NPT	4703K59
MCMaster CARR	WWW.MCMaster.COM	Standard-Wall Aluminum Threaded Pipe Nipple, 2 Pipe Size x 4" Length	44665K287
MCMaster CARR	WWW.MCMaster.COM	Low-Pressure Galvanized Iron Threaded Pipe Fitting, 2 Pipe Size, 90°Female x Male Elbow	4638K228
MCMaster CARR	WWW.MCMaster.COM	Standard-Wall Galvanized Welded Steel Thread Pipe Nipple, 1-1/2 Pipe Size x 3" Length	4549K654
MCMaster CARR	WWW.MCMaster.COM	Galvanized Steel Welded Pipe - Schedule 40, 2 Pipe Size x 72" Length, Threaded Ends - 6FT LENGTH	4499K85
MCMaster CARR	WWW.MCMaster.COM	Zinc Plated Steel U-Bolt, 3/8"-16 Thread Size, 2 7/16" ID, 4 7/16" Height	8875T859
MCMaster CARR	WWW.MCMaster.COM	Zinc Yellow-Chromate Plated Steel Flat Washer, Grade 8, 3/8" Screw Size, 0.406" ID, 0.812" OD - 50 PK	98023A031
MCMaster CARR	WWW.MCMaster.COM	Zinc-Plated Steel Split Lock Washer, 3/8" Screw Size, 0.385" ID, 0.680" OD-100PK	91102A760
MCMaster CARR	WWW.MCMaster.COM	Low-Strength Steel Hex Nut, Zinc Plated, 3/8"-16 Thread Size, 9/16" Wide, 21/64" High-100PK	90473A031
MCMaster CARR	WWW.MCMaster.COM	Low-Strength Zinc-Plated Steel Cap Screw, 3/8"-16 Fully Threaded, 1-1/2" Long - 25 PK	91309A628
MCMaster CARR	WWW.MCMaster.COM	Pipe Thread Sealant, Loctite® with PTFE, #1527514, 16 oz.	8149K22
MCMaster CARR	WWW.MCMaster.COM	Aluminum Hex Head Cap Screw, 3/8"-16 Thread, 1-1/2" Long, Fully Threaded - package of 25 pcs	93306A628
MCMaster CARR	WWW.MCMaster.COM	Aluminum Hex Nut, 3/8"-16 Thread Size, 9/16" Wide, 21/64" High - 100 PCS	90670A031
MCMaster CARR	WWW.MCMaster.COM	Combination Drive Screw for Sheet Metal, Brass, Pan Head, Number 10 Size, 3/4" Length	90077A910
MCMaster CARR	WWW.MCMaster.COM	Corrosion-Resistant Formable 3003 Aluminum, .125" Thick, 12" x 12"	8973K89
MCMaster CARR	WWW.MCMaster.COM	Lightweight Aluminum Sheet with Diamond Openings, Type 3003, 0.040" Thick, 0.122" Wide Strand	9305T214
MCMaster CARR	WWW.MCMaster.COM	Aluminum Flat Washer, 3/8" Screw Size, 0.391" ID, 0.625" OD - 5 PACK	93286A045
MCMaster CARR	WWW.MCMaster.COM	Brass Hex Head Cap Screw, 3/4"-10 Thread, 2-1/2" Long	92941A845
MCMaster CARR	WWW.MCMaster.COM	Medium-Strength Grade 5 Zinc-Plated Steel Cap Screw, 5/16"-18 Fully Threaded, 3/4" Long-100PK	92865A581
MCMaster CARR	WWW.MCMaster.COM	Zinc Yellow-Chromate Plated Steel Flat Washer, Grade 8, 5/16" Screw Size, 0.344" ID, 0.688" OD-50PK	98023A030
MCMaster CARR	WWW.MCMaster.COM	Zinc-Plated Steel Split Lock Washer, 5/16" Screw Size, 0.322" ID, 0.583" OD-100PK	91102A755
MCMaster CARR	WWW.MCMaster.COM	Grade 5 Steel Hex Nut, Zinc Plated, 5/16"-18 Thread Size, 1/2" Wide, 17/64" High-100PK	95462A030
MCMaster CARR	WWW.MCMaster.COM	Zinc-Plated Steel Split Lock Washer, 3/4" Screw Size, 0.766" ID, 1.265" OD - PACK OF 50	91102A036
MCMaster CARR	WWW.MCMaster.COM	Zinc-Plated Steel SAE Flat Washer, 3/4" Screw Size, 0.812" ID, 1.469" OD - PACKS OF 21	90126A036
MCMaster CARR	WWW.MCMaster.COM	Black-Oxide Steel U-Bolt, 5/16"-18 Thread Size, 2-1/2" ID	3201T190
MCMaster CARR	WWW.MCMaster.COM	Aluminum Split Lock Washer, 3/8" Screw Size, 0.385" ID, 0.680" OD-50 PACK	91013A727
MCMaster CARR	WWW.MCMaster.COM	3/16" X 36" X 24" 3003 ALUMINUM SHEET	8973K44
MCMaster CARR	WWW.MCMaster.COM	3/8" X 18" X 18" MULTIPURPOSE 6061 ALUMINUM PLATE	89155K28
TANK TRUCK SERVICE AND SALES	WWW.TANKTRUCKSERVICE.COM	BLIND WELD FLANGE, .31" THICK, 6.63"OD, BOLT CIRCLE: 5.88", 8 BOLT HOLES, BOLT HOLE DIA:.44"	BETBWF401MS
TANK TRUCK SERVICE AND SALES	WWW.TANKTRUCKSERVICE.COM	CAP PLATE FOR RETURN LINE INTO TANK FRONT PASS. SIDE	BETBSF401AL
TANK TRUCK SERVICE AND SALES	WWW.TANKTRUCKSERVICE.COM	GASKET-(NOT A RING SO CENTER WILL NEED TO BE CUTOUT) FOR CAP PLATE	BETG15266CB
TANK TRUCK SERVICE AND SALES	WWW.TANKTRUCKSERVICE.COM	ALUMINUM BOLTED FLANGE EXTENSION	DF4AL2-88
ETNA SUPPLY	WWW.ETNASUPPLY.COM	2" FEMALE NPT ADAPTER TO VIC - FOR RETURN TO TANK (STEEL GALV.)	32000
ETNA SUPPLY	WWW.ETNASUPPLY.COM	VIC 52, 4" VIC X 2" MALE NPT REDUCER MALE THREAD SMALL END PAINTED	2280
ETNA SUPPLY	WWW.ETNASUPPLY.COM	VIC 60 2 GRV CAP PAINTED	77907
FIREHOSE DIRECT	WWW.FIREHOSEDIRECT.COM	BRASS PIN LUG 2.5" NH CAP W CHAIN	FC250F
FIREHOSE DIRECT	WWW.FIREHOSEDIRECT.COM	BRASS 2.5" NH TO 2.5" NPT DOUBLE MALE	DMH2525F
FIREHOSE DIRECT	WWW.FIREHOSEDIRECT.COM	BRASS PIN LUG 1.5" NH CAP W/ CHAIN	FC150F
FIREHOSE DIRECT	WWW.FIREHOSEDIRECT.COM	BRASS 1.5" NH TO 1.5" NPT DOUBLE MALE	DMH1515F
ALRO STEEL	WWW.ALRO.COM	4" X 1/4" HR STEEL BAR, A-36, 20FT. STICK LENGTH	06502320
ALRO STEEL	WWW.ALRO.COM	4FT X 8 FT SHEET 14 GAGE STEEL, P&O	08000750
ALRO STEEL	WWW.ALRO.COM	3/16" X 4" 6061-T6511 EXT ALUM - 12ft length	21429140
ANIXTER INC.	WWW.ANIXTER.COM	CROSS LINKED POLY HEAT SHRINK TUBING, HEAVY WALL ADHESIVE LINED	CFW-2700-D
GRAND TRAVERSE RUBBER SUPPLY	WWW.GTRUBBER.COM	1-1/2" RED ORTAC 300 PSI HOSE, 75 FT LENGTH	ORTAC-300

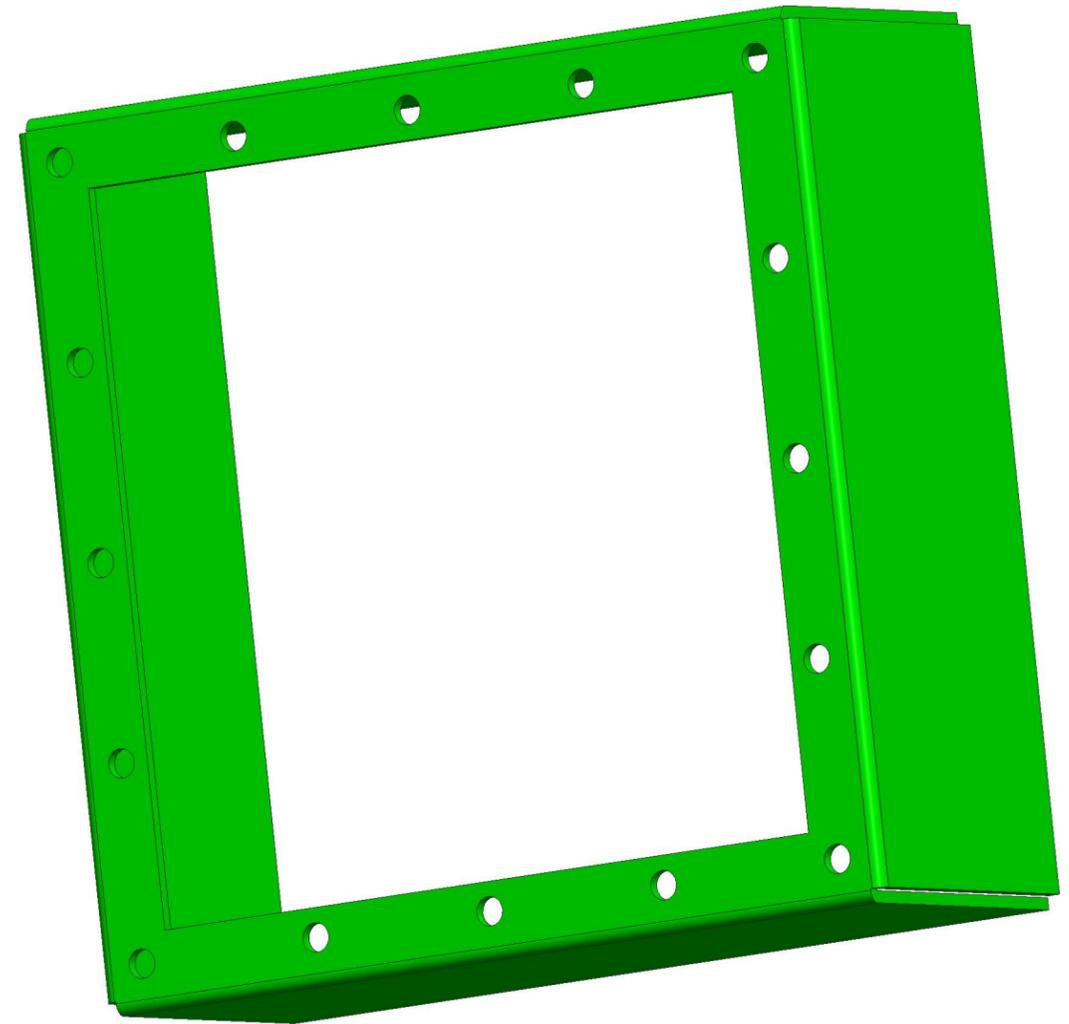
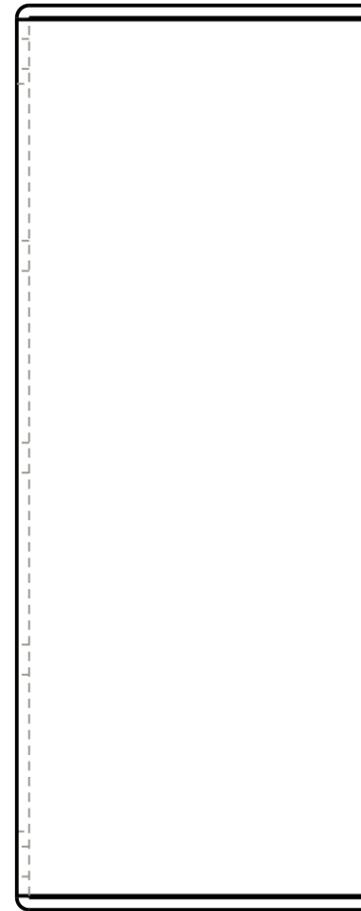
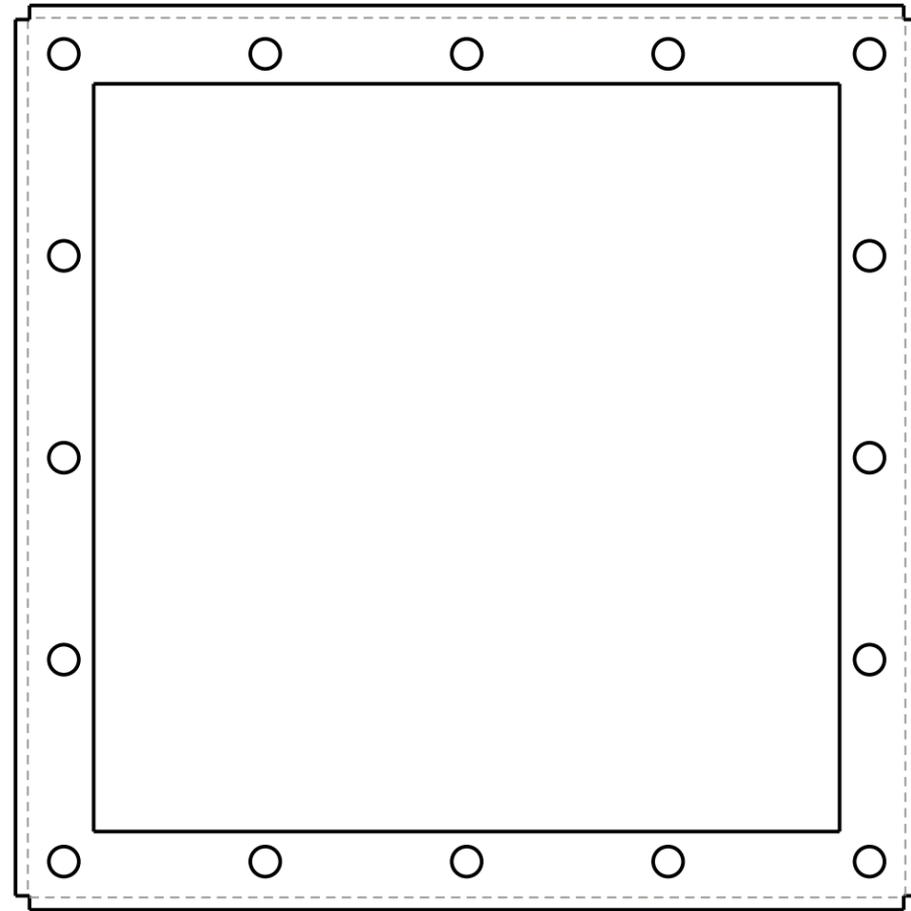
REC	REC CUSTOM MAKE PARTS	PART NUMBER
REC	DRAIN STRAP	26-0162
REC	SWASH STRAP	26-0161
REC	OVERFLOW SCREEN	26-0163
REC	MANHOLE ACCESS RESTRICTOR	26-0150
REC	DRAIN PLATE	26-0166
REC	OVERFLOW FILTER RING	26-0164
REC	OVERFLOW SCREEN SW	26-0165
REC	DRAIN PIPE	26-0169
REC	HORIZONTAL PIPE	26-0167
REC	REAR STEP FILLER	26-0153
REC	COVER PLATE RECTANGLE	26-0160
REC	COVER PLATE L	26-0159
REC	CARGO SHEET	26-0158
REC	DRIVER SIDE PLUMBING BRACE	26-0157
REC	PASSENGER SIDE PLUMBING BRACE	26-0156
REC	REAR STEP SW	26-0154
REC	REAR STEP	26-0152
REC	REAR WORKLIGHT SWITCH GUARD	26-0151
REC	LADDER WELD TAB	26-0155
REC	PIPE STUB	26-0168
REC	WATER FILL WC	26-0170
REC	WELD FLANGE MODIFIED	BETBWF401MS_MODIFIED

REC	REC ASSEMBLY DRAWINGS	PART NUMBER
REC	WATER INLET DETAIL	10-0007
REC	DRAIN FLANGE DETAIL	10-0007
REC	DUMP VALVE, LADDER & STEP DETAIL	10-0007
REC	PASSENGER SIDE PLUMBING DETAIL	10-0007
REC	DRIVERSIDE PLUMBING DETAIL	10-0007
REC	BAFFLE DETAIL	10-0007
REC	COMPLETED TRUCK OVERVIEW & VICTAULIC CAP DETAIL	10-0007
REC	OVERFLOW AND MANHOLE RESTRICTOR DEVICE DETAIL	10-0007



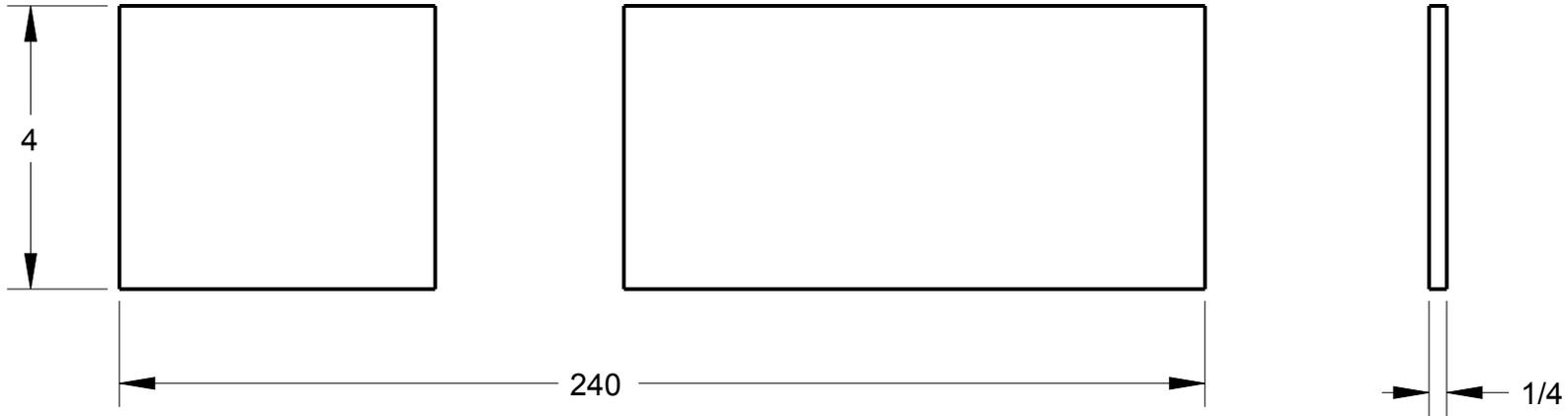
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ANGULAR: + - 1 DEG.						APPROVED:	
DECIMAL: 1 PLACE + - 0.05 2 PLACE + - 0.01 3 PLACE + - 0.005	NO.	BY	DATE	REVISION		DATE: 06-Jul-2016	
PROJECT NO.:	TITLE: 1060 GATE STYLE DUMP VALVE					SCALE:	
ROSCOMMON EQUIPMENT CENTER P.O. BOX 68 ROSCOMMON, MICHIGAN 48653							SIZE: B



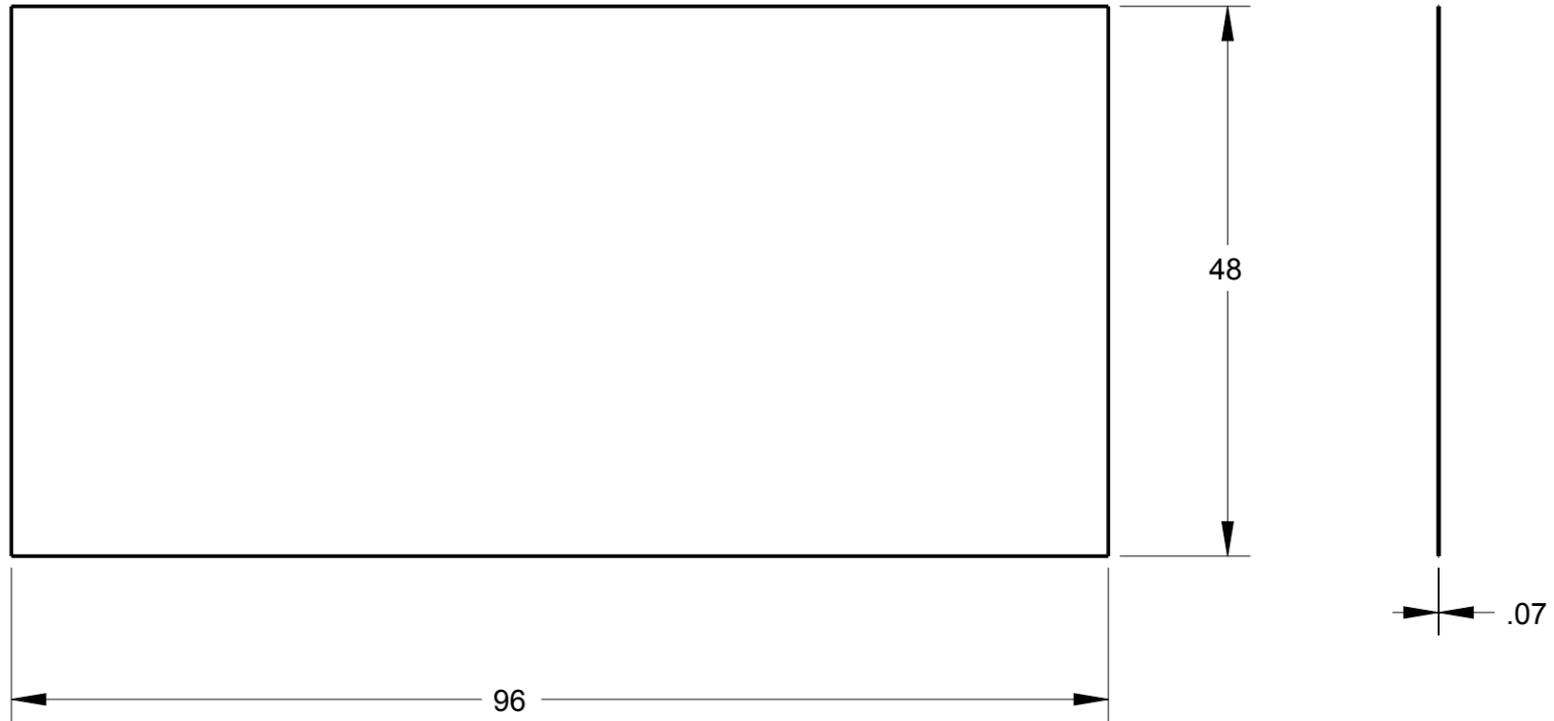
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PROJECT NO.:	ROSCOMMON EQUIPMENT CENTER P.O. BOX 68 ROSCOMMON, MICHIGAN 48653							SCALE:	
	TITLE: 105090, MATING INSTALLATION TUBE							DWG. NO. 105090	SIZE: B



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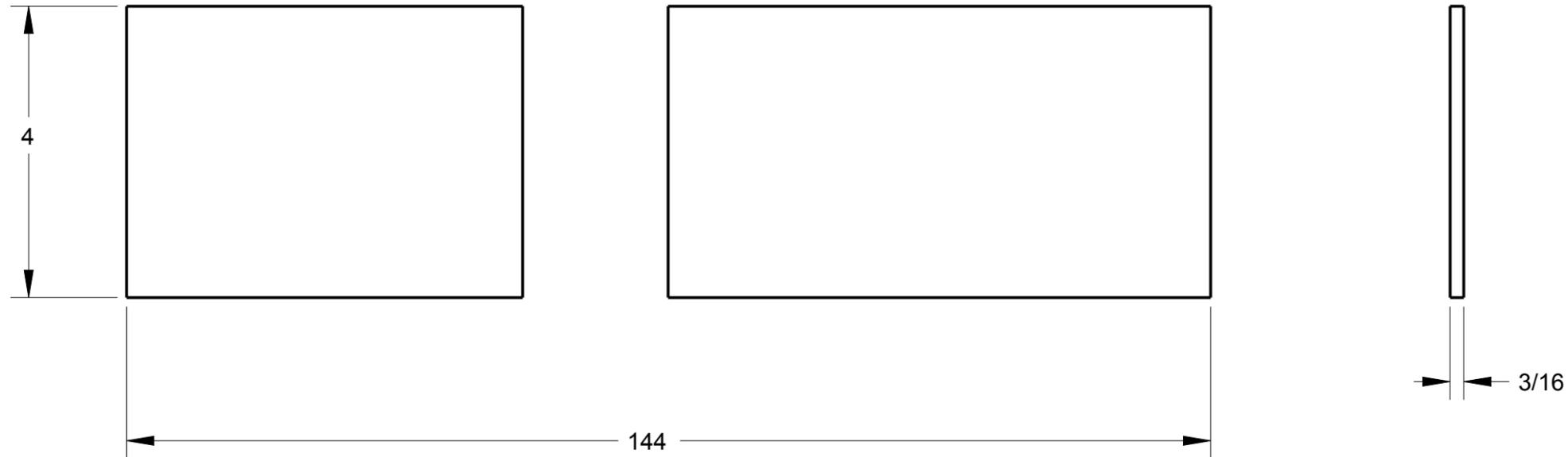
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ANGULAR: + - 1 DEG.						APPROVED:	
DECIMAL: 1 PLACE + - 0.05 2 PLACE + - 0.01 3 PLACE + - 0.005	NO.	BY	DATE	REVISION		DATE: 08-Jul-2016	
	ROSCOMMON EQUIPMENT CENTER P.O. BOX 68 ROSCOMMON, MICHIGAN 48653					SCALE:	
PROJECT NO.:	TITLE: 4" x 1/4" HR STEEL BAR, A-36, 20FT STICK LENGTH					DWG. NO. 06502320	SIZE: A



PURCHASED THROUGH: ALRO STEEL

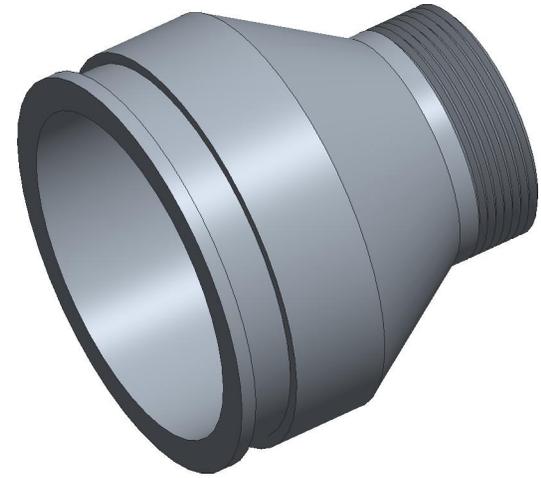
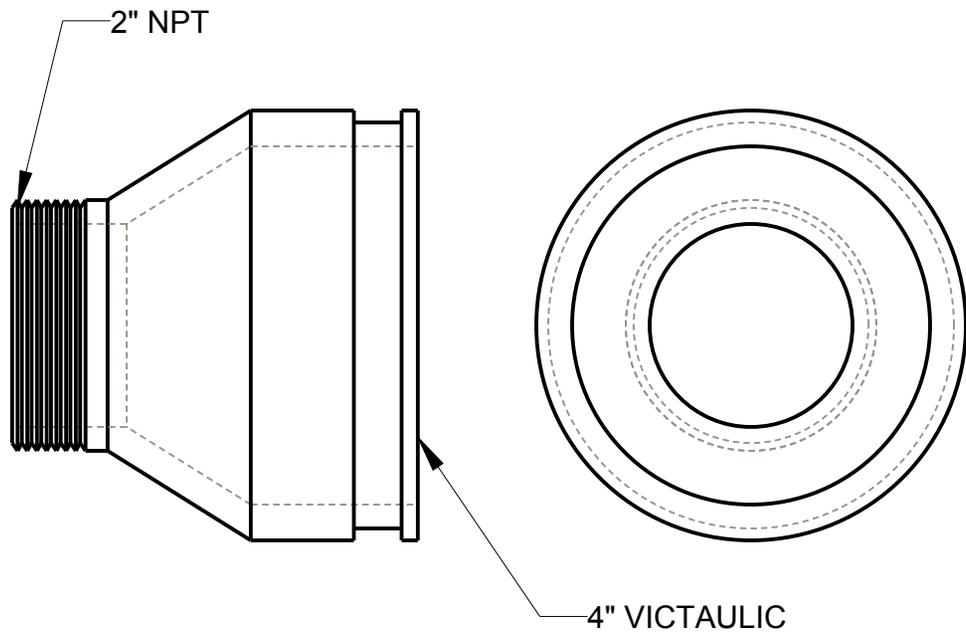
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<i>DECIMAL:</i> 1 PLACE + - 0.05 2 PLACE + - 0.01 3 PLACE + - 0.005	<i>NO.</i>	<i>BY</i>	<i>DATE</i>	<i>REVISION</i>		<i>DATE:</i> 08-Jul-2016	
<i>PROJECT NO.:</i>	<i>TITLE:</i> 4FT X 8FT X 14 GAGE STEEL SHEET, PICKLED AND OILED					<i>SCALE:</i>	
							<i>SIZE:</i> B

ROSCOMMON EQUIPMENT CENTER
P.O. BOX 68 ROSCOMMON, MICHIGAN 48653



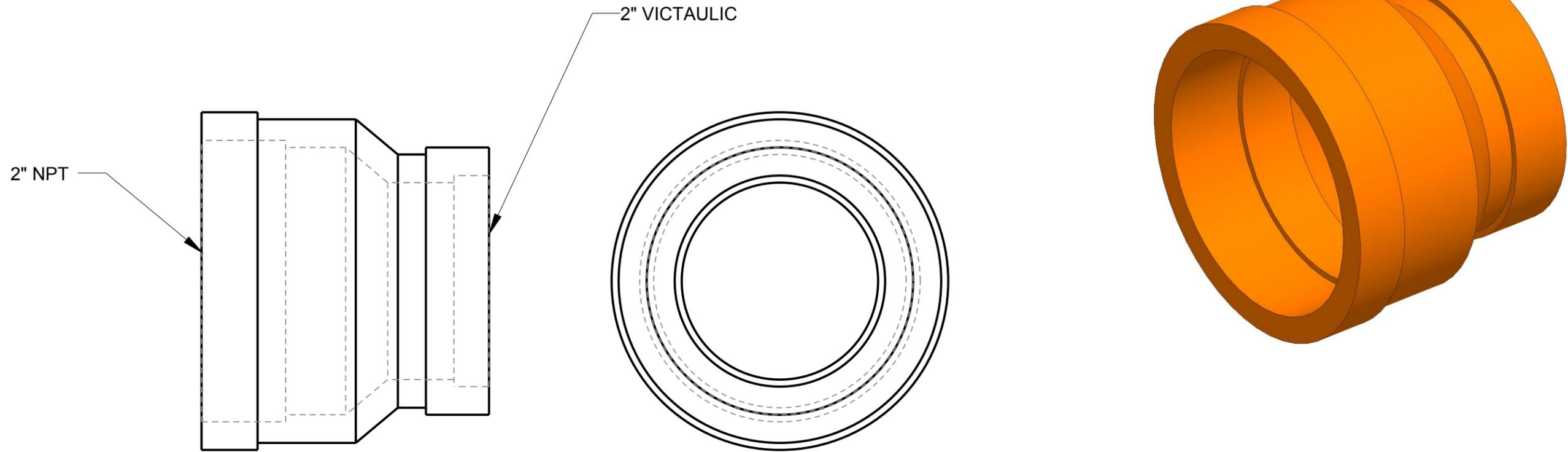
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<i>DECIMAL:</i> 1 PLACE + - 0.05 2 PLACE + - 0.01 3 PLACE + - 0.005								<i>DATE:</i> 08-Jul-2016	
<i>PROJECT NO.:</i>	ROSCOMMON EQUIPMENT CENTER P.O. BOX 68 ROSCOMMON, MICHIGAN 48653							<i>SCALE:</i>	<i>DWG. NO.</i> 21429140
	<i>TITLE:</i> 3/16" X 4" X 12FT, 6061-T6 ALUMINUM BAR								



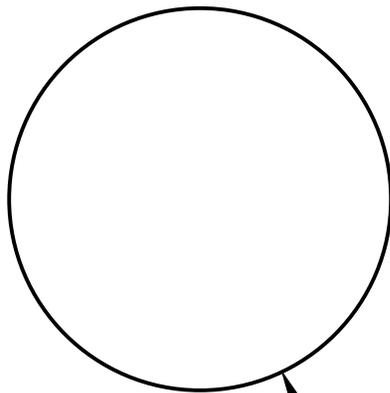
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DECIMAL: 1 PLACE + - 0.05 2 PLACE + - 0.01 3 PLACE + - 0.005	NO.	BY	DATE	REVISION		DATE: 06-Jul-2016	
ROSCOMMON EQUIPMENT CENTER P.O. BOX 68 ROSCOMMON, MICHIGAN 48653						SCALE:	
PROJECT NO.:	TITLE: VIC 52, 4" VIC TO 2" NPT ADAPTER					DWG. NO. 2280	SIZE: A

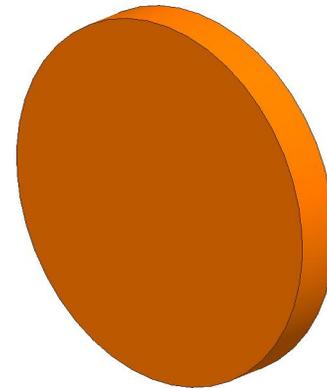
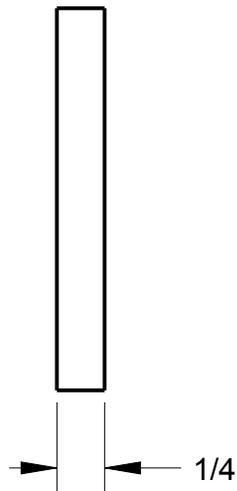


PURCHASED THROUGH: ETNA SUPPLY

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ANGULAR: + - 1 DEG.						APPROVED:	
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PROJECT NO.: REC 72	TITLE: 2" NPT TO VICTAULIC ADAPTER					SCALE:	
ROSCOMMON EQUIPMENT CENTER P.O. BOX 68 ROSCOMMON, MICHIGAN 48653							SIZE: B

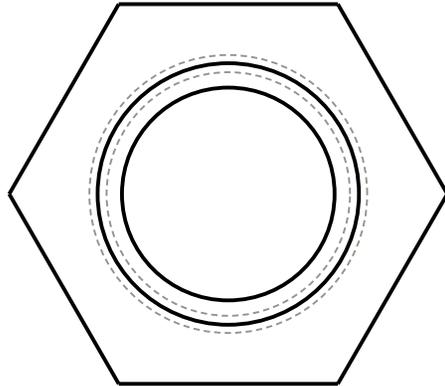


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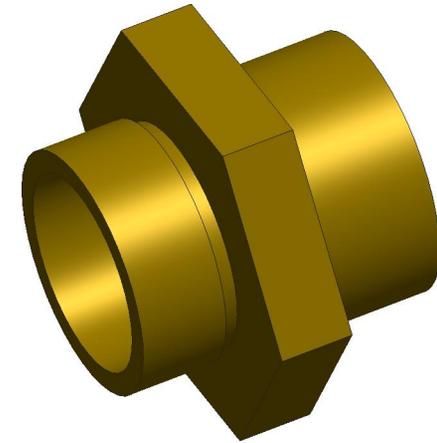
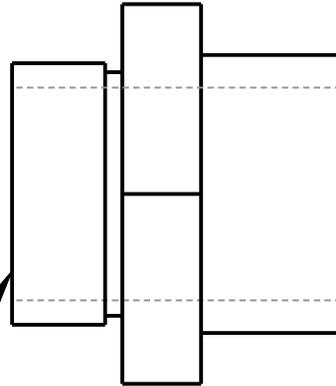


PURCHASED THROUGH: ETNA SUPPLY

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ANGULAR: + - 1 DEG.						APPROVED:	
DECIMAL: 1 PLACE + - 0.05 2 PLACE + - 0.01 3 PLACE + - 0.005	NO.	BY	DATE	REVISION		DATE: 06-Jul-2016	
ROSCOMMON EQUIPMENT CENTER P.O. BOX 68 ROSCOMMON, MICHIGAN 48653						SCALE:	
PROJECT NO.:	TITLE: VIC 60, 2" GRV CAP PAINTED STEEL					DWG. NO. 77907	SIZE: A



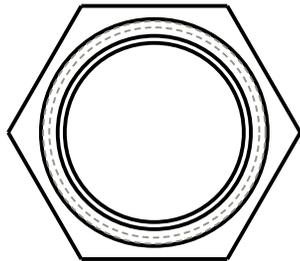
1.5" NH THREAD



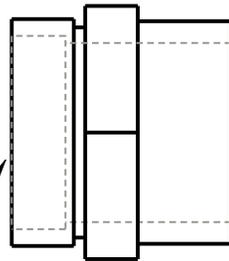
1.5" NPT THREAD

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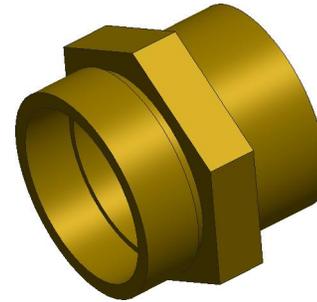
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ANGULAR: + - 1 DEG.						APPROVED:	
DECIMAL: 1 PLACE + - 0.05 2 PLACE + - 0.01 3 PLACE + - 0.005	NO.	BY	DATE	REVISION		DATE: 08-Jul-2016	
ROSCOMMON EQUIPMENT CENTER P.O. BOX 68 ROSCOMMON, MICHIGAN 48653						SCALE:	
PROJECT NO.:	TITLE: BRASS 1.5" NH TO 1.5" NPT ADAPTER DOUBLE MALE					DWG. NO. DMH1515F	SIZE: A



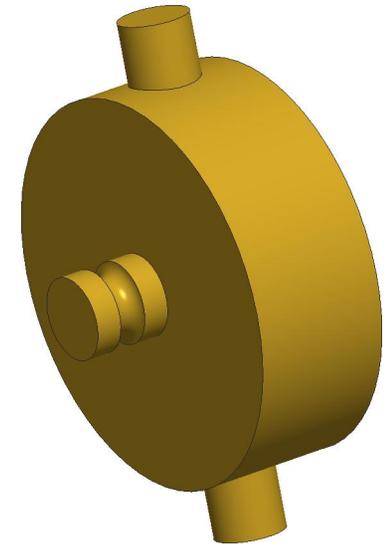
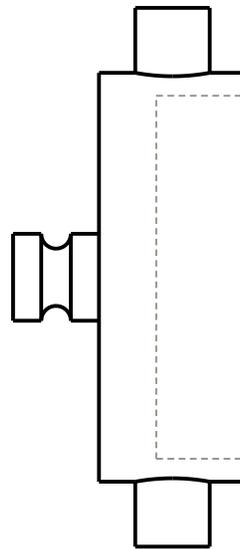
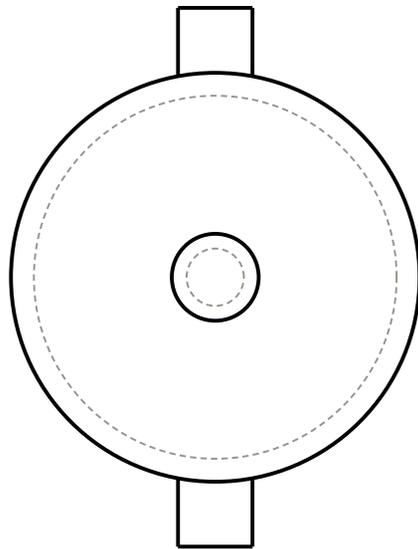
2.5" NH



2.5" NPT



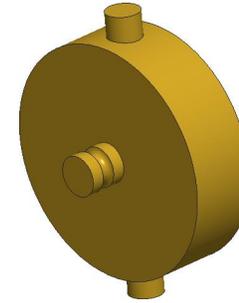
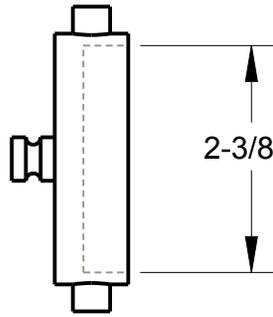
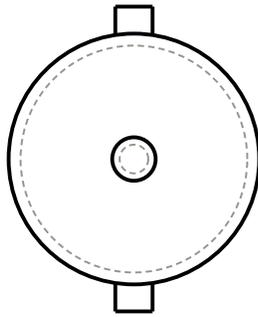
STD. TOL.						DRAWN:	
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DECIMAL: 1 PLACE + - 0.05 2 PLACE + - 0.01 3 PLACE + - 0.005	NO.	BY	DATE	REVISION		DATE: 06-Jul-2016	
ROSCOMMON EQUIPMENT CENTER P.O. BOX 68 ROSCOMMON, MICHIGAN 48653						SCALE:	
PROJECT NO.:	TITLE: 2.5" NPT TO 2.5" NH ADAPTER					DWG. NO. DMH2525F	SIZE: A



** CHAIN NOT SHOWN

PURCHASED THROUGH: FIREHOSE DIRECT

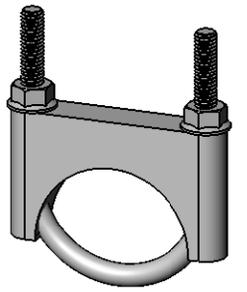
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FRACTIONAL 0 TO 6 IN + - 1/32 6 IN AND UP + - 1/16						<i>DESIGNED:</i>	
ANGULAR: + - 1 DEG.						<i>APPROVED:</i>	
DECIMAL: 1 PLACE + - 0.05 2 PLACE + - 0.01 3 PLACE + - 0.005	<small>NO.</small>	<small>BY</small>	<small>DATE</small>	<small>REVISION</small>		<i>DATE:</i> 08-Jul-2016	
	ROSCOMMON EQUIPMENT CENTER P.O. BOX 68 ROSCOMMON, MICHIGAN 48653					<i>SCALE:</i>	
PROJECT NO.:	TITLE: BRASS PIN LUG 1.5" NH CAP W/CHAIN					<small>DWG. NO.</small> FC150F	<small>SIZE:</small> A

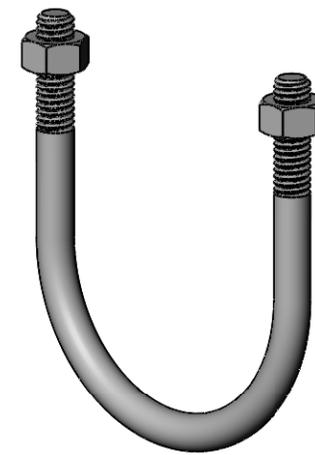
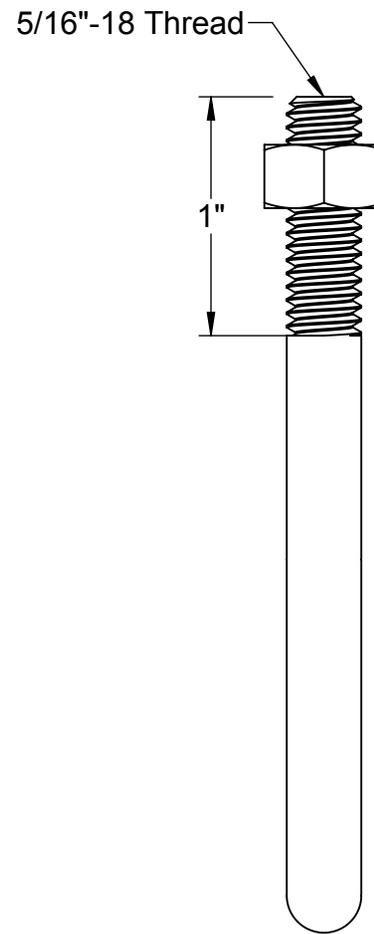
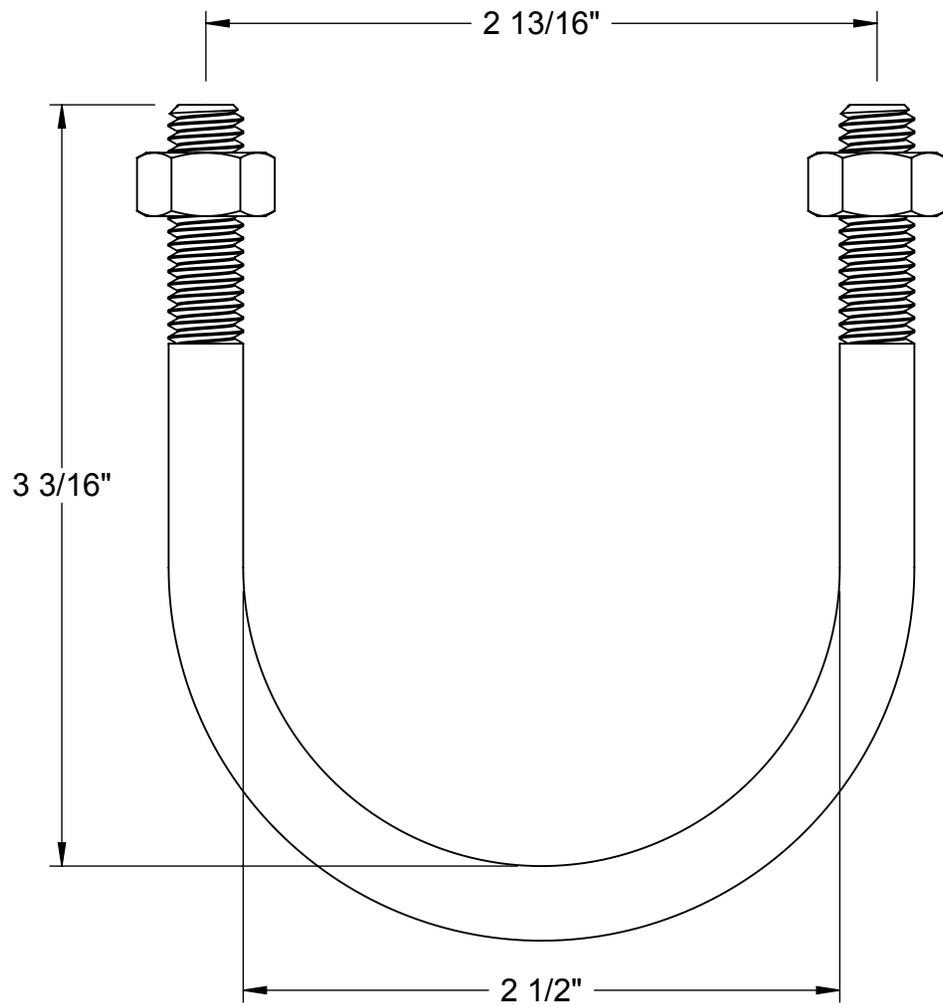


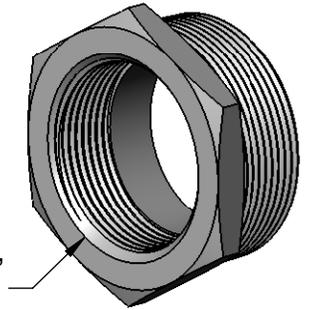
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PURCHASED THROUGH: FIREHOSE DIRECT

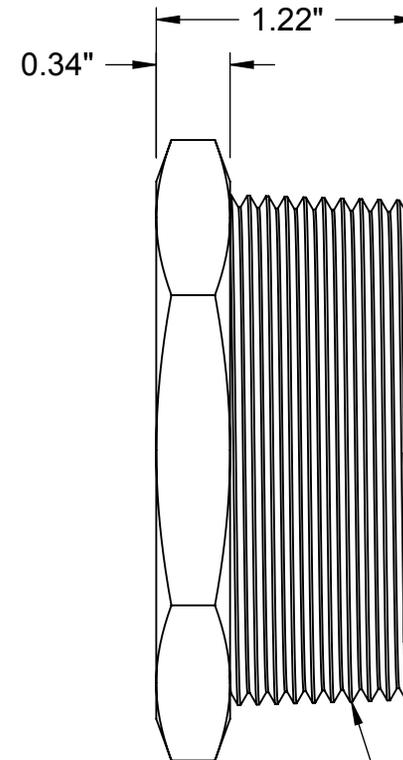
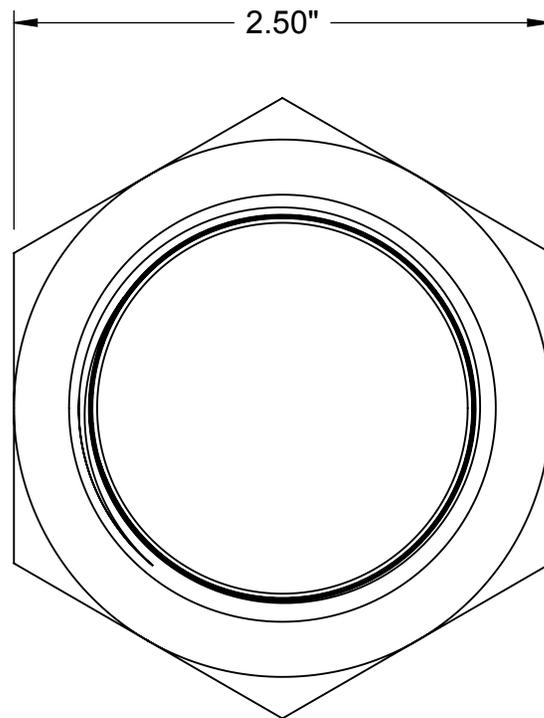
STD. TOL.						DRAWN:	
FRACTIONAL 0 TO 6 IN + - 1/32 6 IN AND UP + - 1/16						DESIGNED:	
ANGULAR: + - 1 DEG.						APPROVED:	
DECIMAL: 1 PLACE + - 0.05 2 PLACE + - 0.01 3 PLACE + - 0.005	NO.	BY	DATE	REVISION		DATE: 06-Jul-2016	
ROSCOMMON EQUIPMENT CENTER P.O. BOX 68 ROSCOMMON, MICHIGAN 48653						SCALE:	
PROJECT NO.:	TITLE: 2.5" NH, CAP AND CHAIN					DWG. NO. FC250F	SIZE: A







1 1/2 NPT Pipe Size, 11 1/2 Threads Per Inch,
0.72" Thread Engagement



2 NPT Pipe Size, 11 1/2 Threads Per Inch,
0.76" Thread Engagement

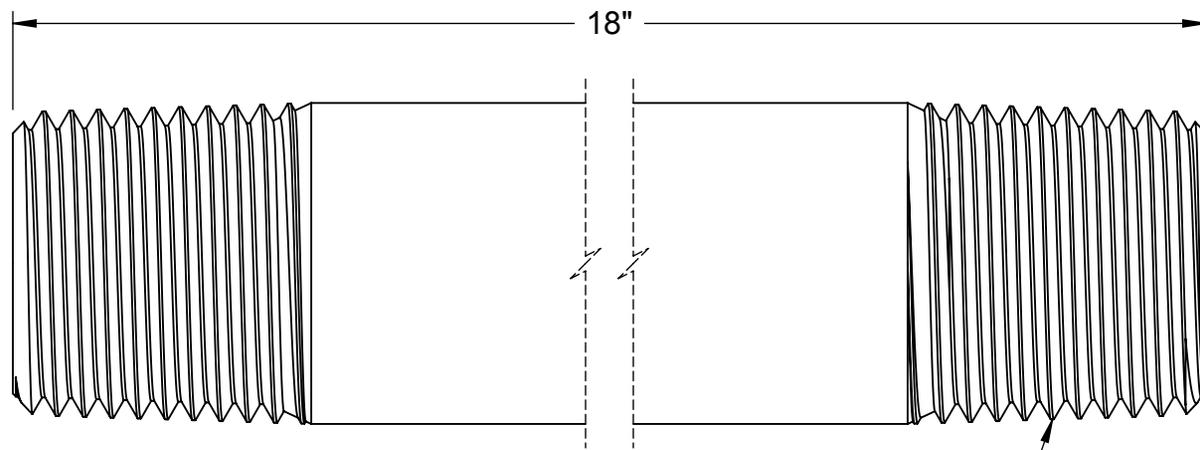
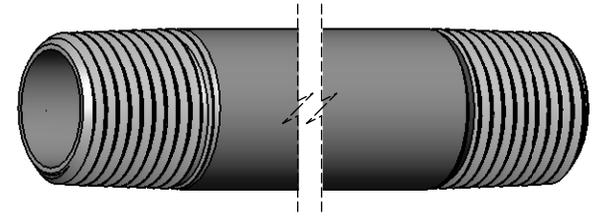
McMASTER-CARR CAD

PART
NUMBER

4429K427

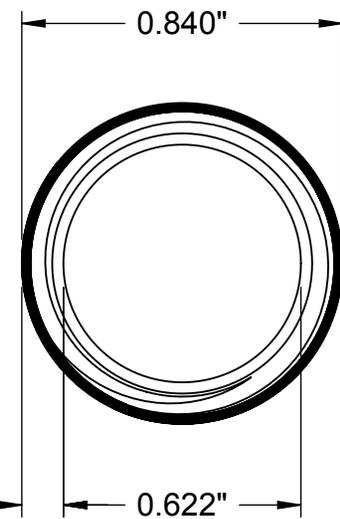
<http://www.mcmaster.com>
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Brass



1/2 NPT Pipe Size, 14 Threads Per Inch,
0.53" Thread Engagement

0.109"
Wall Thickness



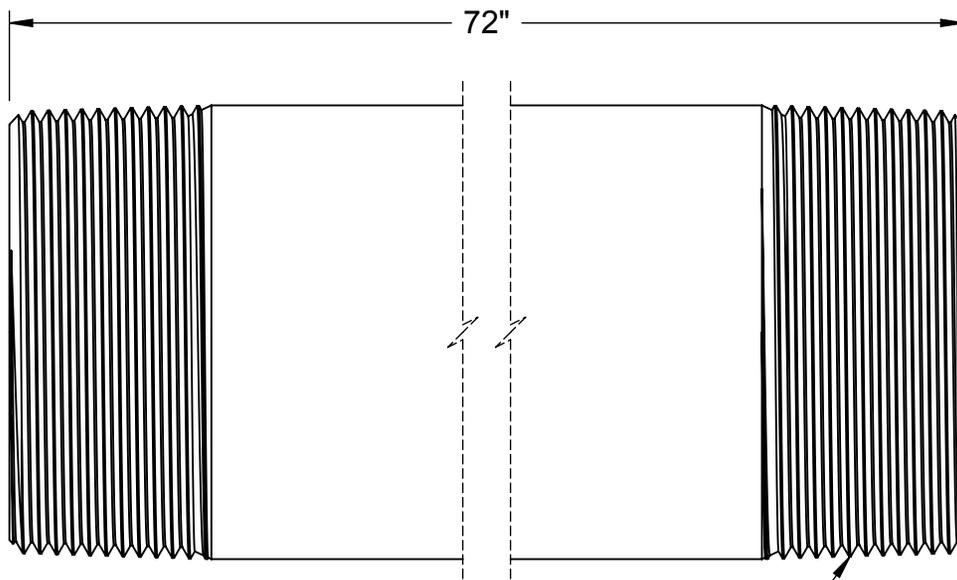
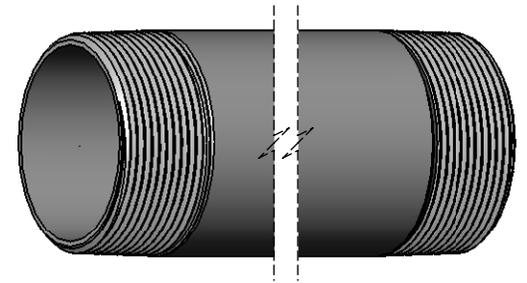
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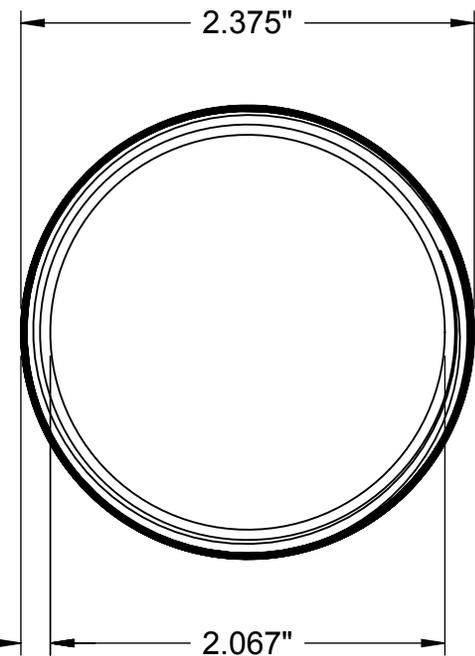
<http://www.mcmaster.com>
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Galvanized Steel



2 NPT Pipe Size, 11 1/2 Threads Per Inch,
0.76" Thread Engagement

0.154"
Wall Thickness



McMASTER-CARR CAD

PART
NUMBER

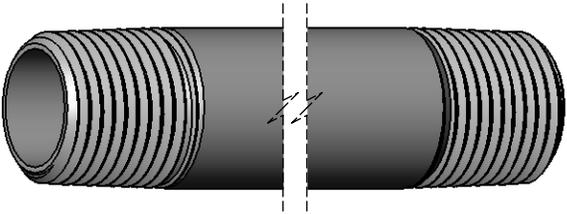
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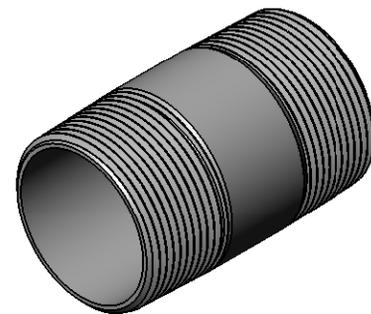
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© 2011 McMaster-Carr Supply Company

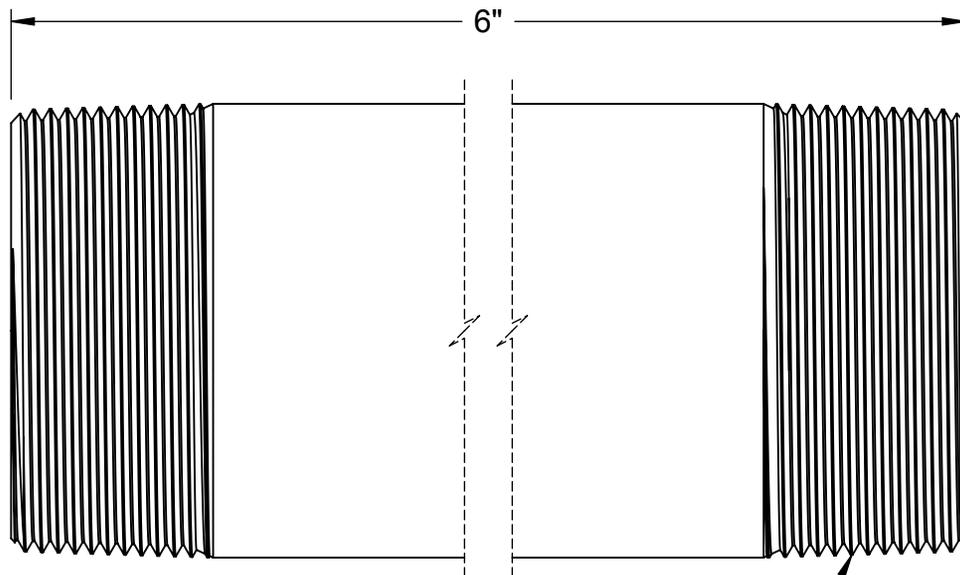
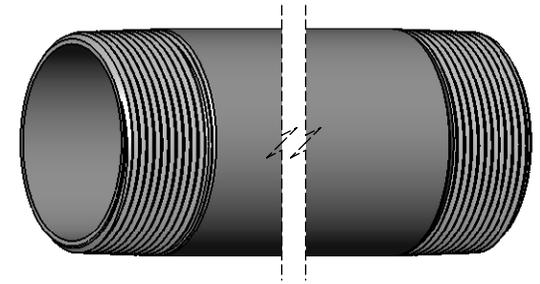
Galvanized Steel
Pipe

Information in this drawing is provided for reference only.



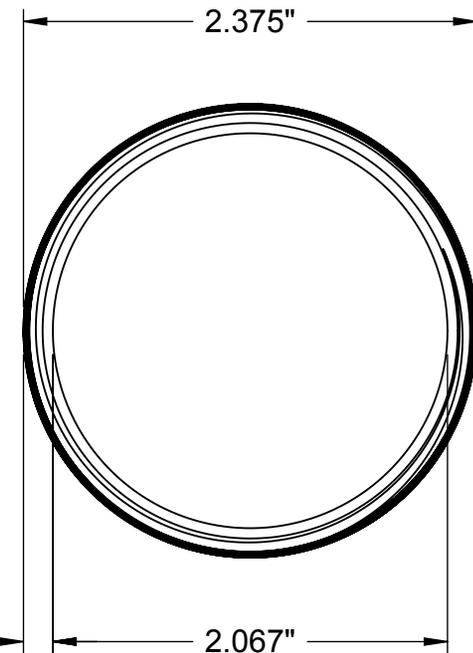






2 NPT Pipe Size, 11 1/2 Threads Per Inch,
0.76" Thread Engagement

0.154"
Wall Thickness



McMASTER-CARR CAD

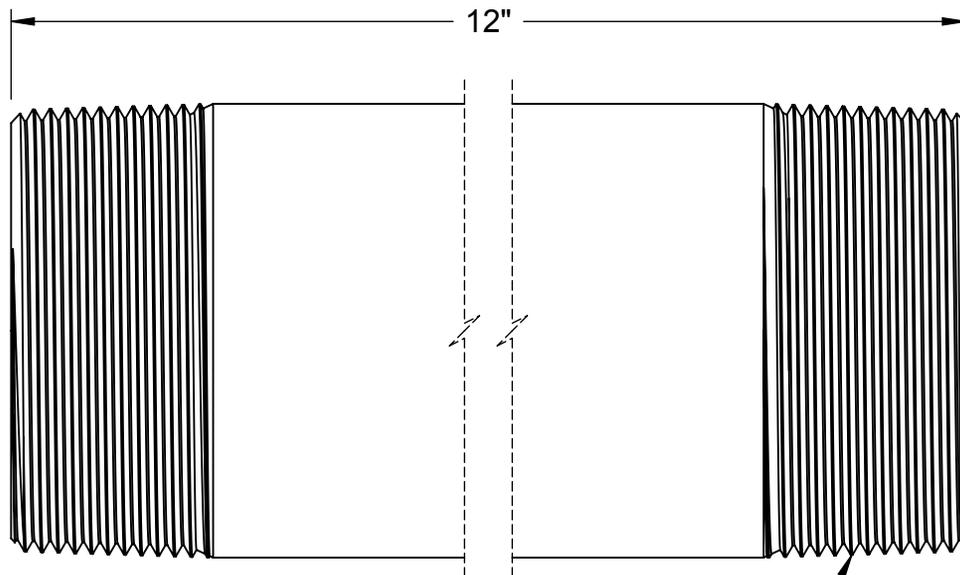
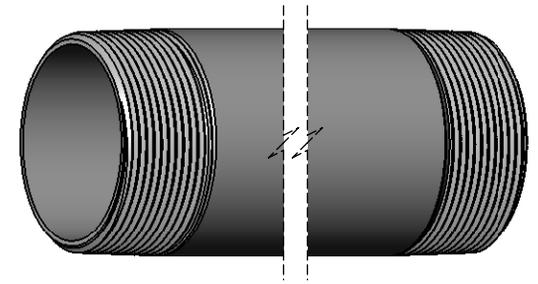
PART
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<http://www.mcmaster.com>
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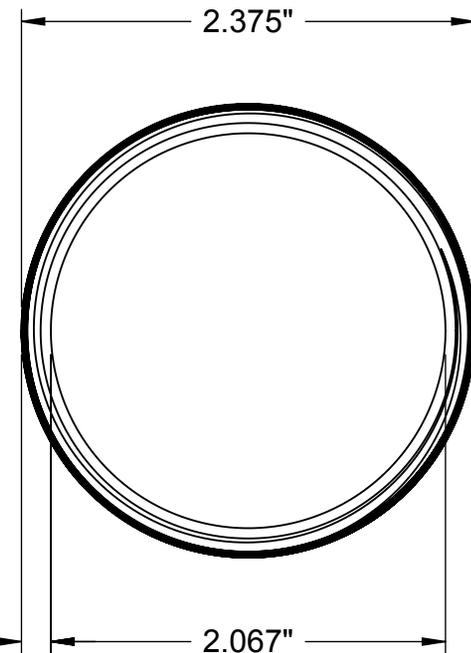
Galvanized Steel
Pipe Nipple

Information in this drawing is provided for reference only.



2 NPT Pipe Size, 11 1/2 Threads Per Inch,
0.76" Thread Engagement

0.154"
Wall Thickness



McMASTER-CARR CAD

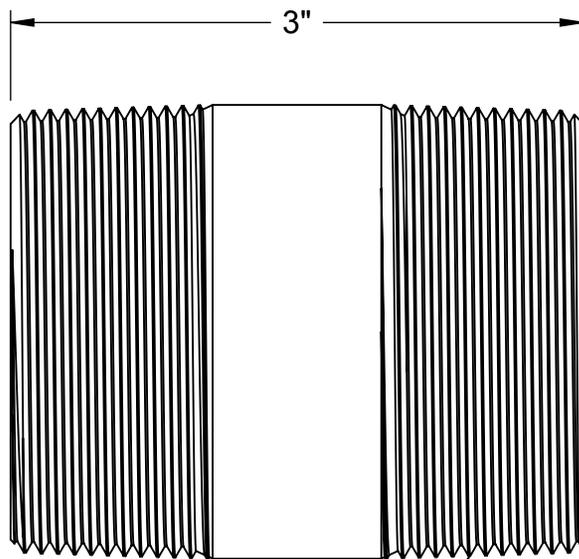
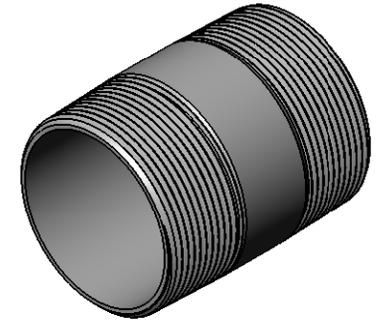
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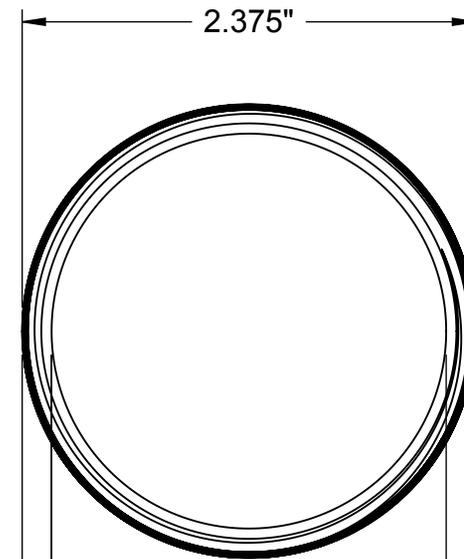
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Galvanized Steel
Pipe Nipple

Information in this drawing is provided for reference only.



2 NPT Pipe Size, 11 1/2 Threads Per Inch,
0.76" Thread Engagement



0.154"
Wall Thickness

McMASTER-CARR CAD

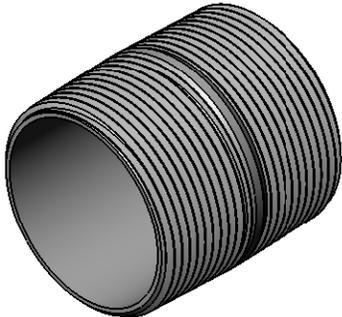
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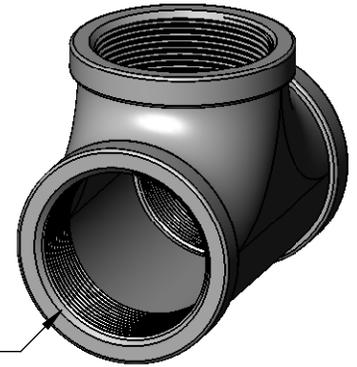
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PART
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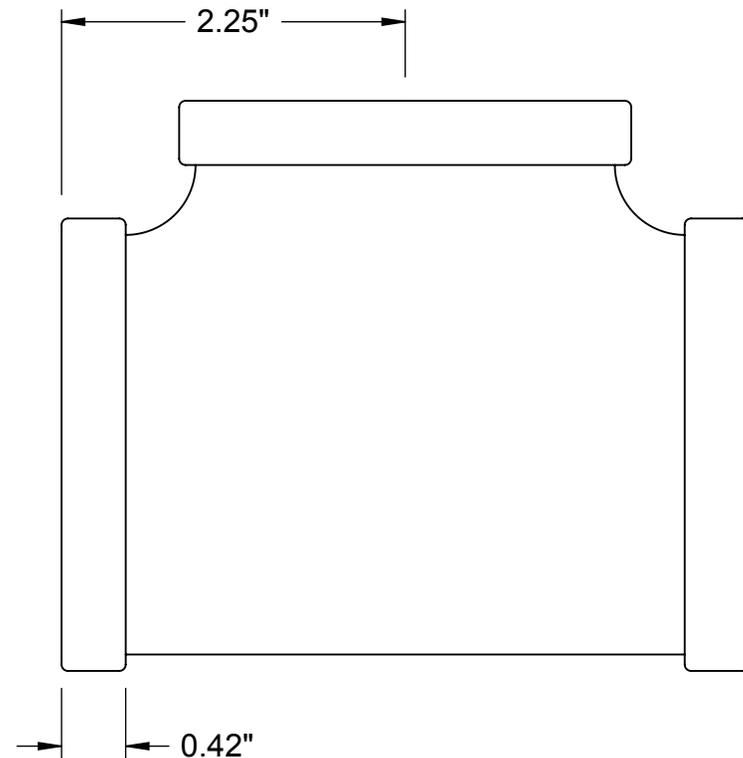
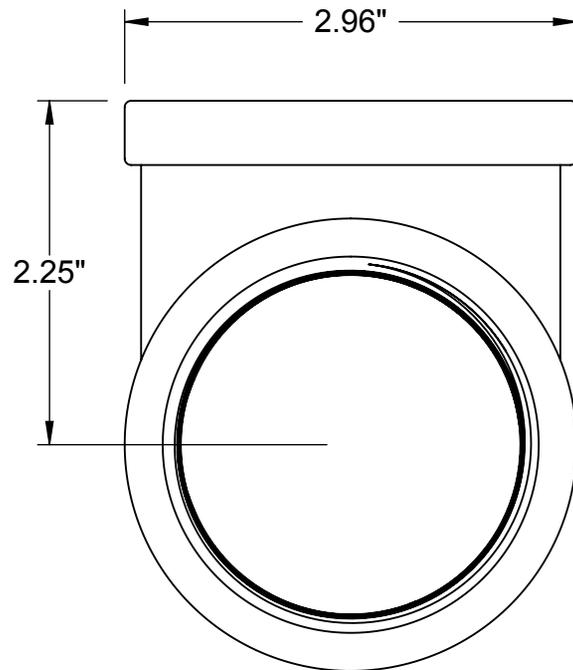
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Galvanized Steel
Pipe Nipple





2 NPT Pipe Size, 11 1/2 Threads Per Inch,
0.76" Thread Engagement



McMASTER-CARR CAD

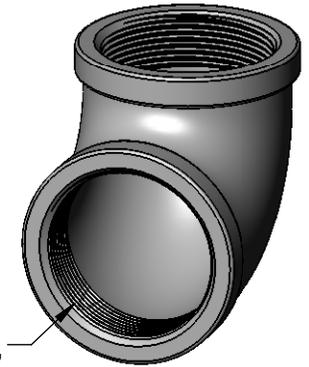
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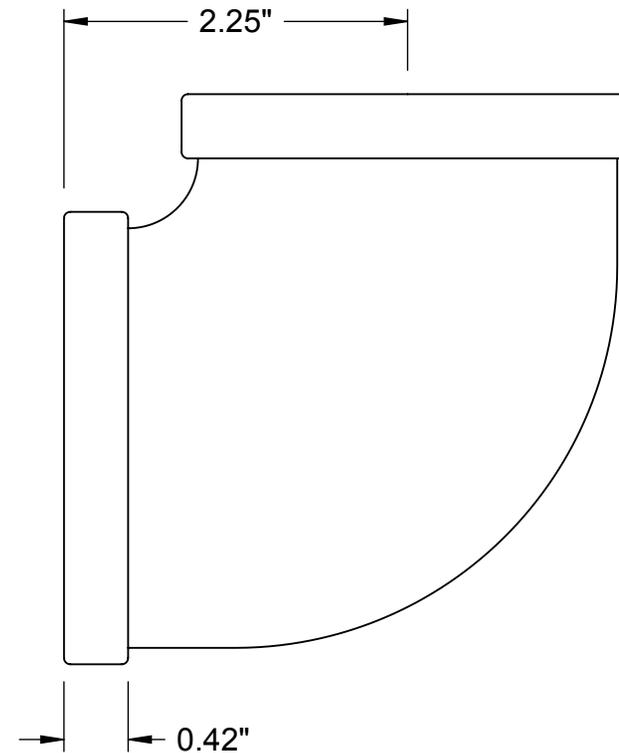
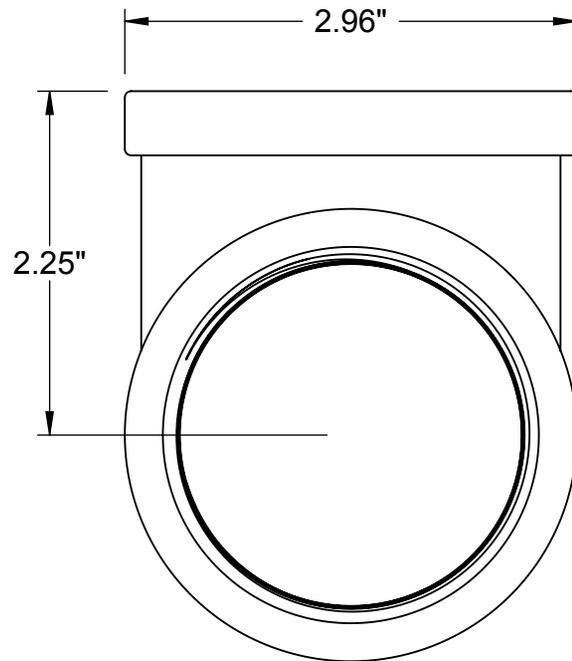
<http://www.mcmaster.com>
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Galvanized Iron
Tee

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2 NPT Pipe Size, 11 1/2 Threads Per Inch,
0.76" Thread Engagement



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PART
NUMBER

4638K138

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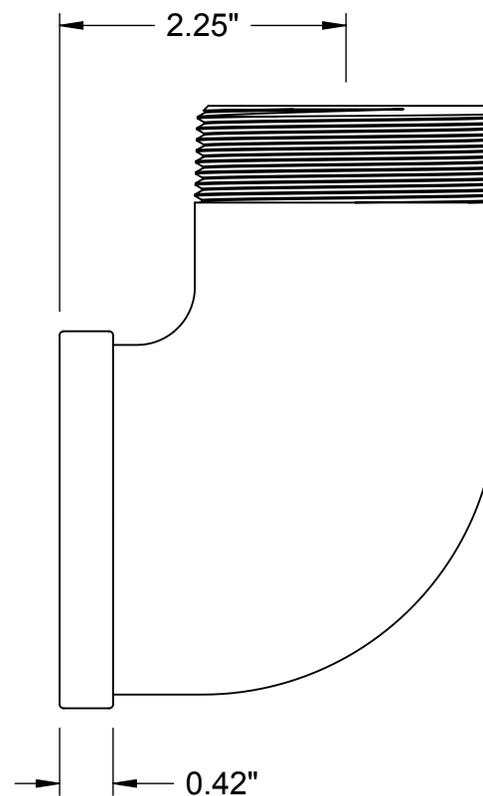
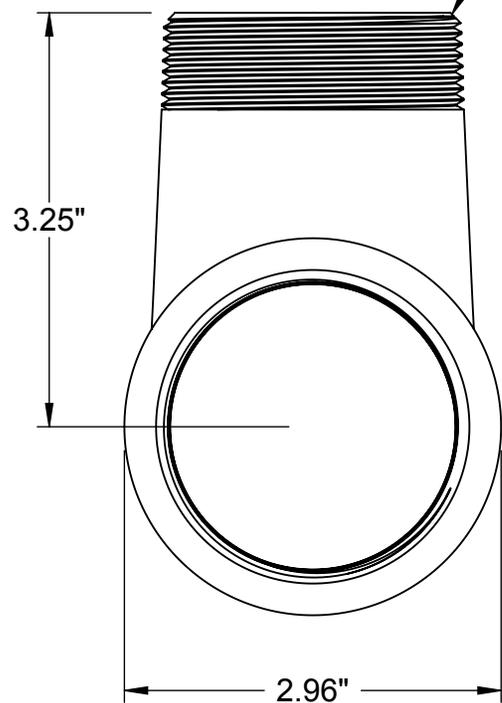
Galvanized Iron
90° Elbow

Information in this drawing is provided for reference only.



2 NPT Pipe Size, 11 1/2 Threads Per Inch,
0.76" Thread Engagement

2 NPT Pipe Size, 11 1/2 Threads Per Inch,
0.76" Thread Engagement



McMASTER-CARR CAD

PART
NUMBER

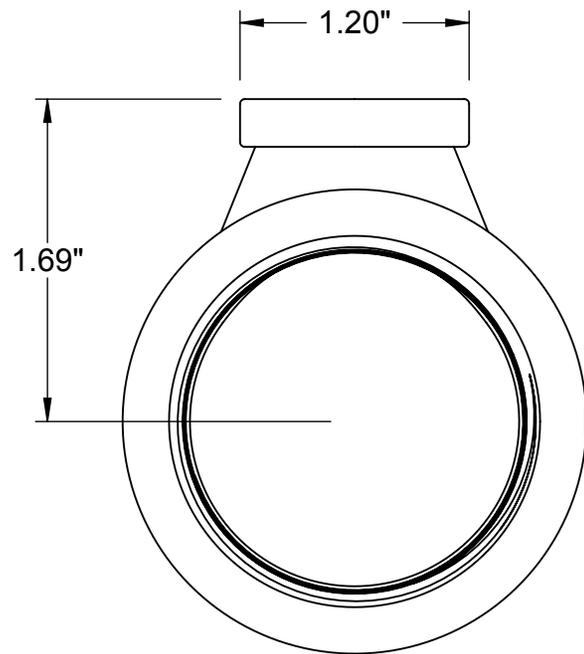
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<http://www.mcmaster.com>
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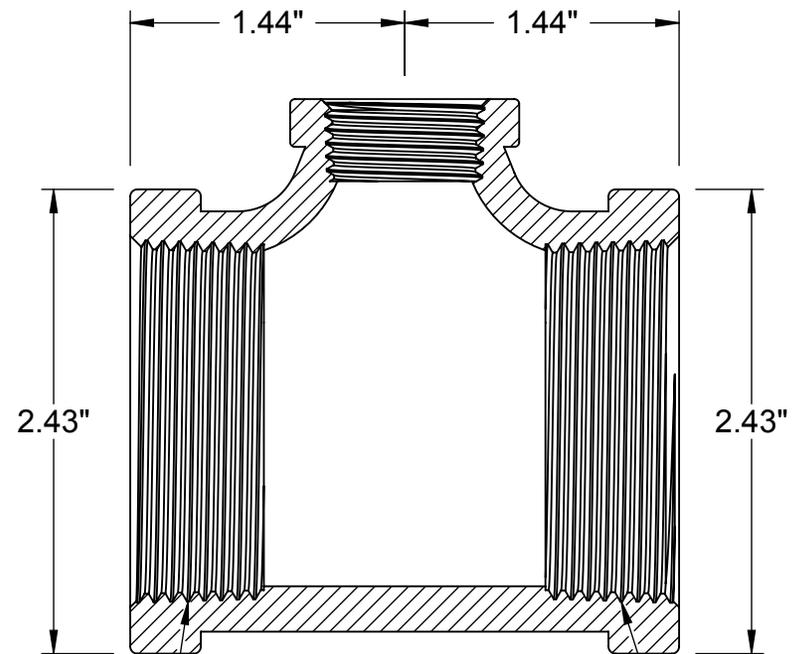
Galvanized Iron
Female x Male 90° Elbow

Information in this drawing is provided for reference only.

1/2 NPT Pipe Size, 14 Threads Per Inch,
0.53" Thread Engagement



1 1/2 NPT Pipe Size, 11 1/2 Threads Per Inch,
0.72" Thread Engagement



1 1/2 NPT Pipe Size, 11 1/2 Threads Per Inch,
0.72" Thread Engagement

McMASTER-CARR CAD

PART
NUMBER

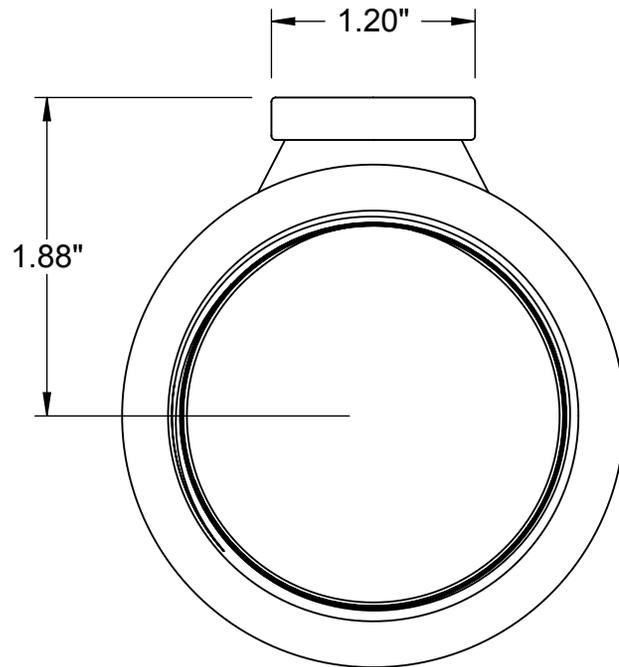
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<http://www.mcmaster.com>
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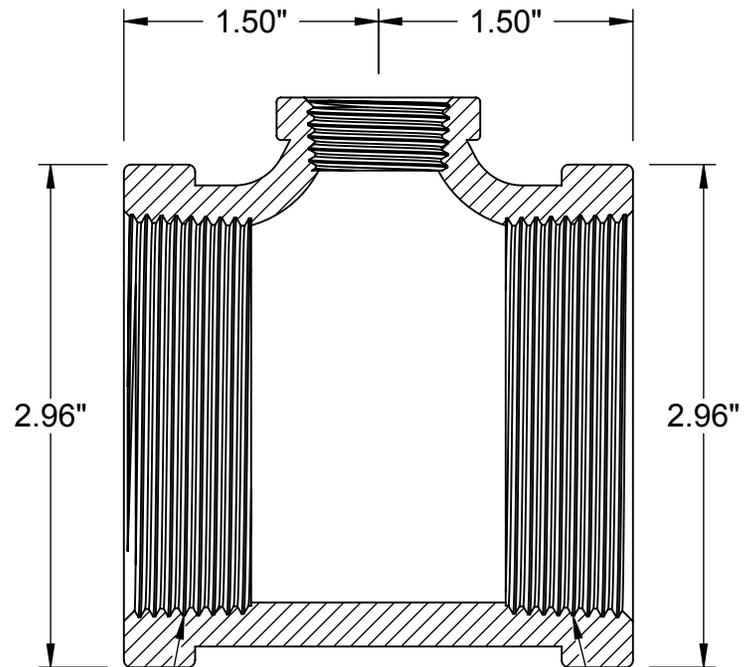
Information in this drawing is provided for reference only.

Galvanized Iron
Inline Reducing Tee

1/2 NPT Pipe Size, 14 Threads Per Inch,
0.53" Thread Engagement



2 NPT Pipe Size, 11 1/2 Threads Per Inch,
0.76" Thread Engagement



2 NPT Pipe Size, 11 1/2 Threads Per Inch,
0.76" Thread Engagement

McMASTER-CARR CAD

PART
NUMBER

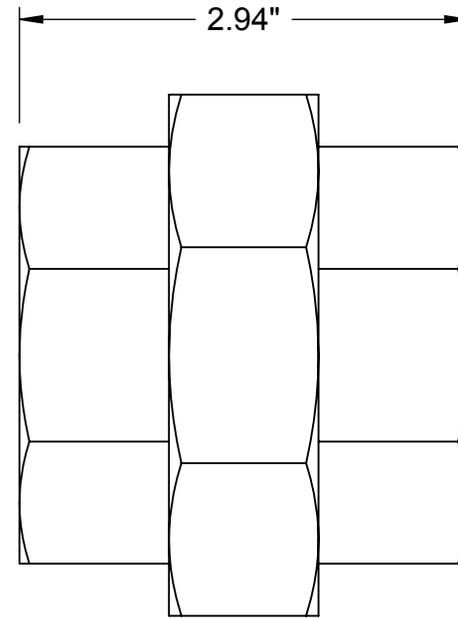
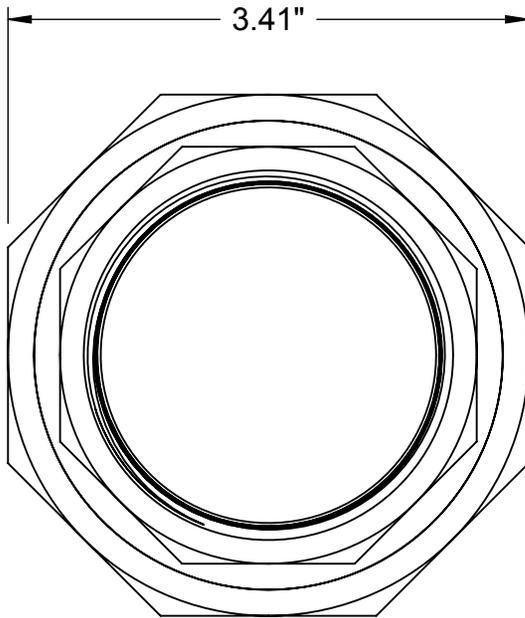
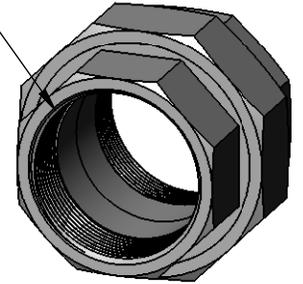
4638K276

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Information in this drawing is provided for reference only.

Galvanized Iron
Inline Reducing Tee

2 NPT Pipe Size, 11 1/2 Threads Per Inch,
0.76" Thread Engagement



McMASTER-CARR CAD

PART
NUMBER

4638K738

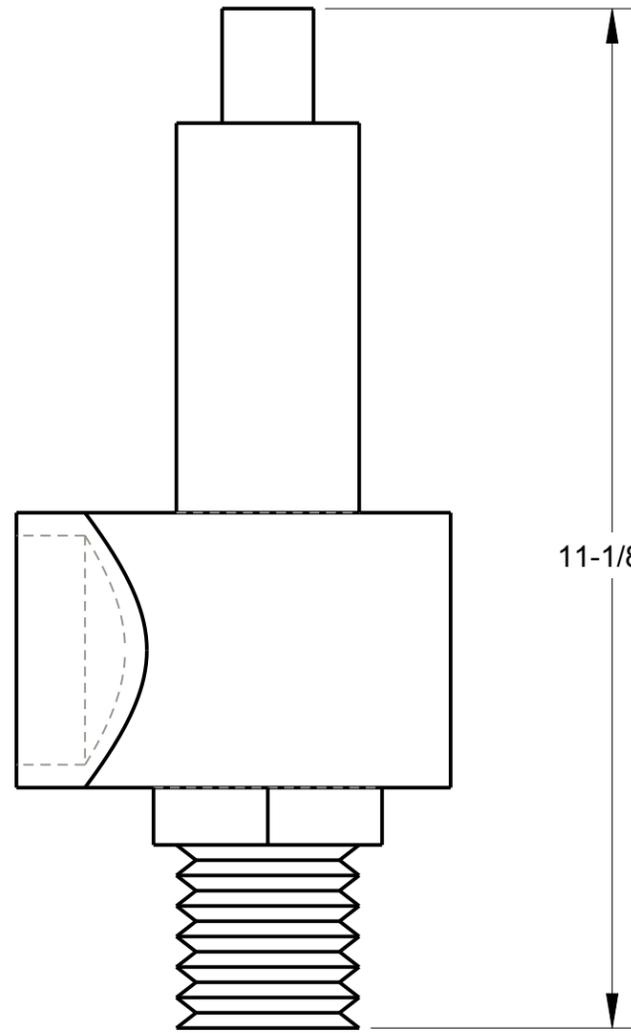
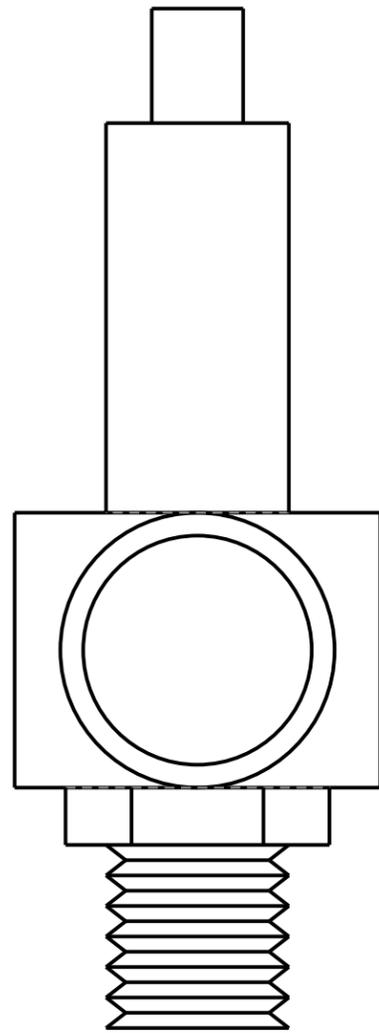
<http://www.mcmaster.com>
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Galvanized Iron
Union

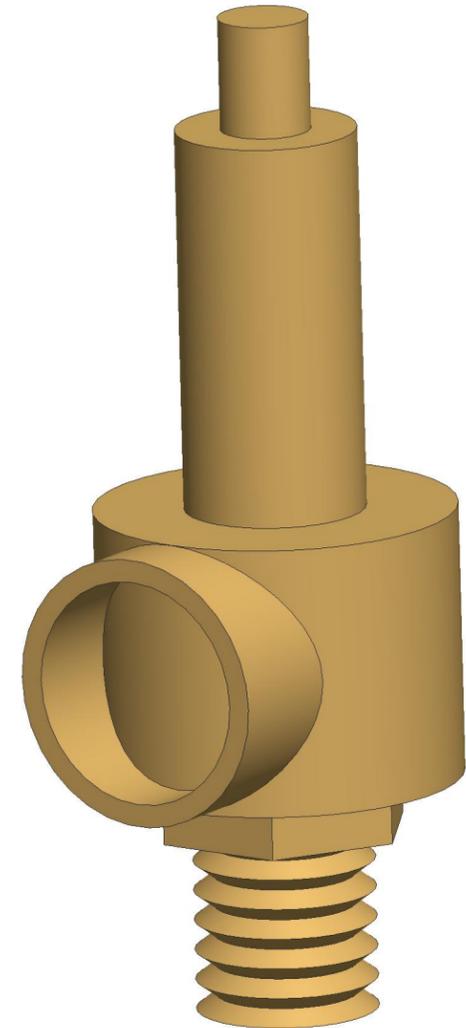
Information in this drawing is provided for reference only.

3/4 NPT Pipe Size, 14 Threads Per Inch,
0.55" Thread Engagement





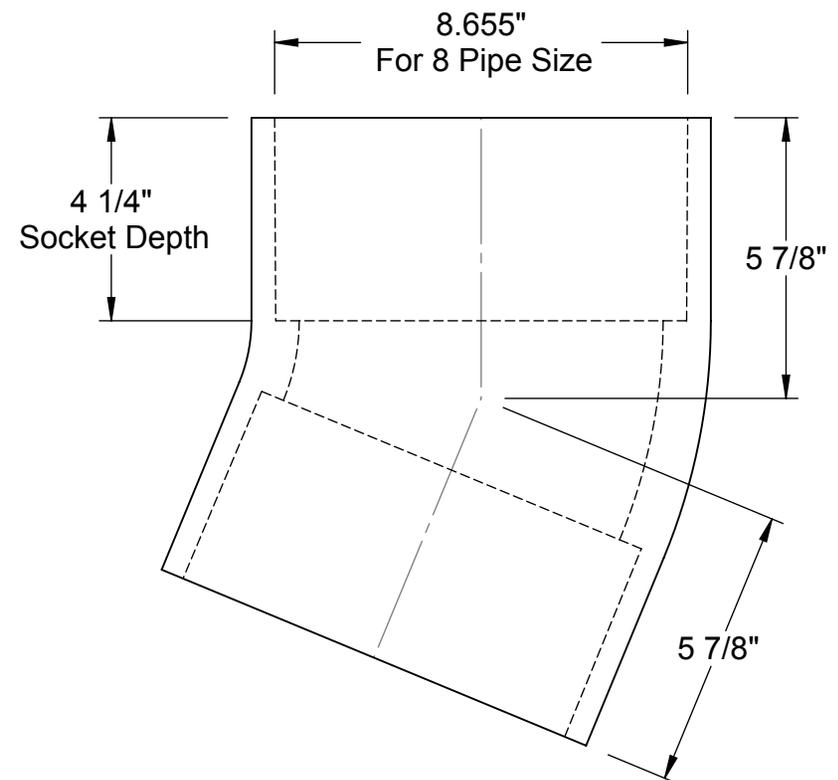
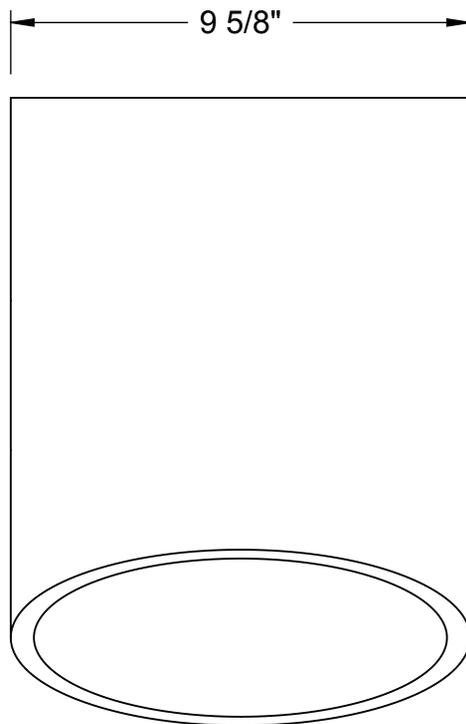
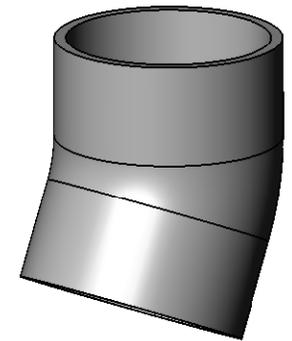
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PURCHASED THROUGH: MCMaster CARR

STD. TOL.						DRAWN:	
FRACTIONAL: 0 TO 6 IN + - 1/32 6 IN AND UP + - 1/16						DESIGNED:	
ANGULAR: + - 1 DEG.						APPROVED:	
DECIMAL: 1 PLACE + - 0.05 2 PLACE + - 0.01 3 PLACE + - 0.005	NO.	BY	DATE	REVISION		DATE: 06-Jul-2016	
PROJECT NO.:	TITLE: EXTENDED LIFE ADJUSTABLE RELIEF VALVE, 131-150 PSI					SCALE:	
							SIZE: B

ROSCOMMON EQUIPMENT CENTER
P.O. BOX 68 ROSCOMMON, MICHIGAN 48653



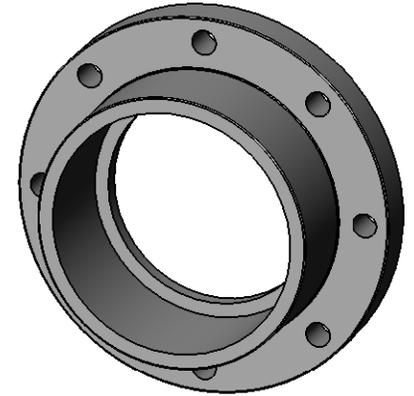
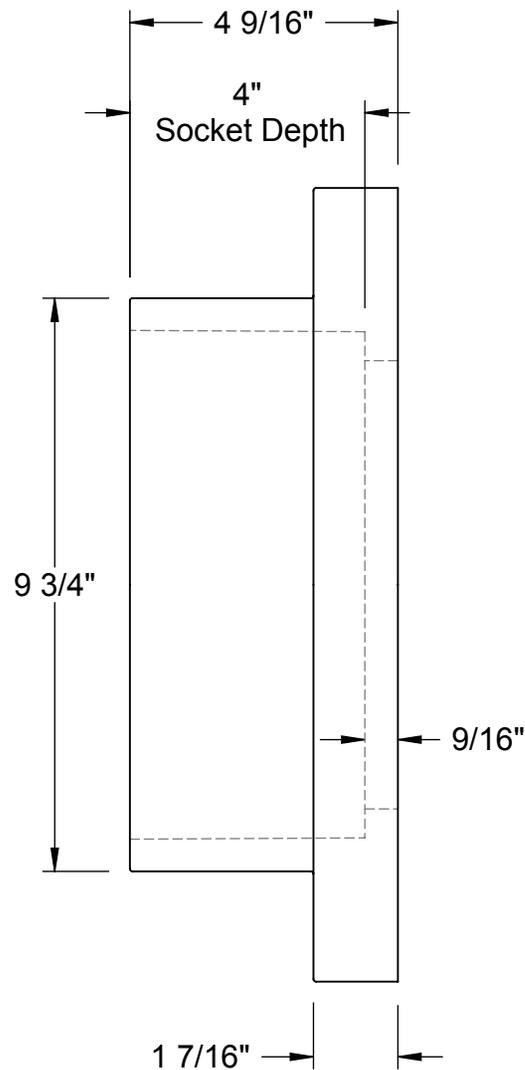
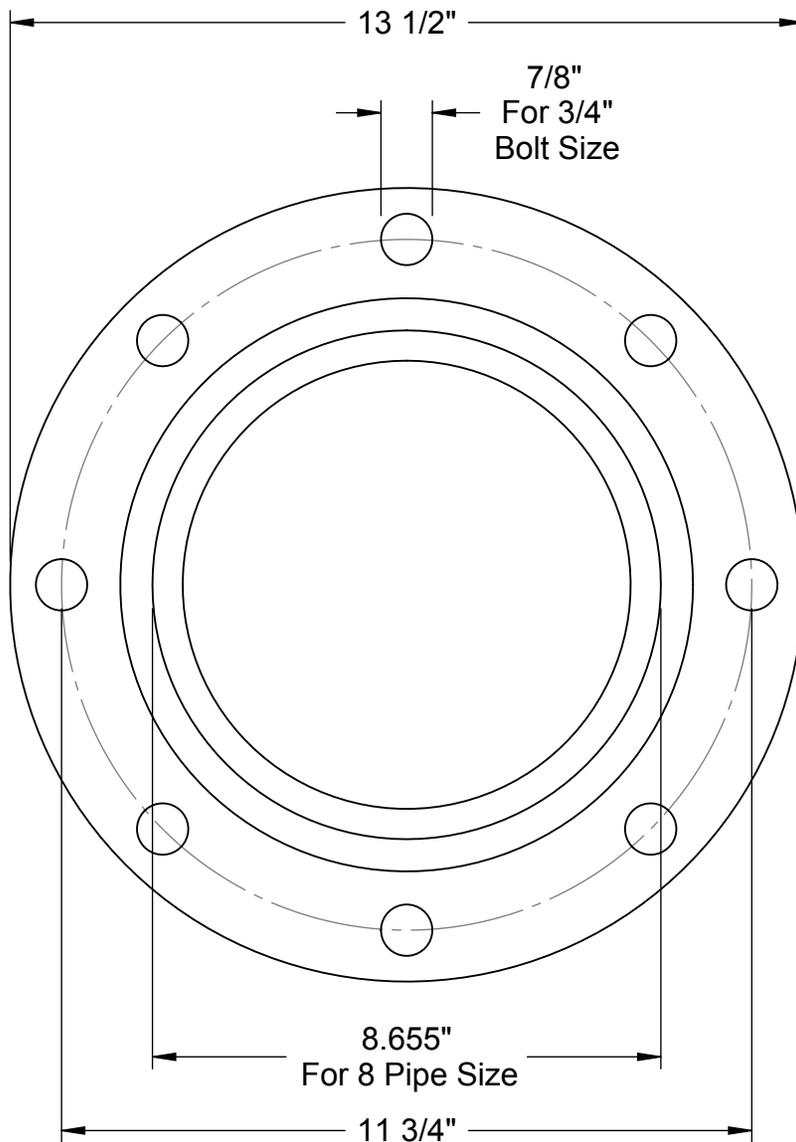
McMASTER-CARR CAD

PART NUMBER **4881K172**

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Thick-Wall Dark Gray PVC
Unthreaded 22 1/2° Elbow

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McMASTER-CARR CAD

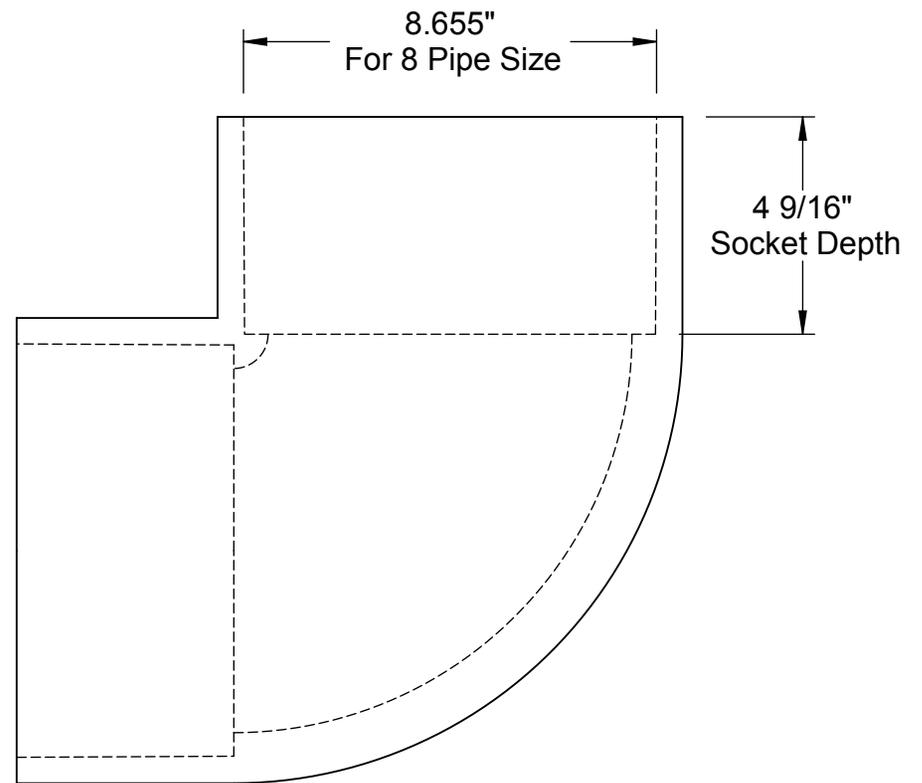
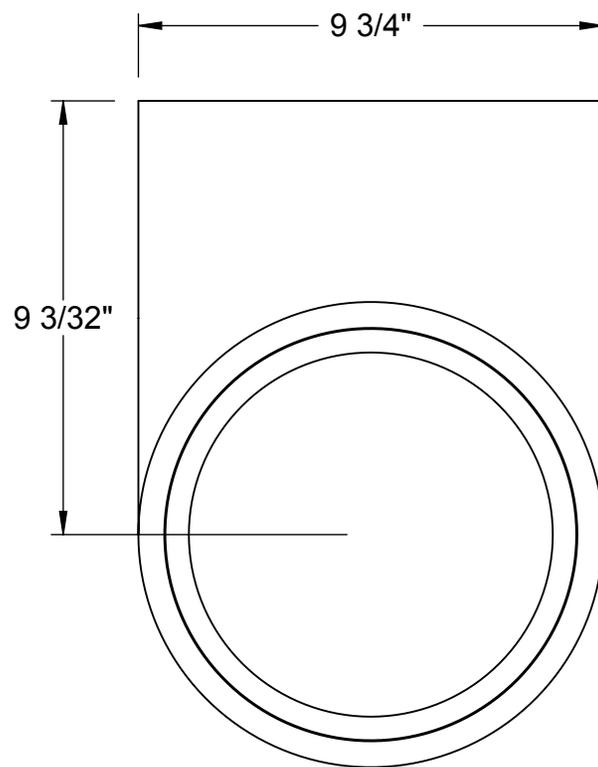
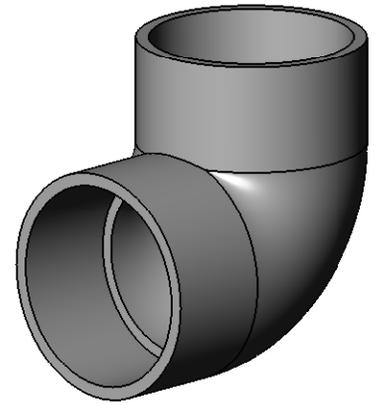
PART
NUMBER

4881K224

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Thick-Wall Dark Gray PVC Unthreaded
Socket End Class 150 Flange

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McMASTER-CARR CAD

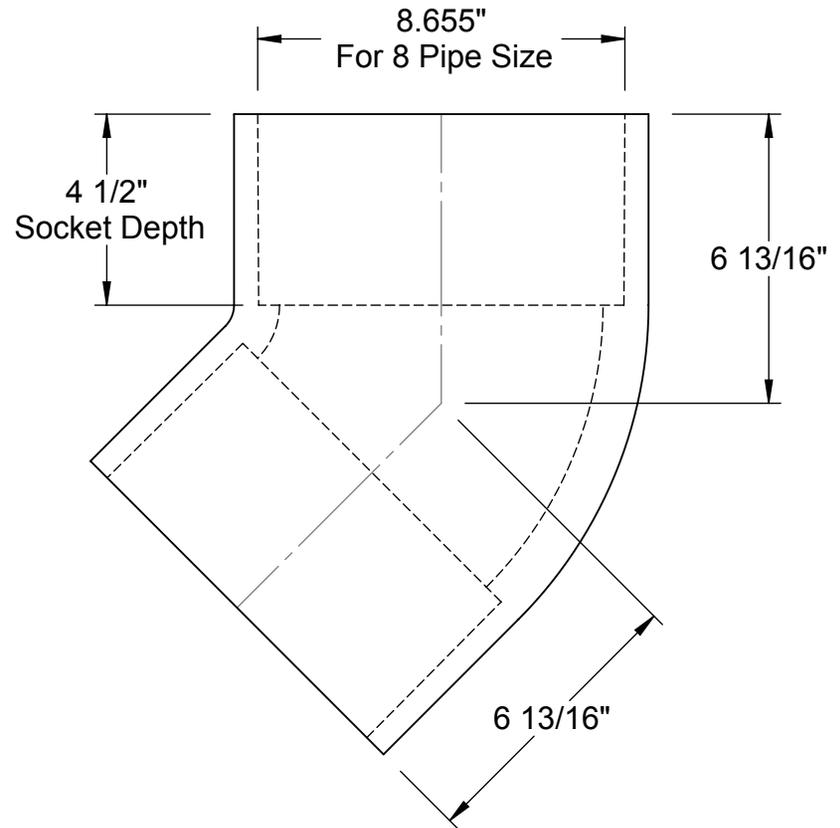
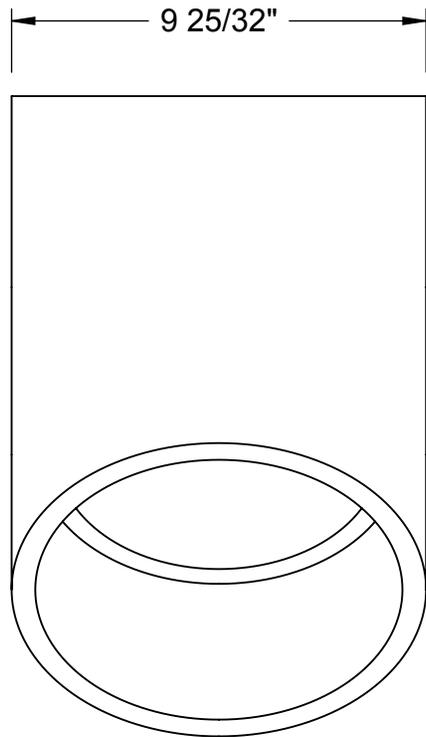
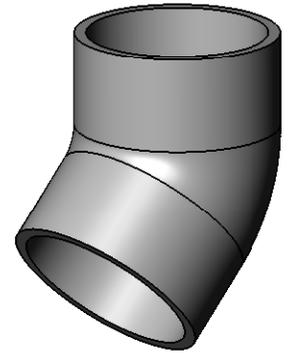
PART
NUMBER

4881K283

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Thick-Wall Dark Gray PVC
Unthreaded 90° Elbow

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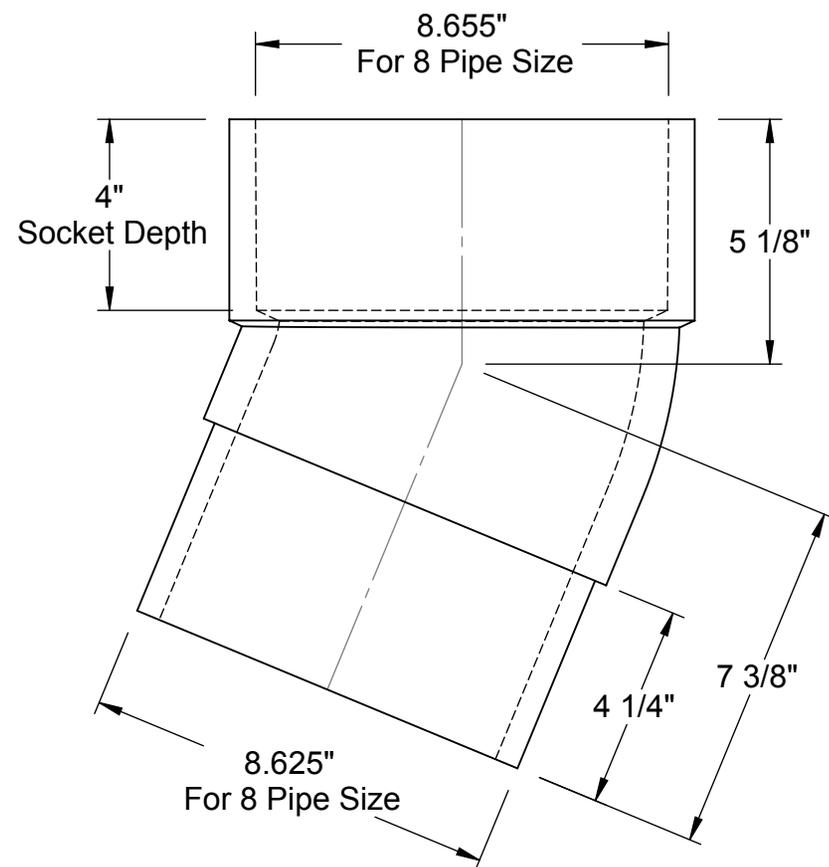
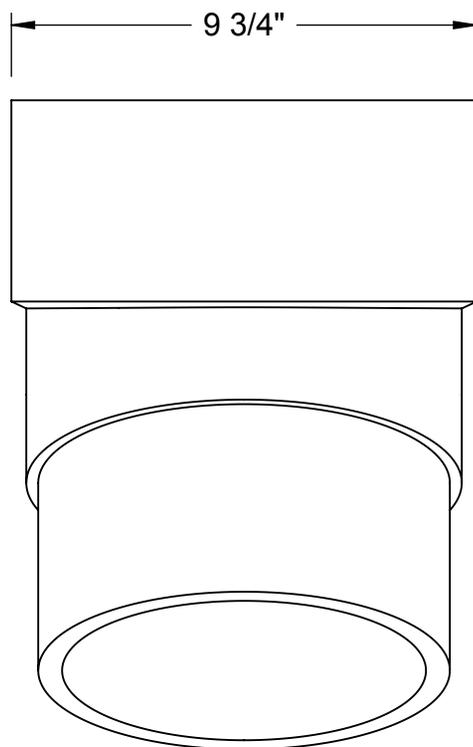
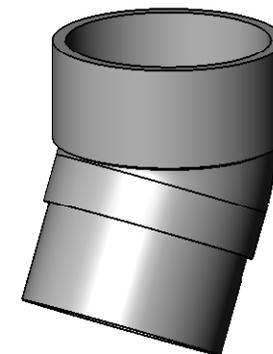
PART
NUMBER

4881K313

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Thick-Wall Dark Gray PVC
Unthreaded 45° Elbow

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McMASTER-CARR CAD

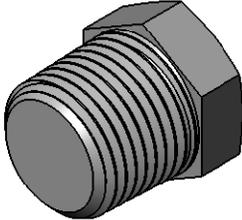
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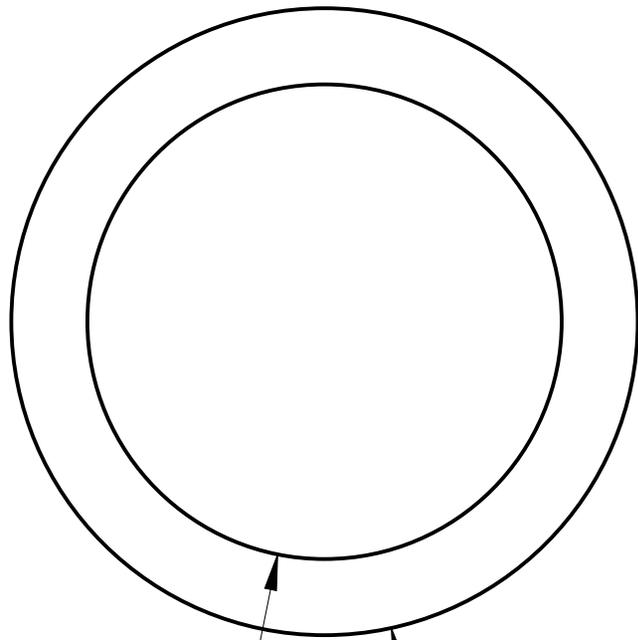
4881K783

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Thick-Wall Dark Gray PVC Unthreaded
Male x Female 22 1/2° Elbow

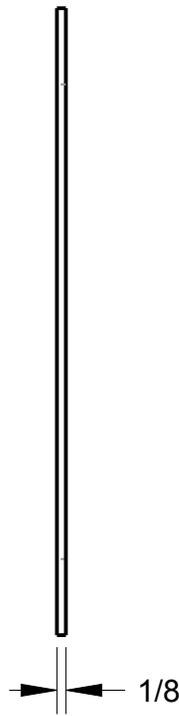
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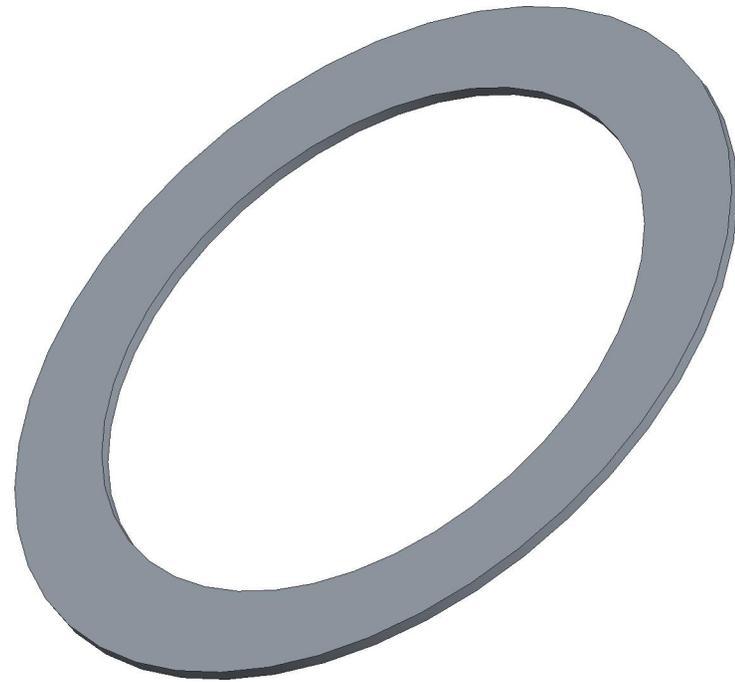


∅ 6-5/8

∅ 8-3/4

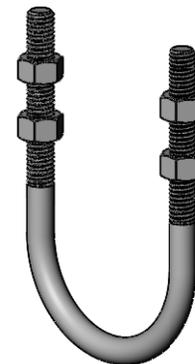
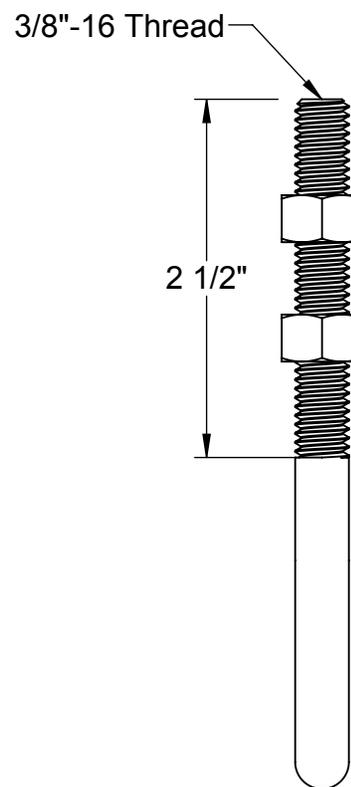
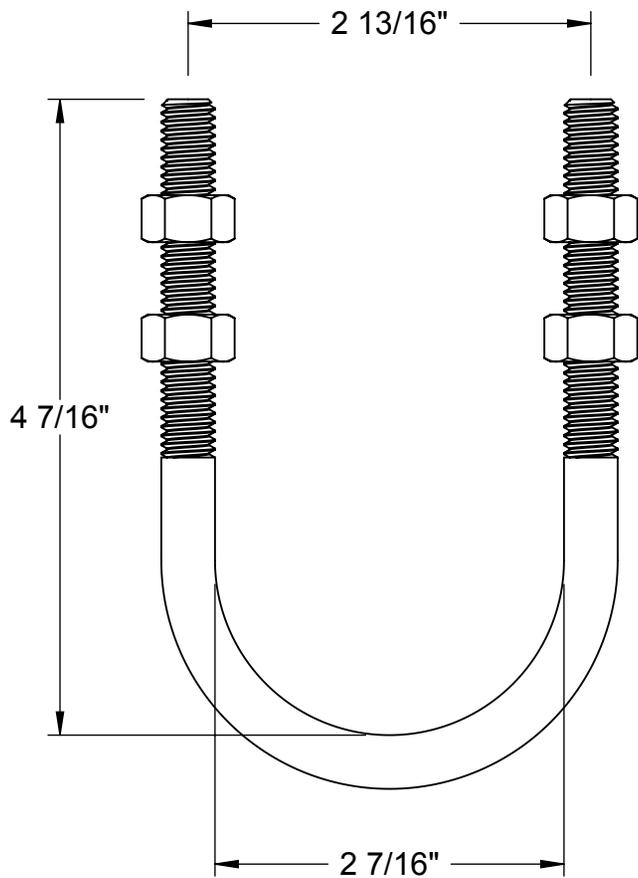


1/8



PURCHASED FROM: MCMASTER CARR

STD. TOL.						DRAWN:	
FRACTIONAL 0 TO 6 IN + - 1/32 6 IN AND UP + - 1/16						DESIGNED:	
ANGULAR: + - 1 DEG.						APPROVED:	
DECIMAL: 1 PLACE + - 0.05 2 PLACE + - 0.01 3 PLACE + - 0.005	NO.	BY	DATE	REVISION		DATE: 06-Jul-2016	
ROSCOMMON EQUIPMENT CENTER P.O. BOX 68 ROSCOMMON, MICHIGAN 48653						SCALE:	DWG. NO. 8516T143
PROJECT NO.:	TITLE: BUNA-N FLANGE GASKET						



McMASTER-CARR CAD

PART
NUMBER

8875T859

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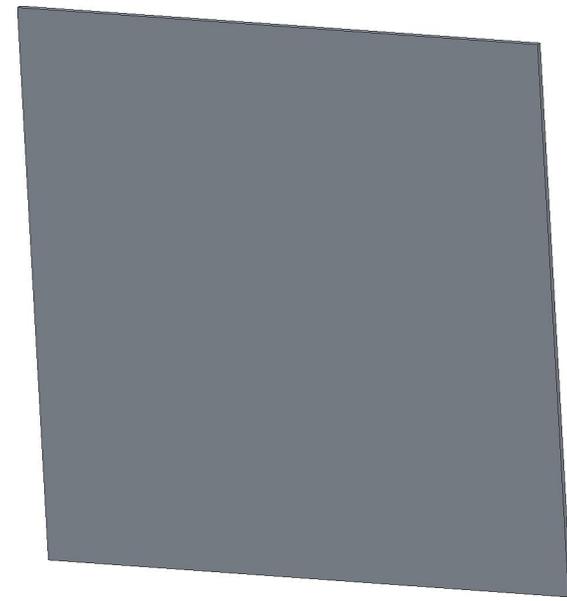
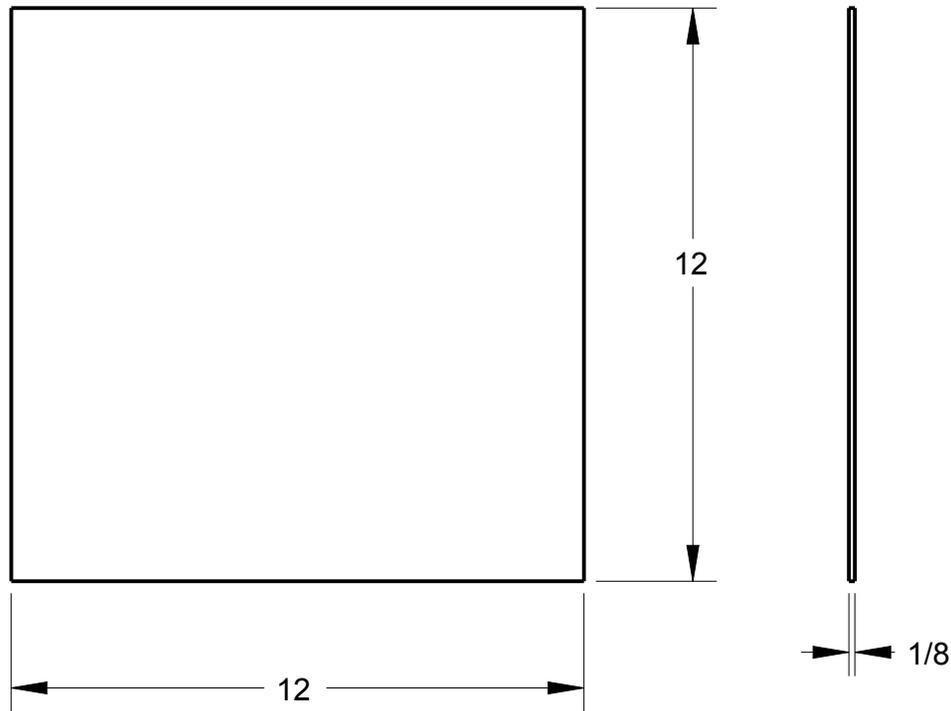
U-Bolt

Information in this drawing is provided for reference only.

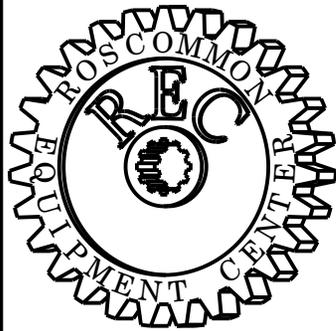


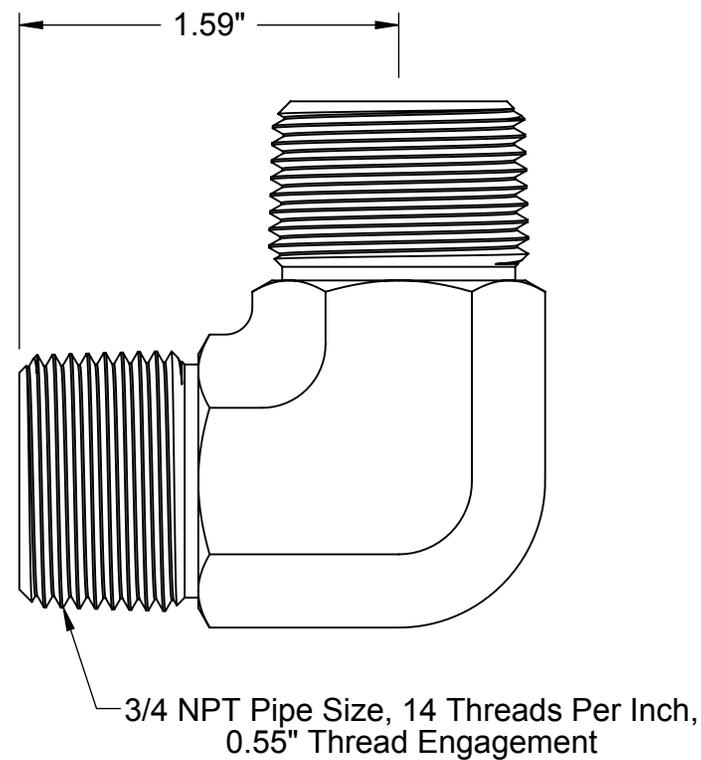
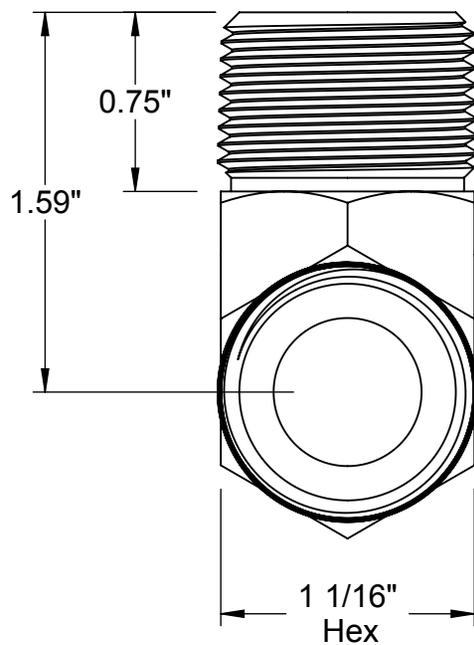
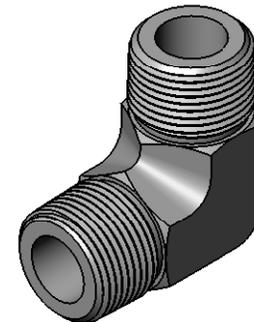
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STD. TOL.						DRAWN:	
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DECIMAL: 1 PLACE + - 0.05 2 PLACE + - 0.01 3 PLACE + - 0.005	NO.	BY	DATE	REVISION		DATE: 15-Jul-2016	
PROJECT NO.:	TITLE: 3/16" x 36" x 24" AL SHEET					SCALE:	
<p align="center">ROSCOMMON EQUIPMENT CENTER P.O. BOX 68 ROSCOMMON, MICHIGAN 48653</p>							SIZE: B



PURCHASED THROUGH: MCMASTER CARR

STD. TOL.						DRAWN:	
FRACTIONAL 0 TO 6 IN + - 1/32 6 IN AND UP + - 1/16						DESIGNED:	
ANGULAR: + - 1 DEG.						APPROVED:	
DECIMAL: 1 PLACE + - 0.05 2 PLACE + - 0.01 3 PLACE + - 0.005	NO.	BY	DATE	REVISION		DATE: 06-Jul-2016	
ROSCOMMON EQUIPMENT CENTER P.O. BOX 68 ROSCOMMON, MICHIGAN 48653						SCALE:	
PROJECT NO.:	TITLE: CORROSION RESISTANT FORMABLE 3003 ALUMINUM					DWG. NO. 8973K89	SIZE: A



McMASTER-CARR CAD

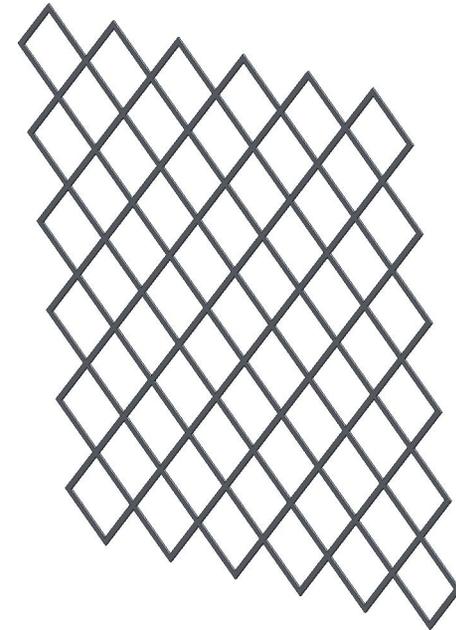
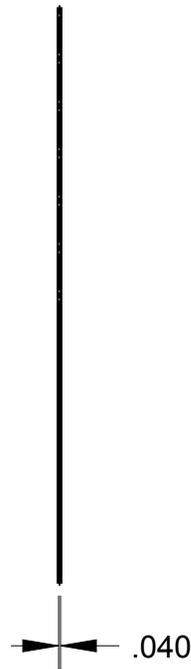
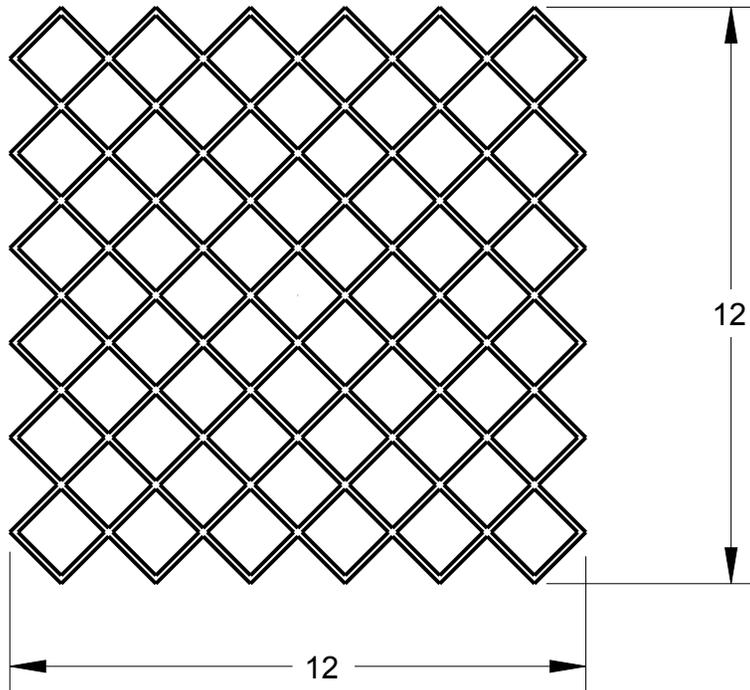
PART
NUMBER

9171K25

<http://www.mcmaster.com>
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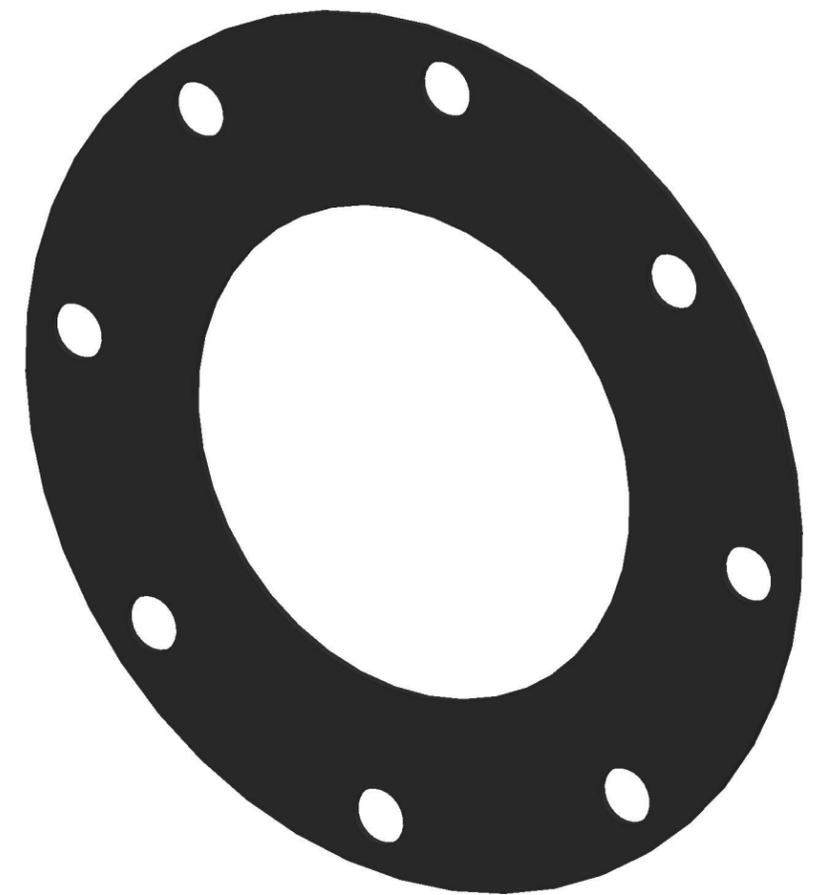
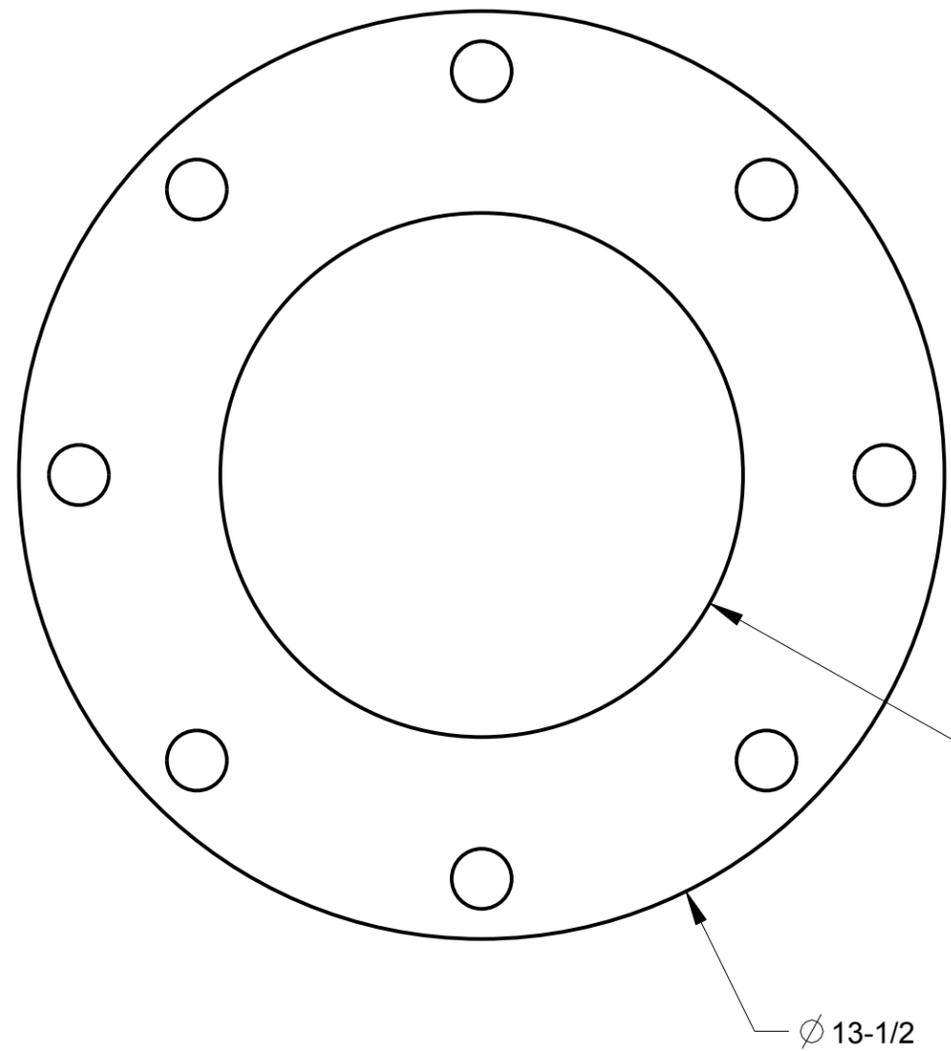
Brass
Male 90° Elbow

Information in this drawing is provided for reference only.



PURCHASED THROUGH: MCMASTER CARR

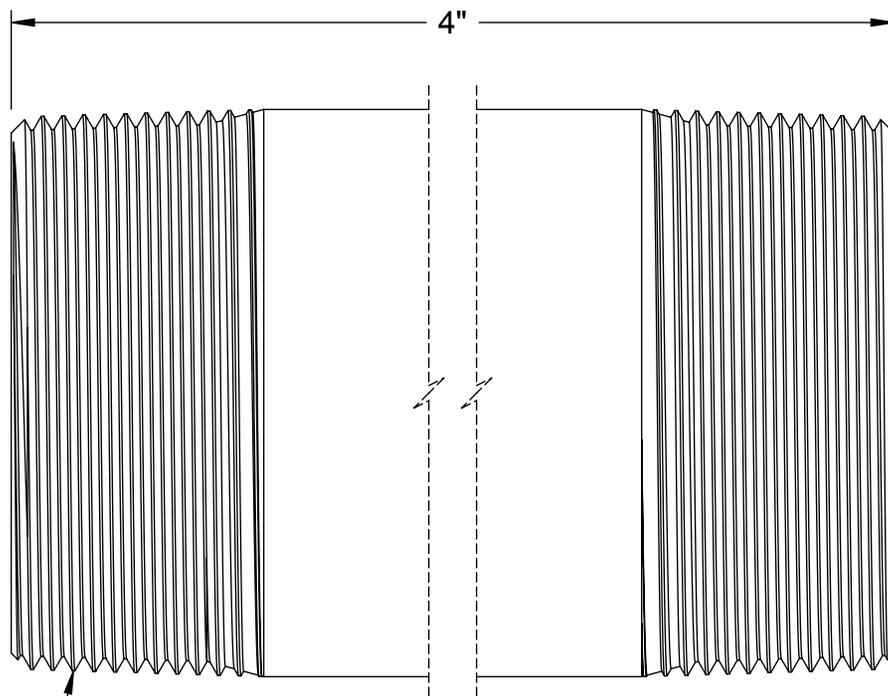
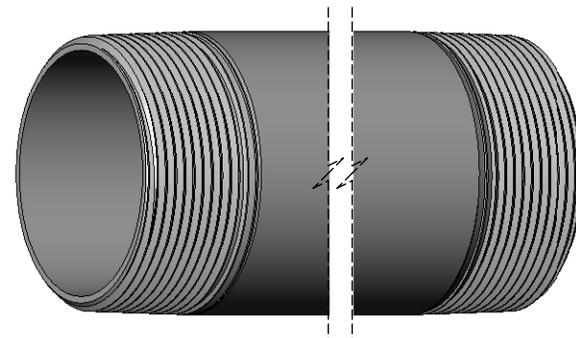
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ANGULAR: + - 1 DEG.						APPROVED:	
DECIMAL: 1 PLACE + - 0.05 2 PLACE + - 0.01 3 PLACE + - 0.005	NO.	BY	DATE	REVISION		DATE: 04-Feb-2016	
ROSCOMMON EQUIPMENT CENTER P.O. BOX 68 ROSCOMMON, MICHIGAN 48653						SCALE:	
PROJECT NO.:	TITLE: LIGHTWEIGHT ALUMINUM SHEET WITH DIAMOND OPENINGS					DWG. NO. 9305T214	SIZE: A



FOR USE WITH: 4881K224

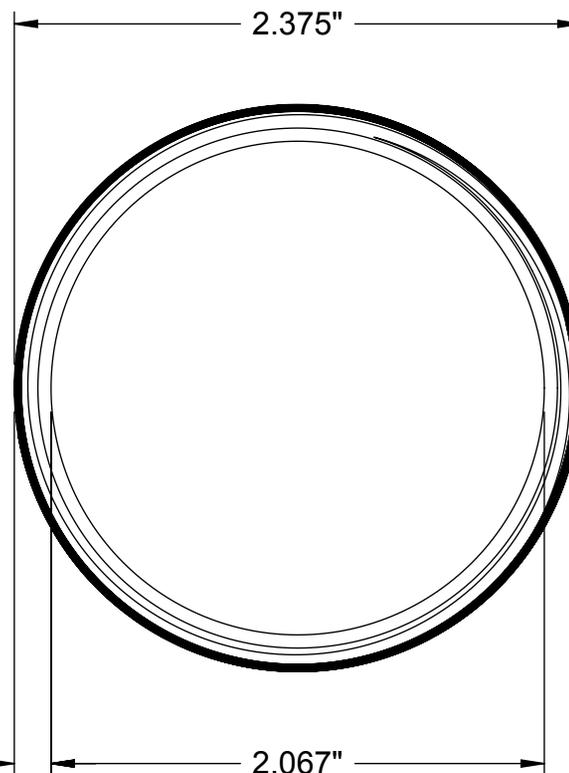
PURCHASED THROUGH: MCMaster CARR

STD. TOL.						DRAWN:									
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ANGULAR: + - 1 DEG.						APPROVED:									
DECIMAL: 1 PLACE + - 0.05 2 PLACE + - 0.01 3 PLACE + - 0.005						DATE: 15-Jul-2016									
PROJECT NO.: REC 72	<table border="1"> <thead> <tr> <th>NO.</th> <th>BY</th> <th>DATE</th> <th>REVISION</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>				NO.	BY	DATE	REVISION					ROSCOMMON EQUIPMENT CENTER P.O. BOX 68 ROSCOMMON, MICHIGAN 48653		SCALE:
NO.	BY	DATE	REVISION												
		TITLE: FLANGE GASKET				DWG. NO. 9473K624	SIZE: B								



2 NPT Pipe Size, 11 1/2 Threads Per Inch,
0.76" Thread Engagement

0.154"
Wall Thickness



McMASTER-CARR CAD

PART
NUMBER

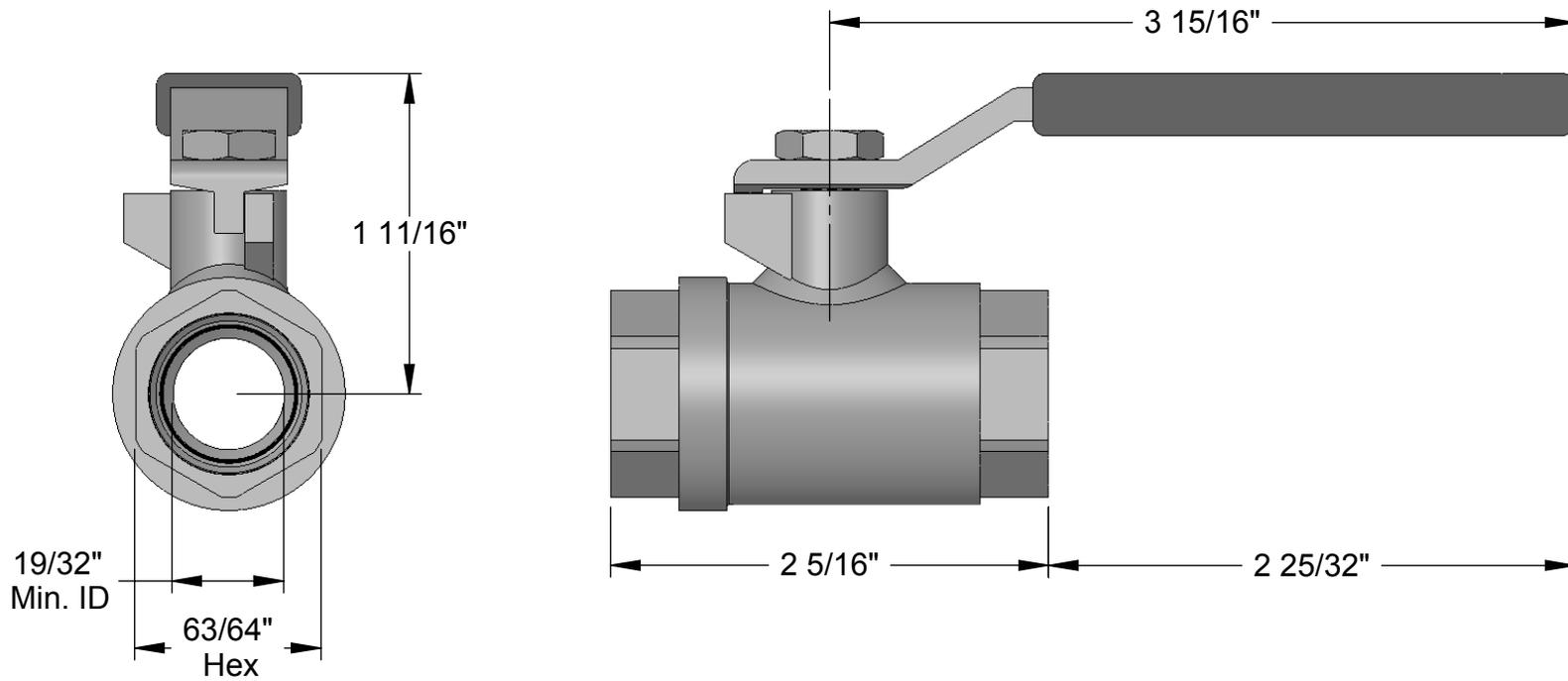
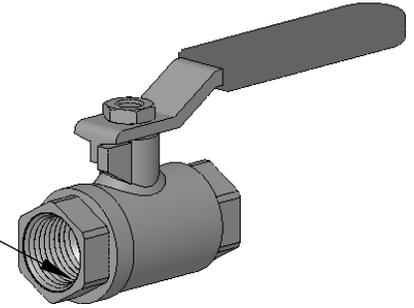
44665K287

<http://www.mcmaster.com>
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Aluminum
Pipe Nipple

Information in this drawing is provided for reference only.

1/2" NPT, 14 Threads Per Inch,
0.53" Thread Engagement



McMASTER-CARR CAD

PART
NUMBER

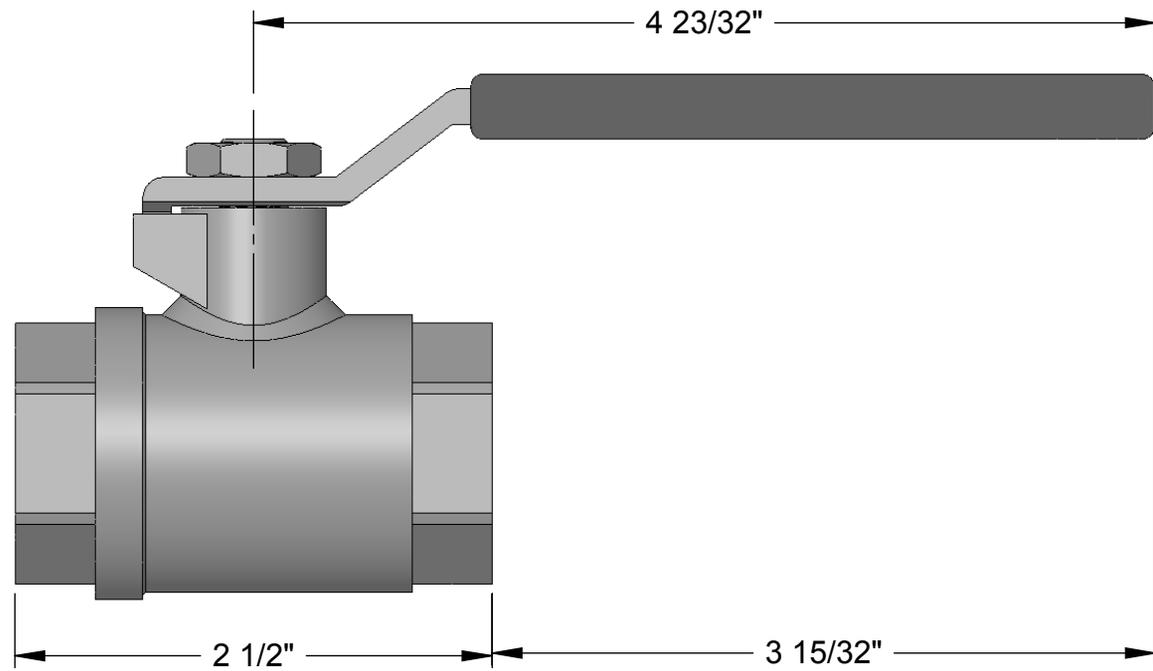
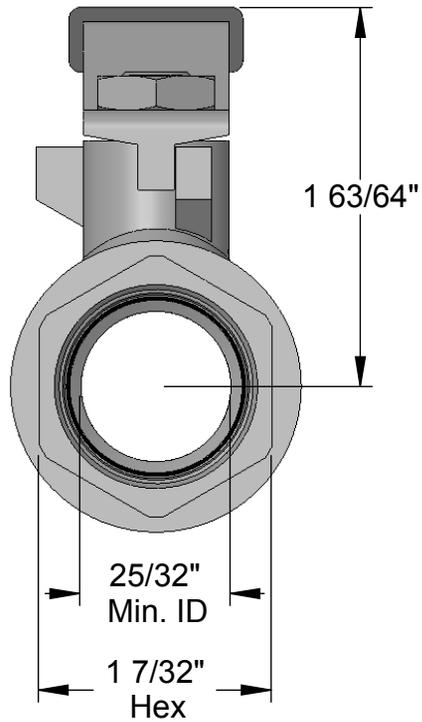
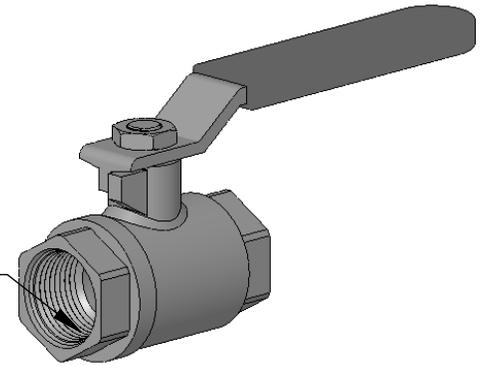
47865K23

<http://www.mcmaster.com>
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Brass Ball Valve
with Lever Handle

Information in this drawing is provided for reference only.

3/4" NPT, 14 Threads Per Inch,
0.55" Thread Engagement



McMASTER-CARR CAD

PART
NUMBER

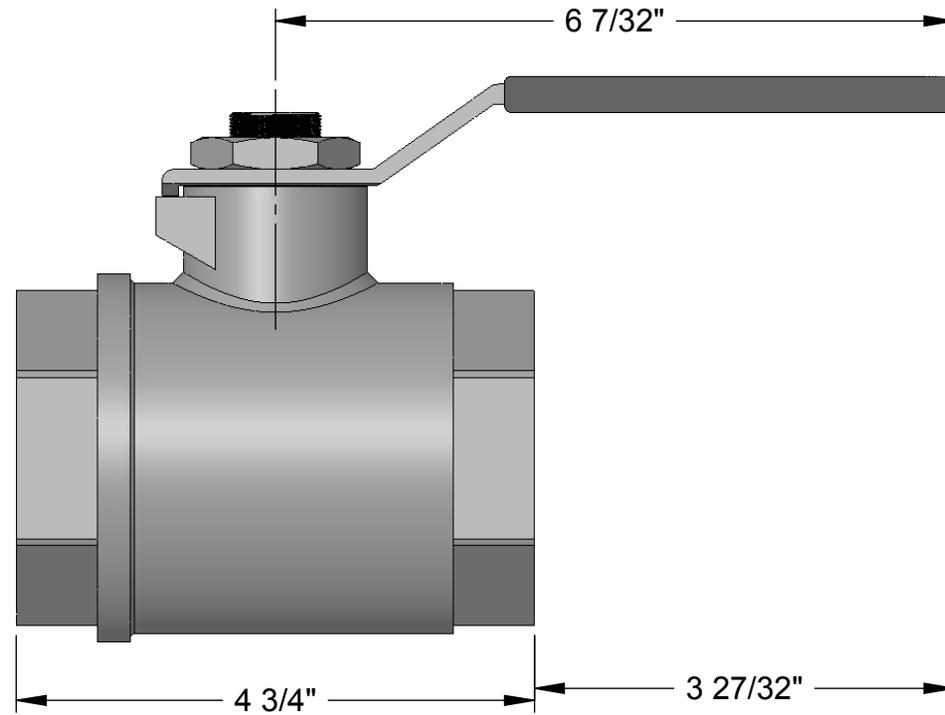
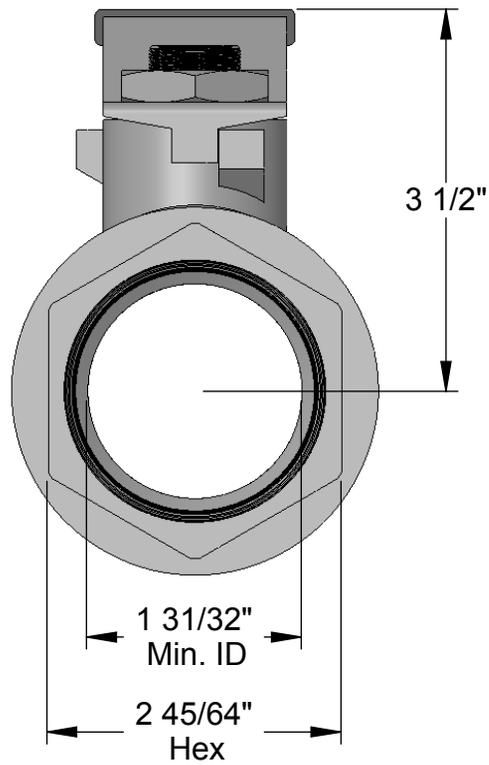
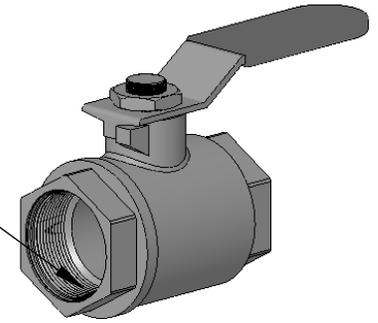
47865K24

<http://www.mcmaster.com>
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Brass Ball Valve
with Lever Handle

Information in this drawing is provided for reference only.

2" NPT, 11-1/2 Threads Per Inch,
0.76" Thread Engagement



McMASTER-CARR CAD

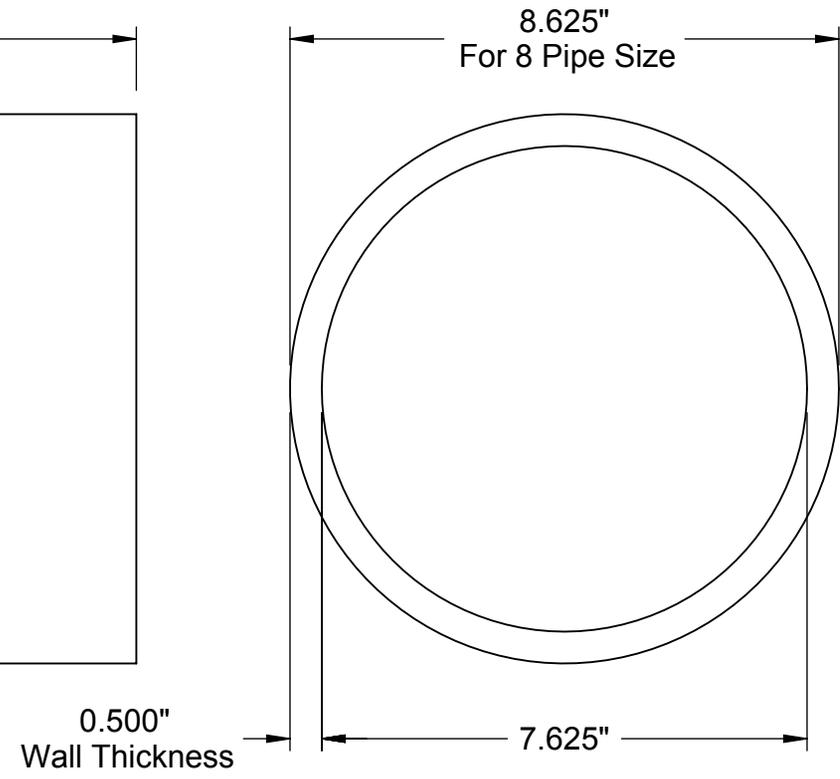
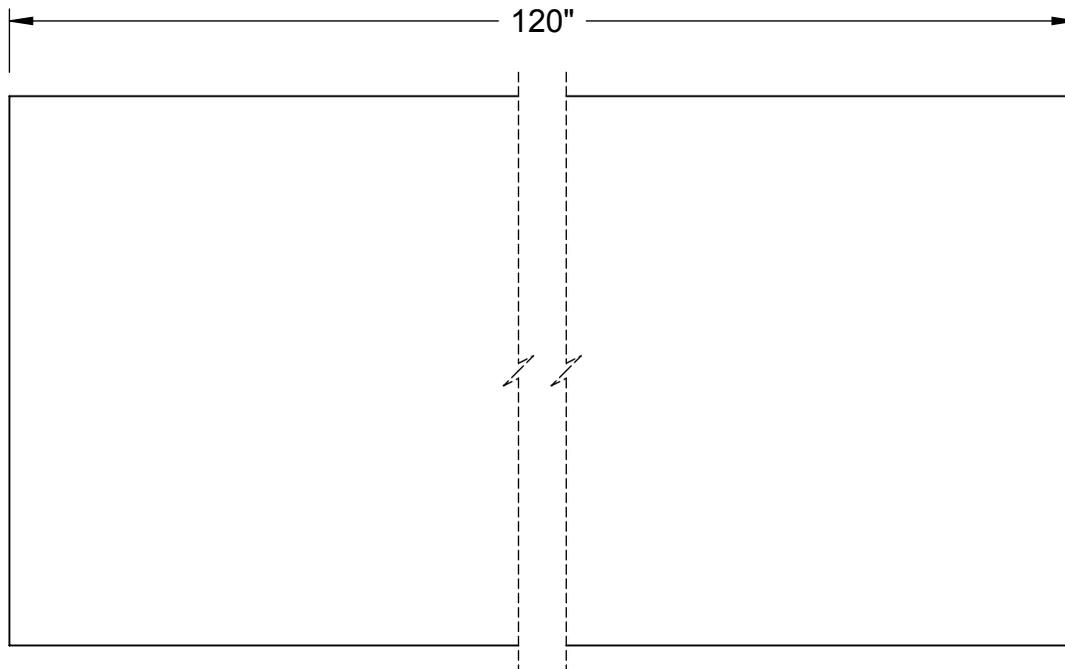
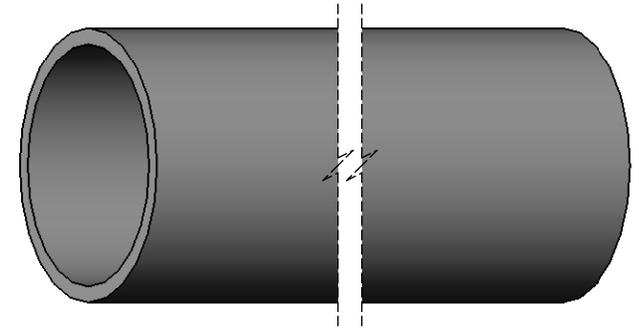
PART
NUMBER

47865K28

<http://www.mcmaster.com>
© 2010 McMaster-Carr Supply Company

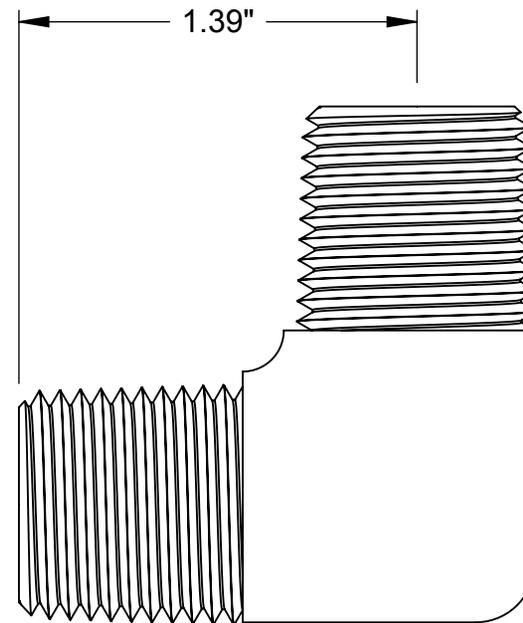
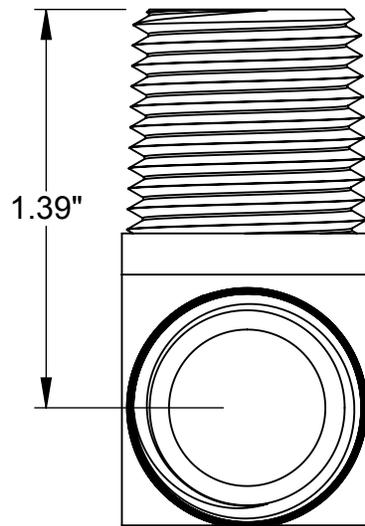
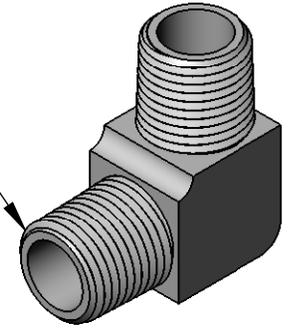
Brass Ball Valve
with Lever Handle

Information in this drawing is provided for reference only.



McMASTER-CARR <small>CAD</small>	PART NUMBER 48855K53
http://www.mcmaster.com	Thick-Wall Dark Gray PVC
© 2013 McMaster-Carr Supply Company	Unthreaded Pipe
<small>Information in this drawing is provided for reference only.</small>	

1/2 NPT Pipe Size, 14 Threads Per Inch,
0.53" Thread Engagement



McMASTER-CARR CAD

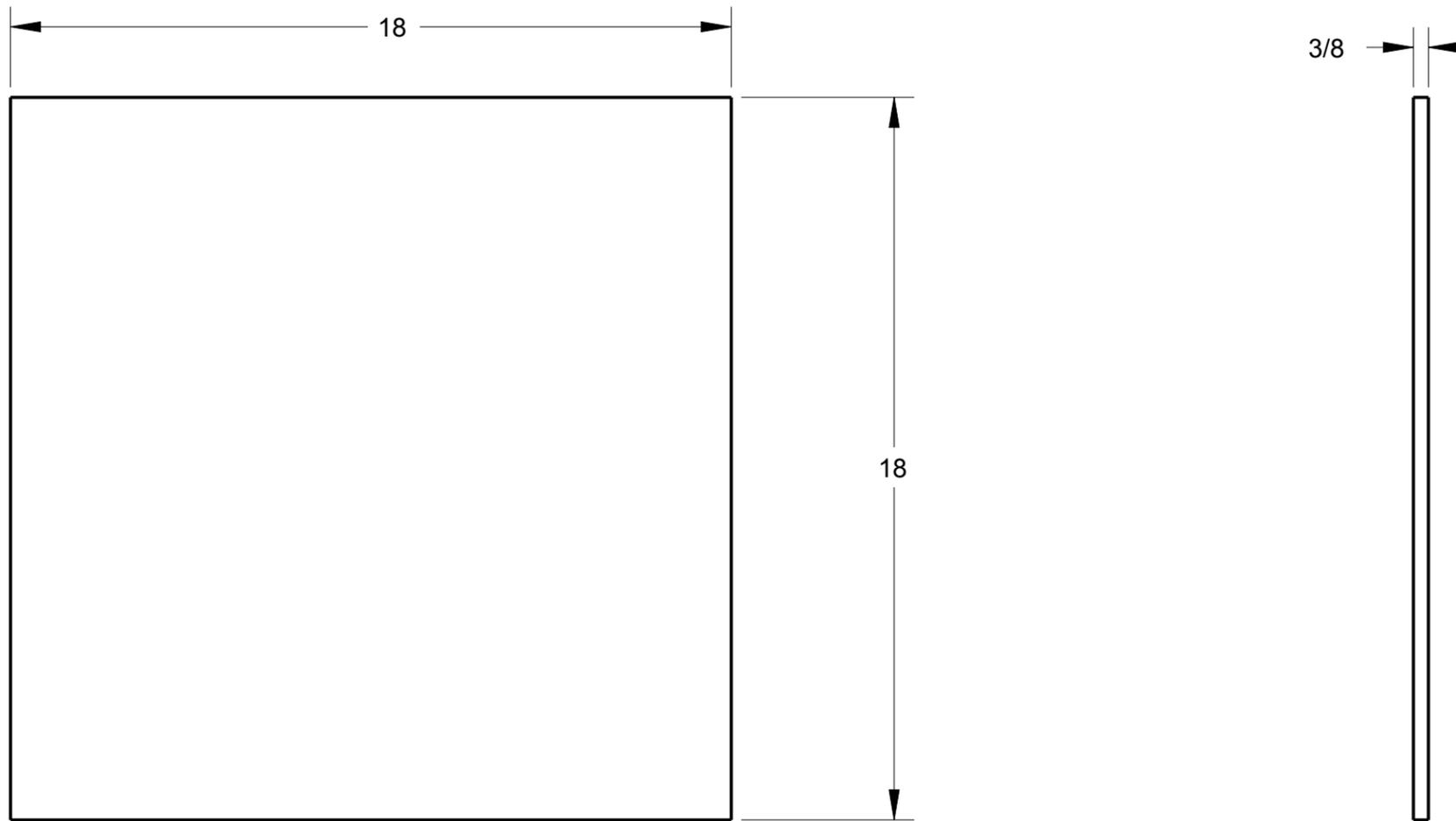
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Information in this drawing is provided for reference only.

PART
NUMBER

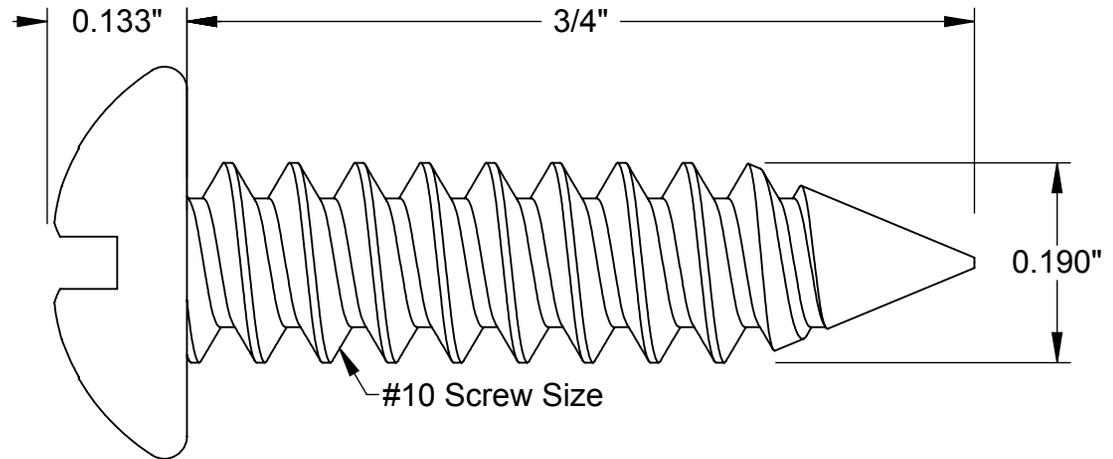
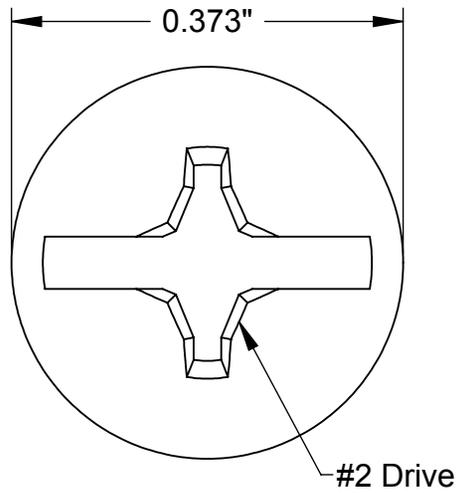
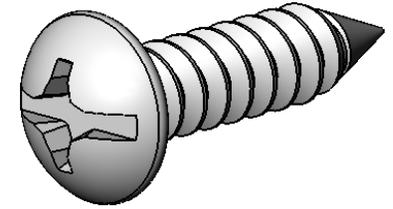
50785K125

Brass
Male 90° Elbow



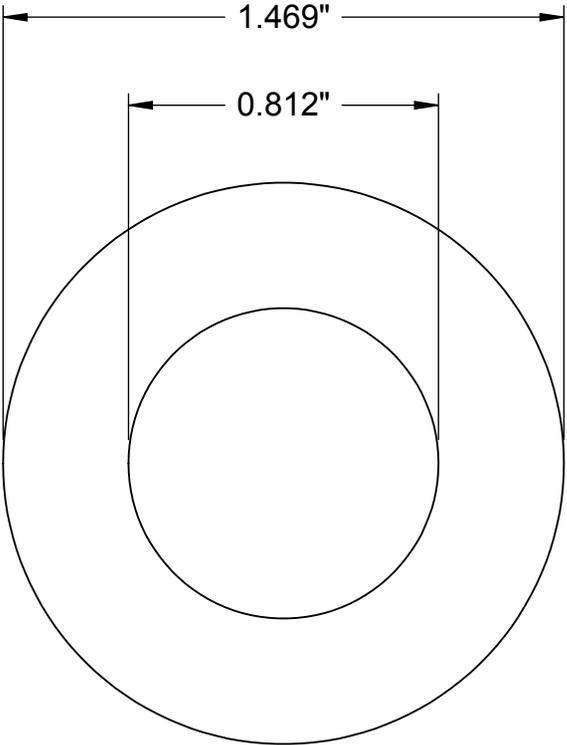
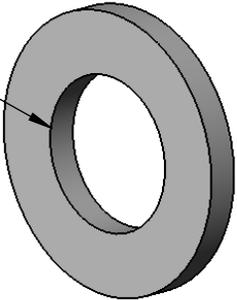
*** PURCHASE FROM MCMASTER CARR, P/N: 89155K28

<i>STD. TOL.</i>						<i>DRAWN:</i>	
<i>FRACTIONAL:</i> 0 TO 6 IN + - 1/32 6 IN AND UP + - 1/16						<i>DESIGNED:</i>	
<i>ANGULAR:</i> + - 1 DEG.						<i>APPROVED:</i>	
<i>DECIMAL:</i> 1 PLACE + - 0.05 2 PLACE + - 0.01 3 PLACE + - 0.005	<i>NO.</i>	<i>BY</i>	<i>DATE</i>	<i>REVISION</i>		<i>DATE:</i> 09-Aug-2016	
<i>PROJECT NO.:</i>	<i>TITLE:</i> 3/8" x 18" x 18" AL PLATE					<i>SCALE:</i>	
<p align="center">ROSCOMMON EQUIPMENT CENTER P.O. BOX 68 ROSCOMMON, MICHIGAN 48653</p>							<i>SIZE:</i> B



McMASTER-CARR <small>CAD</small>	PART NUMBER	90077A910
http://www.mcmaster.com	Combination Drive Screw for Sheet Metal	
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For 3/4"
Screw Size



Washer may vary from
0.108" to 0.160" in thickness.

McMASTER-CARR CAD

PART
NUMBER

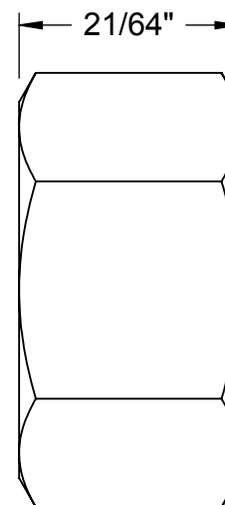
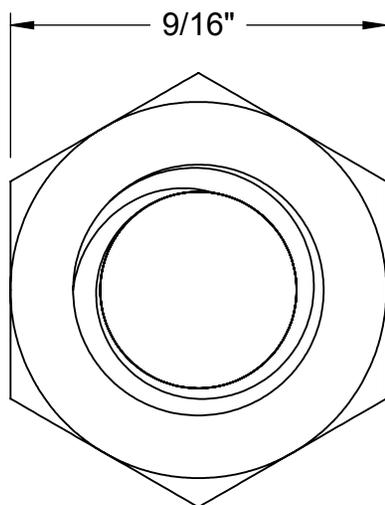
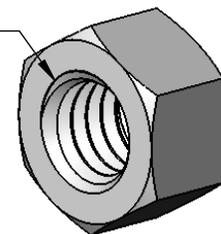
90126A036

<http://www.mcmaster.com>
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SAE
Washer

Information in this drawing is provided for reference only.

3/8"-16 Thread



McMASTER-CARR CAD

PART
NUMBER

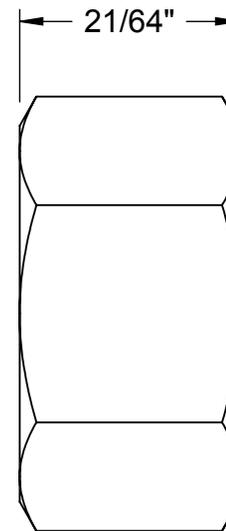
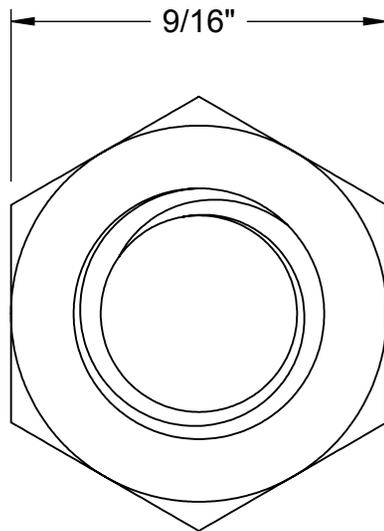
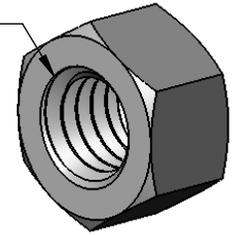
90473A031

<http://www.mcmaster.com>
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Hex
Nut

Information in this drawing is provided for reference only.

3/8"-16 Thread



McMASTER-CARR CAD

PART
NUMBER

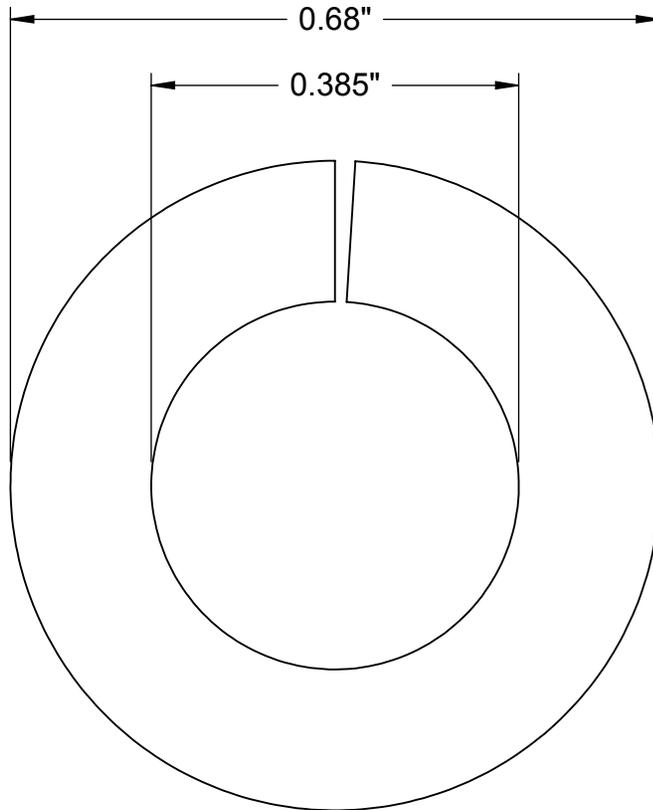
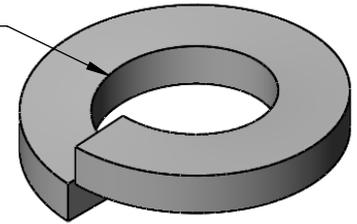
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<http://www.mcmaster.com>
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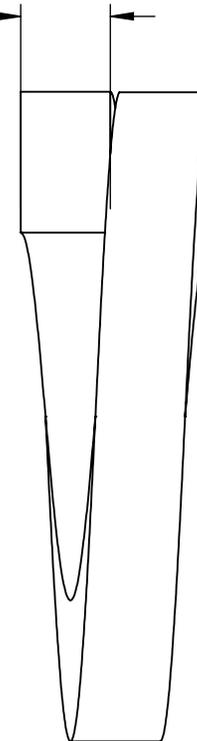
Hex
Nut

Information in this drawing is provided for reference only.

For 3/8"
Screw Size

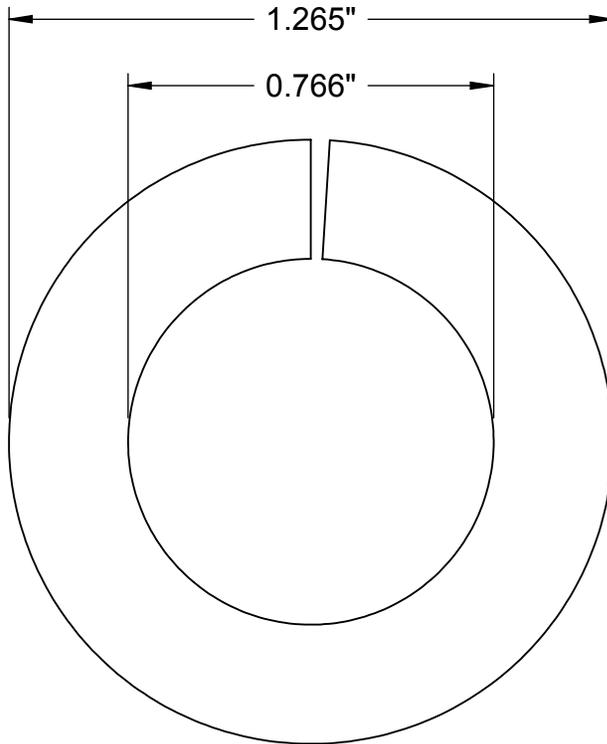
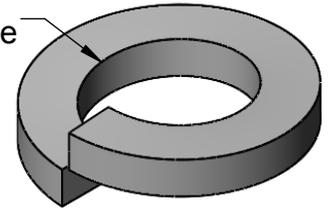


0.094"
Thickness

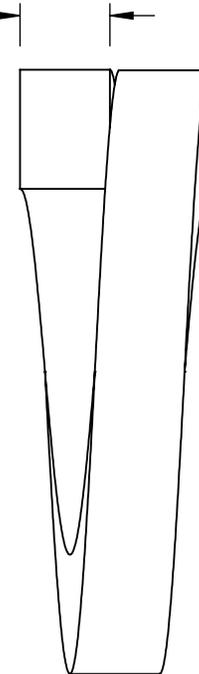


McMASTER-CARR <small>CAD</small>	PART NUMBER	91013A727
http://www.mcmaster.com		Split Lock Washer
© 2014 McMaster-Carr Supply Company		
Information in this drawing is provided for reference only.		

For 3/4"
Screw Size



0.188"
Thickness



McMASTER-CARR CAD

PART
NUMBER

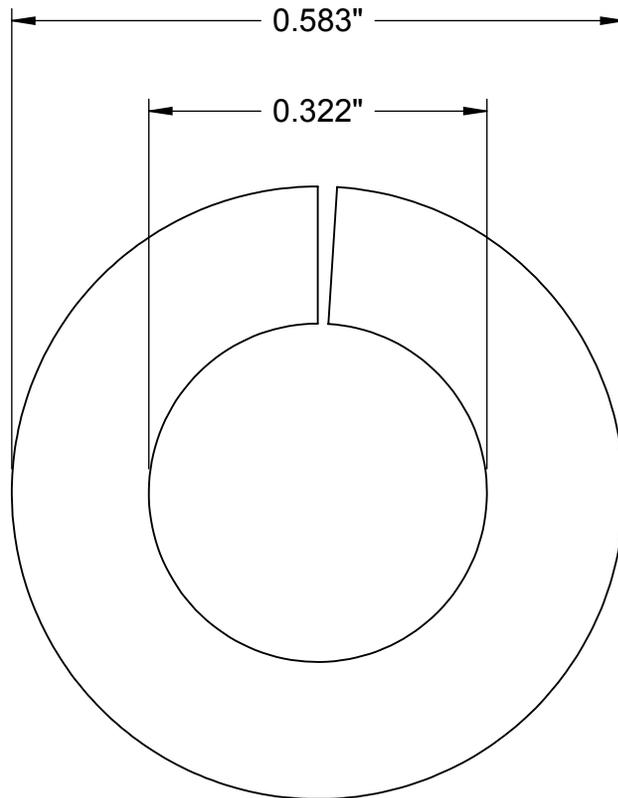
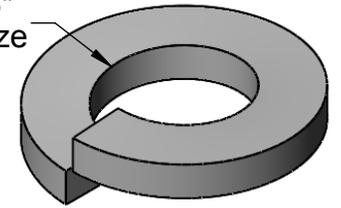
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<http://www.mcmaster.com>
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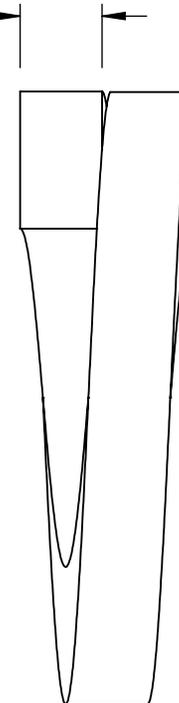
Split Lock
Washer

Information in this drawing is provided for reference only.

For 5/16"
Screw Size



0.078"
Thickness



McMASTER-CARR CAD

PART
NUMBER

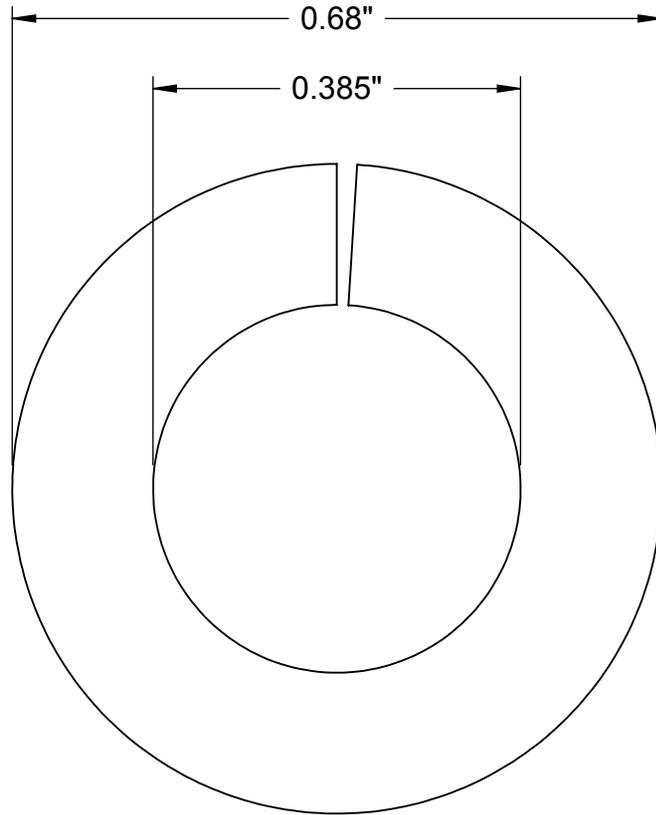
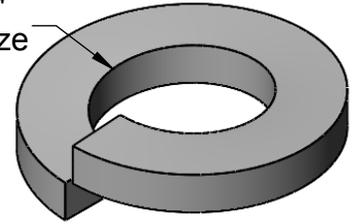
91102A755

<http://www.mcmaster.com>
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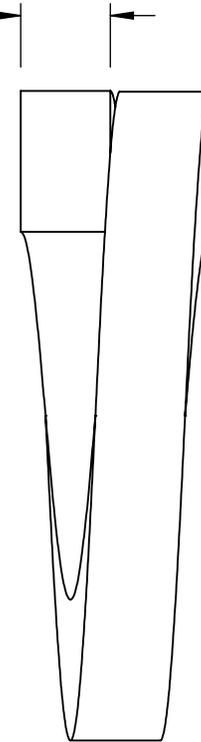
Split Lock
Washer

Information in this drawing is provided for reference only.

For 3/8"
Screw Size



0.094"
Thickness



McMASTER-CARR CAD

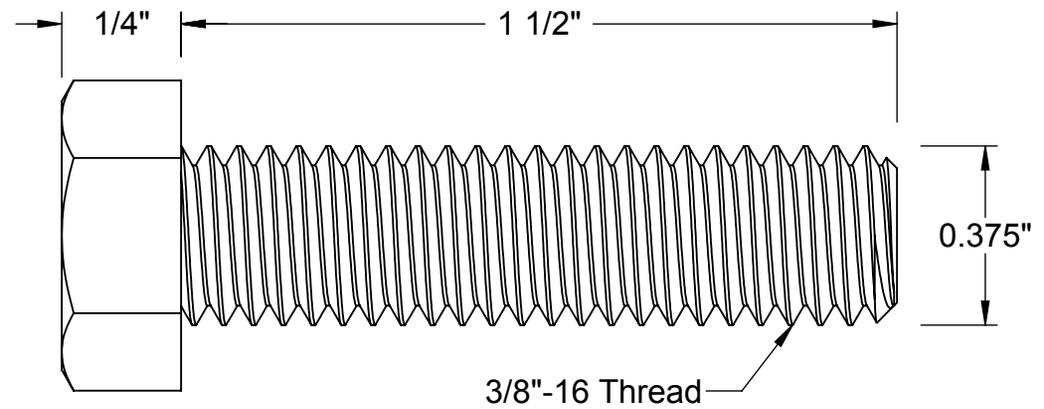
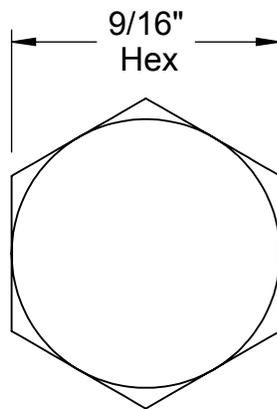
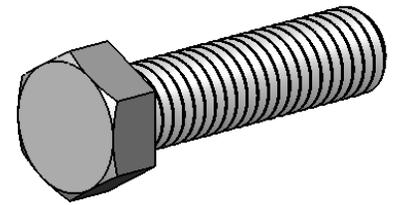
PART
NUMBER

91102A760

<http://www.mcmaster.com>
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Split Lock
Washer

Information in this drawing is provided for reference only.



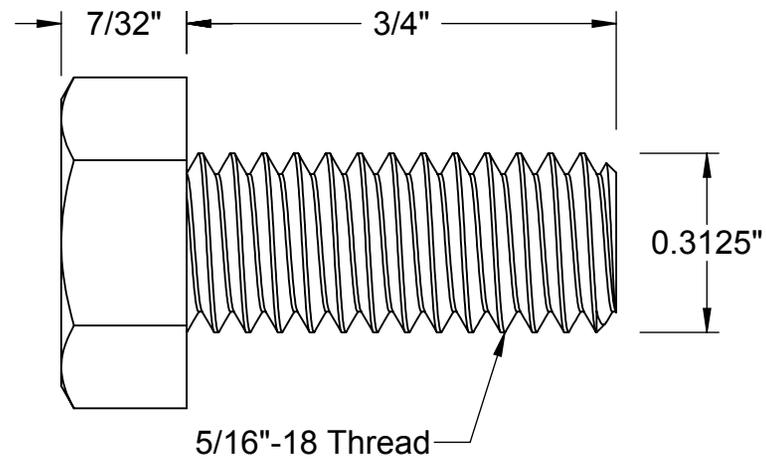
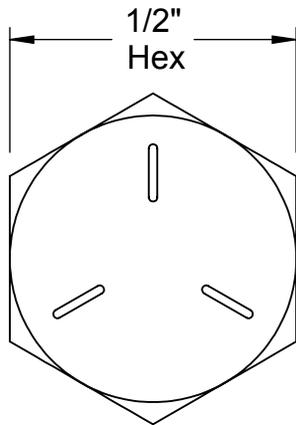
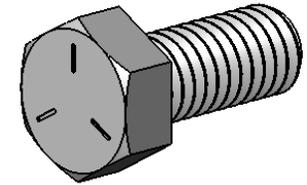
McMASTER-CARR CAD

PART NUMBER **91309A628**

<http://www.mcmaster.com>
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Low-Strength Steel
Cap Screw

Information in this drawing is provided for reference only.



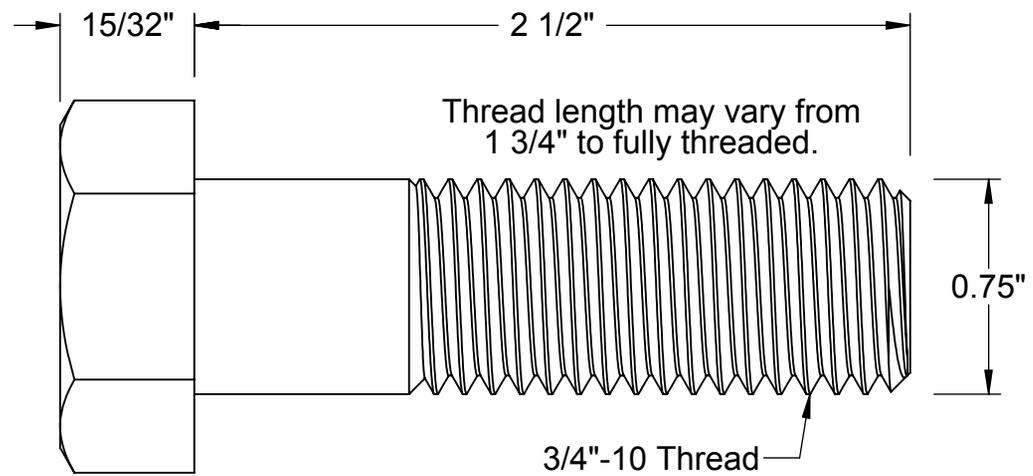
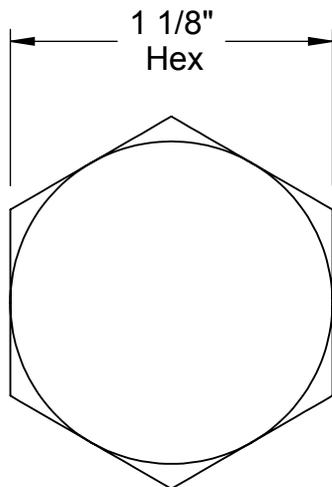
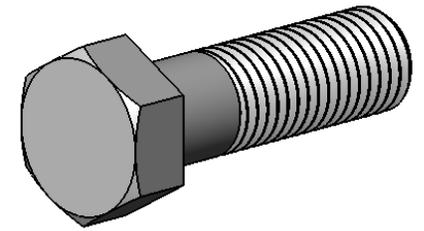
McMASTER-CARR CAD

PART NUMBER **92865A581**

<http://www.mcmaster.com>
© 2014 McMaster-Carr Supply Company

Medium-Strength Steel
Cap Screw - Grade 5

Information in this drawing is provided for reference only.



McMASTER-CARR CAD

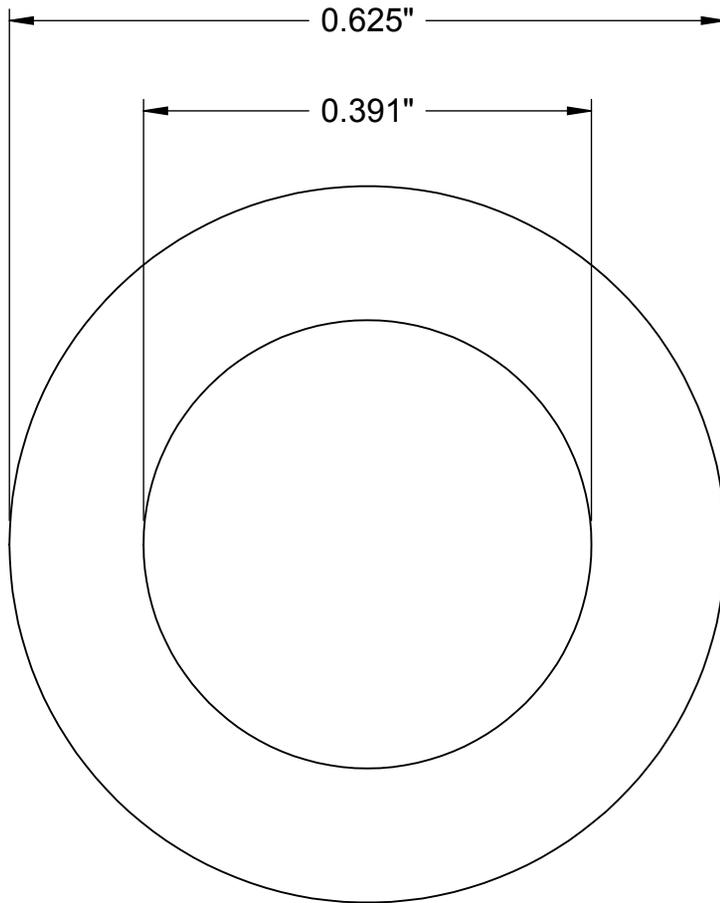
PART
NUMBER

92941A845

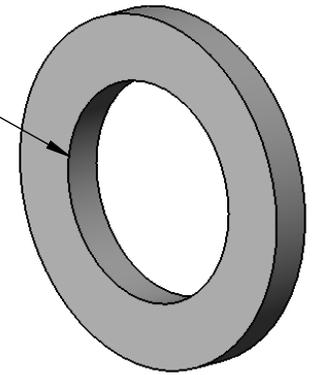
<http://www.mcmaster.com>
© 2014 McMaster-Carr Supply Company

Brass
Cap Screw

Information in this drawing is provided for reference only.

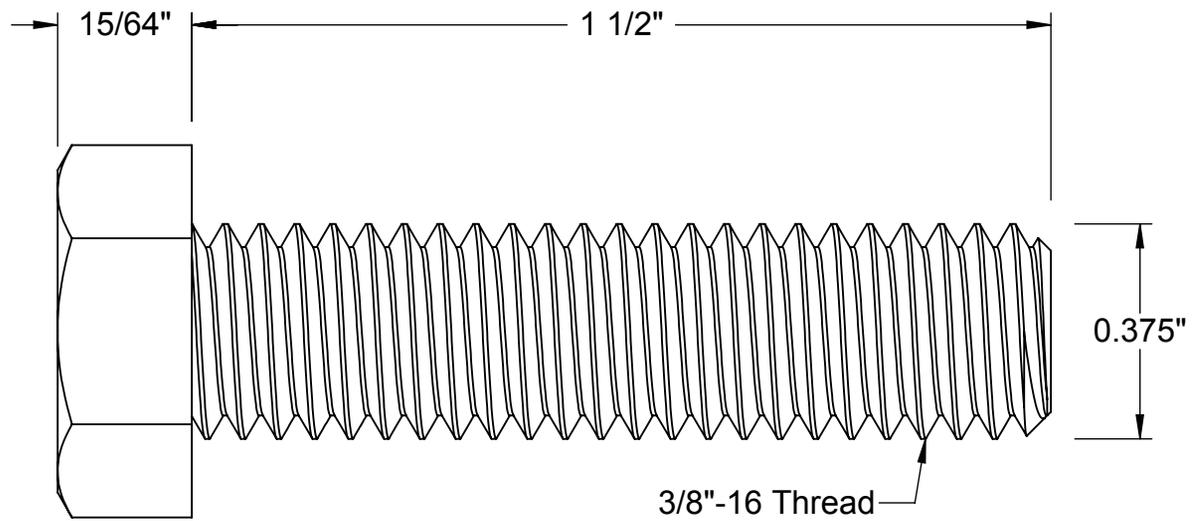
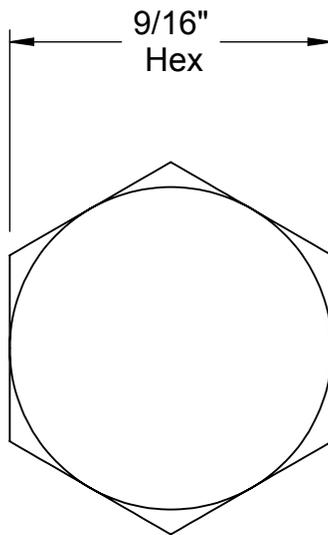
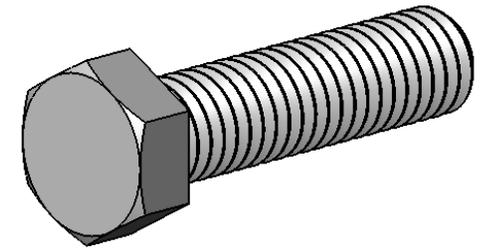


For 3/8"
Screw Size



Washer may vary from
0.059" to 0.069" in thickness.

McMASTER-CARR <small>CAD</small> http://www.mcmaster.com © 2014 McMaster-Carr Supply Company <small>Information in this drawing is provided for reference only.</small>	PART NUMBER	93286A045
	General Purpose Washer	



McMASTER-CARR CAD

PART
NUMBER

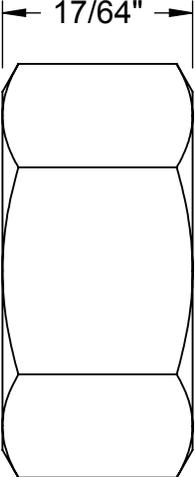
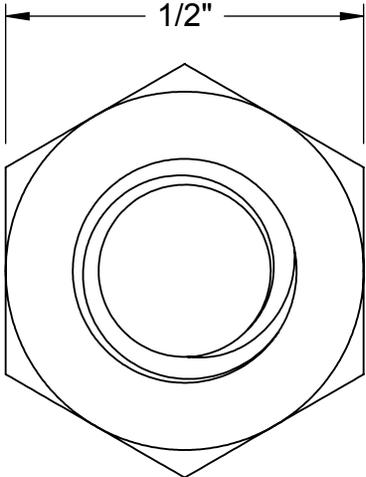
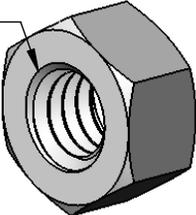
93306A628

<http://www.mcmaster.com>
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Aluminum
Cap Screw

Information in this drawing is provided for reference only.

5/16"-18 Thread



McMASTER-CARR CAD

PART NUMBER

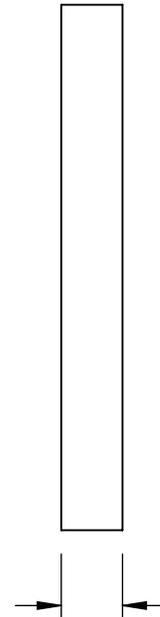
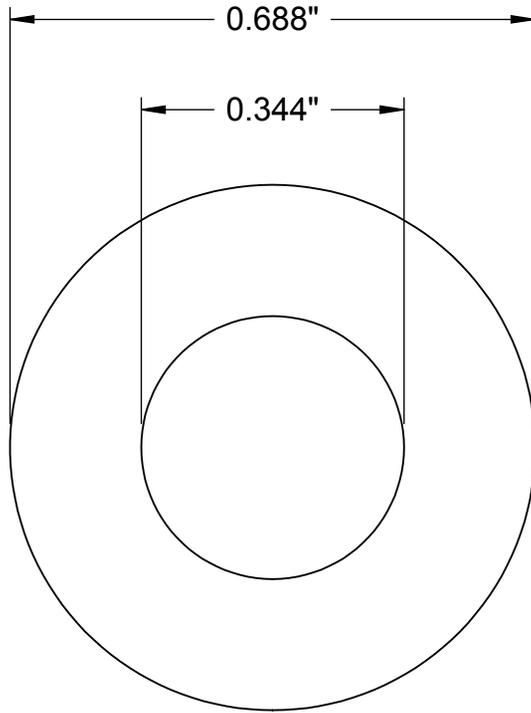
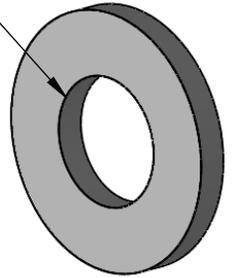
95462A030

<http://www.mcmaster.com>
© 2015 McMaster-Carr Supply Company

Hex
Nut

Information in this drawing is provided for reference only.

For 5/16"
Screw Size



Washer may vary from
0.051" to 0.08" in thickness.

McMASTER-CARR CAD

PART
NUMBER

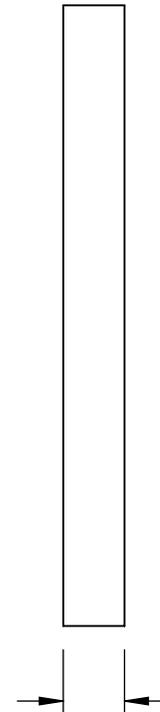
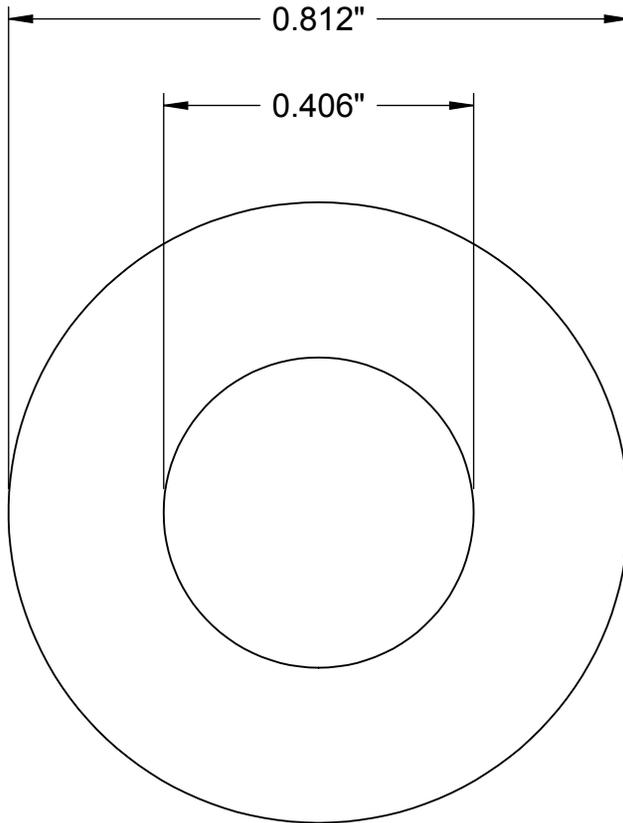
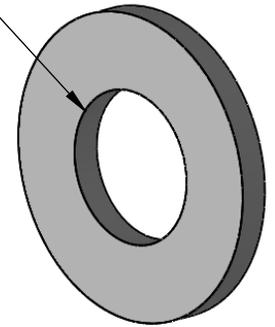
98023A030

<http://www.mcmaster.com>
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General Purpose
Washer

Information in this drawing is provided for reference only.

For 3/8"
Screw Size



Washer may vary from
0.051" to 0.08" in thickness.

McMASTER-CARR CAD

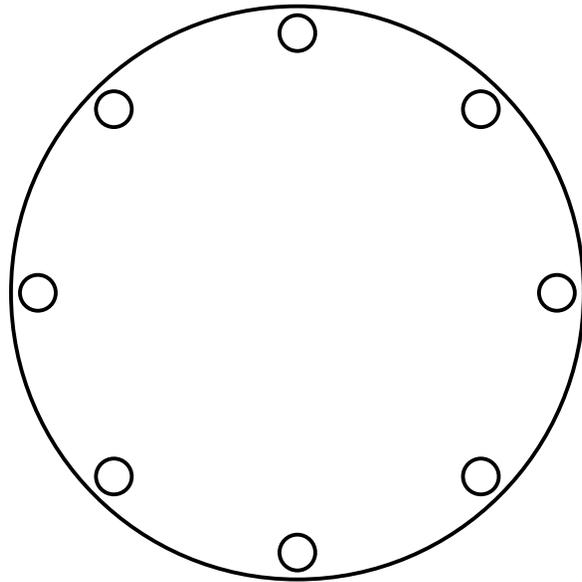
PART
NUMBER

98023A031

<http://www.mcmaster.com>
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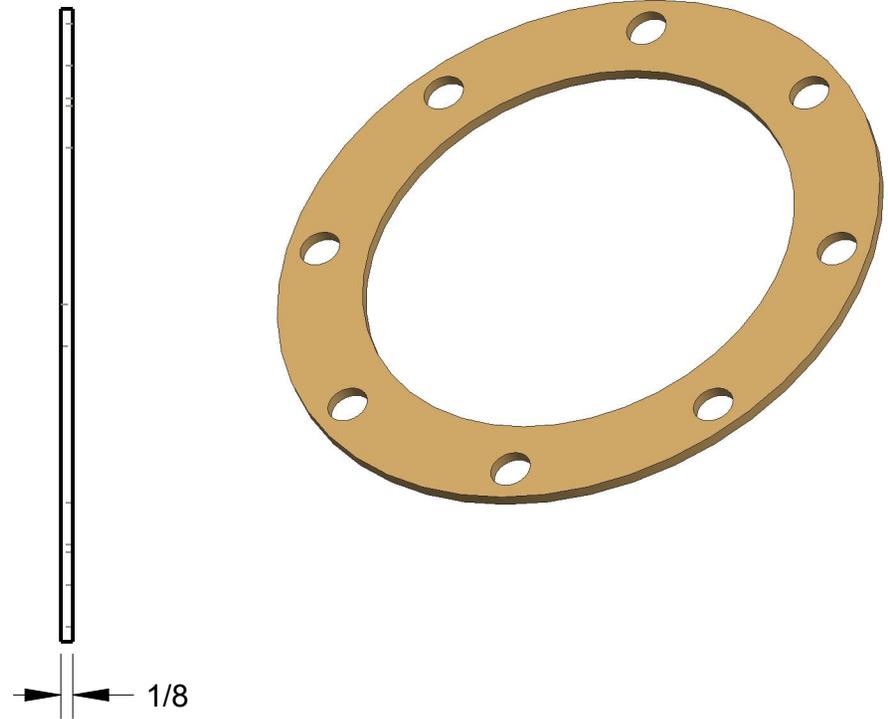
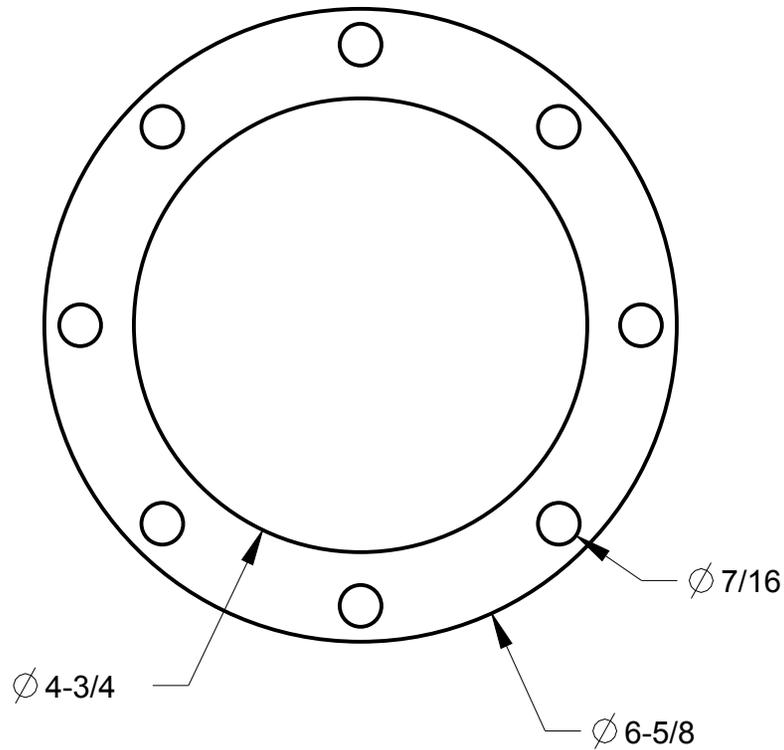
General Purpose
Washer

Information in this drawing is provided for reference only.



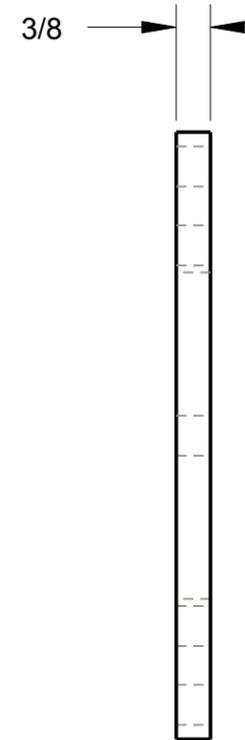
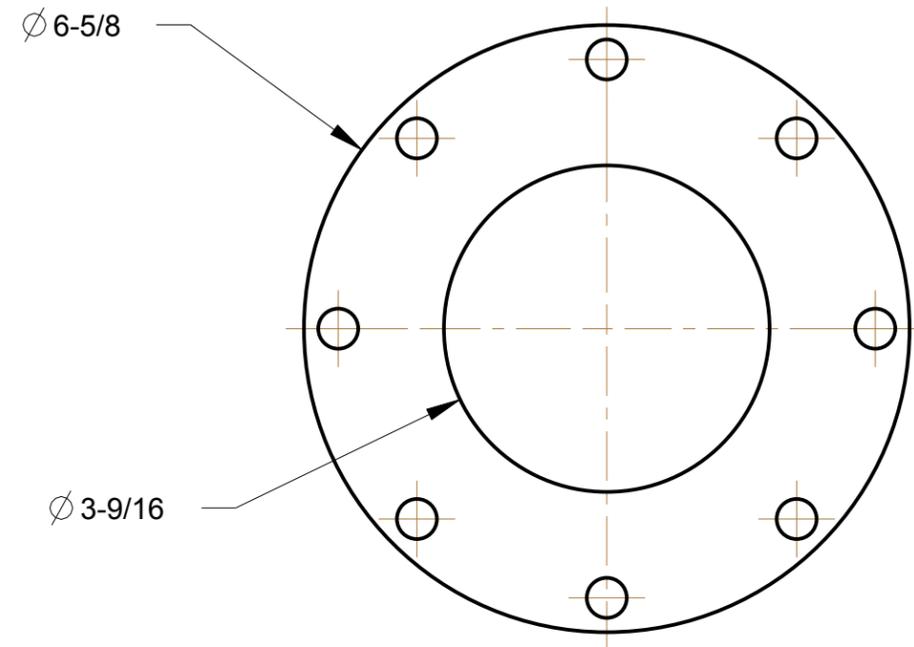
PURCHASED THROUGH: WWW.TANKTRUCKSERVICE.COM

STD. TOL.						DRAWN:	
FRACTIONAL 0 TO 6 IN + - 1/32 6 IN AND UP + - 1/16						DESIGNED:	
ANGULAR: + - 1 DEG.						APPROVED:	
DECIMAL: 1 PLACE + - 0.05 2 PLACE + - 0.01 3 PLACE + - 0.005	NO.	BY	DATE	REVISION		DATE: 06-Jul-2016	
ROSCOMMON EQUIPMENT CENTER P.O. BOX 68 ROSCOMMON, MICHIGAN 48653						SCALE:	
PROJECT NO.:	TITLE: CAP PLATE, RETURN					DWG. NO. BETBSF401AL	SIZE: A



PURCHASED THROUGH: TANK TRUCK SERVICE

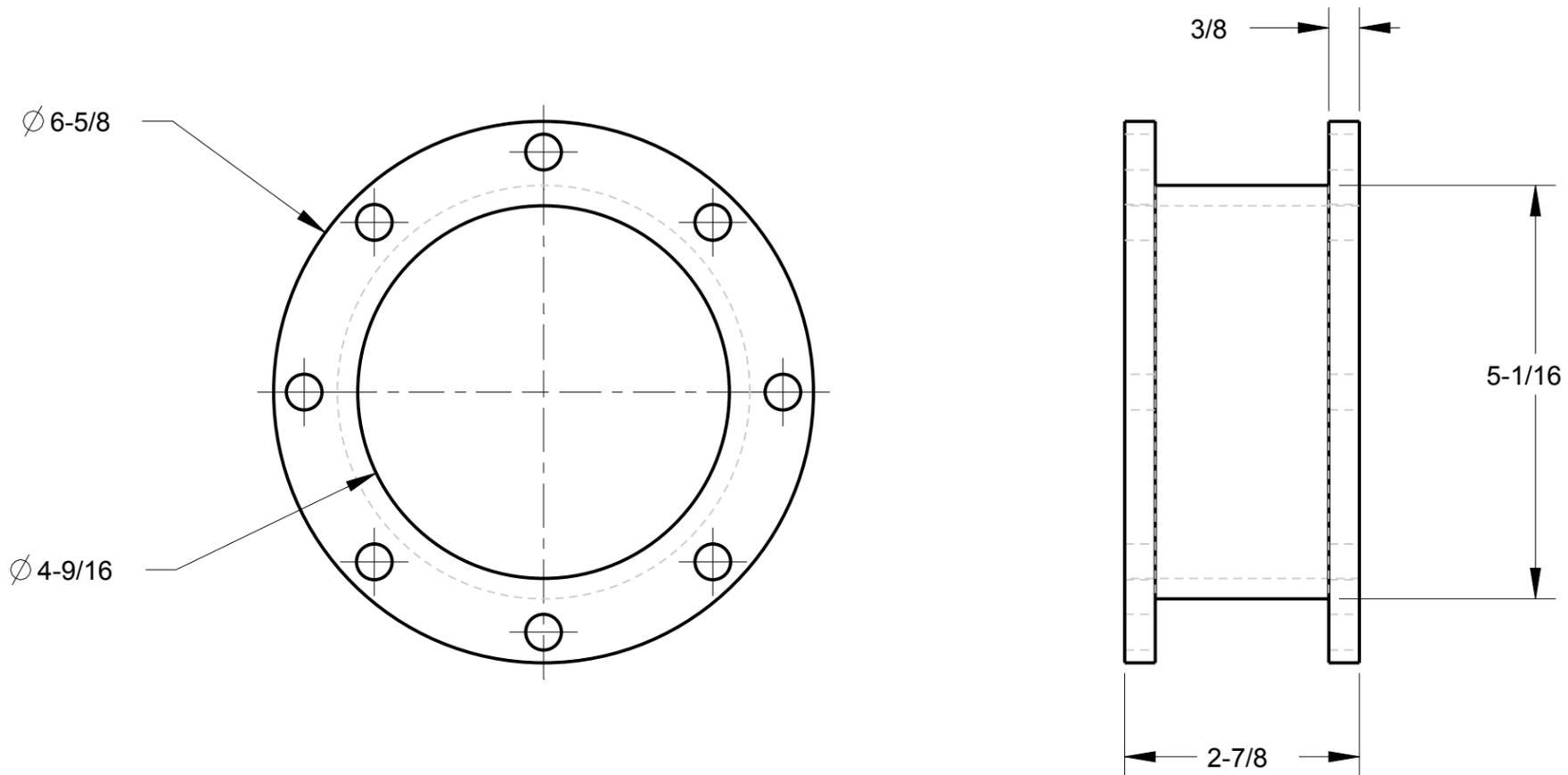
STD. TOL.						DRAWN:	
FRACTIONAL 0 TO 6 IN + - 1/32 6 IN AND UP + - 1/16						DESIGNED:	
ANGULAR: + - 1 DEG.						APPROVED:	
DECIMAL: 1 PLACE + - 0.05 2 PLACE + - 0.01 3 PLACE + - 0.005	NO.	BY	DATE	REVISION		DATE: 06-Jul-2016	
ROSCOMMON EQUIPMENT CENTER P.O. BOX 68 ROSCOMMON, MICHIGAN 48653						SCALE:	
PROJECT NO.:	TITLE: GASKET, CORK MATERIAL					DWG. NO. BETG15266CB	SIZE: A



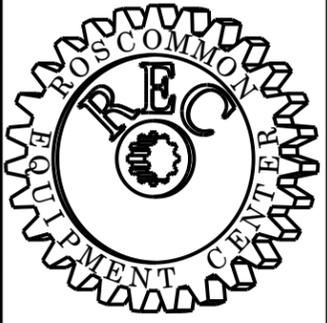
BETBWF401MS, MODIFIED INTO PART NUMBER: BETBWF401MS_MODIFIED

STD. TOL.						DRAWN:	
FRACTIONAL: 0 TO 6 IN + - 1/32 6 IN AND UP + - 1/16						DESIGNED: DCM	
ANGULAR: + - 1 DEG.						APPROVED:	
DECIMAL: 1 PLACE + - 0.05 2 PLACE + - 0.01 3 PLACE + - 0.005	NO.	BY	DATE	REVISION		DATE: 09-Dec-2015	
PROJECT NO.:	TITLE: WELD FLANGE , MODIFIED					SCALE:	
							SIZE: B

ROSCOMMON EQUIPMENT CENTER
P.O. BOX 68 ROSCOMMON, MICHIGAN 48653

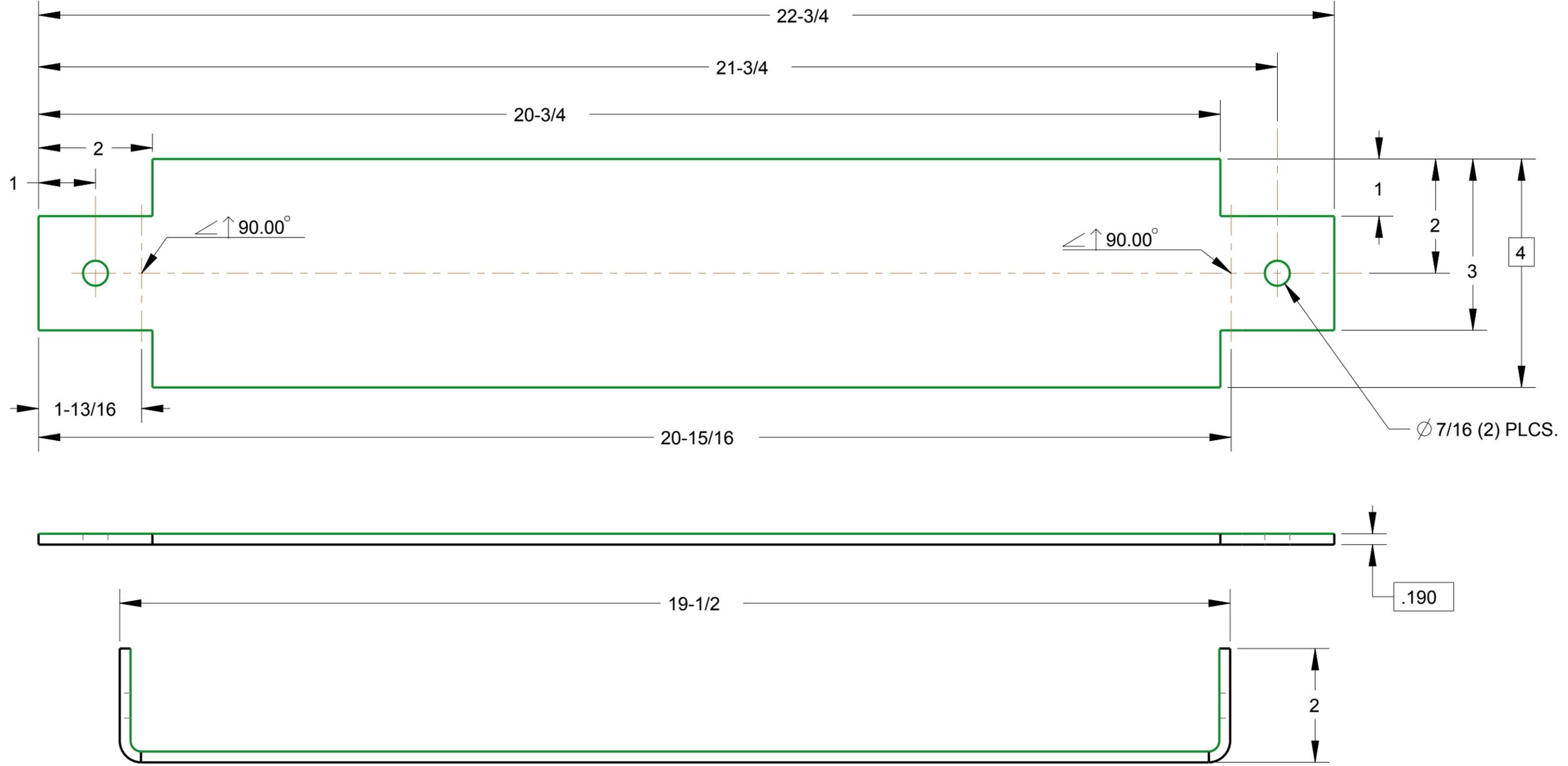


*** PURCHASED THROUGH TANK TRUCK SERVICE

STD. TOL.						DRAWN:	
FRACTIONAL: 0 TO 6 IN + - 1/32 6 IN AND UP + - 1/16						DESIGNED: DCM	
ANGULAR: + - 1 DEG.						APPROVED:	
DECIMAL: 1 PLACE + - 0.05 2 PLACE + - 0.01 3 PLACE + - 0.005	NO.	BY	DATE	REVISION		DATE: 09-Dec-2015	
PROJECT NO.: REC 72	TITLE: WELD FLANGE					SCALE:	
							SIZE: B

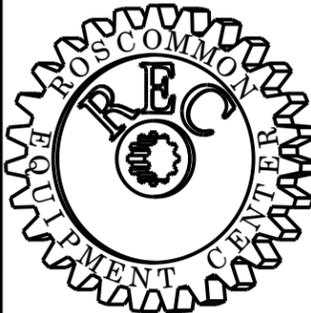
ROSCOMMON EQUIPMENT CENTER

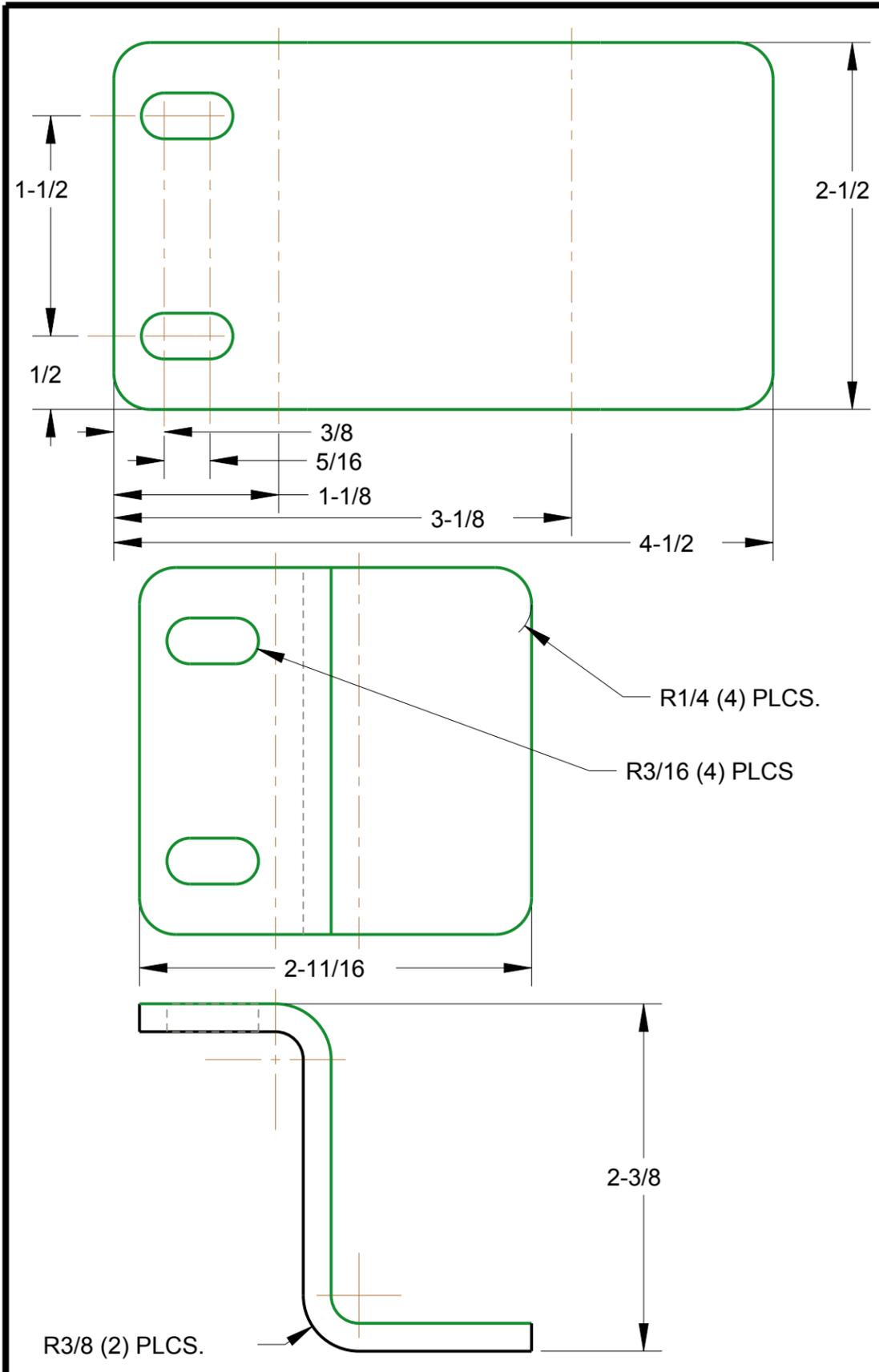
P.O. BOX 68 ROSCOMMON, MICHIGAN 48653



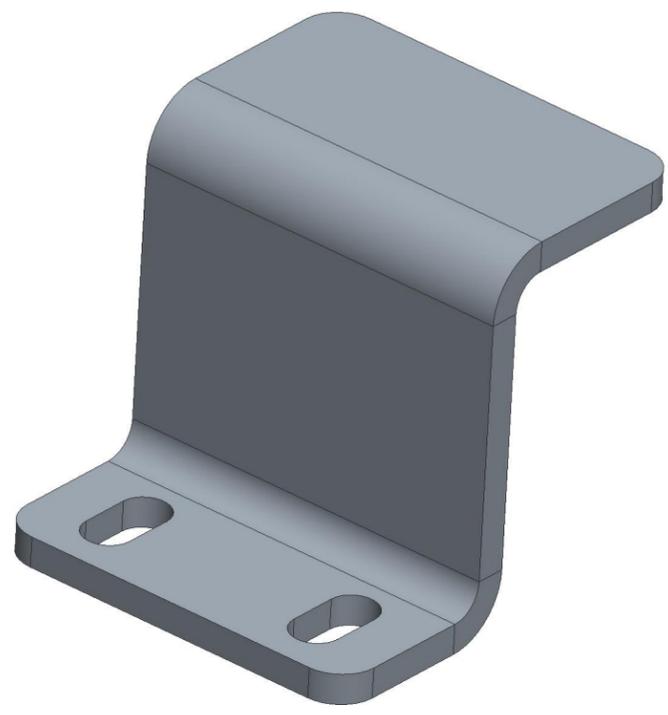
BREAK EDGES & DEBURR

** MAKE FROM DWG. NO. 21429140

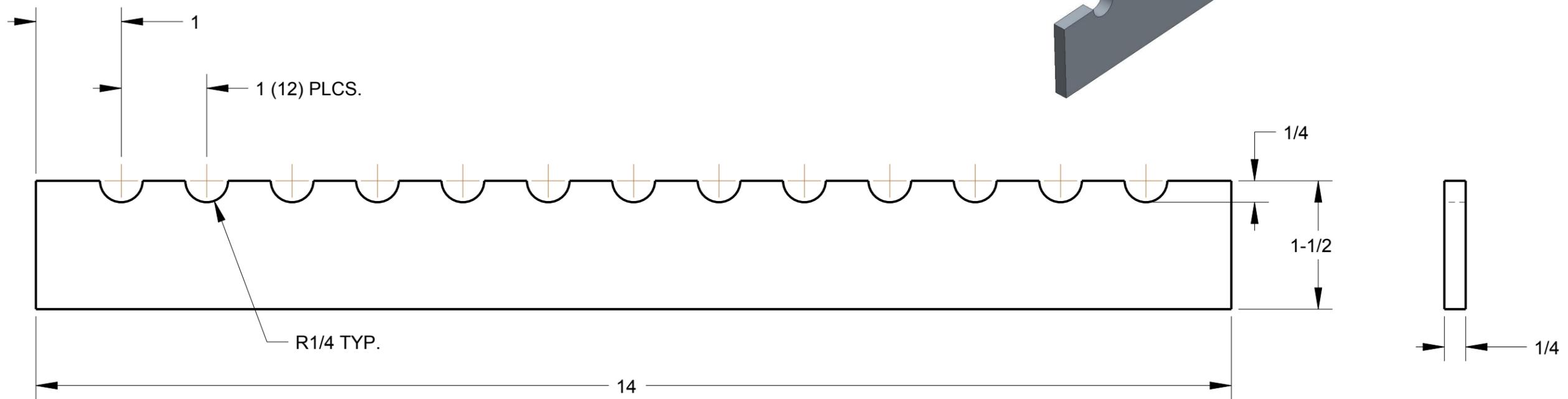
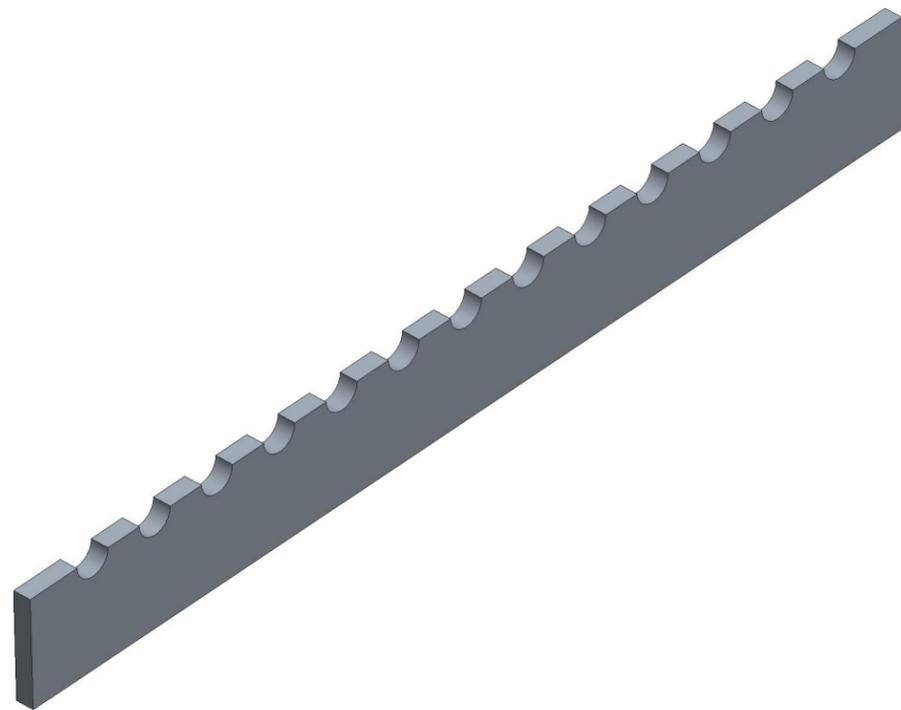
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FRACTIONAL: 0 TO 6 IN + - 1/32 6 IN AND UP + - 1/16								DESIGNED:		
ANGULAR: + - 1 DEG.								APPROVED:		
DECIMAL: 1 PLACE + - 0.05 2 PLACE + - 0.01 3 PLACE + - 0.005								DATE: 21-Dec-2015		
PROJECT NO.:	ROSCOMMON EQUIPMENT CENTER P.O. BOX 68 ROSCOMMON, MICHIGAN 48653								SCALE:	DWG. NO. 26-0150
TITLE: MANHOLE ACCESS RESTRICTOR									SIZE: B	



** MAKE FROM 21429140



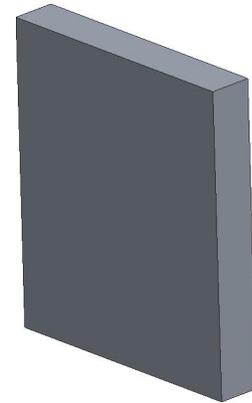
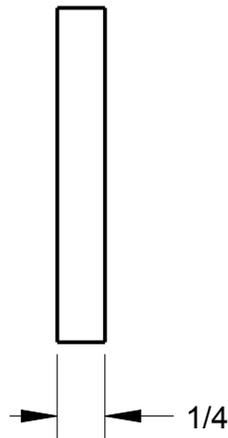
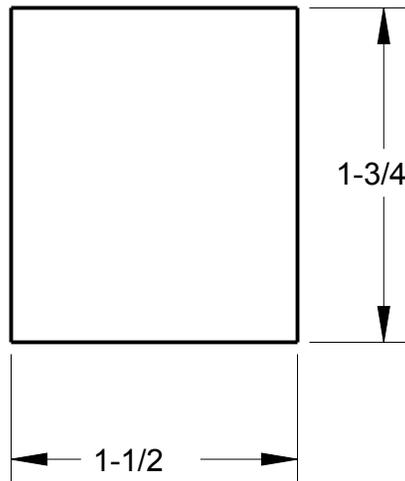
STD. TOL.						DRAWN:	
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ANGULAR: + - 1 DEG.						APPROVED:	
DECIMAL: 1 PLACE + - 0.05 2 PLACE + - 0.01 3 PLACE + - 0.005	NO.	BY	DATE	REVISION		DATE: 08-Jul-2016	
PROJECT NO.: REC 72	ROSCOMMON EQUIPMENT CENTER P.O. BOX 68 ROSCOMMON, MICHIGAN 48653				SCALE:	DWG. NO.: 26-0151	
TITLE: REAR WORKLIGHT SWITCH GUARD							SIZE: B



MAKE FROM: 06502320

STD. TOL.						DRAWN:	
FRACTIONAL: 0 TO 6 IN + - 1/32 6 IN AND UP + - 1/16						DESIGNED:	
ANGULAR: + - 1 DEG.						APPROVED:	
DECIMAL: 1 PLACE + - 0.05 2 PLACE + - 0.01 3 PLACE + - 0.005	NO.	BY	DATE	REVISION		DATE: 08-Jul-2016	
PROJECT NO.:	TITLE: REAR STEP					SCALE:	
							SIZE: B

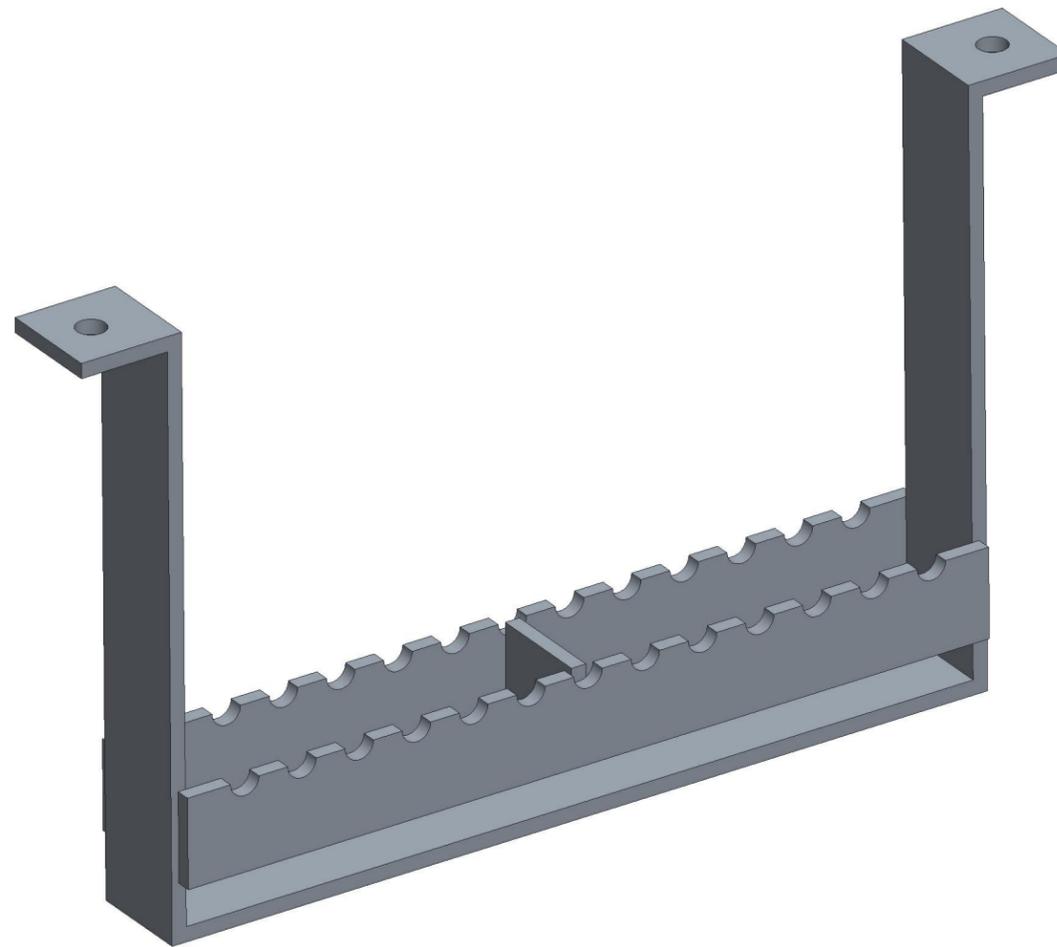
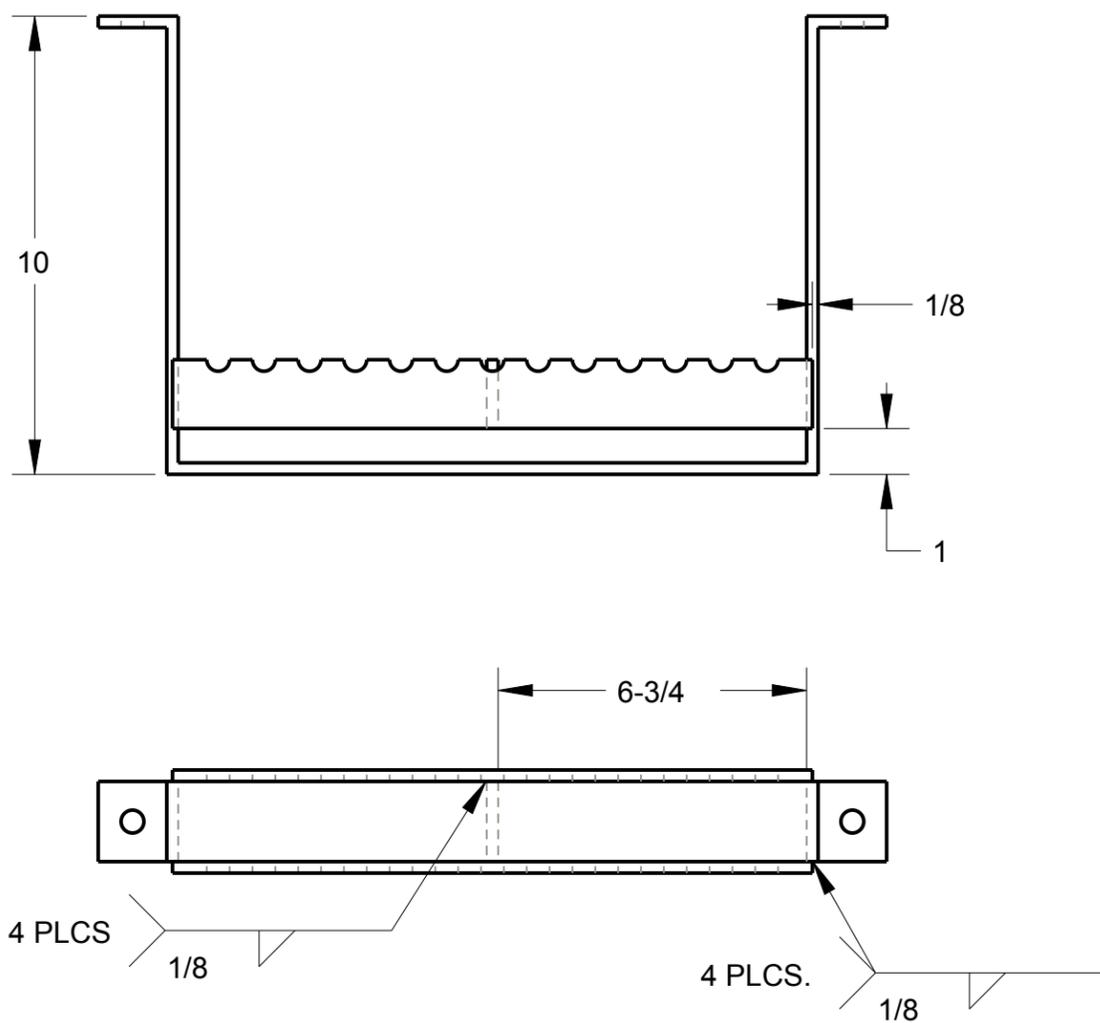
ROSCOMMON EQUIPMENT CENTER
P.O. BOX 68 ROSCOMMON, MICHIGAN 48653



*** MAKE FROM 06502320

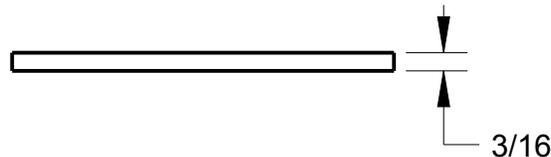
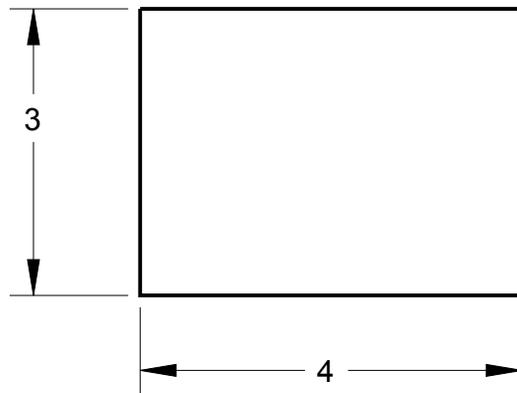
<i>STD. TOL.</i>						<i>DRAWN:</i>	
<i>FRACTIONAL</i> 0 TO 6 IN + - 1/32 6 IN AND UP + - 1/16						<i>DESIGNED:</i>	
<i>ANGULAR:</i> + - 1 DEG.						<i>APPROVED:</i>	
<i>DECIMAL:</i> 1 PLACE + - 0.05 2 PLACE + - 0.01 3 PLACE + - 0.005	<i>NO.</i>	<i>BY</i>	<i>DATE</i>	<i>REVISION</i>		<i>DATE:</i> 08-Jul-2016	
ROSCOMMON EQUIPMENT CENTER P.O. BOX 68 ROSCOMMON, MICHIGAN 48653						<i>SCALE:</i>	
<i>PROJECT NO.:</i>	<i>TITLE:</i> REAR STEP FILLER					<i>DWG. NO.</i> 26-0153	<i>SIZE:</i> A

ITEM	PART NO.	DWG	DESCRIPTION	QTY
1			REAR STIRRUP	1
2	26-0152		REAR STEP	2
3	26-0153		REAR STEP FILLER	1



*** BEFORE CREATING THIS PART, REMOVE EXISTING STIRRUP FROM TRUCK & BY CUTTING AND RE-WELDING, MAKE THE STIRRUP 10" TALL AS DEPICTED ABOVE.

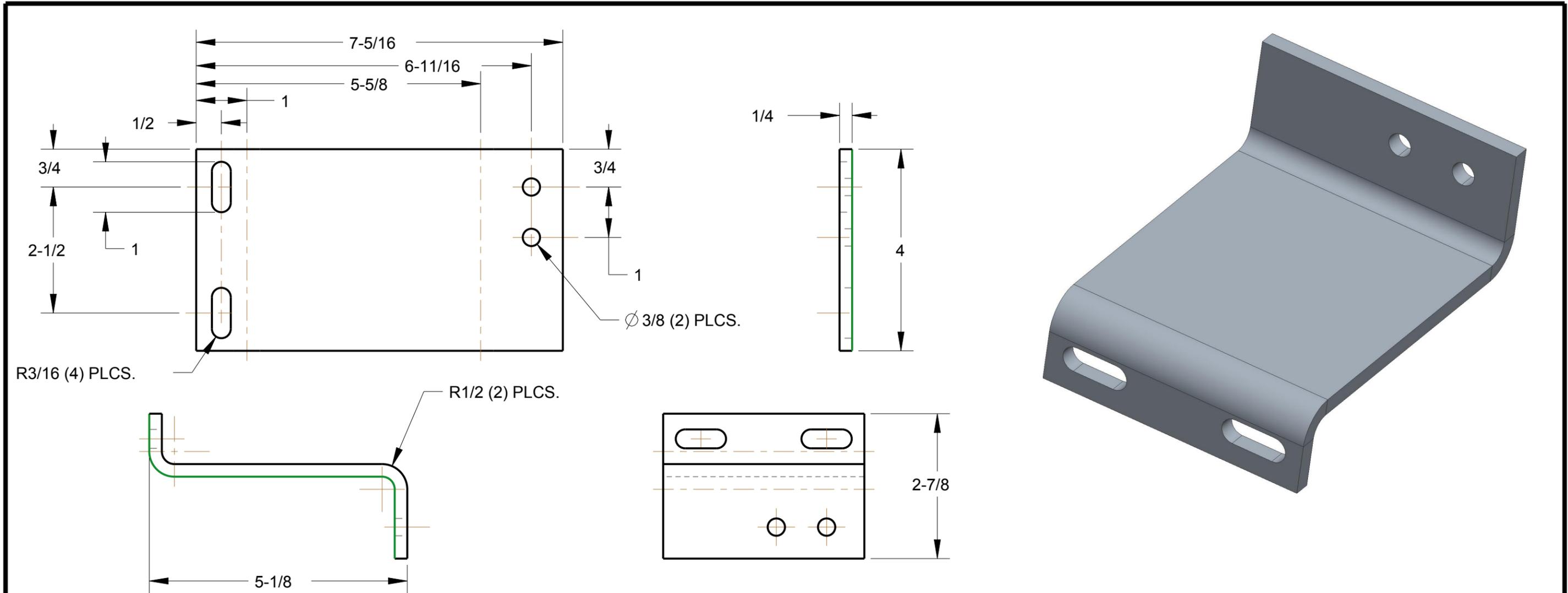
STD. TOL.						DRAWN:		
FRACTIONAL: 0 TO 6 IN + - 1/32 6 IN AND UP + - 1/16						DESIGNED:		
ANGULAR: + - 1 DEG.						APPROVED:		
DECIMAL: 1 PLACE + - 0.05 2 PLACE + - 0.01 3 PLACE + - 0.005						DATE: 08-Jul-2016		
PROJECT NO.:	TITLE: REAR STEP SW					SCALE:	DWG. NO. 26-0154	SIZE: B



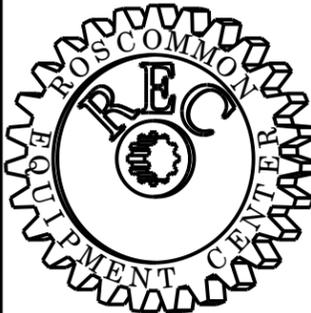
*** SOME DIMENSIONAL ADJUSTMENT MAY BE NEEDED FOR THIS PART. REFER TO THE DRAWING LABELED: "DUMP VALVE, LADDER & STEP DETAIL" FOR MORE INFORMATION.

*** MAKE FROM: 21429140

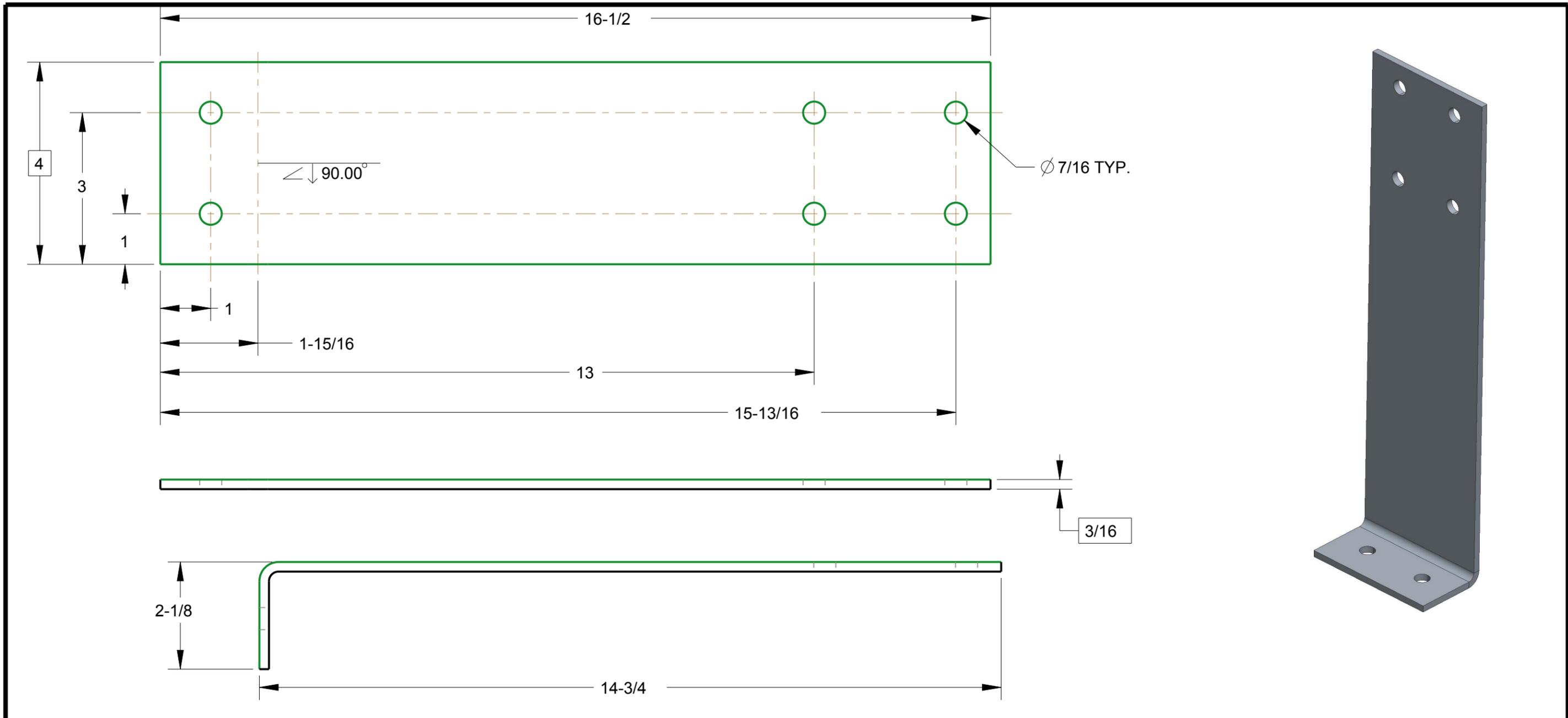
STD. TOL.						DRAWN:	
FRACTIONAL 0 TO 6 IN + - 1/32 6 IN AND UP + - 1/16						DESIGNED:	
ANGULAR: + - 1 DEG.						APPROVED:	
DECIMAL: 1 PLACE + - 0.05 2 PLACE + - 0.01 3 PLACE + - 0.005	NO.	BY	DATE	REVISION		DATE: 08-Jul-2016	
ROSCOMMON EQUIPMENT CENTER P.O. BOX 68 ROSCOMMON, MICHIGAN 48653						SCALE:	
PROJECT NO.:	TITLE: LADDER WELD TAB					DWG. NO. 26-0155	SIZE: A



*** MAKE FROM 06502320

STD. TOL.						DRAWN:	
FRACTIONAL: 0 TO 6 IN + - 1/32 6 IN AND UP + - 1/16						DESIGNED:	
ANGULAR: + - 1 DEG.						APPROVED:	
DECIMAL: 1 PLACE + - 0.05 2 PLACE + - 0.01 3 PLACE + - 0.005	NO.	BY	DATE	REVISION		DATE: 08-Jul-2016	
PROJECT NO.:	TITLE: PASSENGER SIDE PLUMBING BRACE					SCALE:	
							SIZE: B

ROSCOMMON EQUIPMENT CENTER
P.O. BOX 68 ROSCOMMON, MICHIGAN 48653



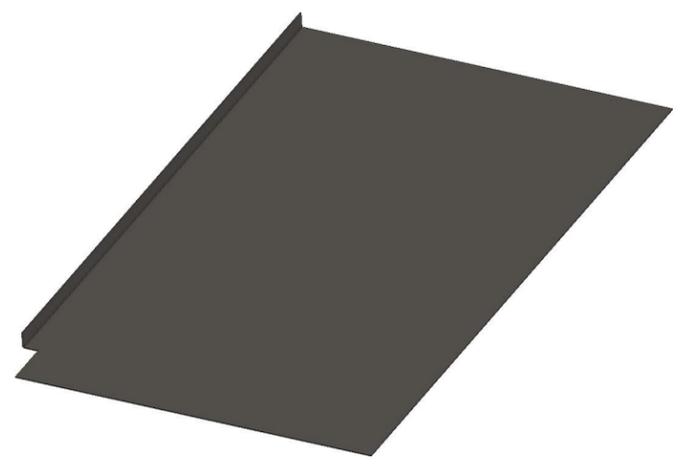
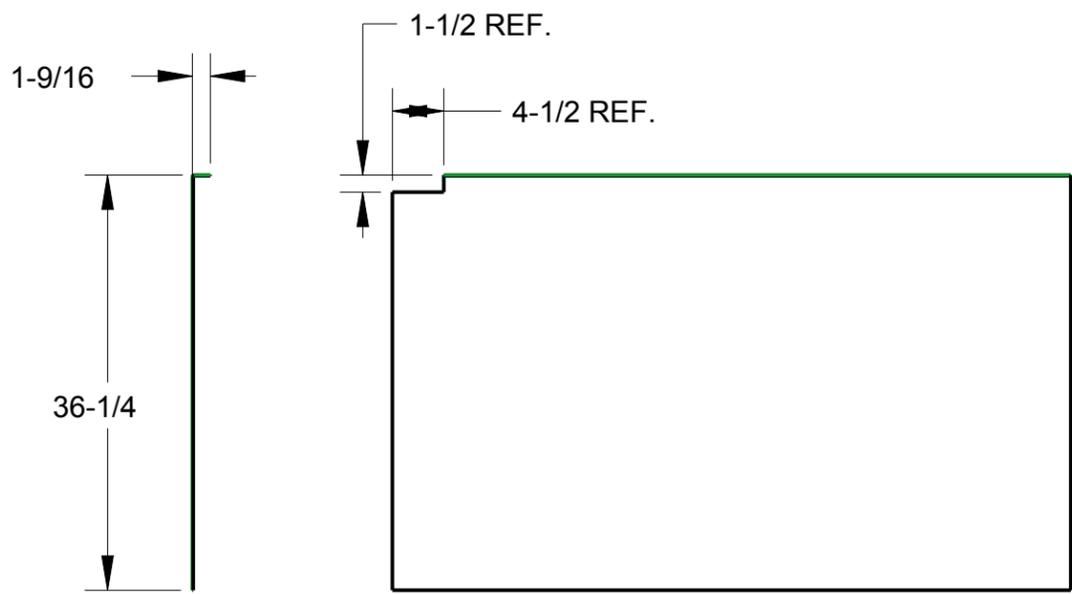
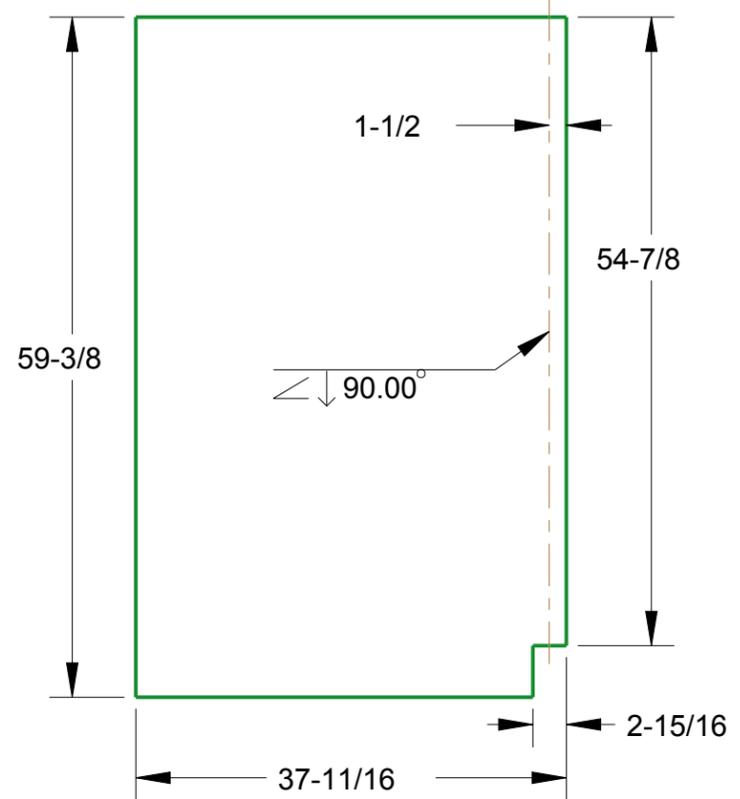
Ø 7/16 TYP.

3/16

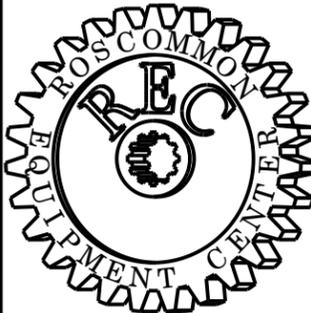
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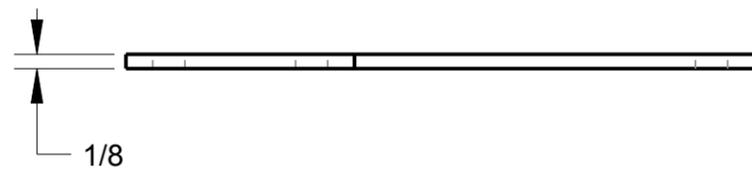
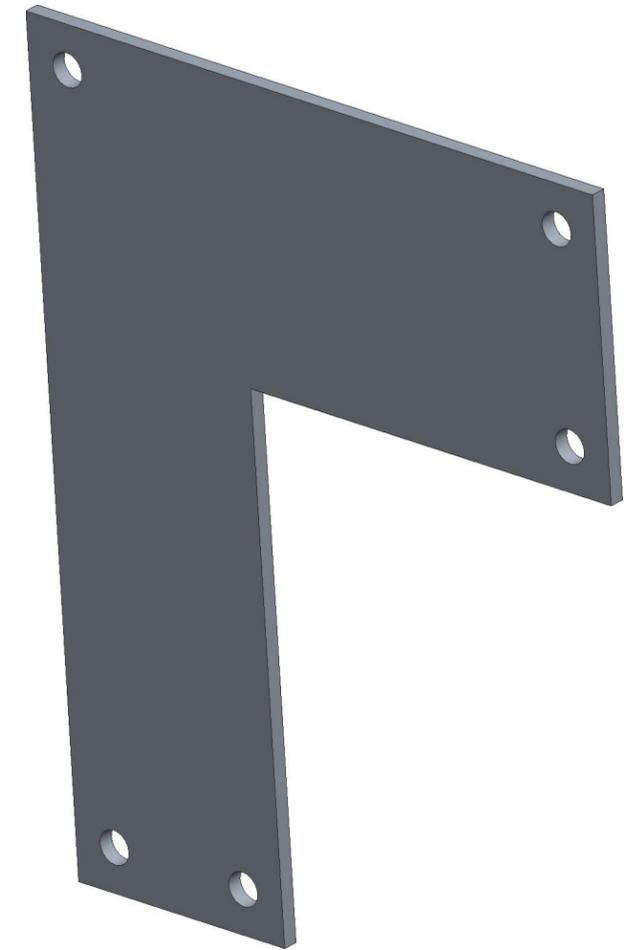
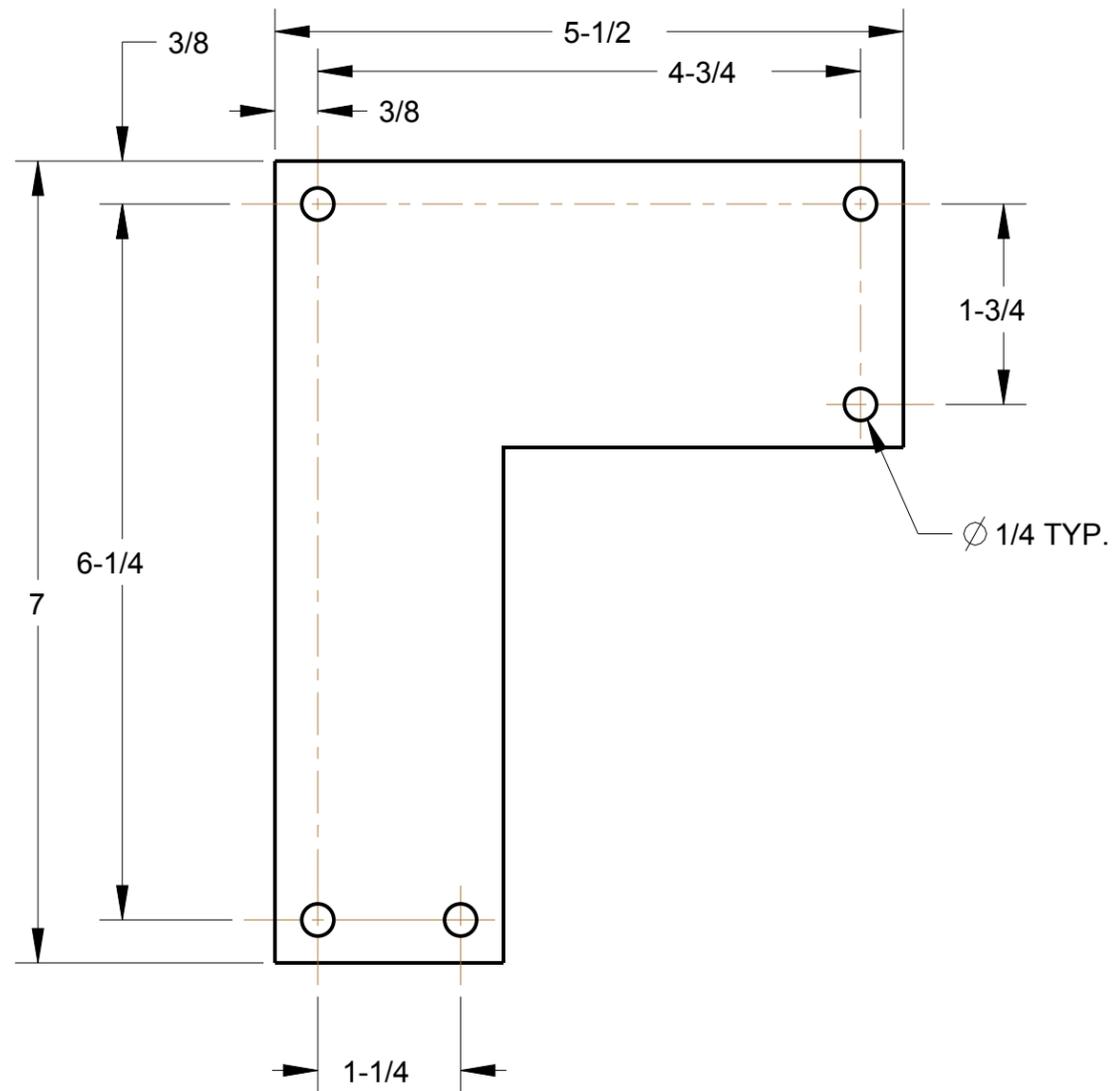
STD. TOL.								DRAWN:	
FRACTIONAL: 0 TO 6 IN + - 1/32 6 IN AND UP + - 1/16								DESIGNED:	
ANGULAR: + - 1 DEG.								APPROVED:	
DECIMAL: 1 PLACE + - 0.05 2 PLACE + - 0.01 3 PLACE + - 0.005	NO.	BY	DATE	REVISION				DATE: 21-Dec-2015	
PROJECT NO.:	TITLE: DRIVER SIDE PLUMBING BRACE							SCALE:	
								DWG. NO. 26-0157	SIZE: B

ROSCOMMON EQUIPMENT CENTER
P.O. BOX 68 ROSCOMMON, MICHIGAN 48653

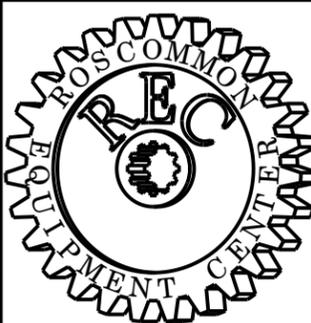


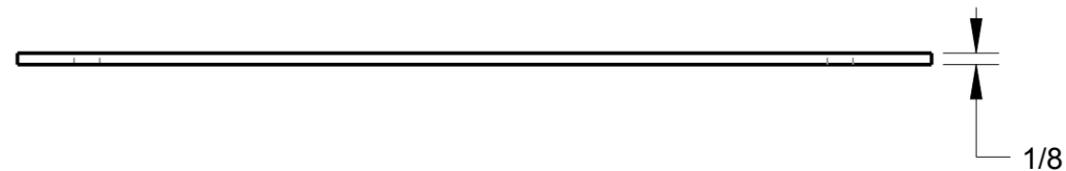
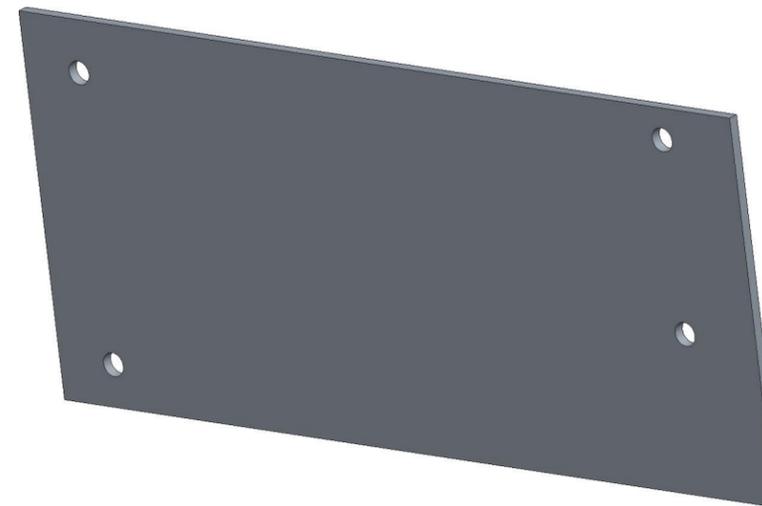
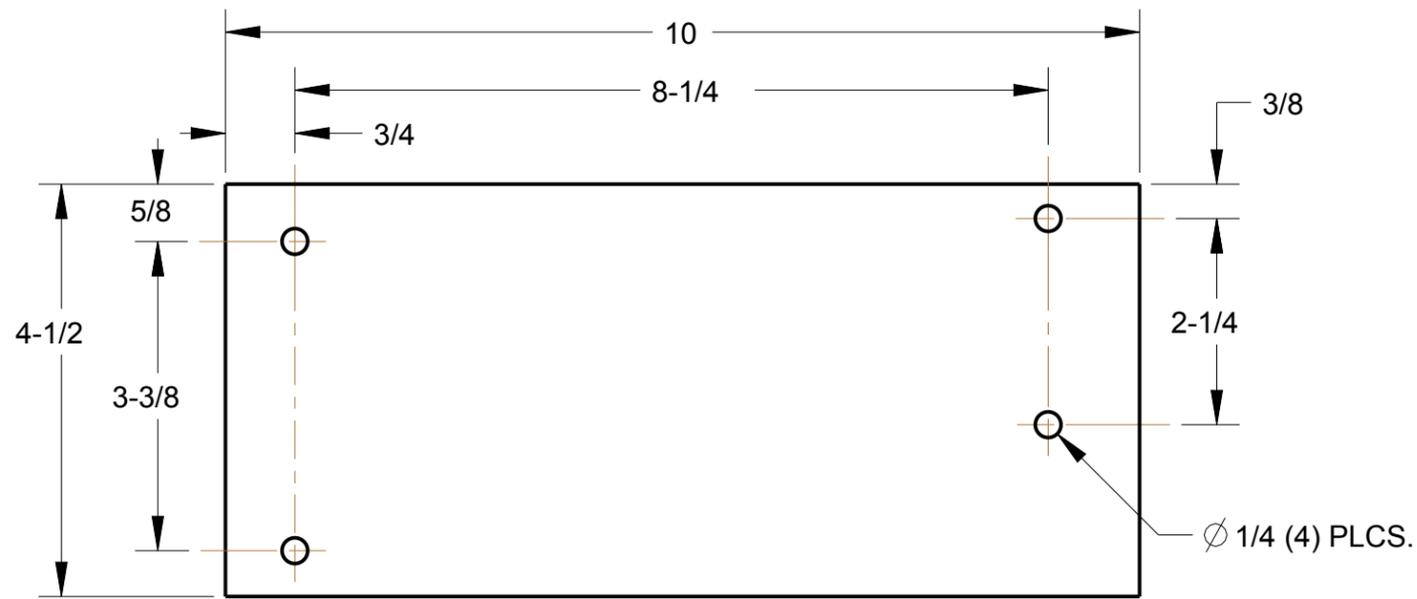
*** MAKE FROM: 08000750

STD. TOL.						DRAWN:	
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ANGULAR: + - 1 DEG.						APPROVED:	
DECIMAL: 1 PLACE + - 0.05 2 PLACE + - 0.01 3 PLACE + - 0.005						DATE: 25-Nov-2015	
PROJECT NO.:	ROSCOMMON EQUIPMENT CENTER P.O. BOX 68 ROSCOMMON, MICHIGAN 48653					SCALE:	DWG. NO. 26-0158
TITLE:	CARGO SHEET						SIZE: B

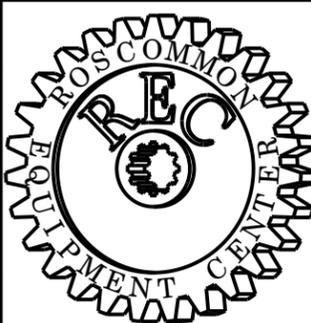


*** MAKE FROM: 8973K89

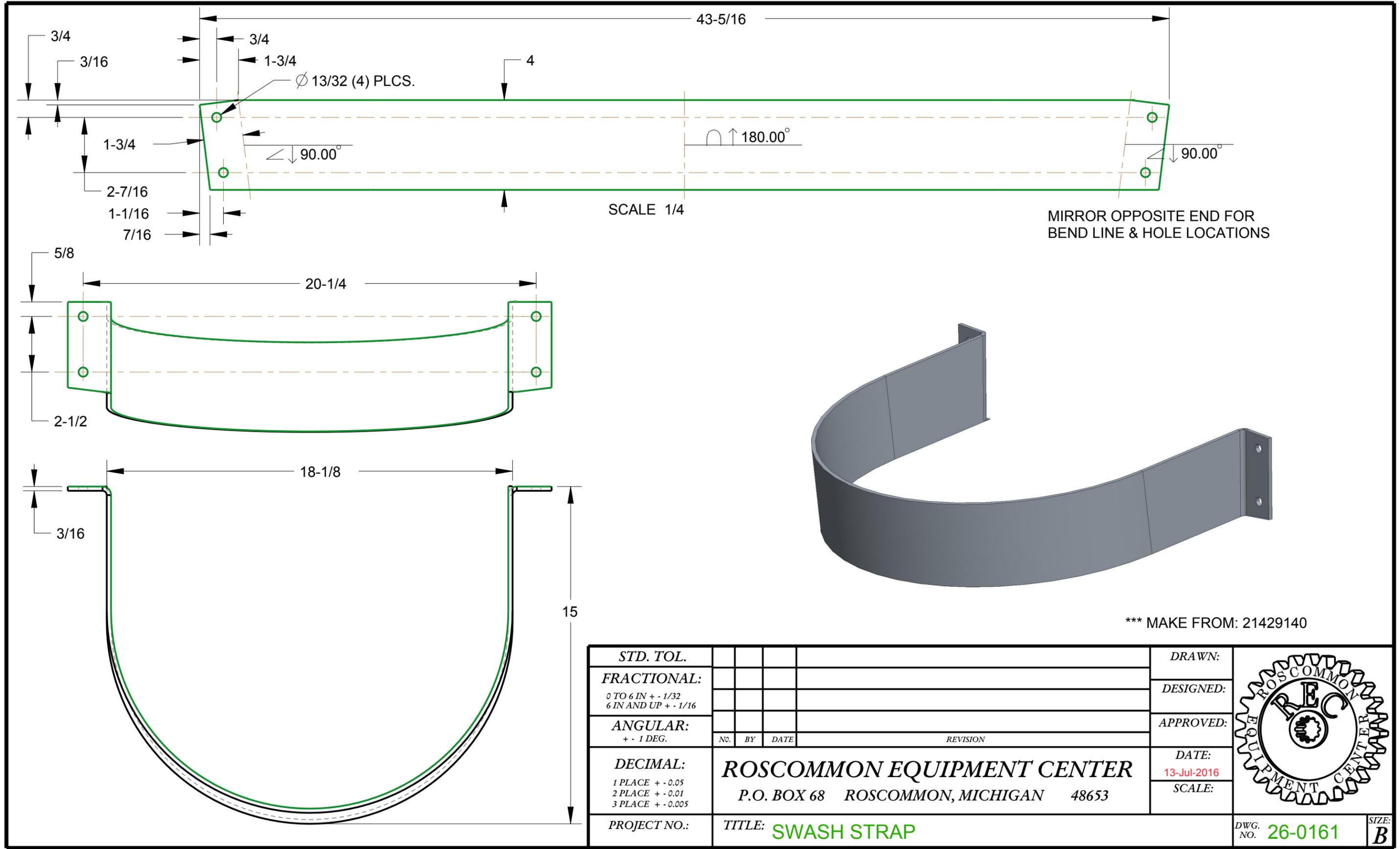
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FRACTIONAL: 0 TO 6 IN + - 1/32 6 IN AND UP + - 1/16						DESIGNED:		
ANGULAR: + - 1 DEG.						APPROVED:		
DECIMAL: 1 PLACE + - 0.05 2 PLACE + - 0.01 3 PLACE + - 0.005						DATE: 11-Jul-2016		
PROJECT NO.:	TITLE: COVER PLATE L					SCALE:	DWG. NO. 26-0159	SIZE: B

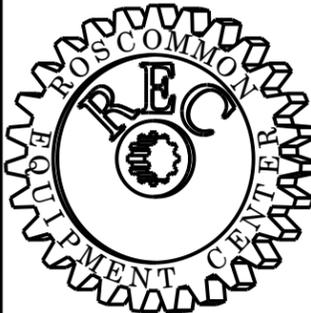


*** MAKE FROM: 8973K89

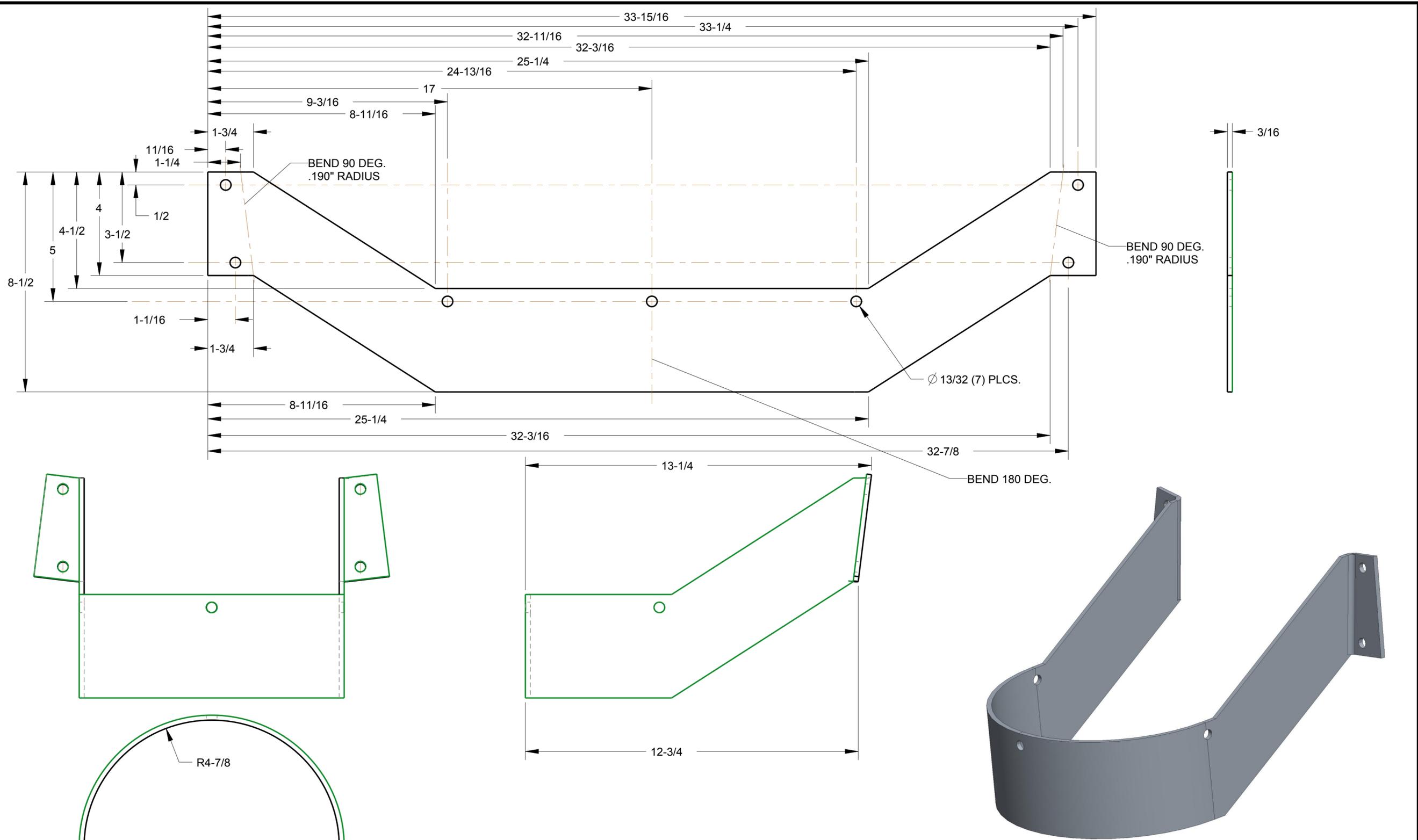
STD. TOL.						DRAWN:	
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ANGULAR: + - 1 DEG.						APPROVED:	
DECIMAL: 1 PLACE + - 0.05 2 PLACE + - 0.01 3 PLACE + - 0.005	NO.	BY	DATE	REVISION		DATE: 11-Jul-2016	
PROJECT NO.:	TITLE: COVER PLATE RECTANGLE					SCALE:	
							SIZE: B

ROSCOMMON EQUIPMENT CENTER
P.O. BOX 68 ROSCOMMON, MICHIGAN 48653



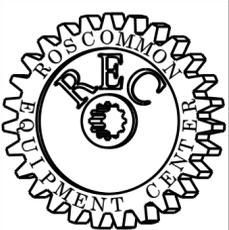
STD. TOL.						DRAWN:		
FRACTIONAL: 0 TO 6 IN + - 1/32 6 IN AND UP + - 1/16						DESIGNED:		
ANGULAR: + - 1 DEG.						APPROVED:		
DECIMAL: 1 PLACE + - 0.05 2 PLACE + - 0.01 3 PLACE + - 0.005						DATE: 13-Jul-2016		
PROJECT NO.:	TITLE: SWASH STRAP						SCALE:	DWG. NO. 26-0161
							SIZE: B	

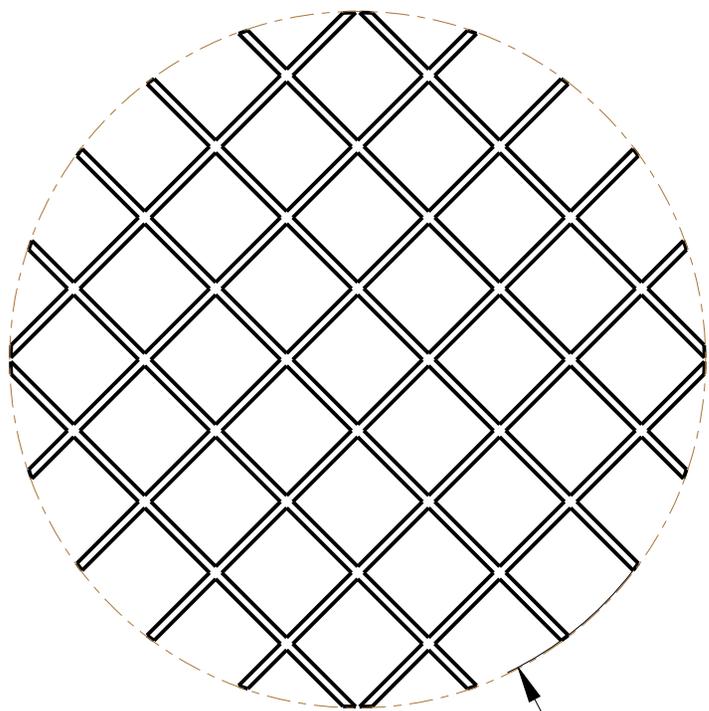
ROSCOMMON EQUIPMENT CENTER
P.O. BOX 68 ROSCOMMON, MICHIGAN 48653



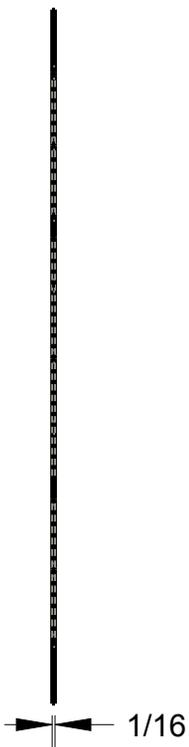
*** MAKE FROM: 8973K44

STD. TOL.						DRAWN:	
FRACTIONAL:						DESIGNED:	
0 TO 6 IN + .1/32						APPROVED:	
6 IN AND UP + .1/16						DATE:	
ANGULAR:						13-Jul-2016	
+ .1 DEG.	NO.	BY	DATE	REVISION		SCALE:	
DECIMAL:	ROSCOMMON EQUIPMENT CENTER P.O. BOX 68 ROSCOMMON, MICHIGAN 48653						
1 PLACE + .005							
2 PLACE + .001							
3 PLACE + .0005	PROJECT NO.:	TITLE: DRAIN STRAP				DWG. NO. 26-0162	SIZE: C

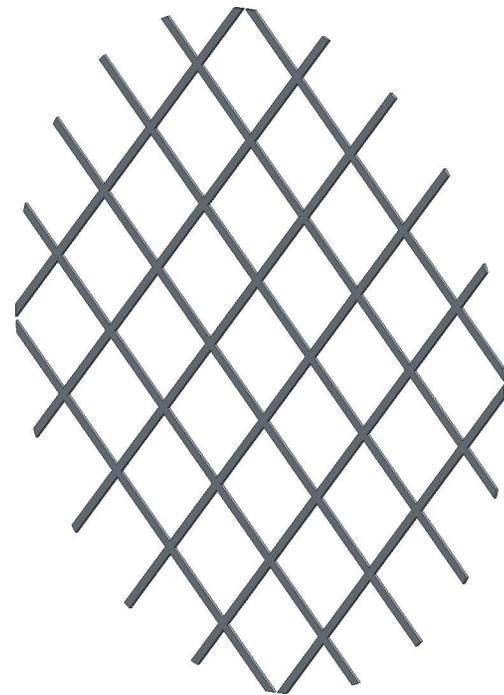




Ø 9-11/16

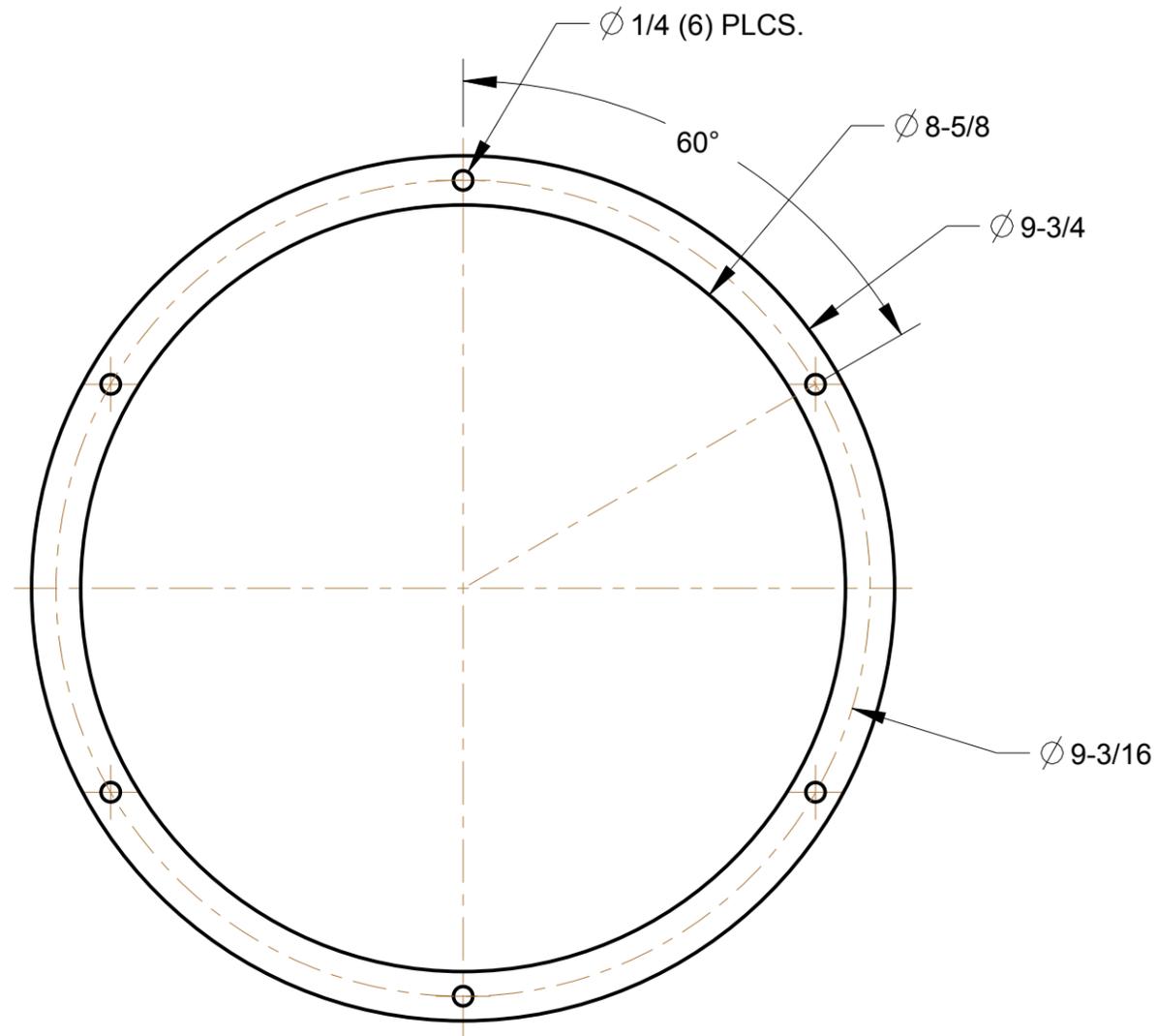


1/16



MAKE FROM: 9305T214

STD. TOL.						DRAWN:	
FRACTIONAL 0 TO 6 IN + - 1/32 6 IN AND UP + - 1/16						DESIGNED:	
ANGULAR: + - 1 DEG.						APPROVED:	
DECIMAL: 1 PLACE + - 0.05 2 PLACE + - 0.01 3 PLACE + - 0.005	NO.	BY	DATE	REVISION		DATE: 04-Feb-2016	
	ROSCOMMON EQUIPMENT CENTER P.O. BOX 68 ROSCOMMON, MICHIGAN 48653					SCALE:	
PROJECT NO.:	TITLE: OVERFLOW SCREEN					DWG. NO. 26-0163	SIZE: A

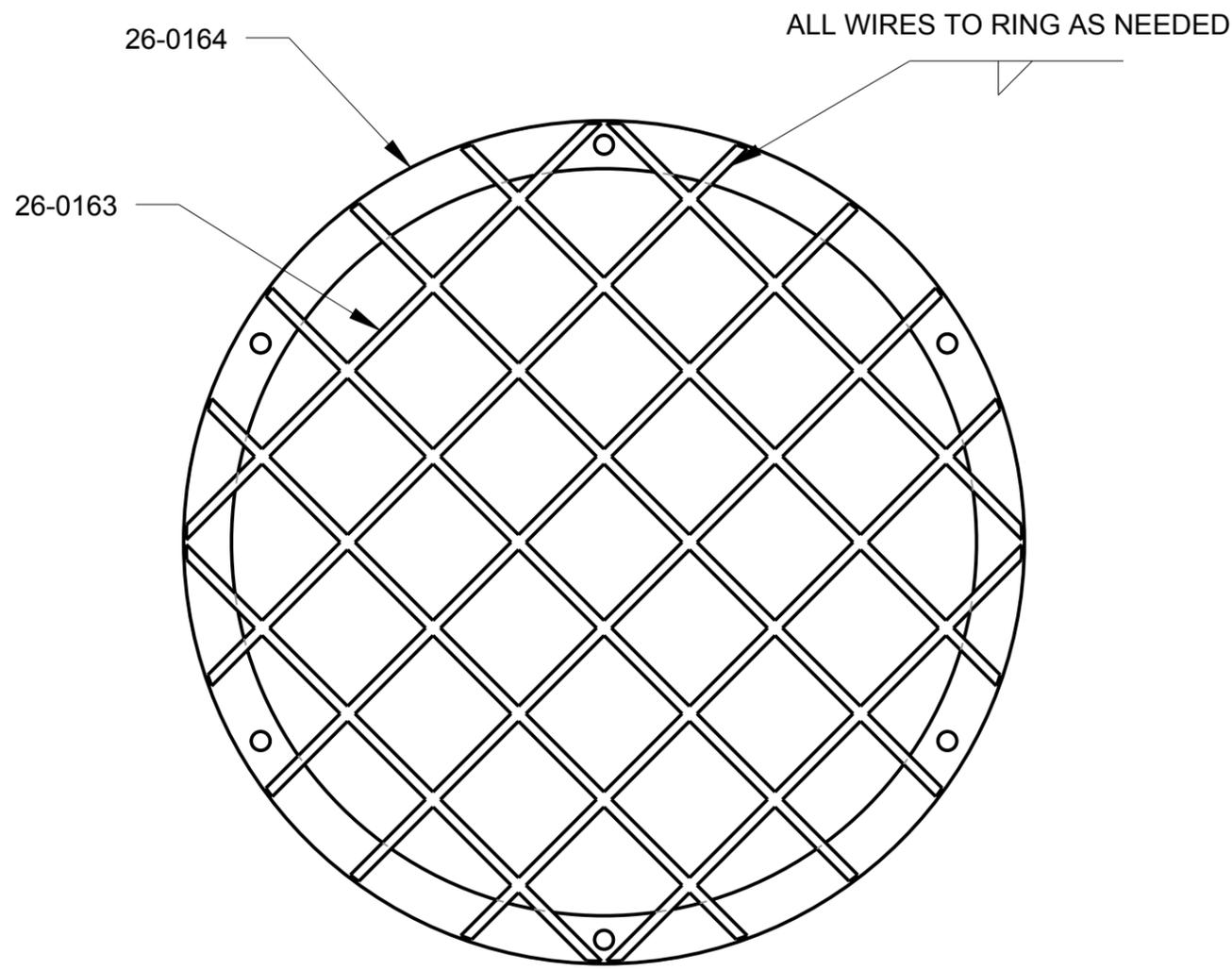


***NOTE - MAKE FROM:8973K89

STD. TOL.						DRAWN:	
FRACTIONAL: 0 TO 6 IN + - 1/32 6 IN AND UP + - 1/16						DESIGNED:	
ANGULAR: + - 1 DEG.						APPROVED:	
DECIMAL: 1 PLACE + - 0.05 2 PLACE + - 0.01 3 PLACE + - 0.005	NO.	BY	DATE	REVISION		DATE: 04-Feb-2016	
PROJECT NO.:	TITLE: OVERFLOW FILTER RING					SCALE:	
							SIZE: B

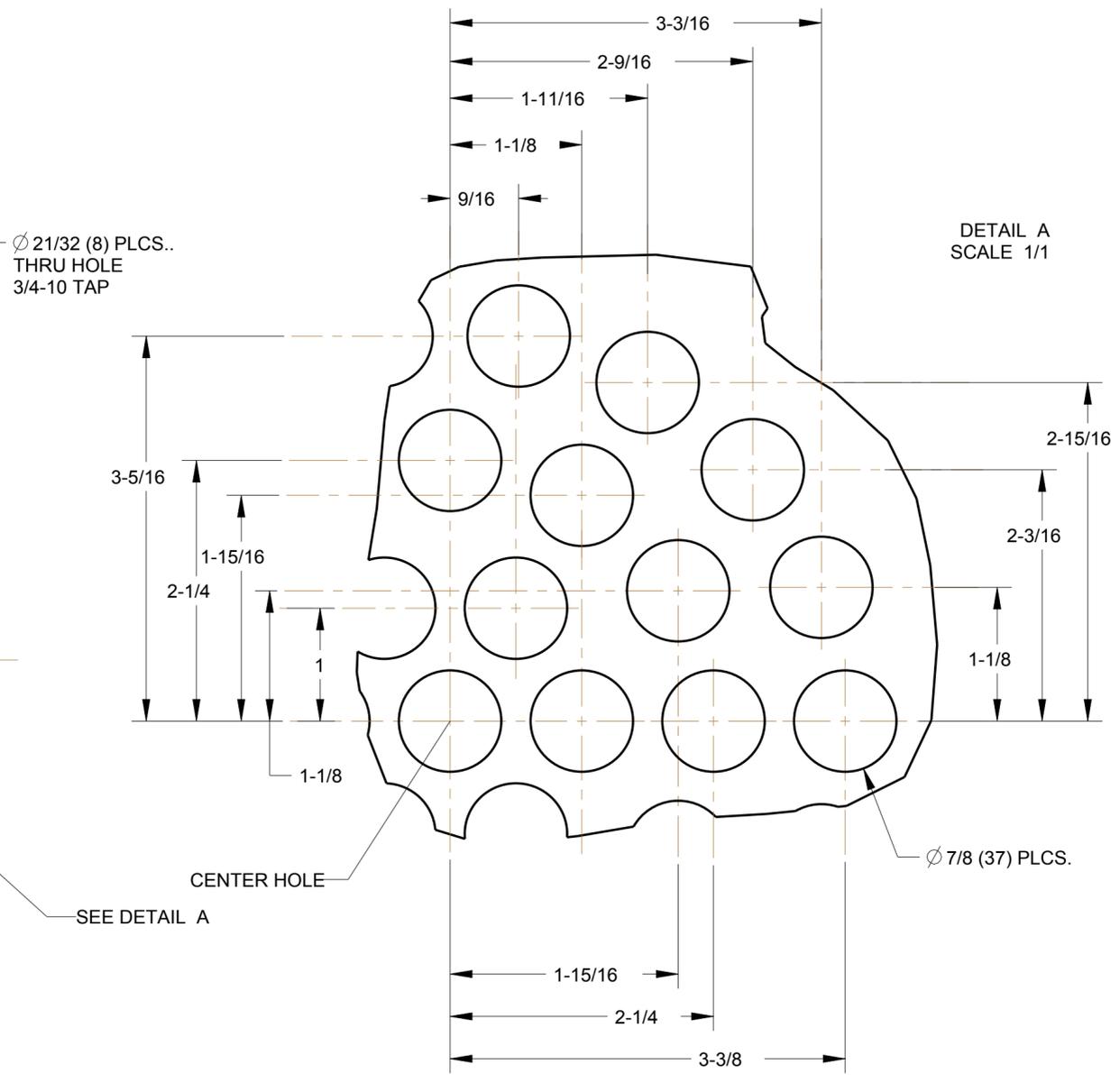
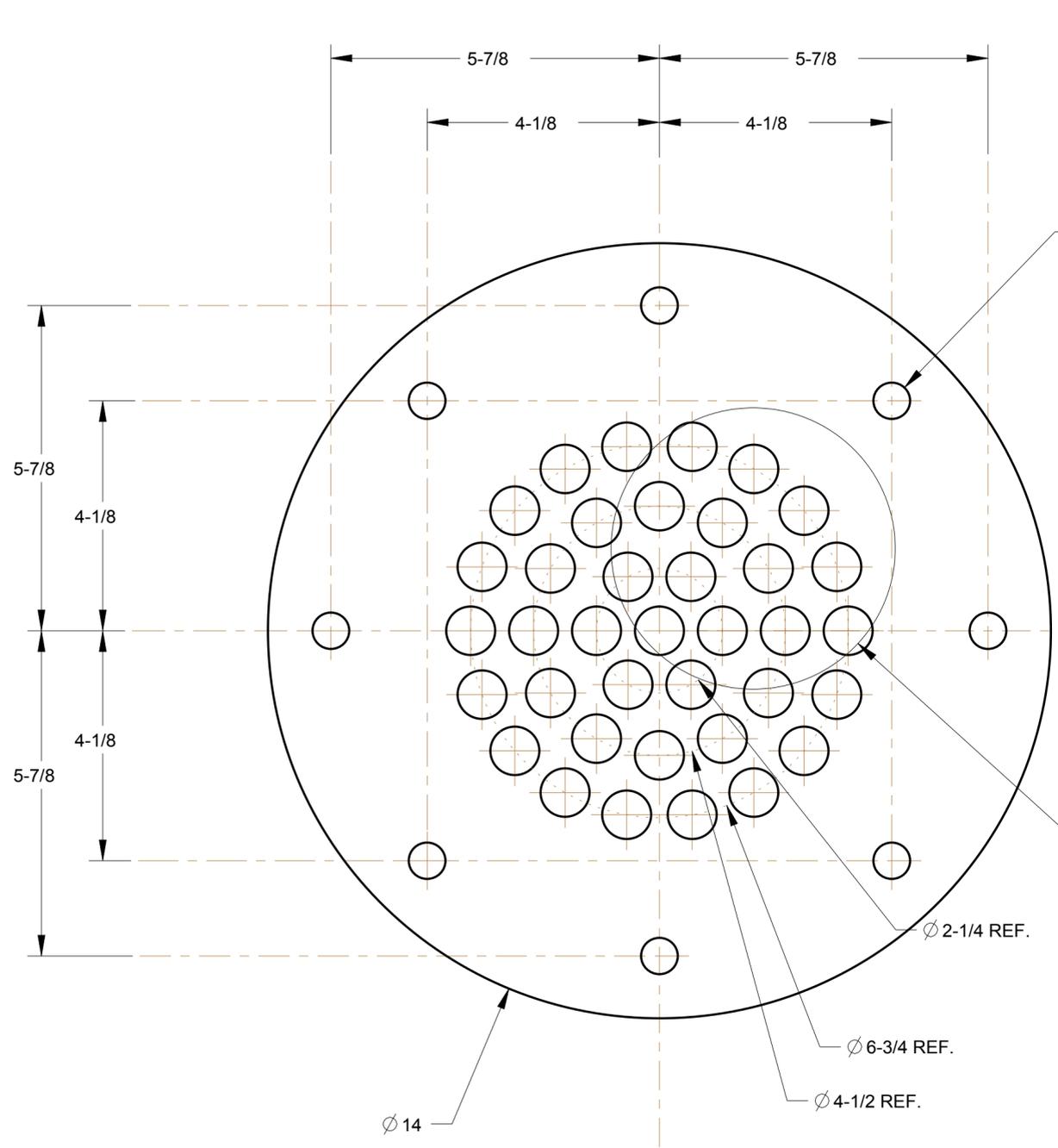
ROSCOMMON EQUIPMENT CENTER

P.O. BOX 68 ROSCOMMON, MICHIGAN 48653



STD. TOL.						DRAWN:	
FRACTIONAL: 0 TO 6 IN + - 1/32 6 IN AND UP + - 1/16						DESIGNED:	
ANGULAR: + - 1 DEG.						APPROVED:	
DECIMAL: 1 PLACE + - 0.05 2 PLACE + - 0.01 3 PLACE + - 0.005	NO.	BY	DATE	REVISION		DATE: 04-Feb-2016	
PROJECT NO.:	TITLE: OVERFLOW SCREEN SW					SCALE:	
							SIZE: B

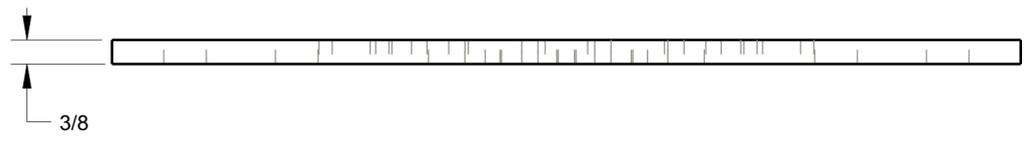
ROSCOMMON EQUIPMENT CENTER
P.O. BOX 68 ROSCOMMON, MICHIGAN 48653



DETAIL A
SCALE 1/1

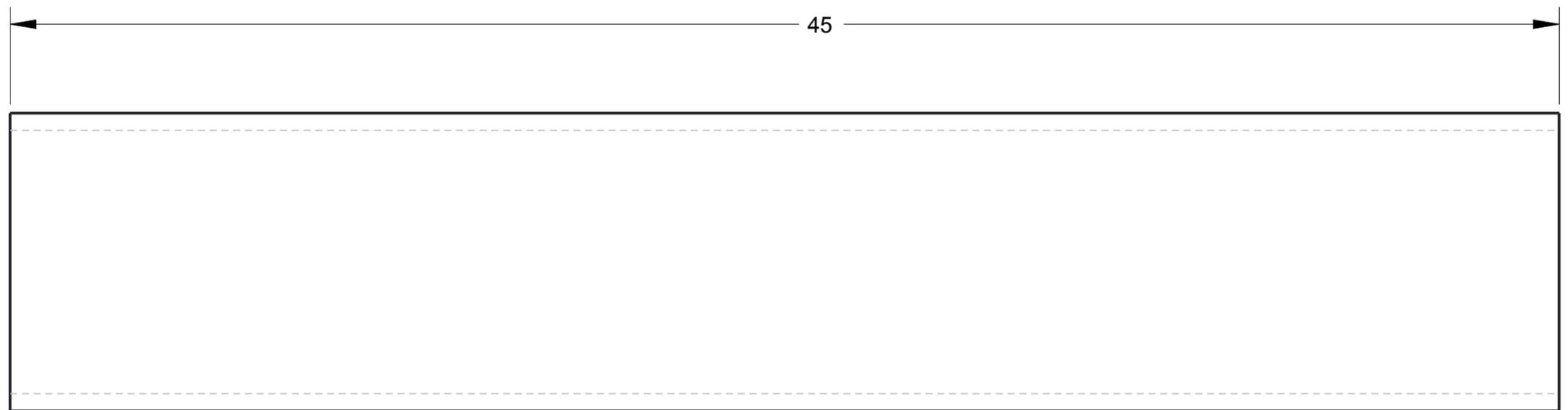
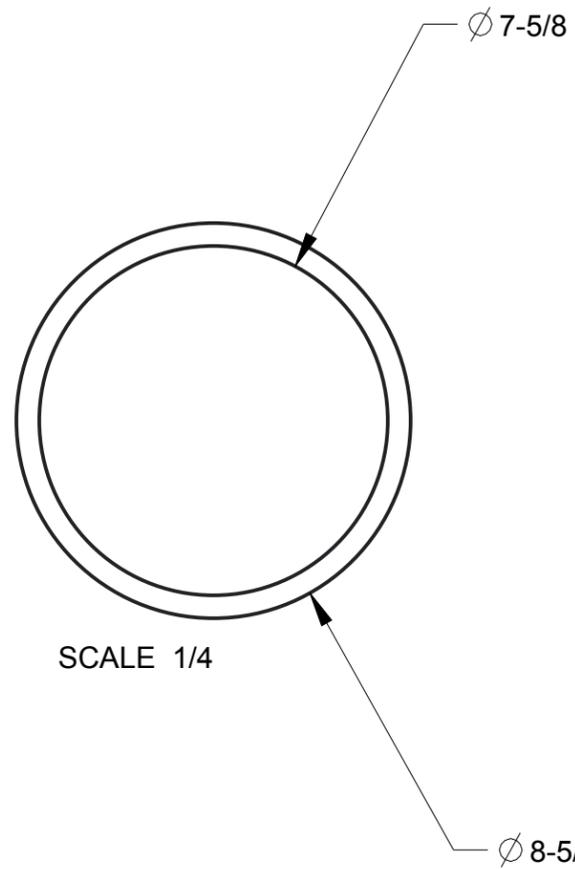
MIRROR HORIZONTALLY AND VERTICALLY ABOUT CENTER HOLE FOR REMAINING PATTERN.

MAKE FROM: 89155K28



STD. TOL.						DRAWN:		
FRACTIONAL: 0 TO 6 IN + - 1/32 6 IN AND UP + - 1/16						DESIGNED:		
ANGULAR: + - 1 DEG.						APPROVED:		
DECIMAL: 1 PLACE + - 0.05 2 PLACE + - 0.01 3 PLACE + - 0.005						DATE: 18-Dec-2015		
PROJECT NO.:	TITLE: DRAIN PLATE					SCALE:	DWG. NO. 26-0166	SIZE: C

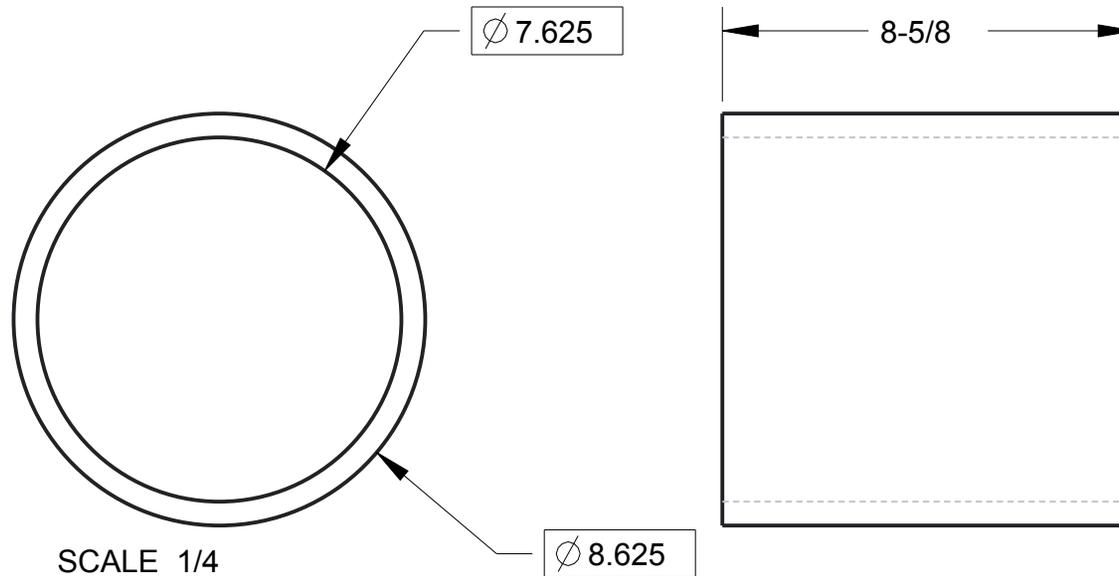
ROSCOMMON EQUIPMENT CENTER
P.O. BOX 68 ROSCOMMON, MICHIGAN 48653



MAKE FROM:48855K53

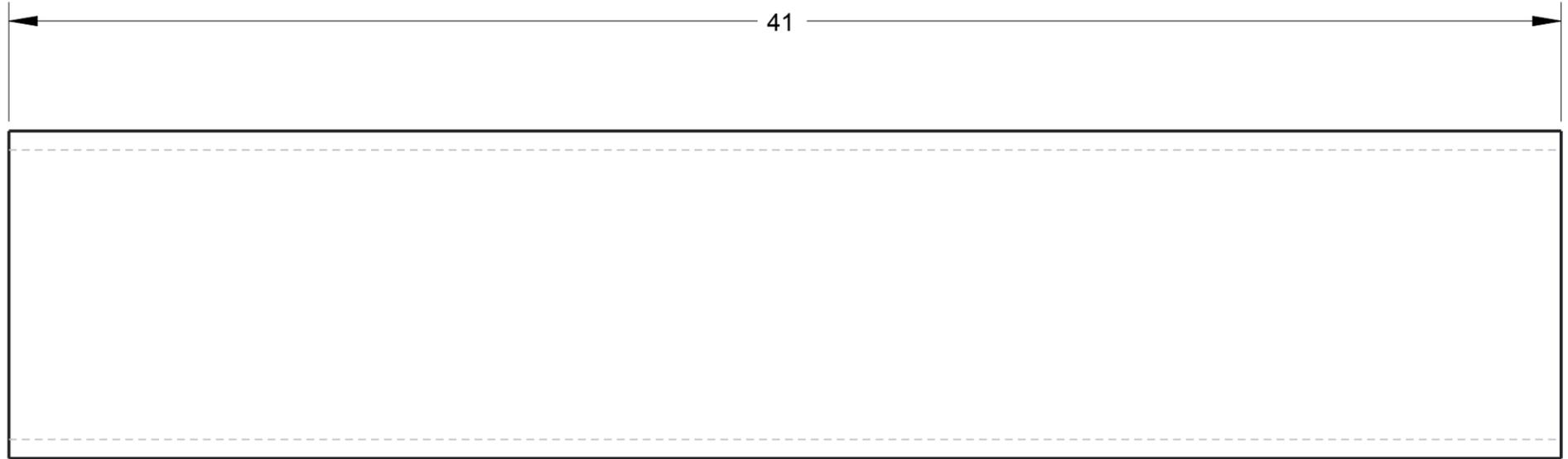
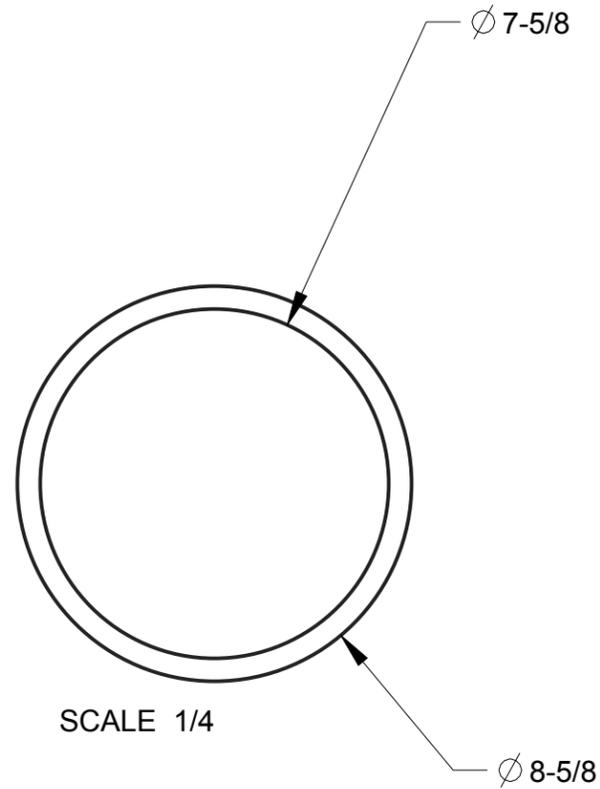
STD. TOL.						DRAWN:	
FRACTIONAL: 0 TO 6 IN + - 1/32 6 IN AND UP + - 1/16						DESIGNED:	
ANGULAR: + - 1 DEG.						APPROVED:	
DECIMAL: 1 PLACE + - 0.05 2 PLACE + - 0.01 3 PLACE + - 0.005	NO.	BY	DATE	REVISION		DATE: 04-Feb-2016	
PROJECT NO.:	TITLE: HORIZONTAL PIPE					SCALE:	
							SIZE: B

ROSCOMMON EQUIPMENT CENTER
P.O. BOX 68 ROSCOMMON, MICHIGAN 48653



MAKE FROM:48855K53

STD. TOL.						DRAWN:	
FRACTIONAL 0 TO 6 IN + - 1/32 6 IN AND UP + - 1/16						DESIGNED:	
ANGULAR: + - 1 DEG.						APPROVED:	
DECIMAL: 1 PLACE + - 0.05 2 PLACE + - 0.01 3 PLACE + - 0.005	NO.	BY	DATE	REVISION		DATE: 04-Feb-2016	
	ROSCOMMON EQUIPMENT CENTER P.O. BOX 68 ROSCOMMON, MICHIGAN 48653					SCALE:	
PROJECT NO.:	TITLE: PIPE STUB					DWG. NO. 26-0168	SIZE: A

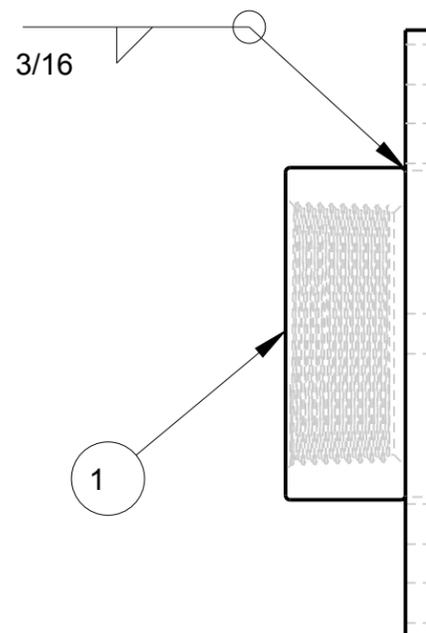
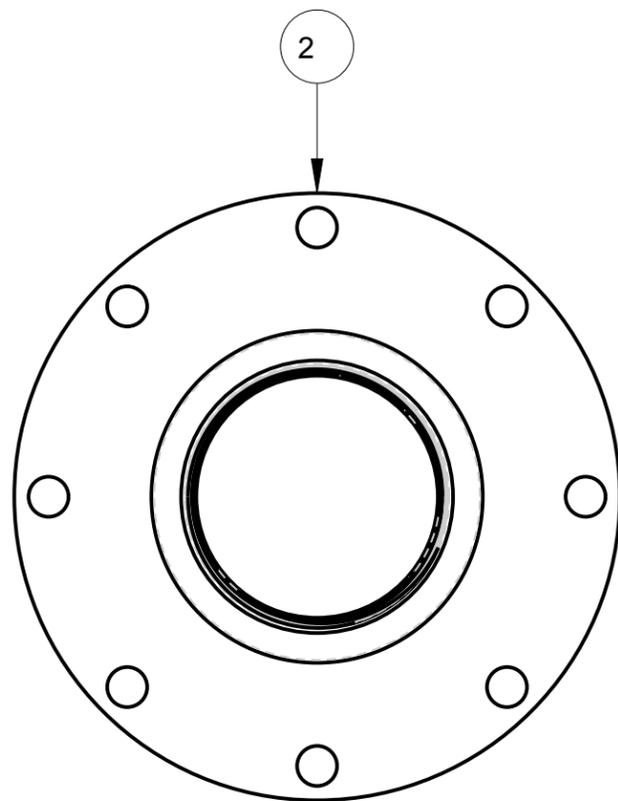


*** MAKE FROM:48855K53

STD. TOL.						DRAWN:	
FRACTIONAL: 0 TO 6 IN + - 1/32 6 IN AND UP + - 1/16						DESIGNED:	
ANGULAR: + - 1 DEG.						APPROVED:	
DECIMAL: 1 PLACE + - 0.05 2 PLACE + - 0.01 3 PLACE + - 0.005	NO.	BY	DATE	REVISION		DATE: 04-Feb-2016	
PROJECT NO.:	TITLE: DRAIN PIPE					SCALE:	
							SIZE: B

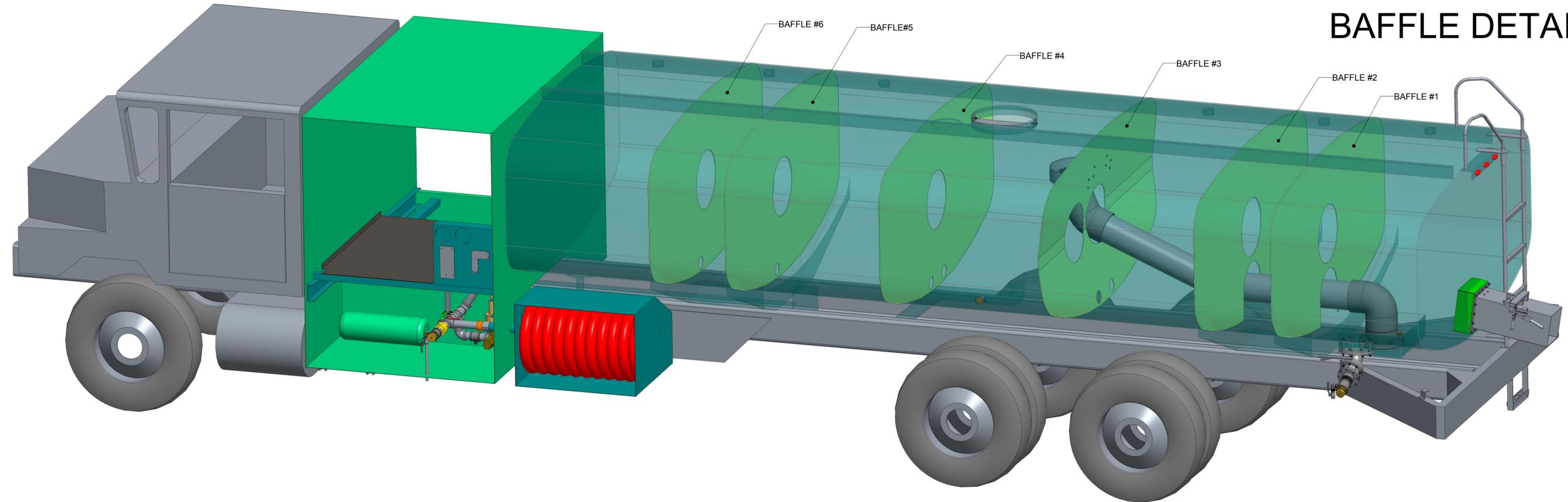
ROSCOMMON EQUIPMENT CENTER
 P.O. BOX 68 ROSCOMMON, MICHIGAN 48653

ITEM	PART NO.	DWG	DESCRIPTION	QTY
1	4513K419		1/2 COUPLING BLK, 2 1/2" NPT MCMASTER	1
2	BETBWF401MS	B	WELD FLANGE , MODIFIED	1

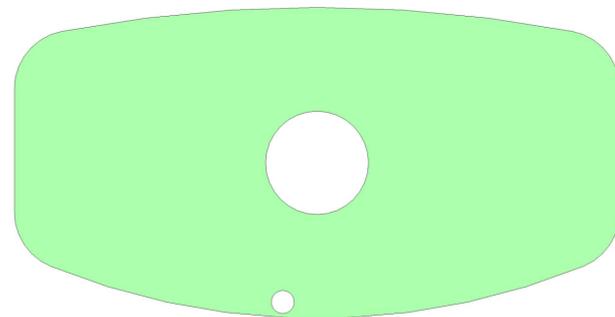


STD. TOL.					DRAWN:	
FRACTIONAL: 0 TO 6 IN + - 1/32 6 IN AND UP + - 1/16					DESIGNED: DCM	
ANGULAR: + - 1 DEG.	NO.	BY	DATE	REVISION	APPROVED:	
DECIMAL: 1 PLACE + - 0.05 2 PLACE + - 0.01 3 PLACE + - 0.005	ROSCOMMON EQUIPMENT CENTER P.O. BOX 68 ROSCOMMON, MICHIGAN 48653				DATE: 09-Aug-2016	
PROJECT NO.: REC 72	TITLE: WATER FILL WC				SCALE:	DWG. NO.: 26-0170
						SIZE: B

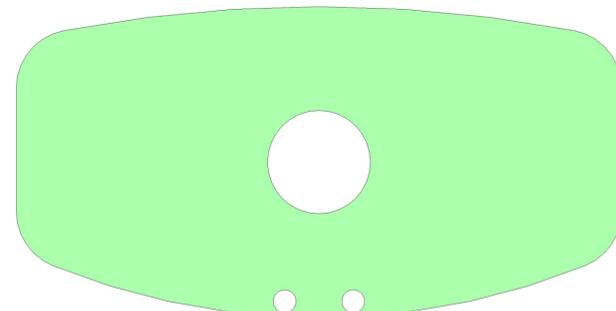
BAFFLE DETAIL



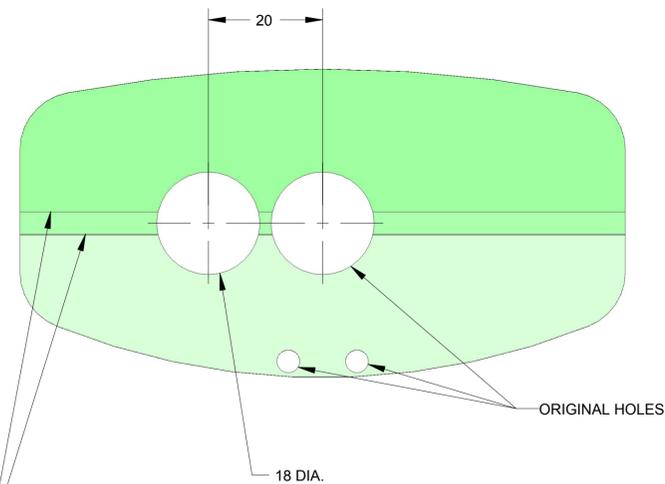
BAFFLE #5 & #6
UNCHANGED FROM ORIGINAL VEHICLE



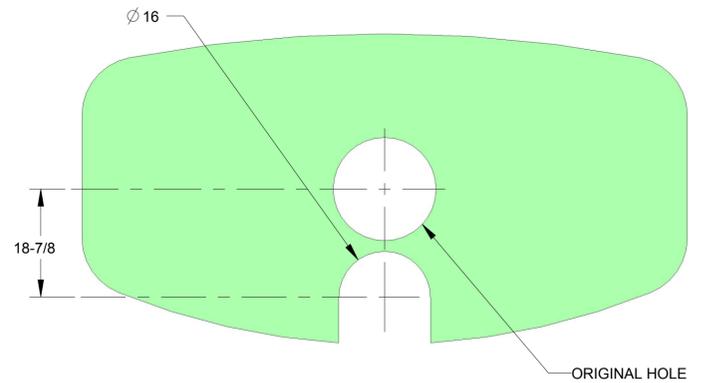
BAFFLE #4
UNCHANGED FROM ORIGINAL VEHICLE



BAFFLE #3



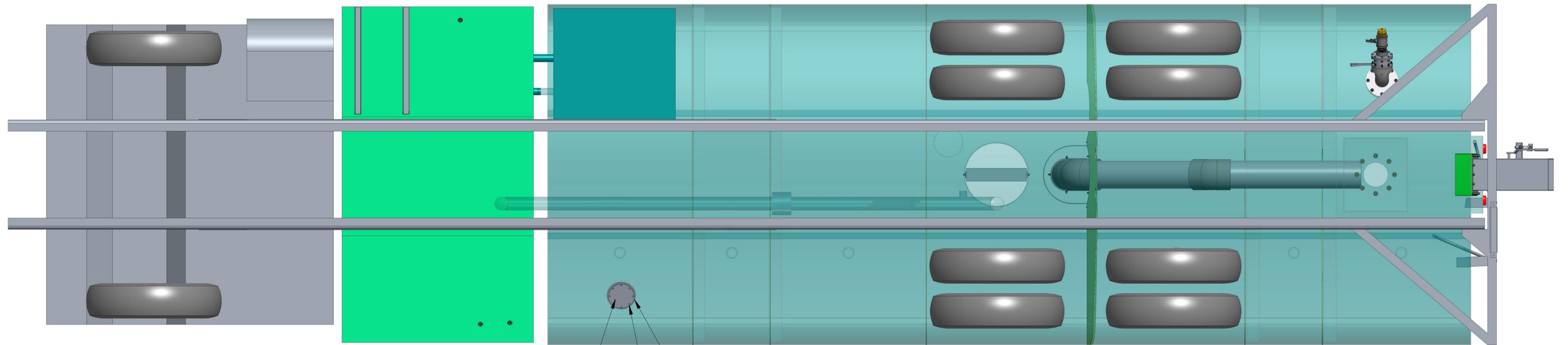
CLEARANCE HOLE FOR ADDED
OVERFILL PIPE ROUTING PATH



THESE HORIZONTAL LINES REPRESENT BENDS/CONCAVITY THAT EXIST IN ALL BAFFLES. THEY ARE ONLY DEPICTED IN THIS PARTICULAR VIEW DUE TO THE MODELLING NEED FOR ACCURATELY DISPLAYING THE CONNECTION BETWEEN BAFFLE#3 AND THE SWASH AND DRAIN STRAP PARTS (P/N's: 26-0161 & 26-0162) ON THE "OVERFLOW AND MANHOLE RESTRICTOR DEVICE" DETAIL DRAWING

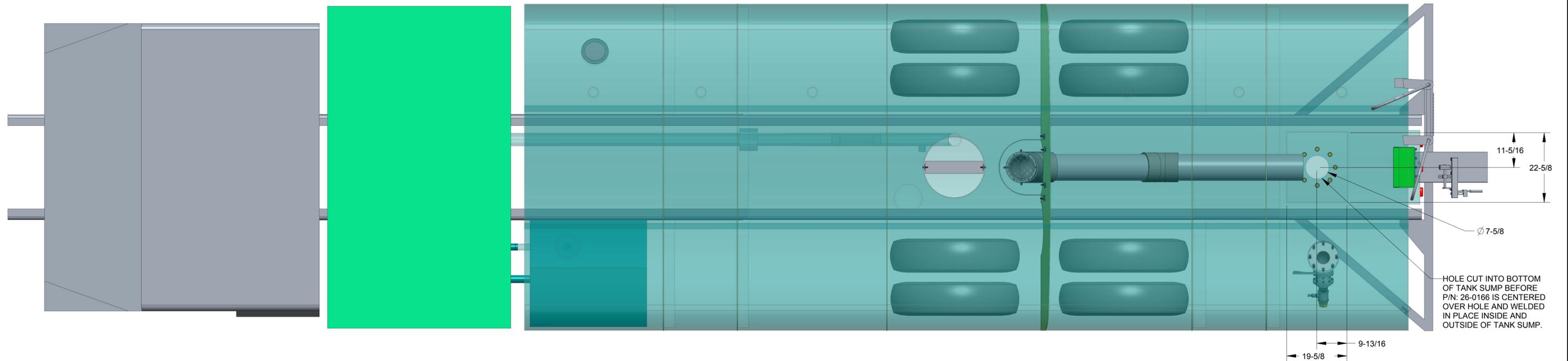
STD. TOL.						DRAWN:	
FRACTIONAL:						DESIGNED:	
ANGULAR:						APPROVED:	
DECIMAL:						DATE:	
PROJECT NO.:	TITLE: OSHKOSH R11 A/C					DWG. NO.:	10-0007
ROSCOMMON EQUIPMENT CENTER P.O. BOX 68 ROSCOMMON, MICHIGAN 48653						SCALE:	D

DRAIN FLANGE DETAIL



BETBSF401AL
8516T143

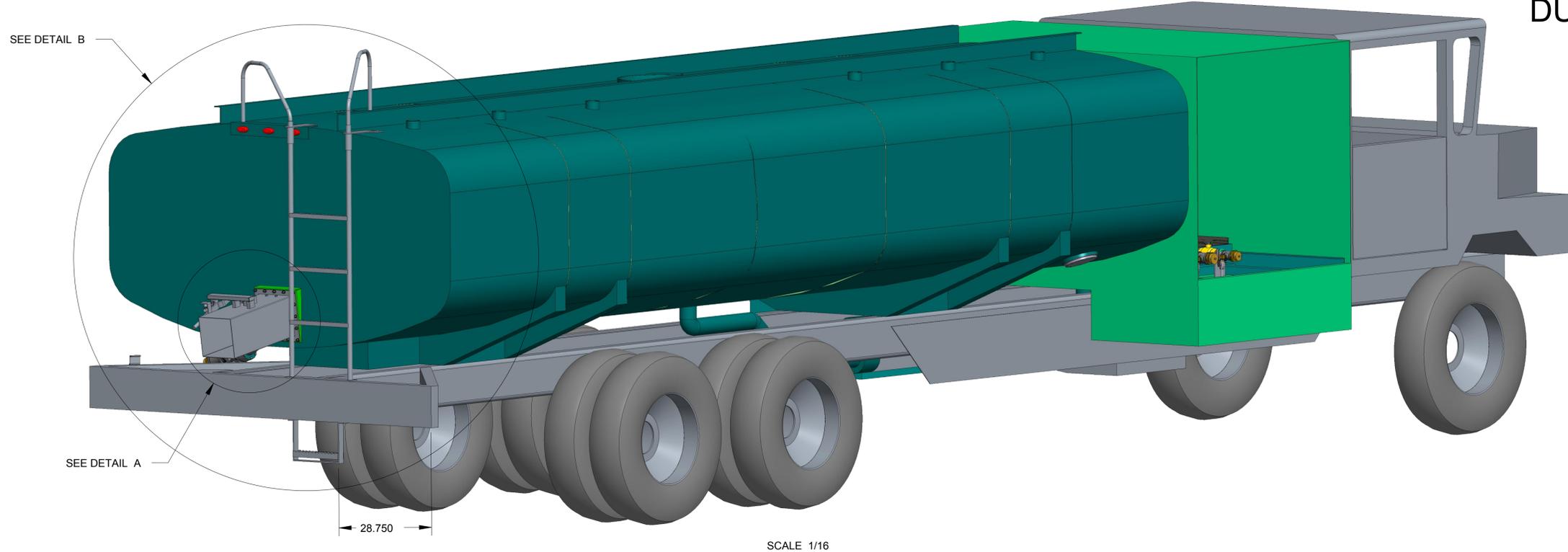
FASTENERS REMOVED FOR CLARITY
FASTENERS ARE ORIGINAL/RE-USED
FROM THE ORIGINAL VEHICLE.



HOLE CUT INTO BOTTOM OF TANK SUMP BEFORE PIN: 26-0166 IS CENTERED OVER HOLE AND WELDED IN PLACE INSIDE AND OUTSIDE OF TANK SUMP.

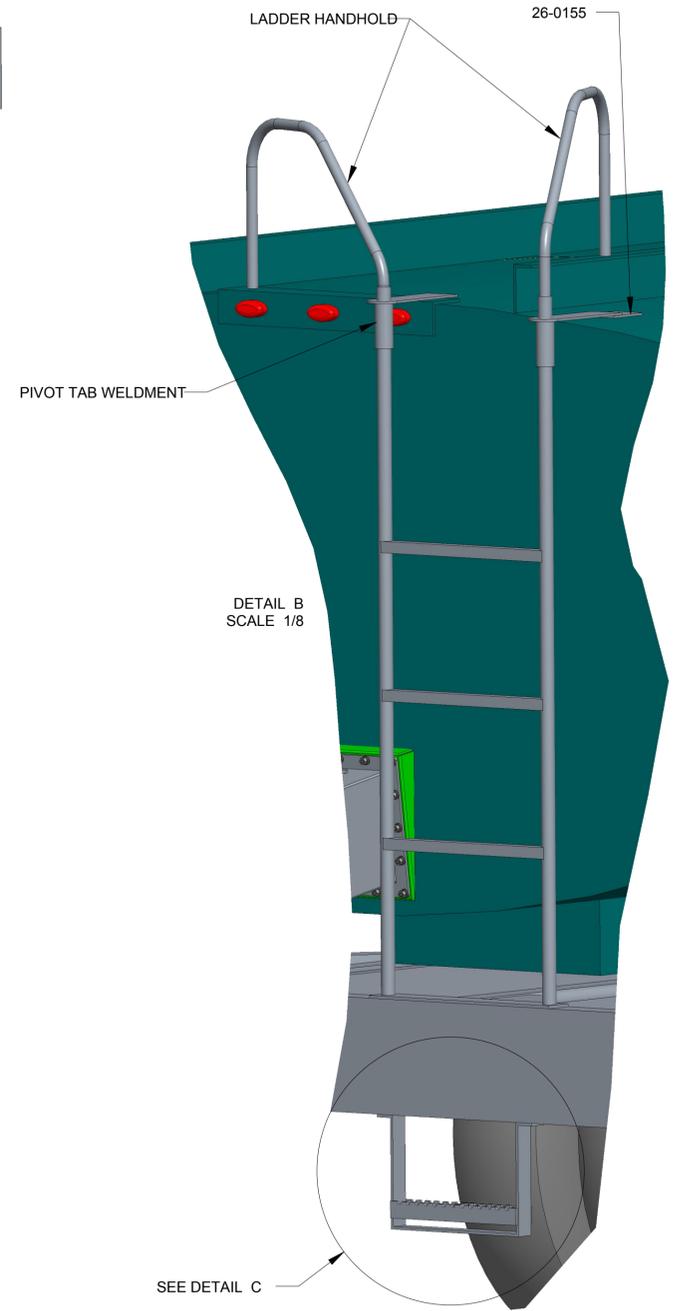
STD. TOL.									DRAWN:		
FRACTIONAL:									DESIGNED:		
ANGULAR:									APPROVED:		
DECIMAL:									DATE:		
1 PLACE + .05									09-Aug-2016		
2 PLACE + .01									SCALE:		
3 PLACE + .005											
PROJECT NO.:	TITLE: OSHKOSH R11 A/C							DWG. NO.:	10-0007	SIZE:	D

DUMP VALVE, LADDER & STEP DETAIL



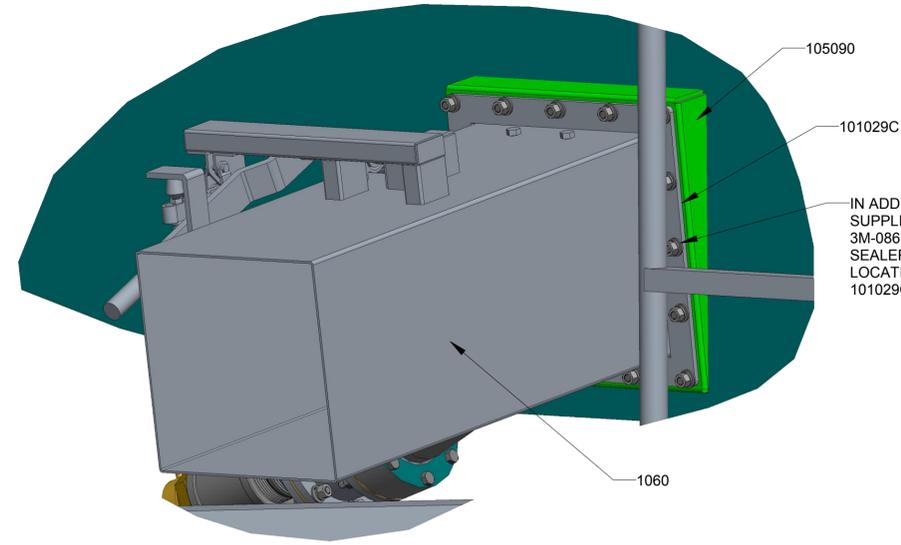
SCALE 1/16

REC MODIFIED EACH LADDER HANDHOLD BY TRIMMING THE VERTICALLY ORIENTED TUBES TO ACHIEVE THE CORRECT HEIGHT TO BE ABLE TO ATTACH THEM AS SHOWN BELOW. THE AMOUNT TRIMMED COULD VARY BETWEEN VEHICLES. THE DIMENSIONS OF PIN: 26-0155 COULD VARY AS WELL. 26-0155, IS WELDED TO THE TOP OF THE TANK AND ITS OPPOSITE END IS BOLTED TO THE ORIGINAL/RE-USED PIVOT TAB WELDMENT THAT WAS SUPPLIED WITH THE ORIGINAL VEHICLE.



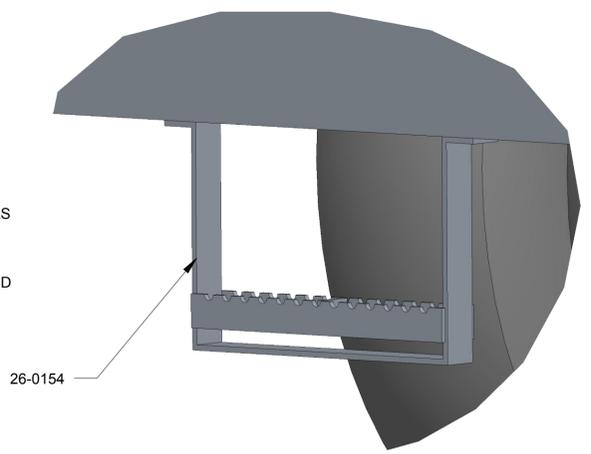
DETAIL B
SCALE 1/8

105090 WAS POSITIONED AGAINST THE REAR OF THE TANK AND USED AS A SCRIBING TEMPLATE TO TRANSFER ITS OUTLINE. THE SQUARE HOLE IN THE TANK WAS THEN CUT TO THAT SHAPE. ONCE 105090 WAS POSITIONED CORRECTLY, THE EXCESS MATERIAL OF 105090 THAT EXTENDED INSIDE THE TANK WAS REMOVED. 105090 WAS THEN WELDED TO THE TANK, BOTH INSIDE AND OUTSIDE TO CREATE A WATERTIGHT CONNECTION.



DETAIL A
SCALE 1/4

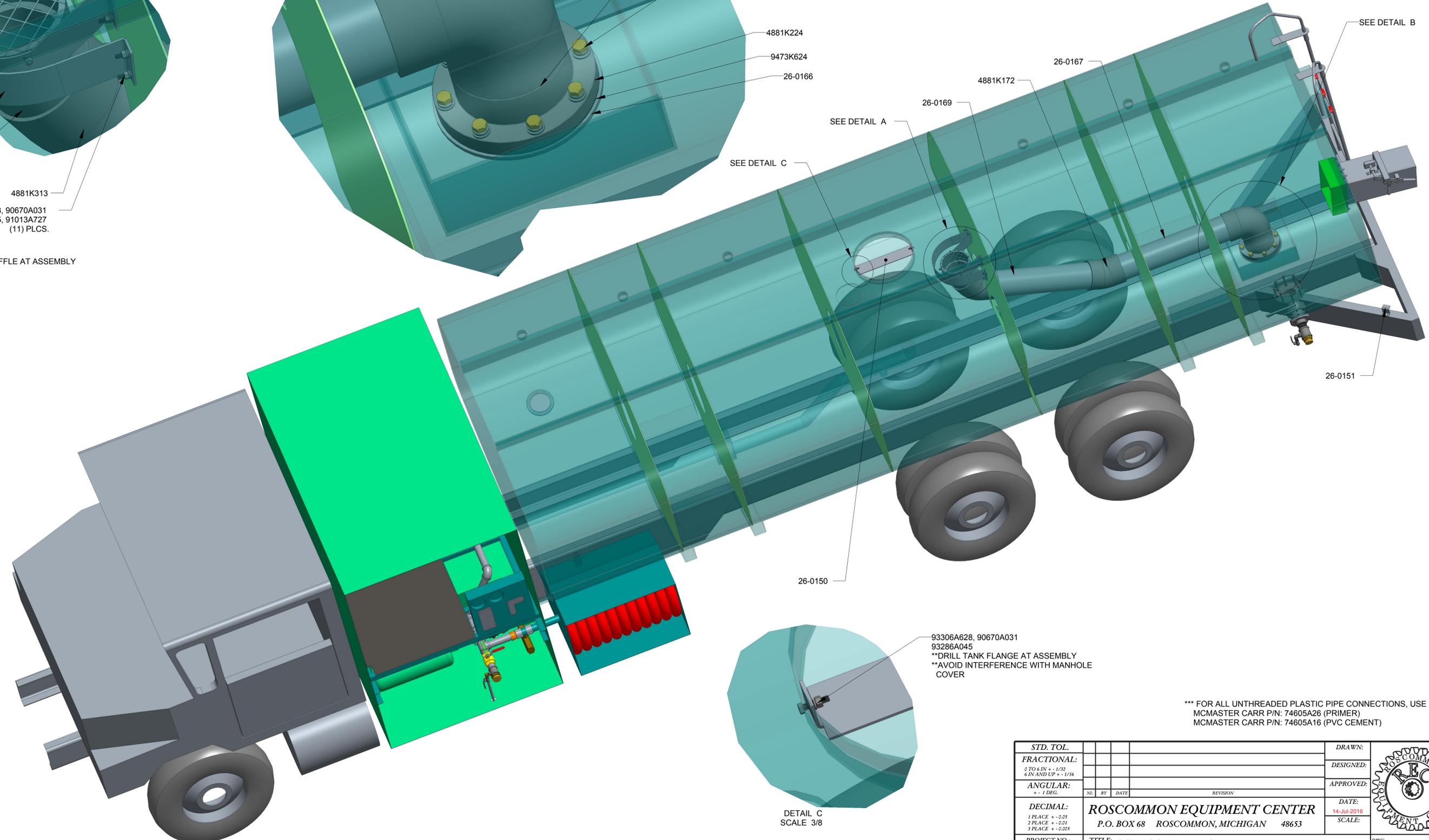
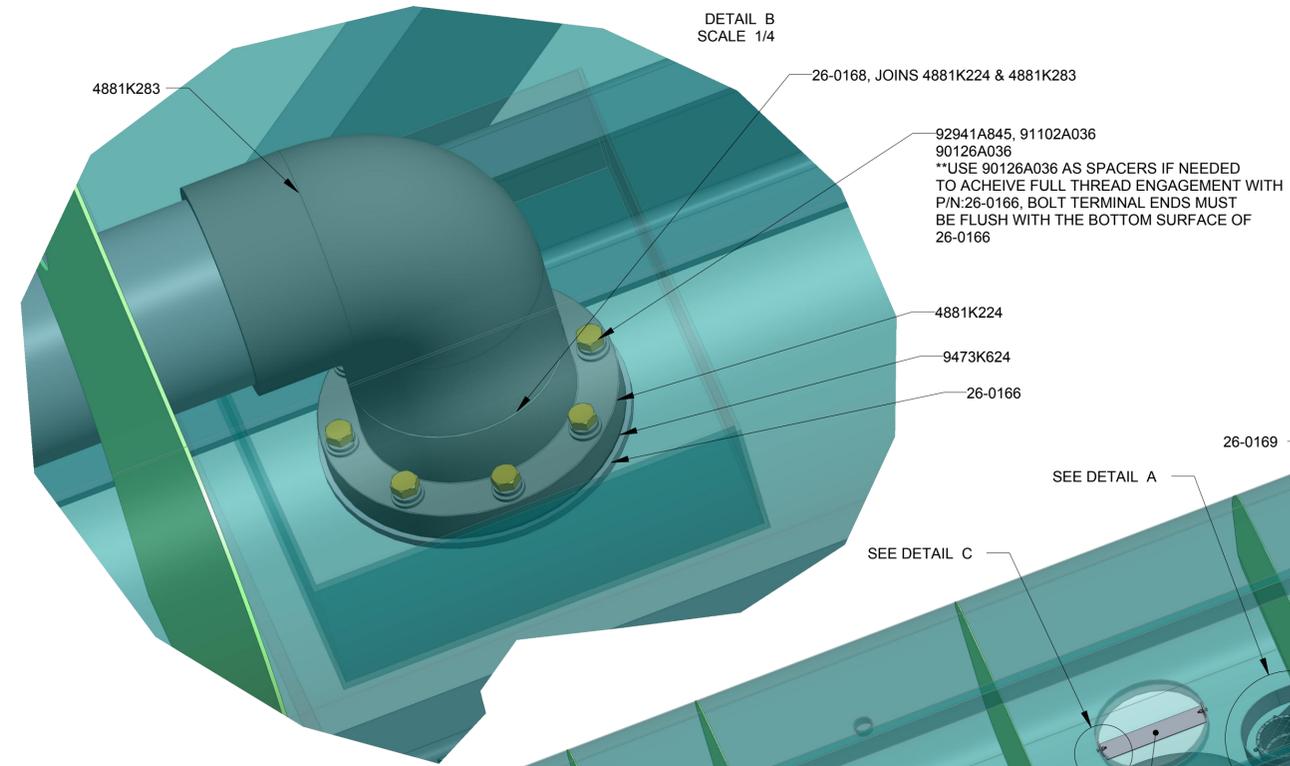
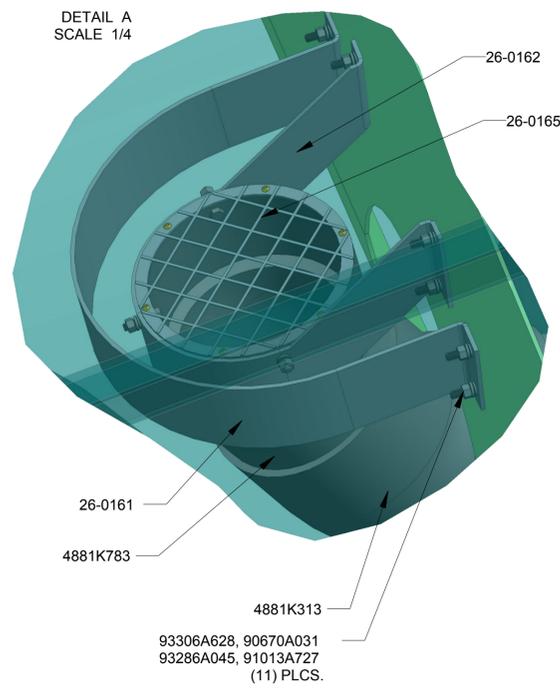
IN ADDITION TO THE GASKET AND FASTENERS SUPPLIED WITH 1060, REC ADDED: 3M-08612 WINDO-WELD, ROUND RIBBON SEALER 3/8" DIAMETER TO EACH FASTENER LOCATION BETWEEN THE FLAT WASHERS AND 101029C TO ENSURE A WATERTIGHT SEAL



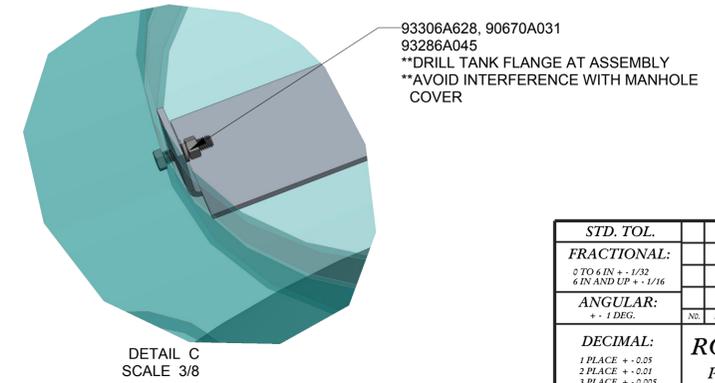
DETAIL C
SCALE 1/4

STD. TOL.										DRAWN:			
FRACTIONAL:										DESIGNED:			
ANGULAR:										APPROVED:			
DECIMAL:										DATE:			
0 TO 6 IN + .1/32										09-Aug-2016			
6 IN AND UP + .1/16										SCALE:			
+ .1 DEG.													
1 PLACE + .05													
2 PLACE + .01													
3 PLACE + .005													
PROJECT NO.:	TITLE: OSHKOSH R11 A/C									DWG. NO.:	10-0007	SIZE:	D

OVERFLOW AND MANHOLE RESTRICTOR DEVICE



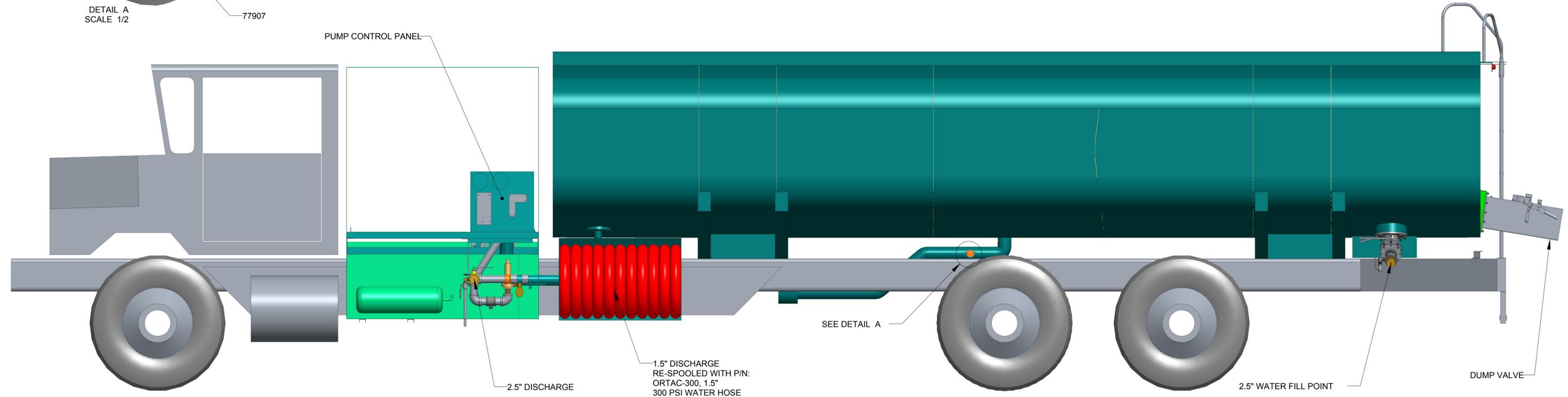
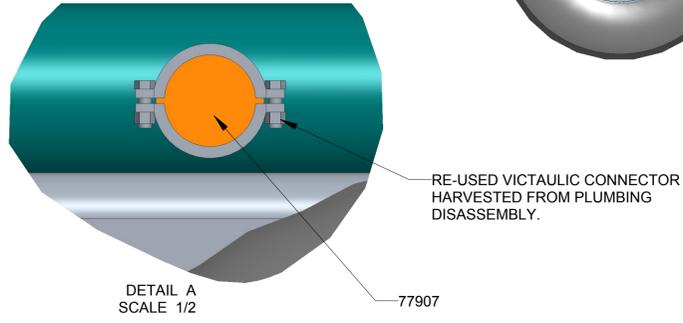
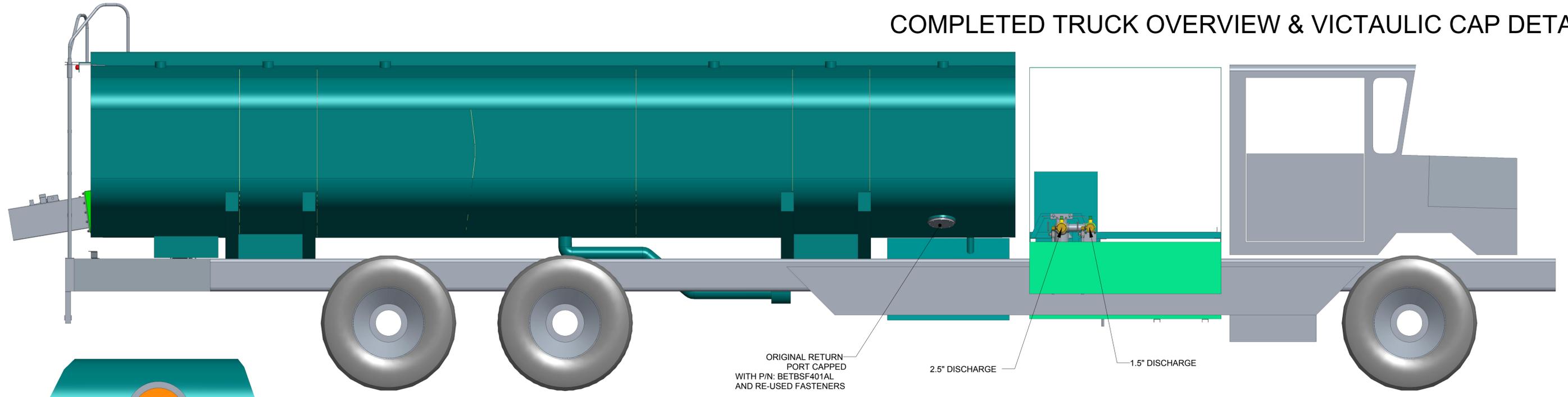
*** DRILL BOLT HOLES IN BAFFLE AT ASSEMBLY



*** FOR ALL UNTHREADED PLASTIC PIPE CONNECTIONS, USE
MCMASTER CARR P/N: 74605A26 (PRIMER)
MCMASTER CARR P/N: 74605A16 (PVC CEMENT)

STD. TOL.						DRAWN:	
FRACTIONAL:						DESIGNED:	
0 TO 6 IN + .1/32						APPROVED:	
6 IN AND UP + .1/16						DATE:	
ANGULAR:						SCALE:	
+ .1 DEG.						ROSCOMMON EQUIPMENT CENTER P.O. BOX 68 ROSCOMMON, MICHIGAN 48653	
DECIMAL:						PROJECT NO.:	TITLE: OSHKOSH R11 A/C
1 PLACE + .05						DWG. NO.: 10-0007	SIZE: D
2 PLACE + .01							
3 PLACE + .005							

COMPLETED TRUCK OVERVIEW & VICTAULIC CAP DETAIL

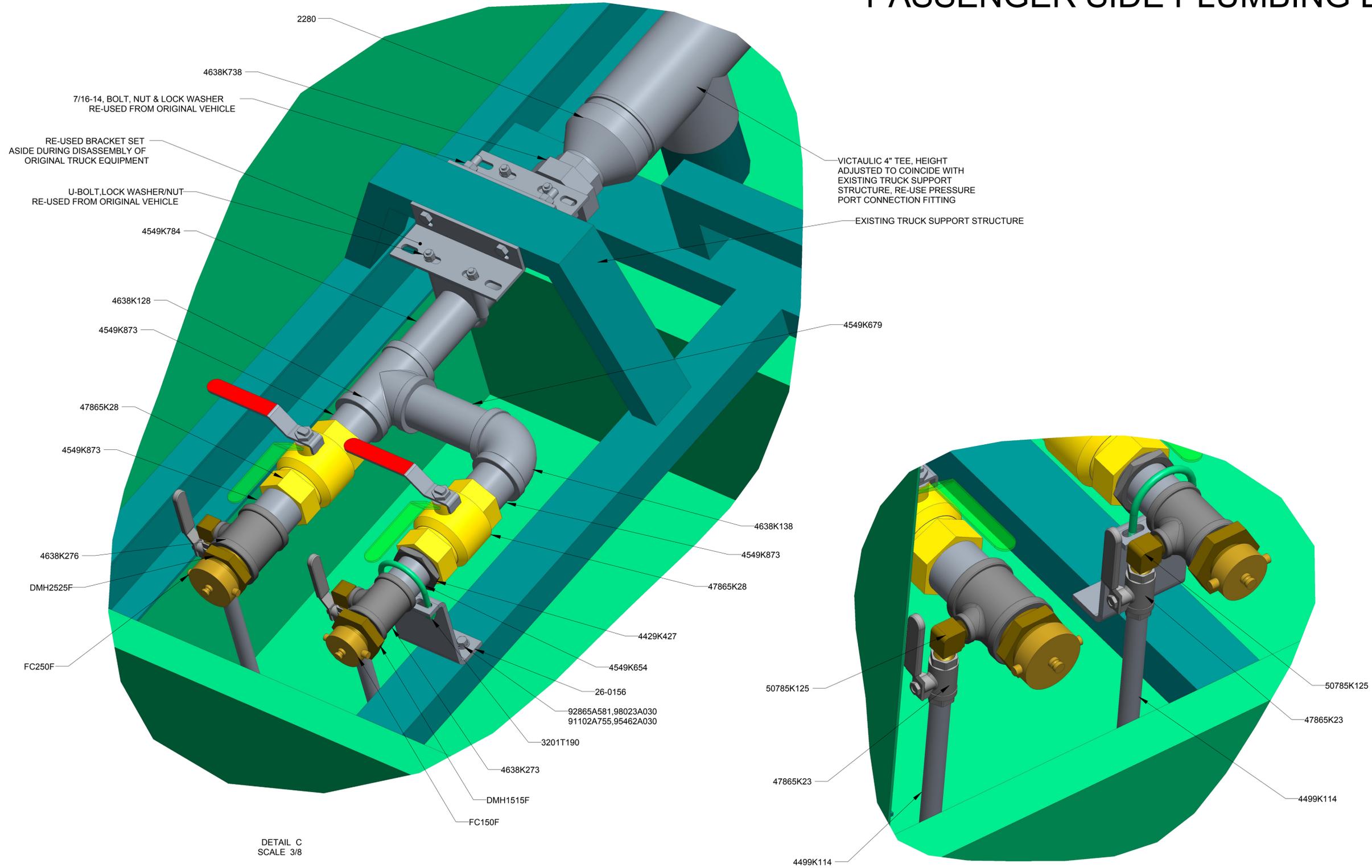


*** DOORS OF CARGO AREA REMOVED FOR CLARITY

STD. TOL.				DRAWN:	
FRACTIONAL:				DESIGNED:	
0 TO 6 IN ± 1/32				APPROVED:	
6 IN AND UP ± 1/16				DATE:	
ANGULAR:				13-Jul-2016	
± 1 DEG.				SCALE:	
				PROJECT NO.:	
				TITLE: OSHKOSH R11 A/C	
				DWG. NO. 10-0007	
				SIZE D	



PASSENGER SIDE PLUMBING DETAIL



DETAIL C
SCALE 3/8

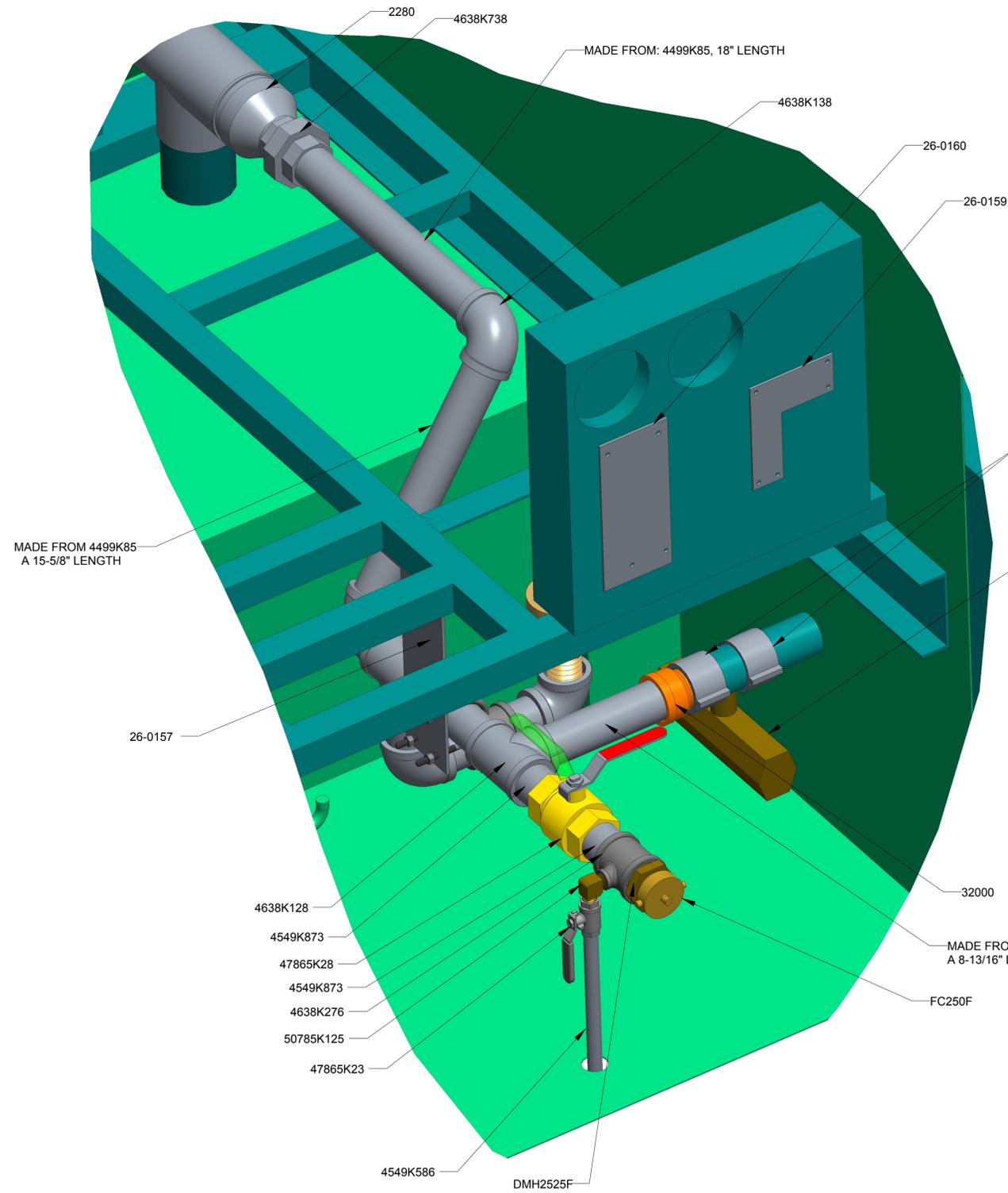
DETAIL D
SCALE 1/2

*** FOR ALL THREADED PIPE CONNECTIONS, USE MCMASTER CARR P/N: 8149K22 PIPE THREAD SEALANT

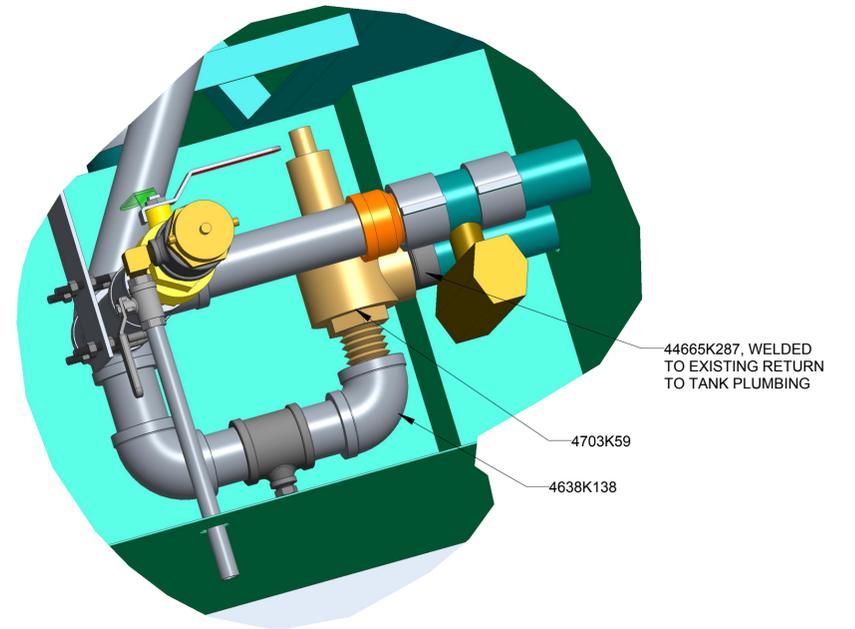
STD. TOL.										DRAWN:		
FRACTIONAL:										DESIGNED:		
0 TO 6 IN + .1/32										APPROVED:		
6 IN AND UP + .1/16										DATE:		
ANGULAR:										SCALE:		
+ .1 DEG.												
DECIMAL:												
1 PLACE + .05												
2 PLACE + .01												
3 PLACE + .005												
PROJECT NO.:	TITLE: OSHKOSH R11 A/C								DWG. NO.:	10-0007	SIZE:	D

ROSCOMMON EQUIPMENT CENTER
P.O. BOX 68 ROSCOMMON, MICHIGAN 48653

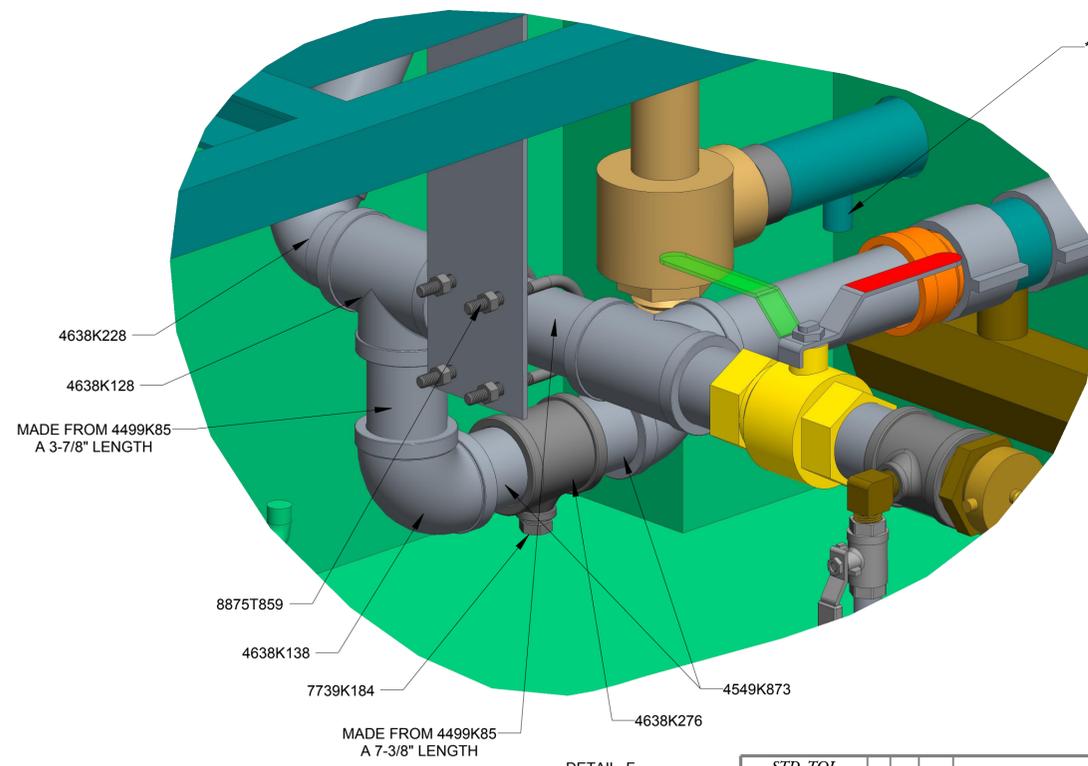
DRIVERSIDE PLUMBING DETAIL



DETAIL E
SCALE 1/4



DETAIL G
SCALE 1/4



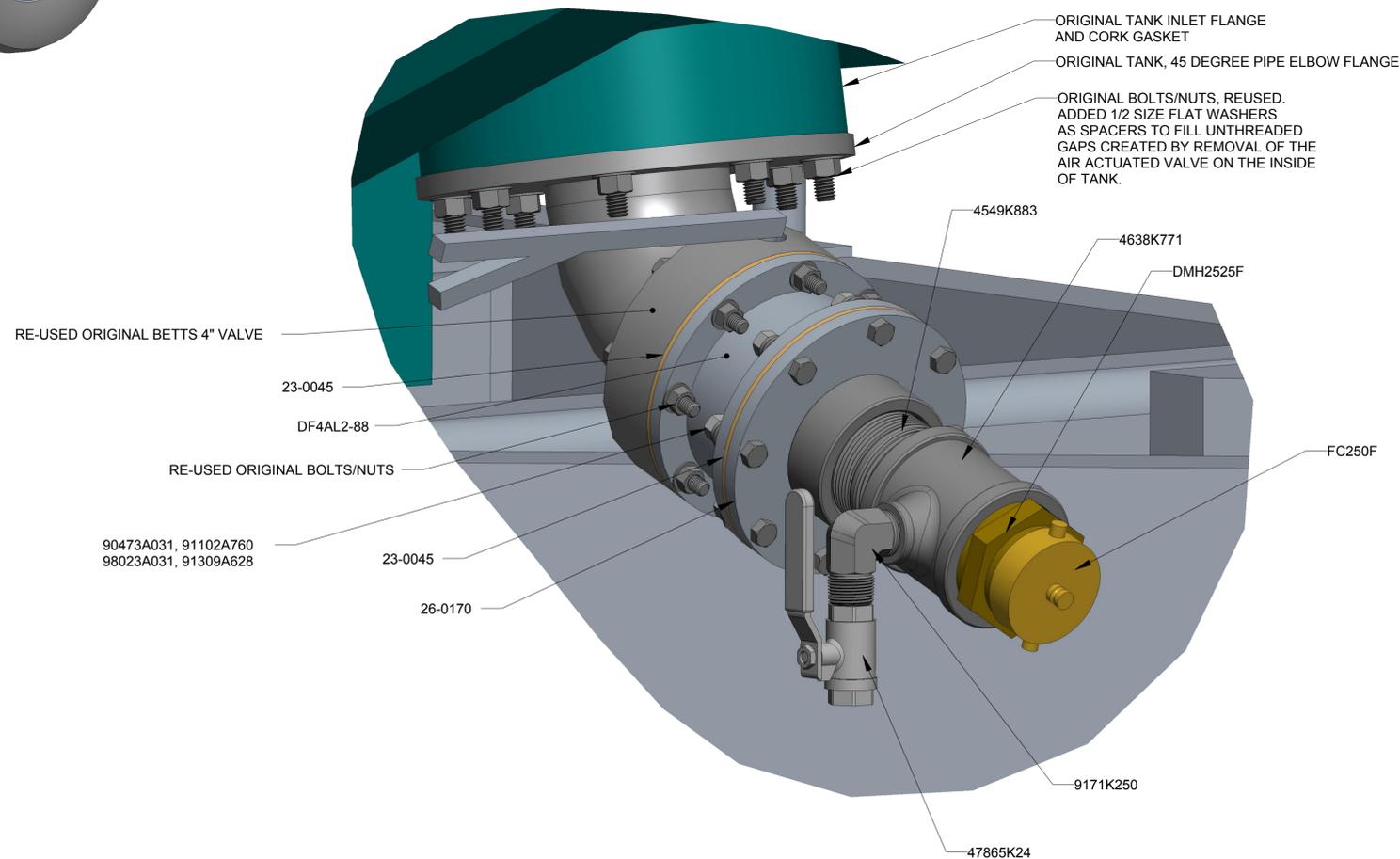
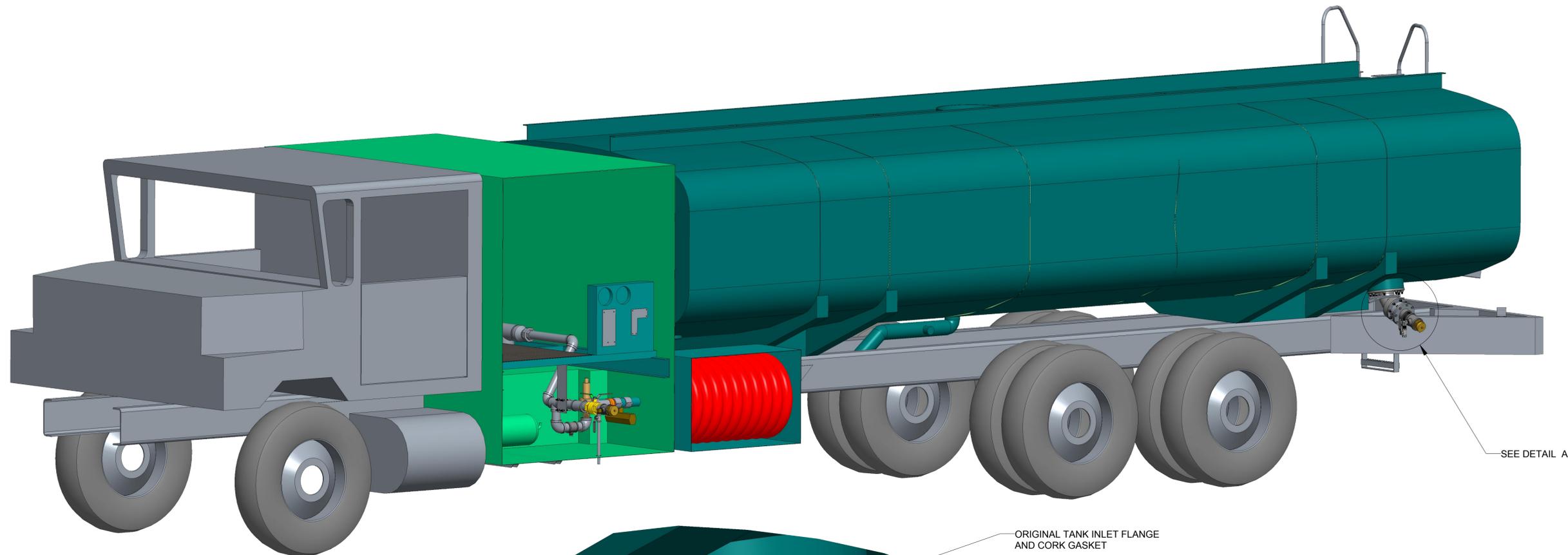
DETAIL F
SCALE 3/8

*** MAKE SURE DRAIN/PLUG ARE PRESENT & POSITIONED IN THIS MANNER WHEN EDITING THE TANK RETURN LINE TO ACCOMMODATE 44665K287, SEE DETAIL G ABOVE

*** FOR ALL THREADED PLUMBING CONNECTIONS, USE MCMASTER CARR P/N: 8149K22 PIPE THREAD SEALANT
 *** CARGO SHEET, P/N:26-0158 REMOVED FOR CLARITY

STD. TOL.				DRAWN:			
FRACTIONAL:				DESIGNED:			
0 TO 6 IN + .1/32				APPROVED:			
6 IN AND UP + .1/16				DATE:			
ANGULAR:				SCALE:			
+ .1 DEG.				12-Jul-2016			
		NO. BY DATE		REVISION			
DECIMAL:		ROSCOMMON EQUIPMENT CENTER P.O. BOX 68 ROSCOMMON, MICHIGAN 48653				DWG. NO. 10-0007	
1 PLACE + .05						SIZE D	
2 PLACE + .01							
3 PLACE + .005							
PROJECT NO.:		TITLE: OSHKOSH R11 A/C					

WATER INLET DETAIL



SEE DETAIL A

STD. TOL.					DRAWN:
FRACTIONAL:					DESIGNED:
0 TO 6 IN + .1/32					APPROVED:
6 IN AND UP + .1/16					DATE:
ANGULAR:					09-Aug-2016
+ .1 DEG.					SCALE:
DECIMAL:					
1 PLACE + .05					
2 PLACE + .01					
3 PLACE + .005					
PROJECT NO.:	TITLE: OSHKOSH R11 A/C				DWG. NO. 10-0007
					SIZE D

