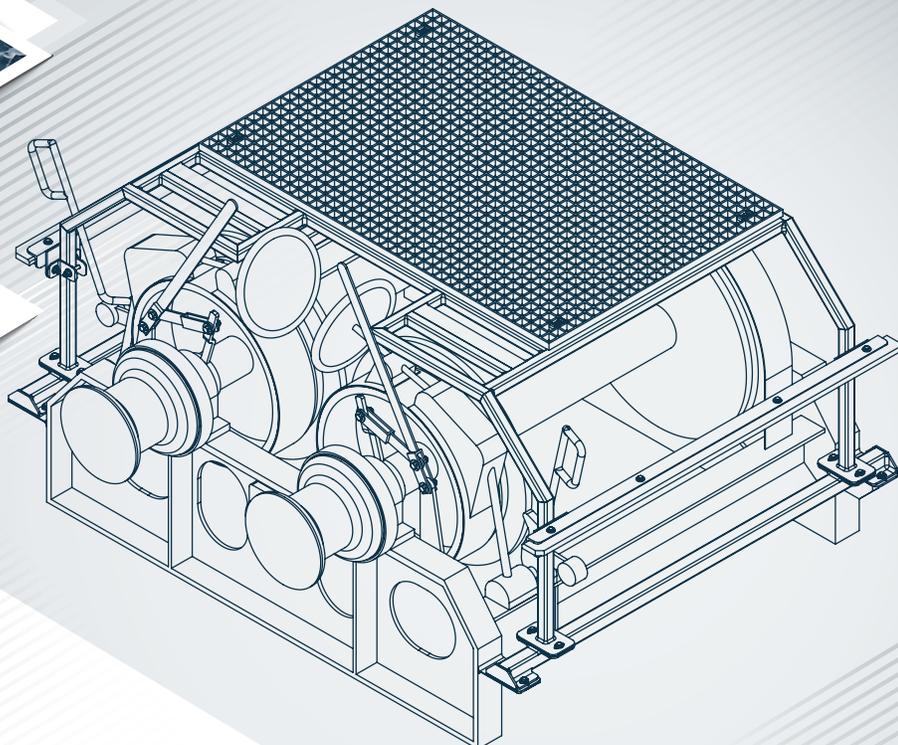


505



Fabrication Guide

McElroy/Catchot Model 505 Winch Guard



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NIOSH Fabrication Guide

McElroy/Catchot Model 505 Winch Guard

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Users must build and install the winch guards per NIOSH specifications. The strength testing analysis for the winch guard corresponds to the precise fabrication specifications detailed within this guide. Any deviation from the published designs or installation instructions will invalidate the strength testing and could lead to a product that provides less protection than expected.

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Table of Contents

Winch Guard Executive Summary	.1
How to Use This Guide	.2
Abbreviations	.3
505 Winch Guard Final Product: Assembled and Installed on McElroy/Catchot Model 505 Winch	.4
Bill of Materials	.5
Purchased Parts List	.6
Cut List: (1 of 3)	.7
Cut List: (2 of 3)	.8
Cut List: (3 of 3)	.9
Parts Inventory	10
Customization Formulas for Fabrication	11
Customization Formulas for Fabrication: NIOSH Example	12
505 Winch Guard: Assembled	13
505 Winch Guard: Installed on 505 Winch	14
Square Tube Components	
Square Tube Components: Guard Leg, 45° Tube, Grab Bar Return, and Middle Crossbar	15
Square Tube Components: Back, Front, and Spool Cover Tube, and Outer Crossbar	16
Square Tube Components: Grab Bar, Sides 1&2	17
Square Tube Components: Mount Bar	18
Guard Frame Plates	
Guard Frame Plates: Guard Frame Gusset and Guard Foot Plate	19
Frame Plates: Spool Cover Plate	20
Main Brackets	
Main Bracket: Side 1	21
Main Bracket: Side 2	22
Rub Rail Components	
Mount Bar Plates: Mount Bar Top, Base, and End Plates	23
Rub Rail Components: Weld-on Plate	24
Rub Rail Components: Rub Rail Clamp Bracket	25
Rub Rail Components: Rub Rail Bracket	26
Rub Rail Components: Rub Rail Top Plate and Rub Rail	27
Barrier Components: Barrier Sheet and Barrier Tube	28
Fiberglass Grating	29
Assembly Drawings	
Frame Side Assembly: Side 1	30
Frame Side Assembly: Side 2	31
Back Assembly	32
Frame Assembly: Exploded View	33
Frame Assembly: Detailed View	34
Mount Bar Assembly	35
Rub Rail Bracket Assembly	36

Winch Guard Executive Summary

Unguarded drum winches are a common hazard on side-trawl shrimp vessels. From 2000-2011, 35 injuries (8 fatal) involving winches were reported in the shrimp fleet fishing in the Gulf of Mexico waters. Injuries involving the main winch drums had a higher risk for fatal outcomes compared to injuries involving the winch cathead. Injuries were occasionally fatal, while nonfatal injuries were usually severe and disabling. These results, along with further analysis, can be found in the published CDC MMWR, [“Fatal and Nonfatal Injuries Involving Fishing Vessel Winches — Southern Shrimp Fleet, United States, 2000–2011”](#).

National Institute for Occupational Safety and Health (NIOSH) researchers conducted a series of site visits to ports around the Gulf of Mexico to determine the main areas of concern related to winch operations on shrimp vessels. After discussions with U.S. Coast Guard staff, vessel owners, shrimp fishermen, and winch manufacturers, they identified three primary activities that led to main drum winch entanglements on shrimp vessels:

- line leveling,
- retrieving wire rope,
- working the catheads.

NIOSH addressed the unique entanglement hazards associated with the main drum winches on shrimp vessels by developing static winch guards for these mechanically-driven winches. The guards were developed between 2012 and 2019 with input from side-trawl shrimp vessel operators across the Gulf of Mexico. NIOSH explored potential guard designs for several common models of winches based on surveys of vessels around the Gulf. This guide is for the McElroy/Catchot Model 505, which was most commonly seen winch in informal surveys.

There are no explicit design standards specific to guards used on U.S. commercial fishing vessels. [46 CFR 28.215](#), which covers Requirements for Commercial Fishing Industry Vessels, states:

“Suitable hand covers, guards, or railing must be installed in way of machinery which can cause injury to personnel, such as gearing, chain or belt drives, and rotating shafting. This is not meant to restrict necessary access to fishing equipment such as winches, drums, or gurdies.”

Given this broad standard, the NIOSH McElroy/Catchot Model 505 Winch Guard was designed to provide protection without restricting necessary access. Additionally, since the standard for machine guarding for U.S. commercial fishing vessels does not address strength or load bearing, the guard was successfully tested according to [29 CFR 1928.57\(a\)\(8\)\(ii\)](#), which is the U.S. standard for Guarding of Farm Field Equipment, Farmstead Equipment, and Cotton Gins. It states:

“Unless otherwise specified, each guard and its support shall be capable of withstanding the force that a 250-pound individual, leaning or falling against the guard, would exert upon the guard.”

NIOSH designed its McElroy/Catchot Model 505 Winch Guard to withstand high levels of loading from the front, sides, and top of the guard that exceed that 250-pound force. Strength testing simulations were conducted by third-party contractors using finite element analysis, a computer-based testing method. After successful testing, winch guard prototypes were fabricated and installed on test vessels across the Gulf to gather performance feedback in actual working conditions, to ensure that guards did not impede routine winch use for fishing operations.

This design can be used either by

- an individual to build a NIOSH McElroy/Catchot Model 505 Winch Guard for their privately owned winch, or
- a company to build and sell a NIOSH-designed McElroy/Catchot Model 505 Winch Guard.

Users must build and install the winch guards per NIOSH specifications. The strength testing analysis for the winch guard corresponds to the precise fabrication specifications detailed within this guide. Any deviation from the published designs or installation instructions will invalidate the strength testing and could lead to a product that provides less protection than expected. See [Disclaimer](#) for additional information.

How to Use This Guide

The NIOSH McElroy/Catchot Model 505 Winch Guard Fabrication Guide is designed to be used in conjunction with the corresponding NIOSH McElroy/Catchot Model 505 Winch Guard Installation Guide to construct and install the winch guard to protect deckhands and operators from safety hazards present while operating the equipment. This Fabrication Guide is intended to be used by fabricators, machinists, and owners/operators of vessels that use the McElroy/Catchot Model 505 winch to build the NIOSH guard that will fit their specific sized winches. The NIOSH McElroy/Catchot Model 505 Winch Fabrication Guide contains detailed lists of the parts and materials needed, as well as detailed dimensional drawings that are needed to create a single winch guard. If built to the specifications found within this guide, the NIOSH McElroy/Catchot Model 505 Winch Guard is intended to protect deckhands and operators from entanglements, crushing hazards, and potential traumatic injuries that can occur while working with or near a winch.

It should be noted that many McElroy/Catchot Model 505 winches have varying dimensions, either from manufacturing, or modifications made to the equipment. The Fabrication Guide contains the necessary measurements and steps that will need to be taken to account for these size differences. It should also be noted that any modifications to the NIOSH winch guard outside of those mentioned in the Fabrication or Installation Guide could affect the overall performance of the guarding, rendering a lower level of protection to operators and deck hands. It is recommended that the winch guarding be constructed by those who understand engineering drawings and are comfortable with advanced welding and construction techniques. It is also imperative that substitute materials outside of those mentioned below, or within this guide, are not used, as it could also lower the level of performance of the guarding.

Material Considerations

The NIOSH McElroy/Catchot Model 505 Winch Guard was designed to be constructed primarily of 304 stainless steel for strength, durability, and longevity (resistance to galvanic corrosion). To save on fabrication and material costs, ASTM A36 steel can be used on the winch guard frame, fasteners, and associated brackets as an alternative. The components used should be the same size as those dictated in the Fabrication Guide and materials that have smaller size (i.e. – square tubing with a wall thickness less than .125”) should not be used as a lesser level of protection could be provided. If ASTM A36 steel is used as a substitute, the frame, all brackets, and any other low carbon mild steel pieces will need to be painted with a three-stage paint with zinc epoxy primer coat, transitional coat, and a color topcoat to prevent galvanic corrosion.

Barrier Materials

The NIOSH McElroy/Catchot Model 505 Winch Guard Fabrication Guide part list contains UV Resistant Nylon sheeting and tubing. It is imperative that these materials be used as instructed in the Installation Guide as a galvanic corrosion barrier between the A36 steel and the 304 stainless steel. Failure to properly install these barrier items will lead to corrosion that could lead to failure of the winch guard frame mounts and expose workers to safety hazards.

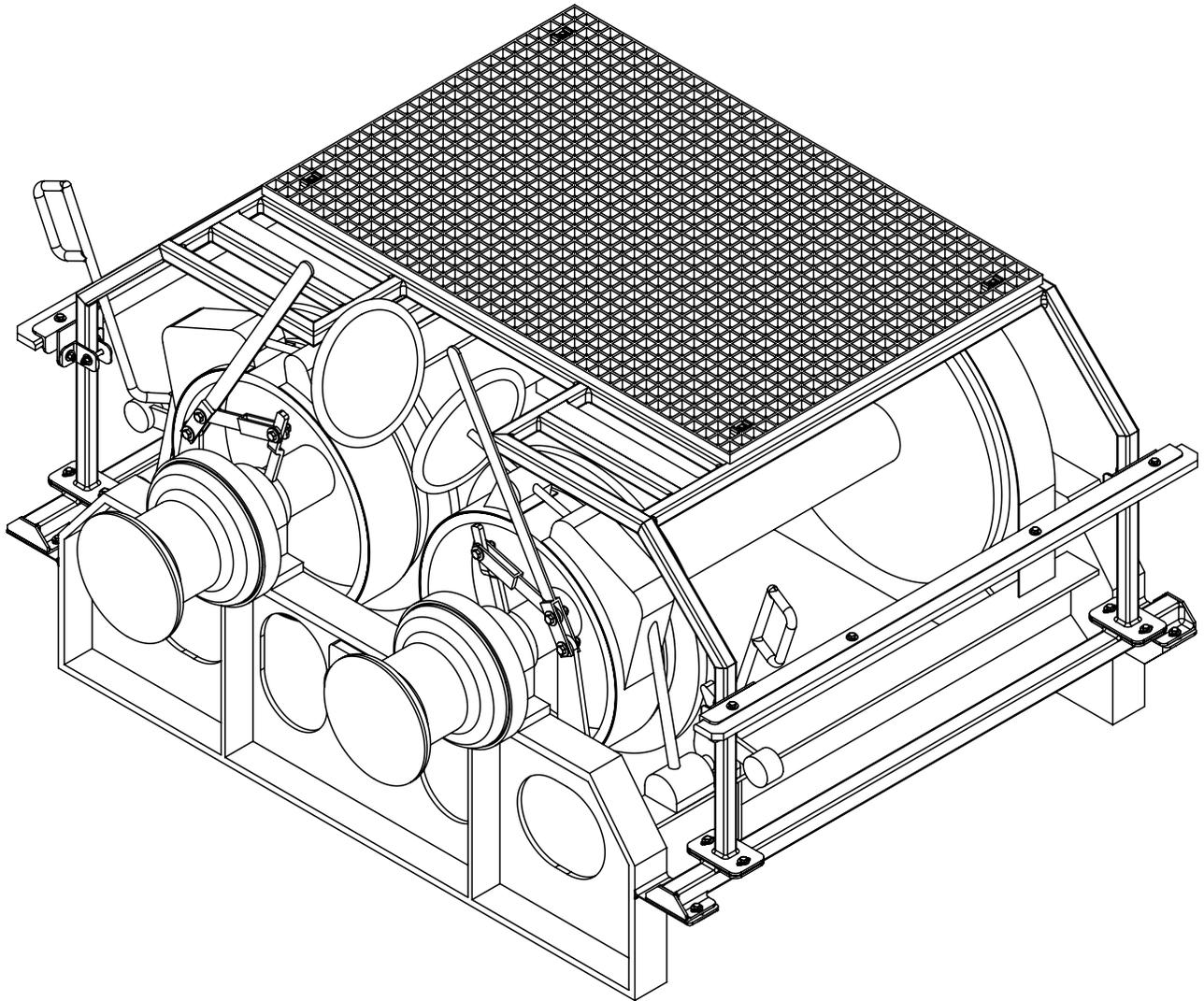
How to Use Customization Formulas for Fabrication

Different versions of the McElroy/Catchot Model 505 Winch exist. While similar, each of these models have varied manufactured sizes and dimensions. To properly fabricate the NIOSH McElroy/Catchot Model 505 Winch Guard to fit your specific winch, four key dimensions will need to be manually measured. The dimensions needed are shown on [Page 11](#) of this Fabrication Guide. If using the electronic PDF version of this Fabrication Guide, once the four key dimensions are entered into the corresponding cells, the resulting dimension sizes will auto-populate. The customized dimensions and cut size on individual pieces will also auto-populate on the previous pages. If the electronic version of the NIOSH McElroy/Catchot Model 505 Winch Guard Fabrication Guide is not being used, these dimensions, as well as the customization formulas will have to be **manually** calculated and entered. A NIOSH example of customized measurements/dimensions can be found on [Page 12](#) of this Fabrication Guide.

Abbreviations

A	assembly
AB	angle bracket
Assy	assembly
ASTM A36	American Society for Testing and Materials, A36 structural steel (common)
BR	barrier
CDC	Centers for Disease Control and Prevention
DHHS	Department of Health and Human Services
FG	fiberglass grating
FP	flat plate
H	hardware
ID	inside diameter
in.	inches
McElroy/Catchot 505	McElroy/Catchot Model 505 double drum winch
NIOSH	National Institute for Occupational Safety and Health
OD	outside diameter
PDF	Portable Document Format
PE	polyethylene
Qty.	quantity
ft-lbs.	foot pounds
SS	stainless steel
UHMW-PE	ultra-high-molecular-weight polyethylene
UV Resistant	ultra violet resistant

505 Winch Guard Final Product: Assembled and Installed on McElroy/Catchot Model 505 Winch



Bill of Materials

Part Number Legend



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BR - BARRIER	H - HARDWARE	FP - FLAT PLATE	FG - FIBERGLASS GRATING
PE - UHMWPE	AB - ANGLE BRACKET	A - ASSEMBLY	ST - SQUARE TUBE

Part Name	Part ID Number	Qty. Per Assembly	Material	Description	Stock
505_Mnt_Bar_Assembly					
→ 505_mnt_bar	ST1	1	ASTM A36 Steel	Mount Bar	2" x 2" x .125" Square Tube
→ 505_mnt_bar_top_plate	FP1	2	ASTM A36 Steel	Mount Bar Top Plate	.250" Plate
→ 505_mnt_bar_base_plate	FP2	2	ASTM A36 Steel	Mount Bar Base Plate	.250" Plate
→ 505_mnt_bar_end_plate	FP3	2	ASTM A36 Steel	Mount Bar End Plate	.250" Plate
505_Guard_Frame_Assembly					
505_Guard_Frame_Side_1_Assembly					
→ 505_grab_bar_side_1	ST4	1	304/304L SS	Grab Bar Side 1	1.5" x 1.5" x .125" Square Tube
→ 505_45_tube	ST3	1	304/304L SS	45° Tube	1.5" x 1.5" x .125" Square Tube
→ 505_guard_leg	ST2	1	304/304L SS	Guard Leg	1.5" x 1.5" x .125" Square Tube
505_Guard_Frame_Side_2_Assembly					
→ 505_grab_bar_side_2	ST5	1	304/304L SS	Grab Bar Side 2	1.5" x 1.5" x .125" Square Tube
→ 505_45_tube	ST3	1	304/304L SS	45° Tube	1.5" x 1.5" x .125" Square Tube
→ 505_guard_leg	ST2	1	304/304L SS	Guard Leg	1.5" x 1.5" x .125" Square Tube
505_Guard_Frame_Back_Assembly					
→ 505_back_tube	ST6	1	304/304L SS	Back Tube	1.5" x 1.5" x .125" Square Tube
→ 505_45_tube	ST3	2	304/304L SS	45° Tube	1.5" x 1.5" x .125" Square Tube
→ 505_guard_leg	ST2	2	304/304L SS	Guard Leg	1.5" x 1.5" x .125" Square Tube
→ 505_front_tube	ST7	1	304/304L SS	Front Tube	1.5" x 1.5" x .125" Square Tube
→ 505_grab_bar_return	ST8	2	304/304L SS	Grab Bar Return	1.5" x 1.5" x .125" Square Tube
→ 505_outer_cross_bar	ST9	2	304/304L SS	Outer Cross Bar	1.5" x 1.5" x .125" Square Tube
→ 505_middle_cross_bar	ST10	1	304/304L SS	Middle Cross Bar	1.5" x 1.5" x .125" Square Tube
→ 505_spool_cover_bar	ST11	2	304/304L SS	Spool Cover Bar	1.5" x 1.5" x .125" Square Tube
→ 505_guard_frame_gusset	FP4	4	304/304L SS	Guard Frame Gusset Plate	.250" Plate
→ 505_guard_foot_plate	FP5	4	304/304L SS	Guard Foot Plate	.250" Plate
→ 505_spool_cover_plate	FP6	2	304/304L SS	Spool Cover Plate	.250" Plate
505_Rub_Rail_Bracket_Assembly					
→ 505_rub_rail_bracket	AB1	1	304/304L SS	Rub Rail Angle Bracket	2" x 2" Angle Bracket, .250" Thick
→ 505_rub_rail_weld-on_plate	FP8	2	304/304L SS	Rub Rail Weld-On Plate	.250" Plate
505_Main_Guard_Bracket_Assembly					
→ 505_main_bracket_side1	AB3	2	ASTM A36 Steel	Guard Mount Bracket Side 1	4" x 3" Angle Bracket, .250" Thick
→ 505_main_bracket_side2	AB4	2	ASTM A36 Steel	Guard Mount Bracket Side 2	4" x 3" Angle Bracket, .250" Thick
→ 505_rub_rail	PE1	2	UHMW-PE	UHMW-PE Strip	3" x .750" Bar
→ 505_rub_rail_top_plate	FP7	2	304/304L SS	Rub Rail Top Plate	.250" Plate
→ 505_rub_rail_clamp_bracket	AB2	8	304/304L SS	Rub Rail Clamp Bracket	2" x 3" Angle Bracket, .1875" Thick
→ 505_barrier_sheet	BR1	4	UV Resistant Nylon	Barrier Sheet	.0625" Sheet
→ 505_fiberglass_grating	FG1	1	Fiberglass	Fiberglass Grating Panel	1.0" Panel, 1.5" Square Grating
→ 505_barrier_tube	H4	16	UV Resistant Nylon	Barrier Tubing, Cut To .4375" Length	.500" OD x .4375" ID Tube

Purchased Parts List

Required Stock Material

Material	Stock Size	Exact Amt. Needed	Recommended Amount	Examples	Notes
ASTM A36 Steel	1/4" Plate	1.56 sq. ft.	2 sq. ft.	https://www.mcmaster.com/metals/steel/shape~sheet-and-bar/width~24-1/material~low-carbon-steel/	-
ASTM A36 Steel	2" x 2" x 1/8" Square Tube	10.59 ft.*	11 ft.	-	-
304/304L SS	1/4" Plate	4.27 sq. ft.*	5 sq. ft.	-	-
304/304L SS	1.5" x 1.5" x 1/8" Square Tube	40.86 ft.*	42 ft.	-	-
304/304L SS	2" x 2" Angle Bracket, 1/4" Thick	9.84 ft.*	10 ft.	-	-
304/304L SS	2" x 3" Angle Bracket, 3/16" Thick	1.34 ft.	1.5 ft.	-	-
304/304L SS	4" x 3" Angle Bracket, 1/4" Thick	2.25 ft.	2.5 ft.	-	-
UHMW - PE	3.0" x 3/4" Bar	10.17 ft.*	11 ft.	-	-
UV Resistant Nylon	1/16" Sheet	0.73 sq. ft.	1 sq. ft.	-	Must be UV resistant nylon (<i>typically black</i>).
UV Resistant Nylon	1/2" OD x 7/16" ID Tube	0.59 ft.	1 ft.	-	Must be UV resistant nylon (<i>typically black</i>).
Fiberglass	1" Sheet, 1-1/2" Sq. Mesh	4.90 ft. x 3.28 ft.*	4 ft. x 8 ft. Panel	https://nationalgrating.com/molded-fiberglass-grating/	Panel should be purchased at larger size and cut down as close as possible to size needed. See drawing notes.

Other Required Supplies

Item	Process	Notes
Polyurethane Spray	Fabrication/Installation	Seal fiberglass grating after cutting, per manufacturer's recommendations.

***Note:** Values given are nominal based on the McElroy/Catchot Model 505 Winch with 36" drums. The **exact amount of materials you will need** depends on the customization table included in this packet. Use the **recommended amount** when estimating material to purchase.

Cut List: (1 of 3)

Part Number Legend				Notes				
BR - BARRIER	FG - FIBERGLASS GRATING	FP - FLAT PLATE	H - HARDWARE	Verify dimensions of slots and holes if using water-jet or automatic milling machine. All dimensions are in inches (in.).				
PE - UHMWPE	ST - SQUARE TUBE	AB - ANGLE BRACKET	A - ASSEMBLY					
Stock Material	ASTM A36 Steel, 1/4" Plate							
Part ID #	Description	Length (in.)	Width (in.)		Qty	Image	Used in Assembly:	Notes
FP1	Mount Bar Top Plate	6.500	4.000	/	4		A2	Post machining necessary, see part drawings for details
FP2	Mount Bar Base Plate	5.000	4.000		4		A2	Post machining necessary, see part drawings for details
FP3	Mount Bar End Plate	5.000	2.000		4		A2	Post machining necessary, see part drawings for details
Stock Material	304/304L Stainless Steel, 1/4" Plate							
Part ID #	Description	Length (in.)	Width (in.)	Customized Dimension	Qty	Image	Used in Assembly:	Notes
FP4	Guard Frame Gusset Plate	10.000	3.000	N/A	4		A3	Angle cut, see part drawings for details
FP5	Guard Foot Plate	6.500	4.000	N/A	4		A3	Post machining necessary, see part drawings for details
FP6	Spool Cover Plate	16.438*	2.000	T8:	2		A3	Straight cuts, edges deburred
FP7	Rub Rail Top Plate	59.000*	2.000	RR1:	2		A8	Post machining necessary, see part drawings for details
FP8	Rub Rail Weld-On Plate	5.500	4.000	N/A	4		A4	Post machining necessary, see part drawings for details

***Note:** These dimensions are determined through the **customization table** included in the drawing package. The nominal value is shown. Please refer to the customization table for instructions on calculating the **customized dimensions (fill in values)** to suit your specific winch.

Cut List: (2 of 3)

Part Number Legend				Notes			
BR - BARRIER	FG - FIBERGLASS GRATING	FP - FLAT PLATE	H - HARDWARE	Verify dimensions of slots and holes if using water-jet All dimensions are in inches			
PE - UHMWPE	ST - SQUARE TUBE	AB - ANGLE BRACKET	A - ASSEMBLY				

Stock Material	ASTM A36 Steel, 2" x 2" x 1/8" Square Tubing						
Part ID #	Description	Length (in.)	Customized Dimension (Fill in Value)	Qty	Image	Used in Assembly:	Notes
ST1	Guard Mount Bar	63.500*	T7:	2		A2	Straight cuts, edges deburred

Stock Material	304/304L Stainless Steel, 1-1/2" x 1-1/2" x 1/8" Square Tubing						
Part ID #	Description	Length (in.)	Customized Dimension (Fill in Value)	Qty	Image	Used in Assembly:	Notes
ST2	Leg Tube	20.625*	T1:	4		A5, A6, A7	Angle cut, see drawing for details
ST3	45 Tube	14.875	N/A	4		A5, A6, A7	Angle cut, see drawing for details
ST4	Grab Bar Side 1	19.438*	T2:	1		A5	Angle cut, see drawing for details
ST5	Grab Bar Side 2	19.438*	T2:	1		A6	Angle cut, see drawing for details
ST6	Back Tube	60.625*	T3:	1		A7	Angle cut, see drawing for details
ST7	Front Tube	57.625*	T4:	1		A3	Straight cuts, edges deburred
ST8	Grab Bar Return	11.250	N/A	2		A3	Angle cut, see drawing for details
ST9	Outer Cross Bar	49.000*	T5:	2		A3	Straight cuts, edges deburred
ST10	Middle Cross Bar	37.750*	T6:	1		A3	Straight cuts, edges deburred
ST11	Spool Cover Bar	16.438*	T8:	2		A3	Straight cuts, edges deburred

***Note:** These dimensions are determined through the **customization table** included in the drawing package. The nominal value is shown. Please refer to the customization table for instructions on calculating the **customized dimensions (fill in values)** to suit your specific winch.

Cut List: (3 of 3)

Part Number Legend				Notes			
BR - BARRIER	FG - FIBERGLASS GRATING	FP - FLAT PLATE	H - HARDWARE	Verify dimensions of slots and holes if using water-jet All dimensions are in inches			
PE - UHMWPE	ST - SQUARE TUBE	AB - ANGLE BRACKET	A - ASSEMBLY				

Stock Material	304/304L Stainless Steel, 2" x 2" Angle Bracket, 1/4" Thick						
Part ID #	Description	Length (in.)	Customized Dimension (Fill in Value)	Qty	Image	Used in Assembly:	Notes
AB1	Rub Rail Angle Bracket	59.000*	RR1:	2		A4	Post machining necessary, see part drawings for details

Stock Material	304/304L Stainless Steel, 2" x 3" Angle Bracket, 3/16" Thick						
Part ID #	Description	Length (in.)	Customized Dimension (Fill in Value)	Qty	Image	Used in Assembly:	Notes
AB2	Rub Rail Clamp Bracket	2.000	N/A	8		A0	Post machining necessary, see part drawings for details

Stock Material	ASTM A36 Steel, 3" x 4" Angle Bracket, 1/4" Thick						
Part ID #	Description	Length (in.)	Customized Dimension (Fill in Value)	Qty	Image	Used in Assembly:	Notes
AB3	Guard Mount Bracket Side 1	6.750	N/A	2		A1	Post machining necessary, see part drawings for details
AB4	Guard Mount Bracket Side 2	6.750	N/A	2		A1	Post machining necessary, see part drawings for details

Stock Material	UHMW-PE, 3" x 3/4" Bar						
Part ID #	Description	Length (in.)	Customized Dimension (Fill in Value)	Qty	Image	Used in Assembly:	Notes
PE1	UHMW-PE Strip	61.000*	RR2:	2		A8	Post machining necessary, see part drawings for details

Stock Material	UV Resistant Nylon						
Part ID #	Description	Length (in.)	Width (in.)	Qty	Image	Used in Assembly:	Notes
BR1	Barrier Sheet	6.500	4.000	4		A0	Post machining necessary, see part drawings for details

Stock Material	UV Resistant Nylon, 1/2" OD, 7/16" ID Round Tube						
Part ID #	Description	Length (in.)	Qty	Image	Used in Assembly:	Notes	
H4	Barrier Tube	0.438	16		A0	Straight cuts, edges deburred	

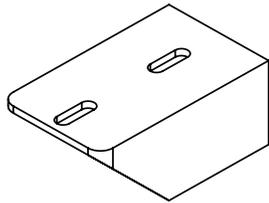
***Note:** These dimensions are determined through the **customization table** included in the drawing package. The nominal value is shown. Please refer to the customization table for instructions on calculating the **customized dimensions (fill in values)** to suit your specific winch.

2

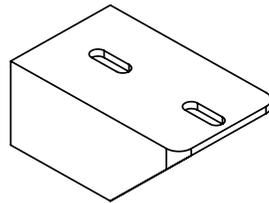
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Parts Inventory

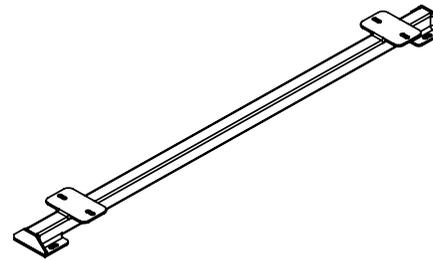
**AB3/AB4 are part of the Main Brackets
ASTM A36 Steel, 3" x 4" Angle Bracket, 1/4" Thick**



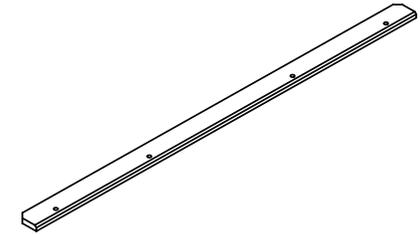
**AB3 - MOUNT BAR ASSEMBLY
QTY. 2**



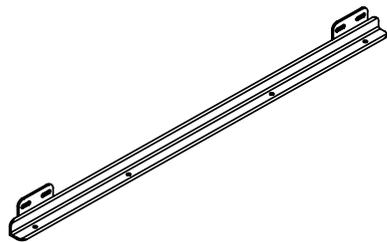
**AB4 - MOUNT BAR ASSEMBLY
QTY. 2**



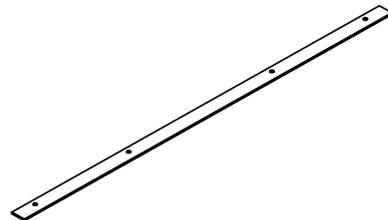
**A2 - MOUNT BAR ASSEMBLY
QTY. 2**



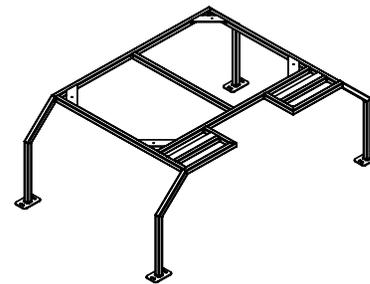
**PE1 - RUB RAIL
QTY. 2**



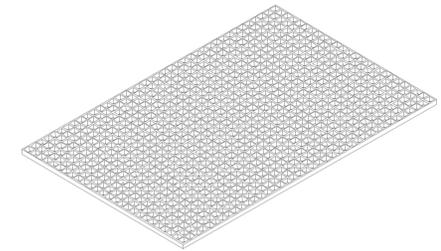
**A4 - RUB RAIL BRACKET ASSEMBLY
QTY. 2**



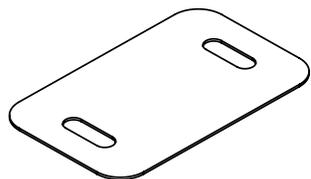
**FP7 - RUB RAIL TOP PLATE
QTY. 2**



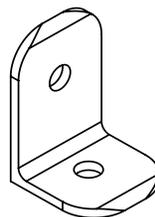
**A3 - GUARD FRAME ASSEMBLY
QTY. 1**



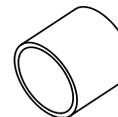
**FG1 - FIBERGLASS GRATING
QTY. 1**



**BR1 - BARRIER SHEET
QTY. 4**



**AB2 - RUB RAIL CLAMP BRACKET
QTY. 8**



**H4 - BARRIER TUBE
QTY. 16**

505 Parts Inventory			
National Institute for Occupational Safety and Health (NIOSH)	PART ID NUMBER	NAME	DATE
	N/A	DRAWN DJS	05/16/18
		CHECKED CW	05/16/18
PAGE 1 OF 1	SCALE: 1:5	SIZE: A	

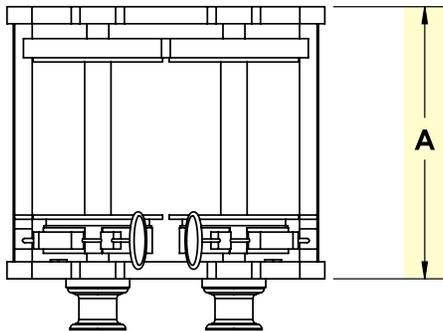
2

1

Customization Formulas for Fabrication

In order to properly build the guard to fit your specific winch, some dimensions will need to be **manually measured** on your winch. The dimensions needed are shown below and will be used to determine certain key dimensions on your winch guard. The subsequent sheets for the various components and assemblies will reference these dimensions.

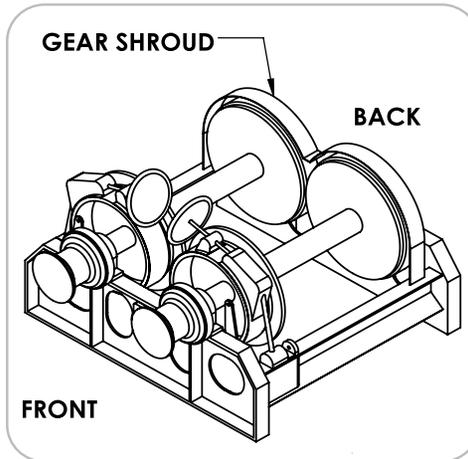
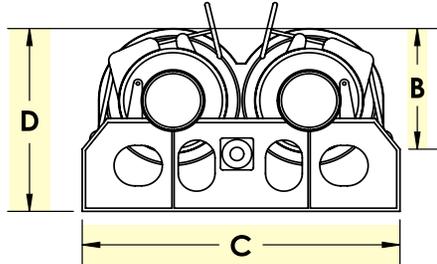
B



Dimensions	Value (± .250")	Description
A		OVERALL DEPTH OF THE WINCH MEASURED FROM THE OUTER FACE OF THE FRONT FRAME TO THE OUTER FACE OF THE BACK FRAME.
B		THIS IS THE DISTANCE FROM THE BOTTOM EDGE OF THE CHAMFER ON A CHAMFERED EDGE FRAME (TOP EDGE OF A SQUARED FRAME) TO THE TOP MOST POINT OF THE GEAR SHROUD.
C		OVERALL WIDTH OF THE WINCH MEASURED FROM PORT SIDE TO STARBOARD SIDE OF THE FRONT WINCH FRAME.
D		OVERALL HEIGHT OF THE WINCH. MEASURE FROM THE BASE OF THE WINCH FRAME (NOT THE DECK) TO THE TOP MOST POINT OF THE GEAR SHROUD.

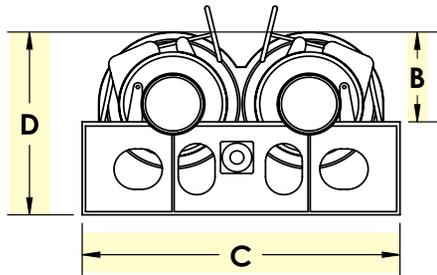
B

CHAMFERED FRAME



A

SQUARED FRAME



NOTE: Dimension R will be used on the **Installation Guide** to install the tabs that the winch guard will be mounted to.

Dimensions	Use in Part/s	Formulas	New Value
T1	ST2	= B - 7.75"	
T2	ST4, ST5	= C/2 - 16.75"	
T3	ST6	= C - 11.75"	
T4	ST7	= C - 14.75"	
T5	ST9	= A - 15"	
T6	ST10	= A - 26.25"	
T7	ST1	= A - 0.5"	
T8	ST11, FP9	= C/2 - 19.75"	
RR1	AB1, FP7	= A - 5"	
RR2	PE1	= A - 3"	
G1	FG1	= A - 24.75"	
G2	FG1	= C - 13.5"	
R	A1	= D - B - 3"	

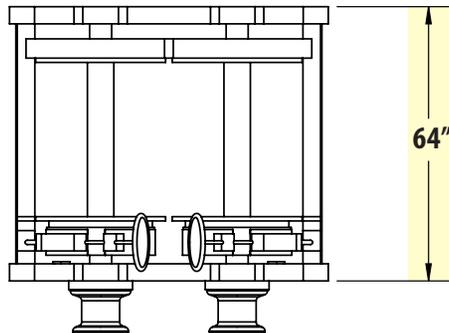
A

Customization Formulas for Fabrication: NIOSH Example

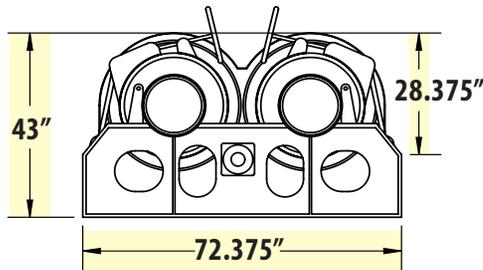
This is an example of how to use the customization formulas based on measurements taken by NIOSH engineers on a sample 505 winch. You must enter your specific winch measurements and **apply the formulas** to determine certain key dimensions used during fabrication of your winch guard.

EXAMPLE OF MEASUREMENTS WITH FORMULAS APPLIED

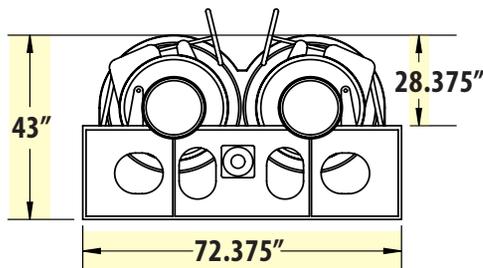
B



CHAMFERED FRAME



SQUARED FRAME



A

Dimensions	Value (± .250")	Description	
A	64"	OVERALL DEPTH OF THE WINCH MEASURED FROM THE OUTER FACE OF THE FRONT FRAME TO THE OUTER FACE OF THE BACK FRAME.	
B	28.375"	THIS IS THE DISTANCE FROM THE BOTTOM EDGE OF THE CHAMFER ON A CHAMFERED EDGE FRAME (TOP EDGE OF A SQUARED FRAME) TO THE TOP MOST POINT OF THE GEAR SHROUD.	
C	72.375"	OVERALL WIDTH OF THE WINCH MEASURED FROM PORT SIDE TO STARBOARD SIDE OF THE FRONT WINCH FRAME.	
D	43"	OVERALL HEIGHT OF THE WINCH. MEASURE FROM THE BASE OF THE WINCH FRAME (NOT THE DECK) TO THE TOP MOST POINT OF THE GEAR SHROUD.	
Dimensions	Use in Part/s	Formulas	New Value
T1	ST2	$B - 7.75" = 28.375" - 7.75"$	20.63"
T2	ST4, ST5	$C/2 - 16.75" = (72.375" / 2) - 16.75"$	19.44"
T3	ST6	$C - 11.75" = 72.375" - 11.75"$	60.63"
T4	ST7	$C - 14.75" = 72.375" - 14.75"$	57.63"
T5	ST9	$A - 15" = 64" - 15"$	49"
T6	ST10	$A - 26.25" = 64" - 26.25"$	37.75"
T7	ST1	$A - 0.5" = 64" - 0.5"$	63.5"
T8	ST11, FP9	$C/2 - 19.75" = (72.375" / 2) - 19.75"$	16.44"
RR1	AB1, FP7	$A - 5" = 64" - 5"$	59"
RR2	PE1	$A - 3" = 64" - 3"$	61"
G1	FG1	$A - 24.75" = 64" - 24.75"$	39.25"
G2	FG1	$C - 13.5" = 72.375" - 13.5"$	58.88"
R	A1	$D - B - 3" = 48" - 28.375" - 3"$	11.63"

B

A

2

1

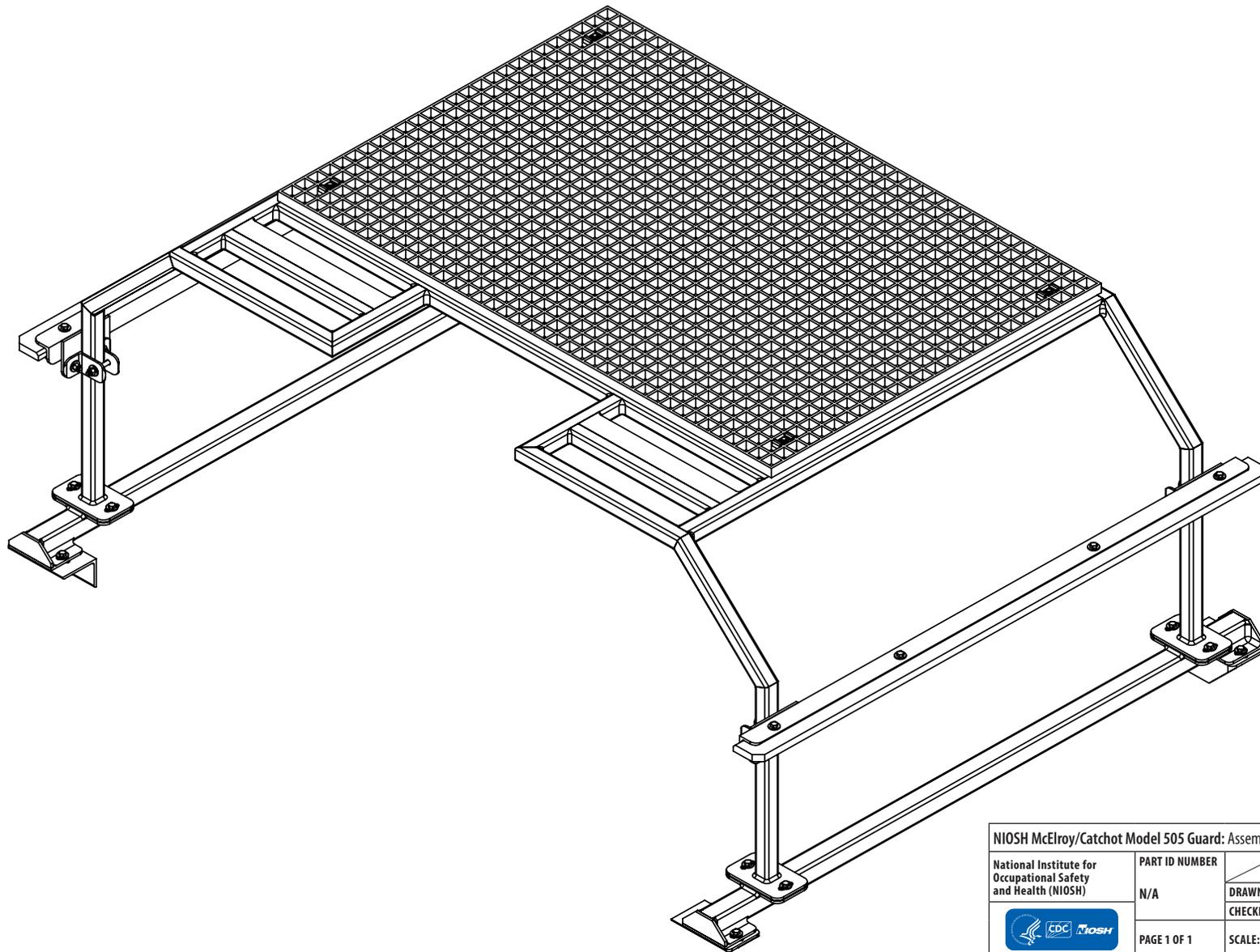
NIOSH McElroy/Catchot Model 505 Winch Guard: Assembled

B

B

A

A



NIOSH McElroy/Catchot Model 505 Guard: Assembled			
National Institute for Occupational Safety and Health (NIOSH)	PART ID NUMBER	NAME	DATE
	N/A	DRAWN DJS	05/16/18
	CHECKED CW	05/16/18	
	PAGE 1 OF 1	SCALE: 1:13	SIZE: A

2

1

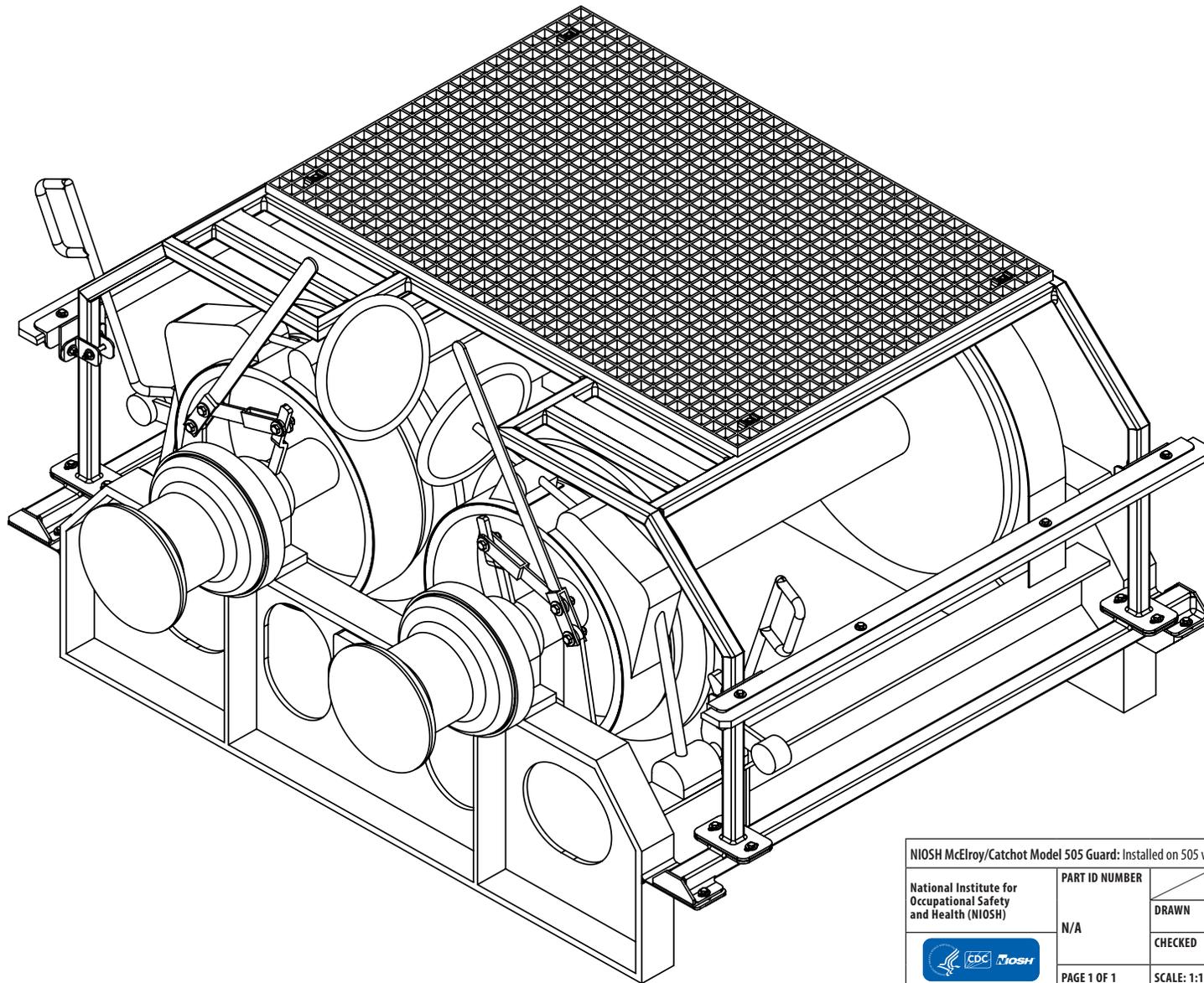
2

1

NIOSH McElroy/Catchot Model 505 Winch Guard: Installed on 505 Winch

B

B



A

A

2

1

NIOSH McElroy/Catchot Model 505 Guard: Installed on 505 winch			
National Institute for Occupational Safety and Health (NIOSH)	PART ID NUMBER	NAME	DATE
	N/A	DRAWN DJS	05/16/18
		CHECKED CW	05/16/18
		PAGE 1 OF 1	SCALE: 1:13
		SIZE: A	

2

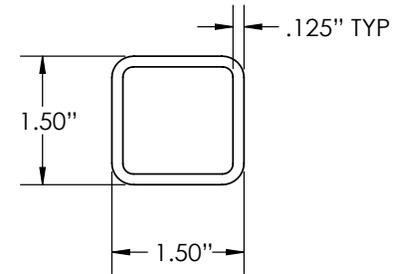
1

505 Square Tube Components: Guard Leg, 45° Tube, Grab Bar Return, and Middle Crossbar

See page [30/31](#) for assembly

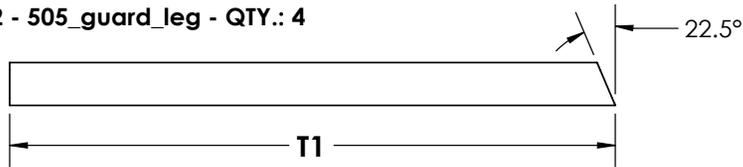
NOTES:

1. MATERIAL: 304/304L STAINLESS STEEL (1-1/2" X 1-1/2" X 1/8" THICK SQUARE TUBE)
2. FINISH: DEBURRED
3. TOLERANCE: ± .0625", ± .5°
4. PARTS TO BE CUT
5. LABEL PARTS TO SIMPLIFY ASSEMBLY
6. MEASUREMENTS ARE IN INCHES

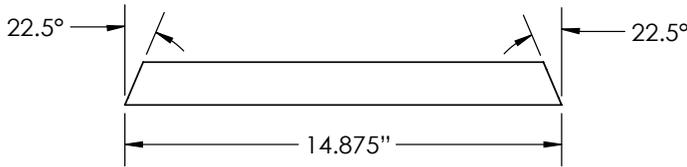


CROSS SECTIONAL VIEW OF SQUARE TUBE MATERIAL
SCALE: 1:1

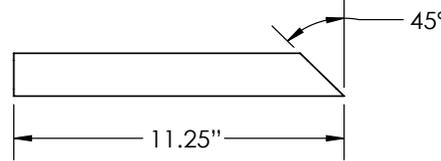
ST2 - 505_guard_leg - QTY.: 4



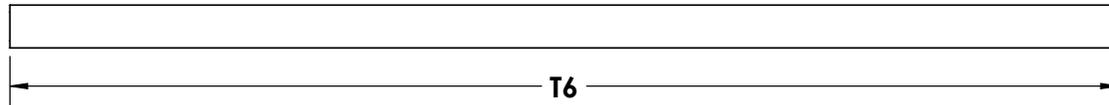
ST3 - 505_45_tube - QTY.: 4



ST8 - 505_grab_bar_return - QTY.: 2



ST10 - 505_middle_crossbar - QTY.: 1



Dimensions	Formulas	New Values
T1	= B - 7.75"	
T6	= A - 26.25"	

NOTE: IN ORDER TO DETERMINE THE TUBE LENGTHS, T1 AND T6, INSERT DIMENSIONS **A** AND **B** INTO THE TABLE ABOVE. DIMENSIONS **A** AND **B** ARE MEASUREMENTS MADE DIRECTLY FROM THE SPECIFIC WINCH ONTO WHICH THIS GUARD WILL BE MOUNTED.

505 Square Tube Components: Guard Leg, 45° Tube, Grab Bar Return, Middle Crossbar			
National Institute for Occupational Safety and Health (NIOSH)	PART ID NUMBER	NAME	DATE
		ST2, ST3, ST8, ST10	DRAWN DJS
		CHECKED CW	05/16/18
PAGE 1 OF 4		SCALE: 1:6	SIZE: A

2

1

2

1

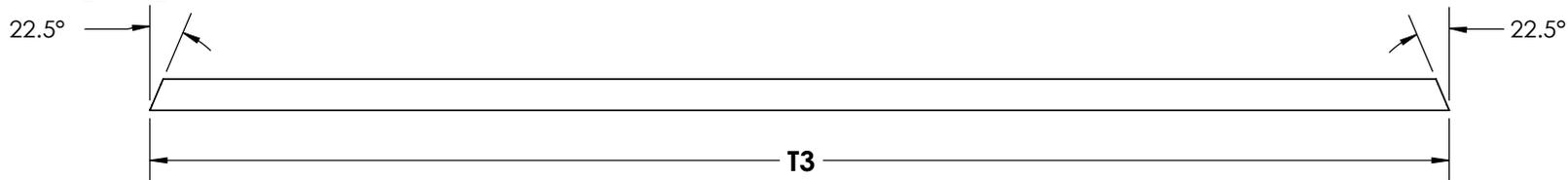
Square Tube Components: Back, Front, and Spool Cover Tube, and Outer Crossbar

See page 32 for assembly

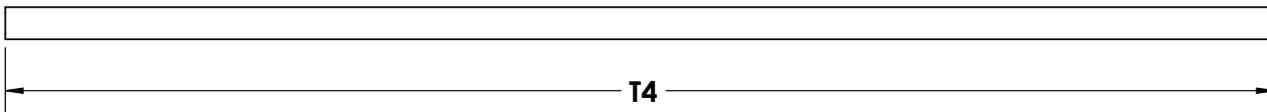
NOTES:

1. MATERIAL: 304/304L STAINLESS STEEL (1-1/2" X 1-1/2" X 1/8" THICK SQUARE TUBE)
2. FINISH: DEBURRED
3. TOLERANCE: ± .0625", ± .500
4. PARTS TO BE CUT
5. LABEL PARTS TO SIMPLIFY ASSEMBLY
6. MEASUREMENTS ARE IN INCHES

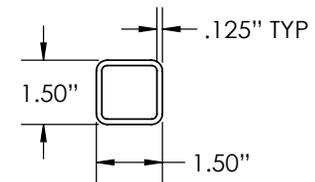
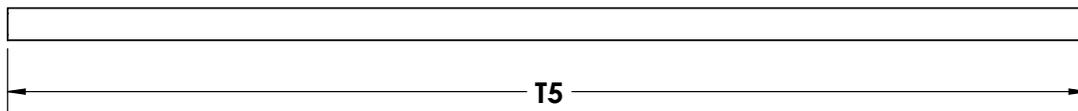
ST6 - 505_back_tube - QTY.: 1



ST7 - 505_front_tube - QTY.: 4

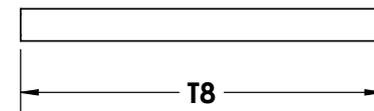


ST9 - 505_outer_crossbar - QTY.: 4



CROSS SECTIONAL VIEW OF SQUARE TUBE MATERIAL
SCALE: 1:4

ST11 - 505_spool_cover_tube - QTY.: 2



NOTE: TO DETERMINE THE TUBE LENGTHS, T3, T4, T5 and T8, INSERT DIMENSIONS **A** AND **C** INTO THE TABLE BELOW. DIMENSIONS **A** AND **C** ARE MEASUREMENTS MADE DIRECTLY FROM THE SPECIFIC WINCH ONTO WHICH THIS GUARD WILL BE MOUNTED.

Dimensions	Formulas	New Values
T3	= C - 11.75"	
T4	= C - 14.75"	
T5	= A - 15"	
T8	= C/2 - 19.75"	

505 Square Tube Components: Back, Front, and Spool Cover Tube, and Outer Crossbar			
National Institute for Occupational Safety and Health (NIOSH)	PART ID NUMBER	NAME	DATE
		ST6, ST7, ST9, ST11	DRAWN DJS
		CHECKED CW	05/16/18
PAGE 2 OF 4		SCALE: 1:8	SIZE: A

2

1

2

1

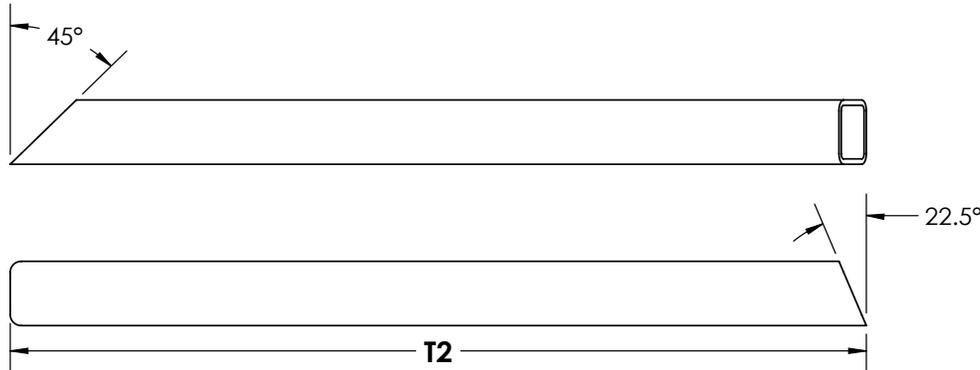
NOTES:

1. MATERIAL: 304/304L STAINLESS STEEL (1-1/2" X 1-1/2" X 1/8" THICK SQUARE TUBE)
2. FINISH: DEBURRED
3. TOLERANCE: ± .0625", ± .5°
4. PARTS TO BE CUT
5. LABEL PARTS TO SIMPLIFY ASSEMBLY
6. MEASUREMENTS ARE IN INCHES

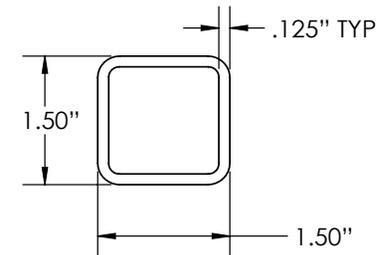
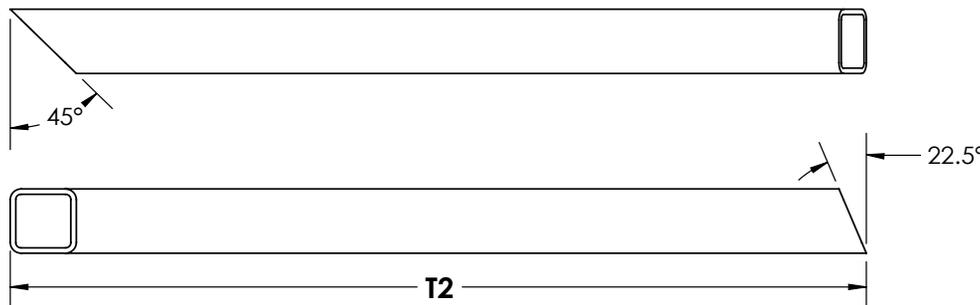
505 Square Tube Components: Grab Bar, Sides 1&2

See page [33/34](#) for assembly

ST4 - 505_grab_bar_side_1 - QTY.: 1



ST5 - 505_grab_bar_side_2 - QTY.: 1



CROSS SECTIONAL VIEW OF SQUARE TUBE MATERIAL
SCALE: 1:2

Dimensions	Formula	New Value
T2	$= C / 2 - 16.75"$	

NOTE: TO DETERMINE THE TUBE LENGTH, T2, INSERT DIMENSION **C** INTO THE TABLE ABOVE. DIMENSION **C** IS A MEASUREMENT MADE DIRECTLY FROM THE SPECIFIC WINCH ONTO WHICH THIS GUARD WILL BE MOUNTED.

505 Square Tube Components: Grab Bar Side 1&2			
National Institute for Occupational Safety and Health (NIOSH)	PART ID NUMBER	NAME	DATE
	ST4, ST5	DRAWN	DJS
	CHECKED	CW	05/16/18
	PAGE 3 OF 4	SCALE: 1:4	SIZE: A

2

1

2

1

505 Square Tube Components: Mount Bar

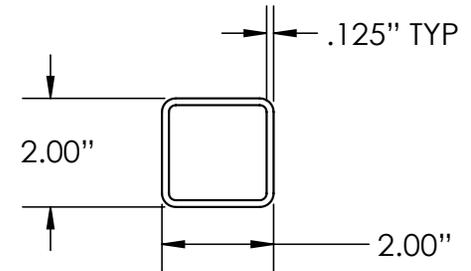
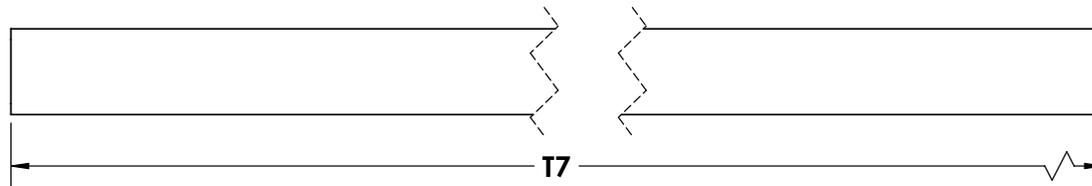
NOTES:

1. MATERIAL: ASTM A36 STEEL (2" X 2" X 1/8" THICK SQUARE TUBE)
2. FINISH: DEBURRED
3. TOLERANCE: ± .0625", ± .5°
4. PARTS TO BE CUT
5. LABEL PARTS TO SIMPLIFY ASSEMBLY
6. MEASUREMENTS ARE IN INCHES

B

B

ST1 - 505_mnt_bar - QTY.: 2



CROSS SECTIONAL VIEW OF SQUARE TUBE MATERIAL
SCALE: 1:2

NOTE: TO DETERMINE THE TUBE LENGTH, T7, INSERT DIMENSION **A** INTO THE TABLE BELOW. DIMENSION **A** IS A MEASUREMENT MADE DIRECTLY FROM THE SPECIFIC WINCH ONTO WHICH THIS GUARD WILL BE MOUNTED.

Dimension	Formula	New Value
T7	$= A - 0.5"$	

A

A

505 Square Tube Components: Mount Bar			
National Institute for Occupational Safety and Health (NIOSH)	PART ID NUMBER	NAME	DATE
	ST1	DRAWN DJS	05/16/18
		CHECKED CW	05/16/18
PAGE 4 OF 4		SCALE: 1:4	SIZE: A

2

1

2

1

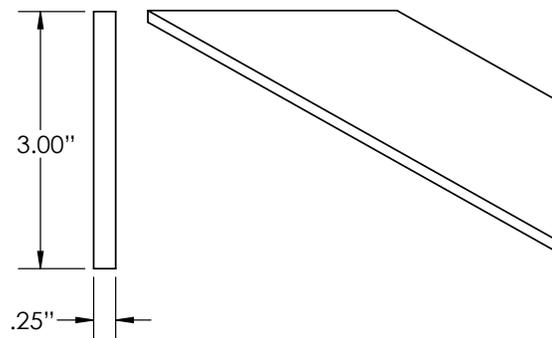
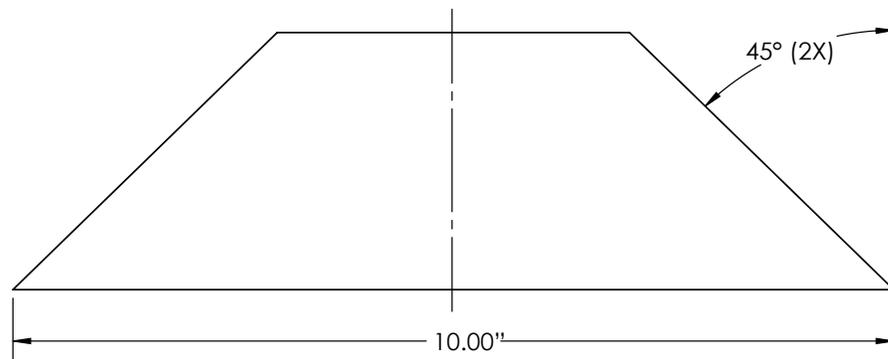
NOTES:

- 1. MATERIAL: 304/304L STAINLESS STEEL (1/4" PLATE)
- 2. FINISH: DEBURRED
- 3. TOLERANCE: $\pm .0625"$, $\pm .5^\circ$
- 4. PARTS TO BE CUT AND MACHINED
- 5. LABEL PARTS AFTER MACHINING TO SIMPLIFY ASSEMBLY
- 6. SYMMETRY APPLIES WHERE EVIDENT
- 7. MEASUREMENTS ARE IN INCHES

505 Guard Frame Plates: Guard Frame Gusset and Guard Foot Plate

FP4 - 505_guard_frame_gusset - QTY.: 4

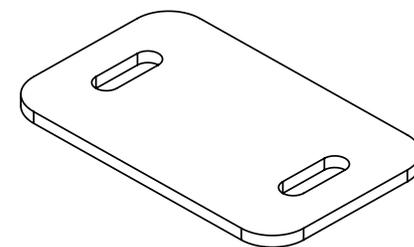
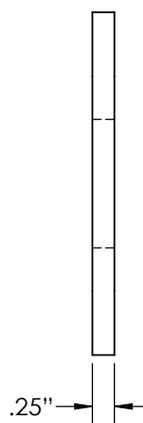
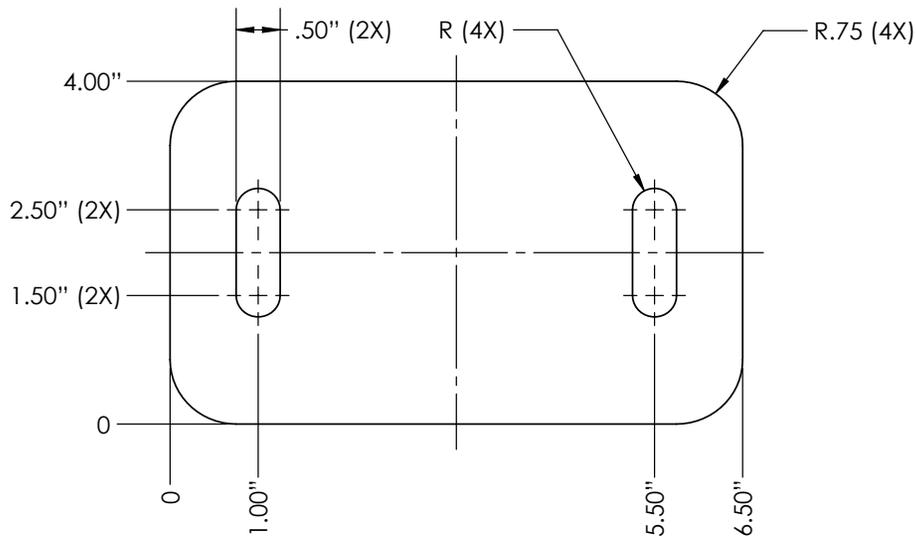
B



B

FP5 - 505_guard_foot_plate - QTY.: 4

A



A

505 Guard Frame Plates: Guard Frame Gusset and Guard Foot Plate				
National Institute for Occupational Safety and Health (NIOSH)	PART ID NUMBER		NAME	DATE
	FP4, FP5		DRAWN	DJS 05/16/18
			CHECKED	CW 05/16/18
PAGE 1 OF 2		SCALE: 1:2	SIZE: A	

2

1

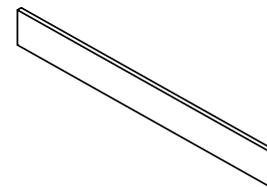
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1

NOTES:

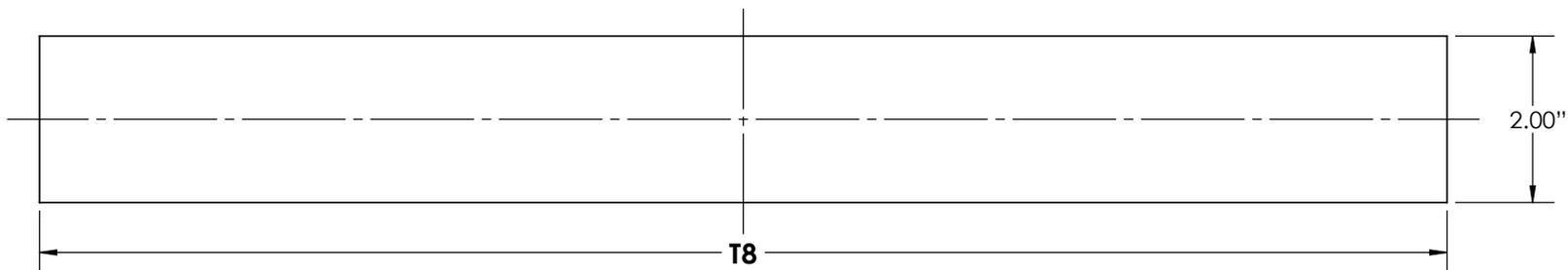
- 1. MATERIAL: 304/304L STAINLESS STEEL (1/4" PLATE)
- 2. FINISH: DEBURRED
- 3. TOLERANCE: ± .0625", ± .5°
- 4. PARTS TO BE CUT
- 5. LABEL PARTS AFTER CUT TO SIMPLIFY ASSEMBLY
- 6. SYMMETRY APPLIES WHERE EVIDENT
- 7. MEASUREMENTS ARE IN INCHES

505 Frame Plates: Spool Cover Plate



B

FP6 - 505_spool_cover_plate - QTY.: 2



B



NOTE: TO DETERMINE THE PLATE LENGTH, T8, INSERT DIMENSION **C** INTO THE TABLE BELOW. DIMENSION **C** IS A MEASUREMENT MADE DIRECTLY FROM THE SPECIFIC WINCH ONTO WHICH THIS GUARD WILL BE MOUNTED.

Dimension	Formula	New Value
T8	$= C/2 - 19.75''$	

A

A

2

1

505 Guard Frame Plates: Spool Cover Plate			
National Institute for Occupational Safety and Health (NIOSH)	PART ID NUMBER	NAME	DATE
	FP6	DRAWN: DJS	05/16/18
	CHECKED: CW	05/16/18	
PAGE 2 OF 2		SCALE: 1:2	SIZE: A



2

1

NOTES:

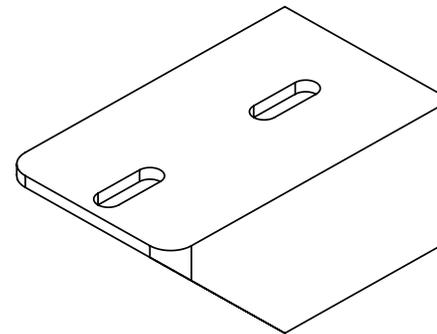
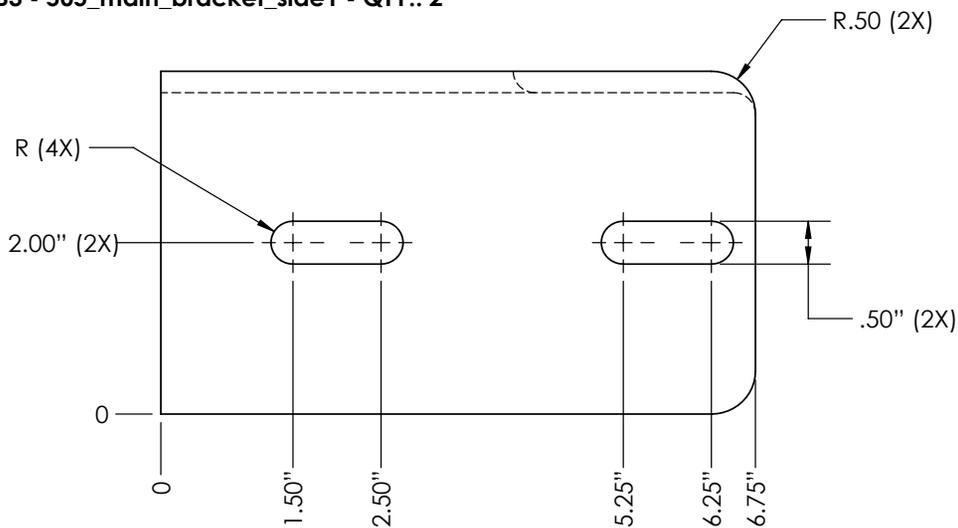
1. MATERIAL: ASTM A36 STEEL (4" X 3" ANGLE BRACKET, 1/4" THICK)
2. FINISH: DEBURRED
3. TOLERANCE: $\pm .0625"$, $\pm .5^\circ$
4. PARTS TO BE CUT AND MACHINED
5. LABEL PARTS AFTER MACHINING TO SIMPLIFY ASSEMBLY
6. MEASUREMENTS ARE IN INCHES

505 Main Bracket: Side 1

AB3 - 505_main_bracket_side1 - QTY.: 2

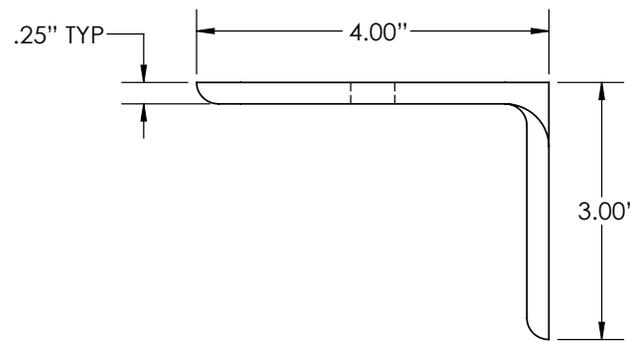
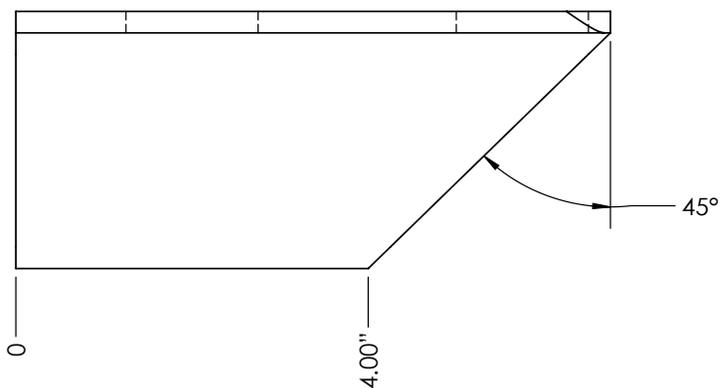
B

B



A

A



505 Main Brackets: Main Bracket Side 1			
National Institute for Occupational Safety and Health (NIOSH)	PART ID NUMBER	NAME	DATE
		AB3	DJS
		CHECKED	CW
PAGE 1 OF 2		SCALE: 1:2	SIZE: A

2

1

2

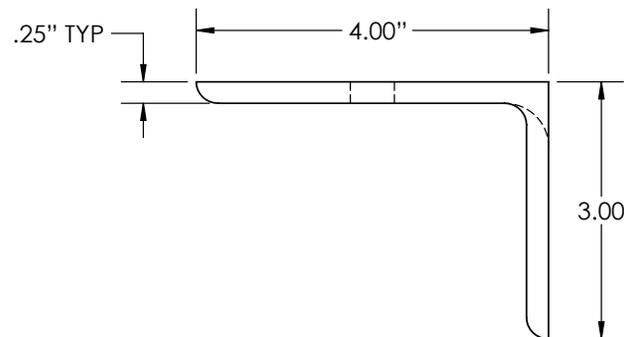
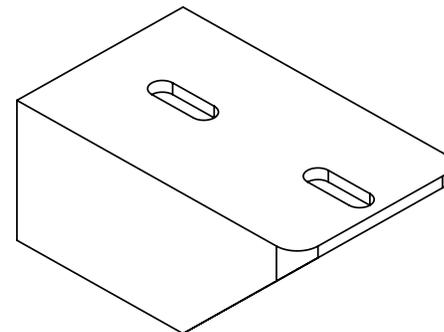
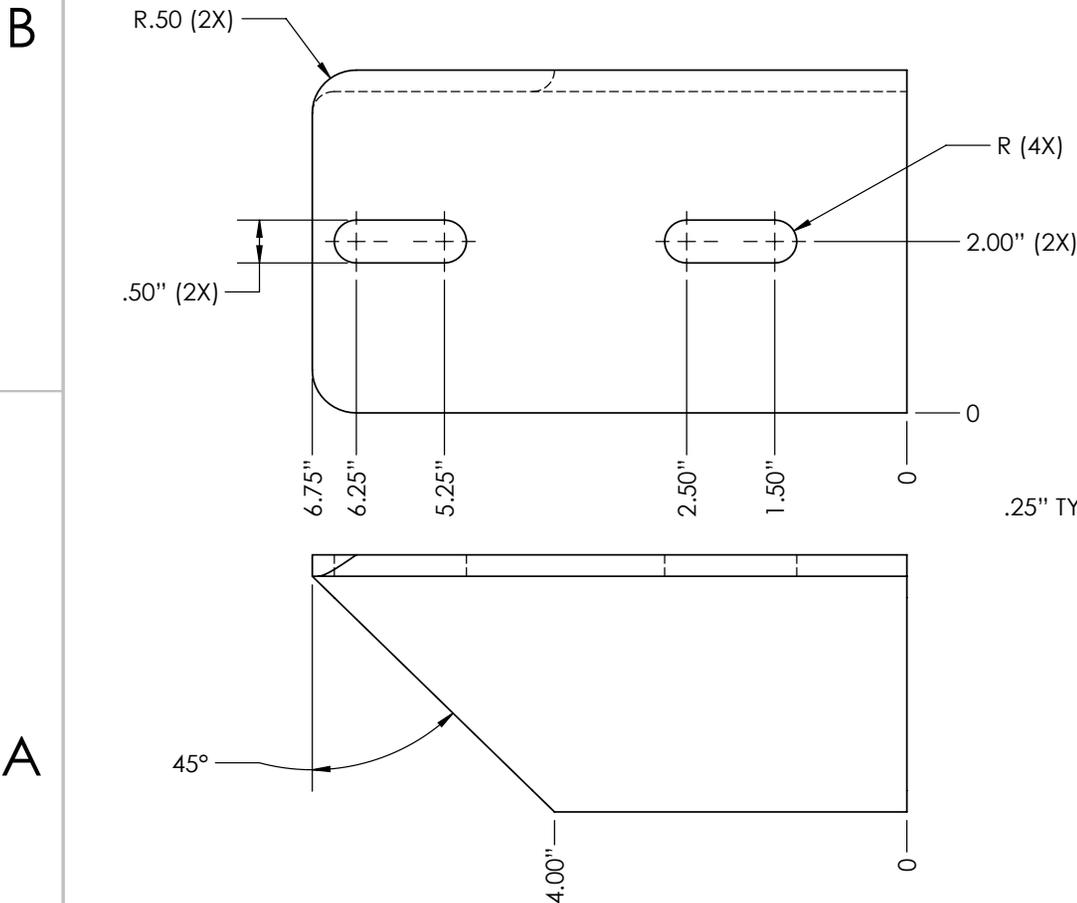
1

NOTES:

1. MATERIAL: ASTM A36 STEEL (4" X 3" ANGLE BRACKET, 1/4" THICK)
2. FINISH: DEBURRED
3. TOLERANCE: $\pm .0625"$, $\pm .5^\circ$
4. PARTS TO BE CUT AND MACHINED
5. LABEL PARTS AFTER MACHINING TO SIMPLIFY ASSEMBLY
6. MEASUREMENTS ARE IN INCHES

505 Main Bracket: Side 2

AB4 - 505_main_bracket_side2 - QTY.: 2



505 Main Brackets: Main Bracket Side 2			
National Institute for Occupational Safety and Health (NIOSH)	PART ID NUMBER	NAME	DATE
	AB4	DRAWN: DJS	05/16/18
		CHECKED: CW	05/16/18
		PAGE 2 OF 2	SCALE: 1:2
			SIZE: A

2

1

2

1

NOTES:

- 1. MATERIAL: ASTM A36 STEEL (1/4" PLATE)
- 2. FINISH: DEBURRED
- 3. TOLERANCE: $\pm .0625"$, $\pm .5^\circ$
- 4. PARTS TO BE CUT AND MACHINED
- 5. LABEL PARTS AFTER MACHINING TO SIMPLIFY ASSEMBLY
- 6. SYMMETRY APPLIES WHERE EVIDENT
- 7. MEASUREMENTS ARE IN INCHES

505 Mount Bar Plates: Mount Bar Top, Base, and End Plates

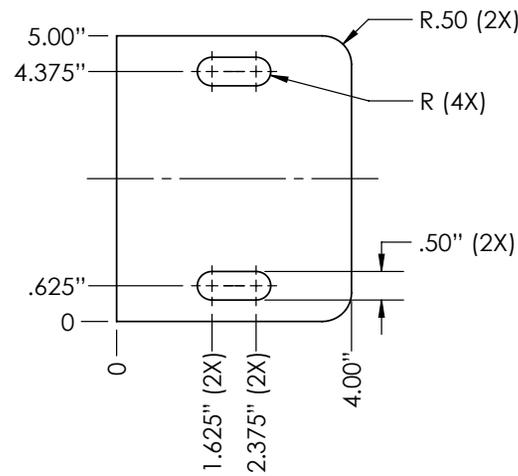
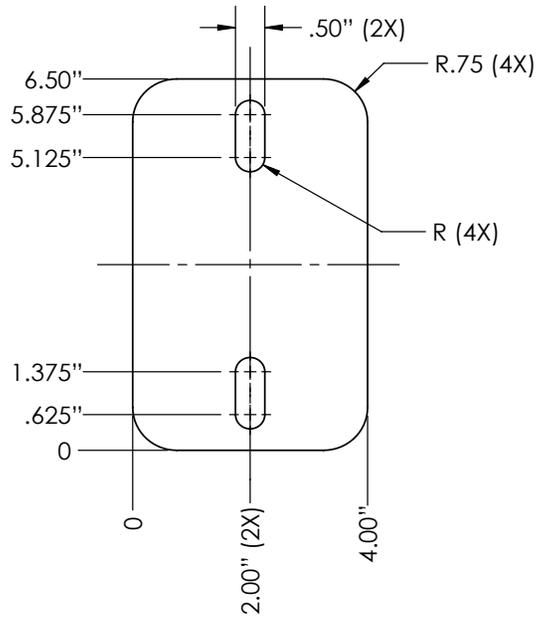


FP1 - 505_mnt_bar_top_plate - QTY.: 4

FP2 - 505_mnt_bar_base_plate - QTY.: 4

B

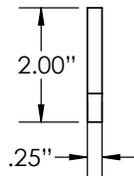
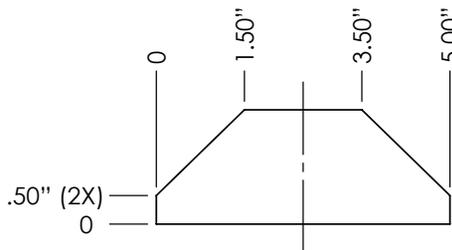
B



FP3 - 505_mnt_bar_end_plate - QTY.: 4

A

A



505 Mount Bar Plates: Mount Bar Top, Base, and End Plates			
National Institute for Occupational Safety and Health (NIOSH)	PART ID NUMBER	NAME	DATE
		FP1, FP2, FP3	DRAWN DJS
		CHECKED CW	05/16/18
PAGE 1 OF 1		SCALE: 1:3	SIZE: A

2

1

2

1

NOTES:

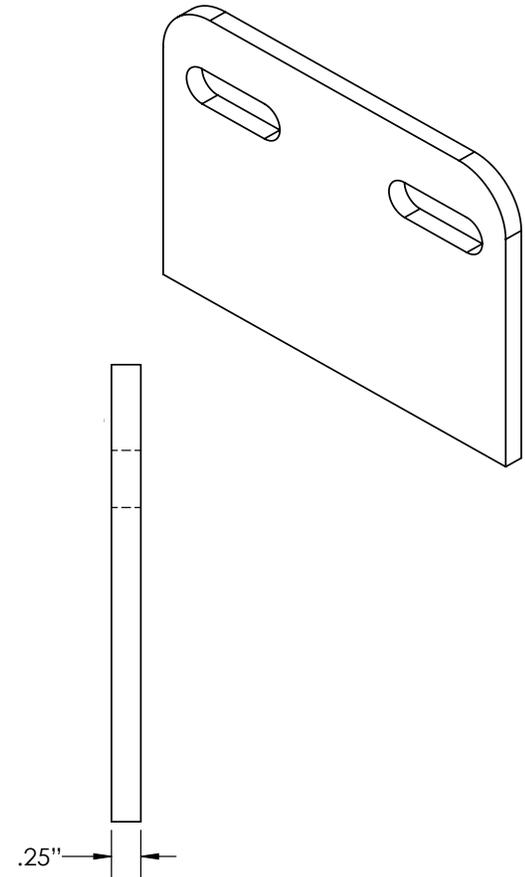
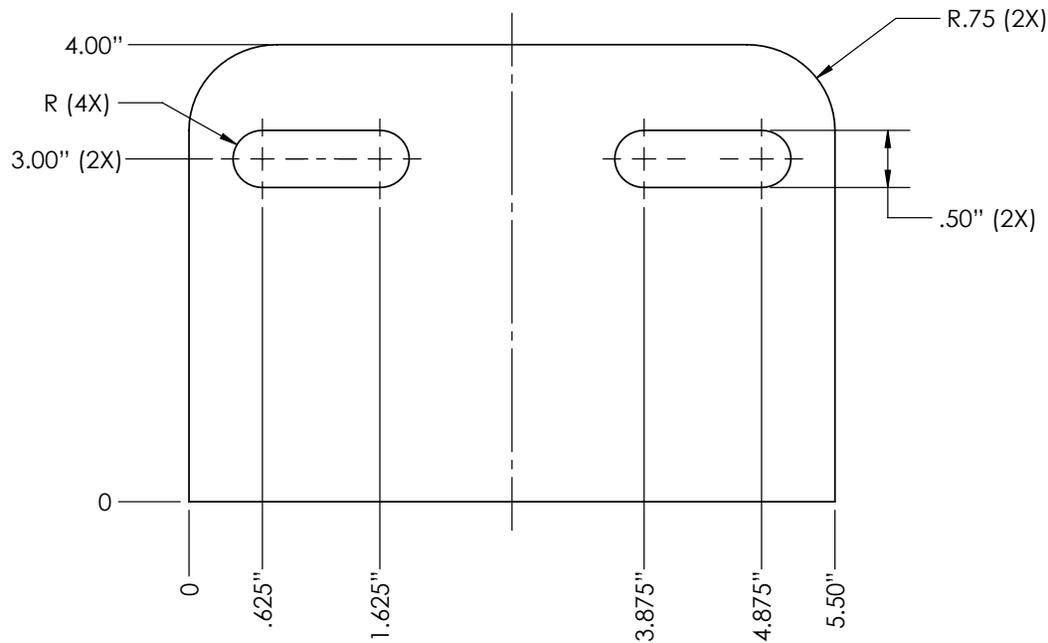
1. MATERIAL: 304/304L STAINLESS STEEL (1/4" PLATE)
2. FINISH: DEBURRED
3. TOLERANCE: $\pm .0625"$, $\pm .5^\circ$
4. PARTS TO BE CUT AND MACHINED
5. LABEL PARTS AFTER MACHINING TO SIMPLIFY ASSEMBLY
6. SYMMETRY APPLIES WHERE EVIDENT
7. MEASUREMENTS ARE IN INCHES

505 Rub Rail Components: Weld-on Plate

B

B

FP8 - 505_rub_rail_weld-on_plate - QTY.: 4



A

A

2

1

505 Rub Rail Components: Weld-on Plate			
National Institute for Occupational Safety and Health (NIOSH)	PART ID NUMBER	NAME	DATE
	FP8	DRAWN DJS	05/16/18
	CHECKED	CW	05/16/18
	PAGE 1 OF 4	SCALE: 2:3	SIZE: A

2

1

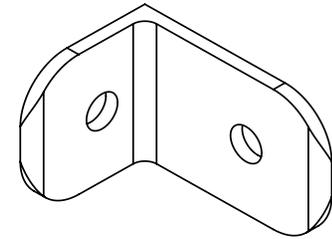
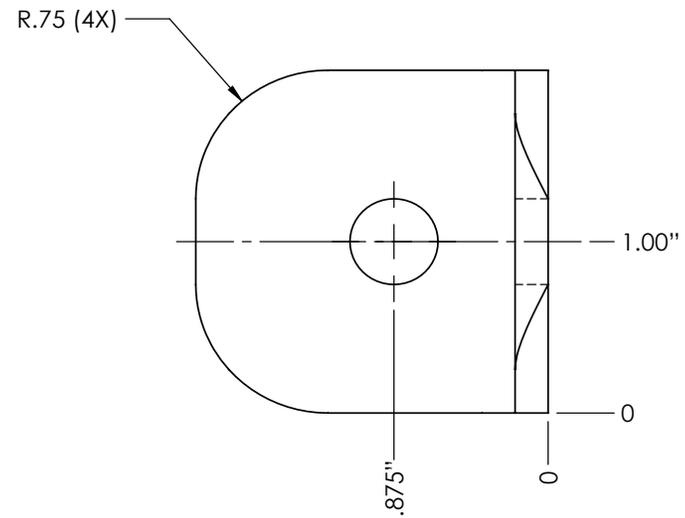
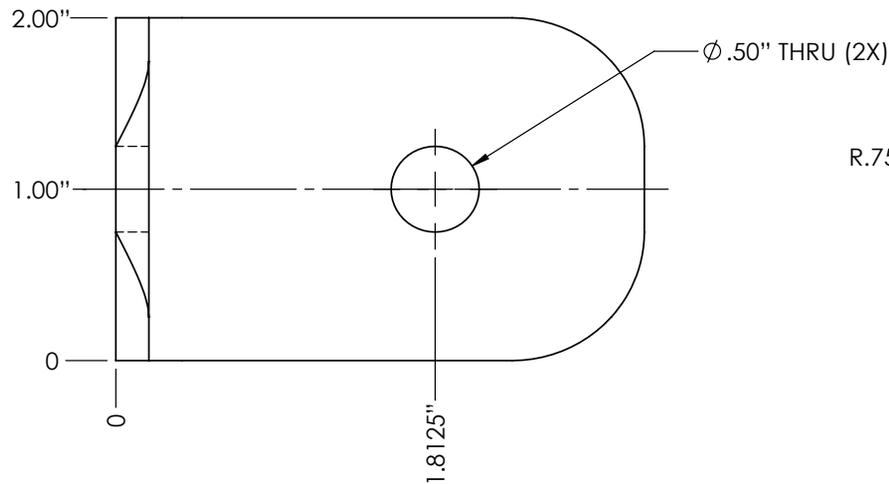
NOTES:

- 1. MATERIAL: 304/304L STAINLESS STEEL (2" X 3" ANGLE BRACKET, 3/16" THICK)
- 2. FINISH: DEBURRED
- 3. TOLERANCE: ± .0625", ± .5°
- 4. PARTS TO BE CUT AND MACHINED
- 5. LABEL PARTS AFTER MACHINING TO SIMPLIFY ASSEMBLY
- 6. SYMMETRY APPLIES WHERE EVIDENT
- 7. MEASUREMENTS ARE IN INCHES

505 Rub Rail Components: Rub Rail Clamp Bracket

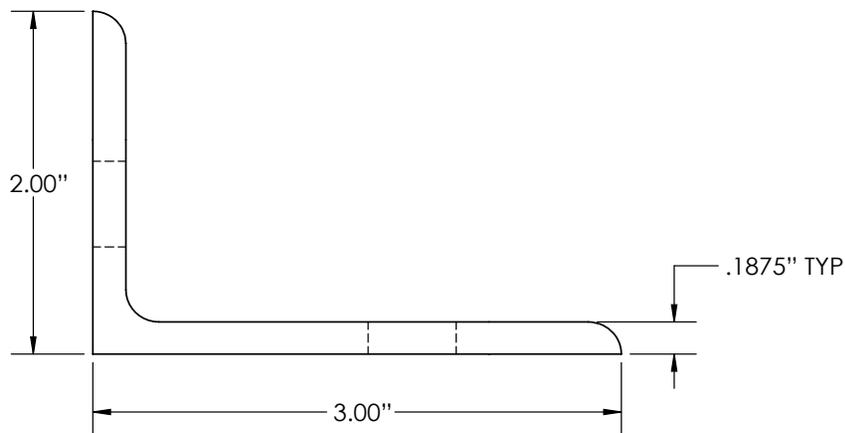
B

AB2 - 505_rub_rail_clamp_bracket - QTY.: 8



B

A



A

505 Rub Rail Components: Rub Rail Clamp Bracket			
National Institute for Occupational Safety and Health (NIOSH)	PART ID NUMBER	NAME	DATE
		AB2	DJS
		CHECKED	05/16/18
PAGE 2 OF 4		SCALE: 1:1	SIZE: A

2

1

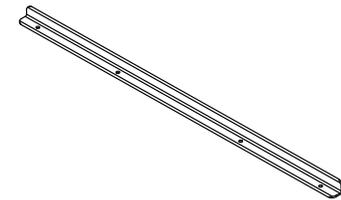
2

1

NOTES:

1. MATERIAL: 304/304L STAINLESS STEEL (2" X 2" ANGLE BRACKET, 1/4" THICK)
2. FINISH: DEBURRED
3. TOLERANCE: ± .0625", ± .5°
4. PARTS TO BE CUT AND MACHINED
5. LABEL PARTS AFTER MACHINING TO SIMPLIFY ASSEMBLY
6. SYMMETRY APPLIES WHERE EVIDENT
7. MEASUREMENTS ARE IN INCHES

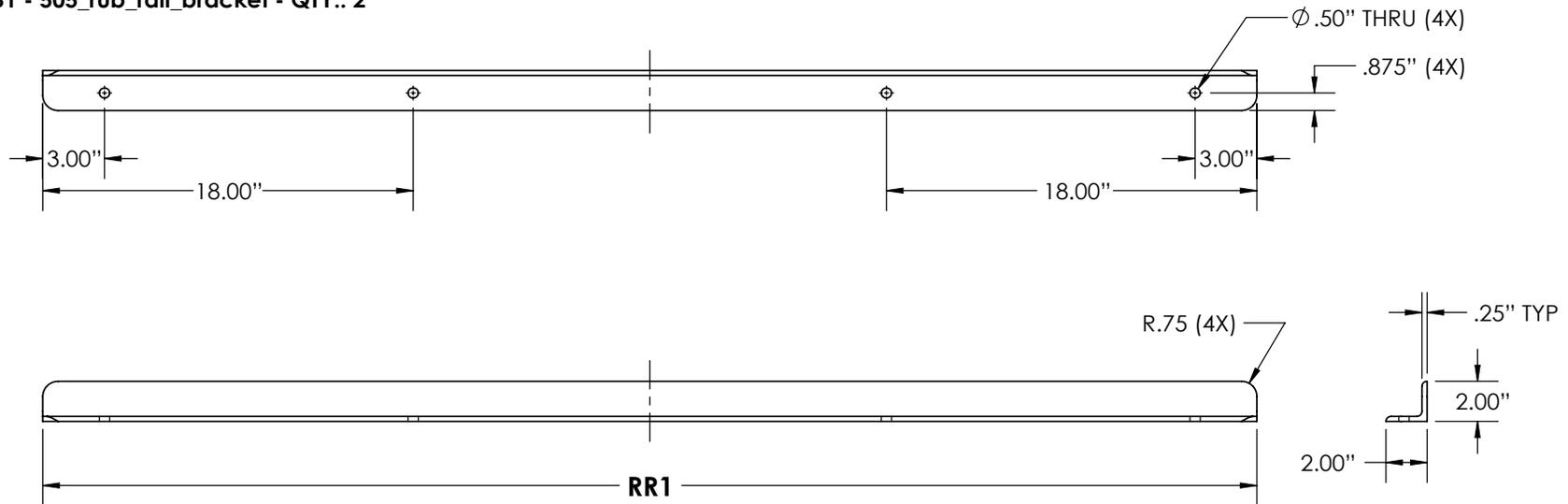
505 Rub Rail Components: Rub Rail Bracket



B

B

AB1 - 505_rub_rail_bracket - QTY.: 2



A

A

Dimension	Formula	New Value
RR1	= A - 5"	

NOTE: TO DETERMINE THE RUB RAIL BRACKET LENGTH, RR1, INSERT DIMENSION **A** INTO THE TABLE ABOVE. DIMENSION **A** IS A MEASUREMENT MADE DIRECTLY FROM THE SPECIFIC WINCH ONTO WHICH THIS GUARD WILL BE MOUNTED.

505 Rub Rail Components: Rub Rail Bracket			
National Institute for Occupational Safety and Health (NIOSH)	PART ID NUMBER	NAME	DATE
	AB1	DRAWN	DJS 05/16/18
	CHECKED	CW	05/16/18
		PAGE 3 OF 4	SCALE: 1:8 SIZE: A

2

1

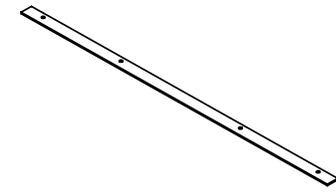
2

1

NOTES:

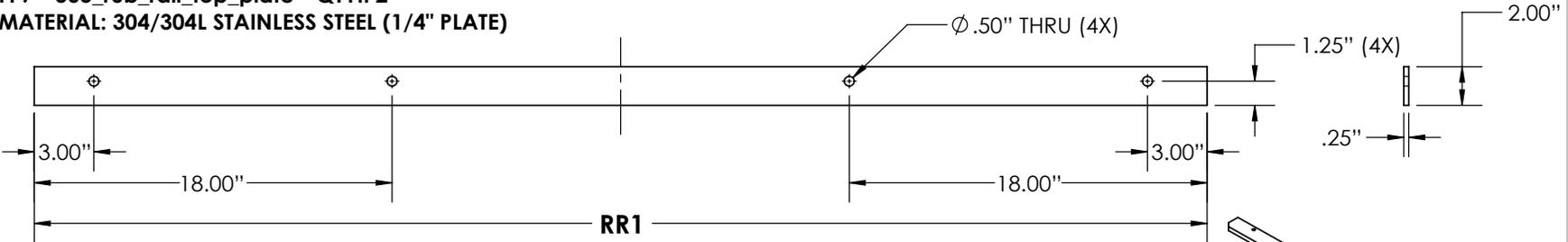
1. MATERIAL: SEE INDIVIDUAL PART NOTES BELOW
2. FINISH: DEBURRED
3. TOLERANCE: $\pm .0625"$; $\pm .5^\circ$
4. PARTS TO BE CUT AND MACHINED
5. LABEL PARTS AFTER MACHINING TO SIMPLIFY ASSEMBLY
6. SYMMETRY APPLIES WHERE EVIDENT
7. MEASUREMENTS ARE IN INCHES

505 Rub Rail Components: Rub Rail Top Plate and Rub Rail



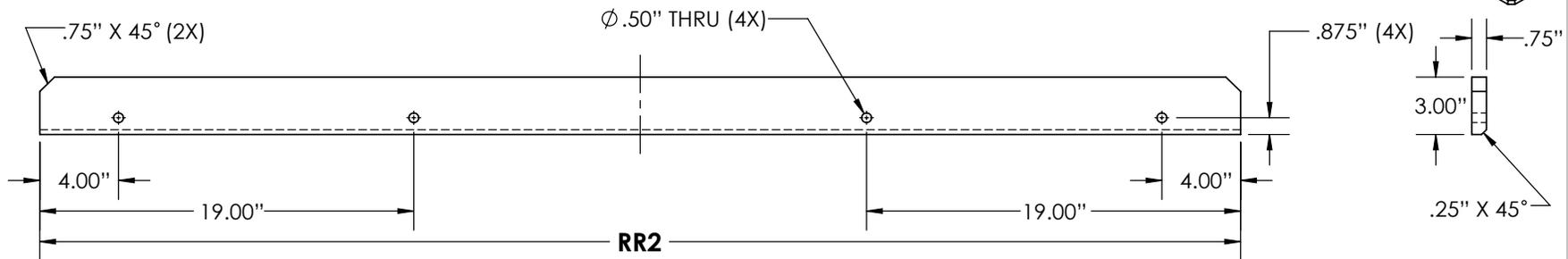
B

FP7 - 505_rub_rail_top_plate - QTY.: 2
MATERIAL: 304/304L STAINLESS STEEL (1/4" PLATE)



B

PE1 - 505_rub_rail - QTY.: 2
MATERIAL: UHMW-PE (3/4" BAR STOCK)



A

Dimensions	Formulas	New Values
RR1	= A - 5"	
RR2	= A - 3"	

NOTE: TO DETERMINE THE RUB RAIL COMPONENT LENGTHS, RR1 AND RR2, INSERT DIMENSION **A** INTO THE TABLE ABOVE. DIMENSION **A** IS A MEASUREMENT MADE DIRECTLY FROM THE SPECIFIC WINCH ONTO WHICH THIS GUARD WILL BE MOUNTED.

A

505 Rub Rail Components: Rub Rail Top Plate and Rub Rail			
National Institute for Occupational Safety and Health (NIOSH)	PART ID NUMBER	NAME	DATE
	FP7, PE1	DRAWN	DJS 05/16/18
		CHECKED	CW 05/16/18
PAGE 4 OF 4		SCALE: 1:8	SIZE: A

2

1

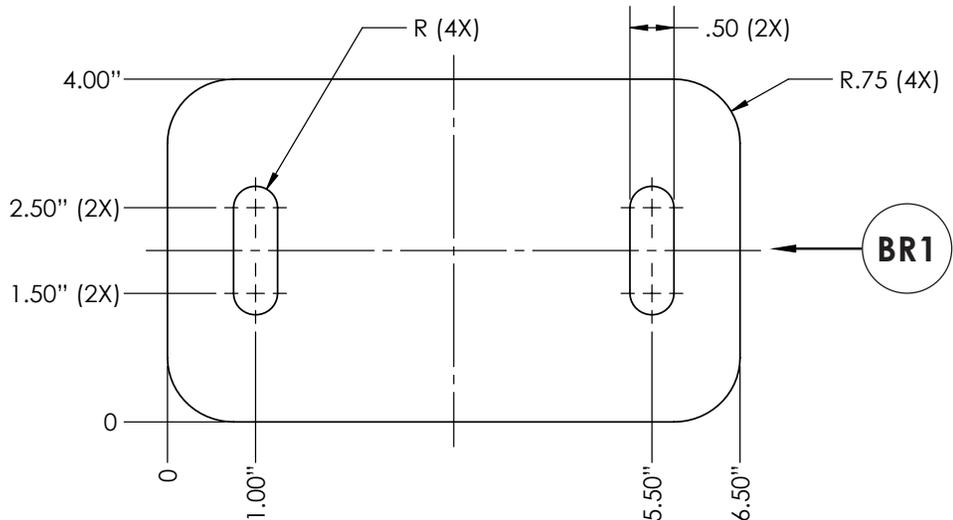
NOTES:

1. MATERIAL: UV RESISTANT NYLON
2. FINISH: DEBURRED
3. TOLERANCE: $\pm .0625"$, $\pm .5^\circ$
4. PARTS TO BE CUT AND MACHINED
5. LABEL PARTS AFTER MACHINING TO SIMPLIFY ASSEMBLY
6. SYMMETRY APPLIES WHERE EVIDENT
7. MEASUREMENTS ARE IN INCHES

505 Barrier Components: Barrier Sheet and Barrier Tube

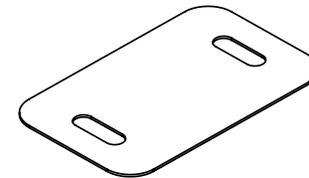
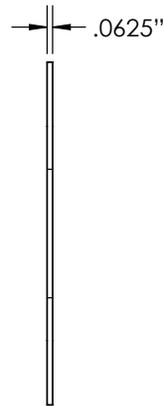
B

BR1 - 505_barrier_sheet - QTY.: 4
STOCK: 1/16" (.0625) SHEET



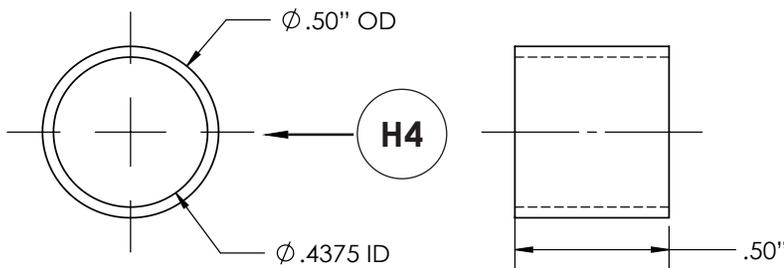
NOTE:

Instructions for attaching these parts are found in the NIOSH McElroy/Catchot Model 505 Winch Guard Installation Guide.



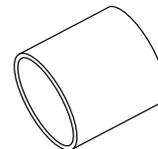
B

H4 - 505_barrier_tube - QTY.: 16
STOCK: 7/16" (.4375) ID, 1/2" (.50) OD TUBE
 SCALE: 2:1



NOTE:

These barrier materials must be used on the bolts, and between the A36 steel and 304 Stainless Steel, where the winch guard frame meets the foot pads to prevent galvanic corrosion.



A

A

505 Barrier Components: Barrier Sheet and Barrier Tube			
National Institute for Occupational Safety and Health (NIOSH)	PART ID NUMBER	NAME	DATE
		BR1, H4	DJS
		CW	05/16/18
PAGE 1 OF 1	SCALE: 1:2	SIZE: A	

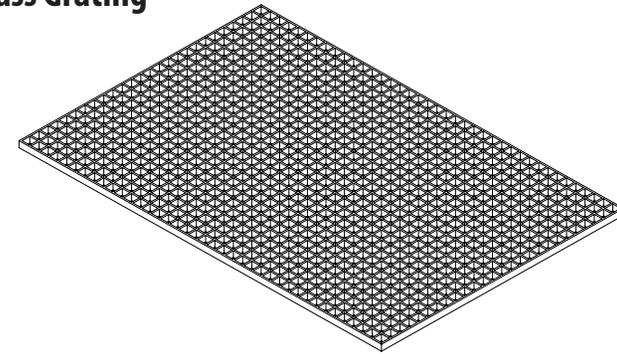
2

1

NOTES:

1. MATERIAL: FIBERGLASS (1.5" SQUARE MESH GRATING, 1.0" THICK)
2. FINISH: DEBURRED
3. TOLERANCE: ± .0625", ± .5°
4. PART TO BE CUT
5. SEAL ALL CUT SURFACES WITH POLYURETHANE SPRAY
6. MEASUREMENTS ARE IN INCHES

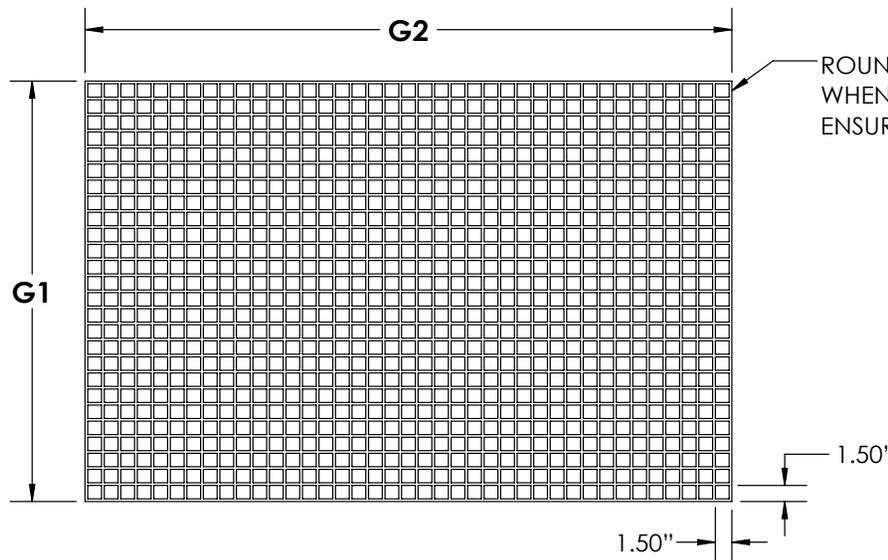
505 Fiberglass Grating



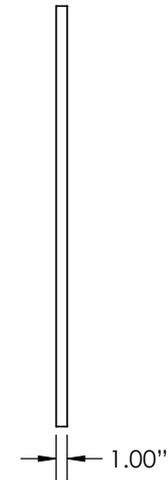
B

B

FG1 - 505_fiberglass_grating - QTY.: 1



ROUND UP TO NEAREST SQUARE
WHEN CUTTING GRATING TO
ENSURE UNIFORM FLAT OUTER EDGE



A

A

DIMENSIONS	FORMULA	NEW VALUE
G1	= A - 24.75"	
G2	= C - 13.5"	

NOTE: TO DETERMINE THE GRATING WIDTH AND LENGTH, G1 AND G2, INSERT DIMENSIONS **A** AND **C** INTO THE TABLE ABOVE. DIMENSIONS **A** AND **C** ARE MEASUREMENTS MADE DIRECTLY FROM THE SPECIFIC WINCH ONTO WHICH THIS GUARD WILL BE MOUNTED.

505 Fiberglass Grating			
National Institute for Occupational Safety and Health (NIOSH)	PART ID NUMBER	NAME	DATE
		FG1	DJS
		CW	05/16/18
PAGE 1 OF 1		SCALE: 1:16	SIZE: A

2

1

2

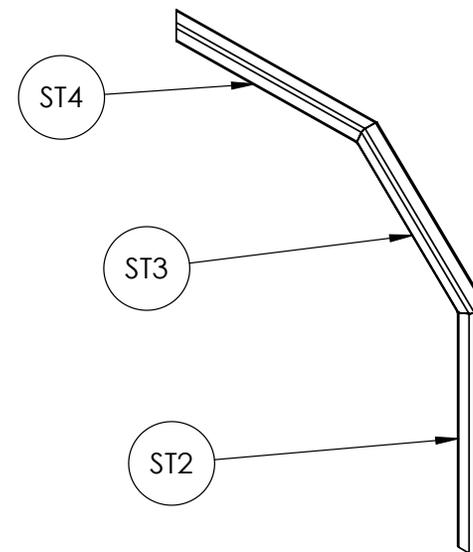
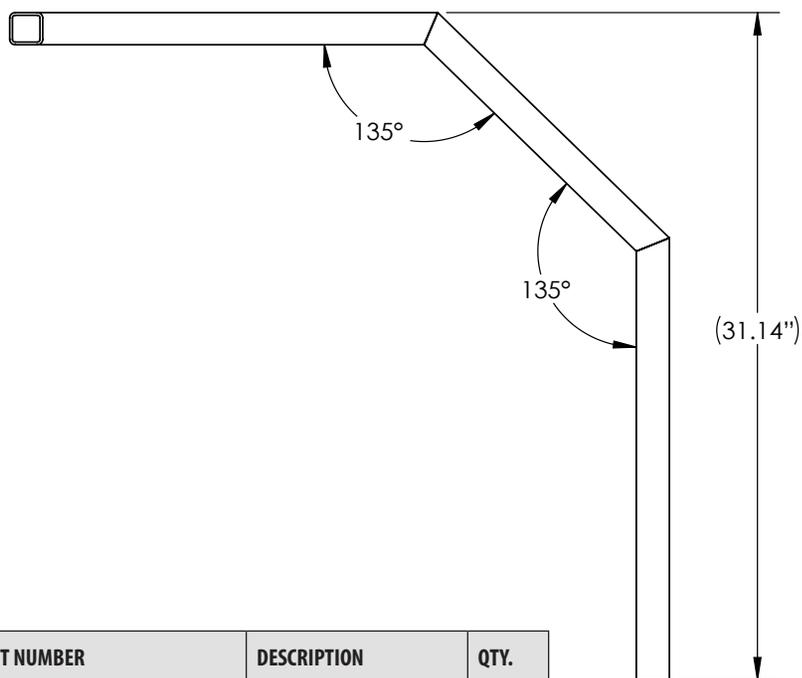
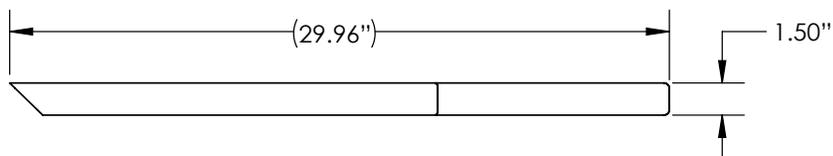
1

NOTES:

1. TOLERANCE: $\pm .0625"$, $\pm .5^\circ$
2. PARTS TO BE WELDED ALONG ALL TOUCHING EDGES
3. REFERENCE DIMENSIONS ARE SHOWN IN PARENTHESES
REFERENCE DIMENSIONS ARE NOMINAL AND MAY CHANGE
BASED ON THE CUSTOMIZATION TABLE
4. LABEL WELDMENT TO SIMPLIFY LATER ASSEMBLY
5. MEASUREMENTS ARE IN INCHES

505 Guard Frame Side Assembly: Side 1

A5 - 505_Guard_Frame_Side_1_Assy - QTY.: 1



PART ID #	PART NUMBER	DESCRIPTION	QTY.
ST4	505_grab_bar_side_1	Grab Bar Side 1	1
ST3	505_45_tube	45° Tube	1
ST2	505_guard_leg	Guard Leg	1

505 Guard Frame Side Assembly: Side 1			
National Institute for Occupational Safety and Health (NIOSH)	PART ID NUMBER A5	NAME	DATE
		DRAWN DJS	05/16/18
	CHECKED CW	05/16/18	
PAGE 1 OF 2		SCALE: 1:8	SIZE: A

2

1

2

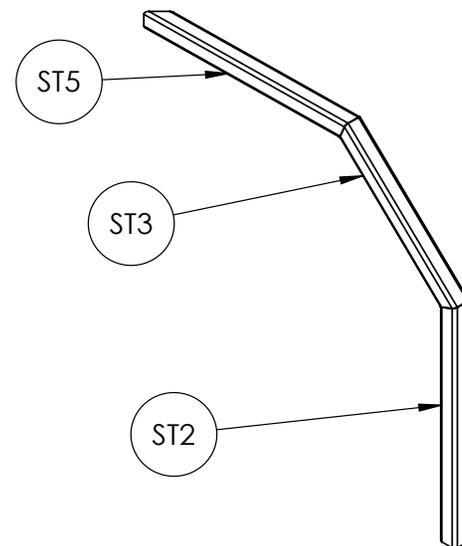
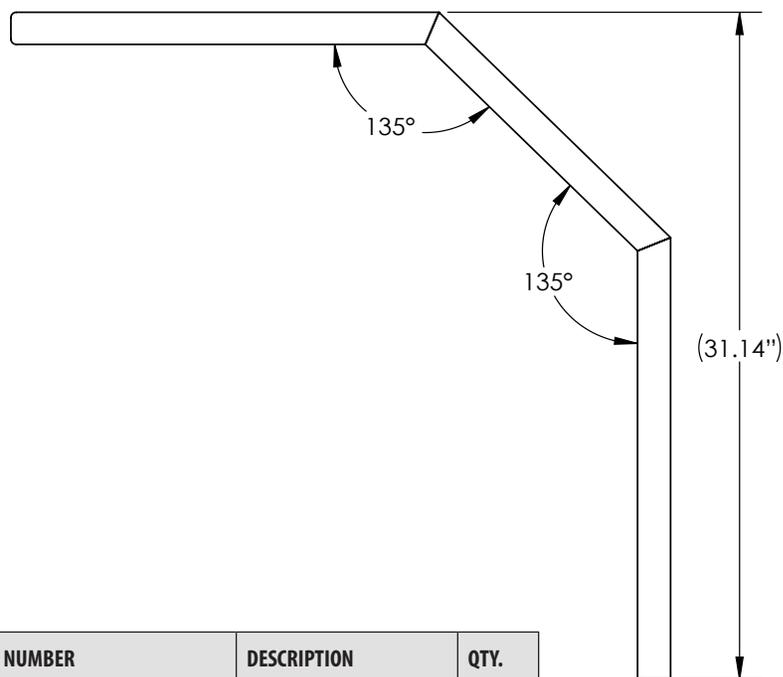
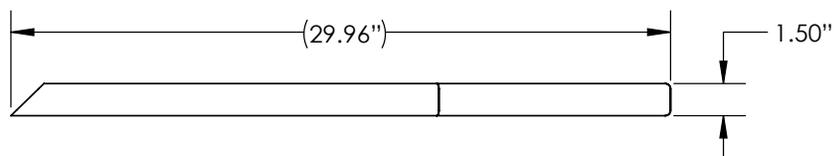
1

NOTES:

1. TOLERANCE: $\pm 0.0625"$, $\pm 5^\circ$
2. PARTS TO BE WELDED ALONG ALL TOUCHING EDGES
3. REFERENCE DIMENSIONS ARE SHOWN IN PARENTHESES
REFERENCE DIMENSIONS ARE NOMINAL AND MAY CHANGE
BASED ON THE CUSTOMIZATION TABLE
4. LABEL WELDMENT TO SIMPLIFY LATER ASSEMBLY
5. MEASUREMENTS ARE IN INCHES

505 Guard Frame Side Assembly: Side 2

A6 - 505_Guard_Frame_Side_2_Assy - QTY.: 1



PART ID #	PART NUMBER	DESCRIPTION	QTY.
ST5	505_grab_bar_side_2	Grab Bar Side 2	1
ST3	505_45_tube	45° Tube	1
ST2	505_guard_leg	Guard Leg	1

505 Guard Frame Side Assembly: Side 2			
National Institute for Occupational Safety and Health (NIOSH)	PART ID NUMBER	NAME	DATE
		A6	DJS
		CHECKED	CW
			05/16/18
		PAGE 2 OF 2	SCALE: 1:8
			SIZE: A

2

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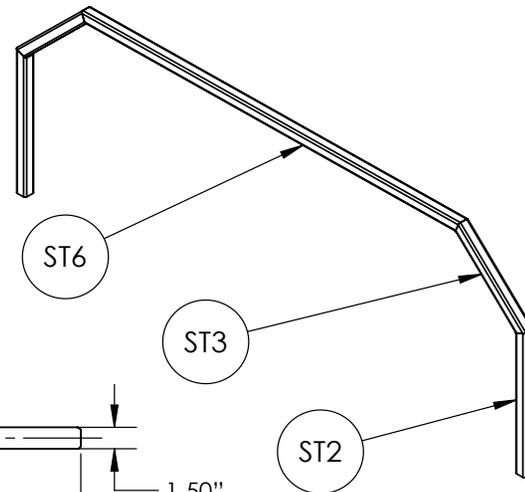
2

1

505 Guard Frame Back Assembly

NOTES:

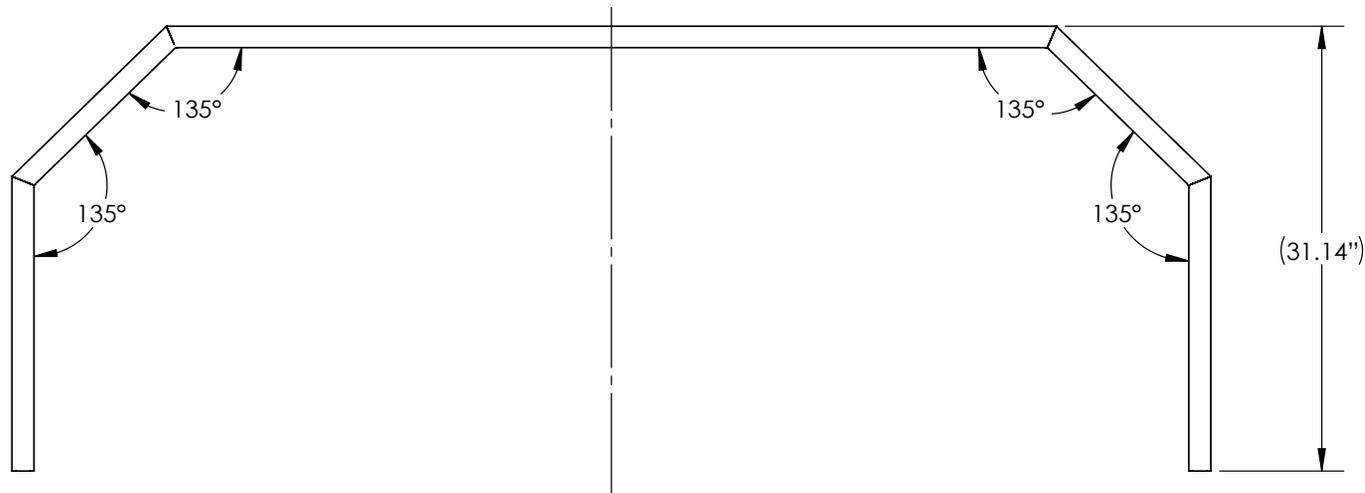
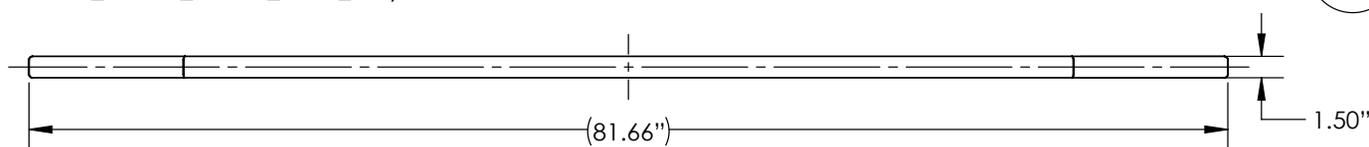
1. TOLERANCE: $\pm .0625"$, $\pm .5^\circ$
2. SYMMETRY APPLIES WHERE EVIDENT
3. PARTS TO BE WELDED ALONG ALL TOUCHING EDGES
4. REFERENCE DIMENSIONS ARE SHOWN IN PARENTHESES
REFERENCE DIMENSIONS ARE NOMINAL AND MAY CHANGE
BASED ON THE CUSTOMIZATION TABLE
5. MEASUREMENTS ARE IN INCHES



B

B

A7 - 505_Guard_Frame_Back_Assy - QTY.: 1



A

A

PART ID #	PART NUMBER	DESCRIPTION	QTY.
ST6	505_back_tube	Back Tube	1
ST3	505_45_tube	45° Tube	2
ST2	505_guard_leg	Guard Leg	2

505 Guard Frame Back Assembly				
 National Institute for Occupational Safety and Health (NIOSH)	PART ID NUMBER	NAME	DATE	
	A7	DRAWN	DJS	05/16/18
		CHECKED	CW	05/16/18
PAGE 1 OF 1		SCALE: 1:12	SIZE: A	

2

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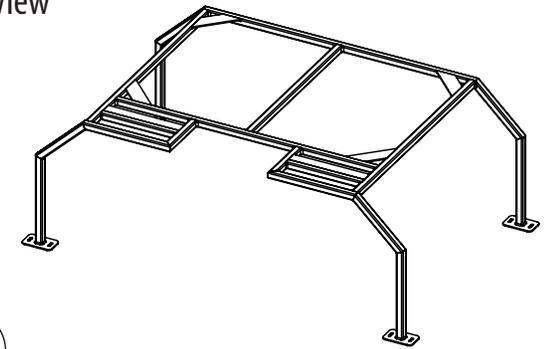
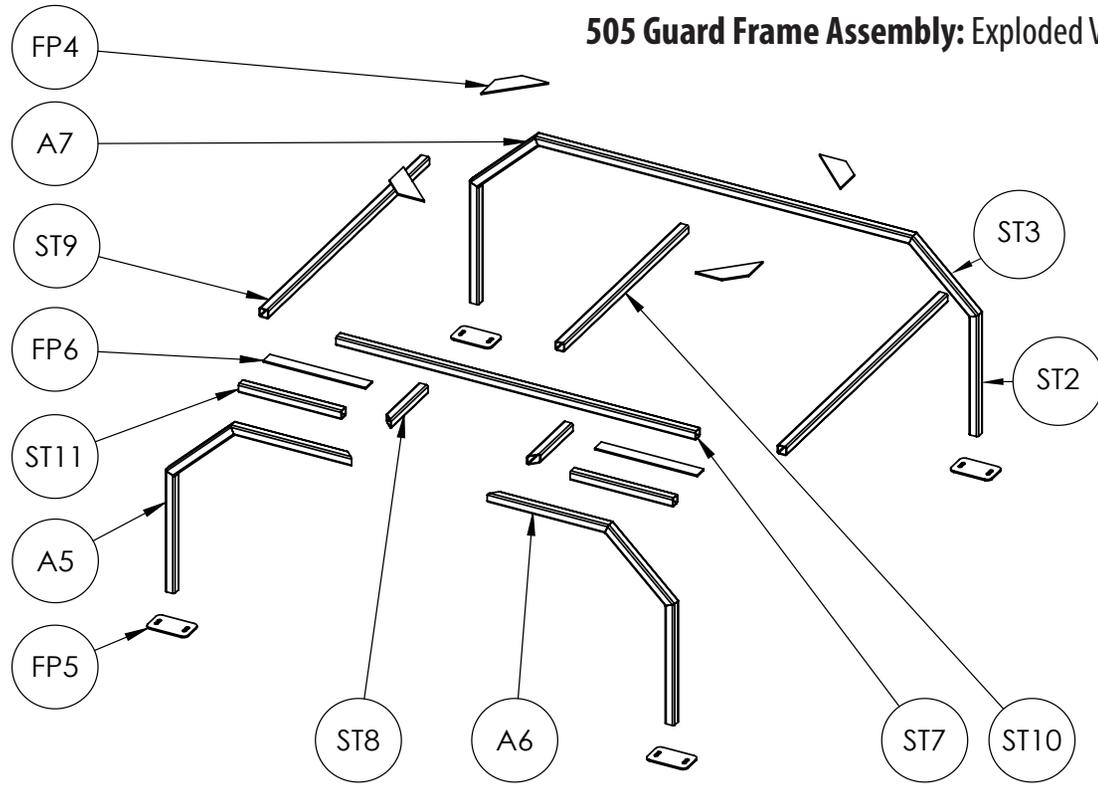
2

1

505 Guard Frame Assembly: Exploded View

B

B



A

A

PART ID #	PART NUMBER	DESCRIPTION	QTY.
A5	505_Guard_Frame_Side_1_Assy	Guard Frame Side 1 Weldment	1
A6	505_Guard_Frame_Side_2_Assy	Guard Frame Side 2 Weldment	1
A7	505_Guard_Frame_Back_Assy	Guard Frame Back Weldment	1
ST7	505_front_tube	Front Tube	1
ST8	505_grab_bar_return	Grab Bar Return	2
ST9	505_outer_crossbar	Outer Crossbar	2
ST10	505_middle_crossbar	Middle Crossbar	1
ST11	505_spool_cover_tube	Spool Cover Tube	2
FP4	505_guard_frame_gusset	Guard Frame Gusset Plate	4
FP5	505_guard_foot_plate	Guard Foot Plate	4
FP6	505_spool_cover_plate	Spool Cover Plate	2

505 Guard Frame Assembly: Exploded View			
National Institute for Occupational Safety and Health (NIOSH)	PART ID NUMBER	NAME	DATE
		A3	DRAWN DJS
		CHECKED CW	05/16/18
	PAGE 1 OF 2	SCALE: 1:25	SIZE: A

2

1

2

1

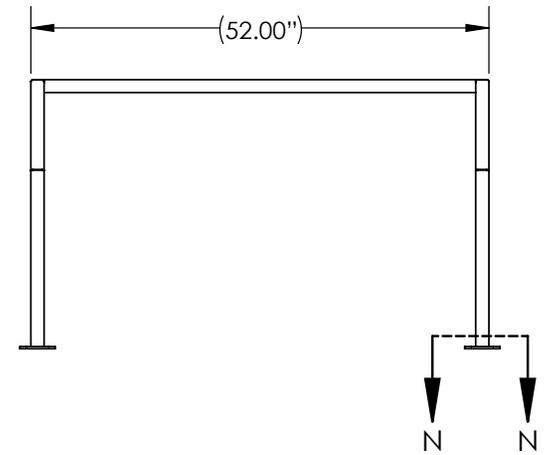
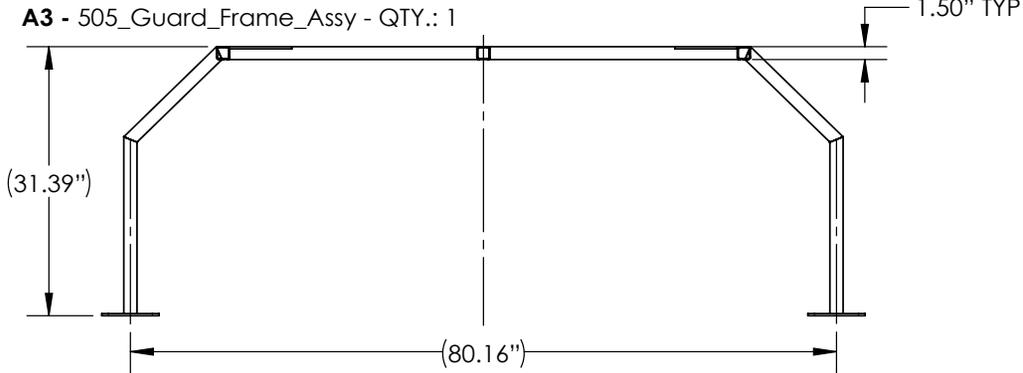
NOTES:

- 1. TOLERANCE: $\pm 0.0625"$, $\pm 5^\circ$
- 2. PARTS TO BE WELDED ON ALL TOUCHING EDGES
- 3. SYMMETRY APPLIES WHERE EVIDENT
- 4. REFERENCE DIMENSIONS ARE SHOWN IN PARENTHESES
REFERENCE DIMENSIONS ARE NOMINAL AND MAY CHANGE
BASED ON THE CUSTOMIZATION TABLE
- 5. MEASUREMENTS ARE IN INCHES

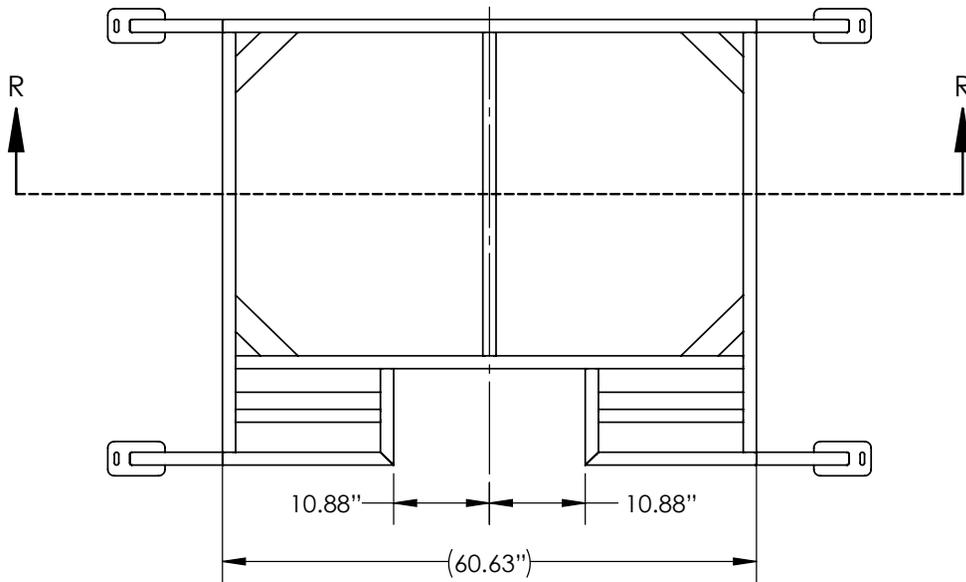
505 Guard Frame Assembly: Detailed View

B

B



SECTION R-R



SECTION N-N

(4X) GUARD FOOT PLATE
(FP10) TO BE CENTERED
TO LEG TUBE (ST2)

A

A

505 Guard Frame Assembly: Detailed View			
National Institute for Occupational Safety and Health (NIOSH)	PART ID NUMBER	NAME	DATE
		A3	DJS
		CW	05/16/18
PAGE 2 OF 2	SCALE: 1:20	SIZE: A	

2

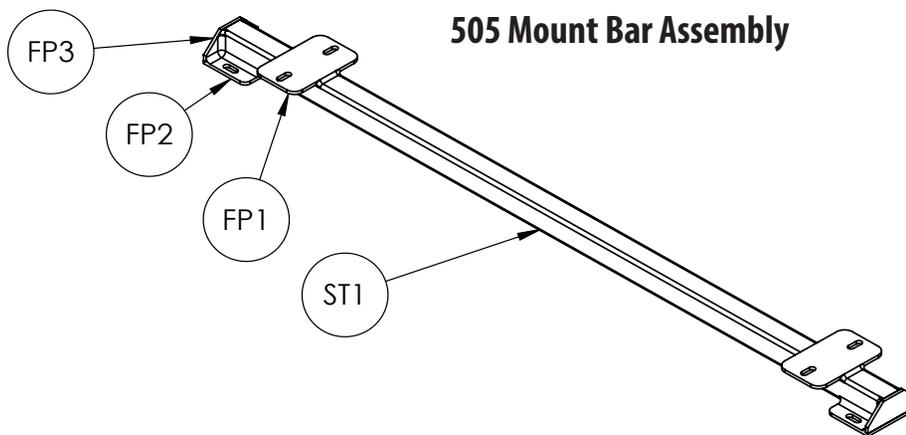
1

2

1

NOTES:

1. TOLERANCE: $\pm 0.0625"$, $\pm 5^\circ$
2. SYMMETRY APPLIES WHERE EVIDENT
3. PARTS TO BE WELDED ALONG ALL TOUCHING EDGES
4. REFERENCE DIMENSIONS ARE SHOWN IN PARENTHESES
REFERENCE DIMENSIONS ARE NOMINAL AND MAY CHANGE
BASED ON THE CUSTOMIZATION TABLE
5. MEASUREMENTS ARE IN INCHES

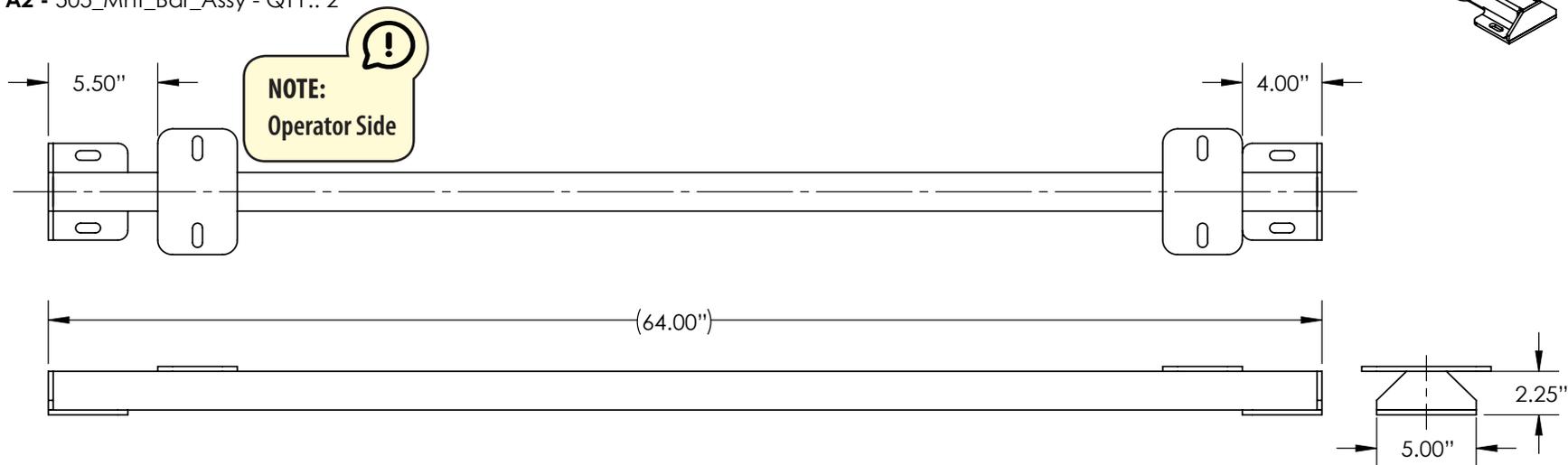


505 Mount Bar Assembly

B

B

A2 - 505_Mnt_Bar_Assy - QTY.: 2



A

A

PART ID #	PART NUMBER	DESCRIPTION	QTY.
ST1	505_mnt_bar	Guard Mount Bar	1
FP1	505_mnt_bar_top_plate	Mount Bar Top Plate	2
FP2	505_mnt_bar_base_plate	Mount Bar Base Plate	2
FP3	505_mnt_bar_end_plate	Mount Bar End Plate	2

505 Mount Bar Assembly			
National Institute for Occupational Safety and Health (NIOSH)	PART ID NUMBER	NAME	DATE
		A2	DRAWN: DJ5
		CHECKED: CW	05/16/18
PAGE 1 OF 1		SCALE: 1:8	SIZE: A

2

1

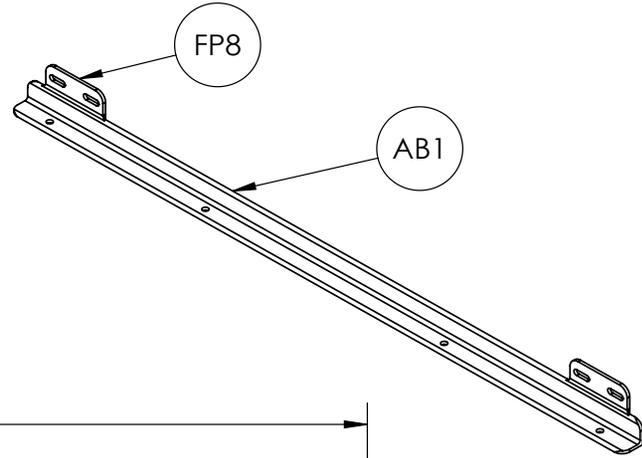
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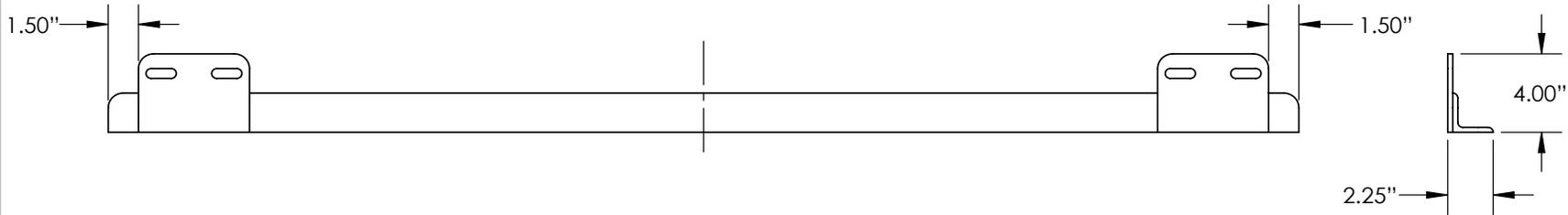
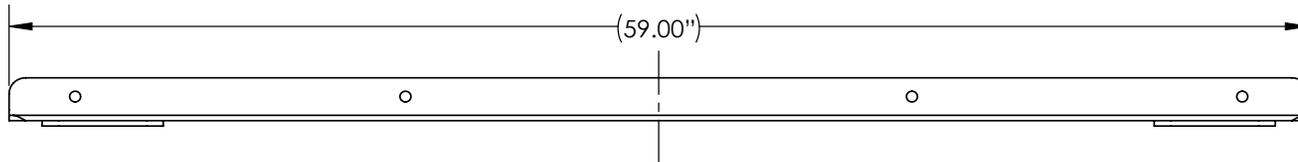
505 Rub Rail Bracket Assembly

NOTES:

- 1. TOLERANCE: $\pm 0.0625"$, $\pm 5^\circ$
- 2. SYMMETRY APPLIES WHERE EVIDENT
- 3. PARTS TO BE WELDED ALONG ALL TOUCHING EDGES
- 4. REFERENCE DIMENSIONS ARE SHOWN IN PARENTHESES
REFERENCE DIMENSIONS ARE NOMINAL AND MAY CHANGE
BASED ON THE CUSTOMIZATION TABLE
- 5. ALL MEASUREMENTS ARE IN INCHES



A4 - 505_Rub_Rail_Bracket_Assy - QTY.: 2



PART ID #	PART NUMBER	DESCRIPTION	QTY.
AB1	505_rub_rail_bracket	Rub Rail Angle Bracket	1
FP8	505_rub_rail_weld-on_plate	Rub Rail Weld-on Plate	2

505 Rub Rail Bracket Assembly			
National Institute for Occupational Safety and Health (NIOSH)	PART ID NUMBER	NAME	DATE
		A4	DRAWN
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PAGE 1 OF 1		SCALE: 1:8	SIZE: A

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Promoting productive workplaces
through safety and health research

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