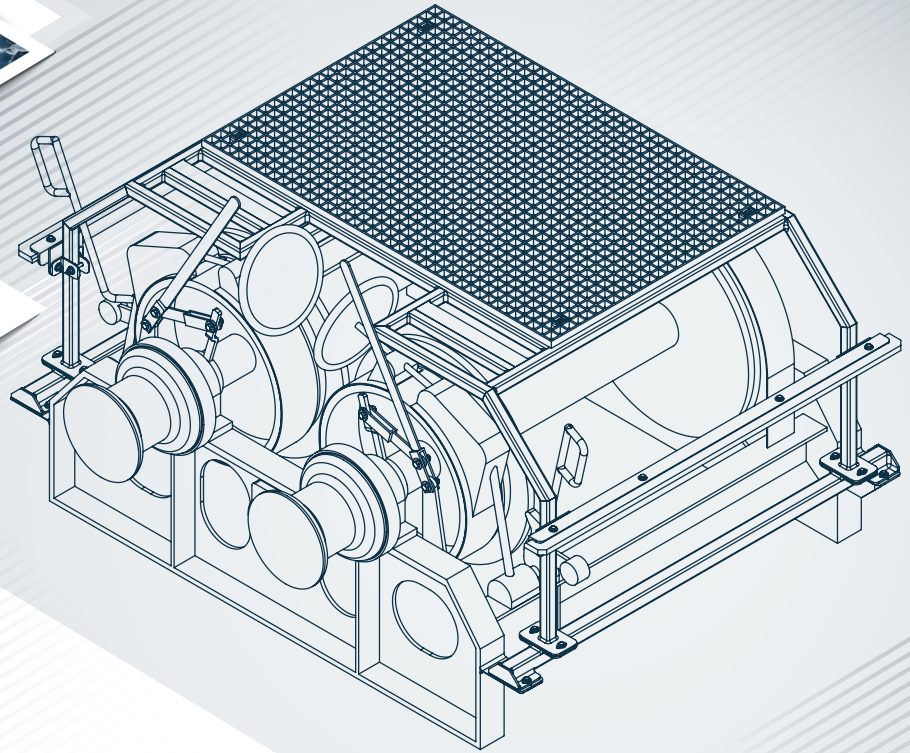




# 505



## Installation Guide

# McElroy/Catchot Model 505 Winch Guard



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# NIOSH Installation Guide

## McElroy/Catchot Model 505 Winch Guard

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National Institute for Occupational Safety and Health



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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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## Suggested Citation

NIOSH [2024] Installation Guide: McElroy/Catchot Model 505 Winch Guard. By Sweet D, Alexander J, Wimer B, Teske T, Kloczko D, Victoroff T. Spokane, WA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication No. 2024-111, <https://doi.org/10.26616/NIOSH PUB2024111>.

DOI: <https://doi.org/10.26616/NIOSH PUB2024111>

DHHS (NIOSH) Publication No. 2024-111

June 2024

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## 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 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 Installation Guide is designed to be used in conjunction with the corresponding NIOSH McElroy/Catchot Model 505 Winch Guard Fabrication Guide to construct and install the winch guard to protect deckhands and operators from safety hazards present while operating the equipment. This Installation 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 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 these guides, the NIOSH 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 Model 505 winches have varying dimensions, either from manufacturing, or modifications made to the equipment. The NIOSH McElroy/Catchot Model 505 Winch 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

This Installation Guide is designed to be used in conjunction with the NIOSH McElroy/Catchot 505 Fabrication Guide. To properly install a NIOSH McElroy/Catchot 505 Winch Guard, the guard must be designed and built according to the specifications found in the companion NIOSH McElroy/Catchot Model 505 Fabrication Guide. Different versions of the McElroy/Catchot 505 Winch exist. While similar, each of these models have varied manufactured sizes and dimensions. In order 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 the Fabrication Guide. If using the electronic PDF version of the NIOSH McElroy/Catchot Model 505 Winch Guard Fabrication Guide, once the four key dimensions are entered in to 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 may also be found on [Page 9](#) of this guide.

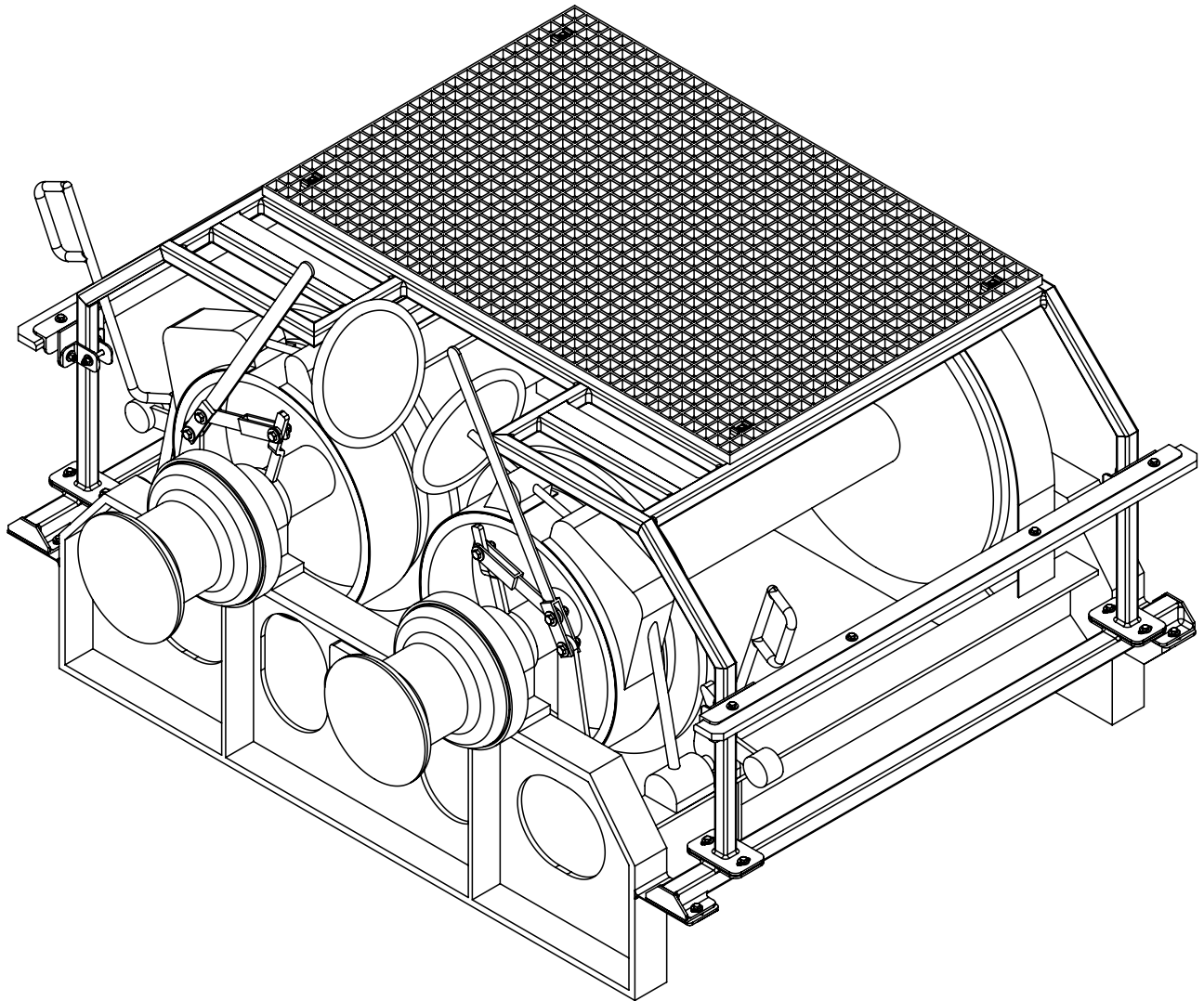
## Abbreviations and Symbols

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

Symbols used in this Guide					
	Note additional information, and instructions		Weld indicated components		Tighten bolts to specified torque
	Remove previously installed brackets		Paint mild steel using 3-part corrosion resistant coating		Drill marked holes as indicated
	Clean area of paint, rust, and debris		Apply anti-seize compound to bolts		Apply polyurethane spray



**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	Image	
<b>505_Guard_Installation_Assembly</b>	<b>A0</b>	<b>1</b>		Main Guard Installation Assembly		
→ 505_Main_Guard_Bracket_Assy	A1	1		Welded Bracket Winch Assembly		
→ McElroy/Catchot_505	WC1	1		McElroy/Catchot 505 Winch		
→ 505_main_bracket_side1	AB3	2	ASTM A36 Steel	Guard Mount Bracket Side 1		
→ 505_main_bracket_side2	AB4	2	ASTM A36 Steel	Guard Mount Bracket Side 2		
→ 505_Mnt_Bar_Assembly	A2	2		Mount Bar Weldment		
→ 505_Guard_Frame_Assy	A3	1		Guard Frame Weldment		
→ 505_Rub_Rail_Assembly	A8	2		Rub Rail Assembly		
→ 505_rub_rail_bracket_assy	A4	1		Rub Rail Bracket Weldment		
→ 505_rub_rail	PE1	1	UHMW-PE	UHMW-PE Strip		
→ 505_rub_rail_top_plate	FP7	1	304/304L SS	Rub Rail Top Plate		
→ 505_hex_head_375-16x2250	H11	4	18-8 SS	Hex Head Cap Screw, 3/8"-16 X 2.25" (Partially Threaded)		
→ 505_hex_nyloc_nut_375-16	H2	4	18-8 SS	Nylon-Insert Hex Locknut, 3/8"-16		
→ 505_washer_375_1_OD	H5	8	18-8 SS	Washer for 3/8" Screw, 1" OD, .100-.130" Thick		
→ 505_rub_rail_clamp_bracket	AB2	8	304/304L SS	Rub Rail Clamp Bracket		
→ 505_barrier_sheet	BR1	4	UV Resistant Nylon	Barrier Sheet		
→ 505_fiberglass_grating	FG1	1	Fiberglass	Fiberglass Grating Panel		
→ 505_hex_head_375-16x1500	H1	16	18-8 SS	Hex Head Cap Screw, 3/8"-16 X 1.50"		
→ 505_hex_nyloc_nut_375-16	H2	28	18-8 SS	Nylon-Insert Hex Locknut, 3/8"-16		
→ 505_nylon_washer_375_1_OD	H3	24	UV Resistant Nylon	Nylon Flat Washer For 3/8" Screw, 1.00" OD, .050 - .070" Thick		
→ 505_barrier_tube	H4	16	UV Resistant Nylon	Barrier Tubing, Cut To .4375" Length		
→ 505_washer_375_1_OD	H5	56	18-8 SS	Washer For 3/8" Screw, 1.00" OD, .100" - .130" Thick		
→ 505_hex_head_250-20x1750	H6	4	18-8 SS	Hex Head Cap Screw, 1/4"-20 X 1.75"		
→ 505_fiberglass_grating_m-clip	H7	4	18-8 SS	M-Clip For Fiberglass Grating, 1.5" Strut Spacing		
→ 505_hex_nyloc_nut_250-20	H8	4	18-8 SS	Nylon-Insert Hex Locknut, 1/4"-20		
→ 505_washer_250_750_OD	H9	8	18-8 SS	Washer For 1/4" Screw, .625" OD		
→ 505_hex_head_375-16x2750	H10	4	18-8 SS	Hex Head Cap Screw, 3/8"-16 X 2.75"		
→ 505_hex_head_375-16x1250	H12	8	18-8 SS	Hex Head Cap Screw, 3/8"-16 X 1.25"		

## Purchased Parts List

### Required Hardware

Material	Material	Quantity	Specifications	Notes
1/4"-20 x 1.75" Cap Screw	18-8 Stainless Steel	4	Hex Head Cap Screw, 1/4"-20 X 1.75" (Partially Threaded)	-
3/8"-16 x 1.25" Cap Screw	18-8 Stainless Steel	8	Hex Head Cap Screw, 3/8"-16 X 1.25" (Partially Threaded)	-
3/8"-16 x 1.50" Cap Screw	18-8 Stainless Steel	16	Hex Head Cap Screw, 3/8"-16 X 1.50" (Partially Threaded)	-
3/8"-16 x 2.25" Cap Screw	18-8 Stainless Steel	8	Hex Head Cap Screw, 3/8"-16 X 2.25" (Partially Threaded)	-
3/8"-16 x 2.75" Cap Screw	18-8 Stainless Steel	4	Hex Head Cap Screw, 3/8"-16 X 2.75" (Partially Threaded)	-
1/4"-20 Lock Nut	18-8 Stainless Steel	4	Nylon-Insert Hex Locknut, 1/4"-20	-
3/8"-16 Lock Nut	18-8 Stainless Steel	36	Nylon-Insert Hex Locknut, 3/8"-16	-
1/4" Washer	18-8 Stainless Steel	8	1/4" Washer, .750" OD, 0.10" - 0.13" Thick	<b>Thick washers</b> must be used. If thick washers cannot be sourced, double up on standard washers wherever they are used.
3/8" Washer	18-8 Stainless Steel	72	3/8" Washer, 1.000" OD, 0.10" - 0.13" Thick	<b>Thick washers</b> must be used. If thick washers cannot be sourced, double up on standard washers wherever they are used.
3/8" Nylon Washer	UV Resistant Nylon	24	3/8" Nylon Washer, 1.000" OD, 0.06" Thick	Must be <b>UV resistant</b> nylon ( <i>typically black</i> ).
Grating M-Clip	18-8 Stainless Steel	4	M-Clip for Grating, 1.5" Strut Spacing	<a href="https://nationalgrating.com/grating-clips/">https://nationalgrating.com/grating-clips/</a>

### Other Required Supplies

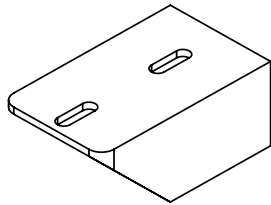
Item	Notes
Zinc Paint	Corrosion-resistant layer. Enough to coat all ASTM A36 steel weldments ( <b>AB3</b> , <b>AB4</b> , and <b>A2</b> ).
Intermediate Primer	Enough to coat all ASTM A36 steel weldments ( <b>AB3</b> , <b>AB4</b> , and <b>A2</b> ).
Top Coat Paint	Enough to coat all ASTM A36 steel weldments ( <b>AB3</b> , <b>AB4</b> , and <b>A2</b> ).
Polyurethane Spray	Seal fiberglass grating after cutting, per manufacturers recommendations.
Anti-Seize Compound	Enough for around 38 bolts (all bolt assemblies).

2

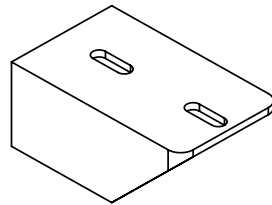
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**Parts Inventory:** From NIOSH McElroy/Catchot Model 505 Winch Fabrication Guide

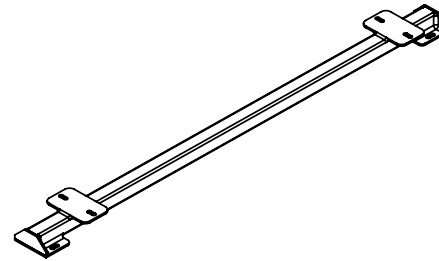
**AB3/AB4 are part of the Main Brackets**  
**ASTM A36 Steel, 3" x 4" Angle Bracket, 1/4" Thick**



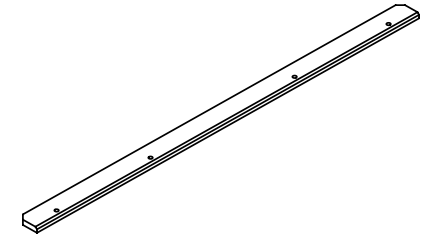
**AB3 - MOUNT BAR ASSEMBLY**  
QTY. 2



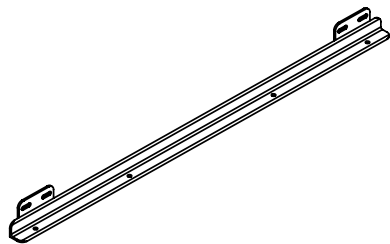
**AB4 - MOUNT BAR ASSEMBLY**  
QTY. 2



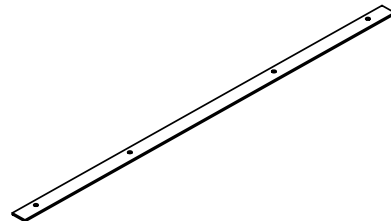
**A2 - MOUNT BAR ASSEMBLY**  
QTY. 2



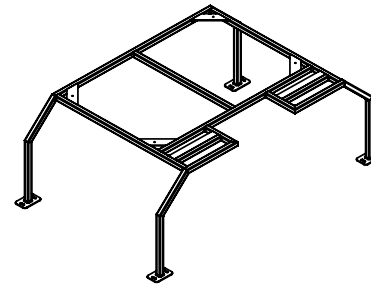
**PE1 - RUB RAIL**  
QTY. 2



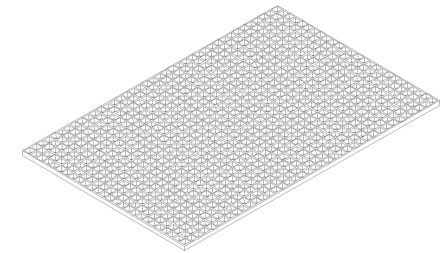
**A4 - RUB RAIL BRACKET ASSEMBLY**  
QTY. 2



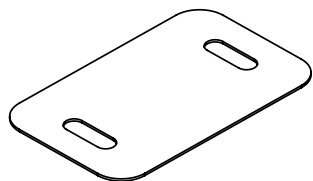
**FP7 - RUB RAIL TOP PLATE**  
QTY. 2



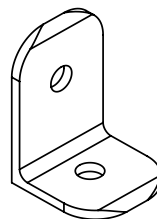
**A3 - GUARD FRAME ASSEMBLY**  
QTY. 1



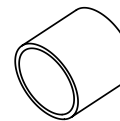
**FG1 - FIBERGLASS GRATING**  
QTY. 1



**BR1 - BARRIER SHEET**  
QTY. 4



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



**H4 - BARRIER TUBE**  
QTY. 16

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

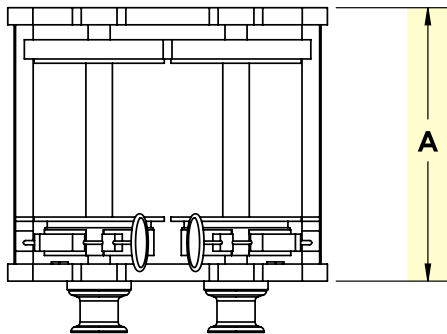
2

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.

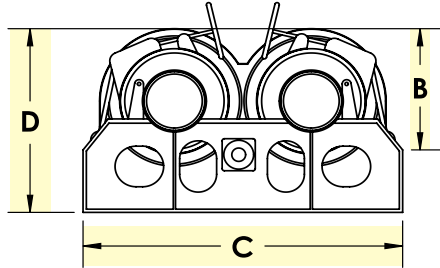
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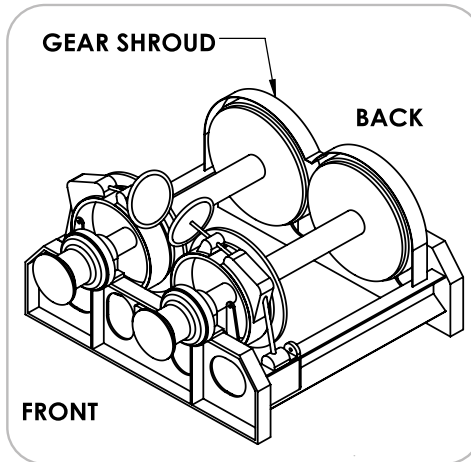
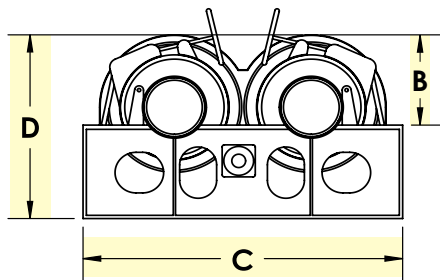
Dimensions	Value (± .250")	Description
A		OVERALL DEPTH OF THE WINCH MEASURED FROM THE OUTER FACE OF THE FRONT FRAME TO THE OUTER FACE OF THE BACK FRAME.
B		THIS IS THE DISTANCE FROM THE BOTTOM EDGE OF THE CHAMFER ON A CHAMFERED EDGE FRAME (TOP EDGE OF A SQUARED FRAME) TO THE TOP MOST POINT OF THE GEAR 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



SQUARED FRAME



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

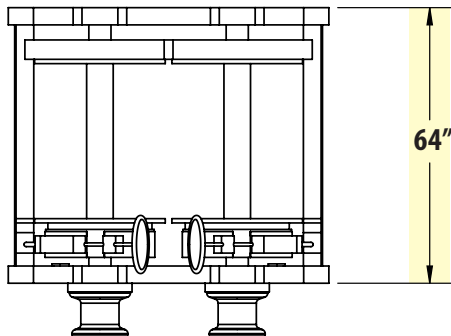
A

### Customization Formulas for Fabrication: NIOSH Example

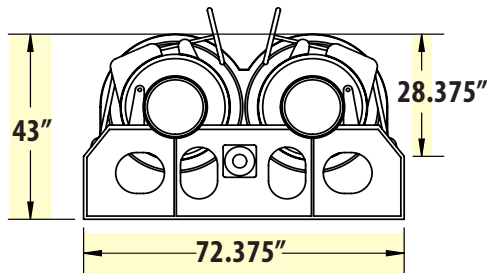
This is an example of how to use the customization formulas based on measurements taken by NIOSH engineers on a sample 505 winch. You must enter your specific winch measurements and **apply the formulas** to determine certain key dimensions used during fabrication of your winch guard.

#### EXAMPLE OF MEASUREMENTS WITH FORMULAS APPLIED

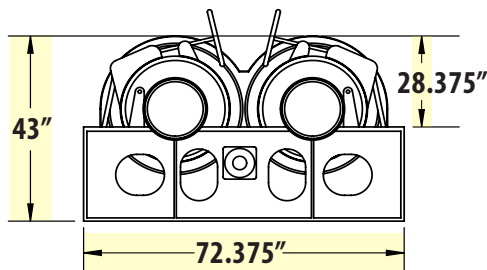
B



CHAMFERED FRAME



SQUARED FRAME



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

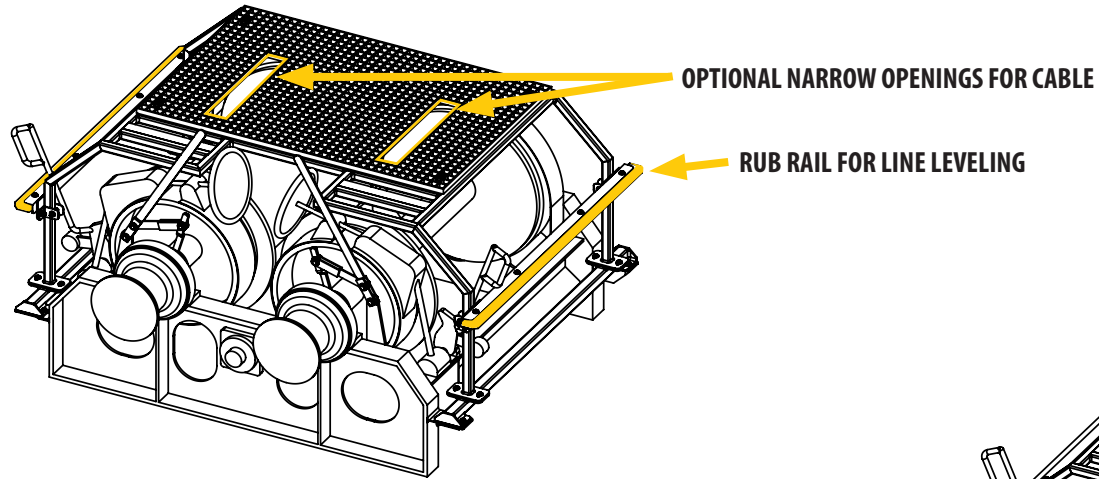
A

A

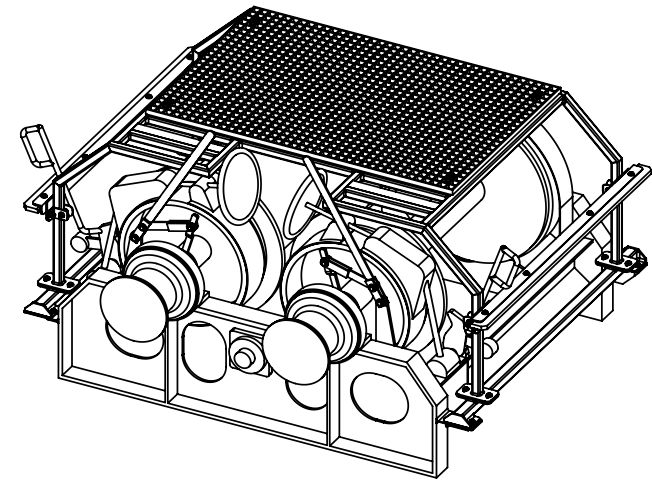
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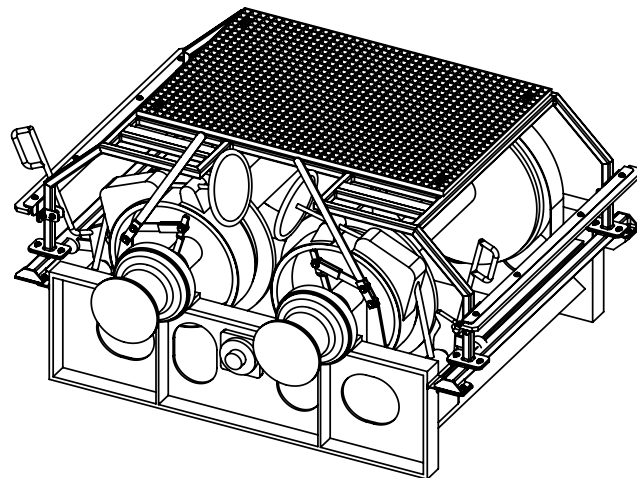
### 505 Winch Guard Main Assembly: Overview and Customizations




MAIN GUARD ASSEMBLY - CHAMFERED FRAME (WITH CUSTOMIZATIONS)



DEFAULT MAIN GUARD ASSEMBLY - CHAMFERED FRAME



DEFAULT MAIN GUARD ASSEMBLY - SQUARED FRAME

505 Winch Guard Main Assembly: Overview and Customizations			
National Institute for Occupational Safety and Health (NIOSH)	PART ID NUMBER	NAME	DATE
	A0	DRAWN DJS	05/16/18
	CHECKED CW	05/16/18	
	PAGE 1 OF 2	SCALE: 1:30	SIZE: A

2

1



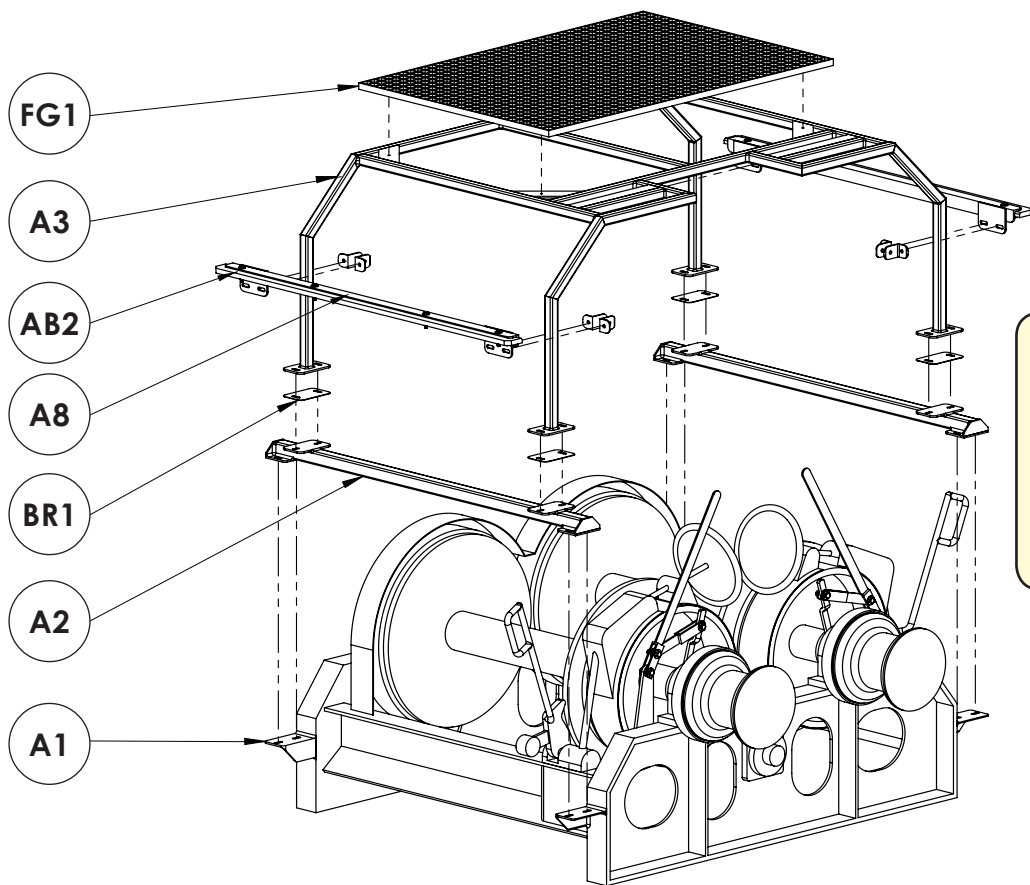
2

1

### 505 Winch Guard Main Assembly: Exploded View

B

B



**NOTE:**  
 This exploded view of the 505 Winch Guard Main Assembly does not show hardware required to assemble. See subsequent pages for hardware assembly.  
 Clutch and pawl arms may need to be modified to provide proper clearance after installation.

A

A

Part ID Number	Part Number	Description	QTY.
A1	505_Main_Guard_Bracket_Assembly	Welded Bracket Winch Assembly	1
A2	505_Mnt_Bar_Assembly	Mount Bar Weldment	2
BR1	505_Barrier_Sheet	Barrier Sheet	4
A3	505_Guard_Frame_Back_Assembly	Guard Frame Weldment	1
FG1	505_Fiberglass_Grating	Fiberglass Grating	1
A8	505_Rub_Rail_Assembly	Rub Rail Bracket Assembly	2
AB2	505_rub_rail_clamp_bracket	Rub Rail Clamp Bracket	8

505 Winch Guard Main Assembly: Exploded View			
PART ID NUMBER	NAME		DATE
	A0	DRAWN	DJS
CHECKED		CW	05/16/18
PAGE 2 OF 2		SCALE: 1:23	SIZE: A

2

1

2

1

### 505 Winch Guard Bracket Assembly: Exploded View

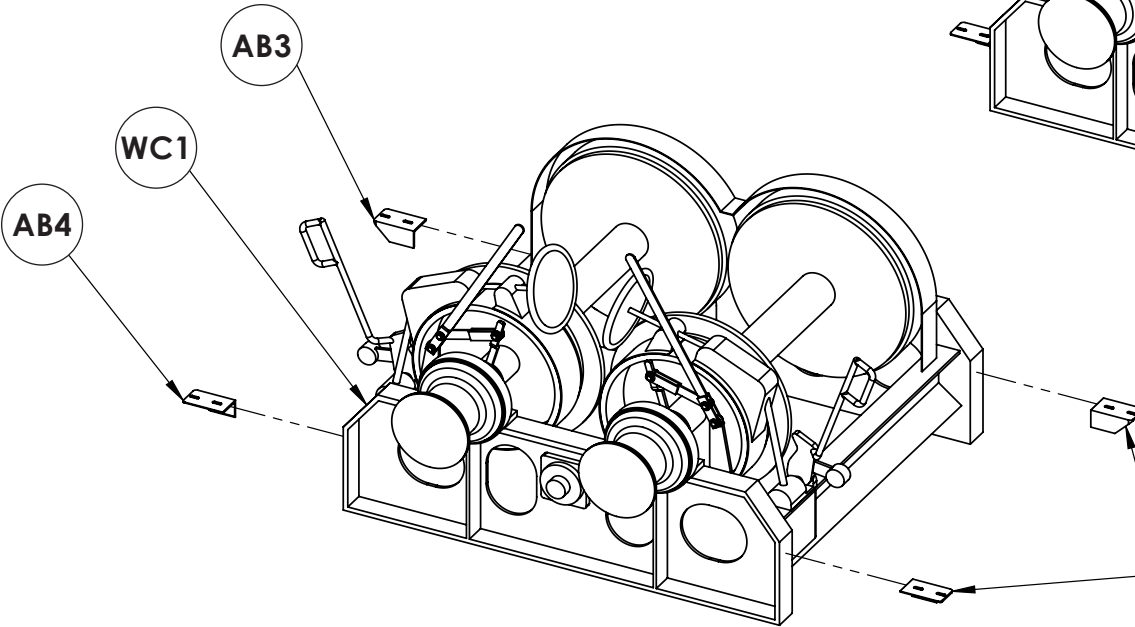
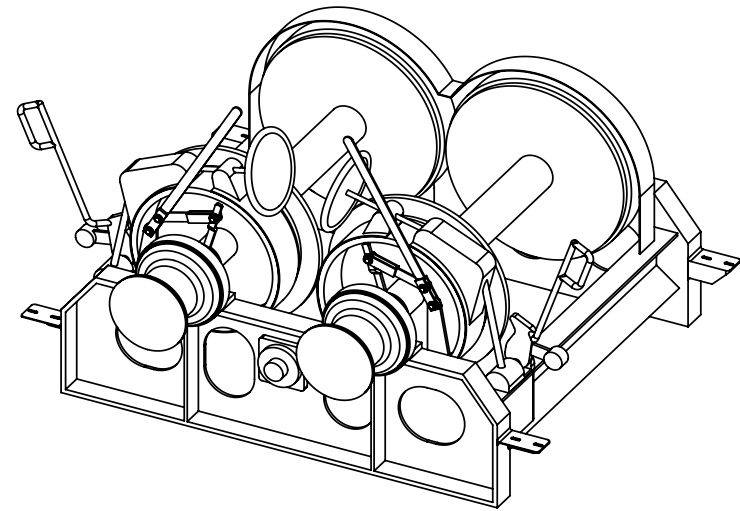
**STEPS:**

1. Prepare the winch for welding on the main brackets (AB3 and AB4)
  - a. Any previously installed brackets should be removed first if they interfere with placement.
  - b. Clean areas of paint, debris, etc. as needed prior to welding AB3 and AB4 brackets to winch frame.



B

B



**NOTE:**  
Brackets should be oriented such that the vertical leg is flush against the inside wall of the winch frame as shown.

A

A

Part ID Number	Part Number	Description	QTY.
AB3	505_Main_Bracket_Side 1	Guard Mount Bracket Side 1	2
WC1	McElroy/Catchot_505_Winch	McElroy/Catchot 505 Winch	1
AB4	505_Main_Bracket_Side 2	Guard Mount Bracket Side 2	2

505 Winch Guard Bracket Assembly: Exploded View

National Institute for Occupational Safety and Health (NIOSH)

PART ID NUMBER A1	NAME	DATE
	DRAWN DJS	05/16/18
	CHECKED CW	05/16/18

PAGE 1 OF 1    SCALE: 1:26    SIZE: A

2

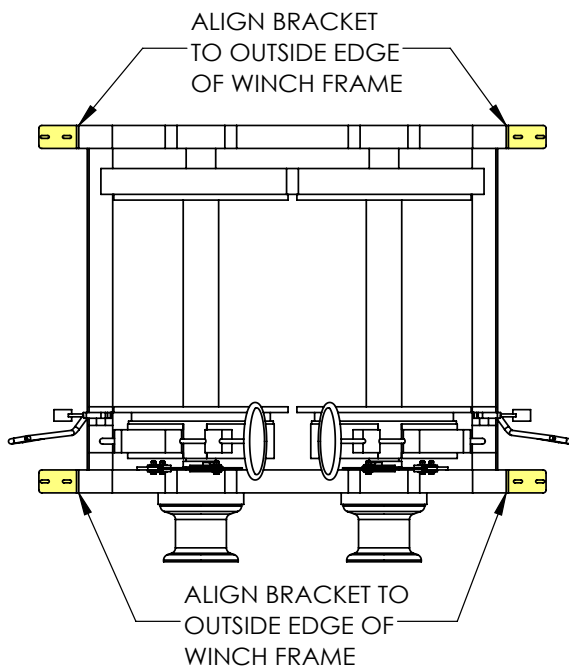
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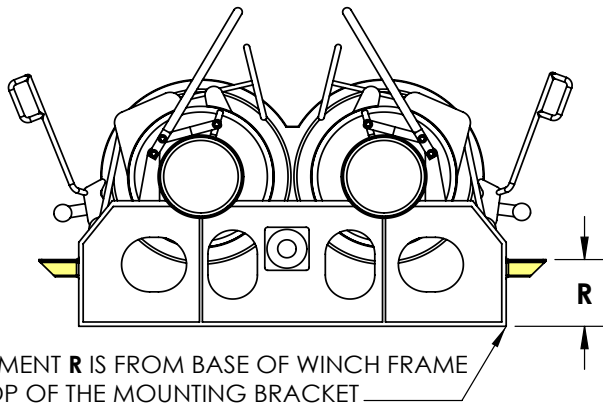
1

### 505 Winch Guard Main Bracket Assembly: Detailed Illustration

B



A



MEASUREMENT R IS FROM BASE OF WINCH FRAME TO THE TOP OF THE MOUNTING BRACKET

**STEPS:**

Test fit pieces to make sure touching edges are flush and alignment is correct

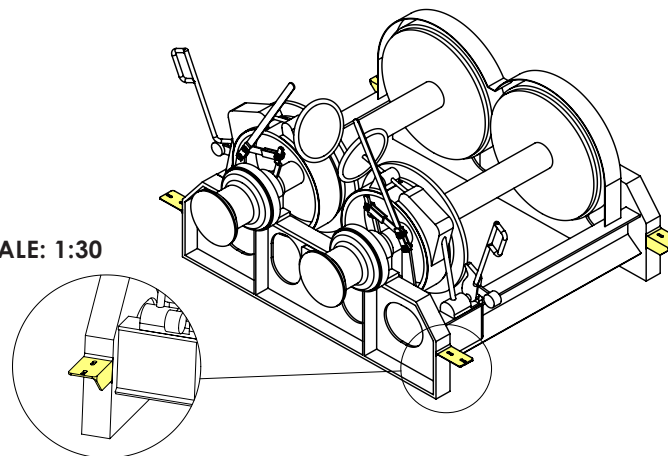
2. Weld the main brackets (AB3 and AB4) into place using the referenced dimensions annotated below:

- a. Parts must be welded along all touching edges
- b. Weld beads should be between .250" - .375" thick



B

SCALE: 1:30



**NOTE:**

In order to determine the bracket mount height, R, insert dimensions D and B found on [page 9](#), into the table below. Dimensions D and B are measurements made directly from the specific winch this guard will be installed onto.

Dimension	Formula	New Value
R	$D - B - 3.00"$	

A

2

1

2

1

### 505 Winch Guard Main Bracket Assembly: Installed View



#### STEPS:

3. Paint mild steel components (identified below in yellow) using the three-part corrosion resistant coating (in order):

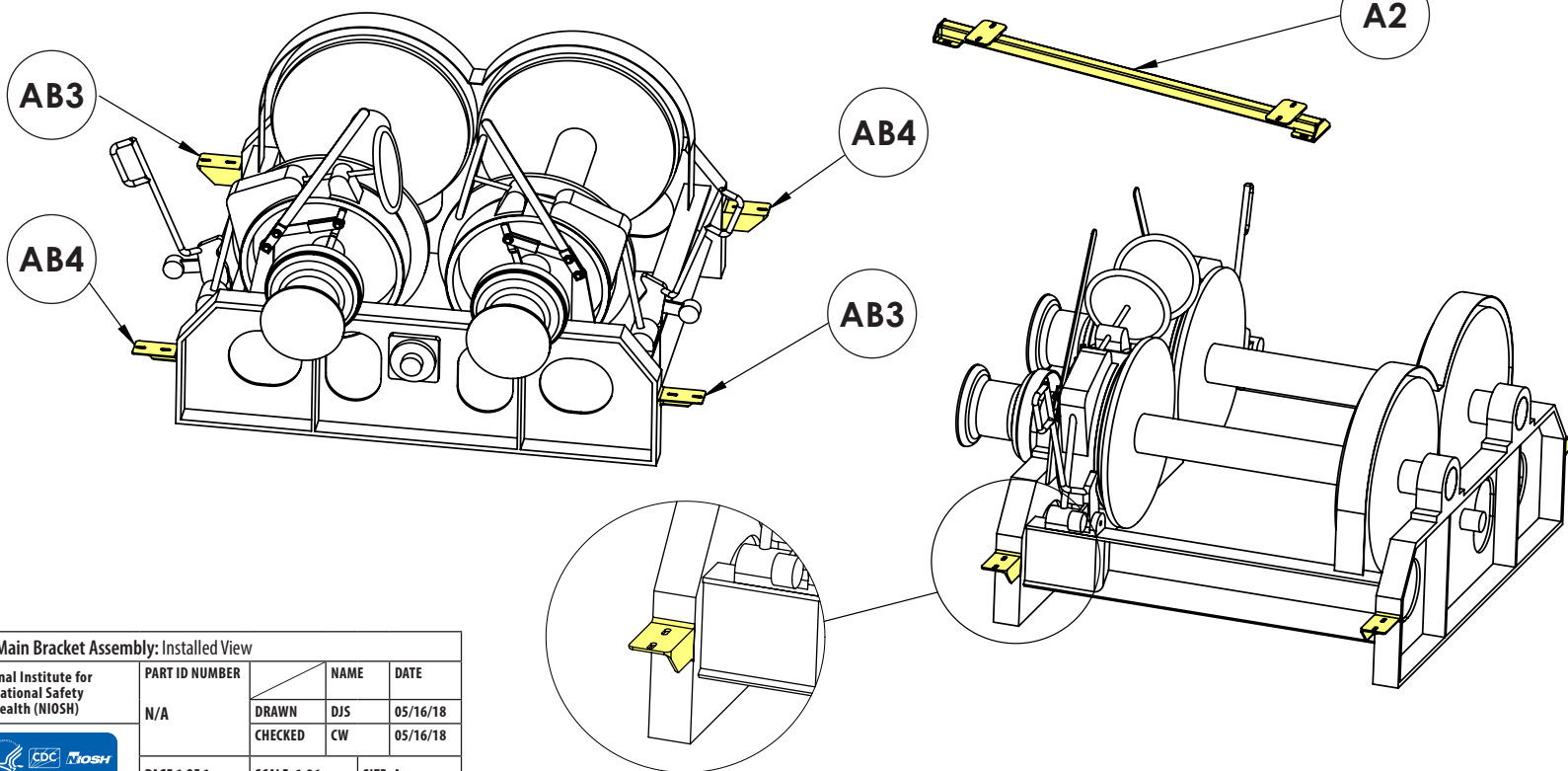
- a. Zinc Paint
- b. Intermediate Primer
- c. Top Coat



#### NOTE:

Follow manufacturer instructions to ensure paint is applied properly and allowed to fully dry before proceeding with the installation.

Paint main brackets and surrounding area where paint or previous coating was removed.



505 Main Bracket Assembly: Installed View

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: 1:26	SIZE: A

2

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2

1

### Install Mount Bar Assembly: Exploded View

**STEPS:**

4. Loosely bolt the mount bar assembly (A2) to the main brackets (AB3, AB4) on both sides of winch ensuring the following:
  - a. Apply anti-seize to all bolts prior to assembly
  - b. Ensure the mount bar is correctly installed as shown



Use this set of hardware to install the mount bar assembly to the main winch brackets (2 bolts X 4 brackets)

18-8 SS HEX HEAD CAP SCREW, 3/8"-16 X 1.50" (H1)

18-8 SS WASHER FOR 3/8" SCREW, 1.00" OD, .100"-.130" THICK (H5)

NYLON FLAT WASHER FOR 3/8" SCREW, 1" OD, .050" - .070" THICK (H3)

NYLON TUBE, 1/2" OD, 7/16" ID, CUT TO .400"-.500" LENGTH (H4)

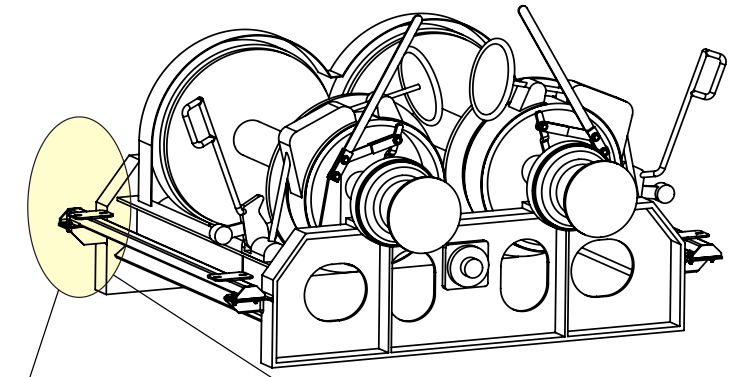
MOUNT BAR ASSEMBLY (A2)

MAIN BRACKETS (AB3 AND AB4)

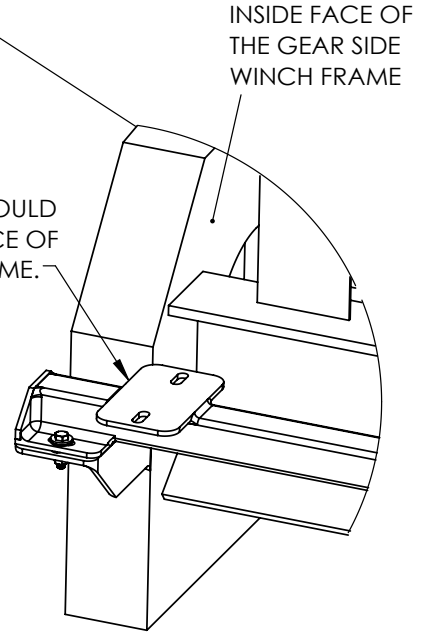
NYLON FLAT WASHER FOR 3/8" SCREW, 1" OD, .050" - .070" THICK (H3)

18-8 SS WASHER FOR 3/8" SCREW, 1.00" OD, .100"-.130" THICK (H5)

18-8 SS NYLON-INSERT HEX LOCKNUT, 3/8"-16 (H2)



THE OUTSIDE EDGE OF THE MOUNT BAR TOP PLATE SHOULD ALIGN WITH THE INSIDE FACE OF THE GEAR SIDE WINCH FRAME.



Install Mount Bar Assembly: Exploded View			
National Institute for Occupational Safety and Health (NIOSH)	PART ID NUMBER	NAME	DATE
	A2	DRAWN DJS	05/16/18
	CHECKED CW	05/16/18	
	PAGE 1 OF 1	SCALE: 1:28	SIZE: A

2

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2

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## Install Guard Frame Assembly: Exploded View

**Use this set of hardware to install the guard frame assembly to the mount bar assemblies (2 bolts X 4 brackets)**

18-8 SS HEX HEAD CAP SCREW, 3/8"-16 X 1.50"  
(H1)

18-8 SS WASHER FOR 3/8" SCREW, 1.00" OD,  
.100"-.130" THICK  
(H5)

NYLON TUBE, 1/2" OD, 7/16" ID,  
CUT TO .400"-.500" LENGTH  
(H4)

GUARD FRAME ASSEMBLY  
(A3)

UV RESISTANT NYLON BARRIER SHEET  
(BR1)

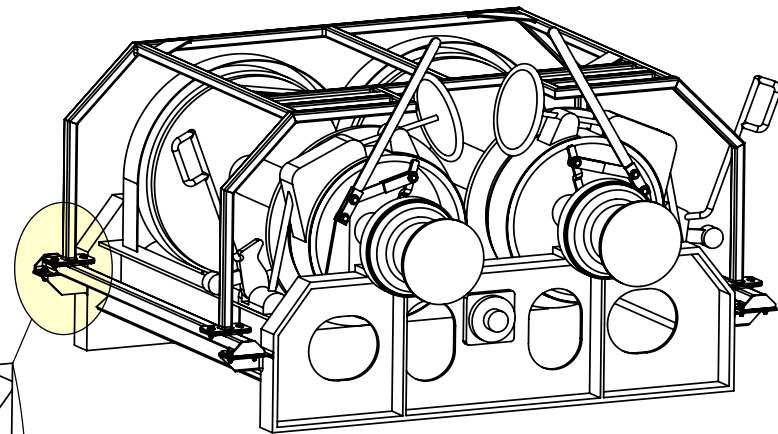
MOUNT BAR ASSEMBLY  
(A2)

NYLON FLAT WASHER FOR 3/8" SCREW, 1" OD,  
.050" - .070" THICK  
(H3)

18-8 SS WASHER FOR 3/8" SCREW, 1.00" OD,  
.100"-.130" THICK  
(H5)

18-8 SS NYLON-INSERT HEX LOCKNUT, 3/8"-16  
(H2)

MAIN GUARD BRACKET ASSEMBLY  
(A1)



### STEPS:

5. Loosely bolt the guard frame assembly (A3) to the mount bar assemblies (A2) ensuring the following:
- Apply anti-seize to all bolts prior to assembly
  - Ensure the guard frame is correctly installed as shown



Install 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

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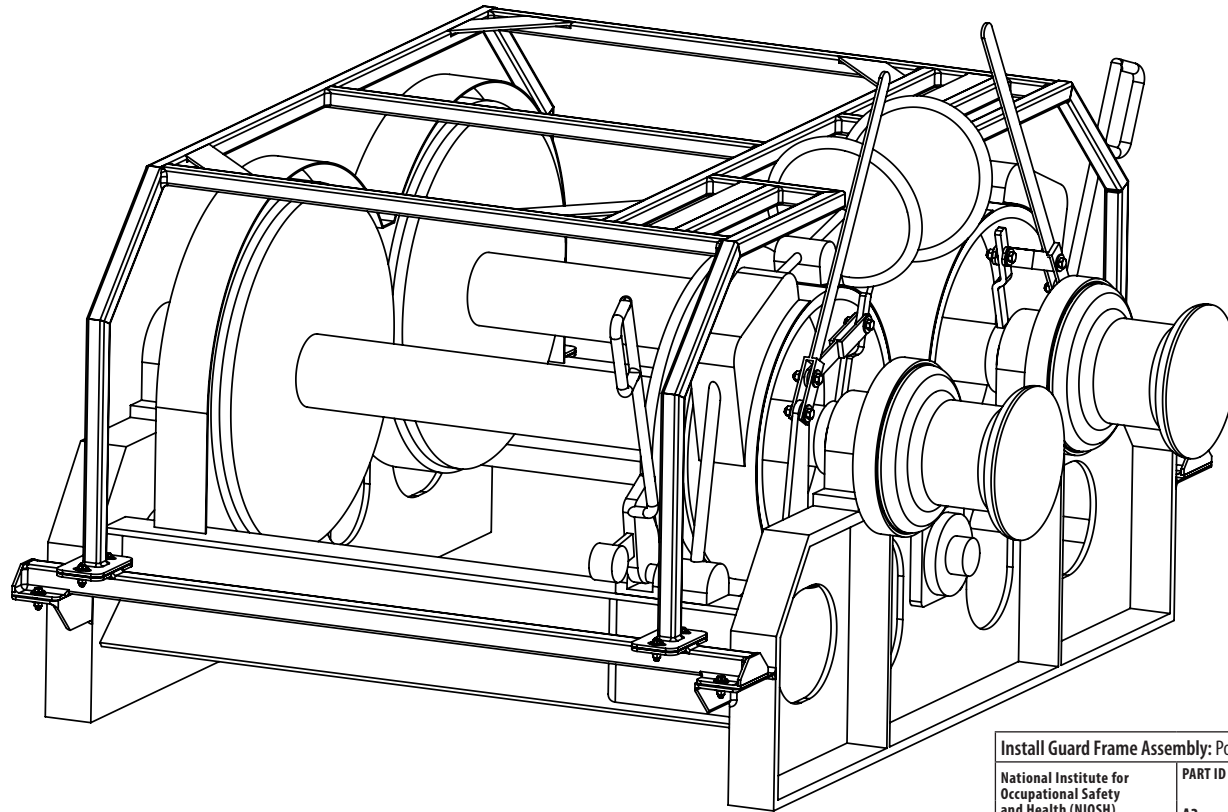
2


1

### Install Guard Frame Assembly: Position and Tighten Bolts

**STEPS:**

6. Position the loosely fastened components such that the guard frame assembly (A3) will not interfere with the winch cable during operation. Once in position, tighten all 3/8" bolt assemblies (16 total) to 16 ft-lbs.



Install Guard Frame Assembly: Position and Tighten Bolts			
National Institute for Occupational Safety and Health (NIOSH)	PART ID NUMBER	NAME	DATE
	A3	DRAWN	DJS
	CHECKED	CW	05/16/18
	PAGE 2 OF 2	SCALE: 1:14	SIZE: A

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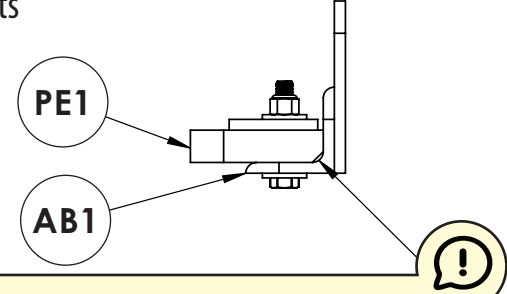
2

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### Install Rub Rail Assembly: Assemble Rub Rail Components

#### STEPS:

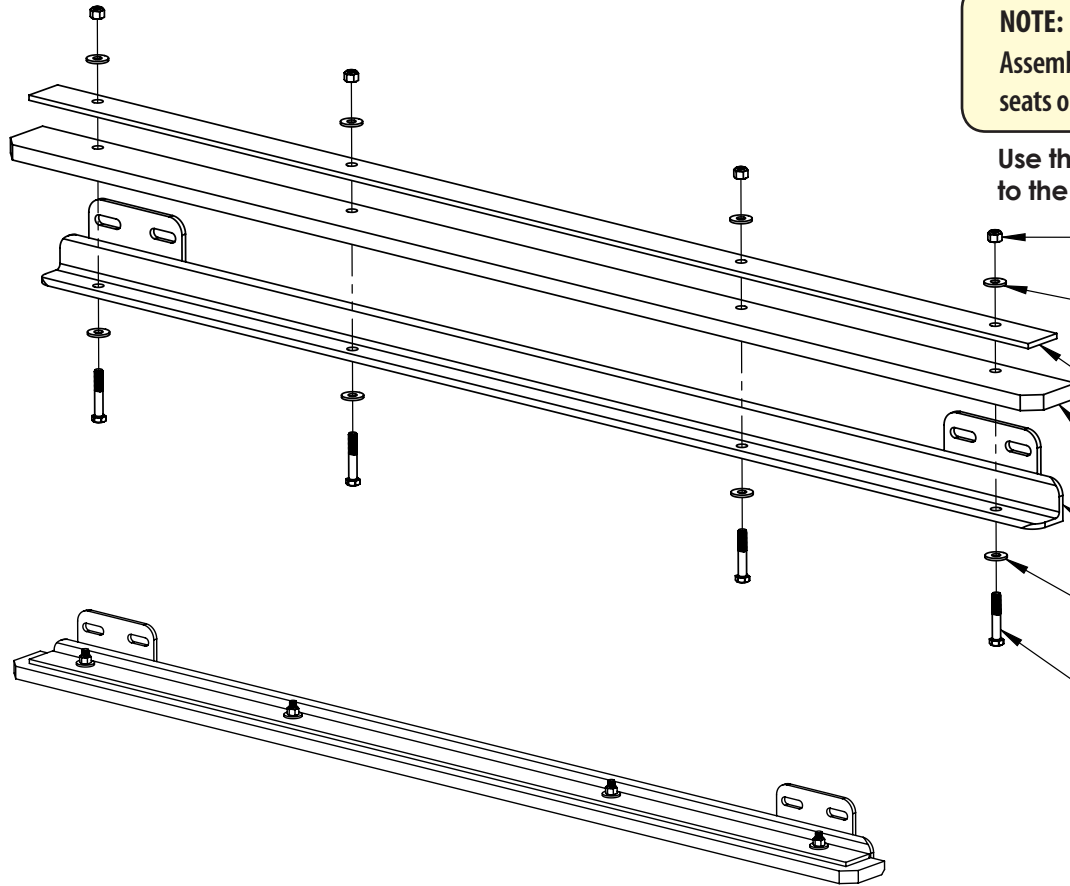
7. Assemble the rub rail components as shown using the 3/8" hardware specified below. First, loosely bolt all components together, then tighten all bolt assemblies to 16 ft-lbs. Apply anti-seize to all bolts prior to assembly.



#### NOTE:

Assemble such that the long chamfered edge on the rub rail (PE1) seats on the inside edge of the rub rail angle bracket (AB1).

Use this set of hardware to install the mount bar assembly to the main winch brackets (4 bolts X 2 brackets)



- 18-8 SS NYLON-INSERT HEX LOCKNUT, 3/8"-16 (H2)
- 18-8 SS WASHER FOR 3/8" SCREW, 1.00" OD, .100" - .130" THICK (H5)
- RUB RAIL TOP PLATE (FP7)
- RUB RAIL (PE1)
- RUB RAIL BRACKET WELDMENT (A4)
- 18-8 SS WASHER FOR 3/8" SCREW, 1.00" OD, .100" - .130" THICK (H5)
- 18-8 SS HEX HEAD CAP SCREW, 3/8"-16 X 2.25" (H11)

Install Rub Rail Assembly: Assemble Rub Rail Components				
National Institute for Occupational Safety and Health (NIOSH)		PART ID NUMBER	NAME	DATE
		A8	DRAWN	DJS 05/16/18
			CHECKED	CW 05/16/18
PAGE 1 OF 3		SCALE: 1:8		SIZE: A

2

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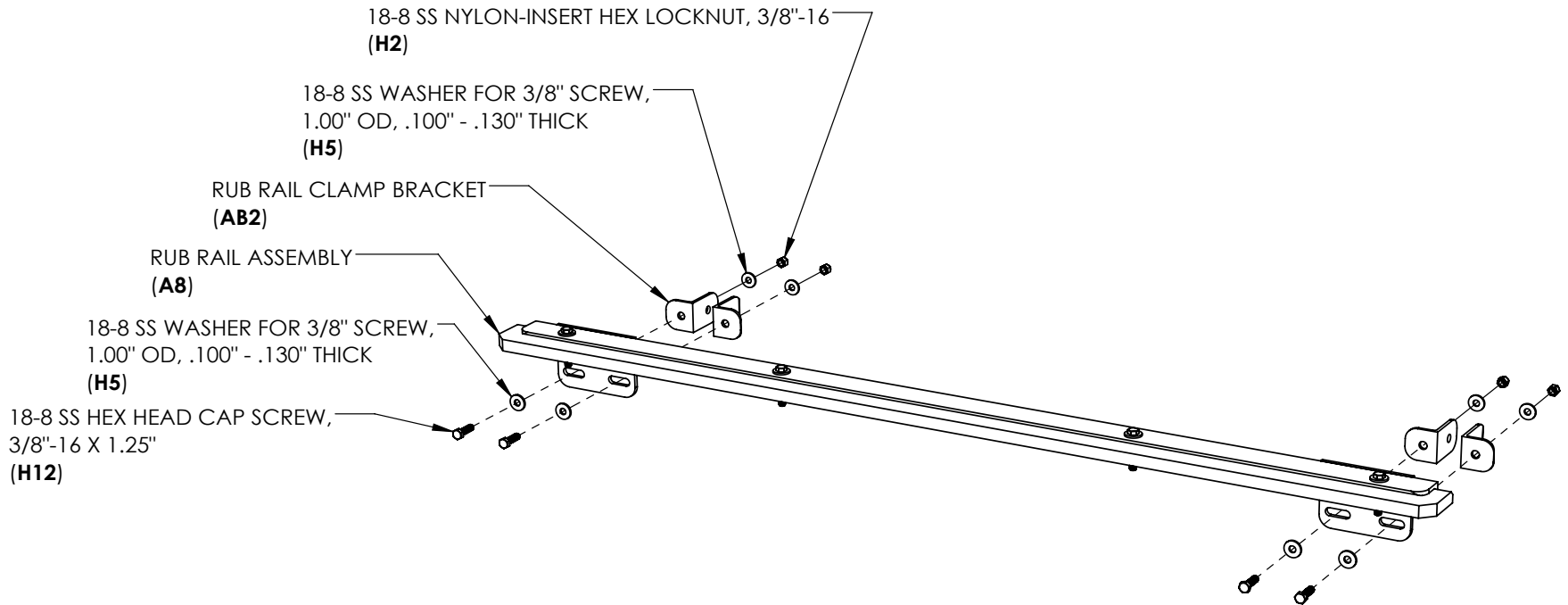
### Install Rub Rail Assembly: Attach Rub Rail Clamp Brackets

**STEPS:**

8. Loosely bolt the rub rail clamp brackets (AB2) to the rub rail assembly (A8) as shown. Apply anti-seize to all bolts prior to assembly.



Use this set of hardware to assemble the rub rail components (4 bolts X 2 assemblies)



Install Rub Rail Assembly: Attach Rub Rail Clamp Brackets			
National Institute for Occupational Safety and Health (NIOSH)	PART ID NUMBER	NAME	DATE
	A8	DRAWN	DJS
	CHECKED	CW	05/16/18
	PAGE 2 OF 3	SCALE: 1:8	SIZE: A

2

1

2

1

## Install Rub Rail Assembly: Exploded View

### STEPS:

9. Position the assembly from step 8 onto either side of the guard frame assembly (A3) so that the rub rail clamp brackets (AB2) straddle the guard frame assembly legs as shown. Loosely bolt the rub rail clamp brackets together using the 3/8" hardware specified below.



10. Move the rub rail assembly (A8) into position so that it will not interfere with the winch cable during operation. Once in position, tighten the 3/8" bolt assemblies to 16 ft-lbs. Apply anti-seize to all bolts prior to assembly. If the rub rail is mounted above the cable, orient the brackets up. If the rub rail is mounted below the cable, orient the brackets down.



Use this set of hardware to assemble the rub rail assembly to the guard frame assembly (2 bolts X 2 rub rail assemblies)

18-8 SS HEX HEAD CAP SCREW, 3/8"-16 X 2.75"  
(H10)

18-8 SS WASHER FOR 3/8" SCREW, 1" OD,  
.100" - .130" THICK  
(H5)

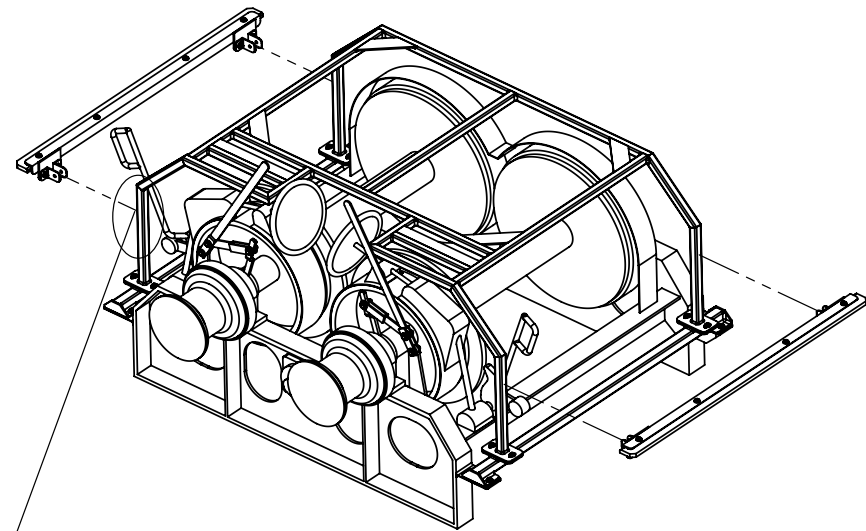
RUB RAIL ASSEMBLY  
(A8)

RUB RAIL CLAMP BRACKET  
(AB2)

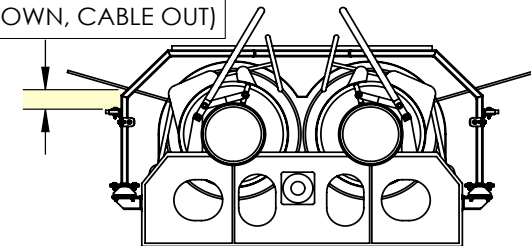
18-8 SS WASHER FOR 3/8" SCREW, 1" OD,  
.100" - .130" THICK  
(H5)

18-8 SS NYLON-INSERT HEX LOCKNUT,  
3/8"-16  
(H2)


GUARD FRAME ASSEMBLY  
(A3)



1.0" - 4.0" CLEARANCE  
(TRAWLS DOWN, CABLE OUT)



### Install Rub Rail Assembly: Exploded View

National Institute for Occupational Safety and Health (NIOSH)		PART ID NUMBER	NAME	DATE
		A8	DRAWN	DJS 05/16/18
			CHECKED	CW 05/16/18
PAGE 3 OF 3		SCALE: 1:30	SIZE: A	

2

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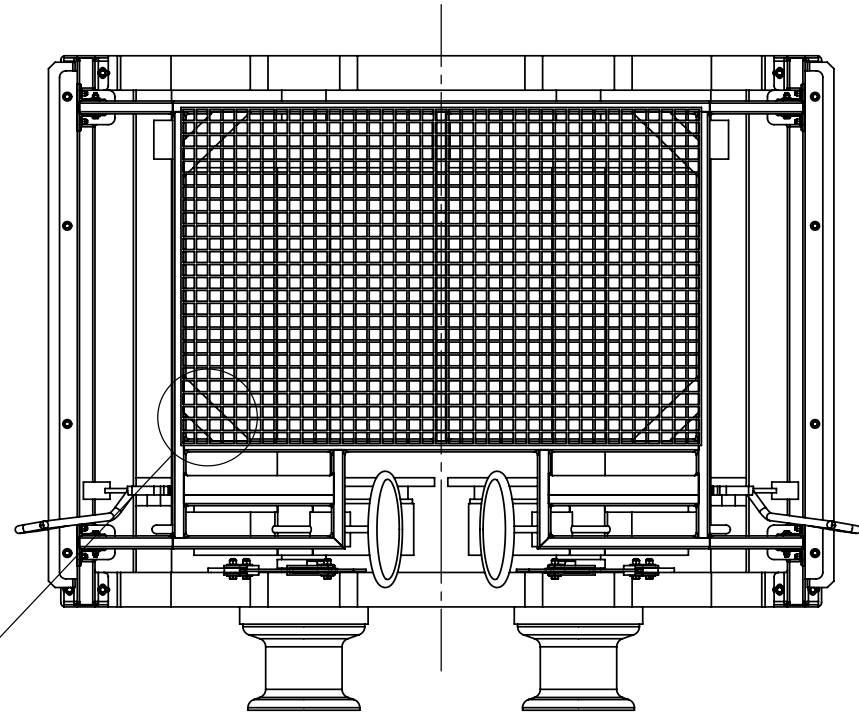
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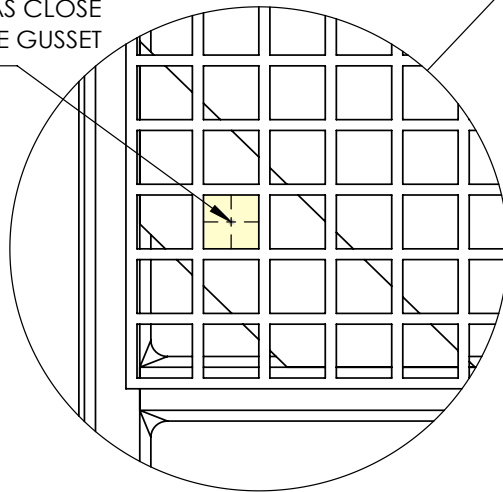
### Install Fiberglass Grating: Position and Mark Holes to Drill


**STEPS:**

- 11. Rest and center the fiberglass grating onto the top of the guard frame assembly main opening, coarse-side down. Mark the location of the holes for the M-clips (one hole on each gusset plate).
- 12. Remove the fiberglass grating (FG1) and drill the holes marked with a 5/16" drill bit.



MARK AND DRILL IN THE CENTER OF A GRATING SQUARE (ONE ON EACH CORNER) AS CLOSE TO THE CENTER OF THE GUSSET PLATE AS POSSIBLE.



Install Fiberglass Grating: Position and Mark Holes to Drill			
National Institute for Occupational Safety and Health (NIOSH)	PART ID NUMBER	NAME	DATE
	FG1	DRAWN DJS	CW
	CHECKED	CW	05/16/18
	PAGE 1 OF 3	SCALE: 1:20	SIZE: A

2

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2

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### Install Fiberglass Grating: Optional Viewing Window Cut Out

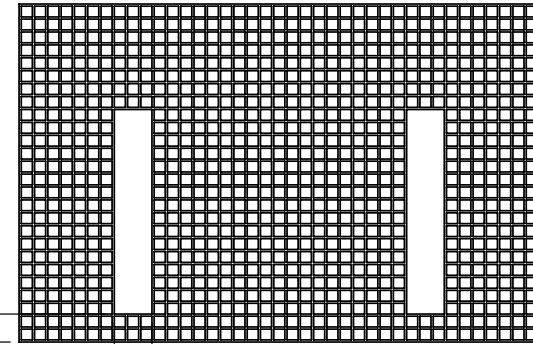
**NOTES:**

- Ensure a minimum of two grids on either side of the opening (front and back).
- Do not remove a section greater than three sections wide.
- It is recommended to cut the grating during installation to obtain the most accurate result.
- After removing sections, apply polyurethane spray along all cut surfaces to seal the fiberglass grating. Follow manufacturer's instructions.

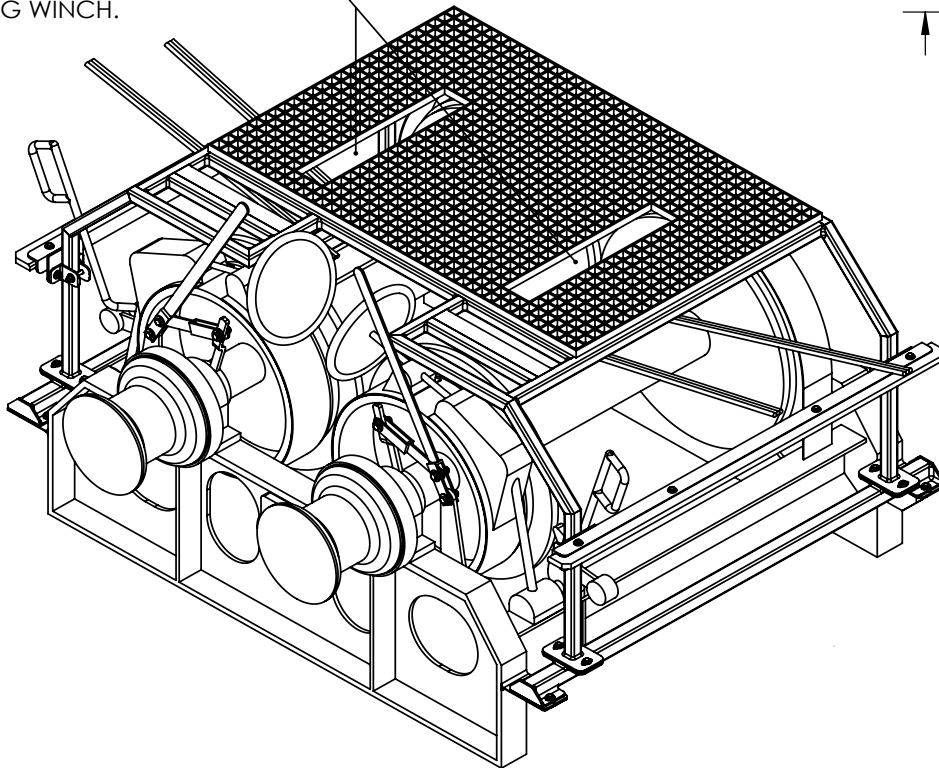


CUT OUT SECTION OF GRATING ABOVE EACH DRUM CENTER TO ALLOW BETTER VISIBILITY WHILE OPERATING WINCH.

MINIMUM OF 2 GRIDS EACH SIDE



3 GRIDS WIDE **MAX**



Install Fiberglass Grating: Optional Viewing Window Cut Out			
National Institute for Occupational Safety and Health (NIOSH)	PART ID NUMBER	NAME	DATE
	FG1	DRAWN DJS	05/16/18
		CHECKED CW	05/16/18
	PAGE 2 OF 3	SCALE: 1:20	SIZE: A

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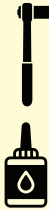
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## Install Fiberglass Grating: Exploded View

### STEPS:

13. Loosely bolt all four corners of the fiberglass grating (FG1) to the guard frame assembly (A3). Then torque bolts to 5 ft-lbs. Apply anti-seize compound to all bolts prior to assembly.



Use this set of hardware to mount the fiberglass panel to the guard frame assembly (1 bolt X 4 brackets)

18-8 SS HEX HEAD CAP SCREW, 1/4"-20 X 1.75"  
(H6)

18-8 SS WASHER FOR 1/4" SCREW, .750" OD,  
.060" - .070" THICK  
(H9)

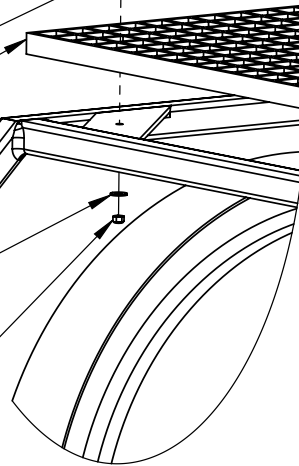
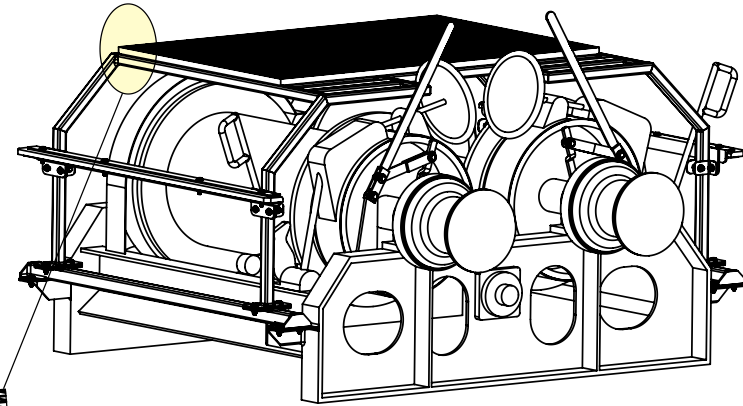
18-8 SS M-CLIP FOR FIBERGLASS GRATING,  
1.5" STRUT SPACING  
(H7)

FIBERGLASS GRATING  
(FG1)

GUARD FRAME ASSEMBLY  
(A3)

18-8 SS WASHER FOR 1/4" SCREW,  
.750" OD, .060" - .070" THICK  
(H9)

18-8 SS NYLON-INSERT HEX LOCKNUT,  
1/4"-20  
(H8)



Install Fiberglass Grating: Exploded View			
National Institute for Occupational Safety and Health (NIOSH)	PART ID NUMBER	NAME	DATE
	FG1	DRAWN DJS	05/16/18
	CHECKED CW	05/16/18	
PAGE 3 OF 3		SCALE: 1:26	SIZE: A

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### Completed Guard Assembly: Maintenance Notes

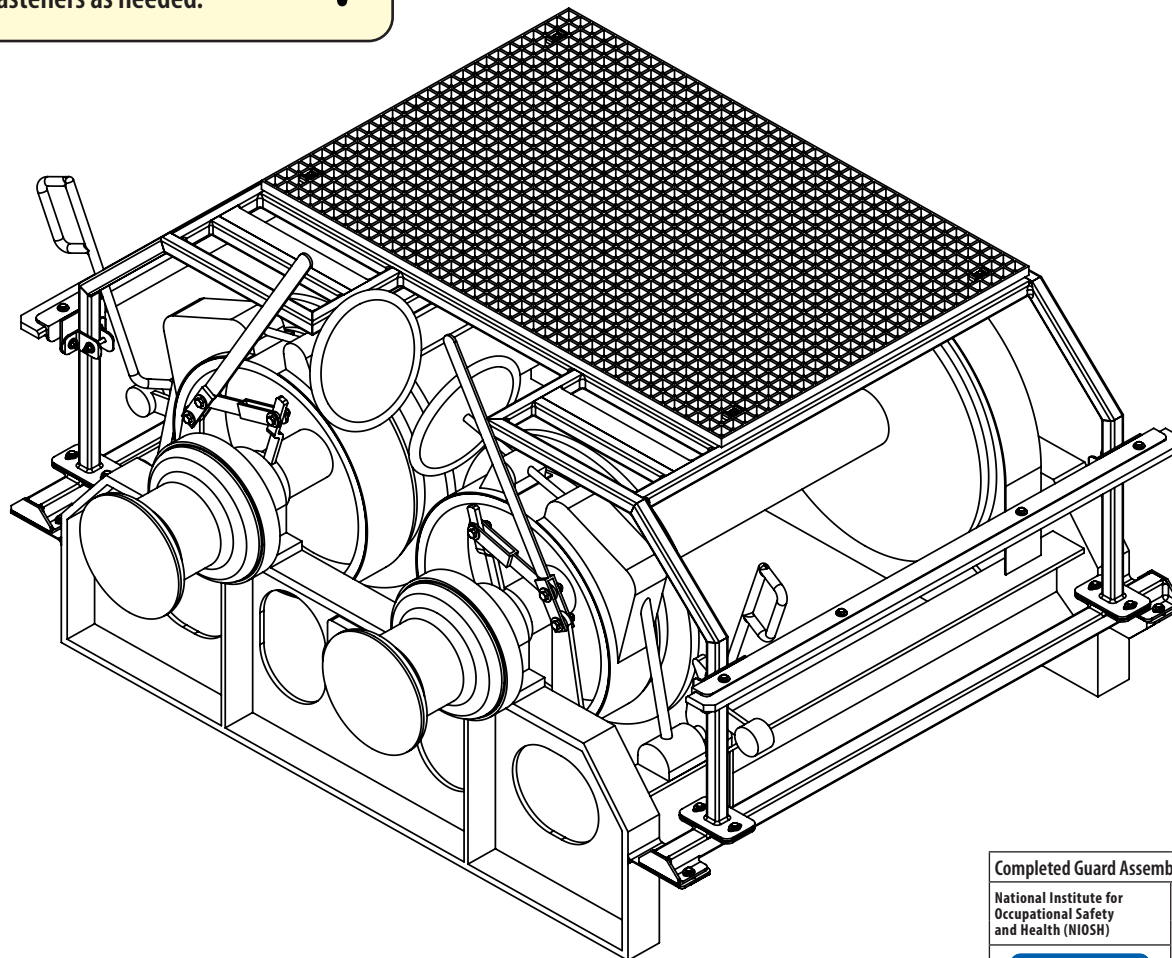
#### FINAL STEPS:

14. Retighten and inspect all bolt assemblies after first use and annually thereafter, replacing worn fasteners as needed.



#### NOTE:

Regularly inspect all areas of the guard for corrosion. Specifically, the mounting points between the mild and stainless steels.



B

B

A

A

Completed Guard Assembly: Maintenance Notes			
National Institute for Occupational Safety and Health (NIOSH)	PART ID NUMBER	NAME	DATE
	AO	DRAWN DJS	05/16/18
		CHECKED CW	05/16/18
PAGE 1 OF 1	SCALE: 1:16	SIZE: A	

2

1





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through safety and health research

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**DHHS (NIOSH) Publication No. 2024-111**  
**DOI:** <https://doi.org/10.26616/NIOSH PUB2024111>