

<b>Doc Name</b>	WhaleShark™ Packerless Separator SOP		
<b>Date</b>	March 15, 2024	<b>Revision</b>	14

## 1. Transportation

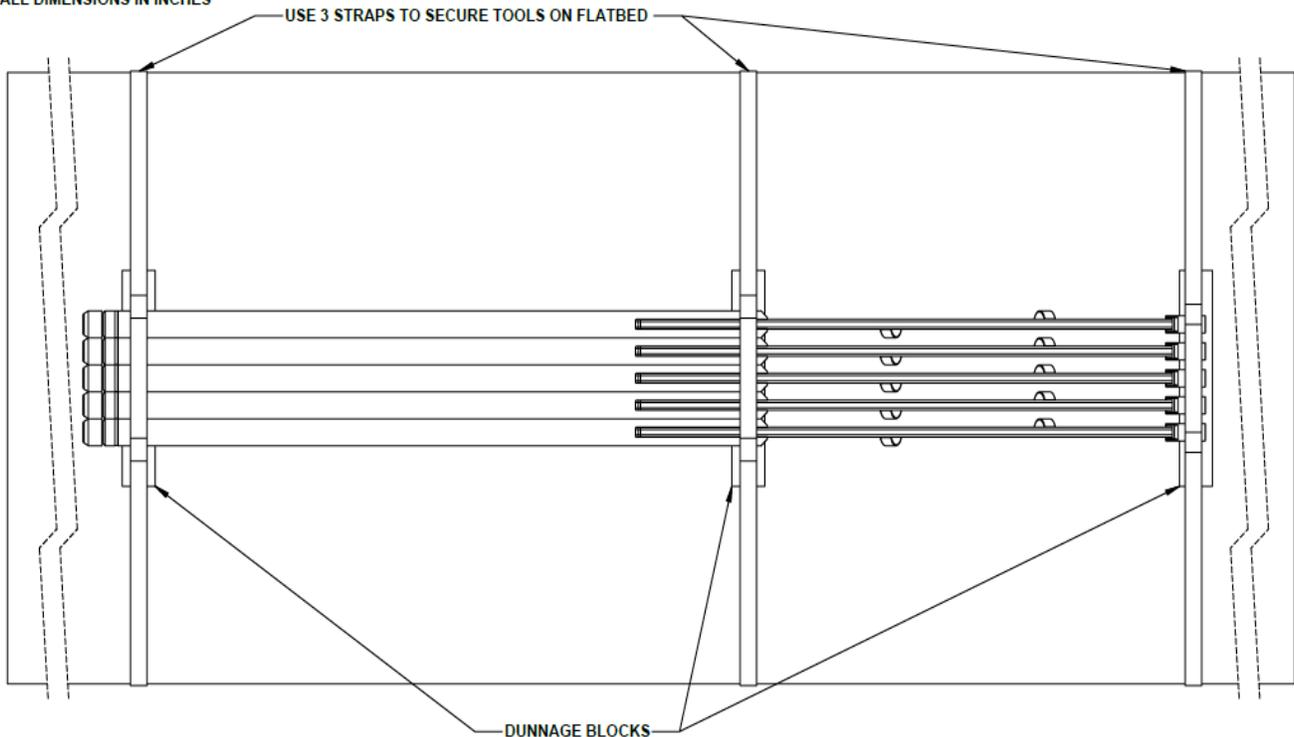
1.1. To control the risk of damage while transporting, it is recommended to either group or individually wood crate the tools. If shipping across the Canada / USA border use shipping grade approved wood.

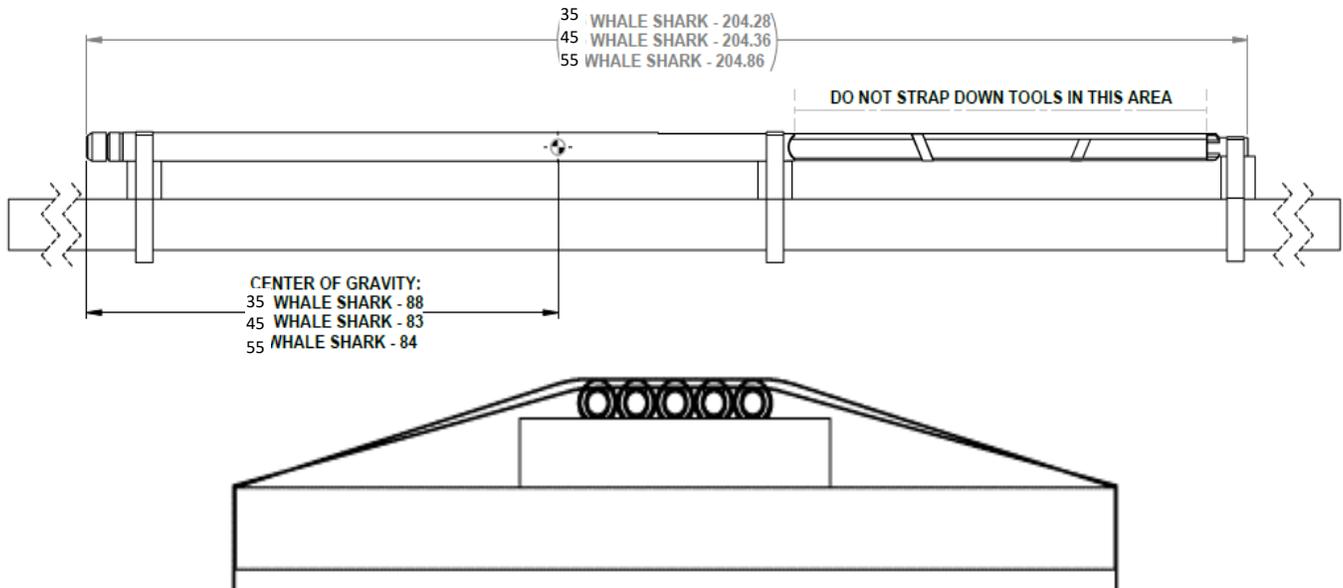
1.1.1. Use 2"x 4" wood material for the 35/45 and 35ss/40ss series WhaleShark's and 2"x 6" wood material for the 55/50ss series. Build and band as per photos following:



1.2. The following loading and transportation diagram shall be adhered to at all times to avoid damage to the separator:

- NOTE: 1) TOOLS ARE TO BE PLACED ON DUNNAGE AND STRAPPED AS SHOWN; DO NOT STRAP DOWN OVER THE SMALL TUBING / FLATBAR AS THIS CAN RESULT IN DEFORMING THE TOOL  
 2) DO NOT STACK TOOLS  
 3) APPROXIMATE CENTER OF MASS FOR ALL 3 SIZES OF WHALE SHARK ARE INDICATED BELOW TO AID IN LOADING AND UNLOADING THE TOOLS  
 4) ALL DIMENSIONS IN INCHES





- 1.3. Do not lift or strap with forklift or slings on the oval pump intake tube and rigid bar section between the top sub and separator collector body.
- 1.4. Support separator at the top 2-3/8" EUE sub and main separator collector shroud body while shipping.
- 1.5. Do not stack anything on top of the separator.
- 1.6. Do not strap across the separator's oval pump intake tube and ridged bar sections during transportation, as this will risk bending it.
- 1.7. Always use a 2-3/8" EUE box thread protector. Ensure the WhaleShark's collector intake is appropriately covered (tape or equivalent, see picture of collector intake appropriately covered) to prevent debris from entering the separator during transportation.
- 1.8. The WhaleShark's 35 / 45 series Extension tool shall be hand loaded and transported either in a crate and strapped down so as to not risk bending the tool or transport in a side board.



## 2. Pumping High Rate Bullhead Flushes for Solids Control

- 2.1. Prior to installing a new BHA and for especially when designing a BHA for increasing the production drawdown (high inclination pump/separator placements), we always recommend pumping high rate flushes in multiple stages, generally more than 3. The dual purpose concept here is about how solids are transported along a horizontal wellbore (saltation) and using a repeated cyclical water hammer pressure differential effect to bust-up potential solids bridges. Saltation means solids are transported as migrating dunes and thus it is more effective to pump multiple disruptive flush stages to bust-up these dunes transport solids more effectively/efficiently down the horizontal lateral. Pumping a single steady state flush ineffectively transports solids as they find a solids dune equilibrium quickly and the flush then just travels overtop these dunes (moving hardly any solids in the process). So you need to be disruptive in your pump rates/stages to be most effective.
- 2.2. Pump multiple smaller stages (at least 3) of 100-200 bbls per stage (or as well conditions/field experience dictate). Pump at as high of rate as possible for each stage (within surface treating pressure limits). Stop for 30 minutes between stages to confirm well is on a strong vacuum or as well dictates.
- 2.3. **NOTE:** If pumping flush down the casing annulus (to the tubing) after a tubing anchor has been set and with a WhaleShark in place, tubing movement calculations are required to avoid excessive surface treatment pressures, hydrostatic and fluid flow frictional pressures (past tubing anchor and WhaleShark separator) imposing additional tubing tensile forces that could shear out the tubing anchor.

## 3. Running BHA with WhaleShark in Hole

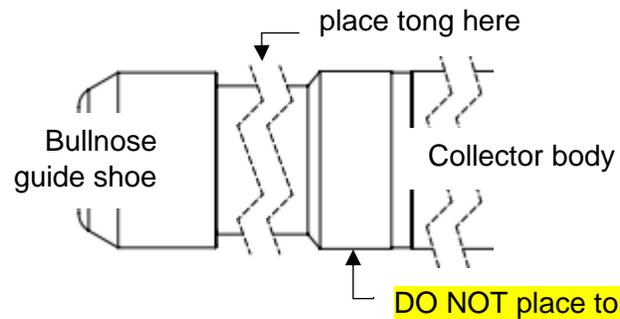
- 3.1. Ensure wellbore to separator landing depth is free of debris and a casing drift run has been performed. Run a casing scraper across Tubing Anchor (TA) or Tubing Anchor Catcher (TAC) setting depth to remove scale/build up and prepare casing for TA/TAC slips. If possible, avoid setting TAC across from previous ESP motor depth as this area can have additional scaling.
  - 3.1.1. If setting separator beyond 30 degrees wellbore inclination, it is recommended to run a flat bottom mill and a string mill (one joint back) and run this assembly at least two joints past the separator setting. Always pump fluid down annulus while running any assembly beyond 30 degrees wellbore inclination.
- 3.2. Inspect and caliper separator; confirm OD of separator is within specifications and for at least ¼ inch radial clearance of the casing drift ID of the well.
  - 3.2.1. Observe for any transport damage or bending to the separator's oval pump intake tube or rigid bar (which could restrict flow during operation).
  - 3.2.2. Remove transportation tape from separator's collector intake. Observe for any debris inside separator's collector that could plug the oval pump intake tube or pump.

**Note:** If this a WhaleShark™ separator rerun, then pump in reverse down through oval pump intake tube and back out the collector to flush any debris that may have fallen into the collector while pulling the separator out of hole.
  - 3.2.3. RIH with mud joints as required. **Note: always run a bull plug on the bottom of the mud joints.**
  - 3.2.4. Remove box thread protector from separator's lifting/handling sub. If no lifting sub has been pre-installed on separator, the remove 2-3/8" EUE box thread protector at top of separator and install a 2-3/8" EUE lifting sub (4' to 6' length is adequate).

3.2.5. Orient separator on catwalk with the oval pump intake on the high side (this avoids unnecessary bending of the separator when lifting off catwalk to the rig floor). Lift separator by attaching elevators to the lifting sub. Do not allow any side impact to separator (on rig floor while lifting). Avoid bending separator while lifting.

3.2.6. If running mud joints on bottom of separator, remove the bullnose guide shoe on the bottom of the separator so there is a pin down (2-3/8" EUE on the 35 series WhaleShark™ or 3-1/2" EUE on the 45, 55 50ss series or 2-7/8" on the 40ss series WhaleShark's).

**Note: Do not place tongs on separator's collector body as it will easily crush; only place on bottom crossover TONG AREA (see adjacent drawing)**



3.2.7. If not running mud joints on bottom of separator, ensure the bullnose on the bottom of the separator is torqued up to the minimum EUE torque for the thread size.

3.2.8. If running SharkNET™ filter screens, install screen to WhaleShark's NPT connection as per the SharkNET™ SOP.

3.2.9. Make up pin down WhaleShark™ separator into box up of top mud joint and tighten by only applying a wrench to the separator's designated TONG AREA. Make-up to minimum EUE make-up torque. **Note:** Do not over torque.

3.3. RIH with separator and land lifting sub in slips. Avoid putting weight on separator or placing it in compression and avoid/minimize rotation. Install remaining tubing string components as per well specific program.

3.4. If running a 20' WhaleShark Liquid Fallback Extension on top of the WhaleShark Separator, proceed as follows:

3.4.1. On the catwalk, install a 4' by 2-3/8" EUE handling sub on the Extension and using that lifting sub to pickup the Extension without bending or side impacts. Prior to lifting, orient the Extension such that dual oval pump intake tubes are on the high and low sides (prevent bending during lifting).

3.4.2. Attach to the WhaleShark Separator's lifting sub that is landed in the slips, make up to 2-3/8" EUE minimum torque requirement and RIH.

3.5. Set TA/TAC according to calculated tubing hanger tension calculations.

3.6. After setting TA/TAC (and tubing hanger), running the pump/rods, and just prior to landing pump in seat nipple, pump a minimum 20 bbls (3 m<sup>3</sup>) of load fluid (with wax dispersant, if wax is a risk) down tubing to purge separator of any debris that may have accumulated in it while running in hole or while running pumps/rods.

#### 4. Fishing (if required)

- 4.1. See WhaleShark and optional Extension dimension information in Appendix 1.
- 4.2. In 4-1/2" (114.3mm) casing, fish the 35 series WhaleShark™ separator (and/or Extension, if installed) as follows:
  - 4.2.1. **Scenario 1** – assumes separator's top 2-3/8" EUE box connection with 2-3/8" EUE lifting/handling being pin broke off inside the separator's 2-3/8" EUE box. Run a Box Tap/Die Collar (see picture) with outside dimension of casing drift or close to drift with a catch range 3" to 2.875" over 3" taper, equivalent as follows:



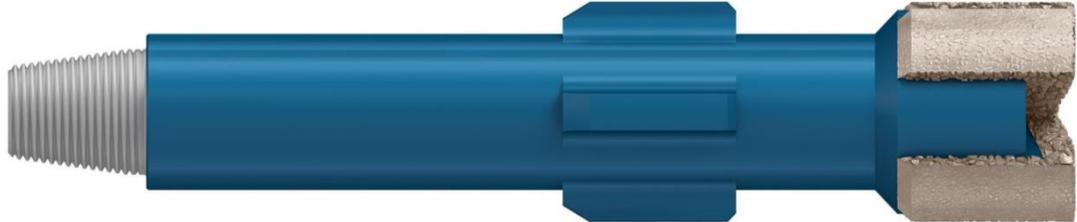
- 4.2.2. **Scenario 2** – assumes separator parted below its top 2-3/8" EUE box connection and has pulled apart or twisted off in the separation region (i.e., oval pump intake tube and the rigid bar have parted below the separator's top connection) or the Extension (if installed) parted below its top connection exposing the dual oval pump intake tubes.

- 4.2.2.1. Run a Box Tap/Die Collar (see picture above) with outside dimension of casing drift or close to drift with a catch range 3" to 2.875" over 3" taper.
    - 4.2.2.2. Attempt to latch onto fish as shown in adjacent photo or a successful fishing attempt.



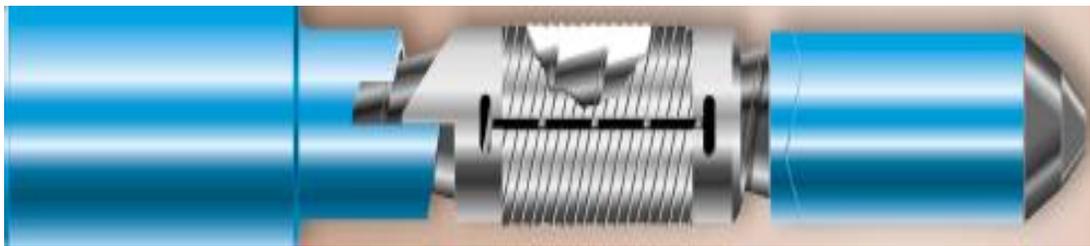
- 4.2.2.3. Run a drift OD Concave mill and mill off pump intake tube and rigid bar (with half-spiral gussets) and top 24 " of separator's collector. Then run tapered or round nose mill to clean out ID of separator's collector to minimum 24" inside.

Example Drift Concave Mill:



- 4.2.2.4. Then run spear to catch ID of separator's collector.

Example Itco Type Spear:



- 4.3. In 5-1/2" (139.7mm) casing, fish the 45 series WhaleShark™ separator (and/or Extension, if installed) or in 7" (177.8mm) casing, fish the 55 series WhaleShark™ separator (and/or Extension, if installed):

- 4.3.1. **Scenario 1** – assumes separator's top 2-3/8" EUE box connection with 2-3/8" EUE lifting/handling being pin broke off inside the separator's 2-3/8" EUE box.

- 4.3.1.1. Run a short catch overshot loaded to catch 1.92" OD fish neck.

70 Series Short Catch Overshot:



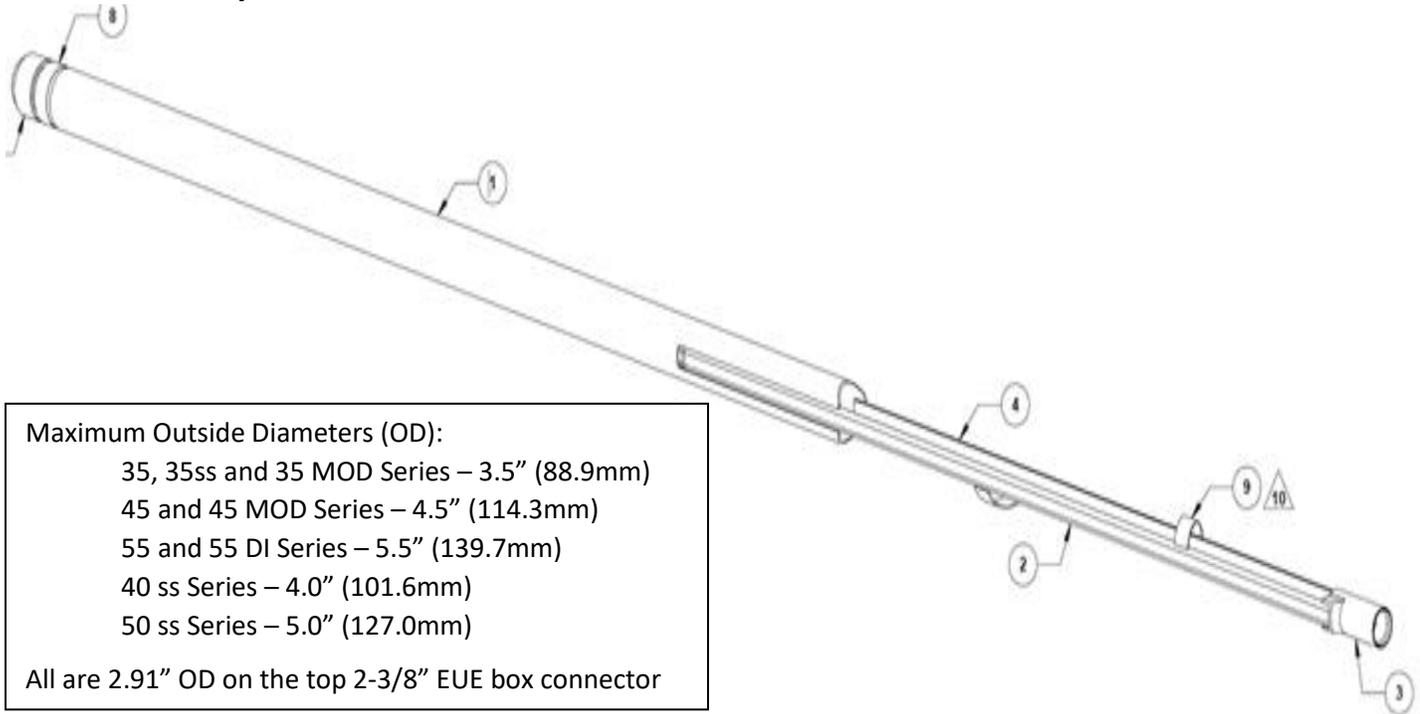
- 4.3.2. **Scenario 2** – assumes separator parted below its top 2-3/8" EUE box connection and has pulled apart or twisted off in the separation region (i.e., oval pump intake tube and the rigid bar have parted below the separator's top connection) or the Extension (if installed) parted below its top connection exposing the dual oval pump intake tubes.

- 4.3.2.1. Run a drift OD Concave mill and mill off pump intake tube and rigid bar (with spiral gussets) and top 24" of separator's collector. Then run tapered or round nose mill to clean out ID of separator Collector to 24" inside.

- 4.3.2.2. Then run spear to catch ID of separator's collector.

## Appendix 1

### WhaleShark Separator Dimensional Data:



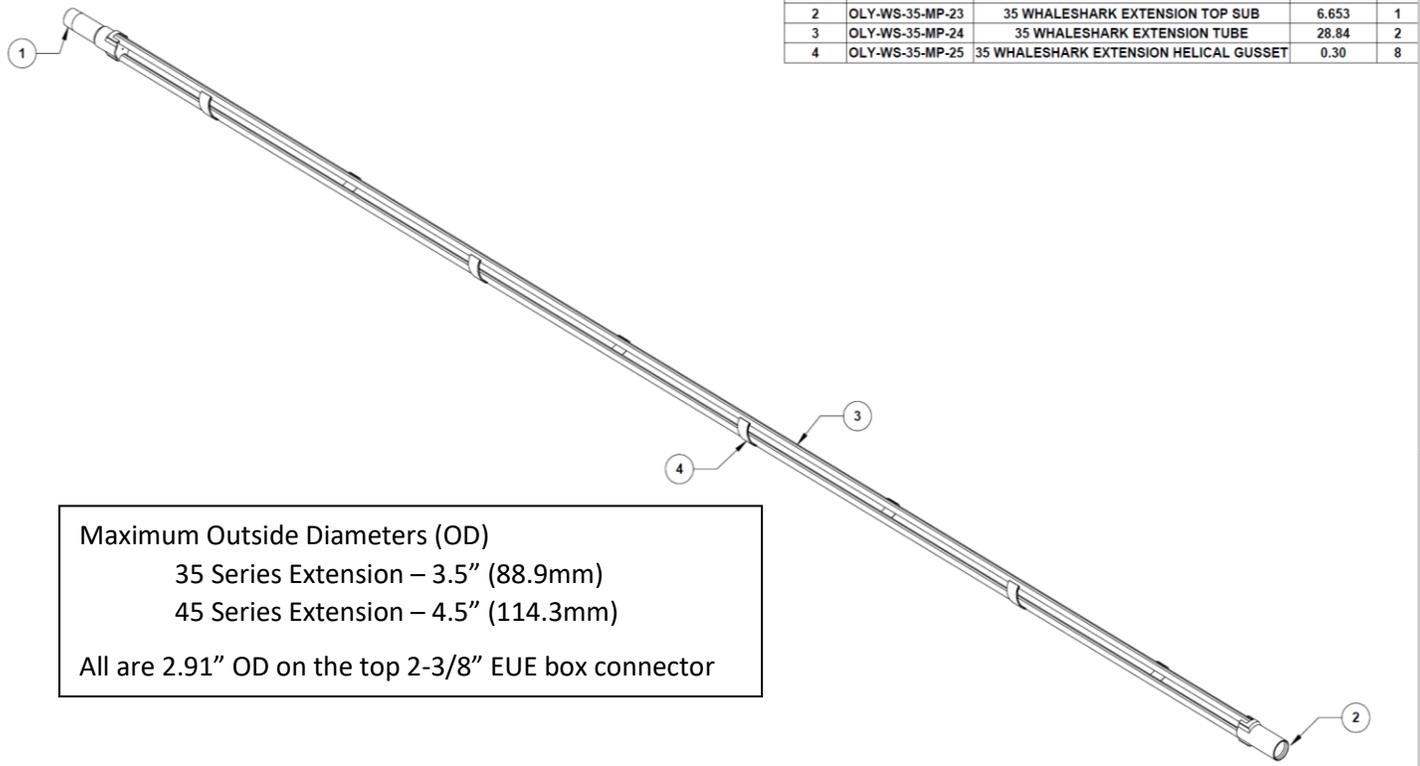
**Maximum Outside Diameters (OD):**

- 35, 35ss and 35 MOD Series – 3.5" (88.9mm)
- 45 and 45 MOD Series – 4.5" (114.3mm)
- 55 and 55 DI Series – 5.5" (139.7mm)
- 40 ss Series – 4.0" (101.6mm)
- 50 ss Series – 5.0" (127.0mm)

All are 2.91" OD on the top 2-3/8" EUE box connector

### Extension Dimensional Data:

ITEM NO.	PART NUMBER	DESCRIPTION	WEIGHT (LB)	QTY.
1	OLY-WS-35-MP-22	35 WHALESARK EXTENSION BOTTOM SUB	8.181	1
2	OLY-WS-35-MP-23	35 WHALESARK EXTENSION TOP SUB	6.653	1
3	OLY-WS-35-MP-24	35 WHALESARK EXTENSION TUBE	28.84	2
4	OLY-WS-35-MP-25	35 WHALESARK EXTENSION HELICAL GUSSET	0.30	8

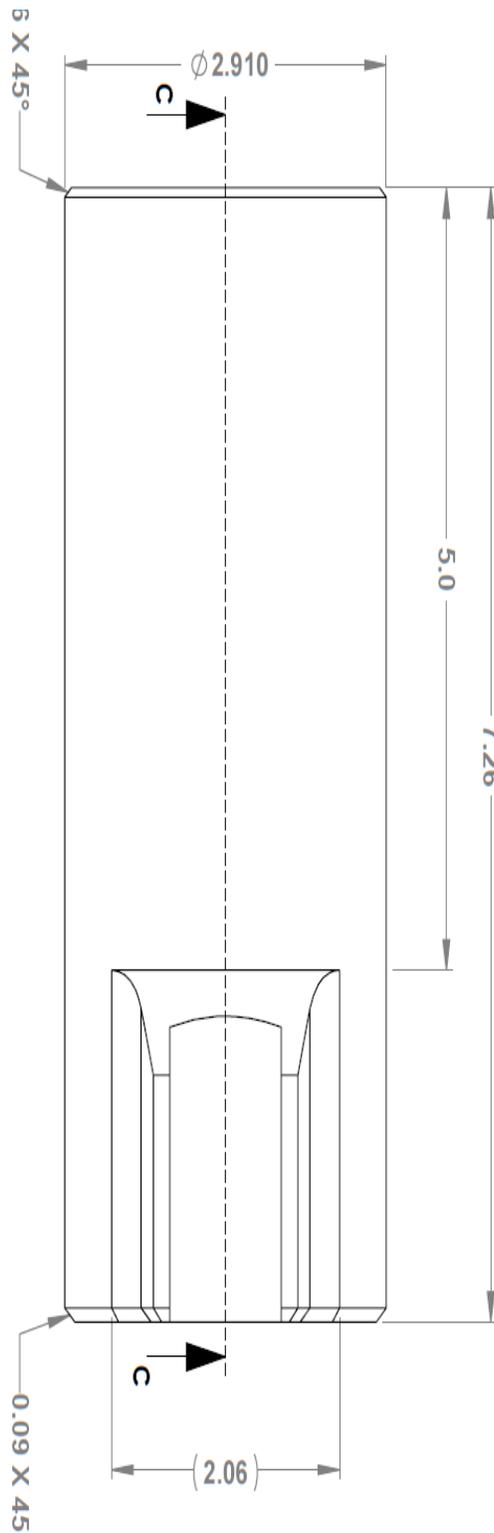


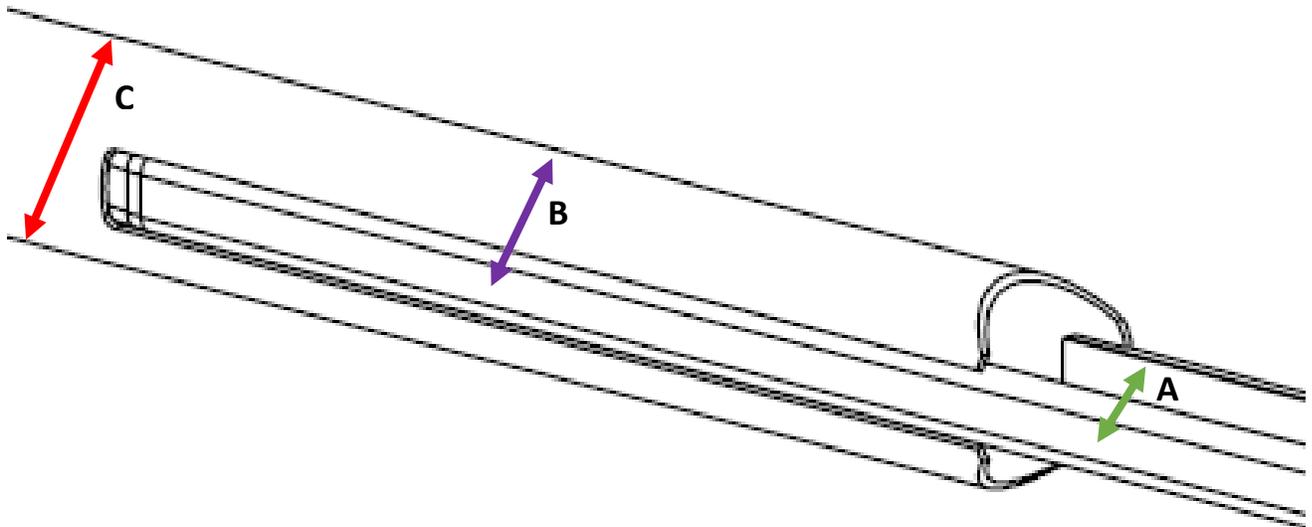
**Maximum Outside Diameters (OD)**

- 35 Series Extension – 3.5" (88.9mm)
- 45 Series Extension – 4.5" (114.3mm)

All are 2.91" OD on the top 2-3/8" EUE box connector

2-3/8" EUE box top connector details (item 3 WhaleShark, item 2 Extension in diagrams above):





Series	Collector Body OD	A Distance between Pump Intake Tube and Rigid Bar	B Distance between Pump Intake Tube and Collector ID	C Collector Body ID
35	3.5"	2.38"	2.59"	3.19"
45	4.5"	3.02"	3.36"	4.13"
55	5.5"	3.96"	4.27"	5.10"
55 DI	5.5"	2.92"	3.32"	5.10"
35 MOD	3.5"	1.92"	2.23"	3.20"
45 MOD	4.5"	2.00"	2.20"	4.10"
55 MOD	5.5"	3.08"	3.48"	5.10"
35ss	3.5"	2.25"	1.99"	2.99"
40ss	4.0"	2.43"	2.15"	3.43"
50ss	5.0"	3.39"	3.03"	4.28"

For the 35, 45, and 55 series, the Ridged Bar is welded 1.5" deep into separator Collector (from the Collector's intake). The Oval Pump Intake Tube is welded 24" into separator Collector (from the collector's intake).