Testing and Process-Vx Spectra Multiphase Flowmeter

First Generation Trolley, Operations Procedure for Vx Spectra (SWTC)

Version: 102875432 AA / Release Date: 11-Jul-2017

Schlumberger

Standard Work Set

First Generation Trolley, Operations Procedure for Vx Spectra (SWTC)

Testing and Process-Vx Spectra Multiphase Flowmeter

Table of Contents

1. First Generation Trolley, Operations Procedure (1)

Testing and Process-Singapore Well Testing Centre

Introduction

This SWI consists of steps on First generation trolley operations procedure for Vx Specrtra (88mm)

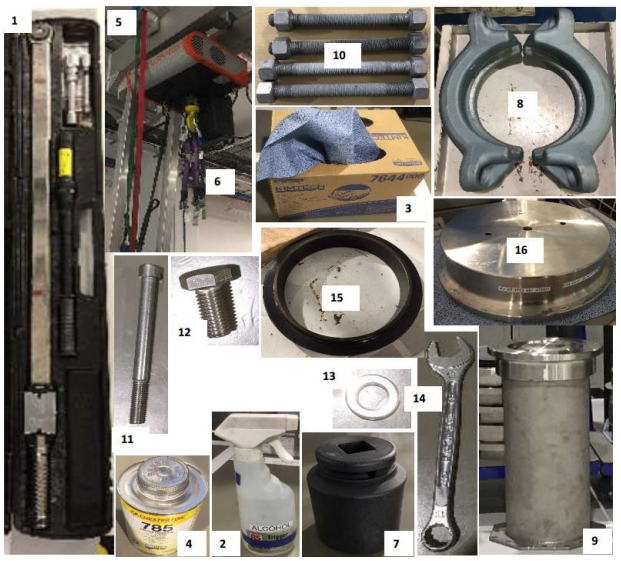
This SWI is split into Document 1 and Document 2. This will be referred as Document 1.

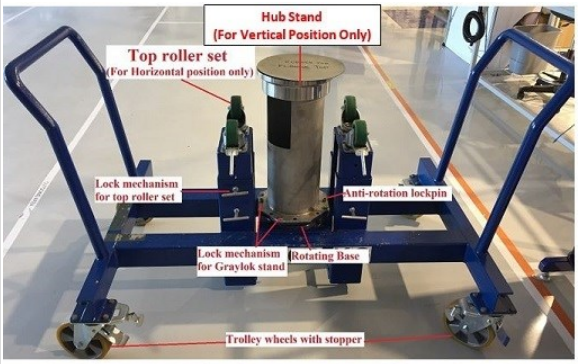
Steps

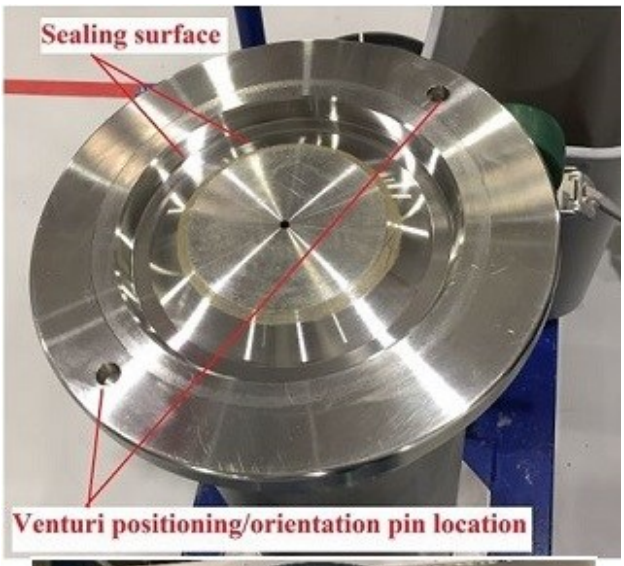
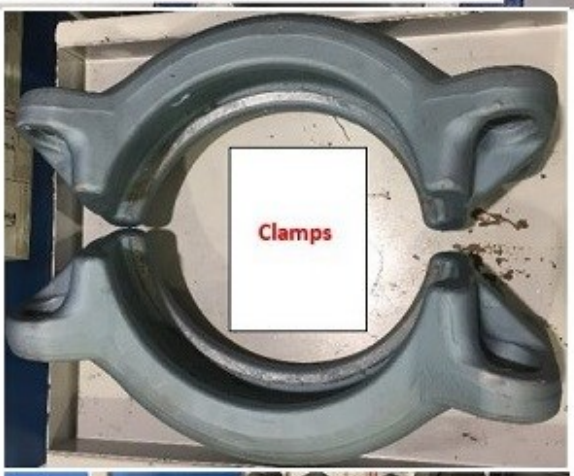
Minimum 2 people required and in certain steps require 3 people. Caution, this operation has pinch points.

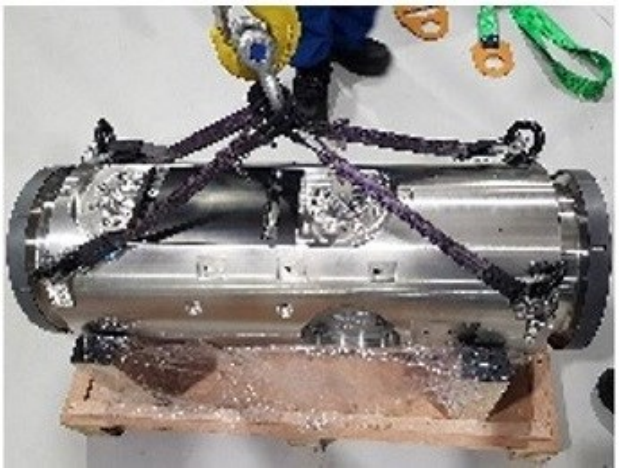
1 Tools needed

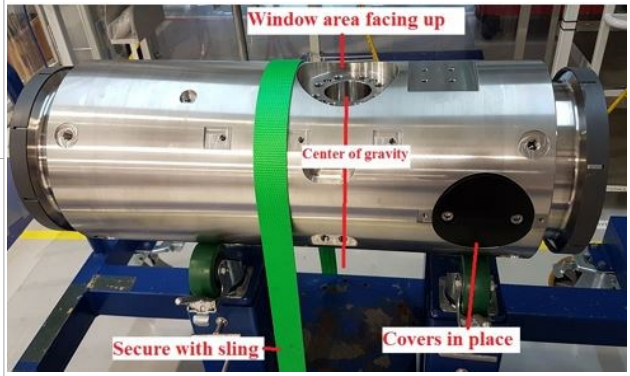
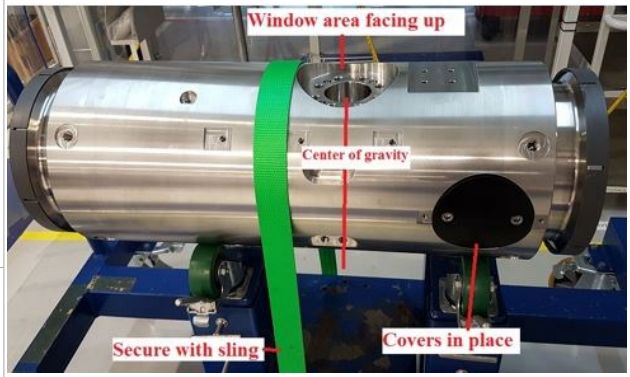
Sl No	Description	Quantity
1	Torque Wrench (500-1500Nm)	1
2	Cleaning alcohol	As required
3	Lint Free Wipes	As required
4	Chesterton 785	As required
5	Overhead crane	1
6	Slings + Shackles	4 each
7	2" socket	1
8	Hub	As required
9	Hub stand	1
10	Studs + Nuts (2" size)	4 each
11	M12x140 socket head screw	2
12	M12x25 Hex head screw	4
13	M12 flat washer	4
14	19mm spanner	1
15	IX Seal ring	1
16	Top Flange	1
17	Mallet	1

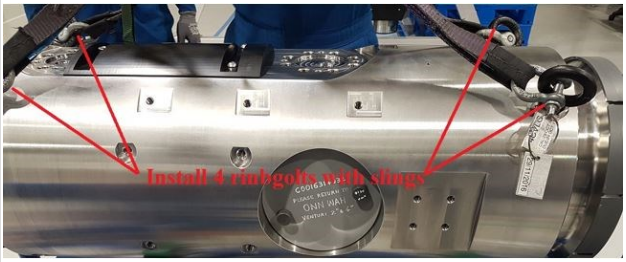


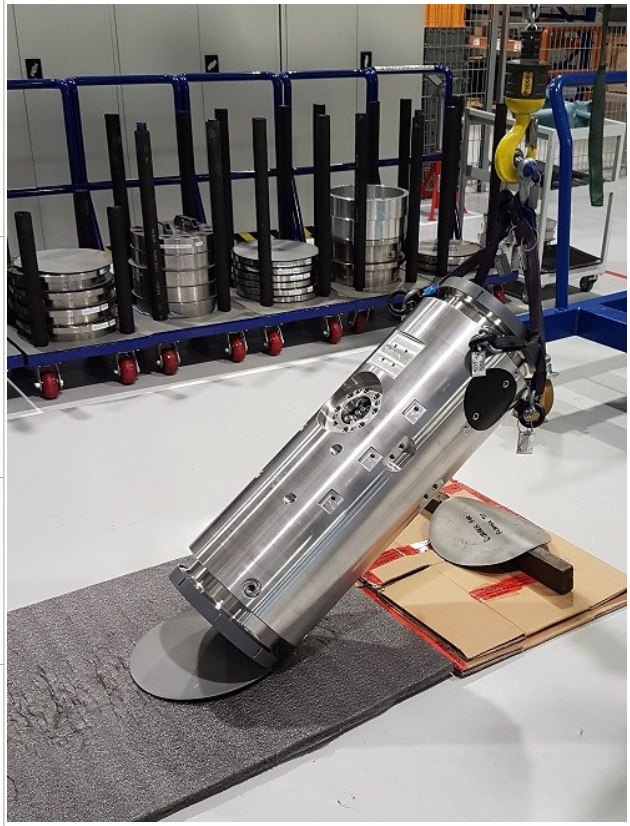
Steps			
i	The first generation trolley will be referred to as "trolley"		
2	Follow steps 3 & 4 for collection and inspection of parts		
Step 3			
	3a	Collect all required parts, tools and equipment for this task. Check their working condition as below	
	3b	Trolley - Good working condition, no obvious damage. Check last inspection date is within a year.	
	3c	Venturi - Check the Venturi material, size, PN, serial number and revision. Ensure there are protective covers at top/bottom, remote seal, thermowell, MVT area and windows area.	
	3d	Tools - Ensure all necessary tools and shop supply are available and in good condition/calibration	
i	The top 4 rollers are used to position the Venturi in horizontal position. The hub stand is only used when the venturi is required in vertical position.		
Step 4			

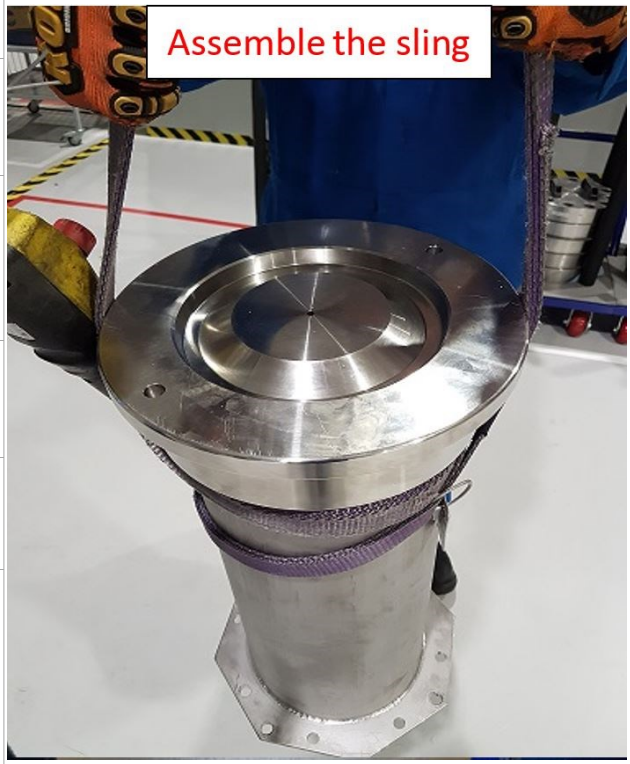
Steps			
	4a	Hub Stand - No scratches on sealing surfaces or obvious damage	
	4b	Clamp - No obvious signs of damage	
	4c	Stud bolts and nuts - No damage to threads	
5	Follow steps 6 - 8 to mount Venturi in horizontal position		
i	Use proper trolley movement guidelines such as line of sight, position, stepping and handling and SIPP.		
Step 6			

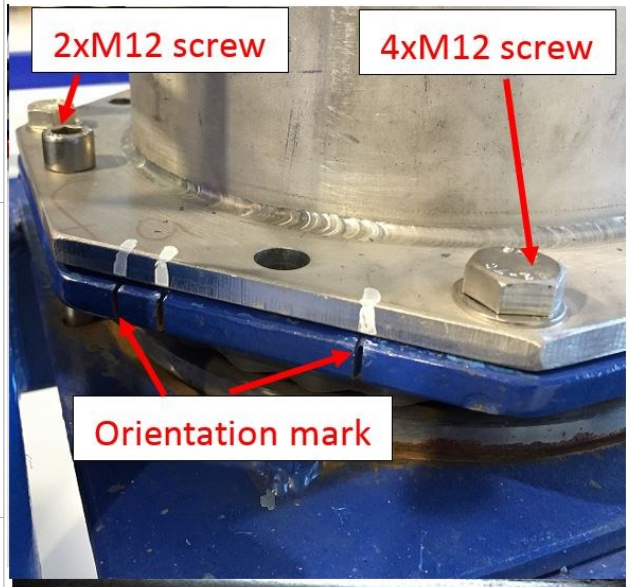
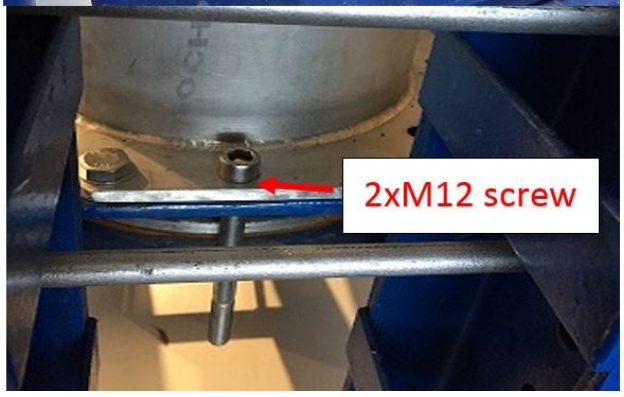
Steps			
	6a	Make sure the hub stand is dismantled. If required to dismantle follow step 18 in document 2.	
	6b	Check whether lock pins (Which is the lock mechanism) are installed to safely secure the vertical height of the rollers	
	6c	Position the trolley in the crane area and lock the wheels	
	2 people are required when moving the trolley.		
	Make sure the protective covers are used. This is to prevent damages on the Venturi critical surfaces.		
Step 7			
	7a	Move the Venturi crate into the crane area using a pallet jack	
	7b	Check Venturi as per Step 3	
	7c	Install the 2 ringbolts on the top side and 2 ringbolts on the bottom side and ensure all the ringbolts are facing up as shown in the picture	
	7d	Assemble 4 shackles and 4 slings and attach to the 4 ringbolts as shown in the picture.	
	Ensure that Venturi is mounted horizontally in the direction of length of the trolley. Keep clear distance. Take care of pinch points. Use proper PPE. 2 person required.		
Step 8			

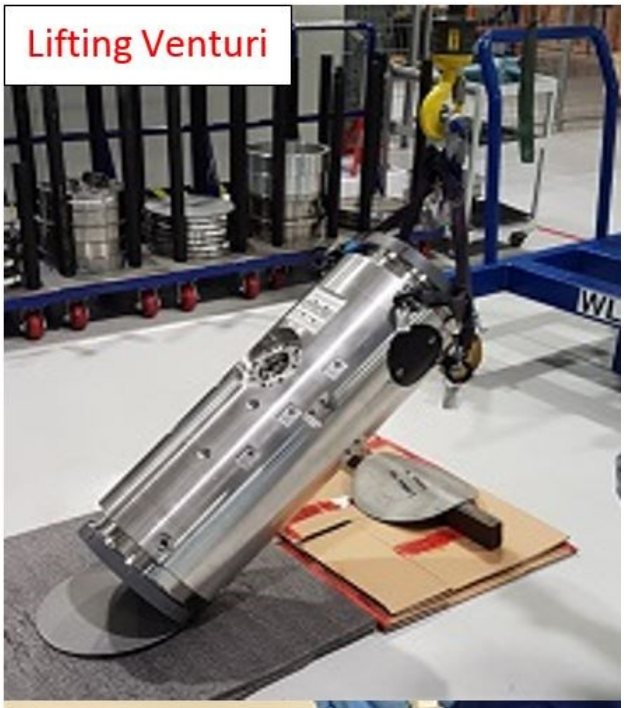
Steps			
	8a	Lift Venturi from the crate and place it on the 4 rollers on the trolley as shown.	
	8b	Ensure that the Venturi is placed such that the window area is between the 4 rollers to balance center of gravity.	
	8c	Rotate the venturi such that the window area is facing up.	
	8d	Use a sling to secure the venturi in this orientation.	
	8e	Remove the ringbolts, shackles and slings.	
	To change the angular orientation, hold the Venturi at the 2 ends and rotate slowly.		
	Keep clear distance. Take care of pinch points. Use proper PPE. 2 person required.		
Step 9 - Rotating Venturi for Windows assembly			
	9a	After MW installation (as per SWI 101401979) is completed on one side, to orient the Venturi for windows assembly make sure step 5 is completed.	
	9b	Rotate the venturi using hand until the windows area is facing up.	
	9c	Ensure the Venturi is secured using the sling	
10	Follow steps 11 & 12 to dismount Venturi from horizontal position		

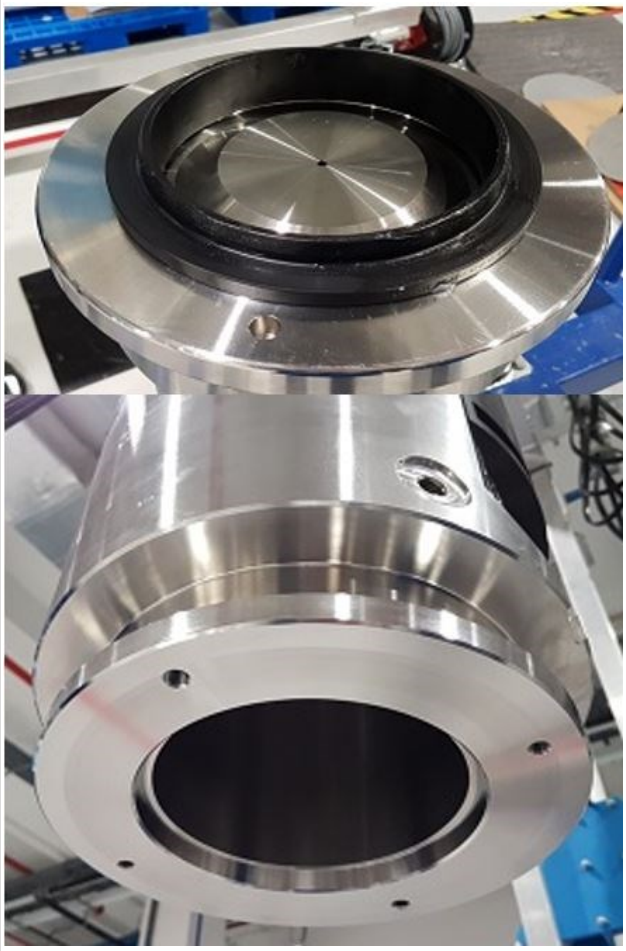
Steps			
Step 11			
	11a	Check and ensure that there are protective covers at top/bottom, remote seal, thermowell and MVT area.	
	11b	Position trolley in the middle of crane area and lock the wheels.	
	11c	Place a foam pad/crate/wooden board on the floor beside the trolley.	
	11d	Install 2 ringbolts each on the top and bottom side of the Venturi (Ringbolts should be facing up), 4 shackles and 4 slings on the Venturi as shown in the picture.	
		This is required to facilitate installation of the 4 ringbolts.	
		The Venturi will be in a slant position due to the use of wooden bar.	
Step 12			

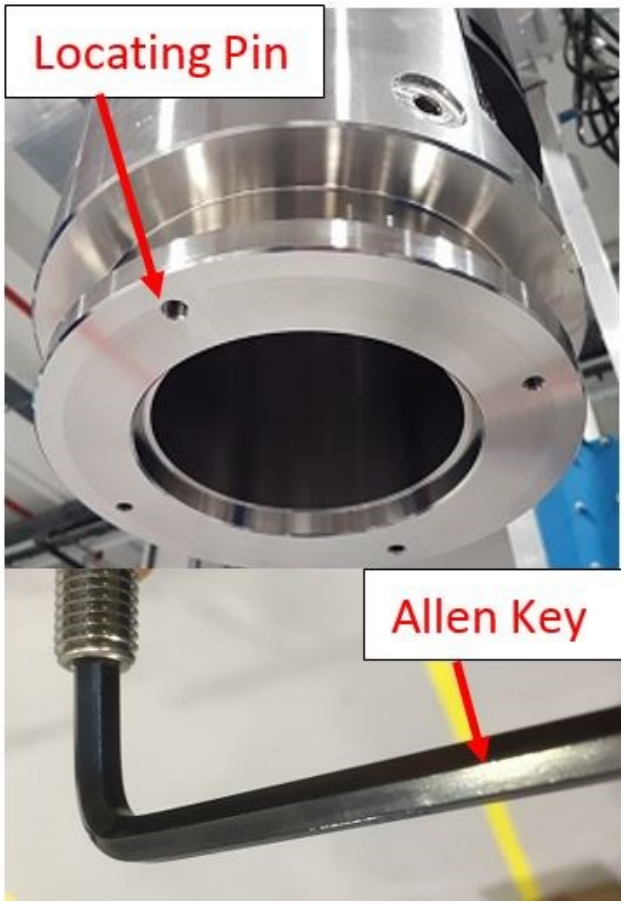
Steps			
	12a	Place a wooden bar at the top hub side of the Venturi (Venturi is at a slant position).	
	12b	Lift Venturi from the trolley and place it on the foam pad/crate/wooden board.	
	12c	Remove the slings and ringbolts from the Venturi.	
	12d	Place choke to prevent the Venturi from rolling sideways.	
13	Follow steps 14 & 15 to mount the hub stand on trolley		
	The operation requires atleast 2 person. Caution required for lifting operation. Proper PPE requried.		
Step 14			

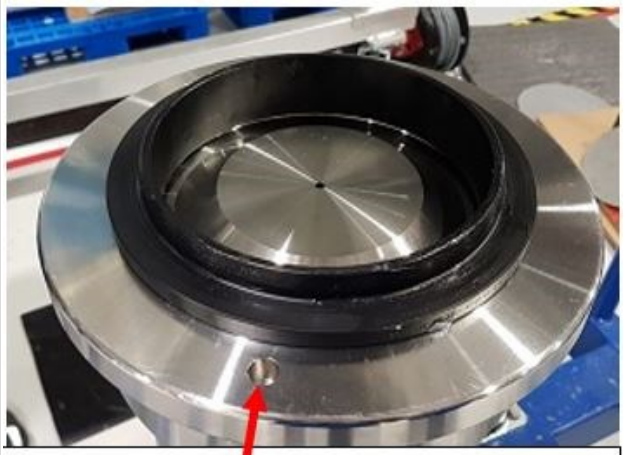
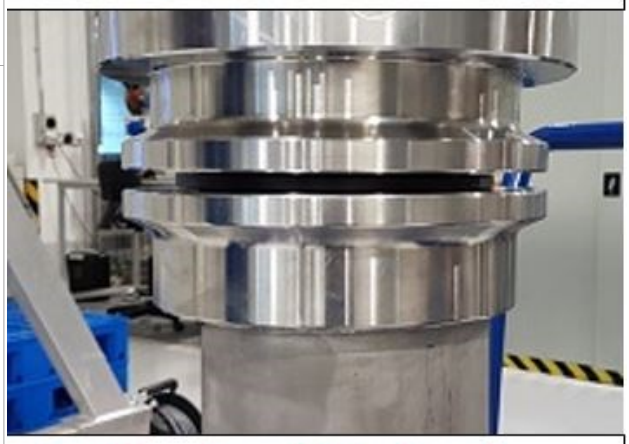
Steps			
	14a	Ensure Step 10 is completed.	
	14b	Move the hub stand to the crane area.	
	14c	Use a sling to support the weight of the hub stand i.e prepare sling to lift the hub stand.	
	14d	Lift the hub stand slowly until there is enough space to position the trolley.	
	14e	Move and position the trolley under the hub stand and lock the wheels.	
	14f	There are orientation marks on the trolley and hub stand. Using these marks, orient the trolley and lower the hub stand and position on the trolley.	
i	Use proper Trolley movement guidelines such as line of sight, position, stepping & handling.		
Step 15			

Steps			
	15a	Confirm the orientation is correct based on the marking on trolley.	
	15b	Insert 2xM12 (PN 101349461) socket head screws - this acts as a lock mechanism to prevent rotation of the base.	
	15c	Install 4xM12 (PN C20096570) hex head screws with washers (PN 100912109) to secure the stand to the base using 19mm spanner (Wrench tight).	
	15d	Lower the sling and dismantle the sling.	
⚠	**Minimum 2 people are required.**		
16	Follow steps 17 - 20 in document 1 and Steps 1-2 in document 2 to mount the Venturi in vertical orientation after windows assembly.		
Step 17			

Steps			
	17a	Prepare a parts trolley with clamps, nuts and studs.	
	17b	Ensure Step 13 is completed.	
	17c	Install the 4 ringbolts, 4 shackles and 4 slings on the top side of the Venturi and ensure sling is in tension.	
	17d	Apply Chesterton 785 on 1 stud and by using another stud to evenly spread it out on the first 10 threads of all the studs.	
	17e	Clean the sealing surface on the hub stand and seal ring with alcohol and lint free wipe.	
⚠	**Once the seal ring is placed on the flange, ensure that it is seated properly by checking if the seal ring is rocking.**		
Step 18			

Steps			
	18a	Apply Molykote 111 on the seal ring and assemble it on the hub stand as shown in the picture.	
	18b	Keep clear distance and lift the top side of the Venturi slowly until the Venturi is vertical.	
	18c	Lift the Venturi above the ground and hold suspended at working height to facilitate cleaning in next step.	
	18d	Ensure the sling is in tension and remove the bottom cover of the Venturi.	
Step 19			

Steps			
	19a	Clean the sealing surface on the Venturi with alcohol and lint free wipe.	
	19b	Install the locating pin in one of the threaded holes at the Venturi bottom surface.	
	19c	Ensure the locating pin is fully tightened using 5.5mm allen key so that it helps in positioning on the trolley.	
	19d	Using crane, position the Venturi above the hub stand.	
Step 20			

Steps			
	20a	With one person operating the crane and one person positioning the Venturi, lower the Venturi close enough and ensure the locating pin is seated properly and seal ring is in correct position.	
	20b	Once good, lower the Venturi and place it on the hub stand. Do not dismantle the slings at this point, maintain the Venturi support.	
	Result: End of document 1. Continue the assembly as per document 2 below.		

END OF STANDARD WORK INSTRUCTION

2. First Generation Trolley, Operations Procedure (2)

Testing and Process-Singapore Well Testing Centre

Introduction

This is continuation of 102875432 AA-Document 1. This will be referred as Document 2.

Steps

⚠	**3 people required for this step. Caution, this operation has pinch points.**

Step 1 - Continue after Step 20 from 102875432_AA - Document 1 above

	1a	2 person have to bring the clamps and place it around the Venturi-hub stand interface and third person to install the studs and nuts.	
	1b	Once all the nuts and studs are inserted into the clamps, it is safe for the 2 person to release their hands.	

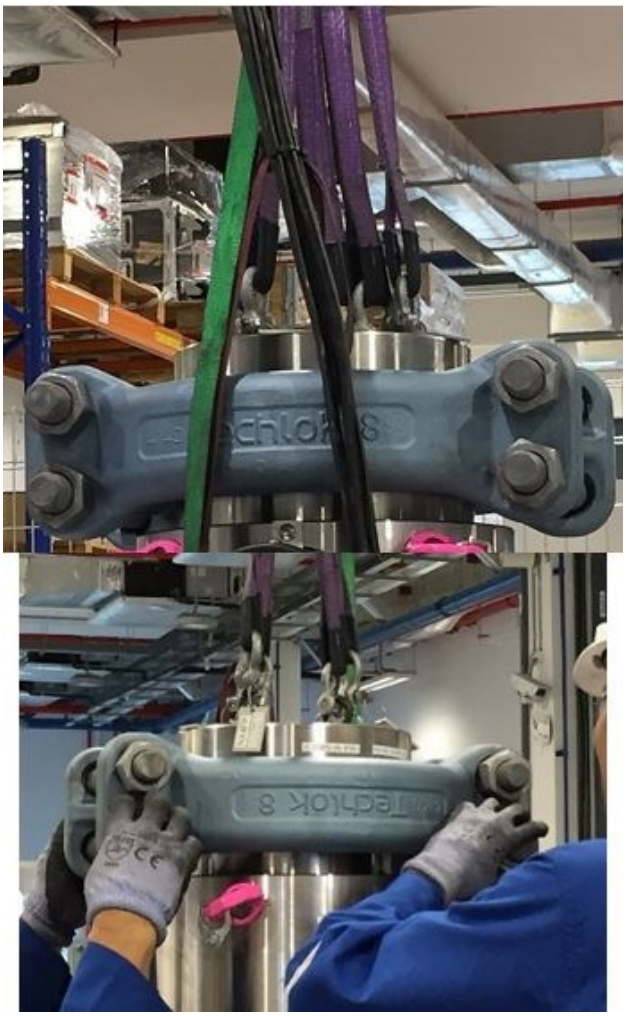
Steps			
i	Ensure parts trolley is stationed nearby.		
Step 2			
	2a	Torque the nuts to 692 Nm using a torque wrench with 2" socket.	
	2b	Perform the torqueing in two stages at 50% torque and 100% torque.	
	2c	Remove the slings and ringbolts from the Venturi and store accordingly. Move all tooling to their home positions.	
i	Bolting shall be uniformly tightened to 692Nm, keeping spacing between the clamp halves the approximate equal.		
⚠	**Ensure that the crane, slings and shackles are certified. Checklist to be updated daily prior to any lifting operation. 3 people are required for this activity.**		
3	Follow steps 4 - 7 to mount blind hub for pressure test		
i	Use a raised platform for the operation.		
Step 4			

Steps			
	4a	Prepare the blind hub, clamp, seal ring, studs and nuts in a parts trolley and position in the crane area.	
	4b	Apply Chesterton 785 on 1 stud and by using another stud to evenly spread it out on the first 10 threads of all the studs.	
	4c	Remove the top cover on the Venturi.	
	4d	Clean the hub sealing surface on the Venturi with alcohol and lint free wipe.	
	4e	Apply Molykote 111 on the seal ring and place it on the Venturi.	
	4f	Install 2 ringbolts and slings on the top side of the hub.	
	4g	Lift the blind hub and clean the sealing surface with alcohol and lint free paper and lift further the height of the Venturi and position over the hub area of the venturi.	
i	Visually inspect the seal ring prior to placing theblind hub.		
i	Once the seal ring is placed on the flange, ensure that it is seated properly by checking if the seal ring is rocking.		
Step 5			

Steps			
	5a	With one person operating the crane and one person positioning the blind hub, lower the hub close enough and ensure seal ring is in correct position.	
	5b	Once good, lower the blind hub and place it on the Venturi. Do not dismantle the slings at this point, maintain the support.	
Step 6			

Steps			
	6a	2 person have to bring the clamps and place it around the Venturi-blind hub interface and third person to install the studs and nuts.	
	6b	Once all the nuts and studs are inserted into the clamp, it is safe for the 2 person to release their hands.	
Step 7			

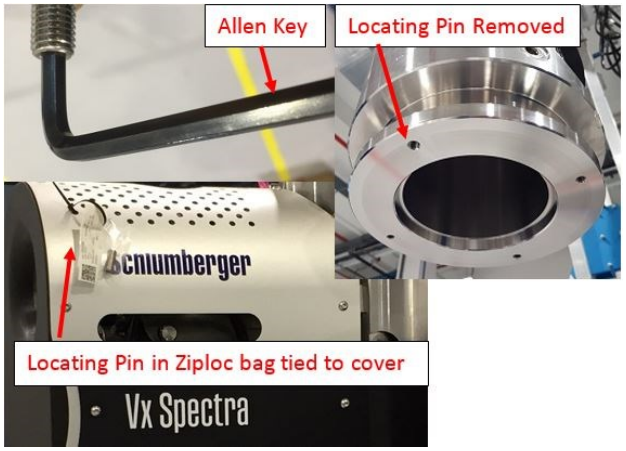
Steps			
	7a	Torque the nuts to 692 Nm using a torque wrench with 2" socket.	
	7b	Perform the torqueing in two stages at 50% torque and 100% torque.	
	7c	Remove the slings and ringbolts from the blind hub and store accordingly. Move all tooling to their home positions.	
i	Bolting shall be uniformly tightened to 692Nm, keeping spacing between the clamp halves the approximate equal.		
⚠	**Ensure that the crane, slings and shackles are certified. Checklist to be updated daily prior to any lifting operation. 3 people are required for this activity.**		
8	Follow steps 9 - 11 to dismount blind hub after pressure test		
i	Use a raised platform for the operation.		
Step 9			

Steps			
	9a	Move the trolley and position in the crane area with its wheels locked.	
	9b	Install 2 ringbolts and slings on the top side of the hub and ensure sling is in tension.	
	9c	Using a raised platform, 2 person to hold the clamp in place and third person to remove the studs and nuts.	
Step 10			

Steps			
	10a	Using torque wrench, loosen the 4 studs such that it is loose enough to dismatle screws using hand force as per below.	
	10b	If required, use a mallet to loosen the clamp.	
	10c	The third person to place the studs and nuts in the parts trolley once removed from clamp.	
	10d	The two person holding the clamps shall slowly lower the clamps and place it on the parts trolley nearby.	
Step 11			

Steps			
	11a	With one person operating the crane and one person positioning the blind hub, lift the blind hub slowly and move it towards the parts trolley.	
	11b	Clean the sealing surface on the blind hub with alcohol and lint free wipe.	
	11c	Place the blind hub on the parts trolley with a cloth/lint free paper between, remove the slings and ringbolts from the hub and store accordingly.	
	11d	Remove the seal rings from the Venturi and clean using alcohol and lint free paper.	
	11e	Clean the sealing surface on the Venturi with alcohol and lint free paper and assemble the top cover.	
	11f	Move all tooling to their home positions.	
⚠	**Make sure you are not in the zone of fall of the meter. 3 people required for task.**		
12	Follow steps 13 - 17 to dismount the completed meter from the trolley		
i	Use proper trolley movement guidelines (Line of sight, position, stepping).		
⚠	**Make sure the assembly is lifted with tension rather than slack to ensure it does not fall after loosening flange bolts.**		

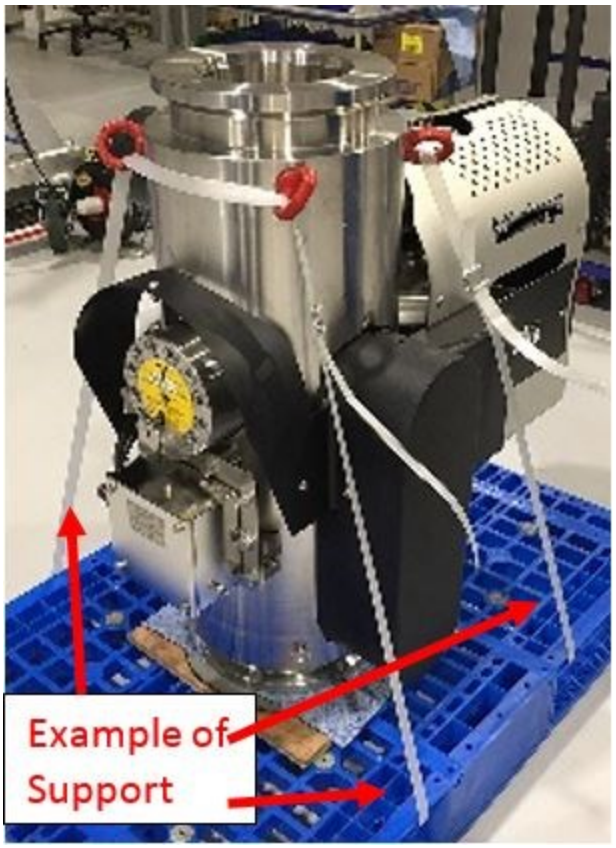
Steps			
Step 13			
	13a	Push final assembly to crane area for unloading from the trolley.	
	13b	Secure to the Venturi 4 ringbolts with 4 slings, 4 shackles and lift the slings until there is tension.	
	13c	Position a parts trolley nearby and lock the wheels.	
	13d	2 person to hold the clamps at the Venturi-hub stand interface and third person to loosen the nuts using torque wrench with 2" socket.	
	Ensure the stoppers on both side of the trolley are engaged and trolley does not move.		
	Take note that clamps are heavy and requrie caution during handling.		
Step 14			

Steps			
	14a	Once the nuts are loose, use handforce to loosen further but do not remove the studs.	
	14b	If required, use a mallet to loosen the clamp.	
	14c	2 person to hold the clamps and 3rd person to remove the studs and nuts and place on parts trolley.	
	14d	2 person to move the clamps to parts trolley.	
	14e	With one person operating the crane and one person positioning the Venturi, lift the Venturi and suspend at working height to clean the bottom side of the Venturi.	
Step 15			
	15a	Uninstall the locating pin using a 5.5mm allen key, put in a plastic cover and tie it to the cover using a cable tie.	
	15b	Move the trolley away from the crane area.	
	15c	Clean the sealing surface with alcohol and lint free wipe.	
i	2 people are required for movement of trolley.		

Steps	
	**Maintain meter suspended until it is confirmed that meter is stable on the pallet.**
Step 16	

Steps

	16a	Place a pallet under the suspended venturi with a wooden plate and rubber mat as in picture
	16b	Lower the Venturi and place it on the pallet.
	16c	Do not dismantle the slings at this point, maintain the Venturi support.
	16d	Once placed on pallet, check if the meter is stable.
	16e	If not, adjust position on pallet as required.

Steps			
	The meter should be positioned on the pallet in such a way to balance the center of gravity as shown in picture.		
Step 17			
	17a	Once stable, secure the meter to the pallet with additional support such as strings/slings as shown in picture	
	17b	Remove the slings and ringbolts from the Venturi.	
	Ensure that the crane, slings and shackles are certified. Checklist to be updated daily prior to any lifting operation. 2 people are required for this activity.		
18	Follow steps 19 & 20 to dismount hub stand from trolley.		
	Use proper Trolley movement guidelines such as line of sight, position, stepping & handling and SIPP and PPE.		
	Take care of pich points		
Step 19			

Steps			
	19a	Move the trolley installed with hub stand to the crane area. Position the trolley and lock in position using the stoppers.	
	19b	Check if there is Seal ring on the stand. If available remove and clean using alcohol.	
	19c	Prepare the sling to support the weight of the stand i.e sling should be in tension.	
	19d	Un-install 4xM12 (PN C20096570) hex head screws with using 19mm spanner.	
	19e	Store the screws and washers (PN 100912109) in the hub parts trolley.	
	19f	Un-install the 2xM12 (PN 101349461) socket head screws that provides the lock mechanism and store in hub parts trolley.	
Step 20			

Steps			
	20a	Lift the stand slowly until there is enough space between trolley and the hub stand.	
	20b	Lower and positioned the hub stand on the floor in vertical direction.	
	20c	Lower the sling further and dismantle sling.	
	20d	Place a protection cover such as rubber mat on the hub stand sealing surface.	
	20e	Move the hub stand to its storage location.	
	20f	Move the crane and slings to home position.	
	Result: End of first generation trolley operation procedure.		

END OF STANDARD WORK INSTRUCTION

END OF STANDARD WORK SET

This symbol means that the equipment cannot be discarded in a rubbish-bin. At its end of life, the equipment and/or its components must be treated, following Schlumberger Environmental procedures, in compliance with Schlumberger QHSE Policy and applicable laws and regulations on waste management.