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APPLICATION NOTE NO. 12-1

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Pressure Port Oil Refill Procedure and Nylon Capillary Fitting Replacement

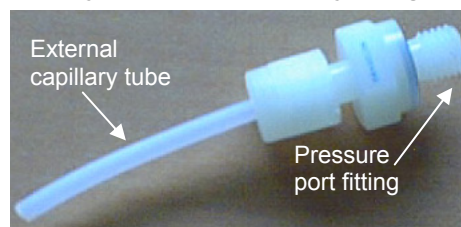
This Application Note describes the refilling of the pressure capillary tube and replacement of the nylon pressure capillary fitting for the following instruments:

- SBE 9, 16, 19, 25, and 29
- SBE 16*plus*, 16*plus*-IM, 16*plus* V2, 16*plus*-IM V2, and 19*plus* V2 when equipped with a Digiquartz pressure sensor

NOTE: The nylon pressure capillary fitting - which includes a pressure port fitting and an external capillary tube - is filled with silicone oil. The oil transmits hydrostatic pressure via internal, stainless steel, capillary tubing to the pressure sensor inside the instrument, and prevents corrosion that might occur if the sensor diaphragm was exposed to water. The internal tubing and nylon capillary fitting are vacuum back-filled at the factory. Because of the viscosity of the silicone oil and capillary action, the silicone oil does not run out of the external capillary tube. However, due to temperature and pressure cycling over long periods, it is normal for some oil to slowly leak out of the external capillary tube.

When the oil is not visible or is receding inside the translucent tube, or if the fitting has been damaged, refill the oil.

Nylon pressure capillary fitting

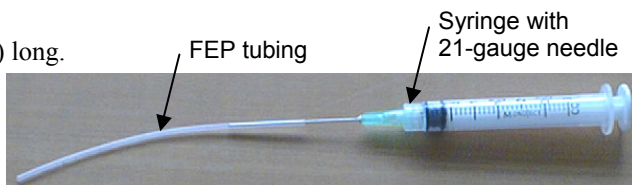


Prepare P/N 50025 Pressure Sensor Oil Refill Kit

P/N	Description	Quantity
30419	Syringe for injecting DC-200	1
30420	Needle (21 gauge) for syringe	1
30421	76mm (3 inch) long FEP tubing ($\frac{1}{32}$ inch I.D.; $\frac{1}{16}$ inch O.D.), to place on end of syringe needle	1
30410	Dow Corning DC-200 oil (20 centistokes viscosity)	1 ounce
30422	Bottle for 30410 oil	1

To replace the needle (if necessary):

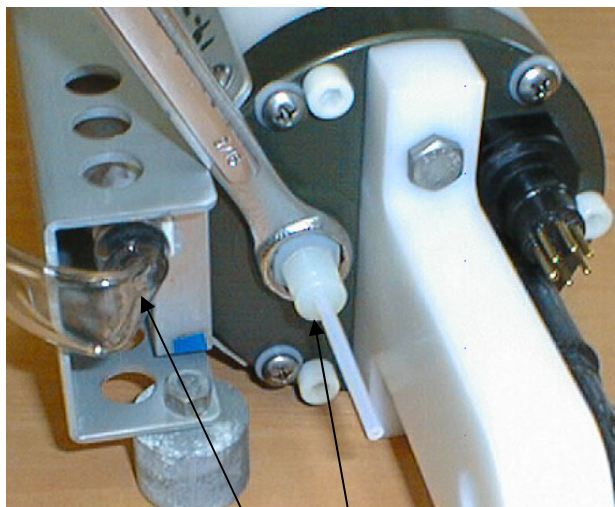
1. Use a 21-gauge surgical needle, minimum 25 mm (1 inch) long.
2. Grind off the tip so the needle is no longer sharp.
3. Remove any burrs.
4. Verify that the needle still has a hole through it.
5. Screw-lock the needle into place on the syringe.



Remove Nylon Capillary Fitting and Refill Pressure Sensor Capillary with Oil

1. Seal the end of the glass conductivity cell (using Tygon tubing or similar material) to avoid contaminating the cell with oil.
2. Unscrew the nylon pressure capillary fitting (P/N 50029) from the end cap pressure port. The fitting contains silicon oil, so there will be some spillage.

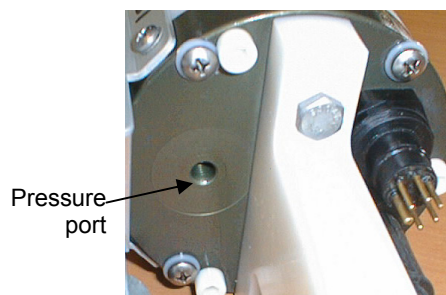
CAUTION: Be careful not to hit the glass conductivity cell with the wrench, as doing so will break the cell.



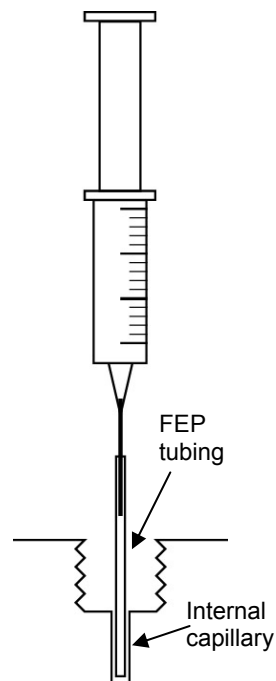
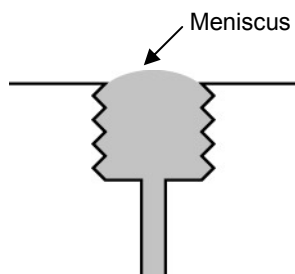
Seal end of glass conductivity cell

Unscrew nylon pressure capillary fitting

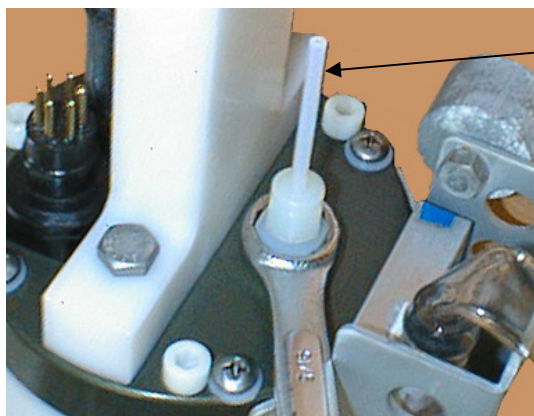
3. Calibrate the pressure sensor (if desired):
 - A. The end cap pressure port is tapped with a 5/16-24 straight thread to accept your pressure fitting. Use a fitting that has an O-ring face seal, such as Swagelok-200-1-OR.
 - B. Calibrate the pressure sensor.
 - C. Remove the pressure fitting.



4. Turn the instrument so that the end cap faces up.
5. Fill the pressure sensor internal capillary with oil:
 - A. Fill the syringe with DC-200 oil.
 - B. Insert the syringe's FEP tubing as far as it will go into the pressure port's internal capillary.
 - C. Fill the internal capillary with oil, slowly pulling the syringe tubing out of the capillary as the capillary fills. Make sure to keep the tip of the syringe tubing below the oil surface as you pull out the syringe. When filled, a slight meniscus forms at the surface of the end cap.



6. With the end cap still facing up, reinstall the nylon pressure capillary fitting on the end cap. Do not overtighten the fitting. The oil from the internal capillary should fill the fitting and overflow the top of the external capillary tube as the fitting is screwed in. If it does not, repeat Steps 2 through 6 to fill with additional oil.
7. Clean up any spilled oil on the instrument.
8. Remove the material used to seal the end of the glass conductivity cell.



Oil from internal capillary should fill fitting, and overflow top end of external capillary tube