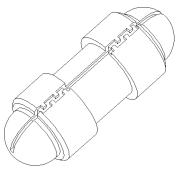
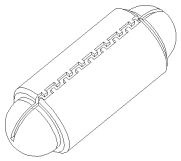
Tortuous Path Metering Device Installation

Theory of Operation: The Tortuous Path Metering Device (TPMD) uses a well known principle of fluid engineering to control small flows of liquid in a water driven system. Knight's TPMD uses a small molded plastic torpedo shaped device (referred to as a "Knuckle") that has a molded fluid path with 16 turns per 1/2 Knuckle and 32 turns in a full Knuckle.



1/2 Knuckle



Full Knuckle

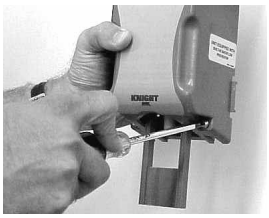
It is the .014" channel with it's twisting turns that provides resistance and reduces the suction of the water driven venturi. The more turns in the tortuous path or the more "TPMD" Knuckles placed in a supply tube the less chemical will be mixed with the final solution.

The following procedures should be followed for KP1H Stations and KP1H Dial 4. These instructions replace steps 6-8 on page 4 of the KP1H Manual P/N 0900875 Rev. B.

KP1H Station and Dial 4

1. Remove the cover by loosening the screws near the bottom of the proportioner. Then lift the cover up and out using the open slot at the top of the cover. Remove the actuator and fill tube spout is used.

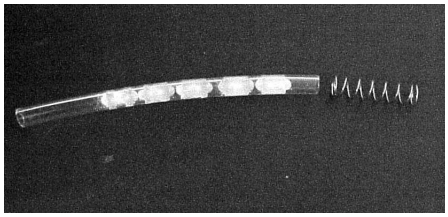
   For a Dial 4, the D4 Selector must be at the 12 o'clock position for the cover to be removed.



2. Select the appropriate TPMD assembly for the dilution rate desired. Refer to the Dilution Ratio Chart on the following page.

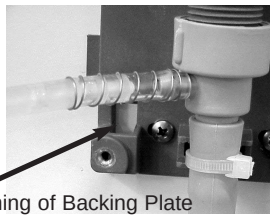
3. Twist the supply tube spring over the TPMD assembly. Be sure to attach the spring on the end of the TPMD assembly nearest the TPMD Knuckles.

   For a Dial 4 setup, spring is not used.

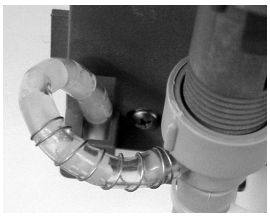


4. Attach the TPMD to the inlet barb of the venturi body. Route the free end of the TPMD tube through the opening at the bottom of the backing plate.

   For a Dial 4 setup, connect the remaining TPMD to the chemical inlet port on the Dial 4 venturi. Then route the tubes through the backing plate.

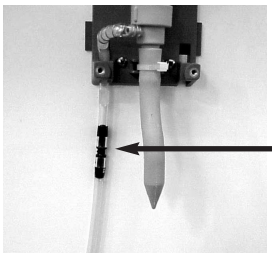


Opening of Backing Plate



5. Attach one end of the black barb fitting to the 3/8" chemical supply tube. Attach the other end of the barb fitting to the TPMD.

   For a Dial 4 setup, attach the remaining barb fittings to the supply tubes and TPMD assembly.



6. Replace the cover on the KP1H Unit.

DILUTION RATIO CHART

DILUTION	DYNAMIC WATER PRESSURE		
	30 PSI	40 PSI	50 PSI
1 GPM Flex Gap			
512:1	P/N 2201221-35 Tortuous Path Metering Device 3 1/2 Knuckles	P/N 2201221-30 Tortuous Path Metering Device 3 Knuckles	P/N 2201221-25 Tortuous Path Metering Device 2 1/2 Knuckles
1 GPM Aire Gap			
512:1	P/N 2201221-40 Tortuous Path Metering Device 4 Knuckles	P/N 2201221-30 Tortuous Path Metering Device 3 Knuckles	P/N 2201221-25 Tortuous Path Metering Device 2 1/2 Knuckles
4 GPM Flex Gap			
512:1	P/N 2201221-05 Tortuous Path Metering Device 1/2 Knuckle	P/N 2201221-05 Tortuous Path Metering Device 1/2 Knuckle	P/N 2201221-05 Tortuous Path Metering Device 1/2 Knuckle
750:1	P/N 2201221-10 Tortuous Path Metering Device 1 Knuckle	P/N 2201221-10 Tortuous Path Metering Device 1 Knuckle	P/N 2201221-10 Tortuous Path Metering Device 1 Knuckle
935:1	P/N 2201221-15 Tortuous Path Metering Device 1 1/2 Knuckles	P/N 2201221-15 Tortuous Path Metering Device 1 1/2 Knuckles	P/N 2201221-15 Tortuous Path Metering Device 1 1/2 Knuckles
1400:1	P/N 2201221-25 Tortuous Path Metering Device 2 1/2 Knuckles	P/N 2201221-25 Tortuous Path Metering Device 2 1/2 Knuckles	P/N 2201221-25 Tortuous Path Metering Device 2 1/2 Knuckles
3 GPM Aire Gap			
512:1	P/N 2201221-15 Tortuous Path Metering Device 1 1/2 Knuckles	P/N 2201221-10 Tortuous Path Metering Device 1 Knuckle	P/N 2201221-10 Tortuous Path Metering Device 1 Knuckle
750:1	P/N 2201221-15 Tortuous Path Metering Device 1 1/2 Knuckles	P/N 2201221-20 Tortuous Path Metering Device 2 Knuckles	P/N 2201221-20 Tortuous Path Metering Device 2 Knuckles
935:1	P/N 2201221-25 Tortuous Path Metering Device 2 1/2 Knuckles	P/N 2201221-25 Tortuous Path Metering Device 2 1/2 Knuckles	P/N 2201221-20 Tortuous Path Metering Device 2 Knuckles
1400:1	P/N 2201221-50 Tortuous Path Metering Device 5 Knuckles	P/N 2201221-40 Tortuous Path Metering Device 4 Knuckles	P/N 2201221-35 Tortuous Path Metering Device 3 1/2 Knuckles

Mixing Ratios should be used for reference only. Ratios and flow rate will vary depending on water pressure, chemical viscosity and length of chemical lines.