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# PSG Combination Moisture & Liquid Indicator

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ENGINEERING YOUR SUCCESS.

# Parker PSG Moisture & Liquid Indicator

The Parker PSG Moisture and Liquid Indicator combines the two functions of moisture and liquid indication into a single economical product. It takes the guess work out of servicing refrigeration and air conditioning equipment. The PSG assists the technician in determining the state of the circulating refrigerant at a particular location and if a safe moisture level exists in the system. Excessive moisture in refrigerant systems can cause unwanted chemistries such as hydrolysis of lubricants and other materials, corrosion of metals, copper plating, ice formation at the metering device and a chemical change in the motor insulation of a hermetic compressor.

## 8 Outstanding Benefits

**One Indicator For All Refrigerants** — provides a true moisture indication for Refrigerant 12, 134a, 22, 404A, 407C, 410A, 502 or 507.

**Reliable And Accurately Calibrated Color Change Points** — calibration in parts per million of moisture for each refrigerant. 3% relative humidity indicator for CFC, HCFC, and HFC, including R410A.

**Replaceable Indicator Element** — the color indicator paper can be changed without removing the PSG from the line.

**Indicator Protected From Discoloration And Dirt** — by a filter pad and screen. This prevents washing of the indicator by the refrigerant and protects it from system contamination and turbulence.

**Color Changes Are Easily Distinguished And Reversible** — indicator colors differ so widely between the wet and dry condition, there is no possibility of confusion. Colors reverse as often as moisture concentration in the system changes.

**Large Full View Sight Glass** — extra large crystal clear sight glass for viewing the refrigerant. Bubbles indicate a shortage of refrigerant or a restriction in the liquid line.

**Disassembly For Installation Is Unnecessary** — with extended fittings on small size solder models. PSGs are easy to braze.

**Plastic Cap** — is supplied with PSG to keep the glass free from dust, dirt and grease.

## How It's Made

The plated steel and copper fittings are copper brazed to the heavily copper plated steel body. A glass disc is inserted in the body and heated, just to the melting point, under carefully controlled conditions. This **fuses the glass to the body** in a permanent leak-free joint. The indicator paper (retained in a small brass ferrule) is inserted from the back and held in place with a slotted cylinder. The slotted cylinder and indicator assembly is mounted on a post that screws into the bottom of the body, and seals with a knife-edge joint. This overall construction is highly effective in preventing refrigerant leakage. The unit is painted to protect it from corrosion.

Paper indicator elements are made in the Parker laboratory under the strictest quality control procedures. The indicator is tested for proper color change ability in the laboratory and twice more during assembly.

## How It Works

The indicator is a porous filter paper impregnated with a chemical salt that is sensitive to moisture. The salt changes color according to the moisture content (relative saturation) in the refrigerant. A dark blue color indicates the refrigerant is DRY and pink indicates a WET condition. The indicator is formulated so that it changes color at the moisture levels generally accepted as the safe operating range.

The PSG calibration information in Tables 1 and 2 is based on detailed experimental data for Refrigerants 12, 22, 134a, 404A, 407C, 410A, 502 and 507. The PSG change points occur at similar or lower moisture levels than competing models promoted to have 3% relative humidity indication.

**For Air** — Tests on air show that the PSG changes color in the range of 0.5% to 2.0% R.H. In ordinary air lines this means that the PSG will change color at dew points in the range of minus 40°F to -60°F (-40°C to -51°C).

## Brazing

PSGs with 1/4" through 1-1/8" ODF Solder connections are constructed with long fittings made from either heavily copper plated steel or copper. Both fitting types are suitable for soldering or brazing using any of the common alloys, such as silver solder, soft solder, Sta-Brite, or Sil-Fos or PhosCopper. PSGs do not require disassembly in the field for brazing because the extended fittings reduce the possibility of damaging the moisture indicator element when the PSG is brazed into the system. To prevent damaging the PSG, ensure ample heat is supplied to the fittings and point the torch tip away from the PSG body. Proper brazing technique ensures proper capillary action of the alloy.

The ODF Solder connections on the PSG are clean when shipped. Polishing the inside of the fittings before brazing is unnecessary, and could be harmful on the copper plated steel fittings if an excessive amount of copper plating

Figure 1

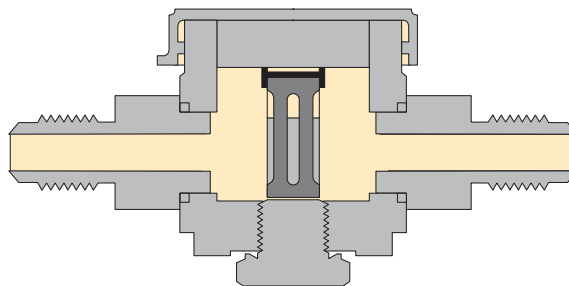


Table 1

### Moisture Content - PPM/°F

PSG SHOWS	REFRIGERANT 12		REFRIGERANT 22		REFRIGERANT 134a		REFRIGERANT 502		REFRIGERANT 404A & 507		REFRIGERANT 407C		REFRIGERANT 410A	
	LIQUID LINE TEMPERATURE													
	75°F	100°F	75°F	100°F	75°F	100°F	75°F	100°F	75°F	100°F	75°F	100°F	75°F	75°F
Blue - DRY	Below 5	Below 10	Below 30	Below 45	Below 50	Below 80	Below 10	Below 20	Below 15	Below 30	Below 120	Below 75		
Intermediate Color - CAUTION	5-15	10-30	30-90	45-130	50-200	80-225	10-45	20-65	15-90	30-140	120-280	75-150		
Pink - WET	Above 15	Above 30	Above 90	Above 130	Above 200	Above 225	Above 45	Above 65	Above 90	Above 140	Above 280	Above 150		

Table 2

### Moisture Content - PPM/°C

PSG SHOWS	REFRIGERANT 12		REFRIGERANT 22		REFRIGERANT 134a		REFRIGERANT 502		REFRIGERANT 404A & 507		REFRIGERANT 407C		REFRIGERANT 410A	
	LIQUID LINE TEMPERATURE													
	24°C	38°C	24°C	38°C	24°C	38°C	24°C	38°C	24°C	38°C	24°C	38°C	24°C	24°C
Blue - DRY	Below 5	Below 10	Below 30	Below 45	Below 50	Below 80	Below 10	Below 20	Below 15	Below 30	Below 120	Below 75		
Intermediate Color - CAUTION	5-15	10-30	30-90	45-130	50-200	80-225	10-45	20-65	15-90	30-140	120-280	75-150		
Pink - WET	Above 15	Above 30	Above 90	Above 130	Above 200	Above 225	Above 45	Above 65	Above 90	Above 140	Above 280	Above 150		

NOTE: Change or add Parker Filter-Drier when paper turns from blue to intermediate color.

is removed. PSGs with 1/4" through 1-1/8" ODF Solder fittings stated in this publication are with copper plated steel fittings.

The larger PSGs with 1-3/8", 1-5/8", and 2-1/8" ODF Solder connections utilize copper connections and require removal of the cartridge from the brass saddle adaptor before brazing. The cartridge is shipped hand tight for easy removal.

The PSG may be installed anywhere in the the liquid line, but preferably after the Parker Filter-Drier and ahead of the metering device.

### Application

The indicator element of the PSG prior to installation will be pink, indicating a wet condition. This is a normal situation since the air in contact with the element is above 0.5% Relative Humidity. This does not affect the operation or calibration of the PSG. As soon as it is installed in a system, the indicator element will begin to change according to the moisture content of the refrigerant. Some change may take place rapidly at the start-up of a new system or after

replacement of a drier on existing installations. In some cases the PSG will change in as short a time as 15 minutes. However, it is **recommended that the equipment operate for about 12 hours** to allow the moisture in the system and the PSG color to come to complete equilibrium. The action of the indicator element is completely **reversible** and will change color as often as the moisture content of the system varies.

The drying of the system should be continued until the indicating element changes from the intermediate color to blue. The actual moisture content of the refrigerant will be in accordance with the above table.

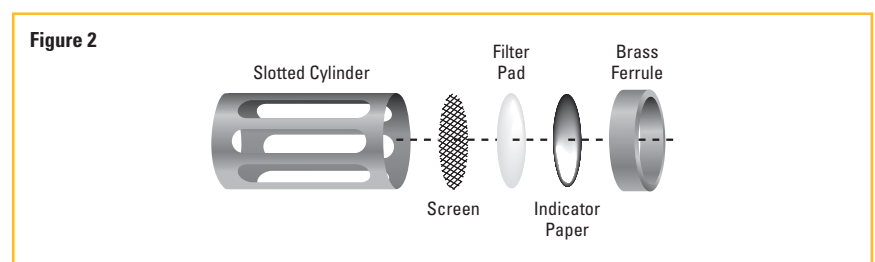
For best results with the nickel plated SAE flare fittings that are used on PSGs, **lubricate the flare surface** and the back

of the flare nut with refrigerant grade oil during assembly. This is particularly necessary to avoid leaks if the PSG is being assembled to another plated steel flare fitting, such as the Parker Filter-Drier.

### Service Pointers

**Replacement Indicator Paper** — Parker kit K-PSG-1 consisting of a slotted cylinder and indicator paper assembly is available for replacing the indicator in the fused glass style Parker PSGs (1/4" thru 1-1/8" sizes). Replacement is through the bottom (see Figure 1). If the indicator becomes damaged, it is generally recommended that the entire PSG be replaced. However, the parts kit can be used in situations where it is difficult to remove the PSG.

**Liquid Water** — On occasion it is possible for large quantities of water to enter a



refrigeration system. An example would be a broken tube in a water cooled condenser. If this happens and **free water** comes in contact with the indicator element, the element will be damaged.

All moisture indicating elements use a chemical salt (see "How It Works"). These salts must be soluble in water in order to change color. **If excessive water is present, then the salts will dissolve, causing permanent damage to the indicator. The indicator paper may remain pink or turn white.**

**Hermetic Motor Burnouts** — After a hermetic motor burnout, install a **Parker Filter-Drier** to remove the acid and sludge contamination. When the system has operated for 48 hours, replace the Parker Filter-Drier and install a PSG.




Since the **acid formed by the burnout** may damage the indicator element of the PSG, it is preferable to install it after most of the contaminants have been removed.

**Excess Oil** — When a system is circulating an excessive amount of oil, the PSG indicator paper may become saturated. This causes the **indicator to appear brown** or translucent and lose its ability to change color, but does not permanently damage the PSG. **Let the PSG remain in the system.** The circulating refrigerant will remove the excess oil, and the indicator element will return to its proper color.

**Leak Detectors** — Certain dye type liquid leak detectors may interfere with the color change of the indicator paper. If desired, many of these leak detectors can be removed by installing a Parker SLD Series Filter-Drier in the system. The PSG can then be installed on the system without risk of damaging the indicator paper.

**Alcohol** — Do **NOT** install a PSG in a system that contains methyl alcohol or similar liquid dehydrating agents. Remove the alcohol by using a Parker Filter-Drier, and then install the PSG. Otherwise the alcohol will damage the PSG color indicator.

**Table 3**  
**Specifications**

Connection Sizes (Inches)	Type No.	Overall Length		PSG
		Inches	mm	
<b>Male Flare</b>				
1/4	PSG-2	2.87	72.9	
3/8	PSG-3	3.37	85.6	
1/2	PSG-4	3.82	97.0	
5/8	PSG-5	4.12	105.0	
<b>Female X Male Flare</b>				
1/4	PSG-2MF	2.56	65.0	
3/8	PSG-3MF	2.97	75.4	
1/2	PSG-4MF	3.44	87.4	
<b>ODF Solder</b>				
1/4	PSG-2S	4.63	118.0	
3/8	PSG-3S			
1/2	PSG-4S	4.88	124.0	
5/8	PSG-5S			
7/8	PSG-7S			
1-1/8	PSG-9S	6.32	161.0	
1-3/8	PSG-11S			
1-5/8	PSG-13S			
2-1/8	PSG-17S	8.00	203.0	

Most solder connections can be used as male fittings as well as female fittings. The 1/4" ODF is 3/8" ODM, the 3/8" ODF is 1/2" ODM, the 1/2" ODF is 5/8" ODM and the 5/8" ODF is 3/4" ODM. Models with female flare connections are supplied with a copper gasket in the fitting.

Overall width is: 1.31" (33.3 mm) for 1/4" and 3/8" sizes, 1.58" (40.1 mm) for 1/2" and 5/8" sizes, and 1.38" (35.1 mm) for 7/8" and 1-1/8" sizes. Shipping weight is: 7 oz. (.20 kg) for 1/4" and 3/8" sizes, 10 oz. (.28 kg) for 1/2" and 5/8" sizes, 15 oz. (.43 kg) for 7/8" and 1-1/8" sizes and 1.5 lbs. (.68 kg) for the PSG-11S, 13S, and 17S series.

UL and UL<sub>c</sub> Listed - Guide - SEYW - File No. SA-3182. Maximum Rated Pressure is 650 psig (44.8 bar).

## Removable Cartridge

Types PSG-11S, 13S and 17S have copper connections and feature a removable cartridge containing the moisture indicating element. The cartridge has a **knife edge joint** and is available as a separate unit for field replacement purposes if necessary. It is designated as PSG-10TS and fits all three sizes.

**PSG-10TS**



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