



# TECHNICAL DATA

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## #158 PURE SYNTHETIC COMPRESSOR OIL

### ISO 32 THROUGH ISO 220

Pure Synthetic Compressor Oil is a full synthetic, non-detergent, ashless, non-zinc containing anti-wear, rust and oxidation inhibited premium quality oil that is specially formulated to satisfy the lubrication needs of oil flooded rotary vane and rotary screw compressors, screw type and reciprocating air compressors, pumps, vacuum pumps and blowers.

Pure Synthetic is blended from the highest quality hydro-finished polyalphaolefin (PAO) synthetic base fluids available. These PAO base fluids provide Pure Synthetic Compressor Oil with the following advantages:

1. **Excellent Resistance To Thermal Degradation** – Carbon, varnish and lacquer deposits due to high temperature operation are virtually eliminated.
2. **Superior Oxidative Stability** – Any oil, as it is increasingly exposed to high temperature operation, undergoes the process of oxidation. This results in the oil's thickening and build-up of acidic components. Because of the PAO's uniform molecular structure, the process of oxidation is greatly reduced.
3. **Extended Drain Intervals** – Because of the PAO's excellent resistance to thermal degradation and oxidation, Pure Synthetic Compressor Oil's service life is extended up to eight (8) times the normal service life of the conventional compressor oils.
4. **Low Volatility** – The low volatility of the PAO's results in lower makeup requirements due to evaporation loss.
5. **Less Oil Carry Over** – Due to its low volatility, there are fewer problems with the oil getting into air tools, instruments or even the production process. It also means there is less oil to remove in the air/oil separators and fewer air filter changes.
6. **High Viscosity Index** – This results in a minimum change in viscosity with temperature. The adequate viscosity for proper bearing lubrication is provided regardless of temperature change.
7. **Excellent Cold Temperature Starting and Pumpability.**
8. **Fire And Explosion Possibilities Are Greatly Reduced** – This is due to not only the PAO's extremely low carbon forming tendencies, but also to their relatively high flash, fire and auto ignition points.
9. **Greater Hydrolytic Stability And Demulsibility Characteristics** – Since PAO's are non-polar; they absorb less water under high humidity conditions. They also separate condensed water much faster and more completely, thus resulting in the water being removed easily from the system. These properties result in extended bearing life, anti-wear protection and improved rust and corrosion protection.
10. **Excellent Operating Temperature Reduction** – PAO's have better specific heat valves (less available heat is absorbed) and better thermal conductivity than conventional air compressor oils. These combined properties help to reduce operating temperatures.
11. **Compatibility With All Types Of Seals And Coatings**

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Combined with these polyalphaolefin synthetic base fluids is a highly specialized additive package which provides Pure Synthetic Compressor Oil with the following performance benefits:

1. **Exceptional anti-wear protection**
2. **Extended compressor life**
3. **Extended bearing life**
4. **Enhanced thermal & oxidation stability**
5. **Superior hydrolytic stability**
6. **Excellent demulsibility characteristics**
7. **Excellent rust and corrosion protection**
8. **Excellent anti-foaming and air release properties**
9. **Reduced sludge, varnish and deposit formation**
10. **Enhanced fluid life**
11. **Enhanced seal life**
12. **Better heat transfer**
13. **Compatibility with zinc based fluids**
14. **Reduced system maintenance**
15. **Reduced downtime**
16. **Reduced power consumption**

Further blended into these polyalphaolefin synthetic base fluids and this highly specialized additive package is a proven frictional modifier, Micron Moly®. Micron Moly® is a liquid soluble type of moly that plates itself to the sliding and rubbing parts of the compressor. This plating action reduces friction between the moving parts, thus eliminating damaging frictional wear. This in turn also helps to reduce operating temperatures.

Pure Synthetic Compressor Oil with its unique blend of polyalphaolefin base fluids, the highly specialized additive package and Micron Moly® results in improved compressor efficiency. This improved compressor efficiency not only results in less downtime, reduced labor and material cost, but also in reduced energy consumption, which can further result in savings that could possibly represent many thousands of dollars each year per compressor.

Pure Synthetic Compressor Oil meets and exceeds all the lubrication specifications of the various compressor manufacturers' such as Joy, Ingersoll Rand, Quincy, Kaeser, Worthington, Atlas Copco, Gardner Denver and Sullair and meets the performance requirements for ISO-L-DAC, ISO-L-DAJ, ISO-L-DVA, and ISO-L-DVD

## **CHANGE-OUT PROCEDURE WHEN SWITCHING FROM POLYALKYLENE GLYCOL AND POLYALKYLENE GLYCOL/POLYOL ESTER BLENDS COMPRESSOR FLUIDS**

This fluid procedure is designed for those compressors that are currently using a Polyalkylene Glycol or Polyalkylene Glycol/Polyol Ester blend such as Ingersoll Rand's SSR Ultra Coolant or Sullair's Sullube 32. This fluid procedure is designed for those compressors that are currently using a Polyalkylene Glycol or Polyalkylene Glycol/Polyol Ester blends are not compatible with petroleum or other type of synthetic base fluids, such as polyalphaolefin (PAO) and diester based compressor fluids. When petroleum based or synthetic based compressor fluids are mixed with a Polyalkylene Glycol or Polyalkylene Glycol/Polyol Ester blends the possibility of gelling of the products can occur.

Because of this possibility Schaeffer Mfg recommends that if a compressor application is being changed over from a Polyalkylene Glycol or Polyalkylene Glycol/Polyol Ester blend compressor fluid to #158 Pure Synthetic Compressor Fluid that the following procedure be strictly followed:

#### **Procedure Steps**

1. **Drain the compressor as completely as possible. Disconnect the air and fluid lines as completely as possible. Remove all oil filters and air/oil separators. Wipe out the air/oil separator bowl with a clean rag to remove any fluid residue.**
2. **Reconnect the lines and replace all the oil filters and air/oil separators with new elements. Charge the compressor with an either an inexpensive or the #158 Moly Pure Synthetic Compressor Fluid in the proper ISO Viscosity Grade. Run the compressor for 1-hour only.**
3. **Drain the compressor as completely as possible. Disconnect the air and fluid lines as completely as possible. Remove all oil filters and air/oil separators. Wipe out the air/oil separator bowl with a clean rag to remove any fluid residue.**
4. **Reconnect the lines and replace all the oil filters and air/oil separators with new elements. Charge the compressor with an either an inexpensive or the #158 Pure Synthetic Compressor Fluid in the proper ISO Viscosity Grade. Run the compressor for 1-hour only.**
5. **Repeat Step 3.**
6. **With the oil drain plug removed, begin filling the compressor slowly with #158 Pure Synthetic Compressor Fluid in the appropriate ISO Viscosity Grade. Allow the new fluid to push any remaining fluid out of the compressor. When new oil is seen, replace the drain plug and fill the compressor.**
7. **Start the compressor and top off the oil level.**

**For additional change-out procedures involving other types of compressor fluids see Technical Bulletin 080303 COMPRESSOR CHANGEOVER PROCEDURES FOR #112 HTC, #254 HTC SUPREME AND #158 PURE SYNTHETIC COMPRESSOR OIL**

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**TYPICAL PROPERTIES**

<b>ISO Grade</b>	<b>32</b>	<b>46</b>	<b>68</b>	<b>100</b>	<b>150</b>	<b>220</b>
Specific Gravity	.825	.83	.87	.835	.835	.8441
Viscosity 100°F SUS (ASTM D-445)	149-171.6	235.2-255.7	350.9-376.6	490.9-540.3	748.7-827.2	1121.4-1268.1
Viscosity 40°C cSt (ASTM D-445)	29.00-33.50	46.00-50.00	68.50-73.50	95.50-105.00	145.00-160.00	217-245
Viscosity 100°C cSt (ASTM D-445)	5.52-6.09	7.69-8.15	10.38-10.98	13.26-14.22	18.17-19.52	27.00-29.50
Viscosity Index	130	135	138	138	140	159
Flash Point °F/°C (ASTM D-92)	455°/235°	460°/238°	495°/257°	530°/277°	530°/277°	453°/234°
Fire Point °F/°C (ASTM D-92)	529°/276°	535°/279.4°	530°/276.67°	560°/293.33°	560°/293.33°	485°/252°
Auto Ignition Temp °F/°C (ASTM D 2155)	730°/388°	750°/399°	750°/399°	750°/399°	750°/399°	750°/399°
Pour Point °F/°C (ASTM D-97)	-65°/-54°	-65°/-54°	-65°/54°	-40°/-40°	-35°/-37°	-15°/-26°
Total Acid Number (ASTM D-644)	0.69	0.69	0.69	0.69	0.69	0.69
Rotary Pressure Vessel Oxidation Test, (ASTM D-2272)						
Minutes	1320	1330	1330	1330	1330	1330
Foam Test (ASTM D-892)						
Sequence I	0/0	0/0	0/0	0/0	0/0	0/0
Sequence II	0/0	0/0	0/0	0/0	0/0	0/0
Sequence III	0/0	0/0	0/0	0/0	0/0	0/0
Air Release (ASTM D-3427)						
Time (min @122°F)	0.25	0.25	0.25	0.25	0.25	0.25
% Evaporation Loss 22 hrs @ 300°F (ASTM D-972)	0.2	0.2	0.2	0.2	0.2	0.25
% Evaporation Loss @ 700°F/371.11°C (ASTM D-2889)	2.6	2.6	2.6	3	3.5	3.5
Four Ball EP (ASTM D-2783)						
Weld Point, kg	250	250	250	250	250	250
LWI, kg	77.1	77.1	78.2	78.2	78.2	78.2
Aniline Point °F/°C (ASTM D-611)	265°/129°	270°/132°	270°/132°	285°/141°	287°/142°	287°/142°

TYPICAL PROPERTIES (continued)

<b>ISO Grade</b>	<b>32</b>	<b>46</b>	<b>68</b>	<b>100</b>	<b>150</b>	<b>220</b>
Rust Test (ASTM D-665)						
Procedure A (Distilled Water)	Pass	Pass	Pass	Pass	Pass	Pass
Procedure B (Salt Water)	Pass	Pass	Pass	Pass	Pass	Pass
Four Ball Wear Test (ASTM D-4172) (1hr 167°F, 1800 RPM, 40 kg)						
Scar Diameter, mm	.18	.18	.18	.18	.18	.18
Average Coefficient of Friction	.08	.08	.08	.08	.08	0.8
Four Ball Test (ASTM D-4172) (1hr 130°F, 1800 RPM, 20 kg)						
Scar Diameter, mm	.27	.27	.27	.33	.33	.33
Falex Continuous Load (ASTM D-3233)						
Failure Load, lbs.	1250	1250	1250	1500	1500	1500
Conradson Carbon Residue (ASTM D-189)						
% Residue	.001	.001	.001	.005	.005	.005
Demulsibility (ASTM D-1401)						
Oil, Water, Emulsion	40-40-0	40-40-0	40-40-0	40-40-0	40-40-0	40-40-0
Time	10	10	10	10	10	10
Hydrolytic Stability (ASTM D-2619)						
Copper Wt Loss (mg/cm <sup>2</sup> )	0.1	0.1	0.1	0.1	0.1	0.1
Acidity of Water	0.31	0.31	0.31	0.31	0.31	0.31
Copper Strip Corrosion (ASTM D-130)	1a	1a	1a	1a	1a	1a
Oxidation Stability Test (ASTM D-943)						
Hrs. to TAN of 2	+10,000	+10,000	+10,000	+10,000	+10,000	+10,000

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**TYPICAL PROPERTIES (continued)**

<b>ISO Grade</b>	<b>32</b>	<b>46</b>	<b>68</b>	<b>100</b>	<b>150</b>	<b>220</b>
Sludge Tendencies (ASTM D-4310)						
Total sludging	18	18	18	18	18	18
Total Copper, mg	15	15	15	15	15	15
Total Iron, mg	0.1	0.1	0.1	0.1	0.1	0.1
Neutralization Number	0.2	0.2	0.2	0.2	0.2	0.2
Thermal Stability (ASTM D-2070) (Cincinnati Milacron Method 168hrs./135°C, copper, steel catalyst)						
Sludge (mg/100ml)	2	2	2	2	2	2
Condition of Copper Rod	1	1	1	1	1	1
Condition of Iron Rod	1	1	1	1	1	1
Denison T6H20C Hybrid Pump Test						
Vane, mgs. Weight Loss	6	6	6	6	---	---
Pins, mgs. Weight Loss	0.7	0.7	0.7	0.7	----	---
Total Pin & Vane, mgs Wt Loss	6.7	6.7	6.7	6.7	-----	---
Vickers Vane Pump 35VQ25						
Run 1						
Ring wt. Loss						
Vane wt. Loss	17	17	17	17	---	---
Total wt. Loss	3	3	3	3	---	---
Run 2	20	20	20	20	----	----
Ring wt. Loss						
Vane wt. Loss	15	15	15	15	----	----
Total wt. Loss	3	3	3	3	---	---
Run 3	18	18	18	18	---	---
Ring wt. Loss						
Vane wt. Loss	29	29	29	29	----	----
Total wt. Loss	7	7	7	7	---	---
	36	36	36	36	---	---

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**TYPICAL PROPERTIES (continued)**

<b>ISO Grade</b>	<b>32</b>	<b>46</b>	<b>68</b>	<b>100</b>	<b>150</b>	<b>220</b>
Denison Filterability TP-02100-A Without Water, seconds	217.5	217.5	217.5	217.5	217.5	217.5
With 2% Water, seconds	381	381	381	381	381	381
AFNOR Filterability NF48-690 and NF 48-691 Dry Phase, minutes	1.1	1.1	1.1	1.1	1.1	1.1
Wet Phase, minutes	1.2	1.2	1.2	1.2	1.2	1.2