

Requirements and recommendations for lubricants in oil-injected air screw compressors

1. Lubricant recommendation

Lubricants used in oil-flooded screw compressor applications are subject to high stresses, requiring properties of low-aging, anti-corrosive characteristics and a low foaming tendency.

It is strongly recommended to use the GHH RAND branded lubricants PrimeCool and PrimeCool Plus because they:

- are specifically developed for use with the GHH RAND Product Range
- meet all specific requirements (see below)
- have been proven in a wide range of operating conditions
- qualify for extended warranty

Other brands will not be approved by Ingersoll Rand because the constantly changing properties of all worldwide available brands cannot be controlled by us. However, alternative lubricants may be utilized and qualify for standard warranty, providing they fully comply with the requirements laid out in section 2 and 3.

2. Critical requirements

The following requirements are mandatory to provide safe and long term operation and have to be ensured at all occurring operating conditions at any time. Consideration must be taken to the full operation and application scope to enable a correct lubrication selection according to following criteria:

- Discharge temperature must be a minimum of 5°C above dew point at discharge pressure. Discharge temperature and according oil injection temperature are to be verified in the GHH RAND performance prediction program (available upon request).
- PAO lubricants must be used if the oil injection temperature exceeds 70°C.
- Compatibility with compressor component material has to be ensured, including additives within the oil not chemically reacting with condensate unavoidably developed at start-up.

Requirements	Unit	Value	Norm
Viscosity at injection temperature (continuous tip speed ≥ 15 m/s)	mm ² /s	> 15	–
Viscosity at injection temperature (continuous tip speed <15 m/s)	mm ² /s	≥ 22	–
Flashpoint	minimum 150°C above oil injection temperature		ISO 2592
Pourpoint	10°C below minimum ambient temperature		ISO 3016
Air release at 50° C	min	< 5	ISO 9120
Foaming (Seq. II)	ml	< 25/0	ASTM D 892
FZG load factor	–	> 10	DIN 51 354-2
Lubricant should be non aggressive to copper, steel, NBR, Viton, PTFE and all other compressor materials			
VI Improver not allowed			

3. Recommendations for improved lubrication characteristics

Recommendation	Einheit	Wert	Norm
Neutralization Number (TAN)	mgKOH/g	0.2-0.5	DIN 51 558-2
Demulsification at 54°C	min	<15	ISO 6614
Oxidation resistance	°C	>160	DIN 51 506

4. Application and maintenance recommendations

- The Oil cycle value must be lower than 5/min. Lower values improve the air release and avoid an increased number of oil changes.
- First fill and re-fill of lubricants need to be filtrated in accordance with the appropriate section of the installation manual.
- To maintain the performance of the lubricants **do not mix different type of lubricants**.
- Follow the recommended flushing procedure of the lubricant supplier when switching lubricants.
- As deterioration of lubricant strongly depends on conditions of the airborne area and the operating method of the compressor, regular checks of the oil quality have to be carried out and documented. Oil change intervals need to be adjusted accordingly.
- High operating temperatures require shorter oil change intervals (60°C = 1, 70°C = 0.5, 80°C = 0.25, 90°C = 0.125, ...).
- Especially for off-shore operation and other non industrial applications regular checks of the lubricant quality need to be conducted and oil change intervals might need to be shortened.

5. Additional information

Min. and max. kinematic viscosity in mm ² /s calculated for VI=100 (ISO 2909)				
Oil Injection Temp.	VG32	VG46	VG68	VG100
40°C	28.80 – 35.20	41.40 – 50.60	61.20 – 74.80	90.00 – 110.00
50°C	19.56 – 23.47	27.24 – 32.74	39.00 – 46.98	55.82 – 67.29
60°C	13.93 – 16.46	18.89 – 22.38	26.31 – 31.28	36.75 – 43.76
70°C	10.33 – 12.04	13.68 – 16.01	18.60 – 21.87	25.44 – 29.96
80°C	7.91 – 9.12	10.28 – 11.89	13.68 – 15.93	18.36 – 21.42
90°C	6.24 – 7.11	7.96 – 9.12	10.41 – 12.01	13.73 – 15.88
100°C	5.03 – 5.69	6.33 – 7.19	8.14 – 9.32	10.58 – 12.15

Marked in yellow: Allowed range of viscosity.

Further effective documents: Norms, dew point diagrams, filter fineness, terms of guarantee