



## Air Service

Air service can include applications for underbalanced drilling, air feed for air separation, and seismic applications. Many air services have high discharge pressures. Air compression has a few technical details for consideration when sizing an air application.

The k-value for air is relatively high, resulting in gas discharge temperatures being higher at lower compression ratios. The higher k-value will also result in faster discharge temperature rises with changes in pressures. Off conditions need to be reviewed to confirm maximum operational temperatures are within the [Ariel discharge temperature limits](#). Refer to the Packager Standards for information on [Instrumentation](#).

Mineral oil auto ignition temperatures in Air service are relatively low at higher pressures and drop significantly as pressures and temperatures increase. An ester based lubricant must be used in air service. The lube oil auto ignition temperature must exceed the compressor discharge temperatures at discharge pressure. The user must confirm the lube oil auto ignition temperature is well above potential discharge temperatures. Ariel limits air applications to no more than 5000 psi. Above this pressure, nitrogen can be applied, with no more than 5% oxygen content.

Refer to the Packager Standards for information on [Cylinder and Packing Lubrication](#).

Due to the potential for auto ignition of the lube oil in air service crank case relief doors are mandatory on JGJ frames with cylinder working pressures greater than 1500 and short coupled distance pieces are provided. Crank case relief doors are highly recommended on all other short coupled guide arrangements, such as on JGM:N:P:Q:I, JG:A and JGR:J:W frames.

When selecting a compressor for air service, lower piston speeds may be necessary in order to allow the heavier gas to flow through the valves with proper valve dynamics. The lower piston speeds will lower the pseudo-q values as well as improve the efficiency of the unit (lowering the power per unit flow value).

### Package and Operational Recommendations:

1. Ariel recommends discharge valve temperature sensors to detect higher temperatures due to leaking or failed valves.
2. Deactivation of cylinder ends is discouraged due to the potential for higher heat build up. Discharge temperature devices will not measure internal heat build-up due to end deactivation.
3. Where available, provide water cooling to packing cases to reduce packing heat.
4. Gas piping systems must be designed to eliminate low points where lube oil can accumulate. Any low point must be set up for continuous draining, including (but not limited to) low points at each elbow-up and gas cooler sections.
5. Separators are to be configured for continuous draining.