The Importance of Air Quality

The act of compressing atmospheric air to 125 psig creates an 800% increase in the concentration of contaminants.

What Influences Your Compressed Air Quality?

Dirt, moisture and oil are everywhere. But they shouldn’t be in your compressed air supply.

- Dust, dirt, pollen, microorganisms, smoke, exhaust emissions and other particulates
- Moisture in the form of water vapor
- Oil, unburned hydrocarbons from the ambient air and compressor coolant carryover
- Caustic gases such as sulfur oxides, nitrogen oxides and chlorine compounds
The problems created by contaminated compressed air in your system can range from annoyance to wreaking havoc on your equipment and your end products.

- Premature wearing and scoring of surfaces
- Rust and corrosion in tools, piping and equipment
- Damaged instruments
- Spoiled paint surfaces
- Increased scrap rate
- Unsafe or unpleasant work environment

ISO 8573.1 Air Quality Classes

Maintaining air quality is so important that the International Standards Organization (ISO) developed six compressed air quality classes, as defined by ISO 8573.1. To determine which industry classification you require, ask yourself these simple questions:

- Does compressed air quality affect my production process and the quality of my end products?
- Will poor compressed air quality decrease my productivity, cost-savings and product quality standards?
- What internal and external ambient conditions affect the quality of my compressed air produced by my system?
Removing Particulate Contamination

Contaminants Can Destroy a Compressed Air System

Think of it as a mini dust storm at 125 psig. The particulates scattered almost invisibly throughout the ambient air become a concentrated force for damage and destruction of your air-operated tools, equipment and instruments.

- Systems are damaged and products are spoiled
- Scoring and uneven wear patterns ruin tools and instruments
- Volatile, hazardous compounds are produced
- Production shuts down, productivity and quality suffer
### ISO 8573.1 Air Quality Classes

<table>
<thead>
<tr>
<th>Quality Classes</th>
<th>SOLIDS Maximum number of particles per m³</th>
<th>Water Pressure Dewpoint (°F/°C)</th>
<th>Oil (including vapor) mg/m³</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
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<td>1,000</td>
<td>10</td>
</tr>
<tr>
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</tr>
<tr>
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<tr>
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<td>20,000</td>
</tr>
<tr>
<td>6</td>
<td>not specified</td>
<td>not specified</td>
<td>not specified</td>
</tr>
</tbody>
</table>

### Dual Filters Eliminate Dirt and Problems

Eliminating the “sandblast” effect of particulates in your compressed air stream gets rid of:

- Premature wear
- Scored surfaces
- Clogged orifices
- Ruined finishes and instruments
Removing Moisture

Why Is Relative Humidity Important?

- ISO classifies a constant Pressure Dewpoint at a specific ambient air temperature (77°F).
- As illustrated in the graph, when Pressure Dewpoint (PDP) is held constant (represented by the color curves) and ambient air temperature changes, the Relative Humidity will increase or decrease.
- When a constant Relative Humidity (RH) is maintained, your air system’s performance will be consistent and reliable.
ISO 8573.1 Air Quality Classes

<table>
<thead>
<tr>
<th>Quality Classes</th>
<th>Solids</th>
<th>WATER Pressure Dewpoint (°F/°C)</th>
<th>Oil (including vapor) mg/m³</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1-0.5 micron</td>
<td>0.5-1.0 micron</td>
<td>1.0-5.0 micron</td>
<td>-100.0</td>
</tr>
<tr>
<td>2</td>
<td>100,000</td>
<td>1,000</td>
<td>10</td>
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<tr>
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</table>

The Effects of Moisture Contamination
- Rust and corrosion in the air system piping
- Inadequate air tool lubrication
- Damage to labeling, packaging and the finished goods
- Productivity losses throughout your operation

Refrigerated air dryers are capable of maintaining less than 50% Relative Humidity in most industrial plant ambient environments.

Processes that require ultra-dry air (ISO Class 1, 2 or 3) will need an advanced solution using nonrefrigerated dryer technology.
Removing Oil

Oil in Compressed Air Affects Products and the Work Environment

Oil, unburned hydrocarbons and compressor coolant become highly concentrated during compression.

- These contaminants enter the air flow as entrained droplets and will pass through the compressed air system into the production process unless they are removed.
- The built-in air/oil separator on all rotary screw air compressors will remove a portion of the oil, but this is not sufficient for most applications.
- Oil contamination will cause batch spoilage, poor quality in finished goods, unwanted coloring in finished goods and a messy or hazardous work environment.

The first barrier removes large oil droplets.
The second barrier removes fine oil droplets.
The third barrier removes oil vapors, providing odor-free air.
Proper Filtration Removes Unwanted Oil from the Air Stream

Removing oil from the compressed air stream provides some real benefits.

- Longer air tool life
- Ensures high quality of finished goods
- No unwanted odors
- Safer workplace

**Totally oil-free compressed air can only be achieved by installing an oil-free air compressor.** However, particulate filtration and moisture removal are still necessary.
# IR Industry Classifications

<table>
<thead>
<tr>
<th>Class</th>
<th>Description</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IN1</strong></td>
<td>Instrument Grade Air: ISO Class 2-1-1, efficient removal of solid particulates and oil. ISO Class 1 Pressure Dewpoint will be maintained.</td>
<td>Instrumentation, process, oil and gas, chemical, electronics</td>
</tr>
<tr>
<td><strong>IN1 Odor Free</strong></td>
<td>Instrument Grade Air: ISO Class 2-1-1, odor free, efficient removal of solid particulates and oil, and oil vapor. ISO Class 1 Pressure Dewpoint will be maintained.</td>
<td>Pharmaceutical, food and beverage, clean rooms</td>
</tr>
<tr>
<td><strong>IN2</strong></td>
<td>Instrument Grade Air: ISO Class 2-2-1, efficient removal of solid particulates and oil. ISO Class 2 Pressure Dewpoint will be maintained.</td>
<td>Instrumentation, process, oil and gas, chemical, electronics</td>
</tr>
<tr>
<td><strong>IN2 Odor Free</strong></td>
<td>Instrument Grade Air: ISO Class 2-2-1, odor free, efficient removal of solid particulates and oil, and oil vapor. ISO Class 2 Pressure Dewpoint will be maintained.</td>
<td>Pharmaceutical, food and beverage, clean rooms</td>
</tr>
<tr>
<td><strong>IG4</strong></td>
<td>Industrial Grade Air: ISO Class 2-4-1, efficient removal of solid particulates and oil. ISO Class 4 Pressure Dewpoint or a 30% (or less) Relative Humidity (RH) will be maintained.</td>
<td>General manufacturing, metal stamping, air tool use, forging, assembly, painting and finishing</td>
</tr>
<tr>
<td><strong>IG4 Odor Free</strong></td>
<td>Industrial Grade Air: ISO Class 2-4-1, odor free, efficient removal of solid particulates and oil, and oil vapor. ISO Class 4 Pressure Dewpoint or a 30% (or less) Relative Humidity (RH) will be maintained.</td>
<td>Food and beverage, raw material mixing</td>
</tr>
<tr>
<td><strong>IG6</strong></td>
<td>Industrial Grade Air: ISO Class 2-6-1, efficient removal of solid particulates and oil. ISO Class 6 Pressure Dewpoint or a 50% (or less) Relative Humidity (RH) will be maintained.</td>
<td>Sand blasting, home use, construction</td>
</tr>
</tbody>
</table>
Ingersoll-Rand Audit Portfolio

AirCare. Flexible Maintenance Programs and Constant Quality.

With an understanding of your industry classification requirements, IR can provide the optimal air treatment equipment for your system. And with IR’s AirCare extended warranty and preventive maintenance program, you’ll continue to enjoy reduced costs and increased productivity.

- You can extend the drivetrain or full-package warranty for 5 years.
- Certified professional technicians will perform routine inspections and diagnostic service.
- An all-inclusive fluid-analysis program monitors compressor lubricants for early detection of problems.
- Vibration analysis and trending can pinpoint an impending component replacement.
- Optional remote monitoring provides 24-hour, 7-day-a-week surveillance of your compressor installation for the utmost in peace of mind.
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