Disclaimer

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Oxygen Hazards

- Is slightly heavier than air, vapor specific gravity 1.10
- Pure oxygen can be very reactive
- Systems must be properly designed, cleaned, maintained and operated (Use no oil, Oxygen Cleaned)
- Explosions or fires can be initiated by the sudden pressure increase when a cylinder valve is opened if the system is not cleaned or maintained properly.
- Mixed with a flammable gas (hydrogen, propane) will become explosive. In welding operation this can happen if there are no backflow preventers.
Common Contaminants in Oxygen Systems, Luxfer

Any of these contaminants—many of which are very difficult to detect—can be the initial fuel for an *ignition event*, the technical term for starting a fire.

- Machining oils (including residual oil film)
- Hydrocarbon-based grease and lubricants (including compressor oil)
- Some soaps, detergents, solvents and cleaning solutions, especially those that contain organic compounds
- Skin lotions and emollients and cosmetics
- Sun-tanning oils and lotions
- Human skin oil and bodily fluids
- Insects and insect body parts
- Paint, wax, and marking crayons
- Carbon dust from filtration systems
- Metal fines, filings, scale and burrs
- Chrome chips (usually from valves and other chrome-plated parts)
- Rust particles and dust
- Metallic oxides in general
- Airborne soot and dust
- Pipe thread sealants
- Residue from soapy water and leak-detection fluids used to check for leaks
- Lint from cloths used in cleaning
- Any other material containing organic compounds and hydrocarbons
Oxygen Compatible Materials

- **Good Compatibility**
  - Nickel 201
  - Monel
  - Inconel (600 series)
  - Copper
  - Yellow & Red Brass
  - Note: Elastomers not in flow path
  - Viton A
  - TFE Teflon (nonfilled)
  - Vespel SP21
  - Fluorel

- **Suitable**
  - Aluminum Silicon Bronze
  - Stainless (300 series)
  - Inconel (800 series)
  - Brass

- **Unsuitable**
  - Silicone Rubber
  - Neoprene
  - Carbon Steel
  - Ethylene Propylene Rubber
  - Buna N
  - Aluminum

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# Oxygen Sustained Combustion

<table>
<thead>
<tr>
<th>Alloy</th>
<th>Diameter (inch)</th>
<th>Threshold Pressure (psig)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless Steel 304</td>
<td>0.25</td>
<td>725</td>
</tr>
<tr>
<td>Aluminum 6061</td>
<td>0.25</td>
<td>25</td>
</tr>
<tr>
<td>9% Nickel Steel</td>
<td>0.25</td>
<td>15</td>
</tr>
<tr>
<td>Carbon Steel 1018</td>
<td>0.25</td>
<td>15</td>
</tr>
<tr>
<td>Stainless Steel 316</td>
<td>0.125</td>
<td>510</td>
</tr>
<tr>
<td>Stainless Steel 304</td>
<td>0.125</td>
<td>525</td>
</tr>
<tr>
<td>17-4 Stainless</td>
<td>0.125</td>
<td>150-400</td>
</tr>
</tbody>
</table>

Oxygen Regulators

- Proper design
- Cleaned
- Maintained
- Stored in a clean bag
Oxygen Regulators

- To dissipate heat rapidly heavy wall Brass is used. Brass will not burn even at 10,000 psig while Aluminum is as low as 25 psig.
- Some designs have deadend directly opposite of inlet to dissipate heat prior to entry into diaphragm.
- Nylon has highest ignition of most elastomers.
- Dust and dirt embedded in seat can ignite. Fine filter is used to screen out.
- Ignition tested under CGA (Compressed Gas Association) Guidelines.
Improper Storage!
Thank You

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