Howden Process Compressors with its headquarters in Scotland is the centre of excellence for process gas screw compressor technology.

Our Process Rotary Screw Compressor experience

<table>
<thead>
<tr>
<th>Type</th>
<th>Operational Experience</th>
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</thead>
<tbody>
<tr>
<td>Oil injected</td>
<td>over 200 yrs experience</td>
</tr>
<tr>
<td>Fuel Gas</td>
<td>over 500 yrs experience</td>
</tr>
<tr>
<td>Offshore applications</td>
<td>over 60 yrs experience</td>
</tr>
<tr>
<td>Sour Hydrocarbon Gases</td>
<td>over 60 yrs experience</td>
</tr>
<tr>
<td>Hazardous Gases</td>
<td>over 26 yrs experience</td>
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</tbody>
</table>
Oil Injected Screw Compressors

An oil injected screw compressor package gives the following additional features and benefits.

Features
- Designed for direct drive (no gearbox/L.O. system)
- Integral capacity control system 100% - 10%
- Enhanced oil separation system
- Minimised acoustic signature (synchronous speed, oil injection). Pipework acoustic suppression
- Effective gas handling
- Single and dual shaft seal systems
- Single/dual loop controls
- Oil injection to compression space
- Single casing tandem, two stage systems available

Benefits
- Cost savings
- Ease of maintenance
- Less power
- Reliability
- Simple mechanical configuration
- Energy efficient
- Proportional power saving
- Delivery of low oil content gas
- Simplified noise attenuation procedures
- Variations in gas composition and MW accommodated. Capable of handling wet and sour gases
- Tolerant to liquid slugs
- High sealing integrity
- Flexible process control system interface (PLC and relay logic)
- High compression ratios per stage
- Discharge temperature control avoiding dew point problems
- Compact size with low absorbed power

Typical applications
- Fuel Gas Compression
- Gas Liquefaction
- Petrochemical and Chemical Processing
- Natural Gas Gathering
- Carbon Dioxide Recovery
- Coke Oven Gas
- Vapour Recovery
- Offshore Flare Gas (V.O.C)
- Hydrocarbon Processing
- Industrial Refrigeration
- Food Processing
- Breweries
- Mine Cooling

Unique features and benefits
- Stepless capacity control with power savings
- Capacity and energy absorbed match system demand
- Variable Volume Ratio available
- Maximises energy efficiency
- Can take side stream above suction pressure
- Reduced through life costs

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Oil Injected Design Criteria

<table>
<thead>
<tr>
<th>Range</th>
<th>163</th>
<th>204</th>
<th>255</th>
<th>321</th>
<th>510</th>
</tr>
</thead>
<tbody>
<tr>
<td>L/D Ratios</td>
<td>2 L/D Ratios</td>
<td>4 L/D Ratios</td>
<td>6 L/D Ratios</td>
<td>4 L/D Ratios</td>
<td>3 L/D Ratios</td>
</tr>
</tbody>
</table>

| Operating Speeds | 1000 – 4500 RPM |
| Capacity Range   | 200 – 1400 M3/HR |
| Pressure Ratio   | 20 / 1 (Single Stage) |
| Max Discharge Pressure | 38 BAR |
| Max Discharge Temperature | 115 DEGREES C |
| Materials Casings | Cast Iron, Nodular Iron, Carbon Steel, LT Carbon Steel |

Key

- FF Flow
- L Level
- M Motor
- P Pressure
- S Speed
- T Temperature
- Z Level Switch

Instrumentation

- Pneumatic Signal
- Electrical Signal
- Oil
- Gas
- Oil/Gas Mixture

Typical piping and instrumentation diagram