Howden products and services
High integrity fans, heat exchangers and compressors for key industries which demand the highest levels of efficiency, reliability and availability.
# Howden Compressors

**Range & Legacy Names**

## Compression

### Positive Displacement
- Rotary
  - Oil-free Screw
  - Oil-flooded Screw
  - Lobe Blowers
  - Piston API 618
  - Piston
  - Diaphragm

### Reciprocating
- Single Stage
  - Turbo Blower
  - Turbo Fans

### Dynamic Centrifugal
- Single Shaft Multistages
- Multistage Integrally Geared
- Peripheral

## Technical Specifications

<table>
<thead>
<tr>
<th>Design</th>
<th>API 619 Standard</th>
<th>API 619 &amp; Standard</th>
<th>Standard</th>
<th>API 618</th>
<th>Standard API 618</th>
<th>Standard API 618</th>
<th>API 617 - 672</th>
<th>Standard API 617</th>
<th>API 617</th>
<th>API 617</th>
<th>Standard API 617</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow</td>
<td>16,000 m³/hr</td>
<td>28,500 m³/hr</td>
<td>10,710 m³/hr (Small)</td>
<td>120,000 m³/hr (Large)</td>
<td>34,000 m³/hr</td>
<td>1,600 m³/hr</td>
<td>1,200 m³/hr</td>
<td>353,000 Nm³/hr</td>
<td>160 m³/sec</td>
<td>480,000 m³/hr Roots</td>
<td>340,000 m³/hr CKD</td>
</tr>
<tr>
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<td></td>
</tr>
<tr>
<td>Pressure</td>
<td>15 bar</td>
<td>21 bar XRV 50 bar WRV 75 bar GTV</td>
<td>15 psig (Small) 35 psig (Large) 28 Hg (Vacuum)</td>
<td>600 bar</td>
<td>450 bar</td>
<td>3,000 bar</td>
<td>2.0 bar(g)</td>
<td>1 bar rise</td>
<td>40 bar 5 bar A rise</td>
<td>200 bar</td>
<td>200 bar(a)</td>
</tr>
<tr>
<td>Other</td>
<td>4,000 kW 15,000 rpm</td>
<td>7.5 MW 5,000 rpm XRV 4500 rpm WRV 3600 rpm GTV</td>
<td>Custom design for higher performance</td>
<td>Lub and Oil free 33 MW 1,800 kN Rod load</td>
<td>Lub and Oil free</td>
<td>1.3 MW 750 rpm</td>
<td>5 MW Tip 450 m/s 1 stage</td>
<td>-</td>
<td>2, 3, 4 Stages High efficiency Isothermal construction available</td>
<td>25 MW</td>
<td>1 – 8 Stages Variable speed</td>
</tr>
</tbody>
</table>

**Brands**
- Howden
- Howden
- Roots
- Thomassen CKD Burton Corblin
- CKD Burton Corblin
- Burton Corblin
- Howden Roots Donkin
- EvVel
- CKD Roots
- CKD
- CKD
- Periflow

Performance values are indicative. Consult Howden and get equipment performance based on your specific site operating conditions.

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## Howden Heaters

### Heater Types

<table>
<thead>
<tr>
<th>Use</th>
<th>Gas &amp; Waste</th>
<th>Iron &amp; Steel</th>
<th>Power</th>
<th>centre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tail End SCR GGH</td>
<td>• Power Flue Gas Heating before Tail End SCR</td>
<td>• Power Flue Gas Reheat after FGD plant</td>
<td>• Power Flue Gas Reheat after FGD in Sinter Plant</td>
<td>• Power Flue Gas Reheat after FGD in Sinter Plant</td>
</tr>
<tr>
<td>FGD GGH</td>
<td>• Industry iron-Steel Refinery Air for combustion</td>
<td>• Industry-Steel Refinery Air for combustion</td>
<td>• Power (heat recovery)</td>
<td>• Power (heat recovery)</td>
</tr>
<tr>
<td>Packaged Vertical</td>
<td>• Gas &amp; oil fired</td>
<td>• Coal firing Main &amp; Mill</td>
<td>• Bio-Gas &amp; Waste (All &gt; 100MW)</td>
<td>• Coal fired plant PA &amp; SA streams combined in one heater</td>
</tr>
<tr>
<td>Packaged Horizontal</td>
<td></td>
<td></td>
<td></td>
<td>• Coal fired plant PA at high pressure bounded by SA sectors on each side</td>
</tr>
<tr>
<td>APH B-sector</td>
<td></td>
<td></td>
<td></td>
<td>• Oxy-firing applications with oxygen in the centre</td>
</tr>
<tr>
<td>APH Tri-sector</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>APH Quad-sector</td>
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</tr>
</tbody>
</table>

### Feature

- Very large diameter deep heaters – air heater temperatures with extreme fouling potential (Usually Single Stream)
- Large diameter shallow heaters for highly corrosive environment – sulphuric acid or sulphuric acid + seawater Single Stream

### Design

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<tr>
<td>Packaged Vertical</td>
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<td>APH B-sector</td>
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### Size

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<tr>
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### Elements

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<tr>
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</tbody>
</table>

### Cleaning

- Fully or Semi retractable steam sootblowers
- On-load Cold End HPWW Off-load Hot End LPWW

### Leakage Reduction

- Labyrinth multiple seals Actuated HE sectorplates
- VN Sealing, Purge and Scavenge Leakage Reduction Systems, Single or double radial & double axial seals (Non-Actuated)
- Labyrinth multiple seals Optional actuated HE sectorplates

### Fire

- Fire Detection & Fighting
- None Required
- Fire Detection & Fighting (if required)
- Fire Detection & Fighting (if required)
- Fire Detection & Fighting

### Drive Type

- Centre drive system with inverter speed control
- Centre drive system with inverter speed control
- Central or Peripheral
- Central or Peripheral
- Centre drive system with inverter speed control
## Howden Heaters

### Element Types – Howden Superack Elements® HS, HC Element TM & HCP Element TM

### Model

<table>
<thead>
<tr>
<th>Model</th>
<th>HS6</th>
<th>NF6</th>
<th>HS6e</th>
<th>NF6e</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HS8</td>
<td>2.78 DU</td>
<td>HS8e</td>
<td>2.8 DU (Enamelled)</td>
</tr>
<tr>
<td>HS9</td>
<td>9.5/3 CU</td>
<td>HS9e</td>
<td>9.5/3 CUe (Enamelled)</td>
<td></td>
</tr>
<tr>
<td>HS20</td>
<td>FNC</td>
<td>HC7</td>
<td>HC9</td>
<td>Element TM</td>
</tr>
<tr>
<td></td>
<td>HC11</td>
<td>HC12</td>
<td>HC15</td>
<td>Element TM</td>
</tr>
<tr>
<td></td>
<td>HCP</td>
<td>Element TM</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Use

<table>
<thead>
<tr>
<th>Label</th>
<th>Notched flat (NF)</th>
<th>Double Undulated (DU)</th>
<th>Corrugated Undulated (CU)</th>
<th>Flat Notched Crossed (FNC)</th>
<th>HC</th>
<th>HCP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cold end applications in APHs</td>
<td>Hot and Cold end APHs &amp; GGHs (2.8DUe)</td>
<td>Cold end in APHs Cold end elements in heaters prone to cold end fouling.</td>
<td>Hot and Cold end APHs particularly gas fired or applications with reduced fouling.</td>
<td>Hot and Cold end APHs &amp; GGHs (enamelled)</td>
<td>Dual profile element combining cold end and intermediate elements profile in a one tier element. Suitable for air preheaters with severe CE fouling and gas-gas heaters</td>
</tr>
<tr>
<td></td>
<td>Combination of notched plate with a flat plate</td>
<td>Combination of notch-undulated with an undulated sheet. HS8 &amp; HS8e have more rounded notches – primarily to enable enamelling.</td>
<td>Combination of a corrugated sheet with an undulated sheet.</td>
<td>Combination of a two notched sheets with the notches crossing over, (no undulations).</td>
<td>Transverse herringbone pattern of undulated sheet paired with a corrugated sheet. The higher the number the larger the corrugations and more cleanable.</td>
<td>Corrugated sheet paired with a sheet with two different profiles. Hot end of the sheet transverse herringbone, CE castellated flats.</td>
</tr>
<tr>
<td></td>
<td>Low performance</td>
<td>HS8 High performance HS7 marginally higher perf. vs HS8</td>
<td>Medium performance</td>
<td>Highest thermal performance</td>
<td>High performance</td>
<td>High performance (but lower than HC for same depth)</td>
</tr>
<tr>
<td></td>
<td>Minimum pressure drop</td>
<td>HS8 High pressure drop HS7 Little higher drop vs HS8</td>
<td>Medium pressure drop</td>
<td>High pressure drop</td>
<td>High pressure drop</td>
<td>High pressure drop (but lower than HC for same depth)</td>
</tr>
</tbody>
</table>

### Thermal

| Fouling Propensity | Totally closed channels in the profile, highly cleanable. | Undulations running in one direction creates cold corner problems and skew flow within each container. This exasbrates fouling. However cleanable with steam sootblowing and Enerjet. | Ease of cleaning Corrugation allow penetration of soot blower jets and Enerjet. | No clear path through the elements – not good for high fouling applications. | Eliminates cold corner problems and skew flow within each individual channel, (hydraulically closed). Superior fouling and plugage resistance – highly cleanable. | Benefits of HC but with an even more cleanable CE for severe CE fouling applications. Even higher cleanability than HC. |

### CARBON STEEL - LOW ALLOY CORROSION RESISTANT STEEL (CORTEN) - ENAMEL COATED STEEL

Enamelled versions for corrosion resistance, also the smooth surface reduces the adhesion of surface deposits and helps their removal.

Howden profiles can perfectly replace any existing profile in the market such as 2.5 DU, 3.5 NP, 5.5 NP, 3.5 NU, 5.5 NU, UNFoe, AFNC, 12/3 CU, 9.5/3 CU

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## Howden Fans

### Range & Legacy Names

#### API 673

- MVR
- Chemical

#### Power and steel

- Cement
- Mixing
- Other industries

#### Construction & Facility

- Vehicles
- Navy ships
- Rail transportation

#### All industries

- ISO/EN/IEC motor

#### Aeration, Forced draft,

- Ventilation
- Explosion proof process
- Filtration systems

#### AMCA / ASME

- IEEE / OSHA / NEMA motor

#### Fume exhaust,

- General ventilation

#### Air curtains

- Dryers
- Freezers
- High temperature Kilns, Ovens
- Product cooling
- Recirculation

#### Fan ventilation

- Air curtains
- Dryers
- Freezers
- High temperature Kilns, Ovens
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#### Fan ventilation

- Air curtains
- Dryers
- Freezers
- High temperature Kilns, Ovens
- Product cooling
- Recirculation

#### Material handling

- Dust collection
- Exhaust applications

## Centrifugal Fans

### Turbo Fans

#### Use

- API 673
- MVR
- Chemical

#### Power and steel

- Cement
- Mixing
- Other industries

#### Construction & Facility

- Vehicles
- Navy ships
- Rail transportation

#### All industries

- ISO/EN/IEC motor

#### Aeration, Forced draft,

- Ventilation
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#### Fan ventilation

- Air curtains
- Dryers
- Freezers
- High temperature Kilns, Ovens
- Product cooling
- Recirculation

#### Material handling

- Dust collection
- Exhaust applications

### Engineered Fans

#### Use

- API, ATEX
- Oil & Gas
- Petrochemicals
- Nuclear
- Other industries

#### Air pollution control, Dust

- Collection, Drying applications
- Pneumatic conveying
- Combustion air
- Moisture blow off

#### All industries

- ASME
- IEEE / OSHA / NEMA motor

#### Material handling

- Dust collection
- Exhaust applications

### Configured Fans

#### Use

- Standard
- API, ATEX
- Oil & Gas
- Petrochemicals
- Nuclear
- Other industries

#### Air pollution control, Dust

- Collection, Drying applications
- Pneumatic conveying
- Combustion air
- Moisture blow off

#### All industries

- ASME
- IEEE / OSHA / NEMA motor

#### Material handling

- Dust collection
- Exhaust applications

### Heavy duty & Core process

- Tip max

- ExVel

- Core Range Technopel
- Centripal
- Donkin
- Carbon Fiber Wheels
- VR, Donkin

### Medium duty & Auxiliary Process

- Tips

- 277m/s (1000km/h)
- 260 m/s

- Air

- Temperature up to 1000°C
- Temperature up to 700°C
- Temperature up to 350°C
- Temperature up to 540°C

### European Codes & Standards

- Diameter

- 800 to >5000mm
- 250 to 1600mm
- 315 to 1600mm as per Eurovent series
- 203 mm to 1676 mm
- 96 mm to 361 mm
- 191 mm to 2384 mm
- 309 mm to 1461 mm

### American Fan, IEAH, IEMH

- American Fan, IEAH, IEMH
- Donkin RB/HRB/HPLV