COMPRRESSOR LOADED EXPANDERS

**PERFORMANCE**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expander Ns Range</td>
<td>40 – 140</td>
</tr>
<tr>
<td>Expander Efficiency</td>
<td>up to the low 90%</td>
</tr>
<tr>
<td>Expander Pressure Ratio</td>
<td>up to 24:1</td>
</tr>
<tr>
<td>Tip Speed</td>
<td>up to 1,500 ft/sec (457 m/s)</td>
</tr>
<tr>
<td>Rotor Speed</td>
<td>up to 115,000 RPM</td>
</tr>
<tr>
<td>Refrigeration Production</td>
<td>up to 10,000 HP (7,457 kW)</td>
</tr>
</tbody>
</table>

**APPLICATIONS**

- Industrial gas production
- Air separation
- Liquefaction

**FLUIDS HANDLED**

- Air
- Nitrogen
- Waste gas (high oxygen content)
- Carbon dioxide & carbon monoxide

**FEATURES & BENEFITS**

- Compact footprint
- “Zero leakage” inlet guide vanes
- Rugged rotor design
- Components individually balanced for ease of field replacement
- Tapered shaft wheel attachment for field interchangeability
- Labyrinth shaft seal design minimizes seal gas consumption and prevents process stream contamination
- Shaft-driven boost compressor reduces power consumption, increasing plant efficiency

**AVAILABLE OPTIONS**

- Inlet screens
- Inlet trip valves
- Surge control system
- Low hysteresis high cycle inlet guide vanes
- Cable trays or conduit
- Safe area or hazardous area location
- International code compliance (HPGSL, PED, GOST, etc.)
- Cryogenic performance testing
- Spare cartridge with nozzle assembly
"Zero Leakage" Inlet Guide Vanes
- Adjustable inlet guide vanes provide optimum flow patterns as well as precise and continuous control across the machine’s full operational spectrum
- Self-energizing back plate maintains zero sidewall clearance for maximum expander efficiency
- Zero backlash variable guide vane configuration provides smooth turn-up capability to 125% of design flow

Rugged Rotor Design
- Stiff rotor shaft and high capacity tilt pad bearings assure maximum stability at all operating loads and speeds
- High capacity tilt pad thrust bearings provide the extra margin necessary to handle transients
- Numerous bearing designs available to accommodate specific process applications, including hydrodynamic (journal and tilt pad) bearings, ball bearings, ceramic bearings, and airfoil bearings
- Sealing design offers robust construction and reliable performance

Dual Independent Labyrinth Shaft Seal
- Reliable teeth-on-shaft design is precision machined to ultra close clearances, minimizing seal gas consumption
- Dual port, atmospheric center vent prevents process stream contamination

Self-Aligning Wheel Attachment
- Tapered bore and stretch rod design automatically compensates for thermal and mechanical changes to maintain alignment under all operating conditions
- Precision machined tapered bore/shaft attachment allows independent balancing of turbine wheel and shaft to facilitate field repair