Sour Gas Compressors
Oil & Natural Gas Applications

Model NFT391 two-stage compressor

Solutions beyond products...

CORKEN®

IDEX
Corken’s reciprocating gas compressors are utilized in the completion and production phases of an oil well. Vapor recovery and casing gas removal are common applications. When a well is not connected to a pipeline, the extracted crude oil is temporarily stored in a tank battery at the well site. During this time, the natural gas within crude oil will build vapor pressure. To prevent the vapor from emitting to the atmosphere, a reciprocating gas compressor is used to recover and distribute to a gas gathering system. In a casing gas application, casing head gas collects in the annular space between the tubing and casing dramatically reducing the flow of the well. Our reciprocating gas compressors are used to reduce the back pressure allowing gas and crude to flow easily into the well bore.

When applying a reciprocating gas compressor into an oil and gas application, it is important to know whether it is a sweet or sour crude oil application. Sweet crude contains less than 0.5% hydrogen sulfide and is friendlier to the environment and the compressor. Our standard off-the-shelf compressor with carbon steel components is acceptable for sweet crude applications. In contrast sour crude has 0.5% or more hydrogen sulfide and is not friendly to the environment or the compressor. It is necessary to use proper materials of construction on several components to prevent sulfide stress cracking.

When choosing a compressor technology, one of the primary factors to consider is the maintenance capability of the user. All compressors will require maintenance, but reciprocating compressors do not generally require special training or equipment in order to maintain them. Corken compressors are simple to understand and maintain. Typical top end repairs can be done in the field in a few hours. This results in minimal down-time and maximum productivity.

**Materials of Construction**

Corken NFD/NFT compressors use a number of material substitutions. These are based on NACE (MR-0175) recommendations, field experience, and industry standards. In general, carbon steel components have been replaced by stainless steel in order to prevent sulfide stress cracking. As a result, compressor failures will be significantly reduced ensuring the NFD/NFT series will provide safe operation and long service life.

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**Single and Double Distance Pieces Explained**

A distance piece is what makes any gas compressor unique and separates it from an ordinary air compressor. This is the center section of the compressor that contains the compressor’s packing (seals). Corken NFD/NFT compressors use “long” type distance pieces that provide no rod over-travel from one set of packing to the next. This allows oil-free compression when needed, and provides one (D-style) or two (T-style) chambers that can collect any condensed liquids before they can contaminate the crankcase oil. Additionally, these chambers can be purged to control process gas leakage.

Purge systems are often customized for the particular application or operating conditions. Purge gas can be nitrogen, propane, sweet gas, or other suitable gas. A very low purge gas flow rate will generally suffice (see page 8 for a detailed illustration).

**Cylinder Lubrication**

Large oilfield compressors always use cylinder lubrication to maximize the life of the piston rings, packing, and valves. These are the primary performance and wearing components of any piston type compressor. In Corken compressors, cylinder lubrication extends the life of these components by a factor of 4 or 5, and provides higher volumetric efficiency. This results in a significant decrease in downtime, lower repair parts cost and labor costs, and more efficient operation.

Cylinder lubrication also helps prevents corrosion – particularly in sour gas applications. The reduced corrosion minimizes or eliminates the need to replace the heavier iron parts of the compressor like the pistons, cylinders, etc. Cylinder lubrication is generally unavailable in other small gas compressors, but is a recommended option on all Corken NFD/NFT compressors.
Benefits:

Safety benefits
- Reduces leakage of toxic \( \text{H}_2\text{S} \) and health hazards
- Minimizes failures and leakage of flammable & toxic process gas
- Less maintenance and fewer site visits means less potential exposure to toxic gas

Environmental benefits
- Helps maintain environmental compliance
- Reduces greenhouse gas
- Lower toxic \( \text{H}_2\text{S} \) emissions

Economic benefits
- Decreased downtime
- Lower long-term repair/ replacement costs
- Significantly longer service life

Applications:
- Wellhead Casing Gas Reduction
- Vapor Recovery (VRU)
- Flare Elimination
- Gas Boosting
- Gas Gathering
- Gas Evacuation
- Gas Blanketing
- Fuel Gas Boosting
- Enhanced Oil Recovery
Performance Curves and Specifications

Two-Stage NFD391/NFT391 Performance Curves

Curves based on Natural Gas, Specific gravity = 0.7, N = 1.26
All data at maximum RPM or HP
Lubricated cylinders
Site elevation = 1000’ ASL (305 m)

Specifications

<table>
<thead>
<tr>
<th>NFD391 D-style (double packed)</th>
<th>NFT391 T-style (triple packed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Available with a lubricator</td>
<td></td>
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<tr>
<td>Viton® (standard), PTFE (optional)</td>
<td></td>
</tr>
<tr>
<td>Standard packing, Vacuum &amp; Purge (optional)</td>
<td></td>
</tr>
<tr>
<td>Available with optional crankcase heater</td>
<td></td>
</tr>
<tr>
<td>Extended crankshaft &amp; heavy duty flywheel standard</td>
<td></td>
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</tbody>
</table>

Bore - first stage inches (mm) 4.5 (114.3)
Bore - second stage inches (mm) 2.5 (63.5)
Stroke inches (mm) 3.0 (76.2)
Speed range RPM 350–825
Maximum power rating HP (kW) 15 (11)
MAWP psig (barg) 600 (41.3)
Rod load rating lb (kg) 4000 (1814)
Maximum temperature rating °F (°C) 350 (177)

Registered trademark of the DuPont Company.
Performance Curves and Specifications

Single-Stage NFD491/NFT491 Performance Curves

Curves based on Natural Gas, Specific gravity = 0.7, N = 1.26
All data at maximum RPM or HP

Specifications

| NFD491 D-style (double packed) | NFT491 T-style (triple packed) |
|--------------------------------|---------------------------------
| Available with a lubricator   |                                  |
| Viton® (standard), PTFE (optional) |                              |
| Standard packing, Vacuum & Purge (optional) |                      |
| Available with optional crankcase heater |                              |
| Extended crankshaft & heavy duty flywheel standard |                    |

Bore - x2 cylinders inches (mm) | 4.0 (101.6)
Stroke inches (mm) | 3.0 (76.2)
Speed range RPM | 350–825
Maximum power rating HP (kW) | 15 (11)
MAWP psig (barg) | 335 (23.1)
Rod load rating lb (kg) | 4000 (1814)
Maximum temperature rating °F (°C) | 350 (177)

1 Registered trademark of the DuPont Company.
Outline Dimensions

Two-Stage NFT391 with Lubricator

Inlet:
1-1/4" 300 lb. RF ANSI Flange

Outlet:
1-1/4" 300 lb. RF ANSI Flange

Cylinder Oil Drain
1/4" NPT

Pressurization Tube For “F” Packing Only

5 Groove Flywheel

1/2" Holes (13)

All dimensions in inches (centimeters)
Outline Dimensions

Single-Stage NFT491

All dimensions in inches (centimeters)
A Distance Piece Purge System is Available for All D- and T-Style Compressors

Purge gas, process gas leakage, and condensed liquids are returned to the compressor’s suction scrubber.

Virtually all gas leakage from the crankcase vent is purge gas.

Contact your local distributor for more information.