Cooper Turbocompressor has been a leading manufacturer in the compressor industry for more than 40 years. Founded by Joy Manufacturing Company, the company created a true revolution in compressor technology when it introduced the first integrally geared centrifugal compressors for plant air application in 1961.

Today, with over 5,000 installations worldwide, on nearly every continent, Cooper Turbocompressor products are proven in a wide variety of industries including plastics, pharmaceuticals, chemicals, industrial gases, automotive, textiles, paper and utilities to name a few. These compressors have earned a reputation for rugged, reliable performance in even the most extreme environments, from the harsh cold of Alaska to the scorching heat of desert climates.

Headquartered close to Niagara Falls in Buffalo, NY (USA), with sales offices around the world, Cooper Turbocompressor continues to advance the state-of-the-art in centrifugal compressor design. The company’s fully integrated manufacturing facilities are dedicated entirely to the engineering and manufacturing of centrifugal compressors for plant and process air applications. Advanced research and development, the most modern testing facilities and ISO 9001 Certification assure Cooper Turbocompressor’s continued leadership in the compressor industry.

Cooper Turbocompressor has the centrifugal compressor to meet your exact needs

Cooper Turbocompressor offers a full line of compressors, each designed for long-lasting performance, easy operation and convenient service. This brochure details the custom engineered MSG® and TA Oil-Free Centrifugal Compressors designed to assure 100% oil-free air or nitrogen gas delivery.

- TA (Turbo Air) compressors are completely packaged on a common base for easy installation. They are available in a number of configurations for capacities in the 600 CFM to 35,000 CFM range to a maximum of 12,000 horsepower and 750 PSIG.

- MSG® (Multi-Stage Geared) compressors are application engineered with a number of available configurations for flow requirements from 600 CFM to 70,000 CFM to a maximum of 20,000 horsepower and 750 PSIG.

No matter what your application requires, Cooper Turbocompressor centrifugal compressors offer outstanding flexibility backed by the engineering expertise to meet your specific needs.
Experience and innovation to meet your exact needs

From air separation plants and refineries to chemical processing and manufacturing facilities, Cooper Turbocompressor engineers have a broad range of experience in designing systems around the world. There is pride in this heritage of innovation in the industry and a striving to exceed the high standards set for the TA and MSG® centrifugal compressors.

Cooper Turbocompressor takes a team approach to meeting customer requirements. The team works with you and your staff, engineer to engineer, in designing the optimum compressor for your plant or process. Together the team can determine the factors that affect the performance of your compressor, including environmental conditions, space requirements and more. The result is a compressor to fit your specific application.

The latest technology to design your compressor

Cooper Turbocompressor has invested in the latest technology to support the expertise of its engineers and shorten response time. CAD/CAM systems are utilized across the entire design and production process.

Tasks are performed simultaneously by engineering teams instead of one at a time by individuals, significantly reducing the time of delivering a high quality compressor for your application.

Advancing the state-of-the-art in compressor design

Cooper Turbocompressor engineers have access to the resources of dedicated lab facilities and extensive research and development programs to ensure your compressor is designed with the very latest technology. These efforts continually advance compressor design with breakthroughs such as the patented intercooler seals, and the first centrifugal compressors with microprocessor control.

Finite Element Analysis - Used to analyze static and dynamic impeller stresses for special impeller designs.

Three-Dimensional Fluid Dynamic System – analyzes the compressible viscous flow through each stage resulting in a high-efficiency impeller and diffuser.
The way it is put together sets Cooper Turbocompressor apart

The Buffalo, New York plant is a fully integrated facility featuring the most current manufacturing technologies. Advanced computer aided manufacturing techniques and precision equipment are utilized to produce each compressor under the ISO 9001 certified quality program.

The latest manufacturing techniques

Cell manufacturing and work-team approaches provide greater control and flexibility in manufacturing. Employees are trained to perform a number of tasks in one cell and are empowered to increase productivity and quality.
The latest manufacturing technology

Cooper Turbocompressor has invested in tools and facilities to reduce manufacturing costs, improve quality, and shorten delivery schedules. Examples of these advanced capabilities include:

**Gearbox Machining Cell** — The Gearbox Cell is used to machine gearboxes offered in TA and MSG® centrifugal compressors. The Cell consists of a CNC-controlled horizontal machining center, with tool changer and 4 pallet system, radial drill and positioner. In short, the Gearbox Cell enables Cooper Turbocompressor to produce compressor gearboxes with outstanding accuracy, consistency, and repeatability.

**Impeller Manufacturing System (IMS)** — The IMS produces centrifugal compressor impellers faster and with greater precision than conventional machines. The CNC-controlled, five-axis milling machine is a system with all tooling, fixturing, and programming required to mill impellers from stainless steel or other material forgings.

The IMS has the capacity to machine impellers from 5" to 30" diameter. The system features custom software including programs to perform coordinate measurements during the machining process to further enhance accuracy.

A tradition of craftsmanship and quality

Cooper Turbocompressor’s advanced manufacturing technologies are complemented by a tradition of excellence in craftsmanship. Highly trained experienced craftsmen build every centrifugal compressor with high quality components and materials to ensure reliability and long operating life.

Compressors are built tough with high strength cast nodular iron scrolls or steel scrolls where required, cast iron gear boxes, stainless steel impellers and pivoted shoe bearings. Integral gears are hardened and precision ground for longer life and designed in accordance with AGMA standards.
Our commitment to your complete satisfaction

ISO 9001 certification is testimony to Cooper Turbocompressor’s commitment to be the best in the compressor industry. It means quality is an all-encompassing, company-wide attitude, from top management to research and development to engineering, manufacturing, and field service. It proves that Cooper Turbocompressor is truly a world-class manufacturer of centrifugal compressors.

Quality Policy

As part of the ISO 9001 certification, Cooper Turbocompressor has established a Quality Policy in which the focus is long-term customer satisfaction. The policy states that the company will provide the products and services worldwide that fully meet the customer’s expectations and requirements; design and manufacture products to equal or exceed industry and government regulatory standards; and provide the customer with the best value delivered.

Total Quality Management

An extensive quality control system, including strict adherence to a Total Quality Management (TQM) program, extends through all areas of products and services. The TQM program provides a systematic approach to continuous improvement, focusing on consistently meeting and exceeding customer expectations.

Supplier partners

Cooper Turbocompressor quality includes its suppliers. A close working relationship is maintained with suppliers to clearly define the quality requirements. A formal review system is in place with key suppliers to continually exchange feedback and improve the quality of the products purchased. New suppliers undergo an extensive audit before they are included on the suppliers list.

Quality never stops

Ultimately, the measure of quality is the customer’s complete satisfaction. Cooper Turbocompressor works closely with its customers to be certain that the company’s products consistently meet the customers’ application requirements.
Complete testing — further assurance of Cooper Turbocompressor’s quality

Cooper Turbocompressor’s outstanding quality is further assured by its testing facility where every centrifugal compressor is given a complete aerodynamic and mechanical test by highly skilled technicians.

The company has invested millions of dollars to create one of the industry’s most sophisticated testing facilities, with five test stands and a wide range of advanced testing instrumentation. All aerodynamic testing is performed per the ASME PTC-10 test code guidelines. To ensure mechanical integrity, the compressor is run 10% over its rated speed.

Test stands with variable speed drives

Three test stands have variable speed output to 11,000 horsepower. Two test cells are available for use with customer drives with maximum power of 1,250 horsepower to meet specific testing requirements.

Two bays allow two machines to be tested simultaneously, or one machine to be tested while another is being set up, providing reduced test schedules.

Two cooling towers are used to provide intercooler water, regulated to meet customer conditions according to ASME specifications.

A complete range of testing instrumentation

Accurate and precise compressor testing is performed by experienced technicians utilizing the latest testing equipment, including pressure instrumentation similar to what NASA uses for its complex specifications.

Automated laser alignment tables on each test stand speed test set-up time and self-calibrating instrumentation systems assure accuracy and consistency.
Testing observation and documentation

Upon request, customers are welcome to observe testing of their compressor. Complete test documentation is available.

Documentation can be provided for full operating tests to identify compressor air capacity, pressure, temperature, and horsepower. Vibration data for both steady state and coast down operation is recorded to verify rotor critical speed and response.
Tilting pad bearings provide high stability and reliability

Horizontally split, tilting pad (five-pad) journal bearings are universally acknowledged to have the highest stability and lowest vibration level for high speed shafts which are subjected to variable loading over a wide range. In the TA and MSG® centrifugal compressors, this means high reliability over the entire operating range of the unit, from full load to no load, from surge to stonewall. Bearing shoes are pressure lubricated and steel-backed babbitt for maximum reliability.

Horizontally Split Gearbox

The horizontally split gearbox allows inspection or replacement of gears, bearings and seals by simply lifting a cover. No disassembly of piping, heat exchangers or impellers is necessary as with vertically split designs.

Periodic inspections and maintenance are made easy through functional simplicity. Easy access is provided through removal of a few parts, unlike other compressor designs in which practically the entire machine must be disassembled just to inspect an impeller. Maintenance and downtime savings can be considerable.

Bull gear delivers optimum speed and efficiency

The bull gear allows each pinion to operate at optimum speed as determined by the flow and efficiency characteristic of the impellers. The bull gear is connected directly to the compressor driver by a low speed coupling.

There is no need for high speed couplings or external speed reduction gears. Gears are high speed, precision helical-type designed to meet or exceed AGMA standards quality.

The most efficient, reliable and highly accessible centrifugal compressor in a compact package

Cooper Turbocompressor centrifugal compressors feature superior design and engineering to deliver a reliable, economical supply of oil-free air for your plant or process needs. The compact package design makes every compressor easier to install, simple to operate and maintain, and more dependable.

COOPER
TURBOCOMPRESSOR
CENTRIFUGAL TECHNOLOGY

COOPER TURBOCOMPRESSOR CENTRIFUGAL TECHNOLOGY
Babbitt seals provide near zero leakage with highest reliability

When used with educting, these seals have the best recovery rate of any of the available seals. The rotating seal teeth create their own grooves in a babbitt sleeve for the ultimate in close clearance.

Sealing arrangement provides oil-free operation

Separate labyrinth-type air and oil seals effectively confine air in the stage casings and prevent contamination of the gas stream from lubricating oil. Atmospheric air space between the air and oil seals keeps free oil vapor away from the air stream, thereby ensuring 100% oil-free operation under all conditions. Cooper Turbocompressor’s horizontally split, non-contacting labyrinth seals do not require periodic replacement because they are not subject to critical shaft wear nor do they require a buffer gas supply.

Optional Babbitt Seal

Babbitt seals provide near zero leakage with highest reliability

When used with educting, these seals have the best recovery rate of any of the available seals. The rotating seal teeth create their own grooves in a babbitt sleeve for the ultimate in close clearance.

Tapered “rider ring” thrust collars maximize efficiency

The symmetry of the Cooper Turbocompressor centrifugal design cancels out the bulk of power-robbing thrust loads. Tapered “rider ring” thrust collars on the pinion shafts create an oil wedge which carries the small remaining net thrust to the bull gear where it is absorbed by a simple low speed thrust bearing. This reduces gearbox power losses to a minimum while maximizing mechanical integrity.

Rotor assembly provides smooth operation

Each rotor assembly consists of a pinion shaft to which one or two impellers are attached. Pinion gears are hardened and precision ground (AGMA 13 quality) for longer life. Smooth, vibration-free operation is ensured through precision balancing of component parts, both individually and as completed assemblies.
AERODYNAMIC PERFORMANCE

Application engineered to match your exact requirements

Optimum performance from a centrifugal compressor depends on two very important components: aerodynamic concepts and the machine’s mechanical arrangement. Cooper Turbocompressor excels in both areas.

Unique impeller designs

With more than 40 years of research and experience in compressor applications, Cooper Turbocompressor has designed several unique impeller configurations in both cast and five-axis milled stainless steel.

Sigma Radial impeller

Combines the best features of straight radial bladed and backward leaning impeller designs. Precision investment casting with high mechanical integrity provides lower operating stress levels. It provides better part load efficiency due to the compressed air being delivered at a near constant power per CFM over the operating range. An added feature of the Sigma Radial impeller is its capability to deliver flows in excess of 100% at slightly reduced pressures.

Custom Engineered – milled

Custom engineered impellers are based on the latest impeller design codes which consider inducer blade lean and exit blade rake to produce an impeller design which is optimum for its application. Higher efficiency equates to dollars saved over the lifetime of the compressor. Savings overall can be as great as 5% increase in efficiency. For a 3,000 horsepower compressor, with a power evaluation of $2,000/horsepower, that can equate to a savings of over $250,000. These unique impellers are manufactured from forgings that are machined by a five-axis milling process.

Radial Sigma Radial

For added flexibility, Cooper Turbocompressor will use RSR impellers. These impellers provide more compression ratio and are used most often in upgrades when the customer’s needs have changed over time.

Meeting the customer’s needs

The Cooper Turbocompressor aerodynamic system consists of a combination of impellers, scrolls and diffusers. Impellers are carefully stage matched by computer. The original Cooper Turbocompressor double-row vaned diffuser, single-row diffuser, or most recently, the low solidity cascade diffuser augments the impeller performance. Finally, the best scroll is chosen from three standard sizes for each stage location. The final objective, combine the components in order to meet customer needs.

Cooper Turbocompressor’s impellers, diffusers and scrolls are uniquely designed to meet each customer’s needs. Below are examples of various specialty-milled, standard-precision cast impellers and diffusers.
Variable inlet guide vanes offer power savings up to 9%

The compressors can be fitted with optional variable inlet guide vanes. Whenever the ambient temperature is below the design air temperature, the compressor flow capability increases. If this additional flow is not required, or system demand is less than 100% capacity, the guide vanes reduce the air flow into the compressor reducing the power consumption.

The inlet vanes impart a whirling motion to the inlet air flow in the same direction as the impeller operation, reducing the work input.

The net power savings when operating at reduced flow or on days colder than the design temperature can be as much as 9%. The inlet vanes are positioned close to the impeller to achieve maximum benefit.

Highly efficient air flow arrangement

Cooper Turbocompressor features a superior arrangement of air flow components. Air movement through each stage of the compressor is directed so turbulence-induced friction is reduced. The air is cooled after every stage to assure a high isothermal efficiency.

Superior air flow design ensures high efficiency and cost-effective plant operations.
Great flexibility to tailor a compressor to your needs

Every TA and MSG® model includes compressor, lubrication system, intercoolers, shaft coupling, coupling guard, interconnecting piping, and normally the driver and control panel...all on a common base.

As a result, each compressor can be installed on a simple slab foundation in the shortest possible time. This ease of installation results from Cooper Turbocompressor’s sensible packaging concept in which the primary goal is to maintain component accessibility.

The concept is simple: don’t mount anything on the compressor that isn’t functional, use top grade components, and make everything accessible with the least amount of work. Besides saving you time, energy and expense on maintenance, this concept affords great flexibility for tailoring machines to your needs.

Cooper Turbocompressor can build standard compressor packages or specialized API-672 packages like the one shown below, all on a common baseplate, very sensibly packaged.

Highly reliable lubrication system

The TA and MSG® centrifugal compressors are furnished with a pressure lubrication system which can serve the driver as well as the compressor. The system consists of an oil reservoir, main oil pump, full-flow auxiliary oil pump, oil cooler, full-flow oil filter (10 micron cartridge), oil piping, and necessary safety instruments and gauges. The system is assembled and packaged with the compressor. Separate consoles are available for the largest MSG® units.

The main oil pump may be shaft-driven, electric motor-driven, or steam turbine-driven. The auxiliary oil pump may be electric motor-driven or air motor-driven. Dual oil coolers and filters are available, as are other custom design features to meet application needs.

The standard TA lubrication system can serve the driver as well as the compressor.
Cooper Turbocompressor intercoolers guarantee maximum heat transfer

ASME-coded intercoolers provide efficient cooling between stages. The air-in-shell, water-in-tube design puts the water where cleaning is easy, an important consideration in areas with poor water conditions. The extended surface, plate-fin design provides maximum heat transfer with minimum space requirements. Entrained moisture is separated by the extended fins and changing air flow direction at low velocity.

The exclusive Cooper Turbocompressor design makes intercoolers more accessible for inspection and cleaning. Smooth bore tubes are easily rodded with bundles in place.

No disassembly of any other part of the compressor is required to perform maintenance on the intercoolers. Standard materials are copper or admiralty brass tubes with aluminum fins.

Special materials are available for tubes and tube sheets where bad water or special conditions dictate. Where contaminated air is a problem, special materials and coatings are available for fins and shells. Water consumption requirements can be tailored to customer needs, using either cooling tower or municipal water.

Low operating sound levels

The TA and MSG® centrifugal compressors are available with sound attenuating treatment for applications where low operating sound levels are a requirement. Compressors are rated in accordance with CAGI-PNEUROP test code for the measurement of sound from pneumatic equipment (ANSI 5.1, 1971). Attenuation is achieved without compromise in machine accessibility.

Legend

1. Independent floating tubesheet/ header...no thermal loads
2. Rectangular bundle...efficient, predictable performance
3. Diagonal baffle...smooth velocity changes
4. Unique flexible seal...seals over a wide range of tolerances
5. Flexible gas nozzle couplings... no transferred loads
6. Smooth bore water-in-tube ... easily cleaned
7. Bundle support channel rollers... bundle easily removed
8. Water box
9. Shell assembly
10. Air in
11. Air out
12. Water in
13. Water out
The right compressor for your needs

Sensible packaging means TA and MSG® centrifugal compressors offer outstanding flexibility to meet a wide variety of plant and process air applications. Here are some packaging considerations to assist you in selecting the model that best fits your needs.

**TA (Turbo Air)**

The TA represents a ready-to-install, immediately available package in which the compressor base is packaged with the compressor, ASME coded intercoolers, lubrication system, control system, control guide vane, main driver and shaft coupling. Installation is simple, with air and oil piping complete and on the base. The entire package can be put in place with one lift.

**MSG® (Multi-Stage Geared)**

MSG® compressors represent a number of different arrangements:

**MSG -** Compressor base with compressor and intercoolers. Lube oil reservoir and driver base separate.

**MSGP -** Compressor base with compressor, intercoolers, and lube oil reservoir. Driver base separate.

**MSGPB -** Compressor base with compressor and intercoolers adjoined to the motor base. Lube oil reservoir may be packaged under compressor base or driver base.

A single-gearbox, five-stage, three-pinion, high-pressure nitrogen compressor stands ready for shipment to a European location.
TA or MSG® three pinion - single gearbox arrangements

To accommodate 6 stages per gearbox, a three-pinion casing is provided which has an additional horizontal split through the top half of the gearbox. This allows an additional pinion to be mounted on top of the bull gear.

The 6 stage compressors feature the same design as the 4 stage compressors - where gearboxes are split horizontally for the best possible access to components. The benefits of 6 stage compressors include:

- Higher pressures
- Multiple air compression service
- Reduced overall footprint
- Fewer internal components
- Easier installation
- Lower installed cost than two separate machines

MSG® three pinion - double gearbox arrangements

The three pinion arrangement has been expanded to provide other packaging options. These include applications where more than one process requiring more than 6 stages can be coupled together with two gearboxes on one base. As many as 3 services and 12 stages can be packaged on a single compressor unit with 2 gearboxes.

For example, a combination of a high pressure recycle compressor (normally 4 stages) and a nitrogen feed compressor (normally 3 stages). In this type of combination, the feed compressor is built into the third pinion location on top of the gearbox. Each duty can be controlled separately. Benefits of such an arrangement include:

- An entire plant can be simplified by having only one machine to install, operated by only one driver and starting system
- Overall operation is improved
- Installation costs are reduced
- Overall costs are reduced
- One lubricating and control system

All Cooper Turbocompressor Recycle Compressors frame MSG -7 and larger are equipped with a patented pressure balance piping system on each stage discharge. This pressure balanced system relieves almost all of the pressure and thermal forces on the scrolls. With reduced forces, Cooper Turbocompressor can provide machines with higher efficiency, hence reducing operating power consumption.
COOPER TURBOCOMPRESSOR CONTROL SYSTEM

Enhanced compressor efficiency and performance are in your control

Cooper Turbocompressor introduced the first microprocessor control for centrifugal compressors over 15 years ago. Today the Quad 2000 is the most advanced microprocessor-based system ever, with numerous advantages over digital relay logic and programmable controller-based systems.

Quad 2000 gives you more control, faster speed, more input/output capability, and more efficient operation ...and it’s easy to use. It is a very flexible control system to meet your exact performance standards. Quad 2000 control can save you money the minute you install your TA or MSG® compressor.

Vibration levels and critical temperatures and pressures with alarm and trip functions are constantly monitored. All data is displayed on a digital readout screen.

Automatically adapts to changes in system demand

Quad 2000 has the unique ability to anticipate changes in system demand and adapt to them automatically...unlike conventional control systems which simply react to changes after they occur. Quad 2000 constantly monitors the rate of change in operating conditions, controlling the inlet valve or guide vanes and modulating the by-pass or blow-off valve to provide smooth, efficient control.

Flexible to meet your application requirements

Quad 2000 is offered with Auto/Dual control, Constant Pressure control or Constant Mass Flow control. Surge Protection automatically ensures stable compressor operation under all operating conditions, while providing maximum range.
Cooper Turbocompressor models have a modular design to fit customer needs for capacity and discharge pressure. Aerodynamic units consisting of matched impellers, scrolls, diffusers, and pinion speeds can be arranged on standard compressor frames to provide a variety of performances.

The complete product line includes standard plant air compressors. These TA-2000 and C-8 series compressors are briefly described on page 24 and in a separate description bulletin.

### A Number of Custom Performances, Designed from Standard Components

- **Two-stage** TA compressors for glass manufacturing, and pharmaceuticals.
- **Three-stage** TA for large manufacturing, textile fiber, and process applications.
- **Four-stage** TA and MSG® for chemical processing needs.
- **Packaged five- and six-stage** MSG® models are available for soot blowing electric utilities and high pressure boosting.
- **Four-stage double gearbox** MSG® compressors for high pressure liquifying and soot blowing service.
- **Three pinion single gearbox or double gearbox** TA and MSG® arrangements for combined service compressors and high pressure applications.
# PRODUCT SECTION
## TURBO-AIR “TA” COMPRESSORS

### TWO OR THREE STAGES ON ONE OR TWO ROTORS WITH:

<table>
<thead>
<tr>
<th>Model</th>
<th>L (in)</th>
<th>H (in)</th>
<th>W (in)</th>
<th>Wgt (lb*)</th>
<th>Wgt (lb**)</th>
<th>Wgt (kg**)</th>
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<td>13100</td>
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<td>75</td>
<td>24000</td>
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<td>TA110/120/120A</td>
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### FOUR, FIVE OR SIX STAGES ON TWO OR THREE ROTORS WITH:

<table>
<thead>
<tr>
<th>Model</th>
<th>L (in)</th>
<th>H (in)</th>
<th>W (in)</th>
<th>Wgt (lb*)</th>
<th>Wgt (lb**)</th>
<th>Wgt (kg**)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TA26/30/35/35A</td>
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<td>25000</td>
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<tr>
<td>TA110/120/120A</td>
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<td>MODELS ARE MANUFACTURED AS MSG PACKAGES</td>
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</tbody>
</table>

### Typical arrangements for
- a) two intercoolers (above)
- b) three intercoolers (to left)

### NOTE:
- For 50 Hz applications, add five (5) inches (130 mm) to the width (W)
- For five and six stages, add on average 7,000 lbs. (3,200 kg) to the weight listed in the above matrix
- For five and six stages with four intercoolers, and four stages with three intercoolers and a mounted aftercooler, add on average 40 inches (1,000 mm) to the width (W)
- All dimensions and weights are subject to change without notice
- * Weights of compressor base, compressor, intercoolers & lubrication system
- ** Total weight of (*-above) with motor
# MULTI STAGE GEARED “MSG” COMPRESSORS

## TWO OR THREE STAGES ON ONE OR TWO ROTORS WITH:

<table>
<thead>
<tr>
<th>ONE OR TWO STANDARD INTERCOOLERS</th>
<th>ONE OR TWO HIGH EFFICIENCY INTERCOOLERS</th>
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<tr>
<td><strong>L</strong> (in) <strong>W</strong> (in) <strong>Wgt</strong> (lb)</td>
<td><strong>L</strong> (in) <strong>W</strong> (in) <strong>Wgt</strong> (lb)</td>
</tr>
<tr>
<td><strong>H</strong> (mm)</td>
<td><strong>W</strong> (mm)</td>
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<tr>
<td>MSG6/7/7A</td>
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<td>MSG8/9/9A</td>
<td>205 5210</td>
</tr>
<tr>
<td>MSG12</td>
<td>230 5850</td>
</tr>
<tr>
<td>MSG14/16</td>
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<td>MSG20</td>
<td>255 6480</td>
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<td>MSG25</td>
<td>255 6480</td>
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## FOUR, FIVE OR SIX STAGES ON TWO OR THREE ROTORS WITH:

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<th>THREE HIGH EFFICIENCY INTERCOOLERS</th>
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<td><strong>L</strong> (in) <strong>W</strong> (in) <strong>Wgt</strong> (lb)</td>
</tr>
<tr>
<td><strong>H</strong> (mm)</td>
<td><strong>W</strong> (mm)</td>
</tr>
<tr>
<td>MSG6/7/7A</td>
<td>200 5080</td>
</tr>
<tr>
<td>MSG8/9/9A</td>
<td>185 4700</td>
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<tr>
<td>MSG12</td>
<td>225 5720</td>
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<td>MSG14/16</td>
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<td>255 6480</td>
</tr>
<tr>
<td>MSG25</td>
<td>255 6480</td>
</tr>
</tbody>
</table>

**Typical arrangement for a compressor with three intercoolers. With a one or two intercooler application the lube oil console can be packaged in the compressor base.**

**NOTE:**

- For 50 Hz applications, add five (5) inches (130 mm) to the width (W)
- For five and six stages, add on average 7,000 lbs. (3,200 kg) to the weight listed in the above matrix
- For five and six stages with four intercoolers, and four stages with three intercoolers and a mounted aftercooler, add on average 40 inches (1,000 mm) to the width (W)
- All dimensions and weights are subject to change without notice

**Weights of compressor base, compressor, intercoolers and lubrication system**

**Weights of compressor base, compressor and intercoolers**

---

20
COMBINATION THREE PINION ARRANGEMENT
RECYCLE AND RECYCLE/FEED COMPRESSORS

COMBINATION RECYCLE AND FEED COMPRESSORS

<table>
<thead>
<tr>
<th></th>
<th>4 STAGES OF RECYCLE &amp; 3 STAGES OF FEED</th>
<th>4 STAGES OF RECYCLE &amp; 2 STAGES OF FEED</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DOUBLE GEARBOX</td>
<td>SINGLE GEARBOX</td>
</tr>
<tr>
<td></td>
<td>4R3 X 3R3 MSGE- ▲ RCD</td>
<td>6R3 MSGE- ▲ RCD</td>
</tr>
<tr>
<td></td>
<td>(in) (mm)</td>
<td>(in) (mm)</td>
</tr>
<tr>
<td>L</td>
<td>Wgt* (lb) (kg)</td>
<td>Wgt* (lb) (kg)</td>
</tr>
<tr>
<td>H</td>
<td>Wgt* (lb) (kg)</td>
<td>Wgt* (lb) (kg)</td>
</tr>
<tr>
<td>3/3A</td>
<td>180 4580 140 3560 155 3940 44000 20000</td>
<td>235 5970 120 3050 145 3690 44000 20000</td>
</tr>
<tr>
<td>4/5/5A</td>
<td>195 4960 130 3310 145 3690 57000 25900</td>
<td>250 6350 110 2800 140 3560 52000 23600</td>
</tr>
<tr>
<td>6/7/7A</td>
<td>235 5970 165 4200 165 4200 94000 42700</td>
<td>200 5080 165 4200 165 4200 63000 28600</td>
</tr>
<tr>
<td>10/11/11A</td>
<td>265 6740 175 4450 180 4580 99000 44900</td>
<td>265 6740 175 4450 180 4580 99000 44900</td>
</tr>
<tr>
<td>12</td>
<td>290 7370 185 4700 225 5720 169000 76700</td>
<td>265 6740 175 4450 180 4580 99000 44900</td>
</tr>
<tr>
<td>14/16</td>
<td>330 8390 200 5080 230 5820 175000 79400</td>
<td>265 6740 195 4960 215 5470 115000 52200</td>
</tr>
</tbody>
</table>

RECYCLE COMPRESSORS - DOUBLE GEARBOX   2 X 2 MSGE- ▲ RC

<table>
<thead>
<tr>
<th></th>
<th>THREE STANDARD INTERCOOLERS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L (in) H (in) W (in) Wgt* (lb) (kg)</td>
</tr>
<tr>
<td>3/3A</td>
<td>165 4200 105 2670 115 2930 41000 18600</td>
</tr>
<tr>
<td>4/5/5A</td>
<td>195 4960 120 3050 125 3180 47000 21400</td>
</tr>
<tr>
<td>6/7/7A</td>
<td>235 5970 150 3810 155 3940 72000 32700</td>
</tr>
<tr>
<td>10/11/11A</td>
<td>255 6480 155 3940 150 3810 105000 47700</td>
</tr>
<tr>
<td>12</td>
<td>280 7120 170 4320 205 5210 124000 56300</td>
</tr>
<tr>
<td>14/16</td>
<td>295 7500 185 4700 210 5340 130000 59000</td>
</tr>
</tbody>
</table>

**NOTE:** All dimensions and weights are subject to change without written notice.

*Weights of compressor base, compressor and intercoolers
EASY MAINTENANCE
SERVICE

Vibration probe removed easily with simple tools, without unit disassembly.

Horizontally split gearbox offers easy access to internal components.

Bearings, gears and seals immediately accessible with gearbox cover removal.

Bearing removal is simple.

Split labyrinth oil seal removal.

Split labyrinth air seal removal.

Removal of interstage piping is the first step to inspecting impeller.

Inlet nozzle can be removed easily to completely expose impeller.

Impeller is revealed for inspection or simple removal.
A combined 11,000-horsepower, 7-stage recycle/feed compressor, installed at a Western New York air separation plant, where liquid nitrogen, oxygen and argon are produced and trucked to area users.

A United Kingdom air separation plant utilizes this custom-engineered, 10,000-horsepower, single-gearbox recycle/feed compressor.

A Model 4MSGE-9, main air compressor installed at the same air separation facility as the 11,000 horse power, 7 stage recycle/feed compressor to the left.

An air separation facility in the southern United States utilizes this high efficiency Model 4MSGE-25 main air compressor.