Oil-free Compressed Air Technology

Ingersoll Rand (NYSE:IR) advances the quality of life by creating and sustaining safe, comfortable and efficient environments. Our people and our family of brands—including Club Car®, Ingersoll Rand®, Thermo King® and Trane® —work together to enhance the quality and comfort of air in homes and buildings; transport and protect food and perishables; secure homes and commercial properties; and increase industrial productivity and efficiency. We are a $12 billion global business committed to a world of sustainable progress and enduring results.

We are committed to using environmentally conscious print practices.

 SN: IAS-0701015-EN

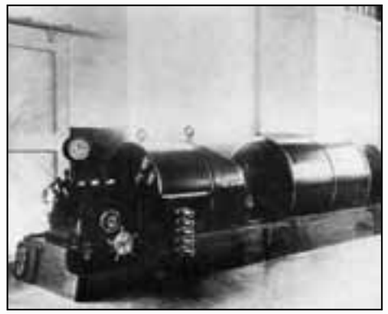
More than air, a history of innovation

For more than 100 years, Ingersoll Rand has inspired progress by driving innovation with revolutionary technology — creating new standards for how the world gets work done. We introduced our first oil-free compressor in 1912, and over the decades we've continued to develop rugged, reliable, industry-leading compressor technologies.

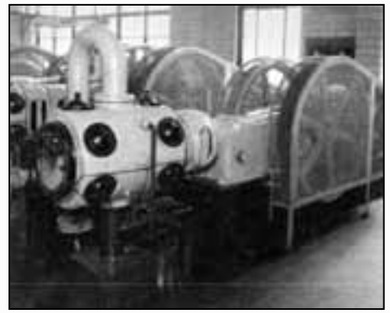
Ingersoll Rand is the technology leader in oil-free compressed air not only because we develop class-leading products, but also because we know our customers' industries, understand the demands placed on productivity and quality, and then offer highly engineered system solutions that make sense. No matter what your product, process, or location, Ingersoll Rand has the expertise, the oil-free technology, and the unmatched service to meet your needs.

1906 Ingersoll Rand becomes publicly traded company on NYSE

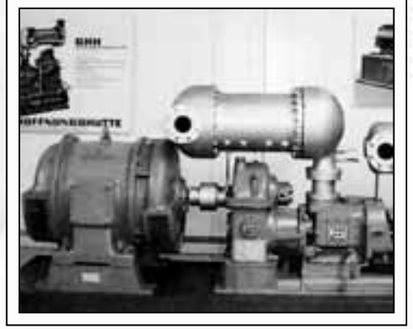
1912 Ingersoll Rand pioneers oil-free centrifugal compressor technology



1933 Technologically advanced oil-free reciprocating compressor goes to market



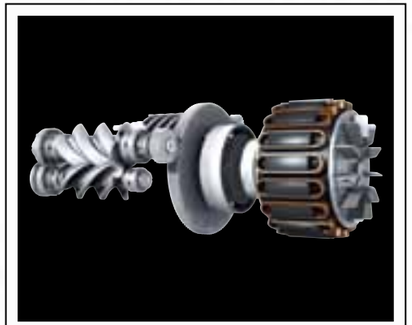
1952 The world's first oil-free rotary compressor is introduced



1968 First packaged centrifugal compressor is introduced
(current model shown)

1993 The 37 – 300 kW packaged rotary-screw compressor is introduced featuring Intellisys™, UltraCoat™ rotor protectant, and 115° F design

2003 Ingersoll Rand offers industry's first true variable-speed drive, oil-free compressor featuring HPM motor technology



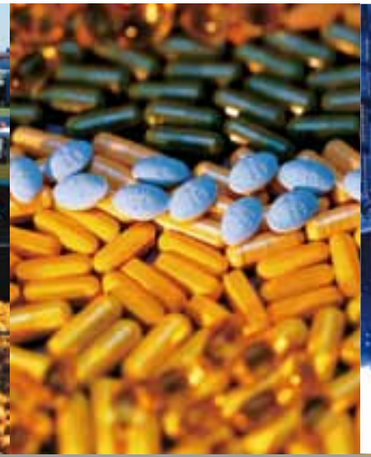
1910 1920 1930 1940 1950 1960 1970 1980 1990 2000

When high air purity is a high priority

oil-free

Food and Beverage ▲

Oil-free compressors that deliver no oil into the air stream and minimize microbial content through high-temperature compression reduce contamination risk for food and beverage manufacturers.



Pharmaceutical ▲

The highly regulated pharmaceutical industry requires 100% total quality built into manufacturing processes. Compressed air quality must be validated as part of GMP.

Electronics ▲

High air quality is critical in this industry — you can't afford downtime or product spoilage with wet or oily compressed air.

Chemical ▲

Whether manufacturing cleaning solutions, base stock pharmaceuticals, or anything in between, the compressed air quality must be of the highest purity to minimize risk of production interruption or higher cost liability.

Textile ▲

High-tech air jet looms require super-clean, dry, 100% oil-free compressed air, which is why Ingersoll Rand has been a critical supplier to this industry for many years.

Utilities ▲

Compressed air quality is too important to risk, so when specifying instrument air for utilities, most engineers request oil-free compressors.

There's a lot riding on the quality of your air. The presence of particles, condensation, oil, and oil vapor in a compressed air system can lead to downtime, product spoilage and recall, damage to your brand reputation, or worse, harmed consumers and product liability.

No matter what industry or critical application, you can count on Ingersoll Rand to offer solutions that mitigate risk and ensure delivery of the highest air purity possible.

Oil-free, risk-free

How pure is your air? One of the keys to ensuring you achieve and maintain acceptable air quality for your critical application is to know industry air quality standards and their allowable levels of contaminants. The lower the particular class rating, the purer the air should be.

ISO 8573-1:2010 Air Quality Classes

	Solid Particulate				Water		Oil
ISO 8573-1:2010 CLASS	Maximum number of particles per m^3			Mass Concentration mg/m^3	Vapour Pressure Dewpoint	Liquid g/m^3	Totall Oil (aerosol liquid and vapour) mg/m^3
	0.1-0.5 micron	0.5-1 micron	1-5 micron				
0	As specified by the equipment user or supplier and more stringent than Class 1						
1	≤20,000	≤400	≤10	–	≤–70°C	–	0.01
2	≤400,000	≤6,000	≤100	–	≤–40°C	–	0.1
3	–	≤90,000	≤1,000	–	≤–20°C	–	1
4	–	–	≤10,000	–	≤+3°C	–	5
5	–	–	≤100,000	–	≤+7°C	–	–
6	–	–	–	≤5	≤+10°C	–	–

ISO 8573-1:2010 Class 0 specifies air quality standards for critical manufacturing processes within the food and beverage, pharmaceutical, textile, and electronics industries. It is the most stringent class, covering oil contamination in aerosol, vapor, and liquid forms.

Some compressor manufacturers have marketed their units as being *essentially* oil-free, but this isn't necessarily the case. If you need *guaranteed* pure air for your critical application, then you need Ingersoll Rand.

Oil-free compressors in a class by themselves

With an Ingersoll Rand oil-free compressor, you don't have to worry about contaminated air, regardless of the technology you choose.

Our oil-free rotary-screw and centrifugal compressors were rigorously tested by TÜV Rheinland® — a global leader in independent testing and assessment services — and earned ISO 8573-1:2010 Class 0 certification.

Only Ingersoll Rand delivers ISO Class 0 in both rotary-screw and centrifugal technologies. Whether you're in food and beverage, pharmaceuticals, electronics, or any other critical application, count on Ingersoll Rand oil-free technology to deliver pure air and peace of mind.

Two-stage, oil-free rotary-screw air compressors

The reliable workhorse. Since its introduction in 1993, the Ingersoll Rand oil-free rotary-screw compressor has earned a reputation for being a highly reliable supplier of pure air. Its rugged design sets the standard for efficiency and durability. With an Ingersoll Rand oil-free rotary-screw compressor in your operation, you benefit from knowing you can run 24 / 7 with virtually no downtime.

Superior technology

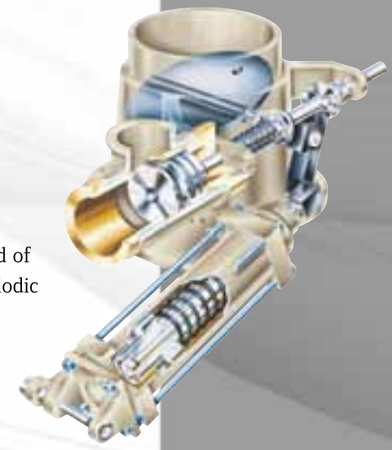
Our time-proven two-stage compression module features precision-machined rotors and gearing, advanced UltraCoat rotor protection, anti-friction bearings, stainless-steel air seals, and a unique labyrinth oil seal design — all ensuring years of reliable, trouble-free operation.

Oil-free heritage

Over the years, Ingersoll Rand has delivered more than 100,000 sets of oil-free rotors to industries that rely on high-purity products such as pharmaceuticals, food and beverages, and electronics.

Stainless-steel rotors

Ingersoll Rand pioneered the use of stainless-steel rotors in the demanding second stage to guarantee longer airend life, and to safeguard the quality of your compressed air.



Inlet valve superiority

Ingersoll Rand uses hydraulic valve actuation instead of pneumatic controls. This eliminates the need for periodic diaphragm replacement, preventing unnecessary downtime and maintenance costs.

Dual-vented seals

Our stainless-steel ring seals and labyrinth oil seals provide dual-vented, 100% guaranteed oil-free air.

UltraCoat™ — energy savings and longer life

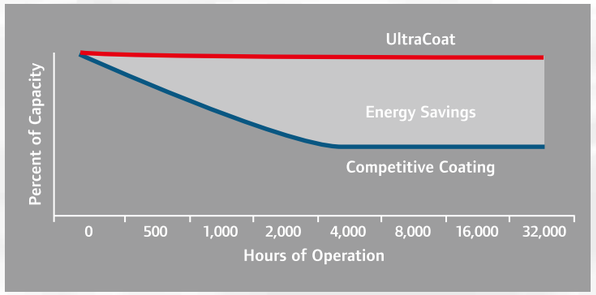
Compressor rotors take a beating. Over time their surfaces can deteriorate, making rotors increasingly susceptible to compressed air impurities and temperature fluctuation, which lead to reduced efficiency, decreased air purity, and compressor failure.

Ingersoll Rand eliminates this problem with UltraCoat, an advanced rotor and housing protection process that ensures the most durable coating, with unmatched adhesion and temperature resistance.

Every Ingersoll Rand oil-free rotor and housing is specially prepared, creating a surface texture to which the UltraCoat micro-coating bonds with the tightest, longest-lasting grip possible.

We also use stainless-steel and aluminum piping to link the compressor's intercooler with the stainless-steel second stage rotors. This way, condensation during the cooling process won't cause corrosion or rust, further extending the life of the UltraCoat coating and rotors.

Ultimately, UltraCoat delivers greater reliability in performance and air quality, rotor longevity, increased uptime, and reduced energy costs.



A smart choice for reliable, repeatable processes

60 Hz (50 – 400 hp)

Nominal hp	Model L FAD at 100 psi(g) cfm	Model H FAD at 125 psi(g) cfm	Model HH FAD at 150 psi(g) cfm	Width in	Length in	Height in	Weight lb
50	214	179	—	54	88.5	75.4	5111
60	266	229	—	54	88.5	75.4	5364
75	333	288	268*	54	88.5	75.4	5364
100	419	407	378*	54	88.5	75.4	5500
125	585	523	477	62.5	106	93.3 / 72.5**	6,437 / 6,709**
150	690	690	565	62.5	106	93.3 / 72.5**	6,452 / 6,724**
200	911	854	759	62.5	106	93.3 / 72.5**	7,099 / 7,385**

50 Hz (37 – 300 kW)

Nominal kW	Model SL FAD (m^3/min) at 7.0 bar(g)	Model SM FAD (m^3/min) at 8.5 bar(g)	Model SH FAD (m^3/min) at 10.0 bar(g)	Width mm	Length mm	Height mm	Weight kg
37	6	5.1	—	1372	2248	1917	2387/2410**
45	7.6	6.5	—	1372	2248	1917	2497/2520**
55	9.6	8.6	7.7*	1372	2248	1917	2577/2600**
75	12.5	11.6	10.7*	1372	2248	1917	2862/2705**
90	15.9	13.6	13	1588	2692	2374/1841**	3270/3425**
110	19.4	18	15.3	1588	2692	2374/1841**	3350/3505**
132	22.8	21.4	18.8	1588	2692	2374/1841**	3400/3555**
150	25.9	24.6	22.1	1588	2692	2374/1841**	3450/3605**
200	35	32.6	27.4	1930	3048	2438/2065**	5222/4830**
250	45.2	41.5	35.5	1930	3048	2438/2065**	5262/4870**
300	–	46.70	43.3	1930	3048	2438/2065**	5512/5120**

FAD (Free Air Delivery) cfm and m^3/min are full-package performance ratings in accordance with CAGI / Pneurop acceptance test standard PN2CPTC2 or ISO 1217.

*Available in water-cooled configuration only.

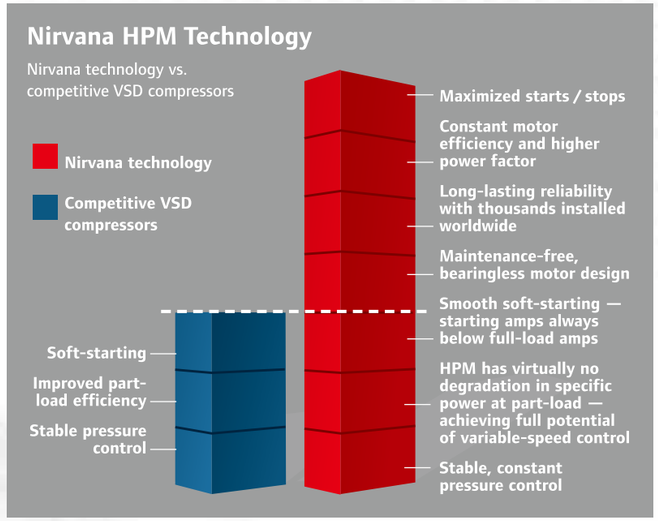
**Specification given with air-cooled value first, then water-cooled.

Unleashing the full potential of variable-speed technology

If you have a critical oil-free application requiring the lowest operating cost, you can't afford to take chances with a compressor system that delivers anything but the absolute highest quality air, reliability, and efficiency. Not a problem with an Ingersoll Rand Nirvana — the world's first true variable-speed drive (VSD) oil-free compressor system.

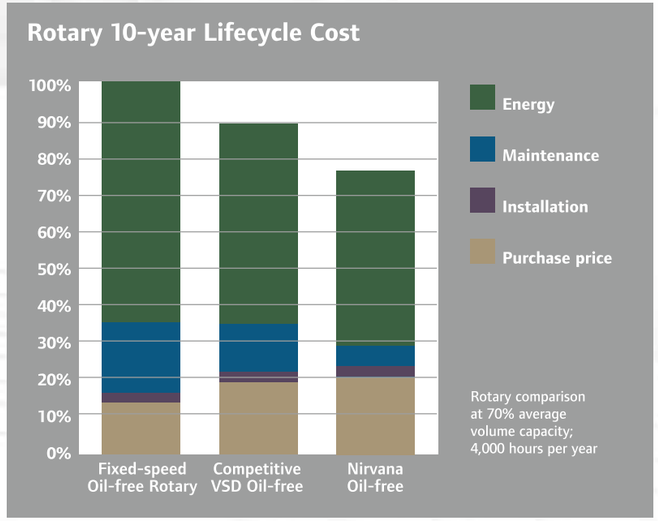
Purely better

While other VSD compressors also deliver stable pressure, soft-starting, and improved part-load efficiency over fixed-speed compressors, only Nirvana enables you to reach the full potential of variable-speed technology. With a Nirvana system, you get ultra-reliability and efficiency, virtually maintenance-free operation, unlimited starts and stops, and peace of mind knowing your air is 100% pure.



Real savings, real satisfaction

Energy costs can be as much as 60% of the lifecycle cost of an air compressor. The Nirvana system helps you reach the full potential of variable speed through the absolute lowest energy cost and the highest efficiency possible.



The Nirvana advantage

Achieve a higher plane of performance

There's never been a compressor system as advanced as Nirvana. It's synergy in motion — a combination of transcendent, inter-dependent technologies including the revolutionary Hybrid Permanent Magnet (HPM) motor, and more than a century of proven engineering expertise and innovation.

Only Ingersoll Rand combines more than a century of proven engineering and compression technologies with the state-of-the-art UltraCoat surface protection for unmatched performance and durability.

Ultra-efficient and reliable, the Nirvana HPM motor delivers peerless performance, including the ability to start and stop limitlessly to meet demand.

Our advanced air system controllers enable you to stabilize air pressure, reduce energy costs, extend the life of system components, and prevent off-quality product.

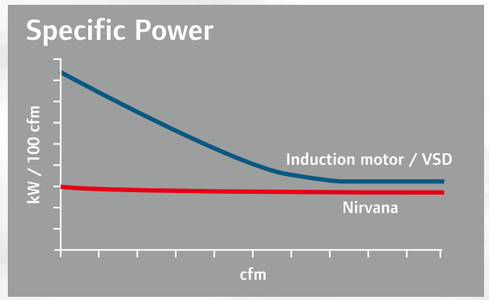
A revolutionary motor coupled with advanced controls and proven compressor technologies

Limitless starts and stops

Nirvana is designed to start and stop limitlessly to meet your compressed air demands while never going above full-load amps. HPM motor technology also has unmatched efficiency throughout the turn-down range, providing savings no matter what your demand profile requires.

No wasted energy

The Nirvana HPM motor requires less power at start-up, never operates at more than full-load amps, and shuts down immediately at minimum speed to avoid wasted energy. Nirvana ensures constant pressure throughout the entire operating range. At start-up, induction motors require a power surge of up to twice full-load current in order to overcome initial inertia. They also run unloaded when demand is below minimum, reducing efficiency and driving up energy costs.



Proven airends

Our rotary-screw airends deliver full potential through unparalleled rotor profile accuracy and repeatability. Stainless-steel rotors are used in the demanding second stage for maximum corrosion resistance. UltraCoat surface coating is also applied to the rotors and all housing surfaces for unmatched durability and performance.

Simpler and more reliable

The Nirvana HPM motor has fewer moving parts, and flanges directly onto the compressor drive shaft, making the motor more reliable and 100% maintenance-free. Its bearing-free design eliminates the need for greasing or replacing motor bearings. The HPM motor is also designed to operate continuously in temperatures up to 115° F (46° C).

Precision-wound

With its precision-wound design, the Nirvana HPM motor eliminates inefficiencies and hot spots common to conventional, random-wound induction motors. These hot spots can cause insulation and motor failure.

Perfect solutions for critical operations

60 Hz

Model (HPM Style)	FAD at 100 psig cfm	FAD at 125 psig cfm	FAD at 150 psig cfm	Discharge Air NPT in	Nominal hp	Width in	Length in	Height in	Weight lb
IRN50H-OF	200	180	159	1.5	50	43.9	81.9	79.7	3482
IRN60H-OF	237	220	198	1.5	60	43.9	81.9	79.7	3482
IRN75H-OF	331	299	269	1.5	75	52	81.8	76.7	4500
IRN100H-OF	435	400	368	1.5	100	52	81.8	76.7	4500
IRN125H-OF	563	504	444	2	125	74.2	100.3	95.9	7088
IRN150H-OF	676	616	555	2	150	74.2	100.3	95.9	7088
IRN200H-OF	881	816	751	2	200	74.2	100.3	95.9	7088

50 Hz

Model (HPM Style)	FAD (m^3/min) at 7 bar(g)	FAD (m^3/min) at 8.6 bar(g)	FAD (m^3/min) at 10.3 bar(g)	Discharge Air BSPT in	Nominal kW	Width mm	Length mm	Height mm	Weight kg
IRN37K-OF	5.66	5.07	4.50	1.5	37	1115	2080	2024	1579/1624**
IRN45K-OF	6.71	6.20	5.61	1.5	45	1115	2080	2024	1579/1624**
IRN55K-OF	9.37	8.47	7.62	1.5	55	1321	2078	1948	2041
IRN75K-OF	12.32	11.33	10.42	1.5	75	1321	2078	1948	2041
IRN90K-OF	15.4	13.7	12.1	2	90	1885	2547	2435	3215
IRN110K-OF	18.8	17.1	15.4	2	110	1885	2547	2435	3215
IRN132K-OF	22.3	20.4	18.6	2	132	1885	2547	2435	3215
IRN160K-OF	25.6	24.4	22.8	2	160	1885	2547	2435	3215

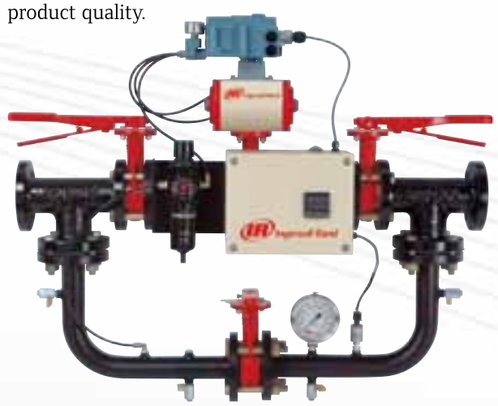
Advanced controls

If you have a multiple-compressor installation, then you probably know that maintaining optimum average pressure along the entire line can be challenging, inefficient, and costly. Load / unload pressures are commonly offset to keep the compressors from starting at the same time, but doing so limits the system's ability to meet demand, and basic control settings can drift over time. This causes wide pressure swings that result in off-quality product, wasted energy, and shortened compressor life.

Ingersoll Rand advanced controllers — when coupled with our extensive system audit services — enable you to optimize air efficiency, deliver consistent flow and pressure, and extend the life of system components. Ultimately, you'll stabilize your pressure and reduce energy costs.

Intelliflow™ Air System Pressure Controller

Intelliflow provides precise air pressure control of production processes by separating supply-side air from demand-side air. As a result, supply-side air is not affected by incidents on the demand side. Intelliflow can lower demand pressure precisely — saving lost energy costs and better ensuring consistent product quality.



Intellisys Energy Optimizer

When incorporated into a Nirvana VSD-enhanced, fixed-speed compressed air system, the IEO provides the utmost in energy savings. The controller designates the Nirvana as a "trimming" or "lead" compressor. If only one compressor is needed to satisfy demand, the more efficient Nirvana will run. When demand exceeds the capacity of the Nirvana, one or more of the fixed-speed compressors will start at full capacity and the Nirvana trims back in output to precisely and efficiently satisfy demand in excess of the fixed-speed capacity. As demand drops, the IEO turns off the fixed-speed units, leaving the Nirvana to run by itself again.

Enhance reliability

Control up to eight rotary-screw or reciprocating compressors from any manufacturer, and continuously monitor air system quality.

Save energy

Overcome the problems associated with compressor trains and reduce the control pressure band.

Increase productivity

Automate compressor control and optimize compressor scheduling to meet varying plant demand.

As Ace As Aeolus

Ingersoll Rand AS Series Oil-free Scroll Air Compressor
Lead to revolution for air compressor

8 Major Advantages

- Smaller footprint, save more space in compressor room
- Fewer components, higher reliability
- Lower sound level, healthy work environment
- Perfectly applicable to all industries
- Less consumables, longer service life
- No metal friction, less maintenance
- Oil-free compression, no pollution
- Zero emission, green and environmental-friendly

Excellent Compression Model

- Aluminum shell, light weight
- Built-in centrifugal fan on the air-end ensures sufficient cooling air
- Efficient cooling module control air-end temperature effectively
- 5.5kW Dual-inlet design of air-end makes the compression more stable and efficient

Efficient Cooling Fan

- Small size, large airflow
- 24V DC power, safe and stable
- Aluminum material, light but durable
- Well known brand for quality assurance

Fin-tube Heat Exchanger

- Fin-tube design
- Anti-corrosion copper tube
- Efficient cooling fin module

Intelligent Controller

- Large size with interactive display
- Large navigation button and intuitive navigation control.
- LCD screen with friendly and visual display
- Chinese/English language display
- Fault protection, air-end fault alarm for safe operation of machine
- 3 control modes: local, remote, communication
- Standard RS-485 interface for remote start/stop, detection of working status
- Multi-level control and operation logics
- Multiple air-end backup operation

Parameters and Specifications

Ingersoll Rand AS Series Oil-free Scroll Air Compressor (50HZ)							
Model	Max Woking Pressure barg	Nominal Power kW	Air Flow m^3/min	Connection Size BSPT	Dimension (LxWxH) mm	Weight kg	Sound Level dB(A)
ASM2	8	2.2	0.24	1/2"	830×740×910	204	58
ASH2	10	2.2	0.21	1/2"	830×740×910	204	58
ASM4	8	3.7	0.40	1/2"	830×740×910	231	58
ASM5	8	5.5	0.60	1/2"	830×740×910	240	59
ASH5	10	5.5	0.53	1/2"	830×740×910	240	59
ASM7	8	7.7	0.84	1"	1445×800×1000	438	62
ASH7	10	7.7	0.74	1"	1445×800×1000	438	62
ASM11	8	11	1.20	1"	1445×800×1000	495	64
ASH11	10	11	1.06	1"	1445×800×1000	495	64

* FAD (Free Air Delivery) is ratings of full package performance in accordance with ISO1217 Annex C.
** Sound level at the work station (±3 dB(A)), determined according to noise test code ISO2151 and noise measurement taken at the duct of inlet and outlet of the standard compressor.