

Ingersoll-Rand®

ThermoStar Refrigeration Air Dryers



 **Ingersoll-Rand®**

Why Dry Compressed Air?

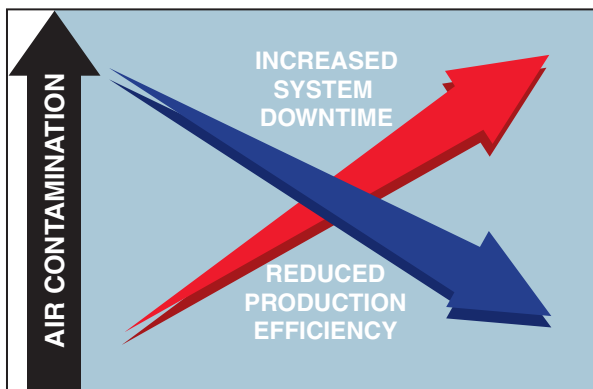
Contamination Reduces Efficiency

The air we breathe contains contamination in the form of water vapor and airborne particles.

During the compression process an air compressor concentrates these contaminants and depending on the design and age will even add to the contamination in the form of oil carry over.

Modern air compressors generally have built in aftercoolers that reduce the discharge temperature of the compressed air and with the help of water separators, remove the bulk of liquid water.

In some applications this may be sufficient, but the remaining dirt and moisture content suspended in aerosol form, can, if not removed, damage the compressed air system and reduce product quality.



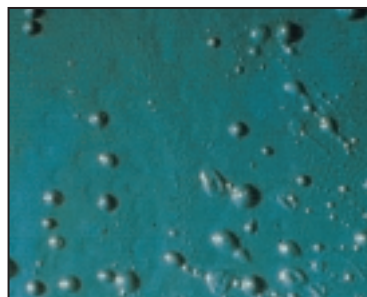
The result - higher overall cost of operation from:

- Increased system downtime
- Reduced production efficiency

These problems can be avoided with the correct selection and application of compressed air filters and dryers from Ingersoll-Rand.



Corrosion



Reduced Paint Quality



Damaged tools

The Air Solutions Group at Ingersoll-Rand has the widest selection of products and application knowledge to protect your investment and your compressed air system.

- | | |
|-------------------------|------------------------|
| ■ Filters | ■ Refrigeration dryers |
| ■ Condensate management | ■ Desiccant dryers |
| ■ Cooling systems | ■ Piping systems |

ThermoStar Dryers - The 'Class' Solution

Quality Matters

Ingersoll-Rand ThermoStar Refrigeration Dryers are available in over 20 model sizes to suit all applications. When installed with compressed air filters they will provide clean compressed air to the classes as prescribed in ISO 8573.1.

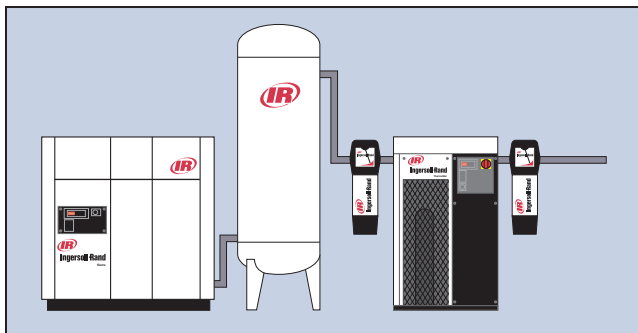


Over 20
models
available

ISO 8573.1 Quality Classes

Quality Class	Dirt Particle size in Micron	Water Pressure Dewpoint Pressure Dewpoint ppm. vol. at 100 psig (7 barg)			Oil (Including vapor) ppm
		°F	(°C)	ppm.vol.	
1	0.1	-100	(-70)	0.3	0.01
2	1	-40	(-40)	16	0.1
3	5	-4	(-20)	128	1
4	15	38	(3)	940	5
5	40	45	(7)	1240	25
6	-	50	(10)	1500	-

Installation Guide



Air Quality - With correct selection, the above schematic relates to an installation that would provide Class 1 dirt, Class 4 water, and Class 1 oil. This is recommended to stop downstream corrosion, prevent product spoilage and prolong the life of pneumatic tools and the compressed air system.

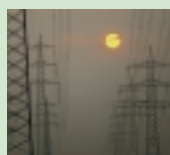
Totally Environmentally Friendly



R407C Refrigerant

Use of environmentally friendly R407C refrigerant ensures compliance with the

Montreal Protocol. With no proposed 'phase out' of this refrigerant, the dryer will not have to be replaced prematurely.



Energy Efficient

Use of R407C refrigerant can reduce dryer running costs by 10% when compared to widely used R134a.

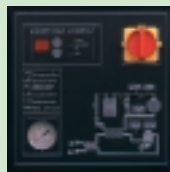
The use of modern technology scroll refrigeration compressors (3 phase units) will reduce energy consumption by a further 20%.



Fully Recyclable

Fully recyclable materials used throughout.

Compact dryer design means fewer raw materials requiring disposal at the end of its useful life.

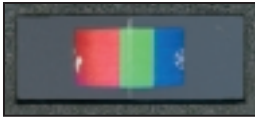


Energy Saving Control

Fitted on models TS200 - TS3000, an electronic controller provides 'at a glance' indication of dryer performance. An integral energy saving control system

also reduces power consumption during stand-by periods.

Superior Design



Visual Performance Indicator

Fitted on models TS10 - TS200, this provides instant indication of dryer performance.



Hot Gas By-Pass Valve

Prevents evaporator freezing.



Refrigerant Scroll Compressors

Fitted on models TS200 - TS3000.

- ✓ Consumes 20% less energy
- ✓ Robust
- ✓ Immediate Start Up
- ✓ 50% fewer moving parts
- ✓ Lower vibration and noise levels



Electronic Controller

With integral energy savings and remote control alarm. Standard on TS250-TS3000.



Easy Access

Easy access to condensate drain simplifies routine cleaning and maintenance. Standard on TS10-TS1000.



Capillary Expander

No moving parts provides simplicity and reliability.

Cross Flow Heat Exchanger

Benefits

- ✓ **Simple, modern design**
- ✓ **Compact and lightweight**
- ✓ **Designed for efficiency**
- ✓ **Modular design**
- ✓ **Reduced risk of leaks**
- ✓ **Six stage moisture separation**

The heart of the dryer is the specially designed cross flow heat exchanger module which incorporates air to air, air to refrigerant heat exchangers and a high efficiency stainless steel demister separator in one compact unit.

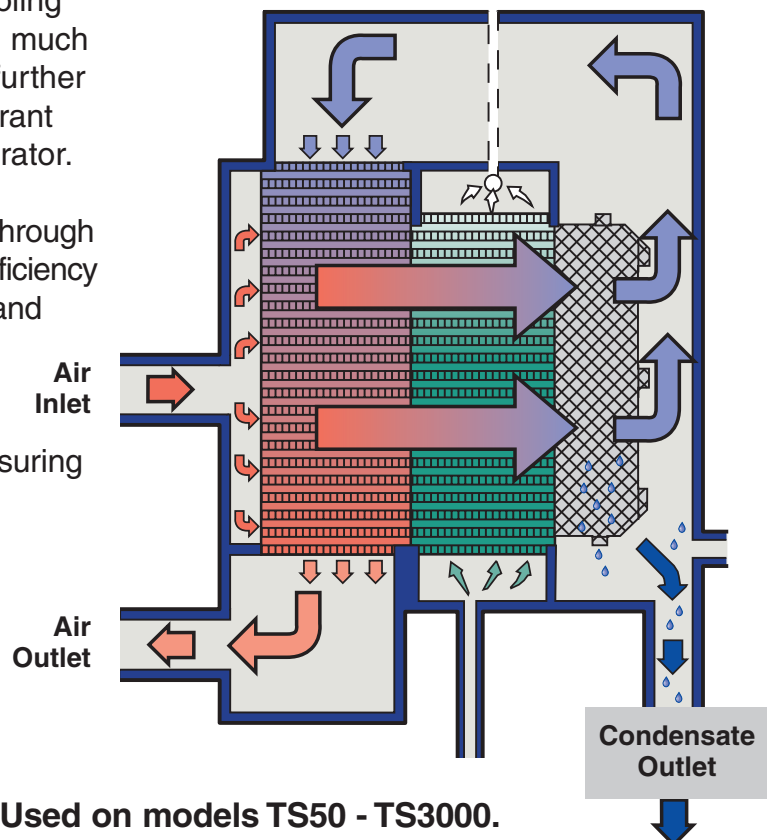
The incoming air is first pre-cooled by warm air exiting the dryer as it passes through the air to air heat exchanger. This pre-cooling reduces the refrigeration circuit by as much as 60%. The air is then cooled even further as it passes through the air to refrigerant heat exchanger coupled to the evaporator.

While at it's coolest, the air is passed through the minimum resistance integral high efficiency demister separator where both liquid and water aerosols are condensed into liquid water and removed from the air stream. This system ensures minimum air pressure losses while ensuring efficient water removal.

Cold air then flows from the outlet of the dryer via the cross flow air to air heat exchanger where it is heated by the incoming air, preventing condensation build up on the outside of downstream piping.

The crossflow heat exchanger modules have been specifically designed to fully optimize R407C refrigerant which is now the most utilized HFC refrigerant and is widely available around the world.

Using R407C and the cross flow heat exchanger module allows the refrigeration circuit to be smaller than equivalent R134a systems, providing a compact design.



Compressed Air Filters

High quality compressed air is no longer a luxury, it is essential. Compressed air contains contamination, and if not removed, will damage the compressed air system and cause product spoilage. The correct selection and application of Ingersoll-Rand compressed air filters will protect your air system and increase production efficiency.



Ask for Filter brochure
Ref 3198

System Saver Condensate Drains

Removing oily, acidic condensate from any compressed air system is essential, as even a small volume can seriously affect downstream pneumatic equipment and processes.

Ingersoll-Rand System Saver electronic level sensing drains detect and discharge only when condensate is present. Intelligent operation always ensures no unnecessary loss of valuable compressed air.

Ask for Drain brochure
Ref 3199



Technical Specifications

Model	Nominal Air Flow cfm	60Hz Models Absorbed Kw	Standard Electrical Supply	Maximum Pressure psi	Air Connections	Dimensions mm			Weight lbs.
						A	B	C	
TS-100	100	0.73	115 - 1ph - 60Hz	175	1-1/2 NPT	24	31	22	143
TS-150	150	0.83	208/230V - 1ph - 60Hz	175	1-1/2 NPT	24	31	22	146
TS-200	200	1.19	208/230V - 1ph - 60Hz	175	1-1/2 NPT	24	31	22	154
TS-250	250	1.89	208/230V - 1ph - 60Hz	175	2 NPT	36	40	26	309
TS-325	325	1.89	208/230V - 1ph - 60Hz	175	2 NPT	36	40	26	309
TS-400	400	1.89	460V - 3ph - 60Hz	175	2 NPT	36	40	26	317
TS-500	500	2.59	460V - 3ph - 60Hz	175	2 NPT	36	40	26	331
TS-700	700	3.33	460V - 3ph - 60Hz	175	3" ANSI 150#	40	59	52	882
TS-800	800	3.33	460V - 3ph - 60Hz	175	3" ANSI 150#	40	59	52	926
TS-1000	1000	4.68	460V - 3ph - 60Hz	175	3" ANSI 150#	40	59	52	992
TS-1200	1200	4.68	460V - 3ph - 60Hz	175	3" ANSI 150#	40	59	52	992
TS-1400	1400	6.76	460V - 3ph - 60Hz	175	4" ANSI 150#	40	59	52	1036
TS-1650	1650	8.70	460V - 3ph - 60Hz	175	4" ANSI 150#	40	59	52	1046
TS-2000	2000	9.50	460V - 3ph - 60Hz	175	6" ANSI 150#	40	59	52	1301
TS-2400	2400	10.13	460V - 3ph - 60Hz	175	6" ANSI 150#	40	59	52	1311
TS-3000	3000	10.13	460V - 3ph - 60Hz	175	6" ANSI 150#	40	59	52	1455

Performances refer to air-cooled models.

Capacity ratings, in accordance with recommended Standard CAGI Standard

No. ADF 100 for Class H (33-39°F) pressure dewpoint and are based on 100 PSIG inlet air pressure, 100°F inlet air temperature, 100% relative humidity, 100°F ambient air temperature and 5 PSIG maximum pressure drop

(1) Shipping weight is approximate.

(2) For other voltages consult factory.

(3) kW and full load amps are based on actual test but nameplate data should be used for sizing wire and circuit breakers.

Nameplate according to UL/CUL requirements and is based on maximum conditions.

INLET TEMPERATURE °F / (°C)	Inlet Air Pressure psig / (barg)									
	60 (4.1)	80 (5.1)	90 (6.2)	100 (6.9)	120 (8.2)	125 (8.6)	150 (10.3)	175 (12)	200* (13.8)	220 (15.2)
	Flow (% of Rated Capacity)									
80 / (26.7)	1.2	1.42	1.46	1.53	1.56	1.62	1.69	1.76	1.77	1.81
90 / (32.2)	0.97	1.14	1.18	1.23	1.25	1.3	1.36	1.41	1.49	1.53
100 / (37.8)	0.79	0.93	0.96	1	1.02	1.06	1.11	1.15	1.21	1.24
110 / (43.3)	0.65	0.76	0.79	0.82	0.83	0.86	0.91	0.94	1	1.03
120 / (48.9)	0.54	0.63	0.65	0.68	0.68	0.72	0.75	0.78	0.82	0.84

*Please contact Ingersoll-Rand when selecting above 175psig on models TS-50 to TS-3150.

PRESSURE DEWPOINT	
Range °F / (°C)	Factor
33-39 / (.6-3.9)	1
40-44 / (4.4-6.7)	1.1
45-49 / (7.2-9.4)	1.2
50-54 / (10-12.2)	1.3

AMBIENT TEMPERATURE	
Range °F / (°C)	Factor
100 F / (37.8 C)	1
110 F / (43.3 C)	0.95
120 F / (48.9 C)	0.88

Dryer Selection

Refrigeration dryers must be sized correctly. Flowrates are shown only for the operating conditions specified at 100 psig (7 barg).

To select a dryer for the following conditions use the correction factors given:

Example:

Customer Flowrate	115 cfm	3.3 m³/min	
Inlet Temperature	110°F	43°C	
System Pressure	90 psig	6.2 barg	→ (correction factor .79)
Dewpoint	37°F	3°C	→ (correction factor 1.0)
Ambient temperature	110°F	43°C	→ (correction factor .95)

Step 1 $\frac{115 \text{ cfm}}{0.79} = 146 \text{ cfm (4.1 m}^3\text{/min)}$

Therefore selection = TS-200

Step 2 $\frac{146 \text{ cfm}}{.95 \times 1.0} = 153 \text{ cfm (4.3 m}^3\text{/min)}$



More Than Parts. Solutions.

Online answers: <http://www.air.ingersoll-rand.com>

Ingersoll-Rand air compressors are not designed, intended or approved for breathing air. Compressed air should not be used for breathing air applications unless treated in accordance with all applicable codes and regulations.

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