

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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Product improvement is a continuing goal at Ingersoll-Rand. Designs and specifications are subject to change without notice or obligation.



**Ingersoll-Rand Company**

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# Ingersoll-Rand®

## ThermoStar Refrigeration Air Dryers



# Why Dry Compressed Air?

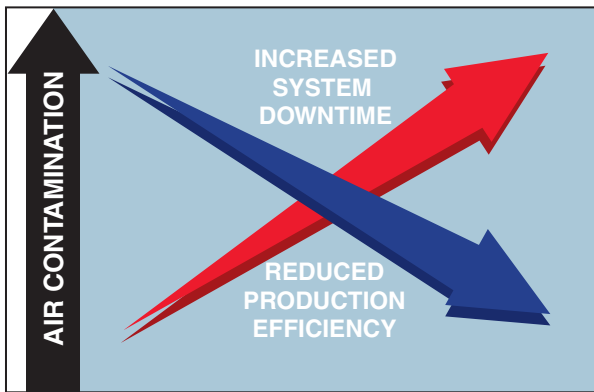
## Contamination Reduces Efficiency

The air we breathe contains contamination in the form of water vapour 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 cause product spoilage.



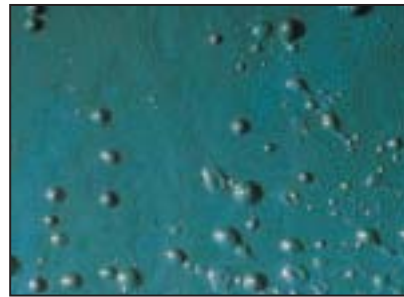
The result - higher overall cost of operation from:

- 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



Spoiled paint finish



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
- Condensate management
- Cooling systems
- Refrigeration dryers
- Desiccant dryers
- 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.

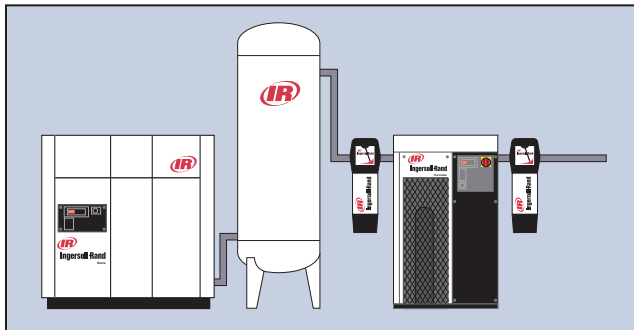


Over 20 models available

## ISO 8573.1 Quality Classes

QUALITY CLASS	DIRT Particle size in Micron	WATER Pressure Dewpoint °C (ppm. vol.) at 7 bar g	OIL (Including vapour) mg/m <sup>3</sup>
1	0.1	-70 (0.3)	0.01
2	1	-40 (16)	0.1
3	5	-20 (128)	1.0
4	15	+3 (940)	5
5	40	+7 (1240)	25
6	-	+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.



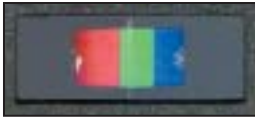
### Energy Saving Control

Fitted on models TS200 - TS3150, 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

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**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 - TS3150.

- ✓ 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.



**Easy Access**  
Easy access to condensate drain simplifies routine cleaning and maintenance.



**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.

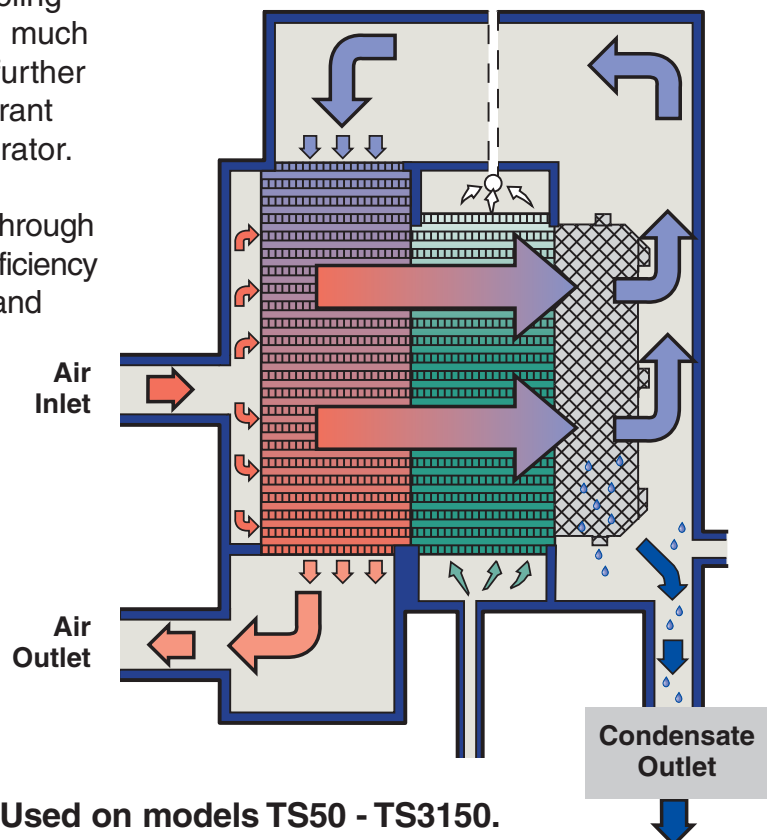
The incoming air is first pre-cooled by warm air exiting the dryer as it passes through the air to air heat exchanger. This pre-cooling reduces the refrigeration circuit by as much as 60%. The air is then cooled even further as it passes through the air to refrigerant heat exchanger coupled to the evaporator.

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 whilst 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 optimise R407C refrigerant which is now the most utilised 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.



Used on models TS50 - TS3150.

# Technical Specifications

Model	Nominal Air Flow cfm	60Hz Models Absorbed Kw	Electrical Supply	Maximum Pressure psi	Air Connections	Dimensions mm			Weight lbs.
						A	B	C	
TS-10	10	0.27	115/1/60	232	3/8 NPT	16	16	16	62
TS-15	15	0.47	115/1/60	232	1/2 NPT	16	24	17	79
TS-25	25	0.47	115/1/60	232	1/2 NPT	16	24	17	79
TS-35	35	0.48	115/1/60	232	3/4 NPT	16	24	18	88
TS-50	50	0.56	115/1/60	175	1 NPT	19	30	20	139
TS-75	75	0.58	115/1/60	175	1 NPT	19	30	20	139
TS-100	100	0.73	115/1/60 230/1/60	175	1-1/2 NPT	24	31	22	143
TS-150	150	0.83	115/1/60 230/1/60	175	1-1/2 NPT	24	31	22	146
TS-200	200	1.19	230/1/60	175	1-1/2 NPT	24	31	22	154
TS-250	250	1.89	230/1/60 230/3/60 460/3/60	175	2 NPT	36	40	26	309
TS-325	325	1.89	230/1/60 230/3/60 460/3/60	175	2 NPT	36	40	26	309
TS-400	400	1.89	230/3/60 460/3/60	175	2 NPT	36	40	26	317
TS-500	500	2.59	230/3/60 460/3/60	175	2 NPT	36	40	26	331
TS-700	700	3.33	230/3/60 460/3/60	175	3 NPT	40	59	52	882
TS-800	800	3.33	230/3/60 460/3/60	175	3 NPT	40	59	52	926
TS-1000	1000	4.68	460/3/60	175	3 NPT	40	59	52	992
TS-1200	1200	4.68	460/3/60	175	3 NPT	40	59	52	992
TS-1400	1400	6.76	460/3/60	175	4" ANSI 150#	40	59	52	1036
TS-1650	1650	8.70	460/3/60	175	4" ANSI 150#	40	59	52	1046
TS-2000	2000	9.50	460/3/60	175	6" ANSI 150#	40	59	52	1301
TS-2400	2400	10.13	460/3/60	175	6" ANSI 150#	40	59	52	1311
TS-3150	3150	10.13	460/3/60	175	6" ANSI 150#	40	59	52	1455

## Multiplication Factors for Ambient Temperatures

°F	77	86	95	104	115
°C	25	30	35	40	46
Correction Factor	1.00	0.96	0.92	0.88	0.83

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 6 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.

## Multiplication Factors for Working Pressure

\*Please contact Ingersoll-Rand when selecting above 174 psi g (12 bar g) on models TS-50 - TS-3150

Pressure psi g	44	58	73	87	100	116	131	145	160	174	189*	203*	218*	232*
Pressure bar g	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Correction Factor	0.75	0.84	0.90	0.96	1.00	1.04	1.06	1.09	1.10	1.13	1.14	1.16	1.17	1.18

## Multiplication Factors for Inlet Temperatures

°F	86	95	104	113	122
°C	30	35	40	45	50
Correction Factor	1.20	1.00	0.84	0.71	0.60

## Multiplication Factors for Dewpoint

°F	37	41	45	50
°C	3	5	7	10
Correction Factor	1.00	1.14	1.25	1.45

## Dryer Selection

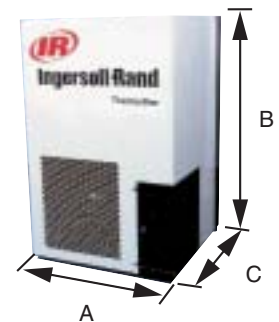
Refrigeration dryers must be sized correctly. Flowrates are shown only for the operating conditions specified at 7 bar g (100 psi g).

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

Example:

<b>Ambient temperature</b>	86°F	30°C	(correction factor 0.96)
<b>Inlet temperature</b>	104°F	40°C	(correction factor 0.84)
<b>System pressure</b>	87 PSI	6 bar g	(correction factor 0.96)
<b>Dewpoint</b>	37°F	3°C	(correction factor 1.00)
<b>Customer flowrate</b>	350ft <sup>3</sup> /min		

$$\frac{350 \text{ ft}^3/\text{min}}{0.96 \times 0.84 \times 0.96 \times 1.00} = 452 \text{ ft}^3/\text{min}. \text{ Therefore selection} = \text{TS 500}$$



## 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

