

Ingersoll-Rand®

ThermoZorb Heatless Regenerative Air Dryer



IR Ingersoll-Rand®

Why Dry Compressed Air?

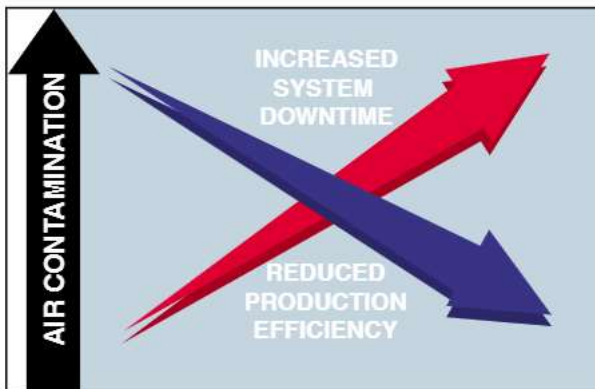
Contamination Reduces Efficiency

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.



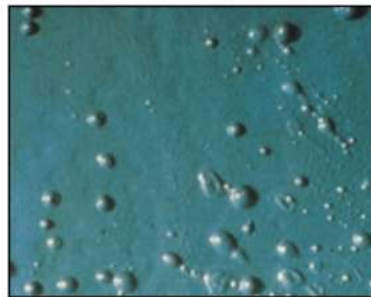
The result – higher overall cost of operation from:

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

Heatless Desiccant Drying

While both types of Desiccant Dryers each have advantages and limitations, the Heatless type is the most popular, due to its inherent advantages of high reliability and low maintenance.

The desiccants used in TZ dryers have been selected basis our thirty plus years of experience in the design and manufacturing of Desiccant Dryers. The vessels have been designed specifically for this service. Vessel diameters have been chosen to allow a minimum of five (5) seconds contact time, which is essential for complete moisture adsorption and consistent dewpoints. Air velocity through the dryer has been conservatively designed at less than fifty-five feet per minute, minimizing desiccant fluidization and dusting, and resulting in high dryer reliability.

Ingersoll-Rand's TZ heatless desiccant dryers are designed to produce a consistent -40°F (-40°C) dewpoint compressed air.

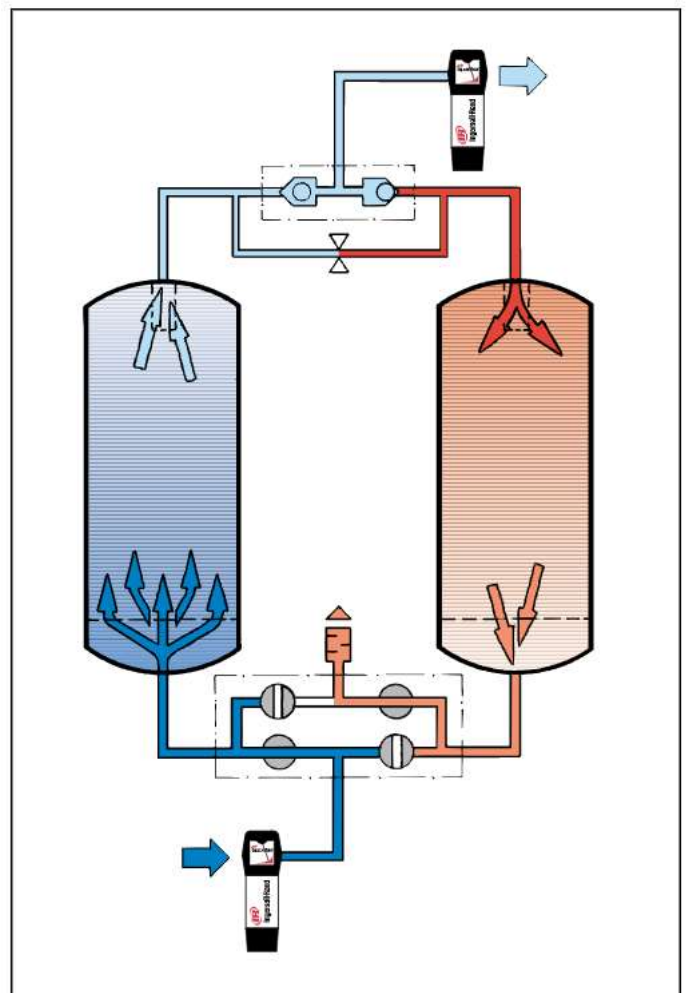
Optional TZ dryers for -100°F (-73°C) are also available.

How the TZ dryer works

Saturated compressed air enters the coalescing prefilter, removing liquid water, oil and particles .01 microns and larger with a 99.999% efficiency. The coalescing prefilter removes contaminants down to .01 PPMW. Compressed air leaving the prefilter enters the dryer at the inlet valve and into the bottom of the active vessel. Moisture is adsorbed by the desiccant as the air flows upward through the vessel. Dry compressed air exits at the outlet valve, dried to the design dewpoint rating. The dry air is then discharged out through the one micron particulate afterfilter to collect any desiccant dust that may have resulted from the drying process.

Prior to discharging to the afterfilter, a portion of the dry air is diverted, and metered through the purge adjusting valve. This metered dry air is fed through the vessel being regenerated, drying the wetted desiccant and preparing it for reuse. This purge air is exhausted through the purge exhaust valve and the silencer, having served its purpose.

In the fixed cycle mode, each vessel operates for approximately five minutes before switching. This vessel switching procedure is repeated again and again, assuring a continuous flow of dry air from the unit.



The Ingersoll-Rand TZ Dryer

The Ingersoll-Rand TZ series desiccant dryer line has a very comprehensive array of standard features to give you high reliability, easy operation and minimal maintenance. Standard features include:

Exclusive Non-Lubricated Switching Valves

For superior performance and long operating life. Since the switching valves of a Desiccant Dryer are really the heart of any Desiccant Dryer, we have developed an exclusive valve design, offering the following advantages:

- Extremely long and trouble-free service life. Our valves have been tested for more than 500,000 cycles without a problem, the equivalent of 5 years continuous operation. We are so confident of this design, we offer a five year warranty on valve components.



Block Valve (on Models TZ100 - TZ600)



3-Way Valve (on Models TZ820 and Larger)

- Corrosion-resistant materials are used on all valve components, both internal and external.
- Continued compressed air flow, even with loss of electrical power to the dryer.
- Automatic float drain valve (TZ100 - TZ1200)
- Coalescing/particulate prefilter is provided as standard to remove liquid moisture and oil down to .01 PPMW and particulates down to .01 micron with an efficiency of 99.999% D.O.P. (mounted on models TZ100-TZ600, shipped loose on TZ820 and larger). Particulate afterfilter is supplied as standard to remove any desiccant dust that may have resulted from the drying process. Particulate filter removes particles 1 micron and larger with a 99.99% efficiency (mounted on models TZ100-TZ600, shipped loose on models TZ820 and larger).
- Upflow drying, which protects the desiccant bed by minimizing the effects of water accidentally hitting the desiccant beads.

TZ Dryer Standard Features



- ASME designed and constructed pressure vessels to assure safety and high quality construction.
- Pressure relief valves, provided on each tower.
- Desiccant fill and drain ports eliminate the need to dismantle dryer piping, reducing maintenance time and cost.
- Adjustable air purge control permits a purge rate to be selected for varying seasonal and process requirements.
- Vessel pressure gauges to identify drying and regeneration chambers at a glance.
- Purge air flow indicator allows easy adjustment of purge flow rate.
- Purge air muffler(s) designed to meet OSHA standards for noise.
- Fully automatic control system utilizes a time proven electric cam timer to control dryer functions reliably (models TZ100 - TZ600). PLC on models TZ820 and larger.
- NEMA 4 electrical enclosure.

Energy Management System

TZ heatless dryers provide a continuous supply of dry compressed air by automatically cycling the flow of air through two desiccant beds. While one bed is adsorbing moisture from the inlet air, the other bed is being regenerated by a portion of the dried air. The normal cycle, or Fixed Cycle, of a heatless dryer is 10 minutes. Each desiccant chamber is in service for 5 minutes, followed by a 5-minute regeneration cycle. The dryer will be sized to deliver a $-40^{\circ}\text{C}/\text{F}$ PDP. If inlet water loading to the dryer is less than the dryer is sized for then the desiccant bed will be underused.

The Energy Management System uses a precision digital hygrometer to measure the outlet dew point of the dryer, and match the capacity of the dryer to inlet moisture loading. Prior to the start of each regeneration cycle (before chamber depressurization) the EMS system will determine the dew point of the system. Should this reading be better than the EMS set point the purge exhaust valves shall remain closed and the depress and purge cycle will not take place. The dryer will continue to cycle without using purge air. This continuous cycling allows the desiccant bed to maintain internal heat of adsorption.

Once the dew point increases to the EMS set point the dryer will revert to the normal drying and purging cycle with the last chamber regenerated being the dryer chamber. The fixed cycle continues until the dew point is drier than the set point at the beginning of a purge cycle.



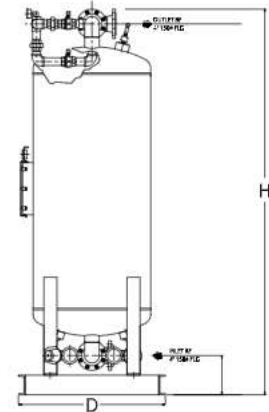
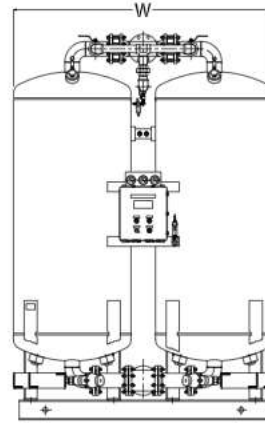
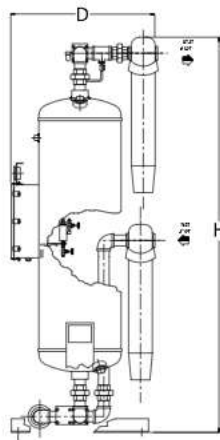
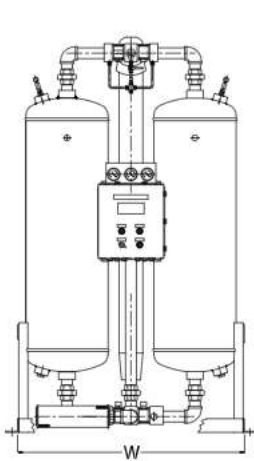
EMS Features:

- EMS is “fail-safe.” Any hygrometer probe failure will force dryer to revert to fixed cycle and high humidity light will flash on and off repeatedly.
- Fixed cycle/EMS mode selector switch. Dryer can be operated in fixed cycle while hygrometer is serviced.
- Switch Failure Alarm and Light
- High Humidity Alarm and Light
- Nema 4 Enclosure
- Eliminates waste of compressed air
- A precision digital hygrometer and aluminum oxide sensor measures outlet dew point.
- Panel mounted direct reading dew point meter.
- Field adjustable set points for high and low dew point alarm set points.
- Fast acting aluminum oxide sensor with a dew point range of $+68^{\circ}\text{F}$ to -112°F .
- 4 - 20 mA output
- Probe can be calibrated in the field.

Additional TZ series dryer options include:

- -100°F Dewpoint
- 50 Cycle electrics
- 3 Valve bypass
- Nema 7 (*EMS not available with this option*)
- Dual prefilter and afterfilter with 9 valves
- Other options available on request

Performance and Dimensions



Models TZ100 – TZ600

Models TZ820 – TZ3400

Model (4)	Capacity (scfm/Nm ³ /min.) (1)	Dimensions (Inches/mm)			Inlet NPT (Inches/mm)	Outlet NPT (Inches/mm)	Approx. Shipping Weight (2) (lbs./kg)
		H	D	W			
TZ100	100 / 2.87	69 / 1753	22 / 559	35 / 889	1 / 25.40	1 / 25.40	310 / 140
TZ160	160 / 4.53	73 / 1854	22 / 559	37 / 940	1 / 25.40	1 / 25.40	420 / 190
TZ220	220 / 6.23	83 / 2108	22 / 559	41 / 1041	1.50 / 38.10	1.50 / 38.10	640 / 290
TZ300	300 / 8.50	72 / 1829	28 / 711	47 / 1194	1.50 / 38.10	1.50 / 38.10	830 / 375
TZ400	400 / 11.33	84 / 2134	28 / 711	51 / 1295	1.50 / 38.10	1.50 / 38.10	1100 / 499
TZ500	500 / 14.16	77 / 1956	30 / 762	56 / 1422	2.0 / 50.80	2.0 / 50.80	1400 / 635
TZ600	600 / 17.23	87 / 2210	30 / 762	56 / 1422	2.0 / 50.80	2.0 / 50.80	1700 / 771
TZ820	820 / 23.22	106 / 2692	30 / 762	60 / 1524	3 / 76.20 FLG	3 / 76.20 FLG	2150 / 975
TZ1050	1050 / 29.73	106 / 2692	34 / 864	60 / 1524	3 / 76.20 FLG	3 / 76.20 FLG	2500 / 1134
TZ1200	1200 / 34.47	118 / 2997	34 / 864	60 / 1524	3 / 76.20 FLG	3 / 76.20 FLG	2900 / 1315
TZ1450	1450 / 41.65	119 / 3023	37 / 940	64 / 1626	3 / 76.20 FLG	3 / 76.20 FLG	3200 / 1452
TZ1710	1710 / 49.11	119 / 3023	37 / 940	64 / 1626	4 / 102 FLG	4 / 102 FLG	4100 / 1860
TZ2000	2000 / 56.64	126 / 3200	45 / 1143	80 / 2032	4 / 102 FLG	4 / 102 FLG	5600 / 2540
TZ2350	2350 / 66.55	119 / 3023	45 / 1143	80 / 2032	4 / 102 FLG	4 / 102 FLG	6300 / 2858
TZ2750	2750 / 77.87	130 / 3302	58 / 1321	89 / 2261	4 / 102 FLG	4 / 102 FLG	7500 / 3402
TZ3400	3400 / 96.28	132 / 3353	58 / 1321	93 / 2362	6 / 152 FLG	6 / 152 FLG	9300 / 4218

Larger models are available. Contact Factory for ratings and specifications.

(1) Capacity is at standard rating conditions per NFPA/T3.27.3M R1-1981 (ANSI B93.45) – i.e., 100°F inlet air temperature, 100 psig inlet air pressure, 100°F inlet pressure dew point, and 100°F ambient temperature. Maximum pressure drop across dryer is 5 psi. Pressure dew point at standard rating conditions is -40°F.

(2) Desiccant shipped loose on Models TZ820 and larger. Shipping weight for these models includes desiccant.

(3) Filters are shipped loose on Models TZ820 and larger.

More Than Air. Solutions.

Online solutions: <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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