



Membrane Technologies

DMD Series Dryers

ESM Series Dryers



Energy Saving Compressed Air Dryers

People around the globe have relied on Deltech to deliver energy efficiency and value in meeting their compressed air treatment needs. ESM Series and DMD Series Modular Membrane Compressed Air Dryers offer you two revolutionary “point-of-use” alternatives for low dew point applications.

Membrane Drying

Deltech modular membrane compressed air dryers were developed to complement our stable

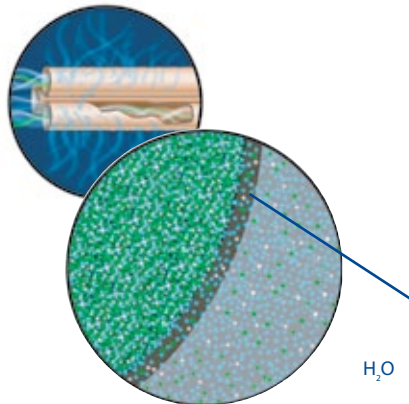
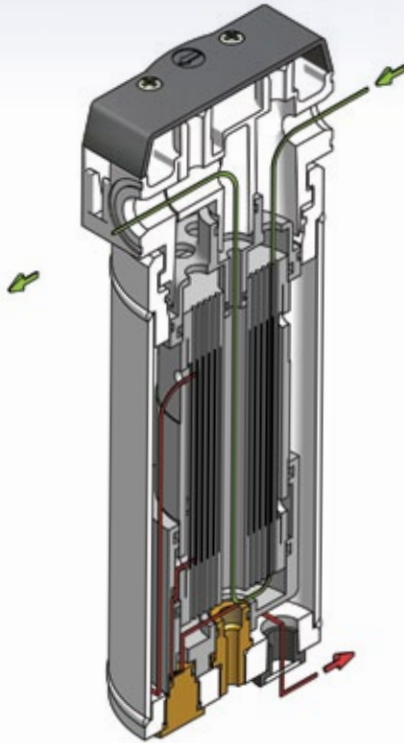
of industry leading refrigeration, adsorption and filtration technologies. Membrane dryers use a bundle of tiny tubular fibers that let fast gases like water vapor permeate through the tube wall to be swept away into the ambient. Our membrane fiber technology features multiple strands to form a continuous microscopic sieve that targets and removes “fast gases” like water molecules as a vapor. Pressure dew points from +50°F to -40°F are achieved by balancing the model size, air pressure and volume (scfm) requirements to the applications.

Selective Permeation

Through the process of selective permeation, water vapor is removed while leaving the gas composition intact. Each membrane bundle is comprised of multiple tubular membrane fibers, evenly spaced to provide maximum surface area in a compact design. Each helically wrapped layer alternates direction to ensure consistent cross-sectional density and large flow paths for the sweep air that carries the water vapor to atmosphere. No oxygen is lost, which makes these ideal for medical applications.

Selective Permeation Process

- Compressed air enters the center of the membrane tubes
- Water (H₂O) vapor diffuses through the membrane wall faster than the other gases
- A small portion of dry compressed air is swept back across the outside of the membrane walls to evacuate the H₂O vapor to atmosphere
- Dry compressed air exits the unit ready for process applications



Modular Membrane Compressed Air Dryers

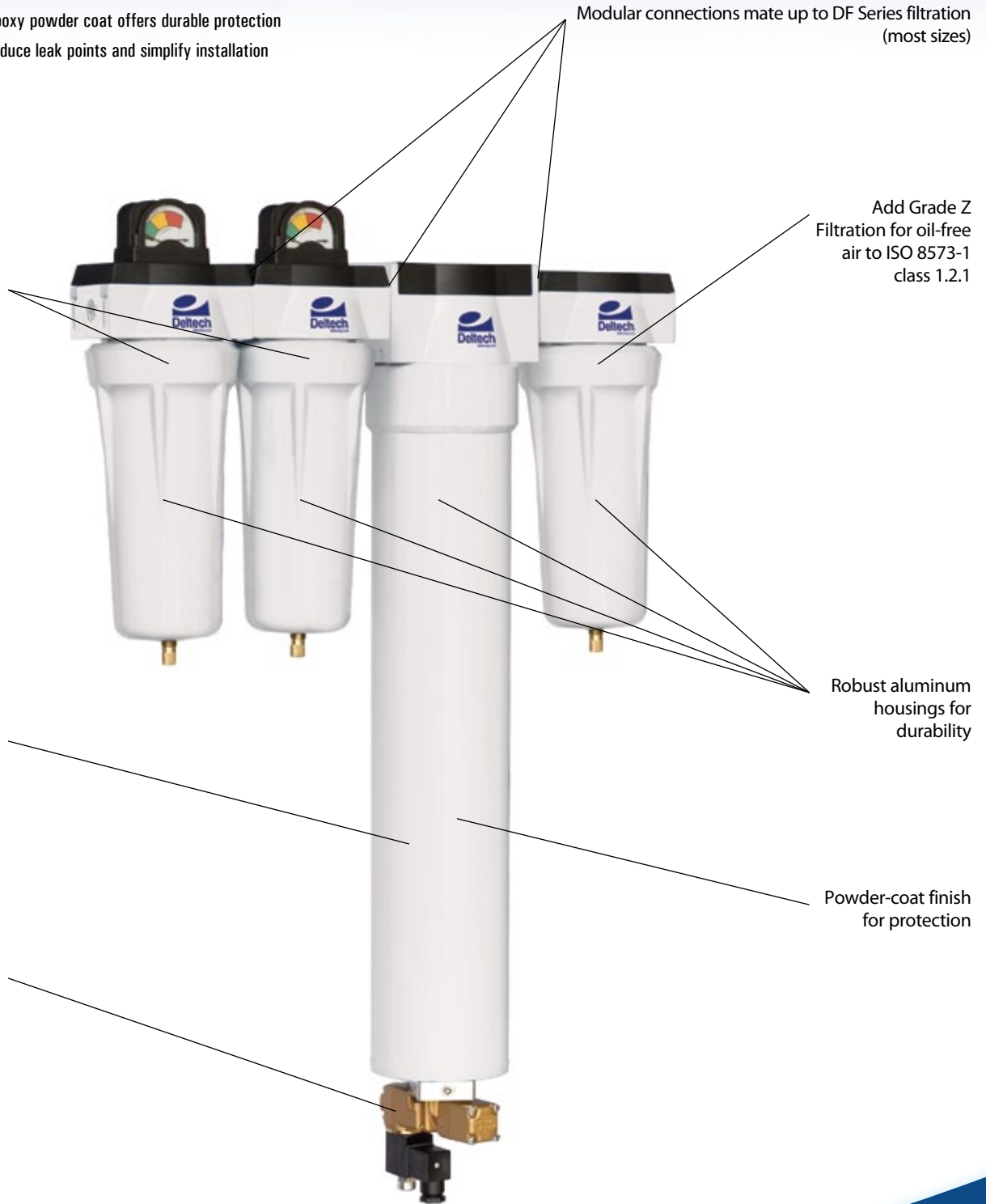
Energy Efficient, Space Saving Design

- Inside-to-outside permeation for greater efficiency
- Helically wound bundles for low pressure drop, high flow capacity
- Compact design offers a space-saving point-of-use solution
- Internal and external epoxy powder coat offers durable protection
- Modular connections reduce leak points and simplify installation
- Dewpoints to -40°F

DF Series prefilter packages protect membrane fibers and define air quality

Space-saving vertical design for quick, clean, easy installation

Energy Saving Digital Purge Control synchronizes to air demand (ESM Series only)



DMD Series Continuous Flow Membrane Dryer

DMD Series Modular Membrane Compressed Air Dryers provide clean, dry compressed air wherever you need it. Designed for continuous flow applications, DMD Series dryers pass a constant side-stream of dry sweep air to exhaust the extracted water vapor into the ambient surroundings.

Modular DF Series Air Preparation

Operation requires the removal of contaminants like liquid water, compressor lubricant, dust, rust, and pipe scale before entering the dryer. Clean, filtered, compressed air will reward you with many years of satisfactory performance from your modular membrane dryer.

Simply select the series and model that meets your requirements, then, add the level of filtration you need.

Filter Package Recommendations

Application	Max. Liquid Inlet Content to Filter	Recommended DF Series Filtration
Space-sensitive OEM's & Pkgs.	1,000 ppm w/w	Prefilter: Grade B - 0.008 ppm (0,01 mg/m ³) oil removal
General Industrial Point-of-use	2,000 ppm w/w	Prefilters: Grade C - 1 micron particulate Grade A - 0.0008 ppm (0,001 mg/m ³) oil removal
Food & Pharmaceuticals Direct & Indirect air contact with product	2,000 ppm w/w	Prefilters: Grade C - 1 micron particulate Grade A - 0.0008 ppm (0,001 mg/m ³) oil removal Afterfilter: Grade Z - Oil vapor and 0.003 ppm (0,004 mg/m ³) oil removal

Typical Applications

- Original Equipment Manufacturers (O.E.M.)
- NEMA 7 Hazardous Environments (DMD Series only)
- Paint Spray Booths
- Dust Collectors
- Coordinate Measuring Machines
- Fluid Agitation
- Dental, Medical, Distilling, Photo Processing, Packaging, Graphic Arts, and Dry Cleaning Equipment
- Instrument Air
- Locomotive Air Brakes
- Oil & Gas Wells
- Ozone Generators
- Air Logic
- Rapid Transit Fare Collection Systems
- Air Blanketing
- Telephone Cable Pressurization
- Ship Supply Air
- Laboratory Instruments
- Control Panel Purge Air
- Optical Lens Cleaning
- Laser Optics
- Welding Equipment
- Chemical and Gas Analyzers
- Dimensioning and Positioning Machines
- Product Fluidization



Deltech ESM Series

Energy Saving Membrane Dryers

ESM Series energy saving membrane dryers are designed to help you gain control over wasted energy. Featuring digital purge control, it is perfect for helping you save energy in applications where process air demands start and stop. Traditional membrane dryers are designed for 24/7 operations in continuous flow applications. They pass a constant side-stream of dry process gas known as “sweep air” to exhaust extracted water vapor into the ambient

surroundings. When applied to intermittent duty applications that valuable sweep air is wasted when there is no air demand. This costs you money and adds unnecessary wear and tear to your air compressor.

Reduce Power Costs

ESM Series’ digital purge control (DPC) accepts your demand signal to open and close an integrated normally open, two-way valve to control the sweep air. A “zero demand” signal keeps the bore of the membrane fibers pressurized while DPC eliminates the waste of sweep air to save you energy. Initiate the process’ “air demand” signal to start the flow of sweep air. Cycle tested to over 1 million cycles.

Save a Bundle

ESM Series guarantees constant pressure differential that prevents fiber flexing from pressure surges – the leading cause of membrane fiber failure. Energy saving operation and long bundle life requires constant pressure differential to protect the fibers from damaging shock waves. Controlling sweep air waste by applying a solenoid valve to a sweep air exhaust port, allows the pressures to equalize. Upon release, the shock from the rapidly expanding air causes fatigue of the tiny tubes, cracks develop, fibers break, pressure dew point

ESM Series Energy Savings

Model	Air Demand				
	90%	75%	50%	25%	10%
ESM1-3	\$3	\$8	\$17	\$25	\$30
ESM2-3	\$11	\$26	\$53	\$79	\$95
ESM3-4	\$23	\$58	\$116	\$174	\$208
ESM4-4	\$31	\$78	\$156	\$234	\$281
ESM5-6	\$58	\$145	\$291	\$436	\$523
ESM6-6	\$90	\$225	\$449	\$674	\$809
ESM7-8	\$168	\$420	\$839	\$1,259	\$1,511
ESM8-16	\$259	\$647	\$1,295	\$1,942	\$2,330
ESM9-16	\$330	\$825	\$1,649	\$2,474	\$2,969

Assumes .50.10 per kWh, 8,760 hours, 4 cfm/HP



Inlet and Outlet Flow Capacity at 100 psig

	-Inlet Temp (°F)	Flow scfm	Outlet Pressure Dew Point (°F)					
			50	40	20	0	-20	-40
ESM1	40	Inlet	-	-	-	1.48	1.07	0.81
		Outlet	-	-	-	1.29	0.88	0.62
	60	Inlet	-	-	1.62	1.18	0.90	0.69
		Outlet	-	-	1.43	0.99	0.71	0.50
	80	Inlet	-	1.76	1.29	0.99	0.77	0.60
		Outlet	-	1.57	1.10	0.80	0.58	0.41
	100	Inlet	1.59	1.39	1.08	0.85	0.67	0.53
		Outlet	1.40	1.20	0.89	0.66	0.48	0.34
	120	Inlet	1.31	1.17	0.94	0.75	0.60	0.48
		Outlet	1.12	0.98	0.75	0.56	0.41	0.29
	150	Inlet	1.06	0.96	0.79	0.64	0.52	-
		Outlet	0.87	0.77	0.60	0.45	0.33	-
ESM2	40	Inlet	-	-	-	4.80	3.56	2.75
		Outlet	-	-	-	4.20	2.96	2.15
	60	Inlet	-	-	5.24	3.88	3.02	2.38
		Outlet	-	-	4.64	3.28	2.42	1.78
	80	Inlet	-	5.67	4.23	3.30	2.63	2.10
		Outlet	-	5.07	3.63	2.70	2.03	1.50
	100	Inlet	5.15	4.55	3.60	2.89	2.34	1.88
		Outlet	4.55	3.95	3.00	2.29	1.74	1.28
	120	Inlet	4.29	3.88	3.16	2.58	2.10	1.70
		Outlet	3.69	3.28	2.56	1.98	1.50	1.10
	150	Inlet	3.52	3.23	2.69	2.22	1.83	-
		Outlet	2.92	2.63	2.09	1.62	1.23	-
ESM3	40	Inlet	-	-	-	10.04	7.21	5.38
		Outlet	-	-	-	8.72	5.89	4.06
	60	Inlet	-	-	11.09	7.93	5.98	4.57
		Outlet	-	-	9.77	6.61	4.66	3.25
	80	Inlet	-	12.07	8.73	6.62	5.11	3.97
		Outlet	-	10.75	7.41	5.30	3.79	2.65
	100	Inlet	10.87	9.47	7.29	5.69	4.47	3.50
		Outlet	9.55	8.15	5.97	4.37	3.15	2.18
	120	Inlet	8.88	7.92	6.29	4.99	3.96	3.13
		Outlet	7.56	6.60	4.97	3.67	2.64	1.81
	150	Inlet	7.09	6.44	5.24	4.22	3.39	-
		Outlet	5.77	5.12	3.92	2.90	2.07	-

	-Inlet Temp (°F)	Flow scfm	Outlet Pressure Dew Point (°F)					
			50	40	20	0	-20	-40
ESM4	40	Inlet	-	-	-	14.41	10.83	8.46
		Outlet	-	-	-	12.63	9.05	6.68
	60	Inlet	-	-	15.72	11.75	9.24	7.36
		Outlet	-	-	13.94	9.97	7.46	5.58
	80	Inlet	-	16.96	12.76	10.07	8.10	6.53
		Outlet	-	15.18	10.98	8.29	6.32	4.75
	100	Inlet	15.45	13.69	10.94	8.86	7.22	5.87
		Outlet	13.67	11.91	9.16	7.08	5.44	4.09
	120	Inlet	12.95	11.74	9.65	7.93	6.52	5.33
		Outlet	11.17	9.96	7.87	6.15	4.74	3.55
	150	Inlet	10.68	9.84	8.26	6.88	5.71	-
		Outlet	8.90	8.06	6.48	5.10	3.93	-
ESM5	40	Inlet	-	-	-	25.7	18.4	13.3
		Outlet	-	-	-	22.4	15.1	10.0
	60	Inlet	-	-	28.4	20.3	15.0	11.0
		Outlet	-	-	25.1	17.0	11.7	7.7
	80	Inlet	-	30.8	22.4	16.8	12.6	9.3
		Outlet	-	27.5	19.1	13.5	9.3	6.0
	100	Inlet	27.8	24.3	18.6	14.2	10.7	7.9
		Outlet	24.5	21.0	15.3	10.9	7.4	4.6
	120	Inlet	22.8	20.3	15.9	12.2	9.3	6.8
		Outlet	19.5	17.0	12.6	8.9	6.0	3.5
	150	Inlet	18.1	16.3	12.9	10.0	7.6	-
		Outlet	14.8	13.0	9.6	6.7	4.3	-
ESM6	40	Inlet	-	-	-	42.6	32.4	25.3
		Outlet	-	-	-	37.5	27.3	20.2
	60	Inlet	-	-	46.2	35.1	27.7	21.9
		Outlet	-	-	41.1	30.0	22.6	16.8
	80	Inlet	-	49.6	37.9	30.2	24.2	19.3
		Outlet	-	44.5	32.8	25.1	19.1	14.2
	100	Inlet	45.5	40.5	32.7	26.6	21.5	17.1
		Outlet	40.4	35.4	27.6	21.5	16.4	12.0
	120	Inlet	38.5	35.0	28.9	23.7	19.2	15.3
		Outlet	33.4	29.9	23.8	18.6	14.1	10.2
	150	Inlet	32.0	29.5	24.7	20.4	16.6	-
		Outlet	26.9	24.4	19.6	15.3	11.5	-

	-Inlet Temp (°F)	Flow scfm	Outlet Pressure Dew Point (°F)						
			50	40	20	0	-20	-40	
ESM7	40	Inlet	-	-	-	71.1	48.6	33.7	
		Outlet	-	-	-	61.5	39.0	24.1	
	60	Inlet	-	-	79.2	54.5	38.6	27.1	
		Outlet	-	-	69.6	44.9	29.0	17.5	
	80	Inlet	-	86.7	60.8	43.8	31.5	22.2	
		Outlet	-	77.1	51.2	34.2	21.9	12.6	
	100	Inlet	77.5	66.6	49.3	36.2	26.2	18.5	
		Outlet	67.9	57.0	39.7	26.6	16.6	8.9	
	120	Inlet	62.0	54.4	41.2	30.5	22.1	15.6	
		Outlet	52.4	44.8	31.6	20.9	12.5	6.0	
	150	Inlet	47.7	42.4	32.5	24.2	17.6	-	
		Outlet	38.1	32.8	22.9	14.6	8.0	-	
	ESM8	40	Inlet	-	-	-	113.0	79.8	57.6
			Outlet	-	-	-	98.3	65.1	42.9
60		Inlet	-	-	124.8	88.5	65.0	47.4	
		Outlet	-	-	110.1	73.8	50.3	32.7	
80		Inlet	-	135.9	97.8	72.7	54.2	39.8	
		Outlet	-	121.2	83.1	58.0	39.5	25.1	
100		Inlet	122.4	106.3	80.8	61.4	46.1	33.8	
		Outlet	107.7	91.6	66.1	46.7	31.4	19.1	
120		Inlet	99.5	88.4	68.8	52.7	39.7	29.2	
		Outlet	84.8	73.7	54.1	38.0	25.0	14.5	
150		Inlet	78.5	70.6	55.8	43.0	32.4	-	
		Outlet	63.8	55.9	41.1	28.3	17.7	-	
ESM9		40	Inlet	-	-	-	146.5	104.8	76.6
			Outlet	-	-	-	127.7	86.0	57.8
	60	Inlet	-	-	161.4	115.7	86.0	63.7	
		Outlet	-	-	142.6	96.9	67.2	44.9	
	80	Inlet	-	175.3	127.4	95.8	72.4	53.8	
		Outlet	-	156.5	108.6	77.0	53.6	35.0	
	100	Inlet	158.3	138.1	106.1	81.4	62.0	46.2	
		Outlet	139.5	119.3	87.3	62.6	43.2	27.4	
	120	Inlet	129.6	115.5	90.9	70.4	53.8	40.1	
		Outlet	110.8	96.7	72.1	51.6	35.0	21.3	
	150	Inlet	103.1	93.1	74.4	58.0	44.4	-	
		Outlet	84.3	74.3	55.6	39.2	25.6	-	

Model	100°F Inlet to 40°F pdp				100°F Inlet to 0°F pdp			
	Inlet Flow		Outlet Flow		Inlet Flow		Outlet Flow	
	scfm	nm ³ /h	scfm	nm ³ /h	scfm	nm ³ /h	scfm	nm ³ /h
ESM1	1.39	2.36	1.20	2.04	0.85	1.44	0.66	1.12
ESM2	4.55	7.73	3.95	6.71	2.89	4.91	2.29	3.89
ESM3	9.47	16.09	8.15	13.85	5.69	9.67	4.37	7.43
ESM4	13.69	23.26	11.91	20.24	8.86	15.05	7.08	12.03
ESM5	24.30	41.29	21.00	35.68	14.20	24.13	10.90	18.52
ESM6	40.50	68.81	35.40	58.62	26.60	45.19	21.50	36.53
ESM7	66.60	113.15	57.00	96.84	36.20	61.50	26.60	45.19
ESM8	106.30	180.60	91.60	155.63	61.40	104.32	46.70	79.34
ESM9	138.10	234.63	119.30	202.69	81.40	138.30	62.60	106.36

Model	In / Out ¹ Connections	Dimensions					
		H ²		W		Weight ³	
		inches	in	mm	in	mm	lbs
ESM1	¾" or 1½"	16	404	4	105	8	37
ESM2	¾" or 1½"	20	509	4	105	9	42
ESM3	¾" or 1½"	24	613	4	105	10	46
ESM4	¾" or 1½"	32	811	4	105	11	51
ESM5	¾" or 1"	25	623	5	133	14	65
ESM6	¾" or 1"	32	822	5	133	17	79
ESM7	1"	33	850	6	164	20	93
ESM8	1"	38	974	8	194	40	181
ESM9	1"	44	1130	8	194	45	203

Maximum Operating Pressure: Membrane dryer: 200 psig (14 bar)
Maximum Inlet Temperature: 150°F (66°C)
Dimensions and weights are for reference only. Request certified drawings for construction purposes
Flow capacity at 100 psig (7 bar) and 100°F (38°C) saturated inlet. Flow capacities are established in accordance with CAGI (Compressed Air and Gas Institute) Standard ADF 700: Membrane Compressed Air Dryers - Methods for testing and rating
1 NPT or BSP - For BSP add B to the model number (eg. ESM1-3B)
2 DMD model heights average 3.5" to 5.5" less
3 DMD model weights average 3.2 lbs. to 4.8 lbs. less

- NOTES:
- Use inlet air temperature if the air entering the dryer has not been dried upstream (air is saturated). If air has been dried (e.g. in a refrigerated dryer) use the dew point temperature of the inlet air.
 - Flow capacities are at 100 psig (7 kgf/cm²). Capacities are established in accordance with CAGI (Compressed Air and Gas Institute) Standard ADF 700: Membrane Compressed Air Dryers - Methods for Testing and Rating. Larger capacities, alternate pressures, and dew points consult factory.

The Deltech Commitment

Deltech sets the standard of excellence in technology for today's growing industries.

We build relationships by understanding the requirements of our customers. As a result, the compressed air solutions we develop enable end users of Deltech products to meet their objectives of improved productivity and optimized efficiency. We will continue to dedicate our research and development resources in providing new and innovative air treatment products, inspired by our valued customers.



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