

## Ultracac Classic

### ALD/MSD

### Heatless Desiccant Compressed Air Dryers



## History

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Ultrafilter International AG, whose world headquarters is in Haan, Germany, was established in 1972 as a trading company to buy and sell, into the German market, compressed air and gas purification equipment. In the 1980's, Ultrafilter established itself as a prime manufacturer of compressed air and gas dryers and filters, backed by numerous innovative patents, and has since grown to be among the largest such manufacturers in the world. Our product lines include, but are not limited to: air, gas and liquid filters for both process and industrial applications; refrigerated, membrane and regenerative desiccant compressed air and gas dryers; breathing air systems; condensate management systems; and process water chillers.

In 2002, Ultrafilter was acquired by Donaldson Company, Inc., headquartered in Minneapolis, Minnesota. Donaldson is a leading worldwide provider of filtration systems and replacement parts. Since 1915, Donaldson has perfected and leveraged its core strengths—innovative technology, strong customer relationships and broad geographic presence—to meet the diverse and changing needs of its customers.



## The Need for Clean Dry Air

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### The Problem

Corrosion, erosion, product defects, line freeze-ups

### The Cause

Solids, liquids, vapors, gases

### The Solution

High quality and energy efficient air and gas purification systems

### The Result;

Energy savings, increased productivity, longer lasting tools, and reduced system maintenance.

Any contaminants present in the atmosphere surrounding an air compressor will be entrained and concentrated in the process air as it enters the compressor. These contaminants can be in the form of liquids (e.g. water and oil), vapors (e.g. hydrocarbons), gases (e.g. carbon dioxide, hydrogen chloride and sulfur dioxide) and solids (e.g. sand, dust and soot). If not removed, such contaminants can lead to serious damage of process equipment and/or degradation of the final product itself through corrosion, erosion, freeze-ups, biological growth and product spoilage from contact with contaminated air.

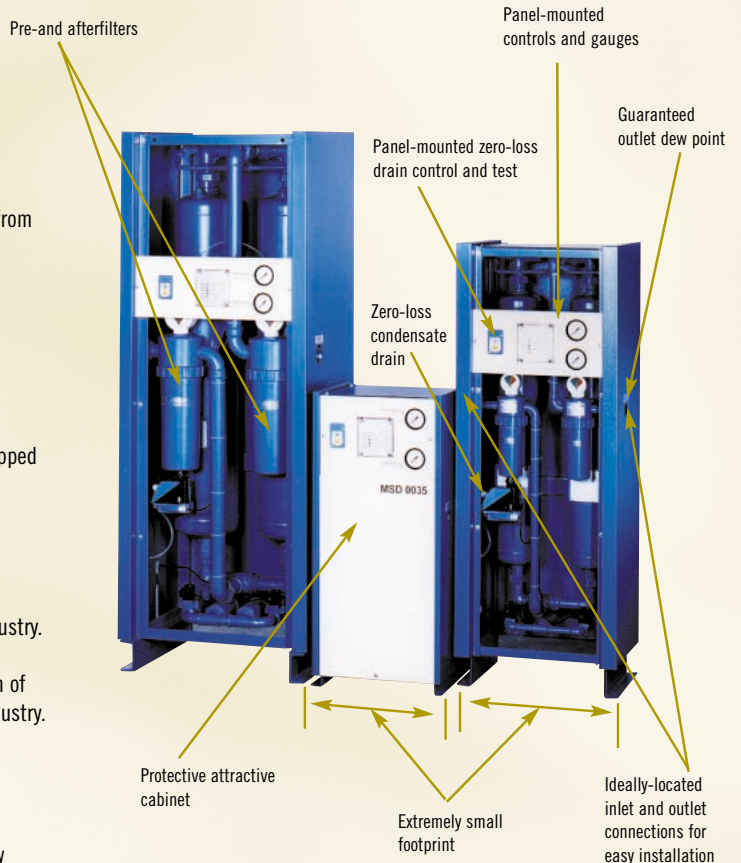
Donaldson Ultrafilter products are designed to address these problems efficiently and economically.

Ultracac Classic ALD/MSD heatless desiccant compressed air dryers benefit from decades of design and fabrication experience by Ultrafilter. Our dryers are designed to consistently provide quality air with high energy efficiency in a flow range from 3 to 5,000 scfm. Operation is fully automatic with a guaranteed outlet dew point of -40° F or -100° F.

ALD	-40° F pdp
MSD	-100° F pdp

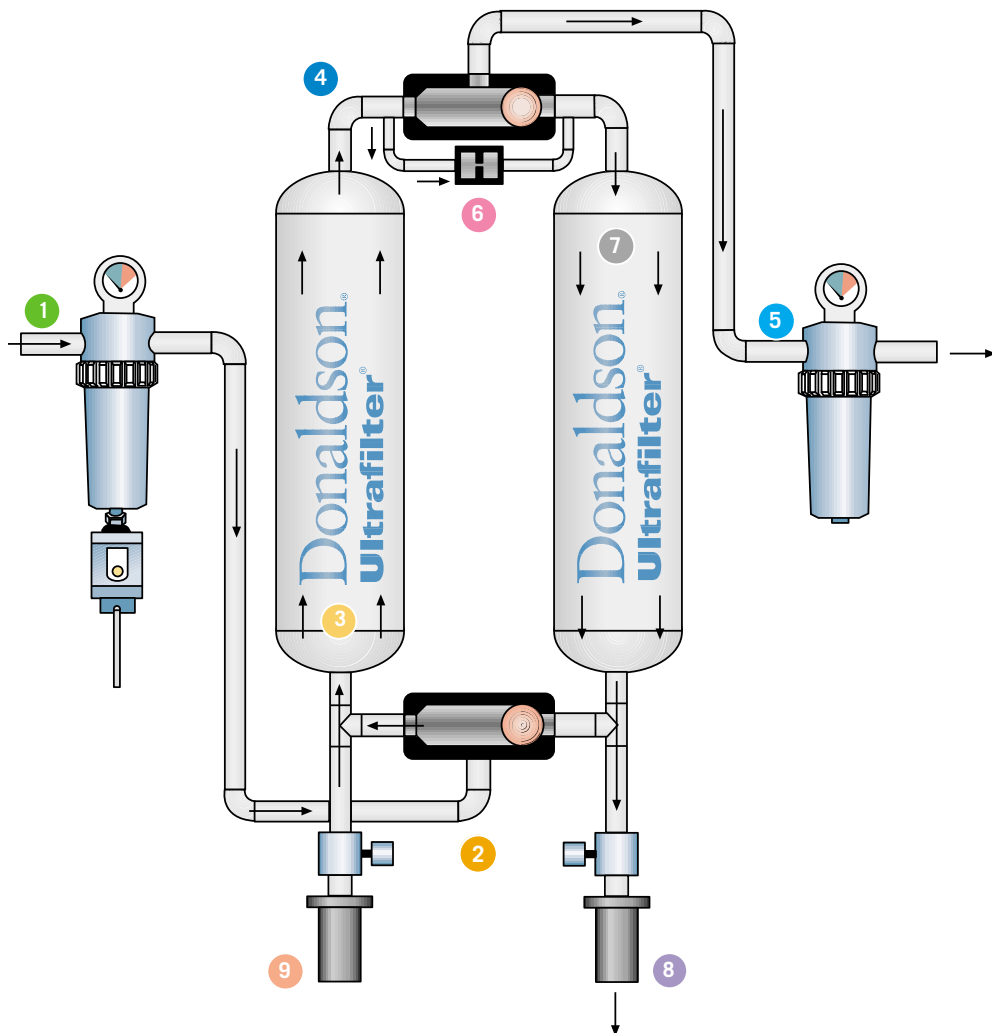
A number of unique features set Ultracac Classic dryers apart from the competition. They include, but are not limited to:

- Each dryer in the 3-600 scfm flow range is enclosed in a protective cabinet with easy-to-remove panels.
- All Ultracac Classic dryers are supplied with preinstalled Ultrafilter industrial prefilters and afterfilters. Each is equipped with an Econometer differential pressure gauge, and the coalescing prefilter is equipped with the Ultramat zero-loss condensate drain.
- Filters are oversized with large surface area to keep system pressure drop to a minimum—among the lowest in the industry.
- The compact design of Ultracac dryers takes up a minimum of floor space, having one of the smallest footprints in the industry.
- Ideally located inlet and outlet connections allow for easy installation.
- Unique dual-purge lines—one fixed, one adjustable—allow the operator to fine-tune purge air consumption to maximize energy efficiency.
- Panel-mounted controller, vessel pressure gauges and zero-loss drain control for ease of operation and system monitoring.
- Ultracac's unique intermittent operation connects the dryer directly to the compressor so that each operates in sync with the other—the dryer only cycles when necessary, saving energy. Even more energy savings can be achieved with use of the optional Ultraconomy dew point dependent control.
- Numerous options are available to customize the Ultracac Classic dryer to your needs.



## Ultracac Process Flow

- 1 Compressed air saturated with moisture and containing concentrated particulates and other contaminants enters the coalescing prefilter which removes liquid water and oil, and solid particles.
- 2 Prefiltered compressed air then enters the bottom of the on-line drying vessel, passing through a simple, pressure controlled, shuttle valve.
- 3 As the air flows upward through the bed, water vapor is removed from the air as water molecules adsorb on to the surface of the desiccant beads. Energy, called the heat of adsorption, is released and stored in the bed to be used for regeneration in a later step.
- 4 Dry compressed air at  $-40^{\circ}\text{F}$  or  $-100^{\circ}\text{F}$  pdp exits the top of the on-line drying vessel.
- 5 The dried air then passes through a particulate afterfilter before entering the plant air system.
- 6 A small volume of dried compressed purge air is redirected from the outlet of the on-line vessel to the top of the off-line, regenerating vessel.
- 7 The purge air is reduced to atmospheric pressure and flows downward through the off-line vessel. The low dew point of the expanded purge air, combined with the heat of adsorption stored in the bed, causes the water molecules to desorb off of the surface of the desiccant beads, regenerating the bed.
- 8 Wet purge air exits through the exhaust muffler.
- 9 At the end of the drying cycle, the on-line bed depressurizes downward through the exhaust muffler, after which it goes off-line for regeneration.



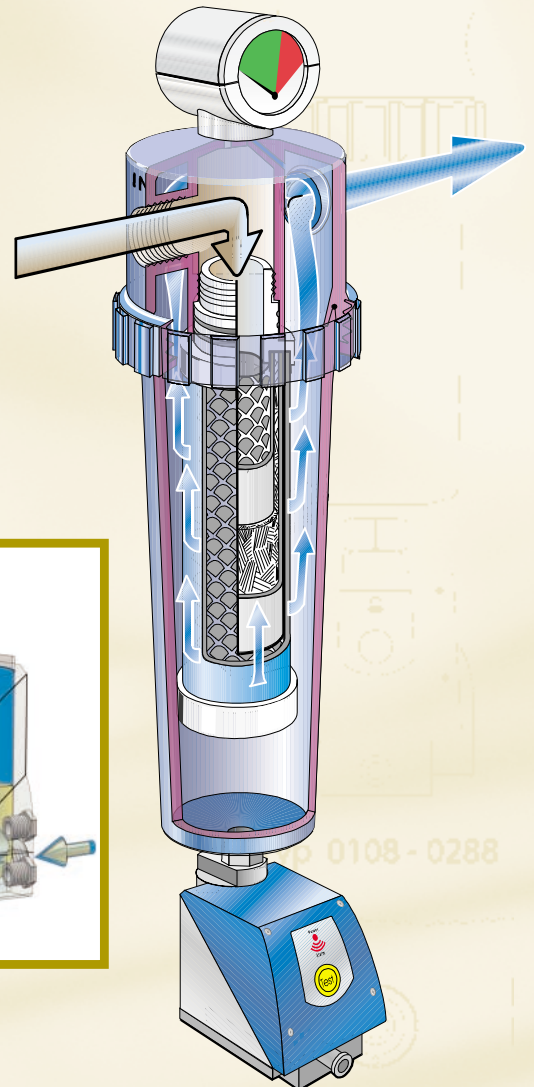
## Ultraconomy Energy Management System

Although sized for a specific flow requirement, compressed air systems do not necessarily operate at full capacity, 24 hours a day. However, a standard heatless desiccant dryer will consume approximately 15% of its design capacity for regeneration regardless of actual utilization rate. When a heatless dryer routinely operates at less than its full design capacity, excess energy is consumed in the form of wasted purge air. With the addition of the optional Ultraconomy energy management system, you can eliminate this excess energy consumption and lower your operating costs.

During normal operation, Ultrapac dryers operate on a fixed cycle divided into drying, regeneration and repressurization stages. No adjustment to this cycle is made for changes in dryer inlet conditions such as flow rate, temperature or relative humidity, all of which affect the load on the dryer. When operating in Ultraconomy mode, the dew point of the process air is monitored at the dryer outlet to determine whether or not regeneration should be initiated. The drying stage will be extended until the dew point rises above a given set point or for a maximum of 35 minutes. This maximum drying time is set to assure that the desiccant bed does not become saturated with moisture, keeping the process air dew point at  $-40^{\circ}\text{F}$  or lower throughout the cycle.

## AG Industrial Prefilters and Afterfilters

All Ultrapac Classic dryers are equipped with our top-of-the-line AG prefilters and afterfilters. These filters include all of the features required to make them the most efficient and cost effective filters for your compressed air system. Their three-part aluminum housing design allows for easy disassembly and element change-out. Low pressure drop is achieved through optimal flow-path design. The tapered bowl and non-turbulent lower filter zone assure that no condensate gets re-entrained in the air stream. Our Econometer differential pressure gauge notifies maintenance personnel of the point at which to change the filter element. For coalescing prefilters, the Ultramat zero-loss drain valve assures that no compressed air is lost when liquid condensate is drained.



# Donaldson<sup>®</sup>

## Ultrafilter<sup>®</sup>

### Ultracpac Classic ALD/MSD Heatless Desiccant Compressed Air Dryers

Ultracpac Classic dryers are designed to provide high drying efficiency in a wide range of flow capacities. Two series of models are available to produce outlet dew points of  $-40^{\circ}\text{F}$  or  $-100^{\circ}\text{F}$ . Their compact design, including preinstalled prefilters and afterfilters, allows for quick and easy installation with a very small footprint.



#### Key Features and Benefits

- Guaranteed dew point performance ( $-40^{\circ}\text{F}$  or  $-100^{\circ}\text{F}$ )
- Models 0003-60 to 0600-60 in full enclosure for quiet, clean operation
- All models equipped with preinstalled filters for reduced installation costs
- Coalescing prefilter equipped with Ultramat zero-loss drain valve
- Low pressure drop for energy savings
- Small footprint saves valuable floor space
- Ideally-located connections for easy installation
- Adjustable purge for optimum performance
- NEMA 4 protection is standard

#### Available Options (partial list)

- Ultraconomy energy management system
- Dual prefilter and afterfilter systems
- 3 to 9 valve bypass systems
- Dew point monitor and alarm
- Pneumatic control
- PLC controller
- Silicon-free components
- Non-standard power supply
- Stainless steel instrument air tubing
- Low-ambient package
- Start-up device
- Failure-to-switch alarm



## Ultradepth® MF Coalescing Prefilter Elements

The unique design of Ultradepth MF filter elements creates a two-stage filtration process within one element. The retention rate of 0.01 µm particles in our MF element is a remarkable 99.99998%. This is made possible by the use of our patented Ultrair® binder-free borosilicate glass fiber media. This media also allows for very low pressure drop, which means that you get the highest efficiency at the lowest energy cost.



## Ultrapoly® PE Particulate Afterfilter Elements

Ultrapoly PE particulate filter elements are made with aluminum end-caps, double o-ring seals and sintered polyethylene media for effective filtration down to 5 µm. PE elements offer the additional advantage of being fully regenerable.

### Capacity Correction Factors — Inlet Air Pressure

Operating Pressure (psig)	60	75	90	100	115	130	150	160	175	190	200	225
Correction Factor	0.63	0.75	0.88	1	1.12	1.25	1.38	1.5	1.63	1.75	1.88	2

### Capacity Correction Factors — Inlet Air Temperature

Operating Temperature (°F)	68	77	86	100	104	115	125
Correction Factor ALD	1.2	1.2	1.1	1	N/A	N/A	N/A
Correction Factor MSD	1	1	1	1	0.8	0.7	0.5

### Operating Parameters

Operating Pressure	40 psig minimum; 225 psig max. Up to 0600-60; 150 psig for 0800-60 and larger
Operating Temperature	40° F minimum; 125° F maximum.
Ambient Temperature	38° F minimum; 125° F maximum.
Pressure Dew Point	ALD: -40° F, MSD: -100° F
Purge Losses	ALD: 15%, MSD: 20% of rated capacity
Medium	Compressed air or nitrogen
Noise Level	80 dB (A)
Vessel Code	ASME, Models 0060-60 to 5000-60

To choose a dryer based on a given flow at non-standard operating conditions, divide the given capacity by the appropriate correction factor(s).

#### Example

Given Flow: 250 scfm  
 Actual Operating Conditions:  
 150 psig working pressure (cf 1.38)  
 86°F inlet temperature (cf 1.1)  
 Adjusted Flow = 250 scfm ÷ 1.38 × 1.1 =  
**165 scfm**  
 Selected Dryer Model: ALD0175-60

To calculate the capacity of a given dryer based on non-standard operating conditions, multiply the standard capacity by the appropriate correction factor(s).

#### Example

Dryer Model: ALD0125-60  
 Standard Capacity: 125 scfm  
 Actual Operating Conditions:  
 130 psig working pressure (cf 1.25)  
 86° F inlet temperature (cf 1.1)  
 Adjusted Capacity = 125 scfm × 1.25 × 1.1 =  
**172 scfm**

### Replacement Filter Elements

#### Prefilters

Dryer Model	Element
0003-60 to 0010-60	MF0305
0015-60 to 0020-60	MF0410
0030-60 to 0050-60	MF0520
0060-60 to 0085-60	MF0525
0125-60 to 0200-60	MF0730
0300-60 to 0400-60	MF1030
0500-60	MF1530
0600-60	MF2030

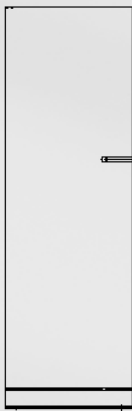
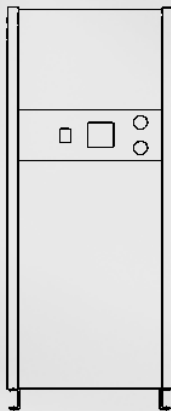
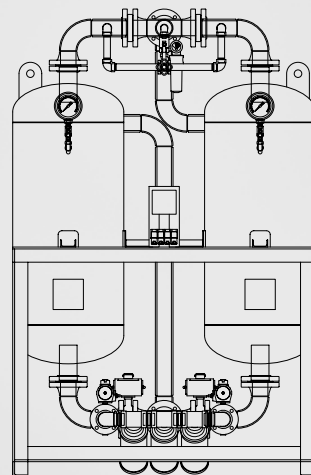
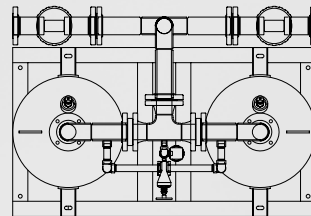
#### Replacement Filter Elements

#### Afterfilters

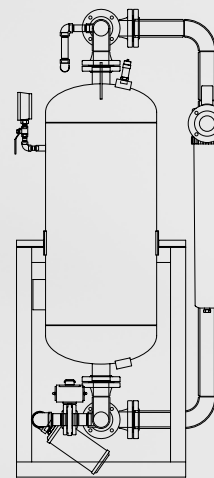
Dryer Model	Element
0003-60 to 0010-60	PE0305
0015-60 to 0020-60	PE0410
0030-60 to 0050-60	PE0520
0060-60 to 0085-60	PE0525
0125-60 to 0200-60	PE0730
0300-60 to 0400-60	PE1030
0500-60	PE1530
0600-60	PE2030

Model Number	Capacity¹ (scfm)	Connections (in.)	Dimensions (in.)			Weight (lb)
			Height	Width	Depth	
0003-60	3	3/8 (FNPT)	28	19	10	59
0005-60	5	3/8 (FNPT)	28	19	10	73
0010-60	10	3/8 (FNPT)	42	19	10	90
0015-60	15	1/2 (FNPT)	42	19	10	97
0020-60	20	1/2 (FNPT)	42	19	10	106
0030-60	30	3/4 (FNPT)	63	26	12	235
0050-60	50	3/4 (FNPT)	63	26	12	308
0060-60	60	1 (FNPT)	63	26	12	372
0085-60	85	1 (FNPT)	78	30	18	440
0100-60	100	1 (FNPT)	78	30	18	561
0125-60	125	1 1/2 (FNPT)	78	30	18	609
0175-60	175	1 1/2 (FNPT)	78	30	18	706
0200-60	200	1 1/2 (FNPT)	86	37	21	876
0300-60	300	2 (FNPT)	86	4	21	948
0400-60	400	2 (FNPT)	86	37	21	1113
0500-60	500	2 (FNPT)	93	43	26	1309
0600-60	600	2 1/2 (FNPT)	93	43	26	1487
0800-60	800	3 (ANSI Flange)	101	59	37	1914
1000-60	1000	3 (ANSI Flange)	93	67	41	2200
1200-60	1200	4 (ANSI Flange)	102	71	45	2431
1400-60	1400	4 (ANSI Flange)	103	75	51	2970
1600-60	1600	4 (ANSI Flange)	106	79	53	3366
2000-60	2000	4 (ANSI Flange)	106	87	59	3784
2400-60	2400	6 (ANSI Flange)	117	94	64	5610
3000-60	3000	6 (ANSI Flange)	119	102	68	6490
3500-60	3500	6 (ANSI Flange)	121	110	71	7700
4000-60	4000	6 (ANSI Flange)	121	118	75	8503
5000-60	5000	8 (ANSI Flange)	129	134	90	12804

¹Capacity based on -40° F pdp (ALD), -100° F pdp (MSD), 100 psig inlet pressure, 100° F inlet temperature and 100° F ambient in accordance with CAGI ADF200.



ALD/MSD 0003-60 to 0600-60



ALD/MSD 0800-60 to 5000-60



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©2003 Bulletin No. UFSB0103

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