

Donaldson®
AirCel™

Donaldson®
Ultrafilter™

Non-Cycling Refrigerated Compressed Air Dryers

VF and AR Series



Non-Cycling Refrigerated Compressed Air Dryers

Leading the Way in Air Purification

As one of the world's leading manufacturers of compressed air purification equipment, Donaldson has built a comprehensive engineering, manufacturing, and customer support network to meet the most demanding applications. With over 30 years of expertise in compressed air filtration and separation technologies, Donaldson manufactures a complete line of drying and filtration equipment in an innovative design – focused on energy efficient operation and reliable performance. Our refrigerated dryer offering is split into two distinct ranges: Donaldson offers a non-cycling and a cycling range of refrigerated dryers to meet all application requirements.

Non-cycling range

VF Compact Series (10 - 40 scfm)
VF Series (50 - 2,000 scfm)
AR Series (2,500 - 10,000 scfm)

Cycling range*

RFC Series (200 - 650 scfm)
DVF Series (800 - 2,000 scfm)
RTM Series (2,500 - 30,000 scfm)

Our non-cycling range is focused on reliable, constant dew point performance in all flow conditions. With its excellent heat transfer coefficients and low pressure drop, these dryers will outperform the competition in protecting your compressed air system, machinery and tools; and will improve your manufacturing processes.

Through optimization of the critical dryer components – heat exchanger, separator and condensate removal – the Donaldson engineers developed a system that ensures highest performance at full- and partial-load conditions to protect your application at all times.

Donaldson's high-efficiency **cycling range** is designed to automatically cycle ON/OFF depending on the actual load conditions.

Ozone-safe, 100% chlorine free, R-134a refrigerant as standard

Donaldson uses R-134a refrigerant in all refrigerated compressed air dryers as standard. R-134a has become the industry's choice as the preferred refrigerant because of its ozone depletion factor of 0.0 and low global warming potential. R-134a is a one-blend refrigerant and, therefore, consistent in performance (no temperature glide) and easy to service (no mixture of different refrigerants).



VF-150 to VF-300

All Donaldson dryers are designed to give our customers the best value available in the industry – reliable performance to CAGI ADF 100 specification while consuming the lowest amount of energy possible.

* For more information on the Donaldson cycling dryers, please refer to respective brochure.

Non-Cycling Refrigerated Compressed Air Dryers

Consistent Performance from 0-100% Load

Donaldson VF Series dryers offer highest efficiencies at varying flow conditions in a lightweight, compact design. No other dryer in the industry can offer the efficiency ratings achieved by the VF Series dryers in variable flow operation.

VF Series dryers are built with the patented Variable Flow heat exchanger, which allows for desired dew point performance regardless of flow variations. Typically, other dryers with mechanical moisture

separators lose performance as compressed airflow velocity increases or decreases substantially around the nominal design point.

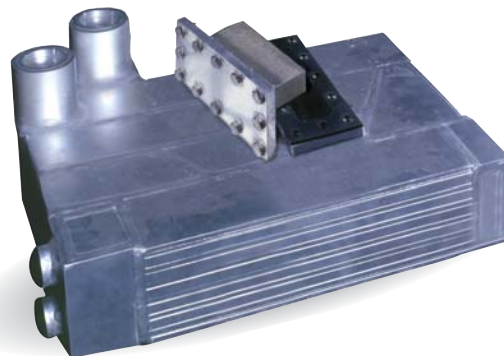
The VF Series high efficiency heat exchanger utilizes a three-step process to thoroughly remove condensed moisture from the chilled compressed air. This process provides a separation efficiency in excess of 98% throughout the dryer's entire flow range.

Features & Benefits

- Lightweight & compact.
- Precooling and reheating of compressed air for high efficiency and low energy consumption.
- Patented Variable Flow high-efficiency anodized aluminum heat exchanger utilizing 3-step process of Impaction, Brownian Motion, and Surface Tension to achieve consistent dew point at varying flow conditions.
- Heat exchanger includes multi-stage separator with removal (cleanable) stainless steel mist eliminator.
- Environmentally friendly refrigerant R-134a ensures reliable operation in high ambient overload conditions.
- Refrigerant analyzer gauge.
- Refrigerant discharge pressure gauge (VF-200 and up).
- Inlet pressure and temperature gauge (VF-400 and up).
- High efficiency scroll refrigeration compressor (VF-500 and up).
- Heavy-duty industrial powder coated cabinet with access panel.
- Optional dryer package filters sized for each dryer (see page 4).



Stainless Steel Plate Heat Exchanger
(VF-10 to VF-25, VF-1400 to VF-2000)

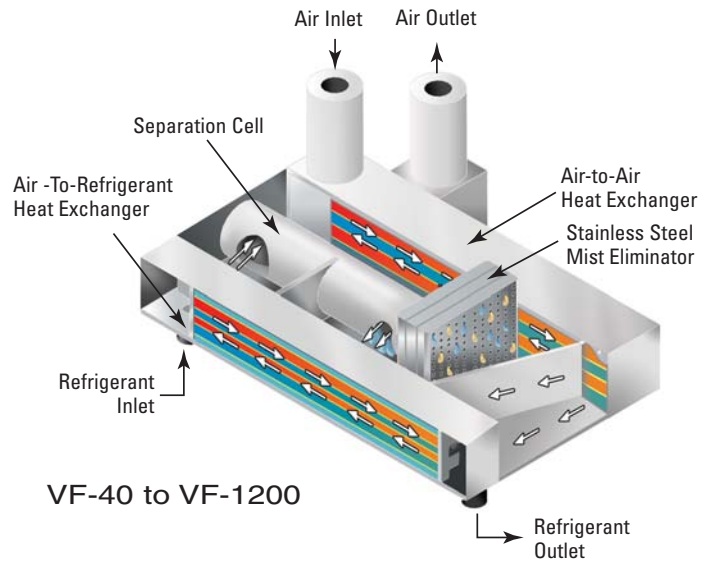


Aluminum Block Heat Exchanger
with integrated high efficiency separator
(VF-40 to VF-1200)

Non-Cycling Refrigerated Compressed Air Dryers

How the VF Heat Exchanger Works

Hot, saturated compressed air is first pre-cooled by exiting cold air in the air-to-air heat exchanger. The pre-cooled air then enters the evaporator where it is cooled to its final dew point. The mixture of cold air and condensation flows into the three-stage separator/mist eliminator where liquids and contaminants are reliably removed and ejected from the system via a programmable timer drain valve. The cold air is then reheated by the incoming hot air before leaving the dryer.



Dimensions & Specifications

| Model | Capacity @ CAGI* (scfm) | Capacity @ ISO** (scfm) | Connection (inches NPT) | HP Installed (size) | KW (full load) | | Rated Load Amps | Voltage (Standard) | Dimensions (inches) | | | Pressure max. (psig) | Weight (lbs) |
|---------|-------------------------|-------------------------|-------------------------|---------------------|---------------------|--------------------|-----------------|--------------------|---------------------|-------|-------|----------------------|--------------|
| | | | | | for CAGI conditions | for ISO conditions | | | Height | Width | Depth | | |
| VF-10 | 10 | 12 | 3/4 | 1/4 | 0.19 | 0.17 | 4.94 | 115-1-60 | 15 | 16 | 16 | 200 | 75 |
| VF-15 | 15 | 18 | 3/4 | 1/4 | 0.19 | 0.17 | 4.94 | 115-1-60 | 15 | 16 | 16 | 200 | 75 |
| VF-25 | 25 | 30 | 3/4 | 1/4 | 0.19 | 0.17 | 4.94 | 115-1-60 | 15 | 16 | 16 | 200 | 75 |
| VF-40 | 40 | 47 | 3/4 | 1/4 | 0.19 | 0.17 | 4.94 | 115-1-60 | 18 | 22 | 15 | 200 | 75 |
| VF-50 | 50 | 59 | 3/4 | 1/4 | 0.20 | 0.18 | 4.94 | 115-1-60 | 18 | 22 | 15 | 200 | 95 |
| VF-60 | 60 | 71 | 3/4 | 1/3 | 0.30 | 0.28 | 7.20 | 115-1-60 | 18 | 22 | 15 | 200 | 118 |
| VF-75 | 75 | 89 | 1 | 1/3 | 0.30 | 0.28 | 7.20 | 115-1-60 | 22 | 24 | 18 | 200 | 126 |
| VF-100 | 100 | 118 | 1 | 1/2 | 0.50 | 0.48 | 10.20 | 115-1-60 | 22 | 24 | 18 | 200 | 132 |
| VF-125 | 125 | 148 | 1 | 3/4 | 0.60 | 0.50 | 13.30 | 115-1-60 | 22 | 24 | 18 | 200 | 160 |
| VF-150 | 150 | 177 | 1 | 3/4 | 0.60 | 0.50 | 13.30 | 115-1-60 | 22 | 24 | 18 | 200 | 175 |
| VF-200 | 200 | 236 | 1-1/2 | 1 | 0.75 | 0.65 | 10.90 | 230-1-60 | 30 | 36 | 25 | 200 | 240 |
| VF-250 | 250 | 295 | 1-1/2 | 1-1/2 | 1.12 | 1.00 | 4.70 | 460-3-60 | 30 | 36 | 25 | 200 | 360 |
| VF-300 | 300 | 354 | 2 | 1-1/2 | 1.12 | 1.00 | 4.70 | 460-3-60 | 30 | 36 | 25 | 200 | 370 |
| VF-400 | 400 | 472 | 2 | 2 | 1.50 | 1.45 | 5.10 | 460-3-60 | 45 | 34 | 45 | 200 | 660 |
| VF-500 | 500 | 590 | 2 | 3 | 2.20 | 2.10 | 9.60 | 460-3-60 | 45 | 34 | 45 | 200 | 675 |
| VF-600 | 600 | 708 | 3 | 3 | 2.60 | 2.50 | 9.60 | 460-3-60 | 45 | 34 | 45 | 200 | 710 |
| VF-800 | 800 | 944 | 3 | 5 | 3.70 | 3.49 | 9.60 | 460-3-60 | 48 | 38 | 54 | 200 | 972 |
| VF-1000 | 1000 | 1180 | 3 | 6 | 4.50 | 4.45 | 9.30 | 460-3-60 | 48 | 38 | 54 | 200 | 1160 |
| VF-1200 | 1200 | 1416 | 3 | 6 | 4.50 | 4.45 | 9.30 | 460-3-60 | 48 | 38 | 54 | 200 | 1450 |
| VF-1600 | 1600 | 1888 | 4 FLG | 10 | 7.50 | 7.00 | 21.10 | 460-3-60 | 65 | 54 | 67 | 200 | 1625 |
| VF-2000 | 2000 | 2360 | 4 FLG | 13 | 9.70 | 9.00 | 25.00 | 460-3-60 | 65 | 54 | 67 | 200 | 2050 |

* Capacity rated in accordance with CAGI ADF 100 @ 100 psig, 100°F inlet, 100°F ambient, and a PDP of 38°F.

** Capacity rated in accordance with ISO 7183 @ 7 bar (101.5 psig), 35°C (95°F) inlet, 25°C (77°F) ambient and a PDP of 3°C (37.4°F).

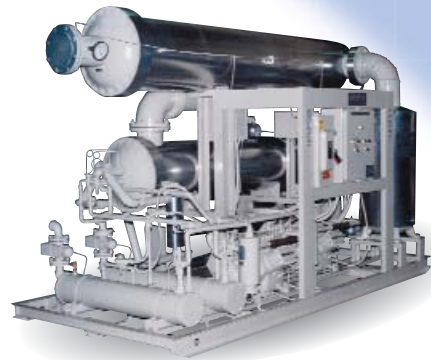
Ambient air temperature: 35°-120°F, inlet air temperature: 140°F max., operating pressure: 200 psig max.

Non-Cycling Refrigerated Compressed Air Dryers

Reliability and Performance

The Donaldson AR Series stands for reliability and performance. Air-cooled and water-cooled designs are available, along with a number of customization options to exactly match the application requirements.

Being the most efficient system in today's market, these dryers are the preferred design in the highly competitive automotive and industrial paint industry.



AR-6500

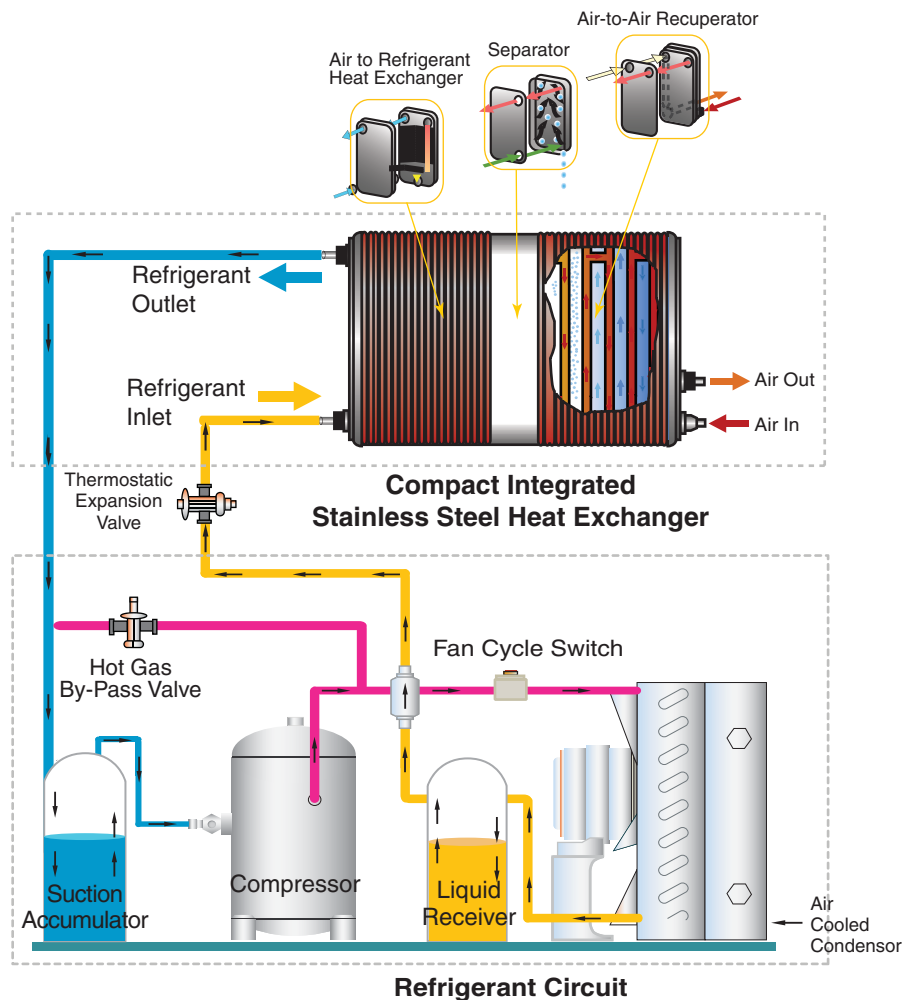
Features & Benefits

- Copper brazed stainless steel multi-plate heat exchangers.
- High-efficiency scroll refrigeration compressors (up to 5,000 scfm).
- High-efficiency discus refrigeration compressors (from 6,000 scfm).
- Environmentally friendly refrigerant R-134a ensures reliable operation in high ambient overload conditions.

How the AR Series Works

- Low Pressure Refrigerant
- High Pressure Refrigerant
- Refrigerant In

- ➔ Warm gas enters the RECUPERATION SECTION and exchanges heat with the cooler leaving gas.
- ➔ The gas then proceeds to the DRYER SECTION and is cooled using refrigeration to a designed dew point.
- ➔ The gas then proceeds through a specially designed MOISTURE SEPARATOR SECTION, where condensate drops out into the bottom of the separator.
- ➔ The gas then proceeds back through the RECUPERATOR SECTION where it is heated up by the incoming warm gas.



Non-Cycling Refrigerated Compressed Air Dryers

Dimensions & Specifications

| Model | Capacity @ CAGI* (scfm) | Capacity @ ISO** (scfm) | Connection (inches NPT) | HP Installed (size) | KW (full load) | | Full Load Amps | Voltage (Standard) | Dimensions (inches) | | | Pressure max. (psig) | Weight (lbs) |
|----------|-------------------------|-------------------------|-------------------------|---------------------|---------------------|--------------------|----------------|--------------------|---------------------|-------|-------|----------------------|--------------|
| | | | | | for CAGI conditions | for ISO conditions | | | Height | Width | Depth | | |
| AR-2500 | 2500 | 2950 | 4 FLG | 13 | 9.70 | 9.00 | 32.6 | 460-3-60 | 60 | 65 | 55 | 150 | 1995 |
| AR-3000 | 3000 | 3540 | 6 FLG | 2 x 7.5 | 11.84 | 11.00 | 36.2 | 460-3-60 | 65 | 130 | 60 | 150 | 2500 |
| AR-4000 | 4000 | 4720 | 6 FLG | 2 x 10 | 14.90 | 13.90 | 45.4 | 460-3-60 | 70 | 130 | 60 | 150 | 3900 |
| AR-5000 | 5000 | 5900 | 8 FLG | 2 x 13 | 19.36 | 18.00 | 65.2 | 460-3-60 | 75 | 130 | 60 | 150 | 4500 |
| AR-6000 | 6000 | 7080 | 8 FLG | 30 | 22.40 | 20.10 | 50.0 | 460-3-60 | 76 | 130 | 70 | 150 | 5000 |
| AR-7000 | 7000 | 8260 | 8 FLG | 35 | 26.00 | 24.20 | 62.5 | 460-3-60 | 76 | 135 | 80 | 150 | 6900 |
| AR-8000 | 8000 | 9440 | 10 FLG | 40 | 29.84 | 27.80 | 71.0 | 460-3-60 | 80 | 140 | 82 | 150 | 7600 |
| AR-9000 | 9000 | 10,620 | 10 FLG | 50 | 37.28 | 34.63 | 68.9 | 460-3-60 | 80 | 145 | 85 | 150 | 8700 |
| AR-10000 | 10,000 | 11,800 | 10 FLG | 50 | 37.28 | 34.63 | 68.9 | 460-3-60 | 80 | 145 | 85 | 150 | 9800 |

* Capacity rated in accordance with CAGI ADF 100 @ 100 psig, 100°F inlet, 100°F ambient, and a PDP of 38°F.

** Capacity rated in accordance with ISO 7183 @ 7 bar (101.5 psig), 35°C (95°F) inlet, 25°C (77°F) ambient and a PDP of 3°C (37.4°F).

Ambient air temperature: 35°-120°F, inlet air temperature: 140°F max., operating pressure: 150 psig max.

Protection for Your Investment

The Filter that Pays for Itself

To protect your investment, we recommend that you install a high performance prefilter directly in front of your dryer. By doing this, you will not only ensure trouble-free operation for years to come, but also guarantee that the dryer will operate at its highest efficiency rating throughout its lifetime.

To make the selection easy for you, Donaldson has matched a filter range to the refrigerated dryer offering in connection size and flow rate. The FF grade prefilter is ideally suited for general applications and combines excellent efficiency with a very low differential pressure due to its patented binder-free media.

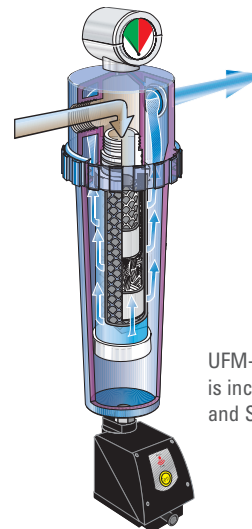
For critical applications, supplement the package with the addition of an SMF grade filter at the dryer outlet for removal of trace contaminants.

By protecting your equipment and keeping the dryer efficiency at its best, these filters will literally pay you back their cost and more in savings on your monthly energy bill.

Donaldson also offers a limited 5-year warranty on the heat exchanger and compressor if a Donaldson prefilter is installed.

Recommended Prefilters & Afterfilters

| Dryer Model | Prefilter | Afterfilter |
|-------------------|-----------|-------------|
| VF-10 to VF-40 | FF 3/4" | SMF 3/4" |
| VF-50 to VF-60 | FF 3/4" | SMF 3/4" |
| VF-75 to VF-150 | FF 1" | SMF 1" |
| VF-200 to VF-250 | FF 1-1/2" | SMF 1-1/2" |
| VF-300 to VF-500 | FF 2" | SMF 2" |
| VF-600 to VF-1200 | FF 3" | SMF 3" |



UFM-T zero air-loss drain is included on filters FF and SMF 2" and larger.

Non-Cycling Refrigerated Compressed Air Dryers

Capacity Correction Factors VF and AR Series

The manufacturers of compressed air and gas equipment in North America are organized in the Compressed Air & Gas Institute (CAGI). As the leading industry organization, CAGI has developed standards to protect users of this equipment. ADF100 is the current standard for refrigerated compressed air dryers. ADF100 specifies the dryers performance to

be rated at 100°F inlet temperature, 100°F ambient temperature, and 100° psig system pressure. To adjust the dryer capacity from these “CAGI conditions” to your specific application, please use the correction factors below for differing ambient air temperatures (C1), inlet air temperatures (C2), system pressures (C3), and varying dew point requirements (C4).

Capacity correction factors for differing ambient air temperature (C1)

| | | | | | | | |
|--------------------------|-----|------|------|------------|------|------|------|
| Ambient Temperature (°F) | 70 | 80 | 90 | 100 | 110 | 115 | 120 |
| Correction Factor | 1.1 | 1.07 | 1.05 | 1 | 0.94 | 0.85 | 0.65 |

Capacity correction factors for differing inlet air temperature (C2)

| | | | | | | |
|------------------------|------|------|------------|------|------|------|
| Inlet Temperature (°F) | 80 | 90 | 100 | 110 | 120 | 140 |
| Correction Factor | 1.50 | 1.21 | 1 | 0.82 | 0.72 | 0.61 |

Capacity correction factors for differing system air pressure (C3)

| | | | | | | | | | |
|------------------------|------|------|------------|------|------|------|------|------|------|
| System Pressure (psig) | 50 | 75 | 100 | 125 | 150 | 175 | 200 | 225 | 250 |
| Correction Factor | 0.57 | 0.78 | 1 | 1.07 | 1.13 | 1.18 | 1.20 | 1.22 | 1.24 |

Capacity correction factors for differing pressure dew point requirements (C4)

| | | | | |
|-------------------|-----------|------|------|------|
| Dew Point (°F) | 38 | 41 | 45 | 50 |
| Correction Factor | 1 | 1.12 | 1.17 | 1.22 |

To Size the Dryer Capacity for Actual Conditions

Adjusted Capacity = scfm x C1 x C2 x C3 x C4

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: VF-100
 Standard Capacity: 100 scfm
 Actual Operating Conditions: 90°F ambient temperature: **C1 = 1.05**
 100°F inlet temperature: **C2 = 1.0**
 125 psig system pressure: **C3 = 1.07**
 38°F required dew point: **C4 = 1.0**
 Adjusted Capacity = 100 scfm x 1.05 x 1.0 x 1.07 x 1.0 = **112.4 scfm**

To Select the Dryer Model for Actual Conditions

Adjusted Capacity = s/C1/C2/C3/C4

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

EXAMPLE: Given Flow: 75 scfm
 Actual Operating Conditions: 80°F ambient temperature: **C1 = 1.07**
 90°F inlet temperature: **C2 = 1.21**
 100 psig system pressure: **C3 = 1.0**
 Required dew point : 38°F pdp: **C4 = 1.0**
 Adjusted Capacity = 75 scfm / 1.07 / 1.21 / 1.0 / 1.0 = **57.9 scfm**
 Selected Dryer Model: VF-60

U.S. Patents 6,691,428

Information in this document is subject to change without notice.

Donaldson®

Trust Donaldson Compressed Air & Gas to deliver a complete range of compressed air purification solutions that improve air quality throughout your plant – from the compressor room to all points of use. With over 30 years of expertise in compressed air filtration and separation, Donaldson manufactures a complete line of drying and filtration equipment using innovative designs that focus on energy efficient operation and reliable performance.

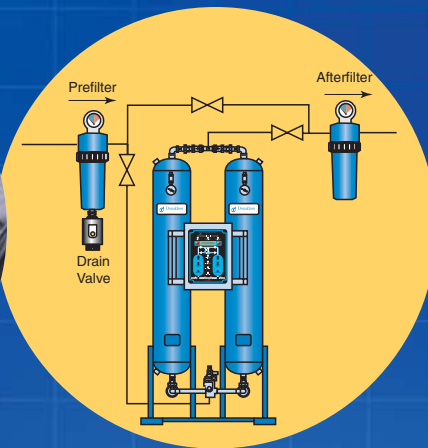
Donaldson has built a comprehensive engineering, manufacturing, and customer support network to meet the most demanding applications.

Leading Technology



- 550 engineers worldwide
- More than 500 patents held by Donaldson employees
- Custom designed solutions

Engineered Solutions



- Total system solutions
- Air capacities from 3 to 50,000+ scfm
- High pressure systems up to 10,000 psig

Knowledgeable Service



- Broad range of innovative filters and dryers
- Ready-to-ship filters and dryers within 48 hours
- Technical expertise and support