

Atlas Copco Air Dryers

BD series

Heat reactivated adsorption air dryers



ABSOLUTELY
DRY AIR

Atlas Copco

Why Quality Air?



When the air that surrounds us is compressed, its vapour and particle concentration increases dramatically.

The compression process causes the oil and water vapours to condense into droplets, and then mix with the high concentration of particles. The result is an abrasive oily sludge that in many cases is also acidic. Without quality air equipment, much of this corrosive sludge will enter the air net.

Effective air treatment equipment is an investment with a solid return: it efficiently reduces the contamination in the air that would otherwise produce corrosion in the pipework, lead to premature pneumatic equipment failure and cause product spoilage.



The high cost of low quality air

When it comes to tools, machines and instruments, poor air quality will cause more breakdowns, repairs and replacements. In addition to the remedial costs, the resulting downtime and production delays are often far more expensive than any repair.



The threat to an excellent reputation

Where the compressed air comes in contact with the product, the stability, scrap rate and final quality of the product can be significantly affected by contamination. Aside from the costs to correct the situation, the potential damage to your product's reputation can not be underestimated.





Money disappearing into thin air

The pipe work that carries the compressed air is often forgotten when calculating the potential cost of poor quality air. Aggressive condensate will cause corrosion, leading to air leaks and a costly waste of energy. A leak of 3 mm is roughly equivalent to an energy waste of 3.7 kW. After one year, this can add up to € 1800.



Persistent pressure on the environment

The energy waste caused by leaks and the unsafe disposal of untreated condensate will adversely affect our environment. Apart from the stringent legislation that imposes heavy fines in case of non-compliance, every waste of energy negatively influences the bottom line. Caring for the environment can be smart business !

From products to total solutions

Based on years of experience, Atlas Copco has the know-how to determine the exact requirements and to offer the right equipment from an extensive range of quality air products. In addition to providing total solutions, Atlas Copco has built an aftermarket organisation to support your complete installation... from a local point of contact, around the globe.

From compressor to dryer and down to the last filter, Atlas Copco can be your single partner for total quality compressed air solutions.



The complete Quality Air Solution

Particles / dust

Water

filtration

drying

adsorption dryers

MD

(for ZR/ZT/ZE/ZA Compressors)

2 3

adsorption dryers

XD

0 1 2 3

refrigerant dryers

FD/ID

4

draining

electronic water drain

EWD

oil/water separation

OSC

Quality Air process
=
End user satisfaction

filters

DD, DDp, PD & PDp



0 1 2



Oil

filtration

0

filters
DD, PD & QD



air compression

oil-free compressors

ZH/ZR/ZT/ZE/ZA/LF/SF/LFX/H/
S/P/HX-HN/PETPACK®



oil-injected compressors

GA/GR/GX/LE/LT



0 1 2



Air quality classes ISO 8573-1	Dirt (solid particles)				Water		Oil
	Maximum number of particles per m ³ particle diameter (d) size, μm				Max. pressure dewpoint		Max. concentration
	≤0.10	0.1 < d ≤ 0.5	0.5 < d ≤ 1.0	1.0 < d ≤ 5.0	°C	°F	mg/m ³
0	As specified by the equipment user or supplier and more stringent than class 1						
1	*	100	1	0	-70	-94	0.01
2	*	100 000	1000	10	-40	-40	0.1
3	*	*	10000	500	-20	-4	1
4	*	*	*	1000	3	+37.4	5
5	*	*	*	20000	7	+44.6	> 5

* Not specified

A well designed compressed air system ensures that the air quality demands of the process are closely met. With the desired ISO class as a guide, the appropriate components can be selected.

Atlas Copco offers a complete product range that never requires a customer to compromise.

BD dryers - for absolutely dry air



Moisture: an avoidable threat ?

Compressed air entering the air net is always 100 % saturated with water vapour. When cooling down, this moisture will condense, causing damage to your air system... and to your finished products. The amount of water is directly proportional to the flow and although an aftercooler will eliminate 2/3 of the moisture, the remaining third can still be very destructive in many applications, such as instrument air, dry powder conveying or processes with rapid air expansion.

BD totally eliminates moisture

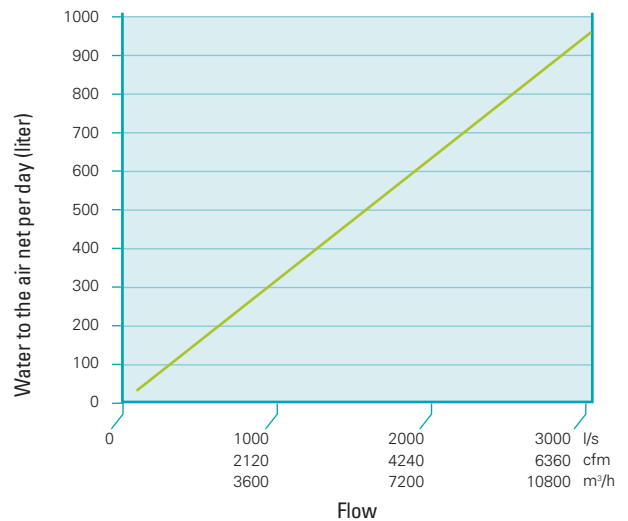
Atlas Copco BD adsorption dryers eliminate the moisture completely before it can cause any damage. Even the possibility of freezing is non-existent. The BD dryers ensure a reliable process and impeccable end products by offering absolutely dry air to your compressed air system, with a pressure dewpoint of -40 °C or even -70 °C.

BD is energy efficient in every aspect

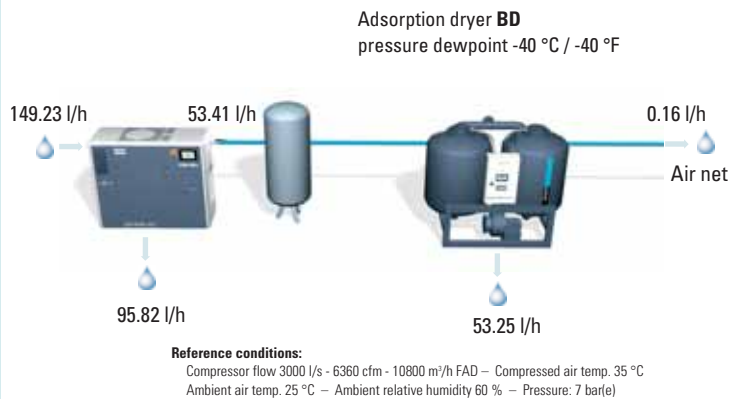
The BD dryer has been designed for high drying efficiency at the lowest energy cost. The desiccant needs 30 % less reactivation energy than other drying agents. The heating is internal to optimally use the radiation effect and the thermostat control saves additional energy. The air flow is evenly distributed over the desiccant bed and compressed air is used for cooling, again reducing the power consumption.



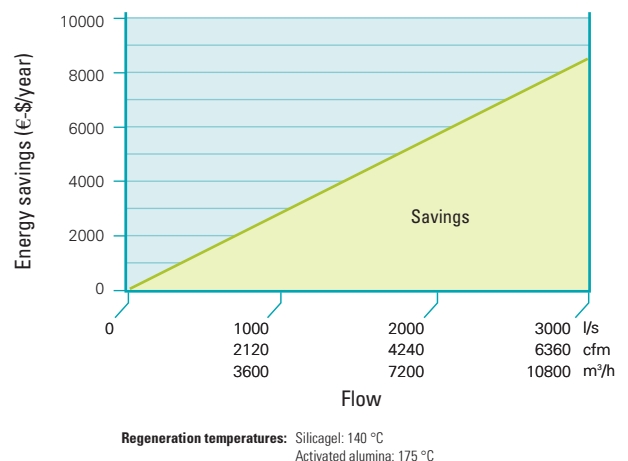
WATER TO THE AIR NET IF NO DRYER INSTALLED



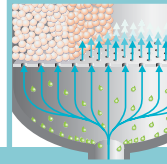
WATER ENTERING AND LEAVING THE COMPRESSOR & DRYER (EXAMPLE)



ENERGY SAVINGS WHEN USING SILICAGEL DESICCANT



The BD adsorption drying process



Working principle

Two towers contain silicagel desiccant. While in one tower the silicagel beads adsorb the moisture from the air, the saturated silicagel is reactivated in the other tower. After half a cycle, the tower functions are reversed.

Adsorption/drying phase

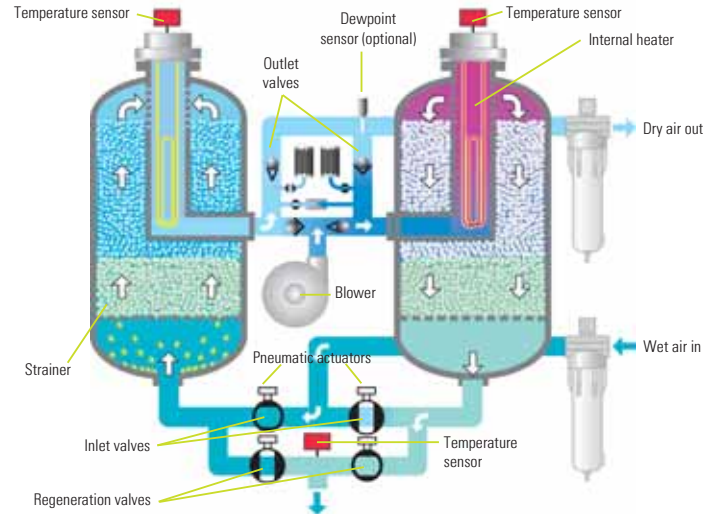
Wet compressed air enters the bottom of the drying towers via the inlet valve. The air flows upwards through the silicagel desiccant beads, where the moisture is adsorbed. Dry air leaves the tower via the outlet valve.

Reactivation phase

The blower sends ambient air past the internal heater^(*); the heated air travels through the saturated desiccant, where it forces the adsorbed moisture out of the silicagel beads. The hot wet ambient air leaves the tower through the bottom valve; this continues until the temperature sensor switches off the heater. Next, dry compressed air is used to cool the desiccant bed, further improving the reactivation efficiency.

Shifting

After regeneration, the tower's pressure is equalized to system pressure by closing the regeneration valve. The functions of both towers are now switched. If a dewpoint sensor is installed, the dryer can be in "waiting mode" without consuming energy, until the desiccant in the drying tower is saturated.



- ▶ **Silicagel desiccant**
adsorbs the moisture from the wet air; during reactivation, hot air forces the moisture out of the silicagel beads
- ▶ **Full size strainer**
optimizes the flow distribution over the desiccant bed and separates water droplets before entering the desiccant, for better drying performance, lower pressure drop and reduced energy consumption
- ▶ **Temperature sensors**
dynamically control the operation of both the blower and the heaters, ensuring that the desiccant bed is fully regenerated with minimum energy consumption
- ▶ **Pneumatic actuators**
control all main valves to prevent clogging or malfunctioning; steered by dry and filtrated air
- ▶ **Internal heaters^(*)**
placed within the drying bed in each tower; but separated from the desiccant; air is blown in and warmed up, both by heat transmission and radiation
- ▶ **High efficiency blower**
takes in ambient air and blows it to the internal heaters, for reactivation

^(*) Heaters external on BD 100-300

High performance drying

Minimal energy consumption

- ▶ desiccant with high adsorption capacity and low reactivation energy requirement
- ▶ internal heating^(*), benefiting from heaters' radiation effect
- ▶ dynamically controlled regeneration sequence
- ▶ dewpoint control for even more savings (optional on the BD 390 and above)
- ▶ low pressure drop

First class performance, first class air quality

- ▶ guaranteed dewpoint of -40 °C/-40 °F or optionally -70 °C/-100 °F
- ▶ optimal spread of air flow over drying bed
- ▶ reliable, continuous drying process

Efficient reduction of water load and pressure drop

- ▶ air inlet at bottom keeps droplets from entering the tower
- ▶ strainer separates droplets/moisture before air enters
- ▶ desiccant cooling with dry compressed air; no water/moisture added during cooling

Intelligent control and monitoring

- ▶ advanced Elektronikon® control and monitoring system with limit switches, pressure & temperature sensors
- ▶ clear indication of dryer status, operation cycle and alarms
- ▶ dewpoint control and indication (optional on BD 390 and above)
- ▶ easy to use

Low maintenance, minimal downtime

- ▶ long service life of silicagel desiccant
- ▶ pneumatic actuators on all main valves to prevent clogging
- ▶ one heater in each vessel doubles heaters' lifetime (BD 390 and above)
- ▶ easy to service



Environment friendly











- ▶ low energy requirements for reactivating the desiccant
- ▶ 100 % oil-free process
- ▶ silent operation
- ▶ total absence of CFC's

^(*) Heaters external on BD 100-300



Excellence by design



-  Fully automatic operation
-  Remote start/stop
-  Display for status indication and alarms
-  Voltage-free alarm contact
-  Pneumatically controlled valves
-  All valves equipped with limit switches
-  Alarms for low inlet pressure and blower, heater and valve operation
-  Easy installation; delivered complete and ready to use with all connection parts
-  Full range to perfectly match your compressor installation
-  Design, manufacturing and service from one single source



Options

- Electronic dewpoint control (standard on BD 100-300)
- 70 °C/-100 °F pressure dewpoint
- Filter pack for pure process air (standard on BD 100-300)
- 14.5 bar(e) operating pressure (standard on BD 100-300)
- Drying towers insulation
- Copper-free dryer
- Minimum pressure valve control at dryer outlet
- Sonic nozzle to limit inlet air flow



BD options for even more versatility

Electronic dewpoint control

Instead of shifting tower functions at regular time intervals, the BD can be controlled by a dewpoint sensor (standard on BD 100-300). When the dewpoint reaches a preset point, the dryer will automatically switch towers. This results in an extension of the drying time and considerable energy savings when the dryer is not operating at maximum capacity.

Energy savings can be as high as 70 %. The dewpoint is continuously monitored and indicated on the dryer display.



-70 °C pressure dewpoint

An extremely low dewpoint throughout the complete cycle is obtained by three measures: the upper filling of desiccant type molecular sieves, vessel insulation and three-stage regeneration. The latter optimises the efficiency by using both ambient air and compressed air for regeneration, which keeps the energy consumption to a minimum. The insulated vessels further contribute to the energy saving.



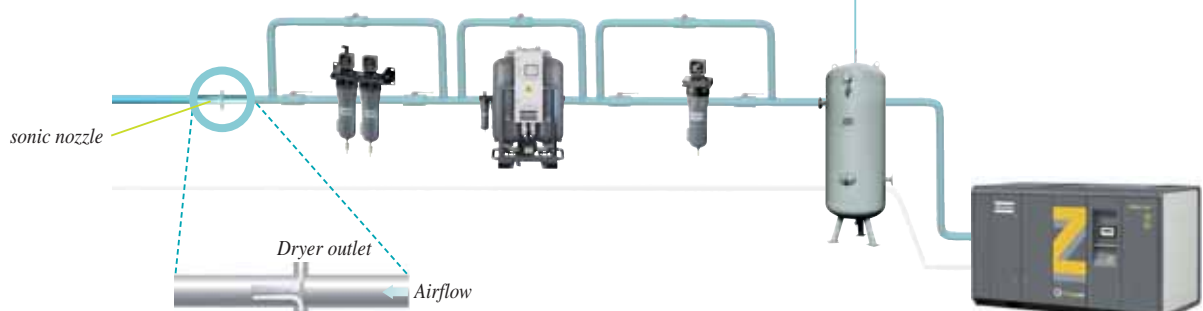
Filter pack for pure process air

The PD pre-filter type removes liquid water and oil aerosol to 0.01 mg/m (0.01 ppm) and particles down to 0.01 micron. The DDp after-filter type removes particles down to 1 micron (3-stage filtration standard on BD 100-300). Filters and piping are all included, with several inlet and outlet configuration possibilities. This simplifies the installation and reduces floor space. The pre-assembled PD and DDp filters come with differential pressure alarm connections, indicating element replacement.



Sonic nozzle

When integrating a desiccant dryer into a large air net, it is recommended to protect the dryer and the drying medium against excessive volumetric flow through the desiccant. This is in particular advisable for some critical applications and compressor installations. The smart solution is to install a sonic nozzle to avoid damage to the desiccant or poor dryer performance.



Technical data

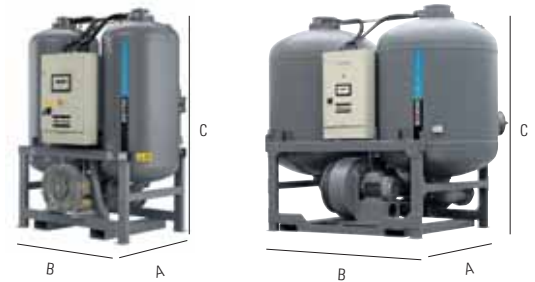
BD adsorption dryer range

BD dryer type	Inlet Capacity FAD 7 bar(g) 100 psi(g)		Total Installed Power		Pressure Drop (excluding filters)		Included Filtration			Inlet/Outlet connections 50 Hz: G/PN16 60 Hz: NPT/DN	Dimensions						Weight	
	l/s	cfm	kW	HP	bar	psi	Pre filters		After filter 1 µm		A	B	C	A	B	C	kg	lbs
							1 µm 0.1 ppm	0.01 µm 0.01 ppm		mm	mm	mm	inch	inch	inch			
BD 100	100	212	5.2	7.0	0.20	2.9	DD120	PD120	DDp120	1 1/2"	770	1250	1720	30.3	49.2	67.7	640	1421
BD 150	150	318	5.2	7.0	0.20	2.9	DD150	PD150	DDp150	1 1/2"	870	1300	1770	34.3	51.2	69.7	680	1510
BD 185	185	392	9.0	12.1	0.20	2.9	DD175	PD175	DDp175	1 1/2"	870	1300	1770	34.3	51.2	69.7	710	1576
BD 250	250	530	9.0	12.1	0.20	2.9	DD280	PD280	DDp280	2"	955	1345	1816	37.6	53.0	71.5	775	1721
BD 300	300	636	9.0	12.1	0.20	2.9	DD280	PD280	DDp280	2"	1010	1425	1853	39.8	56.1	73.0	820	1820
BD 390	390	827	15.0	20.1	0.17	2.5	N/A	PD390	DDp390	80	1175	1340	2145	46.3	52.8	84.4	1200	2664
BD 520	520	1102	22.0	29.5	0.14	2.0	N/A	PD520	DDp520	100	1380	1600	2205	54.3	63.0	86.8	1800	3996
BD 780	780	1654	29.5	39.6	0.16	2.3	N/A	PD780	DDp780	100	1490	1880	2360	58.7	74.0	92.9	2350	5217
BD 1050	1050	2226	41.5	55.7	0.12	1.7	N/A	PD1050	DDp1050	125	1727	2250	2445	68.0	88.6	96.3	3250	7215
BD 1400	1400	2968	65.5	87.8	0.10	1.5	N/A	PD1400	DDp1400	150	1770	2540	2645	69.7	100.0	104.1	4300	9546
BD 1800	1800	3816	35.5	47.6	0.12	1.7	N/A	PD1800	DDp1800	150	1858	2740	2750	73.1	107.9	108.3	4800	10656
BD 2400	2400	5088	92.0	123.4	0.13	1.9	N/A	PD2700	DDp2700	150	2043	3090	2925	80.4	121.7	115.2	7500	16650
BD 3000	3000	6360	119.0	159.6	0.13	1.9	N/A	PD3150	DDp3150	200	2344	3470	2976	92.3	136.6	117.2	10000	22200

Filters optional extra

Reference conditions

Compressed air inlet pressure after filtration	7 bar(g) / 100 psi(g)
Maximum allowed inlet pressure BD 100-300	14.5 bar(g) / 210 psi(g)
Maximum allowed inlet pressure BD 390-3000	11 bar(g) / 160 psi(g)
Compressed air inlet temperature	35 °C / 100 °F
Inlet relative humidity	100%
Nominal pressure dewpoint	-40 °C / -40 °F



BD 780

BD 3000

Standard Correction Factors

To adjust the performance of each dryer for different inlet conditions, use the correction factors below

Inlet Pressure (K_p)

Inlet Pressure	bar (g)	4.5	5	6	7	8	9	10.0	11	12	13	14.5
	psi (g)	65	73	87	102	116	131	145	160	174	189	210
BD 100-3000	K_p	0.69	0.75	0.88	1	1.13	1.25	1.38	1.5	1.62	1.75	1.9

Inlet Temperature (K_t)

Inlet Temperature	°C	20	25	30	35	40
	°F	68	77	86	100	105
BD 100-3000	K_t	1.00	1.00	1.00	1.00	0.70

Example Calculation:

What is the capacity of an BD 520, working at 8 bar(g)/116 psi(g), with an inlet temperature of 35 °C/100 °F with a required pressure dew point of -40 °C/ -40 °F ?

Find each correction factor:

$$K_p = 1.13$$

$$K_t = 1$$

$$\text{Actual capacity} = \text{Nominal capacity} \times K_p \times K_t$$

$$\text{Actual capacity} = 520 \times 1.13 \times 1$$

$$\text{Actual capacity} = 588 \text{ l/s or } 1246 \text{ cfm}$$



The face of innovation

What sets Atlas Copco apart as a company is our conviction that we can only excel in what we do, if we provide the best possible know-how and technology to really help our customers produce, grow and succeed.

There is a unique way of achieving that - we simply call it the Atlas Copco way. It builds on **interaction**, on long-term relationships and involvement in the customers' process, needs and objectives. It means having the flexibility to adapt to the diverse demands of the people we cater for.

It's the **commitment** to our customers' business that drives our effort towards increasing their productivity through better solutions. It starts with fully supporting existing products and continuously doing things better, but it goes much further, creating advances in technology through **innovation**. Not for the sake of technology, but for the sake of our customer's bottom line and peace-of-mind.

That is how Atlas Copco will strive to remain the first choice, to succeed in attracting new business and to maintain our position as the industry leader.



ISO 9001

A consistent quality earned us the industry's leadership and the customer's trust.



ISO 14001

Atlas Copco's Environmental Management System forms an integral part of each business process.

Never use compressed air as breathing air without prior purification in accordance with local legislation and standards.