Breathable Compressed Air

BAS HL 050 - BAS HL 085

ENGINEERING YOUR SUCCESS.

Protecting Employees from Hazards

In most countries, legislation demands employers provide protection for their employees. This includes: When working in the presence of substances that can be damaging to health and those employees working in hazardous environments

Contaminants such as particulates and gases present in the workplace can cause significant damage to health or, in extreme cases, can lead to death. Contamination can occur by inhaling harmful levels of these dangerous contaminants. Entering and working in an oxygen deficient environment can also lead to loss of consciousness and death. Exposure to hazardous substances at work should be eliminated. Where dangerous contaminants cannot be eliminated, protective measures should be put in place to reduce exposure.

Anyone working in such environments must be provided with adequate Personal Protective Equipment (PPE). Equipment to protect the lungs is known as Respiratory Protective Equipment, abbreviated to RPE.

Examples:

Typical Hazardous Environments

- **Spray painting**
- **Tank cleaning**
- **Shot blasting & sand blasting**
- **Welding**
- **Confined spaces**
- **Tunnelling**
- **Demolition**
- **Biohazard areas**
- **Chemical plants & spill containment areas**
- **Pharmaceutical labs, drug manufacturing facilities and clean rooms**
- **Asbestos cleanup sites**
- **Nuclear plants**

Typical Hazardous Substances

- **Biological agents**
  bacteria, moulds and other micro-organisms
- **Dusts**
  with high concentration levels (produced during grinding, sanding or milling)
- **Noble gases**
  e.g. argon and helium (not directly hazardous but can cause oxygen deficiency)
- **Processed substances**
  such as pesticides, medicines chemicals and cosmetics
- **Fumes**
  often created during welding, smelting and pouring molten metals
- **Mists**
  liquid droplets formed by atomisation and condensation processes. Mists can be created by plating, spraying, mixing and cleaning operations
- **Gaseous Atmospheric Contaminants**
  from natural sources, industrial processes and vehicle exhausts
- **Solid Atmospheric Contaminants**
  from natural sources, industrial processes and vehicle exhausts

Health & Safety Legislation - EN 529:2005

EN 529:2005 is a European Union standard document providing recommendations for selection, use, care and maintenance of Respiratory Protective Equipment.

Respiratory Protective Equipment

EN529:2005 states “Respiratory protective devices are designed to be worn in hazardous environments and should provide wearers with an adequate supply of breathable air or gas”.

Section 4.1 of EN 529:2005 defines two distinct types of respiratory protective devices:

Filtering devices:
These purify the ambient air to be breathed using filters able to remove contaminants in the air

Examples of filtering devices are respirators and face masks. These purify ambient air by inhaling it through a medium which removes the contaminants.

Filter based RPE are not suitable for all applications, especially for prolonged use in the presence of dangerous gases or in an oxygen deficient environment.

Breathing apparatus:
Breathing apparatus supplying breathable gas from an uncontaminated source (e.g. oxygen)

Or alternatively
Breathing apparatus supplying breathable air from a from an uncontaminated source (e.g. compressed air)

Self-contained breathing apparatus using high pressure bottles

- Is expensive
- Can be dangerous
- And requires highly trained personnel

Therefore, for most industrial applications, compressed air fed breathing apparatus is the cost effective solution. These provide a continuous source of breathable quality air from a treated compressed air supply.

Health & Safety Legislation - EN 12021:2014

Compressed air used to supply breathing apparatus must comply with local legislation. For compliance in the European Union & the United Kingdom, EN 529 is used and states:

“The quality of the compressed air for breathing apparatus should be in accordance with EN 12021”

EN 12021 stipulates the minimum quality standards for breathable compressed air and includes the levels for oxygen, carbon monoxide, carbon dioxide, lubricants, water, other types of contaminants and odour.

Compressed Air Contamination

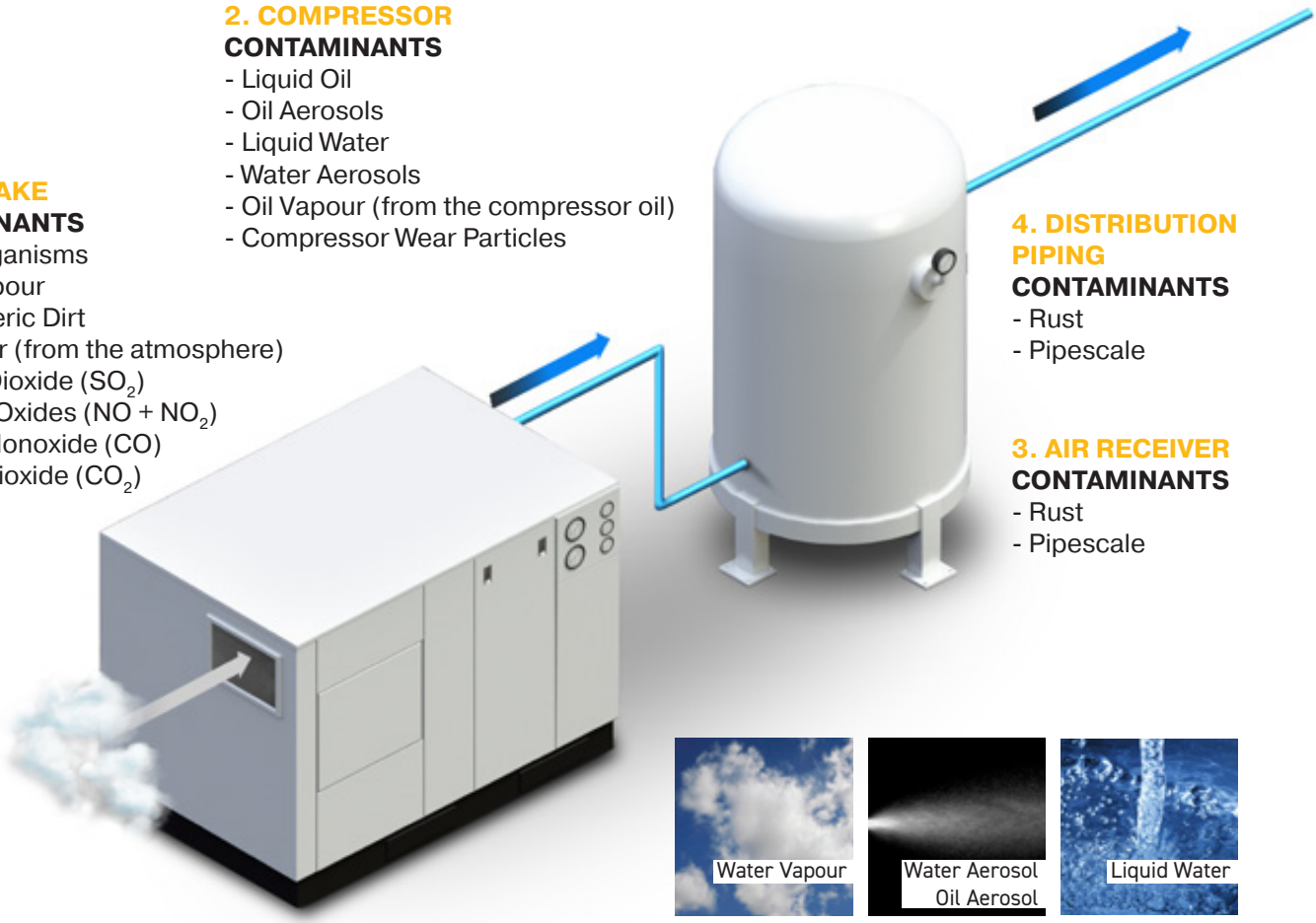
Unfortunately, it is not just a case of connecting breathing apparatus into a standard compressed air line. Compressed air contains contamination and must be treated before it can be used to supply breathing apparatus. In order to protect users of compressed air fed breathing apparatus, there are a minimum of FIFTEEN contaminants originating from FOUR different sources that must be treated.

1. AIR INTAKE
CONTAMINANTS
- Micro-organisms
- Water Vapour
- Atmospheric Dirt
- Oil Vapour (from the atmosphere)
- Sulphur Dioxide (SO_2)
- Nitrogen Oxides ($NO + NO_2$)
- Carbon Monoxide (CO)
- Carbon Dioxide (CO_2)

2. COMPRESSOR
CONTAMINANTS
- Liquid Oil
- Oil Aerosols
- Liquid Water
- Water Aerosols
- Oil Vapour (from the compressor oil)
- Compressor Wear Particles

4. DISTRIBUTION PIPING
CONTAMINANTS
- Rust
- Pipescale

3. AIR RECEIVER
CONTAMINANTS
- Rust
- Pipescale

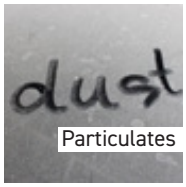


Water Vapour

Water Aerosol
Oil Aerosol

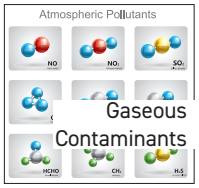
Liquid Water


Oil Vapour



Particulates


Liquid Oil



Gaseous Contaminants


Micro-organisms

Water	Oil	Particulates	Organic	Gaseous
Water Vapour	Oil Vapour	Atmospheric Particulates	Micro-organisms	Sulphur Dioxide (SO_2)
Liquid Water	Liquid Oil	Compressor Wear Particles		Nitrogen Oxides ($NO + NO_2$)
Water Aerosols	Oil Aerosols	Rust / Pipescale		Carbon Monoxide (CO)
				Carbon Dioxide (CO_2)

Compressed Air Contaminants of Concern

All of the contaminants highlighted previously must be treated and reduced to acceptable levels, however, some contaminants pose a greater risk to life than others. Of particular concern are:

- **Carbon Monoxide**
- **Water Vapour**
- **Micro-organisms**

Carbon Monoxide (CO)

Carbon Monoxide (CO) is a colourless, odourless, tasteless gas that can kill. The inhalation effects of Carbon Monoxide are as follows:

<500ppm for 1hr does not produce symptoms
>500ppm for 1hr causes oxygen deficiency
>4000ppm for 1hr is life threatening

As the concentration increases toxic effects become increasingly severe:

- **Accelerated breathing rate**
- **Severe headache**
- **Nausea**
- **Confusion**
- **Double vision**
- **Loss of consciousness**
- **Death**

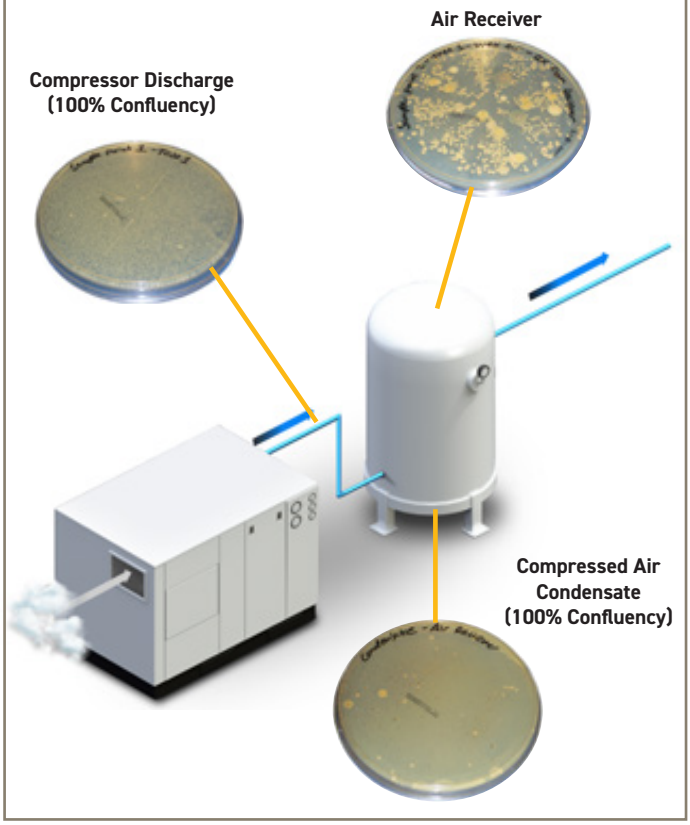
Water (H_2O)Liquid Water / Water Aerosols / Water Vapour

Many of the global breathing air standards are written around Self Contained Breathing Apparatus (SCBA) typically used by emergency services and Self Contained Underwater Breathing Apparatus (SCUBA) used by divers. They are particularly concerned around water condensing in the bottle and the freezing of regulators, however in an industrial compressed air fed breathing air application, the major concern is around the combination of wet compressed air how this promotes the growth of micro-organisms.

Micro-organisms

Ambient air contains viable and non-viable particles. A non-viable particle is a particle that does not contain a living micro-organism but acts as transportation for viable particles, a viable particle is a particle that contains one or more living micro-organisms. There can be up to 100 million micro-organisms per cubic metre of ambient air.

Microbial sampling of an untreated compressed air system



Examples of Micro-organisms found in ambient air & typical size in microns

Due to their small size, they will pass directly through the compressor panel and intake filters. The warm moist air in the compressed air system provides an ideal environment for the growth of these micro-organisms. The air receiver and distribution piping store and distribute their ever expanding growth.

Viruses
0.02µm - 0.2µm

Pathogenic Bacteria
0.3 µm - 5µm

Fungi
(Moulds / Yeasts)
3µm - 10µm

Parker BAS HL Breathing Air Purifiers consist of seven purification stages

1

General Purpose Coalescing Filter

REDUCES:

Particulate down to 1 micron
Water & Oil Aerosols down to 0.5 mg/m³

2

High Efficiency Coalescing Filter

REDUCES:

Particulate down to 0.01 micron
Water & Oil Aerosols down to 0.01 mg/m³

3

Adsorption Dryer

REDUCES:

Water Vapour - PDP ⩽-40°C
Carbon Dioxide (CO_2) ⩽ 500 ppm

Low PDP also Inhibits Growth of Micro-organisms

4

Activated Carbon Filter

REDUCES:

Oil vapours down to ⩽0.003 mg/m³

Nitrogen Oxides (NO + NO_2) ⩽ 2 ppm

Sulphur Dioxide (SO_2) ⩽ 1 ppm

Models BAS HL 050 to BAS HL 070, utilise a single column for stages 4 & 5, containing 1 x activated carbon cartridge & 1 x catalyst cartridge, flowed in series.

Parker BAS HL Breathing Air Purifiers Treat 13 Contaminants* Found in a Compressed Air System

Models BAS HL 075 to BAS HL 085, utilise duplex columns for stages 4 & 5, containing 2 x activated carbon cartridges & 2 x catalyst cartridges, flowed in parallel.

5

Catalyst Stage

REDUCES:
Carbon Monoxide (CO) by conversion into Carbon Dioxide (CO_2)

6

General Purpose Dry Particulate Filter

REDUCES:
Particulate down to 1 micron

7

High Efficiency Dry Particulate Filter

REDUCES:
Particulate & Micro-organisms down to 0.01 micron with an efficiency of 99.9999%

*** Important Note**

Should there be liquid water or liquid oil present at the inlet of the BAS HL Purifier, an additional OIL-X WS Grade Water Separator can be installed, increasing the number of contaminants treated to 15.

Parker BAS HL Tested & Verified

Parker BAS HL has been tested in accordance with the following international standards relating to compressed air purity.

Parker BAS Treatment Stage	Parker Treatment Technology	Contaminant	Performance	Tested in Accordance with
Optional	Parker OIL-X Grade WS Liquid Separator	Liquid Water	>92% Liquid Removal	ISO 12500-4 ISO 8573-9
Optional		Liquid Oil		
Stage 1	Parker OIL-X Grade AO Coalescing Filter	Atmospheric Particles	Down to 1 micron @ 99.925% Efficiency	ISO 8573-4
		Rust		
		Pipescale		
		Water Aerosols	< 0.5mg/m³ @ 99.925% Efficiency	ISO 12500-1 ISO 8573-2
		Oil Aerosols		
Stage 2	Parker OIL-X Grade AA Coalescing Filter	Atmospheric Particles	Down to 0.01 micron @ 99.9999% Efficiency	ISO 8573-4
		Rust		
		Pipescale		
		Micro-organisms		
		Water Aerosols	< 0.01mg/m³ @ 99.9999% Efficiency	ISO 12500-1 ISO 8573-2
		Oil Aerosols		
Stage 3	Parker BAS Dryer	Water Vapour	≤ -40°C PDP	ISO 7183 ISO 8573-3
		Carbon Dioxide (CO_2)	≤ 500 ppm	ISO 8573-6 European Pharmacopoeia
Stage 4	Parker OVR	Oil Vapour	≤ 0.003 mg/m³	ISO 8573-5
		Nitrogen Oxides (NO / NO_2)	≤ 2 ppm v/v	ISO 8573-6 European Pharmacopoeia
		Sulphur Dioxide (SO_2)	≤ 1 ppm v/v	ISO 8573-6 European Pharmacopoeia
Stage 5	Parker Catalyst	Carbon Monoxide (CO)	≤ 5 ppm	ISO 8573-6 European Pharmacopoeia
Stage 6	Parker OIL-X Grade AO Dry Particulate Filter	Dry Particulate	Down to 1 micron @ 99.925% Efficiency	ISO 8573-4
Stage 7	Parker OIL-X Grade AA Dry Particulate Filter	Dry Particulate	< 0.01mg/m³ @ 99.9999% Efficiency	ISO 8573-4
		Micro-organisms		

BAS HL performance is independently verified by Lloyds Register

Parker BAS HL Delivered Air Quality

Parker BAS HL Breathing Air System has been designed to provide breathable quality compressed air that meets or exceeds the levels shown in the following global breathing air standards.

Contaminant Oxygen % Odours	EN12021:2014	European Pharmacopoeia	Osha Grade D	CSA Z180.1	Parker BAS	Parker BAS Treatment Stage
Atmospheric Particles	Not Specified	Not Specified	Not Specified	Not Specified	**Particle & Micro-organism reduction down to 0.01 micron @ 99.9999% efficiency**	**Stage 1 & 2**
Rust	Not Specified	Not Specified	Not Specified	Not Specified		
Pipescale	Not Specified	Not Specified	Not Specified	Not Specified		
Micro-organisms	Not Specified	Not Specified	Not Specified	Not Specified		**Stage 6 & 7**
Liquid Water	No Free Water	Not Specified	Not Specified	Not Specified	**No Free Water**	**Optional WS**
Water Aerosols			Not Specified	Not Specified	**≤ 0.01 mg/m³**	**Stage 1 & 2**
Water Vapour	≤ -11°C PDP	≤ 67ppm (≤ -45°C ADP)	Not Specified	<-53°C ADP	**≤ -40°C PDP (≤ -57°C ADP)**	**Stage 3**
Liquid Oil	Total Oil ≤ 0.5 mg/m³	Total Oil ≤ 0.1 mg/m³	<5 mg/m³	< 1 mg/m³	**Total Oil ≤ 0.003 mg/m³**	**Optional WS**
Oil Aerosols						**Stage 1 & 2**
Oil Vapour						**Stage 4**
Carbon Monoxide (CO)	≤ 5 ppm	≤ 5 ppm v/v	< 10 ppm	< 5 ppm	**≤ 5 ppm**	**Stage 5**
Carbon Dioxide (CO_2)	≤ 500 ppm	≤ 500 ppm v/v	< 1000 ppm	< 500 ppm	**≤ 500 ppm**	**Stage 3**
Nitrogen Oxides (NO / NO_2)	Not Specified	≤ 2 ppm v/v	Not Specified	Not Specified	**≤ 2 ppm**	**Stage 4**
Sulphur Dioxide (SO_2)	Not Specified	≤ 1 ppm v/v	Not Specified	Not Specified	**≤ 1 ppm**	**Stage 4**
Oxygen	(21 ± 1) %	20.4% ~ 21.4% v/v	19.5% - 23.5%	20% – 22%	**As Inlet Concentration**	**As Inlet Concentration**
Odours	The gas shall be free from unsatisfactory odour or taste	Not Specified	Lack of noticeable odour	No pronounced odour	**No Odours**	**Stages 3 & 4**

BAS HL Keeping Users Safe

Treating known hazardous compressed air contaminants not even recognised in international breathing air standards

Breathing Air Purifier Performance

Dryer Models	Dewpoint (Standard)		ISO8573-1:2010 Classification (Standard)
	˚C	˚F	
BAS HL	-40	-40	Class 1.2.0

Technical Data

Dryer Models	Minimum Operating Pressure		Maximum Operating Pressure		Minimum Operating Temperature		Maximum Operating Temperature		Maximum Ambient Temperature		Electrical Supply (Standard)	Electrical Supply (Optional)	Thread Type	Noise Level
	bar g	psi g	bar g	psi g	˚C	˚F	˚C	˚F	˚C	˚F				dB(A)
BAS HL 050 - 085	4	58	16	232	5	41	35	95	55	131	85 - 265V 1ph 50/60Hz	24V DC	BSPP or NPT	<75

Flow Rates

Model	Pipe Size BSPP or NPT	Inlet Flow Rate			
		L/s	m^3/min	m^3/hr	cfm
BAS HL 050	½"	15	0.92	55	32
BAS HL 055	½"	19	1.17	70	41
BAS HL 060	½"	25	1.50	90	53
BAS HL 065	½"	31	1.84	110	65
BAS HL 070	¾"	42	2.51	150	88
BAS HL 075	1"	51	3.09	185	109
BAS HL 080	1"	61	3.67	220	129
BAS HL 085	1 ½"	83	5.01	300	177

Stated flows are for operation at 7 bar (g) (102 psi g) with reference to 20°C, 1 bar (a), 0% relative water vapour pressure. For flows at other pressures, apply the correction factors shown below.

Product Selection & Correction Factors

For correct operation, compressed air dryers must be sized using for the maximum (summer) inlet temperature, maximum (summer) ambient temperature, minimum inlet pressure, required outlet dewpoint and maximum flow rate of the installation.

To select a dryer, first calculate the MTC (Minimum Treatment Capacity) using the formula below then select a dryer from the flow rate table above with a flow rate equal to or above the MTC.

Minimum Treatment Capacity = System Flow x CFIT x CFAT x CFMIP x CFOD

CFIT - Correction Factor Maximum Inlet Temperature

Maximum Inlet Temperature	˚C	25	30	35
	˚F	77	86	95
Correction Factor		1.00	1.00	1.00

CFAT - Correction Factor Maximum Ambient Temperature

Maximum Ambient Temperature	˚C	25	30	35	40	45	50
	˚F	77	86	95	104	113	122
Correction Factor		1.00	1.00	1.00	1.00	1.00	1.00

CFMIP - Correction Factor Minimum Inlet Pressure

Minimum Inlet Pressure	bar g	4	5	6	7	8	9	10	11	12	13	14	15	16
	psi g	58	73	87	100	116	131	145	160	174	189	203	218	232
Correction Factor		1.60	1.33	1.14	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

CFOD - Correction Factor Dewpoint

Maximum Inlet Temperature	˚C	-40
	˚F	-40
Correction Factor		1.00

Controller Functions

Dryer	Controller Function							
	Power On Indication	Visual Fault Indication	Dewpoint Display	Filter Service Indicator	Carbon & Catalyst Service Indicator	Dryer Service Indicator	Fault Relay: Power Loss Dewpoint Alarm Sensor Failure	4-20mA Dewpoint Re-transmission
BAS HL	•	•	•	•	•	•	•	•

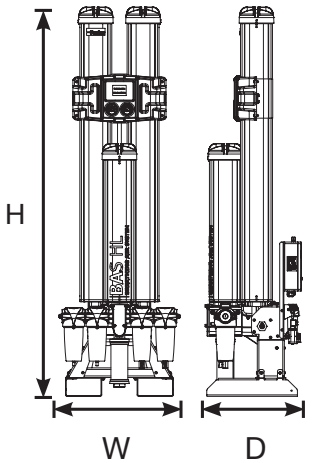
Included Filtration

Model	Pipe Size BSPP or NPT	Dryer Inlet		Dryer Outlet		
		General Purpose Pre-filter	High Efficiency Filter	Oil Vapour Reduction Filter & Catalyst Stage	General Purpose Dry Particulate Filter	High Efficiency Dry Particulate Filter
BAS HL 050	½"	AOPX015C	AAPX015C	Included	AOPX015C	AAPX015C
BAS HL 055	½"	AOPX015C	AAPX015C	Included	AOPX015C	AAPX015C
BAS HL 060	½"	AOPX020C	AAPX020C	Included	AOPX020C	AAPX020C
BAS HL 065	½"	AOPX020C	AAPX020C	Included	AOPX020C	AAPX020C
BAS HL 070	¾"	AOPX025D	AAPX025D	Included	AOPX025D	AAPX025D
BAS HL 075	1"	AOPX025E	AAPX025E	Included	AOPX025E	AAPX025E
BAS HL 080	1"	AOPX025E	AAPX025E	Included	AOPX025E	AAPX025E
BAS HL 085	1 ½"	AOPX030G	AAPX030G	Included	AOPX030G	AAPX030G

Filtration Performance	General Purpose Coalescing Filter	High Efficiency Coalescing Filter	Oil Vapour Reduction Filter	General Purpose Dry Particulate Filter	High Efficiency Dry Particulate Filter
Filtration Grade	Grade AO	Grade AA	OVR	Grade AO	Grade AA
Filtration Type	Coalescing	Coalescing	Adsorption	Dry Particulate	Coalescing
Particle Reduction (inc water & oil aerosols)	Down to 1 micron	Down to 0.01 micron	N/A	Down to 1 micron	Down to 0.01 micron
Maximum Remaining Oil Aerosol Content at 21°C	⩽0.5 mg/m³ (⩽0.5 ppm(w))	⩽0.01 mg/m³ (⩽0.01 ppm(w))	N/A	N/A	N/A
Maximum Remaining Oil Vapour Content at System Temperature	N/A	N/A	⩽0.003 mg/m³ (⩽0.003 ppm(w))	N/A	N/A
Filtration Efficiency	99.925%	99.9999%	N/A	99.925%	99.9999%

Weights & Dimensions

Model	Pipe Size BSPP or NPT	Dimensions						Weight	
		Height (H)		Width (W)		Depth (D)			
		mm	ins	mm	ins	mm	ins	kg	lbs
BAS HL 050	½"	1133	45	559	22	512	20.2	92	203
BAS HL 055	½"	1313	52	559	22	512	20.2	99	218
BAS HL 060	½"	1510	59	559	22	496	19.5	109	240
BAS HL 065	½"	1660	65	559	22	496	19.5	115	254
BAS HL 070	¾"	2020	80	630	24.8	496	19.5	138	304
BAS HL 075	1"	1595	63	630	24.8	682	27	196	432
BAS HL 080	1"	1745	69	630	24.8	682	27	220	485
BAS HL 085	1 ½"	2105	83	630	24.8	682	27	255	562



Quality Assurance / IP Rating / Pressure Vessel Approvals

Development / Manufacture	ISO 9001 / ISO 14001
Ingress Protection Rating	IP55 Indoor Use Only
EU	Pressure vessel approved for fluid group 2 in accordance with the Pressure Equipment Directive 2014/68/EU
USA	Approval to ASME VIII Div. 1 not required
AUS	Approval to AS1210 not required
For use with Compressed Air Only	

Service & underhåll

En viktig del i vårt koncept som totalleverantör och partner, är att kunna erbjuda kvalificerad specialisthjälp för tillsyn, service och underhåll av kompressorer, tryckluftsanläggningar och gasgeneratorer. Genom att teckna serviceavtal med oss, kommer kvalificerad service, rätta reservdelar, effektiva rutiner och löpande dokumentation att garantera en säkrare drift och användning för att distribuera ren tryckluft och rätt kvävgaskvalitet.

ISO 14001

Granzow service är certifierad enligt ISO 14001 vilket medför att kvalitets- och miljötänkande är naturliga faktorer i vårt arbete. Vi ser som en avvåra uppgifter att hålla våra kunders tryckluftsproduktion igång ochsamtidigt utföra uppdraget med utgångspunkt från högt ställda kvalitets- och miljö-krav.

Rätt kapacitet **Rätt kvalité** **Rätt tryck** **Rätt service**

GRANZOW
svensk tryckluftspartner

Service: 020-78 80 00
Försäljning: 0171-47 80 00
www.granzow.se