

ALPHAGAZ - HBS - HBSI



User manual

www.airliquide.com

Warning

To preserve the quality of our product throughout its usage in the best safety conditions, please read this manual carefully and strictly follow the instructions that it contains. Non-compliance with these instructions or modification of the product may result in serious accidents or bodily injuries. AIR LIQUIDE shall not be held responsible in case of non-approved usage of the product.

Air Liquide reserves the right to make all necessary modifications to the specifications described hereafter without notice.



HBS 200- 1- 2
HBS 200- 3- 2,5
HBS 200- 10- 3,5



HBS 200- 0,1- 0,5



HBSI 200- 1- 2
HBSI 200- 10- 3,5

Contents

1. Field of usage and Characteristics.....	4
1.1 Functions	4
1.2 Technical characteristics	4
1.3 Gas compatibility table	4
2. AIR LIQUIDE commitments.....	6
2.1 Conformity	6
2.2 Cleaning	6
2.3 Inspections	6
2.4 Warranty	6
3. Assembly - Activation.....	7
3.1 Safety	7
3.2 Precautions before assembly	7
3.3 Assembly.....	7
3.4 Assembly of a compression fitting	8
3.5 Options	8
3.6 Activation	9
4. Usage.....	10
4.1 Use	10
4.2 After use	10
5. Maintenance.....	11
5.1 Troubleshooting.....	11
5.2 Maintenance.....	11
5.3 Spare parts.....	12

1. Field of usage and Characteristics

1.1 Functions

The ALPHAGAZ HBS and HBSI regulators are used for:

- reduce a high- pressure conditioned gas (200 bar at 15°C) in cylinder.
- regulate and maintain stability of outlet pressure.
- preserve the gas purity.

The HBS and HBSI regulators are designed to carry pure gases and mixtures of purity < N60 which include ALPHAGAZ 1 and 2.

Vacuum treatment possible.

1.2 Technical characteristics

Operating temperature : - 20°C to + 50°C

Leakage rate <= 3 x 10⁻⁷ mbar.l/s helium

Material in contact with gas :


	HBS	HBS.V	HBSI
Body	Chromium- plated brass		Stainless steel 316 L
Main valve 1	Brass		Stainless steel 316 L
Main valve 2	Brass / EPDM		Stainless steel 316 L / EPDM
Seat 1	PTFCE		
Seat 2	Brass		Stainless steel
Diaphragm	Stainless steel		
Bellows	Bronz		Stainless steel
Filter	Monel 400®		
Pressure gauge / Seal	Copper Alloyded / PA 6.6	Copper Alloyded /PTFCE	Stainless steel / PTFCE
Valve : Body / Main valve / Seal	Stainless Steel / Brass / EPDM	Stainless Steel / Brass / FPM	Stainless steel / Stainless steel / EPDM
Other Seal	EPDM / PA 6.6 / PTFCE / Copper	FPM / PTFCE	EPDM / PTFCE


1.3 Gas compatibility table

! **IMPERATIVE** : check the gases compatibility of this equipment by

referring to the "Gas Compatibility Table".

Legend:

 Suitable up to a working pressure of xxx bar (at 15°C)

 Not suitable

* 1,013 bar at 15° C, according to ISO 2503 P. input: (P. downstream x 2) + 1 bar.

** For carbon dioxide, argon an nitrous oxide, provide a heater in case of high output flow.

Parameters		Main gases :																
	Adjustable outlet pressure from/to (bar)	Nominal nitrogen flow rate*(Nm ³ /h)	Inerts Nitrogen	Argon Ar/CO ₂ **	Carbon dioxide **	Carbon monoxide	Breathable air	Air	Oxygen	Nitrous oxide**	Hydrogen	Acetylene	Propane	Propylene	Ethylene	Methane	Ammonia	
			For breathable oxygen, corrosive gases, other gases and mixtures : please contact AIR LIQUIDE.															
HBS Regulators																		
HBS 200- 0,1- 0,5	0,01 to 0,1	0,5	200	200	50	200	200	200	200	44	200	200	200	200	200	200	200	200
HBS 200- 1- 2	0,05 to 1	2	200	200	50	200	200	200	200	44	200	200	200	200	200	200	200	200
HBS.V 200- 1- 2	0,05 to 1	2	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
HBS 200- 3- 2,5	0,1 to 3	2,5	200	200	50	200	200	200	200	44	200	200	200	200	200	200	200	200
HBS.V 200- 3- 2,5	0,1 to 3	2,5	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
HBS 200- 10- 3,5	0,5 to 10	3,5	200	200	50	200	200	200	200	44	200	200	200	200	200	200	200	200
HBS.V 200- 10- 3,5	0,5 to 10	3,5	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
HBSI Regulators																		
HBSI 200- 1- 2	0,05 to 1	2	200	200	50	200	200	200	200	200	200	200	200	200	200	200	200	200
HBSI 200- 10- 3,5	0,5 to 10	3,5	200	200	50	200	200	200	200	200	200	200	200	200	200	200	200	200

2. AIR LIQUIDE commitments

2.1 Conformity

AIR LIQUIDE certifies that the equipment is manufactured, tested and controlled, in accordance with the technical specifications described in the specifications of AIR LIQUIDE.

This equipment is subject specific cleaning procedures (grease & oils removal) to allow use under "oxygen service".

It is the responsibility of the end user to ensure that such equipment are installed and used in accordance with the current regulations.

2.1.1 Directive 97/23/EC: Pressurised equipment (PED)

AIR LIQUIDE equipment of DN < 25 (e.g. pressure regulators, valves, non return valves...) satisfy to requirement of article 3§3 of 97/23/EC directive and at the state of the art. **Consequently, these equipments shall not be "CE" marked** as defined in article 15.

By design, these equipment may integrate pressure relief valves or burst disks. In this case, those ones shall neither be CE marked according to paragraph 2 of annex II.

In other case, pressure relief valves and burst disks shall be CE marked.

2.1.2 Directive 94/9/EC ATEX: Explosive atmospheres

The HBS and HBSI regulators do not have their own source of inflammation. Consequently, they are excluded from field of application of the **ATEX 94/9/EC** directive and shall not be CE marked.

They can be used in **zone 2**, according to **ATEX 1999/92/EC** pending on up to date regulations, rules, operating instruction and state of the art are followed during installation and use.

Every installation including one of those equipments in ATEX zone shall comply to the ATEX directive and

be certified. **Remark:** It belongs to the end user to define ATEX zone.

2.2 Cleaning

Each equipment is subject to a grease removal and a high quality cleaning to preserve the purity of gas in the equipment as well as for use with oxygen in compatible equipment.

A suitable packaging protects the equipment against exterior pollutions during storage and transport.

Take care to avoid polluting the equipment during usage.

2.3 Inspections

Each equipment is inspected and has undergone a leak test (helium) before packing.

2.4 Warranty

The warranty period for equipment supplied by AIR LIQUIDE is **one year**, covering faulty material and workmanship during manufacture. The warranty does not cover packing and return transport costs. Excluded from warranty: seals and relief valves. These components are subjected to a natural wear. Warranty is not valid on deterioration resulting from incorrect or improper use, use of spare parts which are not marked AIR LIQUIDE or from the none respect of this operating instruction.

For more information, refer to the general sales conditions of AIR LIQUIDE.

3. Assembly - Activation

3.1 Safety



First of all, it is **ESSENTIAL** to read and respect the safety instructions described in the document “General Safety Instructions” delivered with the product.

NEVER dismantle a component of the regulator in the High Pressure part, especially the High Pressure inlet fitting.

3.2 Precautions before assembly

After opening the packaging, check that the equipment is not damaged and that the contents correspond to the delivery notes accompanying the equipment.

- During assembly, it is important to take extreme care to ensure cleanliness and avoid contamination.
- The regulators are designed to be directly mounted on suitable high pressure gas cylinders. Ensure that the gas cylinders are installed on a smooth and level surface and that the cylinders are attached to their racks. This will prevent risk of falling.
- To install the equipment, select a ventilated area, protected from the effects of bad weather.

3.3 Assembly

3.3.1 Cylinder set up :

- Check that the high- pressure inlet connection (3) is compatible with the cylinder valve connection.
- Screw in the fitting nut all the way.
 - Fitting by hand in case of O- ring seal,
 - Fitting by wrench in case of other seals.

Where combustible gases are used the valve connection thread will be Left Hand. Tighten the fitting counter- clockwise. Notched groove machined into the hexagon section of the nut.

3.3.2 Pipe network set up :

Outlet fitting assembly on the regulator outlet port :

- Make sure that the supplied outlet fitting matches the application.
- Put in place the seal.
- Screw the outlet fitting on the regulator outlet port (tighten to 35 mN with a wrench).
- Connect the pipe network and strongly fix it to avoid risks of flapping.

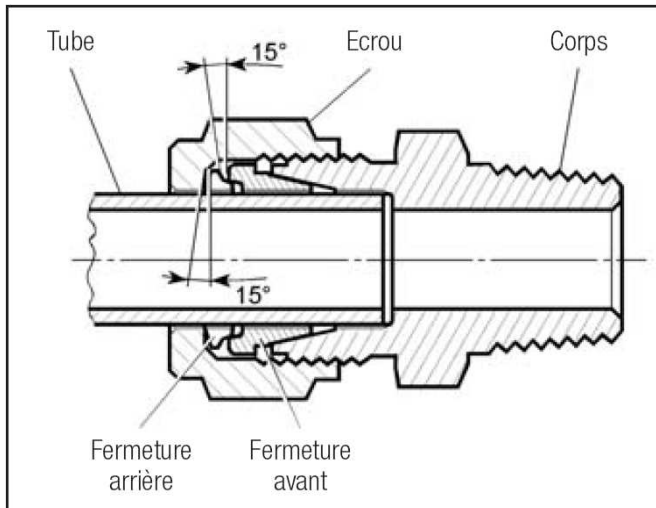
Collect of relief valve (6) :

- Original mounted relief valve are collectable. During the set up of the equipment; it is recommended to connect the relief valve to an event (Compression fitting 6mm) in the following cases :
 - Risk of asphyxiation (restricted space) with neutral gases.
 - Risk of explosion (restricted space) with hydrogen.
 - With toxic and corrosive gases.

Upstream protection on the pipe network :

- Install a shut- off valve on the pipe upstream of the point of use.
- Install a relief valve suited to the application on the pipe (besides the relief valve of the equipment).
- In case of flow adjustment, install a metering valve.

3.4 Assembly of a compression fitting



Check dimensions and respect material compatibility between connection and pipe : Connection and pipe must always be made from the same material, example: Stainless steel connection for stainless steel pipe < Rockwell hardness B90 (exception : brass connection with copper pipe).

Connector pre- assembled by hand.

- After cutting, de- burring and blowing on the tube (use preferably a tube cutter), pre- assemble the nut and the ferrules, following the order and the direction indicated in the figure.
- Introduce the tube inside the connector up to the stop limit on the body.
- Clamp the nut completely by hand.
- Complete the clamping using a wrench by turning the nut a 1 1/4 turn only.

3.5 Options

Outlet Compression Fittings :

Inlet	Tube Ø	Stainless Steel connection for Stainless steel pipe	Cr- Plated Brass for Copper pipe
G 3/8 AL Male	Ø 1/8"	16566	16521
	Ø 3/8"	16564	
	Ø 1/4"	16565	16523
	Ø 6mm	16558	16522
	Ø 8mm	16562	16526
	Ø 10mm	16567	16524
	Ø 12mm	16569	

Other Connections

Inlet	Outlet connection	Code
G3/8 AL Male	Kit N°2 : Stainless Steel Compression Fitting ext.Ø 1/8 " and 6mm + Nipple for flexible pipe Øint 4 to 6mm	16532
	Nipple for flexible pipe Øint 4 to 6 mm	16516

Designation	Code
Set of 5 ferrule + nut brass Ø 6 mm	16529
Set of 5 ferrule + nut brass Ø 10 mm	16531
Set of 5 ferrule + nut Stainless steel Ø 1/8"	16600
Set of 5 ferrule + nut Stainless steel Ø 6 mm	16601
Set of 5 ferrule + nut Stainless steel Ø 1/4"	16602
Set of 5 ferrule + nut Stainless steel Ø 10 mm	16603

3.6 Activation

Even if the tightness of each regulator is tested in factory, it is necessary to ensure there is no leakage on the connections made during the assembly. Before carrying out this check, make sure that the downstream circuit is closed (towards the application).

Never stand directly in front of the cylinder valve outlet while opening it.

3.6.1 Checking of leakage on the upstream circuit :

- Check that the regulator handwheel (3) is loose (counterclockwise).
- Open the cylinder valve.
- Verify that the value indicated on the high pressure gauge (1) does not vary over a sufficiently long period.
- If necessary, check the leakage on the upstream circuit (Inlet fitting and gauge) by using the AIR LIQUIDE GASCHECK leaks detector.

In case of Leakage :

- Close the cylinder valve.
- Purge the regulator.
- Check the seal and, if necessary, change it.
- Retighten the inlet connection. In case of compression fitting, make sure that the tube is fully inserted in the fitting. Check the ferrules, if necessary, change them. Retighten the compression fitting nut.

3.6.2 Checking of leakage on the downstream circuit :

- Make sure that the valve on outlet circuit is closed.
- Open the cylinder valve.
- Turn the handwheel (3) clockwise to read a pressure on the outlet pressure gauge.
- Verify that the value indicated on the low pressure gauge (2) does not vary over a sufficiently long period.
- If necessary, check the leakage on the downstream circuit (outlet fitting and gauge) by using the AIR LIQUIDE GASCHECK leaks detector.

In case of Leakage :

- Close the cylinder valve.
- Purge the regulator.
- Turn the handwheel (3) counterclockwise.
- Make sure that the tube is fully insert in the fitting.
- Check the ferrules, if necessary, change them.
- Retighten the compression fitting nut.

 Always turn valves **GRADUALLY**. **NEVER** retighten a fitting under gas pressure.

4. Usage

4.1 Use

Verify that the regulator handwheel (3) is loose (counterclockwise) and the valve upstream circuit is closed.

Open the cylinder valve.

Read the pressure on the high pressure gauge (1).

Turn the handwheel (3) clockwise until you start feeling resistance.

Then continue until you reach the required working pressure.

Read the pressure on the low pressure gauge (2)

Now the regulator is ready to regulate the working pressure.

Open the outlet valve.

Adjust the outlet pressure if necessary.

To stop the gas flow, close the cylinder valve on the upstream valve of the regulator.

4.2 After use

When the regulator is no longer used :

- Close the cylinder valve.
- Lower the pressure by the outlet .
- Loosen the handwheel (3) of the regulator.
- Close the upstream valve of the regulator .
- Dismantle the regulator and store it safely from dust and moisture.

5. Maintenance

5.1 Troubleshooting

PROBLEM	CAUSE	REMEDY
Mounting impossible	Connections are not mounted	Verify the compatibility of gases, inlet and outlet.
	Damaged connection	Replace the regulator
Insufficient flow of gas	Cross section of passage limited by a valve	Open the valve
	Valve not operating	Replace the cylinder
	Insufficiently filled or empty cylinder	Replace the cylinder
	Under- dimensional equipment	Contact AIR LIQUIDE
	Equipment in output not operational	Replace the equipment
Leak of gas	Ruptur of gastightness	Close the cylinder valve and replace the regulator
The gas comes out of the relief valve	Leakage at the main valve of the regulator or damaged relief valve	
Rise of the outlet pressure	Leakage at the main valve of the reguator	
	Too low operating temperature	Close the cylinder valve. Bring back the equipment to a temperature higher than 0°C
Unstable outlet pressure and/ or frosting	The gas used is argon (Ar), carbon dioxide (CO ₂) or nitrous oxide (N ₂ O)	Mount a heater at the inlet
	Flow of gas too fast	Respect the output of the regulator. Limit the flow by a valve or a calibrated hole
Vibrations	Flow of gas too fast	Limit the flow by a valve or a calibrated hole
	Presence of valve with rapid opening on the output pipe	

5.2 Maintenance

Even though the equipment is reliable, it must be checked periodically. Since this task requires some precautions, it must be done exclusively by a qualified technician.

The periodicity of this verification depends essentially on the usage of the equipment (intensive, moderate, occasional). We recomand to replace it every 5 years (mainly due to wearing of the seal).

In case of operating accident (insufficient output, leakage, opening of the relief valve or accidental damage) : repace the equipment.

- Use only original parts and do not modify the equipment.
- Never dismantle any of the equipment's components .

! Defective reassembly may cause bursting, malfunctioning and/or an increasing output pressure, which is dangerous for your safety.

5.3 Spare parts

Regulator	Connectable relief valve SV 10		Inlet pressure gauge	Outlet pressure gauge	
Designation	Reference	Tightness Pressure	Reference		
HBS 200- 0,1- 0,5	152806	16 bar	15969	16008	
HBS 200- 1- 2				16000	
HBS.V 200- 1- 2				155258	
HBS 200- 3- 2,5				152806	15999
HBS.V 200- 3- 2,5				155258	
HBS 200- 10- 3,5				152806	
HBS.V 200- 10- 3,5				155258	
HBSI 200- 1- 2	153076		15979	16019	
HBSI 200- 10- 3,5				16015	

Spare part seals (package of ten):

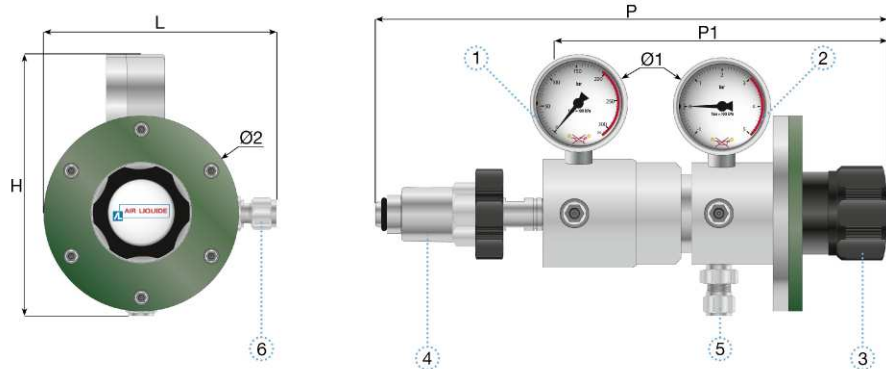
Designation	Code
Flat seals alu/arcap [®] for p.gauge M10 (KIT seals, Alu:8,5x5x1, ARCAP [®] :8,5x5x0,3)	17084
O- ring EPDM 11,1X1,78	17127
O- ring seal R9 for inlet brass connection type C/B4 and E(NF) 10,5x2,7	17130
O- ring EPDM R10 12,1 x 2,7 for brass inlet fitting type B(NF)	17131
O- ring seal R5 for inlet brass/Inox connection type F(NF) 5,7x1,9	17132
Conical seal in TEFLON for inlet brass/Inox connection type G(NF) 11,5x7,2x3	17133
Seal EP. PTCFE (Kel- F [®]) 19,2- 16X12,5X4 for SS inlet fitting type E(NF)	17138
Flat seal en PTFCE 14,5x10x2 for outlet port G3/8 AL	17141
Flat seal PTCFE (Kel- F [®]) 18x11,8x2 for SS inlet fitting DIN 477- 1/6/9/10 & NEN3268 & LU1	17203
Flat seal PTCFE (Kel- F [®]) 18x7x2	17207
Flat seal PTCFE (Kel- F [®]) 20,5x11x2 for SS inlet fitting type J(NF)	19598
O- ring R9 VITON green by 100	22269
Flat seal PA 6- 6 20x12x2 for brass inlet fitting DIN477- 10&NEN3268 & RU3/SSDIN477- 13	29053
Flat seal PTCFE (Kel- F [®]) 14x9x2 for brass inlet fitting DIN 477- 14 (wrench)	29214
Flat seal PTCFE (Kel- F [®]) 18,5x11x2 for brass inlet fitting UNI 11144 N°5 & UNI 11144 N°6	29222
Flat seal PTCFE (Kel- F [®]) 16x9,2x2 for brass inlet fitting DIN 477- 14 (wrench)	29226
O- ring silicone R5 5,7 x 1,9 for brass inlet fitting type G(NF)	64693
O- rings 9,19 x 2,62 EP851 for cylinder connection B (Spain)	115194
Flat seal PA 6.6 18,5x12,3x1,5 for brass inlet fitting DIN 477- 1/6/13&NEN3268 & RU1	135306

Drawings

1.1 Dimensions

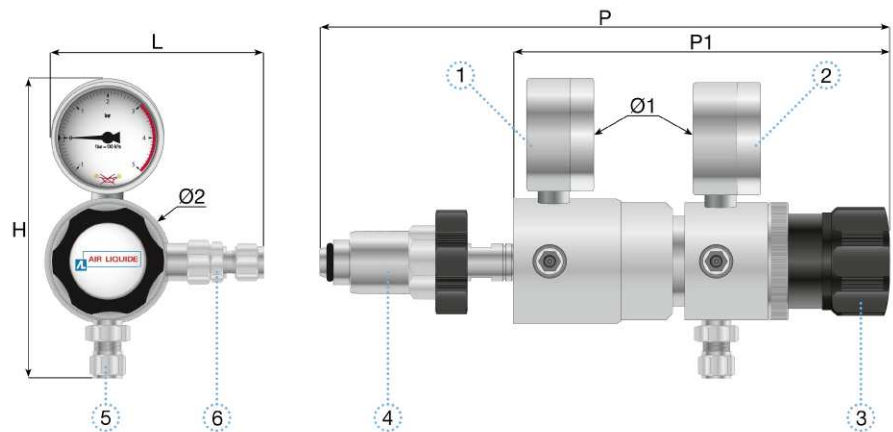
HBS 200- 0,1- 0,5

L : 118 mm
 H : 129 mm
 P : 275 mm
 P1 : 194 mm
 Ø1 : 50 mm
 Ø2 : 98 mm
 Weight: 1,310Kg

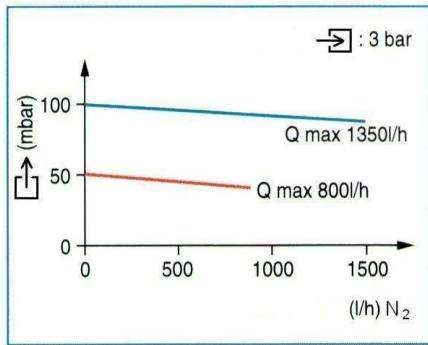


HBS - HBSI

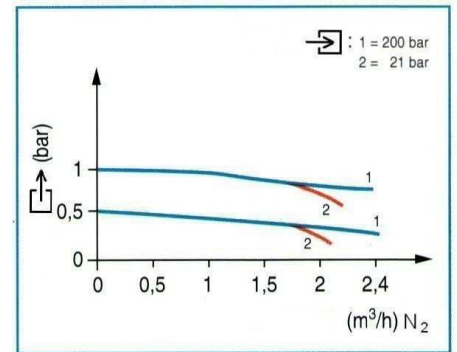
L : 165mm
 L1 : 109mm
 H : 116mm
 P : 87- 96mm
 Ø1 : 50mm
 Ø2 : 52mm
 Weight: 1,220Kg



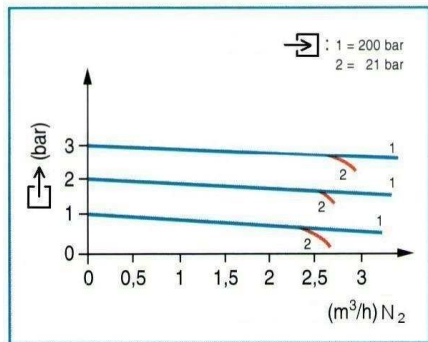
1.2 Flow curves



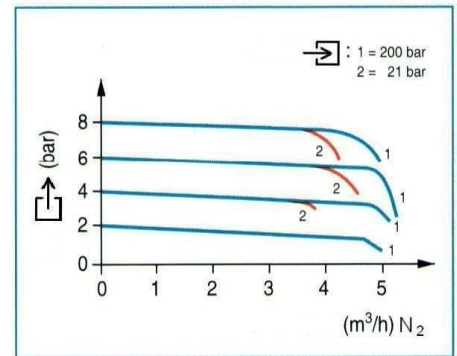
HBS 200-0,1-0,5



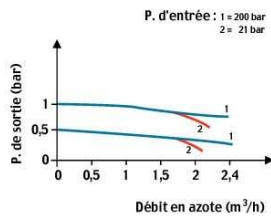
HBS 200-1-2



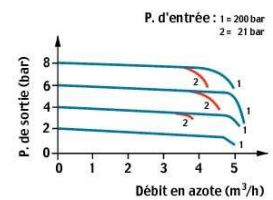
HBS 200-3-2,5



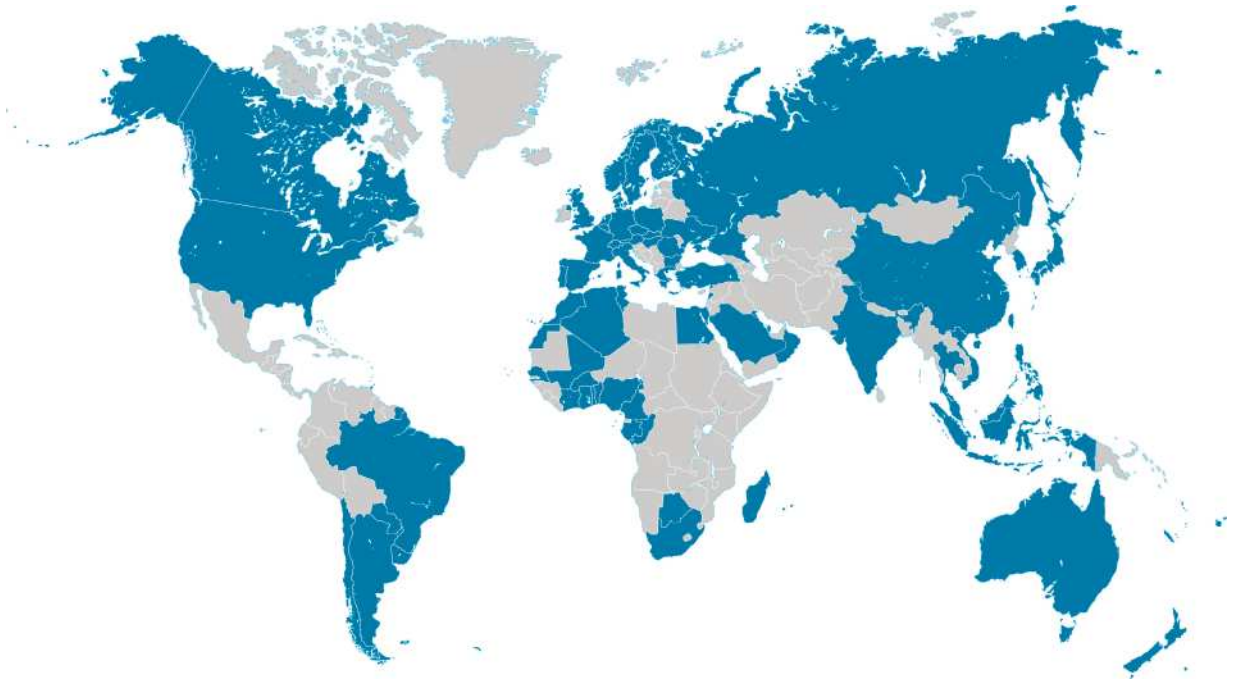
HBS 200-10-3,5



HBSI 200-1-2



HBSI 200-10-3,5



We are present in more than 75 countries.

Contact:

AIR LIQUIDE
European Platform and Services
Tour Kupka C
92039 Paris La Défense Cedex, France
www.airliquide.com



Air Liquide is the world leader in gases for industry, health and the environment, and is present in over 75 countries with 43,000 employees. Oxygen, nitrogen, hydrogen and rare gases have been at the core of Air Liquide's activities since its creation in 1902. Air Liquide explores the best that air can offer to preserve life, staying true to its sustainable development approach.