

Pumps intended for use in ATEX classified areas



The Danfoss PAH pump product programme, covering tap water and technical water operation, is also available ATEX "certified". The pumps can be used in Category 2 (Zone1, 21) and Category 3 (Zone2, 22) classified areas. The pump temperature class is T6 < 85°C. Operational and physical data can be found in the respective pump data sheets.

ATEX labelling



Pump label example



Validity

Approvals are only related to water as fluid.
 Other fluids, if any, must be non-flammable and comply with standard EN 13463-5 § 7.5.5.

Table 1

Table 1 — Equipment groups and categories

Equipment-groups (Annex I of the EC-Directive 94/9/EC)							
Group I (mines, mine gas and dust)		Group II (other explosive atmospheres gas/dust)					
Category M		Category 1		Category 2		Category 3	
1	2	G (gas) (Zone 0)	D (dust) (Zone 20)	G (gas) (Zone 1)	D (dust) (Zone 21)	G (gas) (Zone 2)	D (dust) (Zone 22)
for equipment providing a very high level of protection when endangered by an explosive atmosphere	for equipment providing a high level of protection when likely to be endangered by an explosive atmosphere	for equipment providing a very high level of protection when used in areas where an explosive atmosphere is very likely to occur		for equipment providing a high level of protection when used in areas where an explosive atmosphere is likely to occur		for equipment providing a normal level of protection when used in areas where an explosive atmosphere is less likely to occur	

Ordering code for pumps

Standard pumps for tap water CW rotation

Type	Flow at 1500 rpm	Max. shaft speed	Max. pressure	Ports/Connections	Housing Material	Weight (kg)	Ordering code
PAH 2	2.0 l/min	3000	140 bar	G 1/2, G 1/4	AISI 304	4,4	180B6124*1
PAH 4	5.0 l/min	3000	140 bar	G 1/2, G 1/4	AISI 304	4,4	180B6122*1
PAH 6.3	8.4 l/min	3000	140 bar	G 1/2, G 1/4	AISI 304	4,4	180B6123*1
PAH 10	13.1 l/min	3000	160 bar	G 3/8, G 3/4	AISI 304	7,7	180B6108*2
PAH 12.5	16.7 l/min	3000	160 bar	G 3/8, G 3/4	AISI 304	7,7	180B6107*1
PAH 20	27.0 l/min	2400	80 bar	G 1 1/4, G 3/4	AISI 304	16,0	180B6179*1
PAH 25	34.5 l/min	2400	160 bar	G 1 1/4, G 3/4	AISI 304	16,0	180B6136*1
PAH 32	45.3 l/min	2400	160 bar	G 1 1/4, G 3/4	AISI 304	16,0	180B6137*1
PAH 50	67.1 l/min	2200	100 bar	G 1 1/2, G 1 1/4	AISI 304	31,0	180B6147*1
PAH 63	86.5 l/min	2200	160 bar	G 1 1/2, G 1 1/4	AISI 304	31,0	180B6140*2
PAH 70	96.1 l/min	2000	160 bar	G 1 1/2, G 1 1/4	AISI 304	31,0	180B6142*1
PAH 80	111.0 l/min	1800	160 bar	G 1 1/2, G 1 1/4	AISI 304	31,0	180B6141*1
PAH 100	138.0 l/min	1500	80 bar	G 1 1/2, G 1 1/4	AISI 304	31,0	180B6176*1

*1 = available on request

*2 = standard product

Ordering codes for pumps

Pumps for technical water (demineralized, distilled, RO, softened water)

Type	Flow at 1500 rpm	Max. shaft speed	Max. pressure	Ports/ Connections	Housing Material	Weight (kg)	Ordering code
PAH 2	1.90 l/min	3000	100 bar	G 1/2, G 1/4	AISI 304	4,4	180B6131*1
PAH 3.2	3.0 l/min	3000	100 bar	G 1/2, G 1/4	AISI 304	4,4	180B6177*1
PAH 4	4.7 l/min	3000	100 bar	G 1/2, G 1/4	AISI 304	4,4	180B6130*1
PAH 6.3	8.0 l/min	3000	100 bar	G 1/2, G 1/4	AISI 304	4,4	180B6129*2
PAH 10	12.8 l/min	3000	140 bar	G 3/8, G 3/4	AISI 304	7,7	180B6132*1
PAH 12.5	16.7 l/min	3000	140 bar	G 3/8, G 3/4	AISI 304	7,7	180B6133*1
PAH 25	33.5 l/min	2400	140 bar	G 1 1/4, G 3/4	AISI 304	16,0	180B6138*1
PAH 32	43.8 l/min	2400	140 bar	G 1 1/4, G 3/4	AISI 304	16,0	180B6139*1
PAH 50	60.1 l/min	1800	140 bar	G 1 1/2, G 1 1/4	AISI 304	31,0	180B6146*2
PAH 63	85.0 l/min	1800	140 bar	G 1 1/2, G 1 1/4	AISI 304	31,0	180B6143*1
PAH 70	95.3 l/min	1800	140 bar	G 1 1/2, G 1 1/4	AISI 304	31,0	180B6144*1
PAH 80	110.0 l/min	1800	140 bar	G 1 1/2, G 1 1/4	AISI 304	31,0	180B6145*1

*1 = available on request *2 = standard product

Pumps for technical water (demineralized, distilled, RO, softened water) for boosted applications

Type	Flow at 1500 rpm	Max. shaft speed	Max. pressure	Ports/ Connections	Housing Material	Weight (kg)	Ordering code
PAHT 20	27.7 l/min	1800	80 bar	G 1 1/4, G 3/4	AISI 316	19	180B6119*1
PAHT 25	33.4 l/min	1800	160 bar	G 1 1/4, G 3/4	AISI 316	19	180B6120*1
PAHT 32	45.0 l/min	1800	160 bar	G 1 1/4, G 3/4	AISI 316	19	180B6121*1
PAHT 50	60.1 l/min	1800	160 bar	G 1 1/2, G1	AISI 316	34	180B6185*1
PAHT 63	85.0 l/min	1800	160 bar	G 1 1/2, G1	AISI 316	34	180B6186*1
PAHT 70	95.3 l/min	1800	160 bar	G 1 1/2, G1	AISI 316	34	180B6187*1
PAHT 80	110.0 l/min	1800	160 bar	G 1 1/2, G1	AISI 316	34	180B6188*2
PAHT 90	124.0 l/min	1800	160 bar	G 1 1/2, G1	AISI 316	34	180B6189*1

*1 = available on request *2 = standard product

Demands**Common demands for Category 2 and 3 installations**

This instruction is a supplement to existing product instruction, as ATEX components are subject to some limitations compared with standard components. These limitations are described in this ATEX instruction.

Validity:

Approvals are only related to **water as fluid**. Other fluids, if any, must be non-flammable and comply with standard EN 13463-5 § 7.5.5.

The pumps are designed to pump liquids and not gases! It is the user's responsibility to ensure that the pump is filled with fluid.

Fluids:

If the pump is to operate on other fluids than water, please contact Danfoss. Other operation and maintenance conditions might apply.

Minimum suction pressure:

The user must always ensure that the pump is filled with the fluid to be pumped. The pumps must always be operated with a "positive head" on suction port. The minimum and maximum allowable inlet pressure for the suction port can be found in the pump data sheet.

Maximum discharge pressure:

It is the user's responsibility to ensure that the pump discharge pressure does not exceed the max continuous discharge pressure + 10% stated in the pump data sheet.

Temperature:

The pump is not to be used in systems where the fluid temperature exceeds 50°C /122°F.

Filtration:

Fluids to be used in the pump must as a minimum always be filtered according to the specification found in the pump data sheet.

External impacts due to:**Gases:**

The pumps are made of materials resistant to most common gases. The user of the pump must ensure that materials used are resistant to the gases applied.

Dust:

The pumps may be used in "Dust Certified Areas" – but the pump housing must be cleaned regularly and always when the dust layer is exceeding 5 mm (0.2 inch). It is the user's responsibility that the dust generated in the area of operation is compatible with the materials applied for the pump.

Assembly of pump drive unit:**Motor - Pump assembly and system integration:**

When assembling the pump with the bell housing, flexible couplings and motor, it is the builder's responsibility that the parts used conform to the ATEX directive and that the components are assembled and running according to the operational data found in product data sheets and instructions.

Demands**“Potential equalizing cables” for pump systems installed in Category 3 areas:****All parts must be potential equalized.**

In a Category 3 system, a conductive (ie metallic) bell housing can be applied for equalizing the electrical potentials between motor and pump. Pump and motor must be mounted on the bell housing by bolts and lock washers; this will ensure electrical contact between pump and motor.

“Potential equalizing cables” for systems installed in Category 2 areas:**All parts must be potential equalized.**

In a Category 2 system, all parts must be potential equalized by electrical wires. The wire gauge must be equal to the wire gauge applied in the “supply” of the electric motor and may as minimum not be smaller than 4mm². (EN 60079-0 Item15.4).

Pump housing temperature increase due to pump breakdown/failure in a Category 2 rated system

In a Category 2 system, the pump housing temperature must be monitored.
Pump housing temperature must always be lower than 85°C / 185°F.

A sensor integrated in or on the pump can be used to monitor pump housing temperature. This sensor can either be mounted on top of the cylindrical part of the pump or in the drain/bleed port of the pump. The system must stop the pump, if a temperature of 60°C / 140°F is exceeded.

Checking that suction port is fluid filled and that the fluid flows unrestrictedly:

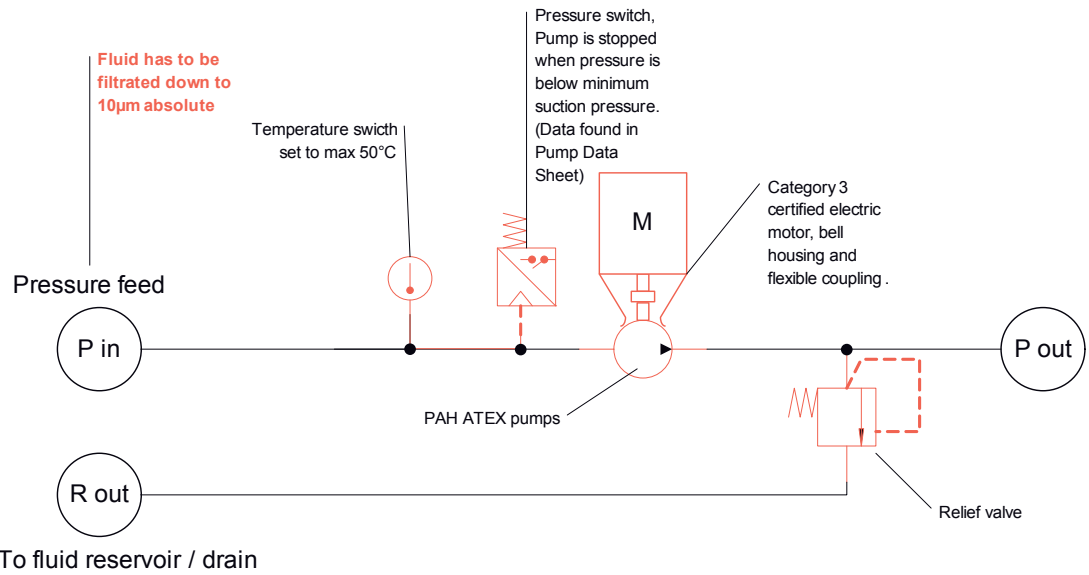
To monitor if suction line is fluid filled at right pressure, a pressure sensor must be placed in the pump suction port. This sensor must as a minimum be set to the minimum suction pressure specified in the pump data sheet. Pump must be stopped by system, if pressure declines below sensor pressure setting.

Category 3

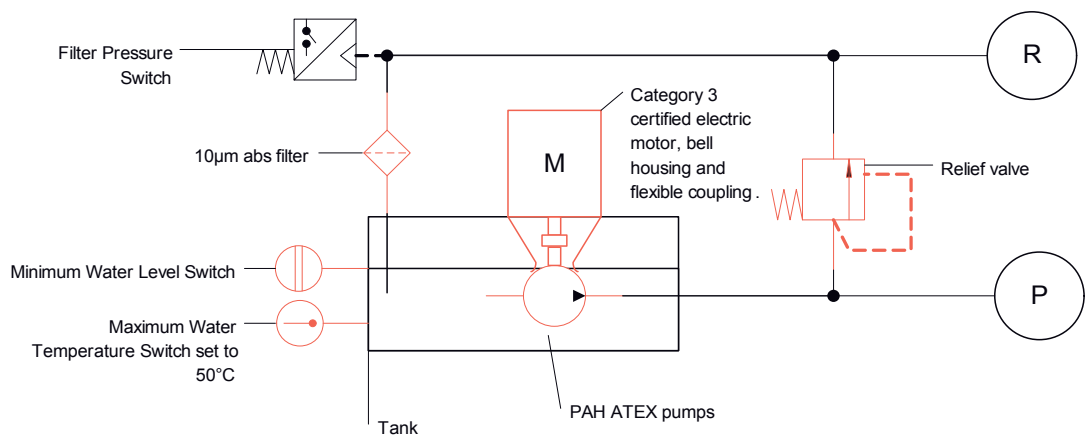
Design guide for Category 3 (Zone 2 and 22) systems.

The following schematics will give an idea of how an ATEX conforming system can be made. Some sensors are mounted due to a direct demand originating from ATEX risk evaluation, and some are placed on basis of "common sense" optimizing service life and reliability of the system.

Example 1, pump is directly fed by a pressure line



Example 2, Hydraulic system where fluid is supplied from a tank. Pump is submerged into tank and suction and drain ports are always fluid covered.

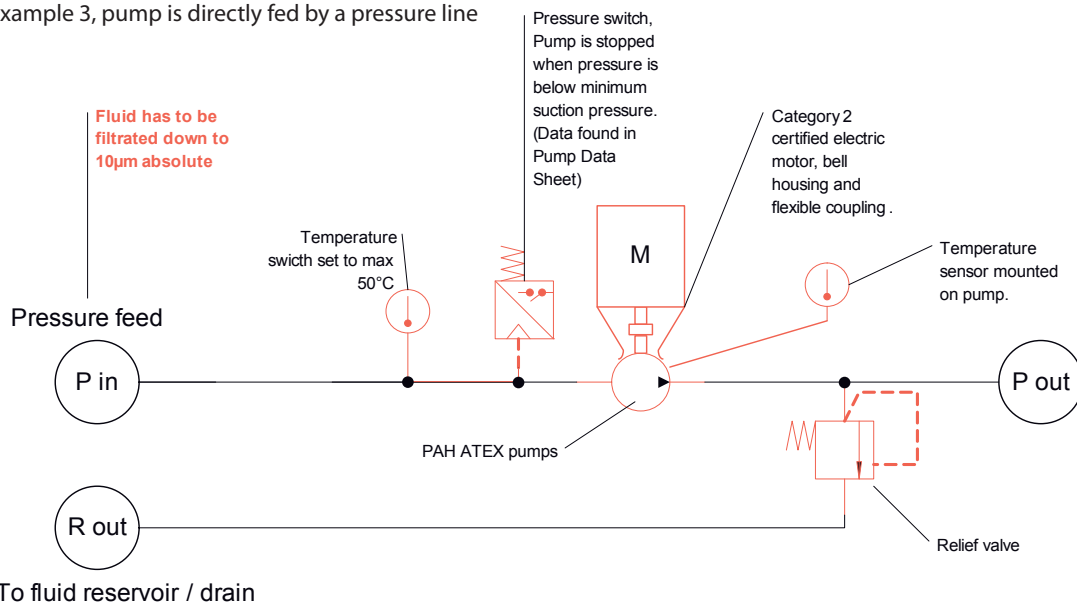


Category 2

Design guide for Category 2 (Zone 1 and 21) systems.

The following schematics will give an idea of how an ATEX conforming system can be made. Some sensors are mounted due to a direct demand originating from ATEX risk evaluation and some are placed on basis of "common sense" optimizing service life and reliability of the system

Example 3, pump is directly fed by a pressure line



Example 4, Hydraulic system where fluid is supplied from a tank. Pump is submerged into tank and suction and drain ports are always fluid covered.

