

Diaphragm Pumps

Conforming to ATEX

explosion protected

- These pumps are specifically designed for use in potentially explosive atmospheres (Equipment Group II, Categories 2 G and 3 G).
- Pump design and documentation according to ATEX (Guideline 94/9/EC). USA Groups C & D pumps also available.
- Excellent pump gas-tightness
- Non-contaminating transfer, evacuation and compression
- Oil-free pumps - no messy pump oil disposal issues
- Greatly increased safety via the optional KNF double diaphragm system



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NEUBERGER, INC.



Diaphragm Pumps Conforming to 94/9/EC (ATEX): for Use in Potentially Explosive Atmospheres

ATEX - The new standard for explosion protection

As part of the new single market, the regulations on explosion prevention and protection have now been unified throughout Europe. The legal requirements are set out in the directive 94/9/EC (also known as ATEX). In Germany, the directive was passed into national law on March 1st, 1996.

Compared to the previous legal requirement, the scope of the regulations have now been extended: whereas the old regulations were concerned with electrical equipment, mechanical equipment is now also included. For pumps, this means that besides the drive section (drive motor, an electrical device), the working section (pump part, a non-electrical device) now also falls within the regulations.

The explosion prevention and protection requirements depend on the specific equipment group and the relevant equipment category. Rather than concrete requirements, the directive formulates the assurance of protection levels, thus placing greater responsibility than before on the product manufacturer.

KNF Neuberger's explosion proof pumps designed according to ATEX guidelines are diaphragm pumps.

This type of pump has the following advantages (among others) which also enhance explosion protection:

- No contamination of the medium, since the pump requires no operating fluid;
- High gas-tightness: the edge of the diaphragm is clamped, pressure-tight, between the pump head and the housing.

In this way, as well as acting as the compressing organ, the diaphragm also functions as a seal in the clamping area.

What KNF offers

KNF Neuberger offers transfer pumps, vacuum pumps and compressors for

- Equipment Group II (other industries) and
- Category 2 G (for gases, vapors, mists where explosive atmospheres are likely to occur) and 3 G (for gases, vapors, mists where explosive atmospheres are unlikely to occur or, if they do occur, are likely to do so only infrequently and for a short period only).
- approved gases the group of II B, temperature up to class T4

Naturally the pumps are designed and documented to the ATEX standard. This applies both to internal and external explosion prevention and protection.

Long experience in the development and production of diaphragm pumps has given KNF Neuberger the know-how and technology to be able to satisfy the highest requirements of explosion protection. Applications in the chemical and process technology fields, as well as other explosion endangered areas, are part of our regular work. Another guarantee of safety, over and above DIN ISO 9001, the company has been certified for decades as a supplier to safety-sensitive industries, such as the nuclear industry.

The following performance range is covered by KNF's explosion protected pumps:

- Delivery rate: up to 280 l/min (litre at STP)
- Vacuum: down to 20 mbar absolute
- Overpressure: up to 4 bar
- USA Groups C & D exproof pumps are also available.



KNF product range of ATEX pumps

■ USA Groups C & D exproof pumps are also available.

Type		Flow rate atm. conditions (l/min)	Vacuum (mbar abs.)	atm. Press.	Pressure (bar g)
N 87 TTE	Chemically-resistant pump head	7.5	140		1.5
N 026 AT.9E	Pump head in aluminium	17	100		2.5
N 026 ST.9E	Pump head in stainless steel	17	100		2.5
N 026.1.2 AT.9E	Pump heads in aluminium	33	100		2.0
N 026.1.2 ST.9E	Pump heads in stainless steel	33	100		2.0
N 143 AT.9E	Pump head in aluminium	27	100		4
N 143 ST.9E	Pump head in stainless steel	27	100		4
N 186 1.2 AT.9E	Pump heads in aluminium	50	100		4
N 186 1.2 ST.9E	Pump heads in stainless steel	50	100		4
N 0150 AT.9E	Pump head in aluminium	120	115		1.0
N 0150 ST.9E	Pump head in stainless steel	120	115		1.0
N 0150 1.2 AT.9E	Pump heads in aluminium	220	115		1.0
N 0150 1.2 ST.9E	Pump heads in stainless steel	220	115		1.0

Modell codes and materials:

TT = Pump head in PVDF, diaphragm PTFE coated, valves in FFPM

AT = Pump head in aluminium, diaphragm PTFE coated, valves in stainless steel

ST = Pump head in stainless steel, diaphragm PTFE coated, valves in PTFE

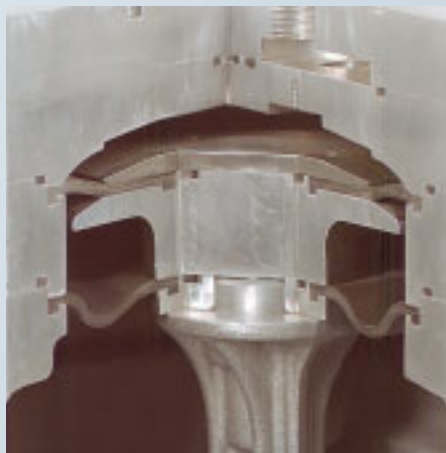
The pumps are equipped with three - phase A.C. motors (Exception: N 87 TTE)

The double diaphragm system for increased safety

The safety of diaphragm pumps has been greatly improved by KNF's patented double diaphragm system. This system is characterized by a special layout of the diaphragms:

below the working diaphragm, an additional safety diaphragm is provided resulting in:

- A particularly high gas-tightness, which is further increased by O-rings; achievable leakage rates of 6×10^{-6} mbar/ls guarantee that the medium cannot escape from the pump chamber.



KNF's Double Diaphragm System:
above – working diaphragm
below – safety diaphragm

Design measures for explosion protection

According to ATEX, explosion prevention and protection strategies are to be considered in the following order:

1. Prevention of explosive atmospheres
2. Prevention of ignition sources
3. Limiting the damage caused by explosions.

Strategy areas 2 and 3 lie in the domain of the manufacturer. In these areas, KNF Neuberger has integrated numerous design features into its pumps – in addition to the double diaphragm system.

Here are a few examples:

Prevention of sparking through friction or hitting

Sparks caused by friction or hitting can lead to ignition. Such sparks may occur when aluminium or magnesium comes into contact with iron or steel (with the exception of stainless steel). By the suitable choice of materials, KNF has eliminated the chance of sparks occurring through friction or hitting – both in the pump head and in the housing.

No electrostatic charge

The build up of an electrostatic charge at the pump head is avoided by assuring a good electrical connection between all the metallic components of the pump head, and earthing them via the compressor housing and the motor. In addition, the relevant elastomeric parts are made of a non-charging material; their surface resistance is below 10^9 Ohm.

Pressure resistance of housing and diaphragms

Both pump housing and diaphragms can withstand high pressures. In the event of an explosion this would limit the damage caused.

Design validation through calculation

Even when the pump compresses to the maximum permissible pressure, the medium temperature must still be kept below the ignition temperature. Through calculation, KNF assures the operational safety of each pump supplied for the particular conditions of service. The calculations are based on the theoretically most unfavorable conditions of adiabatic compression, which, however, are never likely to arise in practice. Thus, an additional safety factor is taken into account in the calculations.

Please contact KNF to discuss your specific applications. A KNF sales engineer will be pleased to help and advise you.