

MOUVEX®



Instructions 35454 (En)

Section

Effective

Replaces

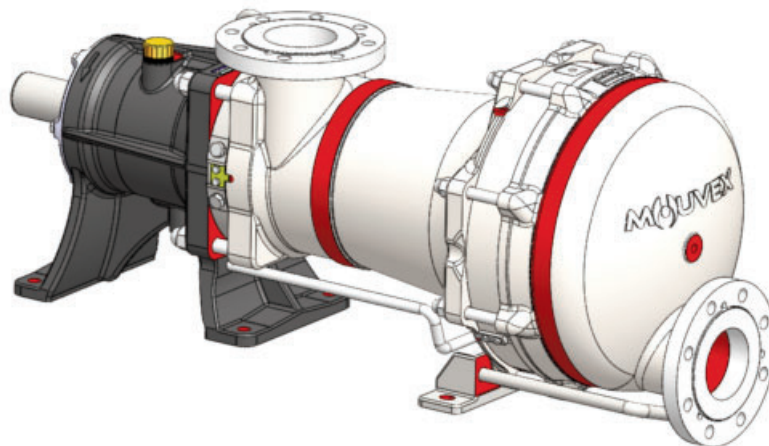
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Original instructions

Additional instructions for ATEX certified equipment

Pumps and pumping units H-FLO - G-FLO



EPL : Equipment Protection Level



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Your distributor :

ECCENTRIC PISTON PUMPS

MOUVEX PRINCIPLE

ADDITIONAL INSTRUCTIONS FOR ATEX CERTIFIED PUMPS AND PUMPING UNITS

MODELS : Pumps and pumping units H-FLO - G-FLO

The following instructions must be read at the same time as:

1. standard NF C 15 100,
2. standard NF EN 60 079-14 (electric installations in explosive gaseous atmospheres),
3. standard NF EN 60 079-17 (inspection and maintenance in dangerous locations),
4. rulings, orders, laws, directives, circulars for application, standards, professional practices and any other document related to its place of installation.

We disclaim any responsibility in the case of non-conformity with these documents.

This manual is an addition to our general manual.

For equipment other than the pump (probe, motor, etc.), the instructions in this manual are intended to help during assembly, but shall in no way replace the specific instruction manuals of equipment manufacturers. These specific instruction manuals must be read before assembling the equipment.

The equipment must be installed by qualified, skilled and authorised personnel.

Our equipment is labelled CE by virtue of directive ATEX 2014/34/EU.

It is designed for use in explosive atmospheres from 0,8 bar to 1,1 bar and temperatures from -15°C to +40°C and from -15°C to +50°C for the gas groups below :

Series	EPL : Equipment Protection Level	Equipment-group	Group II subdivisions
H Flo	Gb	II	IIA, IIB
	Gc		IIA, IIB
	Db	III	IIIA, IIIB, IIIC
	Dc		IIIA, IIIB, IIIC
G Flo	Gb	II	IIA, IIB, IIC
	Gc		IIA, IIB, IIC
	Db	III	IIIA, IIIB, IIIC
	Dc		IIIA, IIIB, IIIC

Check the compatibility between the informations on the rating plate, the explosive atmosphere present, the area of use and the ambient and surface temperatures.

According to the directive 2014/34/EU, the accessories or (and) components assembled and equipping the motors of our pumps must have a standard CE declaration of inspection.

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1. MOUVEX PUMPS AND UNITS CERTIFICATION

MOUVEX pumps and units carry EPL Gb/Db (2G/2D) certification (high level of protection). They are, therefore, obviously suited to EPL Gc/Dc (3G/3D) uses (standard level of protection).

Unless otherwise indicated, the recommendations contained in these Instructions apply to the equipment with EPL Gb/Db and Gc/Dc (2G/2D and 3G/3D).

2. TABLE OF PUMP CHARACTERISTICS

H & G FLO S/HP series pump	FLO 1 S	FLO 2 S	FLO 3 S	FLO 6 S	FLO 8 S	FLO 11 S	FLO 15 S	FLO 25 S	FLO 40 S	FLO 50 S	FLO 65 S	FLO 65 HP
Maximal nominal flow (m ³ .h ⁻¹)	1,5	2,16	2,81	6	8	11	15	25	40	50	65	50

H & G FLO HT series pump	FLO 1 HT	FLO 2 HT	FLO 3 HT	FLO 6 HT	FLO 8 HT	FLO 11 HT	FLO 15 HT	FLO 25 HT	FLO 40 HT	FLO 50 HT
Maximal nominal flow (m ³ .h ⁻¹)	1,5	2,16	2,81	6	8	11	15	25	40	50

Other characteristics : See pump Instructions manual.

3. REPLACEMENT OF PARTS

3.1 Pumps

MOUVEX pumps parts can only be replaced by MOUVEX parts corresponding to the original configuration of the pump.

Failure to these instructions results a modification of the pump's characteristics and its ATEX certification will no longer be applicable.

All operations on MOUVEX ATEX equipment must be carried out by MOUVEX personnel or by personnel specifically authorised to carry out such operations.

Non-conformity with this rule will result in the loss of the MOUVEX ATEX pump certification.

For all operations on MOUVEX ATEX equipment, the tools used must not generate sparks.

Non-conformity with this rule will result in the loss of the MOUVEX ATEX pump certification.

3.2 Pumping units

MOUVEX pumping unit equipment must only be replaced by equipment with a level of protection that is at least equivalent to that of the pumping unit.

Incorporation and use in the pumping unit must not change the compliance thereof with the essential requirements of Directive 2014/34/UE.

Non-conformity with these rules will result in the loss of ATEX MOUVEX certification for the pumping unit.

4. TEMPERATURE CLASS OF PUMPS AND PUMPING UNITS

4.1 Pumps

Pumps are devices whose surface temperatures greatly depend on the products they pump.

Thus the temperature classifications of MOUVEX pumps are obtained with the temperature limits of the product pumped :

Maximum temperature of the product pumped

Temperature class	T4	T3 ^a
Ambient temperature ≤ 40°C		
FLO 1/2/3/6/8 S	80°C	100°C
FLO 11/15/25/40/50/65 S/HP	85°C	100°C
FLO 1/2/3/6/8/11/15/25/40/50 HT	105°C	160°C
Ambient temperature ≤ 50°C		
FLO 1/2/3/6/8 S	70°C	100°C
FLO 11/15/25/40/50/65 S/HP	75°C	100°C
FLO 1/2/3/6/8/11/15/25/40/50 HT	95°C	160°C

Pumps equipped with heating jackets are also devices whose surface temperatures greatly depend on the temperatures of the heating products circulating in the heating jacket. Thus the temperature classifications of the MOUVEX are obtained with the temperature limits of the heating product :

Maximum temperature of the heating product

Temperature class	T4	T3 ^a	T2 ^a
Ambient temperature ≤ 40°C			
FLO 1/2/3/6/8 S	80°C	145°C	180°C
FLO 11/15/25/40/50/65 S/HP	85°C	150°C	180°C
FLO 1/2/3/6/8/11/15/25/40/50 HT	105°C	170°C	180°C
Ambient temperature ≤ 50°C			
FLO 1/2/3/6/8 S	70°C	135°C	180°C
FLO 11/15/25/40/50/65 S/HP	75°C	140°C	180°C
FLO 1/2/3/6/8/11/15/25/40/50 HT	95°C	160°C	180°C

Any overshooting of the maximum temperature of the product pumped or the heating product (in the case of a pump equipped with a heating jacket) is considered as abnormal operation of the pump, that can lead to surface temperatures higher than the classification temperature T for which the pump is certified.

The user of the pump must ensure that the temperature of the product pumped and/or the temperature of the heating product must never exceed the maximum temperature specified. This can be done, for example, by using a pump shutdown control device.

This device must conform to current regulations and standards especially with regulation related to electric equipment in explosive atmosphere (EN 50495...). The choice of its characteristics (temperature resistance, EPL, etc.) must guarantee a level of protection at least equal to that of the pump.

H&G FLO Series pumps can be cleaned in place using a cleaning product (see instructions of the pump). During this cleaning operation, the operating temperatures of the pump are directly influenced by the temperature of the cleaning product circulating in the pump.

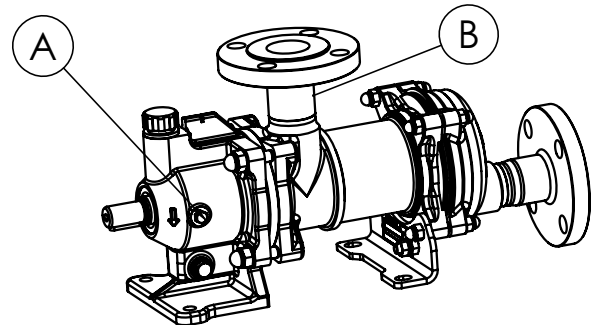
Maximum temperature of the cleaning product

Temperature class	T4	T3 ^a
Ambient temperature ≤ 40°C		
FLO 1/2/3/6/8 S	80°C	121°C
FLO 11/15/25/40/50/65 S/HP	85°C	121°C
FLO 1/2/3/6/8/11/15/25/40/50 HT	105°C	121°C
Ambient temperature ≤ 50°C		
FLO 1/2/3/6/8 S	70°C	121°C
FLO 11/15/25/40/50/65 S/HP	75°C	121°C
FLO 1/2/3/6/8/11/15/25/40/50 HT	95°C	121°C

A pumped liquid temperature higher than the maximum pumped liquid temperature corresponding to the temperature classification T (for example 100°C in T4), is nevertheless possible, provided that to protect the pump against any surface heating at the hottest point, greater than 135°C, it is controlled by the installation of temperature limiter devices stopping the pump in the event of an excessive rise in temperature on the bearing housing (protection mode « b »).

There are two hot points on the pump :

- **Bearing area (A)** : As illustrated, a location is provided on the bearing housing,
- **Body area (B)** : The device must be located either: On the surface of the suction connection (using a clamp), or directly in the upstream fluid.



^a For temperature classes T2 and T3, it is possible to provide a pump certified for intermediate temperature values (see the table for the various possibilities).

4. TEMPERATURE CLASS OF PUMPS AND PUMPING UNITS (continued)

The temperature limiter(s) device must :

- be installed in the place(s) provided for this purpose to stop or regulate the operation of the pump in the event of overheating :

Temperature of the product pumped (T°)	Locations
< 75°C	The bearing housing area must be monitored.
75°C < T° < 100°C	Both areas must be monitored.
> 100°C	The body area must be monitored.

- have a level of protection against explosions equivalent or higher than that of the pump ;
- meet the reliability requirements described in ISO 80079-36. This conformity ensures compliance with the requirements of standard EN 50495, summarized in the table below.

Pump category	3 (Gc/Dc)	2 (Gb/Db)
Required stop device	Yes	Yes
Required safety integrity level	Neither	SIL 1

The rate of temperature rise due to friction being relatively low, the safety factor deemed necessary is that recommended by standard ISO 80079-36, point 8.2.1 c ii (5K) for a case without a temperature limiting device.

The temperature limiter must therefore be set to ensure that the external surfaces of the pump do not exceed a temperature of 130°C.

The manufacturer's user instructions provide information on :

- the operating limits not to be exceeded for each temperature classification ;
- the temperature measurement location of the device ;
- the requirements to be respected for the choice of the temperature limiting device ;
- the setting threshold of the temperature limiter.

4.2 Special temperature limits - Pumps

Intermediate values

Standard version

H&G Flo 1/2/3 S		
Maximum temperature of product pumped (°C)	Temperature class	
	Ambient T° 40°C	Ambient T° 50°C
70	122°C (T4)	132°C (T4)
75	127°C (T4)	137°C (T3)
80	132°C (T4)	142°C (T3)
85	137°C (T3)	147°C (T3)
90	142°C (T3)	152°C (T3)
95	147°C (T3)	157°C (T3)
100	152°C (T3)	162°C (T3)

Maximum temperature of the heating product (°C)	Temperature class	
	Ambient T° 40°C	Ambient T° 50°C
70	122°C (T4)	132°C (T4)
75	127°C (T4)	137°C (T3)
80	132°C (T4)	142°C (T3)
85	137°C (T3)	147°C (T3)
90	142°C (T3)	152°C (T3)
95	147°C (T3)	157°C (T3)
100	152°C (T3)	162°C (T3)
105	157°C (T3)	167°C (T3)
110	162°C (T3)	172°C (T3)
115	167°C (T3)	177°C (T3)
120	172°C (T3)	182°C (T3)
125	177°C (T3)	187°C (T3)
130	182°C (T3)	192°C (T3)
135	187°C (T3)	197°C (T3)
140	192°C (T3)	202°C (T2)
145	197°C (T3)	207°C (T2)
150	202°C (T2)	212°C (T2)
155	207°C (T2)	217°C (T2)
160	212°C (T2)	222°C (T2)
165	217°C (T2)	227°C (T2)
170	222°C (T2)	232°C (T2)
175	227°C (T2)	237°C (T2)
180	232°C (T2)	242°C (T2)

4. TEMPERATURE CLASS OF PUMPS AND PUMPING UNITS (continued)

H&G Flo 6/8 S		
Maximum temperature of product pumped (°C)	Temperature class	
	Ambient T° 40°C	Ambient T° 50°C
70	122°C (T4)	132°C (T4)
75	127°C (T4)	137°C (T3)
80	132°C (T4)	142°C (T3)
85	137°C (T3)	147°C (T3)
90	142°C (T3)	152°C (T3)
95	147°C (T3)	157°C (T3)
100	152°C (T3)	162°C (T3)

H&G Flo 11 S		
Maximum temperature of product pumped (°C)	Temperature class	
	Ambient T° 40°C	Ambient T° 50°C
75	121°C (T4)	131°C (T4)
80	126 °C (T4)	136 °C (T3)
85	131 °C (T4)	141°C (T3)
90	136°C (T3)	146°C (T3)
95	141°C (T3)	151°C (T3)
100	146°C (T3)	156°C (T3)

Maximum temperature of the heating product (°C)	Temperature class	
	Ambient T° 40°C	Ambient T° 50°C
70	122°C (T4)	132°C (T4)
75	127°C (T4)	137°C (T3)
80	132°C (T4)	142°C (T3)
85	137°C (T3)	147°C (T3)
90	142°C (T3)	152°C (T3)
95	147°C (T3)	157°C (T3)
100	152°C (T3)	162°C (T3)
105	157°C (T3)	167°C (T3)
110	162°C (T3)	172°C (T3)
115	167°C (T3)	177°C (T3)
120	172°C (T3)	182°C (T3)
125	177°C (T3)	187°C (T3)
130	182°C (T3)	192°C (T3)
135	187°C (T3)	197°C (T3)
140	192°C (T3)	202°C (T2)
145	197°C (T3)	207°C (T2)
150	202°C (T2)	212°C (T2)
155	207°C (T2)	217°C (T2)
160	212°C (T2)	222°C (T2)
165	217°C (T2)	227°C (T2)
170	222°C (T2)	232°C (T2)
175	227°C (T2)	237°C (T2)
180	232°C (T2)	242°C (T2)

Maximum temperature of the heating product (°C)	Temperature class	
	Ambient T° 40°C	Ambient T° 50°C
75	121°C (T4)	131°C (T4)
80	126 °C (T4)	136 °C (T3)
85	131 °C (T4)	141°C (T3)
90	136°C (T3)	146°C (T3)
95	141°C (T3)	151°C (T3)
100	146°C (T3)	156°C (T3)
105	151°C (T3)	161°C (T3)
110	156°C (T3)	166°C (T3)
115	161°C (T3)	171°C (T3)
120	166°C (T3)	176°C (T3)
125	171°C (T3)	181°C (T3)
130	176°C (T3)	186°C (T3)
135	181°C (T3)	191°C (T3)
140	186°C (T3)	196°C (T3)
145	191°C (T3)	201°C (T2)
150	196°C (T3)	206°C (T2)
155	201°C (T2)	211°C (T2)
160	206°C (T2)	216°C (T2)
165	211°C (T2)	221°C (T2)
170	216°C (T2)	226°C (T2)
175	221°C (T2)	231°C (T2)
180	226°C (T2)	236°C (T2)

4. TEMPERATURE CLASS OF PUMPS AND PUMPING UNITS (continued)

H&G Flo 15 S		
Maximum temperature of product pumped (°C)	Temperature class	
	Ambient T° 40°C	Ambient T° 50°C
75	124°C (T4)	134°C (T4)
80	129°C (T4)	139°C (T3)
85	134°C (T4)	144°C (T3)
90	139°C (T3)	149°C (T3)
95	144°C (T3)	154°C (T3)
100	149°C (T3)	159°C (T3)

H&G Flo 25 S		
Maximum temperature of product pumped (°C)	Temperature class	
	Ambient T° 40°C	Ambient T° 50°C
75	125°C (T4)	135°C (T4)
80	130°C (T4)	140°C (T3)
85	135°C (T4)	145°C (T3)
90	140°C (T3)	150°C (T3)
95	145°C (T3)	155°C (T3)
100	150°C (T3)	160°C (T3)

Maximum temperature of the heating product (°C)	Temperature class	
	Ambient T° 40°C	Ambient T° 50°C
75	124°C (T4)	134°C (T4)
80	129°C (T4)	139°C (T3)
85	134°C (T4)	144°C (T3)
90	139°C (T3)	149°C (T3)
95	144°C (T3)	154°C (T3)
100	149°C (T3)	159°C (T3)
105	154°C (T3)	164°C (T3)
110	159°C (T3)	169°C (T3)
115	164°C (T3)	174°C (T3)
120	169°C (T3)	179°C (T3)
125	174°C (T3)	184°C (T3)
130	179°C (T3)	189°C (T3)
135	184°C (T3)	194°C (T3)
140	189°C (T3)	199°C (T3)
145	194°C (T3)	204°C (T2)
150	199°C (T3)	209°C (T2)
155	204°C (T2)	214°C (T2)
160	209°C (T2)	219°C (T2)
165	214°C (T2)	224°C (T2)
170	219°C (T2)	229°C (T2)
175	224°C (T2)	234°C (T2)
180	229°C (T2)	239°C (T2)

Maximum temperature of the heating product (°C)	Temperature class	
	Ambient T° 40°C	Ambient T° 50°C
75	125°C (T4)	135°C (T4)
80	130°C (T4)	140°C (T3)
85	135°C (T4)	145°C (T3)
90	140°C (T3)	150°C (T3)
95	145°C (T3)	155°C (T3)
100	150°C (T3)	160°C (T3)
105	155°C (T3)	165°C (T3)
110	160°C (T3)	170°C (T3)
115	165°C (T3)	175°C (T3)
120	170°C (T3)	180°C (T3)
125	175°C (T3)	185°C (T3)
130	180°C (T3)	190°C (T3)
135	185°C (T3)	195°C (T3)
140	190°C (T3)	200°C (T3)
145	195°C (T3)	205°C (T2)
150	200°C (T3)	210°C (T2)
155	205°C (T2)	215°C (T2)
160	210°C (T2)	220°C (T2)
165	215°C (T2)	225°C (T2)
170	220°C (T2)	230°C (T2)
175	225°C (T2)	235°C (T2)
180	230°C (T2)	240°C (T2)

4. TEMPERATURE CLASS OF PUMPS AND PUMPING UNITS (continued)

H&G Flo 40 S		
Maximum temperature of product pumped (°C)	Temperature class	
	Ambient T° 40°C	Ambient T° 50°C
75	122°C (T4)	132°C (T4)
80	127°C (T4)	137°C (T3)
85	132°C (T4)	142°C (T3)
90	137°C (T3)	147°C (T3)
95	142°C (T3)	152°C (T3)
100	147°C (T3)	157°C (T3)

H&G Flo 50 S		
Maximum temperature of product pumped (°C)	Temperature class	
	Ambient T° 40°C	Ambient T° 50°C
75	125°C (T4)	135°C (T4)
80	130°C (T4)	140°C (T3)
85	135°C (T4)	145°C (T3)
90	140°C (T3)	150°C (T3)
95	145°C (T3)	155°C (T3)
100	150°C (T3)	160°C (T3)

Maximum temperature of the heating product (°C)	Temperature class	
	Ambient T° 40°C	Ambient T° 50°C
75	122°C (T4)	132°C (T4)
80	127°C (T4)	137°C (T3)
85	132°C (T4)	142°C (T3)
90	137°C (T3)	147°C (T3)
95	142°C (T3)	152°C (T3)
100	147°C (T3)	157°C (T3)
105	152°C (T3)	162°C (T3)
110	157°C (T3)	167°C (T3)
115	162°C (T3)	172°C (T3)
120	167°C (T3)	177°C (T3)
125	172°C (T3)	182°C (T3)
130	177°C (T3)	187°C (T3)
135	182°C (T3)	192°C (T3)
140	187°C (T3)	197°C (T3)
145	192°C (T3)	202°C (T2)
150	197°C (T3)	207°C (T2)
155	202°C (T2)	212°C (T2)
160	207°C (T2)	217°C (T2)
165	212°C (T2)	222°C (T2)
170	217°C (T2)	227°C (T2)
175	222°C (T2)	232°C (T2)
180	227°C (T2)	237°C (T2)

Maximum temperature of the heating product (°C)	Temperature class	
	Ambient T° 40°C	Ambient T° 50°C
75	125°C (T4)	135°C (T4)
80	130°C (T4)	140°C (T3)
85	135°C (T4)	145°C (T3)
90	140°C (T3)	150°C (T3)
95	145°C (T3)	155°C (T3)
100	150°C (T3)	160°C (T3)
105	155°C (T3)	165°C (T3)
110	160°C (T3)	170°C (T3)
115	165°C (T3)	175°C (T3)
120	170°C (T3)	180°C (T3)
125	175°C (T3)	185°C (T3)
130	180°C (T3)	190°C (T3)
135	185°C (T3)	195°C (T3)
140	190°C (T3)	200°C (T3)
145	195°C (T3)	205°C (T2)
150	200°C (T3)	210°C (T2)
155	205°C (T2)	215°C (T2)
160	210°C (T2)	220°C (T2)
165	215°C (T2)	225°C (T2)
170	220°C (T2)	230°C (T2)
175	225°C (T2)	235°C (T2)
180	230°C (T2)	240°C (T2)

4. TEMPERATURE CLASS OF PUMPS AND PUMPING UNITS (continued)

HT version

H&G Flo 65 S & HP		
Maximum temperature of product pumped (°C)	Temperature class	
	Ambient T° 40°C	Ambient T° 50°C
75	123°C (T4)	133°C (T4)
80	128°C (T4)	138°C (T3)
85	133°C (T4)	143°C (T3)
90	138°C (T3)	148°C (T3)
95	143°C (T3)	153°C (T3)
100	148°C (T3)	158°C (T3)

Maximum temperature of the heating product (°C)	Temperature class	
	Ambient T° 40°C	Ambient T° 50°C
75	123°C (T4)	133°C (T4)
80	128°C (T4)	138°C (T3)
85	133°C (T4)	143°C (T3)
90	138°C (T3)	148°C (T3)
95	143°C (T3)	153°C (T3)
100	148°C (T3)	158°C (T3)
105	153°C (T3)	163°C (T3)
110	158°C (T3)	168°C (T3)
115	163°C (T3)	173°C (T3)
120	168°C (T3)	178°C (T3)
125	173°C (T3)	183°C (T3)
130	178°C (T3)	188°C (T3)
135	183°C (T3)	193°C (T3)
140	188°C (T3)	198°C (T3)
145	193°C (T3)	203°C (T2)
150	198°C (T3)	208°C (T2)
155	203°C (T2)	213°C (T2)
160	208°C (T2)	218°C (T2)
165	213°C (T2)	223°C (T2)
170	218°C (T2)	228°C (T2)
175	223°C (T2)	233°C (T2)
180	228°C (T2)	238°C (T2)

H&G FLO 1/2/3/6/8/11/15/25/40/50 HT		
Maximum temperature of product (°C)	Temperature class	
	Ambient T° 40°C	Ambient T° 50°C
70	103°C (T4)	113°C (T4)
75	105°C (T4)	115°C (T4)
80	108°C (T4)	118°C (T4)
85	113°C (T4)	123°C (T4)
90	118°C (T4)	128°C (T4)
95	123°C (T4)	133°C (T4)
100	128°C (T4)	138°C (T3)
105	133°C (T4)	143°C (T3)
110	138°C (T3)	148°C (T3)
115	143°C (T3)	153°C (T3)
120	148°C (T3)	158°C (T3)
125	153°C (T3)	163°C (T3)
130	158°C (T3)	168°C (T3)
135	163°C (T3)	173°C (T3)
140	168°C (T3)	178°C (T3)
145	173°C (T3)	183°C (T3)
150	178°C (T3)	188°C (T3)
155	183°C (T3)	193°C (T3)
160	188°C (T3)	198°C (T3)
165	193°C (T3)	203°C (T2)
170	198°C (T3)	208°C (T2)
175	203°C (T2)	213°C (T2)
180	208°C (T2)	218°C (T2)

4.3 Pumping units

The temperature classification of the pumping units depends on the temperature classification of all equipment making up the pumping unit ; the one enforced is that of the element with the most restrictive classification.

Example : A pumping unit with T3 motor, a T6 pressure switch and a T4 pump will have a T3 temperature classification.

5. OPERATION WITHOUT ANY PUMPED PRODUCT

Pumps using the MOUVEX principle, H&G FLO series, can be run dry, without any pumped product in the pump, throughout the pump priming time without causing the temperature to exceed the temperature classification (for example during the priming or emptying of pipes). However, this is allowed only on condition that the following restrictions are complied with :

5.1 Operation on a product that does not generate its own explosive atmosphere or generate an explosive atmosphere with an ignition temperature that is higher than 160°C

- At start-up, temperature of the external surfaces of the cylinder and the front cover less than 50°C^b,
- Differential pressure when the pump works without the pumped product limited to 3 bar,
- Operating time without pumped product (dry running) not exceeding the value defined below.

Maximum running time (min) without any pumped product

Temperature class	T4	T3
FLO 1/2/3/6/8 S/HT	4	4
FLO 11/15/25/40/50 S/HT FLO 65 S/HP	6	6

This duration may be spread over several operating periods spaced at least 15 minutes apart. Any operation for longer than this period will entail detailed inspection of the equipment and possibly disassembly of it to ensure that the previous operation did not lead to any additional ignition risks (particular attention will be paid to the fact that even though the external temperatures of the pump comply with the limits defined above, the inside surfaces can nonetheless be at high temperatures).

5.2 Operation on a product that generates its own explosible atmosphere and with an ignition temperature of less than 160°C

It is forbidden to operate without the pumped product.

5.3 Presumed pump failure

When the behaviour of the pump indicates that an equipment failure has occurred (drop in flow rate / pressure, abnormal noise, etc.), the pump must not operate without pumped product.

Consequently, the pipe must not be drained by the pump.

It is strictly forbidden to operate the pump without observing these recommendations.

The user must evaluate his installation and list all possible situations in which it functions without pumped product and take the necessary steps to ensure compliance with the operating limits.

The situations involving operation without pumped fluid can for example be the following :

- priming of the pump,
- draining the pipes,
- interruption of pump feed (tank empty),
- suction pipe blocked (valve, filter fouled, etc.),
- air block at suction,
- ...

This can for example be checked by an operator ensuring that the applications dependent on the pump are working or that the physical values dependent on the presence of product (flow, pressure, torque, etc.) correspond to those expected.

These control measures can be automated by using a pump shutdown control device.

This device must conform to current regulations and standards especially with regulation related to electric equipment in explosive atmosphere (EN 50495...). The choice of its characteristics (temperature resistance, EPL, etc.) must guarantee a level of protection at least equal to that of the pump.

^b Special arrangements have to be made for cases where the pumped product requires that the pump be reheated before it is started up, using the formula :

$$[\text{Maximum reheating temperature}] = [\text{Pump temperature classification}] - [\text{Ignition temperature of test gas}] + [\text{Maximum permitted ambient temperature}]$$

$$T_{\text{max}} = 200 - 160 + 40 = 80^{\circ}\text{C}$$

6. DISCHARGE PRESSURE RELIEF

Any overshoot of the maximum allowable pressures is considered to be abnormal pump / pumping unit operation which can lead to surface temperatures in excess of the pump / pumping unit temperature classification, as well as risks to the user and/or the installation.

To avoid these risks, the user must equip the pump / pumping unit with a pressure limiter with a threshold chosen according to the lowest allowable maximum pressure for the circuit components (including head losses).

6.1 Pumping units equipped with an integrated relief valve

Since the pressure relief is incorporated in the elements of the pumping unit, the product is recirculated directly from the discharge pipe to the suction pipe.

The short length of the recirculation circuit means that if the pump operates with a blocked discharge port, the outer surfaces of the relief valve can reach very high temperatures in a short time.

For these reasons, a temperature limiter device can be necessary to respect the temperature classification, depending on EPL and its use (see board below).

The temperature limiter device has to :

- be installed in emplacement provided for this purpose ^c,
- cut the power supply to the pump and control any safety measures required by the installation,
- be conform to current regulations and standards especially with regulation related to electric equipment in explosive atmosphere (EN 50495...),
- have a level of protection against explosions equivalent or higher than that of the pumping unit,
- have a level of integrated safety adapted to the EPL and the type of the relief valve using (see board below).

Type of the relief valve using ^d	Protection		Regulation	
	Gc/Dc (3G/3D)	Gb/Db (2G/2D)	Gc/Dc (3G/3D)	Gb/Db (2G/2D)
Pumping unit EPL				
Temperature limiter device required	no	yes	yes	yes
Level integrated security required	-	neither	neither	SIL 1

The activation threshold of the temperature limiter device should be selected to ensure that the temperatures at controlled locations do not exceed the values given below.

Setting of the activation threshold should take into account the precision of the temperature limiter device.

Example : to a precision of $\pm 5K$, activation threshold in temperature class T4 should be set to $125 - 5 = 120^{\circ}C$.

Temperature class	Maximum detection threshold of the temperature limiter device
T4	125°C
T3	190°C

NOTICE :

The temperature limiter device installed on the integrated relief valve is not designed to control pump surfaces temperature as required in the section TEMPERATURE CLASS OF PUMPS AND PUMPING UNITS, but to be triggered when a malfunction could raise the temperature of the relief valve surfaces to a level higher than what is acceptable for the ATEX area. The temperature of pump surfaces must be checked using a device that is separate from the temperature limiter device installed on the relief valve.

6.2 Pumps and pumping units without an integrated relief valve

6.2.1 Protection by pressure switch

Protection may be provided by installing a pressure switch that stops the equipment in the event of over-pressure.

This device must conform to current regulations and standards especially with regulation related to electric equipment in explosive atmosphere (EN 50495...). The choice of its characteristics (temperature resistance, EPL, etc.) must guarantee a level of protection at least equal to that of the pump / pumping unit.

6.2.2 Protection by external relief valve

Over-pressure protection can be provided by installing an external relief valve with return to the tank / suction pipe.

In this case, the user must ensure that the circuit complies with the recommendations of § CLOSED-CIRCUIT OPERATION.

We also recommend checking that heating on the relief valve remains compatible with the temperature classification of the zone in which it is installed.

^c See pumping unit overall dimensions

^d Types of the relief valve using :

Protection : protection of the pump against accidental and non-repetitive over pressures. The relief valve cannot also fulfil a control role.

Pressure control : controlling the pressure / flow on the application (e.g. : control of the flow of the pump without returning to the tank or speed control). The relief valve can also fulfil a protective role.

7. CONTROLLING THE ROTATION SPEED

Any overshoot of the maximum allowable speed is considered to be abnormal pump operation which can lead to surface temperatures in excess of the pump temperature classification, as well as risks to the user and / or the installation.

At first start-up or after any modification to the pumping unit or its settings, the pump rotation speed must be checked to ensure that it remains below or equal to that defined for the application.

8. CLOSED-CIRCUIT OPERATION

Closed-circuit operation with small volumes of pumped product can lead to significant heating of the pumped product.

The user must check that the recirculation circuit is large enough to ensure that the pumped product temperature rise remains below the temperature limits of all circuit elements.

This check can for example be carried out by installing a temperature sensor controlling shutdown of the installation if the maximum allowable values are exceeded.

This equipment must conform to current regulations and standards especially with regulation related to electric equipment in explosive atmosphere (EN 50495...). The choice of its characteristics (temperature resistance, EPL, etc.) must guarantee a level of protection at least equal to that required by the area where it will be installed.

9. SOLVENTS NOT COMPATIBLE WITH SEALS

The user must ensure that the seals equipping the pump / pumping unit are compatible with the product pumped and products used to clean the pump / pumping unit.

10. RISKS OF EXOTHERMIC REACTION

When the pump / pumping unit is operated successively on different products, the user must make the necessary arrangements to avoid heating through an exothermic reaction between the various products pumped.

11. PROTECTION AGAINST FOREIGN BODIES

The user will take the necessary steps to protect the installation against ingress of any foreign bodies that could damage the pump / pumping unit, for example by ensuring that neither the pumped product nor the piping contain foreign bodies liable to damage the pump / pumping unit, or by installing an appropriate suction filter.

If the pump is operated without pumped product, particular attention must be given to the risk of sparks and hot surfaces generated by friction between foreign bodies and the inner surfaces of the pump / pumping unit. This must be assessed prior to any use of the pump without pumped product.

12. MAINTENANCE

12.1 Pump

Excessive wear of pump parts is considered to be abnormal pump operation which can lead to surface temperatures in excess of the pump temperature classification, as well as risks to the user and/or the installation.

12.1.1 Lubrication

Before starting the pump for the first time, or after any operation on the pump drive, the oil level must be checked at ambient temperature (non-emulsified oil).

The drive shaft seals must be inspected regularly after every 1,000 hours operation.

In the case of loss of lubricant, the user must make the necessary repairs (refer to the § DRAINING OF BEARING of the pump's Instructions).

The user must follow the oil change intervals recommended by the manufacturer and stated in the pump Instructions.

12.1.2 Transmission

The user must ensure compliance with replacement intervals defined below :

Calculation of shelf life (in hours) :

$$\text{Shelf life} = \frac{\text{Number of cycles}}{60 \times \text{Rotation speed (rpm)}}$$

H&G-Flo 1/2/3 S/HT		
Drive torque (N.m)		Shelf life (number of cycles)
Maxi	6,4	450 621 672
	5,7	640 231 508
	5,1	948 081 019
75%	4,8	1 175 640 477
	4,4	1 479 625 958
	3,8	2 473 477 175
50%	3,2	4 541 981 845
	2,5	
	1,9	
25%	1,6	

H&G-Flo 6/8 S/HT		
Drive torque (N.m)		Shelf life (number of cycles)
Maxi	28	288 398 929
	25	403 665 736
	22	585 523 532
75%	21	716 365 241
	20	887 035 365
	17	1 417 901 662
50%	14	2 423 453 713
	11	
	8	
25%	7	

H&G-Flo 11/15 S/HT		
Drive torque (N.m)		Shelf life (number of cycles)
Maxi	103	175 533 600
	93	246 734 400
	82	375 355 200
75%	77	462 950 400
	72	579 057 600
	62	953 224 800
50%	52	1 713 254 400
	41	
	31	
25%	26	

H&G-Flo 25 S/HT		
Drive torque (N.m)		Shelf life (number of cycles)
Maxi	171	113 200 741
	154	160 492 500
	137	237 006 000
75%	128	297 265 500
	120	368 613 000
	103	613 355 441
50%	86	1 119 029 323
	68	
	51	
25%	43	

H&G-Flo 40 S/HT		
Drive torque (N.m)		Shelf life (number of cycles)
Maxi	313	143 297 008
	287	191 328 027
	261	262 572 894
75%	235	372 527 817
	209	550 677 453
	183	857 461 474
50%	157	1 429 067 493
	130	
	104	
25%	78	

H&G-Flo 50 S/HT		
Drive torque (N.m)		Shelf life (number of cycles)
Maxi	395	147 552 000
	360	201 024 000
	330	268 656 000
75%	300	369 144 000
	265	558 168 000
	230	895 032 000
50%	200	1 426 128 000
	165	
	130	
25%	100	

12. MAINTENANCE (continued)

H&G-Flo 65 S/HP		
Drive torque (N.m)		Shelf life (number of cycles)
Maxi	600	117 600 000
	550	157 500 000
	500	216 300 000
75%	450	308 700 000
	400	457 800 000
	350	714 000 000
50%	300	1 197 000 000
	250	
	200	
	150	
25%	150	

12.1.3 Friction parts

Inspection intervals of friction parts are highly dependent on conditions of service, they should be defined according to the application.

Cylinder and piston

The user must check that the wears on cylinder and piston remain below the maximum allowable values defined in the Instructions supplied with the pump.

12.1.4 Alignment

After any maintenance on the pump, pump and gear motor alignment must be controlled.

12.2 Pumping unit

12.2.1 General

Maintenance of the equipment making up the pumping unit will be carried out in accordance with instructions provided by the manufacturer.

12.2.2 Maintenance of electrical equipment

Before performing any maintenance on electrical components (engine, control box, safety elements, control and protection of the pump, etc.) you should :

- Refer to the technical documentation accompanying the equipment,
- Respect the safety instructions and, especially, do not open when live.

During maintenance operations :

- Check the cable glands, tighten the glands, terminals and other connections,
- When closing electrical components, check the lubrication and cleanliness of the mating surface(s).

12.2.3 Alignment

After any maintenance on the pumping unit, pump and gear motor alignment must be controlled.

13. POSSIBLE LEAKS OF THE PUMPED PRODUCT

Possible leaks of product via the pump / pumping unit seals do not lead to additional risks of fire provided that the explosive atmosphere surrounding the equipment corresponds exactly to the type of atmosphere for which it was selected.

Make sure to check that when coming into contact with the atmosphere surrounding the pump or with material located near the pump / pumping unit, the pumped products do not risk to modify the classification of the area where the equipment is located.

H&G FLO series pumps must be stopped if product leaks via the pump drive breather.

14. PAINT

14.1 Pumping units

During any possible paint touch-up operation of the pumping unit's elements, the user must ensure compliance with the recommendations contained in the specific instructions from the equipment manufacturers.

15. DUST

To prevent any risk of dust igniting, the user must check that the layer of dust on the pump / pumping unit is no more than 5 mm thick.

16. PUMP DRIVE

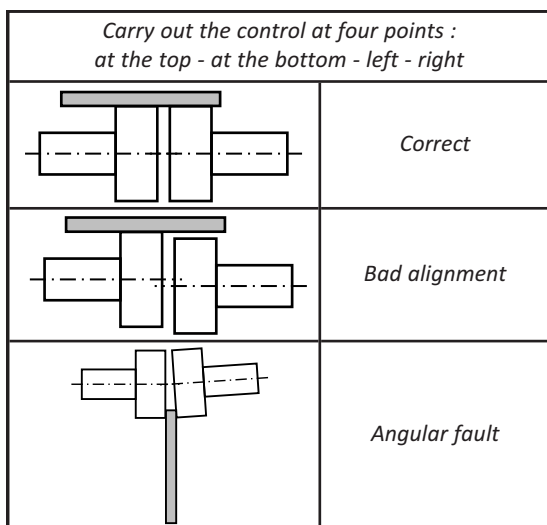
16.1 Alignment of the pump and drive

To carry out alignment of the pump and drive, use a perfectly straight steel rule to control misalignment and feeler gauges for angular misalignment.

It is important to control the alignment of each step of the installation in order to ensure that none of the steps lead to stresses on the unit or the pump :

- after fastening on the foundations,
- after fastening the piping,
- after the pump has operated at normal operating temperature.

An alignment control should be performed every 6 months. The following three figures show the various faults that could be encountered. The allowable misalignment values are stated in the Instructions supplied with the coupling.



REMINDER :

A flexible coupling does not avoid to do a good alignment.

16.2 Elastic coupling

ATEX certified elastic coupling must be used. This coupling must have a level of protection equivalent or better than that of the pumping unit. For mounting or maintenance instructions on the elastic coupling, follow the indications in the specific Instructions of the equipment manufacturer.

16.3 Electric installation of the pump motor or gear motor

Check that the indications on the pump rating plate and the supply voltage match.

Follow the indications in the specific Instructions of the equipment manufacturer to connect the motor to the mains supply.

Refer to the wiring diagram, use wiring adapted to the power and ensure that the contacts are tightened vigorously.

Motors must be protected by circuit breakers and fuses provided in the manufacturer's Instructions.

Connect the regulatory earthing connections.

Start the pump up empty to check that the connections are correct and check that the direction of rotation corresponds well with the direction of suction and discharge of the installation.

16.4 ATEX characteristics of the pump motor or gear motor

The motor or gear motor used must conform to current regulations and standards especially with regulation related to electric equipment in explosive atmosphere.

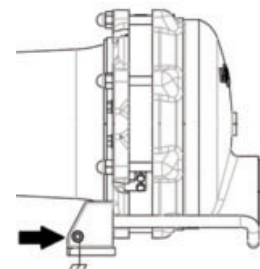
The level of protection selected has to be equal to or greater than that of the pumping unit. For instructions on maintenance of motor and gear motor, follow the indications in the specific Instructions of the equipment manufacturer.

17. EARTHING CONNECTION

To avoid the risk of ignition due to electrostatic discharge, pump and pumping unit must always be grounded.

On the pump, use drilling on inlet manifold bracket.

Particular attention should be given to earthing connection for the pumping units mobile or mounted on truck.



18. DIRECT SUNLIGHT EXPOSURE

A direct exposure of the pump / pumping unit to the radiance of the sun is likely to increase the temperature of their surface above ambient temperature.

As a result of fact, the User must take sure that the pump / pumping unit is not displayed in the direct radiance of the sun or the temperature of the external surfaces of the pump is compatible with its level of protection.

19. PUMP MARKING

The marking of the **H&G FLO S/HP** Series pumps is as follows :

MOUVEX F89 AUXERRE

Ppe H/G FLO 1/2/3/6/8/11/15/25/40/50/65 + Short description of the pump

 II 2 G

Ex h IIB (or IIC) T4 T2 Gb (or Gc) X

or

 II 2 D

Ex h IIIB (or IIIC) 130°C 240°C Db (or Dc) X

or

 II 2 GD

Ex h IIB (or IIC) T4 T2 Gb (or Gc) X

Ex h IIIB (or IIIC) 130°C 240°C Db (or Dc) X

Serial no.

Year of manufacture

——X

The marking of the **H&G FLO HT** Series pumps is as follows :

MOUVEX F89 AUXERRE

Ppe H/G FLO 1/2/3/6/8/11/15/25/40/50 + Short description of the pump

 II 2 G

Ex h IIB (or IIC) T4 T2 Gb (or Gc) X

or

 II 2 D

Ex h IIIB (or IIIC) 130°C 215°C Db (or Dc) X

or

 II 2 GD

Ex h IIB (or IIC) T4 T2 Gb (or Gc) X

Ex h IIIB (or IIIC) 130°C 215°C Db (or Dc) X

Serial no.

Year of manufacture

——X

The marking of the **H&G FLO S/HP** Series pumping units is as follows :

MOUVEX F89 AUXERRE

Gpe H/G FLO 1/2/3/6/8/11/15/25/40/50/65 + Short description of the unit

 II 2 G

Ex h IIB (or IIC) T4 T2 Gb (or Gc) X

or

 II 2 D

Ex h IIIB (or IIIC) 130°C 240°C Db (or Dc) X

or

 II 2 GD

Ex h IIB (or IIC) T4 T2 Gb (or Gc) X

Ex h IIIB (or IIIC) 130°C 240°C Db (or Dc) X

Serial no.


Year of manufacture

——X

The marking of the **H&G FLO HT** Series pumping units is as follows :

MOUVEX F89 AUXERRE

Gpe H/G FLO 1/2/3/6/8/11/15/25/40/50 + Short description of the unit

 II 2 G

Ex h IIB (or IIC) T4 T2 Gb (or Gc) X

or

 II 2 D

Ex h IIIB (or IIIC) 130°C 215°C Db (or Dc) X

or

 II 2 GD

Ex h IIB (or IIC) T4 T2 Gb (or Gc) X

Ex h IIIB (or IIIC) 130°C 215°C Db (or Dc) X

Serial no.

Year of manufacture

——X