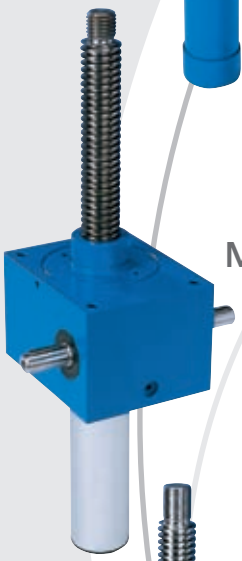
PFAFF silberblau antriebstechnik

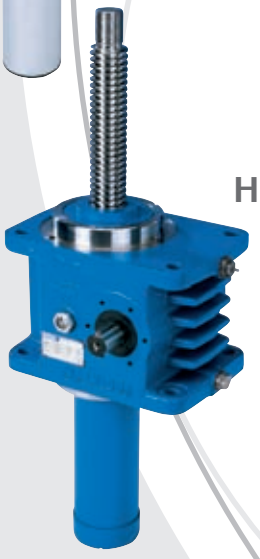
SHE



MERKUR

Worm gear screw jacks/ Linear drives

According to 94/9/EC (ATEX) for use in potential explosive areas



HSE

ELA

ALS/ALS-R

ALLTEC antriebstechnik

1 Responsibility

- Our client is responsible for informing us about all necessary details.
- Our client has to verify the applicability with the information given by us.
- The operator is responsible for:
  - Ensuring compliance with the performance limit of the drive/lifting unit.
  - Prevention of potentially explosive atmospheres.
  - Reduction of the risk of explosion or restriction of its duration.
  - Observing the instructions given in the operation manual provided by us.

  The Declaration of Conformity supplied in accordance with 94/9/EC extinguishes at non-compliance with the operating manual.
- In the offer/contract stage, Pfaff-silberblau prepares a checklist which subsequently becomes part of the contract documentation.

2 What kind of potentially explosive areas do we supply Pfaff-silberblau drive elements for?

2.1 Equipment group

Equipment group	Use	Remarks
I	Equipment intended for use in underground parts of mines	Not available
II	All other equipment	Available

2.2 Equipment category

Equipment group II

	Safety	Zone
Category 1 (= Zone 0/20)	Equipment ensuring a **very high level** of protection. (Ensures the requisite level of protection, even in the event of **rare incidents** relating to equipment!)	Equipment in this category is intended for use in areas in which explosive atmospheres caused by mixtures of air and gases, vapours or mists or air/dust mixtures are present **continuously, for long periods or frequently.**
Category 2 (= Zone 1/21)	Equipment ensuring a **high level** of protection. (Ensures the requisite level of protection, even in the event of **frequently occurring disturbances or equipment faults which normally have to be taken into account.**)	Equipment in this category is intended for use in areas in which explosive atmospheres caused by gases, vapours, mist or air/dust mixtures are **likely to occur**.
Category 3 (= Zone 2/22)	Equipment ensuring a **normal level** of protection. (Ensures the requisite level of protection during **normal operation**!)	Equipment in this category is intended for use in areas in which explosive atmospheres caused by gases, vapours, mists or air/dust mixtures **are unlikely to occur** or, if they do occur, are likely to do so **only infrequently and for a short period only**.

Category 2 includes Category 3.

2.3 Zoning

Zones in potential explosive atmospheres		
Zone		Likelihood of a flammable atmosphere
Gas	Dust	
0	20	Present for long periods or even continuously
1	21	**Present occasionally in normal operation**
2	22	**Unlikely to be present except for a short period of time**

2.4 Temperature classes and explosion groups

Temperature class	Max. surface temperature of the equipment [°C]	Ignition temperature of the combustible substances [°C]	Explosion group		
			II A	II B	II C
T1	450	> 450	Ammonia, acetone-benzole, ethane, ethyl acetate, carbon monoxide, methane, methanol, methyl benzene, propane	Coke oven gas, water gas (enriched)	Hydrogen
T2	300	> 300... < 450	n-butane, n-butanol, cyclohexanone, acetic anhydride, natural gas, liquid gas	Butadiene 1,3 ethanol, ethylene, ethylene oxide	Acetylene
T3	200	> 200... < 300	Petrol, diesel, heating oil, aircraft fuel, n-hexane	Crude oil, isoprene, hydrogen sulphide	
T4	135	> 135... < 200	Acetaldehyde ether	Ethyl ether	
T5	100	> 100... < 135			
T6	85	> 85... < 100			Carbon bisulphide

Pfaff-silberblau drive elements are designed on basis of a Δ housing temperature of 80 °C, that means the surface temperature goes up to 120 °C maximum at a room temperature of 40 °C. This results in a safety factor of 1.12 related to the maximum surface temperature of 135 °C.
The operator has to provide information on the ignition temperature of the air/dust mixture if there is Ex-atmosphere due to dust.

2.5 Type of protection

For non-electrical equipment for use in potentially explosive areas:

EN 13463-2	Protection by flow restricting enclosure "**fr**"
EN 13463-3	Protection by flameproof enclosure "**d**"
EN 13463-4	Protection by inherent safety "**g**"
EN 13463-5	Protection by constructional safety "**c**"
EN 13463-6	Protection by control of ignition source "**b**"
EN 13463-7	Protection by pressurization "**p**"
EN 13463-8	Protection by liquid immersion "**k**"

- Pfaff-silberblau drive elements are designed in accordance with **type of protection** "**c - Protection by constructional safety**".
- Drive elements produced for use in **Zones 1 and 2 (gas)** are designed in accordance with **type of protection** "**k - Protection by liquid immersion**" (drive elements with oil lubrication).
- **Type of protection** "**b - Protection by control of ignition source**" is possible by control of motor performance.

3 Which certification/test applies to which zone?

(Directive 94/9/EC Chapter II Article 8 and Annex VIII)

<table>
<tr><td>Category</td><td colspan="2">2</td><td colspan="2">3</td></tr>
<tr><td>Zone</td><td>1</td><td>21</td><td>2</td><td>22</td></tr>
<tr><td>Ex-atmosphere*</td><td>G</td><td>D</td><td>G</td><td>D</td></tr>
<tr><td>Motor</td><td>EC-type-examination
certificate by notified body</td><td>EC-type-examination
certificate by notified body</td><td colspan="2" rowspan="2">Manufacturer's internal control of production
Manufacturer's declaration of conformity.
(Directive 94/9/EC Annex VIII)</td></tr>
<tr><td>Drive</td><td colspan="2">Manufacturer's internal control of production (Directive 94/9/EC Annex VIII)
Manufacturer's declaration of conformity
Keeping of the ATEX documentation at a notified body</td></tr>
</table>

* G = Gas / D = Dust

4 Assessment of hazardous situations according to DIN EN 1127

The purpose of the hazard analysis is to establish which risks of ignition apply to Pfaff-silberblau drive elements and the safety precautions to be taken to provide the level of safety required.

Risk of ignition from:	Hot surface
	Mechanically generated sparks caused by friction, impact and degradation
	Electrostatic charging
	Chemical reaction
	Improper assembly/installation

5 Documentation for securing protection against explosion

- Checklist to find out all relevant data for explosion protection.
- Questionnaire for the specification of technical data.
- Designing of drive elements.
- Technical calculations for the specification of the thermal limits and the life time of the bearings.
- Production checklist for testing the components: Sealing faces, roughness of screw and nut, tooth bearing.
- Operation manual with 94/9/EC declaration of conformity.
- Type plate.

5.1 Marking

Ex-marking
Equipment group
Category
Ex-atmosphere
Type of protection
Temperature class
Max. surface temperature on which 5 mm of dust can settle

Pfaff-silberblau Hebezeugfabrik GmbH
Äußere Industriestraße 18, 86316 Friedberg/Derching, GERMANY
Phone +49/8 21/78 01-0, Fax +49/8 21/78 01-299
E-mail: antriebstechnik@pfaff-silberblau.de, Internet: www.pfaff-silberblau.de

5.2 CHECKLIST for explosion protection data

To enable Pfaff-silberblau to design lifting units/drive elements in accordance with EC directive 94/9/EC it is essential that this checklist is completed and all open questions regarding explosion protection are answered carefully.

Company: _____

Address: _____

Department: _____ Phone: _____

Fax: _____ E-mail: _____

Name: _____

Equipment group, equipment category and zoning (see item 2.1)

Equipment group	**Please mark with a cross**
Equipment group I	**Not available**
Equipment group II	**X**

Category / Zone	**Ex-atmosphere....**	
Category 1 (= Zone 0/20)	...is present continuously, for long periods or frequently	**Not available**
Category 2 (= Zone 1/21)	**...is present occasionally in normal operation**	
Category 3 (= Zone 2/22)	**...is unlikely to be present except for a short period of time**	

Temperature classes and explosion groups (see item 2.4)

Temp. class	**Max. surface temperature of the equipment [°C]**	**Ignition temperature of the combustible substances [°C]**	**Please mark with a cross**
T1	450	> 450	
T2	300	> 300... < 450	
T3	200	> 200... < 300	
T4	135	> 135... < 200	
T5	100	> 100... < 135	**Not available**
T6	85	> 85... < 100	**Not available**

	Please fill in
Ignition temperature of the dust/air mixture	
Max. surface temperature for dust [°C]	

Explosion group for gas (see item 2.4)

Gases are divided into explosion groups.
The danger of the gases increases from group II A to II C.
The explosion group is only specified for types of protection "d", "i", "nC" and "nL" in the marking.

	Please mark with a cross
II A	
II B	
II C	

Type of protection (see item 2.5)

- Pfaff-silberblau drive elements are designed in accordance with type of protection "c - Protection by constructional safety".
- Drive elements intended for use in **Zones 1 and 2 (gas)** are designed in accordance with **type of protection** "**k - Protection by liquid immersion**" (drive elements with oil lubrication).
- **Type of protection** "**b - Protection by control of ignition source**" is possible by control of the motor performance.

		Please mark with a cross
EN 13463-5	"c" type of protection - "Protection by constructional safety"	X
EN 13463-6	"b" type of protection - "Protection by control of ignition source"	
EN 13463-8	"k" type of protection - "Protection by liquid immersion"	

Ex-atmosphere (see item 3)

		Please mark with a cross
Gases/Vapours	G	
Dust	D	

	Please fill in
Ambient temperature (permitted within the range of – 20 °C to + 40 °C only)	
Ignitable medium (e. g. wood dust, methane)	

Date: _____

Signature: _____

Stamp:

PFAFF silberblau

PFAFF silberblau
hebezeuge & fördergeräte
Lifting & Material Handling Equipment

PFAFF silberblau
antriebstechnik
Actuator Technology

CERTIFIED IQNet MANAGEMENT SYSTEM
Quality Management LRQA ISO 9001:2000
Reg. No. 054 396 QM

Pfaff-silberblau
Hebezeugfabrik GmbH
Äußere Industriestraße 18
86316 Friedberg / GERMANY
Phone +49 / 8 21 / 78 01-0
Fax +49 / 8 21 / 78 01-299

PFAFF silberblau
verkehrstechnik
Rail Technology

CERTIFIED IQNet MANAGEMENT SYSTEM
Quality Management LRQA ISO 9001:2000
Reg. No. DE-062007 QM

ALLTEC
Antriebstechnik GmbH
Ochsenbrunnenstraße 10
74078 Heilbronn / GERMANY
Phone +49 / 71 31 / 28 71-0
Fax +49 / 71 31 / 28 71-11

ALLTEC
antriebstechnik
www.alltec.de

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