1.3 Checklist for explosion-proof gearmotors according to ATEX and IECEx

Step	Criterion	Condition	Decision	Con-tinue with step
1	Underlying standards	ATEX		2
		IECEx		2
2	Potentially explosive mixture of air and	Gas		3
		Dust		8
For gas				
3	Drive will be installed in	Zone 1		4
		Zone 2 (nA)		6
4	In the case of zone 1, the protection type of the motor is prescribed by the customer as	Flameproof enclosure (d)		5
		Increased safety (e)		6
5	In the case of motors with flameproof enclosure, design of the terminal box (TB)	TB with flameproof enclosure (d)		6
		TB with increased safety (e)		
6	Group specification	IIA		7
		IIB		
		IIC		
7	Temperature class (for gas/air mixtures)	T3		10
		T4		
		T5 (only with flameproof enclosure)		
		T6 (only with flameproof enclosure)		
For dust				
8	site of operation zone 21 Protection type tb	IIIA (flammable lint)		9
		IIIB (non-conducting dust)		
		IIIC (conducting dust)		
	site of operation zone 22 Protection type tc	IIIA (flammable lint)		9
		IIIB (non-conducting dust)		
		IIIC (conducting dust)		
9	Maximum permitted surface temperature (for dust/air mixtures)	T120 °C		10
		T140 °C		
		T150 °C (only for synchronous servo gearmotors)		

Inquiry form and checklist for explosion-proof gearmotors

Operating mode			
10	Line operation S1		
	Line operation S1, S4 50% – only category 2 / EPL b		
	Inverter operation VFC		
	Inverter operation CFC – only category 3 / EPL c		
	Max Frequency: ……Hz Speed Setting Range: ……		

1 Checklist for explosion-proof gearmotors according to ATEX and IECEx

Notes on the individual items:

Step 1

Standard reference ATEX: Directive 1999/92/EG with EN 60079 as well as other local plant- and country-specific regulations.

Standard reference IECEx: IEC 60079 as well as other local plant- and country-specific regulations.

Zone categorization according to the installation location of the drive. The operator is responsible for the zone categorization.

Assistance is available in

- IEC/EN 60079-10 for gas
- IEC/EN 60079-10-2 for dust (replaces IEC 61241-10) as well as expert offices, in Germany also (German Technical Control Board), German Institutions for Statutory Accident Insurance and Prevention.

Step 2

Categorization of the potentially explosive atmosphere into gas or dust.

Step 3

The standard reference must be checked, ATEX or IECEx as well as other local plantand country-specific regulations.

Zone categorization according to the installation location of the drive. The operator is responsible for the zone categorization.

- Zone 1: Potentially explosive gas mixtures are to be expected in normal operation.
- Zone 2: Potentially explosive gas mixtures are not to be expected in normal operation and if they occur at all, then only briefly.

Step 4

Protection types of the motor for use in zone 1.

- Flameproof enclosure (d)

  Potentially explosive mixtures can penetrate the equipment, the mixture inside the housing can be ignited → Design measures prevent ignition of the external atmosphere

- Increased safety (e)

  Potentially explosive mixtures can penetrate the equipment, no sources of combustion in or on the equipment → No ignition of the gas mixture.

Step 5

Design of the terminal box in the case of motors with flameproof enclosure with protection type

- Flameproof enclosure (d)

  When this terminal box version is selected, it is essential to take account of the permitted cable bushings (conduit system, cable glands, etc.). In addition, the thread type of the screw fitting (ISO or NPT) must be specified.

- Increased safety (e)

  When this terminal box version is selected, the cable entry design can be simpler. It is merely necessary to use an Ex-certified screw fitting.

Step 6

Group II is divided into 3 subgroups according to substance.

- All protection types

  Electrostatic requirements for plastic surfaces (including paint). As a consequence, the EX designation of protection types "e" and "nA" (previously II) is changed to IIA, IIB or IIC, depending on the plastic surfaces or paint used.

- Additionally for flameproof enclosure (d)

  Here, the subgroup determines the parameters of the ignition gap.

Also observe the country-specific literature:

- Germany: Nabert/Schön, "Kennzahlen brennbarer Gase und Dämpfe" ("Classifications of flammable gases and vapors"), Deutscher Eichverlag GmbH, D-38102 Braunschweig, Germany
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Step 7

Each of the temperature classes represents the assured maximum surface temperatures of the drive. For information about the temperature classes of the hazardous materials, refer to step 5:

- T3: Max. permitted surface temperature: 200 °C
- T4: Max. permitted surface temperature: 135 °C
- T5: Max. permitted surface temperature: 100 °C
- T6: Max. permitted surface temperature: 85 °C

Step 8

The standard reference must be checked, ATEX or IECEx as well as other local plantand country-specific regulations.

Zone categorization according to the installation location of the drive. The operator is responsible for the zone categorization.

- Zone 21: Potentially explosive dust/air mixtures are to be expected in normal operation.
- Zone 22: Potentially explosive dust/air mixtures are not to be expected in normal operation and if they occur at all, then only briefly.

Group III is divided into 3 subgroups according to substance.

Group	Suitable for atmospheres with	tb Zone 21	tc Zone 22
		Minimum degree of protection IP	
IIIA	Inflammable fluffing	5x	5x
IIIB	Non-conducting dust	6x (65)	5x (54)
IIIC	Conducting dust	6x (65)	6x (65)

Values in brackets: SEW standard

Step 9

The maximum surface temperature of a drive in dust/air mixtures. The value is specified in °C. The maximum surface temperature of synchronous servo gearmotors is 150 °C.

Also observe further country-specific information:

- Germany: BIA-Report "Brenn- und Explosionskenngrößen von Stäuben" (Report no. 3051 of BG Institute for Occupational Safety, "Combustion and explosion characteristics of dusts"), Hauptverband der gewerbl. Berufsgenossenschaften, D-53757 St. Augustin, Germany
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Step 10

The operating modes differ as follows:

1. Line operation
   - S1 mode: Continuous duty, unlimited operation with constant load permitted
   - S1, S4-50% mode (only ATEX in category 2): Continuous duty, unlimited operation with constant load permitted; in intermittent duty, the start-up affects the temperature
2. Inverter operation
   - VFC mode
   - CFC mode – only with encoder for zone 2 and 22 in category 3