Drive^{IT} Low Voltage Motors for Dust Ignition Protection

For safe operation in hazardous areas

Industrial^{IT} enabled™

ABB

Dust ignition protection in hazardous areas

Why do you need to pay attention to combustible dust now? This brochure tells you why: the new ATEX directives. It also helps you to select the right motor for "dusty" applications.

What is combustible dust?

Combustible dust is hazardous as it may form potentially explosive atmospheres when dispersed in the air. Furthermore, layers of combustible dust may ignite and act as an ignition source for an explosive atmosphere. Explosive atmosphere is referred to as "Hazardous area" in European countries and "HAZLOC" in North America.

Motors run many applications in hazardous areas

Motors are the REAL workhorses of industry running all kinds of applications, in all weathers and environmental conditions. Two aspects need to be taken into account when selecting motors for demanding conditions: standards regulating the use of electrical equipment, and the design of the motor suitable for those environments. Let's look first at motor design.

Dust ignition proof (DIP) motors are designed for use in environments where the motor is surrounded by combustible dust, or where dust settles under its own weight on the motor. Hazardous areas with dust can be found in a variety of industries, such as grain and flour handling, animal feed, paper, wood, chemicals, plastics and coal. In such applications motors run conveyors in coal transport, run the rolling tables on saw mills and chipboard production, run dough mixers in bakeries, and fans in cereal drying processes.

ABB has the right motor for your hazardous area with combustible dust. ABB also complies with the requirements in the new ATEX directives.

Standards for safe operation

When motors are used in explosive atmospheres they have to be designed, installed, operated and maintained according to international standards and local regulations. Safety is the key word.

As of July 1, 2003 a new product directive, ATEX 95, became valid. This directive defines the requirements for products, including detailed requirements for product tests, audits, documentation, instructions, maintenance and repair.

In its implementation of the ATEX 95 directive, ABB applies the recently updated EN standards. The standard for dust ignition proof protection is EN 50281-1-1.

Efficiency and reliability built on experience

ABB has a long history of delivering low and high voltage motors for manufacturing, process and consumer industries, utilities, the oil and gas sector and infrastructure markets worldwide.

We provide energy efficient, reliable motors with excellent options and service support. The output range of our low voltage motors is 0.25 to 710 kW with frame sizes IEC 71 to 400, aluminum and cast iron frames. The output range of high voltage motors is 100 to 7,700 kW with frame sizes IEC 315 to 630, induction and modular motors. Degrees of protection IP 55 and IP 65. They all conform to international standards and local regulations.

Within easy reach

ABB's global network ensures that customers anywhere in the world always have easy access to engineering and service support. At the same time our local presence enables us to provide lifetime customer support based on the specific knowledge of local conditions and application requirements.

Selection and installation of electrical equipment

To ensure equipment, such as electric motors, can be safely used in hazardous areas with dust, the following should be considered before selecting a product:

1. Type of dust:

- Will a cloud of dust be present around the product, or
- will a layer of dust build up on the product and if so, what will be the maximum thickness of the layer between cleaning/maintenance periods?

2. Characteristics of the dust:

- Is the dust electrically conductive or non-conductive?

3. Ignition temperature of the dust:

- T_{Cl}: Ignition temperature of dust in a "cloud" or
- T_{5mm}: Ignition temperature of a 5 mm dust layer

Selection and installation of product: EN 50 281-1-2

Equipment category	Category 1 (Zone 20)	Category 2 (Zone 21 and conductive dust)	Category 3 (Zone 22 and non-conductive dust)
Minimum protection for equipment	motors not allowed	IP 6X	IP 5X

More detailed information about zones and categories can be found at our website www.abb.com/motors&drives.

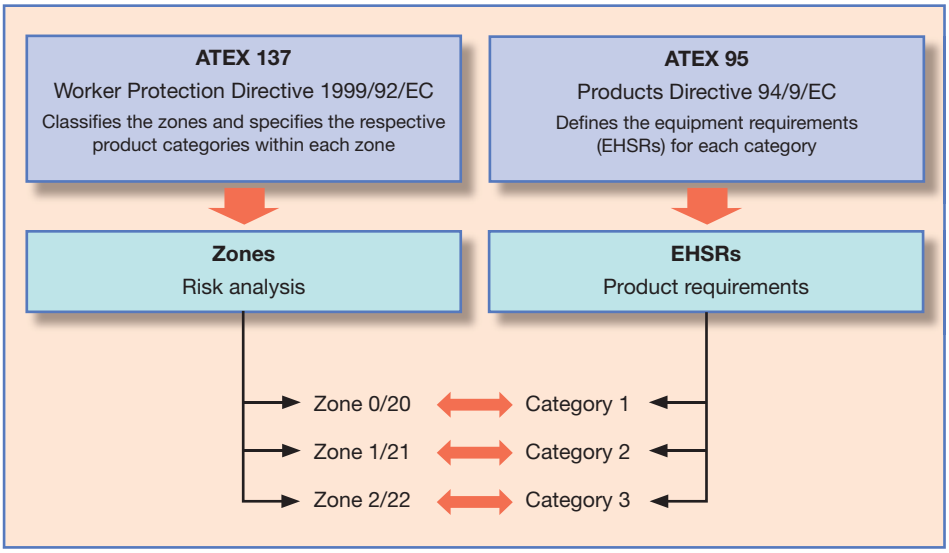
Marking temperature

Type of dust	Ignition temperature	Maximum surface temperature of motor	Marking temperature of equipment T°C
Cloud Layer up to 5 mm	T_{Cl} T_{5mm}	2/3 x T_{Cl} T_{5mm} - 75 K	T°C ≤ 2/3 x T_{Cl} T°C ≤ (T_{5mm} - 75 K)
T_{5mm} is the ignition temperature of 5 mm layer of dust Note: For dust layer above 5 mm; please consult ABB.			

ATEX Certified

Safety with certified motors

The responsibilities of the manufacturer and the user are specified in the new ATEX Directives.

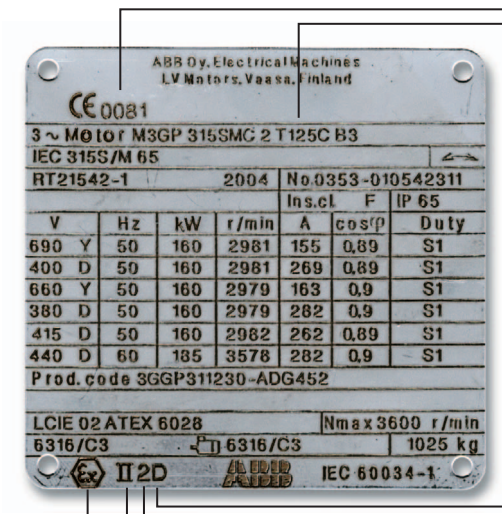


Combustible dust examples

Dust	Wheat	Barley	Corn	Turnip rape	Sunflower	Sugar	Lignite	Sulphur
T_{Cl} (cloud)	420°C	450°C	400°C	480°C	490°C	350°C	450°C	190°C
T_{5mm} (5mm)	200°C	205°C	250°C	230°C	220°C	220°C	200°C	220°C

These are general values and should not be adapted to any application as such.

Marking of equipment



CE 0081 The CE mark is the manufacturer's commitment to fulfilling the relevant Directive. The number indicates the Notified Body responsible for certification. 0081 is the number for LCIE.

T125° maximum surface temperature

D Indicates that the marking relates to dust. A product certified for both gas and dust is marked G-D.

3 Equipment category: 2 for Zone 21 or Zone 22 with conductive dust, 3 for Zone 22 without conductive dust.

II Motor grouping, II for surface industries.

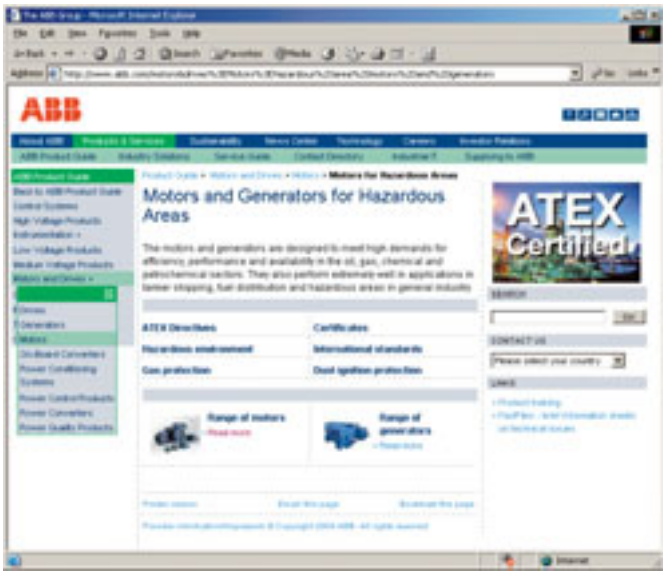
Ex The Ex mark is the European Commission mark for products approved for hazardous areas.

Motor range

Output range	Low voltage				High voltage	
	Category 2 D - IP 65		Category 3 D - IP 55		Category 2 D - IP65 Cast iron	Category 3 D - IP55 Modular
kW	Aluminum	Cast iron	Aluminum	Cast iron		
0.25	●		●	●		
0.37	●		●	●		
0.55	●	●	●	●		
0.75	●	●	●	●		
1.1	●	●	●	●		
1.5	●	●	●	●		
2.2	●	●	●	●		
3	●	●	●	●		
4	●	●	●	●		
5.5	●	●	●	●		
7.5	●	●	●	●		
11	●	●	●	●		
15	●	●	●	●		
18.5	●	●	●	●		
22	●	●	●	●		
37	●	●	●	●		
45	●	●	●	●		
55	●	●	●	●		
75	●	●	●	●		
90		●	●	●		
110		●		●	●	
132		●		●	●	
160		●		●	●	●
200		●		●	●	●
250		●		●	●	●
315		●		●	●	●
355		●		●	●	●
400		●		●	●	●
450		●		●	●	●
500		●		●	●	●
560		●		●	●	●
630		●		●	●	●
710		●		●	●	●
Up to 2250					●	●
Up to 7700						●

Further technical data can be found in the product catalogue “DrivelT Low and High Voltage Motors for Hazardous Areas”, available from ABB offices. A pdf-file of the catalogue is also available on the CD-rom attached to this brochure as well as at www.abb.com/motors&drives.

Visit our web site at www.abb.com/motors&drives!



Our web site provides you with further information concerning ATEX directives, hazardous environments and ABB products suitable for these demanding environments.

Need further info? Use this CD to download a technical catalogue. By using our easy-to-use Motor Data Search tool you can also quickly select the right DIP motor with relevant documentation: CAD-outline drawings, dimension drawings, manual and test reports.

Industrial^{IT}

As a key element of its business strategy, ABB has committed to a broad program of product development and positioning under the Industrial^{IT} umbrella. This initiative is geared towards increasing standardization of ABB products as the ‘building blocks’ of larger solutions, while incorporating functionality that will allow multiple products to interact seamlessly as components of real-time automation and information systems.

Motors and generators represent one of the fundamental building blocks in the Industrial^{IT} architecture.

ABB (www.abb.com) is a leader in power and automation technologies that enable utility and industry customers to improve performance while lowering environmental impacts. The ABB Group of companies operates in around 100 countries and employs around 113,000 people.

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