MOTORS FOR HAZARDOUS AREAS

TYPES OF MOTORS

The following are the main groups of motors used in hazardous locations, but not all situations are covered. Should you have an application not covered by the following, please refer to one of our sales offices.

- Ex d flameproof motors
- Ex e increased safety motors
- Ex nA non-sparking motors
- Ex tD dust ignition protection motors

COMPLIANCE TO STANDARDS

All motors suitable for use in hazardous areas are manufactured/modified in strict accordance with the conditions required by the relevant standards and the issued Certificate of Compliance, and are fully tested prior to despatch by the manufacturer.

SELECTION OF MOTORS FOR USE IN HAZARDOUS AREAS

There are a number of defined hazardous areas covering gases and dusts. It is therefore strongly recommended that the relevant Australian Standards and Statutory Authorities be consulted prior to final selection of the motor.

HAZARDOUS AREAS

Many gases, vapours and dusts or fibres which are generated, processed, handled and stored in industry are combustible. When ignited they may burn rapidly and with considerable explosive force if mixed with air in the appropriate proportions.

Areas where gases, vapours, dusts and fibres occur in dangerous quantities are classified as HAZARDOUS.

The relevant groupings are :-

- a) Group I: electrical equipment for mines susceptible to firedamp
- b) Group II: electrical equipment for places with an explosive gas atmosphere, other than mines susceptible to firedamp
- c) Group III: electrical equipment for places with an explosive dust atmosphere

With Group II gases, they are further subdivided into sub-groups IIA, IIB, IIC, depending upon the ignition point of the gas.

ZONAL CLASSIFICATION is also required where explosive atmospheres are present and they indicate the probability of the presence of a flammable, combustible or explosive material, the extent, dimension and shape of the hazardous areas, together with the volume in which the hazardous material can be expected. There are three zones for each:-

Gases and Vapours

- ZONE 0 - place in which an explosive atmosphere consisting of a mixture with air of flammable substances in the form of gas, vapour or mist is present continuously or for long periods or frequently.
- ZONE 1 - place in which an explosive atmosphere consisting of a mixture with air of flammable substances in the form of gas, vapour or mist is likely to occur in normal operation occasionally.
- ZONE 2 - place in which an explosive atmosphere consisting of a mixture with air of flammable substances in the form of gas, vapour or mist is not likely to occur in normal operation but, if it does occur, will persist for a short period only.

Dusts

- ZONE 20 - area in which an explosive atmosphere in the form of a cloud of combustible dust in air is present continuously, or for long periods or frequently.
- ZONE 21 - area in which an explosive atmosphere in the form of a cloud of combustible dust in air is likely to occur, occasionally, in normal operation.
- ZONE 22 - area in which an explosive atmosphere in the form of a cloud of combustible dust in air is not likely to occur in normal operation but, if it does occur, will persist for a short period only.

MOTORS FOR HAZARDOUS AREAS (Cont.)

TEMPERATURE CLASSIFICATION

Hot surfaces can cause auto ignition of gases, vapours and dust, therefore it is necessary to ensure that the maximum surface temperature of equipment introduced into a hazardous area does not exceed the auto ignition temperature for the gas, vapour or dust in the hazardous area.

Group I - Maximum Surface Temperature 150°C

Group II - are given a Temperature Class (T) based on the maximum surface temperature of the equipment.

Temperature Classes are:-

T1 - 450°C	T4 - 135°C
T2 - 300°C	T5 - 100°C
T3 - 200°C	T6 - 85°C

ExtD motors will have a maximum permisseble surface temperature rating, but do not follow the above temperature classes.

Note: For Ex d flameproof apparatus the external surface is the measured surface. For other types of protection (e.g. Ex e) internal surfaces are of equal importance if the explosive atmosphere has access to them.

FLAMEPROOF MOTORS Ex d, FOR INDUSTRIAL USE

Three-phase motors
These motors are certified to Ex d and can fit a wide range of products as shown throughout the catalogue. The certificate covers gas groups IIA and IIB, temperature classification T4 and enclosure protection IP66.
The Standards complied with are IEC 60079-0:2004 and IEC 60079-1: 2007-04.

Single-phase motors
Fans with single-phase Ex d motors are featured on pages *A-26/27 & B-32/33*.
The certificate covers gas groups IIA, IIB and IIC, temperature classification T6 and enclosure protection IP66.
The Standards complied with are IEC 60079-0:2004 and IEC 60079-1: 2007-04.

EXPLOSION PROOF MOTORS Ex e, INCREASED SAFETY

Standard three-phase motors
These motors are certified to Ex e and can fit a wide range of products as shown throughout the catalogue. The certificate covers gas groups IIA, IIB and IIC, temperature classification T3 and enclosure protection IP55.
The Standards complied with are IEC 60079-0:2004 and IEC 60079-7:2006-07.
This Standard means the motors are also suitable for Ex n applications.

ELECTRICAL AND MECHANICAL SPECIFICATION

Voltage:	Up to 500 Volts
Insulation:	Class 'F'
Enclosure:	Totally enclosed, fan-cooled
Degree of Protection:	Up to IP66
Frequency:	50 or 60 Hz

LIMITING TEMPERATURE

The temperature of an external or internal surface to which the surrounding atmosphere has access, shall not exceed the LIMITING TEMPERATURE specified.

RANGE

It is possible variations will arise in the kW/frame size/rpm, from one manufacturer to another from that normally referred to in normal motor standards.

FANS FOR Ex d AND Ex e APPLICATIONS

Fans for Ex d and Ex e applications, or indeed any hazardous application, can be constructed of special materials and incorporate special features.

Anti-static impellers and earthing leads are just some of the features we can provide.

ELECTRONICALLY COMMUTATED (EC) DC MOTORS

INTRODUCTION

The Electronically Commutated DC motors featured in this catalogue are external-rotor DC motors which are suitable for AC mains supply. These motors have no wear and tear elements such as collectors or carbon brushes which used to be an undesirable component of DC motors and would require regular maintenance. The EC units consist of a brushless DC external-rotor motor with an EC controller that commutates the current in the motor windings electronically. The EC controller monitors the motor and provides interfaces for easy control of the drive. EC motors provide a high level of motor efficiency and carry on-board features that offers almost limitless flexibility in terms of automatic and manual fan speed control.

TEMPERATURE RANGE

These motors are generally suitable for operating in ambients from -25°C to +60°C.

ENCLOSURE STANDARD

The motor enclosure standard is IP54 in accordance with the appropriate Standards.

ELECTRICAL DETAILS

Motors are suitable for 240V or 415V, 50 or 60Hz supply. These motors should not be speed controlled by VSD or VA controller.
Insulation; Motor insulation is Class F with a 60°C winding temperature rise.

BEARINGS

Motors are fitted with sealed-for-life maintenance free bearings.

PARAMETER SETTINGS

Parameters of the EC fans are programmed in our factory for best possible operation to suit the specific application requirements. It is necessary for the mechanical designer or contractor to provide details as to the application and system control requirements at the time of order.

PROTECTION

The EC motors feature their own integral current overload and over-temperature protection. No other electrical protection is required with these units.