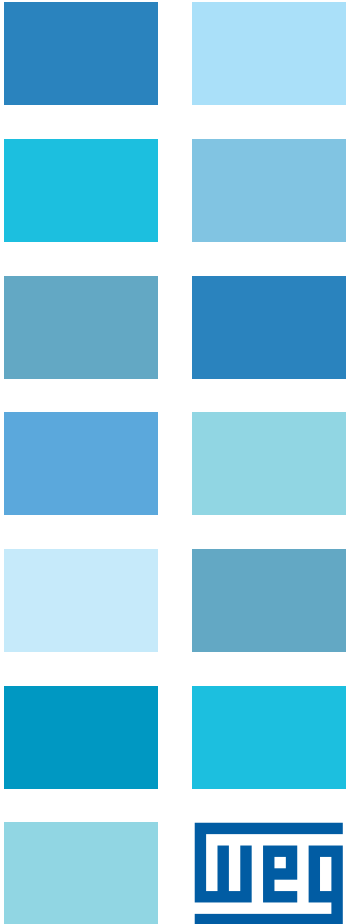
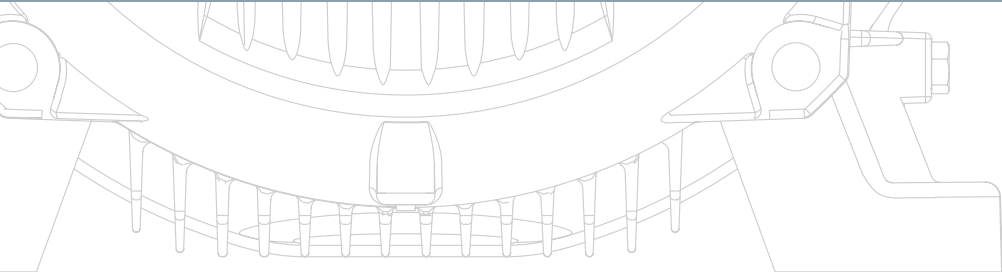
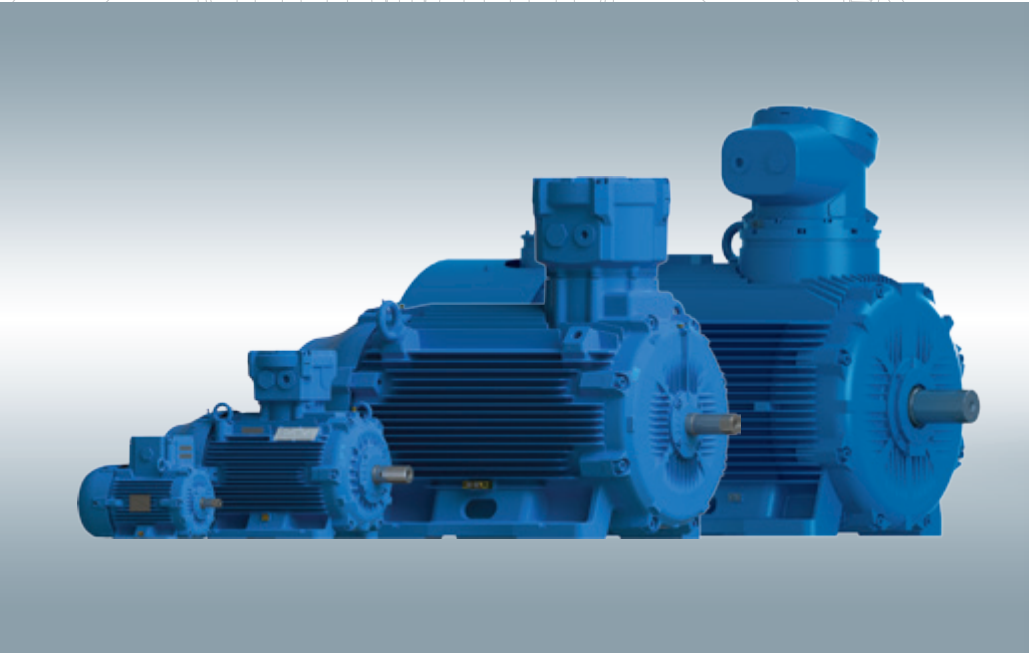
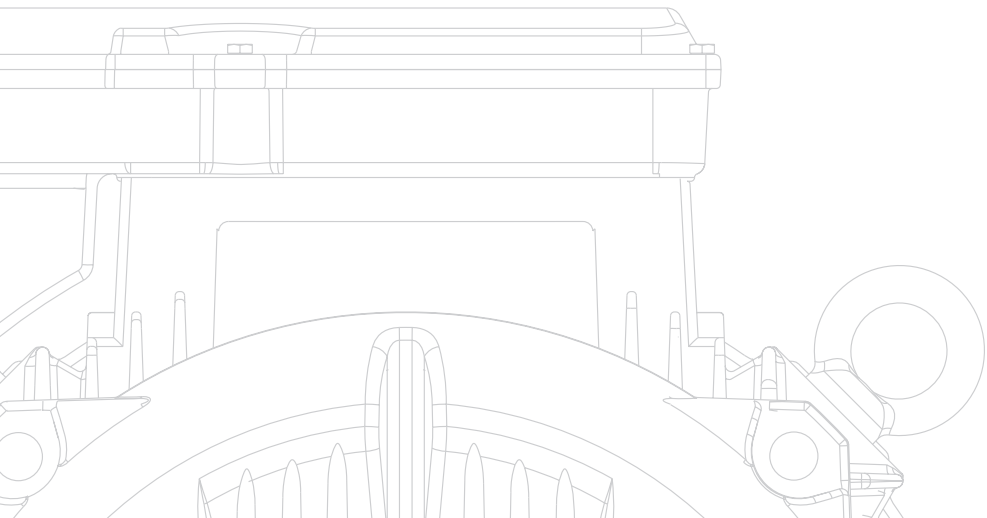


# W22Xd

High Efficiency Low Voltage  
Flameproof Motors

Commercial Catalogue  
European Market



## W22Xd

### The New Generation of Flameproof Motors

The W22Xd line represents all that is most modern in rotating equipment for explosive atmospheres.

As a result of intense research and development, WEG launches its new flameproof motor line, the W22Xd. Incorporating the same innovative concepts of the W22 general purpose motors, the W22Xd line is an evolution in the market of classified area products offering high efficiency levels, energy saving, low operational costs, extended lifetime, low maintenance and assured safety!

Learn more about the W22Xd line including the benefits and advantages for your plant.

## Hazardous Areas

According to the IEC 60079-10-1 and IEC 60079-10-2 standards, the definition of an Explosive Atmosphere is a "mixture with air, under atmospheric conditions, of flammable substances in the form of gas, vapors, dust, fibers, or flyings which, after ignition, permits self-sustaining propagation".

A Hazardous Area is "an area in which an explosive atmosphere is or may be expected to be present, in quantities such as to require special precautions for the construction, installation and use of equipment".

Explosions may occur either due to the transfer of flames or through overheating. For this reason, motors with flameproof protection are constructed in such a way as to prevent propagation of an internal explosion in to the hazardous area in which they are installed.

Hazardous areas are classified through Zones, Groups and Temperature Classes.

The classifications according to the International Electrotechnical Commission (IEC) are shown below:

**Classification per Zones:** based upon the frequency of the occurrence and duration of an explosive atmosphere and based on the type of flammable material (gases/vapors or dusts/fibres):

- **IEC Zone 0 (gases/vapours) or 20 (dusts/fibres)**  
An explosive atmosphere is continuously present (>1000 Hrs/Year)
- **IEC Zone 1 (gases/vapours) or 21 (dusts/fibres)**  
An explosive atmosphere is intermittently present (10 to 1000 Hrs/Year)
- **IEC Zone 2 (gases/vapours) or 22 (dusts/fibres)**  
An explosive atmosphere is abnormally present (<10 Hrs/Year)

**Zone 2/22:** area in which an explosive atmosphere is not likely to occur in normal operation but, if it does occur, will persist for a short period only

**Zone 1/21:** area in which an explosive atmosphere is likely to occur in normal operation occasionally

**Zone 0/20:** area in which an explosive atmosphere is present continuously or for long periods or frequently

(not applicable for motors and generators)

**Classification per Groups:** subdivision according to the type of flammable material present.

- IEC Group I:** gases present in underground coal mines (example: methane)
- IEC Group II:** gases present in other explosive atmospheres.
- Group II subdivisions:
- **IEC Group IIA:** example: Propane
  - **IEC Group IIB:** example: Ethylene
  - **IEC Group IIC:** example: Hydrogen
- IEC Group III:** dusts or fibres

- Group III subdivisions:
- **IEC Group IIIA:** solid particles, larger than 500 µm suspended - combustible fibres
  - **IEC Group IIIB:** non-conductive dust, equal or smaller than 500 µm, with electrical resistivity less than or equal to  $10^3 \Omega.m$  - grime
  - **IEC Group IIIC:** conductive dust, equal or smaller than 500 µm, with electrical resistivity less than or equal to  $10^3 \Omega.m$  - metallic dust

**Classification per Temperature Classes:** according to the temperature limitation, related to the ignition temperature of the flammable material present, IEC 60079-0 defines the limits for electrical equipment surface temperature for Groups I, II and III.

#### Group I - Underground Coal Mines (Methane and Coal Dust)

Conditions	Maximum surface temperature (°C)*
Where coal dust is not likely to form a layer	450
Where coal dust can form a layer	150

\*On any surface of the enclosure.

#### Group II - Gases & Vapours

Temperature class IEC	Maximum surface temperature (°C)
T1	450
T2	300
T3	200
T4	135
T5	100
T6	85

#### Group III - Conductive Dusts

Conditions	Maximum surface temperature (°C)*
With dust layers	Maximum surface temperature of the apparatus must be determined for a given depth of dust layer
Without dust layers	Maximum surface temperature of the apparatus shall not exceed the assigned value. For W22Xd motors the standard assigned temperature is T125 °C.

\*On any surface of the enclosure.

#### Equipment Protection Levels - EPL

In addition to the traditional hazardous area classification of the IEC 60079-10, which considers the possibility of an explosion occurring, IEC 60079-0, has introduced a new risk assessment approach known as the "Equipment Protection Level" that considers, besides the hazardous location itself, the consequences of a possible explosion. The primary intent of the EPL is to allow flexibility in the use of equipment in the various zones. For example it may be appropriate to use Gc equipment in a Zone 1 area where the amount of flammable gas / vapour is small and the location is unmanned virtually all of the time. Conversely Gb equipment may be selected in Zone 2 to allow this equipment to be used in the event of a persistent emergency condition. IEC 60079-14 explains in detail how to use EPL's in a risk assessment.

The EPL designations are defined as follows:

#### First Indices

**M** - Mines

**G** - Gas

**D** - Dust

#### Second Indices

**a** - Equipment having a very high level of protection

**b** - Equipment having a high level of protection

**c** - Equipment having an enhanced high level of protection

Relationship between Groups, Zones and EPL's are detailed in the table below:

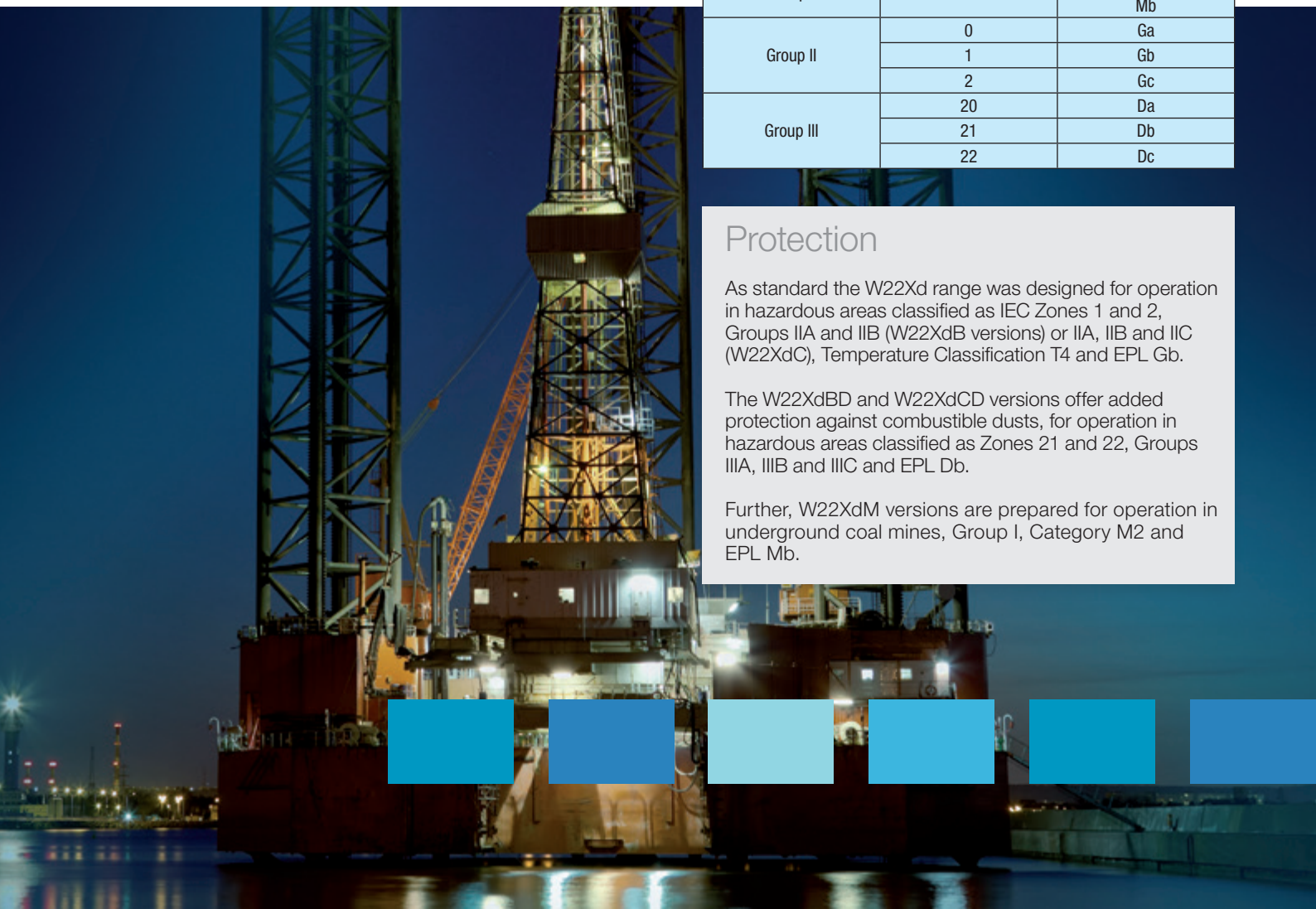
Group	Zone	EPL
Group I	-	Ma
		Mb
Group II	0	Ga
	1	Gb
	2	Gc
Group III	20	Da
	21	Db
	22	Dc

## Protection

As standard the W22Xd range was designed for operation in hazardous areas classified as IEC Zones 1 and 2, Groups IIA and IIB (W22XdB versions) or IIA, IIB and IIC (W22XdC), Temperature Classification T4 and EPL Gb.

The W22XdBD and W22XdCD versions offer added protection against combustible dusts, for operation in hazardous areas classified as Zones 21 and 22, Groups IIIA, IIIB and IIIC and EPL Db.

Further, W22XdM versions are prepared for operation in underground coal mines, Group I, Category M2 and EPL Mb.





## Features and Benefits

### New Concept

The mechanical design of the W22Xd line is based on the highly successful W22 general purpose motor range, with the incorporation of some innovative new features, including: modern frame design with new fins and feet to ensure higher mechanical stiffness and excellent heat dissipation; redesigned endshields to reduce bearing operating temperatures thus increasing the re-lubrication intervals; and an advanced cooling system to reduce noise levels and significantly improve heat dissipation.

### Energy Efficiency

Besides relying on the safe operation of the product, users of W22Xd motors can also reduce their energy consumption and CO<sub>2</sub> emissions due the technology employed and the levels of performance achieved.

The W22Xd motor line was designed to meet the efficiency levels defined in IEC 60034-30-1. As standard the motors meet the IE2 High Efficiency level, with IE3 Premium and IE4 Super Premium Efficiency available as an option.

The ratios between rated power, speed and frame size of the new W22Xd line follow the applicable parts of the IEC Standards 60034 and 60072. This ensures interchangeability with the existing WEG W21 flameproof line and, where replacing lower efficiency motors, offers users the means to achieve a rapid return on their investment.

### Careful Construction

In designing the W22Xd line, special consideration was given to the needs of Industry to reduce their operating costs. Aside from the energy saving aspects afforded by these machines, a variety of carefully chosen features were incorporated as standard to ensure maximum performance and durability:

- IP56 degree of protection: an enhanced protection against the ingress of liquid contaminant agents into the motor enclosure.
- Space heaters: prevent accumulation of condensation inside the motor and maintain the winding insulation resistance within acceptable levels, thus prolonging the life of the motor.
- Eyebolts: ensuring safety to operators, offering easy handling, shipment and storage, and allowing the motors to meet specific local standards and directives regarding product lifting.
- Thermal protection: winding thermistors fitted as standard to protect the motor winding in case of overload.
- Paint finish: high performance polyurethane coating (respecting the C3 Medium criteria of the ISO 12944 standard) protects the motor surface even in the harshest of environments.





### Versatility

The W22Xd line incorporates a comprehensive range options and accessories, enabling them to fulfil a variety of customer specifications without losing the primary focus on the safety of the application.

Among the most widely used accessories are winding or bearing thermal protections, additional terminal boxes for accessories, higher degrees of protection (up to IP66), sintered drain plugs for removal of condensed water, stainless steel shafts / hardware and enhanced painting systems.

W22Xd motors can be supplied for mounting with feet, flanges or both, in horizontal or vertical orientations.

Specifically for axial fan applications, they can be supplied without cooling fans and fan covers, and with loose leads in lieu of a terminal box.



### Easy Installation and Simplified Maintenance

The W22Xd concept also focuses on the provision of easier and safer installation and maintenance procedures. Integrally cast feet provide higher mechanical stiffness particularly suited to heavy duty applications, and for frames 90 and above feature double drilled holes in order to simplify the replacement and retrofitting of existing motors. Extended lubrication intervals for W22Xd motors are achieved due to the reduced bearing temperatures; a benefit obtained with the revolutionary motor cooling system, realized in this case by the endshield designs. To further extend bearing lifetime, motors in frame sizes 160 and above are supplied with grease fittings to permit re-lubrication. For all frame sizes, flat areas for placement of accelerometers are provided in both the vertical and horizontal planes, thus permitting easier monitoring of vibration levels. Additionally for motor frame sizes 160 and above, SPM nipples/adaptors are provided as standard.



### Variable Frequency Drives Operation

The use of VFD's is recognized as one of the major driving forces behind energy saving due to their ability to adjust the motor's output to best suit load requirements.

For this reason, W22Xd motors are equipped with the WISE® insulation (WEG Insulation System Evolution) which permits them to operate with variable frequency drives (VFD's) at voltages up to 690V.

To further enhance their use with VFD's, Insulated Bearings and Shaft Grounding Rings are available.

Additionally, for operation at low frequencies the W22Xd line can be produced in TEBC versions (with forced ventilation) or fitted with an Encoder<sup>1</sup> for applications which require precise positioning operations.

Due to their outstanding performance, W22Xd motors are capable of maintaining the T4 temperature class even when driven by a VFD <sup>2</sup>.

1) Encoder must be compatible with the hazardous location.

2) For VFD operation, output power derating must be considered.



## Product Features

### Standard Version

- **W22XdB** - Flameproof motors (Ex d) - suitable for Zones 1 and 2, Gas groups IIA and IIB
- Temperature class: T4
- Certifying body: BASEEFA or INERIS (ATEX - IECEX)
- Efficiency level: High Efficiency - IE2 according standard IEC 60034-30-1
- Directives / Standards: ATEX - IECEX
- Cooling method: TEFC (Totally Enclosed Fan Cooled) – IC411
- Degree of protection: IP56
- Rated outputs: 0.12 to 1400 kW
- Frame sizes: 71 to 500K/H
- Number of poles: 2, 4, 6 and 8
- Rated voltage: up to 690 V
- Insulation class: “F” (ΔT 80K)
- Mounting: IM B3T Foot
- Suitable for variable frequency drive operation \*
- Winding thermal protection: PTC Thermistors 150 °C
- Ambient temperature: -20 °C to +40 °C
- Space heaters 220-240 V
- Enclosure material: frame, endshields, terminal box and fan cover in FC-200 (EN GJL 200) cast iron
- Terminal box: mains cable entry closed with threaded plastic plug for transport and storage (for motors with two cable entries, one plug is certified)
- Terminal box: accessories cable entries closed with 2xM20 certified plugs
- 6-pin BMC terminal block
- Fan material: aluminium or cast iron
- Shaft sealing: oilseal, lip seal, viton seal or W3 (R) seal
- Joint sealing: Lumomoly or Polyrex EM
- Ball bearings
- Relubrication nipples from frame size 160
- Provided with SPM nipples / adaptors for frames 160 and above
- Shaft material: AISI 1040/45 for frames 71 to 315S/M and AISI 4140 for frames 315L and 500K/H
- AISI 304 stainless steel laser engraved nameplate
- Painting plan: 205P - meeting “C3 Medium” (corrosive category) and High durability criteria of the ISO 12944 Standards.

*\*For the application of hazardous atmosphere motors with frequency inverters please contact the nearest WEG office.*

### Optional Versions / Features on Request:

- **W22XdBE** - Flameproof motors with increased safety terminal box (Ex de) - suitable for Zones 1 & 2, Gas groups IIA and IIB
- **W22XdBD** - Flameproof / Dust Ignition Proof motors (Ex d / Ex tb) - suitable for Zones 1 & 2 / 21 & 22, Gas / Dust groups IIA, IIB / IIIA, IIIB, IIIC
- **W22XdBED** - Flameproof / Dust Ignition Proof motors with increased safety terminal box (Ex de / Ex tb) - suitable for Zones 1 & 2 / 21 & 22, Gas / Dust groups IIA, IIB / IIIA, IIIB, IIIC
- **W22XdC** - Flameproof motors (Ex d) - suitable for Zones 1 & 2, Gas groups IIA, IIB, IIC
- **W22XdCE** - Flameproof motors with increased safety terminal box (Ex de) - suitable for Zones 1 & 2, Gas groups IIA, IIB, IIC
- **W22XdCD** - Flameproof / Dust Ignition Proof motors (Ex d / Ex tb) - suitable for Zones 1 & 2 / 21 & 22, Gas / Dust groups IIA, IIB, IIC / IIIA, IIIB, IIIC
- **W22XdCED** - Flameproof / Dust Ignition Proof motors with increased safety terminal box (Ex de / Ex tb) - suitable for Zones 1 & 2 / 21 & 22, Groups IIA, IIB, IIC / IIIA, IIIB, IIIC
- **W22XdM** - Flameproof motors (Ex d) - suitable for Group I mining
- **W22XdME** - Flameproof motors with increased safety terminal box (Ex de) - suitable for Group I mining
- Temperature class: T5 or T6
- Efficiency levels: Super Premium Efficiency - IE4  
Premium Efficiency - IE3  
Standard Efficiency IE1
- Cooling method: TEAO, TEBC and TENV
- Degree of protection: IP65 and IP66
- Number of poles: 10 and 12
- Two speed motors
- Rated voltage: rated voltages up to 1140 V
- Insulation Class: H
- Other mounting configurations with or without flange: B5T, B35T, B14T, B34T, V1, etc.
- Fan material: Carbon steel, stainless steel, cast iron and aluminium
- Shaft sealing: W3 Seal or Labyrinth Seal
- Insulated NDE bearing
- Shaft grounding ring
- Additional / alternative thermal protections in windings or bearings
- Additional terminal box for connection of accessories
- Ambient temperature: -55°C to +80 °C
- Ex certified drain plug
- Cable glands
- Shaft material: stainless steel or high tensile carbon steel
- Double shaft end
- Internal epoxy coating (tropical treatment)
- Alternative painting plans up to C5/I and C5/M
- Other features available on request
- Certification according TR/CU (EAC Ex), INMETRO, ANZEx, CERTEx, PESO/CCoE, SONCAP, SASO, SABS.



## WEG - A Leading Supplier of Hazardous Area Motors

### Meet the Other Members of the W22X Family

#### **W22Xe**

Increased safety motors (Ex e machines)  
For use in areas classified as Zone 1 and 2  
Power ratings 0,18 kW to 250 kW  
Frames: 63 to 355M/L  
Voltage: up to 690 V

#### **W22XnCD**

Non-sparking motors/dust ignition proof motors  
(Ex nA/Ex tc machines)  
For use in areas classified as Zone 2 and 22  
Power ratings 0,12 kW to 450 kW  
Frames 63 to 355A/B  
Voltage: up to 690 V

#### **W22Xtb**

Dust ignition proof motors (Ex tb machines)  
For use in areas classified as Zone 21  
Power ratings 0,12 kW to 450 kW  
Frames 63 to 355A/B  
Voltage: up to 690 V

#### **W22Xd High Voltage**

Flameproof motors (Ex d/Ex de machines)  
For use in areas classified as Zone 1 and 2  
Power ratings 75 kW to 9,000 kW  
Frames 315 to 1000  
Voltage: up to 11,000 V

### Other WEG Industrial Motors for Hazardous Locations

#### **Pressurized Motors (Ex p machines)**

For use in areas classified as Zone 1 and 2  
Power ratings up to 50,000 kW (other outputs under request)  
Frames 280 to 1800  
Voltages: up to 13,800 V

#### **HGF Non-Sparking Motors**

Non-sparking motors (Ex nA machines)  
For use in areas classified as Zone 2  
Power ratings 75 kW to 3150 kW  
Frames: 315L/A/B to 630  
Voltage: up to 11,000 V

Please visit us at [www.weg.net](http://www.weg.net) to find out more about WEG hazardous area products.



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