Always on the safe side: Reliable system operation

Gear units, motors and gearmotors for potentially explosive areas
Special measures are required for the operation of systems and machinery in areas with potentially explosive air/gas or air/dust mixtures. If mixture formation cannot be prevented, specially protected drives must be used. Applicable standards and regulations govern the use of equipment within existing hazard zones. They also prescribe the quality prerequisites that must be met by drive manufacturers.

Directive 2014/34/EC has been applicable since February 26, 2014 for devices and protective systems for designated use in potentially explosive atmospheres. This directive has replaced directive 94/9/EC. Declarations of conformity according to the new directive cannot be issued until April 20, 2016. SEW-EURODRIVE gearmotors meet all requirements intended for use in potentially explosive atmospheres as defined in EU directive 94/9/EC (ATEX 95).

Different from the internationally recognized IECEx regulations or the North American requirements (HazLoc-NA®), this directive also includes non-electrical operating resources in explosion protection. SEW-EURODRIVE’s drive technology is characterized by collaboration in creating standards, continuous quality control and innovative in-house research and development.

Helical gearmotor
with extended bearing hub
for use in agitators
Legal basis for explosion protection in Europe using Germany as an example

From European law to national implementation

Based on European Union directives in force, some international and some domestic regulations, ordinances, standards and rules apply for implementing the directives in national law.

The works most important for Germany in terms of explosion protection are listed below, separated by operator and manufacturer of products.

<table>
<thead>
<tr>
<th>Operator</th>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>European law (directives)</td>
<td>1999/92/EC (ATEX 137)</td>
</tr>
<tr>
<td></td>
<td>As of April 2016 2014/34/EC</td>
</tr>
<tr>
<td>Laws</td>
<td>Labor Protection Law (ArbSchG)</td>
</tr>
<tr>
<td>Ordinances</td>
<td>Operating safety regulations (BetrSichV)</td>
</tr>
<tr>
<td>Regulations, standards, etc.</td>
<td>Technical regulations on operating safety (TRBS)</td>
</tr>
</tbody>
</table>
|        | EN 60079, EN 60034, EN 13463 | ...

Directive 1999/92/EC
Concerning minimum regulations for improving health and safety protection and the safety of employees who may be placed at risk by potentially explosive atmospheres
- Classification of hazardous areas

Directive 94/9/EC
On the approximation of the laws of the member states concerning equipment and protective systems intended for use in potentially explosive atmospheres
- Equipment groups and categories

IEC/EN 60079-0
Potentially explosive atmosphere
Equipment – general requirements
- Product standard Ex
The zone definition takes into account both the system’s operating condition and the period during which the operating resources are exposed to the potentially explosive mixture. The system’s operator, together with the regulatory authority that is granting approval, determines the zone that must be considered for a specific part. The difference between a mixture that consists of air with gas and one that consists of air with dust is also important.

EU directive 1999/92/EC (also known as ATEX 137) is binding for EU countries. The directive describes, among others, the definition of zones and assignment of equipment (such as gearmotors).

<table>
<thead>
<tr>
<th>Frequency of occurrence of a potentially explosive atmosphere</th>
<th>Zone designation of air mixture with gases (G)</th>
<th>Zone designation of air mixture with dusts (D)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuously, for long periods or frequently</td>
<td>0</td>
<td>20</td>
</tr>
<tr>
<td>Occasionally, in normal operation</td>
<td>1</td>
<td>21</td>
</tr>
<tr>
<td>Not likely to occur, or only for short periods</td>
<td>2</td>
<td>22</td>
</tr>
</tbody>
</table>

SEW-EURODRIVE does not offer products for zones 0 and 20.
EU Directives 94/9/EC and 2014/34/EC classify all equipment in group II into three categories (1, 2 and 3) with regard to its safety requirements. The unit manufacturer determines which unit is to be classified into which category. Usability and safety in case of malfunction are the criteria. The assignment of equipment categories to zones is specified in EU directive 1999/92/EC.

The drives of SEW-EURODRIVE comply with all requirements regarding equipment safety according to the categories’ criteria. Possible error sources that may or can occur during system operation are investigated and taken into account during assignment to the category for which the equipment is approved.

On an international level, IEC 60079-0, Potentially Explosive Atmosphere – Equipment – General Requirements of 2007 introduced EPL protection levels (Equipment Protection Level). These equipment protection levels identify the feasibility of operating resources in potentially explosive areas according to the zone classifications. With the revision of EN 60079-0 issued in 2010, the EPLs were also adopted by European standards.

<table>
<thead>
<tr>
<th>Gas (G)</th>
<th>Dust (D)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Equipment protection level (EPL)</strong></td>
<td><strong>Equipment category</strong></td>
</tr>
<tr>
<td>IEC / EN 60079-0</td>
<td>94/9/EC</td>
</tr>
<tr>
<td>Ga</td>
<td>1G</td>
</tr>
<tr>
<td>Gb</td>
<td>2G</td>
</tr>
<tr>
<td>Gc</td>
<td>3G</td>
</tr>
</tbody>
</table>

Equipment in the safest category can be used in a category with lower safety requirements (1G can be used both in zone 0 and in zones 1 and 2). SEW-EURODRIVE does not offer products for zones 0 and 20.
Safety requirements and equipment categories

**Equipment group I**

applies to units to be used in below-ground mining operations and their above-ground systems that may be subject to hazards from firedamp and/or flammable dusts.

**Equipment group II**

applies to units to be used in other areas that may be subject to hazards from a potentially explosive atmosphere.

<table>
<thead>
<tr>
<th>Equipment group</th>
<th>Category</th>
<th>Degree of protection</th>
<th>Guaranteed protection</th>
<th>Medium</th>
<th>Zone</th>
<th>Protection type</th>
</tr>
</thead>
<tbody>
<tr>
<td>I*</td>
<td>M1</td>
<td>Very high</td>
<td>With two independent preventive measures; two faults are allowed to occur independently of one another</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>II*</td>
<td>1</td>
<td>Very high</td>
<td>With two independent preventive measures; two faults are allowed to occur independently of one another</td>
<td>Gas</td>
<td>0</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Dust</td>
<td>20</td>
<td>–</td>
</tr>
<tr>
<td>I*</td>
<td>M2</td>
<td>High</td>
<td>Suitable for normal operation and harsh operating conditions</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>II</td>
<td>2</td>
<td>High</td>
<td>One preventive measure; suitable for normal operation with the likelihood of frequent malfunctions, one fault is allowed to occur</td>
<td>Gas</td>
<td>1</td>
<td>Motor: d, e, i, p, ... Gear unit: c, k, ...</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Dust</td>
<td>21</td>
<td>Motor: t Gear unit: c, k, ...</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Normal</td>
<td>Suitable for standard operation</td>
<td>Gas</td>
<td>2</td>
<td>Motor: nA Gear unit: c, k, ...</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Dust</td>
<td>22</td>
<td>Motor: t Gear unit: c, k, ...</td>
</tr>
</tbody>
</table>

* In equipment group II, SEW-EURODRIVE offers only units for categories 2 and 3.

Gas approvals 2G and 3G as well as dust approvals 2D and 3D of SEW-EURODRIVE gearmotors of the type .../2GD and .../3GD can be used in zone 1 or 21 (../2GD) or in zone 2 or 22 (../3GD), respectively. These gearmotors simplify the selection process for the relevant drive components, reduce the number of variants, and allow you to use the gearmotors in applications with zone classifications for gas atmospheres, such as paint shops, or dust atmospheres, such as in wood processing.
SEW-EURODRIVE gearmotors have proven themselves over many decades in the most diverse potentially explosive atmospheres. SEW-EURODRIVE passes on the knowledge gained from these experiences, takes them into account during new developments and enhancements, and significantly participates in preparing valid drive technology standards. **SEW-EURODRIVE was one of the first suppliers of drive technology who also offered non-electrical operating resources that comply with EU directive 94/9/EC.**

The globally proliferating regulations on energy efficiency, in particular, were accommodated. For example, all motors larger than 0.7 kW are in principle designed as IE2 motors, for use in China also as grade 3 according to the Chinese energy efficiency standard GB 18613-2012.

Gearmotors from SEW-EURODRIVE conform to directive 94/9/EC (ATEX 95)

Explosion-proof gear units, motors and gearmotors are subject to more stringent requirements because even when unit faults occur, an explosion must still not be triggered. This is the reason why explosion-proof gear units and motors from SEW-EURODRIVE have been further developed in compliance with EU directive 94/9/EC (ATEX 95) and why they are produced using special components with particular attention being paid to quality assurance.

- Degree of protection IP54, higher as an option, for motors exposed to gases
- Degree of protection IP5x/IP6x for motors exposed to dust
- Standardized robust fan guards
- Canopy for vertical mounting positions with motor on top
- External protective conductor connection on the terminal box
- Improved grounding (EMC) with an additional connection (HF equipotential bonding)
- Seals of the terminal box can withstand high temperatures
- Terminal box made from aluminum or gray cast iron
- Metric threads in the walls of the terminal box for the cable glands
- Unused openings in the terminal box are closed with directive-compliant parts
- Clamping straps additionally secure the rubber sealing collars at the brakes
- Standardized robust covers as shrink disk covers on the gear unit
- All screws are additionally secured against unwanted loosening
- Each component (motor/gear unit) has a separate nameplate
- High-quality oil seals on the gear unit
- Lubricant in the gear unit can withstand high temperatures
- Also available as brakemotor in category 3
Equipment safety in gas and dust atmospheres: Gear units for categories 2 and 3

Gear units compliant with 94/9/EC for gas and dust: Robust, powerful and reliable

The EN 13463-1 standard serves as the basis for approval of mechanical equipment that is used in an environment with explosive mixtures. Based on this section 1, additional sections in the standard define measures to be taken for preventing ignition of the air-gas or air-dust mixtures (protection types). Here standard EN 1127 with its risk analysis is additionally helpful.

SEW-EURODRIVE was one of the first drive manufacturers in 2002/2003 to approve gear units for category 2. For gear units in series 7 and SPIROPLAN® gear units, there is no difference between use in gas or dust environments. This means with this approval, the type also meets all requirements of category 3 for use in gas or dust environments. Gear units are certified according to the protection types "c" and "k".

Protected by safe construction (design safety)
EN 13463-1 and -5 (protection type "c")
"Constructional safety" is a type of explosion protection where construction measures are used to ensure protection from possible ignition caused by moving parts, the creation of hot surfaces, sparks, and adiabatic compression.

Protection through liquid immersion
EN 13463-1 and -8 (protection type "k")
"Protection through liquid immersion" is a type of protection where potential sources of ignition cannot become active or are completely separated from the potentially explosive atmosphere. This protection is provided either by completely immersing the source of ignition in a protective liquid or by partially immersing and continued moistening of its active surfaces with a protective liquid. In this way, the potentially explosive atmosphere that exists above the liquid or outside the unit housing cannot be ignited.

EC Declaration of Conformity

Translation of the original text

SEW-EURODRIVE GmbH & Co KG
Ernst-Blickle-Straße 42, D-76646 Bruchsal
declares under sole responsibility that the
Gear units of the series  R...
with mount-on components of the series AM
variant  II2GD
Category  2D
Designation II 2GD c,k T3/T200°C or
II 2GD c,k IIB T3/T200°C or
II 2GD c,k T4/T120°C or
II 2GD c,k IIB T4/T120°C or
II 2GD c,k T5/T100°C or
II 2GD c,k IIB T5/T100°C or
II 2GD c,k T6/T85°C or
II 2GD c,k IIB T6/T85°C or

are in conformity with
ATEX Directive 94/9/EC 2)
Applied harmonized standards: EN 13463-1:2009
EN 13463-5:2011
EN 13463-8:2003
EN 60529:2000

2) SEW-EURODRIVE lodges the documents required by 94/9/EC, appendix VIII, with the notified body: FSA GmbH, EU ID No.: 0588...
Conformity with categories 2G and 2D

**Requirement:** Equipment safety is guaranteed in the event of an expected unit malfunction (one fault)

- Gear units in category 2
  - G (Gas) for use in zones 1 and 2
  - D (Dust) for use in zones 21 and 22

SEW-EURODRIVE provides a declaration of conformity applicable to both gas and dust for gear units in category 2. The following are certified in that declaration through certified depositing of product documents at a named third party that is independent of SEW-EURODRIVE:

- Compliance with standard EN 13463 (including all relevant parts)
- Risk analysis according to standard EN 1127 has been performed
- Internal production control according to EU directive 94/9/EC (ATEX 95)

Conformity according to categories 3G and 3D

**Requirement:** Guaranteeing equipment safety during standard operation

- Gear units in category 3
  - G (Gas) for use in zone 2
  - D (Dust) for use in zone 22

Certification for category 2 means that all the requirements for category 3 have been met. A separate declaration of conformity is issued for category 3.

SEW-EURODRIVE gear units in category 2 for gas and dust atmospheres

**Line operation:** approved for 50 power supply, that is about 1500 rpm input speed

- Helical gear units R../II2GD
- Parallel-shaft helical gear units F../II2GD
- Helical-bevel gear units K../II2GD
- Helical-worm gear units S../II2GD
- SPIROPLAN® gear units W../II2GD
- Planetary servo gear units PS.F../II2GD
- Helical-bevel servo gear units BS.F../II2GD

**Inverter operation:** approved (depending on the project) up to a gear unit input speed of 3000 rpm

- Helical gear units R../II2GD
- Parallel-shaft helical gear units F../II2GD
- Helical-bevel gear units K../II2GD
- Helical-worm gear units S../II2GD
- SPIROPLAN® gear units W../II2GD
- Planetary servo gear units PS.F../II2GD
- Helical-bevel servo gear units BS.F../II2GD

1) With the exception of size W10

2) With the exception of size W10
The EN 60079 series of standards serves as the basis for approval of electrical equipment for use in an environment with explosive air-gas mixtures. Based on this standard, additional standards define measures for implementation how ignition of the air-gas mixture must be prevented (protection types). With its long-time experience, SEW-EURODRIVE has approved the motors for categories 2G and 3G. Motors are certified according to the protection types "d", "e" and "nA".
Protection through flameproof enclosure according to EN 60079-0 and -1 (protection type "d")

For this protection type, potential sources of ignition are enclosed in a flameproof housing in such a way that while the explosive gas mixture can enter and might ignite, an ignition of the outer atmosphere is prevented. This is accomplished by defined "ignition gaps", which force the mixture burned in the interior to cool on its way to the outside. The now safely low temperature of the gas-air mixture prevents ignition of the external atmosphere. The gas-air mixtures are classified by explosion classes depending on flammability. The design of the ignition gaps depends on the flammability of the gas-air mixture that occurs. The designation of the unit with flameproof enclosure therefore in principle also includes the explosion class.

Protection through increased safety according to EN 60079-0 and -7 (protection type "e")

The basic idea behind this protection type is to prevent improperly high surface temperatures and the creation of sparks. This is accomplished with construction measures, such as adherence to minimum air gaps, attention to air and creeping distances, special selection of enameled wires, or careful selection of the plastics and insulating materials used. Proof that proper surface temperatures were maintained must be provided by complex measurements. When designing the units and subsequently inspecting them, a fault must be considered. The combination of these measures essentially precludes ignition of the air-gas mixture. Special monitoring of potential sources of ignition with protective circuit breakers or positive temperature coefficient (PTC) thermistors ensures that no heating to potentially explosive temperatures can occur.

Protection through non-sparking enclosure according to EN 60079-0 and -15 (protection type "nA")

The construction and design requirements of protection type "nA" mostly correspond to those of protection type "e". The main difference is that for protection type "nA" only uninterrupted operation (no fault) must be considered.
### Conformity with category 2G

**Requirement:** Equipment safety is guaranteed in the event of an expected unit malfunction (one fault)

<table>
<thead>
<tr>
<th>Motors in category 2G (gas)</th>
<th>Can be used in zones 1 and 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEW-EURODRIVE has received a type examination from the National Metrology Institute (Physikalisch-Technische Bundesanstalt [PTB]) in effect for gas/dust for motors in category 2. It certifies compliance with the standards in the EN 60079-0, EN 60079-7 and EN 60079-31 series.</td>
<td></td>
</tr>
<tr>
<td>Quality assurance of the production has been audited and certified according to EU directive 94/9/EC (ATEX 95).</td>
<td></td>
</tr>
<tr>
<td>Compliance with the internationally applicable Equipment Protection Level EPL b for gas.</td>
<td></td>
</tr>
<tr>
<td>EDR... motors conform to the most important standards and norms, as well as the new portions of the IEC motor standard 60034.</td>
<td></td>
</tr>
<tr>
<td>EDR... motors conform to the efficiency class IE2 according to IEC 60034-30-1.</td>
<td></td>
</tr>
<tr>
<td>EDR... motors are suitable for gas group IIC according to IEC / EN 60079-0.</td>
<td></td>
</tr>
</tbody>
</table>

### Category 2 motors from SEW-EURODRIVE for gas atmospheres

#### Line operation: for 50 Hz power supply, partly also for 60 Hz

<table>
<thead>
<tr>
<th>Drive in potentially explosive atmosphere (PEA)</th>
<th>Drive in PEA and inverter in control cabinet outside the PEA</th>
<th>Drive with integrated frequency inverter in the PEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motors of protection type &quot;e&quot;</td>
<td>Motors of protection type &quot;e&quot;</td>
<td>- MOVITRAC® B</td>
</tr>
<tr>
<td>Groups IIB and IIC</td>
<td>Types and sizes</td>
<td>- MOVIDRIVE®</td>
</tr>
<tr>
<td>- eDR 63.../II2G</td>
<td>- EDRS 71 – 80.../2GD</td>
<td></td>
</tr>
<tr>
<td>- EDRS 71 – 80.../2GD</td>
<td>- EDRE 80 – 225.../2GD</td>
<td></td>
</tr>
<tr>
<td>- EDRE 80 – 225.../2GD</td>
<td>- Motors of protection type &quot;d&quot;</td>
<td>-</td>
</tr>
<tr>
<td>- Motors of protection type &quot;d&quot;</td>
<td>Types</td>
<td></td>
</tr>
<tr>
<td>- CD / BD</td>
<td>- CD / BD</td>
<td></td>
</tr>
</tbody>
</table>

Type /2GD can be used not only in the gas area, but also in the dust area.
### Conformity with category 3G

**Requirement: Guaranteeing equipment safety during standard operation**

<table>
<thead>
<tr>
<th>Motors in category 3G (gas)</th>
<th>Can be used in zone 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>- SEW-EURODRIVE provides a declaration of conformity applicable to gas and dust for motors in category 3. It certifies compliance with the standards in EN 60079-0, -15, -31 and 60034-1.</td>
<td></td>
</tr>
<tr>
<td>- Quality assurance of the production has been audited and certified according to EU directive 94/9/EC (ATEX 95).</td>
<td></td>
</tr>
<tr>
<td>- EDRE.. motors conform to the efficiency class IE2 according to IEC 60034-30-1.</td>
<td></td>
</tr>
<tr>
<td>- Compliance with the internationally applicable Equipment Protection Level EPL Gc.</td>
<td></td>
</tr>
<tr>
<td>- EDR.. motors are suitable for gas group II B and IIC according to IEC / EN 60079-0.</td>
<td></td>
</tr>
<tr>
<td>- Also available as brakemotor.</td>
<td></td>
</tr>
</tbody>
</table>

### Category 3 motors from SEW-EURODRIVE for gas atmospheres

**Line operation:**
- for 50 Hz or 60 Hz power supply

**Inverter operation**
- Drive in potentially explosive atmosphere (PEA)
- Drive in PEA and inverter in control cabinet outside the PEA
- Drive with integrated frequency inverter in the PEA

<table>
<thead>
<tr>
<th>Drive in potentially explosive atmosphere (PEA)</th>
<th>Drive in PEA and inverter in control cabinet outside the PEA</th>
<th>Drive with integrated frequency inverter in the PEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Motors/brakemotors of protection type &quot;nA&quot;</td>
<td>- Motors of protection type &quot;nA&quot;</td>
<td>-</td>
</tr>
<tr>
<td>- Types and sizes</td>
<td>- Types and sizes</td>
<td></td>
</tr>
<tr>
<td>- DR 63.../3GD</td>
<td>- DR 63.../3GD</td>
<td></td>
</tr>
<tr>
<td>- EDRS 71 – 80.../3GD</td>
<td>- EDRS 71 – 80.../3GD</td>
<td></td>
</tr>
<tr>
<td>- EDRE 80 – 315.../3GD</td>
<td>- EDRE 80 – 315.../3GD</td>
<td></td>
</tr>
</tbody>
</table>
| with the following inverters: | with the following inverters: | |}

Type /3GD can be used not only in the gas area, but also in the dust area.
With the revision of EN 60079, dust explosion protection has been integrated into this set of standards as part 31. As part of this integration, equipment group III was introduced for dusts analogously to group II for gas.

With its long-time experience, SEW-EURODRIVE has approved the motors for categories 2D and 3D. The motors are certified for protection type "t". An important design consideration for units that are used in areas subject to dust explosion hazards is, among others, that they meet certain IP protection types (protection against the ingress of foreign bodies according to EN 60259).

Equipment protection against dust explosion through enclosures according to EN 60079-0 and -31 (protection type "t")

Protection type "t" is used for motors that are to be used in areas with potentially explosive dusts. Here explosion protection is implemented by preventing the ingress of potentially explosive dusts and by definitely preventing that improperly high temperatures occur at the surface.

Depending on the equipment category, units are marked with "tb" (suitable for zone 21) or "tc" (suitable for zone 22).

<table>
<thead>
<tr>
<th>Zone 1999/92/EC</th>
<th>Category 94/9/EC</th>
<th>EPL EN 60079-0</th>
<th>Protection level EN 60079-31</th>
<th>Equipment of group EN 60079-31</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>IIIC Conductive dusts</td>
<td>IIIB Non-conductive dusts</td>
</tr>
<tr>
<td>21</td>
<td>2D</td>
<td>Db</td>
<td>tb</td>
<td>IP6X</td>
</tr>
<tr>
<td>22</td>
<td>3D</td>
<td>Dc</td>
<td>tc</td>
<td>IP6X</td>
</tr>
</tbody>
</table>
For this degree of protection, the housing is designed in such a way that no dust can enter. Sources of ignition inside the housing therefore do not need to be considered. Only the housing’s surface temperature could become a source of ignition. Effective protection can be implemented by permanently monitoring the housing’s temperature.

**IP degree of protection “IP65” dust-tight housing EN 60079-31**

For this degree of protection, it is sufficient to design the housing in such a way that the ingress of dust in dangerous quantities is prevented. Sources of ignition inside the housing therefore do not need to be considered.

**IP degree of protection “IP54” dust-protected housing EN 60079-31**

Only the housing’s surface temperature could become a source of ignition. Effective protection can be implemented by permanently monitoring the housing’s temperature.
### Safety requirements and equipment categories

**Conformity with category 2D**

**Requirement: Equipment safety is guaranteed in the event of an expected unit malfunction (one fault)**

<table>
<thead>
<tr>
<th>Category 2D motors (dust)</th>
<th>Can be used in zones 21 and 22</th>
</tr>
</thead>
</table>

SEW-EURODRIVE has received a type examination from the National Metrology Institute [Physikalisch-Technische Bundesanstalt (PTB)] in effect for gas/dust for motors in category 2. It certifies compliance with the standards in the EN 60079-0, EN 60079-7 and EN 60079-31 series.

- Quality assurance of the production has been audited and certified according to EU directive 94/9/EC (ATEX 95).
- Compliance with the internationally applicable Equipment Protection Level EPL Db.
- EDR.. motors conform to the most important standards and norms, as well as the new portions of the IEC motor standard 60034.
- EDRE.. motors conform to the efficiency class IE2 according to IEC 60034-30-1.
- EDR.. motors are suitable for dust groups IIIB and IIIC according to IEC / EN 60079-0.

### Category 2D motors from SEW-EURODRIVE

**Line operation: for 50 Hz power supply and partly for 60 Hz**

**Inverter operation**

**Drive in potentially explosive atmosphere (PEA)**

- Motors of protection type “tb”
- Equipment groups IIIB, IIIC
- Types and sizes
  - EDR 63.../2GD
  - EDRS 71 – 80.../2GD
  - EDRE 80 – 225.../2GD

**Drive in PEA and inverter in control cabinet outside the PEA**

- Motors of protection type “tb”
- Equipment groups IIIB, IIIC
- Types and sizes
  - EDRS 71 – 80.../2GD
  - EDRE 80 – 225.../2GD
  - with the following inverters:
    - MOVITRAC® B
    - MVIOnline®

**Drive with integrated frequency inverter in PEA**

-
### Conformity with category 3D

**Requirement: Guaranteeing equipment safety during standard operation**

<table>
<thead>
<tr>
<th>Category 3D motors (dust)</th>
<th>Can be used in zone 22</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- SEW-EURODRIVE provides a declaration of conformity applicable to gas and dust for motors in category 3. It certifies compliance with the standards in EN 60079-0, -15, -31 and 60034-1.</td>
</tr>
<tr>
<td></td>
<td>- Quality assurance of the production has been audited and certified according to EU directive 94/9/EC (ATEX 95).</td>
</tr>
<tr>
<td></td>
<td>- EDRE.. motors conform to the efficiency class IE2 according to IEC 60034-30-1.</td>
</tr>
<tr>
<td></td>
<td>- Compliance with the internationally applicable Equipment Protection Level EPL Dc.</td>
</tr>
<tr>
<td></td>
<td>- EDR.. motors are suitable for dust groups IIIB and IIC according to IEC / EN 60079-0.</td>
</tr>
<tr>
<td></td>
<td>- Also available as brakemotor.</td>
</tr>
</tbody>
</table>

### Category 3 motors from SEW-EURODRIVE for dust atmospheres

<table>
<thead>
<tr>
<th>Line operation: for 50 Hz or 60 Hz power supply</th>
<th>Inverter operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive in potentially explosive atmosphere (PEA)</td>
<td>Drive in PEA and inverter in control cabinet outside the PEA</td>
</tr>
<tr>
<td>- Motors of protection type “tc”</td>
<td>- Motors of protection type “tc”</td>
</tr>
<tr>
<td>- Equipment groups IIIB, IIC of the type /3GD</td>
<td>- Equipment groups IIIB, IIC of the type /3GD</td>
</tr>
<tr>
<td>- Types and sizes</td>
<td>- Types and sizes</td>
</tr>
<tr>
<td>- DR 63.../3GD</td>
<td>- DR 63.../3GD</td>
</tr>
<tr>
<td>- EDRS 71 – 80.../3GD</td>
<td>- EDRS 71 – 80.../3GD</td>
</tr>
<tr>
<td>- EDRE 80 – 315.../3GD</td>
<td>- EDRE 80 – 315.../3GD</td>
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<td></td>
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<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SEW gearmotors of types /2GD and /3GD can be used in areas with potentially explosive air-gas and/or air-dust mixtures. SEW-EURODRIVE has received a type examination from the National Metrology Institute [Physikalisch-Technische Bundesanstalt (PBT)] in effect for gas/dust for motors in category 2. It certifies compliance with the standards in the EN 60079-0, EN 60079-7 and EN 60079-31 series. SEW-EURODRIVE provides a declaration of conformity applicable to dust and gas for motors in category 3. It certifies compliance with the standards in EN 60079-0, -15, -31 and 60034-1.

Your benefits:
- Drives and SEW-EURODRIVE audited and certified to 94/9/EC
- EDR.. motors conform to the most important standards and norms, as well as the new portions of the IEC motor standard 60034
- EDRE.. motors meet the IE2 efficiency level and can therefore be used all over the world
- The gearmotors/brakemotors conform to the requirements of EU directive 94/9/EC, IECEx, and of the North American market according to NEC and CSA (certified by CSA)
- Same compact and power-oriented characteristics as the standard drives
- Operation at the inverter for categories 2 and 3 also in field weakening operation
- Available as gearmotor/motor in categories 2G, 2GD for zones 1/21 and categories 3D and 3GD for zones 2/22
- Compliance with the internationally applicable Equipment Protection Level EPL .b and .c

<table>
<thead>
<tr>
<th>Category / zone</th>
<th>Gearmotor type</th>
<th>Types and sizes / power range in kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>3G T3</td>
<td>Helical gearmotors R. / II2GD EDR../3GD</td>
<td>DR 63: 0.12 – 0.25</td>
</tr>
<tr>
<td></td>
<td>Parallel-shaft helical gearmotors F. / II2GD EDR../3GD</td>
<td>EDR 71 – 315: 0.25 – 185/200*</td>
</tr>
<tr>
<td></td>
<td>Helical-bevel gearmotors K. / II2GD EDR../3GD</td>
<td></td>
</tr>
<tr>
<td>Zone 2 / 22</td>
<td>Helical-worm gearmotors S. / II2GD EDR../3GD</td>
<td>DR 63: 0.12 – 0.25</td>
</tr>
<tr>
<td></td>
<td>Gearmotors SPIROPLAN® W. / II2GD EDR../3GD</td>
<td>EDR 71 – 200: 0.25 – 22</td>
</tr>
<tr>
<td>3D IIIB – IIIIC / 120 °C / 140 °C</td>
<td>DR 63: 0.12 – 0.25</td>
<td>EDR 71 – 132: 0.25 – 4</td>
</tr>
<tr>
<td>2G T3</td>
<td>Helical gearmotors R. / II2GD EDR../2GD</td>
<td>eDR 63: 0.12 – 0.25</td>
</tr>
<tr>
<td></td>
<td>Parallel-shaft helical gearmotors F. / II2GD EDR../2GD</td>
<td>EDR 71 – 225: 0.25 – 37</td>
</tr>
<tr>
<td></td>
<td>Helical-bevel gearmotors K. / II2GD EDR../2GD</td>
<td></td>
</tr>
<tr>
<td>Zones 1 and 21</td>
<td>Helical-worm gearmotors S. / II2GD EDR../2GD</td>
<td>EDR 71 – 200: 0.25 – 22</td>
</tr>
<tr>
<td></td>
<td>Gearmotors SPIROPLAN® W. / II2GD EDR../2GD</td>
<td>EDR 71 – 132: 0.25 – 4</td>
</tr>
</tbody>
</table>

* 60 Hz only
<table>
<thead>
<tr>
<th>Category</th>
<th>Zone</th>
<th>Motor type 4-pole</th>
<th>IE class</th>
<th>Power range in kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>II3G  T3</td>
<td>2</td>
<td>DR 63</td>
<td></td>
<td>0.12 ... 0.25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EDRS 71 – 80</td>
<td>IE1</td>
<td>0.25 ... 0.55</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EDR 80 – 315</td>
<td>IE2</td>
<td>0.75 ... 185/200*</td>
</tr>
<tr>
<td>II3D  IIIB – IIIIC / T120 °C / T140 °C</td>
<td>22</td>
<td>eDR 63</td>
<td></td>
<td>0.12 ... 0.25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EDRS 71 – 80</td>
<td>IE1</td>
<td>0.25 ... 0.55</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EDRE 80 – 225</td>
<td>IE2</td>
<td>0.75 ... 37</td>
</tr>
<tr>
<td>II2G  T3</td>
<td>1</td>
<td>eDR 63</td>
<td></td>
<td>0.12 ... 0.25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EDRS 71 – 80</td>
<td>IE1</td>
<td>0.25 ... 0.55</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EDRE 80</td>
<td>IE2</td>
<td>0.75 ... 37</td>
</tr>
<tr>
<td>II2D  IIIIC / T120 °C</td>
<td>21</td>
<td>EDRS 71 – 80</td>
<td>IE1</td>
<td>0.25 ... 0.55</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EDRE 80</td>
<td>IE2</td>
<td>0.75</td>
</tr>
<tr>
<td>II2G  T4</td>
<td>1</td>
<td>EDRE 80</td>
<td>IE1</td>
<td>0.25 ... 0.55</td>
</tr>
<tr>
<td>II2D  IIIIC / T120 °C</td>
<td>21</td>
<td></td>
<td>IE2</td>
<td>0.75</td>
</tr>
</tbody>
</table>

* 60 Hz only
More flexible systems are increasingly required even in areas with potentially explosive air-gas and air-dust mixtures. The use of drives with an inverter with closed or open loop control is becoming increasingly common. It is important to observe and comply with guidelines particularly when using an inverter. Thanks to many years of experience and competence in this area, SEW-EURODRIVE ensures that the relevant guidelines are observed. Furthermore, the company’s expertise is continually being expanded to include new and further developments.

The 4-pole SEW motors of categories 2 and 3 are also suitable for frequency inverter operation. Category 2 has been certified by a type examination. Suitability for inverter operation is explicitly confirmed on the nameplate, among others. A second nameplate provides all the information required for operation.

A device for direct temperature monitoring in combination with the defined parameters of the frequency inverter offer the best possible protection against excessive heating caused by overload. The extensive product range of SEW-EURODRIVE inverters is available for designing electronically controlled drives.
SEW-EURODRIVE offers the following inverter series

**MOVITRAC® B**
Compact and inexpensive frequency inverter for the 0.25 to 75 kW power range. Three-phase line connection for AC 380 to 500 V.

**MOVIDRIVE® MDX60/61B**
High-performance drive inverter for dynamic drives in the power range 0.55 to 250 kW. Great diversity of applications due to extensive expansion options with technology and communication options. Three-phase line connection for AC 380 to 500 V.

**MOVIMOT®**
is a successful product in decentralized drive technology. It is the ingeniously simple combination of a gearmotor and a digital frequency inverter. MOVIMOT® in category 3D form a synthesis of EDR.. motors and integrated frequency inverter. These types are designed specifically for use in areas with potentially explosive dust-air mixtures (zone 22) and are available in the power range of 0.25 to 3 kW, with or without brake, for connection voltages of 400 to 500 V.

---

**Technical data of EDR.. motors 230/400 V**

<table>
<thead>
<tr>
<th>Category</th>
<th>P_{\text{max}} kW</th>
<th>M_{\text{n}} Nm</th>
<th>M_{\text{e}} Nm</th>
</tr>
</thead>
<tbody>
<tr>
<td>2G / 2D</td>
<td>0.25 – 37</td>
<td>1.7 – 240</td>
<td>1.7 – 240</td>
</tr>
<tr>
<td>3G / 3D</td>
<td>0.25 – 90</td>
<td>1.7 – 580</td>
<td>1.7 – 580</td>
</tr>
<tr>
<td>Category 3D with MOVIMOT®</td>
<td>0.25 – 3.0</td>
<td>1.7 – 20.5</td>
<td>1.2 – 9.9</td>
</tr>
</tbody>
</table>

When used at the inverter, the overload value for EDR.. and EDRE.. motors is not reduced as compared to the nominal torque in order to guarantee thermally safe operation, as is often the case elsewhere.

SEW-EURODRIVE inverters conform to all standards and safety requirements.
Conformity to categories 2 and 3
EC Declaration of Conformity

SEW-EURODRIVE GmbH & Co KG
Ernst-Blickle-Straße 42, D-76646 Bruchsal

declares under sole responsibility that the

motors of the series EDRS71...EDRE315

Variant
/GD
/3D

Category
3G
3D

Designation

II3G Ex nA IIB T3 Gc
II3G Ex nA IIC T3 Gc
II3D Ex tc IIB T120°C Dc
II3D Ex tc IIIB T140°C Dc
II3D Ex tc IIC T120°C Dc
II3D Ex tc IIIC T140°C Dc

are in conformity with

ATEX Directive 94/9/EC

Applied harmonized standards:
EN 60079-0:2012 + A11:2013
EN 60079-15:2010
EN 60034-1:2010
EN 60079-31:2014

Bruchsal 20.04.2015

Place
Date

Johann Soder
Managing Director Technology

a) Authorized representative for issuing this declaration on behalf of the manufacturer
b) Authorized representative for compiling the technical documents with same address as manufacturer
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How we’re driving the world