



MOTORS

Technical Information

ATEX Certified OMR



together in motion

White is a leading global provider of motor and steering solutions that power the evolution of mobile and industrial applications around the world.



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Chapter 1

General Information

Topics:

- *ATEX introduction*
- *Explosive atmosphere*

ATEX introduction

Hydraulic Orbital Motors are designed for mobile and stationary applications. Some motors are used in related applications, where locations are classified as hazardous areas.

The ATEX Directive 2014/34/EU specifies the minimum safety requirements for equipment intended for use in potentially explosive atmospheres in European Union member states. ATEX is derived from the French term “ATmosphères EXplosives”.

The equipment intended for use in hazardous areas are divided into two groups:

Group I: Equipment intended for use in underground parts of mines (mining equipment).

Group II: Equipment intended for use in other places than mines (non-mining equipment).

The hydraulic orbital motors are intended for use in Group II applications.

Explosive atmosphere

Explosion triangle

A “hazardous area” is defined as an area in which the atmosphere contains, or may contain in sufficient quantities, flammable or explosive gases, dusts or vapours. In such an atmosphere a fire or explosion is possible when three basic conditions are met. This is often referred to as the “hazardous area” or “explosion” triangle.

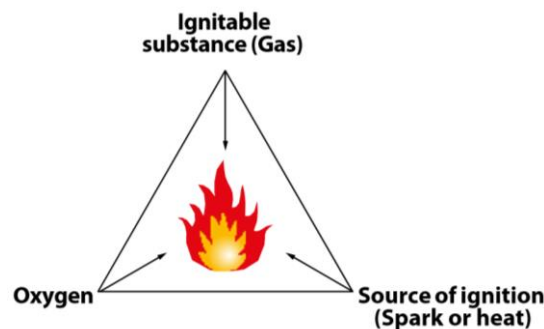


Figure 1 Explosion triangle

An atmosphere with the potential to become an explosive atmosphere during operating conditions and/or under the influence of the surroundings is defined as a potentially explosive atmosphere. Products covered by directive 2014/34/EU are defined as intended for use in potentially explosive atmospheres. Removing one of the elements eliminates all risk of explosion.

General zone classification

Directive 99/92/EC divides the Hazardous areas into zones and defines criteria by which products are categorized within these zones; Zone 0 / 20 is the most restrictive and Zones 1 / 21 and 2 / 22 are less restrictive. The following table describes the zones in an installation where there is a potential for explosive atmospheres. The owner of the installation must analyze and assess the area in which the explosive gas/dust mixture may occur, and if necessary must divide it into zones. This process of zoning then allows the correct plant and equipment to be selected for use in the area.

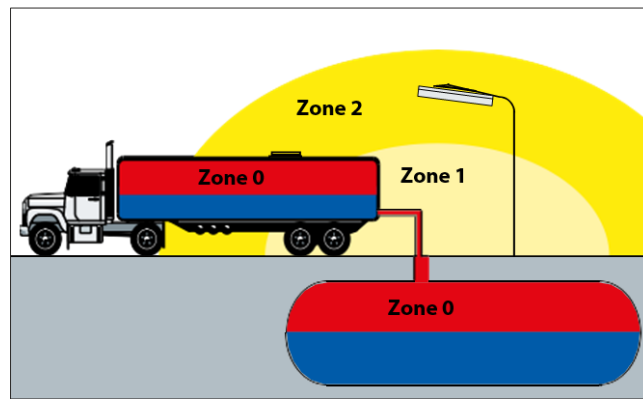


Figure 2 General zone classification

Zones		Presence of potentially explosive atmosphere	Type of risk
Gas (G)	Dust (D)		
0	20	Present continuously or for long periods	Permanent
1	21	Likely to occur in normal operation occasionally	Potential
2	22	Not likely to occur in normal operation but. If it does occur, will persist for a short period of time	Minimal

Table 1 Zone classification

Equipment category and zones

Mechanical components with potential ignition sources e.g. components containing non-conductive materials or layers or components with hot surface are covered by the ATEX-directive.

Non-mining equipment for potentially explosive atmosphere is classified as:

Equipment Group II – this group comprises three categories according to the level of safety provided:

- Category 1
- Category 2
- Category 3

Category 1 equipment has the highest degree of protection – see the following below.

Degree of protection	Protection	Category
Very high	Two independent protection measures or safe if two errors occur independently	Category 1
High	Safe in normal operation and in anticipated case of commonly occurring errors	Category 2
Normal	Safe in normal operation	Category 3

Table 2 Degree of protection

These products have to fulfil all requirements in the ATEX directive and have to be marked with the required “Ex” marking.

Equipment located in zone specified areas must fulfil the following requirements (see also the following figure):

- **Category 1** – approved equipment can be installed in hazardous areas zone 0 / 20, zone 1 / 21, zone 2 / 22 and outside zone categorized areas.
- **Category 2** – approved equipment can be installed in hazardous areas zone 1 / 21, zone 2 / 22 and outside zone categorized areas.

- **Category 3** – approved equipment can be installed in hazardous areas zone 2 / 22 and outside zone categorized areas.

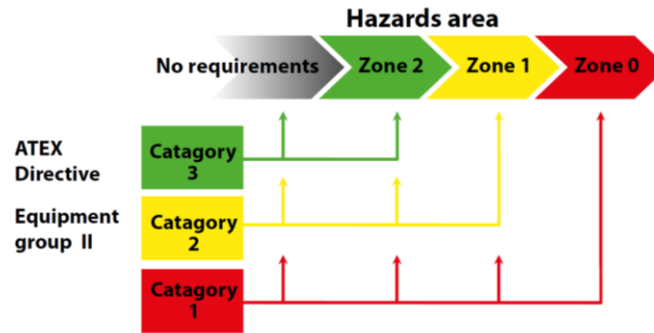


Figure 3 Hazard areas

Marking of ATEX motors

The OMS motor is marked for application in gaseous and dusty environments according to the below:

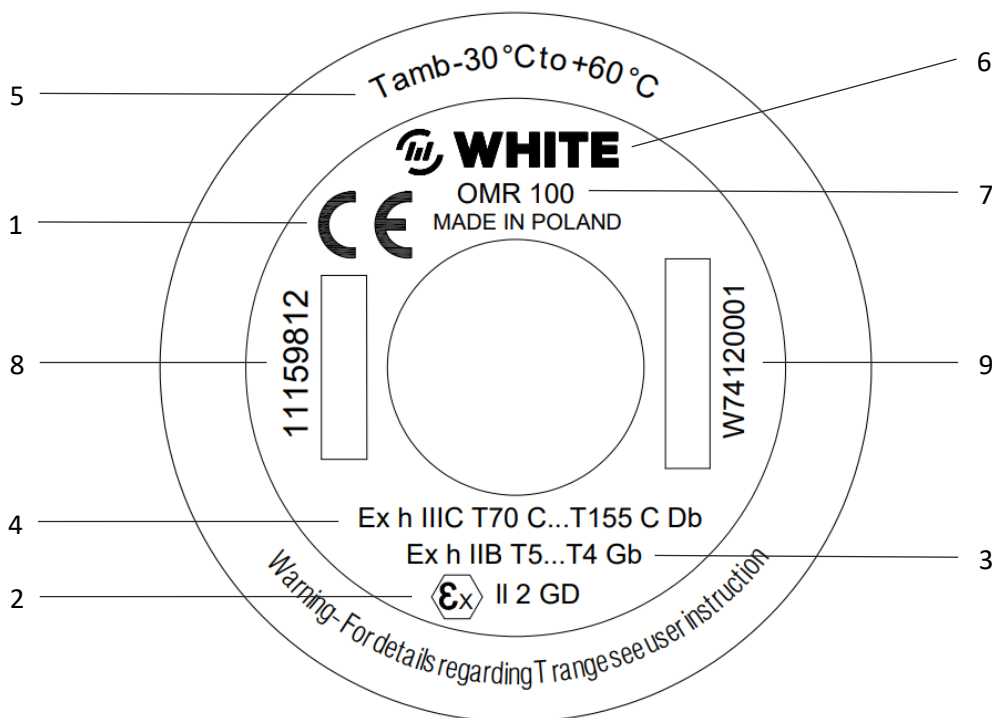


Figure 4 Example label

1. CE Conformity marking
2. EU marking (per 2014/34/EU) - Directive part

Description	EU Marking
CE conformity marking	CE
Explosion protection marking	
Equipment group	II
Equipment Category	2G / 2D

Table 3 ATEX label 2

3. EU marking (per EN ISO 80078-36.2016 Standard part)

Description		EU Marking
Protection principle		h
Explosion protection marking		Ex
Equipment group		II / III
Equipment protection level (EPL)		Gb / Db
OMR	Gas	T5...T4
	Dust	T70°C...T155°C

Table 4 ATEX label 3

Definition	Level of protection	Typical zone of application	EN ISO		EU	
			EPL	Group	Category	Group
Gas atmosphere	Very high	0	Ga	II	1G	II
	High	1	Gb		2G	
	Enhanced	2	Gc		3G	
Dust atmosphere	Very high	20	Da	III	1D	II
	High	21	Db		2D	
	Enhanced	22	Dc		3D	

Table 5 EPL/Equipment category

4. See item 3
5. Min and max ambient temperature (*see Maximum surface temperature for OMR motors*)
6. Manufacturer
7. Motor type and displacement
8. Code number
9. Production number, date, and series number

Example of item 9: **W94921234**

W Manufacturing location (W = Wrocław)

9 Year 2019

49 Week 51

2 Tuesday (1 = Monday)

1234 Consecutive number

Chapter 2

T codes / Maximum surface temperature

Topics:

- *Maximum surface temperature for OMR motors*

Maximum surface temperature for OMR motors

T codes for OMR motors – Gaseous environment (Group II)

Maximum oil temperature	Maximum ambient temperature		
	≤ 20 °C [68 °F]	≤ 40 °C [104 °F]	≤ 60 °C [140 °F]
≤ 20 °C [68 °F]	T5	T5	T5
≤ 40 °C [104 °F]	T5	T5	T4
≤ 60 °C [140 °F]	T5	T4	T4
≤ 80 °C [176 °F]	T4	T4	T4

Table 6 OMR motors - fluid and ambient temperature

Classification of maximum surface temperatures for Group II equipment

Temperature class	Maximum surface temperature	
	°C	[°F]
T4	135	[275]
T5	100	[212]

Table 7 Classification of maximum surface temp for Group II equipment

Note:

For Group II with T4 classification it is acceptable that small surface areas (total areas ≥ 20 mm² and ≤ 1000 mm²) can have surface temperature up to 200 °C.

For T5 classification it is acceptable that small surface areas (total areas ≤ 1000 mm²) can have surface temperature up to 150 °C.

Maximum surface temperature – Dusty environment (Group III)

Maximum oil temperature	Maximum ambient temperature		
	≤ 20 °C [68 °F]	≤ 40 °C [104 °F]	≤ 60 °C [140 °F]
≤ 20 °C [68 °F]	70	90	110
≤ 40 °C [104 °F]	85	105	125
≤ 60 °C [140 °F]	100	120	140
≤ 80 °C [176 °F]	115	135	155

Table 8 OMS motors - Maximum surface temperatures

Note:

Above maximum surface temperatures are without any deposited dust on the motors. The possible insulation effect of a dust layer on the surface has to be taken into account by the safety margin to the minimum ignition temperature of the dust concerned. For up to 5 mm [1.97 in] layer thickness the safety margin is 75 °C [167 °F]. For further information please see IEC 60079-14.



Warning:

The above operating temperatures (ambient and oil) of the motor must be guaranteed by the end user.



Warning:

It is compulsory to use oils whose inflammable degree is at least 50K above the maximum surface temperature of the motor. See [Oil types / Operating fluids](#)

Chapter 3

Versions and code numbers

Topics:

- *OMR standard motor*

OMR standard motor

Spigot diameter	Ø82.5mm [3.25 in]						
Bolt circle diameter	Ø106.4 mm [4.20 in]						
Shaft	Main Port size	Drain Port size	Check valve	Standard shaft seal	High pressure shaft seal	Main type designation	Conf. code
Cyl. Ø32 mm	G 1/2	G 1/4	X	-	X	OMR	A1
Splined 1 in (SAE 6B)	G 1/2	G 1/4	X	-	X	OMR	A2
Cyl. Ø32 mm	G 1/2	G 1/4	X	X	-	OMR	A3

Table 9 Mounting flange: 2-hole flange (A2)

Code numbers

Conf. code	Displacement								
	50	80	100	125	160	200	250	315	375
A1	11159797	11159798	11159799	11159801	11159802	11159803	11159804	11159805	11159806
A2	11159809	11159810	11159812	11159813	11159814	11159815	11159816	11159817	11159818
A3	11181934	11181935	11181936	11181937	11181938	11181939	11181940	11181941	11181942

Table 10 Code numbers: OMR Standard 2-hole flange

Chapter 4

Technical specification – ATEX OMR motors

Topics:

- *Ambient temperature*
- *Oil types / Operating fluids*

Ambient temperature

Maximum ambient temperature depends on the requested ATEX class needed – please see [Maximum surface temperature for OMR motors](#).

In general the ambient temperature should lie between -30 °C [-22 °F] and +60 °C [+140 °F].

Oil types / Operating fluids

In a hydraulic system the most important task of the oil is to transfer energy. At the same time the oil must lubricate moving parts in hydraulic components, protect them from corrosion, and transport dirt particles and heat out of the system. To ensure that hydraulic components operate without problems and have long operating life it is therefore vital to select the correct oil type with the necessary additives.

Ratings and performance data are based on operating with hydraulic fluids containing oxidation, rust and foam inhibitors. These fluids must possess good thermal and hydrolytic stability to prevent wear, erosion and corrosion of components.

Mineral oils

For systems containing hydraulic motors, mineral hydraulic oil with anti-wear additives type HLP [DIN 51524] or HM (ISO 11158) **must be used**. Mineral oils without anti-wear additives or engine oils can also be used, provided operating conditions are suitable.



Warning:

It is compulsory to use oils whose inflammable degree is at least 50K above the maximum surface temperature of the motor. Maximum surface temperature for Group II and III can be found under: [Maximum surface temperature for OMR motors](#)

Oil temperature

Maximum oil temperature depends on the requested ATEX class needed.

Under normal operating conditions it is recommended to keep the temperature in the range of 30 °C [86 °F] to 60 °C [140 °F].

Fluid temperature affects the viscosity of the fluid and resulting lubricity and film thickness. High temperatures can also limit seal life, at most nonmetallic materials are adversely affected by use at elevated temperatures.

Fluids may break down or oxidize at high temperature, reducing their lubricity and resulting in reduced life of the unit. Oil life is greatly reduced if its temperature exceeds +60 °C [+140 °F]. As a general rule, oil life is halved for each 8 °C [46 °F] its temperature exceeds +60 °C [+140 °F].

Viscosity

Maintain fluid viscosity within the recommended range for maximum efficiency and bearing life. Minimum viscosity should only occur during brief occasions of maximum ambient temperature and severe duty cycle operation.

Maximum viscosity should only occur at cold start. Limit speeds until the system warms up.

Conditions	mm ² /s (cSt)	SUS
Minimum	12	66
Continuous	20 - 80	98 - 370
Maximum	1500	6950

Table 11 Fluid viscosity limits

We recommend the use of an oil type having a viscosity of 35 mm²/s at the actual operating temperature.

Filtering

It is necessary to keep the level of oil contamination at an acceptable level to ensure problem-free operation. The recommended maximum level of contamination in systems with hydraulic orbital motors is 22/20/16 (ISO 4406-1999).

Chapter 5

Cross list

Topics:

- *OMR motor cross list*

OMR motor cross list

Shaft type	Cylindrical 25 mm (Conf. Code A1)		Splined 1" (SAE 6B) (Conf. Code A2)		Cylindrical 32 mm (Conf. Code A3)	
	Standard motor	ATEX certified	Standard motor	ATEX certified	Standard motor	ATEX certified
Code number	151-0710	11159797	151-0720	11159809	151-0248	11181934
	151-0711	11159798	151-0721	11159810	151-0242	11181935
	151-0712	11159799	151-0722	11159812	151-0243	11181936
	151-0713	11159801	151-0723	11159813	151-0208	11181937
	151-0714	11159802	151-0724	11159814	151-0244	11181938
	151-0715	11159803	151-0725	11159815	151-0245	11181939
	151-0716	11159804	151-0726	11159816	151-0247	11181940
	151-0717	11159805	151-0727	11159817	151-0246	11181941
	151-0718	11159806	151-0728	11159818	151-6294	11181942

Table 12 OMR motor cross list

EU DECLARATION OF CONFORMITY

White Drive Motors and Steering Sp. z o.o.

Declare under our sole responsibility that the following product(s) / component(s)

Product category Orbital Hydraulic Motors
Type designation(s) OMR 50 – 375

Covered by this declaration is in conformity with the following directive(s), standard(s) or other normative document(s), provided that the product is used in accordance with our instructions.

Part number(s) / Serial number / date of manufactured:

Specifically identified on label affixed to product

European Directive: ATEX 2014/34/EU

International Standards EN ISO 80079-36 : 2016, EN ISO 80079:37 : 2016


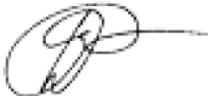
White Drive Motors and Steering declares that the machine has been designed, constructed, and tested to fully comply with the health and safety requirements of the Directive, as mentioned above. Any modification to the machine without our prior permission renders this declaration null and void.

ATEX marking:

Motor type	Gas environment	Dust environment
OMR 50 – 375	Ex h IIB T5...T4 Gb	Ex h IIIC T70 °C...T155°C Db

Technical dossier and archive:

Główny Instytut Górnictwa,
 Jednostka Oceny Zgodności,
 Zespół ds. Bezpieczeństwa Przeciwwybuchowego
 43-190 Mikołów; ul. Podleska 72

Date: 01.10.2021	Issued by Marcin Ładziak	Date: 01.10.2021	Approved by Andrei Divissenko
 Head of Product Engineering		 Sales Director EU	

White Drive Motors and Steering Sp. z o.o.

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 Bielany Wrocławskie
 55-040 Kobierzyce
 POLAND

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