

# EN 54-20 Classification: Transparency for the first time for air sampling smoke detectors



## Fire detection

What has EN 54-20 changed?

What are the advantages of

TITANUS<sup>®</sup>- air sampling

smoke detection systems?

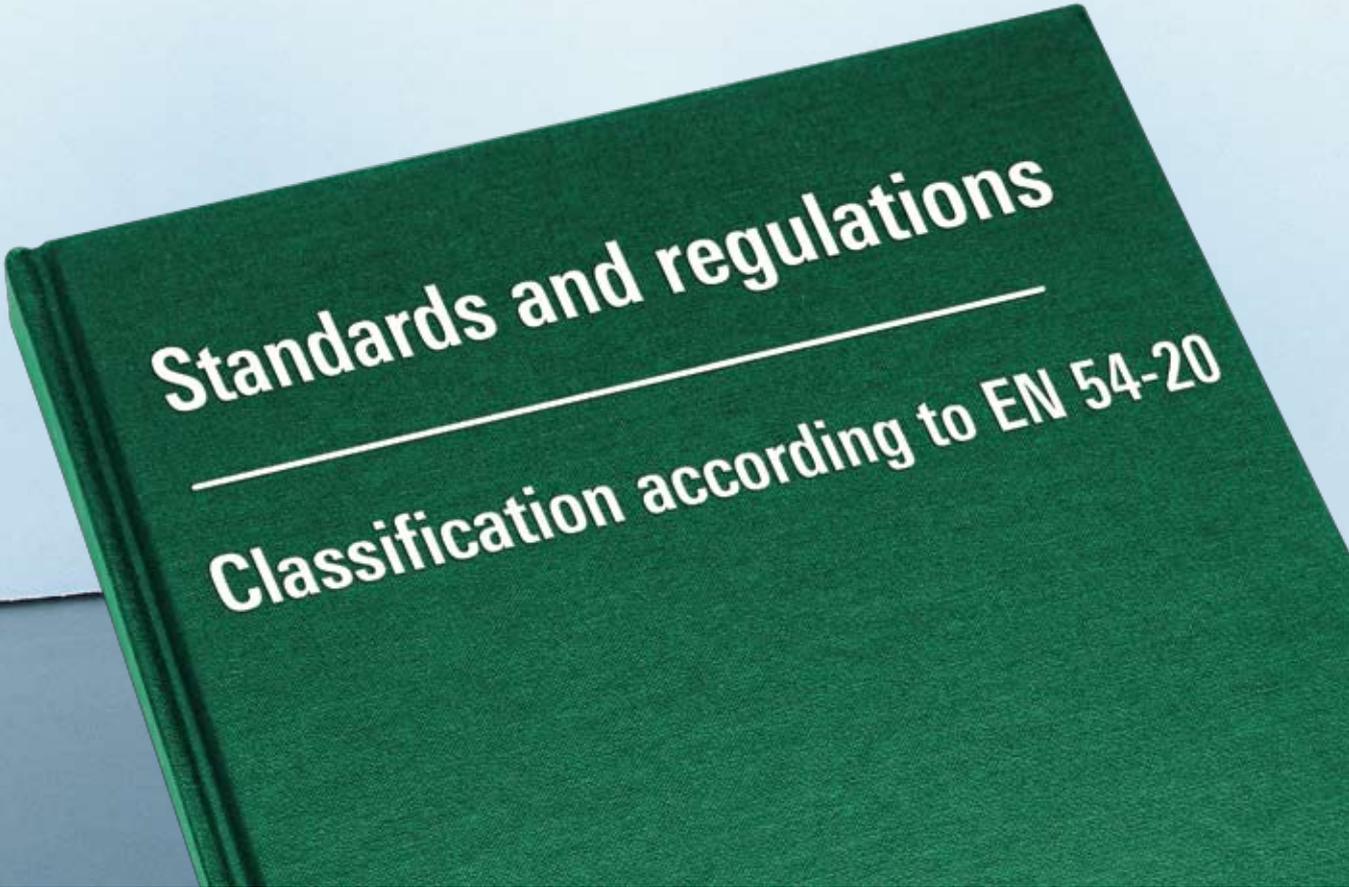


## EN 54-20

### What has EN 54-20 changed?

#### **EN 54-20 is required in order to apply CE marking**

From July 2009 onwards, anyone installing an air sampling smoke detection system - including the project design itself - which is not approved under EN 54-20 will lose the right to apply the CE marking. The product standard EN 54-20 for air sampling smoke detectors was introduced in 2007. Since July 2009 compliance with this harmonised standard has been mandatory throughout Europe. Any conflicting national standards and guidelines were revoked at this point. Since air sampling smoke detection systems, like other detectors for fire detection systems, fall under building product regulations, compliance with EN 54-20 is a prerequisite for CE marking.



# Standards and regulations

## Classification according to EN 54-20

### Sensitivity Transparency for the first time

In order to achieve a protection objective, a fire detector requires a defined degree of sensitivity. Until now the problem was a lack of reliable information about sensitivity, since manufacturers – and this is still the case – were able to declare the nominal sensitivity of their detectors based on their own data. EN 54-20 specifies the first classification system for smoke detectors with regard to their suitability for early fire detection. Down-scaling the previous test fire by up to factor of 40 has created fire scenarios for

3 separate detection categories. Now, for the first time, categories A to C (see table) establish the objective detection standards required to achieve specific protection targets.

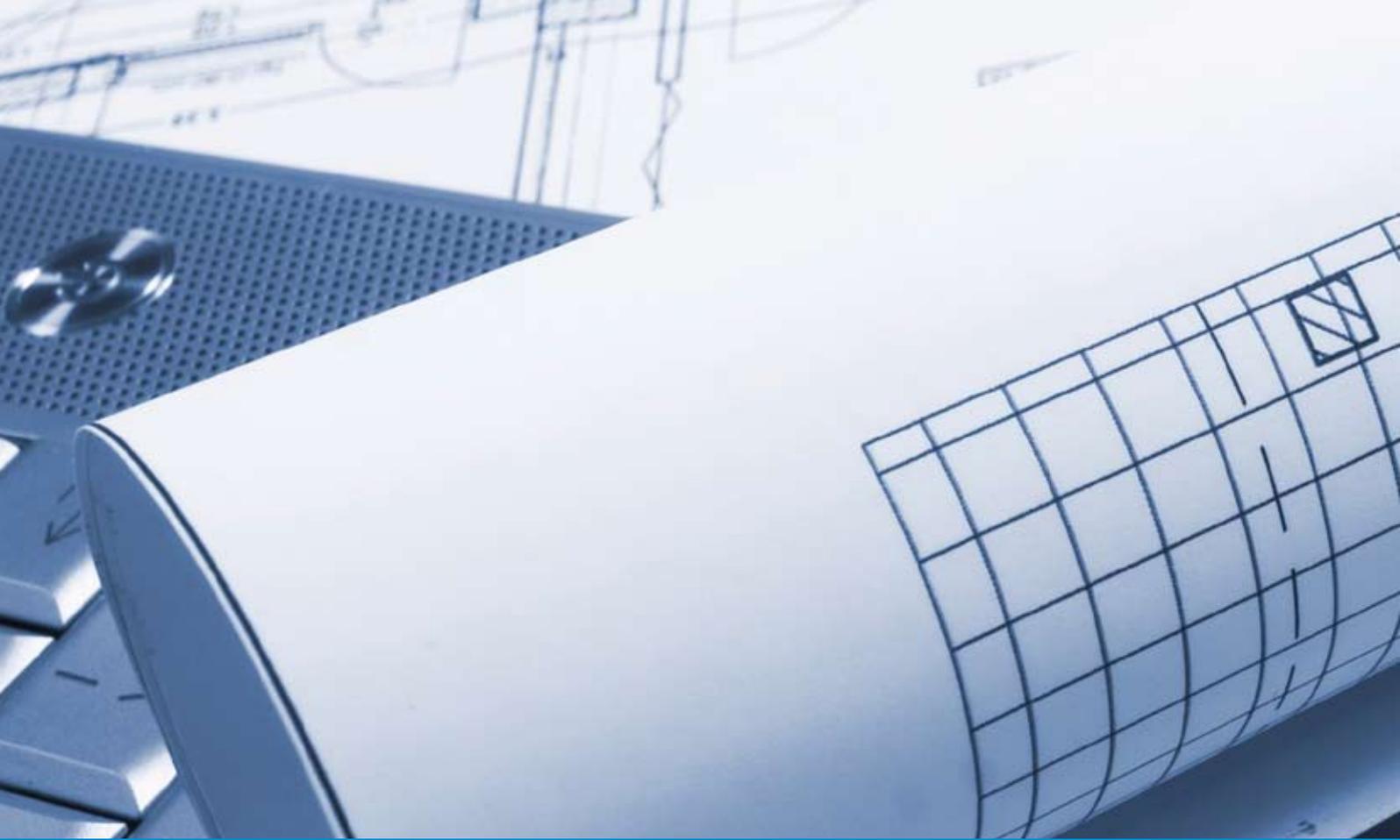
### Legal compliance for accessories too

From now on, all accessories must be tested and approved by an accredited test station and provided with a certificate of approval (e.g. VdS), unless a simple visual test can be used to ascertain that the accessory in question has no effect on the sensitivity of the system and/or

its sampling capacity. This change is not limited to the installation of e.g. VdS-approved systems but applies to every project design and installation of air sampling smoke detection systems in the EU. If, for example, an air sampling smoke detector used a non-approved filter it would automatically lose CE conformity. In case of doubt, the project designer should therefore look in advance at the possibilities for retrofitting with the appropriate approved accessory.

	Sensitivity	Area of application
Class A	Very high	Very early warning fire detection, designed primarily for areas with high levels of air conditioning and air dilution.
Class B	High	Very early fire detection for most areas in which valuable goods and/or processes need to be protected.
Class C	Normal	Applications for general fire protection requirements.

Table 1: Classification of sensitivity



## EN 54-20

### What has EN 54-20 changed?

#### **VDE 0833-2: At least Class B for high-ceiling applications**

Taking into account the classification according to EN 54-20 in VDE 0833-2, detection Classes A to C are now seen as quasi legal obligations in Germany. Specific classes must be installed according to the height of the ceiling (see Table 2). Similar considerations also currently exist in other European member states.

Height up to 12 m	Class A, B or C
Height from 16 m to 20 m	Class A or B
Height from 16 m to 20 m	Class A (with proof of the effectiveness of the detection)

Table 2: VDE 0833-2, issue 06/09



### **False alarm immunity and achievement of the protection objective**

In areas where there is an increased incidence rate of transient faults, air sampling smoke detection systems have – alongside physical filters – two fundamental procedures in place that have proved crucial in preventing false alarms:

- **Elimination of fault scenarios using fire pattern recognition**

The sensitivity/protection objective is retained.

- **Reduction of sensitivity through parameterisation or the use of self-learning algorithms**

The sensitivity/protection target is reduced.

EN 54-20 and its classification system have meant that the reduction of sensitivity is now governed by a narrow set of criteria. If a detector falls below established thresholds it is automatically assigned to a lower class and thus falls short of the protection objective. The consequence could even be a loss of CE conformity. Since the legal consequences of excessive desensitisation in the event of fire could be drastic, EN 54-20 is aimed at achieving a higher level of customer protection. The required detection quality must now actually be achieved in operation.

### **Limit design instead of prescribed transport times**

The logic behind EN 54-20 takes into account the project design possibilities of air sampling smoke detection systems:

certain test fires must be detected within a given time frame in order to satisfy the standard and its classes. This objective can be achieved in one of two ways; either by using more sensitive systems with longer (smoke) transport times or by employing less sensitive systems with shorter transport times. The effect of the transport time cannot therefore be viewed in isolation but should be considered as part of the sensitivity of any air sampling smoke detection system. There are no longer any transport time regulations as there were when CEA directive 4022 came into force. Instead, the test institutes have specified limit designs that are either better or worse than the project designs used in the test fires. These project designs can be found – depending on the manufacturer – in the technical manuals or in the project design software of the detector.



## EN 54-20

### What are the key factors involved in project design?

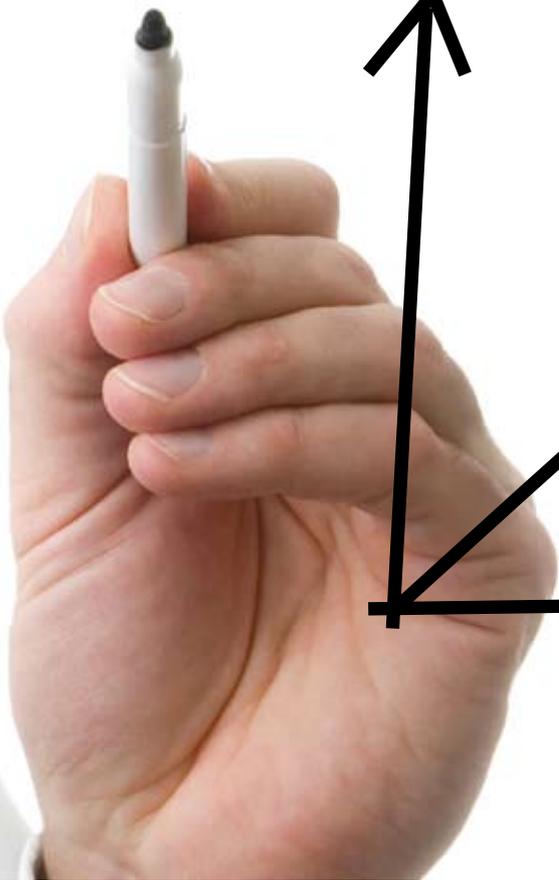
**It is not the detector class that is the critical factor, but the class of the project design itself.**

If an air sampling device has been correctly classified as class A or B, this does not necessarily mean that it will satisfy the class specified in the project design. Labelling a device with a detection class simply indicates that a minimum project design with a single sampling hole corresponding to the specified class can be implemented. It is therefore important to check that the project design satisfies in full the desired detection class (number of sampling holes, pipe length inc. accessories, Ill. 1).

Savings



Maximum coverage

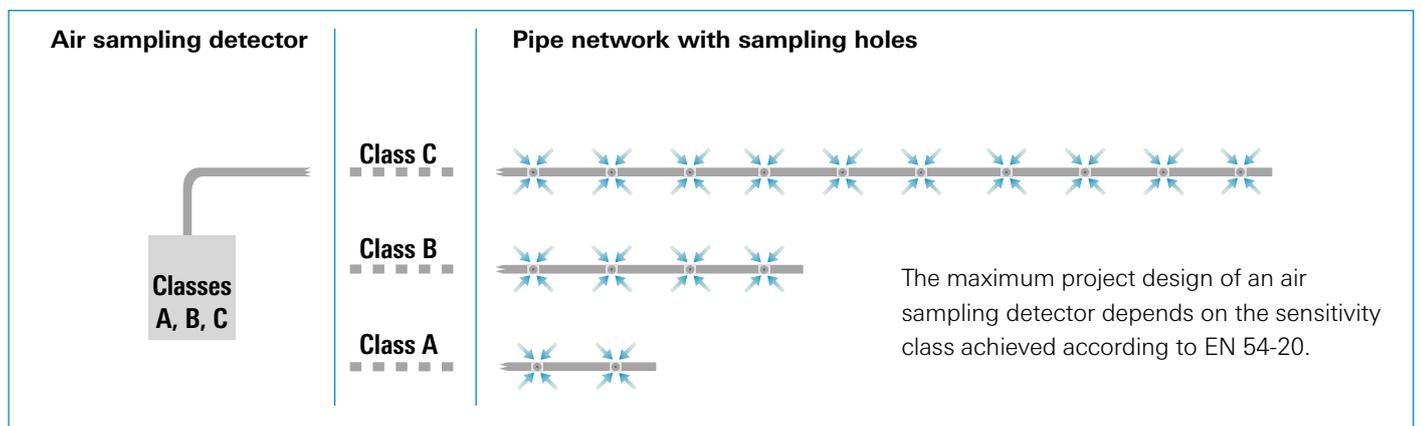


**Maximum coverage**

The maximum coverage of an air sampling smoke detection system is determined by the number of point-type detectors that can be replaced by an air sampling device. This is a crucial factor

in determining what savings can be made by installing an air sampling smoke detection system. The coverage can be worked out simply by calculating how many sampling holes can be installed at a reasonable distance from each other (usually about 8 m).

A high number of sampling holes or long pipework does not in itself represent any particular advantage.



**EN 54-20**  
Classification



## EN 54-20

# What are the advantages of TITANUS®- air sampling smoke detection systems?

### Greatest coverage

The **TITANUS®** family, which encompasses the **TITANUS MICRO-SENS®**, **TITANUS PRO-SENS®**, **TITANUS TOP-SENS®** and **TITANUS SUPER-SENS®** air sampling smoke detection systems, delivers an extremely high coverage, which complies with EN 54-20 and is unrivalled in today's market. Up to 64 sampling holes and 560 m of pipe system demonstrate its technical superiority in the field of fire detection and deliver the basis for cost effective project design. This is made possible by the outstanding detection properties of the **TITANUS®** HPLS light source and the use of a fan with a capacity of up to 560 Pa. The aim here is to meet a clearly defined protection target using as few air sampling smoke detectors as possible.



	Maximum design
Classes A, B and C	up to 64 sampling holes per device with up to 560 m pipe system

### Normal to high sensitivity

**TITANUS**® systems offer the right level of sensitivity for any situation. Whether it is simply used as a like-for-like substitute for point-type smoke detectors for monitoring clean rooms, **TITANUS**® sets new standards in fire detection, with sensitivity up to a thousand times higher than conventional smoke detectors, depending on the system. This means that even in larger spaces, fires can be securely detected at the earliest ignition phase, from just 1 gram of combustion.



### Tried and tested false alarm immunity

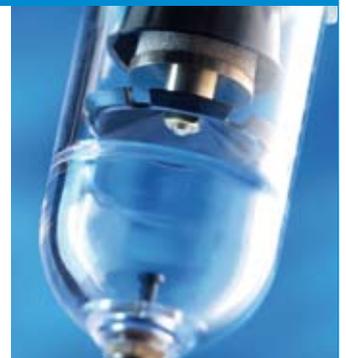
In virtually every field of technology it is a well known fact that algorithms are not infallible. The many different situations found in practice cannot all be simulated during the trial phase of new software. However, problems are unlikely to arise in the case of software that has been optimised over the years and tested many times over in a wide range of applications. This is why *LOGIC-SENS*, the fire pattern recognition system from the **TITANUS**® family, which has already been employed in thousands of difficult situations, has earned an excellent reputation during recent years in terms of false alarm immunity.



### Reliable accessories

The **TITANUS**®-solutions are noted for their high degree of flexibility when it comes to special requirements and changes of use. A flexible, future-oriented system, it offers a large and reliable range of accessories and a modular design.

Any necessary adjustments can therefore be quickly and inexpensively retrofitted, enabling it to deal with such changes as increased quantities of dust, new detection requirements or a subsequent move to an existing Ethernet-based risk management system.



### Broader temperature range

When used for monitoring unheated halls, air sampling smoke detection systems need to be able to function in sub-zero temperatures throughout the winter months. Depending on the relevant detection principle and component parts, most detectors tend to have operational temperature limits that do not allow this. **TITANUS**® air sampling smoke detection systems, in contrast, are approved for use in cold storage units at temperatures as low as  $-40\text{ }^{\circ}\text{C}$ . The upper temperature range for the installation site of this system is as high as  $+60\text{ }^{\circ}\text{C}$ .





## EN 54-20

# What are the advantages of TITANUS®- air sampling smoke detection systems?

### Fast, reliable project design

The various manufacturers of air sampling smoke detectors have found different ways of ensuring that their systems conform to the detection classes specified in EN 54-20. The majority of the project design software available needs to produce detailed system plans to be able to make a reliable statement about the conformity. It is often the case, however, that not all project design parameters are known in advance. Particularly in the case of "design limit planning", the later extension of a feed pipe or an increase in the distance between two openings can lead to loss of conformity.

The **TITANUS**® project design software, on the other hand, is designed to ensure that a reliable project design can be achieved in seconds – including the use of accessories.

The software is based on worst-case project design and takes into account the configuration options within the scope of the defined project design limits. The self-explanatory software does not require any specialist training and gives exact results in just a few seconds. It takes next to no time to produce a conformity declaration for the detection categories specified by the selected project design in accordance with EN 54-20.



### Deployment in noise-sensitive areas

In industrial applications the volume of an air sampling smoke detection system does not usually play a major role, as the normal noise level of 40 dB (A) or more gets lost in the ambient noise. The same is not true of museums, libraries, offices or hospitals.

The **TITANUS®** Silent was designed specifically for use in such noise-sensitive areas. A combination of noise-dampening measures allows this system to reduce the volume to as little as 23 dB (A). This easily satisfies the stipulations laid down by the WHO, which specify a maximum volume of 30 dB (A) for healthy sleep, as well as all other current national and international guidelines with respect to noise protection.



### Also suitable for use in high humidity

The sampling pipes of air sampling smoke detection systems are designed to condense and precipitate high humidity quickly and easily. When choosing an air sampling smoke detection system it is important to ensure that the device will also operate under the expected humidity conditions.

Above all in the months of October and November buildings are likely to experience a lengthy period when the relative humidity reaches 90 %. Devices that are not approved for these conditions will lose their CE conformity during this period. However, **TITANUS®** air sampling smoke detectors are approved for operation at a relative humidity from 10 to 95 %.



### Cost-effective technology

The main features of an air sampling smoke detection system should be clearly deduced from the requirements of the application. Subsequently, this is what will determine the cost of the system.

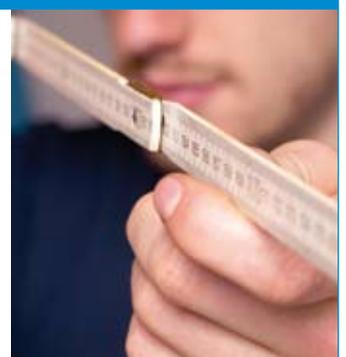
High cost-effectiveness can be achieved when the requirements and the features overlap as far as possible. This is why a broad spectrum, highly modular product range like that offered by the **TITANUS®** family is so indispensable.



### Cost-effective technology

**TITANUS®** air sampling smoke detection systems are suitable for use in a number of different applications. These include:

- Warehouse and logistics facilities
- Refrigerated warehouses
- IT and telecommunication facilities
- Libraries, archives and museums
- Recycling plants and tunnels
- Hotel rooms, hospitals and saunas
- Prisons and strong rooms
- Wind farms and transformer stations
- Electricity generating plants and high voltage switchboards
- Server and switch cabinets
- Heritage and modern architecture





**PREVENTION** **OxyReduct®**

Actively prevents fires.  
OxyReduct® is the innovative way in fire protection.

**DETECTION** **TITANUS®**

Very early fire detection with TITANUS® provides critical additional time to assess the risk and take counter measures.

**SUPPRESSION** **FirExting®**

Fixed fire extinguishing systems with various gaseous extinguishing agents.

**COORDINATION** **VisuLAN®**

Visualisation and control of important system data combined with multiple diagnostic and messaging functions integrated into a powerful building management system.



**WAGNER Group GmbH**  
Germany, Headquarters  
+49 (0)511-97383-0  
[www.wagner.eu](http://www.wagner.eu)

WAGNER Austria GmbH  
+43 (0)2262-64262-0  
[www.wagner-austria.com](http://www.wagner-austria.com)

WAGNER SCHWEIZ AG  
+41 (0)44-8325400  
[www.wagner-schweiz.ch](http://www.wagner-schweiz.ch)

WAGNER China (Shanghai)  
+49 (0)511-97383-285  
[www.wagner-asia.com](http://www.wagner-asia.com)

WAGNER UK Ltd.  
+44 870-3336116  
[www.wagner-uk.com](http://www.wagner-uk.com)

WAGNER Poland Sp. z o.o Sp. k.  
+48 (0)22-72635-50  
[www.wagnerpoland.pl](http://www.wagnerpoland.pl)

WAGNER Nederland B. V.  
+31 (0)30-2200264  
[www.wagner-nl.com](http://www.wagner-nl.com)

WAGNER Middle East FZE  
+971 42990887  
[www.wagner-arabia.com](http://www.wagner-arabia.com)