



## Inspections

### 1. General

Installations in hazardous areas have special features that allow their correct operation in these areas. For safety reasons it is essential that the effectiveness of these special features is sustained throughout the service life of such installations.

This requires an initial inspection and periodic inspections of their operation and, where applicable, of maintenance and repair work. The importance of these inspections of electrical installations, starting with the initial inspection of electrical installations and followed up by specified periodic inspections for ensuring the correct state, is often underestimated and the required actions are neglected.

The periodic inspections with any repair work that might be necessary contribute greatly to the smooth operation of installations. They prolong the service life of equipment and protective systems, they prevent unforeseen shutdowns of installations and they increase the occupational safety. Unforeseen interruptions are not only costly, but they also require a lot of man hours. Employing qualified technicians for special, sporadic tasks is costly and, for this reason, they are not always available. Therefore, employing external certified service providers to ensure a correct inspection and surveillance is a good alternative.

Equipment, service facilities and the expertise of employees can be certified internationally. The accreditation of inspection authorities is carried out on a national basis.

The services provided by our inspection department include the following:

- checking of the selection of equipment
- performance of documentation and organisation checks and initial inspections
- periodic inspections
- repairs and modifications (service facilities)



**SIS 145**

Inspections accompanying maintenance tasks include visual, close and detailed inspections that are carried out as part of the maintenance work. They can be carried out in combination with certification according to the IECEx Scheme «Service Facilities».

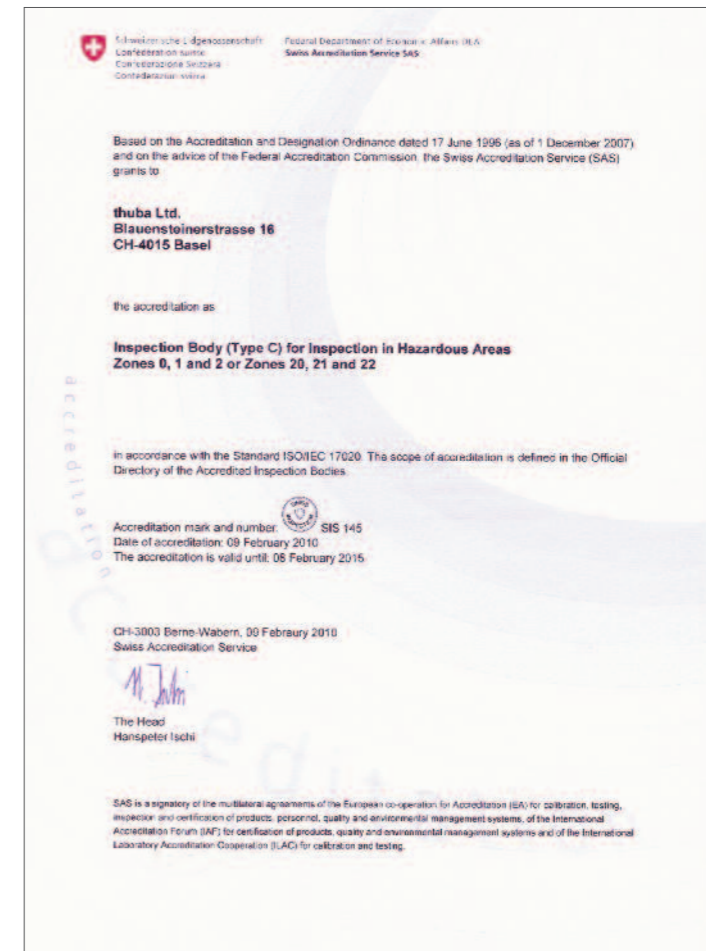
Any measures taken are only carried out by mutual agreement with our customers, in order to be able to make optimum use of financial and human resources.

In this way, costly corrections to new installations can be prevented in good time.

### 2. Definitions

#### 2.1 Documentation and organisation check

The documentation and organisation check is carried out to check whether the specifications laid down in the documentation of the installations (Zone classification) have been implemented during the selection of equipment and protective systems. In addition, the correct documentation of the equipment and protective systems is also checked. The documentation shall comply with IEC/EN 60079-0 (Section 30) or Directive 94/9/EC respectively.



#### 2.2 Technical inspections

An activity that involves the careful examination of an object with a view to issuing a reliable statement on the state of the object, whereby it is carried out without disassembling or, if required, with partial disassembling and supplemented by other measures, e.g. measurements.

##### 2.2.1 Initial inspection

The initial inspection is a detailed inspection and shall be carried out before an installation is put into operation. In addition to the aspects covered by the visual and close inspections, the initial inspection includes the identification of such faults that can only be determined by accessing equipment, for example, the opening enclosures and/or, if necessary, the use of tools and testing equipment.

##### 2.2.2 Periodic inspection

Inspection of all electrical equipment, systems and installations carried out at regular intervals.

##### 2.2.3 Visual inspection

The visual inspection comprises an external scrutiny for the timely identification of defects that

are apparent to the eye (without accessing the equipment or installations, and without interfering with the installation and assembly).

The visual inspection can be carried out on equipment that is switched on.

##### 2.2.4 Close inspection

The close inspection comprises the timely identification of defects that are not immediately visible or audible and is carried out analogue to the visual inspection, but with the use of access equipment (for example, ladders) and, if necessary, other aids (tools). Accessing the object under inspection, for example, the opening of an enclosure is not usually necessary when carrying out a close inspection.

The close inspection can be carried out on equipment that is switched on.

##### 2.2.5 Detailed inspection

In addition to the aspects covered by the visual and close inspections, the detailed inspection also includes the identification of such faults that can only be determined by accessing equipment, for example, opening of enclosures and/or, if necessary, using tools and testing equipment.

Generally speaking, the equipment shall be disconnected before carrying out detailed inspections.

#### 2.2.6 Sample inspection

The sample inspection of parts can cover electrical equipment, systems and installations. The sample inspection can also be carried out to determine the complexity of the inspection if relevant documents are not available.

#### 2.3 Scope of inspection

The inspection covers both the selection of the objects to be inspected (for example, components, samples, review of existing inspection and repair reports) and the intensity of the respective inspection.

#### 2.4 Inspection period

The inspection period is the time until the next recurrent (periodic) inspection. It shall be specified in such a way that, based on all the generally accessible sources of knowledge and practical experience, the object to be inspected can be used safely in the period between two inspections.

### 3. Documentation and organisation check

In particular, the documentation and organisation check is carried out to verify whether:

- the specified documentation for installations or parts of installations respectively is complete,
- the equipment is being used in accordance with the result of the hazard assessment (installation documentation with details relating to zones, equipment protection levels, equipment groups (gas and dust), temperature classes or surface temperatures, external influences, etc. for each location) or the safety-related assessment,
- the requirements specified in the approvals procedure of the occupational health and safety institutions are observed,
- the specified selection of equipment was carried out correctly and
- the documentation required for the equipment and protective systems, such as declarations of conformity, manufacturer's instructions (operating instructions) and possible certificates are available.

### 4. Technical inspections

The technical inspections are carried out on the basis of the standard IEC/EN 60079-17: «Inspection and maintenance of electrical installations». They shall be carried out in accordance with the standard IEC/EN 60079-14: «Electrical installations design, selection and erection».

The term inspection covers:

- the determination of the actual state
- of work equipment,
- of an installation or
- of a workplace in hazardous areas,
- the comparison of the actual state with the target state and
- the assessment of the discrepancy between the actual state and the target state.

During the technical inspection, the safety-related features of a test object are checked with regard to their state and availability and, if necessary, the function is tested on the object itself using a suitable method. These include, for example:

- external or internal visual inspections,
- function and efficiency tests,
- testing with measuring and testing equipment,
- laboratory tests.

Depending upon the inspection concept and the equipment-related inspection requirements, the technical inspection can comprise visual inspections, and, if required, also close and detailed inspections and the checking of the safe functioning.

In the case of inspections before the commissioning of equipment and installations, the correct assembly, installation, location conditions and safe function are verified as part of the technical inspection. Among other things, this inspection includes:

- checking of equipment, directly or on the basis of relevant parameters, for the specified absence of ignition sources (for example, sufficient insulation resistance of electric cables or apparatus, the integrity of the degree of protection of an enclosure or the gaps of flameproof enclosures);
- checking of the technical effectiveness, directly or on the basis of relevant parameters (pressurized enclosures, etc.);
- checking of the safe function of safety, control and regulating devices (manual motor starters, protection against dry running of canned motor

pumps, safety temperature limiters of electric heating systems, etc.

#### 4.1 Initial inspections

The initial inspection is performed as a detailed inspection. Before the initial inspection a one-time documentation and organisation check is carried out. This is only repeated in the event of large-scale modifications or innovations. The initial inspection of new installations is carried out before commissioning.

Paragraph 2.8 of Annex II to Directive 92/1999/EC specifies the following measures:

«Before a workplace containing places where explosive atmospheres may occur is used for the first time, its overall explosion safety must be verified. Any conditions necessary for ensuring explosion protection must be maintained. Such verification must be carried out by persons competent in the field of explosion protection as a result of their experience and/or professional training».

#### 4.2 Periodic inspections

During the periodic inspections, the documents that were presented before putting equipment/installation into operation for the first time (initial inspection) shall be checked for significant changes or modifications, however only to the extent required for carrying out the technical inspection.

The documentation and organisation check that is carried out as part of the periodic inspections is restricted to checking the completeness of the inspections of installation parts and to any changes made since the inspection before commissioning. A new inspection is only necessary if the conditions required to ensure the explosion

protection have been changed to such an extent that the explosion protection of the workplaces and work environment, as well as of the measures for the protection of third parties has been affected.

#### 4.3 Inspection of mobile equipment (hand apparatus, portable and transportable equipment)

Mobile equipment is particularly prone to damage and misuse. For this reason, the interval between periodic inspections has to be shortened. Mobile equipment shall be subjected to a close inspection at least every 12 months. Enclosures that, for example, have to be opened frequently to replace batteries shall be subjected to a detailed inspection at least every 6 months. The operator shall be instructed to subject all equipment to a visual inspection every time before use. The apparatus must not show any visible signs of damage.

### 5. Recording of inspection results

The results of each inspection have to be recorded. These reports act as a basis for the recurrent, periodic inspections and include:

- Records of inspection results, test certificates and inspection reports from the last periodic inspection
- Approval requirements

The results of inspections shall be recorded in accordance with the checklists. They can be recorded as a hardcopy or in electronic systems. The inspection documentation (at least a copy thereof) shall be available at the operation site.

Depending upon the results of the inspection, it can be necessary to adjust the inspection periods. In individual cases it might also be necessary to review the inspection concept.

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