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The translation is of the ordinance in its version of 2004, updates and changes since 2004 have not be incorporated. For questions please contact the Safety Specialist.

**Ordinance**  
**concerning the protection of safety and health**  
**in the provision of work equipment and its use at work,**  
**concerning safety when operating installations subject to monitoring**  
**and concerning the organization of industrial safety and health at work**  
**(Betriebssicherheitsverordnung - Ordinance on Industrial Safety and Health –**  
**BetrSichV)<sup>\*)</sup>**

Article 1 of the Ordinance of 27 September, 2002 (BGBl. - Federal Gazette - I p. 3777) last amended by Article 9 of the Ordinance of 23 December 2004 (BGBl. I - Federal Gazette - p. 3758 and 3813)

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<sup>\*)</sup> The present Ordinance serves for the implementation of

1. Council Directive [95/63/EC](#) of 5 December 1995 amending Directive 89/655/EEC concerning the minimum safety and health requirements for the use of work equipment by workers at work (second individual Directive within the meaning of Article 16 (1) of Directive 89/391/EEC) (OJ EC No. L 335 p. 28),

2. Directive [1999/92/EC](#) of the European Parliament and of the Council of 16 December 1999 on minimum requirements for improving the safety and health protection of workers potentially at risk from explosive atmospheres (15th individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC) (OJ EC No. L 23 p. 57)

and

3. Directive [2001/45/EC](#) of the European Parliament and of the Council of 27 June 2001 amending Council Directive 89/655/EEC concerning the minimum safety and health requirements for the use of work equipment by workers at work (second individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC) (OJ EC No. L 195 p. 46).

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- Annex 1: Minimum requirements on work equipment pursuant to section 7 (1) no. 2
- Annex 2: Minimum requirements for the improvement of safety and health of workers using work equipment at work
- Annex 3: Zone classification of potentially explosive atmospheres
- Annex 4:
  - A. Minimum requirements for improving the safety and health protection of workers potentially at risk from explosive atmospheres
  - B. Criteria for the selection of equipment and protective systems
- Annex 5: Inspection of special pressure equipment pursuant to section 17

## Part 1 General provisions

### Section 1 Scope

(1) The present Ordinance shall be applicable to the provision of work equipment by employers and to the use of work equipment by workers at work.

(2) The present Ordinance shall also apply to installations subject to monitoring covered by section 2 (7) of the Geräte- und Produktsicherheitsgesetz (Equipment and Product Safety Act) to the extent that they are

1.

- a) steam boiler installations,
- b) pressure vessel installations except steam boilers,
- c) filling installations,
- d) internally pressurized pipes for flammable, highly flammable, extremely flammable, corrosive, toxic or highly toxic gases, vapours, or fluids,

which are or include

- aa) pressure equipment covered by Article 1 of Directive 97/23/EC of the European Parliament and of the Council of 29 May 1997 on the approximation of the laws of the Member States concerning pressure equipment (OJ EC No. L 181 p. 1) with the exception of pressure equipment covered by Article 3 (3) of this Directive,
  - bb) mobile pressure equipment used within the establishment covered by Article 1 (3) No. 3.19 of Directive 97/23/EC, or
  - cc) simple pressure vessels covered by Article 1 of Council Directive 87/404/EEC of 25 June 1987 on the harmonization of the laws of the Member States relating to simple pressure vessels (OJ EC No. L 220 p. 48) as amended by Council Directive 90/488/EEC of 17 September 1990 (OJ EC No. L 270 p. 25) and Council Directive 93/68/EEC of 22 July 1993 (OJ EC No. L 220 p. 1) with the exception of simple pressure vessels with a pressurized product content of not more than 50 bar•liter,
2. Lift installations which are
- a) lifts covered by Article 1 of the European Parliament and Council Directive 95/16/EC of 29 June 1995 on the approximation of the laws of the Member States relating to lifts (OJ EC No. L 213 p. 1),
  - b) machinery covered by Annex IV Letter A No. 16 of Directive 98/37/EC of the European Parliament and of the Council of 22 June 1998 on the approximation of the laws and ordinances of the Member States relating to machinery (OJ EC No. L 207 p. 1), insofar as the installations are assembled, installed and operated stationarily and permanently with the exception of the following installations:
    - 1. ship lifts,
    - 2. shelve and rack servicing equipment and installations
    - 3. escalators and moving sidewalks<sup>1</sup>,
    - 4. inclined movators<sup>2</sup> with the exception of inclined elevators,
    - 5. manually operated lift installations,

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<sup>1</sup> A.d.Ü.: Synonyms: travolators/moving walkways

<sup>2</sup> A.d.Ü.: Synonym: moving ramps

6. conveyor installations stationarily attached to cranes and designated for the transport of crane operators,
  7. retractable pilot houses on inland waterway vessels,
- 
- c) continuous lifts for persons,
  - d) construction-site hoists also used for lifting persons, or
  - e) mill-type rope hoists.
3. Installations in potentially explosive atmospheres which are or contain equipment, protective systems, or safety devices, controlling devices and regulating devices covered by Article 1 of Directive 94/9/EC of the European Parliament and the Council of 23 March 1994 on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres (OJ EC No. L 100 p. 1), and
  4.
    - a) storage installations with a total volume of more than 10 000 liters,
    - b) filling installations with a handling volume of more than 1 000 liters per hour,
    - c) petrol filling stations and airfield refueling installations, and
    - d) discharging stations with a handling volume of more than 1 000 liters per hour, provided that flammable, highly flammable or extremely flammable fluids are stored or filled up.

The present Ordinance furthermore applies to installations that are required for the safe operation of the installations mentioned in the 1st sentence hereof. The provisions of Part 2 shall apply to the installations and establishments listed in the 1st and 2nd sentences hereof only to the extent that they have been provided by an employer and are used by workers at work.

(3) The regulations of part 3 of this Ordinance shall not apply to filling installations which are energy installations covered by section 2 (2) of the Energiewirtschaftsgesetz (Energy Industry Act) and have been erected on the premises of public gas supply companies and are operated by the same.

(4) The present Ordinance shall not apply in establishments which are subject to the Bundesberggesetz (Federal Mining Act), on seagoing vessels sailing under a foreign flag or on seagoing vessels for which the Federal Ministry of Traffic, Building and Housing Affairs has granted permission to fly the German flag only for the first transit journey to another port pursuant to section 10 of the Flaggenrechtsgesetz (Law of the Flag Act). Notwithstanding the provisions of the 1st sentence hereof, the provisions of Part 3 of the present Ordinance are applicable to installations subject to monitoring in surface installations of mining establishments except pipelines.

(5) Federal and state immission protection provisions as well as federal traffic law provisions shall not be affected to the extent that they contain stricter requirements than the provisions of the present Ordinance. Federal and state provisions relating to nuclear law shall not be affected to the extent that stricter or different requirements are made or permitted by them.

(6) The Federal Minister of Defense may authorize exceptions from the requirements of this Ordinance with respect to work equipment and installations subject to monitoring which are otherwise covered by this Ordinance, if so warranted by mandatory defense reasons or to comply with international obligations of the Federal Republic of Germany, and if safety is guaranteed by other means.

## **Section 2 Definitions**

(1) For the purposes of this Ordinance, work equipment means tools, equipment, machinery or installations. Installations as referred to in the 1st sentence are composed of several functional units interacting with each other, and whose safe operation is fundamentally influenced by this interaction, including, in particular, installations subject to monitoring covered by section 2 (7) of the Equipment and Product Safety Act.

(2) For the purposes of this Ordinance, the provision means all activities to be carried out by the employer in order to ensure that only work equipment that complies with the Ordinance can be made available to the workers. Provision as referred to in the 1st sentence also means assembly work, such as the assembly of work equipment, including the installation work necessary to ensure its safe use.

(3) For the purposes of this Ordinance, the use means any activity involving work equipment such as inspectioning, starting or stopping the equipment, its use, maintenance and servicing, checking, safety measures in the event of its failure, conversion and dismantling as well as transport.

(4) For the purposes of section 1 (2) sentence 1, the operation of installations subject to monitoring means the inspection of these installations by approved bodies or competent persons as well as their use pursuant to subsection 3 without an inspection prior to their first putting into service, dismantling and transport.

(5) For the purposes of this Ordinance, a modification of an installation subject to monitoring means any activity which influences the safety of an installation. Any service, maintenance or repair work influencing the safety of the installation shall also be considered a modification.

(6) For the purposes of this Ordinance, a fundamental modification of an installation subject to monitoring means any modification which influences the safety of the installation subject to monitoring to the extent that its safety features correspond to those of a new installation.

(7) For the purposes of this Ordinance, a competent person means a person who has the technical knowledge necessary for inspecting the work equipment because of his/her vocational training, professional experience and current activity on the job.

(8) For the purposes of this Ordinance, an explosive atmosphere is a mixture with air, under atmospheric conditions, of flammable substances in the form of flammable gases, vapors, mists or dusts in which, after ignition has occurred, combustion spreads to the entire unburned mixture.

(9) A hazardous explosive atmosphere is an explosive atmosphere which occurs in such a quantity (hazardous quantity) that special safety measures have to be taken to maintain the protection of safety and health of the workers or others.

(10) For the purposes of this Ordinance, a potentially explosive atmosphere is an area in which a hazardous explosive atmosphere may potentially occur. A place in which an explosive atmosphere is not expected to occur in such quantities as to require special precautions is deemed to be non-hazardous within the meaning of this Ordinance.

(11) For the purposes of this Ordinance, storage installations are indoor or outdoor rooms or areas, with the exception of petrol filling stations, which are designed for the storage of flammable, highly flammable or extremely flammable fluids in stationary or mobile containers.

(12) For the purposes of this Ordinance, filling stations are

1. installations in which pressure vessels used for the storage of gases are designed to be filled with compressed gases from mobile pressure equipment,
2. installations in which mobile pressure equipment is designed to be filled with compressed gases, and
3. installations in which vehicles, ships, or aircraft are designed to be filled with compressed gases.

(13) For the purposes of this Ordinance, filling stations are stationary installations in which transport vessels are designed to be filled with flammable, highly flammable or extremely flammable fluids.

(14) For the purposes of this Ordinance, petrol filling stations are stationary installations which serve to supply vehicles, ships and aircraft with flammable, highly flammable or extremely flammable fluids, including the pertinent storage tanks and reservoirs.

(15) For the purposes of this Ordinance, airfield refueling installations are installations or areas on airfields in which aircraft fuel reservoirs are filled from hydrant installations or airfield fuelling vehicles.

(16) For the purposes of this Ordinance, discharging stations are installations or areas in which transport vessels filled with flammable, highly flammable or extremely flammable fluids are designed to be discharged.

(17) For the purposes of this Ordinance, continuous lifts for persons are lift installations which are exclusively designed to transport persons and which are constructed in such a manner that elevator cars are attached to two endless chains and continuously circulated during operation.

(18) For the purposes of this Ordinance, construction-site hoists also used for lifting persons are temporary lifting installations set up on construction sites which are designed to lift persons and goods, and whose lifting height and number of stops can be adjusted to the progress of the construction works.

(19) For the purposes of this Ordinance, mill-type rope hoists are lift installations designed to transport goods or persons who are employed by the person operating the installation; mill-type rope hoists are driven by a winding drum which is pressed to a running friction disc by a control rope to be operated by the load suspension device for going upward, and released by a brake block for going downward.

## **Part 2** **Joint provisions relating to work equipment**

### **Section 3** **Hazard assessment**

(1) In his hazard assessment pursuant to section 5 of the Arbeitsschutzgesetz (Protection at Work Act) and with due regard to Annexes 1 to 5 hereof, section 7 of the Gefahrstoffverordnung (Hazardous Substances Act) and the general principles laid down in section 4 of the Protection at Work Act, the employer shall determine the activities to be carried out to ensure the safe provision and use of the work equipment. In particular, he shall account for the hazards that are associated with the use of the actual work equipment or which are caused at the workplace by interactions between the different pieces of work equipment or between the work equipment and substances used at work or in the working environment.

(2) If it is not possible to safely avoid the formation of hazardous explosive atmospheres pursuant to the provisions of the sections 7 and 12 of the Hazardous Substances Act, the employer shall assess

1. the likelihood that hazardous explosive atmospheres will occur and their persistence,
2. the likelihood that ignition sources, including electrostatic discharges, will be present and become active and effective,
3. the scale of the anticipated effects of explosions.

(3) In particular, the type, scope and time intervals for necessary inspections shall be determined with respect to work equipment. Furthermore, the employer shall determine and define the requirements to be satisfied by persons he shall designate to carry out the inspections and inspections for work equipment.

### **Section 4** **Requirements concerning the provision and use of work equipment**

(1) The employer shall perform the activities called for by the general principles laid down in section 4 of the Protection at Work Act in order to ensure that the employees shall be provided with work equipment only which is suitable for the conditions given at the workplace, and which guarantees that safety and health at work are ensured if it is used under its intended operating conditions. Where it is not possible fully so to ensure that work equipment can be used by workers without risk to their safety or health, the employer shall take appropriate measures to minimize the risks. The 1st and 2nd sentences shall apply, *mutatis mutandis*, to the assembly of work equipment whose safety is conditional upon its assembly.

(2) The activities referred to in subsection 1 hereof shall be carried out with due regard to the rules and findings determined by the Advisory Committee on Protection at Work as published by the Federal Ministry of Economics and Labor in the Bundesarbeitsblatt (Federal Labor Gazette).

These activities shall be in compliance with the result of the hazard assessment pursuant to section 3 and the state of the art.

(3) The employer shall ensure that no work equipment is used unless it is suitable for its intended purpose pursuant to the provisions hereof.

(4) When defining the activities referred to in subsections 1 and 2, ergonomic aspects of the workplace, work equipment, work organization, work sequence and task shall be accounted for in the selection and use of work equipment. This requirement applies, in particular, to the posture to be taken by the workers when using the work equipment.

### **Section 5 Potentially explosive atmosphere**

(1) The employer shall classify places where explosive atmospheres may occur covered by section 2 (10) into zones in accordance with Annex 3, having due regard to the results of the hazard assessment carried out pursuant to section 3.

(2) The employer shall ensure that the minimum requirements laid down in Annex 4 are applied.

### **Section 6 Explosion protection document**

(1) In carrying out the obligations laid down in section 3, and regardless of the number of workers, the employer shall ensure that a document, hereinafter referred to as the "explosion protection document", is drawn up and kept up to date.

(2) The explosion protection document shall demonstrate in particular:

1. that the explosion hazards have been determined and assessed,
2. that adequate measures will be taken to attain the aims of explosion protection,
3. those places which have been classified into zones in accordance with Annex 3, and
4. those places where the minimum requirements set out in Annex 4 will apply.

(3) The explosion protection document shall be drawn up prior to the beginning of the works. It shall be revised whenever the work equipment or work sequence has been modified, enhanced or redesigned.

(4) Without prejudice to the individual responsibility of each employer as provided for in the Protection at Work Act and the sections 7 and 17 of the Hazardous Substances Act, the employer responsible for the provision and use of the work equipment shall coordinate the implementation of all the measures concerning workers' health and safety and shall state, in the explosion protection document referred to in subsection 1, the aim of that coordination and the measures and procedures for implementing it.

(5) In compliance with the obligations laid down in subsection 1 hereof, existing hazard assessments, documents or other, equivalent reports may be used that have been prepared under obligations imposed by other legal provisions.

### **Section 7 Requirements concerning the nature of work equipment**

(1) The work equipment made available to the workers by the employer for the first time shall

1. comply with those legal provisions by which Community Directives are implemented into German law, or
2. comply with the other legal provisions, but at least with the provisions contained in Annex 1, if the aforementioned legal provisions are not applicable.

(2) Work equipment made available to the workers for the first time prior to 3 October 2002 shall

1. comply with the legal provisions in force at the time it was made available for the first time, by which Community Directives are implemented into German law, or
2. comply with the other legal provisions in force at the time it was made available for the first time, but at least with the provisions contained in Annex 1, nos. 1 and 2, if the aforementioned legal provisions are not applicable.

Notwithstanding the stipulations of the 1st sentence, the special work equipment listed in Annex 1 no. 3 shall at least comply with the provisions of Annex 1 no. 3 on or before 1 December 2002.

(3) Work equipment designed to be used in potentially explosive atmospheres shall comply with the requirements of Parts A and B of Annex 4 if it is made available to the workers in the enterprise for the first time after 30 June 2003.

(4) Work equipment designed to be used in potentially explosive atmospheres shall comply with the minimum requirements of Part A of Annex 4 after 30 June 2003 if has already been used or made available to the workers in the enterprise for the first time before this date, and

1. no legal provisions are applicable by which Directives of the European Communities other than Directive 1999/92/EC have been implemented into national law, or
2. such legal provisions are applicable in part only.

(5) The employer shall take the necessary measures to ensure that the work equipment complies with the requirements laid down in subsections 1 to 4 hereof throughout its entire useful life.

## **Section 8 Other safety measures**

When the use of work equipment involves a special risk to the safety or health of workers, the employer shall take the measures necessary to ensure that the use of work equipment is restricted to those persons given the task of using it.

## **Section 9 Information and training of workers**

(1) When providing information to workers pursuant to section 81 of the Betriebsverfassungsgesetz (Works Constitution Act) and section 14 of the Protection at Work Act, the employer shall take all measures to ensure that

1. adequate information concerning the hazards workers are exposed to, which result from work equipment in their direct work environment, even though they might not use the work equipment themselves, and
2. if necessary, instructions concerning the work equipment used at work are available in a form and language they can understand. The instructions must at least contain information on the conditions of use, foreseeable abnormal situations, and any experience made concerning the use of the work equipment.

(2) When providing training to workers pursuant to section 12 of the Protection at Work Act, the employer shall take all measures to ensure that

1. workers using work equipment receive adequate training, including training on any hazards which such use may entail, and
2. the workers given the task of carrying out repairs, maintenance or modifications receive adequate special training.

### **Section 10 Inspection of work equipment**

(1) The employer shall ensure that where the safety of work equipment depends on the installation conditions, it shall be subjected to an inspection (after installation and before first being put into service) and an inspection after assembly at a new site or in a new location. The purpose of this inspection is to ensure that the work equipment has been installed correctly and is operating safely. The inspection shall only be carried out by competent persons in the respective field.

(2) The employer shall ensure that work equipment exposed to conditions causing deterioration which is liable to result in dangerous situations is subject to periodic inspections at intervals determined according to section 3 (3) hereof and, where appropriate, to inspection by competent persons. The employer shall ensure that work equipment is subjected to special inspections by competent persons each time that exceptional circumstances which are liable to jeopardize the safety of the work equipment have occurred. For the purposes of the 2nd sentence hereof, exceptional circumstances mean, in particular, accidents, modification of the work equipment, prolonged periods of inactivity or natural phenomena. The measures taken pursuant to the 1st and 2nd sentences hereof shall be designed to ensure that the deterioration can be detected and remedied in good time and that health and safety conditions are maintained.

(3) The employer shall ensure that work equipment is inspected by competent persons for its safe operation each time repairs have been performed which are liable to jeopardize the safety of the work equipment.

(4) The employer shall ensure that the inspections also comply with the results of the hazard assessment performed pursuant to section 3 hereof.

### **Section 11 Records**

The employer shall record the results of the inspections carried out pursuant to section 10. The competent authority may request that these records be made available to it also at the location of the enterprise. Records shall be kept for an adequate period of time and at least until the next inspection. When work equipment that is subject to section 10 (1) and (2) is used outside the undertaking it must be accompanied by physical evidence that the last inspection has been carried out.

## **Part 3 Special provisions relating to installations subject to monitoring**

### **Section 12 Operation**

(1) Installations subject to monitoring shall be assembled, installed, and operated according to the state of the art. In compliance with the state of the art, the rules and findings determined

by the Advisory Committee on Protection at Work as published by the Federal Ministry of Economics and Labor in the Federal Labor Gazette shall be adhered to.

(2) Installations subject to monitoring shall only be put into service for the first time or after significant modifications

1. if they comply with the requirements of the provisions contained in section 3 (1) of the Equipment and Product Safety Act, by which the Directives referred to in section 1 (2) sentence 1 have been implemented into German law, or
2. if they comply with the other legal provisions, but at least with the state of the art, where the aforementioned legal provisions are not applicable.

Installations subject to monitoring shall not be put into service after a modification unless the parts of the installations that are affected by the modification comply with the state of the art.

(3) Any person who operates an installation subject to monitoring shall keep the same in a proper condition, ensure its surveillance, perform all necessary repairs and maintenance without delay and take all safety measures necessary in view of the conditions.

(4) Any person who operates a lift installation shall ensure that emergency calls from an elevator car are responded to within reasonable time, and that rescue activities are performed properly.

(5) An installation subject to monitoring shall not be operated if it has defects by which workers or third parties may be put at risk.

### **Section 13 Reservation of approval**

(1) The assembly, installation, operation, significant modifications and changes in type or operating conditions affecting the safety of the installation of

1. steam boiler installations covered by section 1 (2) sentence 1 no. 1 letter a comprising fired or otherwise heated pressure equipment with the risk of overheating intended for generation of steam or super-heated water at temperatures higher than 110 degrees Celsius which are to be classed in category IV pursuant to Article 9 in connection with Table 5 of Annex II of Directive 97/23/EC,
2. filling installations covered by section 1 (2) sentence 1 no. 1 letter c comprising pressure equipment designed for filling compressed gases into mobile pressure equipment for transfer to others with a filling capacity of more than 10 kilograms per hour, as well as for filling compressed gases into vehicles, ships, or aircraft,
3. storage installations, filling installations and petrol filling stations covered by section 1 (2) no. 4 letters a to c for highly flammable or extremely flammable fluids, and
4. stationary airfield refueling installations covered by section 1 (2) sentence 1 no. 4 letter c shall require a permit of the competent authority. The 1st sentence hereof shall not be applicable to
  1. installations in which steam or hot water is obtained by a production process involving heat recovery, unless flue gases are cooled, and the resulting steam or hot water are not primarily supplied to the process installation, and
  2. installations designed for the disposal of refrigerants taken from heat exchangers which are filled into mobile pressure equipment.

(2) The permit shall be applied for in writing. All documents necessary for the assessment of the installation shall be attached to the application for a permit. An expert opinion delivered by

an approved body inspectionifying to the compliance of the erection, type, and operating conditions of the installation with the present Ordinance shall be filed together with the application.

(3) Notwithstanding subsection 2 hereof, installations covered by subsection 1 no. 3 and no. 4 hereof shall not require the involvement of an approved body.

(4) The application shall be decided upon within a term of three months of receipt by the competent authority. This time limit can be extended if so warranted by the circumstances. The permit shall be deemed to have been granted unless the competent authority prohibits the assembly and erection of the installation within the period of time specified in the 1st and 2nd sentences hereof.

(5) The permit may be restricted, limited in time, granted conditionally and combined with special requirements. The subsequent inclusion, modification or amendment of special requirements shall be permissible.

(6) Subsection 1 hereof shall not be applicable to installations subject to monitoring which are operated by the federal authority in charge of waterways, the federal armed forces, and the federal border guard.

#### **Section 14 Inspection prior to putting into service**

(1) An installation subject to monitoring shall only be put into service for the first time or after significant modifications if an approved body has inspected the installation with regard to its intended operating conditions for its proper condition as regards the assembly, installation, the conditions of erection and the safety of the installation.

(2) After a modification, an installation subject to monitoring covered by section 1 (2) sentence 1 nos. 1 to 3 and no. 4 letters a to c shall only be put back into service if an approved body has inspected the installation for its proper condition regarding operation, provided that the operation or type of the installation is affected by the modification.

(3) The inspections of installations subject to monitoring pursuant to subsections 1 and 2 hereof concerning

1. equipment, protective systems as well as safety devices, controlling devices and regulating devices covered by Directive 94/9/EC,
2. pressure equipment covered by Directive 97/23/EC classified pursuant to Article 9 in connection with Annex II of the Directive according to
  - a) Table 1 in
    - category I, II or
    - category III or IV, if the maximum pressure PS does not exceed one bar,
  - b) Table 2 in
    - category I or
    - category II or III, if the maximum pressure PS does not exceed one bar,
  - c) Table 3 in
    - category I or

- category II, if the maximum pressure PS is more than 500 bar and the product of PS and the volume V does not exceed 1 000 bar·liter,
- d) Table 4 in category I, if the maximum pressure PS is more than 500 bar and the product of PS and the volume V does not exceed 1 000 bar·liter,
- e) Table 5 in category I or II,
- f) Table 6, if the product of the maximum pressure PS and the nominal size DN does not exceed 2 000 bar and the pipeline is not used for very toxic fluids, or
- g) Table 7, if the product of the maximum pressure PS and the nominal size DN does not exceed 2 000 bar,

and

3. pressure vessels covered by Directive 87/404/EEC, if the product of the maximum pressure PS and the volume V does not exceed 200 bar·liter,

may be performed by a competent person. If an installation subject to monitoring is exclusively composed of parts covered by sentence 1 nos. 1 to 3, the inspections of the installation covered by subsections 1 and 2 hereof may be performed by a competent person. The inspections covered by subsection 1 hereof concerning installations subject to monitoring which are designed for mobile use and which are erected in a new location after having been put into service for the first time may be performed by a competent person. Inspections pursuant to subsection 1 may be carried out by a competent person for

1. tube furnaces in processing installations insofar as they are tube arrangements,
2. pressure equipment consisting exclusively of tube arrangements in refrigeration plants and thermal pump installations,
3. steam traps and separators for gas bubbles, if the gas volume is limited to a maximum of 10 per cent of the vessel volume in the case of separators ,
4. steam heated rotary cloth presses as well as presses intended for mechanical ironing, vaporising, gluing, fixing or treatment procedures similar to fixing of clothes, laundry or other textiles and leather products
5. compressed gas condensators and
6. not directly heated heatgenerators with a heating fuel temperature not in excess of 120 °C and conservators in heating- and refrigeration installations with water temperatures not in excess of 120 °C.'

(4) Subsection 3, sentence 1 no. 2 letter b shall apply, *mutatis mutandis*, to mobile fire extinguishers and bottles for breathing apparatus covered by Directive 97/23/EC, which are to be classified at least in category III pursuant to Article 9 in connection with Table 2 in Annex II of the Directive, if the product of the maximum pressure PS and the volume V would lead to a classification in category I.

(5) Notwithstanding subsection 3 sentence 3, in connection with subsection 1, installations subject to monitoring containing

1. pressure equipment covered by Directive 97/23/EC, with the exception of steam boilers pursuant to section 13 (1) sentence 1 no. 1, or
2. simple pressure vessels covered by Directive 87/404/EEC,

which are used in different places of installation, do not require another inspection before being put into service after a change in location if

1. a certificate inspectionifying that an inspection has been performed elsewhere is available before the installation is put into service,

2. the change in location did not result in new operating conditions, and the connections and equipment are not changed, and
3. their erection is not subject to any special requirements.

If the erection is subject to special requirements, the inspection of the proper erection at the place of operation by a competent person and a certificate inspectionifying thereto shall suffice.

(6) Where equipment, protective systems, or safety devices, controlling devices and regulating devices within the meaning of Directive 94/9/EC or a part thereof on which explosion protection depends, has been repaired it shall not be put back into service - in derogation of subsection 2 - unless the approved body has determined that the essential features of explosion protection comply with the requirements of this Ordinance and unless a certificate of the type described in section 19 has been issued or an inspection mark has been attached to the equipment, protective systems, or safety devices, controlling devices and regulating devices. The inspections pursuant to the 1<sup>st</sup> sentence may also be performed by competent persons of an enterprise if these persons have been recognized by the competent authority for inspecting the equipment, protective systems, or safety devices, controlling devices and regulating devices, which have been repaired by the enterprise. The 1<sup>st</sup> and 2<sup>nd</sup> sentence shall not be applicable if equipment, protective systems, or safety devices, controlling devices and regulating devices have been subjected to an inspection by the manufacturer after the repair and if the manufacturer confirms that the essential explosion protection features of the equipment, protective systems, or safety devices, controlling devices and regulating devices comply with the essential requirements of the present Ordinance.

(6) Subsection 1 hereof shall not be applicable to lift installations covered by section 1 (2) sentence 1 no. 2 letter a. Subsections 1 and 2 hereof shall not be applicable to storage installations covered by section 1 (2) sentence 1 no. 4 letter a for mobile containers and to discharging stations covered by section 1 (2) sentence 1 no. 4 letter d.

(7) Subsection 3 hereof shall not be applicable to filling installations covered by section 2 (12) nos. 2 and 3.

## **Section 15 Recurrent inspections**

(1) An installation subject to monitoring and its components shall be subjected to recurrent inspections in certain intervals by an approved body to ensure their proper condition with respect to its operation. The operator shall determine the inspection intervals of the entire installation and its components on the basis of a technical safety assessment. No technical safety assessment shall be required if it has been carried out in the scope of a hazard assessment covered by section 3 hereof or section 3 of the Allgemeine Bundesbergverordnung (General Federal Miners' Ordinance). The sentences 1 to 3 of section 14 (3) shall apply, *mutatis mutandis*.

(2) The inspections referred to in subsection 1 sentence 1 shall comprise a technical inspection, to be carried out on the actual installation subject to the inspection rules, and an inspection of good order. For components of steam boilers, pressure vessels except steam boilers, installations for filling compressed, liquefied gases or gases dissolved under pressure, internally pressurized pipes for flammable, highly flammable, extremely flammable, corrosive or toxic gases, vapours, or fluids, inspections to be carried out shall comprise external inspections, internal inspections and strength inspections.

(3) In defining the inspection intervals referred to in subsection 1 hereof, the maximum time limits listed in subsections 5 to 9 and 12 to 16 for the components shall not be exceeded. The operator shall inform the competent authority within six months of the putting the installation into service of the inspection intervals for the components and the entire installation and shall attach

installation-specific data to this information. The 2nd sentence hereof shall not be applicable to installations subject to monitoring which only comprise the components listed in section 14 (3) sentence 1, as well as all other installations subject to monitoring which may be subjected to recurrent inspections performed by competent persons.

(4) To the extent that the inspections must be performed by approved bodies pursuant to subsection 1 hereof, the determination of the inspection intervals by the operator shall be subject to a review by an approved body. If an inspection interval determined by the operator is longer than the interval determined by an approved body, the installation subject to monitoring may be operated until the end of the inspection interval determined by the approved body, and the approved body shall inform the competent authority of the discrepancy in inspection intervals. The competent authority shall define the inspection interval. The authority may obtain the expert opinion of another approved body to be selected by mutual consent with the operator for its decision. The costs of such opinion shall be borne by the operator.

(5) The inspections referred to in subsection 2 hereof shall be performed within the period of time indicated in the table, at the inspection, having due regard to the classification of the individual pressure equipment indicated in column 1.

<b>Classification of pressure equipment pursuant to Article 9 in connection with <u>Annex II of Directive 97/23/EC</u> according to</b>	<b>external inspection</b>	<b>internal inspection</b>	<b>strength inspection</b>
1. <u>Table 1</u> in category IV, if the maximum pressure PS exceeds one bar	2 years	5 years	10 years
2. <u>Table 2</u> in a) category III, if the maximum pressure PS exceeds one bar, or b) category IV			
3. <u>Table 3</u> in a) category II, if the maximum pressure PS is more than 500 bar and the product of PS and the volume V exceeds 10,000 bar•liter, or b) category II, if the product of the maximum pressure PS and the volume V exceeds 10,000 bar•liter,			
4. <u>Table 4</u> in a) category I, if the maximum pressure PS is more than 1,000 bar and the product of PS and the volume V exceeds 10,000 bar•liter, or b) category II			
5. <u>Table 5</u> in a) category III, if the product of the maximum pressure PS and the volume V exceeds 1,000 bar•liter, or b) category IV	1 year	3 years	9 years
6. <u>Table 6</u> in a) category I, if the pipeline is used for very toxic fluids, or b) category II or II, if the pipeline is used for – very toxic fluids, or – other fluids, if the product of the maximum pressure PS and the nominal size DN exceeds 2 000 bar,	5 years	–	5 years
7. <u>Table 7</u> in a) category I, if the product of the maximum pressure PS and the nominal size DN exceeds 2 000 bar, or b) category II or III			
8. <u>Table 8</u> in category I, II or III			
9. <u>Table 9</u> in category I or II			

For pressure equipment not covered by the 1st sentence hereof, the inspection intervals for external inspections, internal inspections and the strength inspection must be defined according to the manufacturer's information as well as experience made with the operating conditions and the product in the batch. The inspection of this pressure equipment may be performed by a competent person.

(6) Notwithstanding subsection 5 hereof, external inspections need not be performed on pressure equipment covered by numbers 1 to 4 of the table in subsection 5, unless they are heated by fire, exhaust gas or electrically.

(7) Notwithstanding subsection 5 hereof, approved bodies shall perform inspections of the bottles covered by number 2 of the table in subsection 5 hereof designed for

1. breathing apparatus used for work and rescue purposes in the form of external inspections, internal inspections, strength and weight inspections at intervals not exceeding five years, and
2. breathing apparatus used as diving equipment in the form of
  - a) strength tests at intervals not exceeding five years, and
  - b) external inspections, internal inspections and weight tests at intervals not exceeding two-and-a-half years.

(8) Notwithstanding subsection 5 hereof, installations containing pressure equipment covered by number 5 of the table in subsection 5 in which steam or hot water is generated in a production process involving heat recovery, shall be subjected to inspections by approved bodies in the form of

1. external inspections at intervals not exceeding two years,
2. internal inspections at intervals not exceeding five years, and
3. strength tests at intervals not exceeding ten years.

The 1st sentence shall not be applicable to installations in which flue gases are cooled and the resulting steam or hot water is not primarily supplied to the process installation.

(9) For pressure vessels covered by Directive 87/404/EEC, where the product of the maximum pressure PS and the volume V exceeds 1,000 bar•liter, inspections shall be performed by approved bodies in the form of

1. internal inspections at intervals not exceeding five years, and
2. strength tests at intervals not exceeding ten years.

Subsection 5 sentences 2 and 3 and subsection 10 shall apply, *mutatis mutandis*, to pressure vessels not covered by sentence 1.

(10) In the case of external and internal inspections, other suitable equivalent procedures may be substituted for visual inspections, and the static compression trials for strength tests may be replaced with equivalent, nondestructive methods if the prescribed inspections cannot be performed due to the type of construction of the pressure equipment, or are not adequate given its operating conditions.

(11) If the operator made written determinations in a test program for recurrent inspections of pipelines which are covered by numbers 6 to 9 of the table in subsection 5, and if such determinations have been verified by an approved body and certified by the latter to meet the requirements of the present Ordinance, the inspections may be performed by a competent person, notwithstanding numbers 6 to 9 of the table in subsection 5, if an approved body convinces itself through random inspections that the written determinations are complied with.

(12) For filling installations covered by section 1 (2) sentence 1 no. 1 letter c designed for filling compressed gases into vehicles, ships, or aircraft, inspections in the establishment shall be carried out at intervals not exceeding five years. Subsection 1 hereof shall not be applicable to other filling installations covered by section 1 (2) sentence 1 no. 1 letter c.

(13) For lift installations covered by section 1 (2) sentence 1 no. 2 letters a, c, d, and e, inspections in the establishment shall be carried out at intervals not exceeding two years. Between being put into service and the first recurrent inspection, as well as between any two recurrent inspections, lift installations shall be verified for proper operability and for the proper condition of the load suspension devices.

(14) For lift installations covered by section 1 (2) sentence 1 no. 2 letter b, inspections in the establishment shall be carried out at intervals not exceeding four years. The second sentence of subsection 13 hereof shall apply, *mutatis mutandis*.

(15) For installations in potentially explosive atmospheres covered by section 1 (2) sentence 1 no. 3 inspections in the establishment shall be carried out at intervals not exceeding three years.

(16) For storage installations for stationary containers, filling stations, petrol filling stations and airfield refueling stations covered by section 1 (2) sentence 1 no. 4 letters a to c, inspections in the establishment shall be carried out at intervals not exceeding five years. These inspections include installations covered by section 1 (2) sentence 1 no. 3. In derogation of section 15 subsection 15 the inspection interval shall be 5 years. In derogation of section 14 (3) the inspection of these installations shall be performed by an approved body .

(17) The competent authority may, in individual cases,

1. extend the time limits specified in subsections 5 to 16 hereof if safety is guaranteed by other means, or
2. reduce them if so warranted by the protection of the workers or third parties.

(18) The time limits for the inspections start on the date of the first inspection prior to putting into service. Notwithstanding the 1st sentence hereof, the time limits start on the day of a subsequent inspection prior to putting into service after a significant modification, and on the day lift installations covered by section 1 (2) sentence 1 no.2 letter a are put into service for the first time.

(19) If a special verification has been carried out, the time limit for a recurrent inspection shall start upon the end of the special verification to the extent that it corresponds to the recurrent inspection.

(20) If an installation subject to monitoring is out of operation on the date on which the recurrent inspection is due, it shall not be put back into service unless the inspection has been carried out.

(21) Subsection 1 hereof shall not be applicable to

1. storage installations covered by section 1 (2) sentence 1 no. 4 letter a for mobile containers, and
2. discharging stations covered by section 1 (2) sentence 1 no. 4 letter d.

### **Section 16 Ordered special verification**

(1) In an individual case, the competent authority may order a special verification of installations subject to monitoring if there is special reason, in particular, if damage has occurred.

(2) In particular, a special verification pursuant to subsection 1 hereof shall be ordered by the competent authority if the installation subject to monitoring is suspected of having safety defects.

(3) The operator shall arrange for the ordered verification without delay.

### **Section 17 Testing of special pressure equipment**

To the extent that they are or contain pressure equipment, the installations subject to monitoring specified in Annex 5 hereto shall be subjected to the inspections provided for in sections 14 to 16 subject to the requirements listed in the provisions of Annex 5.

### **Section 18 Notification of accidents and damages**

(1) The operator shall notify the competent authority without delay

1. of any accident involving a fatality or bodily injury, and
2. of any case of damage in which components or safety equipment failed or were damaged.

(2) The competent authority may require the operator to have the notified event subjected to a safety assessment by an approved body which shall be selected by mutual consent, if

possible, at his own expense, and to submit the result thereof in writing to this authority. The safety assessment shall, in particular, cover the determination

1. of the cause of the incident,
2. whether the installation subject to monitoring was not in proper condition, and whether the hazard no longer exists after the repair of the defect, and
3. whether new information has been obtained requiring different or additional protective measures.

### **Section 19 Verification certificates**

(1) Verification certificates shall be issued concerning the result of the inspections and verifications required or ordered under this Part. The result shall be recorded if the inspection or verification was performed by competent persons.

(2) The certificates or records referred to in subsection 1 hereof shall be kept at the location of the installation subject to monitoring and shall be made available to the competent authority on request.

### **Section 20 Notice of defects**

If the approved body has detected defects by which workers or third parties may be jeopardized in the course of an inspection, it shall immediately notify the competent authority accordingly.

### **Section 21 Approved bodies**

(1) Approved bodies for carrying out the inspections required or ordered under this section shall be the bodies listed in section 17 (1) and (2) of the Equipment and Product Safety Act.

(2) Further requirements for the accreditation of an approved body in addition to those stipulated in section 17 (5) of the Equipment and Product Safety Act include:

1. A third party insurance with an insured sum of at least two-and-a-half million Euros shall be maintained.
2. The body shall at least be capable of performing all inspections of installations subject to monitoring pursuant to
  - a) section 1 (2) sentence 1 no. 1,
  - b) Section 1 (2) sentence 1 no. 2, or
  - c) Section 1 (2) sentence 1 nos. 3 and 4.

3. Its management shall have the overall responsibility for the performance of the inspection work in compliance with the provisions of the present Ordinance.
4. It shall apply an appropriate, effective quality management system including regular internal audits.
5. It shall give the persons performing the inspections only those tasks which they can discharge without jeopardizing their impartiality.
6. The remuneration of the persons performing the inspections shall not be directly associated with the number of inspections performed or the results thereof.

(3) The testing departments of companies covered by section 17 (5) sentence 3 of the Equipment and Product Safety Act may be appointed approved body provided that the conditions contained in subsection 2 no. 3 to 6 are satisfied, their appointment is warranted by reason of safety, and they

1. are organizationally identifiable,
2. have reporting methods within the group of which they are part which ensure and demonstrate their impartiality,
3. are not responsible for the planning, manufacturing, distribution, operation or maintenance of the installation subject to monitoring,
4. do not perform any activity that would be in conflict with the impartiality of their judgment and their reliability in the scope of their verification work, and
5. exclusively work for the company of which they form part.

The appointment of departments under the 1st sentence hereof shall be limited to the inspection of installations subject to monitoring covered by section 1 (2) sentence 1 nos. 1, 3 and 4 including the installations covered by section 1 (2) sentence 2.

## **Section 22**

### **Inspectorates responsible for Federal installations subject to monitoring**

The respective Federal ministry or an authority appointed by it shall be the inspectorate in charge of installations subject to monitoring which are operated by the federal authority in charge of waterways, the federal armed forces, and the federal border guard. Other installations subject to monitoring, which are the responsibility of the Federal Administration, shall be governed by section 18 (1) of the Equipment and Product Safety Act.

## **Section 23**

### **Use of mobile pressure equipment within an establishment**

Provided that the conditions specified in the

1. European Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR),
2. Regulations concerning the International Carriage of Dangerous Goods by Rail (RID),
3. International Maritime Dangerous Goods Code (IMDG Code), or
4. International Civil Aviation Organization Technical Instruction for Safe Transport of Dangerous Goods by Air (ICAO TI's)

are no longer met, mobile pressure equipment used within an establishment covered by Article 1 (3) no. 3.19 of Directive 97/23/EC shall not be put into service or operated unless the operating conditions required by these conventions are complied with, and the recurrent inspections provided for by the conventions have been performed.

**Part 4**  
**Joint provisions,**  
**Final provisions**

**Section 24**  
**Advisory Committee on Protection at Work**

(1) In order to provide consultation on all issues related to safety and health at work for the provision and use of work equipment and the operation of installations subject to monitoring, the Advisory Committee on Protection at Work shall be established within the Federal Ministry of Economics and Labor, in which expert members of the public and private employers, the state authorities, the unions, the statutory accident insurance funds, research, and the approved bodies will be adequately represented. The total membership in the Committee shall not exceed 21 persons. Membership in the Advisory Committee on Protection at Work shall be on an honorary basis.

(2) The Advisory Committee on Protection at Work shall set up sub-committees.

(3) The Federal Ministry of Economics and Labor shall appoint the members of the committee and a deputy of each member. The Committee shall adopt its internal rules and elect a chairperson from among its members. The internal rules and the election of the chairperson shall require the approval of the Federal Ministry of Economics and Labor.

(4) The tasks of the Committee shall include, without being limited to:

1. determining rules in compliance with the state of the art, occupational medicine and hygiene and other well-founded industrial science data
  - a) relating to the provision and use of work equipment, and
  - b) relating to the operation of installations subject to monitoring with due regard to the rules existing for other safety objectives and in coordination with the Technical Advisory Committee for the Safety of Installations pursuant to section 31a (1) of the Bundes-Immissionsschutzgesetz (Federal Clean Air Act), to the extent that its sphere of responsibility is affected.
2. determining rules as to how the requirements made by this Ordinance can be met, and
3. providing counsel to the Federal Ministry of Economics and Labor concerning industrial safety issues.

In performing its task, the Committee shall duly observe the general principles of safety and health at work pursuant to section 4 of the Protection at Work Act.

(5) The Federal Ministry of Economics and Labor may publish the rules and data determined by the Advisory Committee on Protection at Work pursuant to subsection 4 no.1 and the procedural rules determined pursuant to subsection 4 no. 2 in the Federal Labor Gazette. If the rules and data referred to in the 1st sentence are complied with, it can usually be assumed that the requirements laid down in the Ordinance are met to this extent.

(6) The Federal Ministries and the competent supreme state authorities may send representatives to attend the meetings of the Committee. On request, these representatives shall be allowed to speak at the meetings.

(7) The Bundesanstalt für Arbeitsschutz und Arbeitsmedizin (Federal Institute for Occupational Safety and Health) shall manage the day-to-day business of the Committee.

## **Section 25 Administrative offenses**

(1) Whoever intentionally or negligently

1. fails to comply with section 10 (1) sentence 1 by not ensuring that work equipment is inspected,
2. fails to comply with section 10 (2) sentence 1 by not arranging for the inspection, or the timely inspection of work equipment, or
3. fails to comply with section 10 (2) sentence 2 by not subjecting work equipment to a special verification, or not subjecting it to a special verification in time,

commits an administrative offense for the purposes of section 25 (1) no. 1 of the Protection at Work Act.

(2) Whoever intentionally or negligently

1. fails to comply with section 15 (3) sentence 2 by failing to provide information at all, properly, completely or in due time, or
2. fails to comply with section 18 (1) by failing to make a notification at all, properly, completely or in due time,

commits an administrative offense for the purposes of section 19 (1) no. 1 letter b of the Equipment and Product Safety Act.

(3) Whoever intentionally or negligently

1.
  - a) violates section 12 (5) by operating, or
  - b) violates section 14 (1) or (2) or section 15 (20) by putting into service an installation subject to monitoring,
2. operates an installation covered by section 13 (1) sentence 1 without the permit referred to in that clause,
3. fails to comply with section 15 (1) sentence 1 by not inspecting an installation subject to monitoring or any part thereof at all, properly, completely or in due time, or
4. fails to comply with section 16 (3) by not arranging for a validly ordered inspection or its performance in due course

commits an administrative offense for the purposes of section 19 (1) no. 1 letter a of the Equipment and Product Safety Act.

## **Section 26 Criminal offenses**

(1) Whoever jeopardizes the life or health of a worker by an intentional act of the type specified in section 25 (1) shall be subject to criminal prosecution pursuant to section 26 no. 2 of the Protection at Work Act.

(2) Whoever persistently repeats an act of the type specified in section 25 (3) or endangers the life and health of another or the property of another of considerable value by such an act shall be subject to criminal prosecution pursuant to section 20 of the Equipment and Product Safety Act.

## **Section 27 Transitional provisions**

(1) The employer shall meet his obligations under section 6 (1) hereof with respect to work equipment and work sequences in potentially explosive atmospheres that were provided or introduced for the first time prior to 3 October 2002 on or before 31 December 2005.

(2) It shall be permitted to continue operating an installation subject to monitoring that was legally installed and operated prior to 1 January 2005. A permit that was valid under the law applicable until that date shall be considered a permit granted under this Ordinance.

(3) Installations subject to monitoring that had been put into service for the first time prior to 1 January 2003 shall continue to be subject to the previous provisions with respect to the requirements to be made concerning their design. The competent authority may demand that these installations be modified to comply with the provisions of the Ordinance if avoidable hazards for the life and health of the workers or third parties are to be expected according to the type of operation. The operating requirements with the exception of section 15 (3) sentence 2 and section 15 (4) stipulated in the Ordinance shall be applied on or before 31 December 2007.

(4) Installations subject to monitoring which were not covered by a legal Ordinance under section 11 of the Safety of Equipment Act in the version valid on 31 December 2000 prior to 1 January 2003 and which had already been erected prior to that date, or whose erection had already been started, shall comply with the operating requirements with the exception of section 15 (3) sentence 2 stipulated in the Ordinance on or before 31 December 2005. If the inspection interval has elapsed after the installation was put into service, a recurrent inspection shall be performed before the date specified in the 1st sentence hereof.

(5) Mill-type rope hoists may continue to be operated until 31 December 2009 provided that no avoidable hazards for the life or health of the user arise from the nature of the installation.

(6) The technical rules determined by a Committee set up by a legal ordinance pursuant to section 11 of the Safety of Equipment Act in the version valid on 31 December 2000 and their operational requirements shall continue to be applicable until they have been revised by the Advisory Committee on Safety at Work and published by the Federal Ministry of Economics and Labor.

This Ordinance shall come into force on 3 October 2002, with the exception of Part 3, which shall come into force on 1 January 2003.

## **Annex 1**

### **Minimum requirements on work equipment pursuant to section 7 (1) no. 2**

#### **1. Preliminary note**

The obligations laid down in this Annex apply having regard to the provisions of this Ordinance and where the use of the work equipment in question is associated with the corresponding health and safety risk for the workers.

The following minimum requirements, in as much as they apply to work equipment in use, do not necessarily call for the same measures as the essential requirements concerning new work equipment if

- a) the employer takes another, equally effective measure, or
- b) compliance with the essential requirements would cause undue hardship in an individual case, and the digression is compatible with the protection of workers.

#### **2. General minimum requirements on work equipment**

- 2.1 Work equipment controls which affect safety must be clearly visible and identifiable and appropriately marked where necessary.

Controls must be located outside the danger zones so as to ensure that their operation cannot involve any additional hazards.

Controls must be located, designed or capable of being secured so that inadvertent operation is prevented.

From the control position, the operator must be able to ensure that there are no exposed persons or obstacles in the danger zones.

If this is impossible, a safe system such as a personal detection system or at least an audible and/or visible warning signal must be given automatically whenever the equipment is about to start.

Workers must have sufficient time or the means to quickly avoid hazards caused by the starting of the work equipment or to prevent its start.

Controls must be safe. Their design must take the foreseeable failures, loads, and constraints into account.

- 2.2 It must be possible to start work equipment only by voluntary actuation of a control provided for the purpose.

The same requirement applies:

- when restarting the equipment after a stoppage, whatever the cause,
- when controlling a significant change in the operating conditions (e.g. speed, pressure, etc.),

unless such restarting or change in operating conditions is without risk to the workers.

This requirement does not apply to the restarting of the work equipment or to the change in operating conditions resulting from the normal sequence of an automatic cycle.

If the work equipment has several controls for starting, these controls must not enable the start simultaneously.

- 2.3 All powered work equipment must be fitted with a control to stop it completely and safely.

Each work station must be fitted with controls to stop some or all of the work equipment, depending on the type of hazard, so that the equipment is in a safe state.

The work equipment's stop control must have priority over the start controls.

When the work equipment or the dangerous parts of it have stopped, the energy supply of the actuator concerned must be capable of being switched off.

If the controls referred to in number 2.1 also serve as main controls as referred to in number 2.13, the requirements of the latter paragraph shall apply, *mutatis mutandis*.

- 2.4 Powered work equipment must have at least one emergency stop device capable of stopping hazardous movements or processes as fast as possible without producing additional hazards.

Their control devices must be quickly, easily and safely to reach and conspicuously marked.

This does not apply where an emergency stop device would not lessen the risk, either because it would not reduce the stopping time or because it would not enable the special measures required to deal with the risk to be taken.

- 2.5 If falling or ejected items are to be expected in dealing with the work equipment, suitable protective devices must be available.

Work equipment must be equipped with devices that retain or discharge emerging gases, vapors, fluids, or dusts.

- 2.6 Work equipment and parts of such equipment must be stabilized against unintentional position and orientation changes by clamping or some other means.

- 2.7 The various parts of work equipment and their linkages must be able to withstand the stress from internal forces and external loads.

Where there is a risk of rupture or disintegration of parts of the work equipment, appropriate protection measures must be taken.

- 2.8 Work equipment must be provided with guards to prevent access to danger zones of moving parts or to halt movements of parts before the danger zones are reached.

Guards and protection devices must:

- be of robust construction,
- not give rise to any additional risk,
- not be easy to by-pass or render non-operational,
- be located at an adequate distance from the danger zone,
- cause minimum obstruction to the view of the operating process, and
- allow operations necessary to fit or replace parts and for repair and maintenance work, restricting access only to the area where the work is to be carried out and, if possible, without removal of the guard or protection device.

- 2.9 Areas and points for working on, or repair and maintenance of, work equipment must be suitably lit in line with the operation to be carried out.
- 2.10 Work equipment parts at high or very low temperature must, where appropriate, be protected to avoid the risk of workers coming into contact or coming too close.
- 2.11 Warning devices and control indications on work equipment must be unambiguous and easily perceived and understood.
- 2.12 It must be possible to carry out repair and maintenance operations when the equipment is shut down.
- If this is not possible, it must be possible to take appropriate protection measures for carrying out such operations or for the repair and maintenance work to be carried out outside the danger zones.
- If repair and maintenance work must be carried out below elevated parts or working devices, suitable devices must be provided to protect them from falling down.
- If energy may still be stored in work equipment in stored-energy systems after such equipment has been separated from all sources of energy, devices must be available to de-energize such systems. These devices must be marked accordingly.
- When total de-energization is not possible, suitable warnings shall be attached to work equipment.
- 2.13 Work equipment must be fitted with clearly identifiable means (e.g. main controls) to isolate it from all its energy sources. Restart must be presumed to pose no risk to the workers concerned. These devices (e.g. main controls) must be capable of being locked against unauthorized or unintentional operation; however separation of a plug shall not be sufficient unless the point of separation can be supervised from the control position.
- These devices, with the exception of connections capable of being plugged, may only have one "Off" and one "On" position each.
- 2.14 Work equipment must bear the warnings and markings (e.g., manufacturer, technical data) essential to ensure the safety of workers.
- 2.15 Workers must have safe means of access to all the areas necessary for production, adjustment, repair and maintenance operations involving work equipment.
- They must be able to remain safely in these areas.
- 2.16 All work equipment must be appropriate for protecting workers against the risk of the work equipment catching fire or overheating, or of discharges of gas, dust, liquid, vapor or other substances produced, used or stored in the work equipment.
- 2.17 Work equipment must be designed to avoid any risk of explosion posed by the work equipment itself or by gases, liquids, dust, vapors or other substances produced or used by the work equipment.
- 2.18 Work equipment must be appropriate for protecting exposed workers against the risk of direct or indirect contact with live parts.

- 2.19 Work equipment shall be designed to resist hazards arising from sources of energy other than electricity (such as hydraulic, pneumatic, thermal energy) used by it.

Lines, hoses and other devices for producing or carrying these energies shall be laid so as to avoid mechanical, thermal, or chemical damages.

### **3. Additional minimum requirements applicable to specific types of work equipment**

#### **3.1. Minimum requirements for mobile work equipment, whether or not self-propelled**

- 3.1.1 Mobile work equipment must be fitted out in such a way as to reduce the risks for ride-on workers during the journey.

Those risks must include the risks of contact with or trapping by wheels or tracks.

- 3.1.2 Where an inadvertent seizure of the drive unit between an item of mobile work equipment and its accessories and/or anything towed might create a specific hazard, such work equipment must be equipped or adapted to prevent blockages of the drive units.

Where such seizure cannot be avoided, every possible measure must be taken to avoid any adverse effects on workers.

- 3.1.3 Where elements for the transmission of energy between mobile items of work equipment can become soiled or damaged by trailing on the ground, facilities must be available for fixing them.

- 3.1.4 Mobile work equipment with ride-on workers must be designed to restrict, under actual conditions of use, the hazards arising from work equipment rolling over or tilting

- either by a structure to ensure that the equipment does not tilt by more than a quarter turn, or
- a structure giving sufficient clearance around the ride-on workers if the tilting movement can continue beyond a quarter turn, or
- by some other device of equivalent effect.

These structures are not necessary if the protective effect is ensured by the design of the actual work equipment.

These structures are not required when the work equipment is stabilized during operation or where the design makes roll over impossible.

Where there is a risk of a ride-on worker being crushed between parts of the work equipment and the ground, should the equipment roll over or tilt, a restraining system for the ride-on workers must be installed.

- 3.1.5 Fork-lift trucks carrying one or more workers must be adapted or equipped to limit the risk of the fork-lift truck overturning, e. g.:

- by the installation of an enclosure for the driver, or
- by a structure preventing the fork-lift truck from overturning, or

- by a structure ensuring that, if the fork-lift truck overturns, sufficient clearance remains between the ground and certain parts of the fork-lift truck for the workers carried, or
- by a structure restraining the workers on the driving seat so as to prevent them from being crushed by parts of the fork-lift truck which overturns.

3.1.6 Self-propelled work equipment must fulfill the following conditions:

- a) It must be capable of being secured against unauthorized start.
- b) It must have appropriate facilities for minimizing the consequences of a collision where there is more than one item of track-mounted work equipment in motion at the same time.
- c) There must be a device for braking and locking equipment. Where safety constraints so require, emergency facilities operated by readily accessible controls or automatic systems must be available for braking and stopping equipment in the event of failure of the main braking facility.
- d) Where the driver's direct field of vision is inadequate to ensure safety, adequate auxiliary devices must be installed to improve visibility.
- e) Work equipment designed for use at night or in dark places must be equipped with lighting appropriate to the work to be carried out and must ensure sufficient safety for workers.
- f) Work equipment which constitutes a fire hazard, either on its own or in respect of whatever it is towing and/or carrying must be equipped with appropriate fire-fighting appliances where such appliances are not available sufficiently nearby at the place of use.
- g) Remote-controlled work equipment must stop automatically once it leaves the control range.
- h) Automatically controlled work equipment which may in normal conditions engender a crushing or impact hazard must have facilities to guard against this risk, unless other appropriate devices are present to control the impact risk.

3.1.7 Where workers stay in the hazard area, controls of the work equipment must be so that the work equipment is automatically stopped without delay when the controls are released.

3.1.8 It must be possible to adjust the speed of pedestrian-controlled work equipment by the pedestrian himself/herself, if necessary.

The controls of the pedestrian-controlled work equipment must be so that the work equipment is automatically stopped without delay when the controls are released.

3.1.9 The devices for linking mobile work equipment must be so that they

- are protected against inadvertent release, and
- can be operated safely and without any effort.

### **3.2 Minimum requirements for work equipment for lifting loads**

3.2.1 Work equipment for lifting loads, their load suspension devices and detachable parts, if any, must be designed so that sufficient stability and strength is

maintained both in service and out of service under the intended weather conditions, including all stages of transportation, assembly and dismantling, during foreseeable component failures and also during the inspections including those carried out with a test load. If necessary, work equipment must be equipped with a device that prevents loads in excess of the permitted capacity.

In particular, the stress induced at the mounting or fixing point or the supporting structures must be accounted for.

- 3.2.2 Work equipment for lifting loads must be clearly marked to indicate its nominal load, and, where appropriate, a load plate giving the nominal load for each configuration.

Accessories for lifting must be marked in such a way that it is possible to identify the characteristics essential for safe use.

Work equipment for lifting workers must be marked accordingly and clearly in a visible location.

- 3.2.3 Work equipment for lifting loads must prevent the loads from, in particular,

- a) unintentionally drifting dangerously or falling freely, or
- b) being released unintentionally.

Controls for controlling movements must automatically return to neutral position and interrupt the initiated movement after having been operated. The foregoing shall not apply in as far as exposure of workers to the hazard area is safely prevented.

- 3.2.3.1 The maximum speed of self-propelled work equipment must be adequate for the driver himself.

- 3.2.3.2 It must be possible to brake lifting, traveling and turning movements and to prevent unintentional movements.

- 3.2.3.3 Powered lifting movements must be limited. Tracks must have borders.

- 3.2.3.4 Where the operation of work equipment poses hazards to persons, and if the control is not located near the load, the work equipment must be equipped with warning devices.

- 3.2.3.5 The return kick of controls for manually operated work equipment must be limited.

- 3.2.4 Work equipment for lifting or moving workers must be such as to:

- a) prevent the risk of the car falling, where one exists, by suitable devices;
- b) prevent the workers from falling out of the car of the work equipment;
- c) minimize the risk of the workers being crushed, trapped or struck, in particular through inadvertent contact with objects;
- d) ensure that workers trapped in the car in the event of an incident are not exposed to danger and can be freed.

If, for reasons inherent in the site and height differences, the risks referred to in point a) cannot be avoided by any safety measures, an enhanced safety coefficient must be provided.

## **Annex 2**

### **Minimum requirements for the improvement of safety and health of workers using work equipment**

#### **1. Preliminary note**

The following minimum requirements for the provision and use of work equipment shall be given due consideration in the hazard assessment referred to in section 3.

#### **2. General minimum requirements**

2.1 The employer shall obtain the necessary information and instructions concerning the safe provision and use of the work equipment. He shall select the information relevant for the safe provision and use of the work equipment under the circumstances of his operations, and shall include them in the determination of the protective measures. He shall bring the necessary information to the attention of the workers.

This information shall be observed in using the work equipment.

2.2 The work equipment shall be provided and used so as to avoid exposure of workers to hazards arising from physical, chemical and biological effects.

In particular, it must be ensured that

- work equipment is only used for operations and under conditions for which it is appropriate pursuant to the manufacturer's operating instructions;
- work equipment is erected or dismantled safely in compliance with any instructions which may have been furnished by the manufacturer;
- there is sufficient space between the moving parts of work equipment and fixed or moving parts in its environment, and
- all forms of energy and substances used or produced can be supplied and removed in a safe manner.

Where risks to workers from the use of work equipment cannot be avoided, adequate measures shall be defined and implemented.

2.3 When using the work equipment, the protective devices shall be used and must not be rendered non-operational.

2.4 The employer shall take all measures to ensure that

- appropriate lighting is available when using the work equipment;
- the work equipment is checked for defects prior to use and its faultless condition is guaranteed to the greatest extent possible during its use. Where defects are detected which are liable to jeopardize the safety of the workers, the work equipment must not be used.

Where such defects are not detected prior to use, the work equipment shall no longer be used.

- modification, repair and maintenance operations can only be carried out when the equipment is shut down. The work equipment and its moving part shall be protected against accidental start and movement. Where it is not

possible to perform such work with the work equipment shut down, adequate measures must be taken to reduce the hazard exposure of the workers. Repair and maintenance measures must be documented; if a maintenance log exists, it must be kept up-to-date.

- adequate, understandable and easily noticeable markings and warnings are attached to the work equipment or posted in its environment in order to avoid hazards in the use of work equipment. The markings and warnings must be observed by the workers.
- work equipment is used in outdoor areas subject to the weather conditions so as to ensure the health and safety of workers.

2.5 The use of the work equipment shall be reserved to workers who are suitable for this task, specially trained or have been given the task of using it. Where workers do not satisfy this condition, this work equipment shall only be used under the supervision of workers qualifying under the 1st sentence hereof.

2.6 The work equipment shall be kept so that its safe condition is maintained.

2.7 When using work equipment, adequate means of communication and warning must be available and used if necessary in order to avoid the exposure of workers to hazards. Signals must be unambiguous and easily perceived and understood. Where necessary, they shall be agreed upon by the workers concerned.

### **3. Minimum requirements concerning the use of mobile equipment, whether or not self-propelled**

3.1 The employer shall take all measures to ensure that

- self-propelled work equipment shall be driven only by workers who have been appropriately trained in and are capable of the safe driving of such equipment;
- suitable traffic regulations are stipulated and adhered to for the use of mobile work equipment in a working area;
- workers cannot stay in the hazard area of self-propelled work equipment. If their presence cannot be avoided for operational reasons, measures must be taken to prevent injuries to the workers.
- mobile work equipment with a combustion engine or other powered devices is not used unless sufficient quantities of air presenting no health or safety risk to workers can be guaranteed;
- mobile work equipment is attached to or detached from other mobile work equipment or additional appliances without exposing workers to a hazard. Links shall be of sufficient size and shall not be capable of detaching unintentionally.
- mobile work equipment is parked and secured while being transported, loaded or unloaded so as to avoid unintentional movements of the work equipment.

3.2 The transport of workers on mobile work equipment is authorized only where safe facilities are provided to this effect. The speed must be reduced where work must be carried out during transport.

#### **4. Minimum requirements concerning the use of work equipment for lifting loads**

##### **4.1 General requirements**

4.1.1 The employer shall take all measures to ensure that

- work equipment which is mobile or can be dismantled and which is designed for lifting loads is installed and used in such a way as to ensure the stability of the work equipment and to prevent it from tilting, moving or slipping. Checks must be made to ensure that these measures are executed properly.
- workers may be lifted only by means of work equipment and accessories provided for this purpose. Work equipment which is not specifically designed for the purpose of lifting persons may be used to this effect, provided appropriate action has been taken to ensure safety and appropriate supervision.
- when lifting workers while they are on work equipment designed for lifting loads the control position is manned at all times. Safe means of communication must be available. In the event of danger, there must be reliable means of evacuating them.
- suspended loads are not moved above unprotected workplaces and that there are no workers below suspended loads. Where work cannot be carried out properly any other way and the presence of workers below suspended loads cannot be avoided, appropriate procedures must be laid down and applied. Non-positive load suspension devices must not be used for this purpose.
- loads are slung safely, and the loads, load suspension devices and lifting accessories cannot be released or move inadvertently. Load suspension devices and lifting accessories must be selected as a function of the loads to be handled, gripping points, attachment tackle and the atmospheric conditions having regard to the mode and configuration of slinging. When using load suspension devices and lifting accessories, the workers must have access to adequate information concerning their properties. Lifting accessory tackle must be clearly marked where such tackle is not dismantled after use.
- the load suspension device as described in Annex 1 no. 3.2.4 letter a is checked each working day for its proper condition.

4.1.2 Load suspension devices and lifting accessories must be stored in a way that ensures that they will not be damaged or degraded.

##### **4.2 Minimum requirements concerning the use of work equipment for lifting non-guided loads**

4.2.1 When two or more items of work equipment used for lifting non-guided loads are installed or erected on a site in such a way that their working radii overlap, appropriate measures must be taken to avoid collision between loads and the work equipment parts themselves.

4.2.2 If the operator of work equipment designed for lifting non-guided loads cannot observe the full path of the load either directly or by means of auxiliary

equipment, he must be guided by another worker. Organizational measures must be taken to prevent collisions of the load which could endanger workers.

4.2.3 The employer shall take all measures to ensure that

- work can be organized in such a way that when a worker is attaching or detaching a load by hand, it can be done safely. In particular, it must be ensured that the workers concerned retain direct or indirect control of the process.
- all lifting operations involving non-guided loads are properly planned and carried out to protect the safety of workers. If a load has to be lifted by two or more pieces of work equipment simultaneously, a procedure must be established and supervised to ensure good coordination.
- work equipment designed for lifting non-guided loads is used which safely maintains its hold on the load even in the event of a complete or partial power failure; otherwise, appropriate measures must be taken to avoid exposing workers to any resultant risks. Suspended loads must not be left without surveillance unless access to the danger zone is prevented and the load has been safely suspended and is safely held.
- open-air use of work equipment designed for lifting non-guided loads is halted when meteorological conditions deteriorate to the point of jeopardizing the safe use of the equipment and exposing workers to risks. The measures specified by the manufacturer of the work equipment, in particular, to avoid work equipment turning over must be taken.

5. Minimum requirements concerning the use of work equipment provided for temporary work at a height.

**5.1 General minimum requirements**

5.1.1 These provisions are applicable to the use including the assembly, conversion and dismantling of scaffolding and the use of ladders as well as access and positioning processes with the help of ropes which are provided for temporary work at a height.

5.1.2 If temporary work at a height cannot be carried out safely and under appropriate ergonomic conditions from a suitable surface, the work equipment most suitable to ensure and maintain safe working conditions must be selected. Collective protection measures must be given priority over personal protection measures. The selected work equipment must be appropriate to the nature of the work to be performed and to the foreseeable stress and allow use without danger.

The most appropriate means of access to temporary workplaces at a height must be selected, the height to be negotiated and the duration and frequency of use. The choice made must permit evacuation in the event of imminent danger. Access to and from a workplace at a height must not give rise to any additional risks of falling.

5.1.3 All facilities that are used as access points or temporary workplaces at a height shall be dimensioned, erected, supported, braced, anchored and designed so as to ensure that they can safely carry and transfer the loads prevailing during their envisaged operation. They must not be overloaded and must maintain their stability even during the individual construction phases and their total period of use.

- 5.1.4 Ladders may be used as work stations for work at a height only under circumstances in which the use of other, safer work equipment is not justified because of the low level of risk and either the short duration of use or existing features on site that the employer cannot alter.
- 5.1.5 Rope access and positioning techniques may be used only under circumstances where the use of other, safer work equipment is not justified and where the hazard assessment indicates that the work can be performed safely.
- 5.1.6 Depending on the type of work equipment selected on the basis of the foregoing, the appropriate measures for minimizing the risks to workers inherent in this type of equipment must be determined. If necessary, provision must be made for the installation of safeguards to prevent falls. These must be of suitable configuration and designed so as to prevent falls from a height and, as far as possible, to preclude injury to workers. Collective safeguards to prevent falls may be interrupted only at points of ladder or stairway access.
- Where it is not possible to use collective safeguards for operational reasons, collective safeguards to arrest falling persons (fall arresters) shall be available.
- 5.1.7 When the performance of a particular task requires a collective safeguard to prevent falls to be temporarily removed, effective compensatory worker safety measures must be taken. The task may not be performed until such measures have been taken. Once the particular task has been finished, either definitively or temporarily, the collective safeguards to prevent falls must be reinstalled.
- 5.1.8 Temporary work at a height using the work equipment specified in no. 5.1.1 hereof may be carried out only when the weather conditions do not jeopardize the safety and health of workers. In particular, temporary work at a height must not be started or continued if strong or gusty winds, freezing over or hard-packed snow entail the risk that workers might fall or suffer injuries from falling or tilting parts.

## **5.2 Specific provisions regarding the use of scaffolding**

- 5.2.1 Where the scaffolding selected cannot be assembled in conformity with a generally recognized standard, strength and stability calculations must be carried out for the whole scaffolding or selected parts of the scaffolding.
- 5.2.2 Depending on the complexity of the scaffolding chosen, an assembly, use and dismantling plan must be drawn up by the employer responsible for the assembly of the scaffolding or a competent person designated by him. This may be in the form of standard assembly and operating instructions, supplemented by items relating to specific details of the scaffolding in question.
- 5.2.3 It must be ensured that the scaffolding is stable. Scaffolding that is not stable when self-supported must be anchored. The bearing components of scaffolding must be prevented from slipping, whether by attachment to the bearing surface, provision of an anti-slip device or any other means of equivalent effectiveness. The load-bearing surface must have a sufficient capacity. Wheeled scaffolding must be prevented by appropriate devices from moving accidentally during work at a height. Wheeled scaffolding must not be moved while there are workers on it.
- 5.2.4 The dimensions, form and layout of scaffolding decks must be appropriate to the nature of the work to be performed. The scaffolding decks must be suitable

for the loads to be carried and permit work and passage in safety. The scaffolding decks must be installed close to each other and must be assembled in such a way that their components cannot seesaw or move in normal use. There must be no dangerous gap between the deck components and the lateral safeguards to prevent falls.

- 5.2.5 When parts of a scaffolding are not ready for use, for example during assembly, dismantling or alteration, they must be marked with the “No Entrance” warning sign and be suitably delimited by physical means preventing access to the danger zone.
- 5.2.6 Scaffolding may be assembled, dismantled or significantly altered only under the supervision of a competent person and by workers who must have received appropriate and specific training in the operations envisaged, addressing specific risks in accordance with section 9, and more particularly in:
- a) understanding of the plan for the assembly, dismantling or alteration of the scaffolding concerned;
  - b) safety during the assembly, dismantling or alteration of the scaffolding concerned;
  - c) measures to prevent the risk of persons or objects falling;
  - d) safety measures in the event of changing weather conditions which could adversely affect the safety of the scaffolding concerned;
  - e) permissible loads;
  - f) any other risks which the above-mentioned assembly, dismantling or alteration operations may entail.

The competent person supervising the scaffolding works and the workers concerned must have available the instructions for assembly and use referred to in no. 5.2.2, including any instructions it may contain.

### **5.3 Specific provisions regarding the use of ladders.**

- 5.3.1 The employer shall only make those ladders available to workers which are suitable for the work to be performed according to their very nature. The employer shall ensure that ladders are subjected to recurrent inspections for their proper condition.
- 5.3.2 Ladders must be so positioned as to ensure their stability and accessibility during use. Ladders must be additionally prevented from turning over if so warranted by the type of work to be performed. Portable ladders must rest on a suitably sized, immobile footing of sufficient strength so that the rungs remain horizontal. Suspended ladders must be protected against being unhooked inadvertently. They must be attached in a secure manner and, with the exception of rope ladders, so that they cannot be displaced and so that swinging is prevented.
- 5.3.3 The feet of portable ladders must be prevented from slipping during use by securing the stiles at or near their upper or lower ends, by any anti-slip device or by any other arrangement of equivalent effectiveness. Ladders used for access must be long enough to protrude sufficiently beyond the access platform, unless other measures have been taken to ensure a firm handhold. Interlocking ladders and extension ladders must be used so that the different

sections are prevented from moving relative to one another. Mobile ladders must be prevented from moving before they are stepped on.

- 5.3.4 Ladders must be used in such a way that a secure handhold and secure support are available to workers at all times. In particular, if a load has to be carried on a ladder, it must not preclude the maintenance of a safe handhold.

#### **5.4 Specific provisions regarding the use of rope access and positioning techniques**

- 5.4.1 The use of rope access and positioning techniques must comply with the following conditions:

- a) the system must comprise at least two separately anchored ropes, one as a means of access, descent and support (work rope) and the other as backup (security rope);
- b) workers must be provided with and use an appropriate harness and be connected by it to the security rope;
- c) the system must provide for a seat with appropriate accessories which is connected to the work rope;
- d) the work rope must be equipped with safe means of ascent and descent. It must have a self-locking system to prevent the worker falling should he lose control of his movements. The security rope must be equipped with a mobile fall prevention system which follows the movements of the worker;
- e) the tools and other accessories to be used by a worker must be secured to the worker's harness or seat or by some other appropriate means;
- f) the work must be properly planned and supervised, so that a worker can be rescued immediately in an emergency;
- g) in accordance with section 9, the workers concerned must receive adequate training specific to the operations envisaged, in particular rescue procedures.

- 5.4.2 In exceptional circumstances where, in view of the hazard assessment, the use of a second rope would make the work more dangerous, the use of a single rope may be permitted, provided that appropriate measures have been taken to ensure the safety of workers.

### **Annex 3**

#### **Zone classification of potentially explosive atmospheres**

##### **1. Preliminary note**

The following classification of zones must be applied to places where precautions in accordance with sections 3, 4 and 6 must be taken. The extent of the measures to be taken in accordance with Annex 4, Part A, is determined by this classification.

Layers, deposits and heaps of combustible dust must be considered as any other source which can form a hazardous explosive atmosphere.

"Normal operation" means the situation when installations are used within their design parameters.

## **2. Classification of zones**

Hazardous places are classified in terms of zones on the basis of the frequency and duration of the occurrence of a hazardous explosive atmosphere.

### **2.1 Zone 0**

A place in which a hazardous explosive atmosphere consisting of a mixture with air of flammable substances in the form of gas, vapor or mist is present continuously or for long periods or frequently.

### **2.2 Zone 1**

A place in which a hazardous explosive atmosphere consisting of a mixture with air of flammable substances in the form of gas, vapor or mist is likely to occur in normal operation occasionally.

### **2.3 Zone 2**

A place in which a hazardous explosive atmosphere consisting of a mixture with air of flammable substances in the form of gas, vapor or mist is not likely to occur in normal operation but, if it does occur, will persist for a short period only.

### **2.4 Zone 20**

A place in which a hazardous explosive atmosphere in the form of a cloud of combustible dust in air is present continuously, or for long periods or frequently.

### **2.5 Zone 21**

A place in which a hazardous explosive atmosphere in the form of a cloud of combustible dust in air is likely to occur in normal operation occasionally.

### **2.6 Zone 22**

A place in which a hazardous explosive atmosphere in the form of a cloud of combustible dust in air is not likely to occur in normal operation but, if it does occur, will persist for a short period only.

## **Annex 4**

### **A. Minimum requirements for improving the safety and health protection of workers potentially at risk from explosive atmospheres**

#### **1. Preliminary note**

The obligations laid down in this Annex apply to:

- places classified as hazardous and subdivided into zones in accordance with Annex 3 whenever required by the features of the working environment, workplaces, the equipment or substances used, the interaction between them or the danger caused by their use related to the risks from explosive atmospheres,
- equipment in non-hazardous places which is required for, or helps to ensure, the safe operation of work equipment located in hazardous places.

#### **2. Organizational measures**

## 2.1 Training of workers

The employer must provide those working in places where explosive atmospheres may occur with sufficient and appropriate training with regard to explosion protection.

## 2.2 Written instructions, permits to work, supervision

Work in hazardous places must be carried out in accordance with written instructions issued by the employer; a system of permits to work must be implemented for

- hazardous activities, and
- activities which may interact with other work to cause hazards.

Permits to work must be issued by a person with responsibility for this function prior to the commencement of work.

In working environments where explosive atmospheres may arise, appropriate supervision during the presence of workers must be ensured in accordance with the principles of the hazard assessment.

2.3 The entrances to areas in which explosive atmospheres may arise must be marked with the warnings provided for in Annex III of Directive 1999/92/EC of the European Parliament and of the Council of 16 December 1999 on minimum requirements for improving the safety and health protection of workers potentially at risk from explosive atmospheres (15th individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC).

2.4 Ignition sources, such as smoking and the use of open fire or open light, shall be banned from explosive atmospheres. Furthermore, unauthorized persons shall not be permitted access to areas in which explosive atmospheres may arise. This ban must be indicated in a visible, durable manner.

## 3. Explosion protection measures

3.1 If several types of flammable and/or combustible gases, vapors, mists or dusts arise in an explosive atmosphere, protective measures shall be appropriate to the greatest potential hazard.

3.2 Plant, equipment, protective systems and any associated connecting devices must only be brought into service if the explosion protection document indicates that they can be safely used in an explosive atmosphere. This applies also to work equipment and associated connecting devices which are not regarded as equipment or protective systems within the meaning of Directive 94/9/EC if their incorporation into an installation can in itself be considered a potential ignition source. Necessary measures must be taken to prevent confusion between connecting devices.

3.3 All necessary precautions must be taken to ensure that the workplace, work equipment and any associated connecting device made available to workers have been designed, constructed, assembled and installed, and are maintained and operated, in such a way as to minimize the risks of an explosion and, if an explosion does occur, to control or minimize its propagation within that workplace or work equipment. For such workplaces appropriate measures must be taken to minimize the risks to workers from the physical effects of an explosion.

- 3.4 Where necessary, workers must be given optical and acoustic warnings and evacuated before the explosion conditions are reached.
- 3.5 In the evaluation of ignition hazards, dangerous electrostatic discharges must also be taken account of and prevented.
- 3.6 Areas in which explosive atmospheres may arise must have a sufficient number of escape and rescue routes and exits which can be reached promptly, without hindrance and safely by the workers in the event of danger and to ensure that victims can be rescued at any time.
- 3.7 Where required by the hazard assessment, escape facilities must be provided and maintained to ensure that, in the event of danger, workers can leave endangered places promptly and safely.
- 3.8 Prior to the first use of workplaces in explosive atmospheres, explosion protection of the workplaces including the work equipment to be used and the working environment as well as all third-party protection measures must be reviewed. Any conditions necessary for ensuring explosion protection must be maintained. This review must be performed by a competent person with special knowledge in the field of explosion protection.
- 3.9 Where the hazard assessment shows it is necessary:
  - it must be possible, where power failure can give rise to the spread of additional risks, to maintain equipment and protective systems in a safe state of operation independently of the rest of the installation in the event of power failure,
  - manual override must be possible in order to shut down the equipment and protective systems incorporated within automatic processes which deviate from the intended operating conditions, provided that this does not compromise safety. Only workers who have been given this task may take such action;
  - on operation of the emergency shutdown, accumulated energy must be dissipated as quickly and as safely as possible or isolated so that it no longer constitutes a hazard.

#### **B. Criteria for the selection of equipment and protective systems**

If the explosion protection document based on the results of the hazard assessment does not state otherwise, equipment and protective systems for all places in which explosive atmospheres may occur must be selected on the basis of the categories set out in Directive 94/9/EC.

In particular, the following categories of equipment must be used in explosive atmospheres, provided they are suitable for gases, vapors or mists and/or dusts as appropriate:

- in zone 0 or zone 20, category 1 equipment,
- in zone 1 or zone 21, category 1 or 2 equipment,
- in zone 2 or zone 22, category 1, 2 or 3 equipment.

## **Annex 5**

### **Inspection of special pressure equipment pursuant to section 17**

#### Overview

1. External heating and cooling devices
2. Pressure equipment with a gas cushion in hydraulic fluid installations
3. Pressure equipment of electrical switchgear and controlgear systems
4. Pressure equipment in refrigeration plants and thermal pump installations
5. Silencers
6. Pressure equipment for extinguishers and containers for extinguishing agents
7. Pressure equipment with a lining made of bricks or other materials
8. Pressure equipment with internal parts
9. Stationary pressure equipment for granular materials or dusts
10. Vehicle-mounted containers for fluid or granular materials or dusts
11. Pressure equipment for non-corrosive gases or gas mixtures
12. Pressure equipment for gases or gas mixtures with operating temperatures below -10 degrees Celsius
13. Pressure equipment for liquefied gases or gas mixtures
14. Rotating steam-heated cylinders
15. Stone hardening furnaces
16. Pressure equipment made of glass
17. Dust filters in gas pipes
18. Pressure equipment in heat transfer systems
19. Experimental autoclaves
20. Steam plates in corrugated cardboard production plants
21. Water heating installations for drinking water or raw water
22. Pneumatic wine presses (diaphragm presses, hydrostatic presses)
23. Plate heat exchangers
24. Storage containers for beverages
25. Ready-to-use units
26. Pressure equipment with quick acting closure

#### **1. External heating and cooling devices**

External heating or cooling tubes which are used to heat or cool pressure equipment or open containers, and which are permanently connected to the container jacket, require recurrent inspections only where the seams joining the tube and the container wall are not accessible for visual inspections.

#### **2. Pressure equipment with a gas cushion in hydraulic fluid systems**

(1) Pressure equipment covered by numbers 1 and 2 of the table in section 15 (5) with a gas cushion in hydraulic fluid systems are subject to recurrent internal inspections at intervals not exceeding ten years, provided that the fluids and gases used do not have a corrosive effect on the equipment walls.

(2) For intermediate oil tanks in oil-hydraulic regulation systems, recurrent inspections may be omitted.

### **3. Pressure equipment of electrical switchgear and controlgear systems**

(1) Recurrent internal inspections of compressed-air reservoirs for electrical switchgear and controlgear systems covered by number 2 of the table in section 15 (5) or by Article 1 of Directive 87/404/EEC may be delayed until repair works, however, the inspection intervals for main reservoirs shall not exceed ten years, for intermediate reservoirs and the reservoirs directly attached to the switchgear the inspection intervals shall not exceed fifteen years. Notwithstanding the 1st sentence hereof, section 15 (5) sentences 2 and 3 and section 15 (9) sentence 2 shall apply, *mutatis mutandis*, to compressed-air reservoirs directly attached to switchgear which are operated with dry air.

(2) For compressed-air containers covered by subsection 1 hereof, recurrent strength tests may be omitted. However, the internal inspections shall be supplemented by strength tests whenever major repairs have been made, or when the internal inspections are not sufficient to judge the safe condition of the containers.

(3) For storage tanks for insulating material and fire-extinguishing agents as well as hydraulic reservoirs covered by numbers 1 and 2 of the table in section 15 (5) for electrical switchgear and controlgear systems, recurrent inspections may be omitted, provided that the pressure equipment is filled with fluids and gases that do not have a corrosive effect on the equipment walls. However, leakage tests must be performed by a competent person having due regard to the safety requirements.

(4) For pressure equipment for electrical high-voltage switchgear and controlgear equipment, systems and gas-insulated tubular bars for the transmission of electrical energy covered by Directive 97/23/EC classified pursuant to Article 9 in connection with Annex II of the Directive according to

- Table 1 in category III or IV, or
- Table 2 in category II, III or IV

the inspection prior to being put into service, and for pressure equipment covered by numbers 1 and 2 of the table in section 15 (5), the recurrent inspections may be performed by a competent person, provided that the electrical equipment requires pressurized fire-extinguishing agents or insulating materials for its proper functioning, and provided that it is not covered by subsections 1 to 3 hereof. The recurrent inspections may be omitted if the pressure equipment is filled with gases or gas mixtures that do not have a corrosive effect on the equipment walls; however, leakage tests must be performed by a competent person having due regard to the safety requirements

### **4. Pressure equipment in refrigeration plants and thermal pump installations**

For pressure equipment that is operated with refrigerating agents in a closed circuit, internal inspections and strength tests only have to be performed if the pressure equipment is put out of service for the purpose of performing repair work.

### **5. Silencers**

(1) For silencers that have been built into pipelines, recurrent internal inspections

may be omitted.

(2) For silencers that are connected to the atmosphere, the inspection prior to being put into service and the recurrent inspections may be omitted.

## **6. Pressure equipment for extinguishers and containers for extinguishing agents**

(1) For mobile fire extinguishers that are put into circulation as ready-to-use assemblies no inspection shall be performed before their putting into service. For these fire extinguishers recurrent inspections may be performed by a competent person if the product of maximum permissible pressure PS and relevant volume V does not exceed 1,000 bar·liter.

(2) For pressure equipment for fire extinguishers which are pressurized in active use only, and for carbonic acid and halon containers for fire-extinguishing purposes, recurrent inspections shall be performed after the end of the inspection intervals only if the equipment is refilled. For dry powder containers, recurrent strength tests may be omitted if no defects were found in the course of the internal inspections.

## **7. Pressure equipment with a lining made of bricks or other materials**

(1) For lined pressure equipment, recurrent strength tests may be omitted if no defects in the lining were found in the course of the internal inspections.

(2) For brick-lined pressure equipment, recurrent inspections may be omitted. However, internal inspections have to be performed where

1. parts of the brick lining with a size of 1 m<sup>2</sup> or more has been removed,
2. walls have been exposed, or
3. erosion or damages have been detected on the equipment wall.

Furthermore, internal inspections and strength tests must be performed if the brick lining has been completely removed.

(3) For pressure equipment where a clearance remains between the lining and the jacket, which is subject to an operational inspection of the lining for leaks, recurrent inspections may be omitted if the equipment has been inspected by the approved body for its reliability and suitability. Records shall be maintained concerning the inspections of the clearance. Where such equipment covered by numbers 1 and 2 of the table in section 15 (5) after the end of the time intervals specified in section 15 (5) is opened for the purpose of performing repair work, making it accessible for an internal inspection, the inspection shall be carried out.

## **8. Pressure equipment with internal parts**

For pressure equipment covered by numbers 1 to 4 of the table in section 15 (5) containing internal parts not likely to pose hazards, such as corrosion, and where an internal inspection of all parts of the wall cannot be performed at all or with great difficulty, the inspection interval for the internal inspections may be extended up to ten years, provided that no defects have been detected in the course of the first recurrent internal inspection.

## **9. Stationary pressure equipment for granular materials or dusts**

For stationary pressure equipment for granular materials or dusts, recurrent

pressure tests may be omitted.

#### **10. Vehicle-mounted containers for fluid or granular materials or dusts**

(1) For vehicle-mounted containers for fluid or granular materials or dusts without safety equipment of their own, the inspection prior to being put into service may be omitted. The time intervals for the recurrent inspections will in this case be calculated from the manufacture of the container.

(2) For vehicle-mounted containers for granular materials or dusts, the recurrent strength tests may be omitted.

(3) For road vehicles covered by numbers 1 and 2 of the table in section 15 (5) for fluid or granular materials or dusts, external inspections must be performed by an approved body not later than after two years.

#### **11. Pressure equipment for non-corrosive gases or gas mixtures**

(1) Unburied pressure equipment covered by numbers 1 and 2 of the table in section 15 (5) for gases or gas mixtures which do not have a corrosive effect on the equipment wall shall be subjected to internal inspections by an approved body at intervals not exceeding ten years.

(2) For pressure equipment covered by subsection 1 hereof, whose pressure-bearing walls do not consist, in whole or in part, of high-strength close-grained structural steel materials, the recurrent strength tests may be omitted if the inspection before being put into service was performed maximally ten years ago, or if no defects were detected in the course of the last internal inspection performed.

(3) For pressure equipment covered by subsection 1 hereof, an inspection of the internal wall may be omitted during the recurrent inspection if the equipment

1. only serves for the storage of propane, butane or their mixtures with a standardized purity;
2. does not contain any internal parts, such as heating elements or banding, and
3. has a capacity of not more than 3 t.

(4) Buried pressure equipment covered by numbers 1 and 2 of the table in section 15 (5) for gases or gas mixtures which do not have a corrosive effect on the equipment wall shall be equivalent to pressure equipment covered by subsection 1 hereof if it is protected against chemical and mechanical attack by especially effective means, that is, if the equipment

- has been fitted with a bitumen sheath and additional electric corrosion protection,
- has been constructed as a pressure vessel with an additional outer container made of steel and leakage monitoring of the clearance, or
- has been coated on the outside with substances on the basis of epoxy resins or unsaturated polyester resins so as to resist the stress to be expected from its intended use.

The special protective measures described in the 1st sentence hereof shall be included in the inspection prior to being put into operation. The effectiveness of electrical corrosion protection shall be verified after one year and the function of the equipment for electrical corrosion protection and leakage monitoring shall be verified at intervals not exceeding two years by a competent person. Electrical

corrosion protection systems supplied by external current shall be inspected at intervals not exceeding four years by an approved body.

(5) For electrically heated pressure equipment covered by number 2 of the table in section 15 (5) for carbonic acid, the external inspections may be performed by competent persons.

(6) For pressure equipment designed to evaporate gases or gas mixtures which do not have a corrosive effect, which exclusively consist of pipe arrangements, recurrent internal inspections and strength tests must be carried out by competent persons, regardless of their maximum pressure PS and their nominal size DN, only if they are put out of service for the purpose of performing repair works.

(7) For installations covered by section 1 (2) sentence 1 no. 1 letter b, which have been manufactured in series production and are not covered by section 14 (3) sentence 1, the inspections required under section 14 (1) may be performed by a competent person, provided that the equipment of the container is included in the prototype and an installation from the series has been inspected by an approved body.

## **12. Pressure equipment for gases or gas mixtures with operating temperatures below -10 degrees Celsius**

(1) For pressure equipment for gases or gas mixtures whose operating temperature has to be permanently kept below -10 degrees Celsius, the recurrent internal inspections and strength tests only have to be performed if the pressure equipment is put out of service for the purpose of performing repair works.

(2) For pressure equipment covered by subsection 1 hereof, recurrent internal inspections and recurrent strength tests must be performed by approved bodies, even if their maximum pressure is less than one bar.

## **13. Pressure equipment for liquefied gases or gas mixtures**

(1) Pressure equipment for flammable liquefied gases and gas mixtures which

- have a corrosive effect on the container walls, external inspections must be carried out every two years by an approved body,
- have no corrosive effect on the container walls, external inspections must be carried out every two years by a competent person.

(2) Heated pressure equipment for storing flammable liquefied gases or gas mixtures must be subjected to external inspections by an approved body at intervals not exceeding two years.

(3) For pressure equipment for liquefied gases or gas mixtures which is removed from its normal location for the purpose of performing recurrent inspections, and which may be installed in another location after the performance of the inspection, the subsequent inspection prior to being put into service may be omitted, provided that the connections and accessories of the pressure equipment have not been modified, an inspection prior to being put into service has already been performed on similar pressure equipment in the new location, and the inspection log contains a photocopy of the inspection prior to being put into service of the pressure equipment that has been replaced.

## **14. Rotating steam-heated cylinders**

Rotating, steam-heated cylinders shall only be subjected to recurrent strength tests if the cylinders are removed from the machine support.

#### **15. Stone hardening furnaces**

(1) For stone hardening furnaces covered by number 2 of the table in section 15 (5), the recurrent internal inspections shall be performed at intervals not exceeding two years.

(2) The repaired areas of repaired stone hardening furnaces to which patches have been applied shall be subjected annually to an inspection for surface cracks by an approved body.

(3) Areas of patches with a length of more than 400 mm in longitudinal direction shall be subjected to the inspection for surface cracks referred to in subsection 2 hereof no later than six months after the repair.

(4) The inspections referred to in subsection 2 hereof may be omitted if no defects have been detected in five inspections of the repaired areas.

#### **16. Pressure equipment made of glass**

(1) For pressure equipment made of glass, except experimental autoclaves covered by Number 19, recurrent inspections may be omitted. If the equipment is affected by abrasive media, the wall thickness must be measured at intervals to be defined subject to the operating stress by a competent person.

(2) A leakage test shall be carried out by a competent person on pressure equipment made of glass prior to being put into service for the first time.

#### **17. Dust filters in gas pipes**

For dust filters in gas pipelines covered by Directive 97/23/EC classified pursuant to Article 9 in connection with Annex II of the Directive according to

- Table 1 in category III or IV, or
- Table 2 in category II, III or IV

the inspection prior to being put into service, and for dust filters covered by numbers 1 and 2 of the table in section 15 (5) even the recurrent inspections by an approved body, may be omitted. The 1st sentence hereof shall not be applicable to cyclone filters.

#### **18. Pressure equipment in heat transfer systems**

(1) Pressure equipment in heat transfer systems in which organic fluids are heated, or in which these fluids or their vapors are used for heat transfer, must be subjected to the following inspections by an approved body:

1. an inspection prior to being put into service, if the product of the maximum pressure PS and the volume V exceeds 100 bar•liter, and
2. recurrent inspections, if the product of the maximum pressure PS and the volume V exceeds 500 bar•liter.

(2) Heat transfer installations covered by subsection 1 hereof and any part thereof shall not be put into service for the first time or after a repair or a modification unless they have been inspected for leaks by a competent person.

(3) Heat transfer installations covered by subsection 1 shall not be operated unless the heat transfer medium has been inspected by a competent person whenever necessary, but no less than once per year, for its further usability.

**19. Experimental autoclaves**

(1) Experimental autoclaves shall be subjected to recurrent inspections by an approved body, if the product of the maximum pressure PS and the volume V exceeds 100 bar•liter. The inspection prior to being put into service and the recurrent external inspections may be omitted.

(2) Experimental autoclaves must be inspected by a competent person after each use.

**20. Steam plates in corrugated cardboard production plants**

Steam plates in corrugated cardboard production plants shall only be subjected to recurrent strength tests if the steam plates are removed from the machine support. Internal inspections may be omitted.

**21. Water heating installations for drinking water or raw water**

For pressure-containing chambers that serve to heat closed water systems of water heating installations with a maximum temperature of the heating medium of 110 degrees Celsius, the inspection prior to being put into service and the recurrent inspections may be performed by a competent person. Recurrent inspections shall be performed annually if the heat transfer media contain substances or preparations with hazardous properties covered by section 3a of the Chemicals Act. The second and third sentences of section 15 (5) and the 2nd sentence of section 15 (9) shall apply, *mutatis mutandis*.

**22. Pneumatic wine presses (diaphragm presses, hydrostatic presses)**

(1) The recurrent inspections may be omitted for pressure equipment designed for pressing wine grapes if they are inspected for visible damages at least once per year by a competent person. However, if the competent person detects defects on pressurized parts, or if repair work is performed, internal inspections and strength tests have to be performed, which have to be carried out by an approved body if pressure equipment covered by Directive 97/23/EC is involved which is to be classified pursuant to Article 9 in connection with Annex II of the Directive according to Table 2 in categories II, III or IV.

(2) Accessories of pressure equipment covered by subsection 1 hereof must be subjected to recurrent inspections at intervals not exceeding five years by an approved body if they are pressure equipment covered by number 2 of the table in section 15 (5), or otherwise by a competent person.

**23. Plate heat exchangers**

For plate heat exchangers consisting of a detachable plate assembly, the inspection prior to being put into service and the recurrent inspections may be omitted.

**24. Storage containers for beverages**

(1) The recurrent inspections may be omitted for pressure vessels covered by number 2 of the table in section 15 (5) which serve for the storage of beverages

provided that they are inspected for visible damages at least once per year by a competent person. However, if the competent person detects defects on pressurized parts, or if repair work is performed, internal inspections and strength tests have to be performed pursuant to number 2 of the table in section 15 (5).

(2) Accessories of pressure vessels covered by subsection 1 hereof which are filled, discharged or sterilized under pressure shall be subjected to an initial inspection and recurrent inspections at intervals of five years. The inspections shall be carried out by approved bodies if the maximum pressure exceeds one bar.

## **25. Ready-to-use units**

For ready-to-use units produced in series which include pressure equipment covered by Article 1 of Directive 97/23/EC or simple pressure vessels covered by Article 1 of Directive 87/404/EEC, an inspection of installation produced in series prior to being put into service may be carried out on a sample by an approved body without reference to the final location of the installation, if the product of the pressure  $PS$  and the volume  $V$  of the equipment or vessel does not exceed 1 000 bar·liter. The second and third sentences of section 15 (5) and the 2nd sentence of section 15 (9) shall apply, *mutatis mutandis*, to installations subject to monitoring for which a test certificate referred to in the 1st sentence hereof has been issued.

## **26. Pressure equipment with quick-acting closure**

Quick-acting closures on pressure equipment covered by Directive 97/23/EC classified pursuant to Article 9 in connection with Annex II of the Directive according to

- Table 1 in category IV, or
- Table 2 in category III or IV

shall be subjected to external inspections by the approved body at intervals not exceeding two years.