BS EN 14717:2024

BSI Standards Publication

Welding and allied processes — Environmental check list

National foreword

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The UK participation in its preparation was entrusted to Technical Committee WEE/0.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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Soudage et techniques connexes - Liste de vérification relative à l'environnement

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Contents

European foreword

This document (EN 14717:2024) has been prepared by Technical Committee CEN/TC 121 “Welding and allied processes”, the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by December 2024, and conflicting national standards shall be withdrawn at the latest by December 2024.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 14717:2005.

This document has been prepared under a standardization request addressed to CEN by the European Commission. The Standing Committee of the EFTA States subsequently approves these requests for its Member States.

For the relationship with EU Legislation, see informative Annex ZA, which is an integral part of this document.

The main changes compared to the previous edition EN 14717:2005 are as follows:

a) the document was editorially reviewed;

b) new terms (ecodesign and improvement of the environmental performance) under Clause 3 added;

c) the options in Clause 4 were changed to requirements;

d) all checklist items in Clause 5 were changed to requirements;

e) new Annex ZA regarding relationship between this document and the ecodesign requirements of Commission Regulation (EU) No 2019/1784.

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Introduction

Protection of the environment is a key political issue in Europe and elsewhere. Protection of the environment is taken in a very broad sense. What is meant is the total life cycle aspects of, e.g. a product on the environment, including expenditure of energy and during all phases from mining of raw materials, fabrication, packaging, distribution, use, scrapping, recycling of materials, etc. However, assessment of all aspects of the welded product or structure during its entire lifetime cycle is beyond the scope of the present document. The document is limited to aspects directly related to welding fabrication.

The design of the fabricated structures puts a lower limit on the expenditure of energy during joint preparation and welding, on the consumption of consumables and consequently on emissions of fumes and gases during welding, etc. but the design phase is not covered by the document.

Welding fabrication has many environmental aspects. This document provides for a checklist, which may be used for identification of environmental aspects during welding fabrication.

Provisions are restricted to a general guidance. Limit values are specified in national laws.

Some of the environmental aspects also have an implication for occupational health and safety, but the check list in this document is incomplete for this use.

1 Scope

This document provides check lists for the assessment of the environmental aspects of welding fabrication of metallic materials including site and repair work. Informative annexes indicate recommended actions for avoiding and reducing the possible environmental impacts outside the workshop.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
welding fabrication
includes the following activities and associated processes:

— joint preparation including thermal cutting and grinding;

— surface preparation including sand blasting, shot blasting, shot peening, chemical pickling and cleaning;

— welding, including grinding and back gouging;

— soldering and brazing;

— thermal spraying;

— preheating and heat treatments;

— flame straightening and mechanical straightening;

— inspection and testing of welds and thermal sprayed surfaces

3.2
disposal
collection, sorting, transport and treatment of waste as well as its storage and tipping above or underground, the transformation operations necessary for its re-use, recovery or recycling

[SOURCE: Directive 75/442/EEC]

3.3
ecodesign
integration of environmental aspects into product design with the aim of improving the environmental performance of the product throughout its whole life cycle

[SOURCE: Directive 2009/125/EC]

3.4
environment
surroundings in which an organization operates, including air, water, land, natural resources, flora, fauna, humans and their interrelation

[SOURCE: EN ISO 14001:2015, 3.2.1, modified – Note 1 to entry and Note 2 to entry have been deleted.]

3.5
environmental aspect
element of an organization's activities or products or services that can interact with the environment

[SOURCE: EN ISO 14001:2015, 3.2.2, modified – Note 1 to entry and Note 2 to entry have been deleted.]

3.6
environmental impact
any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's environmental aspects

[SOURCE: EN ISO 14001:2015, 3.2.4.]

3.7
improvement of the environmental performance
process of enhancing the environmental performance of a product over successive generations, although not necessarily in respect of all environmental aspects of the product simultaneously

[SOURCE: Directive 2009/125/EC]

4 Procedures

Requirements for the protection of the environment and improvement of the environmental performance of welding equipment during welding fabrication shall originate from a number of sources such as:

— legal requirements, often at the national level;

— commercial requirements (customer requirements);

— economical requirements, e.g. related to insurance.

Annex B provides additional considerations for control of environmental impacts.

Absolute limits, e.g. emissions, shall apply but protection of the environment is, as a general rule, a continuous process for which gradual improvements are aimed.

The check lists in the document shall be used as a tool for determination of possible problem areas applicable to the following situations:

— when planning a fabrication, the application of new methods of fabrication or new equipment;

— for identification of procedures for monitoring or checks of actual environmental aspects;

— for specification of procedures for handling, storage and disposal of environmentally harmful substances.

NOTE All check lists state possible environmental aspects. Many aspects can be identified during the planning stage as having no environmental impact. Others can be shown to be of no significance by monitoring or checking the production processes. A few can result in further action to comply with the requirements. Annex A provides general guidance for assessment and possible actions.

5 Check lists of possible environmental aspects

The checklist shall be used to identify a series of potential environmental problematic areas during welding fabrication as listed in Table 1 to Table 7.

Table 1 — Common to welding fabrication

Common to welding fabrication	
Consumables	The following shall be checked: — consumption of welding consumables during welding (filler material, shielding gas, backing gas, electrode coating); — disposal of containers, packaging material, etc.; — disposal of used consumables and waste materials.
Equipment	The following shall be checked: — energy and fuel efficiency; — generation of physical aspects, e.g. noise, heat and radiation; — requirements for spare parts and consumables for maintenance; — procedures for disposal and recycling of equipment.
Work operation	The following shall be checked: — disposal of scrap; — emission of fumes, gases and aerosols; — energy and fuel consumption; — fire hazards and explosion risks whenever there is a risk of ignition; — generation of physical aspects, e.g. heat, light, noise, radiation.
NOTE Several of the aspects listed above have a limited range of influence. It depends on the circumstances whether they represent an environmental aspect or not. Noise can e.g. not represent an environmental aspect when working in a large workshop but can be a serious problem when working on site or performing repair work in residential areas.	

Table 2 — Joint and surface preparation, weld dressing, surface treatment and cleaning

Joint and surface preparation, weld dressing, surface treatment and cleaning	
Cleaning, pickling and other chemical treatment	The following shall be checked: — disposal of cleaning agents and other chemicals; — vapours; — leakage of consumables, cleaning agents, etc. from storage vessels representing a risk of contamination of soil, drains, watercourses or groundwater; — emission of hazardous substances in the air.
Grinding and gouging	The following shall be checked: — disposal of dust, used grinding wheels and other tools for grinding; — dust explosions; — emission of dust [a]; — noise.
Sandblasting, shot blasting, shot peening, etc.	The following shall be checked: — disposal of dust and used sand/shot; — emission of dust [a]; — noise.
Thermal cutting	The following shall be checked: — disposal of scrap, slag or mud; — emission of UV-/IR-radiation; — emission of dust [a]; — noise; — use of coolants; — emission of hazardous gases, e.g. nitrogen oxide (if relevant).
[a] Un-controlled emission of dust (not least when working on site) could represent a risk of contamination of soil, drains, watercourses or groundwater, e.g. by heavy metals.	

Table 3 — Welding, brazing and soldering

Welding, brazing and soldering	
Welding, brazing and soldering	The following shall be checked: — disposal of non-permanent backing; — disposal of slag, fluxes; — emission of UV-/IR-radiation; — emission of fume, dust and gases [a]; — noise; — use of coolants; — electrode stubs.
[a] Un-controlled emission of dust (not least when working on site) could represent a risk of contamination of soil, drains, watercourses or groundwater, e.g. by heavy metals.	

Table 4 — Thermal spraying

Thermal spraying	
Thermal spraying	The following shall be checked: — emission of fume and dust; — disposal of dust; — noise; — pollution of water curtain; — radiation (arc processes).

Table 5 — Pre- and post heating, post weld heat treatment and straightening

Pre- and post heating, post weld heat treatment and straightening	
Pre- and post heating, post weld heat treatment and straightening	The following shall be checked: — disposal of insulating materials and other materials (in particular for temporary ovens); — use of coolants; — energy consumption (e.g. efficiency of insulation); — energy consumption of repairing/re-working.

Table 6 — Inspection and testing

Inspection and testing	
Inspection and testing	The following shall be checked: — ionising radiation when performing radiographic testing (RT); — disposal of chemicals used for the development of radiographic films; — disposal of radiographic films after use; — disposal of other radiographic material, e.g. storage plates; — use and disposal of fluids used for magnetic particle testing (MT); — use and disposal of fluids and cleaning materials for penetrant testing (PT); — use and disposal of materials used for ultrasonic testing (UT), e.g. couplants.

Table 7 — Destructive testing

Destructive testing	
Destructive testing	The following shall be checked: — environmental aspects related to sampling and preparation of test specimens in accordance with Table 2; — use and disposal of chemicals used for preparation of test specimens; — disposal of scrap and test specimens after use.

Annex A
(informative)

Assessment and actions

Table A.1 gives a set of assessment of the environmental aspects and associated actions in case any adverse environmental impact has been identified.

Table A.1 — Assessment and actions

Environmental aspect	Assessment	Actions when adverse environmental impact has been identified
Chemicals used for development of radiographs	Development of radiographs includes the use of potentially harmful chemicals.	Used chemicals should be neutralized before disposal or special arrangements for disposal should be established. Used fixing baths hold silver, which can be recycled. Use digital radiography, whenever possible.
Cleaning agents	Cleaning fluids can include elements harmful to the environment. The environmental effects should be assessed for all cleaning agents, which evaporate significantly during use or storage. Water-based cleaning fluids are usually less harmful than other cleaning agents.	Some fluids can be cleaned by filtration or distillation and re-used. Substitute other cleaning agents by water-based cleaning fluids, if possible. Other fluids have to be disposed, e.g. by burning (organic fluids). Cleaning fluids should preferably be limited to non-cyclic hydrocarbon, aqueous cleaning agents or equivalent non-halogenated or halogen-free organic degreasing agents.
Coolants	Some welding power sources, laser beam sources and other equipment incorporate a cooling system. Some systems use direct water-cooling. Other systems include a refrigerating unit and use either water or the ambient air for secondary cooling. Check systems for leaks. Check for environmental consequences of emission of heat to surroundings. Check for use of cooling water.	Recycling of coolants and use of cooling towers could diminish waste. Use of waste heat for heating purposes e.g. room heating might also be a possibility. Check the efficiency of waste water treatment (if needed).

Environmental aspect	Assessment	Actions when adverse environmental impact has been identified
Dust	The disposal of dust should be planned in order to minimize environmental impacts.	Dust particles should be automatically transported into a sealed container.
Energy consumption	The total amount of joint preparation and welding and the corresponding expenditure of energy are determined largely by the design of the fabricated structures. However, ineffective work planning, absence or ineffective use of jigs and fixtures, repair work and ineffective process control can result in augmented energy consumption and scrap.	Efficient process control is important in order to avoid unnecessary expenditure of energy during repair and rework. Waste of consumables and raw materials is reduced at the same time. Check energy consumption of ventilation system. Check energy consumption of manipulators, fixtures and other auxiliary equipment. Check for proper supporting equipment required for assembly, disposal of clamping devices and fixtures: Assembly and welding fixtures are very important equipment for welding production. They should be as universal as possible and should be taken into account when planning a fabrication. Conventional recycling of redundant jigs and fixtures is not economically viable nor sustainable. Therefore, the answer should be found in increased flexibility of these jigs and fixtures.
Equipment	The disposal of equipment should be planned in order to minimize environmental effects.	Materials and parts of equipment should be recycled whenever possible. Special arrangements for disposal of remaining parts of equipment in garbage dumps can be required. Disposal of radioactive isotopes used for radiography represents a special problem, usually regulated by national law.

Environmental aspect	Assessment	Actions when adverse environmental impact has been identified
Explosions	Explosions are usually caused by one of the following: - leakage of fuel gas or acetylene resulting in an explosive concentration especially in confined spaces; - repair welding on storage vessels holding or having held an inflammable medium; - dispersing of deposited dust. However, special techniques have been developed e.g. for hot tapping of gas pipelines. See also fire hazards.	Perform regular checks of hoses, gas installations, etc. Avoid cutting and repair welding on vessels holding remains of oil, gasoline, etc. Regular cleaning of the workplace and equipment. Enclosure of equipment to prevent dust deposit.
Fire hazard	Fire hazards can be caused by the heat from flames, sparks, hot spatter or hot materials. Fire hazards are, in particular, a problem when working on site, e.g. for repair work. Fire can develop very slowly and can sometimes be observed until several hours after ignition.	Combustible items close to the workplace should be removed whenever possible or at least shielded properly. Fire extinguishers should be readily at hand. Keep the welding site under regular surveillance during off-hours. Use efficient extracting of the welding smoke directly at the source.
Fire hazards due to oxygen enrichment	An unusual but potentially very dangerous fire hazard is due to oxygen enrichment. If a leak e.g. in an oxygen hose raises the oxygen concentration in a confined space, any fire can develop rapidly and violently.	Perform regular checks of hoses, oxygen installations, etc.

Environmental aspect	Assessment	Actions when adverse environmental impact has been identified
Fumes and gases	Fumes and gases can be removed by ventilation from the workplace into the environment unless effective filters are included in the flow. Check effectiveness of ventilation system and in particular of the filters. The nature of the emissions depends on the welding procedure. Control involves determination of the nature of possible emissions and subsequent determination of the amount of emission of each particular substance. Metallic oxides are a very common emission. Gases are usually not removed by filters. However, many protective gases are a normal constituent of the atmosphere and as such not harmful. This is the case for argon, nitrogen and oxygen. Helium is not harmful but is drawn from a limited resource. CO_2 is not directly harmful but can have an effect as a green house gas. The emission of other gases such as NO should be kept as low as possible. Ozone can also occur but is usually neutralized within a short distance from the welding workplace. Other possible gaseous decomposition products like xylene, ethanol, butanol, methanol, isopropylalcohol, formaldehyde, phenol etc. have to be analysed if they are supposed to be emitted in relevant quantity that might harm the environment.	Use more efficient filters. Fumes and gases emission can be reduced by choosing lower polluting processes and with appropriate process control. Check the function of filters, automatic switch-off/ alert in case limit values are exceeded, etc.

Environmental aspect	Assessment	Actions when adverse environmental impact has been identified
Insulating materials (in particular for temporary ovens)	Insulating materials often consist of mineral or glass wool. Older equipment could also include asbestos as an insulation. Materials used for insulation during preheating or for temporary ovens are often disposed after heat treatment or preheating. The materials are not biodegradable and can rarely be recycled.	Special arrangements for disposal in garbage dumps could be required. [a]
Ionising radiation	The radiation from X-ray sources and radioactive isotopes is harmful to the environment. Distance is important and the problems are usually most pronounced when working on site in build-up areas.	Minimize the harmful effects by effective screening.
Light	Emission of non-ionising radiation usually has a minimal impact on the more distant environment. However, emission of light from arc welding can be a problem for welding on site and repair welding in build- up areas. Laser beams can present a more serious threat if going astray, e.g. due to reflections. High power focussed laser beams easily penetrate simple screens used for arc welding. However, the main danger is collimated but unfocussed beams, which can damage the eyes. The safe distance for powerful collimated, unfocussed YAG laser beams is of the order several kilometres.	Use effective light screen when welding on site and for repair welding. Safety devices should be installed which prevent collimated, unfocussed beams to be directed towards areas outside the laser beam cell.
Magnetic particle testing (MT)	Fluid for magnetic particle testing can represent an environmental aspect due to hydrocarbons.	Use biodegradable and water-soluble fluids, whenever possible. Use adequate procedures for disposal.

Environmental aspect	Assessment	Actions when adverse environmental impact has been identified
Noise	Noise could be difficult to attenuate. However, distance is essential for the environmental impact and problems are usually limited to work on site and to workplaces close to residential areas.	Check emission of noise from ventilation systems. Special arrangements could be needed when working in or close to residential areas.
Radiograph film after use	Radiograph films hold silver which may be recycled.	Silver can be recycled. Use digital radiography (RT-D), whenever possible.
Scrap	Metal materials can hold alloy elements which can be harmful to the environment.	Scrap from different materials groups should be kept apart and free of contamination in order to facilitate re-cycling. Check layout of parts in plates, etc. in order to nest as close as possible and minimize the amount of scrap.
Slag and mud	Slag and mud can include chemical elements harmful to the environment such as heavy metals.	Re-cycling of slag and mud is not common. Special arrangements for disposal in garbage dumps can be required. Mud can occasionally be used for other purposes, depending on the chemical composition.
[a] Asbestos is harmful to health and disposal is in many countries regulated by national law.		

Annex B
(informative)

Additional considerations for control of environmental impacts

The control of environmental impacts and the corresponding limit values for emissions depend on many factors and cannot be standardized. Table B.1 provides comments on the various categories of considerations. The considerations can be legal in which case a limit value is specified or there can be a case for continual improvement in which case EN ISO 14001 is being referred to.

Table B.1 — Category of additional considerations for control of environmental impacts

Category	Comments
Regulations	Regulations are specified nationally and can depend on the location of the welding operations. The regulations usually specify limits for emissions and conditions for disposal of waste.
Commercial	Company management can have formulated an environmental policy. [a]
	Customers may also require a formalized system (even certified) for environmental management. [a]
	Implementation of a strict environmental policy can make the company more attractive to new employees.
	Good relations with the local community can, in certain cases, require a reduction of one or more of the environmental impacts.
Economical	Efficient quality control is an efficient means for reduction of many environmental impacts - and also for reduction of costs.
	The costs related to disposal of waste, etc. might make it attractive to reduce the environmental impacts.
	Requirements for the control of the environmental impacts can be of importance for insurance conditions.
Occupational health and safety	Many environmental impacts also influence the occupational health and safety for the personnel involved in welding and vice versa. Legal or some other requirement can make it necessary to reduce one or more environmental impact in order to comply with the requirement to occupational health and safety. It should be noted, however, that the occupational health and safety is influenced by additional factors, which do not have any environmental impact. Some environmental impacts do not have any direct influence on the occupational health and safety. The check lists in this document can give some guidance but they are inadequate as check lists as regards impacts on the occupational health and safety.

[a] See EN ISO 14001 for further information.

Annex ZA
(informative)

Relationship between this European Standard and the ecodesign requirements of Commission Regulation (EU) No 2019/1784 aimed to be covered

This European Standard has been prepared under a Commission's standardization request "M/559"/"C(2018) 3309 final" to provide one voluntary means of conforming to the ecodesign requirements of Commission Regulation (EU) No 2019/1784 of 1st October 2019 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for welding equipment.

Once this standard is cited in the Official Journal of the European Union under that Regulation, compliance with the normative clauses of this standard given in Table ZA.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding ecodesign requirements of that Regulation and associated EFTA regulations.

Table ZA.1 — Correspondence between this European Standard and Commission Regulation (EU) No 2019/1784 of 1st October 2019 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for welding equipment and Commission's standardization request 'M/559"/"C(2018) 3309 final']

Ecodesign Requirements of Regulation (EU) No 2019/1784	Clause(s)/sub-clause(s) of this EN	Remarks/Notes
Annex II, 3 (i) – shielding gas	Table 1, Consumables 1st bullet point	
Annex II, 3 (j) – filler material	Table 1, Consumables 1st bullet point	
Annex II, 3 (g) – Disposal at end of life	Table 1, Equipment 4th bullet point	

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Bibliography

[1] Commission Regulation (EU) 2019/1784 of 1 October 2019 laying down ecodesign requirements for welding equipment pursuant to Directive 2009/125/EC of the European Parliament and of the Council

[2] Council Directive 75/442/EEC of 15 July 1975 on waste

[3] EN ISO 14001:2015, *Environmental management systems — Requirements with guidance for use (ISO 14001:2015)*

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