INTERNATIONAL STANDARD

ISO 8230-2

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Safety requirements for dry-cleaning machines —

Part 2: Machines using perchloroethylene

Exigences de sécurité pour les machines de nettoyage à sec —

Partie 2: Machines utilisant du perchloroéthylène

Reference number
ISO 8230-2:2008(E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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

ISO 8230-2 was prepared by Technical Committee ISO/TC 72, *Textile machinery and accessories*, Subcommittee SC 5, *Industrial laundry and dry-cleaning machinery and accessories*.

This first edition of ISO 8230-2, together with ISO 8230-1:2008 and ISO 8230-3:2008, cancels and replaces ISO 8230:1997, of which it constitutes a technical revision.

ISO 8230 consists of the following parts, under the general title *Safety requirements for dry-cleaning machines*:

— *Part 1: Common safety requirements*

— *Part 2: Machines using perchloroethylene*

— *Part 3: Machines using combustible solvents*

Introduction

This document is a type-C standard as stated in ISO 12100.

The machinery concerned and the extent to which hazards, hazardous situations or hazardous events are covered are indicated in the Scope of this document.

When requirements of this type-C standard are different from those which are stated in type-A or -B standards, the requirements of this type-C standard take precedence over the requirements of the other standards for machines that have been designed and built according to the requirements of this type-C standard.

Safety requirements for dry-cleaning machines —

Part 2:
Machines using perchloroethylene

1 Scope

This part of ISO 8230 specifies safety requirements for dry-cleaning machines that exclusively use perchloroethylene (hereinafter known as “perc”) as their cleaning medium.

It is applicable to such dry-cleaning machines, within the scope of ISO 8230-1, when they are used as intended and under conditions of misuse that are reasonably foreseeable by the manufacturer.

It is not applicable to:

— open-circuit dry-cleaning machines;

— transfer machines.

NOTE See ISO 8230-1 for the definitions of those machines.

This part of ISO 8230, in conjunction with ISO 8230-1, deals with all significant hazards, significant hazardous situations and significant hazardous events that have been identified as being significant to the types of machines covered by this part of ISO 8230 and which require specific action by the designer or manufacturer to eliminate or reduce the risk.

It deals with the following significant hazards specific to the use of perc, which can lead to the inhalation of unhealthy vapours, to perc contact with the skin (including of the feet) or eyes of the machine operator and those of other personnel and members of the public, as well as to water and ground contamination:

a) perc emission to the workroom, seepage into the ground and sewer during operation and maintenance of the water separator;

b) perc emission resulting from operation, cleaning and maintenance of the distilling installation.

This part of ISO 8230 applies to machines manufactured after the date of its issue.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 8230-1:2008, *Safety requirements for dry-cleaning machines — Part 1: Common safety requirements*

ISO 12100-1:2003, *Safety of machinery — Basic concepts, general principles for design — Part 1: Basic terminology, methodology*

IEC 60204-1:2005, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 12100-1 and ISO 8230-1 apply.

4 Safety requirements and/or protective measures

4.1 General

Dry-cleaning machines using perc shall comply with the safety requirements and/or protective measures of ISO 8230-1, in as far as these are not modified or completed by this clause and other requirements of this part of ISO 8230.

4.2 Hazards generated by perc

4.2.1 Ventilation

The dry-cleaning machine shall have a provision for allowing the interlocking of its functioning with the general room ventilation. Appropriate advice shall be given in the instruction handbook.

4.2.2 Perc emission to the workroom, and seepage into ground and sewer during operation and maintenance of water separator

The water outlet of the separator shall lead through a pipe into a sealed collecting system — e.g. into an additional decantation tank or a purifying system — in order to avoid the loss of perc.

It shall be possible to detect the presence of perc in the tank, e.g. by means of a sight glass.

The capacity of the water-collecting tank shall be not less than the maximum one-day's production for which the dry-cleaning machine is intended.

A label on the collecting tank shall indicate that the water contains perc. The wording of this label shall be reproduced in the instruction handbook.

The instruction handbook shall include information about the measures for preventing perc spills during maintenance operations on the water separator and sealed collecting system.

Drainage from a water separator and any associated collecting system shall be possible either via a manual valve that closes automatically when released or via a direct return circuit to the still or other reservoir.

NOTE National regulations may require specific contact water disposal.

4.2.3 Perc emission resulting from operation, cleaning and maintenance of distilling installation

4.2.3.1 A still pressure-relief device shall be fitted, capable of releasing excess pressure by evacuating the volume of gas generated by distillation at maximum rate. The pressure-relief device shall be accessible for enabling inspection. Operation of the pressure-relief device shall cut off the heating of the still. The instruction handbook shall describe the inspection procedure for the pressure-relief device. The instructions for installation shall advise on how to evacuate the exhaust without polluting the workroom, e.g. to the outside.

4.2.3.2 The temperature of the still heating surface shall not exceed 150 °C.

4.2.3.3 If manual valves are provided for air or steam injection into the still, these shall return to the closed position when released.

4.2.3.4 The coolant flow shall be interlocked with the heating of the still in such a way as to stop heating when the coolant flow is reduced below a safe limit and to produce a visual or acoustical alarm. This can be

achieved, e.g. by a pressure sensor in the coolant service or a sensor of the solvent condensate temperature. This temperature shall not exceed 55 °C.

4.2.3.5 If a manual drain valve is installed to empty the still in the event of breakdown or to reduce the oily residues prior to opening the cleaning door, it shall have an interlocking provision with locking so that it can only be opened if the temperature is below 40 °C and it shall return automatically to the closed position when released.

5 Verification of the safety requirements and/or protective measures

Verification of the safety requirements and/or protective measures, as well as requirements of Clause 6, shall be in accordance with ISO 8230-1 and Table 1.

Table 1 — Verification list

Subclause of this part of ISO 8230	Subject	Verification method
4.1	Hazards specified in ISO 8230-1	In accordance with ISO 8230-1
4.2	Perc	
4.2.1	Ventilation	Design verification and testing
4.2.2	Water separator	Design verification and visual inspection
4.2.3	Distilling installation	Design verification, measuring, testing and inspection
6.2	Signals and warning devices	Visual inspection
6.3	Instruction handbook	Visual inspection
6.4	Marking	Visual inspection

6 Information for use

6.1 General

All requirements specified in ISO 8230-1:2008, Clause 6, are applicable to the dry-cleaning machines working with perc. In addition, the provisions of 6.2 to 6.4, below, apply.

6.2 Signals and warning devices

A label on the collecting tank shall indicate that the water contains perc.

6.3 Instruction handbook

Dry-cleaning machines using perc as their cleaning medium involve some hazards that are very specific to this type of equipment and that need particular mention in the instruction handbook. These are as listed in Table 2 (see also Clause 4).

Table 2 — Special points to be included in the instruction handbook

Installation	Details of how to interlock workroom ventilation with machine operation during installation so that the dry-cleaning machine cannot be operated without the ventilation running. A notice to the user that the pressure-relief valve of the still shall be piped during installation of the machine so that perc vapours are safely evacuated without polluting the workroom.
Machine marking and warning notices	Details of the label on the water-collecting tank advising that the water in it contains perc. Details of the label advising maximum operating pressure of the still.
Operator maintenance	Instructions as to the safe draining of the water collecting tank.
Engineering maintenance	Details of the still pressure release.
Safety monitoring	The method by which the user can check the correct operation of the still pressure-relief device. Instructions on how the user can measure the concentration of perc in the air in the cage at the end of the working cycle.

6.4 Marking

All requirements specified in ISO 8230-1:2008, 6.4, are applicable to dry-cleaning machines working with perc.

Table 3 presents an example of a machine plate (not including possible mandatory marking).

Table 3 — Example of machine plate

Manufacturer	Address
Machine type	Serial number
Year of manufacture	
Maximum dry load	kg
Maximum spinning speed	1/min
Permitted solvent	perc
Solvent total charge	l
Electrical supply	V phases Hz
Maximum power [a]	kW (... kVA)
Maximum current [b]	A
Maximum steam pressure range	bar (… MPa) [c]
Maximum coolant pressure range	bar (… MPa)
Maximum coolant temperature	°C
Compressed air pressure range	bar (… MPa)
IMPORTANT — Refer to the instruction handbook for maintenance and operation.	

[a] Maximum power draw during a working cycle.

[b] Full-load current as defined in IEC 60204-1:2005, 16.4.

[c] 1 bar = 0,1 MPa = 10^5 Pa; 1 MPa = 1 N/mm^2.

Bibliography

[1] ISO 12100-2:2003, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles*

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