INTERNATIONAL STANDARD

ISO 17652-3

First edition
2003-05-15

Welding — Test for shop primers in relation to welding and allied processes —

Part 3: Thermal cutting

Soudage — Essai sur peintures primaires en relation avec le soudage et les techniques connexes —

Partie 3: Coupage thermique

Reference number
ISO 17652-3:2003(E)

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Published in Switzerland

Foreword

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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 17652-3 was prepared by the European Committee for Standardization (CEN) in collaboration with Technical Committee ISO/TC 44, *Welding and allied processes*, Subcommittee SC 10, *Unification of requirements in the field of metal welding*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

Throughout the text of this document, read "...this European Standard..." to mean "...this International Standard...".

ISO 17652 consists of the following parts, under the general title *Welding — Test for shop primers in relation to welding and allied processes*:

— *Part 1: General requirements*

— *Part 2: Welding properties of shop primers*

— *Part 3: Thermal cutting*

— *Part 4: Emission of fumes and gases*

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Foreword

This document (EN ISO 17652-3:2003) has been prepared by Technical Committee CEN/TC 121 "Welding", the secretariat of which is held by DS, in collaboration with Technical Committee ISO/TC 44 “Welding and allied processes”.

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of an identical text or by endorsement, at the latest by November 2003 and conflicting national standards shall be withdrawn at the latest by November 2003.

EN ISO 17652 consists of the following parts, under the general title: *Welding – Test for shop primers in relation to welding and allied processes:*

- *Part 1: General requirements*
- *Part 2: Welding properties of shop primers*
- *Part 3: Thermal cutting*
- *Part 4: Emission of fumes and gases*

Annex ZA is informative.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This part of this European Standard specifies a test method for determination of a shop primers influence on the maximum speed usable for thermal cutting.

For precaution for protection of health, safety and environment during testing, see EN ISO 17652-1.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 10025, *Hot rolled products of non-alloy structural steels — Technical delivery conditions.*

EN 10238, *Automatically blast-cleaned and automatically prefabricated primed structural steel products.*

EN ISO 2808, *Paints and varnishes - Determination of film thickness (ISO 2808:1997).*

EN ISO 8501-1:1988, *Preparation of steel substrates before application of paints and related products - Visual assessment of surface cleanliness - Part 1: Rust grades and preparation grades of uncoated steel substrates and of steel substrates after overall removal of previous coatings (ISO 8501-1:1988).*

EN ISO 9013, *Thermal cutting - Classification of thermal cuts - Geometrical product specification and quality tolerances (ISO 9013:2002).*

EN ISO 17652-1:2003, *Welding - Test for shop primers in relation to welding and allied processes - Part 1: General requirements (ISO 17652-1:2003).*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions in EN ISO 17652-1:2003 apply.

4 Procedure

4.1 Preparation of test pieces

The test pieces shall be made from hot rolled steel plates, grade S275 according to EN 10025. The size of the test pieces shall be 1000 × 1000 mm with a nominal thickness of 10 mm. All test pieces used in a series of tests shall originate from the same charge (heat). The parts shall have smooth, flat, undamaged surfaces.

A series shall include one test piece which is abrasively blasted until SA 2½ (EN ISO 8501-1:1988). One or more test piece(s) shall be coated with shop primer in accordance with the supplier's recommendations for the type of shop primer being assessed. One test piece shall be left uncoated.

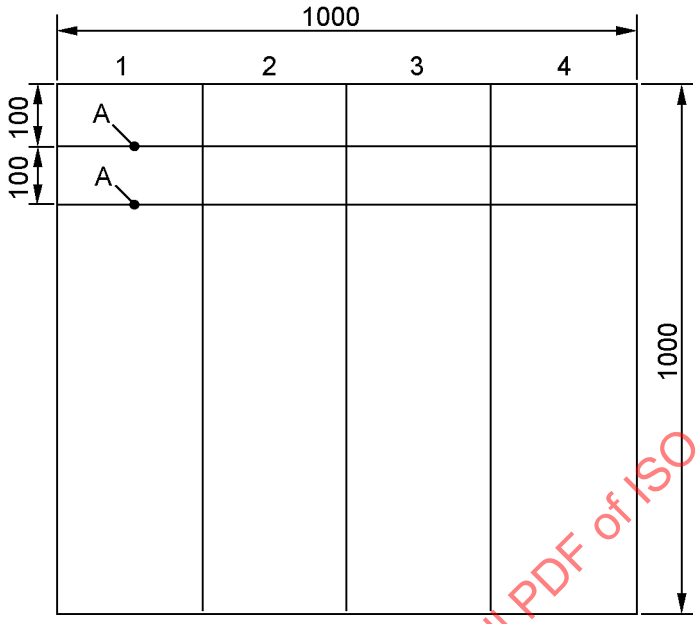
The thickness of the shop primer shall be uniform and in accordance with the supplier's recommendation. Unless otherwise specified, the specimens can be cut after a drying period of at least 10 days at a surface temperature above 10°C but below 40°C and at a minimum air humidity of 50 %. Alternative conditions for storage shall be monitored and reported in the test report.

The thickness shall be checked, e.g., by use of small smooth steel plates or glass plates. See also EN ISO 2808 and EN 10238.

All test pieces shall be marked with speed zones and positions for cuts and each of the pieces into which the plate may be cut shall be unequivocally identified, see Figure 1.

Each test piece can be used for a total of 9 possible cutting lines, spaced 100 mm apart and 100 mm from the edge, see Figure 1.

All dimensions in millimetres



Key

1, 2, 3, 4 Zones
A Examples of cutting lines

Figure 1 — Example of a test piece marked with zones and cutting lines

4.2 Acceptance criteria for cuts

Cut surfaces shall be evaluated in accordance with EN ISO 9013.

NOTE The quality level has been chosen to eliminate other variables so that the speed is the variable being measured.

4.3 Cutting data

Declaration of the properties on a shop primer according to this standard shall be based on thermal cutting using conventional oxygen-fuel techniques. Laser beam cutting and/or plasma arc cutting can, however, also be performed and reported as optional information.

Cutting data shall be selected so as to obtain maximum cutting speed, v_0. Data do not have to be identical for cutting of test plates with and without shop primer.

4.4 Initial cutting of test plate without shop primer

The approximate maximum cutting speed, v_0, for which the specified quality can be obtained shall be determined on the basis of experience or preliminary tests.

A cut is made along one of the possible cutting lines. The cutting speed shall be regulated in four steps as follows:

Zone	Speed
1	0,95 v_0
2	0,975 v_0
3	v_0
4	1,025 v_0

The cut surfaces shall be examined. The quality shall be acceptable in zones 1, 2 and 3 but not in zone 4. If this has not been obtained, a new cut shall be made, using a new v_0 , higher or lower as appropriate. The v_0 for which the criteria are fulfilled is termed $v_{0,\,R}$ and shall be registered. The test plate shall have cooled to room temperature before each cut is started.

4.5 Cutting of test plate(s) with shop primer

The approximate maximum cutting speed, v_p, for which the specified quality can be obtained shall be determined on the basis of experience or preliminary tests.

A cut is made along one of the possible cutting lines. The cutting speed shall regulated in four steps as follows:

Zone	Speed
1	0,95 v_p
2	0,975 v_p
3	v_p
4	1,025 v_p

The cut surfaces shall be examined. The quality of the examined surfaces shall be acceptable in zones 1, 2 and 3 but not in zone 4. If this has not been obtained, a new cut shall be made, using a new v_P , higher or lower as appropriate. The v_P for which the criteria are fulfilled is termed $v_{P,\,R}$ and shall be registered. The test plate shall have cooled to room temperature before each cut is started.

More than one plate may be cut in case more than one shop primer is to be tested or in order to provide sufficient material for cutting.

4.6 Final cutting of test plate without shop primer

When cutting of test plate(s) with shop primer has been terminated, one more cut shall be made in the plate without shop primer, using the speed $v_{0,\,R}$. The quality shall be acceptable in zones 1, 2 and 3 but not in zone 4. If this is not obtained, the test conditions have not been stable and the entire series of tests shall be repeated.

There is a risk that the cutting nozzle get soiled by a layer of oxide at the tip. This soiling has a considerably influence on the maximum cutting speed and if possible it shall be prevented.

Cutting nozzles may be cleaned but not exchanged during a single series of tests. The cutting nozzle shall be inspected and if necessary be changed before starting a new series.

NOTE Cutting nozzle with high tendency to soiling should be avoided.

The cutting parameters for oxygen-fuel cutting shall be as follows:

Cutting process:	Mechanised thermal cutting
Fuel gas:	Acetylene or propane
Fuel gas pressure/-flow:	Optimum conditions for the material and plate thickness
Nozzle:	A nozzle with low tendency of getting soiled at the tip
Cutting nozzle height:	As recommended by the manufacturer
Cutting gas:	Oxygen. The purity of the oxygen shall be kept constant during each series of tests
Oxygen pressure/-flow:	Optimum conditions for the material and plate thickness

The laser cutting parameters shall be as follows:

Cutting process:	Mechanised laser cutting
Laser type	YAG or CO_2
Laser power	Optimum conditions for the material and plate thickness
Nozzle/diameter/distance:	Optimum conditions for the material and plate thickness
Focal length of optic	Optimum conditions for the material and plate thickness
Cutting gas:	Oxygen. The purity of the oxygen shall be kept constant during each series of tests
Gas flow:	Optimum conditions for the material and plate thickness

The plasma cutting parameters shall be as follows:

Cutting process:	Mechanised plasma cutting
Cutting gas	No restrictions
Cutting gas flow	Optimum conditions for the material and plate thickness
Cutting nozzle height	Optimum conditions for the material and plate thickness
Current	Optimum conditions for the material and plate thickness

Data for other cutting processes shall be selected so as to obtain maximum cutting speed (for the required quality).

5 Assessment of results

The influence of the shop primer is calculated as a reduction factor *R*:

$$R = \frac{v_{0,R}}{v_{p,R}}$$

6 Test report

The test results shall be reported in a cutting report with the following contents:

a) trade mark of the shop primer;

b) type of shop primer;

c) observed dry film thickness;

d) description of cutting equipment used in the tests;

e) specification of the test pieces (materials certificates);

f) process used for cutting;

g) cutting speed without shop primer, $v_{0,\,R}$;

h) cutting speed with shop primer, $v_{P,\,R}$;

i) reduction factor, R;

j) date, name and address of the test body;

k) signature by the responsible person;

l) acceptance criteria for cut surfaces.