

Nederlandse norm

# NEN-ISO 4999

(en)

Continuous hot-dip terne (lead alloy) coated cold-reduced carbon steel sheet of commercial, drawing and structural qualities (ISO 4999:2011, IDT)

Vervangt NEN-ISO 4999:2005

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Als Nederlandse norm is aanvaard:

- ISO 4999:2011, IDT

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Preview

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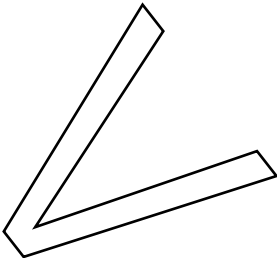
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**Continuous hot-dip terne (lead alloy)  
coated cold-reduced carbon steel sheet  
of commercial, drawing and structural  
qualities**

*Tôles en acier au carbone laminées à froid, revêtues d'un alliage au plomb en continu par immersion à chaud, de qualités commerciale, pour emboutissage et de construction*

Preview



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# Contents

Page

Foreword .....	iv
1 Scope .....	1
2 Normative references .....	1
3 Terms and definitions .....	1
4 Thickness .....	3
5 Conditions of manufacture .....	3
5.1 Chemical composition .....	3
5.2 Mechanical properties .....	5
5.3 Coating .....	6
5.4 Weldability .....	7
5.5 Surface treatments .....	8
5.6 Coated coil joining .....	8
5.7 Dimensional and shape tolerances .....	8
6 Sampling .....	8
6.1 Chemical composition .....	8
6.2 Tensile test .....	8
6.3 Coating tests .....	8
6.4 Coating adherence .....	9
6.5 Retest .....	9
7 Test methods .....	9
7.1 Tensile test .....	9
7.2 Coating properties .....	9
8 Designation system .....	9
8.1 Coating mass .....	9
8.2 Coating surface condition .....	10
8.3 Surface treatment .....	10
8.4 Base-metal designations .....	10
8.5 Examples .....	10
9 Resubmission .....	11
10 Workmanship .....	11
11 Inspection and acceptance .....	11
12 Marking .....	11
13 Information to be supplied by the purchaser .....	12
Annex A (normative) Determination of mass and composition of coating onterne (lead alloy) coated sheet .....	13
Annex B (informative) Orders requiring base-metal thickness .....	19
Bibliography .....	20

## 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 4999 was prepared by Technical Committee ISO/TC 17, *Steel*, Subcommittee SC 12, *Continuous mill flat rolled products*.

This fifth edition cancels and replaces the fourth edition (ISO 4999:2005), which has been technically revised.

Preview  
ISO 4999:2011

# Continuous hot-dip terne (lead alloy) coated cold-reduced carbon steel sheet of commercial, drawing and structural qualities

## 1 Scope

This International Standard is applicable to cold-reduced carbon steel sheet of commercial, drawing and structural qualities coated by a continuous hot-dip terne (lead alloy) coating process. It includes the group of products commonly known as terne plate or terne sheets (or in the USA as terne coated).

Terne sheets are used where ease of solderability, a degree of corrosion resistance, or amenability to stamping, pressing or deep-drawing would be advantageous.

Terne (lead alloy) coated steel sheet can be ordered in one of two ordering conditions:

- a) Condition A: steel ordered to satisfy mechanical property requirements.
- b) Condition B: steel ordered to make an identified part.

## 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 reference document (including any amendments) applies.

ISO 6892-1, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature*

ISO 7438, *Metallic materials — Bend test*

ISO 16162, *Continuously cold-rolled steel sheet products — Dimensional and shape tolerances*

ISO 16163, *Continuously hot-dipped coated steel sheet products — Dimensional and shape tolerances*

## 3 Terms and definitions

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

### 3.1 Quality applications

#### 3.1.1

##### **commercial**

intended for general fabricating purposes where sheet is used in the flat condition, or for bending or moderate forming

#### 3.1.2

##### **drawing**

intended for parts where drawing or severe forming may be involved

**ISO 4999:2011(E)****3.1.3****deep drawing**

intended for parts where severe forming or severe drawing may be involved

**3.1.4****deep drawing/aluminum killed (non-aging)**

intended for fabricating parts where particularly severe drawing or forming may be involved or essential freedom from aging is required

**3.1.5****extra-deep drawing (stabilized)**

intended for applications requiring interstitial-free steel (IF) which is non-aging and has maximum formability

**3.1.6****structural quality**

structural quality which is available in several grades and classes

See Tables 2 and 6.

**3.2****aluminum killed**

steel which has been deoxidized with sufficient aluminum to prevent the evolution of gas during solidification

**3.3****stabilized interstitial-free steel**

extra-low-carbon steel in which all interstitial elements are combined with titanium and/or equivalent elements

NOTE Stabilized steel is sometimes referred to as interstitial-free steel.

**3.4****terne****lead alloy**

any lead-based alloy in commercial use for the hot-dip coating of steel sheet

NOTE 1 Tin is the most common alloying element, but antimony is also used commercially, as are combinations of both elements.

NOTE 2 If a specific alloy composition is required, it shall be by agreement between the manufacturer and purchaser.

**3.5****skin pass**

light cold rolling of the coated steel sheet

NOTE The purpose of the skin pass is to produce a higher degree of surface smoothness and thereby improve the surface appearance. The skin pass also temporarily minimizes the occurrence of a surface condition known as stretcher strain (Luder's Lines) or fluting during the fabrication of finished parts. The skin pass also controls and improves flatness. Some increase in hardness and some loss in ductility will result from skin passing.

**3.6****differential coating**

coating having a coating mass on one surface significantly different from the coating mass on the other surface

**3.7****lot**

50 t or less of sheet of the same grade rolled to the same thickness and coating condition



## 4 Thickness

Terne sheet is normally produced in thicknesses from 0,30 mm to 2,0 mm, and in widths of 600 mm to 1 400 mm in coils and cut lengths. Terne sheet less than 600 mm wide may be slit from wide sheet and will be considered as sheet. Slit sheet is not available from all producers.

The thickness of hot-dip terne (lead alloy) coated steel sheet may be specified as a combination of base metal and metallic coating, or as base metal alone. The purchaser shall indicate on the order which specification method is required. In the event that the purchaser does not indicate any preference, the thickness as a combination of the base metal and coating will be provided. Annex B describes the requirements for specifying the thickness as base metal alone.

## 5 Conditions of manufacture

### 5.1 Chemical composition

The chemical composition (heat analysis) shall not exceed the values given in Tables 1, 2 and 3. On request, a report of the heat analysis shall be made to the purchaser.

A verification analysis may be made by the purchaser to verify the specified analysis of the product and shall take into consideration any normal heterogeneity. Non-killed steels (such as rimmed or capped steels) are not technologically suited to product analysis. For killed steels, the sampling method and deviation limits shall be agreed upon between the interested parties at the time of ordering. The product analysis tolerances are shown in Table 4.

The processes used in making the steel and in manufacturing terne (lead alloy) sheet are left to the discretion of the manufacturer. When requested, the purchaser shall be informed of the steel-making process used.

**Table 1 — Chemical composition (heat analysis) commercial and drawing qualities**

Mass fractions in percent

Designation	Quality Name	C max.	Mn max.	P max.	S max.	Ti max.
T0 01	Commercial	0,15	0,60	0,035	0,035	—
T0 02	Drawing	0,10	0,50	0,025	0,035	—
T0 03	Deep drawing	0,08	0,45	0,03	0,03	<sup>a</sup>
T0 04	Deep drawing aluminum killed	0,06	0,50	0,025	0,035	<sup>a</sup>
T0 05	Extra-deep drawing stabilized	0,02	0,25	0,02	0,02	0,15 <sup>a</sup>

<sup>a</sup> For interstitial-free steels only, the value of 0,15 % titanium, and 0,10 % maximum for niobium and vanadium, are acceptable to ensure that the carbon and nitrogen are fully stabilized.

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