BS ISO 4999:2014

BSI Standards Publication

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

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National foreword

This British Standard is the UK implementation of ISO 4999:2014. It supersedes BS ISO 4999:2011 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee ISE/109, Coated and Uncoated Flat Products to be Used for Cold Forming.

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

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INTERNATIONAL STANDARD

ISO 4999

Sixth edition
2014-07-01

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

Reference number
ISO 4999:2014(E)

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 17, *Steel*, Subcommittee SC 12, *Continuous mill flat rolled products*.

This sixth edition cancels and replaces the fifth edition (ISO 4999:2011), which has been technically revised.

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INTERNATIONAL STANDARD ISO 4999:2014(E)

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 documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced 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, *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 might be involved

3.1.3
deep drawing
intended for parts where severe forming or severe drawing might be involved

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3.1.4
deep drawing/aluminum killed (non-aging)
intended for fabricating parts where particularly severe drawing or forming might 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

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

Note 2 to entry: 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 1 to entry: 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

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4 Dimensions

4.1 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 can be slit from wide sheet and will be considered as sheet. Slit sheet is not available from all producers.

4.2 The thickness of hot-dip terne (lead alloy) coated steel sheet can 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 can be made by the purchaser to verify the specified analysis of the product and shall take into consideration any normal heterogeneity. 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 3 and 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 steelmaking process used.

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

Mass fractions in percent

Quality		C max.	Mn max.	P max.	S max.	Ti max.
Designation	**Name**					
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	a
T0 04	Deep drawing aluminium killed	0,06	0,50	0,025	0,035	a
T0 05	Extra-deep drawing stabilized	0,02	0,25	0,02	0,02	0,15[a]

[a] 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.

Table 2 — Chemical composition (heat analysis) — Structural quality

Mass fractions in percent

Grade	C max.	Mn max.	P max.	S max.
TCR220	0,15	1,20	0,035	0,035
TCR250	0,20	1,40	0,035	0,035
TCR320	0,20	1,50	0,035	0,035
TCH550	0,20	1,50	0,035	0,035

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