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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 24171.2-2009

**Metallic materials -- Sheet and strip -- Determinations of
forming limit curves -- Part 2: Determinations of forming limit
curves in laboratory**

金属材料 薄板和薄带 成形极限曲线的测定 第2部分：实验室成形极限曲线的测定
(English Translation)

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Foreword

GB/T 24171 "Determination limit curves of metallic materials - Sheet and strip forming" is divided into two parts.

--- Part 1. press shop Forming Limit Diagram Measurement and Application;

--- Part 2. Laboratory determination of forming limit curves.

This section GB/T 24171 Part 2. This section is equivalent international standards ISO 12004-2:2008 "metal thin material Plate and strip - Determination of forming limit curves - Part 2. Laboratory determination of forming limit curves "(in English).

For ease of use, this section made the following editorial changes.

a) "this International Standard" be replaced by "this standard";

- b) with a decimal point '. 'Instead of a comma as the decimal point,' ';
- c) Remove the preface to the international standards;
- d) Remove the international standard tables in French, German and Note 21 of the Notes;
- e) Remove the International Standard Table 2;
- g) of the sample reported partial increase of the "standard number" one.
- h) deleted Appendix E, "the following data sets and allow the dispersion can be found in the relevant documents on the Internet (see reference table of Contents). "Sentence.

This section of the Appendix A, Appendix B, Appendix C, Appendix D, Appendix F, Appendix H are normative appendix, Appendix E, Appendix G of data Appendix.

This part is proposed by the China Iron and Steel Association.

This part of the National Steel Standardization Technical Committee.

This section is drafted. Wuhan Iron and Steel (Group) Corporation, Taiyuan Iron and Steel (Group) Company.

Introduction

Forming Limit Diagram (FormingLimitDiagram/FLD) --- contains the main strain/strain point of the second chart.

FLD can distinguish a strain value is safe or broken for some materials, from the security point to the breaking point the boundaries set Defined as the forming limit curve.

There are two different methods can be determined forming limit of materials.

1) Hedge waste parts strain analysis, measurement and shape of the part and process related FLCs.

In the press shop, strain path of these points is usually unknown, dependent on the forming limit curve FLC materials, parts and selected in the molding conditions. This method, see Part 1 of this standard.

2) FLCs under perfect laboratory conditions measured.

In order to evaluate its formability, only need to draw the forming limit curve FLC for a given material. The standard measure of the FLC Constant need to use different linear strain paths. This method can be applied to materials characterization, see Part 2 of this standard.

For this part (on laboratory determination of forming limit curves) GB/T 24171, the following conditions are also valid.

Deformable material forming limit curves (FLCs) for determining been specified in the drawing, bulging or drawing bulging amorphous phase can be achieved when combined

degree. This capability is crack, local necking limit. There are a number measuring the material forming limit of the method, it should be noted, The results obtained using different methods can not be used for comparison purposes.

FLC characterized through certain hot - deformation limit certain thickness of the material after mechanical treatment. Mechanical properties and material as measured in FLC History and other additional information to determine the amount of pre-forming properties are important.

In order to compare the ability of different materials molding, not only to judge the FLC, and the following parameters are important.

- a) at least the mechanical properties of the main direction;
- b) The most vigorous plastic elongation, referring to GB/T 228;
- d) given deformation section shape values, referring to GB/T 5028.

GB/T 24171.2-2009/ISO 12004-2:2008 Metallic materials - Sheet and strip -Determination of forming limit curve Determination of forming limit curves Laboratory. Part 2

1 Scope

This section GB/T 24171 specifies the linear strain at room temperature and measuring path forming limit curve (FLC) and test conditions method.

This section applies to the test material is flat, thickness between 0.3mm ~ 4mm metal material.

Note: The upper limit of 4mm thickness is determined by the material thickness and the maximum allowable ratio of the diameter of the punch.

For steel sheet, the recommended maximum thickness of 2.5mm.

2 Symbol and description

This section uses the symbols in Table 1 and described below.

Table 1 Symbol and description

Symbol Description Unit ϵ_1 main true strain - ϵ_2 times true strain - ϵ_3 thick strain - σ standard deviation -D punch diameter mm Dbh mm die diameter X (0), X (1) X (m1) X (shape) X-direction position mm S (0), S (1) S (5) cross-section -Shaped X-direction position Points -M1 failure Number of Positions section -W1 fitting area width mm Principle 3 FLC material used to represent approximate intrinsic limit at a set linear path strain deformation conditions. In order to accurately determine the FLC, in Measurement area needs to maintain nearly friction-free state.

GB/T 24171.2-2009/ISO 12004-2:2008