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

GB/T 24171.1-2009

**Metallic materials -- Sheet and strip -- Determination of forming
limit curves -- Part 1: Measurement and application of forming
limit diagrams in press shop**

金属材料 薄板和薄带 成形极限曲线的测定 第1部分：冲压车间成形极限图的测量
及应用

(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 1. This section is equivalent international standards ISO 12004-1:2008 "metal thin material Plate and strip - Determination of forming limit curves - Part 1. press shop FLD measurement and Applications "(in English).

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

- a) "this International Standard" be replaced by "this section";
- b) use a decimal point instead of a decimal comma " , " . " , " ;
- c) Remove the preface to the international standards;
- d) a reference to the file by pressing the corresponding national standards were changed;
- e) The number "5.1.7,5.1.8,5.1.9" to "5.1.6.1,5.1.6.2,5.1.6.3" to make it more logical;
- f) in Appendix A, Appendix B to change to make the text a reference to the order in line with the habit.

This section of the Appendix A, Appendix B is an informative annex.

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) Company, Shanghai Exit Inspection and Quarantine.

Introduction

Forming Limit Diagram (FormingLimitDiagram/FLD) --- contains the main strain/time graph main strain point.

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.

GB/T 24171.1-2009/ISO 12004-1:2008 Metallic materials - Sheet and strip -Determination of forming limit curve Part 1. press shop FLD Measurement and Application

1 Scope

This section GB/T 24171 specifies the method for determination of forming limit diagram of the metal strip and forming limit curve.

This section applies to a thickness of 0.3mm ~ 4mm metal sheet and strip.

2 Symbols and

The symbols used in this section and are listed in Table 1, the sample for measuring the mesh forming limit diagram in Appendix A.

Table 1 Symbols and

Symbol Description Unit FLD FLD -FLC FLC -Principle 3 First, the surface of the metal sheet specimen printed fine grid of suitable size, then the sample is shaping up to rupture. By measuring the net Grid size and the percentage change in the principal strain direction perpendicular to the direction of strain in the second to give to the forming limit strain under constant strain state value. Repeat the test strain state of change can be a series of strain data, strain data are plotted in these Forming Limit Diagram (FLD) on it can be obtained forming limit curve (FLC) (see Figure 1).

4 Test conditions

4.1

Recommendation mesh size in 1.5mm ~ 5mm between error and the true size of the grid between the nominal value shall be $\pm 2\%$ Fewer.

4.2

during the forming process of the sample, the critical strain measurement area in front of the neck should be kept uniform.

4.3

To meet these requirements, any test device to facilitate forming force and clamping force is applied to obtain different limit strain state.

4.4

forming limit curve should be plotted on the forming limit diagram. Figure 1 is an example of a forming limit curve.

5 Test procedure

5.1

recommend the following steps were determined forming limit.

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