

Data sheet: B1

Cold Rolled Products

Cold rolled steel sheet

Introduction

Cold rolled sheet is produced by processing Hot Rolled Strip through a cold rolling process to obtain thinner gauges and enhanced surface textures. It is used in the manufacture of products such as electric appliances, car bodies, office equipment and containers. The trend today is towards greater diversity of products to meet more sophisticated needs and to realise increased efficiency in manufacturing the final product. Greater demands for performance and quality are thus being made on cold rolled steel sheet. Mittal Steel South Africa's cold rolled steel sheet range includes steels with excellent press formability as well as more general purpose steels conforming to the description in Mittal Steel South Africa's data sheets and Euronorm, ASTM and JIS specifications.

As far as possible cold rolled sheet is produced to suit customers' end-uses. Customers are therefore advised to consult Mittal Steel South Africa in order to obtain material best suited for their purpose.

For selection of the optimum cold rolled steel for a specific application, refer to the following Data Sheets:

Table 1. Data Sheets for specific steel types

Steel type	Data sheet file reference
Commercial steels	B2.1
SUPRADRAW CR [®] 170 - 210	B3.1
DRAWING QUALITY CR [®] 210	B3.1.1
DRAWING AND FORMING CR [®] 170	B3.1.2
SUPRASTRETCH CR [®] 210	B3.2
SUPRAFORM CR [®] 170 - 380	B4.1
COR-TEN [®] A	B5.1
Enamelling steels	B6.1

Note:

Tolerances on shape and dimensions for cold rolled steel are given in the data sheet: Cold Rolled Product Tolerances (file reference B1.1).

Manufacturing process

Steel making

Steel is normally supplied from a basic oxygen furnace but could also be supplied from an electric arc furnace using clean internal scrap and direct reduced iron. All steel is desulphurised to maintain a high degree of cleanliness. All cold-rolled steel sheet is made fully killed and fine grained from continuously

For further information, contact:

Mittal Steel South Africa Limited, PO Box 2, Vanderbijlpark 1900. Toll free number 0800 005043, Fax (016) 889-0070
e-mail address: datasheets@mittalsa.com

Care has been taken to ensure that the information in this data sheet is accurate. Mittal Steel South Africa Limited does not, however, assume responsibility for any inaccuracies or misinterpretations of this data. We are continuously engaged in product development and revised data sheets will be issued from time to time. Please ensure that you have the most recent issue. Effective date: October 2005

cast slabs. Full shrouding techniques and automatic mould level control are applied to ensure superior internal and surface quality.

Hot rolling

The slab is reheated and then reduced to a transfer bar of a specific thickness in a roughing mill before final rolling. The transfer bar is passed to a seven stand finishing mill where it is rolled to the hot band thickness and then cooled to the required temperature and coiled. The process is highly automated, with key parameters such as thickness and temperature being computer controlled throughout the rolling sequence. The material is closely monitored at all critical stages of the process.

Pickling

The hot rolled coil passes through a pickling line where hydrochloric acid removes surface scale arising in the hot rolling process. After pickling, the steel is thoroughly rinsed, dried and oiled to prevent atmospheric oxidation before cold rolling.

Cold rolling

The pickled hot rolled strip is cold reduced in a cold rolling mill to the specified thickness. The critical points at this stage are flatness and precise thickness. Mittal Steel South Africa meets these criteria by using fully automated and computerised equipment.

Annealing

Cold rolling elongates the grains of the steel in the direction of rolling, making the steel hard and brittle. Annealing entails heating the steel in a reducing atmosphere to re-crystallise the grains under conditions that promote uniform crystal growth. This treatment gives the steel the ductility needed for its intended use. The operating flexibility of Mittal Steel South Africa's Continuous Annealing and Processing Line (CAPL) in addition to the HNX and Hydrogen Batch Annealers makes it possible to offer a wide range of products.

Hard unannealed material (coils only) is available on enquiry.

Temper rolling

Temper rolling imparts a light temper to the cold rolled sheet and eliminates yield point elongation. It allows adjustment of surface roughness to suit user requirements and further ensures flatness. Finally, rust preventive oil is applied to the sheet to protect it against corrosion for a reasonable time.

Inspection and finishing

In all finishing units the thickness, width and surface quality of the product are checked. Product samples are taken and sent to the laboratory for testing of mechanical and other specified properties. The steel is then prepared for shipment.

Ageing

Non-stabilised cold rolled sheet is susceptible to ageing, or age hardening. To minimise ageing the material should be:

- used as soon as possible after receipt;
- stored in a cool, roofed area;
- roller levelled, if possible before fabrication.

Alternatively, customers should consider the use of stabilised steel.

For further information, contact:

Mittal Steel South Africa Limited, PO Box 2, Vanderbijlpark 1900. Toll free number 0800 005043, Fax (016) 889-0070
e-mail address: datasheets@mittalsa.com

Care has been taken to ensure that the information in this data sheet is accurate. Mittal Steel South Africa Limited does not, however, assume responsibility for any inaccuracies or misinterpretations of this data. We are continuously engaged in product development and revised data sheets will be issued from time to time. Please ensure that you have the most recent issue. **Effective date: October 2005**

Surface textures

The following textures are available:

- a. **Smooth (plating applications)**
This texture is produced in the temper mill using smooth rolls. It is suitable for electroplated articles and also for re-rolling when a matt texture is undesirable. A maximum surface roughness of 0,5 micrometers centre line average (CLA) is aimed for. Typical applications are car bumpers, door locks and other electroplated articles.
- b. **Light matt (drawing and pressing applications)**
This surface is characterised by a fine, closely packed sharp texture. A surface roughness of 0.60 - 1,25 micrometers centre line average (CLA) and 100 peaks per inch (PPI) minimum is aimed for. Typical applications are automobile panels.
- c. **Medium matt (drawing and pressing applications)**
A surface roughness of 0,8 - 1,6 micrometers centre line average (CLA) and 100 peaks per inch (PPI) minimum is aimed for. Typical applications are drum bodies and ends.
- d. **Normal (general applications)**
A surface roughness of 0,8 - 2,0 micrometers centre line average (CLA) and 90 peaks per inch (PPI) minimum is aimed for. Typical applications are steel furniture and general sheet metal work.
- e. **Matt (drawing and pressing applications)**
The surface texture is relatively rough to ensure lubricant retention during drawing and pressing operations. A surface roughness of 1,2 - 2,0 micrometers centre line average (CLA) and 100 peaks per inch (PPI) minimum is aimed for. Typical applications are automobile panels, engine mountings, brackets and enamelling.

Note:

The CLA and PPI ranges indicated above cannot be controlled within exact limits and no guarantee can be given that check readings will at all times be within the specified limits.

Surface quality

Cold rolled steel sheet is supplied in two levels of surface quality namely standard surface finish and improved surface finish or ISF.

The standard or non-ISF surface texture is suitable for unexposed applications and may contain minor defects such as pores, slight indentations, minor scratches and discolouration. These defects will not affect formability or the application of surface coatings.

ISF is intended for applications in which minor defects might affect the uniform appearance of a high quality paint coating (e.g. automotive) or an electrolytic coating. Such a surface can be specified for light matt or matt textures. It is not available on smooth, medium matt and normal finishes.

Unless otherwise agreed, one surface of the product will comply with the specified requirements. The other surface will be such that during subsequent processing it will not have a deleterious effect on the improved surface. The improved surface or inspected surface will be indicated by means of a sticker.

Coil mass

The limitations pertaining to coil mass are indicated in Price Lists 130 and 131.

Marking

Each coil is marked with the following information: cast and sequence number, trade mark, Mittal Steel South Africa order number, material description, customer order number, width and thickness, mass, steel specification, address and lift card number.

For further information, contact:

Mittal Steel South Africa Limited, PO Box 2, Vanderbijlpark 1900. Toll free number 0800 005043, Fax (016) 889-0070
e-mail address: datasheets@mittalsa.com

Care has been taken to ensure that the information in this data sheet is accurate. Mittal Steel South Africa Limited does not, however, assume responsibility for any inaccuracies or misinterpretations of this data. We are continuously engaged in product development and revised data sheets will be issued from time to time. Please ensure that you have the most recent issue. Effective date: October 2005

Corrosion prevention

Cold rolled sheet, when not adequately protected, is susceptible to corrosion and users are advised to take the following precautions:

- a. Cold rolled sheet can be ordered as follows:
 - i) With a rust preventative oil. The protective oil, which is used to treat cold rolled sheet, has a mineral oil base with resistance to corrosion, staining and emulsification. It can be removed by using conventional hot alkaline cleaning methods or solvents. The oil is compatible with drawing compounds in common use for drawing and pressing operations.
 - ii) Treated with a skin passing / wet temper corrosion straining fluid. The fluid is not compatible with paint systems and can be removed by conventional hot alkaline cleaning methods or solvents. A corrosion free strip cannot be guaranteed due to the limited corrosion protection provided.
 - iii) Hard, un-annealed without rust preventative oil, but with a thin layer of residual rolling oil (not adequate to guarantee products free from rust).
 - iv) Dry without any temporary surface corrosion protection and no guarantee against corrosion is provided.
- b. Store the sheet under low humidity (less than 40 %) and constant temperature conditions. High humidity accelerates corrosion. Stagnant air, which is subjected to changes in temperature, precipitates moisture and consequently, corrosion of the sheet takes place.
- c. If it is impossible to control humidity or temperature, the sheet must be stored where good air circulation exists.
- d. When bundles or coils have been opened the material must be used with a minimum of delay.
- e. In the event of material coming into direct contact with water, it should be treated with an approved dewatering oil and used as soon as possible.

Note:

All material despatched by Mittal Steel South Africa will be covered by tarpaulins during transit.

Packaging

Coils are packed in standard non-protective or protective packaging depending on what is stipulated on the customer's order. Refer to the Mittal Steel South Africa Packing Specification for selection of the preferred type of packaging.

Claims allowance policy

Refer to Mittal Steel South Africa's published claims allowance policy and procedure, as well as Mittal Steel South Africa's General Conditions of Sale.

For further information, contact:

Mittal Steel South Africa Limited, PO Box 2, Vanderbijlpark 1900. Toll free number 0800 005043, Fax (016) 889-0070
e-mail address: datasheets@mittalsa.com

Care has been taken to ensure that the information in this data sheet is accurate. Mittal Steel South Africa Limited does not, however, assume responsibility for any inaccuracies or misinterpretations of this data. We are continuously engaged in product development and revised data sheets will be issued from time to time. Please ensure that you have the most recent issue. **Effective date: October 2005**