

A Product of the
Cooperative Engineering Program

SAE J810 MAR87

**Classification
of Common
Imperfections in
Sheet Steel**

SAE Information Report
Reaffirmed March 1987

SAENORM.COM : Click to view the full PDF file 810/198703

S.A.E.
LIBRARY

SAENORM.COM : Click to view the full PDF of j810_198703

No part of this publication may be reproduced in any form, in an electronic retrieval system or otherwise, without the prior written permission of the publisher.

Copyright 1987 Society of Automotive Engineers, Inc.

CLASSIFICATION OF COMMON IMPERFECTIONS IN SHEET STEEL

Common or obvious surface imperfections, which sometimes occur in sheet steel, are normally visible to the naked eye before or after fabrication. Illustrations and definitions of these imperfections are contained in this SAE Information Report. The identifying names are those commonly used throughout the steel industry. These imperfections are variable in appearance and severity. Extreme conditions have been selected in some instances in order to obtain suitable photographs.

Photographs are courtesy of the American Iron and Steel Institute, Steel Products Manual covering Sheet Steel; Carbon, High Strength Low Alloy, and Alloy; Copyright 1979.

SAE Technical Board Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

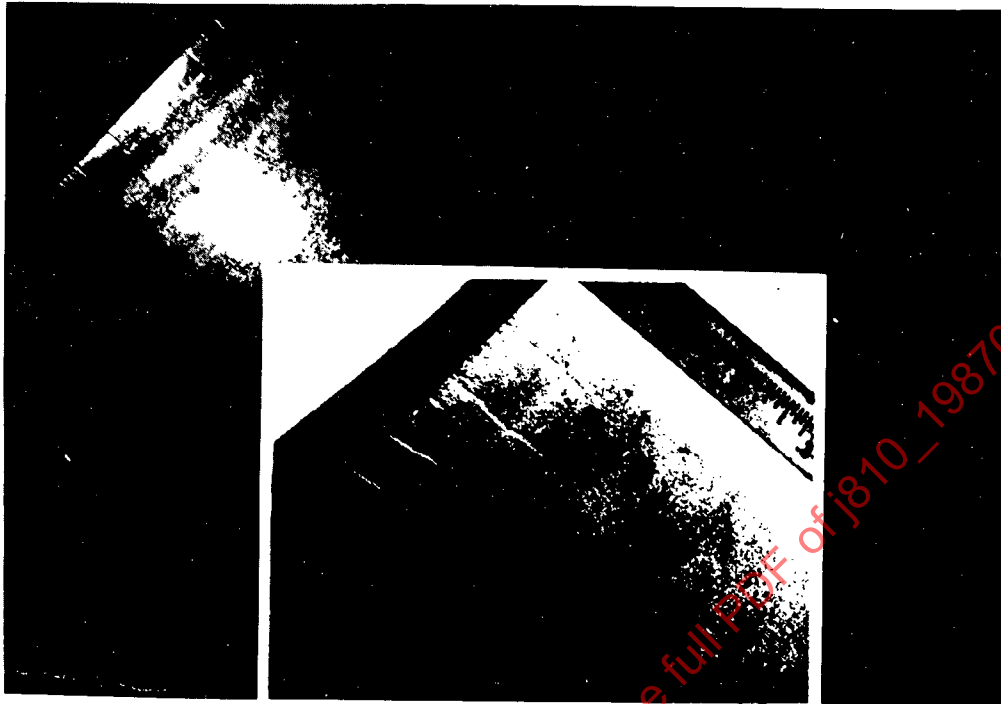
SAE reviews each technical report at least every five years at which time it may be reaffirmed, revised, or cancelled. SAE invites your written comments and suggestions.



COIL BREAKS—Coil breaks are creases or ridges which appear as parallel lines, transverse to the direction of rolling, and which generally extend across the width of the sheet.



COIL WELD—A coil weld is a joint between two lengths of metal within a coil. Coil welds are not always visible in the cold reduced product.



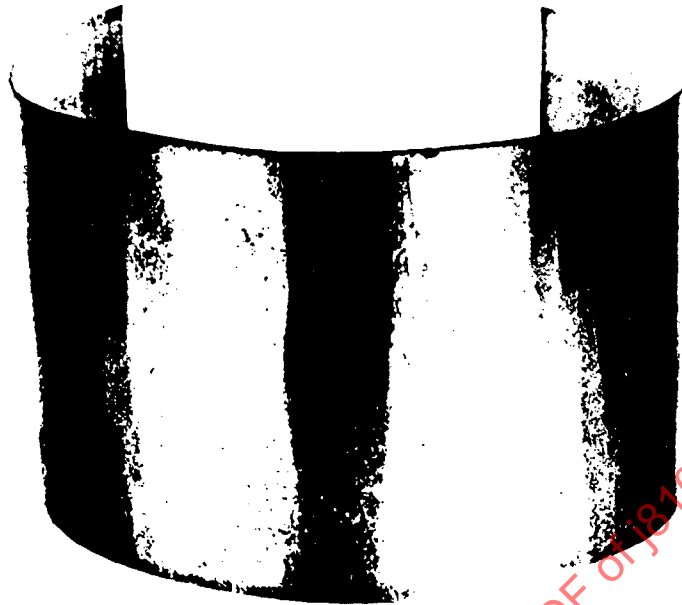
↖
ROLLING
DIRECTION

EDGE BREAKS—Edge breaks are short creases which extend in varying distances from the side edge of the temper rolled sheet.



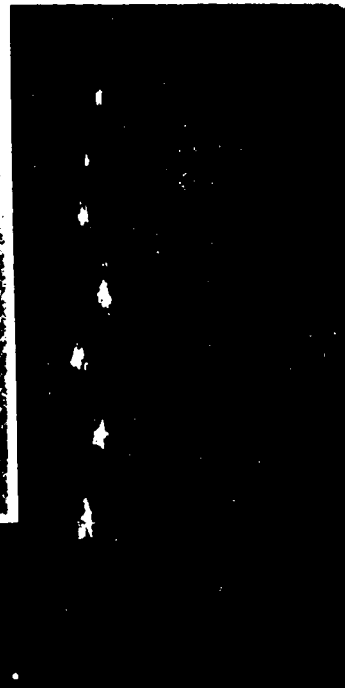
↕
ROLLING
DIRECTION

FLOPPERS—Floppers are lines or ridges which are diagonally transverse to the direction of rolling and generally confined to the section midway between the edges of a coil as rolled. They are somewhat irregular and tend toward a flat arc shape.



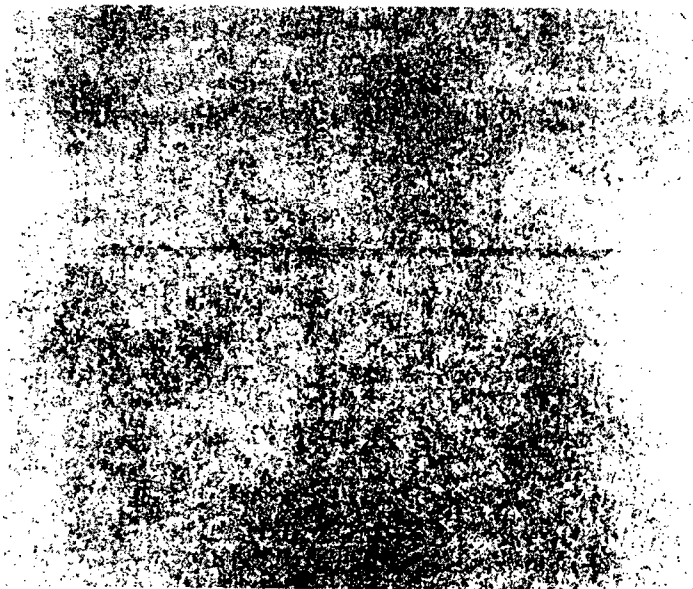
FLUTING—Fluting is a series of sharp parallel kinks or creases occurring in the arc when sheet steel is formed cylindrically. Photograph shown above is from a test specimen.

2
3
4
5



↑
↓
**ROLLING
DIRECTION**

FRICTION DIGS—Friction digs are a series of relatively short scratches variable in form and severity.

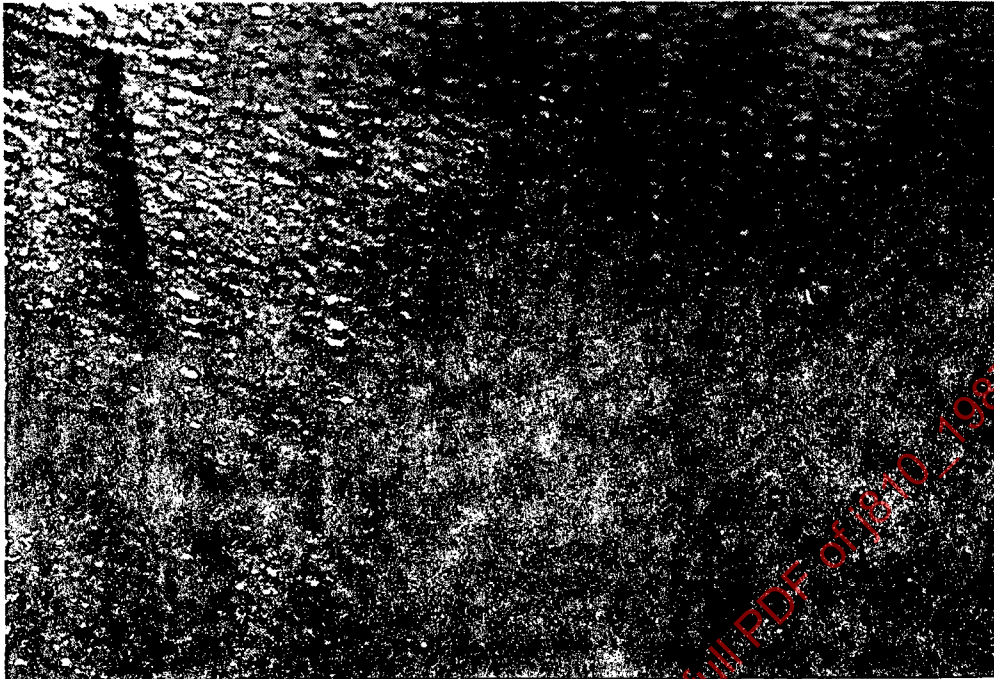


←→
ROLLING
DIRECTION

HEALED-OVER SCRATCH—Healed-over scratch is a scratch that occurred in an earlier mill operation and was partially masked in subsequent rolling. It might open up during forming.



ORANGE PEEL—Orange peel is a coarse grain condition which becomes evident during drawing.



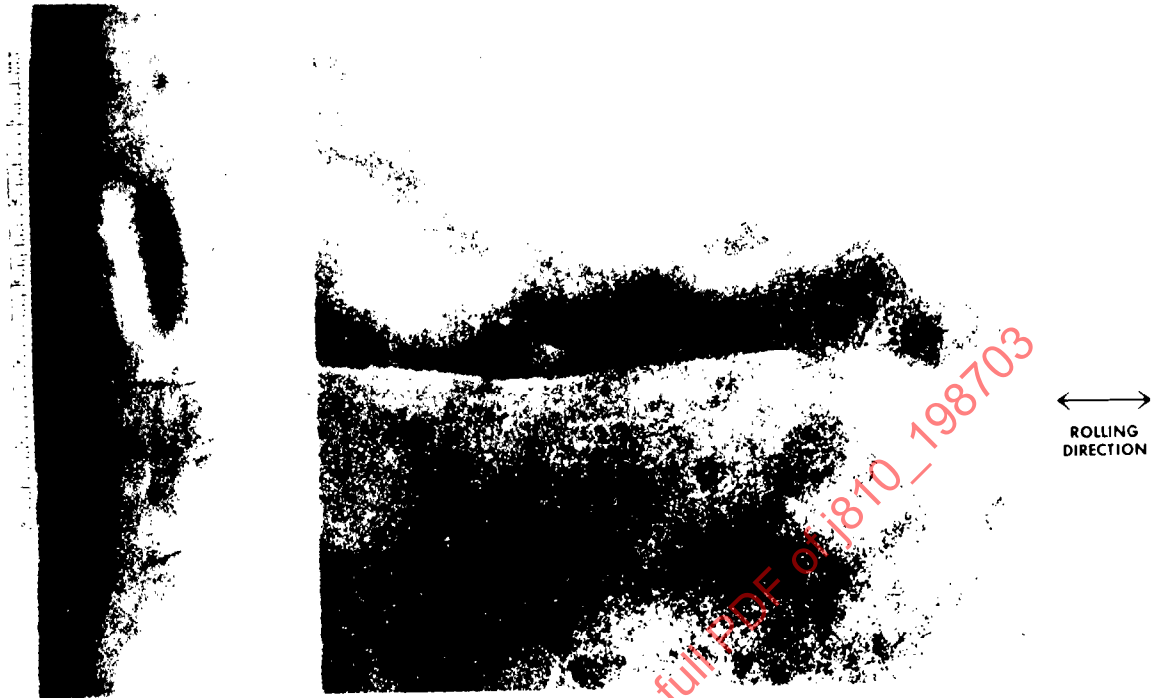
↑
↓
ROLLING
DIRECTION

ORANGE PEEL STRAIN—Orange peel strain is a pebbly surface condition which develops during drawing.



←
→
ROLLING
DIRECTION

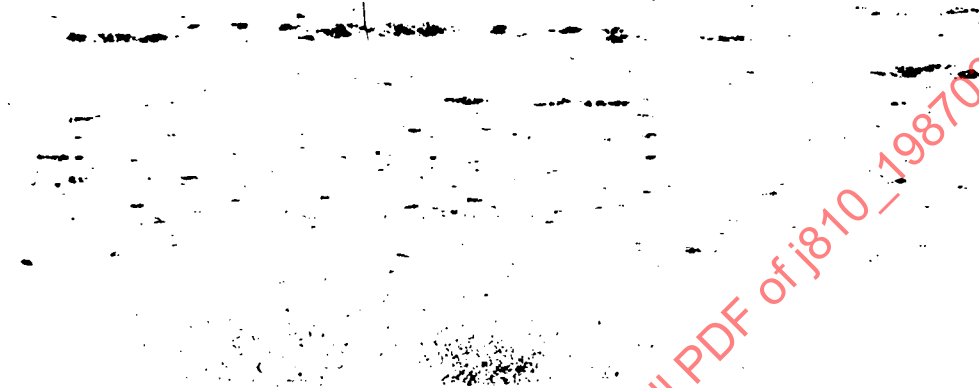
PINCHERS—Pinchers are fern-like ripples or creases usually diagonal to the rolling direction.



PIPE LAMINATION—Pipe lamination is a separation midway between the surfaces containing oxide inclusions.

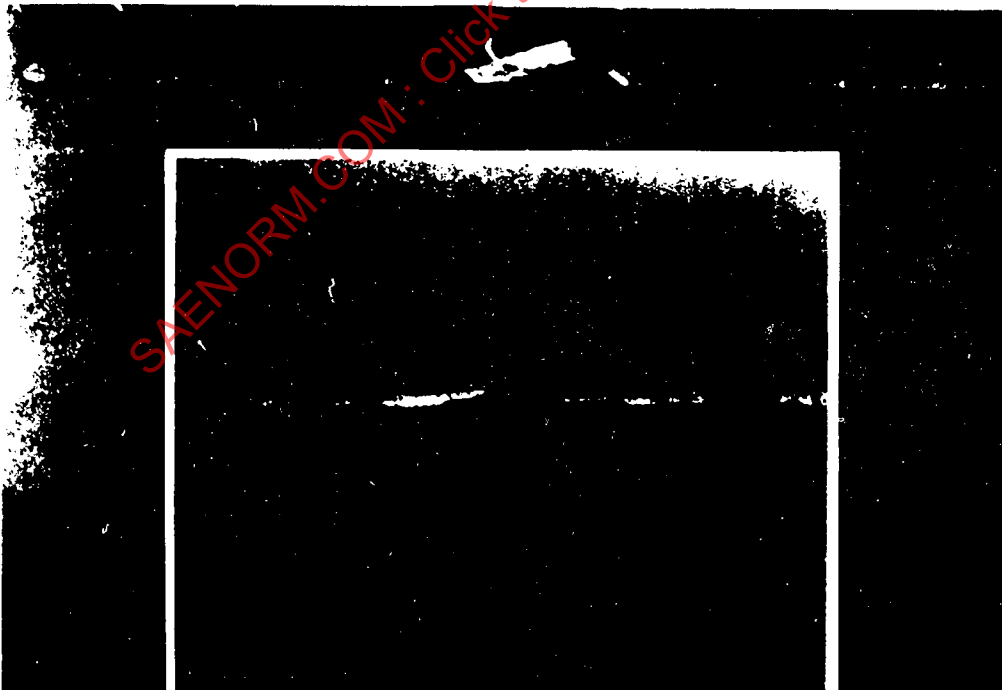


ROLLED-IN DIRT—Rolled-in dirt is extraneous matter rolled into the surface of the sheet.



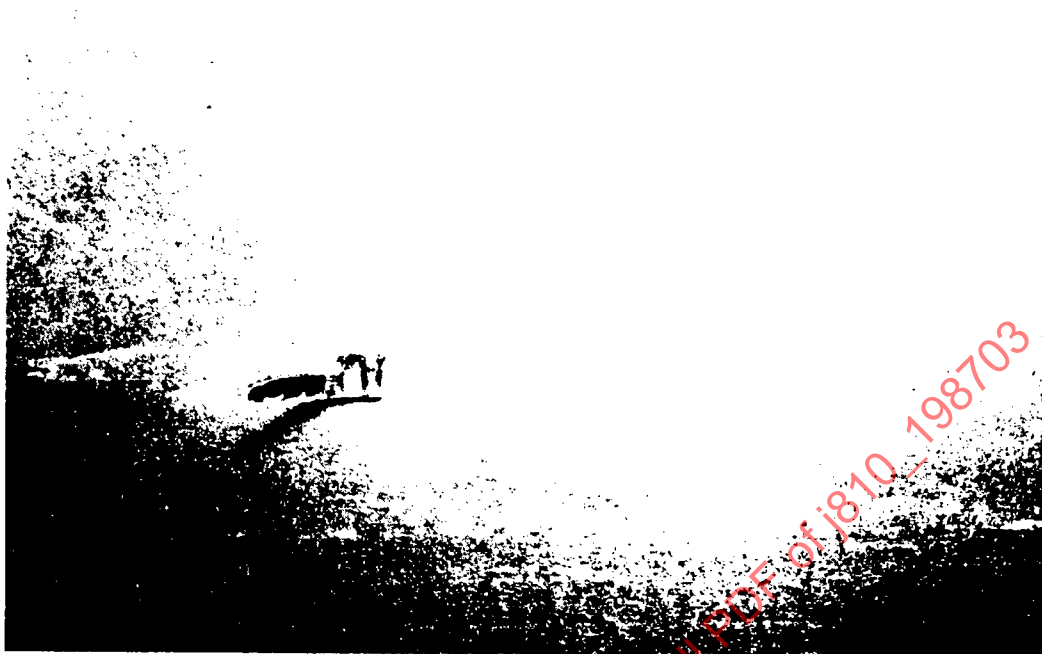
←→
ROLLING
DIRECTION

ROLLED-IN SCALE—Rolled-in scale consists of scale partially rolled into the surface of the sheet.



←→
ROLLING
DIRECTION

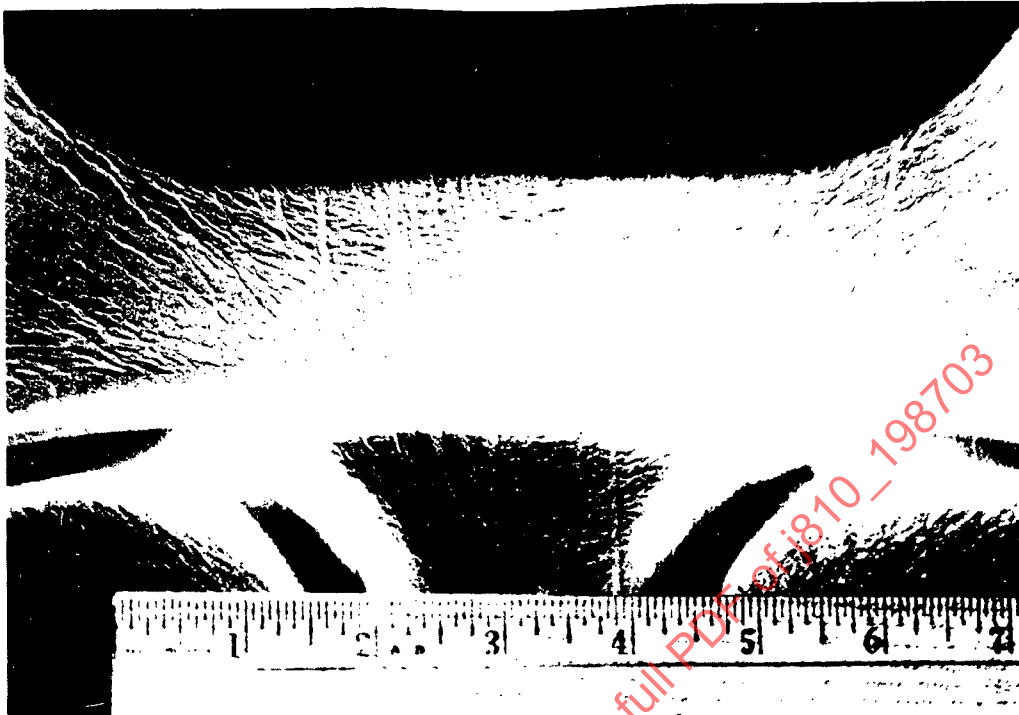
SKIN LAMINATION—Skin lamination is a sub-surface separation which usually results in a surface rupture.



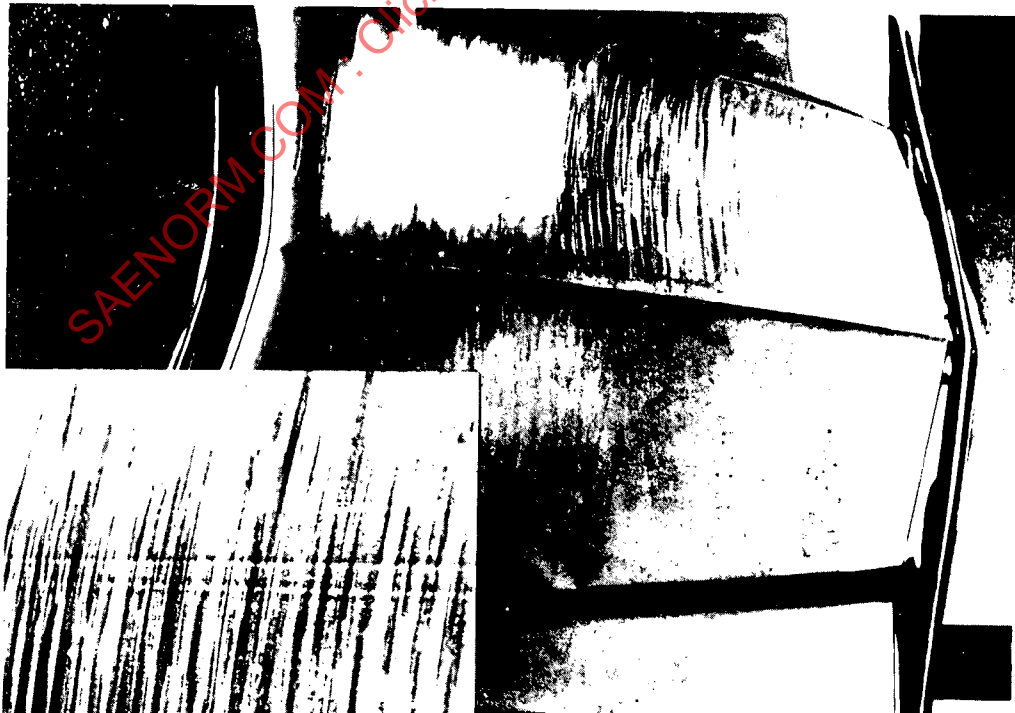
SLIVERS—Slivers are surface ruptures somewhat similar in appearance to skin laminations but usually more prominent.



STICKER BREAKS—Sticker breaks are arc-shaped types of coil breaks usually located near the middle of the sheet.



STRETCHER STRAINS (LUDER'S LINES)—Stretcher strains are irregular surface patterns of ridges and valleys which develop during drawing.



GHOST LINES—Ghost lines are lineal irregularities in the surface which develop in drawing. They are parallel to the direction of rolling.