Product Description
Cold Rolled Full Hard Unprocessed Sheet is produced by U. S. Steel for direct use by customers for applications that do not require any formability beyond very limited bending and/or rollforming. It is supplied directly off the cold-reduction mill without any annealing to soften the steel. Thus, the steel is highly work-hardened, and exhibits a high resistance to denting, etc., but at the same time, it exhibits only minimal ductility. The hardness is Rockwell B 84 minimum.

Since the product is supplied directly after cold rolling without further processing, Full Hard Cold Rolled Unprocessed Sheet will have residual cold mill oils on the sheet surface. Also, the product, in coil form, includes off-gauge coil ends unless further processing is needed to facilitate processing through the customer's operations.

Unprocessed Full Hard Cold Rolled Sheet is not subject to the same product standards that have been established for other cold rolled sheet products.

Ordering Information
Definitive shape standards have not been established for Cold Rolled Full Hard Sheet. However, further processing through a tension leveler can improve the shape so that the shape will normally meet the ASTM specification (A568) for cold rolled flatness. If further processing is required to flatten the strip to apply oil or to remove off-gauge material, Cold Rolled Full Hard Processed Sheet must be ordered.

U.S. Steel Cold Rolled Full Hard Sheet is produced to either nominal or
minimum thickness. For nominal orders, the thickness tolerances are plus and minus around the ordered thickness. For minimum thickness orders, the thickness tolerance is all plus/nothing under the minimum specified.

Standard Finish
Cold Rolled Full Hard Sheet product is provided with the surface finish produced on the cold reduction mill. This will be either a matte finish or a smooth ground finish depending on the product thickness and the mill processing parameters on the specific cold-reduction mill used to manufacture the product.

Surface Treatment
The standard practice is to provide Cold Rolled Full Hard Sheet product with the residual cold mill rolling oil on the surface. Any other customer requirement will entail special processing steps and added production cost.

Special Processing
Special processing can be applied to full hard sheet products. These include recoiling to remove off-gauge at the coil ends and tension leveling to improve shape. Also, a rust-inhibitive oil can be applied. However, this entails an additional processing step, i.e., temper rolling, recoiling, or tension leveling. If the product is ordered tension-leveled or cropped back to gauge, a rust-inhibitive oil can be applied at the same time. This product is ordered as Cold Rolled Full Hard Processed.

Steel Designations and Chemistry
If the purchaser of Cold Rolled Full Hard Sheet plans to further process the product such as by annealing to soften the product or apply a hot-dip coating, it is important to order the proper steel chemistry. The steel chemistry can be specified to allow the customer to meet the end-desired mechanical properties. Also, if U. S. Steel is made aware of the end application and the additional processing practices being planned by the customer, the proper chemistry can be selected by the producing mill. For example, if the product will be hot-dip galvanized and the final application
requires that the steel exhibit extra deep-drawing properties (EDDS), the steel can be melted to provide a vacuum degassed, fully stabilized product. Or, if the final product requirement is to meet the ASTM Structural Steel (SS) Grade 40, the alloying additions made during steelmaking can be properly selected.

**ASTM Specifications**

There is no ASTM product specification that covers all Cold Rolled Full Hard Sheet product, per se. However, the general requirements of ASTM A568 are applicable with several exceptions.

ASTM Structural Steel (SS) Grade 80 described in Specification A1008 is often processed identically to Cold Rolled Full Hard Sheet product. Thus, the term full hard is often used to describe this product. In effect, the product attributes of Grade 80 and Cold Rolled Full Hard sheet are similar. However, if additional processing (annealing, hot-dip coating, etc.) is planned by the purchaser, special steel chemistry considerations beyond the requirements of Grade 80 product will usually be required.