


STANDARD OPERATING PROCEDURES		
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Purpose

To establish inspection and workmanship standards by which to disposition Hot Roll, Cold Roll, and Coated Products material.

Scope

This SOP applies to any person involved in the inspection process.

Responsibility

Qualified inspectors are responsible for adhering to this procedure.

Process Standard

Material will be inspected on appropriate finishing units by a qualified inspector, who will make disposition of the material.

Reason for Control

To ensure that inspection is performed in a consistent manner.

Method

The following procedure is used to inspect the surface of steel.

1. Check the scheduled surface and shape requirements.
2. Scan the surface for defects as the coil is being processed.
3. Determine whether or not coil meets requirements.
4. Reject, divert, hold, or release the coil for the next operation.
 - A. Surface Categories - Surface requirements are categorized as A, B, and C surfaces, and are defined as follows:
 - “A” Surface - Wrapper-fully exposed, no defects allowed.
 - “B” Surface - Exposed-surface critical, minor cosmetic defects OK.
 - “C” Surface - Unexposed-non-critical surface.

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Method (Cont.)

The surface requirement for each order appears in the processing instructions of the unit schedule.

Definition of Defects - The severity of defects are classified as:

- “LI” - Light and Infrequent,
- “LF” - Light and Frequent,
- “MI” - Medium and Infrequent,
- “MF” - Medium and Frequent,
- “HI” - Heavy and Infrequent, and
- “HF” - Heavy and Frequent.

- Light and Infrequent - Superficial, cosmetic, without depth or definition, with less than 10% of the total coil affected.
- Light and Frequent - Superficial, cosmetic, without depth or definition, with more than 10% of the total coil affected.
- Medium and Infrequent - Minor, small, with some definition and depth, with less than 10% of the total coil affected.
- Medium and Frequent - Minor, small, with some definition and depth, with more than 10% of the total coil affected.
- Heavy and Infrequent - Easily seen, sharp and defined, with measurable depth, and with less than 10% of the total coil affected.
- Heavy and Frequent - Easily seen, sharp and defined, with measurable depth, and with more than 10% of the total coil affected.

Whenever there is doubt in making disposition of a coil, the inspector holds the coil and calls upon his/her supervisor or the process control supervisor for direction. The process control supervisor’s decision on disposition takes priority.

Attached is the list of defects commonly encountered while processing steel. (Attachment A) This list is used to inspect and assign disposition to a coil being processed. Samples of defects may be found in the Surface Imperfections Manual.

Attachment B is a list of general guidelines, by product type, for scheduling surface requirements for coils. All surface requirements per Attachment B are hard coded into the Level III computer system. The requirements for each order are developed automatically during the planning of each order. Any changes to this SOP must follow the requirements of the Hard Coding SOP (METL,CORP,03.02,O).

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Method (Cont.)

B. Shape Categories

Shape is described using two letters. The first letter describes the severity of an edge wave. The second letter describes the severity of a buckle.

- L - Light
- M - Medium
- H - Heavy

This letter appears as part of the processing instructions on a unit schedule, and represents the most severe shape permissible by the order.

EXAMPLE: A shape code of "ML" tells the inspector that up to a medium edge wave, and a light buckle would be permissible on the item.

Definitions

Light, Medium, and Heavy has different meanings depending on the product.

<u>HOT ROLLED STEEL</u>	<u>COLD ROLLED STEEL</u>	<u>SILICON STEEL</u>
Light 0" to 1"	Light 0" to 1/8"	Light 0" to 1/16"
Medium 1" to 2"	Medium 1/8" to 1/4"	Medium 1/16" to 3/16"
Heavy 2" to 3"	Heavy 1/4" to 3/4"	Heavy 3/16" to 5/16"

In determining measurements, the inspector makes a judgment call and visually estimates the measurement to describe how far out of flat the coil is. He visually estimates from the top of the table roll to the top of the wave or buckle to get the approximate measurement.

Attachment C is a list of general guidelines, by product type, for scheduling shape requirements for coils. All shape requirements per Attachment C are hard coded into the Level III computer system. The requirements for each order are developed automatically during the planning of each order. Any changes to this SOP must follow the requirements of the Hard Coding SOP (METL,CORP,03.02,O).

Verification

Adherence to this SOP is verified through internal auditing.

Definitions

N/A

References

METL,CORP,10.01,O - Final Inspection and Testing.
Surface Imperfections Manual


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ATTACHMENT A-2

L = LIGHT M = MEDIUM H = HEAVY I = INFREQUENT F = FREQUENT

A	B	C	H.S. SLITTER DEFECTS	A	B	C	COATING DEFECTS
	LI	LI	DENTS/PICKUP				BAD C.P. PAINT
	LI	LI	DIGS				BARE SPOTS
LI	MI	MI	GREASE/OIL SPOTS			LI	BEADS ON EDGE
LI	LI	MI	OSCILLATED			LI	BLOWAROUND/POOR COATING
LI	LI	LI	POOR SHEARING		LI	LI	CASTER CRACKS
LI	LI	MI	ROLLED IN DIRT			MI	CENTER STICKER
	LI	MI	ROLL MARKS				COATING BUILDUP
	LI	LI	SCRATCHES			LI	CROSS BREAKS
	LI	LI	SLITTER DAMAGE			LI	DAMAGE STICKER
						LI	EYE BAND STICKER
							FLUX PULL THROUGH
							GAUGE BUILDUP
			TEMPER MILL DEFECTS (HR)				HOLES
	LI	MI	CROSS BREAKS	LI	LI	MI	OSCILLATION
	LI	LI	DIGS			LF	PICKLER FOLDS
	LI	MI	EDGE BREAKS			LI	PICKUP/DENTS
LI	LI	MI	GREASE/OIL SPOTS			LI	PIMPLES
LI	LI	MI	OSCILLATED COIL				POOR CHEM TREAT
	LI	LI	PICKUP				POOR/NO STENCIL
		LI	PINCHER/TRAV. LINES			LI	POROSITY
	LI	MI	ROLLED IN DIRT			LF	REEL KINKS
	LI	MI	ROLL MARKS			LF	ROLL MARKS
		LI	RUST/WET/STAIN			MF	ROUGH BEADY SURFACE
		LI	SCRATCHES			LI	RUST/WET/STAIN
	LI	LI	TRACTOR DAMAGE			LI	SCRATCHES/DIGS
	LI	MI	TEMPER MILL DAMAGE			LI	SHEARING BAD
							SKIPS & VOIDS
						LI	SLITTER DAMAGE
						LI	TERNE TRACKING
							TOWER BURNS
						LI	WHITE RUST

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ATTACHMENT B

GENERAL GUIDELINES FOR SCHEDULING SURFACE REQUIREMENTS FOR COILS

SURFACE CODES BY PRODUCT TYPE

HOT ROLL

- A. BEARING STOCK, ROME, CMP & GIBRALTAR FOR BORG, BUMPER, CHRYSLER-LOGAN METAL, VIKING MATERIALS, BELMONT STEEL CORP, LIBERTY SAE 1008 DS BRAKE ASSEMBLY, MONARCH ALL HR PRODUCTS, PEN CLIP APPLICATIONS, EXPOSED AND PAINTED APPLICATIONS.
- B. ALL OTHERS
- C. NONE

COLD ROLL

- A. WRAPPER, BUMPER < **80XF**, .098" x 11.656 DIA Chrysler-Toledo Machining, Meco CRFH Exposed and Painted Folding Chair, Metals USA all products except Grand Rapids
- B. ALL OTHERS
- C. NONE

GALVANIZE

- A. WRAPPER, Metals USA all CR Based, Harris all CR Based, Feralloy - Clev. all CR Based
- B. COLD ROLL BASE
- C. HOT ROLL BASE, CULVERT

SILICON

- A. NONE
- B. NONE
- C. ALL

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ATTACHMENT C-1

GENERAL GUIDELINES FOR SCHEDULING SHAPE REQUIREMENTS FOR COILS

HOT ROLLED CARBON STEEL TEMPER PASSED .150" GA				
(HR STANDARDS)	0-24" WIDE	24.01-30" WIDE	30.01-36" WIDE	36.01- 51 " WIDE
0-10 CARBON	LL	LL	LL	ML
11-20 CARBON	LL	LL	ML	ML
21-40 CARBON	LL	ML	MM	MM
41-50 CARBON	MM	MM	MM	MH
OVER 50 CARBON	MM	MM	HM	HH
HOT ROLLED CARBON STEEL TEMPER PASSED > .150" GA				
(HR STANDARDS)	0-24" WIDE	24.01-30" WIDE	30.01-36" WIDE	36.01- 51 " WIDE
0-10 CARBON	LL	LL	ML	ML
11-20 CARBON	LL	LL	ML	MM
21-40 CARBON	ML	ML	MM	MH
41-50 CARBON	ML	MM	HM	HM
OVER 50 CARBON	MM	MM	HH	HH
ITEMS OUTSIDE THE PRODUCT LIMITATION PARAMETERS MUST HAVE AN INQUIRY				

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ATTACHMENT C-2

GENERAL GUIDELINES FOR SCHEDULING SHAPE REQUIREMENTS FOR COILS

HOT ROLLED CARBON STEEL NON-TEMPER PASSED .150" GA				
(HR STANDARDS)	0-24" WIDE	24.01-30" WIDE	30.01-36" WIDE	36.01- 51 " WIDE
0-10 CARBON	LL	ML	MM	MM
11-20 CARBON	LL	ML	MM	HM
21-40 CARBON	ML	MM	HM	HM
41-50 CARBON	MM	HM	HM	HH
OVER 50 CARBON	MM	HM	HH	HH
HOT ROLLED CARBON STEEL NON-TEMPER PASSED > .150" GA				
(HR STANDARDS)	0-24" WIDE	24.01-30" WIDE	30.01-36" WIDE	36.01- 51 " WIDE
0-10 CARBON	LL	ML	MM	MM
11-20 CARBON	LL	ML	ML	MM
21-40 CARBON	LL	MM	MM	HM
41-50 CARBON	ML	MM	HM	HH
OVER 50 CARBON	MM	MM	HM	HH
ITEMS OUTSIDE THE PRODUCT LIMITATION PARAMETERS MUST HAVE AN INQUIRY				

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ATTACHMENT C-3

GENERAL GUIDELINES FOR SCHEDULING SHAPE REQUIREMENTS FOR COILS

HOT ROLLED ALLOY WITH V OR > .60C (NS 801,D6A)			
(HR STANDARDS)	0-24" WIDE	24.01-36" WIDE	36.01- 51 " WIDE
TEMPER PASSED .000 TO .150" GA	MM	HM	HH
TEMPER PASSED ABOVE .150" GA	ML	MM	HM
NON-TEMPER PASSED TO .150"	HM	HH	HH
NON-TEMPER PASSED ABOVE .150"	MM	HM	HH
HOT ROLLED STANDARD ALLOY, HIGH STRENGTH, AND HSLA GRADES			
(HR STANDARDS)	0-24" WIDE	24.01-36" WIDE	36.01- 51 " WIDE
TEMPER PASSED ALL GAUGES	ML	MM	HM
NON-TEMPER PASSED ALL GAUGES	MM	HM	HH
ITEMS OUTSIDE THE PRODUCT LIMITATION PARAMETERS MUST HAVE AN INQUIRY			

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ATTACHMENT C-4

GENERAL GUIDELINES FOR SCHEDULING SHAPE REQUIREMENTS FOR COILS

ALL ANNEALED AND SKIN ROLLED COLD ROLLED STEEL				
(CR STANDARDS)	0-24" WIDE	24.01-30" WIDE	30.01-36" WIDE	36.01- 51 " WIDE
.000-.024" THICK	LL	LL	ML	MM
.0241-.030" THICK	LL	ML	MM	MM
.0301-.036" THICK	LL	ML	MM	HM
.0361-.045" THICK	ML	ML	HM	HM
OVER .045" THICK	ML	MM	HM	HH
COLD ROLLED FULL HARD, AND NON-TEMPERED PASSED ANNEALED STEEL				
(CR STANDARDS)	0-24" WIDE	24.01-30" WIDE	30.01-36" WIDE	36.01- 51 " WIDE
.000-.030" THICK	LL	ML	ML	MM
.0301-.045" THICK	ML	MM	HM	HH
OVER .045" THICK	MM	HM	HH	HH
ITEMS OUTSIDE THE PRODUCT LIMITATION PARAMETERS MUST HAVE AN INQUIRY				

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ATTACHMENT C-5

GENERAL GUIDELINES FOR SCHEDULING SHAPE REQUIREMENTS FOR COILS

ALL COLD ROLL BASED COATED GALVANIZE				
(CR STANDARDS)	0-24" WIDE	24.01-30" WIDE	30.01-36" WIDE	36.01- 51 " WIDE
.000-.030" THICK	LL	LL	ML	ML
.0301-.050" THICK	ML	ML	ML	MM
OVER .050" THICK	ML	ML	ML	MM
ALL HOT ROLL BASED COATED GALVANIZE				
(HR STANDARDS)	0-24" WIDE	24.01-30" WIDE	30.01-36" WIDE	36.01- 51 " WIDE
ALL THICKNESSES	LL	LL	LL	LL
ALL SILICON				
SILICON STANDARD	0-6" WIDE	6.01-10" WIDE	10.01-15" WIDE	OVER 15" WIDE
ALL GAUGES	LL	LL	ML	ML
ITEMS OUTSIDE THE PRODUCT LIMITATION PARAMETERS MUST HAVE AN INQUIRY				