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Surface Preparation

Surface preparation means all activities and methods involved in preparing metal surface for paint application. Proper surface preparation is essential for the success of any coating scheme. The importance of removing oil, grease and surface contaminants can not be overemphasized. The performance of any paint coating is directly dependent on the correct and thoroughly surface preparation prior to paint application. The technologically advanced coating system may fail if the surface preparation is incorrect or incomplete.

1. Methods of surface preparation

There are a number of surface preparation methods and the equipment imvolved. The folowing equipments and tools are mainly to be used. For preparation of steel surface, power tool cleaning and blast cleaning is generally applied. Recently water jetting has come to be applied for M&R.

Methods			Equipments／Tools
Manual methods	・Hand tool cleaning		・Steel brushes ・Steel scrapers ・Pick hammers ・Sand / carborundum paper
Mechanical methods	・Power tool cleaning		・Pneumatic hammers ・Needle-guns ・Grinders ・Rotary grinding disks
	・Blast cleaning	・Dry abrassive blasting	・Dry abrassive blasting equipment
	・High pressure water jetting		・Water jetting equipment


Steel brush


Steel scraper


Pick hammer


Rotary grinding disk

2. Surface preparation for Newbuilding

(1) Primary surface praparation

In the surface preparation for ship steel, a primary surface preparation is conducted to remove mill scales on the steel. After that, shop primer is applied to the steel for the primary rust preventive.

(2) Secondary surface preparation

Shop-primed steel is generally used in shipbuilding yards. After constructing blocks or hull structures with the shop-primed steel by welding and cutting, before painting, the shop-primed steel is provided with the secondary surface preparatioin to remove the rusted / damaged parts and the contaminants on the welds.

3. Standard for surface preparation

The internationally used standards of surface preparation is as follows. The standards including ISO, SSPC and NACE provide the degree of rust removal for the steel that is applied with no shop primer. Regarding secondary surface preparation for the shop-primed steel, the Shipbuilding Research Association of Japan stipulated the "Standard of Steel Surface Preparation" (JSRA-SPSS).

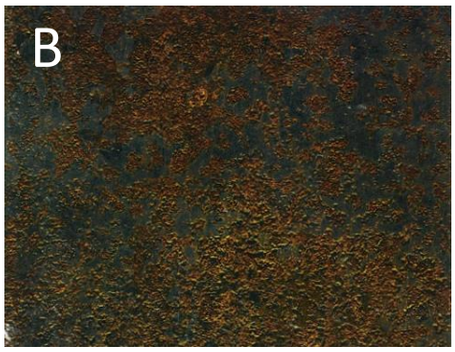
① ISO 8501-1 (International Standard Organization)
② SSPC (Steel Structures Painting Council)
③ NACE (National Association of Corrosion Engineering)
④ JSRA - SPSS (Japanese Ship Research Association)

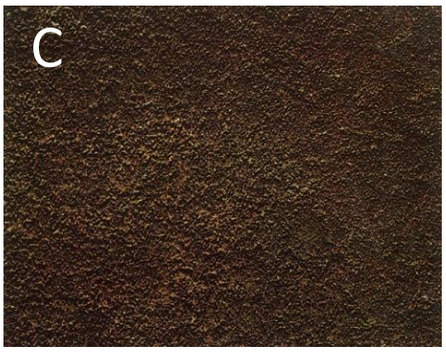
(1) Hand and power tool cleaning

Rust grades / Preparation grades	ISO8501-1				Various standards (For reference)		
	A	B	C	D	SSPC	NACE	JSRA
	Steel surface largely covered with adhering mill scale but little, if any, rust.	Steel surface which has begun to rust and from mill scale has begun to flake.	Steel surface on which the mill scale has rusted away or from which it can be scraped, but with slight pitting visible under normal version.	Steel surface on which the mill scale has rusted away and on which general pitting is visible under normal version			
Thoroughly hand and power tool cleaning **When viewed without magnification, the surface shall be free from visible oil, grease and dirt, and from poorly adhering mill scale, rust, paint coatings and foreign matter.**	-	B St 2	C St 2	D St 2	SP 2	-	Pt 1
Very thoroughly hand and power tool cleaning **As for St 2, but the surface shall be treated much more thoroughly to give a metallic sheen arising from metallic substrate.**	-	B St 3	C St 3	D St 3	SP 3	-	Pt 2 Pt 3

【Reference】 Hand and power tool cleaning

Rust grades





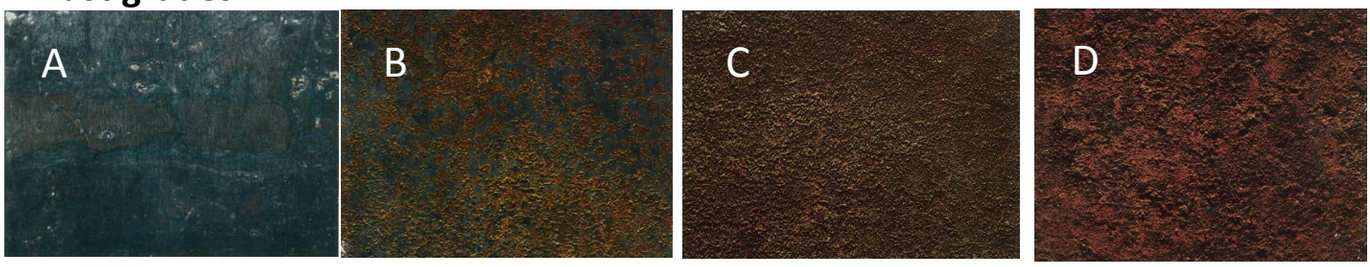
Peparation

(2) Blast cleaning

Rust grades / Preparation grades	ISO8501-1				Various standards (For reference)		
	A	B	C	D	SSPC	NACE	JSRA
	Steel surface largely covered with adhering mill scale but little, if any, rust.	Steel surface which has begun to rust and from mill scale has begun to flake.	Steel surface on which the mill scale has rusted away or from which it can be scraped, but with slight pitting visible under normal version.	Steel surface on which the mill scale has rusted away and on which general pitting is visible under normal version			
Light blast-cleaning **When viewed without magnification, the surface shall be free from visible oil, grease and dirt, and from poorly adhering mill scale, rust, paint coatings and foreign matter.**	-	B Sa 1	C Sa 1	D Sa 1	SP 7	No.4	-
Thoroughly blast-cleaning **When viewed without magnification, the surface shall be free from visible oil, grease and dirt, and from most of the mill scale, rust, paint coatings and foreign matter. Any residual contamination shall be firmly adhering.**	-	B Sa 2	C Sa 2	D Sa 2	SP 6	No.3	Sd 1
Very thoroughly blast-cleaning **When viewed without magnification, the surface shall be free from visible oil, grease and dirt, and from most of the mill scale, rust, paint coatings and foreign matter. Any remaining traces of contamination shall show only as slight stains in the form of spots or stripes.**	A Sa 2 $^{1}/_{2}$	B Sa 2 $^{1}/_{2}$	C Sa 2 $^{1}/_{2}$	D Sa 2 $^{1}/_{2}$	SP 10	No.2	Sd 2
Blast-cleaning to visually clean steel **When viewed without magnification, the surface shall be free from visible oil, grease and dirt, and from most of the mill scale, rust, paint coatings and foreign matter. It shall have a uniform metallic colour.**	A Sa 3	B Sa 3	C Sa 3	D Sa 3	SP 5	No.1	Sd 3

【Reference】 Blast cleaning

Rust grades



Preparation grade