CHUGOKU MARINE PAINTS, LTD.

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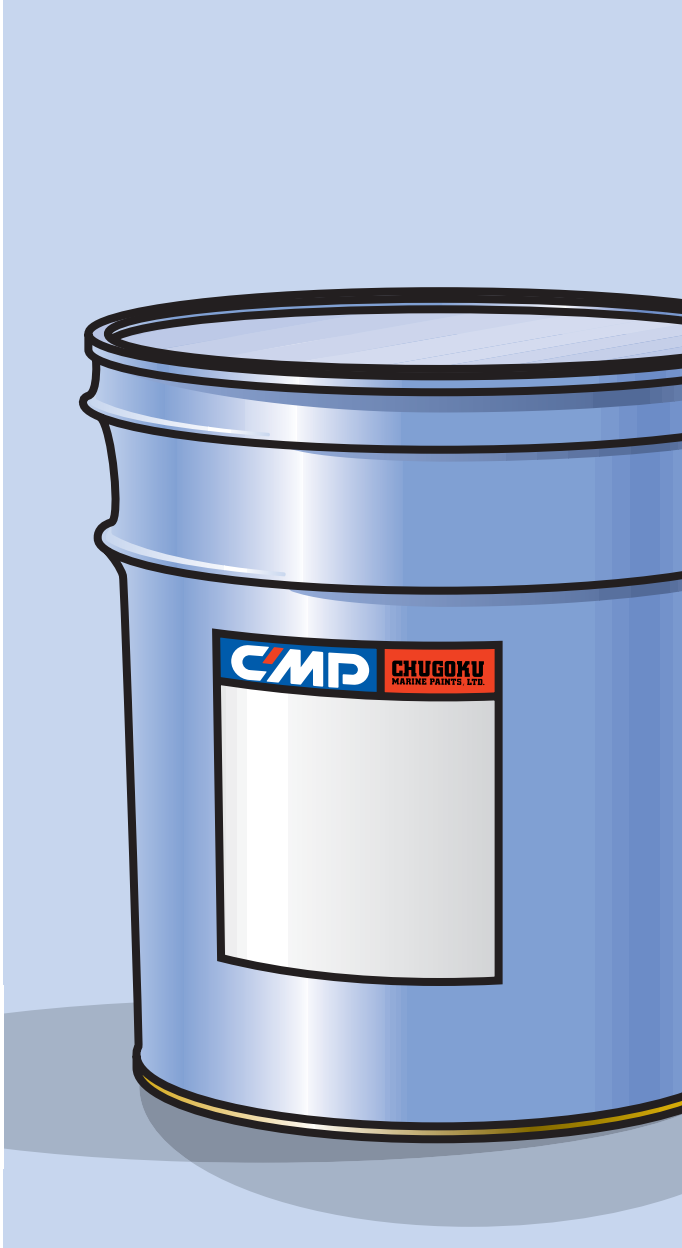
MAINTENANCE PAINTING

Introduction

CMP, Chugoku Marine Paints, Ltd. wishes to express its sincere appreciation to customers and users in using CMP quality products.

CMP quality products ensure marine and heavy duty coatings are well kept in excellent condition for a long time. Coatings, however, are damaged by inevitable factors and such damages need to be repaired by means of effective and appropriate manners as soon as possible.

Therefore, CMP made this booklet of MAINTENANCE PAINTING, which guides and helps customers, users, engineers, etc. to perform good maintenance and repair work.



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Notes before the use of this booklet

■ Information in this booklet is subject to change without notice. All information is written with full attention, but there is no guarantee that information in this booklet is accurate, useful, updated, etc. Chugoku Marine Paints, Ltd. assumes no responsibility for incurred loss and/or damages caused by the events based on this booklet, or those caused by failure to consult and use of this booklet.

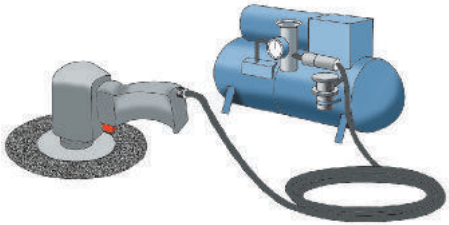
Equipments for surface preparation and Coating

Equipments for surface preparation and Coating

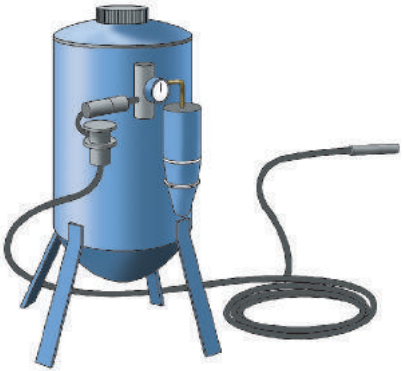
Prepare the following equipments when necessary before repair.

What to be prepared for surface preparation

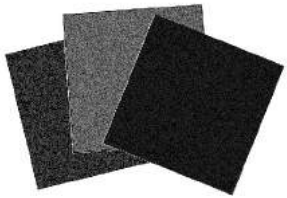
- A set of Disc Sander
  (including sand discs, hoses, air compressor, etc.)



- A set of Abrasive Blaster (including nozzles, hoses, abrasives, air compressor, etc.)

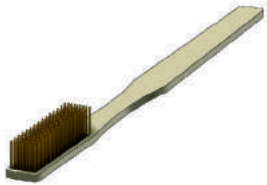


- Sand Papers



- Power brush

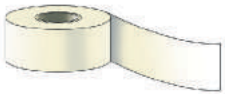
- Wire brush



- Chipping Hammer

What to be prepared before coating

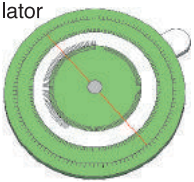
Masking tape



Viscometer (to check viscosity)

Disper

Dew Point Calculator

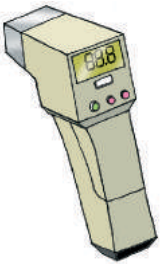


RH Hygrometer

Analog Type

Digital Type

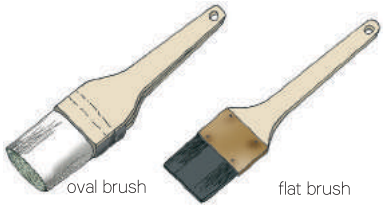
Surface thermometer



Salinometer

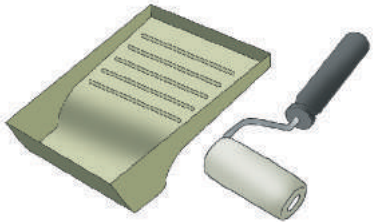
What to be prepared for coating

- Brushes (flat brush, oval brush)

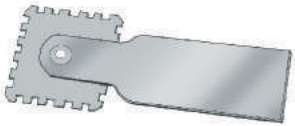


- Airless Spray Set
  (hoses, air compressor, spray gun, tips, etc)

- Rollers (a couple of different size of rollers)



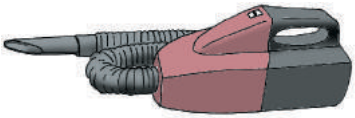
- Wet Film Gauge



- Dry Film Gauge

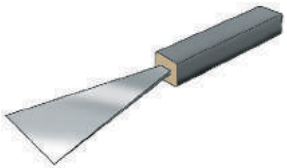
Others also needed

- Vacuum Cleaner



- Bucket, fresh water, cotton waste, degreasing agent, detergent

- Scrapers



Make a repair plan

Make a repair plan

1 Make a repair plan

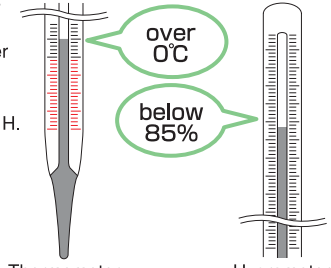
Check carefully the area to be repaired to apply appropriate paints prior to repair work.

2 Air Temperature

Painting should be done at over 0℃ in ambient air temperature and below 85% R.H. Too high air temperature may cause dry spraying and poor film of coatings. And too low air temperature will cause slow drying, solvent retention, sagging, and slow curing. When coating is absolutely necessary in lower temperature, it is recommendable to refer to Product Data Sheet.

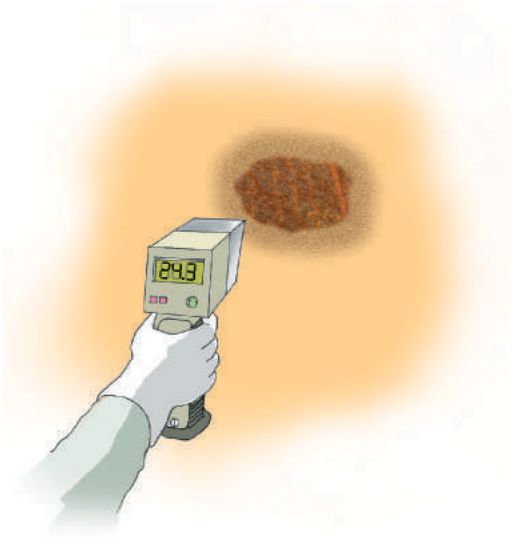
Twirl a thermohygrometer for about a minute before use.

Coating should be done under the condition of at over 0℃ in ambient air temperature and below 85% R.H.



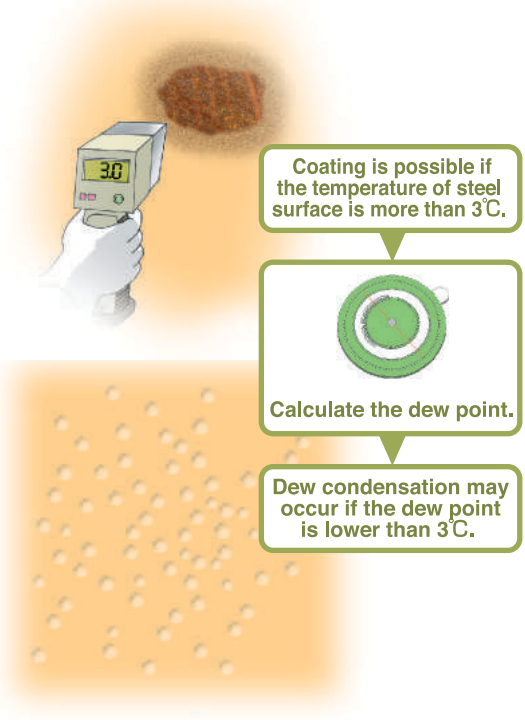
3 Steel temperature of repair area

Too high temperature of repair area may cause too quick drying, which results in poor adhesion and bubbles.
Too low temperature of repair area may cause dew condensation, which results in peeling off of coatings.



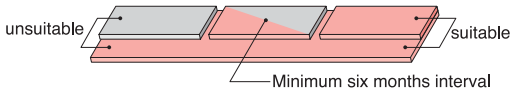
4 Dew Point

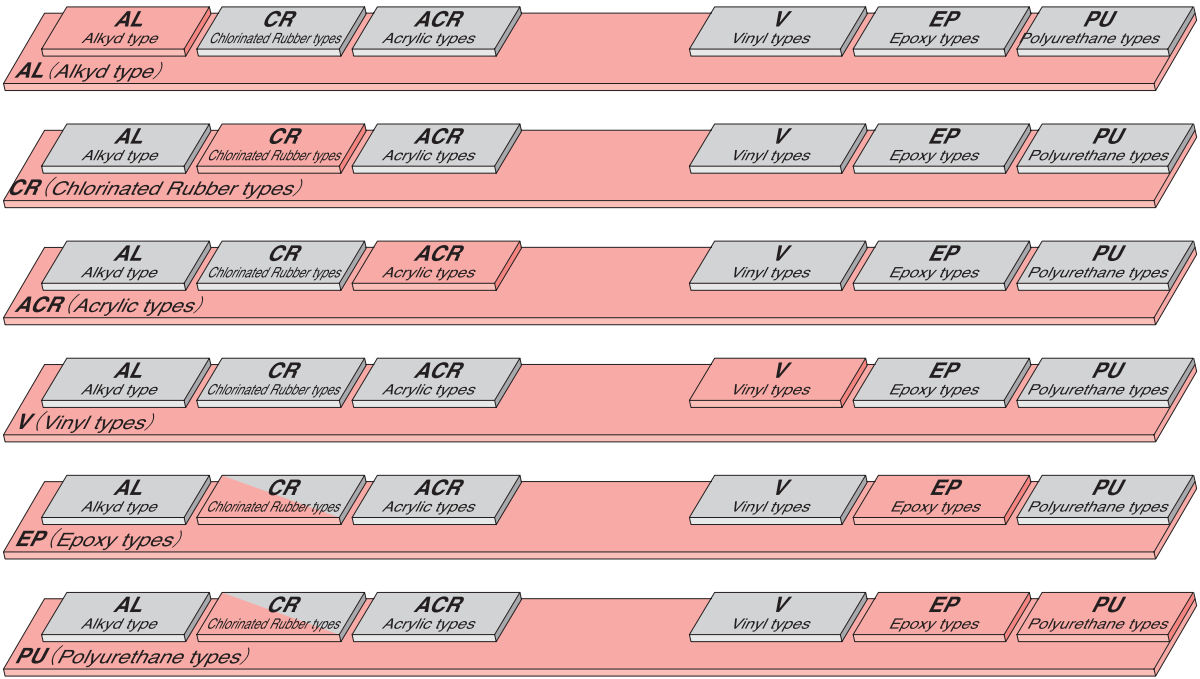
Painting is recommended only when the steel surface of repair area is more than 3℃ above the dew point, regardless of R.H. When dew point is lower than 3℃, the surface of repair area may cause dew condensation, which may result in paint failure.



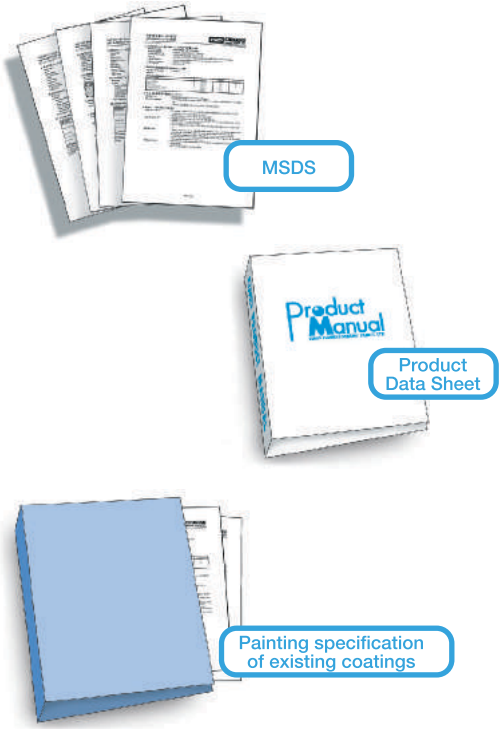
5 Compatibility between different type of paints in maintenance for exposed and interior areas

When a different type of paint from the present coating is used for overcoating, check the compatibility between coats and determine the coating specification. Surface preparation is necessary before repair.





6 Prepare Product Data Sheet



Surface preparation on areas to be repaired

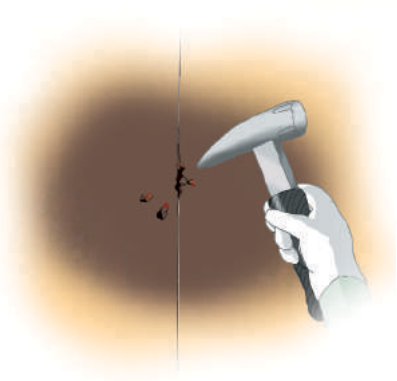
Surface preparation on areas to be repaired

1 Cleaning of areas to be repaired

Water soluble salt, dirt, oil, grease, dust and other foreign matters are to be removed by high-pressured fresh water washing, scraping, degreaser, cleanser and/or thinner wiping, prior to derusting.

2 Slag removal

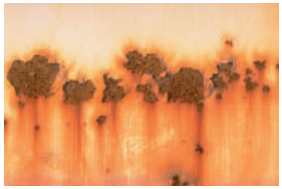
Completely remove the slag, sputter and hume left after welding with chipping hammers.



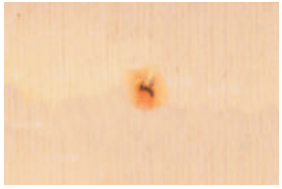
Chipping hammer

3 Grade of surface preparation

Conduct surface preparation depending on the effect of rusting on areas to be repaired.



Area of heavy rusting and / or defected coatings



Area of light rusting and / or defected coatings

Area of heavy rusting and/or defected coatings

The surface should be derusted by abrasive blasting to the grade of Sa2.5, or to St3.0 if using disc sander or power tool.

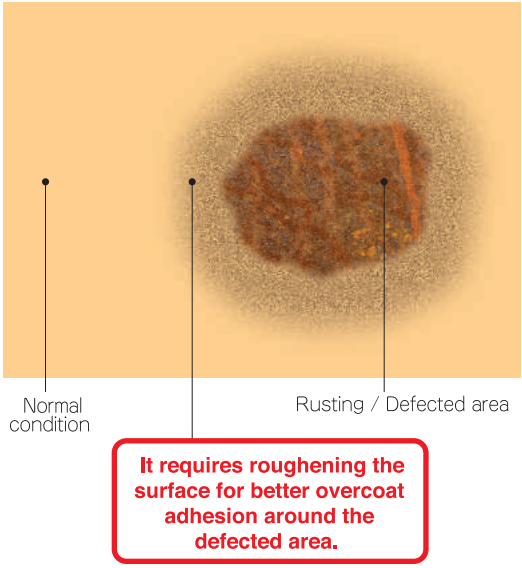
Wear dust-proof work wear when conducting the abrasive blasting.

Area of light rusting and / or defected coatings

The surface should be derusted with power tool (i.e. disc-sander, wire brush or other suitable tool).

Around defected area

The surface is to be thoroughly washed down with fresh water and dried. Depending on the type of existing coatings, it sometimes requires roughening the surface for better overcoat adhesion when the painting interval of existing coating exceeds the max. interval of the product (see the max painting interval in Product Data Sheet).



4 Cleaning after surface preparation

Conduct elaborative cleaning using a cleaner after surface preparation and dispose the trash properly.

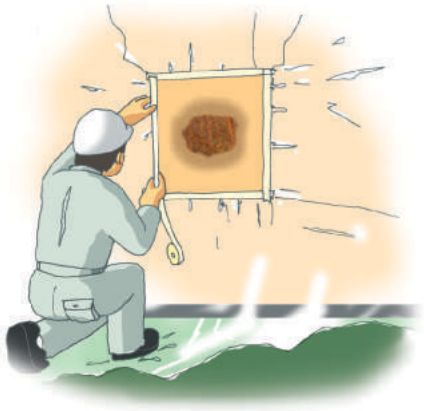
Preparation for coating

1 Check the paints for coating

Prepare the paints based on the repair plan, the expiration data, Product Data Sheet, etc.

2 Masking

Prepare for paint scattering and dripping by masking situation by situation. Especially, masking is required when the way of coatings causes wide area of coating adhesion such as airless spraying.



3 Stirring and mixing

Stirring is necessary for all paints before use. Epoxy paints and polyurethane paints are separated into two components of curing agent and base. Curing agent and base of paint should be mixed well by a proper ratio (see Product Data Sheet) and stirred homogeneously in a mixing machine. Poor mixing impairs curing and adhesion properties of paints.

Mixing using a disper

4 Thinning

Thinner may be added for spray application, but should not exceed the specified amount (see Product Data Sheet). Too much thinning causes low wet film and low dry film thickness and results in melting the previous coating. After adding thinner, it is recommendable to check the paint viscosity prior to use (thinning is sometimes needed in order to assure the appropriate viscosity). Stirring is necessary after thinning.

5 Arrangement of work area

To avoid accidents such as falling, do not put anything unnecessary in the work area. Always try to arrange the work area.

Coating

Coating

1 Pot life (Usable life)

Check well the Pot Life (usable life) of products. Note that Pot Life will change depending on the temperature.

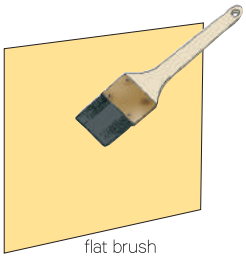
2 Application methods (Coating methods)

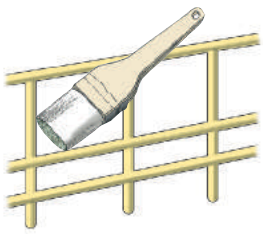
Brush

Repair with brushes is recommendable for areas where airless spray is not available. Brush painting does not give thick paint film at once, therefore it requires 2～3 coats to achieve a targeted DFT.

Brushes should be just dipped into paints and tapped on the side of the can to drop the excess paint before coating. Paints should be applied carefully and slowly by lengthwise and crosswise brush movements. Tough surfaces, rivet heads, edges and angles should be painted carefully to obtain thickness without not to leave any areas unpainted.

The size and shape of brushes are decided depending on the repair area. Flat brush is preferable for flat surface, and rough or oval brush is preferable for rough surface such as rivet heads constricted areas.


flat brush


oval brush

Care and cleaning of brushes after use

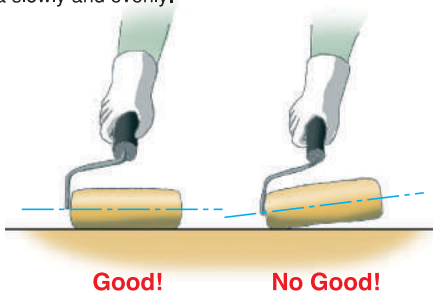
① Gently clean off the pains left using scrapers, etc.

② Then, brushes are rinsed in thinner. If the brush is shortly to be used again, carefully rinse it in thinner.

③ When the coating is completed, the brush should be carefully cleaned with thinner, washed thoroughly with fresh water, dried and stored in cool and dry place.

Roller

Roller application is of particular value on board for plain surfaces. Although not as quickly as spraying, it usually dries faster than brush application. Another advantage is that it enables a semi-skilled painter to obtain a reasonable standard of finish. In using a roller, cover the surface of the roller evenly with paint and apply to repair area slowly and evenly.



It does not give thick paint film at once, the same as brushing, therefore it also requires 2～3 coats to achieve a targeted DFT.

For care and cleaning of rollers after use, conduct the same as the brush.

Airless spray

Chugoku products can be applied by airless spray in general, which is more effective to achieve targeted thick film.

Airless spray

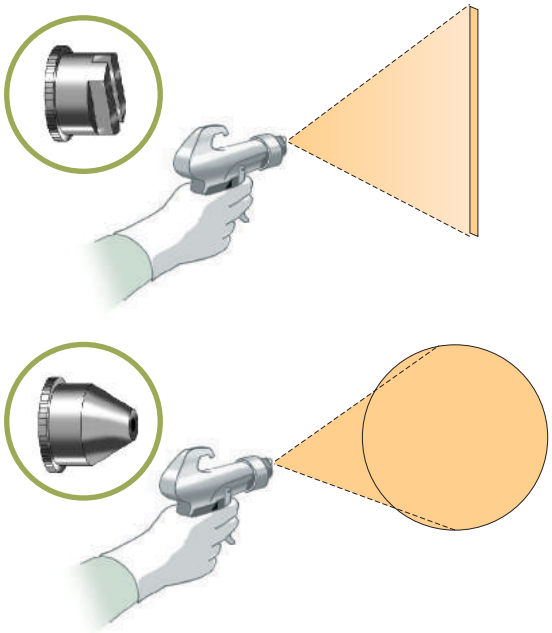
Air pressure and paint viscosity

Equipment consists basically of an air-operated pump from which is connected to an airless spray gun with a hose. The ratio of the pumped air pressure of most airless spray equipment varies between 45 to 1 and 60 to 1. Before air spraying, it is recommended to carefully consult its Manual. In use and application by airless spray, air pressure is to be controlled by 'Paint Out Put Pressure' of a gun nozzle (see Product Data Sheet). Generally, no thinner is required, but thinning may be needed depending on the ability of airless spray equipment (small amount of thinner may be added). Refer to Product Data Sheet for the dilution ratio.

Selection of Airless spray tips

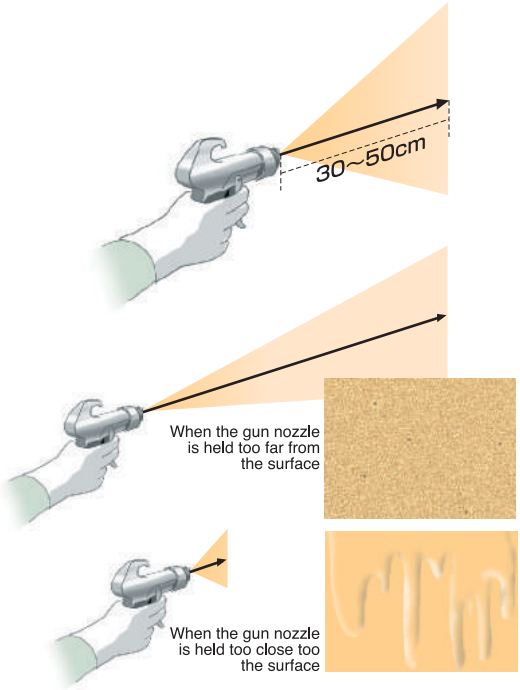
The correct tip size should be chosen depending on the type of paints and areas to be painted. The size of spray pattern and the amount of paints sprayed are governed by the tip size.

Appropriate spray tips must be used depending on products (see Product Data Sheet)



■ Distance between a spray gun and repair area

A gun nozzle should be kept in 30cm to 50cm from the surface of repair area. If it is kept too close to the surface, paint will sag or ripple. If it is kept too far from the surface, it will cause pin holes and rough surface.



■ Strokes of spray gun

Speed of spray gun operation is determined by the film thickness and the amount of paint sprayed. A spray gun should be kept at a constant distance from the surface of repair area and swung outward at the end of the stroke. Strokes should be overlapped correctly.

【Trigger】 The trigger must be pulled firmly at the beginning of each stroke and released fully at the end of it.

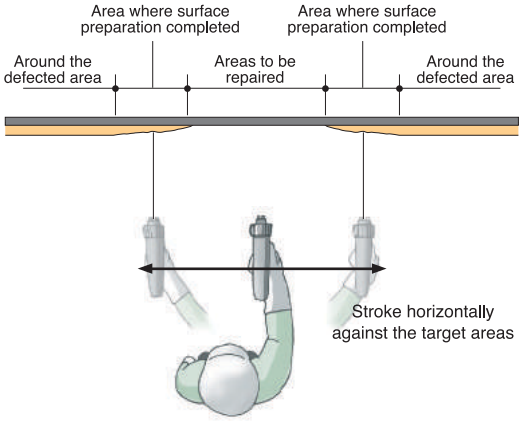
【Angle】 The spray gun must be held at the right angle to the surface throughout strokes ; 90 degrees and 45 degrees at the end of stroke.

【Corner】 Keep closer and apply quickly at the corners

【Slim and long shape surface】 Stroke straight

【Round and long surface】 Repeat stroke straight

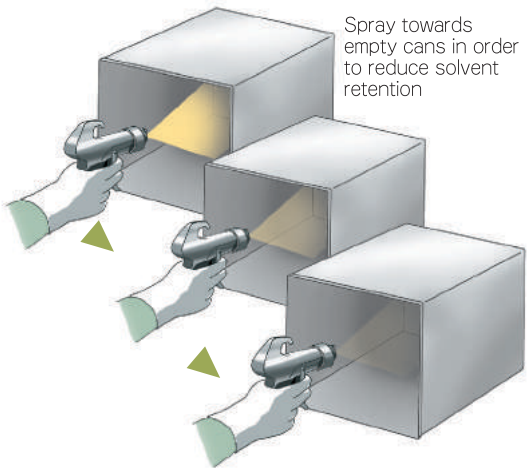
【Wide surface】 Stroke horizontally and vertically (see below illustration)



■ Care and cleaning of airless spray after use

① Remove the paints left inside its hose and gun with thinner.

② Stroke. Change thinner. Repeat this procedure until the color of spraying thinner is clear.

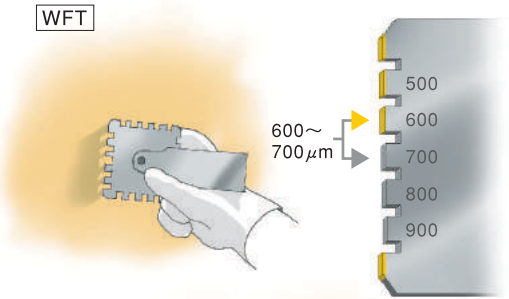


Spray towards empty cans in order to reduce solvent retention

3 Paint film thickness (in wet and dry condition)

Film thickness should be controlled at the recommended specification, unless otherwise specified. To make sure if targeted dry film thickness (DFT) is obtained, it is recommendable to check wet film thickness (WFT) with a tool of Wet Gauge soon after application (see DFT / WFT ratio in the Product Data Sheet)

WFT



DFT

4 Ventilation

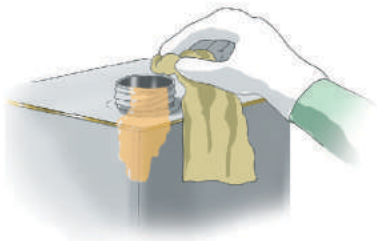
Solvent and thinner need to evaporate after application, and avoid the effects from solvent retention and slow drying as much as possible.

Storage of paints

Storage of paints

1 Seal-up of containers

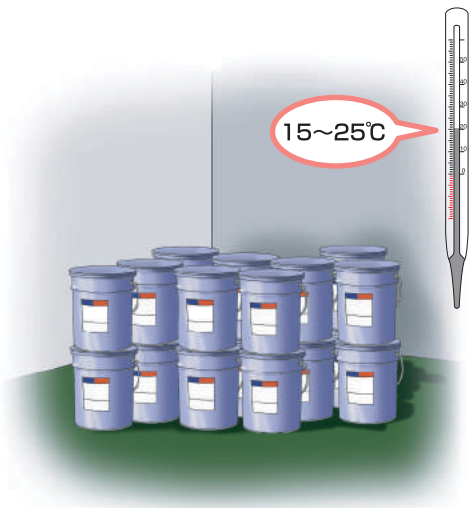
When storing the products, properly seal-up the containers' lids.



Wipe and clean well the adhered paints on the can lids with clothes, etc., then close the lids.

2 Storage

Paints may be caused settling and gelling after a long period, even when they are stored in a normal atmosphere and temperature. Some paints such as water-based paints and emulsions are affected by frost. Therefore, paints storage should be controlled in "First-in First-out" basis and be stored where there will not be excessively higher or lower temperature (Temperature between 15℃ to 25℃ is most preferable). Also, in order to avoid settlement of pigments, it is recommendable to turn over paint cans once in 3-4 months time.



3 Shelf life (at 20℃)

The usable life when products are kept in 20℃

AL	(Alkyd type)	
	■Primers	18 months
	■Overcoats	12 months
CL	(Chlorinated Rubber types)	
ACR	(Acrylic types)	
V	(Vinyl types)	12 months
EP	(Epoxy types)	
PU	(Polyurethane types)	
ZN	(Inorganic zinc paint)	6 months

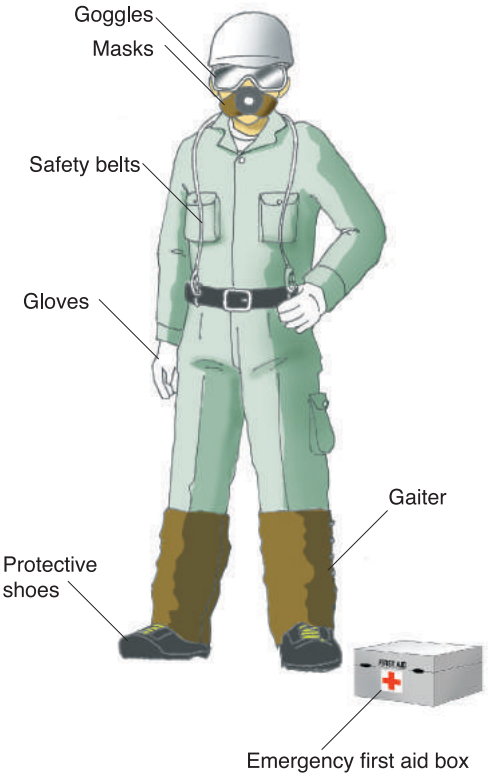
※The above usable life is the rough indication in general, and will change by various factors. Also, the usable life does not show the guarantee period of our product quality.

※Please check paints even before the guarantee period of our product quality.

Safety

Safety

1 Protective gear and First aid kid



2 Fire

As solvents are flammable, careful attention should be paid to prevent fire hazard. When painting is carried out in confined spaces such as inside tank or small room, sufficient ventilation should be provided during painting and drying process.

3 What to do at times like this?

In the event of when the skin gets contact with paints

When the skin gets contact with paints, wipe it off with a cloth and then washed with lukewarm water and soap.

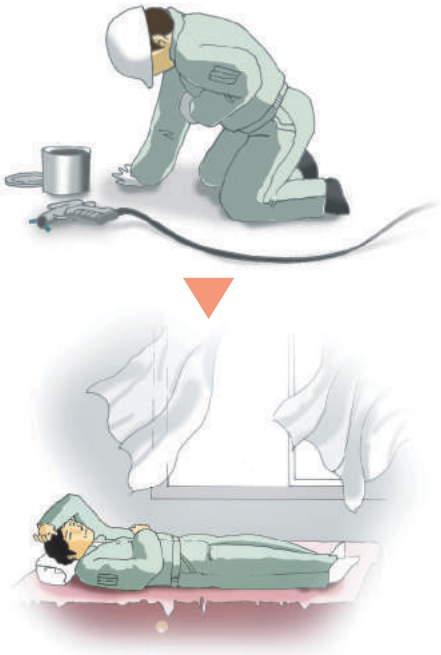
Depending on the type of paints or body-build, it sometimes causes skin irritation. Consult with a doctor in such case.

In the event of when you get paints into your eye

When getting paints into eyes, wash eyes in 15 minutes or more with a lot of pure running water immediately and consult with a doctor (see MSDS of each product).

In the event of when you feel ill during work

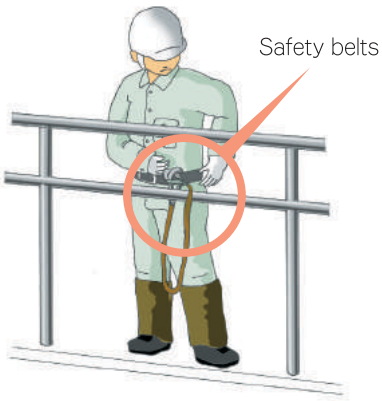
If you feel ill for inhaling vapor or gas, take a rest where the air is clean and see a doctor as needed.



4 Safety ensuring

Operations on high places

When conducting tasks on high places, take due note to operate safely with enough preparation of protective gear



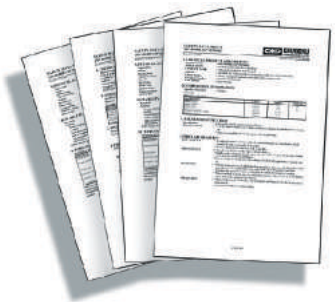
After operations

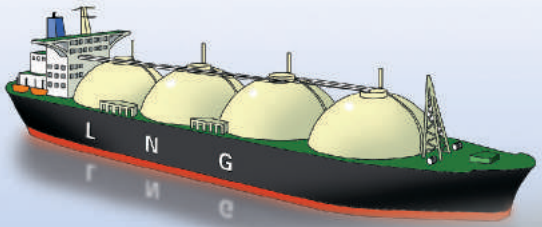
Conduct enough hand washing, gargling, and nostril washing after operation

5 MATERIAL SAFETY DATA SHEET

MSDS, “MATERIAL SAFETY DATA SHEET” describes the aspects and ways of handling of materials and it is required to submit to other companies when a manufacturer or a seller transfers and/or offers the first and second grade of designated chemical substances and/or products which contains those designated chemical substances.

Before starting operation, read MSDS carefully which we, paint manufacturers disclose in order for persons concerned to safely and correctly use the products.





CMP WORLDWIDE NETWORK

MAINTENANCE PAINTING

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