NIPPON PAINT MARINE

APPLICATION MANUAL

FASTAR

(For Maintenance & Repair)

Feb 2020 1st edition

Recognised in Japan as 日本ペイントマリン株式会社

Contents

Introduction

FASTAR is a self-polishing type anti-fouling paint which contributes to environmental preservation by stable anti-fouling performance with nanodomain structure developed by NIPPON PAINT MARINE, and fuel efficiency by hydrogel.

Application can be carried out using the same method as conventional self-polishing type A/F paint, and no special installation or equipment is required.

Please proceed application with the following details.

1. Standard of antifouling zone painting specification

1) Under water area (Flat bottom, Vertical bottom)

Standard coating system of FASTAR

System	Paint name	D.F.T(μm)	Type of paint
A/C	NIPPON E-MARINE A/C	175	Epoxy A/C
	NIPPON E-MARINE A/CII	75	Epoxy A/C
A/F	FASTAR	＊	Hydrolysis type A/F
	FASTAR	＊	Hydrolysis type A/F

NOA10M+FASTAR Coating system

System	Paint name	D.F.T(μm)	Type of paint
A/C	NOA10M Buff	175	Epoxy A/C
A/F	FASTAR	＊	Hydrolysis type A/F
	FASTAR	＊	Hydrolysis type A/F

＊DFT of FASTAR depends on the ship's operating conditions and dry docking intervals.

2) FASTAR's standard coating sequence according to colors

FASTAR number of coatings	1st	2nd	3rd	4th
FASTAR　1 coat system	RB			
FASTAR　2 coat system	DB	RB		
FASTAR　3 coat system	RB	DB	RB	

DB：Dark Brown、ＲB：Red Brown

＊For Dark Brown and Red Brown color systems, Red Brown is the top coat.

2. High pressure fresh water washing (HPFWW)

Immediately after dry-docking, any salt, slime layer, marine growth and other foreign matters should be removed by HPFWW.

1) Timing

・Wash down all foreign matters before they dried up and become stiff.

・Prepare facilities for HPFWW in advance in order to start this immediately after dry up.

2) Procedure

・HPFWW should be carried out as early as possible immediately after dry up.

・Considering falling out of salt, slime and marine growth with washing water from upper side of hull, HPFWW should be done from upper part of topsides down to boottop, vertical bottom and flat bottom

3) Pressure for HPFWW

・Vertical hull（topsides to vertical bottom）: 100kg/c ㎡ and above

・Flat bottom :80kg/ c ㎡

＊Especially, washing down with fan-jet and / or rotary-jet is recommended for flat bottom.

4) HPFWW Washing Checkpoints

As any residues of slime layer and salt etc will badly affect the adhesion between coating layers, thorough washing down is necessary in accordance with the following procedures.

・Slime etc. should be thoroughly removed by carrying out HPFWW to the entire hull surface.

・Check that the surface exhibits no sliminess (slime residue) by rubbing the wet coating surface with your hand/fingers.

・ Any remaining salt concentration is to be less than 30mg/㎡.

・ Washing down should be carried out from both right & left sides of welds so as not to leave any slime residue on or around the welding seams.

・ Salinity and slime residues tend to remain around wood blocks. Careful & thorough washing down should be carried out to these areas.

Slime layer remained due to lack of washing down.

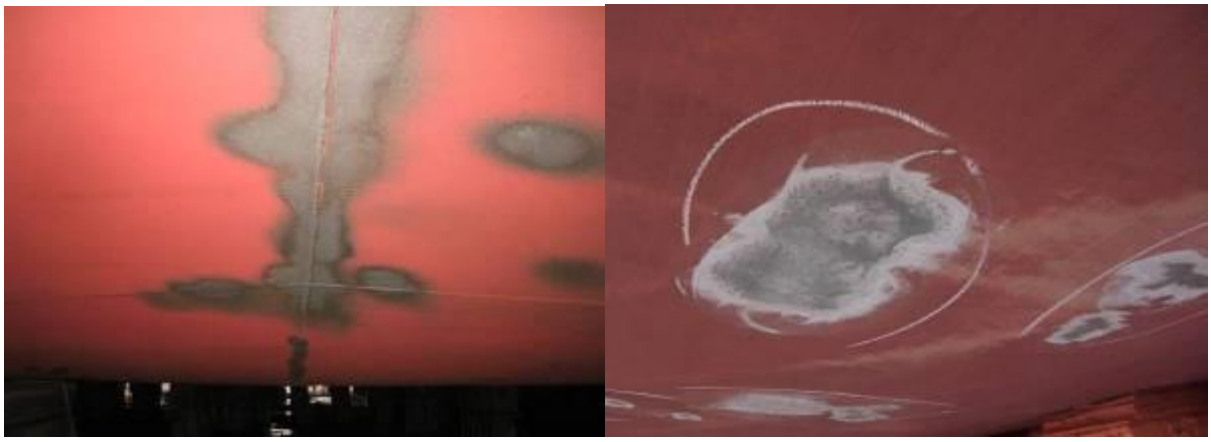
Checking by hand if slime layer remains.

5) Other requirements

- Any oil and grease should be carefully removed with emulsifying or neutral detergent before HPFWW.
- Minor spots of oil or grease can be cleaned locally by rubbing with solvent
- Other foreign matters should be removed by proper power tools (e.g. scrubbing machine pad).

3. Surface preparation

1) Rusty and / or defective film should be removed by blast cleaning or power tool cleaning.



Spot blasting

Disc sanding

2) Coating edges and loose film after spot blasting should be feathered by power tool.

Removal of loose paint film

Loose paint film around T/U area shall be removed.

* Any loose or flaked coating films should be removed by blasting, power tool cleaning or scraper.
* If heavy corrosion and severe mechanical damages are observed, to avoid loose films and uneven edges, blasting should be carried out partial or in square shapes so that the blasted film edges are evenly feathered.

Loose paint film (Partial blast cleaning)

Rust scale or blistering (Partial blast cleaning)

Square blast cleaning

Square blast cleaning

3) Water jetting shall be applicable as surface preparation. In this case, the surface should be treated to the following preparation grade and flush rust grade.

Surface preparation grade : Wa. 2 1/2 (ISO 8501-4:2006)

Flash rust grade : Up to FR 2 Medium flash rust (ISO8501-4:2006)

* When the flash rust grade shall be less than FR 2, the surface should be re-treated or treated by power tool cleaning.

4. Painting

1) Precautions before painting

・Relative humidity, Dew point

Relative humidity is to be below 85% and the dew point is to be at least 3 ℃ above steel substrate.

・Substrate surface to be coated

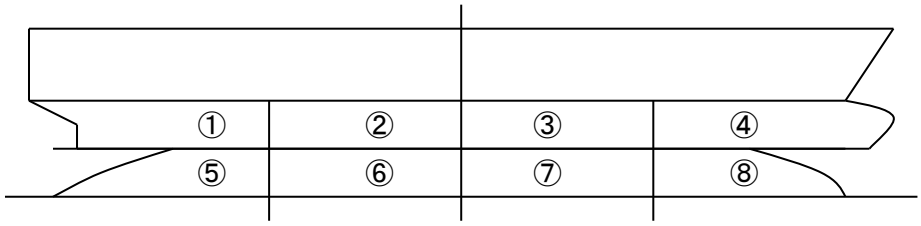
Any paint dust or overspray from the A/C or finish coats that have adhered to the surface should be removed by power tool cleaning or other suitable method before painting FASTAR.

Removal of paint dust of finish coating adhered on bulbous bow

Removal of paint dust before final coating

2) Allotment & distribution of paint

"FASTAR" is self-polishing type paint, so it is important that the coating film maintains uniform specified film thickness. Please divide (distribute) the paint according to the following procedure, paint uniformly for each part, and use up all the paint. The distribution method depends on the size of the ship, but please refer to the diagram below.



3) Important points during painting

When painting FASTAR, it is very important to ensure uniform film thickness and smooth coating surface, so please strictly observe the following instructions

.

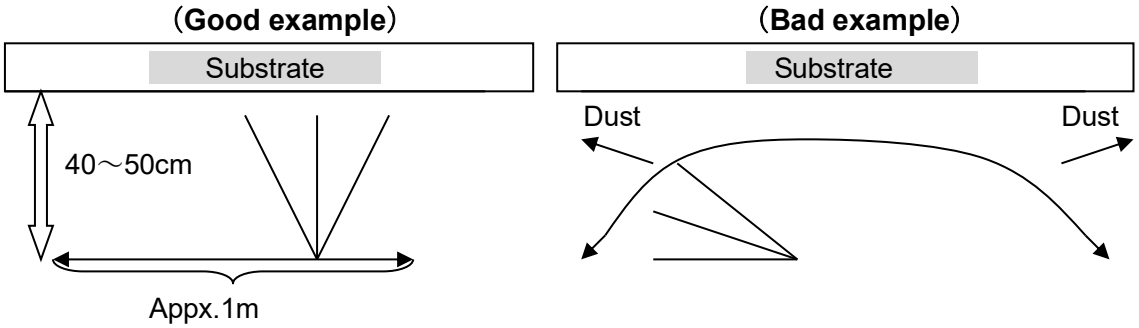
・Carefully clean the painting equipment/ spray lines before painting.

・Spray tip range Graco 525~529 or 625-629. Select proper tip nozzle by checking its atomization. Do not select an extremely large size spray tip which may cause dry spray or uneven paint film surface.

・Check the proper output pressure for painting and ideal spray pattern. When painting at

excessive high pressure, orange peel, sagging or dry spray may occur and a uniform coating cannot be ensured.

・Spray the paint by moving the gun slowly, keeping 40 ~ 50 cm distance between the gun and the substrate and keeping about 1 meter wide spray pass at right angles to the hull, so that the coating film thickness is even and spray dust and loss of paint can be minimized.



＊Should be kept the suitable distance from substrate when applying the painting to avoid dust, dry spray and uneven coating condition.

＊When using pole gun, it's length should be at most 1m to prevent the spray dust.

・ Do not paint under strong winds to prevent spray dust and paint loss.

・ To prevent spray dust, spray paint from windward to leeward.

・ Prepare sufficient lighting facilities for flat bottom.

・ When painting the flat bottom, apply the paint by keeping the spray pattern vertically aligned to the bottom. Swinging the spray gun excessively may cause the thin film thickness due to lack of overlapping of spray patterns. Spray where gun is too close to the surface may create an uneven paint film and orange peeling. Therefore, spray the paint keeping 40 ~ 50 cm distance between gun and surface with proper output pressure.

＊When spraying A/F paint, the spray width should be kept about 1m.

3) Airless spray machine conditions

(a) Airless tip

Following table shows the standard airless tip & thinners for dilution of each product.

Airless tip should be selected by checking the atomization conditions. And dedicated

thinner should be used for dilution.

Items / Product	Standard tip range	Thinner name
E-MARINE A/C	GRACO 619～623	NIPPON MARINE THINNER 600
E-MARINE A/C Ⅱ	GRACO 619～623	NIPPON MARINE THINNER 600
NOA10M	GRACO 519～521	NIPPON MARINE THINNER 600
FASTAR	GRACO 625～629	NIPPON MARINE THINNER300

(b) Airless spray equipment

Above 45 : 1

(c) Output pressure

Above 5kg/㎠ (4.9bar)

(d) Refer to product datasheets for other requirements.

5. Over coating intervals

Over coating intervals between various coat shall be shown as follows.

Under coat	Top coat	0℃		5℃		10℃		20℃		30℃	
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
E-MARINE AC	E-MARINE AC	N/A	N/A	47H	30D	32H	30D	16H	30D	10H	14D
E-MARINE AC	E-MARINE AC LT	N/A	N/A	47H	30D	32H	30D	16H	30D	10H	14D
E-MARINE AC	E-MARINE AC Ⅱ	N/A	N/A	47H	30D	32H	30D	16H	30D	10H	14D
E-MARINE AC LT	E-MARINE AC A/C	30H	30D	24H	30D	16H	30D	10H	14D	N/A	N/A
E-MARINE AC LT	E-MARINE AC LT	30H	30D	24H	30D	16H	30D	10H	14D	N/A	N/A
E-MARINE AC LT	E-MARINE AC Ⅱ	30H	30D	24H	30D	16H	30D	10H	14D	N/A	N/A
E-MARINE AC Ⅱ	E-MARINE AC Ⅱ	20H	-	16H	-	12H	-	8H	-	6H	-
E-MARINE AC Ⅱ	FASTAR	20H	5D	16H	4D	12H	4D	8H	4D	6H	3D
NOA10M	FASTAR			5H	5D	4H	4D	3H	3D	2H	3D
NOA10M LT	FASTAR	24H	5D	5H	5D	4H	4D	3H	4D		
FASTAR	FASTAR	24H	-	6H	-	5H	-	4H	-	3H	-
FASTAR	FASTAR	24H	-	6H	-	5H	-	4H	-	3H	-

< Note > Above coating intervals depends on DFT etc. For more details, please consult with us.

6. Drying time before over coating& immersion

After paint application, drying time before over coating & immersion is to be shown in below table.

Ship's speed (KNOTS)	Number of coating	DFT (μm)	Over coat & Immersion	Dry time (H: Hour)				
				0℃	5℃	10℃	20℃	30℃
15 or less	2	75~100	Over coat	24H	6H	5H	4H	3H
			Immersion	24H	16H	14H	12H	12H
		105~150	Over coat	24H	24H	5H	4H	3H
			Immersion	24H	18H	16H	12H	12H
16~17	2	75~100	Over coat	24H	6H	5H	4H	3H
			Immersion	24H	16H	14H	12H	12H
		105~150	Over coat	24H	24H	5H	4H	3H
			Immersion	24H	18H	16H	24H	12H
18~20	2	75~100	Over coat	24H	6H	5H	4H	3H
			Immersion	24H	16H	14H	12H	12H
		105~150	Over coat	24H	24H	24H	4H	3H
			Immersion	24H	18H	16H	12H	12H
21 or more	2	75~100	Over coat	24H	6H	5H	4H	3H
			Immersion	24H	16H	14H	12H	12H
		105~150	Over coat	24H	24H	24H	4H	3H
			Immersion	36H	18H	16H	12H	12H

Ship's speed (Knots)	Number of coating	DFT (μm)	Over coat & Immersion	Dry time (H: Hour)				
				0℃	5℃	10℃	20℃	30℃
15 or less	3	75~100	Over coat	24H	24H	6H	6H	4H
			Immersion	22H	18H	12H	10H	8H
		100~125	Over coat	24H	24H	6H	6H	4H
			Immersion	36H	30H	22H	15H	9H
		125~150	Over coat	24H	24H	6H	6H	4H
			Immersion	48H	41H	34H	21H	10H
16~17	3	75~100	Over coat	24H	24H	6H	6H	4H
			Immersion	22H	18H	12H	10H	8H
		100~125	Over coat	24H	24H	6H	6H	4H
			Immersion	40H	32H	22H	15H	9H
		125~150	Over coat	24H	24H	6H	6H	4H
			Immersion	56H	48H	34H	21H	10H
18~20	3	75~100	Over coat	24H	24H	6H	6H	4H

			Immersion	22H	18H	14H	10H	8H
		100~125	Over coat	24H	24H	6H	6H	4H
			Immersion	40H	34H	24H	17H	9H
		125~150	Over coat	24H	24H	6H	6H	4H
			Immersion	56H	48H	34H	24H	10H
21 or more	3	75~100	Over coat	24H	24H	6H	6H	4H
			Immersion	24H	20H	16H	10H	8H
		100~125	Over coat	24H	24H	6H	6H	4H
			Immersion	40H	34H	24H	17H	9H
		125~150	Over coat	24H	24H	6H	6H	4H
			Immersion	56H	48H	34H	24H	10H

＊ Temperature indicates lowest in a day".

＊ Specified over coating intervals and drying time before flooding shall be kept.

＊ 2 coats per day is maximum.

＊ Depending on painting condition, DFT may be actually thicker than that of specification.
In that case, longer time may be required than specified drying time.

Drying time until ballast tanks filling up

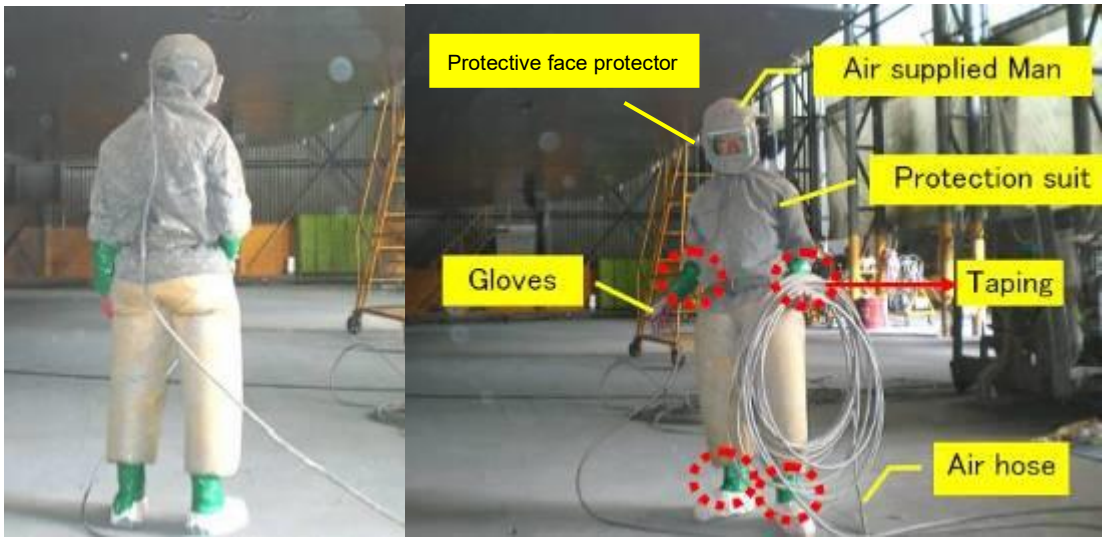
Dry time (H : Hour)				
0℃	5℃	10℃	20℃	30℃
12H	6H	5H	4H	3H

7. General precautions

Please caution that as this paint contains VOC, adhesion of the paint to the skin may cause skin illness etc. Please carefully abide by following instructions.

(a) When using the product, please refer to MSDS (material safety data sheet)
(b) Please apply protective cream and wear protective eyeglasses, gas mask, and protective suits to avoid direct contact with the skin during the application.
(c) Please make sure to avoid entering the area other than those involved in painting. Also, please be careful the safety accident while painting.

＜Example of safety clothing/ PPE for painting＞



Glossary

DFT – Dry Film Thickness

HPFWW – High Pressure Fresh Water Washing

MSDS – Material Safety Data Sheet

NPM – Nippon Paint Marine

PPE – Personal Protective Equipment

Feathering – smoothing of the edge of a previously coated area in order to ensure a smooth surface is achieved when applying a new coating.

D – days

H - hours