Marathon 500

Product description

This is a two component polyamine cured epoxy coating. It is a surface tolerant, high solids, high build product. Will continue to cure when immersed in water. The product has high abrasion resistance. Suitable for environments with very high corrosivity, such as areas in the splash or tidal zone. Can be used as primer, mid coat, finish coat or as single coat system in atmospheric and immersed environments. Suitable for properly prepared carbon steel, galvanised steel, stainless steel, aluminium and concrete substrates.

Scope

The Application Guide offers product details and recommended practices for the use of the product.

The data and information provided are not definite requirements. They are guidelines to assist in smooth and safe use, and optimum service of the product. Adherence to the guidelines does not relieve the applicator of responsibility for ensuring that the work meets specification requirements.
Jotuns liability is in accordance with general product liability rules.

The Application Guide (AG) must be read in conjunction with the relevant specification, Technical Data Sheet (TDS) and Safety Data Sheet (SDS) for all the products used as part of the coating system.

Referred standards

Reference is generally made to ISO Standards. When using standards from other regions it is recommended to reference only one corresponding standard for the substrate being treated.

Surface preparation

The required quality of surface preparation can vary depending on the area of use, expected durability and if applicable, project specification.

When preparing new surfaces, maintaining already coated surfaces or aged coatings it is necessary to remove all contamination that can interfere with coating adhesion, and prepare a sound substrate for the subsequent product. Inspect the surface for hydrocarbon and other contamination and if present, remove with an alkaline detergent. Agitate the surface to activate the cleaner and before it dries, wash the treated area using fresh water. Paint solvents (thinners) shall not be used for general degreasing or preparation of the surface for painting due to the risk of spreading dissolved hydrocarbon contamination. Paint thinners can be used to treat small localized areas of contamination such as marks from marker pens. Use clean, white cotton cloths that are turned and replaced often. Do not bundle used solvent saturated cloths. Place used cloths into water. When the surface is an existing coating, verify with technical data sheet and application guide of the involved products, both over coatability and the given maximum over coating interval.

Process sequence

Surface preparation and coating should normally be commenced only after all welding, degreasing, removal of sharp edges, weld spatter and treatment of welds is complete. It is important that all hot work is completed before coating commences.

Soluble salts removal

Soluble salts have a negative impact on the coating systems performance, especially when immersed. Jotun's general recommendations for maximum soluble salts (sampled and measured as per ISO 8502-6 and -9) content on a surface are:
For areas exposed to (ISO 12944-2):
C1-C4: 200 mg/m²
C5M or C5I: 100 mg/m²
Im1-Im3: 80 mg/m²

Carbon steel

Initial rust grade

The steel shall preferably be Rust Grade A or B (ISO 8501-1). It is technically possible to apply the coating to rust grades C and D, but it is practically challenging to ensure specified film thickness on such a rough surface, hence risk of reduced lifetime of the coating system. When steel of Rust Grade C or D is coated, the frequency of inspection and testing should be increased.

Metal finishing

For areas in corrosivity category C1 to C4 (ISO 12944-2) all irregularities, burrs, slivers, slag and spatter on welds, sharp edges and corners shall conform to minimum grade P2 (ISO 8501-3) Table 1, or as specified. All edges shall have a rounded radius of minimum 2 mm subjected to three pass grinding or equally effective method.
For areas in corrosivity category C5, Im1-3 the requirement is for the steel to conform to grade P2 (ISO 8501-3) Table 1. All edges shall have a rounded radius of minimum 2 mm subjected to three pass grinding or equally effective method. One may use a mechanical grinder fitted with a suitable abrasive disc. All sharp irregularities, burrs, slivers, slag and spatter on welds, whether apparent before or after blast cleaning, shall be removed before coating application. It is recommended that welding smoke should be removed by low-pressure Water Cleaning LP WC method (ISO 8501-4:2006) Wa 1 using fresh water. Welding smoke residues are water soluble and could cause blistering if not removed by washing before blasting.
Defective welds shall be replaced and treated to an acceptable finish before painting. Temporary welds and brackets shall be ground to a flat finish after removal from the parent metal.
Surface preparation and coating should normally be commenced only after all metal finishing and degreasing of a specific area is complete. It is important as much hot work as possible is completed before coating commences.

Pitting repair

Pittings in steel can be difficult to cover fully with most coatings. In some areas it is practically feasible to use filler to fill pittings. This should then be done either after the initial surface preparation or after application of first coat.

Galvanised steel

Abrasive blast cleaning

The galvanised finish shall be smooth as is consistent for a protective coating and shall have no sharp fins, sharp edges, dross or zinc ash on the surface. If present, remove by mechanical cleaning methods.
After removal of excess zinc and surface defects the area to be coated shall be degreased to ISO 12944-5, Part 6.1.4 Alkaline Cleaning. The galvanised surface shall be dry abrasive brush off blast cleaned with the nozzle angle at 45-60° from perpendicular at reduced nozzle pressure to create a sharp and angular surface profile using approved non-metallic abrasive media. As a guide, a surface profile 25-55 µm, grade Fine G; Ry5 (ISO 8503-2) should be achieved.

Hand and Power Tool Cleaning

After removal of excess zinc and surface defects the area to be coated shall be degreased with an alkaline detergent, washed by Low-Pressure Water Cleaning (LPWC) to a grade corresponding to the description of Wa 1 (ISO 8501-4) or higher standard and the surface abraded using mechanical or hand sanding methods using non-metallic abrasives or bonded fibre abrasive pads to remove all polish and to impart a scratch pattern to the surface. Do not use high speed rotational sanders.

Water jetting

Inspect the surface for process residues, hydrocarbon contamination and zinc corrosion by-products. If present, remove with an alkaline detergent. Agitate the surface to activate the detergent and before it dries, wash the treated are by Low-Pressure Water Cleaning (LPWC) to a grade corresponding to the description of Wa 1 (ISO 8501-4) or higher standard using fresh water.
Optimum performance is achieved with preparation to a grade corresponding to the description of Wa 2½.
Minimum preparation grade is Wa 1.

Aluminium

Abrasive blast cleaning

After pre-treatment of welds, sharp edges, removal of weld spatter and other surface contamination the surface shall be degreased using an alkaline detergent which is agitated with non-metallic brushes and removed by Low-pressure Water Cleaning (LPWC) to a grade corresponding to the description of Wa 1 (ISO 8501-4) or higher standard with fresh water. The surface shall be then dry abrasive blast cleaned with an approved non-metallic abrasive media to create a sharp and angular surface profile. As a guide, a surface profile between 25-55 µm, grade Fine G; Ry5 (ISO 8503-2) should be achieved.

Hand and Power Tool Cleaning

After pre-treatment of welds, sharp edges, removal of weld spatter and other surface contamination the surface shall be degreased using an alkaline detergent which is agitated with non-metallic brushes and then fresh water rinsed. The cleaned surface shall be then hand or machine abraded with non-metallic abrasives or bonded fibre machine or hand abrasive pads to remove all surface polish and to impart a scratch pattern to the surface. Do not use high speed rotational sanders.

Water jetting

Surfaces not contaminated with hydrocarbon deposits shall be cleaned by Low-pressure Water Cleaning (LPWC) to a grade corresponding to the description of Wa 1 (ISO 8501-4) or higher standard using fresh water to remove all dusts, chloride and non-visible contamination.
Optimum performance is achieved with preparation to a grade corresponding to the description of Wa 2½.
Minimum preparation grade is Wa 1.

Stainless steel

Abrasive blast cleaning

The surface to be coated shall be dry abrasive blast cleaned as required for the specified surface profile using approved non-metallic abrasive media which is suitable to achieve a sharp and angular surface profile. As a guide, a surface profile corresponding to 25-55 µm, grade Fine G; Ry5 (ISO 8503-2) should be achieved.
Examples of recommended abrasives are:
- Ferrite free almandite garnet grade 30/60 and 80 grade (US Mesh size)
- Aluminium oxide grade G24

Chlorinated or chlorine containing solvents or detergents must not be used on stainless steel.

Concrete

Sand sweeping

Dry abrasive blast cleaning to SSPC-SP 13/NACE No. 6. Where the concrete has become contaminated with oils, grease, or fuels, alkaline detergent may be used to remove the contaminants. It is important to only clean an area that can be fully washed down after degreasing before the cleaner can dry on the surface. Where the contamination has penetrated deep in to the substrate it may be necessary to use Flame/ Thermal cleaning. All prepared surfaces should then have all "blow holes" and other surface defects filled with suitable filler that is compatible with the primer and finish coat system to ensure that the coating can be applied over a smooth and regular substrate.

Diamond disc grinding

Diamond grind the surface to remove all laitance and expose the aggregates.

Coated surfaces

Shop primers

Shop primers are accepted as temporary protection of steel plates and profiles. However the shopprimer should be completely removed through blast cleaning to minimum Sa 2½ (ISO 8501-1) using abrasive media suitable to achieve a sharp and angular surface profile 50-85 µm, grade Medium G; Ry5 (ISO 8503- 2).

Application

Acceptable environmental conditions - before and during application

Before application, test the atmospheric conditions in the vicinity of the substrate for the dew formation according to ISO 8502-4.

Air temperature	10 - 60	°C
Substrate temperature	10 - 50	°C
Relative Humidity (RH)	10 - 85	%

The following restrictions must be observed:

- Only apply the coating when the substrate temperature is at least 3 °C (5 °F) above the dew point
- Do not apply the coating if the substrate is wet or likely to become wet
- Do not apply the coating if the weather is clearly deteriorating or unfavourable for application or curing
- Do not apply the coating in high wind conditions

Product mixing

Product mixing ratio (by volume)

Marathon 500 Comp A	5 part(s)
Marathon 500 Comp B	1 part(s)

Induction time and Pot life

Paint temperature	**23 °C**
Induction time	10 min
Pot life	1.5 h

The temperature of base and curing agent is recommended to be 18 °C or higher when the paint is mixed.

Thinner/Cleaning solvent

Thinner: Jotun Thinner No. 17

Application data

Airless Spray Equipment

Pump ratio (minimum) :	42:1
Pump output (litres/minute) :	2.7-8.4
Pressure at nozzle (minimum) :	170 bar/2500 psi
Nozzle tip (inch/1000) :	21-27
Filters (mesh) :	Remove filters

Material hose length :

Several factors influence, and need to be observed to maintain the recommended pressure at nozzle. Among factors causing pressure drop are:
- long paint- and whip hoses
- low inner diameter hoses
- high paint viscosity
- large spray nozzle size
- inadequate air capacity from compressor
- wrong or clogged filters

Film thickness per coat

Typical recommended specification range

Dry film thickness	250	-	500	µm
Wet film thickness	295	-	590	µm
Theoretical spreading rate	3,4	-	1,7	m²/l

Drying and Curing time

Substrate temperature	10 °C	15 °C	23 °C	40 °C
Surface (touch) dry	14 h	10 h	4 h	1.5 h
Walk-on-dry	24 h	18 h	8 h	3 h
Dry to over coat, minimum	24 h	18 h	8 h	3 h
Dried/cured for immersion	8 d	6 d	4 d	2 d

Drying and curing times are determined under controlled temperatures and relative humidity below 85 %, and at average of the DFT range for the product.

Excess DFT and/or thinning will prolong drying and curing.

If the product is applied during the tidal zone on piles and jetties, it can be immersed after 1 hour. Early immersion will lead to a whitening of colours, most visible on darker colours. The corrosion performance is however not affected.

Surface (touch) dry: The state of drying when slight pressure with a finger does not leave an imprint or reveal tackiness.

Walk-on-dry: Minimum time before the coating can tolerate normal foot traffic without permanent marks, imprints or other physical damage.

Dry to over coat, minimum: The shortest time allowed before the next coat can be applied.

Dried/cured for immersion: Minimum time before the coating can be permanently immersed in sea water.

Maximum over coating intervals

Maximum time before thorough surface preparation is required. The surface must be clean and dry and suitable for over coating. Inspect the surface for chalking and other contamination and if present, remove with an alkaline detergent. Agitate the surface to activate the cleaner and before it dries, wash the treated area by low-pressure water jetting to Wa 1 (ISO 8501-4) using fresh water.

If maximum over coating interval is exceeded the surface should in addition be carefully roughened to ensure good inter coat adhesion.

Areas for atmospheric exposure

Average temperature during drying/curing	0 °C	5 °C	10 °C	15 °C	23 °C	40 °C
Itself	1 mth	1 mth	14 d	10 d	7 d	3 d
polyurethane	10 d	10 d	7 d	5 d	3 d	2 d
polysiloxane	10 d	10 d	7 d	5 d	3 d	2 d
epoxy	1 mth	1 mth	14 d	10 d	7 d	3 d
vinyl epoxy	14 d	14 d	7 d	5 d	3 d	2 d

Areas for immersed exposure

Average temperature during drying/curing	0 °C	5 °C	10 °C	15 °C	23 °C	40 °C
Itself	14 d	10 d	5 d	5 d	3 d	2 d
epoxy	14 d	10 d	5 d	5 d	3 d	2 d
vinyl epoxy	10 d	10 d	5 d	5 d	3 d	2 d

Quality assurance

The following information is the minimum required. The specification may have additional requirements.

- Confirm that all welding and other metal work has been completed before commencing pre-treatment and surface preparation
- Confirm that installed ventilation is balanced and has the capacity to deliver and maintain the RAQ
- Confirm that the required surface preparation standard has been achieved and is held prior to coating application
- Confirm that the climatic conditions are within recommendations in the AG, and are held during the application
- Confirm that the required number of stripe coats have been applied
- Confirm that each coat meets the DFT requirements in the specification
- Confirm that the coating has not been adversely affected by rain or other factors during curing
- Observe that adequate coverage has been achieved on corners, crevices, edges and surfaces where the spray gun cannot be positioned so that its spray impinges on the surface at 90° angle
- Observe that the coating is free from defects, discontinuities, insects, abrasive media and other contamination
- Observe that the coating is free from misses, sags, runs, wrinkles, fat edges, mud cracking, blistering, obvious pinholes, excessive dry spray, heavy brush marks and excessive film build
- Observe that the uniformity and colour are satisfactory

All noted defects shall be fully repaired to conform to the coating specification.

Caution

This product is for professional use only. The applicators and operators shall be trained, experienced and have the capability and equipment to mix/stir and apply the coatings correctly and according to Jotun's technical documentation. Applicators and operators shall use appropriate personal protection equipment when using this product. This guideline is given based on the current knowledge of the product. Any suggested deviation to suit the site conditions shall be forwarded to the responsible Jotun representative for approval before commencing the work.
For further advice please contact your local Jotun office.

Health and safety

Please observe the precautionary notices displayed on the container. Use under well ventilated conditions. Do not inhale spray mist. Avoid skin contact. Spillage on the skin should immediately be removed with suitable cleanser, soap and water. Eyes should be well flushed with water and medical attention sought immediately.

Accuracy of information

Always refer to and use the current (last issued) version of the TDS, SDS and if available, the AG for this product. Always refer to and use the current (last issued) version of all International and Local Authority Standards referred to in the TDS, AG & SDS for this product.

Colour variation

Some coatings used as the final coat may fade and chalk in time when exposed to sunlight and weathering effects. Coatings designed for high temperature service can undergo colour changes without affecting performance. Some slight colour variation can occur from batch to batch. When long term colour and gloss retention is required, please seek advice from your local Jotun office for assistance in selection of the most suitable top coat for the exposure conditions and durability requirements.

Reference to related documents

The Application Guide (AG) must be read in conjunction with the relevant specification, Technical Data Sheet (TDS) and Safety Data Sheet (SDS) for all the products used as part of the coating system.

When applicable, refer to the separate application procedure for Jotun products that are approved to classification societies such as PSPC, IMO etc.

Symbols and abbreviations

min = minutes
h = hours
d = days
°C = degree Celsius
° = unit of angle
µm = microns = micrometres
g/l = grams per litre
g/kg = grams per kilogram
m²/l = square metres per litre
mg/m² = milligrams per square metre
psi = unit of pressure, pounds/inch²
Bar = unit of pressure
RH = Relative humidity (% RH)
UV = Ultraviolet
DFT = dry film thickness
WFT = wet film thickness

TDS = Technical Data Sheet
AG = Application Guide
SDS = Safety Data Sheet
VOC = Volatile Organic Compound
MCI = Jotun Multi Colour Industry (tinted colour)
RAQ = Required air quantity
PPE = Personal Protective Equipment
EU = European Union
UK = United Kingdom
EPA = Environmental Protection Agency
ISO = International Standards Organisation
ASTM = American Society of Testing and Materials
AS/NZS = Australian/New Zealand Standards
NACE = National Association of Corrosion Engineers
SSPC = The Society for Protective Coatings
PSPC = Performance Standard for Protective Coatings
IMO = International Maritime Organization

Disclaimer

The information in this document is given to the best of Jotun's knowledge, based on laboratory testing and practical experience. Jotun's products are considered as semi-finished goods and as such, products are often used under conditions beyond Jotun's control. Jotun cannot guarantee anything but the quality of the product itself. Minor product variations may be implemented in order to comply with local requirements. Jotun reserves the right to change the given data without further notice.

Users should always consult Jotun for specific guidance on the general suitability of this product for their needs and specific application practices.

If there is any inconsistency between different language issues of this document, the English (United Kingdom) version will prevail.