SteelMaster 1200HPE

Product description

This is a two component solvent free amine cured epoxy intumescent coating. Independently approved for fire protection of structural steel exposed to cellulosic fire. Can be used direct to metal, as a mid coat or finish coat in atmospheric environments. Suitable on approved primers on carbon steel and hot dipped galvanised steel 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 with efficient 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 localised areas of contamination such as dye penetration inks and 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.

In the case of surface preparation, the requirements of the SteelMaster 1200HPE TDS / AG should be used instead of the corresponding primer TDS / AG.

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

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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
C5: 100 mg/m²

Carbon steel

Metal finishing

Surface laminations and sharp edges should be removed, sharp edges must be rounded off smooth prior to priming. Weld spatter, or flux, dust and spent abrasive and all contamination must also be removed before primer application. Ensure substrate is clean and dry before painting.

Abrasive blast cleaning

Abrasive blasting should not take place under adverse ambient conditions, when relative humidity exceeds 85 % or when the steel temperature is less than 3°C (37°F) above ambient dew point.

Apply the approved primer within 4 hours of completing the blasting, before degradation of the surface occurs.

Direct to metal

It is possible to apply the product directly to blasted steel, provided environmental controls and relevant project approval allows it. Apply within 4 hours of completing the blasting, relative humidity <60 %, substrate temperature >15 °C (59 °F) and at least 3 °C (5 °F) above the dew point, before degradation of the of the surface. Third party certification typically require 50 µm dry film thickness of epoxy primer. For final exposure in corrosivity categories C1 to C3 (ISO 12944-2). Refer to Jotun for specification.

Cleanliness

After pre-treatment is complete, the surface shall be dry abrasive blast cleaned to Sa 2½ (ISO 8501-1) using abrasive media suitable to achieve a sharp and angular surface profile.

Surface profile

Measure the achieved profile with surface replication tape (Testex) to ISO 8503-5 or by surface roughness stylus instrument to ISO 8503-4.

Achieved surface roughness should be as required by specified primer. The recommended surface profile is 50-75 µm, grade Fine to Medium G; Ry 5 (ISO 8503-1). However, this profile should not be less than figures stated below for carbon steel and alloys. Finished surfaces shall be dull, profiled and show no areas of shiny metal. Do not handle the prepared surface with bare hands.

Compressed air quality

To avoid contaminating the substrate, the dryness and cleanliness of the compressed air supply used for blast cleaning should be verified by testing the air on a white blotter as per ASTM D4285.

Dust contamination

At the completion of abrasive blasting remove residues of abrasive media and inspect for surface particulate contamination. Maximum contamination level is rating 1 (ISO 8502-3) as per Figure 1 of the standard for dust size no greater than class 2.

Wet abrasive blast cleaning

Wet abrasive blasting is an acceptable method of surface preparation. Surface profile and cleanliness shall be as mentioned above. Optimum performance is achieved with preparation grade SSPC SP-10 (WAB)/NACE WAB-2, near white metal wet abrasive blast cleaning. Maximum accepted flash rust grade is Moderate (M). A qualified wet blast primer must be used with this method of surface preparation.
The recommended primer is Jotamastic 85/90.

Hydro-blasting (high pressure water jetting)

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Hydro-blasting may be an acceptable method of surface preparation when abrasive blast cleaning is prohibited or not possible. However, this is acceptable only if an adequate surface profile is revealed as per the requirements stated above. Where a suitable surface profile is not revealed, abrasive blasting will be required. High pressure water jetting does not remove mill scale or create surface roughness, and is only useful for surfaces with an initial roughness suitable for the subsequent coat. Best performance is achieved with preparation grade Wa 2½ (ISO 8501-4). Maximum accepted grade of flash rust for any preparation is FR M (ISO 8501-4).

Alternatively minimum approved preparation grade is SSPC-SP WJ-2/ NACE WJ-2, very thorough cleaning. Maximum accepted flash rust grade is Moderate (M).

A qualified wet blast primer must be used with this method of surface preparation. The recommended primer is Jotamastic 85/90.

Hand and Power Tool Cleaning

Power tool cleaning

Power tool cleaning is not acceptable as a primary surface preparation for steel. It is only recommended for small areas of repair, typically less than 1 m² in size where abrasive blasting is expected to create more damage to the coating system than actual benefit to the performance of the coating system.

Power tool cleaning to St 3 (ISO 8501-1) with 50 µm surface profile or as prescribed in SSPC SP11 with 50 µm surface profile. Removal of all loose mill scale, loose rust, loose paint and other loose detrimental foreign matter to a bare metal finish with a surface profile.

In areas where blasting is not feasible or permitted, power tool surface preparation can be acceptable provided a surface profile of 50 µm is achieved.

Overlapping zones to intact coating shall have all leading edges feathered back by sanding methods to remove all sharp edges and establish a smooth transition from the exposed substrate to the surrounding coating. Consecutive layers of coating shall be feathered to expose each layer and new coating shall always overlap to an abraded existing layer. Abrade intact coatings around the damaged areas for a minimum 100 mm to ensure a mat, rough surface profile, suitable for overcoating.

DO NOT power tool clean aluminium or stainless steel substrates.

Bolts and fixtures

General guidance notes from ASFP recommends that bolt heads should have the same resistance to fire exposure as the steel section. Refer to TSS-TI-099 SteelMaster Protection of Bolt Heads.

Continuous linear fixtures (brackets and angles) should be considered as part of the main beam and duly protected from fire. Refer to TSS-TI-098 Over-cladding and Fixings to Intumescent Protected Steelwork.

Galvanised steel

Abrasive blast cleaning

After removal of excess zinc and surface defects the area to be coated shall be degreased to ISO 12944-4, Part 6.2.4 Alkaline Cleaning. The galvanised surface shall be sweep blast-cleaned (SSPC-SP 16) 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. Finished surfaces shall be dull, profiled and show no areas of shiny metal. Do not handle the prepared surface with bare hands.

Galvanized bolts should be degreased in case of oil/grease contamination, abraded for surface roughening, solvent cleaned, followed by application of approved primer.

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Coated surfaces

Verification of existing coatings including primers

When the surface is an existing coating, verify with technical data sheet and application guide of the involved products, both overcoatability and the given maximum overcoating interval. Only approved and qualified primers can be used in conjunction with this product. It is the application contractor's responsibility to ensure that only approved primers are used. For the current list of approved primers please contact your local Jotun office.

The applied primer should be:
• Dry and cured enough to stand for overcoating, as per minimum overcoating time stated on manufacturer's TDS
• Maximum overcoating period as per Jotun approved primer Application Guide (AG) or contact your local Jotun office
• Strongly adhered to the steel substrate
• Free from any damage, defects or contamination (including oil, grease, soluble salts and dust)
• Uniform in thickness and within the recommended DFT range. It is important to apply the approved primer systems carefully according to the specified DFT as over thickness could affect the performance of the passive fire protection system

Primer system maximum dry film thickness (DFT)

As a general guideline the following maximum dry film should be adhered to.

Epoxy, including epoxy zinc phosphate
- Typical Dry Film Thickness: 40 - 100 µm (1.6 - 4 mils)
- Maximum mean: 200 µm (8 mils)

Zinc epoxy
- Typical Dry Film Thickness: 40 - 75 µm (1.6 - 3 mils)
- Maximum mean: 80 µm (3.2 mils)
- Max in overlaps: 100 µm (4 mils)

Epoxy tie coat (on zinc epoxy)
- Typical Dry Film Thickness: 25 - 60 µm (1 – 2.4 mils)
- Maximum mean: 60 µm (2.4 mils)

The recommended maximum mean is dependent on the primer product. Any restrictions on the maximum recommended DFT for the primer must be adhered to.

Dry film thickness and overcoating periods as per manufacturer's instructions must be strictly observed.

It is the responsibility of the contractor to assess the condition of the primer coating before the product is applied. Any defective areas must be repaired prior to application of this product.

Refer to your Jotun representative for a fire specification and approved primer system.

Reduction of high primer thickness

Areas of high primer thickness should be reduced to the recommended thickness as per the above guideline using medium grade sandpaper, grinding or other suitable methods followed by fresh water washing to remove dust/contaminants. Frequent changes of abrasive paper to be made to avoid polishing the surface. Abrasive sweep blasting followed by thorough cleaning/vacuuming can also be used.

Ensure the surface is clean and dry before application of this product.

Over coating

The primer manufacturer and Jotun should be consulted for minimum and maximum recommended overcoating times. Refer to specific product technical data sheet for details.

Shop primers

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Shop primers are accepted as temporary protection of steel plates and profiles. As long as the shop primer is dry, clean, intact and not damaged it is possible to apply this product over the shop primer. However, if the shop primer is not in sound condition or damaged the shop primer should be completely removed by blast cleaning to minimum Sa 2½ (ISO 8501-1) to a surface profile as recommended.

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	5 - 40	°C
Substrate temperature	5 - 40	°C
Relative Humidity (RH)	10 - 85	%

The following restrictions must be observed:

The product can be applied at minimum temperatures down to 5 °C (41 °F). Curing will slow at temperatures less than 10 °C (50 °F) and will not effectively cure below 5 °C (41 °F). For optimum application and drying, steel and air temperatures should be above 10 °C (50 °F).

Application below 10 °C (50 °F) and at higher relative humidity will retard drying and could compromise ultimate coating performance. Engineering controls such as electric powered heaters or dehumidifiers to maintain environmental conditions within the acceptable parameters are recommended. Fuel fired heaters can create moisture and will be detrimental to the drying.

After a short drying period, the coating may be exposed to weather conditions. After full cure the coating will resist extended exposure to driving rain, pooling water, high humidity and condensation.

It is recommended that the ambient conditions are monitored every 4 hours. Where conditions vary it will be necessary to monitor at least every one or two hours. It is the applicator's responsibility to monitor these conditions in accordance with the specification and to maintain auditable records to demonstrate compliance.

- 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

Material storage conditions

The material should be stored in sealed containers, away from direct sunlight and high humidity.
The following are the recommended storage temperature ranges:

General storage:
5 ºC (41 ºF) minimum and 35 ºC (95 ºF) maximum

Protect the product from frost.

Pre-heating prior to use:
20 to 30 ºC (68 to 86 ºF)

Uniform heating of the material is required. Heaters in direct contact with the containers are not recommended, as it may overheat the outer layers of the material in the container, changing its properties.

Product mixing

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Product mixing ratio (by volume)

SteelMaster 1200HPE Comp A	2.35 part(s)
SteelMaster 1200HPE Comp B	1 part(s)

Product mixing

Individual components must have been stored at 20 to 30 °C (68 to 86 °F) prior to use. Stir/mix thoroughly with a power agitator before application.

Product mixing for application by single leg

Before mixing, Comp A and Comp B to be preheated to 30 - 35 °C (86 - 95 °F) prior to use.

Premixing and thinning is required for application with a single leg airless spray pump. A small amount of Jotun Thinner No. 7 or No. 17 is added (maximum 4 %) to reduce viscosity for mixing and spraying. A high torque variable speed, paddle paint mixer is required for mixing.

Up to 640 ml of thinner may be used per 16 litre kit of this product. Add thinner accurately, do not add "by eye". Always mix full kits when spraying. Mix the two components together until a uniform light grey coloured material is obtained. During mixing, care should be taken to scrape the material from the walls of container into the centre. Care should be taken not to mix more material than can be applied within the pot life of the product.

Induction time and Pot life

Paint temperature	15 °C	23 °C	40 °C
Pot life	45 min	40 min	25 min

Working pot life is not applicable for plural airless spray application.
For single leg airless spray, mixed material should be applied with minimum delay. Due to exothermic reaction, the larger the volume of mixed material, the shorter the pot life will be.

Thinner/Cleaning solvent

Thinner: Jotun Thinner No. 7 / Jotun Thinner No. 17 / Jotun Thinner No. 10

Thinning max.: 4 %

No thinning is required for plural spray or brush application. Thinning is typically 1-3 % by volume for single leg airless spray with hopper, recommended maximum 4 %.
Depending on pump type and ambient conditions thinning may not be required, e.g. spray pump with hydraulic ram and follower plate in a warm climate. Thinning will affect sag resistance and can delay drying times.

Cleaning solvent: Jotun Thinner No. 7 or Jotun Thinner No. 17

Application data

Spray application

Masking

Any surfaces or equipment in the spraying areas that do not require fireproofing must be masked-off using plastic sheeting or equivalent. Regardless of the structural configuration being protected, overspray should always be considered. Overspray onto surfaces must be removed before the material cures. Application on top of overspray is not acceptable. Masking should be done to protect the surrounding area in a square or rectangular shape.

Airless Spray Equipment

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Nozzle tip (inch/1000) : 23-27

Two component heated plural spray pump is recommended.

Airless single leg spray pump can be used with the following material feeding systems:
• Hopper fed system (gravity assisted) or
• Pump with hydraulic ram and follower plate

Several factors influence, and need to be observed to maintain the recommended pressure at the nozzle. Among factors causing pressure drop are:
- extended hoses or hose bundles
- extended hose whip-end line
- small internal diameter hoses
- high paint viscosity
- large spray nozzle size
- inadequate air capacity from compressor
- incorrect or clogged filters

Plural component (Twin Pump) airless spray equipment

Equipment to spray this product are supplied by a number of manufacturers. Each manufacturer provides instructions on machine operation and maintenance. Contractor should discuss with the supplier for individual set up required to achieve best application qualities.
The plural component equipment used must be capable of delivering the required pressures, temperatures and flow rates. This information is given for advice only and the contractor is responsible to determine the suitability of the equipment and to maintain the equipment in good working order according to the manufacturer's recommendations.

Jotun should always be consulted regarding the suitability of any proposed equipment.
Refer to TSS-TI-124 Recommended SteelMaster 1200HPE Pump List.

Operating parameter summary

• Equipment to be set to deliver a mix ratio of 2.35:1, Component A to Component B. Spray application should not start unless the weight ratio check is within ± 5 % of the designated ratio. The ratio check should only be performed once both components have attained the required temperatures to spray.

- 2.23 : 1 minimum
- 2.46 : 1 maximum

• Do not thin the product for plural component pump.
• Temperature of Component A and B to be maintained in the range of 45-55 °C (113-131 °F) using heated storage tanks and/or in-line heaters.
• The recommended fluid line internal diameter (I.D) is 10 mm (3/8"). Use the minimum length of hose required.
• A whip end line of I.D 6 mm (1/4") and 4.5 m (15 feet) in length can be added to the spray line.
• A 30-50° fan angle and 0.023" to 0.027" orifice spray tips are recommended
• Ensure the lines and gun are fully flushed with Jotun Thinner No. 7 or No. 17 after spraying stops for a prolonged period.
• Replacement of the static mixer with a freshly cleaned one is recommended at the end of each working day.

Pre-heat material:
Comp A and Comp B, minimum 20 °C (68 °F)

In-line heater temperatures:
Component A: 45-55 °C (113-131 °F)
Component B: 45-55 °C (113-131 °F)

Temperature at nozzle:
45-55 °C (113-131 °F)

Nozzle tip (inch/1000):
23-27 orifice
30-50 fan angle

The above parameters are for guidance only, settings may vary depending on ambient conditions and equipment used. In regions that may have cold climates, the use of an insulated spray line or a hot water circulation system is recommended for maintaining material temperature in the spray line.

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Single leg airless spray equipment

Airless single leg spray pump can be used for the application of this product dependent on the following criteria being met:

- Minimum 60:1 pumping ratio
- **Material holding hopper attached directly to pump leg (not suitable for suction hose) or a spray pump with hydraulic ram and follower plate**
- The recommended fluid line internal diameter (I.D) is 10 mm (3/8") and the length should not exceed 30 m (100 feet)
- It is recommended that the spray gun is fitted to the 10 mm (3/8") fluid line. If needed, a whip end line of I.D 6 mm (1/4") and 4.5 m (15 feet) length can also be added to the spray line
- A 30-50° fan angle and 0.023" to 0.027" orifice spray tips are recommended
- Before mixing, Comp A and Comp B to be preheated to 30 - 35 °C (86 - 95 °F) prior to use
- Thinning is typically 1-3 % by volume for single leg airless spray with hopper, recommended maximum 4 %. Depending on pump type and ambient conditions thinning may not be required, e.g. spray pump with hydraulic ram and follower plate in a warm climate.
- Remove filters (spray gun, inlet, and pump)

The above parameters are for guidance only, settings may vary depending on ambient conditions and equipment used. In regions that may have cold climates, the use of an insulated spray line or a hot water circulation system is recommended for maintaining material temperature in the spray line. In-line heaters are not a preferred method due to the short pot life of mixed material, however if an in-line heater is used, the material must not exceed 35 °C (95 °F) and the material should have a continuous flow through the spray line. Stoppages can result in material curing in the heater and spray line.

When using single leg airless spray equipment ensure the pump, lines and gun are fully flushed with Jotun Thinner No. 7 or No. 17 after spraying stops for a prolonged period.

Jotun should always be consulted regarding the suitability of any proposed equipment.
Refer to TSS-TI-124 Recommended SteelMaster 1200HPE Pump List.

Other application tools

Brush application

Brush application is only for small areas, touch ups or repairs. Application rates will always be slow when compared to airless spray. Multi-coat application by brush to achieve high DFT is neither practical nor economical. Care should be taken to achieve a uniform DFT. The appearance of brush applied product will be different to that of spray applied product.

Roller application

Roller application is not recommended as an application method, however it can be used to smooth the coating.

Cosmetic finish

The cosmetic finish will depend largely on the method of application. Generally airless spray application will give a superior finish. Before the start of any application, it is recommended that all interested parties agree on the required surface finish. The applicator should spray and finish a sample area acceptable to the client representative. This area should be used as a reference area for the project. The applied film should be closed and uniform in thickness, free from voids and sagging.

More work will be required to achieve the higher standards. It may be necessary to abrade the intumescent surface to remove texture. Topcoats are relatively thin and will tend to highlight rather than hide surface defects. It is, therefore, important to ensure that the required finish has been archived prior to application of the topcoat.

ASFP Technical Guidance Document 11 section 2.1.11 outlines three standards of finish:

1. Basic Finish: The coating system achieves the required fire and corrosion protection performance but is not required to achieve any required standard of finish
2. Decorative Finish: In addition to item 1, a good standard of cosmetic finish is required when viewed from a distance of 5 meters. Minor orange peel or other textures resulting from application or localized repair is acceptable.
3. Bespoke Finish: In addition to item 1, the finish coating is required to have a standard of evenness, smoothness and gloss agreed between specifier and contractor.

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Film thickness per coat

Typical recommended specification range

Dry film thickness:
0.5mm to 4mm per coat

All steel sections must be coated with correct film thickness to achieve the required fire rating. Please refer to the current loading tables. For further advice please contact your local Jotun office.

A typical applied thickness of 3 to 4 mm with plural spray pump is recommended as this affords the optimum compromise between film build, finish and thickness control. It can be possible to apply the product to a higher wet film thickness, depending upon steelwork configuration, geometry, ambient conditions, pump type, sprayer experience, access and primer used. Subsequent coats can be applied in a continuous application process once the material has gelled sufficiently; typically carried out after 60 minutes dependent on ambient conditions.

Maximum WFT is the thickness at which the system can be applied without sagging or slumping. If thicker coats are applied sagging may occur and also the overcoating, drying and handling time will be extended.

For single leg spray, thinning is required. Wet film thickness up to 1.5 mm can be achieved, however this is dependent upon the amount of thinners added, pump type, pump set up, application technique etc.

Refer to Application Guide for more detailed information.

Maximum allowable Dry Film Thickness (BS & EN certification)
If measured mean thicknesses are in excess of these values, action needs to be taken to reduce the measured thickness to below the maximum allowable for the particular member shape and orientation.
I/H beams, 3 sided: 9.02 mm
I/H beams, 4 sided: 9.02 mm
I/H columns, 4 sided: 11.06 mm
CHS & RHS columns: 13.77 mm

Film thickness measurement

Wet film thickness (WFT) measurement and calculation

To ensure correct film thickness, it is recommended to measure the wet film thickness continuously during application using a painter's wet film comb (ISO 2808 Method 1A). The measurements should be done as soon as possible after application. Pre-cut bridge gauge of 75 mm (3 inch) width made from a putty knife to measure the wet film thickness may also be used.

Dry film thickness (DFT) measurement

The effectiveness of an intumescent coating is controlled by thickness applied to give the appropriate fire rating. It is essential to ensure that the correct thickness applicable to each section size is obtained according to the loading tables issued by Jotun. It is the responsibility of the applicator to ensure all coatings are applied in accordance with this working procedure and that the specified dry film thickness is achieved on each section.

The film thicknesses for Jotun's intumescent coating are included in the Jotun loading tables (DFT). These thicknesses apply only to the intumescent coating and are not inclusive of any primer coat. Allowance will have to be made for the thickness of primer & topcoat (deduct) when measuring the overall system.

Primer thickness may be determined either after application in shop, or on site prior to commencement of application of the intumescent basecoat. It should be a requirement of the contract that steelwork delivered to site in primed condition should be accompanied by a documented record of primer thickness supplied by the fabricator. If this is not available, the site contractor must be required to conduct a primer thickness survey prior to commencement of intumescent application. Establishing the correct primer thickness is important. Measurement at this stage will more easily facilitate any subsequent corrections which may prove necessary. If the total intumescent dry film coating thickness, allowing for the underlying primer, is found to be within specified tolerances, application of the next coat (usually a decorative and/or protective coat) can proceed.

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Indentation of the intumescent coating by the measuring instrument probe indicates insufficient hardness of the intumescent coating and measurements should be deferred. However, if programming requires coating to proceed urgently, by agreement with the specifier a shim of known thickness can be used to spread the load of the probe tip on the coated surface, allowing measurement to proceed before the coating has fully hardened. The dry film thickness of coating and shim together can then be measured and the shim value deducted to give the coating thickness.

If the total intumescent dry film coating thickness is found to be outside the specified tolerances, the procedure outlined below.

The recommended procedure for measuring dry film thickness and the acceptance criteria is based on Section 4.7 of ASFP Technical Guidance Doument 11.

Sections must be measured in accordance with the following guidelines:
(i) I Sections, Tee Sections and Channels
Webs: Two readings per metre length on each face of web
Flanges: Two readings per metre length on the outer face of each flange
One reading per metre length on the inner face of each flange.

(ii) Square and Rectangular Hollow Sections and Angles:
Two readings per metre length on each face.

(iii) Circular Hollow Sections:
Eight readings per metre length evenly spread around the section

Where members are less than 2 m in length, three sets of readings shall be taken, one at each end and at the centre of the member. Each set shall comprise the number of readings on each face given by (i), (ii) or (iii) above, as appropriate.

When taking DFT readings, it is recommended that no readings are taken within 25 mm of the edge of an I section or within 25 mm of the join of flange to web of an I section.

The average dry film thickness (DFT) applied to each steel section shall be greater than or equal to the specified dry film thickness.

Where any single thickness reading is found to be less than 80 % of the specified DFT, a further three readings shall be taken within 200 to 300 mm around the area of the low reading. The initial reading may be considered isolated if all the additional readings are at least 80 % of the specified nominal value.

If one or more of the additional readings are less than 80 % of the specified nominal value, further readings shall be made to determine the extent of the area of under thickness. In such cases, low thickness areas identified must be brought up to the specified dry film thickness before proceeding to the next application stage.

Individual dry film thickness readings of less than 50 % of the specified DFT are not acceptable.

The maximum average measured dry film thickness of any face of any member should not exceed the absolute maximum certified thickness for the particular member shape and orientation. Consult with your Jotun representative.

Other recommended procedure based on **AMPP SSPC-PA2 (2022) Procedure for Determining Conformance to Dry Coating Thickness Requirements** –Appendix 11 Method for Measuring the Thickness of Intumescent (Fireproofing) and Cryogenic Spill Protection Coatings Applied to Load-Bearing Structural Steel Members, Fire Divisions, Pipework, and Vessels/Tanks

The dry film thickness (DFT) acceptance criteria (min / average / max) should be defined within the chosen standard for the project and is agreed by all parties in advance of project start-up.

Example:
AMPP SSPC-PA2 (2022), Appendix 11, Table A11.1 whereby the specifier may select the fireproofing thickness restriction level for a given project. Level 3 is satisfactory by Jotun.

In all cases, the average dry film thickness (DFT) applied to each steel section shall be greater than or equal to the specified dry film thickness. If required, the maximum average measured dry film thickness of any face of any member should not exceed the absolute maximum certified thickness for the particular member shape and orientation. Consult with your Jotun representative.

Correction of inadequate coating thickness

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The importance of dry film thickness checking is emphasized where inadequate thickness is identified prior to application of the topcoat.

In such situations it is a relatively simple exercise to define the extent of the deficient area(s) and to apply further coat(s) of intumescent product to bring the overall thickness up to acceptable standards.

If low thickness is not detected until after the topcoat has been applied the topcoat must be completely removed and apply further coat(s) of intumescent product to bring up to specification. Where the intumescent coating thickness exceeds the limits stated in the manufacturer's recommendations, guidance must be obtained from the manufacturer.

Ventilation

Sufficient ventilation is very important to ensure proper drying/curing of the film.

Pre-commissioning considerations

Off-site application

Lifting and Transportation

Refer to TSS-TI-119 for lifting and transportation guidance. Contact your local Jotun office for further information.

Drying and Curing time

Substrate temperature	10 °C	15 °C	23 °C	40 °C
Surface (touch) dry	14 h	12 h	8 h	3 h
Dried to handle	30 h	16 h	16 h	8 h
Dry to over coat, minimum	8 h	6 h	4 h	4 h
Dried/cured for service	30 h	24 h	24 h	16 h

Dry to overcoat minimum is with self. See additional guidance for Topcoating.
For maximum overcoating intervals, refer to the Application Guide (AG) for this product.

All drying times have been measured at a wet film thickness of 4000 µm under controlled temperature and relative humidity below 85 %.

Topcoating:
The minimum overcoating interval of this product with approved topcoats is 16 hours. The system should be dry to handle and coating thickness gauge should not to leave an indentation on the coating. Prior to application of topcoat, the applicator must ensure that the specified dry film thickness has been achieved.

The product can be applied at minimum temperatures down to 5 °C (41 °F). For optimum application and drying, steel and air temperatures should be above 10 °C (50 °F).

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

Dried to handle: Minimum time before the coated objects can be handled without physical damage.

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

Dried/cured for service: Minimum time before the coating can be permanently exposed to the intended environment/medium.

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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 cleaning 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	10 °C	15 °C	23 °C	40 °C
Itself	extended	extended	extended	extended
acrylic	7 d	7 d	7 d	7 d
polyurethane	14 d	14 d	14 d	14 d
polysiloxane	14 d	14 d	14 d	14 d

Refer to your Jotun representative for a detailed fire protection specification including approved primer and topcoat systems.

The maximum over coating times depend on the environmental exposure conditions, type of topcoat, and other factors. This product has tested ability to withstand severe weather and environmental exposure to stringent industry standards. The product is only available in a light grey colour, therefore generally a topcoat is used to meet owners' colour scheme.

Topcoat is recommended for specific areas with aesthetic requirements and high UV exposure. (A general characteristic of all epoxy coatings is chalking with prolonged periods of high UV and moisture exposure.)

Extended - Where an extended overcoating time is stated, the product can be overcoated after an indefinite time period, however the anticipated level of intercoat adhesion can only be achieved through good painting practice. The maximum over coating time depends on environmental exposure conditions, type of topcoat, and other factors. If the surface has signs of chalking or contamination, surface treatment such as thorough sandpapering followed by thorough fresh water washing should be employed. Alkaline detergent should be used to remove heavy contamination.

Exceeding maximum over coating interval of primers

For maximum over coating intervals of approved Jotun primers when used with this product, refer to the approved primer's Application Guide (AG).

Always observe the maximum over coating intervals. Any primer surface which has surface chalking or has exceeded its maximum over coating interval will need to be treated by appropriate abrasion method, e.g. Sweep-blasting, to ensure good intercoat adhesion. It is recommended that a site adhesion test patch, together with a coating survey, is done after secondary surface preparation of the primer.

Corroded and damaged areas should be blast cleaned back to Sa 2½ (ISO 8501-1) and primer re-applied.

Where the above is not possible, surface treatment such as mechanical grinding/disking or very thorough sand papering should be employed. Use suitable sand paper grade of P100 and P120. Polishing of surface must be avoided and frequent changes of the abrasive papers to be made for a matt surface. Followed by thorough fresh water washing to remove all dust. Surface to be thoroughly dried out prior to the application of this product.

Zinc epoxy primers which have been exposed to high humidity or outdoor weathering, may have zinc salts (white rust) formation on the surface which is detrimental to adhesion. Zinc salts must be removed prior to application of this product. Careful sanding and/or high pressure water-washing at a minimum of 170 bar (2500 psi) to remove zinc salts. An epoxy tie coat may be applied over the epoxy zinc primer to prevent salts forming.

Depending on primer type, conditions and site practicalities, surface treatment and application of an approved epoxy tie coat may be recommended before application of this product.

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Other conditions that can affect drying / curing / over coating

Environments and Topcoating

Only topcoats approved by Jotun can be applied over this product. Contact Jotun's technical department for the approved topcoats. Prior to application of the topcoat ensure that the product has been applied to the specified DFT. The surface must be clean, dry and free of contamination before applying the topcoat.

• For exposure up to corrosivity category C5 external (ISO 12944-2) topcoat is optional. Where a durable aesthetic finish and colour scheme is required, it is recommended to overcoat with an approved topcoat at a minimum of 50 µm dry film thickness.
• It is recommended that the total dft of the topcoat does not exceed 150 µm.

Site conditions and practicalities

It is recommended that this product is overcoated when sufficiently cured and before the surface is subjected to surface contamination. The use of an epoxy tie-coat may have to be considered before application of topcoat when assessing site practicalities and application practice.

It is good general practice for a 16-hour cure period for all epoxy primers which have been applied at temperatures >10 °C.

Amine bloom / Sweating

Amine bloom is also referred to as amine blushing or sweating, which is an undesired chemical reaction with water on the coating surface that can lead to insufficient adhesion of the subsequent coat. Contributing factors can be lower than minimum temperature during curing, high content of carbon dioxide in the air, high relative humidity and condensation.

If amine bloom is suspected, wash with warm alkaline detergent and/or high pressure fresh water washing to remove all contaminants. Light abrasion of the surface and removal of dust before overcoating will further secure good intrcoat adhesion.

Water/Moisture contamination

When uncured material is subjected to rain or excessive condensation, water may be absorbed. Also, amine blushing may form on the surface adversely affecting the inter-coat adhesion.

In case of water contamination of an uncured product, the following action should be taken;
• Allow the material to cure
• Dry and wipe the surface with Jotun Thinner No 7, No 10 or No 17
• High pressure fresh water washing may also be done
• Remove and replace any uncured material

Removal

Overspray and unwanted coated surfaces with this product should be removed with a scraper whilst wet. Substrate should immediately be cleaned by Jotun Thinner No. 7, Jotun Thinner No. 10 or Jotun Thinner No. 17, removing all residue.

Once applied and cured this product can be removed if required.
• A disc grinder should be used to cut through the coating to the substrate
• The material can then be removed with a pneumatic chisel, or manually using a hammer and chisel. Care should be taken not to damage the steel substrate
• Edges of repair area to be feathered back
• Other means of removal may also be considered, please consult Jotun Technical Sales Support

Repair of coating system

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Repair of damaged areas requires complete removal of those areas and restoration of the complete system 'as new'. This includes surface preparation and primer installation.

The following repair procedure is recommended:

• The adjacent border area should be checked to confirm integrity of material and adhesion.
• Mark out the area to be repaired. Masking should be done to protect the surrounding area in a square or rectangular shape.
• Any defective material should be removed using appropriate tools.
• Squaring the repair area is recommended.
• Edges of the repair area to be feathered back.
• The surrounding area of up to 50-75 mm should be roughened using a grinding disc to ensure sound adhesion of the new coat of this product. After roughening, use Jotun Thinner No. 7, Jotun Thinner No. 10 or Jotun Thinner No. 17, to ensure the area is clean.
• Restore the cleanliness, degree of surface preparation and surface roughness of the substrate as per the original specification requirement.
• Apply the product to the repair area applied to the same coating thickness as existing. Ensure the dry film thickness on the repair area meets the specification and the fire protection requirement.

Repair of small areas:

• Areas less than 10 cm² may be prepared by power tool cleaning as prescribed in SSPC SP11 with 50 µm surface profile. For final exposure in corrosivity categories C1 to C3 (ISO 12944-2), SteelMaster 1200HPE may be applied direct to the substrate, otherwise apply an approved primer. On the clean dry surface apply this product to specified dft.
• Areas larger than 10 cm² but less than 1 m² may be prepared by power tool cleaning as prescribed in SSPC SP 11 with 50 µm surface profile. The affected area should be primed using the approved repair primer followed by this product to the specified dft.
• Areas greater than 1 m² may be prepared by blast cleaning the affected area to Sa 2½ (ISO 8501-1) using abrasive media suitable to achieve a sharp and angular surface profile. The recommended surface profile is 50-75 µm, grade Fine to Medium G; Ry 5 (ISO 8503-1). Power tools should not be used as a primary surface preparation method for large areas.
• Apply the original specified primer to the specified dft.
• Apply this product at the specified thickness as per the Application Guide to the repair area including the feathered edges.
• Apply the specified topcoat at the recommended thickness as per the product application instructions.

Weld cutback

The product should be removed prior to welding. The extent of the cutback varies depending on the nature of welding operation.

•For small weld operations, e.g. welding of clips or similar fixation, initially remove 100-150 mm in all directions from welding area, on both sides of the steel. After completion of welding, if any blistering or discoloration of the product has occurred, the cutback should be extended 50 mm beyond these defects.
•For larger weld operations, e.g. welding of a pipe support or similar structure, initially cutback 200-250 mm in all directions from welding area, on both sides of the steel. After completion of welding, if any blistering or discoloration of the product has occurred, the cutback should be extended 75 mm beyond these defects.
•In the case of welding of pre-coated structure members, a welding cutback allowance is recommended to avoid removing and damaging the applied product, initially a cutback of 300-350 mm either side of the weld is required for welding processes which do not require preheat.

For welding processes which require preheat, the cutback allowance depends on the preheat temperature, method of preheat, duration and mass of steel at weld junction. The following recommendation is provided.
• Preheating temperature of 100°C
  - Duration of 4 to 8 hours, cutback of 0.75 m.
  - Duration of 9 to 12 hours, cutback of 1.00 m.
• Preheating temperature of 150°C
  - Duration of 4 to 8 hours, cutback of 0.75 to 1.00 m.
  - Duration of 9 to 12 hours, cutback of 1.00 to 1.25 m.

After welding has taken place, the surrounding material should show no sign of discolouration or damage. If any blistering or discolouration of the product has occurred, the affected material should be removed back to sound material.

Junction with acrylic SteelMaster

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ASFP Technical Guidance Document 8 outlines that when a reactive coating fire protection system (intumescent) is to be applied next to an existing reactive coating, best guidance is to have a butt joint between the two systems.

Good practice is to coat steel members with one product and to use the natural junction at a connection point of members to have a butt joint between intumescent systems.

Where SteelMaster 1200HPE may interface with a Jotun single pack acrylic intumescent coating, such as SteelMaster 1200WF, Jotun recommends a butt joint, although a slight overlap (20mm) of the acrylic intumescent onto SteelMaster 1200HPE is acceptable. Masking off at the interface is recommended to achieve a tidy joint. It is widely recognised as good coating practice not to overcoat acrylic single pack paint with two component epoxy paint due to epoxy products have greater tension in the dry film compared to acrylic coatings, therefore, it is not recommended for SteelMaster 1200HPE to overlap onto a single pack acrylic intumescent.

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

When applicable, products primarily meant for use as primers or antifoulings may have slight colour variations from batch to batch. Such products and epoxy based products used as a finish coat may chalk when exposed to sunlight and weathering.

Colour and gloss retention on topcoats/finish coats may vary depending on type of colour, exposure environment such as temperature, UV intensity etc., application quality and generic type of paint. Contact your local Jotun office for further information.

Reference to related documents

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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
m^2/l = square metres per litre
mg/m^2 = milligrams per square metre
psi = unit of pressure, pounds/$inch^2$
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
ASFP = Association for Specialist Fire Protection

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.

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