SteelMaster 900WF

Product description

This is a one component waterborne acrylic thin film intumescent coating. Independently approved for fire protection of structural steel exposed to cellulosic fire. Can be used as mid coat or finish coat in atmospheric environments. Suitable on approved primers on carbon 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.

Metal surface preparation refers to requirements for preparation prior to application of approved primers. All steel must be physically clean, dry and free from mud, concrete slurry, grease, zinc salts and other forms of contamination. Complete washing down of steelwork may be necessary. Oil & grease should be removed in accordance with SSPSC SP1 solvent cleaning.
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.

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.

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.

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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 before degradation of the surface occurs.

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.

Hand and Power Tool Cleaning

Power tool cleaning

Power tool cleaning 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). 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.

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

After removal of excess zinc and surface defects the area to be coated shall be degreased according to ISO 12944-4, section 6.2.4 Alkaline cleaning. The surface shall be sweep 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 nonmetallic abrasive media. As a guide, a surface profile 25-55 µm, grade Fine to Medium G; Ry5 (ISO 8503-2) should be achieved. Care must be exercised when sweep blasting. The zinc coating thickness should be reduced as little as possible, preferably not more than 10 µm. Finished surfaces shall be dull, profiled and show no areas of shiny metal.

An approved epoxy primer must be applied prior to the SteelMaster system.

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Coated surfaces

Verification of existing coatings including primers

This product must always be applied over a primer approved by Jotun. 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
• 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

Should the primer's suitability for overcoating be in doubt in any way, for example, primer type unknown, primer not approved, excessive dry film thickness, surface contamination, surface glossiness etc, Jotun must be consulted prior to the application of this product.

A primer without a matt finish may require sanding to improve hold up for the first coat of intumescent.

Contamination on primer may lead to slipping of intumescent during first coat application. It is the responsibility of the applicator to assess the condition of the primer coating before intumescent is applied. An on-site evaluation patch must be made to confirm surface preparation and adhesion before main application work commences.

Primer system maximum dry film thickness (DFT)

The typical primer thickness is 75 µm. Primer DFT may vary in relation to the corrosive category and recommended total DFT required for corrosion protection with topcoat in consideration of ISO 12944-2/5.

The maximum recommended dry film thickness of the primer system is 150 µm depending on the type of product used. If the maximum primer thickness exceeds the recommended DFT, consult with Jotun technical department.

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

When applied on coatings past maximum intercoating interval light abrading may be required to achieve proper intercoat adhesion.

Organic primers/intermediates

Clean, dry and undamaged compatible coating

Areas with breakdown, damage, etc. must be prepared to the specified standard of blast cleaning to Sa 2½ (ISO 8501-1) or power tool cleaning to minimum St 3 (for small areas) and a coat of primer touched up before the product is applied.

Compatibility of intumescent coatings with zinc rich primers

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The product must not be applied directly over zinc primers. An epoxy tie coat must be applied prior to the application of the SteelMaster system. The recommended Jotun approved tie coat is Penguard Primer or Penguard Tiecoat 100 applied at a DFT of 25-40 µm.

Zinc rich primers, usually based on epoxy resin or silicate binders, are often used as corrosion protection coatings on structural steelwork. Weathering or prolonged exposure of the zinc primer will lead to the formation of zinc salts (white rust) on the surface of the coating which is detrimental to adhesion. Zinc salts must be removed prior to application of the epoxy tie coat. Hard bristle brushes, 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.

In all cases, the intumescent coating manufacturer must be consulted to confirm the compatibility of the primer system with the intumescent system and, where applicable, the tie coat.

Application

Environmental conditions

Intumescent coatings require a greater degree of environmental monitoring than conventional coatings. Intumescent coatings are moisture sensitive and must be protected against high humidity, rain and consequent water ponding both during application, transportation or during storage prior to being erected at site. Otherwise blistering/delamination will occur.

Where a topcoat is specified, application must occur as soon as the final coat of this product is fully through dry. During transportation or construction, exposed SteelMaster must be protected from weather with a topcoat.

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 - 45	°C
Substrate temperature	5 - 45	°C
Relative Humidity (RH)	10 - 80	%

The following restrictions must be observed:

- For optimum application and drying, the air and substrate temperature should be greater than 10°C (50°F) and relative humidity below 80%.
- 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

It is advisable to apply the product to the steelwork when the building has been made water tight and dry. Where a topcoat is specified, application must take place in accordance with the recommended overcoating interval.

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.

Application / drying temperatures down to 5°C and/or at higher relative humidity up to 85%, will retard drying and could compromise overcoating interval and inter-coat adhesion. Good air flow and ventilation should be maintained to improve drying and overcoat properties. Application at this temperature can result in hairline cracking in internal angles. In such cases it is recommended to extend overcoating times and/or reduce wet film thickness. This cracking is not detrimental to the fire performance of SteelMaster and are easily repaired for aesthetics. The same is applicable when applying topcoats. 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.

Application in direct sunlight and high temperatures is not recommend. At temperatures above 40°C surface defects, such as wrinkling, can be expected to occur. At these conditions, application in shaded and protected

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areas, at different times of the day, or a reduced applied film thickness are advised.

Material storage conditions

When storing and transporting, the temperature must be between 5 °C (41 °F) and 35 °C (95 °F). It is the responsibility of the contractor / applicator to ensure that the product is stored within the correct parameters. Outside of this, it is advisable to use climatic control. Protect from freezing at all times during storage and transport. If frozen this product shall be discarded in accordance with local regulations. Do not thaw frozen material and apply. It is the applicator's responsibility to monitor these conditions and to maintain auditable records to demonstrate compliance.

Product mixing

Product mixing

Single pack

This product is a high viscosity product. It is possible that this may be affected when stored. It is a non-Newtonian liquid, which means that the viscosity of the product can change when under force to a shear stress – e.g. high-speed mixing. The product should be mixed with a powered mechanical paint mixer with a helical-ribbon impeller that is clean and fit for purpose. Mechanically mix for about 1-2 minutes to ensure that the product is mixed to a uniform consistency and to fully incorporate all of the ingredients into a homogenous mixture. Care should be taken to ensure no aeration or air bubbles are formed during the mixing process, especially in warmer climates.

Manual mixing is not recommended.

Thinner/Cleaning solvent

Thinner: Fresh water

The product is ready for use. Thinning will affect sag resistance and can delay drying times.

Cleaning solvent: Fresh water

Equipment cleaning

It is recommended as best practice to use airless spray equipment suited exclusively for spraying waterborne coatings. Although this is not mandatory, well maintained airless spray equipment will perform well. Alternating use of solvent and water borne coatings need conditioning of the spray equipment to avoid solvent contamination of the water borne paint. All equipment containing solvent in the pump, hoses and gun must be thoroughly cleaned. Before spraying, circulate a suitable thinner such as Jotun Thinner No. 17 through the equipment, hoses and gun until such time clean solvent flows through them. This should be followed by flushing with clean fresh water through the pump, hoses and gun until you see clean water flow. Care should be taken to ensure no water is mixed with this product when the paint is circulated through the pump, hose and gun. Allow some of the product to flow out into the waste container to ensure that any product mixed with water is not used for spraying. Mixing of even small quantity of water with Steelaster can affect the spray properties and drying of the product.

Application data

Spray application

Airless Spray Equipment

Pump ratio (minimum) :	45:1
Pressure at nozzle (minimum) :	200 bar/2900 psi
Nozzle tip (inch/1000) :	19-23

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Nozzle output (litres/minute) :	1.9-2.6
Filters (mesh) :	Remove filters
Material hose length :	Maximum 60 meters

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

Other application tools

Brush application

Brush application is only for small areas 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.

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. It may also be necessary to apply intumescent in a series of thinner coats. 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.

Film thickness per coat

Typical recommended specification range

Dry film thickness	220	-	730	µm
Wet film thickness	300	-	1000	µm

Single coat system or final coat on a multi-coat system may be applied up 1500um WFT, depending upon steelwork configuration, geometry, primer used and ambient conditions. 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.

Note: The film thickness is only achievable by airless spray application in one coat.

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Single coat application
The recommended method of application is by heavy-duty airless spray equipment. A typical wet film thickness (WFT) of not more than 1000 µm per coat is recommended. A maximum single coat of 1500 um WFT is possible but care must be taken at the extremes of acceptable conditions (hot, cold, humid etc.)
The most suitable method and technique will depend on a number of factors such as total coating thickness required, configuration of the steelwork, access to the steelwork, programming of the project, presence of other trade activity on site, etc.

Multi-coat application method
Where the specified dry film thickness (DFT) is greater than 1000 µm, apply two or more coats to build up the total specified DFT. Keep the WFT to a maximum of 1000 µm per coat. Follow the recommended over coating intervals between coats as given in the product technical data sheet. Drying time and over coating intervals will depend on local environmental conditions.

A maximum coat of 1500 µm WFT is possible for the final coat on a multi application system, however this will depend on the local ambient conditions. In direct sunlight, extreme hot/ cold temperatures and high humidity, this is not recommended and may results in surface drying defects of the final coating finish.

Where the substrate temperature during application is likely to exceed 40 ºC or is in direct sunlight, it is recommended to apply a thinner first coat at 400 µm, followed by subsequent coats at 600-700 µm. Allow to dry as per recommended minimum drying time between coats mentioned in the product technical data sheet. Apply further coats to build up the DFT to the specified thickness as per loading table/project specification. Wherever possible during application and drying, coated steel to be kept in dry, shaded areas to minimise surface drying defects.

Where a decorative or bespoke finish is needed, further measures may be required to achieve the desired finish. These may include: application in shade, application at cooler times of the day and reduced WFT per coat. In these cases, light abrasion before top coating can also improve overall finish to the coating system.

The over coating time between each coat depends on the total DFT required to be built up as a system. The actual drying time can vary depending on environmental conditions such as air temperature, relative humidity, weather conditions, ventilation and also the number of coats, total dry film thickness applied, etc. Water ponding must be avoided. Early exposure of this product to moisture, rainwater, high humidity or condensation will cause defects such as blistering and/or delamination.

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.
Fast drying paints may give incorrect (too low) readings resulting in excessive dry film thickness. For multi layer physically drying (resoluble) coating systems the wet film thickness comb may give too high readings resulting in too low dry film thickness of the intermediate and top coats.
Use a wet-to-dry film calculation table (available on the Jotun Web site) to calculate the required wet film thickness per coat.

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

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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.

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.

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Correction of inadequate coating thickness

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.

With little air movement, it is possible that the local relative humidity in the vicinity of the coated steel will increase to unacceptable levels, resulting in extended drying/overcoating times.

Forced ventilation such as portable fans is permissible, however not in direct contact with the freshly applied product as it can lead to surface skinning, wrinkling of the coating or other related defects.

Waterborne coatings must be protected from condensation and water during application and drying. They must always be protected from pooling or running water, driving rain, high humidity/condensation even when topcoated. If in doubt contact Jotun.

Coating loss

The consumption of paint should be controlled carefully, with thorough planning and a practical approach to reducing loss. Application of liquid coatings will result in some material loss. Understanding the ways that coating can be lost during the application process, and making appropriate changes, can help reducing material loss.
Some of the factors that can influence the loss of coating material are:
- type of spray gun/unit used
- air pressure used for airless pump or for atomization
- orifice size of the spray tip or nozzle
- fan width of the spray tip or nozzle
- the amount of thinner added
- the distance between spray gun and substrate
- the shape of the substrate target
- environmental conditions such as wind and air temperature

Pre-commissioning considerations

Off-site application

During the following given operations, damage to the coating system can occur particularly between in-shop applications through to final erection on site. For transportation of the applied sections from the fabrication yard to the erection site, the complete system with approved topcoat must be applied. Systems must be allowed to hard dry and approved before movement to site.

Off-site application with waterborne SteelMaster is not recommended for regions/countries that experience frequent rainfall conditions unless special protective measures are taken with planning.

Handling
• Coatings should be sufficiently dry before handling and members should be lifted at designated lifting points or by using lifting brackets where available.
• The use of appropriate lifting chains or slings to be considered to minimise damage to coated steel.
• Single lift should be used unless specially designed multi-lift cradles are available.
• It should be noted that the potential for damage increases with coating thickness, as does the difficulty of repair.

Transportation
• The loading of trailers should be carefully planned, with timber supports positioned, where possible, in uncoated contact areas (e.g. areas to receive bolted connections). Where contact of supports with coated areas is unavoidable, members should be supported on their toes to minimise the contact area.
• Members which may fill with water should be prevented from doing so by the use of covers which will not react with the intumescent coating system, should they come into contact.
• Loads are best secured with the careful use of clean chains and it is advised that loaders wear overshoes and where possible avoid walking on coated surfaces in order to minimise contamination.

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Storage
• Where site storage is unavoidable, similar care should be taken in the handling and support of the coated steel using the same lifting and support points as those used in transportation.
• The steelwork must be stored off ground and under cover both at the application facility and once transported to site. Any temporary covers must allow ventilation to prevent a humid atmosphere building up around the steelwork.
• Once dried occasional condensation is acceptable but this must not amount to ponding or running water. Protect from frost and snow.
• Storage areas should be roped off with signage clearly explaining the need to avoid contamination and mechanical damage to the coated steelwork.

Drying and Curing time

Substrate temperature	10 °C	23 °C	40 °C
Surface (touch) dry	4 h	2 h	1 h
Dried to handle	16 h	4 h	3 h
Dry to over coat, minimum	16 h	6 h	3 h

Dry to overcoat minimum is with self. See additional guidance for Topcoating.
All drying times have been measured at a wet film thickness of 1000 µm under controlled temperature and relative humidity below 80 %.

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

Topcoating
The minimum overcoating interval of this product with an approved topcoat is 24 hours.
The system should be dry to handle and coating thickness gauge should not leave an indentation on the coating. Prior to application of topcoat, the applicator must ensure that the specified dry film thickness has been achieved.

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.

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	23 °C	40 °C
Itself	extended	extended	extended

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

Where a topcoat is specified, application must occur as soon as the final coat of this product is fully through dry. During transportation or construction, exposed SteelMaster must be protected from weather with a topcoat.

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 cleaning should be employed. Alkaline detergent should be used to remove heavy contamination.

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.

Topcoat will normally be applied as per specification.
- For exposure to corrosivity category C1 (ISO 12944-2) topcoat not necessary if intumescent is applied and maintained in a C1 environment.
- For exposure to corrosivity category C2 (ISO 12944-2) a minimum of one coat of topcoat at 50 µm DFT is recommended.
- For corrosivity category C3 (ISO 12944-2) Jotun recommends two coats of topcoat at 50 µm DFT per coat.
- It is recommended that the total DFT of the topcoat does not exceed 150 µm.
- During transportation or construction, SteelMaster must be protected from weather with the application of a topcoat. This is applicable for perimeter steelwork and intumescent systems destined for a C1 (ISO 12944-2) internal environment that are exposed to a higher environment category during the construction phase. There must be no ponding or running water on the steelwork.

Apply using an airless spray machine and follow the instructions contained on the technical data sheets. Topcoat can be applied on site by brush/roller where there is no access or limited access and shall be recorded in the reports.
It is important that the topcoat is applied at the specified DFT film thickness. To achieve a uniform finish on an uneven surface is difficult and may require additional coats. As a guide the wet film thickness of the topcoat should be measured at regular intervals to ensure the specified dry film thickness is obtained.

Internal angles & over application
In areas such as corners and internal angles of open sections, it is possible that hairline cracks could occur. Excessive film thickness will lead to extended drying and may lead to surface drying defects. Applied film thickness and drying conditions will affect the rate at which these may develop.

To prevent these effects, it will be necessary to control the film thickness in these areas and the applied wet film thickness per coat should be reduced from the recommended maximum. Particular caution should be exercised when coating narrow-webbed sections.

This cracking is not detrimental to the fire performance of SteelMaster and are easily repaired for aesthetics. Lightly abrade the area and apply intumescent by brush and/or putty knife to fill in the gap. Where a topcoat is specified, stripe coat of topcoat followed by full coat of topcoat.

Repair of coating system

This Application Guide supersedes those previously issued.
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.
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It is always recommended that all types of damages are repaired at the earliest opportunity to avoid any moisture ingress that can lead to degradation of the intumescent coating. The repair method will depend on the extent of damage.

This repair procedure applies to these types of example scenarios:
a) Areas of mechanical damages due to site works
b) Coating damaged due to fixing additional brackets by welding
c) Burn damages due to welding
d) Any other damages down to bare steel
e) SteelMaster surface damages
f) Damages caused by high humidity, moisture, entrapped air, etc causing blistering

Damage to Topcoat only
• If only the topcoat is damaged, then remove loose unsound coatings and feather the rough edges.
• Ensure the surface is free from contamination and dry before applying the topcoat to the original specified dry film thickness, following the topcoat product application guide.

Damage to SteelMaster coating
• Depending on the extent of damage, lightly abrade the surface or "cut out'' as described below.
• Cut out the SteelMaster coating at least 50 mm from the damaged/heat affected area, in all directions back to sound edge (large enough to allow manual/mechanical preparation).
• In case of scattered spot blistering/damages caused due to water ingress, high humidity or heat, the blisters need to be cut open. For extensive blistering or damages of the SteelMaster, the coating needs to be removed to bare/primed steel.
• Sand down the affected area and feather the edges of each coating layer.
• Repair area is to be clean, dry and free from any contamination before painting.
• Ensure the primer is not damaged. If the primer is damaged a priming coat will be necessary.
• Apply SteelMaster to the original specified film thickness for fire protection. May require multiple coats depending on application method and required thickness.
• Ensure SteelMaster has dried sufficiently as per product application guide before overcoating.
• Apply the topcoat to the original specified dry film thickness, following the topcoat product application guide.
• When applying SteelMaster, the intumescent coating must not be applied over top coated areas. Ensure to limit the primer / SteelMaster / topcoat within its own layers of coating on feathered edges.

Damage to the coating system that exposes bare steel
• Cut out the SteelMaster coating at least 50 mm from the damaged/heat affected area, in all directions back to sound edge (large enough to allow manual/mechanical preparation).
• Damage to small areas may be power tool cleaned to St 3 (ISO 8501-1) to a bare metal finish with a surface profile. Large areas of damage should be prepared by dry abrasive blast cleaned to Sa 2½ (ISO 8501-1) preferably by the use of vacuum blasting equipment to avoid damage to intact coating.
• Edges of intact coating around damage area shall be feathered to ensure a smooth transition from the coating to the prepared steel.
• For spray application, the surrounding area must be covered so that overspray to the sound coating does not occur during repair application.
• Substrate and repair area is to be clean, dry and free from any contamination before painting.
• Apply original primer or the recommended repair primer to the specified dry film thickness, following the primer product application guide.
• Apply SteelMaster to the original specified film thickness for fire protection. May required multiple coats depending on application method and required thickness.
• Ensure SteelMaster has dried sufficiently as per product application guide before overcoating.
• Apply the topcoat to the original specified dry film thickness, following the topcoat product application guide.
• Ensure to limit the primer / SteelMaster / topcoat within its own layers of coating on feathered edges.

Repair Primer:
Approved primer to patch prime exposed steel applied at a typical DFT of 75-100 µm or as per original specified DFT. Care should be taken to avoid overlap of primer onto the adjacent SteelMaster.

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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

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

TDS = Technical Data Sheet
AG = Application Guide
SDS = Safety Data Sheet
VOC = Volatile Organic Compound
MCI = Jotun Multi Colour Industry (tinted colour)

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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

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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