

Jotachar 1709

Product description

This is a two component solvent free amine cured epoxy intumescent coating. Specially designed to provide passive fire protection for steel in hydrocarbon pool fires for different types of structures and equipment. No additional reinforcing mesh is required. To be used as mid coat as part of a complete system in atmospheric environments. Suitable on approved primers on carbon steel, hot dipped galvanised steel and stainless 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 in smooth and safe use, and optimum service of the product. Adherence to the guidelines does not relieve the applicator of responsibility for ensuring that the work meets specification requirements. Jotun's 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.

Process sequence

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

Soluble salts removal

Soluble salts have a negative impact on the coating systems performance, especially when immersed. Jotun recommends the following maximum soluble salts (sampled and measured as per ISO 8502-6 and -9) content on a surface; 80 mg NaCl / m² unless otherwise specified.

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.

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.

The recommended surface profile is 50-75 µm, grade Fine to Medium G; Ry 5 (ISO 8503-1). 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. A qualified wet blast primer must be used with this method of surface preparation.

Hydro-blasting (high pressure water jetting)

Hydro-blasting may be an acceptable method of surface preparation for previously coated surfaces. 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. A qualified wet blast primer must be used with this method of surface preparation.

Hand and Power Tool Cleaning

Power tool cleaning

Power tool cleaning to St 3 (ISO8501-1) is the removal of all loose mill scale, loose rust, loose paint and other loose detrimental foreign matter. St 3 (ISO8501-1) 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.

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.

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 6.1.4 Alkaline Cleaning. The galvanised surface shall be dry abrasive brush off blast cleaned with the nozzle angle at 45-60° from perpendicular at reduced nozzle pressure to create a sharp and angular surface profile using approved non-metallic abrasive media. As a guide, a surface profile 35 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.

Stainless steel

Abrasive blast cleaning

After pre-treatment is complete, the surface shall be sweep blasted (brush off) to cleanliness corresponding to Sa 1 (ISO 8501-1) using non-metallic, abrasive media which is suitable to achieve a sharp and angular surface profile. Sweep (brush off) blast cleaning is defined as; the removal of all loose mill scale, loose rust and loose coating with abrasive blast cleaning. As a guide, the surface profile should not be less than 35 µm (1.4 mils).

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

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 the Jotachar product range. 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 or www.jotun.com. 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 stated in manufacturer's TDS should not be exceeded
- 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

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

Epoxy primer, including zinc phosphate and phenolic epoxy primers: 50-100 µm (2-4 mils), maximum 125 µm (5 mils) in overlap areas.

Surface tolerant epoxy: 100-150 µm (4-6 mils), maximum 175 µm (7 mils) in overlap areas.

Epoxy zinc rich primers: 50-75 µm (2-3 mils), maximum 100 µm (4 mils) in overlap areas.

Epoxy zinc rich primers and epoxy tie coat: 75-110 µm (3-4.4 mils), maximum 125 µm (5 mils) in overlap areas.

Zinc silicate primer and tie coat: 75-110 µm (3-4.4 mils), maximum 125 µm (5 mils) in overlap areas.

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

It is the responsibility of the PFP applicator installing any version of the Jotachar product range to assess the condition of the primer coating before the Jotachar product is applied. Any defective areas must be repaired prior to application of the Jotachar product.

Areas of high primer thickness should be reduced to the recommended thickness as per the above guideline using medium grade emery paper or other suitable methods followed by fresh water washing to remove dust/contaminants. Some primers/intermediates may have a semi gloss finish. The higher gloss level of these primers will mean a reduction in the achievable wet film thickness of the 1st applied wet coat of Jotachar. Any reduction will depend on the primer chosen. A test area should be applied to determine the achievable wet film thickness of the first application. Ensure the surface is clean and dry before application of the Jotachar product.

The generic type primers systems approved are found on the TDS. Note that inorganic zinc silicate is only approved when over coated with an epoxy tie coat. The dry film thickness of the primer system should be as per the product specification, and above guideline.

For further advice please contact your local Jotun office.

Refer to Jotun's representative for an approved specification with the entire coating system and dry film thickness' as well as a list of approved primer systems.

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.

Organic primers/intermediates

Clean, dry and undamaged compatible coating (ISO 12944-5 6.1)

Shop primers

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 roughness as recommended.

Inorganic zinc silicates

Due to the special properties of inorganic zinc silicate primers the following should be considered:

- The applied film of inorganic zinc silicate should be fully cured. Curing should be verified by MEK test in accordance to ASTM D4752 with a minimum resistance rating of '4'
- The maximum dry film thickness of inorganic zinc silicate should not exceed 75 µm
- An epoxy tie-coat must be used, 35 µm dry film thickness is recommended
- Mechanical damages at edges should be repaired using a zinc rich epoxy

Application

Apply the initial primer coating within 4 hours of completing the blast cleaning and before degradation of the surface occurs.

Jotun highly recommends that this Jotachar product is applied by heated twin feed spray (plural component) equipment to ensure high productivity and minimum wastage.

ALL SPRAY EQUIPMENT USED WITH JOTACHAR PRODUCTS MUST BE APPROVED BY JOTUN TECHNICAL SALES SUPPORT TEAM.

Coat back

Whilst there is no specific standard for coatbacks, in case of pipe racks, API 2218 states that "If conduction into primary beams is a concern the fireproofing can be extended back 18 in. (450 mm) from the primary beams." If a different coat back is required by the project specification or classification societies, then consultation with the design engineers or classification society should be considered.

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 - 50 | °C |
| Substrate temperature | 5 - 60 | °C |
| Relative Humidity (RH) | 10 - 85 | % |

The following restrictions must be observed:

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

Material storage conditions

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

- General storage
- 1 °C (34 °F) minimum and 35 °C (95 °F) maximum
- Pre-heating for plural component spray application
- 20-35 °C (68 to 95 °F) for minimum 12 hours prior to use

Protect the product from frost.

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 Jotachar product in the container, changing its properties. At temperatures below 15 °C (60 °F) it is recommended to also place the spray unit in a heated, insulated container.

Product mixing

Modified airless spray and manual application

Premixing and 'thinning' is required for application with a single leg airless spray pump. A small amount of Jotun Thinner No. 29 is added (maximum 5 %) to reduce viscosity for mixing and spraying.

A high torque variable speed, paddle paint mixer (mounted on a power ram base) is required for mixing.

At ambient temperature below 20 °C (68 °F) , it is recommended to pre-heat the material up to 25-30 °C (77-86 °F) prior to mixing.

Up to 1 litre of thinner may be used per 20 kg kit of the Jotachar product. Add this into Component A and mix thoroughly. Add thinner accurately, do not add "by eye". Add component B into the component A container, scraping the sides of component B container to empty it completely. Always mix full kits when spraying. Mix the two components together until a uniform grey coloured material is obtained. During mixing, care should be taken to scrape the material from the walls of container into the center.

Care should be taken not to mix more material than can be applied within the pot life of the product. The volume solids of this Jotachar product is 100 %. In the case of 1 litre thinning, the new volume solids will be 95 %. This should be taken into account when measuring wet film thickness and calculating dry film thickness.

Product mixing ratio (by weight)

Individual components must have been stored for minimum 12 hours at 25 to 30 °C (77 to 86 °F). Stir/mix thoroughly with a power agitator before application.

| | |
|----------------------|-----------|
| Jotachar 1709 Comp A | 1 part(s) |
| Jotachar 1709 Comp B | 1 part(s) |

Product mixing

The above is true by weight and by volume

Induction time and Pot life

| Paint temperature | 15 °C | 23 °C |
|-------------------|--------|--------|
| Pot life | 75 min | 40 min |

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

Thinner/Cleaning solvent

Thinner: Jotun Thinner No. 29

Thinning is typically 2-3 % by volume for modified airless spray and manual application.

Thinning max.: 5 %

Do not thin by more than 5 %.

Cleaning solvent: Jotun Thinner No. 7

Application data

The coating of the top flanges is not required as per some project specifications. In this case, appropriate procedures should be considered and agreed on between all concerned parties to ensure correct terminations of this Jotachar product application at the top flange.

Spray application

It is possible to apply this Jotachar product in one coat up to 18 mm using a continuous application process. However, a thickness of 5.5 mm is recommended for the first coat. Subsequent applications are typically carried out after 60 minutes, subject to current ambient environmental conditions.

After spraying, immediately flush out the mixed material from the static mixer and spray line (whip end) with hot water using the flushing pump. For long time storage or maintenance of the spray unit it is recommended to use Jotun Thinner No. 7 to dissolve and flush out the material residues.

In a continuous spray application process lasting typically 2 hours, replacement of the static mixer with a freshly cleaned one is recommended to ensure ease of application.

Airless Spray Equipment

Pressure at nozzle (minimum) : 200 bar/2900 psi
Nozzle tip (inch/1000) : 31-41

Several factors influence, and need to be observed to maintain the recommended pressure at nozzle. Among factors causing pressure drop are:

- long paint- and whip hoses
- low inner diameter hoses
- high paint viscosity
- large spray nozzle size
- inadequate air capacity from compressor
- wrong or clogged filters

Modified Single Leg Airless Spray Equipment

Modified single leg airless spray pump can be used for the application of this product dependant on the following criteria being met:

- Minimum 68:1 pumping ratio
- Equipped with ram feed plate and wiper to fit the size of the drum
- The recommended fluid line I.D. is 3/4" and the length should not exceed 15 m (50 feet)
- A whip end line of 1/2" I.D. and 4.5 m (15 feet) length can be added to the spray line
- A 30-50° fan angle and 0.031" to 0.041" orifice spray tips are recommended

When using modified single leg airless spray equipment ensure the pump, lines and gun are fully flushed with thinner after spraying stops for a prolonged period.

Jotun should always be consulted regarding the suitability of any proposed equipment.

This Jotachar product can be applied at 3-5 mm thickness per coat using modified single leg airless depending on the material temperature, the thinning percentage, ambient and substrate temperature.

Plural component (Twin Pump) airless spray equipment

Spray application should not start unless the weight ratio check is within $\pm 10\%$ of the designated ratio. After checking and confirming acceptability of the mix ratio, it is not recommended to alter or change any of the operating parameters of the plural spray unit except the metering pump air motor inlet pressure. Proper atomisation should be achieved by adjusting the metering pump pressure within 200–320 bar (2900–4600 psi).

Spray application should be performed with the spray gun at right angles to the substrate. Apply in parallel paths, overlapped at 50 %, with constant speed and distance in order to achieve a uniform thickness. The spray unit delivers a high volume of material (up to 345 cm³ per cycle), the crew size should be large enough to finish the sprayed material surface by trowelling or rolling when required.

The following instructions are specified for this Jotachar product application using plural component spray equipment.

Spray equipment:

A compact unit consisting of the following major components;

- Metering pump with two equal sized liquid ends or legs, one leg for component A and one for component B (fixed ratio equipment)
- Two metering pumps with one liquid end or leg, one for component A and one for component B (Digital variable ratio equipment i.e. Graco XM)
- Two ram assisted feed plate airless supply pumps, one for each component
- Two heated and pressurised storage tanks equipped with pneumatic or electrical agitators, one for each component
- In-line electrical heaters to heat up the material components.
- Hot water circulation
- Flush pump
- Insulated heated spray line
- Remote mixing manifold and static mixer
- High pressure spray gun
- High pressure safety shut down system

Some units are also equipped with the following:

- Ratio monitoring system to shut down the unit when metering pump is out of ratio
- Optical level control for the material tanks with automatic refill

Jotun should always be consulted regarding the suitability of any proposed equipment.

Operating parameter summary

| | |
|------------------------------|--|
| Component tank temperatures | Component A: 40 °C (104 °F) Component B: 40 °C (104 °F) |
| Component tank pressures | Component A: 3 bar (44 psi) Component B: 5 bar (73 psi) |
| Component tank stirrer speed | Component A: 10 rpm Component B: 10 rpm |
| In-line heater temperatures | Component A: 40 °C (104 °F) Component B: 45 °C (113 °F) |
| Hose heater temperature | 50 - 60 °C (122 - 140 °F) |
| Temperature at nozzle | 40 - 50 °C (104 - 122 °F) |
| Metering pump pressure | 200 - 320 bar (2900 - 4600 psi) |
| Nozzle tip (inch/1000) : | 31-41 orifice 30-50 fan angle |

The above setting parameters of temperature, pressure and stirring speed are for guidance only, settings may vary depending on ambient conditions and equipment used.

Weight ratio check

Weight ratio checks procedure:

- The ratio check should only be performed once both components have attained the required temperatures to spray
- Set the metering pump air motor pressure to 2.8 bar (40 psi)
- Empty approximately 10-15 kg of component A and 10-15 kg of component B into separate, clean containers from the pressure release (dump) valves located on the mixing block, in order to remove any cold material from the lines. (This material can be used again, either back into machine or hand application)
- Weigh clean, empty containers for components A and B and record the weights
- Place the containers under the ratio check valves and open the valves at exactly the same time

- Close the valves when the Component A container is at least half full. Valves should be closed at exactly the same time
- Calculate the net weight of each component by subtracting the weight of the empty containers
- Calculate the ratio of Part A to Part B as a percentage of the total weight

Note: Some plural spray equipments have other methods of taking ratio checks. Please follow machine manufactures guidelines for taking ratio checks.

| | |
|-----------------------------------|----------------------|
| Weight of empty container | Component A : a (kg) |
| | Component B : b (kg) |
| Weight of container with Jotachar | Component A : c (kg) |
| | Component B : d (kg) |

$$\text{Weight ratio A/B} = \frac{c - a}{d - b} = X/1$$

The acceptable mix ratio range of component A to component B is $\pm 10\%$ of designated ratio

- 0.90 : 1 minimum
- 1.10 : 1 maximum

In addition to the ratio checks, it is also important to constantly check metering pump pressure gauges and the grey colour shade of the mixed Jotachar product.

Spray application technique

Spray application should be performed with the spray gun at right angles to the substrate. Apply in parallel paths, overlapped at 50 %, with constant speed and distance in order to achieve a uniform thickness.

Rolling the material with a short nap roller slightly dampened with Jotun Thinner No. 29 solvent will remove trowel marks and high points and can also be used to obtain a smooth finish. Rolling should be conducted within 30 minutes of spray application.

Trowelling may not be required providing that the material atomisation is sufficiently good enough to achieve consistent, even spray fan without fingering. Where trowelling is required, it should be conducted within 30 minutes of spray application.

Other application tools

Manual application

This Jotachar product can be applied manually, i.e. by trowel. The following instructions are specified for manual application of this Jotachar product and must be strictly adhered to.

Usually manual application requires less than a full kit of Jotachar product. Therefore, the required amounts of Component A and B should be accurately weighed according to the correct mixing ratio and thoroughly mixed. Clean and dry containers should be used.

As the mix ratio is 1 : 1 by weight it is very simple to ensure that the correct ratio is obtained. Simply ensure that equal weights of components A and B are used.

Care should be taken not to mix more material that can be applied within the pot life of this Jotachar product.

This Jotachar product is applied manually using a plastering trowel or similar and then smoothed off using a short nap roller slightly dampened with Jotun Thinner No. 29 solvent. Rolling should be conducted within 30 minutes of initial application.

Film thickness per coat

Typical recommended specification range

Dry film thickness is in the range of 5.39 mm to 21.45 mm dependent upon the fire case and project specific requirements.

Typical first coat thickness achievable is 5.5 mm.

Subsequent coats of up to 10 mm can be applied in a continuous application process, typically carried out after 60 minutes dependent on ambient conditions.

Film build is dependent upon steel configuration, geometry, ambient conditions, pump type and set up as well as primer used.

Absolute maximum DFT is the thickness at which the system can be applied without sagging or slumping.

Wet film thickness (WFT) measurement and calculation

Regular checking of wet film thickness during application is required to control the applied thickness, it is recommended to use a pre-cut bridge gauge of 50 mm width made from a putty knife to measure the wet film thickness. This Jotachar product is a solvent free epoxy of 100 % solids; applied wet film thickness will be equal to dry film thicknesses. All members of the application team (sprayer, troweller, rollers) should be using these gauges to ensure the required film thickness is achieved and maintained.

Dry film thickness (DFT) measurement

When the coating has cured the dry film thickness can be checked to ISO19840, or equivalent standard, or as per project specification. There are two principal methods for measuring the thickness of thick film epoxy PFP:

1. Destructive method

Straight holes (1.5-2 mm diameter) are drilled through the applied film of PFP to the substrate, and then the film thickness is measured using a calibrated depth gauge. The holes should be marked and repaired after the measurement.

This method is not recommended as it is time intensive and causes damage to the PFP and primer.

2. Non-destructive method

An electromagnetic or ultrasound dry film thickness gauge is used to measure the dry film thickness of the applied system. Care must be taken to follow the equipment manufacturer's instructions. Any equipment used should have a valid calibration certificate.

This is the recommended method for assessing dry film thickness of the applied system as it is fast, accurate and does not cause any damage.

Frequency of measurements

The measurements should be taken in a frequency as per the project specification requirements. It is advisable not to take any measurements within 25 mm of any edges or corners of structures. This should be considered as guidance only.

On open profile sections a minimum of one reading should be taken every linear meter along the length of each coated side.

For closed profile sections readings should be taken every linear meter on four points at equal distance around the circumference.

On flat areas (e.g. associated equipment), a minimum of two readings should be taken every one square meter.

DFT acceptance criteria

The average dry film thickness (DFT) applied to each steel section shall be greater than or equal to the specified dry film thickness. Unless otherwise specifically stated in the project specification the minimum acceptable dry film thickness at any single point should not be less than 85 % of the specified dry film thickness up to a maximum of 1.5 mm less than the specified dry film thickness.

For DFT up to and less than 10 mm the minimum allowable dry film thickness is 85 % of the specified DFT.

For DFT above 10 mm the minimum acceptable thickness is the specified DFT less 1.5 mm.

Where any single thickness reading is found to be less than 85 % or 1.5 mm of the specified DFT, a further three readings shall be taken within 200 to 300 mm around the area of the low reading. If one or more of the additional readings are less than 85 % or 1.5 mm of the specified DFT, 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.

Areas of over-application of this Jotachar product, above the specified DFT, do not normally create a problem,

providing there has not been any solvent thinning. However, the average of all readings in the defined area should not exceed the specified thickness by more than 10 % with no individual readings of more than 50 % of the specified thickness. Any areas exceeding these criteria should be confirmed with Jotun and approved by the client.

Ventilation

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

Drying and Curing time

| Substrate temperature | 5 °C | 15 °C | 23 °C | 40 °C |
|------------------------------|-------------|--------------|--------------|--------------|
| Surface (touch) dry | 6 h | 3 h | 1 h | 1 h |
| Walk-on-dry | 24 h | 12 h | 6 h | 3 h |
| Dry to over coat, minimum | 6 h | 3 h | 2 h | 1 h |
| Dried/cured for service | 24 h | 12 h | 6 h | 3 h |

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

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

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

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

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

Maximum over coating intervals

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

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

Areas for atmospheric exposure

| Average temperature during drying/curing | 5 °C | 15 °C | 23 °C | 40 °C |
|---|-------------|--------------|--------------|--------------|
| Itself | extended | extended | extended | extended |
| epoxy | extended | extended | extended | extended |
| epoxy mastic | extended | extended | extended | extended |
| polysiloxane | extended | extended | extended | extended |
| polyurethane | extended | extended | extended | extended |

This Jotachar product has the ability to withstand exposure to severe environments and weather conditions without a protective topcoat and has been tested to the most stringent industry standards. However, the product is available in a matt grey colour only, therefore, a top coat may be required to meet an owner's colour scheme.

There can also be specific areas where top coating of this Jotachar product is recommended. Examples of these are:

- Splash zone areas
- In areas of high intensity UV exposure the Jotachar product may chalk (a general characteristic of all epoxy coatings)
- Areas of high and continuous moisture exposure, such as the upper surfaces of horizontal decks and flanges

Theoretically, as long as the Jotachar product is free from chalking and other forms of contamination, there is no overcoating time limit. Practically, maximum top coating time interval depends on the type of top coat and environmental exposure, the top coat manufacturer should be consulted.

Before top coating, the surfaces should be clean, dry and free from contamination.

Excessive rolling with Jotun Thinner No. 29 solvent may cause amine blushing on the surface of the Jotachar product. The surface must be suitably washed prior to topcoat application.

Any topcoat used should be pre approved by Jotun Technical Sales Support. While the generic type of the topcoat may fit the description in the over coating table, the specific topcoat should still be tested for adhesion.

Extended - Where an extended overcoating time is stated, the product can be overcoated after an indefinite time period but the anticipated level of intercoat adhesion can only be achieved if the existing coating has been applied in accordance with good painting practices, application guide and at the specified film thickness. The maximum over coating times depend on the environmental exposure conditions, type of topcoat, and other factors. The topcoat manufacturer should be consulted.

Other conditions that can affect drying / curing / over coating

Water 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 solvent
- Remove uncured material
- Repair the affected area (As per Repair of coating system section)

Repair of coating system

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.
- Any defective material should be removed.
- Squaring the repair area is recommended if possible.
- Cut the edges of the repair area at an angle of 90°. 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 Jotachar product. After roughening use Thinner No. 7 to ensure the area is clean. Apply the Jotachar 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.
- Restore the cleanliness, degree of surface preparation and surface roughness of the substrate as per the original specification requirement.
- Repair of small areas:
 1. Areas less than 10 cm² may be prepared by power tool cleaning as prescribed in SSPC SP11. On the clean dry surface apply the Jotachar product to specified dft.
 2. Areas larger than 10 cm² but less than 1 m² may be prepared by power tool cleaning as prescribed in SSPC SP11. The effected area should be primed using the approved repair primer followed by the Jotachar product to the specified dft.
 3. Areas greater than 1 m² maybe prepared by blast cleaning the effected area to Sa 2½. Apply one coat of the original specified primer to the specified dft. Apply the Jotachar product to the specified dft.
- Power tools should not be used as a primary surface preparation method for large areas.
- Apply the Jotachar product at the specified thickness as per the product application instructions to the repair

area including a 50-75 mm overlap area onto the existing coating.

- Manual application is acceptable at the repair areas providing that a smooth finish is achieved by rolling the surface.
- Apply the specified topcoat at the recommended thickness as per the product application instructions.

Removal

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.
- Other means of removal may also be considered, please consult Jotun Technical Sales Support.

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 and duration, please consult Jotun Technical Sales Support.

Surface finish

A number of different surface finishes are achievable with this Jotachar product.

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 spray applied film should be closed and uniform in thickness, free from voids and sagging. Horizontal surfaces should be finished with a slight slope to avoid water pooling in case of rain or dew condensation.

Quality assurance

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

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

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

Caution

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

For further advice please contact your local Jotun office.

Health and safety

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

Accuracy of information

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

Colour variation

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

Reference to related documents

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

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

Symbols and abbreviations

min = minutes

h = hours

d = days

°C = degree Celsius

° = unit of angle

µm = microns = micrometres

g/l = grams per litre

g/kg = grams per kilogram

m²/l = square metres per litre

mg/m² = milligrams per square metre

psi = unit of pressure, pounds/inch²

Bar = unit of pressure

RH = Relative humidity (% RH)

UV = Ultraviolet

DFT = dry film thickness

WFT = wet film thickness

TDS = Technical Data Sheet

AG = Application Guide

SDS = Safety Data Sheet

VOC = Volatile Organic Compound

MCI = Jotun Multi Colour Industry (tinted colour)

RAQ = Required air quantity

PPE = Personal Protective Equipment

EU = European Union

UK = United Kingdom

EPA = Environmental Protection Agency

ISO = International Standards Organisation

ASTM = American Society of Testing and Materials

AS/NZS = Australian/New Zealand Standards

NACE = National Association of Corrosion Engineers

SSPC = The Society for Protective Coatings

PSPC = Performance Standard for Protective Coatings

IMO = International Maritime Organization

Disclaimer

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

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

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