

Chemtech GM

Product description

This is a two component solvent free polyamine cured epoxy coating. Specially designed to be used as a lining in storage tanks in combination with glass fibre mats. Can be used as primer, mid coat or finish coat in atmospheric and immersed environments. Suitable for properly prepared carbon steel substrates only.

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.

Process sequence

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

Soluble salts removal

Soluble salts have a negative impact on the coating systems performance, especially when immersed. Jotun's general recommendations for maximum soluble salts (sampled and measured as per ISO 8502-6 and -9) content on a surface are:
Chemical tanks: 50 mg/m²

Carbon steel

Initial inspection and pretreatment

Inspect the surface for contaminations 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 (LPWC) to Wa 1 (ISO 8501-4) using fresh water.

Non-contaminated areas shall be washed down by Low-Pressure Water Cleaning (LPWC) to Wa 1 (ISO 8501-4) using fresh water to reduce the concentration of surface chlorides.

Metal finishing

All edges shall have a rounded radius of minimum 2 mm subjected to three pass grinding or equally effective method. Defective welds shall be replaced and treated to an acceptable finish before painting. Temporary welds and brackets shall be ground to a flat finish after removal from the parent metal.

Pitting repair

For tank coating and lining used for chemical exposure the recommendation is to fill pits through welding, since using fillers may negatively affect the coating systems' chemical resistance and flexibility.

Abrasive blast cleaning

Special attention should be given to pitted areas, blast clean twice if necessary. In bad cases these sections may have to be ground open with pencil grinders to ensure that no voids are left under the coating. The condition of the steelwork should be rechecked after the final cleaning process is finished, prior to commencement of lining application.

After the tank bottom has been cleaned and until the lining application and cure is completed all workers entering the tank shall wear shoe covers. No contamination of the cleaned or coated surface is acceptable. Water shall be prevented from entering the tank.

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

The surface shall have a sharp and angular surface profile 75-130 µm, grade Coarse G; Ry5 (ISO 8503-2). Measure the achieved profile with surface replication tape (Testex) (ISO 8503-5) or by surface roughness stylus instrument (ISO 8503-4).

Dust contamination

The blast medium should be thoroughly removed prior to coating, this should be done preferably using industrial vacuum cleaning equipment. Blowing down with compressed air is not recommended due to the potential of oil/dust contamination.

Application

Acceptable environmental conditions - before and during application

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

Standard grade

Air temperature	10 - 50	°C
Substrate temperature	10 - 40	°C
Relative Humidity (RH)	10 - 85	%

The following restrictions must be observed:

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

Product mixing

Product mixing ratio (by volume)

Chemtech GM Comp A	2,5 part(s)
Chemtech GM Comp B	1 part(s)

Induction time and Pot life

Paint temperature **23 °C**

Pot life 30 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. 17 / Jotun Thinner No. 23

Application data

Airless Spray Equipment

Pump ratio (minimum) :	64:1
Pump output (litres/minute) :	2.6-4.8
Pressure at nozzle (minimum) :	200 bar/2900 psi
Nozzle tip (inch/1000) :	25-31
Filters (mesh) :	Remove filters

Material hose length :

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

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

Other application tools

Pitting or other imperfections are repaired to ensure a smooth surface for the following laminate. This is done using Chemtech GM Clear as epoxy putty.

At site prepare Chemtech GM Clear putty by mixing Comp A + Comp B thoroughly together, then adding Aerosil 300 or equivalent until consistency is suitable for application as a putty. Do not mix large quantities at a time as pot life is quite short.

The area to be repaired must be free of any dust or other contamination.

Fill holes, pits etc with putty using trowel / putty knives making an even surface so that the glass matt lining will adhere without air entrapment.

After application of holding primer caulking shall be applied to Plate lap welds, surface pits, chine area (angle formed by bottom plate & shell plate).

Caulking shall be particularly applied mainly between shell & floor (coving), between floor plates in and around sumps, around connection between pipes and hull and around support pipes. Also fill edges between any overlapping plates.

The thickness of the applied coving shall be just sufficient to establish a smooth transition of the laminate.

This operation is critical to the entire system as sharp corners or edges may result in air entrapment below the laminate.

Follow SSPC-PA6/NACE No. 10 standards.

Film thickness per coat

Typical recommended specification range

Dry film thickness	1000 - 3000	µm
Wet film thickness	1000 - 3000	µm
Theoretical spreading rate	1 - 0,3	m ² /l

Wet film thickness (WFT) measurement and calculation

Use a wet-to-dry film calculation table to calculate the required wet film thickness per coat. A wet to dry film thickness chart is available on the Jotun Web site.

Dry film thickness (DFT) measurement

When the coating has cured to hard dry state the dry film thickness can be checked to SSPC PA 2 or equivalent standard using statistical sampling to verify the actual dry film thickness. Measurement and control of the WFT and DFT on welds is done by measuring adjacent to and no further than 15 cm from the weld.

Ventilation

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

Laminate

Mix Chemtech GM Clear Component A and B in the correct mixing ratio using a power mixer. Material is supplied in two containers as a single unit. Always mix the two components in full as supplied.

Once the two components are mixed use within specified pot life. Mix component A with a power mixer/agitator. Always add component B to component A and mix thoroughly using power mixer/agitator.

Apply a generous amount of catalyzed Chemtech GM Clear (600-800 µm) onto the primed steel surface, as evenly as possible using a roller/airless spray.

Apply one layer of 450 g/m² fiberglass chopped strand mat (CSM) to the wet catalyzed Chemtech GM Clear. Jotun recommends highly soluble powder bonded chopped strand Mat such as Owens Corning – M723A 300 g/m² or 450 g/m² etc.

Embed fully to remove wrinkles and roll with steel ribbed roller to remove trapped air.

Add resin where required and consolidate well with steel roller.

Allow to dry overnight.

Apply a second generous coating of catalyzed Chemtech GM Clear at 600-800 µm. Lay a non-woven high tensile surfacing tissue of 20 g/m² in such a manner that it overlaps the mat without aligning with mat edge, and ensuring that the strands of mat are not exposed or protruding at the laminate surface. Jotun recommends min. 20 g/m² Surface Tissue. Owens Corning – M524C64.

If 2 layers of fiberglass are required the direction of the second layer of mat should be at 90 degrees to that of the 1st mat layer. Apply the second layer of 450 g/m² fiberglass CSM with a 50 % of the nominal width of the mat overlap on the previous layer in order to achieve a 2 layer system.

When applying a 2-layer system, the 2nd layer of fiberglass mat must be laid at a 90° angle to the first layer. The second layer of matt fiber lining is laid using the same method the next day or may be applied as a wet on wet system. The over coating interval must be followed as given in the TDS.

The above procedure describes a typical procedure using 450 g/m² glass mat. Special circumstances may require other sequences. Some specifications require two layers of (450+300 g/m²) glass mat using a 50 % overlap.

Apply a final coat of Chemtech GM Clear over the entire laminated area, normally by roller. It is recommended this procedure to be carried out within 24-36 hours depending on the temperature at the time of application to ensure good adhesion.

Drying process

Do not attempt to speed up the curing process by blowing hot air on to the wet coating film as this may lead to skin drying/curing, entrapped solvents and consequently solvent blistering and inferior corrosion protection.

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 profile or surface roughness of the substrate. Higher profiles will lead to a higher "dead volume"
- the shape of the substrate target
- environmental conditions such as wind and air temperature

Pre-commissioning considerations

Striker plates:

In floating roof tanks, steel panel may be inserted under the support legs. Striker plates are first blast cleaned and primed on both sides, and the lamination system is applied to one side only.

While blast cleaning is in progress, work shall start on the landing legs in the following manner:

1. The welds on the striker plate are caulked.
2. Two to three hydraulic jacks are placed around the leg on timber spreaders, clear of the area to be lined, and the roof is lifted about 15 mm. The pin holding the leg is removed, and the leg is raised.
3. The area under the leg is cleaned.
4. The lining is applied so it extends 10 cm from the landing plate. The lining should be resin rich in the center.
5. The prepared plate is placed, laminate side up, and forced slightly in the wet laminate. The system is allowed to set, the leg is lowered, the pin replaced and the jacks are released.
6. Any gaps between the landing plate and the striker plate should be filled with epoxy filler (caulking).

Drying and Curing time

Substrate temperature	10 °C	23 °C	40 °C
Surface (touch) dry	14 h	7 h	5 h
Walk-on-dry	26 h	12 h	7 h
Dry to over coat, minimum	26 h	12 h	7 h
Dried/cured for service	14 d	7 d	3 d

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

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.

Areas for immersed exposure

Average temperature during drying/curing	10 °C	23 °C	40 °C
Itself	2 d	1 d	16 h
epoxy	2 d	1 d	16 h

Other conditions that can affect drying / curing / over coating

Repair of coating system

Damages to the coating layers:

Prepare the area through sandpapering or grinding, followed by thorough cleaning/vacuuming. When the surface is clean and dry the coating may be over coated by itself or by another product, ref. original specification.

Always observe the maximum over coating intervals. If the maximum over coating interval is exceeded the surface should be carefully roughened in order to ensure good intercoat adhesion.

Damages exposing bare substrate:

Remove all rust, loose paint, grease or other contaminants by spot blasting, mechanical grinding, water and/or solvent washing. Feather edges and roughen the overlap zone of surrounding intact coating. Apply the coating system specified for repair.

Any porosity or pinholes found on areas with diameter not exceeding 10 cm shall be repaired by grinding down to bare metal in the affected area followed by removal of dust and debris and the lining reinstated by application of resin and glass matt.

Repair of damaged areas

Sags and runs can be caused by too high wet film thickness, too much thinner added or the spray gun used too close to the surface.

Repair by using a paint brush to smooth the film when still wet.

Sand down to a rough, even surface and re-coat if the coating is cured.

Orange peel can be caused by poor flow/levelling properties of the paint, poor atomization of the paint, thinner evaporating too fast or the spray gun held too close to the surface.

This can be rectified by abrading the surface and applying an additional coat after having adjusted the application properties or the application technique.

Dry spray can be caused by poor atomization of the paint, spray gun held too far from the surface, high air temperature, thinner evaporating too fast or coating applied in windy conditions. Sand down to a rough even surface and re-coat.

Pinholes can be caused by entrapped solvents in the film or by incorrect application technique. Pinholes can be repaired as per procedure for damages to the coating layer or to the substrate, ref. above.

Coating film continuity

Jotun recommends that all coating systems for immersion shall be inspected for film continuity/defects by visual observation of pin hole rusting through the coating after tank hydro-testing or sea water immersion during sea trials. Alternatively, full immersion of tanks in combination with tanks fully saturated by tank cleaning machine(s), soaking all surfaces with sea water and creating a high condensation environment during sea trials.

All noted defects shall be repaired or reported as outstanding issues.

For onshore storage tanks or for tanks where sea water immersion may not be permitted or practical, coating shall be tested for film continuity/defects as described in ASTM D 5162, method A or B as appropriate for the coating thickness.

The recommended voltage is 400 volts per 100 µm DFT. The acceptance criterion is no defects. Defects found shall be repaired as per coating specification.

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

TDS = Technical Data Sheet
AG = Application Guide

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

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.
