Jotatemp 1000 HT

Product description

This is a two component titanium catalyzed inorganic ceramic copolymer based coating, which cures in ambient conditions. It complies to the generic type inert multipolymeric matrix coating. Designed as a heat resistant coating, and it is resistant to low temperatures down to -196 °C and high temperatures up to 1000 °C continuously, where substrates allow. Can be used as primer or finish coat in atmospheric environments. Suitable for properly prepared carbon steel and ceramic substrates. It can be applied on hot substrates up to 250 °C, **however** be aware that substrate temperature above 200 °C will require further safety considerations due to autoignition risks. Please contact your local Jotun office and refer also to the application guide for more detailed information. It will offer proper corrosion protection at ambient conditions during construction and shut-down periods. The product passes the standard tests used for qualifying coatings preventing corrosion under insulation (CUI).

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.

All surfaces must be free of salt and other contaminant. Water used for rinsing should be potable water grade. Surfaces must dry before start of mechanical surface preparation.
Paint solvents (thinners) shall not be used for general degreasing or preparation of the surface for painting due to the risk of spreading dissolved hydrocarbon contamination. Paint thinners can be used to treat small localized areas of contamination such as marks from marker pens. Use clean, white cotton cloths that are turned and replaced often. Do not bundle used solvent saturated cloths. Place used cloths into water.

Process sequence

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

Soluble salts removal

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Soluble salts have a negative impact on the coating systems performance, especially when immersed. Jotun's general recommendations for maximum soluble salts (sampled and measured as per ISO 8502-6 and -9) content on a surface are:
For areas exposed to (ISO 12944-2):
C1-C4: 200 mg/m²
C5: 100 mg/m²

It is impractical to check salt level on hot substrates, hence the best recommendation practical when preparing a hot surface in the field is to carry out a thorough high pressure fresh water cleaning. Extra attention must be put to badly pitted surfaces.

Stainless steel

Abrasive blast cleaning

After removal of surface defects, the area to be coated shall be degreased according to ISO 12944-4, section 6.2.1 Water cleaning or 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.
Examples of recommended abrasives are:
• Ferrite free almandite garnet grade 30/60 and 80 grade (US Mesh size)
• Aluminium oxide grade G24

Compressed air quality
The supply of clean air to blasting pots must be secured to avoid contamination of abrasive and thereby of blast cleaned surfaces. Compressors must be fitted with sufficient traps for oil and water. It is also recommended to fit two water separators at the blasting machine to ensure a supply of moisture-free air to the abrasive chamber.

Dust contamination
At the completion of abrasive blasting the prepared surface shall be cleaned to remove residues of corrosion products and abrasive media, and inspected for surface particulate contamination. Maximum contamination level is rating 2 (ISO 8502-3). Dust size no greater than class 2.

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

Hand and Power Tool Cleaning

The surface shall be abraded using mechanical or hand sanding methods using non-metallic abrasives or bonded fibre abrasive pads to remove all polish and to impart a scratch pattern to the surface. Do not use high speed rotational sanders.

Coated surfaces

Verification of existing coatings including primers

The performance of this product may be reduced when applied over existing coatings and while not documented may be affected by lesser levels of surface preparation. Surfaces to be coated with this product should be detergent washed and fresh water rinsed prior to start of mechanical surface preparation.

Shop primers

Shop primers are accepted as temporary protection of steel plates and profiles. However the shopprimer should be completely removed through blast cleaning to minimum Sa 2½ (ISO 8501-1) using abrasive media suitable to achieve a sharp and angular surface profile 45-85 µm, grade Medium G; Ry5 (ISO 8503- 2).

Inorganic zinc silicates

This product can be applied on top of an inorganic zinc silicate primer. Before being overcoated the primer must be fully cured, clean, dust free, dry and undamaged. The zinc silicate primer must be free of zinc salts (white rust).

Other surfaces

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Alloyed steel (P91)

Abrasive blast cleaning
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Examples of recommended abrasives are:
• Ferrite free almandite garnet grade 30/60 and 80 grade (US Mesh size)
• Aluminium oxide grade G24

Hand and Power Tool Cleaning
The surface shall be abraded using mechanical or hand sanding methods using non-metallic abrasives or bonded fibre abrasive pads to remove all polish and to impart a scratch pattern to the surface. Do not use high speed rotational sanders.

Compressed air quality
The supply of clean air to blasting pots must be secured to avoid contamination of abrasive and thereby of blast cleaned surfaces. Compressors must be fitted with sufficient traps for oil and water. It is also recommended to fit two water separators at the blasting machine to ensure a supply of moisture-free air to the abrasive chamber.

Dust contamination
At the completion of abrasive blasting the prepared surface shall be cleaned to remove residues of corrosion products and abrasive media, and inspected for surface particulate contamination. Maximum contamination level is rating 2 (ISO 8502-3). Dust size no greater than class 2.

Chlorinated or chlorine containing solvents or detergents must not be used on alloyed steel (P91).

Ceramic substrates
The surface shall be clean, dry and appear with a rough and dull profile. To create a rough surface abrasive blasting (using alumina or grit) may be utilized for larger areas. For smaller areas sanding with medium-grit sandpaper (180-220 grit) until a rough and dull finish is achieved can be utilized. After the surface preparation is completed, remove all the dust formed on the surface.

Application

Acceptable environmental conditions - before and during application

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

Air temperature	10 - 60	°C
Substrate temperature	10 - 250	°C
Relative Humidity (RH)	10 - 85	%

The following restrictions must be observed:

Substrate temperature 10 - 250 °C *

*** PLEASE NOTE:** When applying coatings on substrates with temperatures above 200 °C, specific safety measures and procedures are required. It is generally not recommended to apply coatings on substrates that exceed their autoignition temperature. In this product, one raw material has a lowest known autoignition temperature of 207 °C. Therefore, any substrate temperature higher than this will necessitate cautious measures, such as, but not limited to, applying the coating outdoors in a well-ventilated area, keeping it away from combustible materials, and performing a fire risk evaluation.

• 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

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Material storage conditions

Material to be stored below 40 °C. Keep out of direct sunlight.

Any gas developed during storage will also remain in the drum even when the temperature is decreasing to lower levels. So, in order to avoid splash of paint/thinner during opening these lids, it is strongly recommended to release the pressure by making a small hole in the plastic seal in the centre of the lid.

Product mixing

Product mixing ratio (by volume)

Jotatemp 1000 HT Comp A	110 part(s)
Jotatemp 1000 Comp B	1 part(s)

Product mixing

Mix component A thoroughly before adding component B.

Ideally the product should be shaken prior to usage using a mechanical shaker. If settling has occured the initial mixing should be done manually to ensure the settled material is distributed properly, lumps should be broken up. This is a very heavy-bodied material and tends to settle out after extended storage; it is normal to have a small amount of thin liquid at the tops of cans. Whenever possible, pour off the liquid into a clean large mixing bucket, then pour in the heavy bodied liquid, and scrape the residue from cans of the product into the mixing bucket. Use mechanical agitation and a heavy duty mixer or similar tool; stirring from time to time until it is of uniform consistency; do not over-agitate or incorporate air into the mixed product.

Induction time and Pot life

Paint temperature	10 °C	23 °C	40 °C
Pot life	10 h	6 h	4 h

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

Thinner/Cleaning solvent

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

To achieve the best spraying properties the product can be thinned 3-5% by volume before application.

Note: Korean VOC regulation "Korea Clean Air Conservation Act" and its corresponding thinning limit will prevail over recommended thinning volumes.

Application data

Spray application

Airless Spray Equipment

Pump ratio (minimum) :	32:1
Pressure at nozzle (minimum) :	150 bar/2100 psi
Nozzle tip (inch/1000) :	17-23
Nozzle output (litres/minute) :	0.8-1.0
Filters (mesh) :	70

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Note*
Several factors influence and need to be observed to maintain the recommended fluid flow/product atomization pattern. Among factors causing pressure drop are:
- Pump size
- Extended hoses or hose bundles
- Extended hose whip-end line
- Small internal diameter hoses
- Narrow tip angle
- High paint viscosity
- Large spray nozzle size
- Inadequate air capacity from compressor
- Incorrect or clogged filters
- Product temperatures

Spray application technique

Apply even multiple passes, overlapping 50% on each pass; avoid arcing, excessive reaching and dry spray. Check wet film thickness as often as practical to assure even coating application. For pitting corrosion on aged steel, and for difficult-to coat areas like bolt rings on flanges, spray apply a single wet pass, then use wood handled china bristle brushes to coat areas the spray fan could not cover. Avoid excessive film build on adjacent, more exposed areas. Apply additional spray passes as needed to achieve the specified WFT.

For Hot Substrate Application:
When applying this product to surfaces above 80℃, application should be done in multiple fast passes to allow for solvents to evaporate. Special attention should be paid not to apply more than 125-150 µm DFT per coat on flat or pitted substrates.

The full system should be completed within 48 hours. Application on hot substrates needs special attention and additional thinning up to 15 % can be tolerated. If the coating is thinned, it may settle in the can and extra agitation may be required. Shorter durability of the coating may be expected when hot applied.

Other application tools

Brush application

Brush application is possible however technically difficult to get right especially on hot substrates. When brush application is required, small areas may be coated using round good quality natural bristle brushes. Be sure to wet out the surface with the brush on the first pass and then to add additional even layers without clumping or streaking the heavy bodied fillers in the product.
Exceptional care should be taken during brush application to assure even film thickness. Apply additional layers as needed to achieve the specified DFT.

Film thickness per coat

Typical recommended specification range

Dry film thickness	100	-	150	µm
Wet film thickness	140	-	210	µm
Theoretical spreading rate	7.2	-	4.8	m²/l

In one-coat systems, dry film thickness up to 200 µm can be applied.

DFT exceeding maximum specified film thickness may cause loss of technical properties.

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Film thickness measurement

Wet film thickness (WFT) measurement and calculation

Assuming the temperature of the surface is practically making it possible, it is recommended to measure the wet film thickness continuously during application using a painter's wet film comb (ISO 2808 Method 1A). Wet film thickness measuresments are not practical on hot substrates, hence a proper calculation and distribution of needed material is recommended before intiating application of a specific area.

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 mm from the weld. On hot substrates, please be sure to use a heat tolerant proper and appropriate HSE equipment.

Ventilation

Adequate ventilation is required to ensure that lower explosion limit (LEL) is not exceeded and that, during application, there is no hinder for the evaporation of the solvents. Solvents will evaporate at a very high rate when applied at raised temperatures, thus the air turnover in confined spaces needs to allow for this situation. At 150 °C one must expect that all solvents evaporate instantaneously.
Solvents are also more dangerous for health when at raised temperatures, therefore it is important that good quality respiratory equipment is used. Standard solvent resistant masks (ideal would be air fed) shall be used. This is important for the applicators and any other trades working in the vicinity of the application. Outside application with free air is of course the ideal situation when solvents flash off instantly. However, applicators shall wear appropriate respiratory equipment also in this situation. Local conditions such as wind direction will dictate the use of masks by other trades in the vicinity. If in doubt use solvent grade masks.

This product requires 102 m³ air per liter of paint in order not to exceed 10% of LEL, which is the generally accepted safe concentration related to risk of explosion.
For a typical application speed (1.5 – 2 l/min), Required Air Quantity (RAQ) will be in the order of 200 m³ per minute.

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

Drying and Curing time

Substrate temperature	10 °C	15 °C	23 °C	40 °C	100 °C
Surface (touch) dry	5 h	3 h	2 h	1.5 h	15 min
Walk-on-dry	22 h	18 h	5 h	3 h	15 min
Dry to over coat, minimum	24 h	18 h	6 h	3.5 h	0 min
Dried/cured for service	4 d	3 d	24 h	18 h	15 min

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Due to the fast evaporation above 100°C, instant drying is expected.
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 recommended shortest time before the next coat can be applied.

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

Maximum over coating intervals

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

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

Areas for atmospheric exposure

Average temperature during drying/curing	10 °C	15 °C	23 °C	40 °C	100 °C
Itself	extended	extended	extended	extended	5 days
silicone	extended	extended	extended	extended	5 days

Other conditions that can affect drying / curing / over coating

Repair of damaged areas

When applied on a hot substrate in too high film thickness, small bubbles may occur, these can be lightly sanded out, followed by an additional coat.

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

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- Observe that the coating is free from defects, discontinuities, insects, abrasive media and other contamination
- Observe that the coating is free from misses, sags, runs, wrinkles, fat edges, mud cracking, blistering, obvious pinholes, excessive dry spray, heavy brush marks and excessive film build
- Observe that the uniformity and colour are satisfactory

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

Caution

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

Health and safety

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

Accuracy of information

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

Colour variation

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

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

Reference to related documents

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

Symbols and abbreviations

min = minutes
h = hours
d = days
°C = degree Celsius
° = unit of angle
µm = microns = micrometres
g/l = grams per litre
g/kg = grams per kilogram
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
ASFP = Association for Specialist Fire Protection

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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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