SeaForce 60

Product description

This is a one component acrylic, hydrolysing antifouling coating based on ion exchange technology. It provides very good fouling protection. This is achieved through self polishing characteristics reducing hull deterioration. To be used as finish coat in immersed environments only. Suitable on approved primers and tie coats on aluminium and carbon steel substrates. It can be applied at sub zero surface temperatures.

Scope

The Application Guide offers product details and recommended practices for the use of this product.

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 application should normally be done 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 done before coating application.
This antifouling may be used for either newbuilding / new construction or drydocking. An antifouling is applied as the last part of a full coating system on the under water area. In general it is important to aim to apply as big areas as possible in one application and allow good ventilation between coats.

Coated surfaces

Organic primers/intermediates

The existing hull coating system must be high pressure washed at 350 bar. Evaluate according to ASTM D610 pictorial assessment guide of these defects combined: mechanical damage, rust/bare metal, flaking, cracks, checks, blisters, animal fouling remains/roots. Jotun's general recommendation for maximum salt contamination for under water areas is 80 mg/m² NaCl.

New tie coat or new antifouling

This product can be applied on top of most of Jotun's other antifouling products assuming the surface is clean and dry.
When applying to new tie coat or new antifouling, remove any contamination that could interfere with coating adhesion by methods such as degreasing with alkali detergent and/or high pressure freshwater washing. If the tie coat's maximum over coating interval has been exceeded, another coat of tie coat is required, or the surface of the hardened tie coat should be thoroughly abraded for roughness by powered orbital/eccentric/dual action abrasive discs on soft backing pads, or by sweep blasting using a fine grade of blast media. Coarse blast media may damage the remaining coatings and will roughen the surface excessively. This may compromise the hull's smoothness, hydrodynamic properties and consequent through-water performance.

Aged antifouling with leached layer

The spent, skeletal, porous layer at the surface of aged antifouling known as leached layer can cause popping/ pinholes/bubbling when over coated. Furthermore the leached layer will be weaker in cohesive strength than a new antifouling system. Therefore, all efforts should be made to properly remove the leached layer. Various factors will determine the leached layer's thickness and its strength and integrity; mainly the antifouling's binder technology, but also the vessel's speed and the water temperature where the ship was trading (slow speeds and cold waters often result in thicker leached layer). Leached layers should be removed by very thorough high pressure freshwater washing.

Note that the use of a tie coat is no substitute for proper washing of aged antifouling. Sealer coatings are not significantly better at sealing porous surfaces than are antifoulings. Popping or compromised adhesion may still result. Furthermore, sealing aged antifouling has the disadvantage of blocking off antifouling that might become exposed, and therefore provide fouling protection later in service.

Practically Jotun recommends doing a test spray with thinned antifouling on the washed and dry surface in order to check for potential popping. Please note that the popping itself will have no negative effect on the performance of the antifouling properties, however it will have a negative visual effect.

Aged antifouling: Cracked, flaked or "sandwiched" coating systems

It should again be highlighted that if the coating exhibits weak adhesion or has been spot repaired for more than 3 dockings or 15 years, the general recommendation is to blast the surface to Sa 2 as per ISO 8501-1.

Aged antifouling systems of suspect physical integrity which exhibit cracking, flaking and/or heavy 'sandwiching' of multiple layers are best fully removed by grit blasting to Sa 2 or by water-jetting back to WJ 2. An alternative solution to remove existing antifouling paints by sweeping the surface by the means of hydrojetting or abrasive blast cleaning using fine grit. The sweeping should be done down to intact primer system, the method should be with focus on not to create unnecessary surface roughness.

Cracking in an antifouling should not be confused with surface "checking" which would appear as superficial cracks in top of the surface, but not penetrating the full coating layer. A checked surface should be carefully washed in order to remove salts or other contamination but would then be possible to over coat.

Cracking is defined as deep cracks penetrating the entire coating layer. In case of cracking the adhesion of the surface should be carefully checked. This should be done using x-cut method as per ISO 16276-2, where level 5 would be unacceptable. In case of level 4 or lower, it is recommended to carry out careful high pressure fresh water hosing in order to remove leach layer and loose paint. Note: If abrasive blasting is to be carried out on mechanical damages in the vicinity of a cracked surface, it is recommended to carry out the blasting in large square boxes with feathering of the overlapping zones, avoiding further damage of a relatively weak coating system.

Exposed sealer/tie coat

In case of through polishing exposing the existing tie coat another new coat of tiecoat is required in order to ensure proper adhesion to the aged sealer/tiecoat. Before any application takes place it should be high pressure fresh water cleaned as per above guidelines. Overlapping with new sealer coat on top of existing, intact antifouling should be limited as much as practically possible.

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 - 60	°C
Substrate temperature	-10 - 50	°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 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)

Single pack

Thinner/Cleaning solvent

Thinner: Jotun Thinner No. 7

Application data

Airless Spray Equipment

Pump ratio (minimum) :	42:1
Pump output (litres/minute) :	1.3-4.2
Pressure at nozzle (minimum) :	150 bar/2100 psi
Nozzle tip (inch/1000) :	21-31
Filters (mesh) :	50-70

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

Recommended film thickness per coat

Film thickness and spreading rate	Dry film thickness (µm)	Wet film thickness (µm)	Theoretical spreading rate (m^2/l)
Minimum	75	130	7,7
Maximum	175	300	3,3

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). 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.

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	0 °C	5 °C	10 °C	23 °C	40 °C
Surface (touch) dry	5 h	2 h	1 h	45 min	30 min	30 min
Dry to over coat, minimum	48 h	36 h	12 h	9 h	7 h	6 h
Dried/cured for immersion	48 h	36 h	12 h	12 h	10 h	8 h

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

Surface (touch) dry: The state of drying when slight pressure with a finger does not leave an imprint or reveal tackiness. Dry sand sprinkled on the surface can be brushed off without sticking to or causing damage to the surface.

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

Dried/cured for immersion: Minimum time before the coating can be permanently immersed in sea water.

Maximum over coating intervals for immersed exposure

Substrate temperature	-10 °C	0 °C	5 °C	10 °C	23 °C	40 °C
Itself	extended	extended	extended	extended	extended	extended
acrylic, ion exchange technology based	extended	extended	extended	extended	extended	extended
silyl acrylate antifoulings	extended	extended	extended	extended	extended	extended

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 washing. When the surface is 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 abrasive 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.

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 dry. 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. Physically drying paints can be solvent wiped and another coat applied. If area is too large to practically solvent wipe, consider sandpapering or grinding, followed by thorough washing. When the surface is dry the coating may be over coated by itself.

Quality assurance

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

- Confirm all welding and other metal work, whether internal or external to the tank, has been completed before commencing pre-treatment and surface preparation of the substrate
- Confirm installed ventilation is balanced and has the capacity to deliver and maintain the RAQ
- Confirm the required surface preparation standard has been achieved and is held prior to coating application
- Confirm that the climatic conditions are within recommendation in the AG and held during the application
- Confirm the required number of stripe coats have been applied
- Confirm each coat meets the DFT requirements of the specification
- Confirm the coating has not been adversely affected by rain or any other agency during curing
- Observe 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°
- Observe the coating is free from defects, discontinuities, insects, spent abrasive media and other contamination
- Observe 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 the uniformity and colour are satisfactory

All noted defects should 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.

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.
For your nearest local Jotun office, please visit our website at www.jotun.com.