

Baltoflake S2000

Product description

This is a glass flake reinforced unsaturated polyester coating. It is a very high build, extremely abrasion resistant and fast curing barrier coating. Can be used as primer, mid coat or finish coat in atmospheric and immersed environments. Suitable for properly prepared carbon steel, stainless steel, aluminium and approved primers.

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. 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:

For areas exposed to (ISO 12944-2):

C1-C4: 200 mg/m²

C5: 100 mg/m²

Im1-Im3: 80 mg/m²

Carbon steel

Initial rust grade

The steel shall be Rust Grade A or B (ISO 8501-1). For steel with Rust Grades C or D, contact your nearest Jotun office for advice.

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

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. All edges shall be ground to a minimum radius of 2.0 mm after a minimum three passes with a mechanical grinder fitted with appropriate abrasive. All sharp irregularities, burrs, slivers, slag and spatter on welds, whether apparent before or after blast cleaning, shall be removed before the commencement of coating application. Weld smoke shall be removed by washing by low-pressure Water Cleaning LP WC method to Wa 1 (ISO 8501-4) using fresh water.

For areas in corrosivity category C5, Im1-3 the requirement are for the steel to conform to grade P2 (ISO 8501-3) Table 1. All edges shall have a rounded radius of minimum 2 mm subjected to three pass grinding or equally effective method. One may use a mechanical grinder fitted with a suitable abrasive disc. All sharp irregularities, burrs, slivers, slag and spatter on welds, whether apparent before or after blast cleaning, shall be removed before coating application. It is recommended that welding smoke should be removed by low-pressure Water Cleaning LP WC method (ISO 8501-4) Wa 1 using fresh water. Welding smoke residues are water soluble and could cause blistering if not removed by washing before blasting.

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.

Abrasive blast cleaning

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 55-130 µm, grade Medium to Coarse G (ISO 8503-2). Measure the achieved profile with surface replication tape (Testex) (ISO 8503-5) or by surface roughness stylus instrument (ISO 8503-4).

Abrasive media quality

The selected abrasive must be compatible with both the surface to be blast cleaned and the specified coating system. The abrasive shall meet specifications as per relevant parts of ISO 11124 (Specification for metallic blast-cleaning abrasives), or ISO 11126 (Specification for non-metallic blast-cleaning abrasives). It should be sampled and tested as per relevant parts of ISO 11125 (metallic abrasives) or ISO 11127 (non-metallic abrasives). Dry storage of abrasive and shelter for blasting pots is necessary to prevent equipment becoming clogged with damp abrasive.

All abrasive blast media used should be new and not recirculated, with the exception of steel grit. If this is utilized the circulation process must include a cleaning process.

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) as per Figure 1. Dust size no greater than class 2.

Hand and Power Tool Cleaning

Power tool cleaning

Minor damage of the coating may be prepared to St 3 (ISO 8501-1) using a suitable rotating fiber disc, like 3M CSD or similar. Leading edges of intact coating around damage shall be feathered to ensure a smooth transition from the coating to the prepared steel. Consecutive layers of coating shall be feathered to expose each layer and new coating shall always overlap to an abraded existing layer. Mechanical repairs are only accepted for minor areas of damage where abrasive blasting is expected to create more damage to the coating system than actual benefit to the performance of the coating system; i.e. damage/defects found after immersion testing. Overlapping zones to intact coating shall have all leading edges feathered back by sanding methods to remove all sharp leading 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 flat, rough surface profile, suitable for over coating.

Water jetting

Due to risk of flashrust which is not recommended for these types of coating, water jetting of steel substrates is not recommended.

Galvanised steel

Abrasive blast cleaning

Baltoflake products are in general NOT recommended for use on galvanized items.

Aluminium

Abrasive blast cleaning

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 by low-pressure Water Cleaning LP WC method to cleanliness corresponding to Wa 1 (ISO 8501-4) using fresh water. Non-contaminated areas shall be washed down by low-pressure Water Cleaning LP WC method to cleanliness corresponding to Wa 1 (ISO 8501-4) using fresh water. Paint solvents (thinners) shall not be used for general degreasing or preparation of the surface for painting. The surface to be coated shall be dry abrasive blast cleaned to NACE No. 4 / SSPC-SP 7 Brush-Off Blast Cleaning as required for the specified surface profile using approved non-metallic abrasive media which is suitable to achieve a sharp and angular surface profile. As a guide, surface profile 55-130 µm, Medium to Coarse G (ISO 8503-2) should be achieved.

Water jetting

Water jetting is not recommended.

Stainless steel

Abrasive blast cleaning

The surface to be coated shall be dry abrasive blast cleaned as required for the specified surface profile using non-metallic abrasive media which is suitable to achieve a sharp and angular surface profile. As a guide, a surface profile corresponding to 25-55 µm, Fine G (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 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 corresponding to rating 2 (ISO 8502-3) as per Figure 1 unless otherwise specified.

Finished surfaces shall be dull, profiled and show no areas of shiny metal.

Do not handle the prepared surface with bare hands.

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

Concrete

Clean – A clean concrete surface should contain nothing other than its original components. Oils, grease, dust, dirt, chemicals, curing compounds, form release oils, sealers or hardeners must be removed prior to coating.
Sound – Concrete that has unsound areas (voids, hollow spots, and friable surface) may have to be removed, replaced or repaired with materials that are compatible with the subsequent coating system.
Dry – It is important to address dryness because most coatings require a dry surface for proper adhesion. Moisture contained within the concrete may compromise coating adhesion.

Vinyl ester based primer is recommended.

Water cleaning

Low pressure water washing to a rough, clean, dry and laitance free surface.

Coated surfaces

Shop primers

Muki EPS is approved as temporary protection of steel. However, prior to application the shop primer shall be completely removed by dry abrasive blast cleaning to min Sa 2½ (ISO 8501-1) using approved abrasive media suitable to achieve a sharp and angular surface profile between 75-100 microns, grade Medium 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).

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 - 45	°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 (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

Mixing ratio table - Additives

The steel temperature shall not be lower than the paint temperature and not more than 20 °C above the paint temperature.

Additive volumes (ml) in 16 litres product.

Due to local regulations, local variants in pack size and filled volume may exist. Note that the amount of additives must be adjusted accordingly.

Additive	Paint temperature					
	10-14 °C	15-19 °C	20-24 °C	25-29 °C	30-34 °C	35-40 °C

Jotun Accelerator CO1P or Accelerator 9802 P	300					
Jotun Peroxide 1 or Norox KP-9	300	300	200	200	200	200
Jotun Inhibitor 51				200	200	400

For other additive suppliers please consult Jotun.

WARNING:

Accelerators must never come in direct contact with peroxides.

All peroxides must be stored in a dark and cool storage room (below 25 °C), and kept away from all kind of combustible materials. Exposure to direct sunlight must be avoided. Use only original or approved containers. Empty containers should be washed with water and kept in separate storage/containers.

The peroxide may catch fire if exposed to sparks or to hot metal dust from grinding or other mechanical work. The curing reaction develops heat. For leftovers of mixed paint it is recommended to fill the tin with water to avoid excessive heat development.

Induction time and Pot life

Paint temperature

23 °C

Pot life

45 min

Thinner/Cleaning solvent

Thinner: Styrene

Thinning max.: 5 %

Cleaning solvent: Jotun Thinner No. 17 / Jotun Thinner No. 27

Application data

Spray application

Airless Spray Equipment

Pump ratio (minimum) :	42:1
Pressure at nozzle (minimum) :	150 bar/2100 psi
Nozzle tip (inch/1000) :	27-35
Nozzle output (litres/minute) :	6.0
Filters (mesh) :	Remove filters

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

- extended hoses or hose bundles
- extended hose whip-end line
- small internal diameter hoses
- high paint viscosity
- large spray nozzle size
- inadequate air capacity from compressor
- incorrect or clogged filters

Film thickness per coat

Typical recommended specification range

Dry film thickness	500 - 1000 μm
Wet film thickness	520 - 1040 μm
Theoretical spreading rate	1.9 - 0.9 m^2/l

All vinyl ester and polyester resin systems are subject to some shrinkage during the curing process. This results in a practical spreading rate lower than the theoretically calculated. The shrinkage depends on actual dry film thickness applied and conditions during application.

Can be applied up to 100 % higher than maximum specified film thickness without loss of technical properties.

Film thickness measurement

Wet film thickness (WFT) measurement and calculation

To ensure correct film thickness, it is recommended to measure the wet film thickness continuously during application using a painter's wet film comb (ISO 2808 Method 1A). The measurements should be done as soon as possible after application.

Fast drying paints may give incorrect (too low) readings resulting in excessive dry film thickness. For multi layer physically drying (resoluble) coating systems the wet film thickness comb may give too high readings resulting in too low dry film thickness of the intermediate and top coats.

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

Dry film thickness (DFT) measurement

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.

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	23 °C	40 °C
Surface (touch) dry	3 h	2 h	2 h
Walk-on-dry	5 h	2 h	2 h
Dry to over coat, minimum	5 h	2 h	2 h
Dried/cured for service	4 d	2 d	1 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 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	23 °C	40 °C
Itself	10 h	6 h	6 h
acrylic	7 d	5 d	1 d
polysiloxane	10 d	7 d	5 d
polyurethane	10 d	7 d	5 d
unsaturated polyester	10 h	6 h	6 h

Areas for immersed exposure

Average temperature during drying/curing	10 °C	23 °C	40 °C
Itself	10 h	6 h	6 h
unsaturated polyester	10 h	6 h	6 h

Other conditions that can affect drying / curing / over coating

Adding anti-skid to the coating system

Anti skid aggregate should only be added in the final coat, and should not be used in single coat systems. Spread the aggregate evenly on the surface before half of time to Surface dry. For coatings applied in 400 to 800 µm DFT use Jotun Anti-skid, coarse particle size (700 - 1000 µm). The recommended usage is 3.0 - 3.5 kg per 10 litres of paint.

For coatings applied in 800 to 1500 µm DFT use Jotun Anti-skid, extra coarse particle size (1200 - 1600 µm). The recommended usage is 3.5 - 4.0 kg per 10 litres of paint.

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.

Damaged areas exposing bare steel:

Remove all rust, loose paint, grease or other contaminants by spot abrasive blasting, mechanical grinding, water and/or thinner washing. Feather edges of surrounding intact coating.

Too thin areas: Remove contaminants and roughen surface and reapply as soon as possible after surface is cleaned to prevent contaminants on the surface.

Overlapping zones to intact coating shall be masked off with a minimum 200 mm distance to the damage and should cover the surrounding area so that overspray to sound coating does not occur during repair application. Edges of intact coating around damage shall be feathered to ensure a smooth transition from the coating to the prepared steel. Consecutive layers of coating shall be feathered to expose each layer and new coating shall always overlap to an abraded existing layer.

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.

Smoothen the wet film with a paint brush to repair small sags and runs. More extensive sags and runs must be removed using scrapers or rags depending on severity and accessibility.

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

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

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

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

Reference to related documents

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

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

Symbols and abbreviations

min = minutes
h = hours
d = days
°C = degree Celsius
° = unit of angle

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

μm = microns = micrometres
g/l = grams per litre
g/kg = grams per kilogram
 m^2/l = square metres per litre
 mg/m^2 = milligrams per square metre
psi = unit of pressure, pounds/inch²
Bar = unit of pressure
RH = Relative humidity (% RH)
UV = Ultraviolet
DFT = dry film thickness
WFT = wet film thickness

RAQ = Required air quantity
PPE = Personal Protective Equipment
EU = European Union
UK = United Kingdom
EPA = Environmental Protection Agency
ISO = International Standards Organisation
ASTM = American Society of Testing and Materials
AS/NZS = Australian/New Zealand Standards
NACE = National Association of Corrosion Engineers
SSPC = The Society for Protective Coatings
PSPC = Performance Standard for Protective Coatings
IMO = International Maritime Organization
ASFP = Association for Specialist Fire Protection

Disclaimer

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

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

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