

For product description refer to product data sheet 48860

Scope:

These Application Instructions include surface preparation, application equipment and application details for HEMPACORE AQ 48860

HEMPACORE AQ 48860 is tested for a range of approvals for the fire protection of structural steel. Please consult the Product Data Sheet for more information. For latest information about country specific approvals, please contact your local Hempel office.

Due to the application properties of HEMPACORE AQ 48860, the coatings can be applied both off-site and on-site.

HEMPACORE AQ 48860 can be specified for indoor environments as described in ISO 12944 C1 and C2 corrosion categories in combination with approved primers and topcoats.

Note that HEMPACORE AQ 48860 shall only be used together with Hempel approved primers and topcoats. For more information please consult the list of approved primers and topcoats for Hempacore products or consult a Hempel representative.

Disclaimer

It is the applicator's responsibility to ensure that all coatings of a HEMPACORE coating system are applied in accordance with these application instructions. It is furthermore the responsibility of the applicator to ensure that the specified dry film thickness is achieved. Technical assistance can be provided by Hempel to assist the applicator and is given subject to HEMPEL's GENERAL TERMS & CONDITIONS FOR INTUMESCENT PAINTS.

Storage

HEMPACORE AQ 48860 is recommended to be stored in dry, shaded areas. The recommended storage and transportation conditions are between 10°C - 40°C. The shelf life of HEMPACORE AQ 48860 may vary depending on the storage conditions. At 25°C the shelf life is 12 months from date of manufacture. The shelf life may be reduced if the products are stored outside Hempel's recommended storage conditions. Do not store below 5°C. The products must be re-inspected before use in case the shelf life is exceeded.

Substrates

HEMPACORE AQ 48860 can be used for fire protection of structural carbon steel, galvanised steel, stainless steel and Thermally Sprayed Aluminium (TSA) according to the below recommendations.

Carbon steel

Cleaning and degreasing. Entire area to be (high pressure) fresh water cleaned in order to remove salts and other contaminants. When the surface is dry, perform abrasive blasting to minimum Sa 2½ according to ISO 8501-1. In case re-rusting has occurred between blasting and application of the primer, then the surface should be re-blasted and primed. Application of HEMPACORE AQ 48860 on top of steel that contains millscale can never be accepted.

Under restrictions St3 steel can be accepted. Degrease and high pressure water wash the substrate, prior to the St3 cleaning. Special care shall be taken to avoid polishing of the surface. Power tools such as chipping hammers, needle guns and power rotary wire brushes will provide acceptable roughness for proper adhesion of the primer. It is not acceptable that any mill scale is present on the cleaned surface. For steel prepared to St3, use primers HEMPADUR 45880, HEMPADUR 15570 or HEMPEL'S 17020. Afterwards apply HEMPACORE AQ and the possible topcoat as per the normal instructions. The St3 preparation is generally only recommended for repair of small areas.

Galvanised steel

Cleaning and degreasing. Entire area to be (high pressure) fresh water cleaned in order to remove salts and other contaminants. When surface is dry, perform either light abrasive sweep blasting with a non-metallic abrasive to a uniform rough surface or roughen the surface by mechanical means. Afterwards, apply one coat of primer HEMPADUR 15553 at maximum DFT of 100 micron.

Stainless steel

Cleaning and degreasing. Entire area to be (high pressure) fresh water cleaned in order to remove salts and other contaminants. When surface is dry, perform either light abrasive sweep with a non-metallic abrasive to a uniform rough surface or roughen the surface by mechanical means. Afterwards, apply one coat of primer HEMPADUR 15570 at maximum DFT of 100 micron.

Thermally Sprayed Aluminium (TSA)

The surface should be overcoated as soon as possible before contamination occurs. If contaminated, thoroughly clean and degrease. Avoid aluminium rust formation by long term exposure to high humidity. If rusted, the rust must be eliminated by mechanical means and washing. Apply first coat of HEMPADUR 15570 by mist-coat technique.

Surface preparation:

After priming and before application of HEMPACORE AQ 48860, remove oil and grease etc. with suitable detergent. Salt and other contaminants shall be removed by (high pressure) fresh water cleaning. Leave the surface drying for sufficient time to ensure full evaporation of water, prior to application of HEMPACORE AQ 48860.

Hempel must be consulted in all cases of doubt about the suitability for overcoating of the primer. Cases where Hempel should be consulted include (but are not limited to): surface contamination, damages and defects, unknown primer pre-applied, non-approved primer and exceeded dry film thickness of primer.

Primers

HEMPACORE AQ 48860 has been tested with several primers for compatibility and suitability in fire scenarios. **Only primers approved by Hempel can be used in combination with HEMPACORE AQ 48860.** Consult your Hempel technical representative for detailed working specification.

HEMPACORE AQ 48860 must under no circumstances be applied directly to the steel surface.

Unless stated differently in "HEMPEL approved products - Hempacore AQ 48860", HEMPACORE AQ 48860 shall be applied within the minimum and maximum over-coating intervals of the primer specified.

The maximum dry film thickness of the primer recommended by Hempel are given in the "HEMPEL approved products - Hempacore AQ 48860" and shall not be exceeded as this could influence the performance during a fire.

Application conditions:

It is recommended to apply HEMPACORE AQ 48860 on steel temperatures between 10°C - 40°C. The minimum temperature to apply the product is 5°C. When applied outside the recommended temperatures the product is more prone to surface defects and/or drying issues may be observed such as wrinkling. The surface temperature must always be 3°C above dew point and the maximum relative humidity should not exceed 85% during the application.

The area where HEMPACORE AQ 48860 is applied must be well ventilated and proper air circulation shall be secured for optimal drying, but during initial drying direct wind-impact or forced ventilation shall be avoided as this can lead to surface defects, for example wrinkling. When two coats are needed for the required DFT it is recommended to apply twice the same DFT that together equal the required total DFT. By doing this the most optimal film formation will be obtained.

Wrinkling can be minimised by

- Application of coats as thin as possible (and to use multiple coats to build up required DFT)
- Application at conditions as cool as possible
- Application in the absence of wind

Combination of the above mentioned remedies gives you the best change to achieve a coat that shows minor or no wrinkling

Prior to overcoating, the Hempacore AQ 48860 must in all situations be protected from condensation and water during application, drying and service. The topcoated paint system may be exposed to indoor C2 conditions (ISO12944).

HEMPACORE AQ 48860 is a relatively high viscosity material. Prior to application, the material has to be stirred correctly in order to homogenise the material and to ensure good flow during the application.

Excessive stirring should be avoided as this may cause dehydration of the product.

Application equipment:**Recommended airless spray equipment:**

(Airless spray data are indicative and subject to adjustment)

Pump ratio:	Min 45:1
Filter:	It is recommended to remove the gun filter and the pump filter
Nozzle size:	0.017" -0.023"
Nozzle pressure:	200 bar/2800psi
Fan angle:	30-50°

After finishing the application, clean the equipment immediately with water.

Note: Increasing spray hose diameter may ease paint flow, thereby improving the spray fan. If longer hoses are necessary, it may be necessary to raise the pump ratio to 60:1 or higher maintaining the high output capacity of the pump.

Thinning:

Thinning of HEMPACORE AQ 48860 is not normally required. In the rare cases it is required it shall be thinned with small amount of water. A drastic viscosity reduction is expected by little amount of water which may impact the sag resistance considerably.

Spray application:

During application it is recommended to put the steel sections on support trestles such that the area of contact is minimum. Best practice is "sharp" contact. This minimises the area of damages and therefore limits the to-be-repaired surfaces after the applications.

When HEMPACORE products are applied in one/few coat(s) at low dry film thicknesses, it is of special importance that a continuous, pinhole-free paint film is obtained during application of each coat. An application technique that will ensure good film formation on all faces of the profiles must be adopted. It is very important to use nozzles of the correct, not too big, size and to have a proper, uniform distance of the spray gun to the surface; 30-50 cm should be aimed at. Furthermore, great care must be taken to cover edges, openings, rear sides of stiffeners etc. Thus, on these areas application of a stripe coat will therefore be good painting practice.

The finished coating must appear as a homogeneous film with a smooth surface and irregularities such as dust, dry spray or abrasives should be removed.

Brush and roller application:

Application with hand tools, brush, or roller is possible but due to the natural tendency a less smooth paint film by these methods may be obtained. Additional coats may be necessary to obtain the specified dry film thickness.

Application by hand tools, brush, or roller is generally only recommended for small areas, repairs and touch-up.

Wet/dry film thickness:

It is important that the specified dry film thickness is achieved in order to make sure that the product is performing as specified.

The required dry film thickness of HEMPACORE products vary depending on the massivity (Hp/A value) of the steel profile and the configuration that the steel profile is used in. It is the responsibility of the applicator to ensure that the specified dry film thickness is applied on all areas.

It is recommended that the **wet film thickness** is measured frequently during the application using a wet film gauge to ensure that the specified thickness is achieved. This will allow the applicator to adjust the thickness if necessary. Avoid the gauge sinking into the underlying coat so incorrect wet film thickness measurements are made.

Measurements of the **dry film thickness** should be conducted on the fully dry HEMPACORE coats. It is important that dry film measurements are done on a fully dried paint as measurements on not fully dried paint may give incorrect results. Normally electronic dry film thickness-gauges are used for this. The applicator must confirm that the specified dry film thickness has been achieved according to the specification. If insufficient dry film thickness is measured then an additional coat or touch-up should be applied.

When indicative measurements have to be made prior to complete drying of the coating, indicative dry film thickness measurements may be done with an electronic DFT-gauge in combination with a shim. The shim must be held in between the coating and the gauge to minimise sinking-in of the gauge into the soft coating.

It is important that no topcoat is applied before the dry film thickness of HEMPACORE AQ 48860 has been measured and confirmed to be correct. If a topcoat has been applied on an area with

insufficient HEMPACORE dry film thickness then the topcoat must be removed before repair/touch-up can be conducted.

The paint layer must be applied homogeneously and as close to the specification as possible. Avoid exaggerated film thickness due to the risk of sagging, cracks and solvent/water retention and surface irregularities. The paint consumption must be controlled.

Application of Hempacore AQ 48860:

The maximum dry film thickness that can be applied with Hempacore AQ 48860 in a single coat is 750µm.

Film thickness acceptance:

It is recommended that as a minimum the specified dry film thickness of HEMPACORE AQ 48860 is achieved. It is recommended that the specified dry film thickness is not exceeded by more than 20% as this may negatively influence the performance in case of fire.

For guidelines and acceptance criteria of dry film thickness measurements it is recommended to follow industry best practice guidelines e.g. "European Industry Best Practice Guide on the application of intumescent coatings to constructional steel - CEPE/EAIPC/EAPFP 2015"

Hempel specifications:

HEMPACORE dry film thickness specifications made by Hempel, are always based on information about steel sections, configurations and other project information provided by the customer and generic information about steel section types from databases. The information provided in the specification is therefore a guideline, made to the best knowledge of Hempel, for the applicator/customer who should confirm the specification prior to application of the material.

Weathering exposure:

HEMPACORE AQ 48860 coating systems can be exposed to indoor conditions and/or C1 or C2 conditions according to ISO12944 with a selection of an appropriate topcoat.

Even in cases where topcoat is not mandatory, its application is generally recommended for optimal performance.

During the construction phase of buildings, HEMPACORE AQ 48860 may be exposed to outdoor arid, hot and humid environments during maximum 3 month provided it is suitably topcoated with a PU topcoat.

Topcoats:

Depending on the end use of the coating system, a topcoat may be required. A selection of approved topcoats are compatible with HEMPACORE AQ 48860.

Only Hempel approved topcoats can be used in combination with HEMPACORE AQ 48860. Consult your Hempel technical representative for a detailed specification.

It must be ensured by the applicator that the total specified dry film thickness of HEMPACORE AQ 48860 is achieved prior to the start of the topcoat application. Dry film thickness measurements must be done on a fully dry HEMPACORE coating in order to measure an accurate result.

Before application of a topcoat (or additional coat of HEMPACORE AQ 48860) the applicator must ensure that the coating surface of the HEMPACORE product is clean of salts, oil, grease or other contaminants.

Recommended dry film thickness of the topcoat depends on the exposure conditions. For ISO 12944 C1 conditions HEMPACORE AQ 48860 may be used without topcoat. A topcoat is, however recommended for increased durability and/or aesthetic appeal, and is required in C2 conditions. Consult your Hempel technical representative for detailed specifications for different corrosion categories.

Some topcoats may inhibit/prolong the drying of HEMPACORE AQ 48860. It is important that the topcoat is not applied before the preceding HEMPACORE coats are dry in order to avoid solvent/water entrapment.

Repair of damaged areas:

HEMPACORE AQ 48860 can be used as repair and touch-up coating for damaged areas of freshly applied HEMPACORE AQ 48860. Prior to repair, make sure that the surface is clean and free of contamination. Loose particles are to be removed completely.

When film damages are deep and bare steel is visible, then clean the spots to minimum St 3 (ISO 8501-1) or by abrasive blasting to minimum Sa 2½ (ISO 8501-1) prior to application of the new coating system. Application of the damaged areas can be done by airless spray, brush cladding, roller or spatula/putty knife. Conditions during these applications shall fulfil the requirements as during normal application conditions.

It is evident that after transport and handling the coating is damaged. Proper lifting equipment shall be used in order to minimise the damage. Areas where the steel sections lean on supporting bars shall be reduced to a minimum. Positioning the lifting equipment smartly also reduces, and sometimes prevents damages.

At those spots where it was not possible to prevent damage, distinction has to be made between damage of the

- complete coating system, including the primer
- damage of the intumescent coating

Where the complete coating system is damaged, including the primer, the coating system shall be removed by St 3 (ISO 8501-1) cleaning with a mechanical brush, until the bare steel is visible. Care shall be taken not to polish the substrate. After St 3 (ISO 8501-1) cleaning the primer shall be applied, followed by the intumescent coating in multiple layers (up to a max DFT per coat of 750µm) until the required intumescent DFT is achieved. After full drying of the intumescent coat the topcoat can be applied again. For spot repairs it is common to apply the primer by brush, and the intumescent coating by brush and/or putty knife.

Where only the intumescent coating is damaged, and the primer is still intact, the intumescent coating can be smoothened by a scraper or mechanical sanding machine. Make sure the surface is free of contaminants and then by airless spray, brush and/or putty knife the damaged areas can be filled up with maximum 750 µm DFT per coat until the required DFT is achieved. After drying of the intumescent coating the topcoat can be applied.

If the damage occurs, when the intumescent coating is still soft, it may be beneficial to remove the coating by knife or spatula/scraper. If the coating has already dried too much for this, St 3 (ISO 8501-1) cleaning can be done using a mechanical wire brush.

For repairs of older systems, the full coating system shall be removed and the damaged areas shall be cleaned thoroughly by power tool cleaning to minimum St 3 (ISO 8501-1) (spot-repairs) or by abrasive blasting to minimum Sa 2½ (ISO 8501-1) prior to application of the new coating system. After removing the loose particles and dust, the coating system can be build up per the normal procedure.

Maintenance:

Maintenance of HEMPACORE coating systems must be done with Hempel approved topcoats or with the same HEMPACORE product if no topcoat has been used before. HEMPACORE products cannot be directly applied over a coating system with topcoat.

Areas of damaged topcoats must be repaired immediately, as the underlying intumescent in these areas may be exposed to unacceptable weathering.

Maintenance of a HEMPACORE coating system without consulting Hempel for approval may influence the performance of the HEMPACORE product. All maintenance of any HEMPACORE coating system must therefore be done in consultation with Hempel.

Maintenance of HEMPACORE coating systems outside Hempel's instructions is subject to the conditions given in HEMPEL's GENERAL TERMS AND CONDITIONS FOR INTUMESCENT PAINTS.

Handling:

In off-site applications, the steel sections will need to be handled after drying of the coating system. It is important to note that due to the thermoplastic nature of acrylic intumescent coatings, they are sensitive to damage, also after full drying. Generally it is more of a matter to minimise the damage than to prevent damage. Therefore special care should be taken to smartly handle the coated steel sections. Use suitable lifting equipment. If the steel sections have areas that are not sprayed with intumescent paint (e.g. areas left blank as welding/bolting area), the lifting equipment should be installed in those places when possible. This reduces the amount of damage, and therefore also the repair work required. The amount of supporting beams, normally of wood, shall be limited to the minimum required, in order to minimise the damaged areas. Areas where the sections lean on the supporting beams are likely to be damaged. Maintain sufficient ventilation, also when the product is considered dry. Therefore, do not cover up the sections as this will affect the final drying properties.

During transport, storage and handling of coated steel sections, attention should be given to avoid damages to the coating.

Those areas that are damaged during handling and/or transport should be repaired according to the repair instructions to secure the fire protection properties.

HEMPACORE AQ 48860 without topcoat must in all situations be protected from condensation and water. The topcoated product can be exposed to indoor C2 conditions (ISO12944).

Physical data versus temperature:

Drying studies have been done at Hempel's laboratories under controlled conditions. These test results are the basis for the drying times mentioned in this document. Drying times of HEMPACORE AQ are dependent on temperature, ventilation, amount of air renewal, air movement, state of the drying of previously applied coats, etc. Hence, the mentioned times are indicative and shall always be used as a guideline for field applications. **Drying times (provided there is good ventilation and RH < 85%):**

Table 1: Surface dry (ISO 9117-3:2010)					
Temperature	DFT	10 °C	20 °C	30 °C	40 °C
HEMPACORE AQ 48860	750 µm DFT	60 min	16 min	10 min	10 min

Table 2: Dry to touch					
Temperature	DFT	10 °C	20 °C	30 °C	40 °C
HEMPACORE AQ 48860	750 µm DFT	80 min	60 min	40 min	<30min

Table 3: Through-dry (ISO 9117-1:2009)		
Temperature	DFT	20 °C
HEMPACORE AQ 48860	750 µm DFT	5 hours

Table 4: Dry to handle (Hempel internal method RD-857)						
	DFT	Nr of coats	10 °C	20 °C	30 °C	40 °C
HEMPACORE AQ 48860	350 µm	1	12 hours	5 hours	4 hours	3 hours
	750 µm	1	16 hours	8 hours	5 hours	4 hours
	1500 µm	2	24 hours	10 hours	7 hours	6 hours

Note: Dry to handle is the minimum time for a coating that is required to dry in order to obtain sufficient hardness to be handled with care without significantly being damaged. However, intumescent coatings like HEMPACORE AQ are always sensitive to damage due to the nature of the product and its thermoplasticity. Special care shall be taken to handle elements coated with HEMPACORE AQ.

Note: The dry to handle times in the table for 1500µm are measured using overcoat intervals of 24 hours. When shorter overcoat times are used, considerable longer dry to handle times will be valid.

Table 5: Minimum overcoating intervals (overcoating with itself)				
DFT of HEMPACORE AQ 48860	10 °C	20 °C	30 °C	40 °C
750 µm	16 hours	8 hours	5 hours	4 hours
1500 µm or higher	24 hours	10 hours	7 hours	6 hours

Note: For maximum throughput when applied in shop it is good practice to determine the condition of the paint prior to recoating or overcoating. In order to obtain the fastest drying of especially high-thickness-coating-system (total DFT above 750 µm), the previous intumescent layer shall be dry hard, which means no mark can be easily made in the paint by pressing firm with a thumb. The coating does not necessarily have to be so called "nail hard". For maximum throughput longer overcoat times are recommended as mentioned in table 5, 24 hours is common practice.

Table 6: Minimum over-coating time (overcoating with approved topcoat, acrylic or other chemistry)

DFT of HEMPACORE AQ 48860	Nr of coats	10 °C	20 °C	30 °C	40 °C
750 µm	1	16 hours	8 hours	5 hours	4 hours
1500 µm	2	24 hours	10 hours	7 hours	6 hours
> 1500 µm	3+	24 hours	10 hours	7 hours	6 hours

Note: Overcoating early with a topcoat may delay the drying of the total coating system. The note from table 5 applies.

Safety:

Handle with care. Before and during use, observe all safety labels on packaging and paint containers, consult Hempel Material Safety Data Sheets and follow all local or national safety regulations. Avoid inhalation, avoid contact with skin and eyes, and do not swallow. Take precautions against possible risks of fire or explosions as well as protection of the environment. Apply only in well ventilated areas.

Important information:

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Issued by:

HEMPEL A/S - 48860

These Application Instructions supersede those previously issued.

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