Interkote®
Application Guidelines

International Paint Ltd.
www.international-pc.com
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Interkote Application Guidelines Revisions

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<td>0</td>
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1. INTRODUCTION

These application guidelines contain instructions on how to install Interkote fireproofing systems.

Passive fireproofing materials prevent potentially catastrophic structural failures from occurring by providing an insulating shield against the intense heat of a fire. The Interkote fireproofing systems possess extensive certification for a wide range of fire protection ratings.

Since both fire protection performance and pre-fire durability critically depend on the correct application of the system, International Protective Coatings requires that the Interkote fireproofing systems are installed in accordance with the instructions contained in these application guidelines.

Our Regional Office Technical Service Managers provide the support necessary to ensure that Interkote fireproofing projects are carried out in accordance with the instructions in this guide and any additional project specific requirements.
2. SYSTEM DESCRIPTION

The Interkote passive fireproofing system consists of a bauxite based cementitious material designed to protect substrates from the effects of onshore hydrocarbon fire. Interkote fireproofing systems require a galvanised metal lath reinforcement to be used to provide long lasting durability.
3. SURFACE PREPARATION

Carbon Steel

For applications to carbon steel Interkote requires a suitable primer system. The primer must be capable of providing adequate corrosion protection to the steel substrate for the environment in which the material will operate.

The selected primer shall be compatible with exposure to alkali Portland cement and pH in the range of 11 to 13. To ensure that this is the case, primers must be selected from the Interkote approved primers list.

Contact your local International Paint sales representative for advice on primer selection.

Steel preparation before priming should be carried out in accordance with the approved primer's Product Data Sheet.

Following primer application and prior to Interkote application mechanical reinforcement in the form of galvanised expanded steel metal lath must be attached to the primed steel substrate. The reinforcement must be attached in accordance with the guidelines detailed in section 5.

Galvanised Surfaces

Interkote is compatible for application over primed galvanized steel surfaces. Prior to application of the approved primer ensure Zinc oxide layers are removed and that the surface is clean, oil and dirt-free to assure proper adhesion of the primer.

Prior to Interkote application, mechanical reinforcement in the form of galvanised expanded steel metal lath must be attached to the primed steel substrate. The reinforcement must be attached in accordance with the guidelines detailed in section 5.

Stainless Steel

Interkote is suitable for application to stainless steel surfaces that are compatible with Portland cement.

Stainless steel mechanical reinforcement must be applied and mechanically fastened to all surfaces prior to application.
4. STORAGE CONDITIONS

All material to be used for fireproofing shall be delivered in original unopened packages bearing the name of the manufacturer, the brand and proper UL labels for fire hazard and fire resistance classifications. The material shall be kept dry until ready for use. Packages of material shall be kept off the ground, under cover and away from sweating walls and other damp surfaces. All material that has been exposed to water before use shall be discarded. Stock of material is to be rotated and used before its expiration date.
5. MECHANICAL REINFORCEMENT

Galvanized metal lath must be mechanically fastened to the substrate prior to the application of the Interkote 1460 or Interkote 1560 fire protection. Metal lath specifications and attachment details are given below.

**Mechanical Reinforcement Specification**

Metal lath shall be minimum 2.5 lbs/yd² (1.4 kg/m²) self-furring galvanized diamond metal lath.

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**Column and 4 Sided Beam Application**

Lath shall be wrapped tightly around the contour of the structural steel (beam or column) and overlapped a minimum of 2 inches (50mm). All lath overlaps shall be fastened 4 inches (100mm) on center through both overlapping layers within one inch (25mm) of the edge of the top exposed layer of lath. Lath shall be overlapped and mechanically fastened to the substrate with metallic fasteners, welds or steel pins. Metallic attachment pins must be compatible with the galvanized metal lath as to avoid electrolytic corrosion.

Attachment to the steel substrate shall be 12 inches (300mm) on centre across the face of the lath. Where flange or web widths are 24 inches (600mm) or less, attachment shall be (at a minimum) a single row of metallic fasteners placed at 12 inch (300mm) centres down the centre of the surface. Fasteners shall have a head diameter of not less than ½ inch (12.5mm). Fasteners and the penetration points shall be protected against corrosion with a compatible protective coating. Designs are based upon lath which is mechanically attached to the steel using powder actuated studs or stud welding pins.
Vessel Skirts & Flat Surfaces

The galvanized self-furring metal lath should be wrapped around the vessel skirt or placed onto the flat surface with a minimum overlap of 2 Inches (50mm) at all joints. The joints shall then be mechanically fastened or secured using galvanised 16 gauge tie wire. Attachments shall be at 4 inches (100mm) on center within one inch (25mm) of the edge of the exposed top layer of lath.

The lath shall be mechanically attached to the steel using powder actuated studs or stud welding pins. When powder actuated or ramset fasteners or welding is prohibited; a pneumatic fastener may be used.

Stud/pin spacing shall be a maximum 16 inches (400mm) in both directions and rows of studs/pins shall be staggered.

On very large areas, control joints are made by scoring halfway through the thickness of Interkote 1460 or Interkote 1560. This is achieved by using a trowel blade edge or an appropriate scoring tool. The joints should be spaced on 10 feet (3 metre) centres, both horizontally and vertically. After scoring the joint should be filled with an exterior grade butyl caulk.
Notes
- Lath mechanically attached to steel shall use powder actuated studs or studwelding pins
- Stud spacing shall be a maximum 406mm (16 inches) in both directions
- Rows of studs/pins shall be staggered
- Lath must be overlapping a minimum 76mm (3 inches) at all joints
- Secure overlapping lath joints using galvanised 18 gauge tie wire
- Exterior grade polysulfide or silicone caulk must be applied to all joints where Interkote terminates to steel

Interkote Application Guidelines

Notch and caulk

1.4 kg/m² (2.5 lb/ft²) diamond lath secured to skirt using mechanical fastening system

Interkote 1460 / 1560 trowelled smooth

Caulk around skirt opening

Sloped to drain

Notch and caulk
6. INTERKOTE APPLICATION EQUIPMENT

General

There are many types of pumps and mixers capable of mixing and conveying Interkote 1460 and Interkote 1560. These pumps are available in gas, diesel, electric and pneumatic versions.

Pumping distance and rate will depend on the type of equipment used. Smaller pumps will pump shorter distances and less bags per hour, but offer more mobility and quicker set ups. Larger pumps can pump longer distances, higher pumping rates, and minimize the number of relocations. Review actual job site conditions and regulations before selecting the appropriate equipment set up.

A reliable water delivery system is also highly recommended to provide consistent mixes batch to batch.

The guidelines below are for a typical large application. Please contact International Paint Technical Service for more information:

**Pump**
Putzmeister S5EV or Hyflex HZ-30E

**Mixer**
May be electric, gas or diesel powered similar to Stone mixer 855 PME1-8cuft or Electric 2 hp 1ph 115/230. Mixers which do not allow blade speed adjustment should be fitted with paddle blades with a rotation speed of 35-40RPM.

**Material Lines**
150-200 feet (45-60 metres) with Rotor/stator pump and 1” (25mm) whip hose.

- Imperial: One 50’x 2”, one 50’x 1.5”, one 50’x 1.25” and one (or two) 25’x 1”
- Metric: One 15m x 50mm, one 15m x 37.5mm, one 15m x 31.25mm and one (or two) 7.5m x 25mm

**Air Lines**
Typical 3/8” (9.5mm) diameter with quick disconnects rated at 300 psi (20 bar). A nozzle air stem with shut off valve is also required.

**Spray Nozzle**
1” (25mm) Finish nozzle with selection of 3/8” (9.5mm), ½” (13mm), and 7/16” (11mm) orifices. A mini shield is recommended for controlling overspray. We do not recommend 9/16” (14mm) or larger. Inclusion of a swivel allows for rotation of the spray nozzle and a material ball valve allows control over the flow of material to reduce waste and overspray.

**Small Set-up**
Quikspray Carrousel Pump Electric 110v
50’x 1” (15m x 25mm) with Spray finishing hand-gun.
7. MIXING

Instructions

It is important to obtain a consistent, uniform mix in order to maintain a proper mixing/spraying operation. To obtain the proper mix quality and density, follow this procedure and the guidance given in the Yield Chart below:

Note: a water metering system is recommended vs. a 5 gallon (19 liter) pail. A choice of an “in-line” water meter can be an electronic GPI Flow Meter or Fill-Rite Flow Meter. For high production jobs a timed sump and 55 gallon (208 liters) reservoir are recommended.

a) Ensure that the mixer blades are clean
b) Set mixer speed at 35-40 RPM
c) With blades turning, add water (per the guidance given in the yield charts below). This is recommended as an initial starting point for water addition
d) Water to be clean, fresh, suitable for domestic consumption and free from such amounts of mineral or organic substances as would affect the set of the Portland cement material. Do not use hot water.
e) Stop the blades, and add the appropriate number of bags of Interkote 1460 / Interkote 1560. Re-start the mix blades
f) Mix for approximately 2-2 ½ minutes. The mix will initially look dry and will gradually “cream out”
g) Stop mixer and check the material for a density (shown below). If not within this tolerance, restart mixer and adjust density upwards by adding water. To decrease the density increase the mix time and/or varying the speed of the blades. Take care not to over mix the material.
h) Once a mixing cycle and amount of water are determined, subsequent mixes will give similar results and Step G need not be repeated
i) Restart mixer for approximately 10 seconds to re-blend before dumping into the pump hopper. Dump entire batch. Before starting a new batch the mixer must empty completely to avoid leaving any old mix being reworked into the next batch.
j) Mixed product can be used for 2 hours at 70°F (21°C) and less at higher temperatures. Product that begins to stiffen and set should not be reworked

k) Mixing by hand is not acceptable

Density

Particular attention must be paid to wet density measurements as they are critical to obtaining correct dry densities. Please refer to the instructions and Simplified Yield Charts for Interkote 1460 / Interkote 1560 below:

a) Place an empty 1 liter measuring cup on a set of digital scales
b) With the cup still on the scales reset the display to zero and then remove the cup
c) Mix the material as instructed in the previous set of instructions (parts a - f)
d) Stop the mixer and completely fill the 1 liter cup with the mixed material so that it is level with the top of the cup

e) Return the filled measuring cup to the scales and record the weight on the display

f) Refer to the simplified yield charts below to ensure that the material is within the minimum and maximum mixer density values

Simplified Yield Chart for Interkote 1460

<table>
<thead>
<tr>
<th>Net weight per 1 liter cup</th>
<th>Minimum</th>
<th>Target</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixer Density</td>
<td>835 g</td>
<td>890 g</td>
<td>945 g</td>
</tr>
<tr>
<td>Nozzle Density</td>
<td>955 g</td>
<td>1005 g</td>
<td>1055 g</td>
</tr>
<tr>
<td>Yield (bd ft / bag)</td>
<td>15.25</td>
<td>15.75</td>
<td>16.25</td>
</tr>
</tbody>
</table>

Notes
1. Water must be between 3.5 – 4.5 gallons (13 – 17 liters) per bag
2. For increased hangability target 3.5 gallons (13 liters) per bag
3. Mixing time ~ 2 - 2 ½ minutes

Simplified Yield Chart for Interkote 1560

<table>
<thead>
<tr>
<th>Net weight per 1 liter cup</th>
<th>Minimum</th>
<th>Target</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixer Density</td>
<td>1040 g</td>
<td>1080 g</td>
<td>1120 g</td>
</tr>
<tr>
<td>Nozzle Density</td>
<td>1140 g</td>
<td>1205 g</td>
<td>1265 g</td>
</tr>
<tr>
<td>Yield (bd ft / bag)</td>
<td>12</td>
<td>12.5</td>
<td>13</td>
</tr>
</tbody>
</table>

Notes
1. Water must be between 3 – 4 gallons (11 – 15 liters) per bag
2. For increased hangability target 3 gallons (11 liters) per bag
3. Mixing time ~ 1 ½ - 2 ½ minutes
8. APPLICATION

General

Interkote 1460 / Interkote 1560 may be applied by spray and/or trowel. **It is recommended that Interkote 1460 / Interkote 1560 be spray applied to the substrate or into a suitable container prior to troweling.**

Thickness per pass will depend on application method, weather conditions and equipment used.

Spray Application

Prior to the start of pumping (the first batch) the pump hopper should be washed down with water and a minimum of 2 gallons (7.5 liters) of water placed in the hopper of the pump. The orifice and cap should be removed from the nozzle and the air stem should be pulled back to minimize restrictions during start up. When mixing is complete the pump should be started and the water in the hopper pumped into the lines. When the pump hopper is just empty, the mixer can be rotated to dump the first batch of Interkote 1460 / Interkote 1560 fireproofing into the hopper. Avoid allowing the pump to run with the hopper empty as this causes air pockets in the line. Pumping should continue until the material at the nozzle is of normal consistency and all the water and "wet" material has been pushed from the lines (approximately 5 gallons (19 liters)). This procedure minimizes packing at fittings and at the nozzle during start up.

When "good" material has reached the nozzle, shut off the pump and install a nozzle orifice to give the desired pattern and texture. Orifice size (3/8", 1/2" or 7/16" (9.5mm, 13mm or 11mm)) and air pressure can be varied to obtain the target nozzle density and desired surface texture.

- a) For application overhead, a scratch coat of up to ½ inch (13mm) is recommended to key into the 2.5 lbs metal lath
- b) Thicknesses in excess of 1 inch (25mm) should be applied in multiple coats allowing the first coat to set (but not dry out) between coats
- c) Allow to set for approximately 1 to 2 hours at 70°F (21°C). Check to see if the material has obtained sufficient strength to support additional product before applying the subsequent coats
- d) It is recommended that the total required thickness be applied within a 24 hour period. If this is not possible, the preceding coats should be left as sprayed or scored after the initial 24 hour period, Interkote 1460 / Interkote 1560 should then be dampened with water before application of additional coats
- e) At no time shall Interkote 1460 / Interkote 1560 be applied at a thickness less than ¼ inch (7mm) or "skim" coated
- f) At no time shall Interkote 1460 / Interkote 1560 be applied at temperatures less than 40°F (4°C) or above 104°F (40°C). Caution: Do not start work if ambient temperatures are expected to drop below 35°F (2°C) for 24 hours after application
- g) Drying time will depend on the environment and thickness of the SFRM
h) Finished surfaces shall be protected from damage and overspray. Particular attention should be paid to alkali sensitive substrates such as aluminium

i) Fresh Interkote 1460 / Interkote 1560 must be protected from rain or running water for 24 hours at 70°F (21°C). In low humidity, high temperature, direct sun or wind, the Interkote 1460 / Interkote 1560 surface should be kept damp for at least 12 hours by applying a water mist or wrapping in plastic sheets to reduce rapid water loss

Surface Appearance

Various textures can be attained for Interkote 1460 / Interkote 1560. Adjusting the nozzle orifice size, air pressure, air stem position and mix stiffness will yield varying degrees of finished texture. As a rule of thumb, a tight smooth “sand like” finish can be attained by utilizing a smaller orifice, increasing the air pressure and make the mix slightly wetter.

A standard more textured finish can be achieved by using a larger orifice, decreasing air pressure and making the mix slightly stiffer. Rollers, brushes and trowels can further provide a unique texture as well as special application techniques.

If a smooth finish is required, this may be done by trowel, roller or brush typically within an hour after final application of Interkote 1460 / Interkote 1560. If left longer than an hour the material may begin to stiffen and become difficult to manipulate.

After complete drying (maximum humidity of 3.5% measured with a plasterers’ moisture meter) Interkote 1460 / Interkote 1560 may be painted with coatings specifically approved for use over Portland cement based products.

Termination Points

Due to the natural shrinkage of Portland cement based products during curing and/or the differential expansion of steel substrates and fireproof coatings, termination points on steel substrates may develop small cracks which can allow water to enter the system. For exterior use, all exposed top or side termination points of the fireproofing on the substrate should be caulked to prevent water from entering the system. It is also recommended that flashings be installed above all termination points. Flashings should be caulked in place and mechanically fastened to the substrate to prevent water from working its way behind the flashing material. The flashing should completely cover the exposed termination point and should extend a minimum of 2 inches (50 mm) down over the fireproofing material. In some cases, application may be terminated under naturally occurring overhangs, such as rings around the tops of vessel skirts that, depending on the design, can act as “flashing” to protect the termination point from exposure to water.
Work Stoppages

Freshly mixed material can remain in the delivery system for up to two hours. Best practice is to move material after the first hour and avoid long periods of downtime. Any material in the hopper can be stirred; material in the mixer can be mixed for a few seconds longer before pumping.

Material should not be left in the lines for longer than necessary as it will begin to stiffen. If this does occur there is no safe way to clean out the hoses.

Removal of blockages should be undertaken by a competent individual familiar with the process and necessary safety precautions.

Cleaning

It is good working practice to periodically rinse out the mixer and pump hopper with water during the course of the working day. Frequency of cleaning will depend upon amount sprayed, temperature and elapsed time, including any delays. When long periods (over 2 hours) of downtime occur it is necessary to thoroughly flush the entire system.

When cleaning the material lines continue to run water through until it runs clear. If material has been left in the lines for a short period of time a sponge should be run in case material has built up on the walls of the hoses.

All surplus materials and empty containers and bags should be disposed of in accordance with appropriate regional regulations/legislation.
9. PATCHING AND REPAIR

Crack Repair

Interkote 1460 / Interkote 1560 are formulated with a Portland cement binder system. Portland cement based products are subject to some shrinkage during the curing and drying process. Interkote 1460 / Interkote 1560 are formulated with various reinforcing and anti-crack additives to minimize the formation of cracks. Careful attention to surface preparation, mesh and lath reinforcing, bonding agent recommendations as well as damp cure recommendations will minimize crack formation during drying. Hairline surface cracking will not impair the fire resistance rating. Where cracking is objectionable cracks can be repaired in the following manner:

a) For cracks less than $\frac{1}{4}''$ (6mm) in width, use a tool to score the crack line and open the crack to a nominal width of $\frac{1}{4}''$ (6mm) or greater. Clean away any loose dust and proceed to 'c'

b) For damaged areas and cracks having a width greater than $\frac{1}{4}''$ (6mm), clean the exposed surface to remove loose material and dust and proceed to 'c'

c) Using a large paintbrush, or latex spray equipment apply an International Paint approved bonding agent (e.g. Firebond Concentrate, manufactured by W.R. Grace) to the crack line. Spray or brush the bonding agent into any crack so that it penetrates as far as possible into the crack. Apply the bonding agent to completely wet all surfaces in the area of the crack. Extend the bonding agent application 12 inches (300mm) onto the surface of the in place fireproofing on all sides of the crack. Allow the bonding agent to dry

d) Prepare a “mixing solution” of 2 parts by volume water and 1 part bonding agent. Follow the mixing instructions for Interkote 1460 / Interkote 1560 as in our published literature substituting the “mixing solution” for the water detailed in the instructions. Mix until the material is well blended and lump free. Avoid over mixing as this may lower the in place density

e) In addition to the use of the bonding agent, (after the bonding agent has dried) when applying new material over ‘in place material’ that has dried, it may be necessary to dampen or pre-wet the ‘in place material’ sufficiently to prevent premature drying of the newly applied patching material. In addition to the dryness of the substrate, the requirement to pre-wet will depend on the thickness of the patch, and environmental drying conditions such as ambient temperature and relative humidity. Where required, International Paint should be consulted for specific recommendations appropriate to the jobsite conditions

f) Trowel the Interkote 1460 / Interkote 1560 into the crack areas pushing the material into the crack to fill the crack as much as possible. Be sure that the material applied over damaged areas is pressed firmly against the surface to eliminate any air pockets and provide intimate contact between the fresh Interkote 1460 / Interkote 1560 and the ‘in place material’. Extend the patch approximately 4 inches (100mm) beyond the edges of the crack

Damaged Material Removal and Repair

a) All damaged and loose material that would impair adhesion of the patching material must be removed prior to patching. Where damaged material extends to the steel or concrete substrate removal should be to the steel or concrete substrate
b) Where well-bonded material exists below the damaged material, removal of the damaged material should extend to the well-bonded firm material. There is no requirement to remove well-bonded material that lies immediately beneath loosely bonded or poorly adhered material. Where the bond of the ‘in place material’ is in question, well-bonded material may be determined by in-place bond strength tests in accordance with ASTM E736 as modified for high strength materials.

c) Using a large paintbrush, or spray equipment apply an International Paint approved bonding agent to the area to be patched and extend the bonding agent application 12 inches (300mm) onto the surface of the ‘in place fireproofing’ on all sides of the area to be patched. Application should be at a rate of 500 square feet per gallon (12 square metres per litre) as to completely wet the surface of the fireproofing where additional material will be applied. Allow the bonding agent to dry.

d) After the bonding agent has dried, when applying new material over ‘in place material’ that has dried it may be necessary to dampen or pre-wet the ‘in place material’ sufficiently to prevent premature drying of the newly applied patching material. In addition to the dryness of the substrate, the requirement to pre-wet will depend on the thickness of the patch, and environmental drying conditions such as wind velocity, ambient temperature and relative humidity. Where required, International Paint should be consulted for recommendations appropriate to the specific jobsite conditions.

e) Spray apply additional Interkote 1460 / Interkote 1560 to the patch area to bring the thickness of the fireproofing to the minimum (or greater) as required in the fire resistance design.

f) The patching material should be keyed into the material surrounding the patch. It should be understood that the integrity of the surrounding material shall not have been impaired. If the surrounding material has been damaged it should be removed prior to patching.

g) Where the area of the individual patch will not exceed 144 square inches (930 square centimetres), Interkote 1460 / Interkote 1560 may also be hand mixed and trowel applied.

h) Where hand applications will exceed 144 square inches (930 square centimetres), spray applied fire resistive material shall be mechanically mixed and pumped through standard application equipment and then sprayed into a suitable container. From the container, the material may be trowel applied to beams, columns, decks, joists and trusses in accordance with the thicknesses and densities required in the specific design. Mechanical mixing may include the use of drill-mounted mixers, plaster mixers and other standard equipment designed for the mixing of plaster based products. Rotary drum “concrete” should not be used.

i) The minimum density of the patching material shall be the minimum specified in the fire resistance design.

j) The minimum thickness of the material, as specified in the fire resistance design, must be maintained.

k) Where required over painted surfaces, bond testing should be conducted in accordance with ASTM E736 and the requirements for Spray Applied Fire Resistive Materials in the Underwriters Laboratories Fire Resistance Directory.

l) Where patching is to attachment point of clips or hangers the point of attachment should be totally encased in the patching material at the point of attachment to the structural member at a thickness equal to that being applied to the structural member.