

Interfine 1080 Application Guidelines

Prepared by: Protective Coatings Technical Support

International Paint Ltd.
www.international-pc.com

The information in this guideline is not intended to be exhaustive; any person using the product for any purpose other than that specifically recommended in this guideline without first obtaining written confirmation from us as to the suitability of the product for the intended purpose does so at their own risk. All advice given or statements made about the product (whether in this guideline or otherwise) is correct to the best of our knowledge but we have no control over the quality or the condition of the substrate or the many factors affecting the use and application of the product. THEREFORE, UNLESS WE SPECIFICALLY AGREE IN WRITING TO DO SO, WE DO NOT ACCEPT ANY LIABILITY AT ALL FOR THE PERFORMANCE OF THE PRODUCT OR FOR (SUBJECT TO THE MAXIMUM EXTENT PERMITTED BY LAW) ANY LOSS OR DAMAGE ARISING OUT OF THE USE OF THE PRODUCT. WE HEREBY DISCLAIM ANY WARRANTIES OR REPRESENTATIONS, EXPRESS OR IMPLIED, BY OPERATION OF LAW OR OTHERWISE, INCLUDING WITHOUT LIMITATION, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. All products supplied and technical advice given are subject to our Conditions of Sale. You should request a copy of this document and review it carefully. The information contained in this guideline is liable to modification from time to time in the light of experience and our policy of continuous development. It is the user's responsibility to check with their local International Paint representative that this guideline is current prior to using the product.

ID 1080_uk	Rev. 08	Date 19/12/2016	Interfine 1080	Page 1 of 19
---------------	------------	--------------------	-----------------------	--------------

The International Paint Application Guidelines have been produced and revised in line with the Worldwide Protective Coatings Product Range. The purpose of the guidelines is to ensure that the product, as applied, provides the required level of durability.

Successful in-service performance of a coating system depends upon both the correct choice of product(s) and the adoption of the correct guidelines for surface preparation and paint application.

The responsibilities for achieving the specific standards outlined, and for carrying out surface preparation and paint application, rest with the Contracting Company. Under no circumstances do these responsibilities rest with International Paint. We will generally provide for the presence of a Technical Service Representative at key stages during the performance of the contract. The role of the International Paint Technical Service Representative is advisory only unless otherwise specified in the terms and conditions of the contract. The information contained herein presents guidelines for the application of Interfine 1080 to correctly prepared surfaces.

Table of Contents

1. Introduction	3
2. Where to Apply Interfine 1080	3
3. Storage of Material	3
4. Environmental Conditions for Application	4
5. Surface Preparation	4
6. Primers and Overcoat Intervals	5
7. Pot Life/Pre-Application	5
8. Airless Spray Application	6
9. Air Spray Application	7
10. Brush and Roller Application	7
11. Standard of Cosmetic Finish	7
12. Possible Film Defects	8
13. Measurement of Dry Film Thickness	8
14. Inspection and Repair	9
15. Health and Safety	10

1. INTRODUCTION

Interfine 1080 is a high performance, single pack, high solids inorganic hybrid finish which offers compliance to current VOC legislation, and contains no free isocyanate. When used in combination with a suitable primer or primer/intermediate, Interfine 1080 provides excellent long term durability and anti-corrosive protection to structural steel.

Interfine 1080 may also be used to provide a cosmetic finish to concrete surfaces, providing that these are sound, stable and have been correctly prepared and primed. Contact International Paint for specific advice with regard to suitability of Interfine 1080 for the intended service conditions.

This document gives detailed guidance on the use and application of Interfine 1080 and should be read in conjunction with the Interfine 1080 technical data sheet and material safety data sheet (MSDS).

2. WHERE TO APPLY INTERFINE 1080

Interfine 1080 is primarily intended for on-site brush & roller application in a maintenance situation or as a new construction finish coat where the finish coat is applied at site. Interfine 1080 can be used in a wide range of industrial and offshore facilities, on tank externals, pipe lines and structural steel items where a high standard of cosmetic finish is required.

Coating systems utilising Interfine 1080 and appropriate primer/intermediate coats are suitable for application onsite and in the paint shop, provided that sufficient time is allowed for through drying (hard dry) before handling. Care should be taken during handling and movement to minimise damage.

3. STORAGE OF MATERIAL

Interfine 1080 is moisture sensitive and should be stored in covered, dry conditions in the temperature range of 0°C to 40°C (32°F to 104°F). At a storage temperature of 25°C (77°F), Interfine 1080 will have a shelf life of 24 months. Shelf life will be reduced at higher storage temperatures. At low temperatures (<5°C (<41°F)), the material will become slightly thicker and may require warming up prior to application. At temperatures higher than 25°C (77°F), it will flow more easily and dry faster. Partially filled containers may show surface skinning and/or a viscosity increase of the material after storage.

ID 1080_uk	Rev. 08	Date 19/12/2016	Interfine 1080	Page 3 of 19
---------------	------------	--------------------	-----------------------	--------------

4. ENVIRONMENTAL CONDITIONS FOR APPLICATION

Interfine 1080 is moisture sensitive and so it is important to monitor environmental conditions before and during application and curing. The following parameters apply, which should be measured and recorded:

- The surface onto which Interfine 1080 is to be applied must be dry.
- Relative humidity during application and curing should be between 40% and 85%. Curing will be slower at lower humidity and faster at higher humidity.
- Steel temperature must always be 3°C (5°F) above the dew point. If conditions are deteriorating, or likely to do so within a few hours, application should stop when substrate temperature falls to within 3°C (5°F) of the dew point.

Ambient conditions should be measured at regular intervals, minimum twice per day (or shift). If conditions are subject to change, measurements should be taken more frequently depending on speed of change.

In common with many finish coatings, the premature exposure of Interfine 1080 to ponding water, condensation and/or dampness may cause colour change or gloss reduction.

5. SURFACE PREPARATION

Interfine 1080 should always be applied over a recommended anti-corrosive coating scheme that provides the appropriate level of protection to the substrate. Details of compatible primer/intermediate coatings and maximum overcoating intervals are listed in Section 6 of this document.

All steel surfaces to be coated should be clean, dry and free from contamination. Prior to paint application all surfaces should be assessed and treated in accordance with ISO 8504:2000.

All steel surfaces to be coated should be correctly prepared. For suitable primers, this normally entails abrasive blast cleaning to Sa2½ (ISO 8501-1:2007) or SSPC-SP6. Where abrasive blast cleaning is not possible a minimum standard of SSPC-SP11, Power Tool Cleaning is required prior to the application of the primer. In all cases consult the relevant primer product technical data sheet for specific recommendations.

For surface preparation of concrete, consult International Paint's Concrete Surface Preparation guide for further advice. The concrete should be suitably primed prior to application of Interfine 1080.

All primer and intermediate surfaces should be dry and free from all contamination such as oil and grease prior to application of Interfine 1080.

Aged coatings

Surfaces must be clean, dry and in sound condition. A surface cleaner such as Interplus 546 can be used to remove contamination. When overcoating an existing unknown system it is recommended to either:

- Apply a test patch (see Appendix 1 for procedure) to confirm compatibility, **or**
- Apply a full coat of compatible primer/intermediate as a sealer coat.

ID 1080_uk	Rev. 08	Date 19/12/2016	Interfine 1080	Page 4 of 19
---------------	------------	--------------------	-----------------------	--------------

6. PRIMERS AND OVERCOAT INTERVAL

Absolute maximum overcoating interval of Interfine 1080 over various approved primers and intermediates is very much product specific, and dependent upon local climate and environmental conditions. It is important that this is taken into account during the specification process. Therefore, the table below is given for guidance only and is subject to regional variation. **Always consult your local International Paint representative for specific recommendations.**

Approved Primer/Intermediate	Maximum Overcoating Interval in atmospheric conditions
Intercure 200	7 days
Intercure 200HS	7 days
Intergard 251	7 days
Intergard 269	7 days
Intergard 345	7 days
Interplus 356	7 days
Interprime 198	7 days
Interprime 298 <i>(available in North America only)</i>	7 days
Interprime 4198 <i>(available in Australasia only)</i>	7 days
Intershield 300	7 days
Interzone 954 [#] <i>(EAA964 only)</i>	7 days
Interplus 1180 <i>(available in Australasia only)</i>	7 days
Interthane 611 <i>(available in Europe only)</i>	1 month
Interseal 1079 <i>(available in North America only)</i>	1 month
Self	12 months
Aged finishes in M&R projects	See Appendix 1

[#]not recommended for use in Australasia

Important notes:

1. Surfaces must be clean, dry and in sound condition. A surface cleaner such as Interplus 546 can be used to remove contamination.
2. In new construction or major refurbishment scenarios, where primers and/or intermediates are likely to be exposed to high levels of UV in warm/hot climates prior to overcoating with Interfine 1080, the maximum overcoating window may be further reduced. A test patch is recommended in order to assess quality of adhesion to such exposed primers and the requirement for secondary preparation. See Appendix 1 for guidelines.

7. POT LIFE/PRE-APPLICATION

This material is single pack and does not have a pot life. The lid must always be sealed after use, otherwise a skin may form. In high humidity conditions the product may skin in the can during use. When airless spraying, the addition of approximately 50mls of GTA007 per 5 litre unit poured onto the surface of the material within the container will help to prevent this. This thinner should **not** be mixed into the unit of paint.

8. AIRLESS SPRAY APPLICATION

Airless spray and air spray are suitable methods of application for Interfine 1080.

The airless spray equipment should be in good working order. Pump ratios of 32:1 up to 60:1 can be used and pump pressures and tip sizes are listed on the product technical data sheet.

Airless gun types used should be rated above the maximum working tip pressure anticipated.

International GTA007 thinners should be used for cleaning. It is recommended to flush out all application equipment with International GTA007 prior to application, to ensure that there is no contamination and/or moisture in the lines. All equipment should be cleaned immediately after use. It should be noted that Interfine 1080 is moisture sensitive therefore it is good working practise to periodically flush out spray equipment during the course of the working day.

Thinning of Interfine 1080 is not normally required. However, if material is cold or equipment is not in optimum condition, application properties may be improved by thinning. At low temperatures <10°C (<50°F), 2.5% thinning by volume with International GTA007 will be satisfactory for this purpose.

NOTE: ONLY USE INTERNATIONAL GTA007 or GTA028 OTHER THINNERS / CLEANERS CAN AFFECT CURE.

Typical Atomising Pressure : 2.8-3.5kg/cm² (40-50 p.s.i.)

Stripe coats should be applied to bolts, welds and difficult areas which are likely to be under-applied prior to application of a full coat. Any sharp edges should be ground to a radius and stripe coated. Application of the full thickness coat of Interfine 1080 can take place over a wet or dry stripe coat.

When applying Interfine 1080 by airless spray at >125µm (5 mils) wet film thickness, a good spray technique and wet film thickness control are required in order to avoid 'foaming' and/or gloss reduction.

Note: Interfine 1080 has a tendency to produce overspray, particularly if high spray pressures are being used. Some improvement can be made by lowering input pressures, modifying tip size, fan angle and/or the addition of small quantities of International GTA007 thinners to improve "wet edge" time. However, in certain circumstances overspray may be unavoidable and the best approach may be to protect adjacent steelwork during the application process.

Pinholing may occur if Interfine 1080 is applied to surfaces which are dusty or to surfaces which have dust or dirt embedded in the primer. Applying Interfine 1080 on to primed surfaces contaminated with dry spray from adjacent coating activity can also lead to pinholing.

Wet film thickness readings are taken as a guide to the applicator to enable him to judge his application technique. They should be taken as frequently as necessary to enable a feel for the material to be established.

When the material is theoretically up to specified thickness, dry film thickness readings must be taken.

Any low thickness areas should be brought up to specification by application of a full coat of Interfine 1080. For large areas, it is advised that the adjacent areas be covered or taped to prevent overspray damaging cosmetic appearance.

ID 1080_uk	Rev. 08	Date 19/12/2016	Interfine 1080	Page 6 of 19
---------------	------------	--------------------	-----------------------	--------------

9. AIR SPRAY APPLICATION

Standard industrial equipment such as DeVilbiss MBC or JGA gun with a 704 or 765 air cap and “E” fluid tip or other manufacturers equipment should be used for air spray application. A moisture and oil trap in the main air supply line is essential.

Typical Pot Pressure : 0.7-1.4kg/cm² (10-20 p.s.i.)

When applying Interfine 1080 by airless spray at >125µm (5 mils) wet film thickness, a good spray technique and wet film thickness control are required in order to avoid ‘foaming’ and/or gloss reduction.

10. BRUSH AND ROLLER APPLICATION

Brush and roller application are the preferred methods of application for Interfine 1080.

Small Areas

Brush application can be utilised for small areas, stripe coating and where minimal overlap to other areas is required. Typically between 40 microns and 50 microns (1.6-2 mils) dry film thickness can be achieved per coat and so it may be necessary to apply multiple coats to achieve the total specified system dry film thickness.

Large Areas

Interfine 1080 is recommended for roller application for large areas. For best results, a medium nap roller should be used. A typical wet film thickness achieved by this method would be 58-74 microns (2.3-3 mils) equivalent to 40-50 microns (1.6-2mls) dry film thickness. Complete coverage in a single application may not be possible and will depend on many factors such as roller type, speed of application and primer/intermediate choice. Best practise would be to use a colour compatible intermediate or anti-corrosive coating under Interfine 1080.

Wet film thickness readings should be taken periodically during application, using a wet film comb or similar. Wet film thickness readings are a guide to the applicator to enable him to judge his application technique. They should be taken as frequently as necessary to enable a feel for the material to be established.

11. STANDARD OF COSMETIC FINISH

Interfine 1080 is designed to provide excellent long term colour and gloss retention, superior to that exhibited by typical epoxy, acrylic polyurethane and catalysed epoxy acrylic finishes. As with all high gloss finishes, the standard of cosmetic finish achieved is dependent upon the quality of application and applicator experience, as well as the method of application employed.

The initial level of gloss and surface finish is also dependent on application method so it is important to avoid using a mixture of application methods whenever possible. Typically, a gloss level between 70 and 80 gloss units can be achieved depending upon colour, application method, dry film thickness and curing conditions.

Airless spray application techniques will typically give a slightly lower gloss than that achieved by air spray. Brush and roller application can also give lower gloss and a different surface appearance due to the presence of slight orange peel and brush strokes etc.

ID 1080_uk	Rev. 08	Date 19/12/2016	Interfine 1080	Page 7 of 19
---------------	------------	--------------------	-----------------------	--------------

12. POSSIBLE FILM DEFECTS

Sagging, Slumping

This is the result of excessive film thickness and poor spray technique. It is advised that Interfine 1080 should not be specified at a dry film thickness in excess of 75 microns (3 mils).

'Orange Peel'

Due to the nature of application employed within the industrial Protective Coatings market, it is not unusual for the appearance of the film to have slight orange peel. The addition of 2.5% by volume of International GTA007 may help to reduce the effect. A small test area is advised to establish the standard of cosmetic appearance achievable.

Overspray

Interfine 1080 generally produces more overspray than traditional epoxy or polyurethane thin film finishes. It is important that any steelwork being stored in adjacent areas is protected from overspray.

Overspray will have the appearance of poor coalescence or surface roughness.

Pinholes

Pinholing may occur if the coating is under applied or if the Interfine 1080 is applied over a contaminated primed surface (see Section 8).

Water Spotting

Water spotting is a result of premature exposure to moisture or ponding water etc. This is particularly prominent in dark colours.

Interfine 1080 will exhibit resistance to water spotting (i.e. exhibit no gloss loss or permanent colour change) after 24 hours cure at 10°C (50°F).

13. MEASUREMENT OF DRY FILM THICKNESS

An electronic dry film thickness gauge, capable of storing statistical data, is very strongly recommended to enable a meaningful dry film thickness survey to be conducted. Gauges should be calibrated on smooth steel plate as per equipment manufacturers recommendations.

The thickness of the priming system must be measured and recorded prior to the application of Interfine 1080. An average thickness must then be calculated and subtracted from thickness readings taken after application of the Interfine 1080.

Specified thicknesses for Interfine 1080 are nominal rather than minimum values, although it is recommended at least 50 microns (2 mils) dry film thickness minimum should be applied.

According to ISO 19840:2004 the following tolerances are recommended:

ID 1080_uk	Rev. 08	Date 19/12/2016	Interfine 1080	Page 8 of 19
---------------	------------	--------------------	-----------------------	--------------

- Individual dry film thicknesses of less than 80% of the nominal dry film thickness are not acceptable. Individual values between 80% and 100% of the nominal dry film thickness are acceptable provided that the overall average (mean) is equal to or greater than the nominal dry film thickness.

Care shall be taken to achieve the nominal dry film thickness and to avoid areas of excessive thickness. It is recommended that the maximum dry film thickness is not greater than 2½ times the nominal film thickness.

The average measured dry film thickness should not be less than the specified thickness (exclusive of primers).

14. INSPECTION AND REPAIR

Damage Down to Steel

Offshore or Onshore Coastal Environments (\geq C4, ISO 12944:2): Spot blast to Sa2½ (ISO 8501-1:2007) or SSPC-SP6, patch prime with a suitable primer and build coat, followed by application of a full thickness coat of Interfine 1080.

Onshore Environment (or < C4, ISO 12944:2): Hand or power tool damaged areas to St2 and patch prime with suitable surface tolerant primer, followed by application of a full thickness coat of Interfine 1080.

Damage of Topcoat Only

In areas where the primer/intermediate coats are still intact, repair can be suitably achieved with Interfine 1080 being applied by a small “radiator” roller. The defective topcoat should be “feathered” back to a firm edge prior to application of Interfine 1080. For larger areas, it is advised that adjacent areas to the repair site be masked off with tape to help prevent fine pinholing at the edges of the repair site.

Due to the very high gloss finish that is achievable with Interfine 1080 via air spray and airless spray techniques, it is advisable that working practises are arranged in order to limit the amount of damage and subsequent repair work required as many small repair areas will detract from the overall appearance. In order to minimise damage sustained by lifting, a crane using nylon strings or padded strops should be used.

Any other repair system should be approved by International Protective Coatings.

ID 1080_uk	Rev. 08	Date 19/12/2016	Interfine 1080	Page 9 of 19
---------------	------------	--------------------	-----------------------	--------------

15. HEALTH AND SAFETY

Interfine 1080 is intended for use only by professional applicators in industrial situations in accordance with the advice given in this leaflet and on containers and should not be used without reference to the Material Health and Safety Data Sheets (MSDS) which International Protective Coatings has provided to its customers. If for any reason a copy of the relevant Material Health & Safety Data Sheets (MSDS) is not immediately available the user should obtain a copy before using the product.

Minimum safety precautions in dealing with all paints are:

- Take precautions to avoid skin and eye contact (i.e. use overalls, gloves, goggles, face mask, barrier creams etc.).
- Where possible provide adequate ventilation. In confined spaces with poor or no ventilation, use airfed hoods.
- If product comes in contact with the skin, wash thoroughly with lukewarm water and soap or suitable industrial cleaner. Do not wash with solvents. If the eyes are contaminated flush with water (minimum 10 minutes) and obtain medical attention at once.
- These coatings contain flammable materials and should be kept away from sparks and open flames. Smoking should be prohibited in the area.

Observe all precautionary notices on containers.

✘ , **International** and all product names mentioned in this publication are trademarks of, or licensed to, Akzo Nobel.

ID 1080_uk	Rev. 08	Date 19/12/2016	Interfine 1080	Page 10 of 19
----------------------	-------------------	---------------------------	-----------------------	----------------------

Appendix 1 – Test Patch Procedure

This appendix provides guidance on field procedure options to ascertain the adhesive properties of Interfine 1080 to existing, sound, intact coating systems. This appendix provides guidance on methods and acceptance criteria.

The procedures within are similar to, and supplement those described in **ASTM D5064 -07 – “Conducting a Patch Test to Assess Coating Compatibility”**

1. Preparation of Area

Ensure aged coating is intact and has good adhesion to the substrate, is dry and free from all contamination such as oil and grease. A minimum test patch area of 0.3m² is recommended, for pipework 0.3m to full circumference of the pipe.

- Prepare up to 5 areas:
 - Freshwater wash.
 - Solvent wash.
 - Freshwater wash then clean with Interplus 546.
 - Freshwater wash then clean with International 950.
 - Abrade using P120 abrasive paper, then freshwater wash.

- Allow to dry

(If possible, select test locations for evaluation that properly characterize differences in configuration of the structure and exposure, that is, vertical versus horizontal surfaces and sheltered versus unsheltered exposure)

2. Weather check

Interfine 1080 is moisture sensitive and so it is important to monitor environmental conditions before and during application, and curing. The following parameters apply which should be measured and recorded.

- The surface onto which Interfine 1080 is to be applied must be dry.
- To achieve optimum curing relative humidity should be between 40% and 85% during application and curing.
- Steel temperature must always be 3°C (5°F) above the dew point. If conditions are deteriorating, or likely to do so within a few hours, application should stop when substrate temperature falls to within 3°C (5°F) of the dew point.

3. Paint preparation

Interfine 1080 is a single component coating and should always be mixed thoroughly with a power agitator prior to application.

4. Paint application

Apply a coating of 75-110µm wet film thickness using the appropriate application method; follow the application guidelines provided in the Technical Datasheet and Application Guideline documents

5. Cure time

Interfine 1080 should be allowed to cure for 7 days before proceeding to Section 6.

(Note – Allow Interfine 1080 to cure or “weather” prior to testing. Long term curing, > 2 weeks, provides the most reliable assessment of compatibility. Short term curing, < 1 week, or 1 or 2 days provides for more rapid evaluation of results, but may reveal adhesion problems that could improve over time)

ID 1080_uk	Rev. 08	Date 19/12/2016	Interfine 1080	Page 11 of 19
---------------	------------	--------------------	-----------------------	---------------

6. Testing

Test each type of preparation area with a minimum of one of the following types of adhesion test. If there is any doubt in the assessment of adhesion results, guidance should be sort from your International Paint Rep.

Health and safety

There is a danger of injury when carrying out adhesion assessments with test equipment. Perform an assessment of the risks involved in carrying out these tests and use appropriate Personal Protection Equipment.

➤ **Penknife adhesion**

Apparatus: A strong, locking blade penknife, e.g. Swiss Army type.

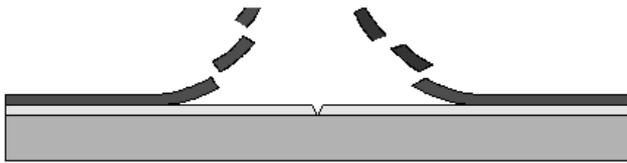
Procedure:

Remove any surface moisture from the coating surface using absorbent tissue. Select an area free from surface imperfections and use the penknife with sufficient force to scribe two cuts, forming a V-shape with internal angle of approximately 30 degrees, through to the interface under test: both cuts should be perpendicular to the coating surface.

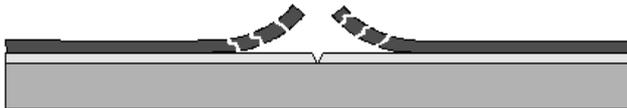


Inspect the V cut to confirm that it has penetrated through the paint films to the substrate: if not, carefully repeat the cutting action where penetration is insufficient, keeping in mind that this may affect the adhesion along that incision and result in a lower assessment.

Assess the quality of adhesion by inserting the point of the penknife blade under the coating at the vertex of the 'V', noting how difficult, or easy, it is to separate the Interfine 1080 from the aged coating.



0 - No adhesion
No force required to split coatings.
(Backs of flakes - Clean)



1 - Very poor adhesion
Little force required to split coatings.
(Backs of flakes - Clean)



2 - Poor adhesion
(Backs of flakes - Clean)



3 = Fair adhesion
(Backs of flakes show 'bits' of each coating)

Minimum Rating of 3 is acceptable



4 - Good adhesion



5 - Excellent adhesion

Rating:

Rate adhesion on the scale of 0 - 5, as follows, (use the pictorial representation above to assist)

- 0 = Little or no adhesion
- 1 = Very poor adhesion
- 2 = Poor adhesion
- 3 = Fair adhesion
- 4 = Good adhesion
- 5 = Excellent adhesion

Result: Adhesion of Interfine 1080 to existing, intact coating system is acceptable if the rating is ≥ 3 ,

(Note: The penknife method is considered the most common used in practice)

➤ Cross-cut adhesion

This procedure is technically identical to: **ISO 2409** and **ASTM D3359 Method B**. In the cross-cut test, knife incisions are made through the coating or coating system down to the substrate and a pressure-sensitive adhesive tape is

firmly pressed over the inscribed area. Adhesion is then assessed by pulling off the tape quickly (without jerking) and examining for coating removal along the scribed lines and over the whole inscribed area.

The cross-cut technique is dependent on the apparent strength of the adhesive backing of the pressure-sensitive tape used for pull off, which may vary between suppliers, batches and in time, as well as in its adherability to different topcoats. Consequently the method is suitable only for assessing adhesion which is required to be “generally adequate” rather than high or very high.

Apparatus:

a) Cutting Tool

(i) Single blade, 0.43mm thick with 20° to 30° edge, e.g. ‘Stanley’ knife.

(ii) Multi-blade, with six cutting edges, spaced 1mm, 2mm or 3mm as required.

b) Guiding and spacing edge apparatus (shim assembly), for use with single-blade cutter available from Paul N. Gardner Company, USA.

c) Soft brush

d) Transparent pressure-sensitive tape, 25mm wide, adhesive strength 10 ± 1 N per 25mm width (when tested to IED 454 - 2)

e) Viewing lens, hand-held, magnification x2 or x3

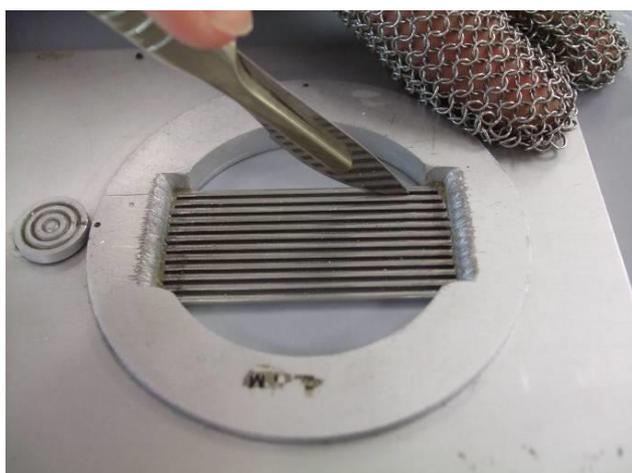
f) Light source for checking complete penetration of cuts to substrate

Procedure:

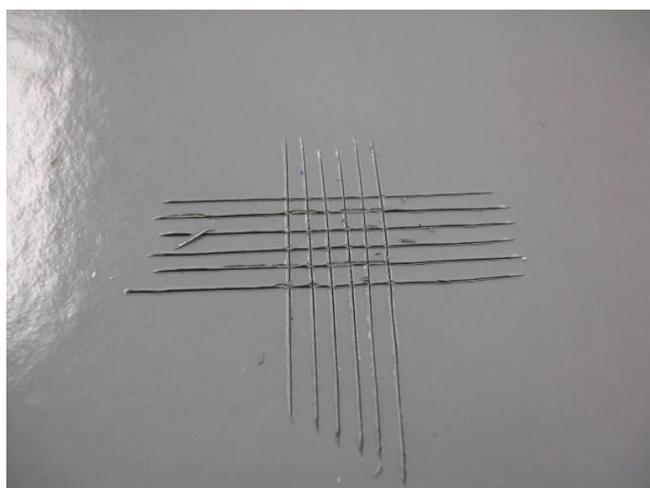
The test should be carried out at three different positions not less than 5mm from each other and from the edge of the substrate.

Inspect the cutting edge(s) of the cutting tool and sharpen or replace as necessary. With the cutting tool held normal to the coating surface and with the aid of the spacing guide shims, use uniform pressure to make six cuts penetrating to the substrate. Alternatively, use the multi-bladed tool to produce six cuts down to the substrate: space all cuts according to the coating thickness, as follows:

0µm to 60µm	-	1mm spacing
61µm to 120µm	-	2mm spacing
121µm to 250µm	-	3mm spacing



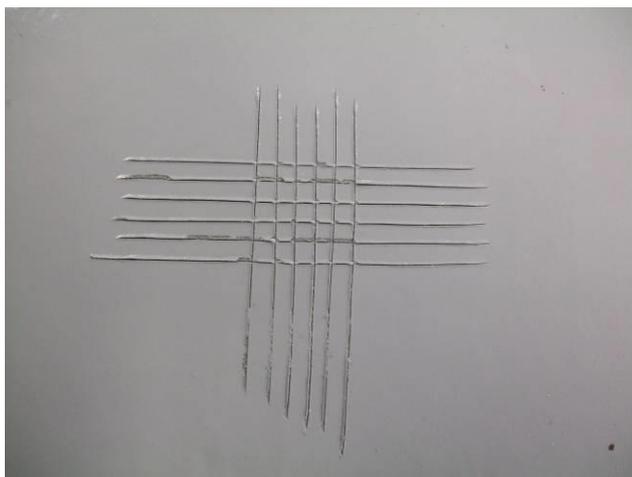
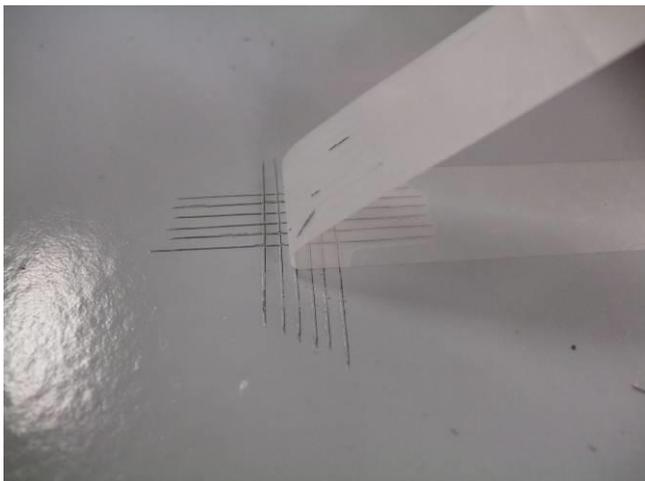
Rotate the panel and make a further six cuts, crossing the original cuts at 90° to form a square lattice pattern.



Brush the substrate lightly with the soft brush several times backwards and forwards along each of the lattice diagonals and inspect the lattice to ensure that all incisions have penetrated to the substrate - use the viewing lens, if necessary.

Then carry out the tape pull-off test. Remove a length at a steady rate and cut off about 75mm. Place the centre of this over the lattice on a direction parallel to one set of cuts and smooth it firmly over the whole area of the lattice and for a distance of, at least, 20mm beyond. Rub the tape firmly with the fingertip to ensure good contact.

Within 5 minutes of applying the tape, remove it by holding the free end and pulling it off steadily, in 0.5 - 1.0 second, back over itself at an angle of 60°.



Rating: Evaluate the results immediately following the tape pull-off. For the X-cut pattern, classify the results in accordance with the following ratings

ISO 2409	ASTM D3359	Comments
0	5B	no peeling or removal of Interfine 1080 from underlying coating system
1	4B	Trace peeling or removal of Interfine 1080 along incisions or at intersection (~5%)
2	3B	Jagged removal of Interfine 1080 along incisions up to 1.5mm on either side (5-15%)
3	2B	Jagged removal of Interfine 1080 along most of the incisions up to 3mm on either side (15-35%)
4	1B	Removal of Interfine 1080 from most of the area of the X-cut under the tape (35-65%)
5	0B	Removal of Interfine 1080 beyond the area of the X-cut (>65%)

Pictorial representations of the above can be found in ISO 2409 – Table 1 & ASTM D3359 – Fig 1

Result: Adhesion of Interfine 1080 to existing coating system is acceptable if the rating is ≤ 2 (ISO 2409) or $\leq 3B$ (ASTM D3359)

➤ **Pull off adhesion**

This procedure is technically equivalent to ISO 4624 & ASTM D4541

ID 1080_uk	Rev. 08	Date 19/12/2016	Interfine 1080	Page 16 of 19
----------------------	-------------------	---------------------------	-----------------------	----------------------

ISO 4624 & ASTM D4541 is suitable for the determination of pull-off adhesion of single or multi-coat paint schemes. The procedure measures the tensile stress necessary to detach or rupture the coating in a direction perpendicular to the substrate. The resulting failure may be adhesive (at the weakest interface), cohesive (within the weakest component), or a mixture of the two.

Apparatus:

a) Tensile tester: Suitable to apply tensile stress in a direction perpendicular to the plane of the coated substrate, at a uniform rate of not greater than 1 MPa/s, such that failure occurs within 90 seconds. Several models are available, the Elcometer 106 and Elcometer 108 being popular in the past and the PAT GM01 being more widely used now.

It is essential that the model be reported along with the results.

b) Test cylinders: Commonly known as “dollies”. Suitable for use with the chosen tensile tester, steel faced and of diameter 20mm (unless otherwise agreed).

Note: The use of dollies of size other than 20mm may give different results.

c) Cutting tool: To cut through the coating around the circumference of the test cylinder.

d) Adhesive: It is essential that the cohesive and adhesive properties of the adhesive are greater than that of the coating scheme under test. If this is not known, screening of adhesives may be carried out to enable selection. The adhesive should not chemically damage the coating for the duration of the test.

Note: It is recommended that Araldite "precision" slow setting two pack solvent free adhesive be used as this has been found to produce very little "glue line" failure and to adhere to all coating types when correctly mixed and applied.

Procedure:

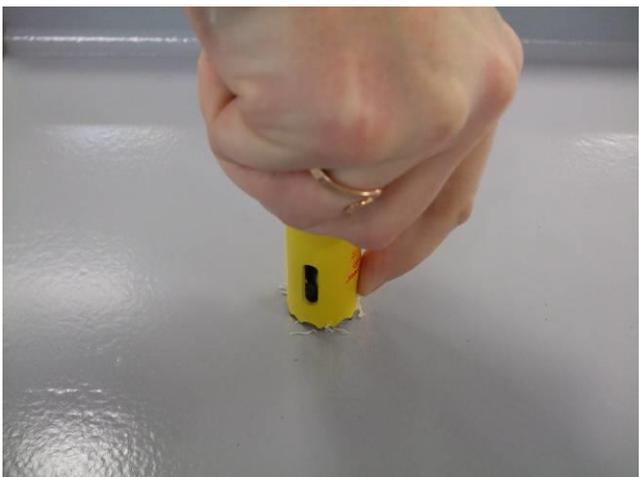
Choose an area that is free from imperfections. Adhesion of the test cylinder to the aged coating may be improved by lightly abrading the surface of the coating and the test cylinder prior to application, P120 abrasive paper may be used. Ensure the coating surface is clean and dry prior to carrying out adhesion testing.



Apply the chosen adhesive evenly to the test cylinder and place in contact with the aged coating.



Allow the adhesive sufficient time to cure, minimum 24 hours. Carefully cut through the coating, to the substrate, around the circumference of the test cylinder. If results are required without cutting through the coating, this must be reported.



Attach the tensile tester, taking care that it is perpendicular to the substrate, i.e. that no bending force will be introduced. Apply tensile stress, uniformly increasing at a rate not greater than 1 MPa/s. Record the tensile stress to failure and examine the fracture surfaces. If failure is mainly associated with the adhesive, repeat the test using a more suitable adhesive.



Carry out at least a further two determinations

Rating: Calculate the pull-off adhesion and describing the mode of failure. Use the following nomenclature to describe failure modes:

- A = Cohesive failure of the substrate
- A/B = Adhesive failure between substrate and coat 1
- B = Cohesive failure in the first coat
- B/C = Adhesive failure between coats 1 and 2
- /Y = Adhesive failure between the final coat and the adhesive
- Y = Cohesive failure within the adhesive
- Y/Z = Adhesive failure between the adhesive and the test cylinder

As more than one of these types of failure may occur during one test, a % rating should be given to each. For example, if the paint system fails at a tensile stress of 20MPa and examination of the area of failure reveals approximately 30% associated with cohesive failure in the first coat and 70% with intercoat failure between first and second coats, the result is expressed as:

20 MPa, 30% B, 70% B/C

Result: Adhesion is acceptable if pull off adhesion is $\geq 5\text{MPa}$ or shows no adhesive failure between the aged coating and Interfine 1080.

 , **International** and all product names mentioned in this publication are trademarks of, or licensed to, Akzo Nobel.