

Data Sheet / Instructions

Adhesion Tester



Paint Test Equipment

Coating Thickness Porosity ADHESION Inspection Kit Surface Roughness Surface Cleanliness Gloss

Adhesion Tester

**ISO 4624: Paints and varnishes.
Pull-off test for adhesion.**

**ISO 16276-1: Corrosion protection of steel structures by
protective paint systems.
Assessment of, and acceptance criteria for, the adhesion/
cohesion (fracture strength) of a coating.
Part 1: Pull-off testing.**

The Adhesion Tester is one of the most accurate and versatile adhesion testers currently available. It measures the adhesion bond strength of applied coatings with ease and precision.

The adhesion is measured by the tensile pull on a Dolly glued to the coating surface. The force is applied through the centre of the Dolly by a hydraulically loaded pin. This ensures an exactly central point-loading of the force.

Adhesion values are recorded by a pressure gauge giving a 1:1 pressure reading. This is made possible as the net surface area of the Dolly is equal to the surface area of the hydraulic piston bore. Pressure reacted by the Dolly is the same as the pressure in the bore and is transmitted directly to the pressure gauge. The maximum value achieved at pull-off is recorded by a reset needle that is easily read on the large scale of the pressure gauge.

Connection to the stainless steel Dolly is easily made with a coupling socket. The pressure gauge is swivel-mounted allowing testing in any position. This is significant as coating breakdown invariably starts at positions that are difficult to reach during surface preparation and application.

Ensures effective quality control with a non-destructive capability. To allow the specification minimum to be proven, the dolly can be removed using the heated dolly remover supplied. If necessary, the dolly can be left in place for testing during service as part of a planned maintenance programme.

The Calibration Certificate with traceability to UKAS is an optional extra. The Certificate is supplied as hard copy and is available online through the Calibration Portal (under Browse Categories) on our website. The Calibration Portal lists all your equipment calibrated by Paint Test Equipment, showing the renewal dates and enabling Calibration Certificates to be viewed at any time.



International Standards

ISO 4624 ASTM D 4541

ISO 16276-1

Adhesion Tester Specifications

Part No	Head Type	Operating Range psi	Operating Range MPa	Resolution psi	Resolution Mpa	Accuracy	Cal Cert Part No
X1003	Standard	0–3500	0–25	20	0.2	±1%FSD	NX001
X1004	Right Angle	0–3500	0–25	20	0.2	±1%FSD	NX001

Coating Thickness Porosity ADHESION Inspection Kit Surface Roughness Surface Cleanliness Gloss

Adhesion Tester Accessories and Spares

Part No	Product	Pipe Size Metric	Pipe Size Imperial	Use with Model	Information
XA201	Concave Dolly	51mm	2"	X1003 / X1004	For external pipe testing.
XA202	Concave Dolly	76mm	3"	X1003 / X1004	Select the closest sized Dolly for your diameter of pipe.
XA203	Concave Dolly	102mm	4"	X1003 / X1004	
XA204	Concave Dolly	152mm	6"	X1003 / X1004	
XA205	Concave Dolly	203mm	8"	X1003 / X1004	
XA206	Concave Dolly	254mm	10"	X1003 / X1004	
XA207	Concave Dolly	305mm	12"	X1003 / X1004	
XA208	Concave Dolly	356mm	14"	X1003 / X1004	
XA209	Concave Dolly	406mm	16"	X1003 / X1004	
XA210	Concave Dolly	457mm	18"	X1003 / X1004	
XA211	Concave Dolly	508mm	20"	X1003 / X1004	
XA212	Concave Dolly	610mm	24"	X1003 / X1004	
XA213	Concave Dolly	762mm	30"	X1003 / X1004	
XA214	Concave Dolly	914mm	36"	X1003 / X1004	
XA215	Convex Dolly	152mm	6"	X1004	For internal pipe testing.
XA216	Convex Dolly	203mm	8"	X1004	Select the closest sized Dolly for your diameter of pipe.
XA217	Convex Dolly	254mm	10"	X1004	
XA218	Convex Dolly	305mm	12"	X1004	
XA219	Convex Dolly	356mm	14"	X1004	
XA220	Convex Dolly	406mm	16"	X1004	
XA221	Convex Dolly	457mm	18"	X1004	
XA222	Convex Dolly	508mm	20"	X1003 / X1004	
XA223	Convex Dolly	610mm	24"	X1003 / X1004	
XA224	Convex Dolly	762mm	30"	X1003 / X1004	
XA225	Convex Dolly	914mm	36"	X1003 / X1004	
XS101	Flat Dolly			X1003 / X1004	For flat substrate testing.
XS102	Spare Adhesive				For bonding the dolly to the coating.
XS103	Dolly Plug				Use inside dolly when applying adhesive.



The Adhesion Tester can test both external and internal surfaces of pipes. Because the load reacts internally within the dolly, curved surfaces of pipes can be easily tested.

To obtain a uniform tensile load, curved dollies machined to match the diameter under test need to be used. External diameters as small as 51mm (2") and internal diameters as small as 152mm (6") can be tested.

Operation

Safety



When using the cyanoacrylate Adhesive – ensure the work area is well ventilated, wear gloves and do not let any Adhesive come into contact with your skin.

When using the Dolly Remover – do not touch the elements or heads after switching on.

Allow approximately 15 minutes for the elements and heads to cool to ambient temperature after switching off.

General

Prior to testing, a recently applied coating shall be dried/cured in accordance with the manufacturer's recommendations.

In the absence of manufacturer's recommendations, the coating should be dried/cured for at least 10 days.

Pull-off tests are destructive test methods.

Repair work will be necessary when they are used on coated structures.

To avoid damage to the coated structure, test panels can be used.

The cyanoacrylate Adhesive should not be used with thermoplastic, non-convertible paint systems due to chemical reactions that could affect adhesion results.

These paint systems include cellulose, vinyls, chlorinated rubbers and some acrylics.

For these paint systems a two-pack epoxy adhesive should be used.

The Right Angle version of the Adhesion Tester enables the user to test the adhesion of coatings inside pipes with a minimum diameter of 150mm (6")

Taking Measurements

To reduce the likelihood of adhesive failure, abrade the face of the Dolly and the surface of the protective coating with fine emery paper.

Clean the surface of the Dolly and protective coating. The cleaning process should include thorough degreasing.

Check that no adhesive has been left in the dolly hole by trial fitting the Dolly Plug.

Insert the Dolly Plug into the Dolly until the tip protrudes from the surface.

Apply the Adhesive thinly and evenly to the whole end surface of the Dolly in sufficient quantity to ensure a good bond to the protective coating.

Ensure that no Adhesive is on the Plastic Plug.

Press the Dolly onto the surface using thumb pressure for approximately 10 seconds and then remove the Dolly Plug. Do not twist the dolly as this could introduce air bubbles. Allow the adhesive to dry for approximately 15 minutes.

If you are testing a pipe using curved Dollies, ensure that the aligning mark is lined up with the longitudinal axis of the pipe.

Connect the Adhesion Tester to the Dolly by pulling back the coupling socket, pushing the head and releasing the coupling. Ensure the Adhesion Tester is held so that the rubber hose is straight.

To pressurise the Adhesion Tester, turn the handle clockwise at a uniform rate, not greater than 1MPa/s

To decrease the pressure, turn anticlockwise at a uniform rate.

Set the red needle to zero before pressurising.

To destructively test the coating, increase the pressure slowly until the Dolly pulls off.

To non-destructively test the coating, increase the pressure slowly until the specified minimum value has been reached – you can then decrease the pressure to zero and remove the head.

The Dolly can be removed by using the heated Dolly remover. The pressure is recorded from the red needle.



Dolly Cleaning

After use, clean the Dolly with the Dolly Remover.

A duration of 3–5 minutes per Dolly should normally be sufficient to degrade the adhesive, which can then be scraped off.

Ensure the work area is well ventilated.

The hole can be cleaned using the Dolly Cleaning Tool.

Care

Always store the Adhesion Tester with a Dolly fitted to the head. This will prevent any damage to the pin.

Do not hold the Adhesion Tester under pressure for longer than is required.

Routine Maintenance

If the Adhesion Tester is not used on a regular basis, you will need to pressurise once a month to 2500psi, then immediately release the pressure.

This will ensure that the seals are kept working to their maximum potential.

Always pressurise with the Dolly fitted.



Supplied in an industrial foam-filled Carrying Case with 5 Flat Dollies, Adhesive, Heated Dolly Remover, Dolly Cleaning Tool and Dolly Plug.

Paint Test Equipment is a global leader in the manufacture of specialist test equipment specifically for the industrial painting and coating industries for the protection of steel assets from corrosion, mainly in the oil, renewables and steel construction sectors. With over 30 years experience and extensive knowledge in delivering practical and cost effective solutions in supporting our customers with world class products for corrosion prevention.

Prevention of corrosion on steel is essential to extend the asset lifetime, optimise performance and minimise downtime for expensive maintenance work. Using Paint Test Equipments technologies and innovations in our unrivalled portfolio of products ensures that industrial coatings are applied to the highest achievable quality standards of ISO compliance.

Paint Test Equipment

www.paint-test-equipment.com

Tel: +44 (0) 1260 275614

Email: sales@paint-test-equipment.com



Paint Test Equipment reserves the right to alter specifications without prior notice. Copyright Paint Test Equipment.

Paint Test Equipment

3-4 The Courtyard
Greenfield Farm Estate
Congleton, Cheshire
CW12 4TR, England

www.paint-test-equipment.com

Tel: +44 (0)1260 275614

e-mail: sales@paint-test-equipment.com

Distributor