

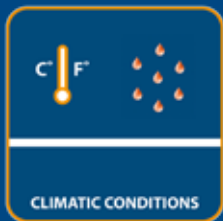


Airblast Inspection Equipment - The Guide

AIRBLAST



Step 1



CLIMATIC CONDITIONS

Step 2



SURFACE CLEANLINESS

Step 3



PROFILE

Step 4



THICKNESS

Step 5



ADHESION

Step 6



INSPECTION

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For more than 35 years Airblast has been the world leader in providing blasting and painting solutions to the anticorrosion industries. With an unparalleled network of offices around the world Airblast works closely with our customers and distribution partners providing tried and tested equipment as well as developing customized solutions for specific applications.

Airblast is dedicated to maintain a profitable organization on a long term basis through ethically and morally sound business practices. By investing in the long term future of our organization, and those with whom we conduct business, Airblast believes that we can share sustained mutual success.

Our manufacturing facilities in Europe and the Far East produce fit for purpose quality products with region specific certification. All Airblast equipment is manufactured according to the highest relevant safety standards and passes our rigorous quality controls before dispatch.

Mindful of the environmental responsibilities faced by our generation Airblast is committed to a programme of research and development into technologies facilitating zero emission blasting and painting along with an education programme promoting planet friendly operations.



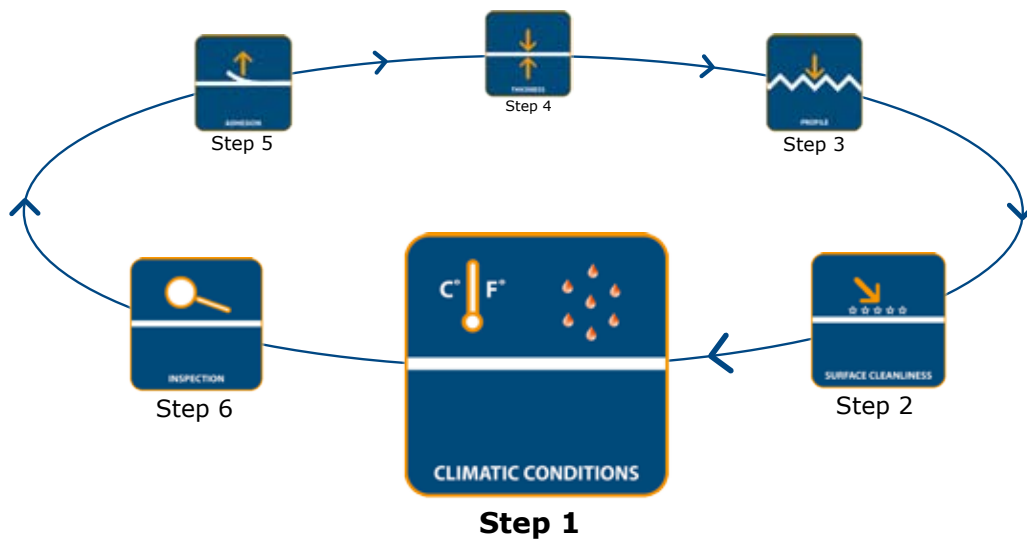
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Introduction

Welcome to "Airblast Inspection Equipment – The Guide".

This guide breaks down the inspection process into six distinct steps – each as important as the next. Within each step the "Guidelines" section explains why the checks are required, and the "Key products" section identifies the choice of equipment available.

Each stage in the process of surface treatment is critical in guarding against premature coating failure. There are many tests and safeguards which can be put in place to ensure that the interaction of the substrate to the coating is as intended.

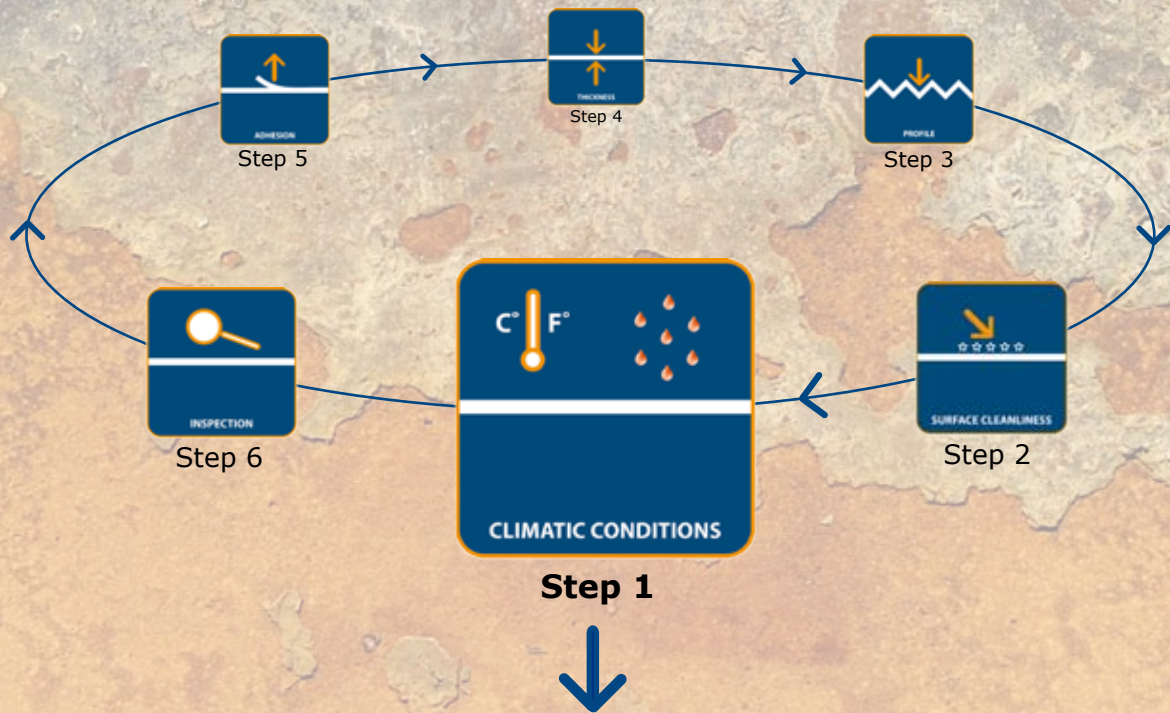


As this guide features only the main pieces of equipment required there may be items which you wish to purchase which are not mentioned within these pages – please consult with your local Airblast representative to receive details of the full range of products.

More details concerning each of the products within the AIE range can be found in our product specific data sheets – please consult page 15 for a complete list of the data sheets available.

We trust that you will find this guide interesting and informative – we look forward to discuss with you your specific requirements.

Step 1 - Climatic Conditions



Guidelines

The prevailing climatic conditions during blasting and painting are critical in achieving a successful coating application.

Dewpoint

In certain conditions moisture from the air can condense on the substrate post blast resulting in flash rust which can adversely affect the adherence of subsequently applied paint. Furthermore moisture can condense on the substrate after the application of the paint before the curing process is complete.

In order to monitor the dewpoint temperature the following parameters must be measured: the surface temperature of the substrate, the air temperature, and the relative humidity. By applying a formula to the air temperature and the relative humidity the dewpoint can be calculated – the surface temperature of the substrate must remain at least 3 degrees Celcius above the dewpoint temperature to avoid moisture condensing on the surface.

Temperature

The temperature must always be monitored to ensure that it remains within the parameters of the coating specifications. The curing process can fail if the temperature is too low or too high.



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Key Products



DPM-120: Dewpoint Meter

The DPM-120 is a multi-functional instrument which can be used to measure, record, and analyse the important climatic parameters in the surface treatment of metal substrates: air temperature, surface temperature, relative humidity, and dew point. Additional information such as the time and date of readings taken are recorded for future reference. The ergonomic and tough DPM-120 is supplied in a convenient protective carry case.

Features

- Large illuminated graphic display
- One-hand operation
- Simple menu-driven user interface
- Extensive data-logging capabilities - record up to 12,000 readings
- USB-Interface connects the unit to PC for programming and downloading data
- To be used as "on the spot" inspectors tool or "stand-alone" data logger
- Set limits for each parameter
- Acoustic and visual alarms
- Select Celsius / Fahrenheit
- Automatic trend indicator shows the trend of climatic conditions
- High-end industrial sensors and built-in probes
- Integrated 'back-up' LED flashlight
- DewLog temperature and humidity monitoring software included
- Two year valid calibration certificate



DTH-100: Digital Thermometer

The DTH-100 allows the substrate temperature to be immediately measured. This ensures that the substrate can be maintained at a temperature sufficiently above the dew point to prevent moisture forming on the uncoated surface.



MTM-110: Magnetic Thermometer

The MTM-110 allows the substrate temperature to be constantly measured. This ensures that the substrate can be maintained at a temperature sufficiently above the dew point to prevent moisture forming on the uncoated surface.

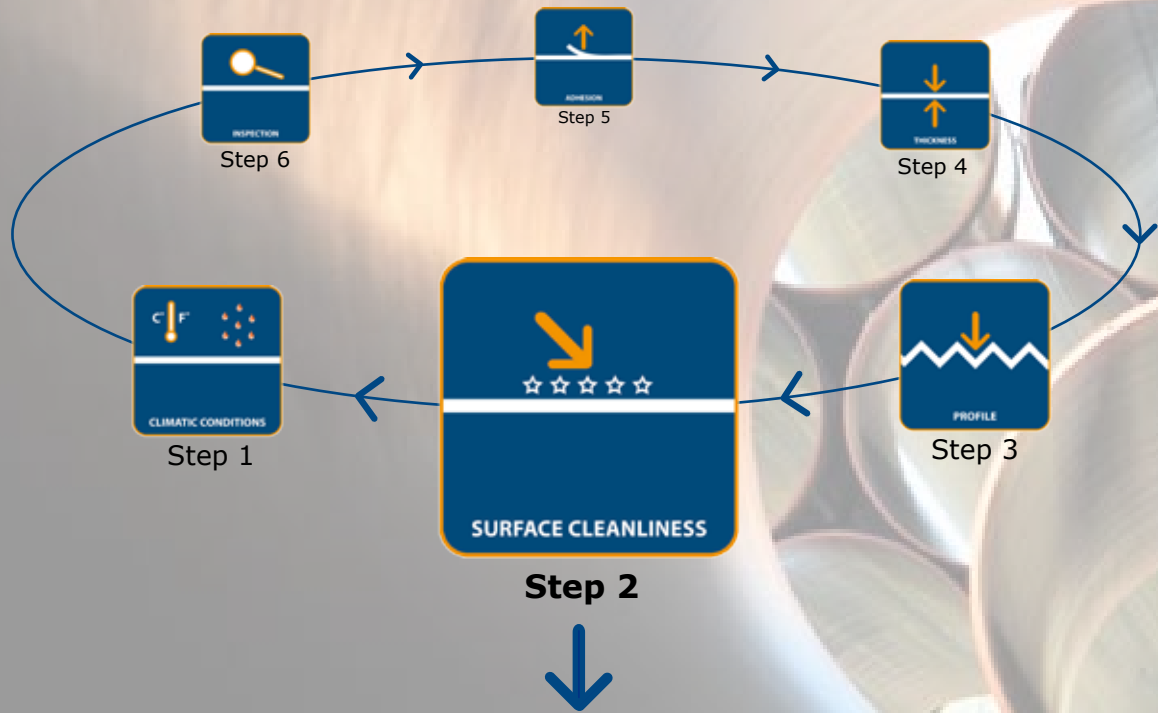


WHM-130: Whirling Hygrometer

The WHM-130 is a manual check of the relative humidity in the prevailing conditions at any given time. The whirling hygrometer when used in conjunction with a dew point calculator (available separately) shows the prevailing dewpoint.

Specific data sheets are available for each of the products above – please see the Product Data Sheet Key on page 15.

Step 2 - Surface Cleanliness



Guidelines

Cleanliness standard

After blasting it is important to assess the cleanliness of the steel. Most high performance coating systems require the steel to be cleaned to a recognised standard. Recognised standards include S.S.P.C. (Steel Structures Painting Council USA), N.A.C.E. (National Association of Corrosion Engineers), SA (Swedish Standards Organisation).

Each standard is divided into four standards of cleanliness, broadly described as follows; brush off, commercial, near white metal, and white metal. Whilst each standard may differ slightly in requirements and terminology a brief description of each of the four levels of cleanliness is as follows:

- Brush Off: Loose mill scale, loose rust and foreign particles are removed.
- Commercial: Mill scale, rust and foreign particles are substantially removed and grey metal is visible.
- Near White Metal: Mill scale, rust and foreign particles are removed to the extent that only traces remain in the form of spots or stripes. The cleaned surface will show varying shades of grey.
- White Metal: Visible mill scale, rust and foreign particles are entirely removed. The cleaned surface should have a uniform metallic colour but may show varying shades of grey when viewed at different angles.

Contamination

The presence of contamination in the form of chlorides, sulphates and nitrates (commonly known as salt ions) prior to the coating being applied can lead to premature coating failure in the form of delamination and blistering.

These salt ions can be present on the surface to be coated due to a number of reasons: locations off-shore or shore side are obviously susceptible to salt contamination from the sea, salt can be present in water used to wash down the surface, salt can be present in new or recycled abrasives used to blast the surface. Once the presence of salt has been detected it can be cleaned and controlled reducing the risk of premature coating failure.



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Key Products



SSM-200: Soluble Salt Meter

The SSM-200 is a patented design that provides a handheld, automated method for detection of soluble salts on magnetic surfaces. The SSM-200 combines surface salt extraction and conductivity measurement in one tool, allowing convenient and ergonomic operation. The handheld design provides a self-contained, easily transportable, unit for soluble salt measurements. The SSM-200 and supplied fluid dispenser allow for quick and accurate injection of deionised water, automatic extraction of surface salts and conductivity measurement. The SSM is complete with a backlit LCD display and easy to follow on screen instructions. Up to a 1000 measurements can be stored in the internal memory. This data can be downloaded to any PC and exported in Microsoft Excel file format for use in any Coating Technical File (CTF) using the supplied software.

The SSM has been developed specifically to replace the Bresle Patch in IMO test protocols. The SSM exactly duplicates the Bresle Patch process but with a higher accuracy and reproducibility. Measurements are automated and there are no consumables. The complete test sequence requires less than a minute. In comparison to the Bresle Patch the SSM cuts sampling and inspection time resulting in low costs per sample and no consumables. The SSM extracts surface salts more reliably resulting in more accurate readings and minimizes operator error through automatic metered water injection. Electronic recording of measurements improves safety by eliminating the need for syringe needles, and the lack of adhesives irradiates sticky residue on the substrate.



BTK-220: Bresle Test Kit

The BTK-220 can be used to check for the presence of salts such as chlorides and sulphates on the substrate prior to the application of the coating.

Once the bresle patch is applied to the surface to be tested, distilled water can be injected and extracted the required amount of times before being analysed in the conductivity meter. The difference in the two readings shows the conductivity of the water, by multiplying the result by 0.4 the presence of salts expressed in parts per million is shown.

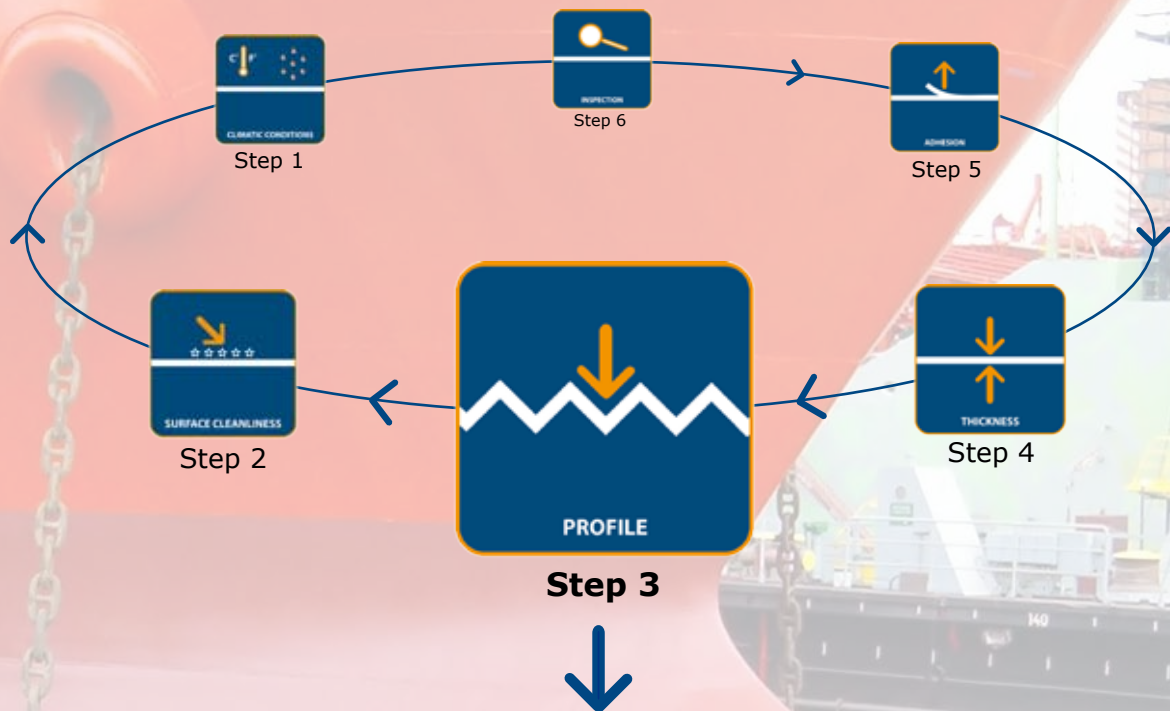


RGB-260: Rust Grade Book

The RGB-260 identifies four levels (designated as rust grades) of mill scale and rust that are commonly found on surfaces of uncoated erected steel and steel held in stock. It also identifies certain degrees of visual cleanliness (designated as preparation grades) after surface preparation of uncoated steel surfaces and of steel surfaces after overall removal of any previous coating.

Specific data sheets are available for each of the products above – please see the Product Data Sheet Key on page 15.

Step 3 - Surface Profile



Guidelines

Surface profile

High performance paint systems normally require that the steel surface is blasted not only to achieve cleanliness but also to achieve a certain profile which allows the coating to adhere correctly. The depth of the profile achieved in the steel can be altered by the use of different types and sizes of abrasives blasted at different pressures onto the surface. Therefore the blasting process has the result not only of cleaning the steel to a recognized standard but also of creating a profile to which the coating can adhere.

If the profile is too shallow the coating system will not adhere correctly potentially resulting in premature failure, if the profile is too deep the amount of coating required increases and the potential for multi-coat systems to adhere incorrectly increases – furthermore if the profile is much too deep the tops of the peaks in the profile may be exposed leading to rust spots.



AIRBLAST

Key Products



TXG-320: Testex Gauge

The TXG-320 accurately reads the depth of the profile recorded from the blasted surface by the TXT-300 Textex tape. The gauge first needs to be zeroed to 50 microns to take into account the backing on the tape, then the tape is placed in the gauge and the movable anvil adjusted onto the film – the reading is then ready to be taken.

TXT-300: Testex Tape

The TXT-300 is fitted with a protective paper which needs to be removed before the tape is adhered to the blasted surface and pressure applied. When removed the tape features the profile of the blasted surface which can be read by the gauge and the average maximum peak to valley height calculated. Locations which are not easily accessible to other devices such as inside pipes and grooves can easily be measured using the testex tape method.



SRC-340: Surface Comparator (Grit)

The SRC-340 can be placed against an area of the blasted surface and each of the four sectors compared in turn - the nearest profile to the Comparator determines the grade.

SRC-341: Surface Comparator (Shot)

The SRC-341 can be placed against an area of the blasted surface and each of the four sectors compared in turn - the nearest profile to the Comparator determines the grade.



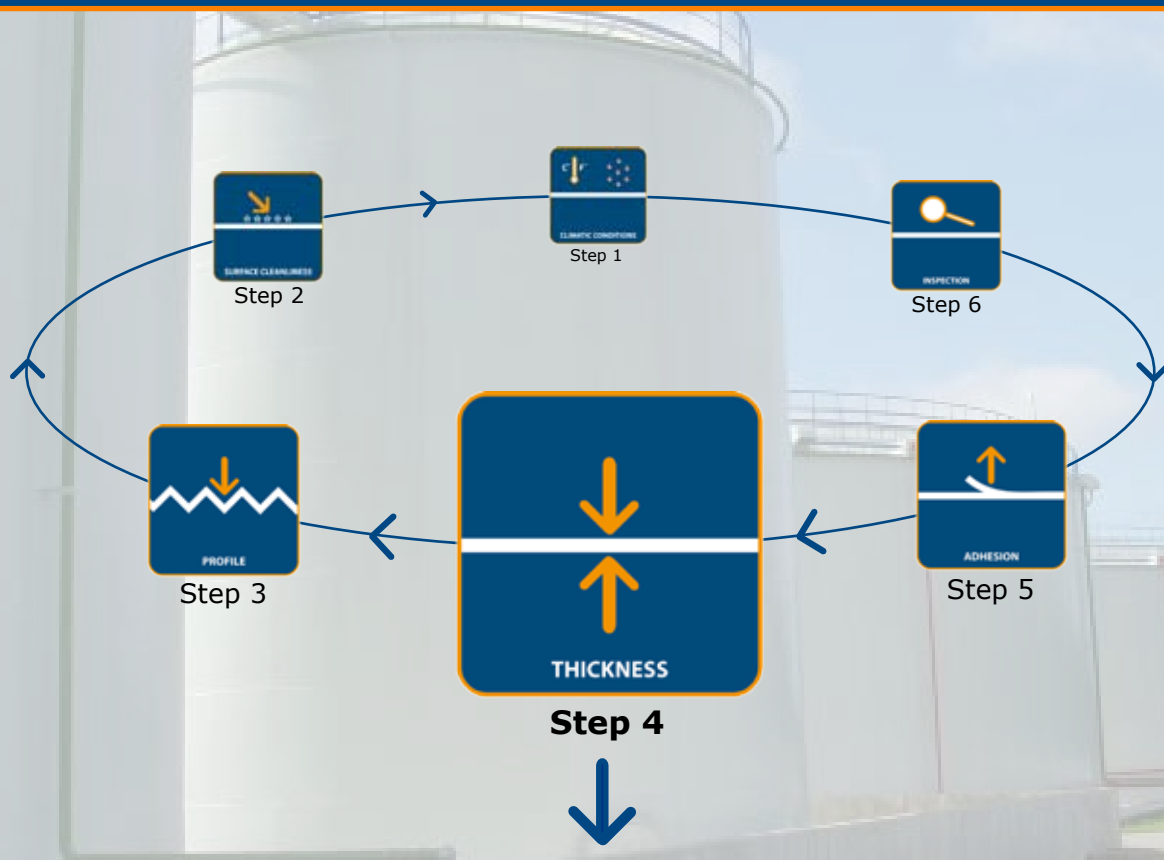
SPG-360: Surface Profile Gauge

The SPG-360 can be quickly and easily used to establish the valley-to-peak height of a blast cleaned surface.

The SPG-360 has a resolution of one micron and can be switched between imperial and metric readings, is supplied complete with a glass zero plate in a protective carry case.

Specific data sheets are available for each of the products above – please see the Product Data Sheet Key on page 15.

Step 4 - Coating Thickness



Guidelines

High performance coating systems require that each application is of a specified thickness when dry. The thickness of the coating is normally measured in microns (one micron is one thousandth of a millimeter).

Wet film thickness

In order to assess the thickness of the coating whilst the application is ongoing a wet film thickness gauge can be used – the wet film thickness reading can be used as a guide to estimate the dry film thickness.

Dry film thickness

Once the coating is dry there are two methods of measuring the dry film thickness: destructive and non-destructive. The most popular method is non-destructive using a dry film thickness gauge. Dry film thickness gauges use physical properties to accurately measure the thickness of the coating quickly and easily in locations chosen by the operator.

Different gauges have different performance capabilities, some basic gauges are used simply to check the film thickness and cannot store or analyse readings, more sophisticated gauges can record multiple readings, the information can be stored in the gauge, and downloaded to a computer for analysis and long term storage.



AIRBLAST

Key Products



DFT-441: Dry Film Thickness Gauge

The DFT-441 provides a fast and economical solution to non-destructive dry film thickness measurement, data storage, and analysis on ferrous and non-ferrous substrates, is calibrated, features a patented probe design which allows for integral or separate use, and has an industry leading three year warranty.

The DFT-441 is ergonomic and light weight (127 gram) yet tough and reliable, and is powered by standard alkaline batteries. The easy to use back lit four button key pad is intuitive and leads the user through the available menu options. The back lit screen displays readings clearly and automatically flips through 180 degrees when the gauge is turned upside down. Use the zero plate provided to zero the gauge before use, and in changing climatic conditions. Up to thirteen thousand readings can be stored in up to 200 batches in the gauge before downloading via a wireless connection to the software provide as standard with the gauge. When taking readings on very rough substrates the average zero value can be stored in the gauge memory to ensure that the substrate condition does not affect the quality of the readings.

The DFT-441 features a patented probe design which allows for integral or separate use to access hard to reach areas. Each probe features an industry leading tip manufactured from ruby ensuring millions of fast, reliable and accurate readings.

A wireless probe is available as a cost option. The wireless probe allows measurements to be taken at a distance of up to twenty meters from one or multiple gauge units allowing for readings to be taken in very hard to access areas as well as being simultaneously monitored and recorded on multiple gauges. The wireless probe is extremely small and light weight (30 grams) and can take up to 4000 measurements without recharging.



DFT-400: Dry Film Thickness Gauge

The DFT-400 can be used on ferrous substrates.

DFT-420: Dry Film Thickness Gauge

The DFT-420 can be used on both ferrous and non-ferrous substrates.



DFT-440: Dry Film Thickness Gauge

The DFT-440 can be used to take readings on both ferrous and non-ferrous substrates using the integral or separate probe and can store up to 100 readings in the internal memory for download to a computer and analysis using the optional purpose designed software.



WFT-450: Wet Film Thickness Comb

The WFT-450 is a high precision machined in stainless steel the wet film comb offers easy and quick measurement from 25 to 1500 micron.

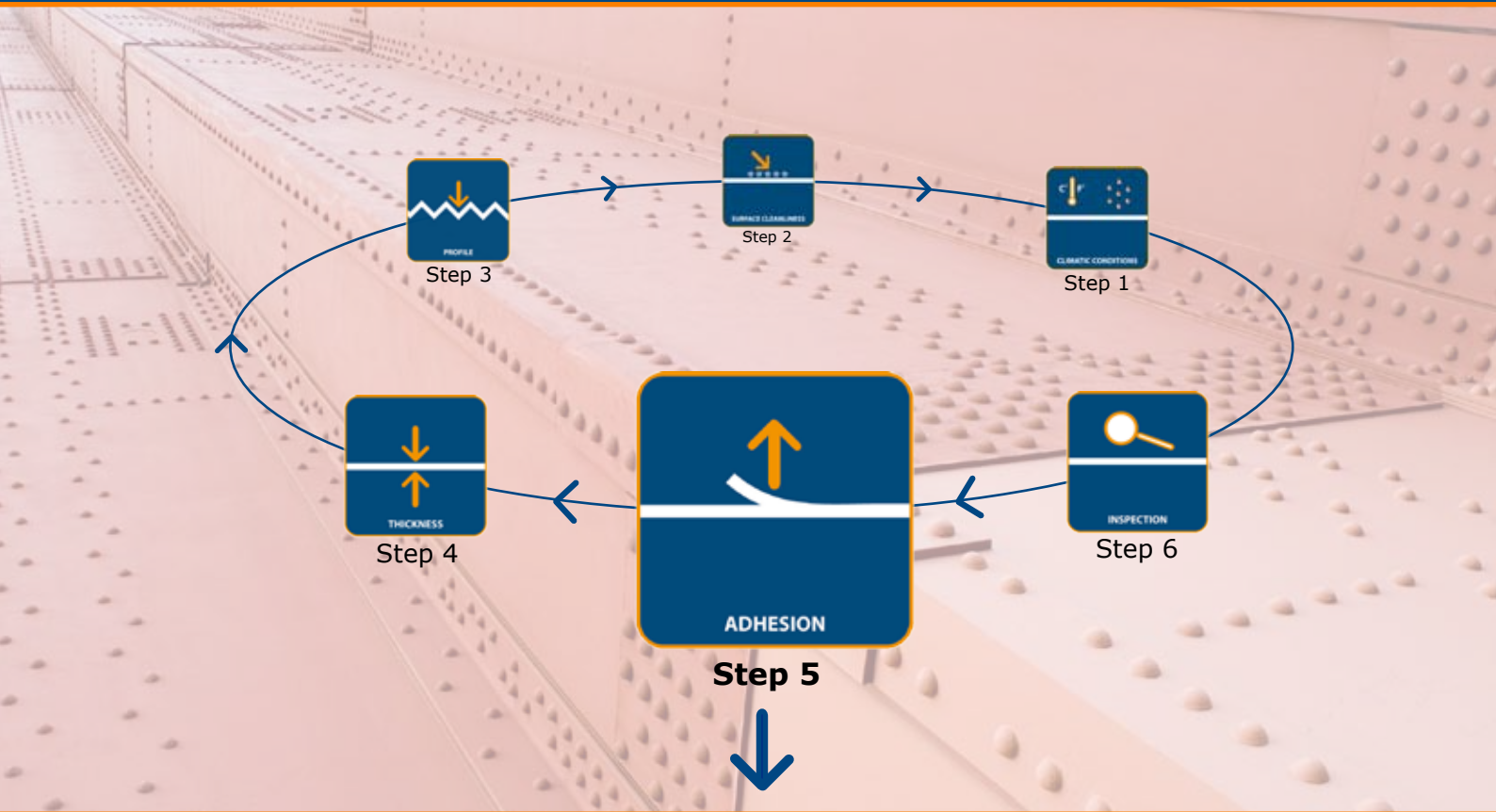


WFT-455: Wet Film Thickness Comb

The WFT-455 is a plastic wet film comb which measures from 25 to 900 microns. The individual combs can be used as a quick and cost effective check as painting operations continue as well as being kept as a record of the coating thickness.

Specific data sheets are available for each of the products above – please see the Product Data Sheet Key on page 15.

Step 5 - Adhesion



Guidelines

Adhesion

Assuming that the initial steps in the blasting and painting process have been carried out correctly the substrate should have been blast cleaned to provide the required standard of cleanliness and the correct surface profile, and the coating should have been applied at the correct film thickness, with both processes taking place in climatic conditions which avoid unwanted condensation on the substrate or coated surface.

The next step in the process is to verify that the coating is adhered to the substrate correctly – if the coating is not adhered correctly the coating may suffer premature failure.

There are two basic types of adhesion test: destructive and non-destructive. As well as providing immediate results to satisfy job completion procedures, the non-destructive adhesion test can be used as part of a long term maintenance programme.



AIRBLAST

Key Products



HAT-500: Hydraulic Adhesion Tester

The HAT-500 is a reliable method of testing the adhesion bond strength of a dry coating onto the substrate to which it is applied.

To measure the adhesion a dolly is glued onto the painted substrate, a force is applied onto the center of the dolly by a hydraulically loaded pin, the maximum force applied is recorded on the pressure gauge by the reset needle. Should the dolly meet the minimum adhesion required it can be removed without disturbing the coating by using the heated dolly remover. Should the pressure overcome the adhesion of the dolly onto the surface the pressure will be recorded on the gauge. Dollies can be glued in place and left indefinitely as part of a scheduled maintenance programme.

The pressure gauge is swivel mounted to allow testing in any position and the flexible mid-section allows easy access. Adhesion on the internal and external surfaces of pipes can be tested using curved dollies. The HAT-500 is supplied in a hard plastic foam filled carry case complete with 5 flat dollies, adhesive, dolly remover.



CHC-520: Cross Hatch Cutter

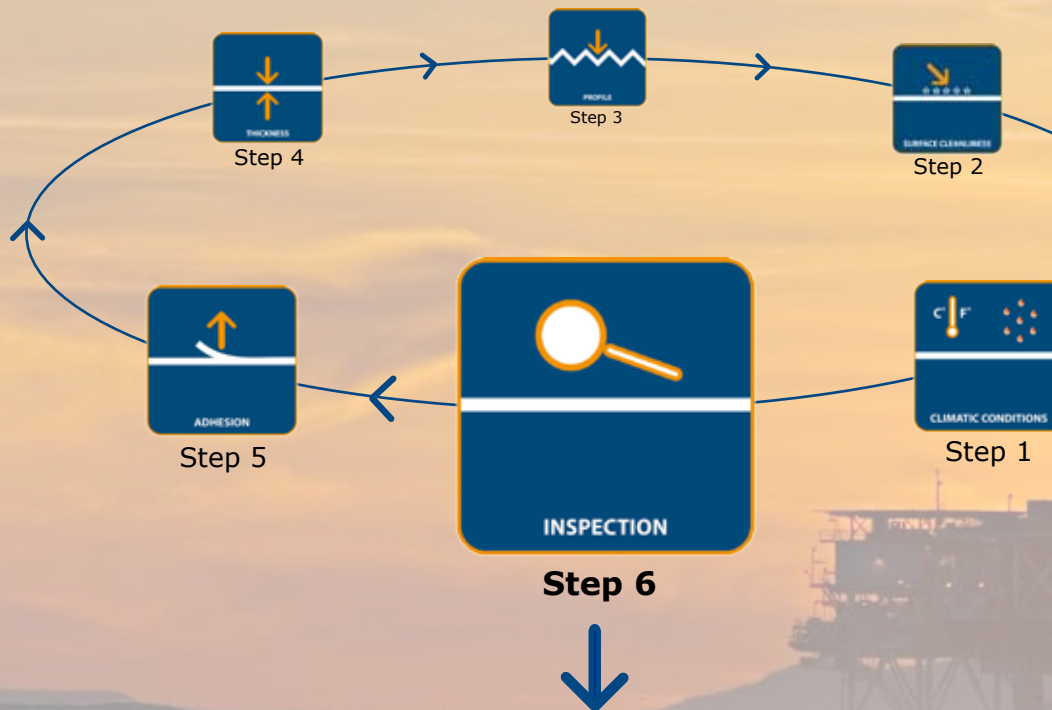
The CHC-520 tests the adhesion of a dry coating onto the substrate to which it is applied.

To measure the adhesion two sets of parallel cuts at ninety degrees to each other are made with a knife resulting in a pattern of similar sized squares. This area can be assessed by using a hard brush or adhesive tape and the results compared with the supplied chart. Different knives are available to test different coating thicknesses and substrates according to different standards.

The CHC-520 is supplied in a hard plastic foam filled carry case complete with hard brush, adhesive tape, and illuminated magnifier. A knife must be ordered separately according to the specific application.

Specific data sheets are available for each of the products above – please see the Product Data Sheet Key on page 15.

Step 6 - Inspection



Guidelines

Coating integrity

The coating applied to the substrate should protect against premature corrosion. The integrity of the coating can be assessed with respect to porosity and remedial work carried out if required. Porosity in the coating can be caused by numerous abnormalities in the coating such as:

- Pinholes in the coating caused by air escaping from the surface of the substrate through the coating during the curing process.
- Uncoated areas especially prevalent on corners or weld seams where coatings may have flowed away leaving the peaks of the profile exposed.
- Cracks in the coating caused by excessive wet film build creating pressure during the flow stage of the curing process.



AIRBLAST

Key Products



HOD-600: DC Holiday Detector

The HOD-600 is used to test the integrity of a coated surface by identifying pin holes and flaws in the coating.

The HOD-600 identifies pin holes and flaws in the coating by passing a voltage through a brush electrode which is moved over the coated surface, the voltage will spark through a pin hole or flaw to the substrate identifying the area for closer inspection. Upon identification of a pin hole or flaw an audible alarm will sound and a red indicator will flash on the unit. The application of the test is safe and does not cause burn marks or damage to the coating due to the test voltage being of high impedance.

The HOD-600 can be carried by the operator using the neck strap provided due to its light weight and portable design, and is supplied in a hard plastic foam filled carry case complete with high voltage probe, brush electrode, and earthing cable.



PHD-620: Pinhole Detector

The PHD-620 is used to test the integrity of a coated surface by identifying pin holes and flaws in the coating.

The PHD-620 identifies pin holes and flaws in the coating by passing a selectable voltage of 9 volts, 67.5 volts, or 90 volts, through a wet sponge which is moved over the coated surface. The voltage will make a path through the wetting agent to the pin hole or flaw in the substrate, an audible alarm will sound and a red light will flash on the unit identifying the area for closer inspection. The application of the test is safe and does not cause burn marks or damage to the coating.

The PHD-620 can be carried by the operator due to its light weight and portable design, and is supplied in a hard plastic foam filled carry case complete with 150mm broad sponge assembly, and earthing cable.

Specific data sheets are available for each of the products above – please see the Product Data Sheet Key on page 15.

Part no. index

Product	Part no.
DTH-100 Digital Thermometer - Metric	7861000
DTH-100 Digital Thermometer - Imperial	7861001
MTM-110 Magnetic Thermometer (-30 -50° C.)	7861100
MTM-111 Magnetic Thermometer (0 - 120° C.)	7861101
DPM-120 RH% Dewpoint Meter	7861200
WHM-130 Whirling Hygrometer	7861300
SSM-200 Soluble Salt Meter - unlimited version	7862000
SSM-200 Soluble Salt Meter - lite version, 50 credits	7862001
BTK-220 Bresle Test Kit	7862200
RGB-260 Rust Grade Book (Swedish Standards)	7862600
TXT-300 Testex Tape (Coarse)	7863301
TXT-300 Testex Tape (X Coarse)	7863302
TXT-300 Testex Tape (X Coarse Plus)	7863303
TXG-320 Testex Gauge	7863200
SRC-340 Surface Comparator (Grit)	7863400
SRC-341 Surface Comparator (Shot)	7863410
SPG-360 Surface Profile Gauge	7863600
DFT-400 Dry Film Thickness Gauge	7872100
DFT-420 Dry Film Thickness Gauge	7872250
DFT440 Dry Film Thickness Gauge	7874250
DFT-441 Dry Film Thickness Gauge	7874260
WFT-450 Wet Film Thickness Comb (SS) 25 - 1500 micron	7864000
WFT-455 Wet Film Thickness Comb (plastic)	7864013
HAT-500 Hydraulic Adhesion Tester - Standard	7865000
HAT-500 Hydraulic Adhesion Tester - Right angle	7865001
CHC-520 Cross Hatch Cutter	7865420
HOD-600 DC Holiday Detector 0.5-6Kv	7866000
HOD-600 DC Holiday Detector 1-20Kv	7866001
HOD-600 DC Holiday Detector 1-30Kv	7866002
PHD-620 Pinhole Detector	7866200



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Literature index

Product	Data Sheet no.	Manual no.
DTH-100 Digital Thermometer	LT9100E	MN9100E
MTM-110 Magnetic Thermometer	LT9110E	MN9110E
DPM-120 RH% Dewpoint Meter	LT9120E	MN9120E
WHM-130 Whirling Hygrometer	LT9130E	MN9130E
SSM-200 Soluble Salt Meter	LT9200E	MN9200E
BTK-220 Bresle Test Kit	LT9220E	MN9220E
RGB-260 Rust Grade Book (Swedish Standards)	LT9260E	MN9260E
TXT-300 Testex Tape	LT9300E	MN9300E
TXG-320 Testex Gauge	LT9320E	MN9320E
SRC-340/341 Surface Comparator (Grit/Shot)	LT9340E	MN9340E
SPG-360 Surface Profile Gauge	LT9360E	MN9360E
DFT-400/420 Dry Film Thickness Gauges	LT9400E	MN9400E
DFT-440 Dry Film Thickness Gauge	LT9440E	MN9440E
DFT-441 Dry Film Thickness Gauge	LT9441E	MN9441E
WFT-450/455 Wet Film Thickness Comb	LT9450E	MN9450E
HAT-500 Hydraulic Adhesion Tester	LT9500E	MN9500E
CHC-520 Cross Hatch Cutter	LT9520E	MN9520E
HOD-600 DC Holiday Detector	LT9600E	MN9600E
PHD-620 Pinhole Detector	LT9620E	MN9620E

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