

Heritage Fabric works

Great John Street Hotel, Manchester



Date: 23/04/21	Document not approved	A	B	C
Author – Richard Granton	Approved – Subject to revision	Tick as Appropriate		
Current status of Document	Document approved – Proceed			

Revision History		
Date	Revision No.	Details of Revision
23/04/21	A	Initial issue

CONTENTS PAGE

CONTENTS:

Page 1: Front Cover

Page 2: Contents Page

Page 3: Introduction

Page 4: Method Statement for Paint Removal to Glazed Bricks

Page 7: Method Statement for Repairs and Replacement of Glazed Brick

Page 10: Method Statement for Re-Grouting of Glazed Bricks

Page 12: Method Statement for Steam Clean to Façade

Page 14: Method Statement for Brickwork Replacement

Page 16: Method Statement for Stone Repairs

Page 18: Method Statement for Masonry Repointing

Page 20: Appendix A

Page 29: Appendix B

INTRODUCTION:

The following Method statements will demonstrate how we are proposing to carry out a number of specific tasks to existing heritage building fabric whilst maintaining the historic character of the property.

These tasks are as follows:

- Paint Removal to Glazed Bricks (Appendix A: Peelaway system information)
- Repairs and Replacement of Glazed Brick
- Re-Grouting of Glazed Bricks
- Steam Clean to Façade (Appendix B: Thermatech system information)
- Brickwork Replacement
- Stone Repairs
- Masonry Repointing

These works will be taking place at the former Great John Street Hotel which is a Grade II listed building.

Works will be carried out by Quadriga who use qualified, competent, experienced professional operatives who specialise in sensitive works of this nature and who will ensure the historic nature of the building be retained. Quadriga operatives hold the relevant training accreditations required which includes Heritage Gold CSCS and the use of DOFF for cleaning purposes.

Precautions will be taken to maintain the integrity of the existing fabric and to protect other areas whilst the works are carried out.

All operatives will be briefed on the importance of carrying out the daily works in a methodical and systematic way so as to protect the existing fabric of the building. This will be closely monitored to ensure strict adherence.

The chosen methods stipulated within this document are the industry tried and tested with proven track records for their use. These methods have been used on other listed buildings in and around Manchester, as well as throughout the U.K. and have been proven to minimise the risk of detrimental damage to existing building fabric such as this.

A great example of this is the Hanover Building on Corporation Street, Manchester, where a number of these methods of restoration were adopted. The building itself went on to achieve a number of prestigious awards which is in part testament to the restoration works carried out.

Samples of each activity and the elements of removal, repair and replacement will be provided for Heritage Planning Authorities to view.

Heritage Fabric works

Great John Street Hotel, Manchester

Methodology for Paint Removal to existing Glazed Bricks

PAINT REMOVAL FROM GLAZED BRICKWORK:

A number of methods were trialled to establish the most appropriate to move forward with. After reviewing these it was decided to move forward with the peelaway system (Appendix A) which provided the best overall finish, did not cause any detrimental damage to the existing brick nor to the surround building fabric.

The other methods trialled were the Thermovac method. This however did not remove the paint and caused excessive water in the small area where it was used. It was decided not to use this method as a result of poor finish and also risk of water accumulated damaging other areas of the building.

A caustic crème was also trialled. It was identified very quickly that when the crème was removed there was the need for excessive working to get the existing paint and residue removed. It was decided that this would not be the method to move forward with as there was the potential to damage the existing glaze on the brick.

Remove handrails, fixtures & fittings from stairwells & corridors to give clear access to walls. Label equipment removed from the walls for later reinstatement. These will be stored in a secure designated room within the building which will be agreed prior to commencing.

Remove dust and surface contaminants from walls via churn brush ready to receive poultice.

Apply Peelaway 1 to the required areas by means of spatula, trowel or brush.

Once the desired area has been coated with Peelaway 1 apply the blanket over the product and rub over the paper to ensure good adhesion to the host substrate.

Allow to dwell for a period of between 24 - 48 hours.

Following the dwelling period remove the paper from the wall and remove remaining residue with scrapers and the use of a damp non abrasive cloth.

Paint between joint lines to be cleaned with a churn brush.

Waste is to be removed from the site and transferred away by contaminated waste carrier.

Clean down the treated area with water and repeat the process above should paint coatings remain.

As the works here progress any existing damage can be assessed. The intention will be that works of this nature are kept to an absolute minimum so that the existing fabric and is retained where possible.

Protection Measures:

Floors to be protected with correx floor protection. Polythene to be laid on top which will be then rolled up systematically as works progress and to contain removed paint and peelaway product.

Trained, competent, experienced personnel to carry out the works. (Heritage Gold CSCS)

METHOD STATEMENTS FOR HERITAGE FABRIC WORKS

Industry tried and tested method adopted which has a proven track record.

Waste to be removed to skip which will be disposed of as contaminated waste.

Heritage Fabric works

Great John Street Hotel, Manchester

Methodology for Repairs and Replacement of existing Glazed Bricks

REPAIRS AND REPLACEMENT OF GLAZED BRICKS METHODOLOGY;

Repairs:

Once paint removed from glazed brickwork contractor to assess extent of repairs/replacements.

Fill area of damage with 2 part epoxy filler slightly shy of surface and allow to set and shrink.

Return to area and fill to surface and allow to set.

Sand back filler to surface of brick to leave seamless repair.

With Pantone Capsure identify the exact shade of paint and ensure with trial that the correct colour is identified.

Prime the repair area with etching solution and airbrush area with compatible paint and blend to match original colour to give invisible repair.

Seal repair area on completion with clear lacquer to give glazed appearance/finish.

Replacement:

Saw cut with arbotech around the defective brick to detach from surrounding masonry.

With light duty breaker, carefully break out brick completely from pocket.

Clear out dust from exposed pocket and flush out area with clean water.

Apply replacement mortar to void and insert glazed brick and ensure good compaction into pocket.

Allow to set and re-visit to re-point mortar joints to perimeter of brick.

New matching bricks are to be obtained from the following potential suppliers:

1. Darwen Terracotta
2. Hathernware Terracotta
3. Modular Clay Products

The intention will be that unless there is no other option the existing glazed brick will be retained where possible.

The materials proposed for use as part of these works will be provided in advance for reference purposes.

Mortar specification and design mix will be provided in advance for reference.

Protection Measures:

Floors will be protected with correx floor protection with polythene laid on top to contain any moisture generated or any potential residue from repair works.

Dust extraction will be used to minimise risk of airborne particles throughout cutting operations.

Materials will be contained within tubs. Tubs will be checked for damage to ensure no leakage prior to commencing.

Equipment used to be checked prior to each use and to be fit for purpose.

Heritage Fabric works

Great John Street Hotel, Manchester

Methodology for Re-Grouting to existing Glazed Bricks

REGROUTING TO GLAZED BRICK METHODOLOGY:

Rake out defective grout with hand tools (It has been noted that some areas have very shallow joints whereby using hand tools would damage the face of the existing brick. Where this is the case a dremmel will be utilised. This method will be a last resort with the intention being to minimise the risk of damage to the existing fabric) to leave joint between brickwork free of material to depth of no greater than 5mm.

Lime putty based grout will be used to match existing with correct colour checks carried out to ensure a match with existing.

Apply grout where necessary with grouting tool to ensure compaction within the joint.

Sponge off over filled grout with sponge and allow material to cure.

Return to area after curing period and clean off any remaining grout residue with water and a stiff brush.

The materials to be used as part of these works will be provided in advance for reference purposes.

Protection Measures:

Floors will be protected using correx floor protection with polythene laid over the top to ensure moisture or residue is captured.

Dust extraction will be used to prevent airborne dust.

Only competent, skilled, experienced personnel will be permitted to use the tools required for removing existing grout to minimise the potential risk of damage to the existing fabric.

Equipment used to be checked prior to each use and to be fit for purpose.

Heritage Fabric works

Great John Street Hotel, Manchester

Methodology for Steam Clean to existing Facade

STEAM CLEAN TO FAÇADE METHODOLOGY:

The clean of the façade is to be completed by means of Thermatech Superwater heated system. (Appendix B)

To clean the existing stone and brickwork the anticipated settings will be 60-90bar, 150°C, 200-400mm nozzle distance.

A sympathetic level of cleaning will normally require a number of passes, often with an interval between. At all times the pressure will be no higher, and the distance no closer than achieves an even result without scarring, striation or other loss of sound surface.

The work shall commence at the uppermost level and proceed downwards for a given section or elevation.

Before cleaning (except when non-aqueous reagents are about to be used), areas of soiling are to be pre-wetted and kept damp for a period of 10-30minutes (thicker residues requiring the longer time) before first cleaning, and at least 5 minutes before subsequent cleaning.

Protection Measures:

Only experienced, competent, trained personnel permitted to use the equipment associated with the works. (DOFF training held by operatives)

Settings to be checked prior to start each day with these monitored on a regular basis to ensure settings are maintained.

Scaffold will have monoflex wrap to perimeter to prevent any overspray to the neighbouring properties or onto the adjacent streets.

Not to be used when overnight temperature drops below 5 degrees.

Equipment used to be checked prior to each use and to be fit for purpose.

Heritage Fabric works

Great John Street Hotel, Manchester

Methodology for existing Brickwork Replacement

BRICKWORK REPLACEMENT METHODOLOGY:

Hand tools to be used to remove existing mortar around the defective brick to detach from surrounding masonry. (Saw cut with arbotech will be used in instances where mortar bed is identified as being too shallow to safely remove without damaging brick when using hand tools. This will only be used as a last resort)

With light duty breaker, carefully break out brick completely from pocket.

Clear out dust from exposed pocket and flush out area with clean water.

Apply mortar to void and insert brick and ensure good compaction into pocket.

Allow to set and re-visit to re-point mortar joints (To match existing) to perimeter of brick.

The intention for these works is to keep the replacing of existing brick to an absolute minimum. Best endeavours will be adopted to retain as much of the existing brickwork where possible.

Existing brick will be retained from existing fabric removal and reused for any replacement required. If not available brick will be sourced to provide a match. Details of such will be provided in advance.

Mortar specification and mix design will be provided in advance for reference as part of these works.

Protection Measures:

Dust extraction to be used throughout cutting operations.

Only competent, experienced operatives permitted to use equipment associated with works.

Equipment used to be checked prior to each use and to be fit for purpose.

Heritage Fabric works

Great John Street Hotel, Manchester

Methodology for Repairs to existing Stonework

STONE REPAIR METHODOLOGY:

Carefully remove decayed or defective areas of stone using hand tools to leave a sound keyed surface.

To introduce non ferrous reinforcing rods and performed supports according to need and extent of repair.

Brush down and well wet the surfaces with clean cold water.

Restore forward the areas concerned using specialist mortar.

The compound is well compressed around the reinforcement and finished with wooden profiles to a modified profile.

On completion of restoration all newly formed masonry joints will be ground out and pointed to match the surrounding work.

Restoration mortar has been specially formulated by us to incorporate crushed natural stone together with appropriate binders and additives to achieve a match as near as reasonably possible with the existing stone, both in colour, texture and strength, while still maintaining the water circuitry of the masonry.

Details of products used as part of the works will be provided in advance.

Specialist mortar mix and design will be provided in advance for reference for repairs required along with mortar design for repointing/re-bedding where required.

Protection Measures:

Only competent, experienced personnel to carry out these works.

Equipment used to be checked prior to each use and to be fit for purpose.

Task specific PPE to be worn whilst carrying out the works and as per manufacturers data sheets.

Location to have protective covering in place to avoid potential contamination on other surfaces.

Heritage Fabric works

Great John Street Hotel, Manchester

Methodology for Re-Pointing to existing Masonry

MASONRY RE-POINTING METHODOLOGY:

Rake out by hand any loose lime based mortars.

Where cementitious based mortars have been applied, using a fine diamond blade, cut the centre of the joint out and hand dress the old remaining mortar into the cut. Note if hard cementitious mortars are removed solely by hand tools, damage will occur to the face and arris of the stone/brick as joints are not consistent in size and some are not deep enough to use hand removal methods.

Cut/rake out joints to a minimum depth of 25mm.

Brush out all loose matter and well wet with clean water prior to repointing. Repoint in a 1:3 sand lime (NHL 3.5). Choice of fine sand to be made to match original mortar where possible.

Details of mortar design and mix will be provided in advance as part of the works. A sample will be collected from existing to aid this process and analysis carried out to determine composition.

Protection Measures:

Only competent, experienced personnel to use any equipment associated with the works.

Equipment used to be checked prior to each use and to be fit for purpose.

Mortar mix/type to be verified by Heritage Officer prior to use.

Dust suppression to be used where applicable.

Overnight temperatures will be monitored to ensure suitability for proceeding with re-pointing.

APPENDIX A

PEELAWAY SYSTEM DETAILS



The Original Poultrice Paint Removal System
The safer, more efficient way to remove almost any type of paint or varnish in one easy application from a variety of substrates.

✓ **Architecturally Specified**

Environmentally Safer*
FORMULATION

* Environmental claim compares to shot blasting, abrasion and heat guns where toxic paint particles can be released into the environment.



Barrettine
TRUSTED BY THE **PROFESSIONALS**

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How does **Peelaway**® work?

Peelaway® was first developed in 1981 to deal effectively with the problems associated with the removal of multiple layers of old lead-based paint where burning or sanding would allow lead particles to escape into the environment with the associated health risks caused by such practices. The stripping compound is formulated to turn the lead into lead hydroxide within the paste so that it can be safely disposed of without endangering the environment or user.

The system is designed to work with the special **Peelaway**® poultice cover supplied (patent protected) which allows the user to extend the time available so the stripping process can be as complete as possible. This is especially useful where crevices and profiles have allowed the build-up of several times the thickness of the paint compared to flat surfaces. The cover increases the penetration of the stripping paste and helps the collection of the waste paint and paste afterwards. This prevents the escape of unwanted chemicals into the environment. The outside of the cover is also printed with instructions and notices to workers and public that chemical paint removal is in progress.



The system will remove paint from many exterior and interior architectural surfaces



WOOD



ORNATE PLASTER



STONE



BRICK



METAL

Sample pots are available for both **Peelaway**® 1 & 7. A test patch should always be carried out first.

One limitation that applies to both products is that they will work slower under 5°C and will stop working under 0°C. **Peelaway**® 1 will not remove certain two pack epoxy coatings, urethanes, chlorinated rubber, baked enamels or masonry cement based paints. **Peelaway**® 7 will remove most of these high performance coatings.



Why use Peelaway®?

The system will remove paint from many exterior and interior architectural surfaces, including stone, cement, brickwork, plaster walls and ceilings, plain and ornate fibrous plaster cornices, plain and carved or turned woodwork, plain and cast metal work. Automobile and aircraft coatings are also efficiently stripped with the **Peelaway®** system. Because the chemicals are doing the stripping work with minimal sanding and scraping compared to other methods, the **Peelaway® Poulitce Paint Removal System** can be very cost effective – substantially reducing the overall amount of labour required for the stripping project and the need for negative air and debris collection that is often very labour and equipment intensive.

Why trust Peelaway®?

Peelaway® is architecturally specified; approved for projects by English Heritage, National Trust and many contractors working in the heritage industry.

Peelaway® Poulitce Paint Removal System has been used for many high profile restoration projects including railings and interiors at **The British Museum**, ornate plaster ceilings at **Greenwich Palace**, ironwork on the **London Underground** and delicate panelling at the **Victoria and Albert Museum**. The system is frequently specified by architects as the only appropriate solution for paint removal where damage to the surface or risk to the environment is an issue.

Watch out for imitations.
If it doesn't say **Peelaway®** on the label, It's not!



Which product do I need?

The chemicals used within the stripping pastes are carefully chosen to minimise fumes and odours and are biodegradable and environmentally friendly. There are two main types of **Peelaway®** stripping pastes that work within the poultice system.



Peelaway® 1

Remember...

Test patches should always be done to assess the suitability of the final finish.

TEST PATCH

Peelaway® 1 is water-based and most often used for restoration projects involving multi layers of oil based paints where the stripping compound is formulated to quickly react with the paint resins and convert any lead present into a compound that can be safely disposed of without endangering the environment.

Peelaway® 1 is a high pH product, so it can penetrate and react with the oil/lead content of multi layers of older coatings, this means that the stripped surface should be neutralised with a weak solution of acetic acid (supplied with the packs) and left to dry thoroughly before repainting.

During very damp periods/conditions such as autumn through to spring, particularly on exterior substrates, moisture containing residues of **Peelaway® 1** may bleed out of the substrate at a later date thus raising the alkaline pH value once again. This could affect the repainted surface. As a precaution if **Peelaway® 1** is used and the surface is to be repainted, we would always recommend using a good quality alkaline resistant acrylic sealer/primer prior to repainting. However if the surface is not to be repainted, the pH or moisture content of the surface is not so critical.

Peelaway® 1 should not be used on gesso (a form of putty) mouldings sometimes used on carved fireplace surrounds.

Peelaway® 1 should not be used to remove paint from veneers, plywoods, aluminium or unskimmed drywall and may discolour certain hardwoods. e.g Oak, Mahogany, Teak etc (for these use **Peelaway® 7**).

Available sizes:

5 kg & 15 kg

Includes: Blanket, spatula & neutraliser



Peelaway® 7

**Peelaway® 7 IS THE NEW MODERN
ALTERNATIVE TO Peelaway® 1**

Peelaway® 7 is a water and solvent-based paste which is formulated to remove more modern water-based coatings. Excellent results have also been achieved with combinations of oil and water-based coatings.

Peelaway® 7 does not require neutralising and can be repainted within a few hours.

Peelaway® 7 is much safer and more user friendly. It is non caustic and does not burn skin in the event of accidental contact.

Peelaway® 7 should not be used on certain plastics such as polycarbonates and perspex. (Test on unskimmed drywall).

Peelaway® 7 is recommended for use in removing paint from veneers, plywoods or aluminium.

Remember...

Test patches should always be done to assess the suitability of the final finish.

**TEST
PATCH**

Key Benefits

Removes multiple layers of most modern industrial and domestic paint in one application.

Easy and safe to use: has very little odour and naturally degradable.

Safer to use than traditional Methylene Chloride paint strippers.

The unique paste formulation works effectively on the most intricate projects.

Effectively removes paints from woodwork, plaster, bricks, masonry and metal.

Available sizes:

750 g, 4 kg & 10 kg

Includes: Blanket & spatula





Achieving the best results!

Peelaway® stripping pastes are designed to be applied with the spatula supplied. Alternatively a hawk and trowel, brushes or a roller can be used. The pastes can also be sprayed with the use of the correct equipment: details are available from the company's technical department. The method of application will depend on how thick the paste needs to be applied, for instance, a spatula or trowel will apply the paste thicker than a brush.



Quick Guide & Check List:

- Always carry out a Test patch first (refer to next page).
- Never presume that **Peelaway**® will work because there are two types for different paints.
- The 2 types are, **Peelaway**® 1 (P1) and **Peelaway**® 7 (P7).
- P1 is mainly for lead and oil based paints and must be neutralised after stripping (pH between 5-9, fluid supplied). Moisture containing residues of **Peelaway**® 1 may bleed out of the substrate at a later date thus raising the alkaline pH value once again. This could affect the appearance of the repainted surface. As a precaution if **Peelaway**® 1 is used and the surface is to be repainted, we would always recommend using a good quality alkaline resistant acrylic sealer/primer prior to repainting. Repaint only when the surface has dried out (below 15% moisture) and has been rubbed down. Rubber gloves must be worn.
- P1 may discolour some hard woods including oak; P7 should not cause this effect as it's made differently but check first with a test patch.
- P1 neutralises the lead in paints so that it can be disposed of in the normal way. P7 is mainly for water based and modern oil paints indoors and out.

- The **Peelaway**® system generally does not work as effectively without the covering of the plastic blankets. These should be cut to size and overlaid as appropriate. Green for P7 and red for P1.
- **Peelaway**® will work slower under 5°C and will stop working under 0°C. You can apply **Peelaway**® with a spatula, trowel or brush; you can also spray it on for bigger surface areas.
- As a guide coverage is approximately 1m² per kilo at 1mm thick for P7. For P1 the coverage is reduced by approximately 20%.
- Always ensure that a sample patch is completed using the twin sample pots available. Starting from 1mm and building up the depth to 4-6mm on an area of 75mm x 75mm. If the initial tests are successful bigger test patches are advised before embarking on the whole project. This will identify the following:
 - which type of **Peelaway**® to use;
 - how much to put on;
 - how long to leave it on to do the job;
 - it will warn you of possible damage;
 - it will save you time and money;
 - and how successfully **Peelaway**® will strip the particular surface.

Further information is available at www.peelaway.co.uk
For technical assistance contact Barretttine at sales@barrettine.co.uk or telephone 0117 960 0060

The Poulitice Method

The application of the **Peelaway**® blanket over the paste protects it from drying out and the active time of the product is subsequently extended.



Before

After

Test Patches

We can not state enough how important it is to carry out a test patch before general use.

The size of the test patches will depend on the subject matter, but as a guide they should be from 75 x 75mm up to 300 x 300mm. Apply **Peelaway**® paste graded from 1mm to 6mm thick according to the age and thickness of the coating (e.g 1mm when removing a thin layer of varnish but possibly up to 6mm where there are multiple layers of thick paint). Place the **Peelaway**® blanket (print side out) on to the paste. Rub gently to remove air, pierce bubbles where necessary. Allow to stand from 2 to 48 hours, again this will be determined by the paint/coating type and thickness/number of layers. When using **Peelaway**® 1 to remove heavy paint build up over plaster mouldings you may need to leave even longer (up to 72 hours) and this can often aid the drying out process which encourages the old paint and blanket to lift away from the substrate being treated to complete the stripping process. For areas involving different elevations several test patches should be applied to accommodate the possibility of different coatings and the effects of weather on exterior surfaces. To remove, the spatula should be inserted into the paste and a section gently lifted away. If the original surface is apparent, the test patch can be



removed and the surface wiped with a damp sponge. If paint can still be seen, the test patch should be replaced and re-examined after a few hours.

Once the correct paste and timing for the project has been established together with the thickness required, the designated paste should be applied, the **Peelaway**® blanket laid over the paste and left for the time indicated by the test patch. Full instructions are on the containers.

Each project can potentially give different results and this is why it is imperative to carry out Test Patches. Leaving on for not long enough could mean the process has not completed. Leaving on too long could damage the substrate or you may find the **Peelaway**® blanket and paste becomes too hard and difficult to clean up.

Peelaway[®] 1 **Peelaway[®] 7**

Both products are available as a test kit.
For further information please contact us.

Authority: The **Peelaway[®]** system is patented or subject to patents applied for worldwide.



A FREE **Peelaway[®]** DVD
is available on request.



Available from:

Barrettine

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APPENDIX B

THERMATECH SYSTEM

Technical Information Sheet

RESTORATIVE TECHNIQUES



THE THERMATeCH® 'SUPERHEATED WATER' SYSTEM

Explanation

Unlike a conventional hot water pressure washer, the ThermaTech system combines continuous **high temperature** and **pressure** and **lower water volume**. This is delivered as a **liquid spray**, even at temperatures close to 155°C. This is referred to as **'Superheated Water'**.

It achieves this by using less water, high heat capacity and specific nozzle design and specification.

Description

The 'standard' ThermaTech system comprises pump, 'heater module', high pressure hoses and 'gun'. The system is modular, the pump and fuel tank can be lifted away to aid vehicle loading and site mobility. Selection of lances and nozzles and the adjustment of temperature and pressure are made to suit the substrate and soiling or coating. A gauge on the pump and digital display on the Module, register the working pressure and temperature.

Cold water from a tap or water tank is pressurised by the pump and passes through a blue high pressure hose to the Heater Module. Heated by diesel or kerosene, hot water exits through flexible red high pressure hoses to the gun.

For vertical surfaces, a short lance can be used more accurately for surface detail or paint and coating removal.

For increased performance, it is possible to connect the pump to two Heater Modules and back to one gun. This provides full temperature at the full pressure rating.

All ThermaTech systems have been built with Digital Temperature Control. The critical feature of this is not that it provides a digital instantaneous display of the temperature, but that the temperature fluctuation is kept to a minimum. Conventional hot machines (including many other superheated/steam types) use capillary thermostats, which result in a wide temperature range at lower operating pressures and thus equally wide changes in the spray shape and intensity through the heating cycle (the thermostat regulates the temperature by switching the boiler in and out). The controls built into the ThermaTech maintain much tighter temperature control and therefore spray shape over the cycle. The standard 110v system and trigger arrangement has a water flow rate of 4-8.5 litres min⁻¹. Standard option pressure is adjustable from 30-140bar*.

However alternative, additional options allow for, ThermaTech systems being used on delicate substrates that can routinely be operated in conjunction with pressure reducing guns. This enables a maximum pressure to be set at the pump but then the same or a reduced pressure to be set on demand at the gun. Whilst the minimum pressure at the pump is normally 30bar, setting at the gun can be as little as 0bar. At low pressures (≤50bar), a ThermaTech can also be set up and used to supply 2 operators simultaneously at full temperature, whilst allowing each operator to select a different pressure if required.

Specification

The **standard electric pump** is 110v and has a water flow rate of 4-8.5 litres min⁻¹. Pressure is adjustable from 30-140bar*. The optional 230v pump has a maximum pressure of 160bar*.

The **standard heater module** is 110v but is made 'dual voltage' by use of the optional 'drop in' transformer. The fuel is red or white diesel, or central heating oil (kerosene). Kerosene should be used with a combustion additive to prevent 'sooting up'. With adjustment, cooking oil is also permitted.

Temperature is adjustable from 30-155°C. With one Heater Module, 155°C can be maintained at pressures up to 90bar*, 120°C up to 120bar* and 100°C up to 155bar*.

High pressure hoses are twin wired and supplied red, in 10m or 20m length. For lengths longer than 30m, it is recommended that the additional hosing be located between pump and Heater Module to minimize temperature loss.

*One 'bar' is a unit of pressure equivalent to 14.5 pounds per square inch (P.S.I.).



Cleaning

The intensity of cleaning for delicate substrates is reduced by (a) Reducing the pump pressure setting (b) Changing the nozzle specification e.g. a nozzle of wider spray angle exerts a lower surface pressure at a given distance (c) Increasing the temperature so that the spray becomes diffuse (d) Increasing the working distance of nozzle to surface.

For delicate surfaces, full temperature but reduced pressure is used (see the explanation under 'paint/coating removal' below). The minimum practical pump pressure is 30bar*.

The temperature at which the spray becomes diffuse varies one nozzle design to another and so one with a lower diffusion temperature but operated at a higher temperature, will provide a 'softer' (diffuse) clean (see nozzle selection).

For tenacious soiling, it will be found advantageous to develop 'the clean' in stages, leaving an interval between. This 'dwell' period often acts to soften or release deposits more readily e.g. for removal of light sulphation, or deep organic soiling from wall copings.

Prolonged or close contact is unable to raise the temperature higher than the setting which, at a maximum of 155°C, is regarded as well below that which will induce chemical or physical change in most mineral substrates. However, direct contact with glass must be avoided. The use of hot water greatly accelerates drying. Precautions must prevent wet substrates being subjected to frost.

Paint/Coating Removal

The closer a nozzle operates to the surface, the higher the temperature but also the higher the surface pressure (because the water exits the aperture in a 'fan' shape). In general, it is high pressure (and/or volume) that will potentially damage a substrate and not the temperature. Therefore, if a given temperature/pressure setting proves to be too aggressive, one should lower the pump pressure and use the nozzle closer to the surface. The pressure effect that would be induced by moving the nozzle closer is counteracted by reducing the pump pressure. The reduced distance will, however, raise the temperature at which the water strikes the surface thus aiding the yield of the coating.

If the coating proves too resistant, or the substrate is too weak, a chemical to soften the coating should be employed. This will allow the nozzle to be operated at a greater distance (lower surface pressure) and to reduce the action time.

Nozzle Selection

Choice of nozzle is important. For the ThermoTech system, we presently have a number of nozzle types.

The standard nozzle (Lechler type) loses sharpness at temperatures greater than 140°C. This produces an even spray with good cleaning and paint removal characteristics. The spray angle used for cleaning is normally 40° but a nozzle of 25° can be used where the substrate allows.

An alternative nozzle ('Spraying Systems' type) causes the spray to become diffused once the water temperature significantly exceeds 100°C. This is used selectively to generate a very soft and hot vapour for the most delicate cleaning. This is not normally necessary for sound surfaces and is generally inappropriate for paint removal.

Health and Safety and Documentation

The ThermoTech system has been designed and built in the U.K specifically for use with restoration and conservation projects and for all kinds of site work generally.

The design utilises 110v as standard. The Heater Module is fitted with twin safety relief valves, twin temperature controllers, direct temperature readout and the controls are 24v. It uses a jerry-can tank to reduce site fuel handling. Fuel tank 'bundling' and 'drip tray' options are available. The switches of both the pump and the Heater Module have current overload and low voltage cut-out protection.

Hot high pressure hoses have been manufactured in red, specifically for the ThermoTech, to denote high temperature. External plugs and connectors are of IP67 'watertight' construction.

In addition to this 'Technical Information Sheet', Restorative has produced a family of documents to support project specification and management. These are for general guidance and include the 'ThermoTech Risk Assessment' and 'ThermoTech Safe Working Procedure'. These have been written in conjunction with our independent health and safety advisors, the NFU, and are reviewed by them and re-issued on an annual basis. These are available for architects, specifiers and contractors for the use of equipment and products supplied by Restorative Techniques Ltd.

Where applicable, 'Health and Safety Data Sheets' are issued for products used in conjunction with this equipment such as that for 'ThermoTech Descaler Concentrate'.

Restorative can be engaged to produce on-site trials and reports and to aid decision making in specification and implementation.

04/07/2012.

Neither Restorative Techniques Limited, nor the author, can accept liability for the relevance of this information and how it is used. Users and specifiers shall determine for themselves if the technique is applicable, and the parameters for use.

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