James Heal

OPERATOR'S GUIDE

ThermaPlate
Contact Heat Tester
Model 620

Covering Serial Numbers
620/03/1001 and upwards

James H. Heal & Co. Ltd.
Halifax, England

THE QUEEN'S AWARDS
FOR ENTERPRISE:
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Setting the Standard

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JAMES HEAL

At James Heal, we are dedicated to designing and developing high precision testing instruments and test materials for physical and colour fastness testing. Our worldwide service and calibration division and expert technical assistance complement our product range, adding real value to your laboratory testing activities.

Setting the Standard

We are committed to forming close relationships and have established numerous partnerships within the textile industry, from trade and standards organizations, to test houses, customers and distribution partners.

With a heritage spanning more than 140 years, we have evolved and grown through a culture of continuous improvement, resulting in a thorough understanding of the applications, operating conditions and requirements of customers worldwide – from independent testing laboratories and test houses, to fabric suppliers, manufacturers and retailers.

Using knowledge and expertise, we consistently set the industry standard through product innovation and technology, with customer and user needs, present and future, driving our technological advancements. You can be assured that with James Heal, you will always receive the highest levels of product quality and customer service. We have Agents and Distribution partners all over the globe, ensuring locally available product whenever, and wherever you need it.

Areas of Expertise

Textile: Colour Fastness

- Chlorinated Water
- Dry Cleaning
- Dry Heat
- Hot Pressing
- Laundering
- Light
- Perspiration
- Phenolic Yellowing
- Print Durability
- Rubbing
- Washing
- Water

Textile: Physical

- Abrasion
- Bursting Strength
- Compression and Puncture
- Crease and Wrinkle Recovery
- Crimp
- Drape
- Durability
- Flammability
- Mass per unit area
- Pilling and Fuzzing
- Security of Attachments
- Seam Slippage
- Shrinkage
- Snagging
- Spray Rating
- Stretch and Recovery
- Surface Deterioration
- Tear Strength
- Tensile Strength
- Washing and Drying

Non-Textile

- Bursting strength of nonwovens, plastics, paper and medical products
- Micro-scratching of laminates, wooden, painted, automotive and high gloss surfaces
- Physical and colour fastness testing of leather
- Rubbing fastness of laminates and wooden surfaces
- Tear strength of paper and plastics

THERMAPLATE – CONTACT HEAT TESTER

ThermaPlate provides an accurate thermal press capable of meeting the exacting demands required for both stability and colour fastness testing.

Features and Benefits

- Space efficient – occupies only a small area of bench.
- Easy calibration – lid designed to facilitate calibration; optional temperature checking device; and fully traceable certification (ISO/IEC 17025 compliant) available.
- Operator safety – positive park position for lid; cool exterior surfaces; and warning light which illuminates when plate temperatures exceed 60˚C
- Efficient temperature control – independent digital controllers for top and bottom plates; controllers continuously display set (target) and actual temperatures; and insulating plate supplied as standard.
- Accurate timing – a digital timer, pre settable, in increments of 1 second up to 1 hour, is activated automatically when the lid is closed.
- Standards – complies with all relevant International, European, American and Retailers standards / methods.
- Test Materials – comprehensive range of standard's-specific test materials available; Multifibre, Grey Scales, as well as Felt and Cotton Limbric (cut to size in order to achieve the correct operating pressures)

Service and Calibration

- Worldwide Service
- ISO 17025 based Accredited Calibration and Service
- 18 Months' Warranty

Technical Assistance

- Operator Training
- Knowledge transfer
- Applications Support
- Engineering Support

Applications

- Colour fastness to dry heat – Used mainly by fabric producers and dyers & finishers to predict colour changes on dyed and printed fabrics, during subsequent heat treatments.
- Colour fastness to hot pressing – Used mainly by fabric producers, dyers & finishers and garment makers to determine the resistance of the colour of textiles to change and transfer, when subjected to ironing and to processing on hot cylinders; tests may be carried out on dry, wet and/or damp specimens.
- Thermal stability – Used by fabric producers, dyers and finishers and garment makers to predict the shrinkage during heat setting synthetic fabrics and particularly those, which will be fused together during making up.
- Sublimation Fastness – Used by polyester producers to select disperse dyes with sublimation characteristics to match their product and process

Standards

ThermaPlate conforms to the following standards:

- EN ISO 105-P01 Colour fastness to heat treatments
- EN ISO 105-X11 Colour fastness to hot pressing

- AATCC 117 Colour fastness to dry heat
- AATCC 133 Colour fastness to heat: Hot pressing

- JIS 0879 Test methods for colour fastness to dry heat
- JIS 0850 Test methods for colour fastness to hot pressing

- Adidas 5.09 Colour migration of fabrics*

  *In order to achieve 4 kPa a specimen with dimensions 10 cm x 10 cm is used.

- M&S P10 Thermal stability
- M&S C13 Colour fastness to hot pressing

ThermaPlate is approved by Marks & Spencer.

SAFETY

Read this manual thoroughly before operating the unit.

- Keep clear of the heater plates while the instrument is in use and after the instrument has been turned off. A warning light on the instrument fascia will illuminate when the heater plates are above 60°C, providing the machine is turned on. After use, close the lid covering any exposed hot surfaces and allow the instrument to cool down slowly. Note: the heater plates takes approximately 2 hours to cool down from 220°C to 60°C with the fan running.

- Open the lid using only the attached handle. Avoid touching the metal case.

- It is possible, if a sample is left in the machine for longer than the stated length of time or at a higher temperature than that required by the test method, for the sample to scorch or even ignite. The heater plates are capable of generating temperatures up to 220°C. As a precaution it is recommend that a suitable fire extinguisher, i.e., dry power, is readily available.

- Do not accelerate cooling of the instrument, other than by using the fan. Allow the instrument to cool slowly by radiating heat to the atmosphere.

- The instrument is suitable for wet testing of fabric; however, water should not be poured directly onto the instrument. Water or other liquids should be added to the specimen before it is placed on the instrument.

- The instrument weighs approximately 13 kg. Only attempt to lift the instrument if you feel it is within your ability or preferably ask a colleague for assistance.

- ThermaPlate complies with the CE regulations in full.

- Covers should not be removed, other than by a qualified engineer, in which case ensure the machine is isolated from the electrical supply before removing any covers.

- Fuses of the correct type and with the correct amperage rating must be used.

Thermal Protection

Never use ThermaPlate for anything other than what it is designed for.

Should the internal compartment of the instrument base overheat, a thermal trip (cut-out) will activate, preventing damage to the instrument. This may occur if the cooling fan fails or if cooling air is restricted from entering / exhausting from the instrument. Activation of the thermal trip will be noticeable by the heater plates failing to maintain temperature. Should this occur, turn the heaters off and allow the instrument to cool down. Check the cooling fan is operating correctly.

Resetting the Instrument

The thermal trip will reset automatically once the temperature inside the instrument base compartment has fallen to the correct operating temperature. Resetting is automatic and requires no intervention from the operator.

INSTALLATION

Unpacking

Do not dispose of any packaging material until all standard and optional accessories are accounted for. If there are any discrepancies, please contact your supplier immediately.

Remove the plastic strapping and tape.

Lift out the top box, containing the accessories. Remove the tape and ensure that all standard accessories are present.

Using both hands remove the lid from the lower section.

Carefully remove the ThermaPlate from its case and place it on a firm, flat surface.
The instrument weighs approximately 13 kg. Only attempt to lift the instrument if you feel it is within your ability or preferably ask a colleague for assistance.

Positioning the instrument

Stand the instrument on a firm, level surface such as a bench or table. The instrument is fitted with leveling feet that can be adjusted by rotating them, to suit an uneven surface.
Important: position the instrument so that the cooling fan at the rear of the instrument is not obstructed. Ensure the air intake duct underneath the instrument is not restricted.

Connecting to electrical supply

This instrument is only suitable for use with mains voltage of 230V 50Hz/60Hz. The mains inlet, and fuse holders, are located at the rear of the instrument. The mains lead wires are coloured in accordance with the following code:

Green/Yellow	Earth
Blue	Neutral
Brown	Live

IMPORTANT: THIS INSTRUMENT MUST BE EARTHED

Accessories

906-601	ThermaPlate model 620, 230V, 50/60Hz, with mains lead.

	STANDARD ACCESSORIES
794-826	1 × Insulating board
794-827	1 × Specimen platform

	CALIBRATION
201-620	ISO Certificate of calibration for ThermaPlate

	ACCESSORIES
794-903	Temperature Measurement Kit

Test Materials

	TEST MATERIALS – ISO 105 P01
702-500	Multifibre Adjacent Fabric DW – per roll (10m)
766-200	James Heal Grey scale for assessing Change in Colour
766-201	James Heal Grey scale for assessing Staining

	TEST MATERIALS – ISO 105 X11
702-447	Woven felt 125 × 90mm – per pack (10)
702-446	Cotton Limbric 125 × 90mm – per pack (20)
766-200	James Heal Grey scale for assessing Change in Colour
766-201	James Heal Grey scale for assessing Staining

	TEST MATERIALS – M&S P10
772-133	Ruler 300mm (12in)

	TEST MATERIALS – M&S C13
766-200	JHH Grey scale for assessing Change in Colour

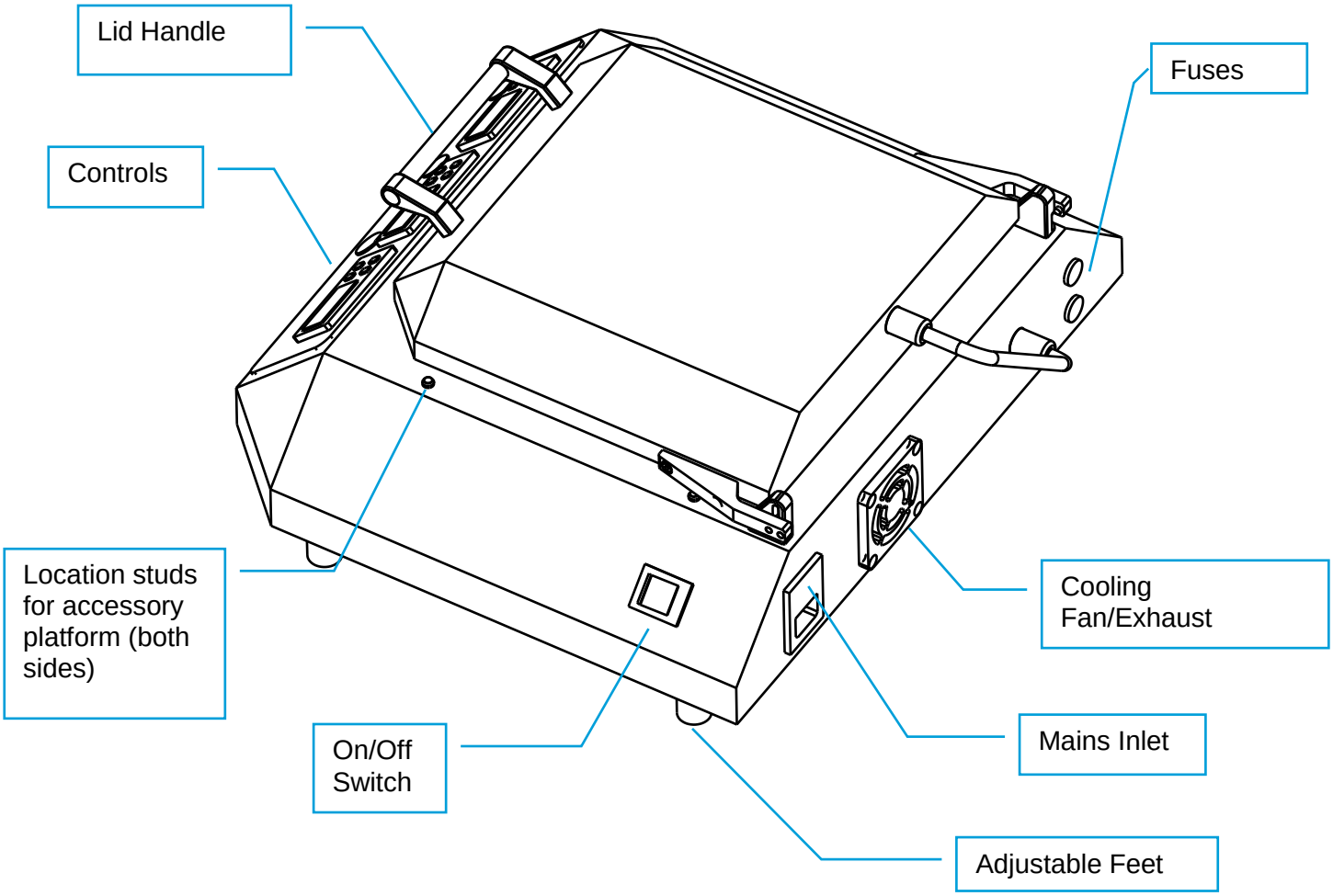
	TEST MATERIALS – AATCC 117
702-403	Multifibre Adjacent Fabric Style 10A – per pack (1m)
766-512	AATCC Gray Scale for Colour Change
766-513	AATCC Gray Scale for Staining

	TEST MATERIALS – AATCC 133
702-447	Woven felt 125 × 90mm – per pack (10)
702-446	Cotton Limbric 125 × 90mm – per pack (20)
766-512	AATCC Gray Scale for Colour Change
766-513	AATCC Gray Scale for Staining

Spare Parts

133-116	Heater element
130-814	10 A anti-surge fuse
130-804	1.25 A anti-surge fuse
130-809	3.15 A anti-surge fuse
195-211	Cooling Fan

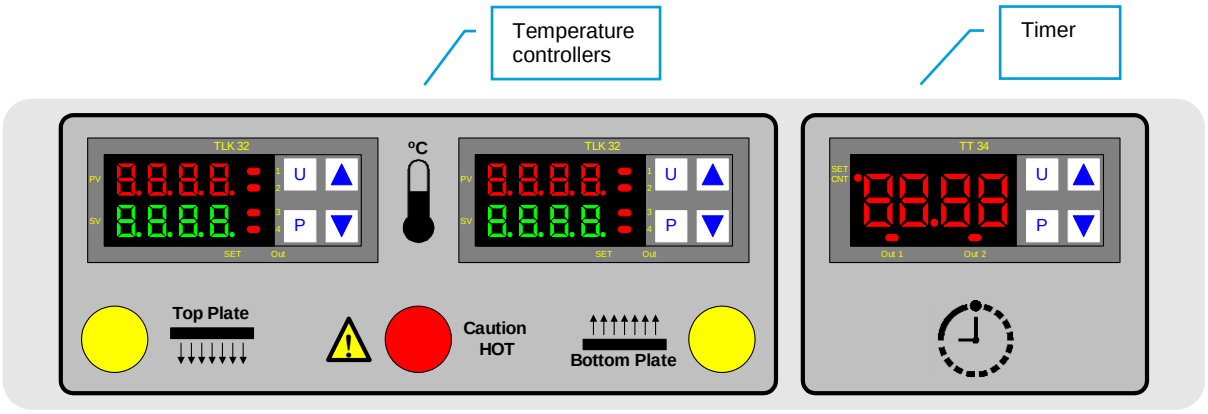
INSTRUMENT LAYOUT



CONTROLS

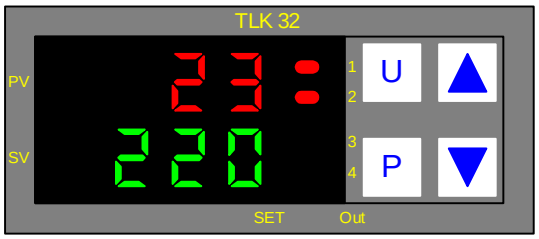
Connect to mains electricity and switch on.

Fascia



Top and Bottom Plate Temperature Controls

The red PV (Process Value) section of the display indicates the current plate temperature in degrees C.



The green SV (Set Value) section of the display is used to set the required plate temperature in degrees C between a minimum of 20 and a maximum of 220. To adjust proceed as follows,

Press key “P” and release.
The red PV section of the display will show “SP 1” flashing.

Then press either the up or down arrow keys to reach the required temperature. These keys change the value one digit at a time but if they are pressed for more than 1 second the value increases or decreases more rapidly. After 2 seconds pressed the changing speed increases again to allow the required value to be reached quicker.

Once the required value has been reached press key “P” once again to accept.

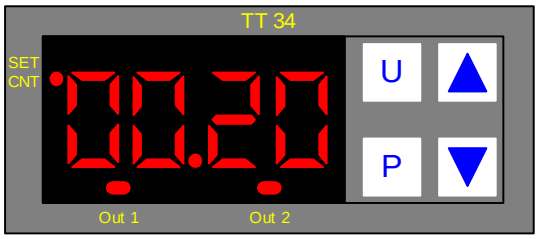
The yellow push buttons are used to turn on / off either plate. Power will be supplied to the plate heaters provided the corresponding push button is down (illuminated) and that the current temperature is less than the required temperature. The red LED adjacent to number "1" will be on. As the current temperature rises and approaches the required temperature then this LED will begin to pulse, its frequency slowing down as the difference reduces.

When the yellow push button is up (not-illuminated) the corresponding plate is off and the red PV section of the display will alternate between the current temperature and the text "OFF".

At any time when the current temperature of either plate is 60°C or above, the red "Caution HOT" indicator will be illuminated. The red LED adjacent to number "2" will be on. This indicator is provided to warn potential users to the dangers of hot top and / or bottom plates. Only when both plates have cooled below 60°C will this indicator go out.

Cycle Timer Control

The display indicates the current cycle time in minutes and seconds (mm.ss).



The display is used to set the required cycle time between a minimum of 00:01 and a maximum of 99:59. To adjust proceed as follows:

Press key "P" and release. The display will show "t1" whilst key "P" is pressed. The LED "SET / CNT" will flash rapidly to indicate adjustment of the cycle time is now possible.

Then press either the up or down arrow keys to reach the required time. These keys change the value one digit at a time but if they are pressed for more than 1 second the value increases or decreases more rapidly. After a further time being pressed the display will increment / decrement in whole minutes.

Once the required value has been reached press key "U" to accept. The LED "SET / CNT" will go out.

To start the cycle timer, simply close the lid. The LED "SET / CNT" will flash slowly and the cycle time will begin counting down to 00:00. Opening the lid will pause the cycle timer. The LED "SET / CNT" will be on continuously. To continue the cycle, close the lid again. Note that if the cycle time was adjusted with the lid closed then it will be necessary to first open, and then close the lid to start the cycle timer.

At the end of the cycle a buzzer will sound. To mute the buzzer and reset the cycle time, to that used at the start of the previous cycle, either press key "U" or open the lid. If the current cycle is aborted by opening the lid, then pressing key "U" will also reset the cycle time.

OPERATION

Before operating the ThermaPlate please read and follow the safety instructions.

Test Principles

Thermal Stability

A test specimen of pre-determined dimensions is placed between two plates at individually controlled temperatures. After the allotted time the sample is carefully removed and allowed to relax in the standard testing atmosphere. The samples are re measured and the percentage elongation or shrinkage is recorded.

Colour Fastness to Hot Pressing

A coloured test specimen is placed with or without an undyed adjacent cloth (wet or dry). The composite specimen is then placed between two plates at individually controlled temperatures for a set length of time. After the allotted time the sample is removed and assessed in comparison with standard Grey Scales.

Preparation of the ThermaPlate for Testing

Cleaning

Prior to switching the instrument on it will need cleaning, see Maintenance.

Warm-up Period

Program the controller with the desired temperature set point (see Controls). Turn the heaters on and allow the instrument to heat up to the required temperature. The ThermaPlate should achieve 220^{o}C in approx. 10 minutes with both upper and lower plates closed and turned on. However certain tests require the top and bottom plates at different temperatures and in these cases the plates should be kept open.

Note: the temperature warning indicator will illuminate when the hot plates exceed 60^{o}C, warning that it is no longer safe to touch the heater plates.

Timer

Set the timer to the required test duration.
The timer is activated by closing the lid and reset by opening the lid.

Performing a Test

The following test methods are illustrations of suitable applications. Users must identify and use the specific routines necessary for their customer's applications.

Thermal Stability to Hot Pressing

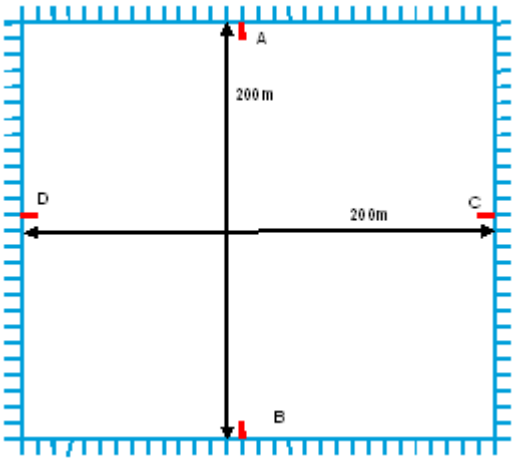
Refer to the appropriate standard for specific instructions including, temperatures, sizes and times.

When the instrument is cold, inspect the top and bottom plates for damage and debris. Clean if necessary as described in Maintenance.

Set the plates to the temperature required in the standard. (see Controls).
Upon reaching the required temperature allow the machine to stabilise for 10 minutes, unless the standard specifies a longer period of stabilisation in which case this should be followed.

Example method:
Prepare the sample as specified in the appropriate standard.

- Cut a square of 220mm × 220mm.
- Allow to condition in the standard testing atmosphere.
- Fray all four sides to 200mm × 200mm.
- Mark the sample in approximately the centre of each edge A, B, C & D



- Measure the distance A to B and C to D. Record the measurements

e.g., AB = 202 mm
CD = 198 mm

- The sample is carefully placed on the bottom plate.
- The timer is set to the required set point (see Controls).
- The top plate is closed, at which point the timer is automatically started.

- When the alarm sounds, carefully remove the sample. Ensuring that the sample is not distorted. A suitable frame for transporting the sample can be used dependent upon test method. (See Accessories)

- Leave the sample to condition in the standard testing atmosphere on an even surface. Do not use a wire / mesh tray.

- After conditioning re measure, e.g.,

	Initial	After pressing
AB	202 mm	195 mm
CD	198 mm	198 mm

- Calculate the percentage elongation or shrinkage

	Initial	After pressing	Difference
AB	202 mm	195 mm	3.46 % Shrinkage
CD	198 mm	198 mm	0.0 % Shrinkage

Example of calculation:

$$\frac{202 - 195}{202} \times 100 = 3.46\%$$

Colourfastness to Hot Pressing

Refer to the appropriate standard for specific instructions including temperatures, sizes and times.

When the instrument is cold inspect the top and bottom plates for damage and debris. Clean if necessary as described in Maintenance.

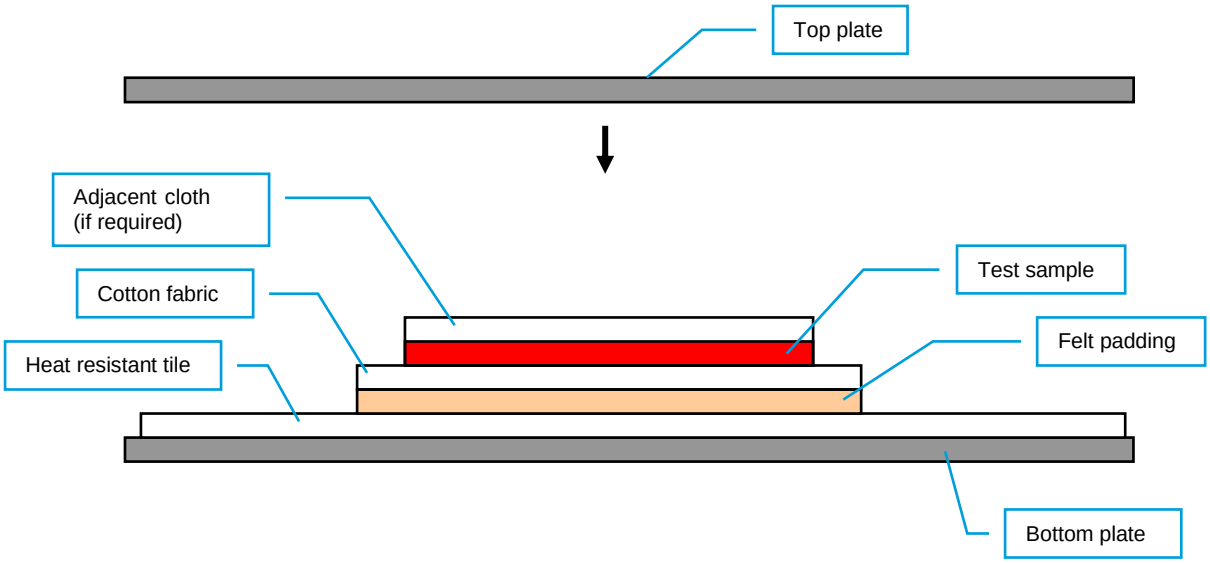
Set the plates to the temperature required in the standard, see Controls.
Upon reaching the required temperature allow the machine to stabilise for 10 minutes, unless the standard specifies a longer period of stabilisation in which case this should be followed.

Prepare the sample as specified in the appropriate standard. An example is illustrated below but each standard may vary. In this example:

- A heat resistant tile is placed over the bottom plate.
- A piece of felt padding cut to a size which provides the required pressure on the sample is placed over the heat resistant tile. (e.g., 4kPa ± 1kPa = 12.5cm × 9.5 cm).
- A piece of cotton fabric of the same dimensions as the felt padding is placed over the felt.

- The test specimen is placed on top of the cotton fabric.
- If required an adjacent fabric (e.g., Multifibre, Cotton Limbric) of the same dimensions as the test sample, is placed over the test sample.

- The timer is set to the required set point (see Controls).
- The top plate is lowered, which automatically starts the timer.
- After the allotted time, the alarm will sound and the sample should immediately be removed.
- Separate the individual layers and follow the grading procedure stated in the standard.



- Some standards require damp or wet pressing in which case the adjacent fabric and /or test sample may need to be wet out prior to pressing. In these cases the piece is weighed whilst dry, wet out and reweighed. The correct amount of water pick up can then be calculated. i.e., 100% pick up.

MAINTENANCE

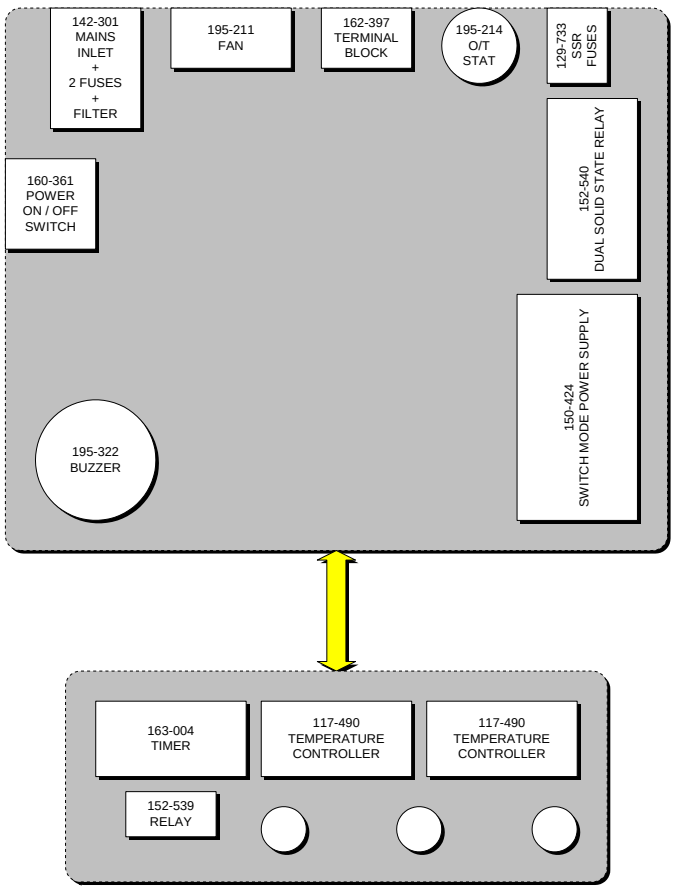
Between service and calibration visits no regular maintenance is required. Simply keep the instrument clean and free from dust and debris.

Clean the heater plates when cold only, using a mild detergent on a damp cloth to remove contamination. DO NOT use abrasive cleaners, as these will permanently damage the surface coating.

Periodically check the cooling fan is working correctly and ensure the air intake duct in the base of the instrument is unrestricted. If air duct appears to be blocked, disconnect the instrument from the mains and clear the holes using a suitable vacuum nozzle.
DO NOT probe any objects through the holes to clear any blockage.

ELECTRICAL SYSTEM OVERVIEW

ELECTRICAL SYSTEM OVERVIEW
620 THERMAPLATE



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SERVICE & CALIBRATION

James Heal Service & Calibration is a totally comprehensive, worldwide support programme. When you buy instrumentation for us, it is the beginning rather than the end of an association. Our aim is simple, to provide precisely the services you need to maintain and protect the value of your investment.

For any enquiries you may have regarding your instrument please contact the James Heal Service & Calibration Support Team by email or phone.

In all communications please quote the serial number, located of your instrument, for example 620/03/1001.

Email	support@james-hea;.co.uk
Telephone	+44 (0)1442 366355

TECHNICAL DATA

Dimensions	:	425 (width) x 400 (depth) x 150 (height) mm
Dimensions Of heated plates	:	210 × 210 mm
Maximum thickness between plates	:	15 mm
Instrument Weight	:	13 kg
Lid Weight	:	4 kg ± 0.1%
Electrical Loading	:	1.2 kW, 0.7 amps at 230V or 1.4 amps at 115V
Resolution	:	±1°C
Approximate Warm up time	:	10 minutes to 220°C and 10 mins to stabilise.
Mains Fuse	:	10A anti-surge
12Vdc Fuse	:	1.25A anti-surge
Heater Fuse	:	3.15A anti-surge