James Heal

OPERATOR'S GUIDE

GyroWash

Washing and Dry Cleaning Colour Fastness Testers

With NEW Intuitive Touchscreen User Interface

Covering Serial Numbers
1615-8/16/1001
1615-20/16/1001
& upwards

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

Setting the Standard

THE QUEEN'S AWARDS FOR ENTERPRISE: INTERNATIONAL TRADE 2012

Publication 290-1615-1$C

Published by:

JAMES HEAL LTD.
RICHMOND WORKS
HALIFAX
WEST YORKSHIRE
HX3 6EP
ENGLAND

TELEPHONE +44 (0) 1422 366355
FACSIMILE +44 (0) 1422 352440

E-mail info@james-heal.co.uk
Internet http://www.james-heal.co.uk

Table of Contents

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

INTRODUCTION

GyroWash – Washing and dry cleaning colour fastness tester

The GyroWash 1615 Series has been produced completely with the user in mind. We have combined James Heal's technical and performance expertise, with intuitive design and operation to produce the most ergonomic and user friendly GyroWash ever.

- GyroWash is used to investigate the colour fastness to washing, dry cleaning and chlorinated water of textiles and leather.
- GyroWash complies with international colour fastness testing standards and is approved by many leading retailers.
- The 1615 series of instruments can accommodate both small and large test vessels without adaptor plates, making it possible to use one instrument for both European and American Standards.
- There are 2 models of GyroWash to choose from, an 8 test vessel and a 20 test vessel model, to reflect the differing volumes of work depending on the end user.
- Two sizes of test vessels meet the requirements of the different standards – small (525ml) and large (1200ml).
- The GyroWash is supplied without test vessels which must be ordered separately.
- To complete the GyroWash portfolio, there is a comprehensive range of accessories and Test Materials – in fact, everything required to start testing immediately.

Features

- Intuitive Touchscreen User Interface
- Sleek, ergonomic design
- Easy loading and unloading of pots due to our bayonet connection mechanism
- Dedicated working area, with spillage tray
- Document holder for safe and convenient storage of associated standards and standard operation procedures
- Easy access fill and drain points
- Proven performance in wet testing environment
- Integrated stand, set at comfortable working height

Service and Calibration

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

Technical Assistance

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

STANDARDS

GyroWash 1615 complies with the following standards:

- AATCC TM 61, 86, 132, 151, 190
- DS 026
- FTMS 191A – 5506, 5509, 5600, 5605, 5610, 5614, 5620, 5621, 5622
- GB/T 3921, 5711
- ISO 105 - C06, C08, C09, C10, C12, D01, E03, E12, X05
- ISO 11643
- JIS L 0844, 0860
- M&S C4A, C5, C10A, C12A, C22, C37, C49A, P3B
- NEXT TM 2, 2A, 3, 3A, 5
- WOOLMARK TM 177, 193, 240, 241, 250, 294, 300

SAFETY

GyroWash has been specifically designed with the operator's health and safety in mind. All touch points are engineered to give an excellent and safe user experience.

To ensure your safety, please observe the following points at all times:

- These instruments are heavy and must be moved with care.
- Read this manual carefully before unpacking and operating the machine.
- Observe the installation requirements for correct machine performance.
- When handling test vessels at 60ºC and above, the high temperature lid developed for use at high temperatures should be used.
- Take care when opening the test vessels as heat will cause the contents to become pressurised. When the test vessel is opened, small particles of liquid may be ejected, therefore eye protection is recommended.
- It is also recommended that water proof and heat resistant protective gloves are worn to protect hands and arms when loading and unloading the instrument at high temperatures.
- GyroWash can achieve bath temperatures (up to 95˚C) that could cause injury if operated incorrectly. In addition to the recommended personal safety equipment, operators must always stand to one side when opening the lid of the instrument to avoid any hot water vapour or steam from the bath.
- GyroWash is not suitable for temperatures above 95˚C.
- The GyroWash bath should be filled with water only, it is not suitable for any other heating medium.
- Many different solutions can be used in the test vessels. The operator should refer to the safety instructions for the solution being used, either from the testing standard or any associated Material Safety Data Sheet (MSDS).
- Have the machine serviced and calibrated at least once a year by a James Heal Service and Calibration Engineer.

INSTALLATION

Siting & Unpacking

GyroWash is delivered on a wooden palette. Move the instrument to its final location whilst still inside the crate using either a forklift truck or other suitable mechanical method.

GyroWash should be located in an appropriate space to accommodate its size. The instrument requires a supply of electricity, water and drain facilities. See Services section.

Check for external damage of the case, record any damage with photographs and report immediately. Do not install or use a damaged instrument.

Identify the top and front of the crate by locating the screws. Unscrew the top and front and ensure all screws are removed fully before attempting to remove the instrument. GyroWash is bolted to a wooden pallet for shipping. Remove the pallet from the crate with a forklift truck, or other suitable mechanical method. Unwrap the film. It is not possible to remove the stand supplied.

Remove the carton of accessories from under the instrument. Note that the order is complete – see Checklist. If there are any discrepancies, please contact your supplier immediately. Once satisfied, please dispose of any packaging materials safely and responsibly.

To allow access for ventilation, the rear of the instrument should be a minimum of 100 mm from a wall.

Read this manual carefully before operating the instrument and refer to Operator Safety.

Checklist

Please check the serial number plate to confirm that the supply voltage and frequency are in accordance with your order. Also, check the items listed below are present.

Instrument & Standard Accessories

Stock Code	GyroWash	Voltage and Frequency
901-977	1615/8	220-240V 50/60Hz Single Phase
Stock Code	**Quantity**	**Description**
327-246	4 metres	Reinforced Hose Ref: RP19-26 19mm I/D, 26mm O/D
393-549	2	Hose Clamp
779-208	1	Blue Inlet Hose
381-108	1	17mm A/F Spanner
381-109	1	5mm Hexagonal Key
297-040	1	1615 Operator's Guide

Stock Code	GyroWash	Voltage and Frequency
901-978	1615/20	220-240V 50/60Hz 3 phase & earth
901-979	1615/20	380-420V 50/60Hz 3 phase neutral & earth
Stock Code	**Quantity**	**Description**
327-246	4 metres	Reinforced Hose Ref: RP19-26 19mm I/D, 26mm O/D
393-549	2	Hose Clamp
779-208	1	Blue Inlet Hose
381-108	1	17mm A/F Spanner
381-109	1	5mm Hexagonal Key
297-040	1	1615 Operator's Guide

Optional Accessories & Test Materials

The following are NOT supplied with the instrument, unless specifically ordered, but are available at short notice.

The GyroWash is supplied *without* test vessels which must be ordered separately.

Test Vessels

718-902	Small (500 ml/1 pt.) Test Vessel/Canister (Type 1)
718-903	Large (1200 ml) Test Vessel/Canister (Type 2)
	GyroWash 1615 accepts Large or Small Test Vessels in any combination. No conversion kits or other parts are required.
528-126	High temperature lid
528-128	Spanner for high temperature lid
528-124	Lid release fixture

Calibration

202-415	UKAS Certificate of Calibration for GyroWash

Accessories (ISO)

766-200	James Heal Grey Scale for assessing Change in Colour ISO 105 A02
766-201	James Heal Grey Scale for assessing Staining ISO 105 A03
718-164	Non-Corrodible Steel Balls (washing) - pack (100)
718-163	Non-Corrodible Steel Discs (dry cleaning) - pack (50)
794-905	Non-Corrodible Steel Discs (dry cleaning) - pack (50 Discs/4 Cotton Bags)
702-526	Cotton Drill Bags 100 x 100 mm (ISO 105 : DO1) - pack (50)
718-168	PTFE Rods (ISO 11643) - pack (100)

Accessories (AATCC)

766-512	AATCC Gray Scale for Color Change
766-513	AATCC Gray Scale for Staining
718-164	Non-Corrodible Steel Balls (washing) - pack (100)
718-163	Non-Corrodible Steel Discs (dry cleaning) - pack (50)

Consumables (ISO)

702-500	James Heal Multifibre Adjacent Fabric DW - per roll (10m)
702-502	James Heal Multifibre Adjacent Fabric DW - per roll (50m)
702-503	James Heal Multifibre Adjacent Fabric DW - per roll (100m)
706-657	James Heal Standard Soap - per tub (2kg)
706-650	James Heal ECE Formulation Phosphate Reference Detergent (B) (Without Optical Brightener) - per tub (2kg)
706-651	James Heal ECE Formulation Phosphate Reference Detergent (B) (Without Optical Brightener) - per box (15kg)
706-714	Anhydrous Sodium Carbonate - per pack (500 g)

706-652	James Heal ECE Formulation Non-Phosphate Reference Detergent (A) (Without Optical Brightener) - per tub (2kg)
706-653	James Heal ECE Formulation Non-Phosphate Reference Detergent (A) (Without Optical Brightener) - per box (15kg)
706-735	TAED (tetraacetylethylenediamine) - per pack (250 g)

Consumables (AATCC)

702-417	Multifiber Adjacent Fabric Style 1 - per pack (1m)
702-419	Multifiber Adjacent Fabric Style 1 - per box (500 pieces) 5 x 10cm (straight heat sealed edges)
702-420	Multifiber Adjacent Fabric Style 10 - per pack (1m)
702-421	Multifiber Adjacent Fabric Style 10 - per box (500 pieces) 5 x 10cm (straight heat sealed edges)
702-403	Multifiber Adjacent Fabric Style 10A - per pack (1m)
702-370	Multifiber Adjacent Fabric Style 10A - per box (500 pieces) 4 x 10cm (straight heat sealed edges)
702-399	Multifiber Adjacent Fabric Style 10A - per box (500 pieces) 5 x 10cm (straight heat sealed edges)
706-500	AATCC 1993 Non-Phosphate Reference Detergent - per tub (2kg) (With Optical Brightener)
706-501	AATCC 1993 Non-Phosphate Reference Detergent - per box (15kg) (With Optical Brightener)
706-502	AATCC 1993 Non-Phosphate Reference Detergent - per tub (2kg) (Without Optical Brightener)
706-503	AATCC 1993 Non-Phosphate Reference Detergent - per box (15kg) (Without Optical Brightener)

Spares

1615-spares	2-year Spares Kit for 1615 GyroWash range

Services

Electrical supply

GyroWash has been fitted with an industrial style IEC 60309 plug for mains connection, attached at the rear.

Before connecting, ensure that the electricity supply voltage and frequency matches the information on the serial number label.

Connect to a power supply only after installation is complete.

Do not use an extension lead.

Isolate from the electricity supply during maintenance or cleaning.

Water supply and drain

We recommend GyroWash is permanently connected to a mains water supply and drain. GyroWash can also be operated independent of a mains water supply and drain if appropriate.

The GyroWash water supply connection is a ¾" BSP male fitting, commonly found on European domestic washing machines.

Fitting a mains water shut-off valve local to the GyroWash is strongly recommended. If splashing occurs when filling an empty bath, reduce the inlet pressure to an acceptable level using the shut-off valve.

GyroWash has one drain and one overflow per bath. Using the hose clamps connect the flexible reinforced hose supplied to the hose tail connectors and the other end into an appropriately sized waste pipe. Any additional pipe-work for the drain or overflow must have a bore diameter of at least 19 mm to prevent the flow from being restricted.

An air gap should be maintained between the drain pipe and the sewer drain to prevent any contamination of the instrument from the sewer.

THE ESSENTIAL FEATURES OF GYROWASH

GyroWash 1615 has been designed with functionality and safety at its core. With all the essential features on both the 8 and 20 pot capacity instruments together with our new touchscreen user interface, this is the most user-friendly and intuitive GyroWash we have ever produced.

Filling the GyroWash

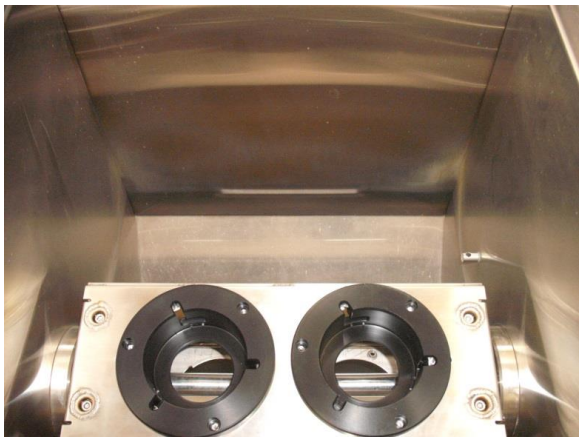
The GyroWash can either be filled manually from a hose pipe or bucket, or by plumbing the system into the mains water supply and drainage.

Note: If filling the GyroWash manually, you must ensure that the drain and fill operation knobs are closed (set to 0) beforehand.

Viewed from behind and underneath the GyroWash, these connectors are for the:

- overflow and spillage drain - left
- fill overflow - centre
- drain - right

Note: See 'Water supply and drain' for specifics regarding plumbing in the GyroWash.



Whether filled manually or using the mains supply, the GyroWash should be filled to the level indicator on the back of the bath wall (central to the image).

Designated working area

The GyroWash further enhances the user experience by having its own dedicated working area located to the right-hand side of the bath.

This comprises of a sturdy mesh surface for standing the test vessels on and a spillage tray for capturing any accidental overflow from preparing the test.

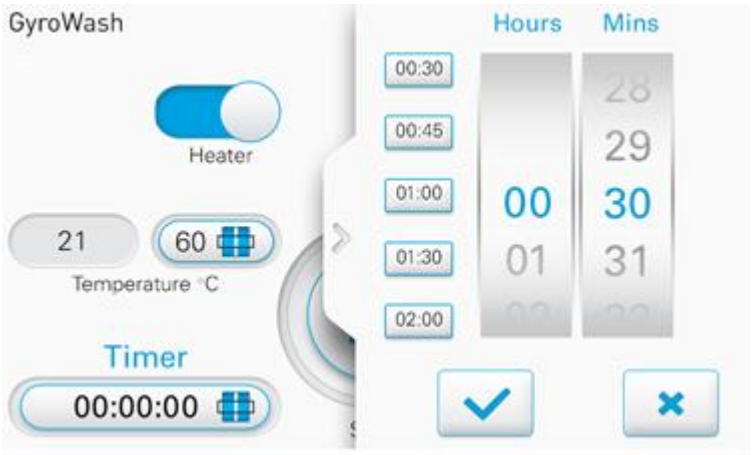
To allow the user to periodically check the rotational speed of the rotor, GyroWash comes with a viewing window and flag located on the left-hand face of the GyroWash. To enable easy access to the window you must leave this face visible when installing the machine.

This flag is attached to end of the rotor shaft and the user can check the rotational speed using either an optical tachometer or visually with a stopwatch.

TOUCHSCREEN USER INTERFACE

Standard Test Screens

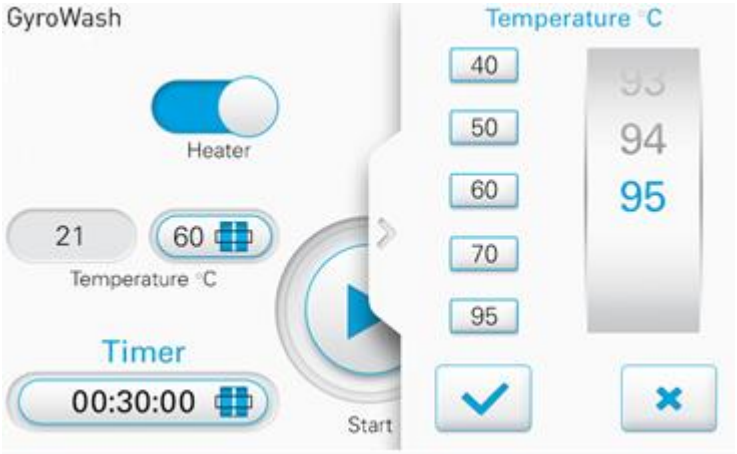
GyroWash home screen



Set the timer

To set the timer, click on the 'Timer' button and the scroll set up tab will appear. Set the required time by scrolling through the numbers, then press the tick button.

Preset values can be saved by typing in the value and holding in the selected tab to the left of the scroll.



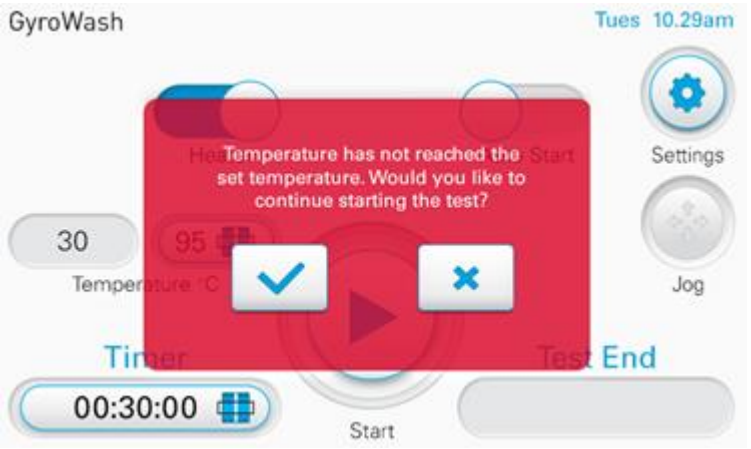
Set the temperature

To set the temperature, click on the temperature scroll button and the scroll set up tab will appear. Select the required temperature and press the tick button.

Preset values can be saved by typing in the value and holding in the selected tab to the left of the scroll.

Toggle switches

To set the Heater or Auto Start on, the user can toggle the switches on and off by sliding them left and right. If the toggle switch is displaying blue the switch is on.



Warning message

If the user presses the Start button before the bath temperature has reached the set temperature, a warning message is displayed (this only applies when the heater toggle is on).

Temperature ready

Once the temperature has reached the set temperature in the display window, the temperature is ready.

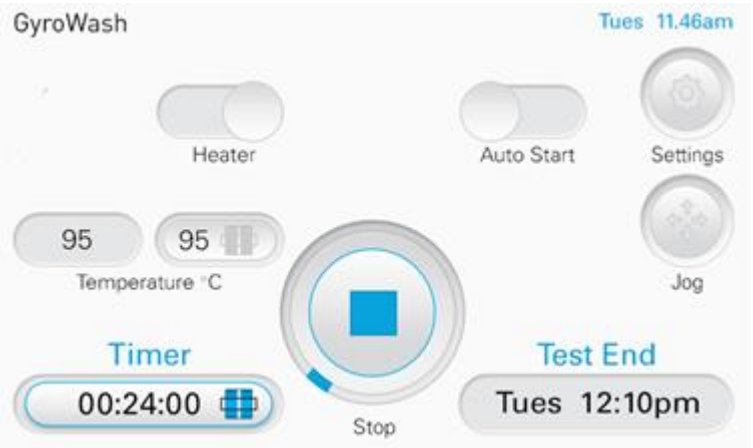
A notification appears at the top of the screen to alert the user that the 'Temperature is ready.'

Place pots in GyroWash

Once the temperature has reached the set temperature, the pots can be added to the GyroWash bath. Whilst the lid is open, a warning message is displayed at the top of the screen and the jog button becomes available to allow the user to slowly rotate the arbour.

Test set up

Once the pots have been added to the bath, the timer can be started by pressing the Start button.



Test in progress

Whilst the test is running:-

The Test End display will inform the user when the test will be complete

The Timer counts down and the progress ring shows the progress of the test

The buttons and toggle switches grey out

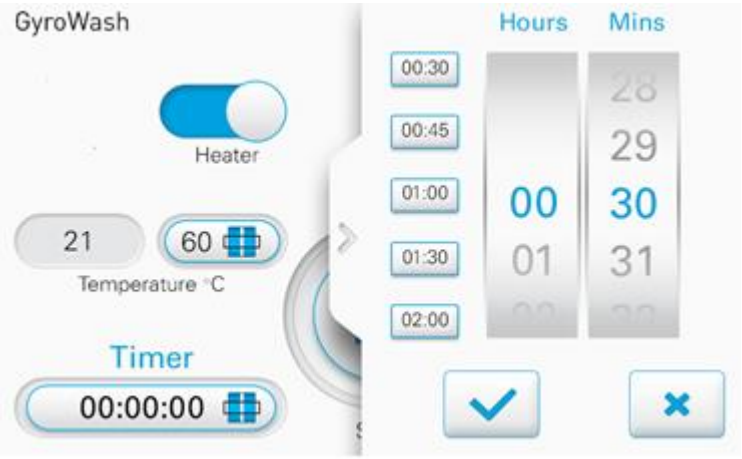
Test end

Once the test is complete:

- The Test End will display a tick
- The Timer will display 00:00:00
- The buttons and toggle switches are active again
- The progress ring will be complete

Auto Start Screens

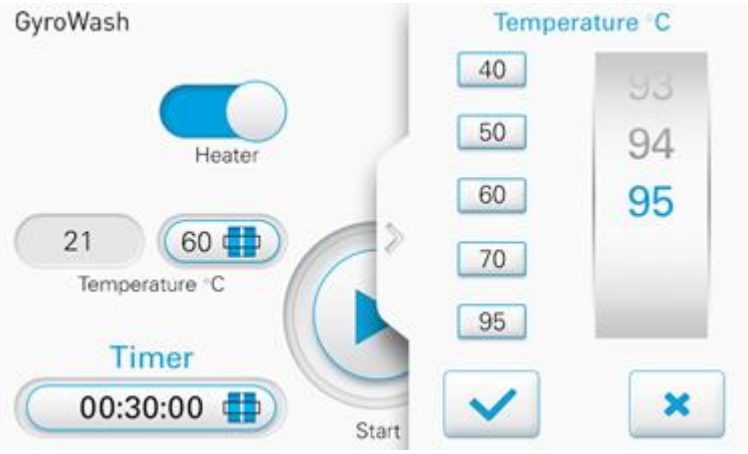
GyroWash home screen



Set the timer

To set the timer, click on the Timer button and the scroll set up tab will appear. Set the required time by scrolling through the numbers, then press the tick button.

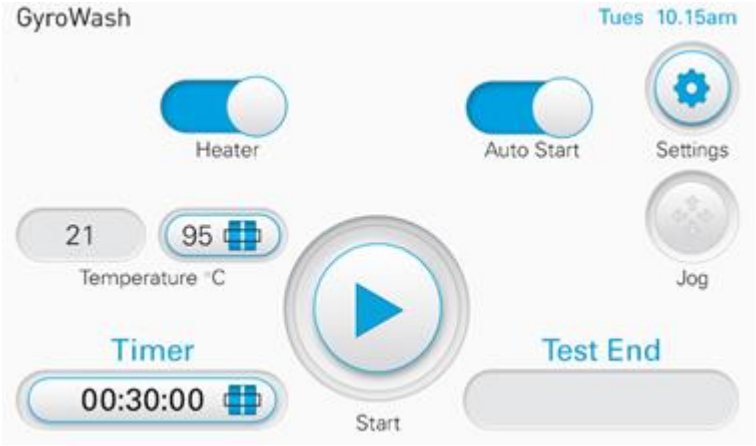
Preset values can be saved by typing in the value and holding in the selected tab to the left of the scroll.



Set the temperature

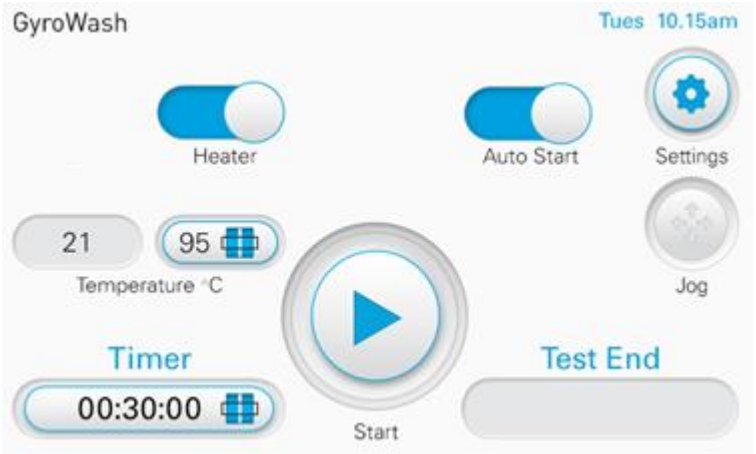
To set the temperature, click on the temperature scroll button and the scroll set up tab will appear. Select the required temperature and press the tick button.

Preset values can be saved by typing in the value and holding in the selected tab to the left of the scroll.



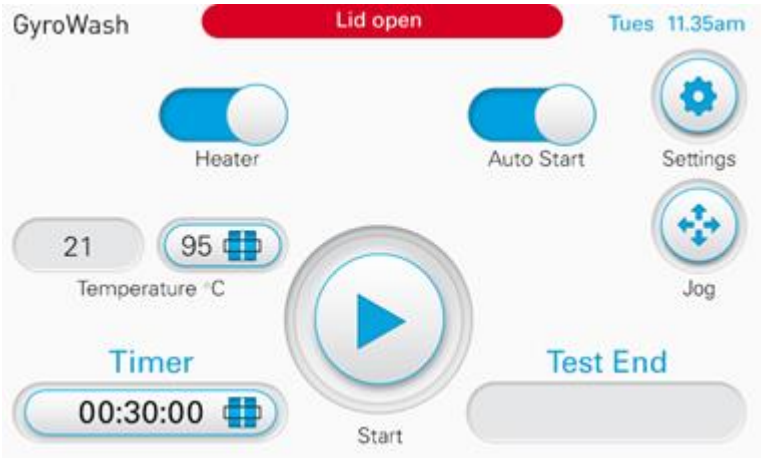
Auto Start toggle

To set the Auto Start, toggle the switch on by sliding it to the right.



Test set up

Unlike the standard test, the heater will not start heating up until the Start button is pressed.



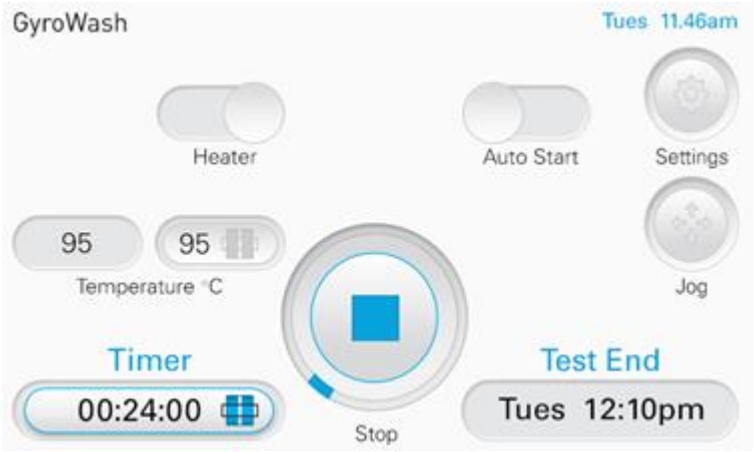
Place pots into GyroWash

Once the test has been set up, the pots can be added to the GyroWash bath.

Whilst the lid is open, a warning message is displayed at the top of the screen and the jog button becomes available to allow the user to slowly rotate the arbour.

Auto Start

Once the start button is pressed, the Test End displays as AUTO START and the heater starts to heat up to the set temperature. All the set up buttons and toggle switches grey out. The Start button changes to a Stop button, but the progress ring and timer will not start until the temperature has reached the set temperature.



Test in progress

Whilst the test is running:

The Test End display informs the user when the test will be complete

The Timer will count down and the progress ring shows the progress of the test

The toggles and switches will be greyed out

Test End

Once the test I complete:

The Test End will display a tick

The Timer will display 00:00:00

The buttons and toggle switches become active again

The progress ring will be complete

Settings

The settings screen is accessed by pressing the Settings button on the top right of the home page.

It allows the user to make quick and easy alterations to:

- Temperature units - °C or °F
- Volume
- Brightness
- Language – English, French, Spanish, German, Italian, Turkish, Chinese & Hindi.

A power cycle is required after a new language has been selected (turn instrument off and on again).

- Day / Time

TEST VESSELS

Types of Test Vessel

Small Pot / 500ml Test Vessel

500 ml Test vessels ***stand vertically*** on the arbour.

Large Pot / 1200ml Test Vessel

1200 ml test vessels ***lay horizontally*** on the arbour.

High Temperature Lid

When handling test vessels at 60ºC and above, the high temperature lid developed for use at high temperatures should be used. Take care when opening the test vessels as heat will cause the contents to become pressurised. When the test vessel is opened, small particles of liquid may be ejected, therefore eye protection is recommended. It is also recommended that water proof and heat resistant protective gloves are worn.

The high temperature lid contains a valve for releasing the pressure built up during the test.

Manually twist the lid onto the vessel.

Secure by twisting clockwise using the GyroWash pot lid spanner.

Tighten the pressure valve on the lid by turning clockwise using the tool on the pot lid spanner.

Clamp down the lid clip.

Insert the pot into the GyroWash arbour and lock into place by twisting clockwise. Close the lid and start the test.

When the test is complete, whilst wearing gloves remove the pot from GyroWash by twisting anti-clockwise & lift out.

If required, cool briefly in cold water. Secure in the jig by twisting clockwise, then unclip.

Unlock the valve by turning it anti-clockwise using the tool on the pot lid spanner.

Release the lid by twisting anti-clockwise using the pot lid spanner, then lift from the pot with a gloved hand.

Insertion into GyroWash

The number of test vessels it is possible to fit in GyroWash depends on the model ordered.

Model number	Maximum Number of Test Vessels*
1615/8	8
1615/20	20

Standard test vessels have quick-release lids, so that they can be conveniently filled 'in-situ'. The standard seals are solvent-resistant fluorocarbon seals, suitable for dry cleaning and chlorinated water fastness testing.

When operating the instrument at temperatures in ***excess*** of 60ºC, it is necessary to pre-heat the liquor prior to introduction to the test vessels. This procedure minimises pressure build up and prevents leakage of liquor during the test cycle. Always use the high temperature lid developed for use at high temperatures.

If a test vessel is allowed to cool with the lid on it may become difficult to remove the lid due to formation of a vacuum inside the test vessel, unless the high temperature lid is used.

Test Vessels should NEVER be completely filled.

GyroWash accepts large or small test vessels in any combination. No conversion kits or other parts are required.

Balancing Test Vessels on the Rotor

Ensure that the number of test vessels on each of the four (4) sides of the rotor is balanced. There should be a minimum of four (4) test vessels equally spaced around the rotor. If there is only one (1) test, the other three (3) should contain only water.

Insert and Rotate

Unlike the vessels of some other wash-wheels, no conversion parts or securing bars are required for fixing them on the rotor.

GyroWash test vessels incorporate a ‘zero force’ insert and rotate feature which enables the operator to rapidly remove and replace them on the rotor.

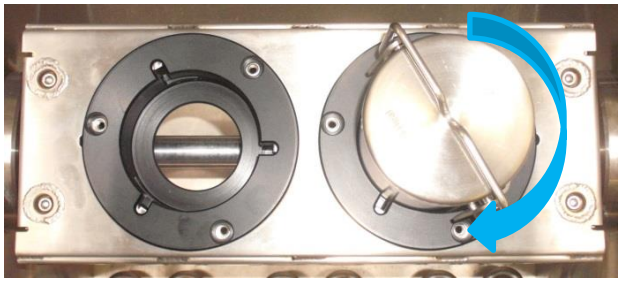
You will notice that each test vessel, or pot, has three (3) pins, equally spaced apart.

On the 500ml test vessel, the pins are located at the bottom of the cylinder so that the test vessel ***stands vertically*** when fixed on the rotor.

The 1200ml test vessel on the other hand, has the pins on an adaptor fixed to the side of the cylinder so that the test vessel ***lies horizontally*** when fixed on the rotor.

Each black bayonet connector on the arbour has 3 slots that are designed to receive the pins of the test vessels.

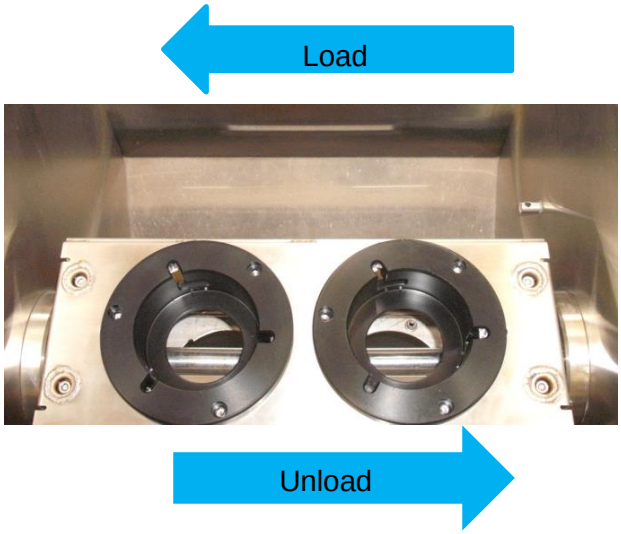
To insert the pot, align the test vessel pins with the slots and allow the test vessel to follow the slots until it reaches the bottom of the pot connector.



Once the test vessel is located in the pot connector, turn the pot ***clockwise*** as indicated by the arrow. This will lock the pot onto the arbour during testing.

After testing turn the test vessel ***anticlockwise*** to unlock them, and lift them vertically from the pot connector.

Note: After the test is complete, the pot may be extremely hot. Ensure adequate precautions are taken to avoid burns. Heat resistant gloves are recommended.



If you are using the large (type 2) test vessels, you must start attaching them to the rotor from the right hand side. If you do not load them from the right, they will not fit onto the arbour.

Once testing is complete, you must unload the pots from the left hand side of the rotor.

VESSEL CLEANING

After each test rinse the pots thoroughly with warm water ensuring all liquor residue is removed.

LID SEALS

After each test when rinsing the pots, the seal should be removed, rinsed separately, and inspected. If the seal is deformed and mis-shaped it should be allowed to cool and regain its original shape before re-use to ensure its sealing function. This could take up to 30 minutes.

TECHNICAL SPECIFICATION

EXTERIOR DIMENSIONS	Width	Depth	Height Inc. Legs	Height With Lid Open	Weight
1615/8	876mm (34.5 in)	731mm (28.8 in)	1041mm (41.0 in)	1445mm (56.9 in)	135Kg
1615/20	1150mm (45.3 in)	731mm (28.8 in)	1040mm (40.9 in)	1445mm (56.9 in)	238Kg

BATH DIMENSIONS	Width	Depth	Height	Bath Volume	Liquid Medium
1615/8	370mm (14.6in)	490mm (19.3in)	515mm (20.3in)	35 Litres	Water
1615/20	760mm (29.9in)	490mm (19.3in)	515mm (20.3in)	70 Litres	Water

ELECTRICAL OPTIONS					
1615/8	220-240V	1P+N+E	50Hz/60Hz	4.5kW	19.5A
1615/20	220-240V	3P+E	50Hz/60Hz	9.0kW	22.6A/Phase
1615/20	380-420V	3P+N+E	50Hz/60Hz	9.0kW	16A/Phase

IEC 60309 plug for mains connection.

INSTALLATION	
Cold water connection	¾ inch BSP
Drain	¾ inch BSP Hose Tail
Overflow	¾ inch BSP Hose Tail

OPERATION	
Temperature Units	°C or °F
Temperature Settings Range	20-95°C (68-203°F)
Temperature Accuracy	±1°C (±1.8°F)
Temperature Rate of Rise	1.5°C/Min (2.7°F/Min)
Timer Setting Range	1 minute to 23 hours 59 minutes
Rotational Speed	40 ±2 rpm
User Interface	Touchscreen

TEST VESSELS (CANISTERS)	
Small (Type 1)	500ml
Large (Type 2)	1200ml

SAFETY	Lid interlocking system

EU Conformity

- Machinery Directive 2006/42/EC
- Low Voltage Directive (LVD) 2014/35/EU
- Electromagnetic Compatibility (EMC) Directive 2014/30/EU
- Waste Electrical and Electronic Equipment recycling (WEEE) Directive 2012/19/EU
- Restriction of Hazardous Substances (RoHS) Directive 2011/65/EU

REVISION HISTORY

See front cover for Publication number, e.g., 290-1615-1$A

Revision	Date	Originator	Details of revision
A	04.10.16	CB	First release
B	30.11.16	CB	Serial no. / 'user' / Electrical info./ Unpacking / EU conformity
C	05.11.18	SEW	Standard Test Screens Illustrations – Standards key function removal
D	10.05.19	SEW	Additional Page: Vessel Cleaning & Lid Seal