OPERATING INSTRUCTIONS
FOR
STOMACHER 400 CIRCULATOR
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OPERATOR INSTRUCTIONS

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1. INTRODUCTION

The *Seward Stomacher* was originally developed in conjunction with Unilever’s Research Centre at Colworth House Bedfordshire as a solution to many of the problems previously experienced in microbiological sample preparation. Subsequently it was decided to market the instrument in response to the interest expressed in the Stomaching technique to meet the ever increasing demands for sample preparation in a fast, consistently repetitive and efficient way. Since then, *Seward* have continually developed the *Stomacher* to maintain its position as the market leader ensuring exacting performance, high quality and exceptional reliability.

This manual provides the user with all the information to install, operate and maintain the *Seward Stomacher*. Please read the manual carefully before using this equipment.

Should any questions arise please do not hesitate to contact the *Seward Customer Service* Department.

2. DESCRIPTION

The *Seward Stomacher* is a unique instrument for homogenising in which the sample is effectively blended within special disposable bag. The instrument acts on the Bag in an action of similar manner to the stomach, hence the name *Stomacher*.

The instrument comprises essentially of an electric motor driven worm gear unit with twin output shafts coupled to flexible crank mechanisms which in turn operate two reciprocating paddles. The paddles act on the flexible plastic bag to create the blending forces termed the “Stomaching action”. An important feature of the system is that the working parts do not come into direct contact with the sample being processed. The main body of the instrument is gravity die cast aluminium alloy, stove enamelled, the door and linkage assemblies are stainless steel. All the control functions and LCD display are ergonomically grouped and situated on the sloped front of the instrument. The power inlet and switch are located at the side.
STOMACHER 400 CIRCULATOR
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GENERAL LAYOUT
4. MARKINGS & MEANINGS

Markings applied to the *Seward Stomacher* have the following meanings:-

- **⚠️** Attention, Consult Accompanying Documents.

- **∼** Alternating Current

- **〇** Power OFF

- **|** Power ON

- **←** Protective Earth

- **=** Conductive Earth
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5: PREPARING FOR USE

Upon receipt of your *Seward Stomacher* inspect the shipping carton for any signs of damage. Carefully unpack and inspect the device, reporting any obvious damage or missing parts to the supplier/dealer and/or carrier as appropriate.

The carton should contain the following items:-

1. One off, *Seward Stomacher 400 Circulator*.
2. One off, Power cord set.
4. One off, Sample sachet of 50 *Seward Stomacher Bags*.

Retain the shipping carton in case of need to return the instrument or for long term storage.

We try to provide a power cord set of the correct pattern often found in your market area, although this is by no means universal. If the plug is not compatible with the socket outlet available it will be necessary to obtain a suitable alternative cord set.

**CAUTION:-** The *Seward Stomacher* is design to operate in ambient temperatures above that of 10 C. Therefore, if the device has been stored or transported at temperatures below 10 C then the device should be left in an ambient greater than 10 C, for at least two hours prior to use.

**CAUTION:-** Before connecting the device to a power supply check that the voltage and frequency details shown on the device are compatible with your mains supply. The device should only be connect to a protectively earthed mains supply. In the event of uncertainty it is recommended that a qualified electrician be consulted.

**CAUTION:-** Ensure that the device is not positioned directly against a wall or other equipment such that the ventilation slots are obstructed or restricted, it is recommended a minimum of 75mm (3”) clear space is maintained.

**CAUTION:-** If this equipment is used in a manner not specified by *Seward*, protection provided by the equipment may be impaired.

Fit the power cord between the *Seward Stomacher* and the mains socket. Ensure that the door is properly closed with the slotted lower hinge lugs located fully into the pivot points. Operate the power switch which should illuminate indicating the instrument is now ready for use.
6. APPLICATION

There are no set rules in the application of the Seward Stomacher instrument and the following is intended as a guide only and is not to restrict laboratory technique.

6.1 Bag Selection and filling:-

For best results it is recommended that only Genuine Seward Stomacher Bags are used. Availability of style and pack options are shown at the rear of this manual. Deep frozen foods should not harm the Bags, but hard particles such as bone, grit, fruit stones and seeds may puncture Bags. Where marginal conditions exist or hazardous material is being blended it is recommended that two bags are utilised, one inside the other. For the vast majority of foods however, e.g. meats (cooked and raw), vegetables, fruit and cheeses the use of a single Bag has proved to be entirely satisfactory.

The sample and diluent (e.g. 10g + 90 ml diluent) are placed in the selected bag. Provided the total volume is within the recommended capacity of the instrument sample/diluent quantities can be varied according to preference.

If required several Bags may be processed simultaneously providing the total volume does not exceed 400ml. When doing so, it is recommended that the bags are layered vertically so that the “load” is fairly evenly distributed over the paddle faces.

For capacities less than 80ml and greater than 400ml alternative Stomacher models should be utilised.

6.2 Speed Selection

There are three pre-set speed settings, 200, 230 and 260rpm, these directly equate to Low, Normal and High, as on previous models. The 230 setting is considered suitable for the vast majority of applications. The 200 setting may be more suitable for delicate work such as cell separation to reduce or avoid cell damage. The 260 setting can provide better agitation when blending predominately liquid substances possibly enabling the processing time to be reduced.

6.3 Time Selection

Samples for bacteriological analysis typically require 30 seconds, although high fat products, such as puff pastry, bacon etc. and some others such as wheat require a longer period. Frozen food stuffs take longer than thawed.

Examples of some suggested Stomaching times are:

<table>
<thead>
<tr>
<th>Substance</th>
<th>Time (secs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Most substances</td>
<td>30</td>
</tr>
<tr>
<td>Fatty meat, cream, pastry</td>
<td>60</td>
</tr>
<tr>
<td>Tobacco</td>
<td>300</td>
</tr>
<tr>
<td>Lipid extraction from meat</td>
<td>120</td>
</tr>
<tr>
<td>Toxin extraction</td>
<td>60</td>
</tr>
<tr>
<td>Powder blending</td>
<td>15</td>
</tr>
<tr>
<td>Fruit pulping</td>
<td>60</td>
</tr>
</tbody>
</table>
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6.4 Processing

The instrument is factory set with minimal paddle clearance between the inner face of the door and the fully extended paddles which although suited to a wide range of applications is by no means suitable for all sample processing and adjustment may be necessary for your application.

Provision for this adjustment is provided internally, since this requires the removal of the rear cover, this work should be carried out by a qualified technician or other competent personnel. Instructions for this procedure can be found in section 6.6 on this page.

6.5 After Processing

The appearance of the sample after processing will frequently differ from that experienced with rotary type blenders and will vary according to the nature of the sample. Liver for example, will break down into a fine slurry after treatment in a Stomacher, whereas heart will probably still be present as fibres - any connective tissue normally remains in fluffy lumps. Many whole vegetables will be ground down to slurry, but others which lie flat beneath the paddles, for example sliced beans, main remain intact or even only bruised.

Due to the infinite variety of samples that may be processed utilising a Seward Stomacher it is not possible to provide definitive procedures for every application, nor give any undertaking, implied or otherwise, as to the validity of any method used Seward Limited maintain an extensive library of Reference Papers covering practical experience with the Stomacher over many years and these details are available on request.

6.6 Paddle Adjustment

This work should be carried out by a qualified technician. To adjust the paddle clearance switch “off” and disconnect the instrument from the mains supply. Turn the instrument over suitably supporting it to prevent damage. Remove the rear cover and slacken the socket cap screws holding the motor mounting plate to the main body. DO NOT slacken the screws holding the motor gearbox to the motor mounting plate or motor alignment will be lost, Turn the adjusting screw until each paddle just touches the inside face of the door when they are at their maximum forward stroke position, this can be done by manually rotating the gearbox output shaft. If the instrument is run briefly the alternate “tapping” noise of each paddle touching the door should just be audible. Take up any backlash in the adjusting screw and turn the screw back one to one and a quarter turns. This is the minimum clearance setting.

If correctly adjusted the “double tap” of the paddles just touching the inner face of the door should just be audible when the front of the door is flexed inwards by hand with the instrument running. For a greater paddle clearance, each additional backward turn of the adjusting screw increases the clearance by 1.5mm up to a maximum of 10mm. When adjustment is complete always re-tighten the socket cap screws and replace the rear cover.
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7. OPERATION

7.1 Control Key Functions

1. **Speed / Time Key** -
   Toggles the display enunciator icon between Speed and Time displays.

2. **Plus (+) Key** -
   Increases the value of the enunciated parameter, i.e. Speed / Time

3. **Minus (-) Key** -
   Decreases the value of the enunciated parameter, i.e. Speed / Time

4. **Auto Key** -
   Toggles the instrument between manual and automatic operating modes

   **Prog Key** -
   Toggles through stored programme selection, P1, P2, P3 & no programme

5. **Start Key** -
   Starts the instrument when in manual mode & initially in auto

   **Stop Key** -
   Stops the instrument in either operational mode

6. **Liquid Crystal Display** -
   Displays selected function values and status icons
STOMACHER 400 CIRCULATOR
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7. OPERATION (cont)

7.2 Display Icon Functions

1. **Enunciator Icon** - Continuously indicates which parameter has the focus, i.e. speed / time

2. **Stall Condition Icon** - Displayed only when a motor stall condition has occurred

3. **Door Open Icon** - Displayed only when the door is open

4. **Auto Icon** - Displayed only when automatic operation mode is selected. There is no icon display for manual mode.

5. **P1, P2, P3 Icons** - Displayed individually, only when a stored programme is selected.
7. OPERATION (cont)

7.3 Manual Operation

Please note that pressing any control function key is acknowledged by a short beep (100mS) emitted from the instrument's internal sounder.

Ensure the “On/Off” rocker switch is in the “On” position. The green lamp in the switch should be illuminated indicating that power is present, the instrument should also emit a short beep. The Display should now indicate the Instrument status.

2 Ensure the Auto Icon is not present, press the Auto Key to revert to manual mode if necessary & no programmes, P1, P2, P3, are selected.

3 Open the door by raising the lid fully upward and back. This gives access to the paddle compartment. The Door Open Icon will now be displayed.

4 Place the charged Stomacher Bag(s) into the paddle compartment leaving 50 to 60 mm protruding above the bag clamp and close the door thus clamping the bag(s). The Door Open Icon will now be off.

5 The Enunciator Icon indicates that Time has the focus (display defaults to 30secs). The Time setting can now be adjusted by pressing the Plus or Minus Key as required. The setting is variable between 0 seconds and 99 minutes 59 seconds in increments of 1 second. Pressing and releasing the Plus or Minus Key increments the Time by 1 second, holding down the Plus or Minus Key accelerates the rate of change.

6 Pressing the Speed / Time Key toggles the Enunciator Icon to indicate that Speed has the focus (display defaults to 230rpm). The Speed setting can now be adjusted by pressing the Plus or Minus Key as required. The settings available are 200rpm (Low), 230rpm (Normal) and 260rpm (High).

7 Pressing the Start Key will initiate the Stomaching process. The Instrument will run at the selected speed for the selected duration. Please note that the time display counts down from the selected time and displays the remaining processing time. The Stomaching process continues in normal circumstances until either:
- The timed cycle has finished.
- The Stop Key is pressed.
- The Door has been opened.
- The power has been switched off.
In all instances the time resets to the selected value.

8 After processing, simply open the door and remove the Stomacher Bag(s). The Instrument is ready for processing the next sample(s).

WARNING:- Opening the door during the operating cycle causes the instrument to stop. This, however, should not be considered the normal method for stopping the instrument.
7. OPERATION (cont)

7.4 Automatic Operation

If a number of samples are to be processed under the same conditions, i.e., Speed / Time values, then it may be preferred to select the Automatic Function. When in Auto the Stomaching process is initiated by the opening and closing of the door between sample loading.

Select Speed / Time values as previously described in 7.3.

2. Press the Auto Key, the Auto Icon should now be present on the display.

3. Load the charged Stomacher Bag(s) as previously described in 7.3.

4. Closing the door will initiate the Stomaching process. The Instrument will run at the selected speed for the selected duration. Please note that the time display counts down from the selected time and displays the remaining processing time. The Stomaching process continues in normal circumstances until either:-
   - The timed cycled has finished.
   - The Stop Key is pressed.
   - The Door has been opened.
   - The power has been switched off.

In all instances the time resets to the selected value.

5. When the processing is completed simply open the door, remove the processed sample and place the next sample into the instrument. Close the door and processing will commence automatically.

7.5 Storing Processing Programmes

It is possible to store up to three combinations of Speed / Time values as programmes within the instrument's memory. This enables the most frequently used or specific processing parameters to be recalled easily and efficiently.

To store or change a programme :-

1. Pressing and releasing the Prog Key toggles through the three programme selections denoted by the P1, P2 and P3 Icons and returns to manual (no Prog Icon). Please note these initially display memory stored default values. Press and release the Prog Key at the desired programme number.

2. Adjust the Speed / Time values as described previously in 7.3

3. Simultaneously press and hold down the Auto Key and Prog Key for at least 2 seconds. This is acknowledged by a longer beep (500mS). The displayed Speed / Time values have been stored in the memory.
7. OPERATION (cont)

7.6 Using Stored Processing Programmes

In Manual mode:

Press and release the Prog Key to select the desired programme. Either the P1, P2 or P3 Icon should now be present on the display.

2. Load the charged Stomacher Bag(s) as previously described.

3. Pressing the Start Key will initiate the Stomaching process as previously described.

4. After processing, simply open the door and remove the Stomacher Bag(s). The Instrument is ready for processing the next sample(s).

In Auto mode:-

Press and release the Prog Key to select the desired programme. Either the P1, P2 or P3 Icon should now be present on the display.

2. Press the Auto Key, the Auto Icon should now be present on the display.

3. Load the charged Stomacher Bag(s) as previously described.

4. Closing the door will initiate the Stomaching process as previously described.

5. When the processing is completed simply open the door, remove the processed sample and place the next sample into the instrument. Close the door and processing will commence automatically.

7.7 Stall Condition

The drive controller has a factory set over current limiter to protect the motor in the event of a stall condition occurring. In the event of a Stall condition the Stall Icon will be displayed on the control panel and the instrument will stop. This condition may simply occur due to overloading the paddles and the sample size should be reduced. (See 7.2 for icon display)
8. MAINTENANCE

8.1 Cleaning

The device should be kept externally clean by wiping over periodically with a cloth damped with mild liquid detergent. **DO NOT** use any solvent based cleaning agents as these will damage the paint finish. Switch the instrument off and disconnect the from the mains supply before wiping down all the surfaces including the control panel.

To facilitate cleaning the processing chamber the door hinge lugs are open slotted to enable the door to be lifted from the lower pivot pins and folded back. To do this open the door in the normal way by lifting the lid fully upward and back then pull the door sharply upwards. A small handled brush may be helpful. It is recommended this procedure is carried out directly in the event of any spillage. Refitting of the door is the reversal of the above procedure: ensure the door hinge lugs are fully engaged on both sides before commencing use.

8.2 Replacing Primary Fuses

The primary fuses can only be removed with the aid of a tool, typically a screwdriver, since they are not considered operative replaceable. In the event of a fuse failure we recommend the equipment and mains supply is checked by a competent qualified electrician.

**WARNING:** When replacing fuses ensure they are replaced with fuses of the same rating and specification, refer to the specification section of this manual and contact the Seward Customer Service if in doubt.

8.3 Servicing & Spare Parts

Internal Servicing and Maintenance should only be carried out by suitably qualified persons. A Maintenance Manual is available giving full details of servicing and repair procedures, wiring diagrams, parts identification and general arrangement drawings. We recommend as a matter of routine that the instrument is inspected and serviced at least every six months or sooner if extensively used.

8.4 Warranty & Service Policy

All Seward Stomacher are protected by a 36 month warranty covering faulty workmanship and materials. In the event of a fault developing within this period please contact Seward Customer Service who will organise the collection/return of the instrument for warranty repair and/or replacement at Seward’s discretion.

The warranty is void if the device has been damaged as a result of unauthorised service, modification or subject to neglect, misuse, accident, improper installation or operation.
9. SPECIFICATIONS

9.1 UL Designated Product

<table>
<thead>
<tr>
<th>Model</th>
<th>Stomacher Model 400 Circulator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cat No</td>
<td>400/100/AM</td>
</tr>
<tr>
<td>Dimensions</td>
<td>350mm wide x 335mm deep x 280mm high. (unpacked)</td>
</tr>
<tr>
<td>Weight</td>
<td>23 Kgs (unpacked)</td>
</tr>
<tr>
<td>Supply Voltage</td>
<td>110V</td>
</tr>
<tr>
<td>Supply Frequency</td>
<td></td>
</tr>
<tr>
<td>Fuses Primary</td>
<td>Bussman GMD 2.0 A 250V x 2 *</td>
</tr>
<tr>
<td>Fuses Secondary</td>
<td>Bussman GMA 2.5 A 250V (PWB) x 1*</td>
</tr>
<tr>
<td></td>
<td>Bussman S504 250mA 250V (Transformer) x 2</td>
</tr>
<tr>
<td>Insulation</td>
<td>Class I (Earthed)</td>
</tr>
<tr>
<td>Installation</td>
<td>Over voltage Category II</td>
</tr>
<tr>
<td>Pollution</td>
<td>Pollution Degree 2</td>
</tr>
<tr>
<td>Duty Cycle</td>
<td>Continuous</td>
</tr>
<tr>
<td>Rated Load</td>
<td>90W</td>
</tr>
<tr>
<td>Disposable Bag Size</td>
<td>177mm x 304mm</td>
</tr>
<tr>
<td>Minimum Recommended Capacity</td>
<td>80ml</td>
</tr>
<tr>
<td>Maximum Recommended Capacity</td>
<td>400ml</td>
</tr>
<tr>
<td>Maximum Recommended Operating Temperature</td>
<td>60 C</td>
</tr>
<tr>
<td>Recommended Operating Ambient Temperature Range</td>
<td>10 - 35 C</td>
</tr>
<tr>
<td>Recommended Operating Relative Humidity Range</td>
<td>10 - 89%RH</td>
</tr>
<tr>
<td>Timer Settings (Variable)</td>
<td>0 secs - 99mins 59secs (+/- 5%)</td>
</tr>
<tr>
<td>No Load Paddle Speeds (@ nominal 20C)</td>
<td>200rpm (+/- 5%)</td>
</tr>
<tr>
<td></td>
<td>230rpm (+/- 5%)</td>
</tr>
<tr>
<td></td>
<td>260rpm (+/- 5%)</td>
</tr>
<tr>
<td>Paddle Clearance</td>
<td>0 - 10mm</td>
</tr>
</tbody>
</table>

only these or equivalent UL approved fuses should be used.
### STOMACHER 400 CIRCULATOR
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#### 9. SPECIFICATIONS (cont)

#### 9.2 EU Designated Product

<table>
<thead>
<tr>
<th>Model</th>
<th>Stomacher Model 400 Circulator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cat No</td>
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</tr>
<tr>
<td>Dimensions</td>
<td>350mm wide x 335mm deep x 280mm high. (unpacked)</td>
</tr>
<tr>
<td>Weight</td>
<td>23 Kgs (unpacked)</td>
</tr>
<tr>
<td>Supply Voltage</td>
<td>230V</td>
</tr>
<tr>
<td>Supply Frequency</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Fuses Primary</td>
<td>F5A (UK cord set only)</td>
</tr>
<tr>
<td></td>
<td>Bussman GMD 1.0 A 250V x 2 (appliance inlet)</td>
</tr>
<tr>
<td></td>
<td>(or IEC 127 T 1.0A 250V)</td>
</tr>
<tr>
<td>Fuses Secondary</td>
<td>Bussman GMA 2.5 A 250V (PWB) x 1</td>
</tr>
<tr>
<td></td>
<td>Bussman S504 250mA 250V (Transformer) x 2</td>
</tr>
<tr>
<td></td>
<td>(or IEC 127 T250mA 250V)</td>
</tr>
<tr>
<td>Insulation</td>
<td>Class 1 (Earthed)</td>
</tr>
<tr>
<td>Installation</td>
<td>Over voltage Category II</td>
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<tr>
<td>Pollution</td>
<td>Pollution Degree 2</td>
</tr>
<tr>
<td>Duty Cycle</td>
<td>Continuous</td>
</tr>
<tr>
<td>Rated Load</td>
<td>90W</td>
</tr>
<tr>
<td>Disposable Bag Size</td>
<td>177mm x 304mm</td>
</tr>
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<td>80ml</td>
</tr>
<tr>
<td>Maximum Recommended Capacity</td>
<td>400ml</td>
</tr>
<tr>
<td>Maximum Recommended Operating Temperature</td>
<td>60 °C</td>
</tr>
<tr>
<td>Recommended Operating Ambient Temperature Range</td>
<td>10 - 35 °C</td>
</tr>
<tr>
<td>Recommended Operating Relative Humidity Range</td>
<td>10 - 89%RH</td>
</tr>
<tr>
<td>Timer Settings (Variable)</td>
<td>0 secs - 99mins 59secs (+/- 5%)</td>
</tr>
<tr>
<td>No Load Paddle Speeds (at nominal 20°C)</td>
<td>200rpm (+/- 5%)</td>
</tr>
<tr>
<td></td>
<td>230rpm (+/- 5%)</td>
</tr>
<tr>
<td></td>
<td>260rpm (+/- 5%)</td>
</tr>
<tr>
<td>Paddle Clearance</td>
<td>0 - 10mm</td>
</tr>
</tbody>
</table>
10. COMPLIANCE

The Seward Stomacher is designed and manufactured to conform to the following standards:

- IEC1010-1990 Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use.
- UL 3101 - 1993 Electrical Equipment for Laboratory Use General Requirements

This equipment complies with the essential requirements of the European Council Directive 89/336/EEC relating to EMC and carries the CE mark.

This equipment complies with the requirements of UL and carries the UL mark UL file # E168827.

11. STORAGE & TRANSPORT

Recommended storage and transport conditions are:

<table>
<thead>
<tr>
<th>Ambient Temperature Range</th>
<th>-20 to +50 C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relative Humidity Range</td>
<td>10 - 90%</td>
</tr>
</tbody>
</table>

The Seward Stomacher should ideally be stored in a clean environment and for long periods of storage it should ideally re-packed in the original packaging.

The Seward Stomacher should, ideally, be transported in its original packaging.

Manufactured by:
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Registered in England No 3211467