



Developed By A Scientist for Scientists

The Belly Dancer was developed by a postdoctoral scientist to optimize washing procedures for fragile gels. Designed originally as a reliable workhorse, the motion was altered to provide the smooth undulation that makes the Belly Dancer unique. The result is an elegantly simple design that is reliable, significantly more efficient, and very, very quiet.

Accommodates
oversize containers



The Belly Dancer's® Unique Motion

As for other shakers, all they do is shake.
Wouldn't you rather have a Belly Dancer?

Whether you need gentle, continuous agitation or vigorous mixing, The Belly Dancer is your instrument of choice: staining and destaining gels; Northern, Southern, or Western blotting; in various environments, bench top operation, cold rooms, warm rooms.

The unique, undulating motion of The Belly Dancer shaker is designed to provide the optimal movement for the multiple stainings and washings involved in gel and blotting techniques. Agitation is gentler but more efficient than the action of ordinary shakers. The smooth combination of vertical and horizontal orbital motion allows for more rapid exchange of solvents in applications like staining and destaining gels and assures lower background in applications such as blotting.

The easily adjustable speed and platform pitch angle controls provide a wide range of agitation conditions, from extremely gentle to vigorous. The Belly Dancer provides an exceptionally simple liquid agitation system, consisting of an orbiting platform flexibly anchored at four corners so that the platform motion, when adjusted by the platform pitch control collar, is an extremely effective combination of rocking platform mixer and orbital shaker. One dimensional shakers do not have the versatility and range of application that result from the variable speed and adjustable platform pitch of The Belly Dancer.



The unique motion of the Belly Dancer produces this unexpected efficiency: separation and thorough washing of multiple filters in a single container.



The utterly simple platform pitch control.



The Belly Dancer® carries a load up to 20 lbs.

FEATURES:

Sensible in Design, Simple in Operation

- Gentle yet thorough mixing and washing action.
- Simple, durable, trouble free construction.
- No belts or pulleys.
- Chemically resistant materials. Stainless steel and anodized aluminum parts. High bake ester finish on case.
- 30 cm x 30 cm platform for efficient benchtop and cold room operation.
- Open sided platform to accommodate oversize containers.
- Removable, washable non-skid platform mat.
- Simple platform pitch control. From level motion to 8° pitch.
- Light weight (16 lbs.) for easy mobility.
- Variable speed control, from 0 to 100 rpm. No cogging at slow speeds.
- Max load, 20 lbs.
- Extremely quiet operation.
- High quality, permanent magnet DC motor and control for long life and dependable performance.

SPECIFICATIONS:

Dimensions: base, 15"x15", height, 9", platform, 12"x12"

Weight: 16 lbs.

Operating Voltages: BDRAA115S, 115V 50/60 hz
BDRAA220S, 220V 50/60 HZ, CE

Speed: 0 rpm to 100 rpm

Max load: 20 lbs.

Ambient Temperature Range: 0°C to 42°C



Pictured here with The Stovall Blot Washer (the automated liquid delivery and aspiration system), the Belly Dancer is the shaker of choice for washing & incubation of Western blots.

The Belly Dancer®

designed expressly for gel and blotting techniques



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A Compact Version of the Belly Dancer® Shaker

For gel & blotting techniques, retroviral infection
cell culture, & mixing small tubes



the
belly button®

the belly button® *The Versatile Shaker*

The Belly Button is a very compact version (8"x8"x4 3/4") of the Belly Dancer® shaker, useful where space is at a premium to molecular & cell biology investigators for:

- ▶ Staining & Destaining Gels
- ▶ Northern & Southern Hybridizations
- ▶ Western Blotting & Rinsing Membranes
- ▶ Cell Culture Incubation
- ▶ Retroviral Infection
- ▶ Phage Elution, Amplification of cDNA Libraries
- ▶ Mixing of Small Tubes and Blood Samples

For cell culture and gel and blotting techniques. The Belly Button motion is an extremely effective combination of rocking platform mixer and orbital shaker for excellent solvent exchange at slow speeds.



For mixing small tubes and blood samples. The platform tilt adjusts from level to a sharp angle for agitating small tubes and 96 well plates. "Finger Mat" holds small tubes in place.



The easily adjustable speed and platform pitch controls provide a wide range of agitation conditions, from extremely gentle to vigorous.



Like the Belly Dancer, the Belly Button is an exceptionally simple liquid agitation system, consisting of an orbiting platform flexibly anchored at four corners so that the motion is an extremely effective combination of rocking platform mixer and orbital shaker. Also perfect for mixing a martini after a hard day in the lab.

For cell culture, retroviral infection and 96 well plate assays. The cool running motor does not upset controlled environments. Shaker fits in incubators & refrigerators without need to rearrange other contents.

BELLY BUTTON FEATURES

- ▶ This compact shaker (8"x8"x4 3/4") fits easily into laboratory incubators, ovens & refrigerated units without rearranging shelves or disturbing other materials. Fits neatly in a hood.
- ▶ The very thin, flat power cord reaches external outlets without damaging incubator or refrigerator gaskets.
- ▶ Platform tilt is continuously adjustable from level to a sharp angle and can be effortlessly adjusted in seconds.
- ▶ Variable speed control. 6 – 100 rpm. No cogging at slow speeds. Direct drive, no belts or pulleys.
- ▶ The wide ambient operating range, 0°C to 60°C, allows the shaker's use in a variety of lab environments, high humidity or dry incubators and refrigerated units.
- ▶ Lightweight (5 lbs.), durable aluminum, brass and stainless steel and ABS plastic construction.
- ▶ A non skid platform mat stabilizes loads. An accessory rubber "finger mat" stabilizes small tubes.
- ▶ Maximum load: 5 lbs.
- ▶ Cool running (heat release of a 2 watt bulb) 12v brushless DC motor.
- ▶ Patented.

SPECIFICATIONS

DIMENSIONS:	8"x8"x4 3/4" h, platform 7"x7"
WEIGHT:	5 lbs
AMBIENT TEMPERATURE OPERATION:	0°C to 60°C
MAX LOAD:	5 lbs.
ELECTRICAL:	100–230v ac 50/60hz, auto fuse
MOTOR:	12 volt brushless DC
CATALOG #:	BBUAAUV1S

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A DAY IN THE LIFE

of the ultimate water bath

8 AM-9 AM	9:15 AM-10:15 AM	10:30 AM-12 PM	1:30 PM-3:30 PM	4 PM-NEXT DAY
Cool and maintain melted agar at 50°C prior to adding ampicillin and/or pouring plates.  	Place bath on Belly Dancer shaker for high stringency filter wash at 60°C for 20 minutes.  	Pour out hot water, replace with cool water. Restriction enzyme digest at 37°C.  	Protein quantitative assay at 55°C.  	Place bath on Belly Dancer shaker for overnight hybridization at 42°C.  

Light Weight ■ Quick Heating ■ Versatile and Easy to Use



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The Stovall Shaking Water Bath

THREE INSTRUMENTS IN ONE:

Shaking water bath, constant temperature bath, Belly Dancer Shaker.

Used together or separately.

The features—light weight and quick heating—originally designed into the Stovall water baths to facilitate nucleic acid hybridizations have made these baths easy to use and quite versatile for the molecular biologist's laboratory.

Use in combination with the Belly Dancer's® well known, gently undulating motion, the bath provides the ideal instrument for:

- Northern and Southern filter blot hybridizations.
- Filter washes and high stringency filter washes. Simultaneous washing of multiple filters.
- In-situ hybridizations and washes.
- Electrophoretic gel manipulation.
- Acceleration of protein gel destaining.
- Hot staining protocols and recombinant DNA technology.

And because of these same features the baths are well suited for numerous, common protocols not requiring agitation.

- Heat inactivation of serums.
- Restriction enzyme digests.
- Lowry and other protein quantitative assays.
- DNA sequencing applications using sequenase or taq polymerases.



The combination Belly Dancer/Hybridization Water Bath unit consists of the bath along with a Belly Dancer modified to contain the temperature controls within the case.

115V
Cat.# CMBAA115S

220V
Cat.# CMBAA220S

A non-dedicated instrument for greater versatility and lab efficiency

Unlike large and expensive environmental chambers and shaking water baths which are dedicated to specific uses, the Belly Dancer/Hybridization Water Bath is a non-dedicated instrument designed to be highly versatile. The bath can be moved around, used with the shaker or independently of it.

By removing the light weight water bath from the combined instrument (the Belly Dancer/Hybridization Water Bath) the Belly Dancer can be used in its ordinary excellence for the multiple non-temperature sensitive stainings, washings and probes involved in gel and blotting techniques.

The Hybridization Water Bath with remote control was designed to extend the versatility of the present Belly Dancers or to transform a bench top rocker or reciprocating shaker into a temperature controlled, shaking water bath.



The unique motion of a Belly Dancer produces this unexpected efficiency: separation and thorough washing of multiple filters in a single container.

FEATURES/BENEFITS

- Light weight for mobility and use on the shaker.
- Quick heating, 3°C rise per minute.
- PID microprocessor heat control. Excellent temperature control and stability: $\pm 0.1^\circ\text{C}$.
- Simple field calibration when necessary.
- Gentle agitation when used in conjunction with the Belly Dancer shaker.
- Safety thermostat to prevent thermal runaway.
- Quick attach/detach power/data cable assembly.

SPECIFICATIONS

Overall dimensions of bath: $12\frac{1}{4}" \times 12\frac{1}{4}" \times 4"$ h plus lid
Stainless steel chamber dimensions: $10\frac{3}{8}" \times 10\frac{3}{8}" \times 3\frac{1}{4}"$ depth

Weight: 7.5 lbs. with lid, no water

Temperature range: 30°C to 75°C

Temperature ramp up speed: approx. 3°C per minute

Stability of water temperature maintenance at set point: $\pm 0.2^\circ\text{C}$

Electrical: 115v ac 50/60hz, 6/26 amp slobber fuse or
220v ac 50/60hz, 4.25 amp slobber fuse

Belly Dancer/Water Bath

115 volt: CAT.# CMBAA115S

220 volt: CAT.# CMBAA220V CE

Simplicity/Safety/Precise Temperature Control

The combined and the remote control water bath units are designed with utter simplicity of instrumentation and ease of use in mind: an on/off, illuminated switch, a PID microprocessor control with set point control pads and display and actual water temperature display.

For safety, the bath is equipped with a thermal runaway thermostat switch which operates independently from the main temperature controller. This automatic reset limit switch shuts power off if the pan temperature exceeds 80°C , thus preventing system burnout should all water evaporate from the pan and cause a thermal runaway condition.

Also for safety, the $3/16"$ thick PETG gabled bath lid, which effectively prevents evaporation, will shield .809 MEV of beta radiation, or 43% over the average ME beta radiation of P32.

The high bake ester finish protects the aluminum cases from oxidation and allows easy maintenance. The stainless steel pan is constructed with smooth corner radii for easy, efficient cleaning. And the complete isolation of the water bath from the mechanical works of the shaker motor, and temperature and motor controls assures greater ease of decontamination when radioactive spills occur.

The PID microprocessor heat controller for the bath will maintain actual water temperature within $\pm 0.2^\circ\text{C}$ at all temperatures between 35°C and 72°C . There is no variation of temperature within the bath when agitation is present. The temperature ramp up speed is approximately 3°C per minute.

The Stovall Hi/Lo Profile Rocker™

At Home in Your Environments
0°C – 65°C



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APPLICATIONS:

This light weight low profile rocker unit is designed for versatility. It operates on bench tops, in high humidity or dry incubators, in high temperature ovens (to 65° C) and in refrigerated units (to 0° C). Typical applications are:

- Staining and destaining gels
- Northern and Southern Hybridizations
- Western blotting and rinsing membranes
- Cell culture incubation
- Phage elution, Amplification of cDNA libraries

The easily adjustable speed and platform pitch controls provide a wide range of agitation conditions: from extremely gentle to vigorous.

ADD ONE, TWO OR THREE ADDITIONAL PLATFORMS FOR INCREASED CAPACITY.



Plus 1



Plus 2



Plus 3

ROCKER FEATURES:

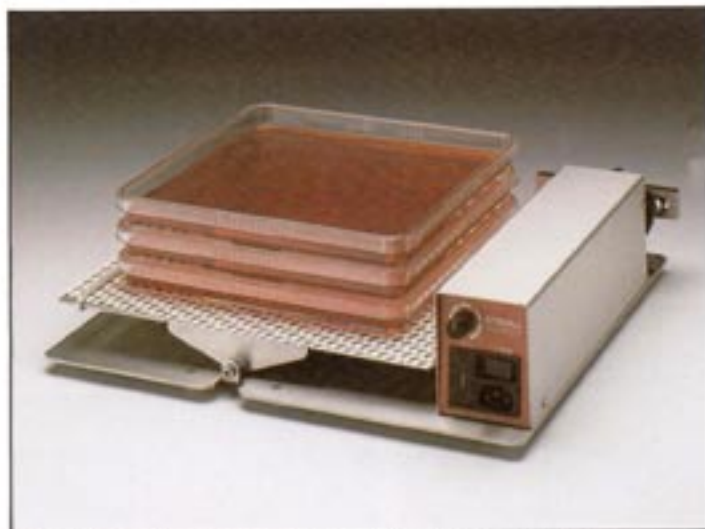
- ☐ The low profile (1.75" level platform height) rocker fits easily into laboratory incubators, ovens and refrigerated units without rearranging shelves or disturbing other materials.
- ☐ The very thin, flat power cord reaches external outlets without damaging incubator or refrigerator gaskets.
- ☐ Platform tilt is continuously adjustable from 2° to 11° and can be effortlessly adjusted in 15 seconds.
- ☐ Variable speed control, 0 - 22 rpm. No cogging at slow speeds.
- ☐ The wide ambient operating range - 0° C to 65° C - allows the rocker's use in a large variety of lab environments.
- ☐ All finishes and hardware are stainless steel. The easily disassembled rocker can be sterilized in the auto clave.
- ☐ A non skid platform mat stabilizes loads.
- ☐ Light weight (16 lbs.) for easy portability.
- ☐ Maximum load: 20 lbs.
- ☐ Cool running 24v DC motor.
- ☐ A maximum of 4 rocker platforms increases the rocker capacity using the same amount of bench space.



Platform tilt is continuously adjustable from 2° to 11° and can be effortlessly and quickly adjusted.



Thin, flat power cord reaches external outlets without damaging gaskets.



Light weight for easy portability. The Rocker is quickly and easily disassembled for sterilization in an auto clave.

SPECIFICATIONS:

Overall Dimensions: 13 3/4" x 15 3/4" x 1 3/4"
3 3/4" Motor Module Height

Weight: 16 lbs.

Ambient Temperature Operation: 0° C to 65° C

Electrical: 115 volt ac 50/60 hz 2 amp slo blo fuse
or

230 volt ac 50/60 hz 1 amp slo blo fuse

Motor: 24 volt permanent magnet DC

Catalog #: 115 volt - ROCAA115S

230 volt - ROCAA220S

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The STOVALL Low Profile Roller™

Versatile and Durable



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The Versatility Of The Stovall Low Profile Roller™

Renders Economies Of Space And Expense For The Research Laboratory And Production Laboratories

This light weight, low profile roller unit was designed as a compact, space saving, non-dedicated instrument which performs multiple functions in the biological research laboratory. It operates on benchtops, in high humidity and CO₂ incubators, high temperature ovens (to 60°C) and in refrigerated units (to 0°C).

Cell Culture

The six rollers supplied with this unit will rotate 3 large (850 cm) roller bottles at a variable speed of 0.5 rpm to 9.5 rpm allowing excellent cultivation, or stress, of adherent cells. Adjust rollers to accommodate small tubes for cell culturing.

Western, Northern and Southern Filter Blot Applications

The Stovall Low Profile Roller also offers to the researcher an economical alternative to the dedicated, rotisserie style dry chambers for hybridization and washing of filters. The roller bottle technique for hybridizations increases the sensitivity of reactions since the filter is completely immersed and drained during each revolution of the bottle and all reactions are complete and uniform. Good for strip blot processing.

Blood Products and Small Tubes

The six rollers supplied with the instrument can be moved close together to accommodate small tubes and bottles. By inserting 5 additional rollers, purchased separately, the unit will accommodate up to twenty 10 to 50 ml tubes, turning them at variable speeds between 1 rpm and 67 rpm.



For cell culture in dry or humid incubator environments.



By adjusting the roller positions or adding additional rollers, one can accommodate different size containers. Pictured are two cell culture bottles along with two 50ml and 15ml tubes.



*Agitation of small tubes/blood products.
Portable for use in any lab environment. This unit
is pictured with 11 rollers. Six rollers come with the
basic unit.*

FEATURES:

- The low profile (2 3/8" roller height) design provides a convenient fit into laboratory incubators, ovens and refrigerated units without rearranging shelves or disturbing other materials.
- Industrial grade durability and drive train.
- The very thin, flat power cord reaches external outlets without damaging incubator gaskets.
- The wide ambient operating range – 0°C to 60°C – allows use in the large variety of lab environments and research protocols.
- The unit is light weight (10.5 lbs) for easy portability.
- All finishes are resistant to chemicals and easy to clean and sterilize. All hardware is of stainless steel, delrin or nylon and a high bake ester finish coats aluminum case parts.
- The variable speed control turns the rollers at 2 rpm to 38 rpm.
- All rollers are removable to allow ease of cleaning and accommodation of variously sized tubes and bottles.
- Cool running brushless motor creates no ozone.
- Single unit operates with all voltages, 90v – 240v, 50/60Hz

SPECIFICATIONS:

Dimensions: 14 1/4" wide x 15" deep x 2 3/8" high (roller height)

Weight: 10.5 lbs

Ambient Temperature Operation: 0°C to 60°C

Electrical: 90-240v ac 50/60Hz; high impedance internal fuse

Rollers: diameter: 1 1/8"
circumference: 3.53"
length: 10"
quantity: 6

Roller Variable Speed: 2 rpm – 38 rpm

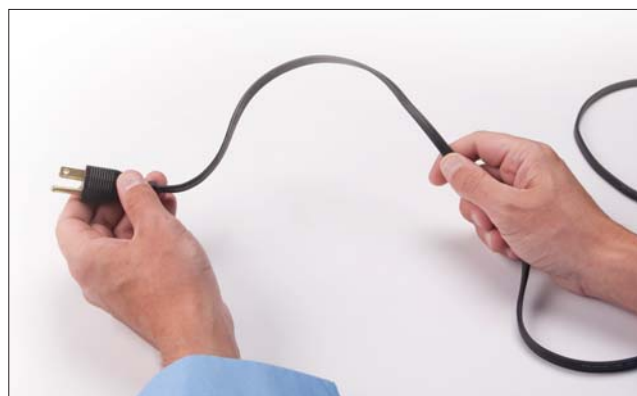
Maximum Weight: 4 liters of liquid

Catalog #: ROLAAUV1S

PATENT PENDING



The Low Profile Roller fits easily into incubators, ovens or refrigerators without disturbing other materials.



Thin, flat power cord reaches external outlets without damaging gaskets.



Rollers can be removed for cleaning or adjusted to accommodate variously sized bottles and tubes.

The Stacks™

The Stacks™ economizes space on benchtops, in warm rooms, and in incubators when you have more than one Low Profile Roller in use. Stack two, three, or more Rollers in a 18" x 16" benchtop space. The acrylic platforms and 9" anodized aluminum legs which separate the platforms allow easy accommodation of conventional roller bottles and visual access to cell growth.

Catalog #: ACCRL0001 Stacks for two Rollers

One shelf, 9 3/8" high

Catalog #: ACCRL0002 Stacks for three Rollers

Two shelves, 18 3/4" high

SPECIFICATIONS:

3/8" acrylic platform, 18" x 16"

9" clear anodized solid aluminum legs, 1" diameter



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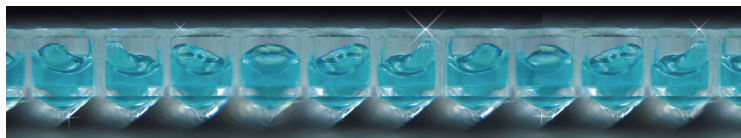
THE FLURRY™

A timed microplate mixer



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The Flurry™ microplate shaker maintains a small vortexing orbit of 1.0 mm for thorough mixing regardless of sample viscosity. The high speed (750-3200 rpm) and small orbit combine to offer true vortexing action in each well of a 96 or 384 well microplate. The Flurry™ accepts most microplate types within the recommendations of the Society for Biomolecular Screening. The Flurry™ operates under timed (1-60 min.) or continuous conditions.



SPECIFICATIONS

Stirring Speed: 750-3200 rpm
(750-2700 rpm for 50Hz models)

Time: 1-60 minutes or continuous

Vortexing Orbit: 1.0 mm diameter

Maximum Capacity: 1 micro plate, any type with standard SBS footprint

Dimensions: (D x W x H) 150 x 180 x 165 mm (5.75 x 7.0 x 6.5 in.)

Weight: 2.75 kg (6.1 lb.)

CATALOG NUMBERS

120 V, 60 Hz

230 V, 50 Hz

100V, 50/60Hz

The Well Mark® & Easel WMKAA0003

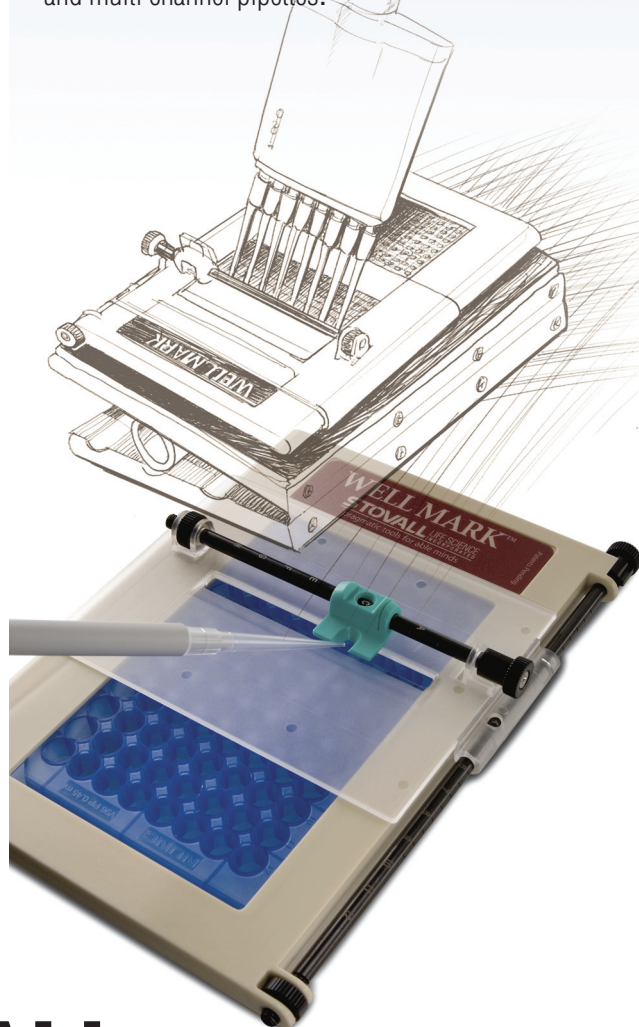
ETL Listed Conforms to UL Std. 3101-1

ETL Listed Certified to CAN/CSA C22.2

WELL MARK®

The Well Mark®: dispense error reducing companion to The Flurry™ microplate shaker

The Well Mark® is a simple, effective device designed to reduce pipette dispense errors and cross contamination during manual delivery of assay reagents to 96 and 384 well plates. With laser etched index shafts, the Well Mark® registers the progress and current position in delivery of reagents to a complete column or single well in 96 or 384 well plates. At beta site labs, commercial and academic, errors were reduced by 26% and 32% respectively within a two week period. For use with single and multi channel pipettes.



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SPECIFICATIONS

Weight & Dimensions

Control/Valve Console 9" W x 9 5/8" D x 5 3/8" H

Electrical

115V model, 50-60hz 500 m amp fuse

220V model, 50-60 hz 250 m amp fuse

110V model, 50-60hz 500 m amp fuse

Wash Timing

From seconds to 99 hours.

Liquid Dispensing Rate

ca. 2 ml/sec.

Liquid Aspiring Rate

ca. 5 ml/sec

Reagent Vessels

1 wash bottle, 4 liters,

1 waste receptacle, 4 liters

Other accessory vessels available

Program Storage Capacity

10+ Liquid delivery & aspiration programs

Valves

3 solenoid valves for liquid flow control,

2 for delivery, 1 for aspiration.

Blot Trays

Mini blot: 3 5/8" x 2 5/8" x 1 1/8" (9.1 x 6.6 x 2.9 cm)

Standard blot: 4 5/8" x 3 9/16" x 1 1/8" (11.7 x 9.0 x 2.9 cm)

Other sizes available, see price list

Keypad

10 key membrane switch

Description

The Blot Washer 115V - Catalog #: BLWAA115S

The Blot Washer 220V - Catalog #: BLWAA220S

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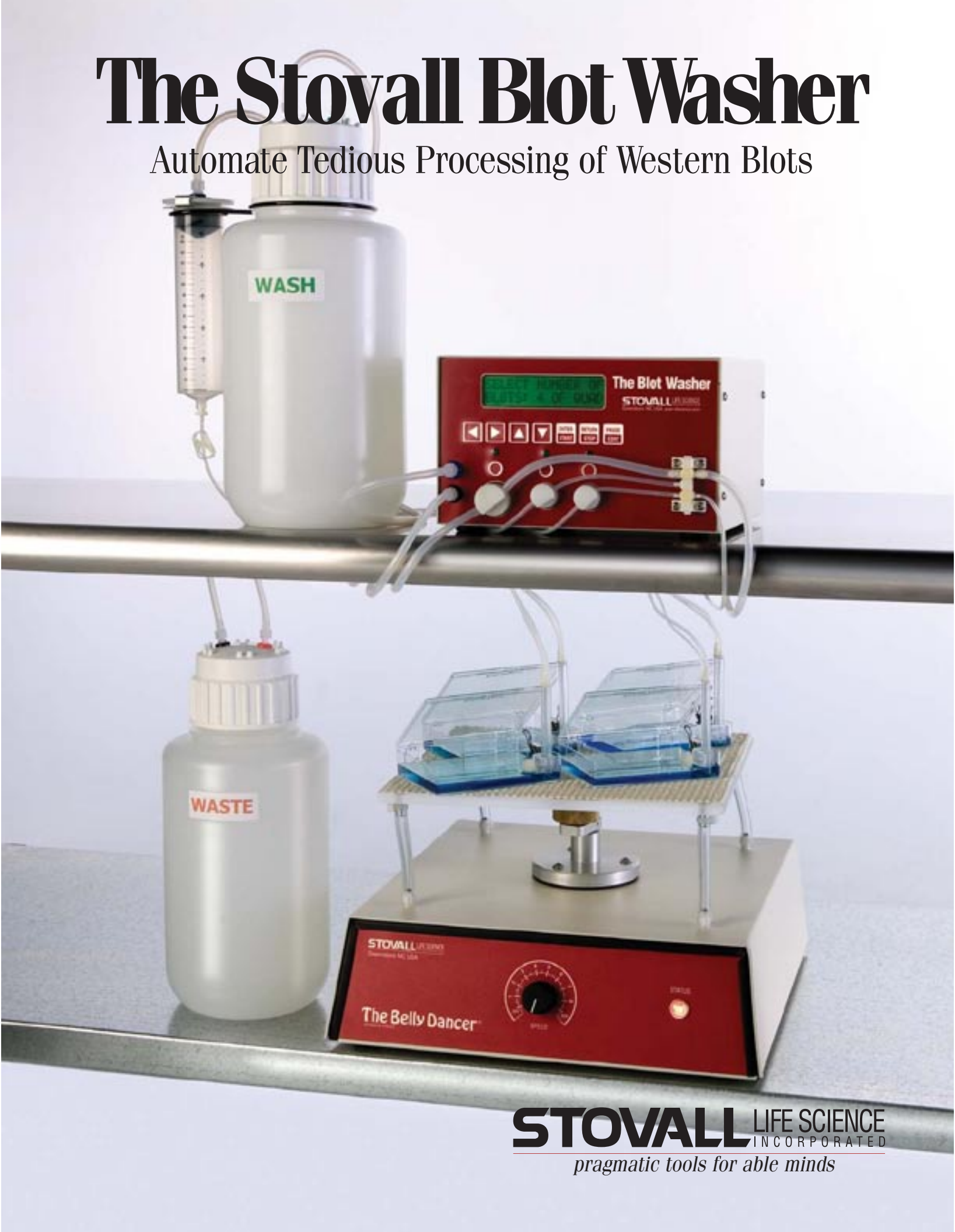
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Website: slscience.com

The Stovall Blot Washer

Automate Tedious Processing of Western Blots



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THE STOVALL BLOT WASHER: Automation at an Affordable Price

With the Stovall Blot Washer you can:

- 1 Automate the most tedious, distracting and interruptive part of processing Western blots: the multiple washes after incubations.
- 2 Process numerous blots in one to four containers.
- 3 Increase the productivity of your lab by making better use of your time.
- 4 Reduce background, even with new chemiluminescent detection, because there is no limit to the number or duration of washes.

All of this at an affordable price.

Without automation, what should take 20 to 30 minutes for a set of repeated rinses can extend to hours because one generally attempts to do other things while being interrupted by these washes. Why spend your time doing what a monkey can do? Wouldn't you rather press the "start" button and have 30 uninterrupted minutes to read a paper or set up another experiment?



The dispensing/aspirating tube bits are designed to work with containers already in use in your lab. A stainless steel clip attaches the dispensing/aspirating bits to the side of the container. A nylon thumbscrew loosens to allow adjustment of the bits up or down to work with different container depths.

Programs for Wash Protocols

Software contained in the unit's microprocessor controller allows you to create and store up to 10+ programs. Scroll to the stored program you want, punch "start" and walk away until the wash cycle is completed. Alteration of any stored program is quick and easy.

The software allows you to control all elements of the instrument's capability: volume of wash or other reagent dispensed, number and duration of washes, and aspiration of reagents to waste. The user-friendly software offers an intuitive approach and allows the operator to program a procedure in minutes.

Containers for Blots & Dispensing/Aspirating Harnesses

Large (standard gel size) and small (mini gel size) blot containers are supplied with the unit to accommodate the most commonly used gel and blot samples. However, the dispensing/aspirating harnesses with d/a tube bits are designed to work with containers already in use in your lab.

A quad harness for processing of one to four containers is available as an accessory for the Blot Washer. Tubing lines on the quad harness can be clamped off when fewer containers are used in a particular wash protocol. With the multiple harness, washes for several different Western blots can be accommodated simultaneously.



Quad Harness

A quad harness with dispensing/aspirating bits for simultaneous processing of one to four containers is available as an accessory.

A Second Reagent Container

The Blot Washer unit comes with one 4 liter wash reservoir and one 4 liter waste container. However, the unit is designed to dispense a second reagent: either a second wash or other reagent such as secondary antibody. One of two accessory items is required to take advantage of this capability: a 4 liter wash reservoir (Cat.#: ACCBW0002) or the 140 ml luer lock delivery syringe with syringe hanger (Cat.#: ACCBW0003) for smaller volume liquid delivery. The syringe is especially convenient for automated delivery of the secondary antibody so that everything can be automated after the primary antibody incubation is completed.

Shaker for use with The Blot Washer

The Stovall Blot Washer is designed to be used with almost any mixing instrument: rocker units, orbital shakers, Belly Dancer® or Belly Button® shakers. Most labs are equipped with one or more of these instruments. If your lab needs a mixing device, visit Stovall's website www.slscience.com to review our several high quality shakers. We highly recommend the Belly Dancer for the most effective washing and the lowest background.

Delivery & Aspiration of Liquids

The Blot Washer uses a monitored air pressure system for delivery of liquids to the blot containers. The pressure monitor regulates the pump to provide a liquid delivery rate of approximately 2 ml/sec. Use of house vacuum provides the energy to aspirate reagents to waste at approximately 5 ml/sec.



Second Reservoir

A second reservoir - either a 4 liter Wash Reservoir bottle or a 140 ml syringe - can be incorporated easily into the blot washer for delivery of a second reagent. See the price list for these accessories. The delivery syringe with hangar is shown here.



One 4 liter container for dispensing wash solution comes with the unit. An additional wash solution container or a 140 ml delivery syringe with syringe hanger is available as an accessory for delivery of a second reagent.



The tactile keypad controls provide simple, intuitive control of programming, storage and operation of The Blot Washer.



A 4 liter waste receptacle comes with the unit. The level of liquid in all containers is easily visible through the translucent plastic.

The blot trays are designed to accommodate mini & standard gel & blot sizes. Various other sizes are available as accessories.

Vacuum & Pressure outlets on the front panel connect to tubing directed, to the wash and waste containers

Telephone 800-852-0102 or visit our Website at: slscience.com

The Stovall Flow Cell

For On-line Study of Biofilms

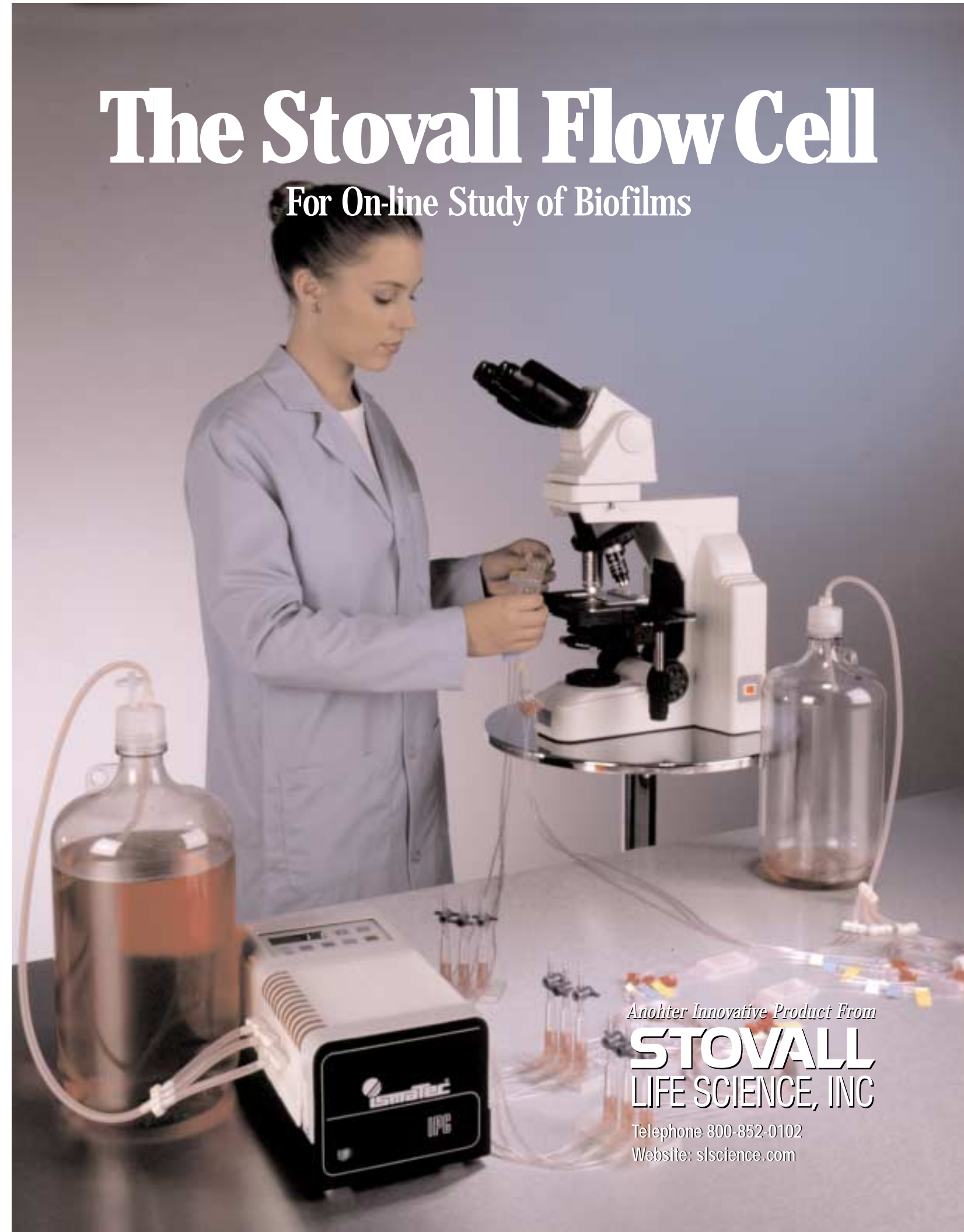
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Another Innovative Product From

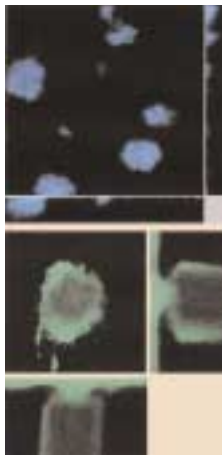
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CONTINUOUS CULTURE CHAMBERS FOR REAL TIME, NON DESTRUCTIVE, MICROSCOPIC STUDY OF BIOFILMS

Stovall Life Science offers the biofilm investigator an affordable, sterile, consumable flow cell apparatus for creation of biofilms, and for direct, non-destructive, on-line microscopic examination of biofilms. The gamma irradiated flow cell, bubble trap and connective tubing necessary for experiments is completely assembled in its airtight package, and needs only to be opened and connected to a reservoir of culture medium and a peristaltic pump to start a biofilm experiment. This single use set-up eliminates the possibility of carryover from one experiment to the next, and eliminates time consuming sterilization methods which either require equipment not easily accessible to most researchers (ethylene oxide chambers) or are, in fact, disinfection methods (hypochlorite). Moreover, the bubble trap design creates a low positive pressure on the flow of medium, thus mitigating the undesirable peristaltic pulsation in liquid delivery to the flow cell.



Traditional vs. confocal microscopy for study of biofilms.
Traditional transmission light microscopy may be used to follow biofilm development. However, as the biofilm thickness increases, it becomes more difficult to obtain good images due to the contribution from unfocused parts of the viewing field. Above, the scanning confocal laser microscope solves this problem by scanning several planes interspersed by short distances, thus reconstructing virtual three-dimensional images of the biofilm.



Bubble Trap
The triple cylinder bubble trap with air release cocks captures air bubbles released from the flowing culture medium. Inside the cylinder a "fountain" spout directs the flow of liquid upward for better release of air bubbles. The air release cocks allow the investigator to control the amount of air captured & govern the pressure on the passing liquid to help mitigate peristaltic pulsation.



Single 3 Channel flow cell with tubing attached & glass cover slip.
The triple channels of the flow cell are covered with a #1 glass cover slip, attached to the cell with acrylic adhesive. The cover slip can be scored & removed for access to the biofilm for further analysis. Each channel measures 1 mm D x 4 mm W x 40 mm L. Influent & effluent tubing is attached by barbed fittings. Write-on multicolored flags index the tubing at two junctures.



Luer Connector & Tube Rack for Effluent Capture.
The luer connectors in the effluent tubing can be unlocked briefly to collect effluent for analysis. The tube rack accessory for effluent capture is also illustrated here.

References for the Stovall Flow Cell Apparatus

Prototypes of the Stovall flow cell apparatus have been used successfully for biofilm cultures by numerous scientists over the past 3 years. Below are publications by some of these investigators who have used the flow cell apparatus:

Christensen BB, Sternberg C, Andersen JB, Palmer RJ Jr, Nielsen AT, Givskov M, Molin S.

Molecular tools for study of biofilm physiology. Methods Enzymol. 1999;310:20-42. Review.

Heydorn A, Ersboll BK, Hentzer M, Parsek MR, Givskov M, Molin S. Related Articles

Experimental reproducibility in flow-chamber biofilms. Microbiology. 2000 Oct;146 (Pt 10):2409-15.

Mathee K, Ciofu O, Sternberg C, Lindum PW, Campbell JI, Jensen P, Johnsen AH, Givskov M, Ohman DE, Molin S, Hoiby N, Kharazmi A.

Mucoid conversion of Pseudomonas aeruginosa by hydrogen peroxide: a mechanism for virulence activation in the cystic fibrosis lung. Microbiology. 1999 Jun;145 (Pt 6):1349-57.

Nielsen AT, Tolker-Nielsen T, Barken KB, Molin S.

Role of commensal relationships on the spatial structure of a surface-attached microbial consortium. Environ Microbiol. 2000 Feb;2(1):59-68.

Ramos C, Licht TR, Sternberg C, Krogfelt KA, Molin S.

Monitoring bacterial growth activity in biofilms from laboratory flow chambers, plant rhizosphere, and animal intestine. Methods Enzymol. 2001;337:21-42.

Sternberg C, Christensen BB, Johansen T, Toftgaard Nielsen A, Andersen JB, Givskov M, Molin S. Related Articles

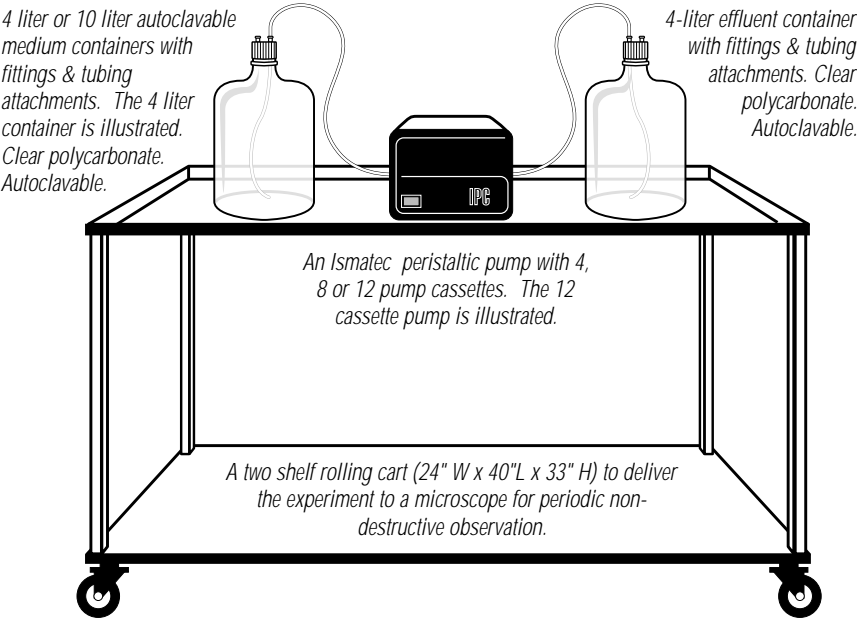
Distribution of bacterial growth activity in flow-chamber biofilms. Appl Environ Microbiol. 1999 Sep;65(9):4108-17.

Tolker-Nielsen T, Molin S.

Spatial Organization of Microbial Biofilm Communities. Microb Ecol. 2000 Aug;40(2):75-84.

HARDWARE FOR START UP LABORATORIES

Many labs are already adequately equipped to use the Stovall flow cell perfusion system. However, for those labs needing set up equipment, Stovall offers the various hardware elements which can be purchased in part or whole for biofilm experiments.



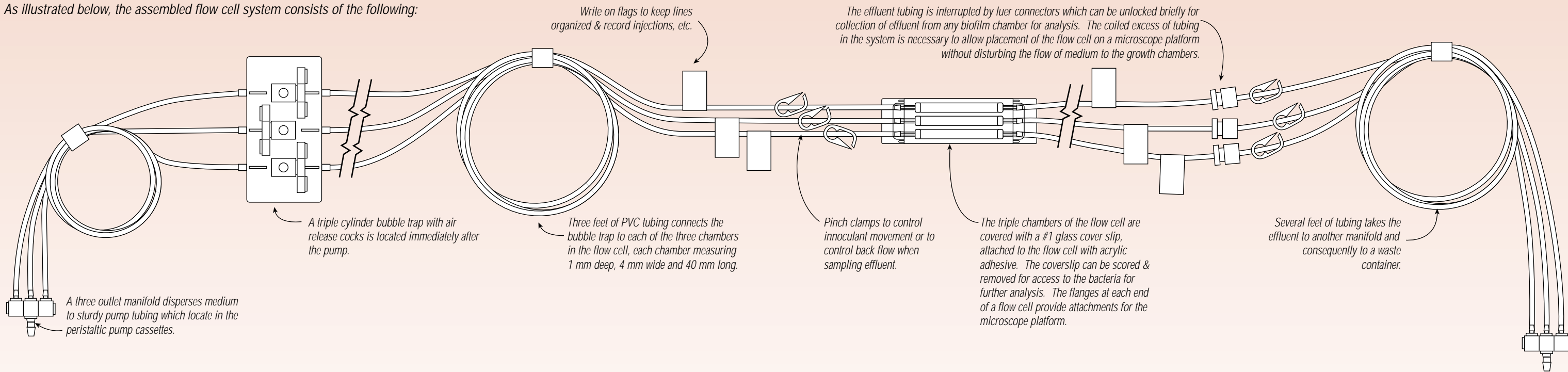
Each flow cell has three separate growth channels and each channel requires a single pump cassette to supply culture medium to it. The Stovall cart is designed to accommodate a maximum of 4 flow cells (I.E.: 12 growth channels) for a single experiment.

Custom Coatings for Flow Cell Glass Cover Slips.

The standard three chambered flow cell has a #1 glass coverslip (0.13 - 0.16 mm thick) attached. Stovall, in conjunction with specialized suppliers, can offer a wide range of metal, polymer and other coatings for the glass coverslips. These thin coatings do not interfere with microscope on-line observations of the development of the biofilms attached to the coated glass. Write or call us to discuss the kinds of coatings you require for your experiments. Our e-mail address is slscience@earthlink.net.

ELEMENTS OF THE CONTINUOUS FLOW CELL SYSTEM

As illustrated below, the assembled flow cell system consists of the following:



Telephone 800-852-0102 or visit our Website at: slscience.com

The STOVALL Convertible Flow Cell

For On-line Study of Biofilms



STOVALL
LIFE SCIENCE, INC

Stovall Life Science, 206-G South Westgate Drive, Greensboro, NC 27407
Telephone 800-852-0102 • Fax 336-852-3507
E-mail: info@slscience.com
Website: slscience.com

Another Innovative Product From

STOVALL
LIFE SCIENCE, INC

Telephone 800-852-0102
Website: slscience.com

Continuous Culture Flow Cell: *THE CONVERTIBLE*

The Convertible continuous culture flow cell extends in several ways Stovall's offering for real time, nondestructive, microscopic study of biofilms:

Detachable Reattachable Top

This single chamber flow cell with a detachable/reattachable top allows an investigator to subject test samples—polymers, metal, or other—to cells injected into the chamber through the self-sealing injection port.

Large Chamber 7.7cm³

The relatively large chamber, 24mm x 40mm x 8mm deep, accommodates harvesting of significant volumes of biofilms for RNA array and protein analysis. The easy access to matured biofilm facilitates this purpose.

Two Attachment Surfaces

Two glass cover slips, one on the top of the cell and one on the bottom, provide attachment surfaces for regular or inverted microscope observation.



Glass or TCT Coated Plastic Option

Alternative TCT treated APET plastic cover slips provide better attachment surfaces for some biofilms and for cell growth and yield.

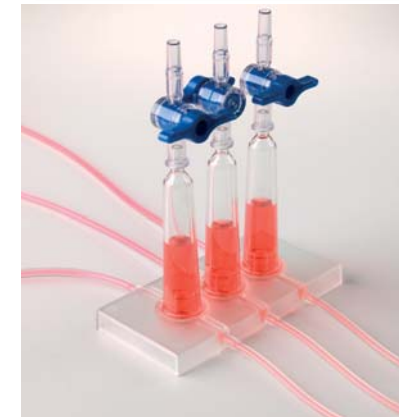
SEE PRICE LIST FOR THE APET AND OTHER PRODUCTS.

Coating the Attachment Surfaces

The detachable top allows investigators to coat the glass or plastic attachment surfaces with a variety of materials—seeded cells, proteins, polymer films, ECM—for experiments testing the response of biofilms or cells to such materials.

Bubble Trap

The triple cylinder bubble trap with air release cocks captures air bubbles released from the flowing culture medium. Inside the cylinder a "fountain" spout directs the flow of liquid upward for better release of air bubbles. The air release cocks allow the investigator to control the amount of air captured & govern the pressure on the passing liquid to help mitigate peristaltic pulsation.



Self Sealing Injection Port

The self sealing injection port facilitates initial inoculation of the flow cell chamber and any additional injections an investigator wishes to add to the growth chamber in the course of an experiment.

Transmission Light and Confocal Microscopy

As with other Stovall flow cell products, The Convertible Flow Cell can be used with traditional transmission light microscopes to follow biofilm development. However, as the biofilm thickness increases, it becomes more difficult to obtain good images due to the contribution from the unfocused part of the viewing field. The scanning confocal laser microscope solves this problem by scanning several planes interspersed by short distances, thus reconstructing virtual three-dimensional images of the biofilm.

TWO CONFIGURATIONS, FOUR PRODUCTS, GAMMA IRRADIATED

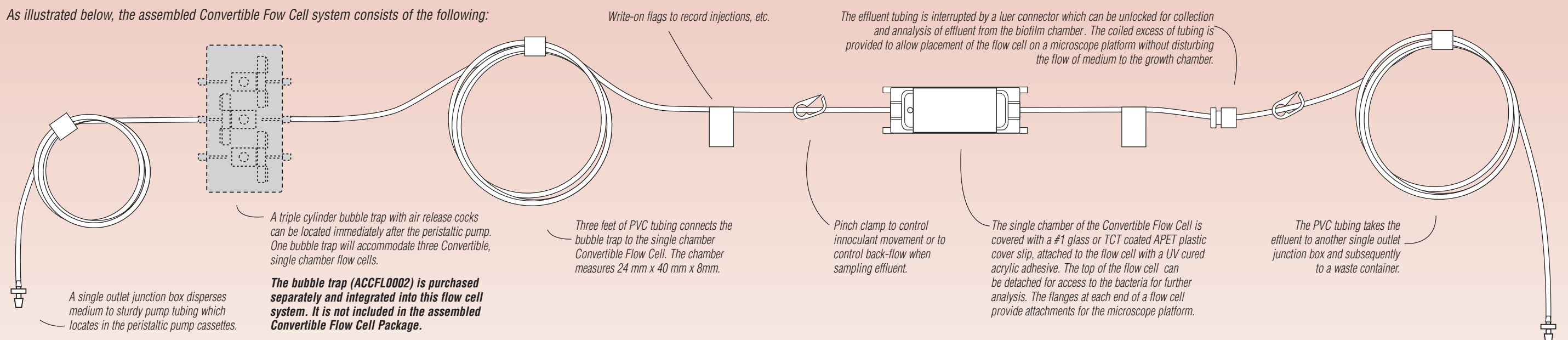
The Convertible Flow Cell is offered in two different configurations:

- 1** The Convertible Flow Cell by itself (CFCAS0003, CFCAS0004)
- 2** An assembled apparatus (CFCAS0001, CFCAS0002) consisting of the Convertible Flow Cell, connective tubing, pinch clamps to control inoculant movement, write-on flags to record injections, and a luer connector which can be unlocked to collect effluent for analysis. Each configuration is packaged in a sealed polybag and sterilized by gamma irradiation.

Both Configurations are gamma irradiated and designed for a single use which eliminates the possibility of carryover from one experiment to the next, and eliminates time consuming sterilization methods which either require equipment not easily accessible to most researchers (ethylene oxide chambers), or are, in fact, disinfection methods (hypochlorite).

ELEMENTS OF THE CONTINUOUS FLOW CELL SYSTEM

As illustrated below, the assembled Convertible Flow Cell system consists of the following:



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The Stovall Hybridization Oven

- ☐ Quick Heating
- ☐ Easy Cleaning
- ☐ Small Footprint

A Product of
STOVALL
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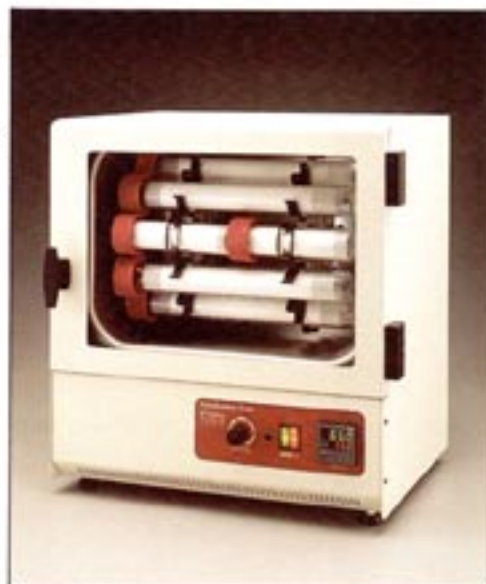
FEATURE/BENEFITS

- ☐ Quick Heating & Recovery. Quick heating from room temperature to 65° C in 5 to 14 minutes depending on number of bottles and amount of buffer.
- ☐ Seamless stainless steel chamber for easy cleaning and safe containment of spills. This is the only hybridization incubator on the market with this safety feature.
- ☐ Variable speed motor rotates the carousel from 0 to 22 rpm, allowing choice of optimum speed for probe or wash.
- ☐ The H010 unit holds 10 35mm x 300mm borosilicate bottles or 20 35mm x 150mm bottles.
- ☐ Optional carousel for larger diameter hybridization bottles. The larger diameter bottles (55mm to 70mm id) allow for no overlap of membrane filters.
- ☐ The small footprint of the oven conserves precious lab counter space. A second oven can stack on top of the first, if so desired.
- ☐ Microprocessor, PID temperature controller with 2 digital readouts holds temperature within ± 0.1 degrees C. Two digital readouts, one for set point and one for actual oven temperature.
- ☐ A thermal fuse, controlled separately from the microprocessor temperature controller, protects the incubator from thermal runaway.
- ☐ Coated bottle retainer clips to protect bottles from scratches.
- ☐ Large polycarbonate window for excellent visibility.
- ☐ Carousel jog feature for convenient placement and retrieval of containers.
- ☐ Belt clutch provides safety slippage should anything interfere with the rotating carousel.
- ☐ One year warranty.

FASTER AND MORE EFFICIENT

The Stovall Oven improves upon other available incubators and ovens by increasing the speed of heating and cooling, providing a safer seamless heating chamber to contain spills, and offering an optional carousel for holding larger diameter hybridizing containers, all in a compact space. Other incubators take up to 45 minutes to heat from ambient to 65° C; the Stovall Oven takes five to fourteen minutes to reach 65° C, depending on the thermal load.

The rolling or rotating bottle technique for hybridizing Southern and Northern and Western blots, slot and dot blots and for in situ screening of plaque and colonies to specific probes is rapidly becoming the method of choice for researchers. The ease, convenience, safety and economy of using the same leak proof containers for incubations and washes has caused this shift from sealed bags to bottle techniques.



BETTER RESULTS/LARGE CAPACITY

In the rotisserie oven hybridizations are carried out in leak proof bottles rather than in plastic bags or boxes. With the bottle system the membrane is rolled into a spiral, placed into the bottle which is secured in the oven's carousel. The



membrane is saturated and drained in each revolution of the carousel ensuring two results: thorough and even exposure of the blots to probe or wash solutions and evenness of temperature through the averaging of any gradient which may exist within the heated chamber.

A sheet of nylon mesh separates the membrane where it overlaps itself and also separates where several blots are rolled together and put into the same bottle. This separation allows full exposure of the membrane to probe or wash solutions.

As many as ten large bottles or twenty small bottles may be rotated at the same time in the Stovall H010 Oven.

SAFETY AND CONVENIENCE

The deep drawn, stainless steel chamber of the Stovall Oven provides a seamless containment for any reagent spills. This containment is easy and convenient to clean and safer to manage than the awkward removal of spill trays in other hybridization units.

A proximate thermal fuse, independent of the temperature controller, protects the unit from thermal runaway.



ACCESSORIES AND OPTIONS



There are two models of the oven available, the H010 which holds two sizes of borosilicate glass bottles (35 x 300mm and 35 x 150mm) and the H04 which holds four large size acrylic bottles. A tube rack to hold six of either glass bottles is useful for safe storage of tubes and for probe and buffer wash additions.

The epoxy covered rack withstands heat and steam sterilization.

CONVENIENT AND RELIABLE OPERATION

The digital PID (Proportional/Integral/Derivative) controller which measures and controls chamber temperature adjusts set points simply and quickly by touch buttons. Dual LEDs display both actual and set-point temperatures continuously. A jog feature makes setting and retrieving bottles from the carousel simple and convenient. The strong blower and heater provide quick recovery of chamber temperature after bottles are reinserted.

The rotation speed of the carousel, from 0 to 22 rpm allows the researcher to optimize the speed for a particular probe and to vary the speed for best results when washing.



HYBRIDIZATION OVEN SPECIFICATIONS

MODEL H010 AND H04

Temperature Range:	ambient + 5° to 95° C	
Temperature Precision:	+ /- 0.1° C	
Temperature Ramp:	3° - 9° C per minute depending upon thermal load	
Temperature Controller & Display:	Microprocessor based PID controller with two digital readouts to 0.1° C	
Temperature Sensor:	Thin film PRTD, shielded cable with ground	
Carrousel Speed:	0 - 22 rpm	
Carrousel Assembly Capacity:	Model H010:	10 35mm x 300mm or 20 35mm x 150mm borosilicate bottles
	Model H04:	4 70mm x 210mm or 4 55mm x 170mm acrylic bottles
Exterior Dimensions:	18¼" H x 17¼" W x 13½" D	
Interior Dimensions:	10" H x 14" W x 9½" D	
Weight:	Net 50 lbs.	
	Gross 55 lbs.	
Voltage:	H010-1 & H04-1	115 volt 50/60 hz.
	H010-2 & H04-2	230 volt 50/60 hz.

STOVALL LIFE SCIENCE
INCORPORATED

206-G South Westgate Drive, Greensboro, NC 27407 USA
Phone: 336-852-0102, Fax: 336-852-3507

The Problem

Distractions and interruptions in a lab result in manual pipetting errors which lead to failed reactions and costly repeats of reaction failure. Every investigator or technician must devise methods and tricks to keep track of multi-well plate reagent deposits while juggling important or trivial interruptions to concentration. The Stovall Well Mark® helps to remedy these problems, and at a very affordable price.

WELL MARK®

The Well Mark Solution

The Well Mark is a simple, effective device designed to reduce pipette dispense errors and cross contamination during manual delivery of assay reagents to 96 and 384 well plates. The Well Mark name is a play upon the function of a Book Mark which registers progress and place when reading a book. In a similar manner, the Well Mark registers the progress and current position in delivery of reagents to a complete column or single well in 96 or 384 well plates. At beta site labs, commercial and academic, errors were reduced by 26% and 32% respectively within a two week period.

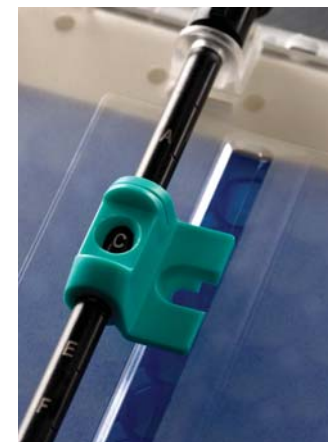
HTS Corrections

Researchers performing High Throughput Screening (HTS) experiments often need to focus on one or more samples following an initial screen. Accurately locating wells of interest within a 96 and 384-well format can be challenging. For this task, the use of robotics is costly and manual pipetting will often yield errors. The Well Mark provides an efficient, low cost means of isolating samples and offers complete accuracy without fear of cross-contamination.

Plate Variations & The Sloped Entrance to the Open Slot of the Protective Cover

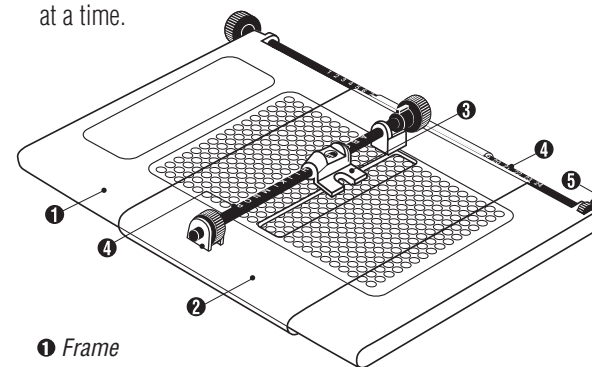
Multi-well plates vary by vendor and the only consistent measurement is the interval center to center, between wells. The Well Mark can accommodate most plate variations through small, user adjustments to the device. The Well Mark has a sloped entrance to the column slot for easier single or multi-channel pipette access and for accommodating raised features of some multi-well plates.

Opaque plates, as well as clear and tinted plates, work equally well with the Well Mark.



Well Mark Construction

The Well Mark consists of a windowed frame which locks any skirted or unskirted wellplate in place; a moving, protective shield with an open slot revealing one column of wells at a time; and a single-well isolator with protective skirt which moves down a column one well at a time.



- 1 Frame
- 2 Protective, slotted shield
- 3 Single-well isolator
- 4 Index bars
- 5 Thumb wheel
- Sliding lock bar under the frame (not shown)

Alignment for 96 or 384 Well Plates

To change spacing from 96 to 384 well plates or the reverse, simply turn the textured thumb wheel counter clockwise until the index bar is released from its encasement, then turn the whole bar 180° to change the detents for the desired well spacing. Reseat the index bar by turning the thumb wheel in the opposite direction.

When a plate is locked in place in the frame, the operator registers the open slot of the sliding cover with the first column of wells. Refinement of that registration is accomplished by moving the thumb wheel in one direction or the other. This registration for one type of plate is maintained until a different type of plate is used, perhaps requiring new registration.

Cleaning, Disinfection of the Well Mark

The Well Mark is made of Topas 8007, HDPE, and stainless steel which are resistant to chemicals such as 70% alcohol or dilute bleach solution. Additionally, there are several products in the form of sprays or wipes which can eliminate lingering reagents or samples on the Well Mark.

The Well Mark cannot be autoclaved.

Dispensing progression of columns with multichannel pipette



The protective, slotted cover is moved by the operator from one column of wells to the next while the other hand dispenses reagent from a multi channel pipette. The protective slotted cover shields adjacent columns of wells from accidental contamination and registers the current dispensing position.

The long, stainless steel index bar on one side of the Well Mark has two sets of detents – one for 96 well plates, the second for 384 well plates – into which an encapsulated spring clip catches to align the slotted window with succeeding columns of wells

Dispensing progression of wells within a column with single channel pipette



A similar set of detents on the shorter index bar provides the same alignment for the single-well isolator as the operator moves it down the column from well to well.

The black oxide bars display letters and numbers to index 96 and 384 well plates.

The Ergonomic Easel

This small, hinged, accessory easel holds the plate and Well Mark at an angle advantageous for easier deposit of assay reagents. Removable and cleanable, non-skid mats secure plate and Well Mark in place as the operator advances the slotted, protective cover from column to succeeding column of wells. The easel can be set at three different angles to accommodate the preference of the operator.

Two non-skid mats, one white and one black, are included for use. The black mat makes the wells more visible for clear plates; the white mat works well for tinted plates. Either mat can be used with opaque plates.



Laser Etched Index Shafts

The laser etched index shafts clearly indicate the current dispense position for 96 or 384 well plates.

Telephone 800-852-0102 or visit our Website at: slscience.com

SPECIFICATIONS

See price list for pricing

The Well Mark

Size: 5" x 7" x 3/4"

Weight: 8 OZ.

Material: Topas, 8007, HDPE, stainless steel

Catalog #: WMKAA0001

The Ergonomic Easel

Size: 5 1/2" X 7 1/2" X 1"

Weight: 12 OZ.

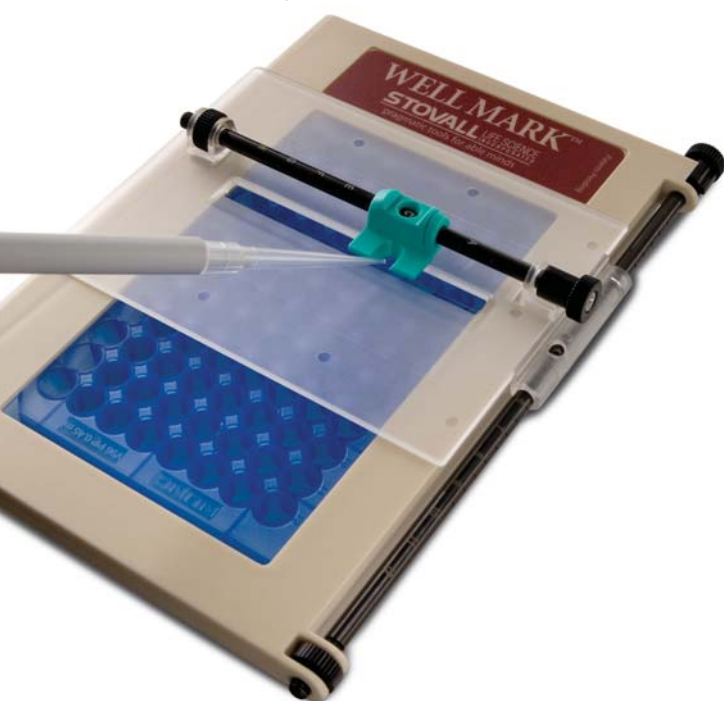
Material: Acrylic

Catalog #: WMKAA0002

Easel/Well Mark Economy Package

Catalog #: WMKAA0003

Patents Pending



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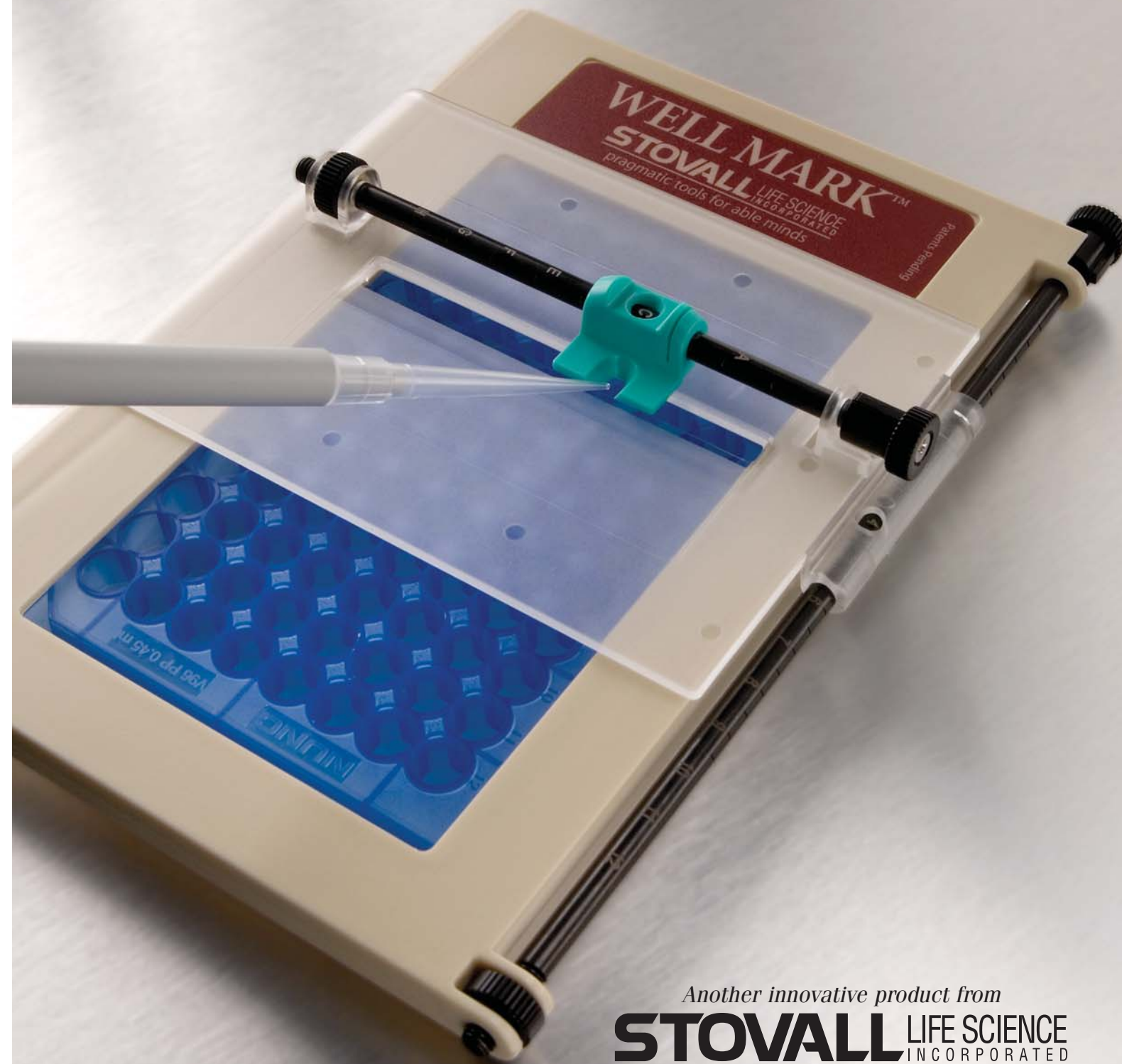
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WELL MARK®

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Pragmatic tools for able minds™