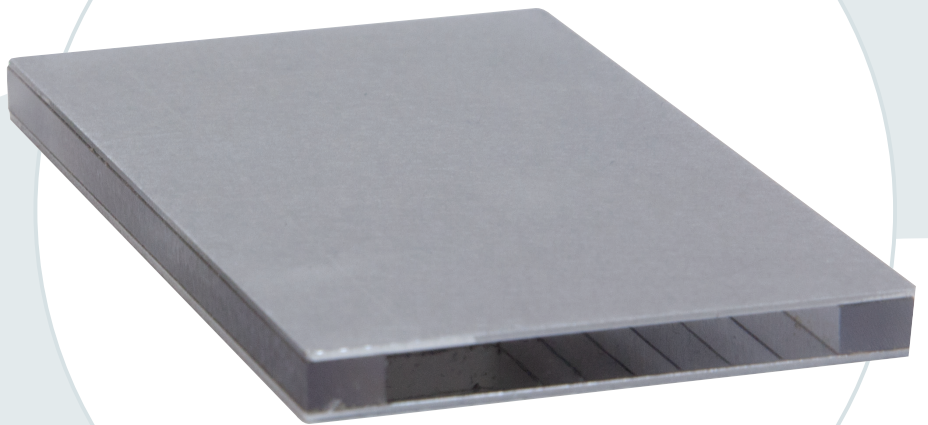


Flatpack Chambers

USER'S MANUAL



BTX[®]

a division of **Harvard Bioscience, Inc.**

00-900036-01-Rev 1.0

INTRODUCTION

Three Flatpack Chamber models are available. Large volume 10 ml Flatpack Chambers (Item 47-0206) have a gap size of 4 mm and are recommended for use with mammalian cells. Large volume Flatpack Chambers are constructed using a three-ply sandwich construction of brushed aluminum plate electrodes and a polycarbonate plastic spacer. 1.5 ml Flatpack Chambers (Item 45-0109, Model 485) have a gap size of 1.83 mm and can be used for electroporation of mammalian and plant cells and bacteria, such as *E. coli*. 85 µl Flatpack Chambers (Item 45-0110, Model 486) have a gap of 0.56 mm, are recommended for bacteria and other microorganisms, and are capable of generating field strengths in excess of 40 kV/cm. Flatpack Chambers 45-0109, 1.5 ml and 45-0110, 85 µl are constructed using a three-ply sandwich construction of aluminum plate electrodes and mylar plastic spacers.

Flatpack Chambers are gamma sterilized in individual packages. 10 ml Flatpack Chambers are sold in sets of 10, and 1.5 ml and 85 µl flatpack chambers are sold in sets of 50. These Flatpack Chambers are used with BTX Safety Stands and BTX generator systems listed below.

INTENDED USE

The BTX Flatpack Chambers are intended for use with the BTX Safety Stand and the generators listed on page 4. This document provides the information necessary for using the Flatpack Chambers with the BTX Electroporation Systems. These instructions are supplemental to the instrument operating manual. Refer to the respective instrument manual prior to using the Flatpack Chambers.

ELECTRICAL FIELD STRENGTH

Field strength is measured as the voltage delivered across an electrode gap. It is influenced by three main factors voltage or amplitude of the applied pulse, the gap between two electrodes, and the resistance of the electroporation chamber. The chamber resistance in turn is determined by the chamber geometry and the specific conductivity of the medium. Additives in the ionic media can lead to a reduced field strength in the chamber. BTXpress Cytoporation Low Conductivity Medium T is recommended for the electroporation of mammalian cells.

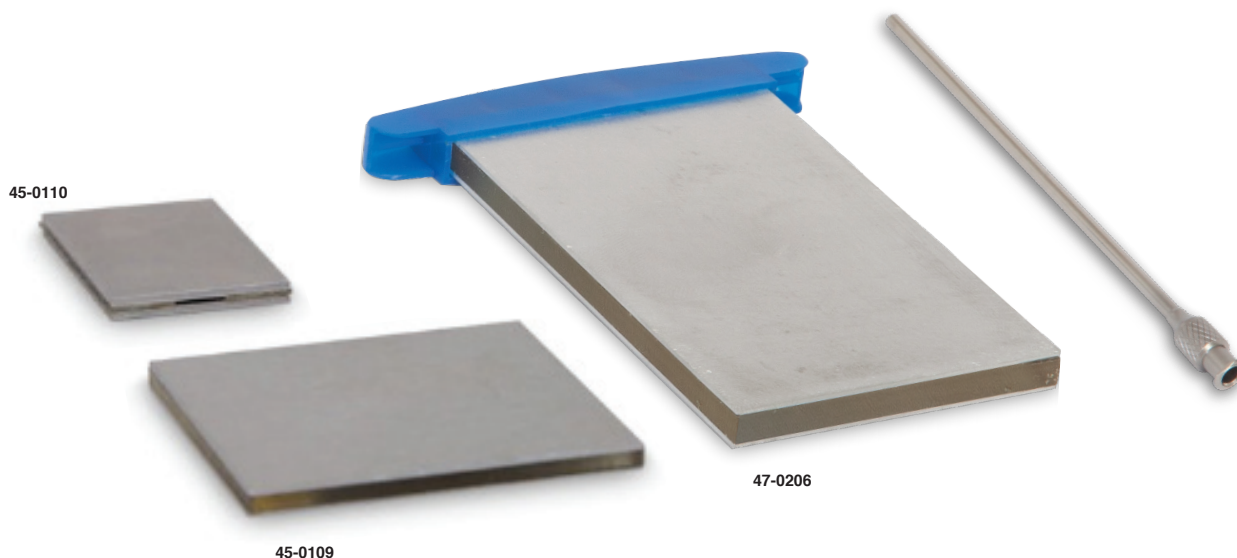
LIMITATIONS

Each Flatpack Chamber should be filled to the recommended fill volume indicated to ensure the proper voltage is applied to the cell suspension. If a lesser amount is used, the medium may boil at high field strengths, thereby damaging cells. Arcing between electrodes can occur at high amplitude settings if the chambers are only partially filled.

IMPORTANT: Read all Instructions, Warnings and Precautions prior to use.

FOR RESEARCH PURPOSES ONLY

Item #	Description
45-0109 (Model 485)	50 Disposable flatpacks, 1.83 mm gap, 1.5 ml
45-0110 (Model 486)	50 Disposable flatpacks, 0.56 mm gap, 85 µl
47-0206	10 Disposable flatpacks and lids, with metal syringe filling tip 4 mm gap, 10 ml



GENERAL INFORMATION

Warranty

BTX/Harvard Apparatus warranties this BTX Flatpack Chambers for a period of 90 days from date of purchase. At its option, BTX/Harvard Apparatus will repair or replace the item if it is found to be defective as to workmanship or material. This warranty does not extend to damage resulting from misuse, neglect, or abuse, normal wear and tear, or accident. This warranty extends only to the original customer purchase.

IN NO EVENT SHALL HARVARD APPARATUS BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES. Some states do not allow exclusion or limitation of incidental or consequential damages so the above limitation or exclusion may not apply to you. THERE ARE NO IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE, OR OF ANY OTHER NATURE. Some states do not allow this limitation on an implied warranty, so the above limitation may not apply to you. If a defect arises within the 90 day warranty period, promptly contact: BTX/Harvard Apparatus, 84 October Hill Road, Holliston, Massachusetts 01746-1388 using our toll free number 1-800-272-2775 (Outside the U.S. call 1-508-893-8999). Goods will not be accepted for return unless an RMA (Return Materials Authorization) number has been issued by our customer service department. The customer is responsible for shipping charges. Please allow a reasonable period of time for completion of repairs or replacement and return. If the unit is replaced, the replacement unit is covered only for the remainder of the original warranty period dating from the purchase of the original device. This warranty gives you specific rights, and you may also have other rights which vary from state to state.

Note: BTX electrodes are not recommended for use with power supplies or cables from other manufacturers. Such use is completely at the customer's own risk as it may result in damage, create unsafe conditions and will immediately void the 90 day warranty.

IMPORTANT: Read all Instructions, Warnings and Precautions prior to use.

Technical & Customer Service

BTX® is the ultimate resource for technical information on the use of high voltage bacterial transformation and general electroporation of molecules and drugs into cells. We constantly track and monitor scientific publications in this area. Our Technical Service group extracts and enters pertinent information, such as results and parameters from these papers into a Protocol database. This database is available via the BTX website. Please visit www.btxonline.com. For technical assistance, additional information or an inquiry/request for repair service, contact BTX/Harvard Bioscience Technical Support/Customer Service Group at:

BTX®

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Holliston, MA 01746-1388 U.S.A.

Toll Free: 1-800-272-2775 (U.S. only)

Phone: 1-508-893-8999

Fax: 1-508-429-5732

E-mail: support@hbiosci.com

Website: www.btxonline.com (click on customer service)

GENERAL SAFETY INFORMATION

Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it. To avoid potential hazard, use this product only as specified. Only qualified BTX personnel should perform service procedures.

To Prevent Hazard or Injury:

ARCING CAN OCCUR AT HIGH VOLTAGES

An unfavorable combination of parameters such as high voltage settings and a small sample volume with a highly conductive medium might lead to flashover between the electrodes (ARC) and/or explosive evaporation of the medium. Reduce voltage or pulse length to avoid repeating this condition.

DO NOT OPERATE WITH SUSPECTED FAILURES

If you suspect there is damage to the product, have it inspected by qualified BTX service personnel.

DO NOT CONTACT ELECTRODES

To avoid fire or shock hazard, observe all ratings and markings on the product or in this manual before using the device.

AVOID EXPOSURE TO CONTACT

Do not insert fingers or try to remove electrode or sample during pulsing sequence.

WEAR PROPER EYE PROTECTION DURING ELECTROPORATION

DO NOT OPERATE IN AN EXPLOSIVE ENVIRONMENT

DO NOT OPERATE IN WET/DAMP CONDITIONS

Safety Terms and Symbols:

Terms that appear in this manual:



WARNING. Warning statements identify conditions or practices that could result in injury or loss of life.



CAUTION. Caution statements identify conditions or practices that could result in damage to these products or other property.

If outside the United States and Canada: call 1-508-893-8999 or contact your nearest BTX Distributor. A complete list of distributors is on our website.

OPERATION: GETTING STARTED



WARNING HIGH VOLTAGE

Make sure the BTX pulse generator is switched off before continuing.

1. Attach the safety stand cables to the output on the rear or the front panel of the generator depending on the BTX generator being used.
2. Using aseptic techniques, pipet the correct volume of cell suspension and reagents into the chamber. For 10 ml Flatpack chambers, a sterile metal filling tip is provided, which is compatible with sterile 10 ml syringes. Alternatively, a sterile plastic transfer pipette may be used. Fill the chamber from the bottom-up to avoid bubbles and prevent cell suspension splashing on the sides of the chamber.
3. Open the safety stand shield and place the chamber in between the metal contacts in an upright position. Adjust the distance between the contacts and the chamber using the black roller, so that the chamber has good contact (Note: the adjustment will remain the same after the first time, simply insert the chamber between the contacts and remove after electroporation. Check chamber contact periodically to ensure good current flow). Close the shield.
4. Switch on the BTX pulse generator. Check that all instrument settings and connections are correct. Deliver the electroporation pulse by pressing the appropriate START or PULSE button depending on the BTX Generator being used.
5. After the pulse is delivered, remove the chamber from the safety stand. Treat the pulsed cells according to the protocol.
6. Discard the flatpack chamber in a typical biohazard container. Refer to your local waste management organization for proper disposal practices.

Flatpack Chambers Electrical & Technical Specifications

Voltage Range 0 - 3000 V DC

0 - 250 VAC

Electrical Field type: Homogeneous

Operating Temperature: 5° - 40° C

Intended Use: Indoor Use

Relative Humidity: 20-80%

Generators: ECM® 630, 830, 2001+, Gemini X2, and AgilePulse MAX.

Monitoring: Enhancer 3000 recommended

Physical Characteristics			
Flatpack Item Number	45-0110	45-0109	47-0206
Height	1.20 in	1.50 in	3.25 in
Width	0.75 in	1.50 in	2.00 in
Gap Distance	0.56 mm	1.83 mm	0.158 in (4 mm)
Electrode Material	Aluminum	Aluminum	Aluminum
Recommended Fill Volume	85 µl	1.5 ml	1 to 10 ml

Product Compatibility			
Flatpack Item #	45-0110	45-0109	47-0206
Compatible Safety Stands	45-0207, 47-0208, 47-0209	45-0207, 47-0208, 47-0209	47-0208, 47-0209
Suggested BTX Generators	ECM 630, Gemini X2	ECM 630, ECM 830, Gemini X2, ECM 2001+, AgilePulse MAX	ECM 830, Gemini X2, ECM 2001+, AgilePulse MAX

Ordering Information	
Item #	Description
45-0109	(Model 485) 50 Disposable flatpacks, 1.83 mm gap
45-0110	(Model 486) 50 Disposable flatpacks, 0.56 mm gap
47-0206	10 Disposable flatpacks and lids, with metal syringe filling tip 4 mm gap
45-0207	Safety Stand, Adjustable Gap
47-0208	Safety Stand for Flatpack
47-0209	AgilePulse MAX Safety Stand for Flatpack
45-0059	Enhancer 3000SC Monitoring System
47-0002	BTXpress Cytoporation Low Conductivity Medium T