Gel Caster

Models JGC-3, JGC-2, and JGC-4

Operating and Maintenance Manual 7217692 Rev. 0

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Owl
Separation Systems

MANUAL NUMBER 7217692

REV	ECR/ECN	DATE	DESCRIPTION	By
0	--	5/7/12	Transfer to Marietta (was The Joey 11/2003)	ccs

Important Read this instruction manual. Failure to read, understand and follow the instructions in this manual may result in damage to the unit, injury to operating personnel, and poor equipment performance. ▲

Caution All internal adjustments and maintenance must be performed by qualified service personnel. ▲

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Statement of Proper Use: Use this product only for its intended purpose as described in this manual. Do not use this product if the power leads are damaged or if any of its surfaces are cracked.

Important operating and/or maintenance instructions. Read the accompanying text carefully.

Potential electrical hazards. Only qualified persons should perform procedures associated with this symbol.

Equipment being maintained or serviced must be turned off and locked off to prevent possible injury.

Hot surface(s) present which may cause burns to unprotected skin, or to materials which may be damaged by elevated temperatures.

Marking of electrical and electronic equipment, which applies to electrical and electronic equipment falling under the Directive 2002/96/EC (WEEE) and the equipment that has been put on the market after 13 August 2005.

This product is required to comply with the European Union's Waste Electrical & Electronic Equipment (WEEE) Directive 2002/96/EC. It is marked with the WEEE symbol. Thermo Fisher Scientific has contracted with one or more recycling/disposal companies in each EU Member State European Country, and this product should be disposed of or recycled through them. Further information on Thermo Fisher Scientific's compliance with this directive, the recyclers in your country and information on these products will be available at www.thermofisher.com.

- ✔ Always use the proper protective equipment (clothing, gloves, goggles, etc.)
- ✔ Always dissipate extreme cold or heat and wear protective clothing.
- ✔ Always follow good hygiene practices.
- ✔ Each individual is responsible for his or her own safety.

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When more extensive service is necessary, we will assist you with direct factory trained technicians or a qualified service organization for on-the-spot repair. If your service need is covered by the warranty, we will arrange for the unit to be repaired at our expense and to your satisfaction.

Regardless of your needs, our professional telephone technicians are available to assist you Monday through Friday from 8:00 a.m. to 6:00 p.m. Eastern Time. Please contact us by telephone or fax. If you wish to write, our mailing address is:

Thermo Fisher Scientific
401 Millcreek Road, Box 649
Marietta, OH 45750

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Table of Contents

Section 1 General Information

This patented Gel Casting System is a unique method to cast 1 to 4 polyacrylamide gels without taping or special sealing of the gel plates. Plastic pouches hold glass plates and spacers snugly together in the casting stand. These pouches serve as the bottom spacer and a containment system for any excess polyacrylamide. Gels may be cast ahead of time and sealed inside the plastic pouch, creating your own pre-cast gels.

Before starting, unpack the unit and inventory your order. Reference the order or catalog number on your invoice and check the corresponding parts list (Table 1-1). If any parts are missing, refer to the service page of this manual and contact Technical Services.

Table 1-1. Parts List

Description	JGC-4	Qty.	JGC-2	Qty.	JGC-3	Qty.
Casting Stand	--	1	--	1	--	1
Blocking Plate	JGC4-006	1	JGC2-003	1	JGC3-003	1
Gel Pouches	GP4-25	25	GP2-25	25	GP3-25	25
Spacer Placer	R10559	1	R10359	1	R10360	1
Thumbscrew	R10013	4	R10013	4	R10013	4
Bubble Level	R10416	1	R10416	1	R10416	1
Leveling Screw	R10014	2	R10014	2	R10014	2

Table 1-2. Specifications

Unit/Model Number	JGC-4	JGC-2	JGC-3
Gel size	10cmW x 10cmL 10cmW x 8cmL	16cmW x 14cmL 16cmW x 16cmL	20cmW x 20cmL
Footprint (cm) W x D	13 x 13	17 x 18	17 x 23
Glass Size (cm) W x L	10cmW x 10cmL 10cmW x 8cmL	16cmW x 14cmL 16cmW x 16cmL	20cmW x 20cmL
Approximate Gel Volume	6ml	15ml	28ml
Compatible with Unit	P8DS, P81, P82	P9DS	P10DS

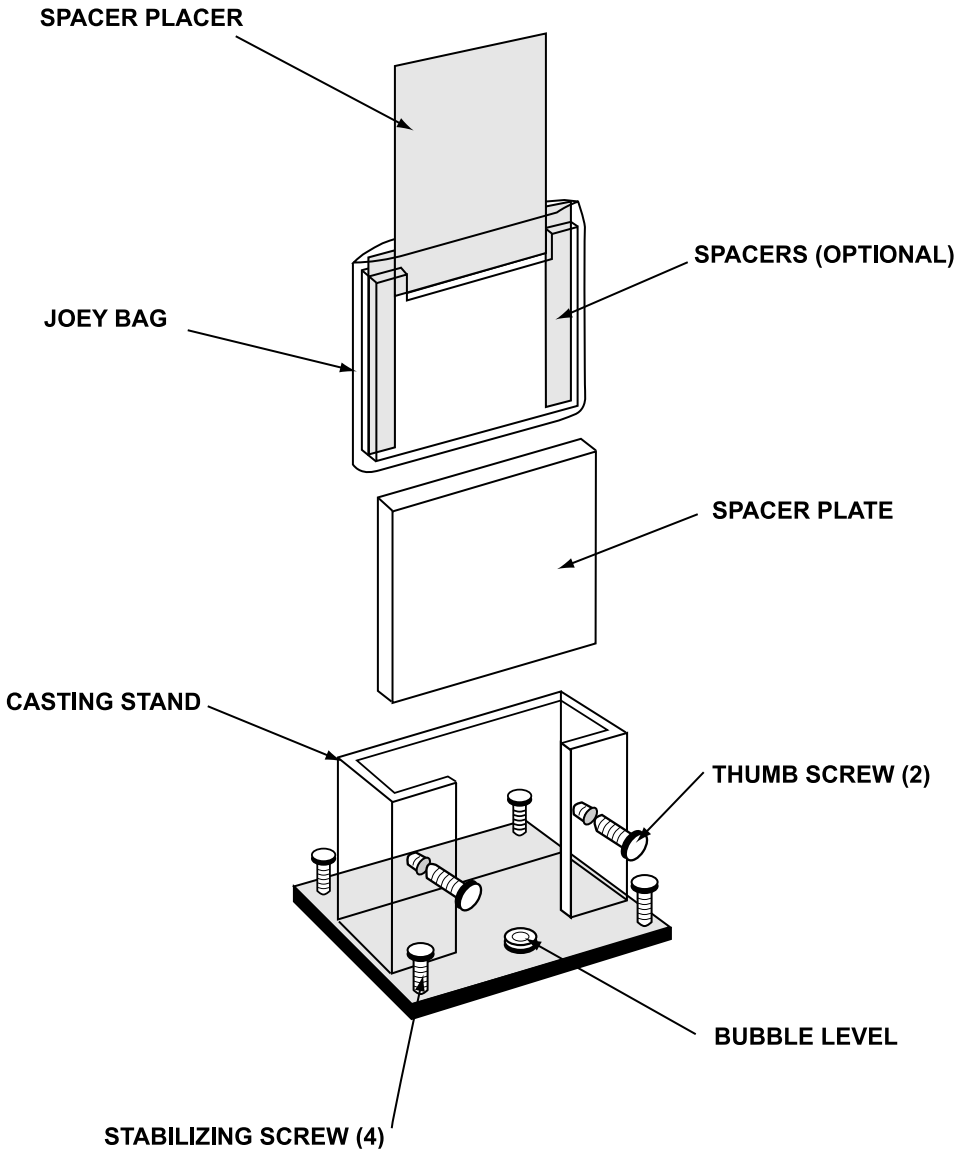


Figure 1-1. Exploded Parts Diagram

Section 2 Setting Up

Gel Casting

The JGC Gel Caster is not designed to seal off the bottom of the gel, rather restrict where the gel solution can go. The gel solution is forced to occupy only the space between the glass plates. There is some room in the pouch which will also fill with gel solution. Liquid will come out from between the plates, but the bag restricts where it can go.

The bottom of the pouch (plastic bag) willl form a "v" of gel that will exclude air from between the plates. On the side of the cassette, there will be a worm of gel formed that you can pull or rinse off. It is a good idea to rinse the gel cassette, clean glass creates a better seal against the gasket of the running device.

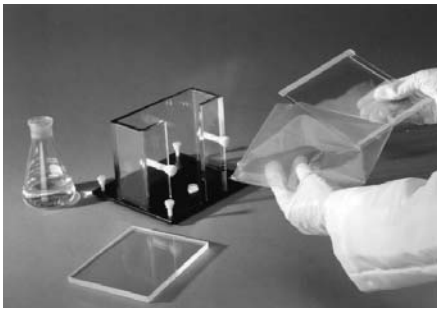


Figure 2-1. Inserting into Pouch

1. Open pouch and insert one blank plate and a spacer placer.
2. Add one notched plate on top of the spacer placer so that the spacer placer is between the two plates.
3. Insert a spacer, one on each side of the spacer placer. Repeat Steps 1-3 for a second gel cassette. One or two cassettes will fit into a single pouch.
4. Press the spacers in toward the center of the spacer placer.
5. Let the bag and its contents rest on the lab bench while lightly holding the bag by the sides. This will let the spacers and both pieces of glass align their bottoms together.
6. Place the bag up against the back of the unit.
7. Place the blocking plate in front of the bag.
8. Tighten the screws using moderate tension. This is to prevent the liquid in the bag from bulging.

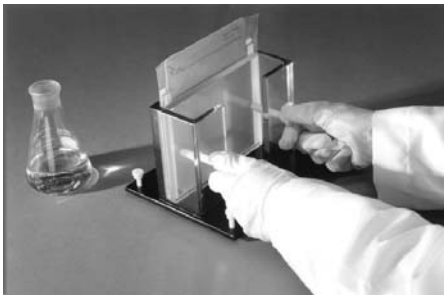


Figure 2-2. Secure with Screws

Gel Casting (continued)

9. Use the two front screws on the base of the unit to level the casting stand.

10. Pour. Liquid can be pipetted in or poured in (Figure 2-3).

Figure 2-3. Pour Slowly

11. Overlay the gel with water or water saturated isobutanol as usual, and allow to polymerize.

12. The pouch can now be heat-sealed for later use. Just rinse off the isobutanol and replace with buffer.

13. If required, the stacking gel can be poured in or out of the bag. If the comb fits the casette tightly, it may be better to pour this gel while the gel is clamped to the running device. This mitigates the possibility of separating the plates from the gel.

14. Remove the gel from the pouch. Squeeze from the bottom if there is a tight fit.

15. Rinse the cassette with water. Add from buffer to the wells if present.

Section 3 Technical Tips

Combs

STANDARD

0.5mm(A), 0.8mm (C) and 1.5mm (D) thicknesses

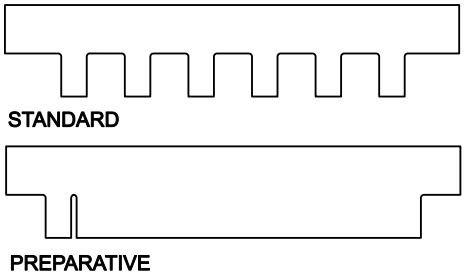


Figure 3-1. Combs

PREPARATIVE

One long well and one marker lane

CUSTOM COMBS

Call Technical Services for more information.

Spacers

STANDARD

Protein spacer sets include two side spacers and one bottom spacer. Spacers and combs must be of identical thickness to be used together.

WEDGE

Linear wedge spacers (0.4 - 0.8mm) provide a current gradient allowing a single percent gel to separate disparate sized DNA fragments.

Reagent Information

Gel Preparation (SDS-PAGE Continuous Buffer System)

	% Polyacrylamide*				
Stock Solution	20.0	15.0	12.5	10.0	5.0
Acrylamide-Bisacrylamide (30:0.8)	20.0	15.0	12.5	10.0	5.0
0.5 M Sodium Phosphate Buffer pH 7.2	6.0	6.0	6.0	6.0	6.0
10% (w/v) SDS	0.3	0.3	0.3	0.3	0.3
Water	2.2	7.2	9.7	12.2	17.2
1.5% (w/v) APS	1.5	1.5	1.5	1.5	1.5
TEMED	0.015	0.015	0.015	0.015	0.015

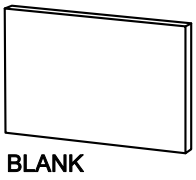
Electrophoresis buffer: 0.1 M sodium phosphate pH 7.2, 0.1% (w/v) SDS.

* The columns represent volumes (ml) of stock solutions required to prepare 30ml of gel mixture.

Glass

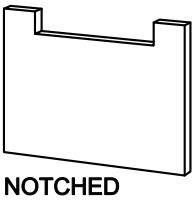
BLANK

The plate which faces you during electrophoresis. All gel sandwiches require one piece of blank glass.



NOTCHED

The plate which faces the chamber during electrophoresis. Spacers are placed over the "ears" of the plate when casting vertical gels. Buffer accesses the gel between the ears.



OFFSET

Offset plates may be used in place of notched plates. They require sponge tips mounted on the spacers. Sponge tips take the place of the "ears", and prevent buffer from running out of the upper buffer chamber from the sides.

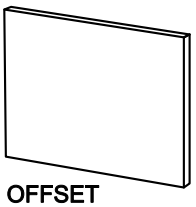


Figure 3-2. Glass

FROSTED

Frosted plates are used for vertical agarose electrophoresis. One side of the plate has a rough surface to prevent agarose from sliding down.

Offset vs. Notched Glass

All units require a blank piece of glass and an offset or notched piece of glass. Offset glass is glass that is about 2cm shorter than the blank piece without "ears" on the sides. Notched glass has two "ears" that are left behind when a cut is made in the middle of the top of the glass. Both offset glass and notched glass allow the gel and samples to make contact with the upper buffer chamber. Offset glass has to be used with sponge tips, which take the place of the notches on the glass. The advantage of offset glass is that this glass is more rigid. Notched glass is easier to use and does not require the addition of sponge tips.

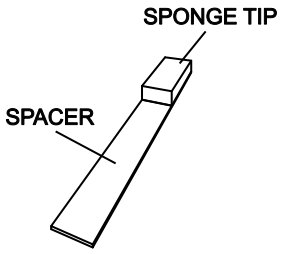


Figure 3-3. Spacer

Section 4 Troubleshooting

PROBLEM	SOLUTION
polyacrylamide is leaking from between glass plates when pouring	Be sure the acrylic blocking plate is placed in front of the glass and bag assemblies before tightening the bags into the casting stand. This spacer plate provides even pressure across the entire glass plate. Also, be sure the spacers and glass plates are pushed firmly to the bottom of the casting stand.
Gels are not level	Use the leveling screws on the base of the casting stand to level the caster.
Bag is leaking	Replace glass in new bag and re-pour gel. Check bags with the gel in place with water. Some bags may have small holes and or the glass can create small cuts.
Spacers won't line up	Use a spacer placer to align the spacers. See Step 2 in Section 2.
Excess polymerized polyacrylamide cassette(s) from the bag	This is normal, the bead of gel will exclude air bubbles from being trapped between the glass plates.
Gels stick together inside of bag.	Excess polyacrylamide may polymerize between plates. Using a razor blade and gently placing between each of the gel assemblies will loosen the acrylamide. Gently apply pressure to separate the gel assemblies and wash glass of any excess poly-acryamide. Or use one gel per pouch.

Section 5 Care and Cleaning

Caution Organic solvents cause acrylic to "craze" or crack. Clean all acrylic systems with warm water and a mild detergent. Do not use ethanol or other organic solvents to clean acrylic products. Do not autoclave, bake, or microwave your unit. Temperatures over 50°C can damage the acrylic. ▲

Note If an RNase free electrophoresis system is desired, there are various methods to rid the system of RNA contamination. For fast and easy decontamination, use RNase AWAY®*. Spray, wipe or soak labware with RNase Away then wipe or rinse the surface clean; it instantly eliminates RNase. RNase Away eliminates the old methods that include treatment with 0.1% Diethyl Pyrocarbonate (DEPC) treated water and soaking in dilute bleach. DEPC is suspected to be a carcinogen and should be handled with care. This electrophoresis system should never be autoclaved, baked, or placed in a microwave. ▲

To order RNase AWAY®, contact Technical Services:

Part Number

7000 250ml bottle

7002 475ml spray bottle

7003 1 liter bottle

7005 4 liter bottle

**Rnase AWAY® is a registered trademark of Molecular BioProducts.*

Care of Acrylic

The following chemical compatibility chart is supplied for the convenience of our customers. Although acrylic is compatible with most solvents and solutions found in the biochemical laboratory, some solvents can cause substantial damage. Keep this chart handy to avoid harm to your apparatus by the use of an inappropriate solvent.

Codes:

S - Safe (no effect, except possibly some staining)

A - Attacked (slight attack by, or absorption of, the liquid)
(Slight crazing or swelling, but acrylic has retained most of its strength)

U - Unsatisfactory (softened, swollen, slowly dissolved)

D - Dissolved (in seven days, or less)

Table 5-1. Chemical Compatibility for Acrylic-Based Products

Chemical	Code	Chemical	Code	Chemical	Code
Acetic acid (5%)	S	Ethyl alcohol (50%)	A	Naptha	S
Acetic acid (Glacial)	D	Ethyl alcohol (95%)	U	Nitric acid (10%)	S
Acetic Anhydride	A	Ethylene dichloride	D	Nitric acid (40%)	A
Acetone	D	Ethylene glycol	S	Nitric acid concentrate	U
Ammonia	S	2-Ethylhexyl Sebacate	S	Oleic acid	S
Ammonium Chloride (saturated)	S	Formaldehyde (40%)	S	Olive oil	S
Ammonium Hydroxide (10%)	S	Gasoline, regular, leaded	S	Phenol 5% solution	U
Hydroxide (10%)	S	Glycerine Heptane (commercial grade)	S	Soap solution (Ivory)	S
Ammonium Hydroxide concentrate	S	Hexane	S	Sodium carbonate (2%)	S
Aniline	D	Hydrochloric acid (10%)	S	Sodium carbonate (20%)	S
Benzene	D	Hydrochloric acid concentrate	S	Sodium chloride (10%)	S
Butyl Acetate	D	Hydro uoric acid (40%)	U	Sodium hydroxide (1%)	S
Calcium chloride (saturated)	S	Hydrogen peroxide (3% solution)	S	Sodium hydroxide (10%)	S
Carbon tetrachloride	U	Hydrogen peroxide (28% solution)	U	Sodium hydroxide (60%)	S
Chloroform	D	Isooctane	S	Sodium hydrochlorite (5%)	S
Chromic acid (40%)	U	Isopropyl alcohol (100%)	A	Sulfuric acid (3%)	S
Citric acid (10%)	S	Kerosene (no. 2 fuel oil)	S	Sulfuric acid (30%)	S
Cottonseed oil (edible)	S	Lacquer thinner	D	Sulfuric acid concentrate	U
Detergent Solution (Heavy Duty)	S	Methyl alcohol (50%)	A	Toluene	D
Diesel oil	S	Methyl alcohol (100%)	U	Trichloroethylene	D
Diethyl ether	U	Methyl Ethyl Ketone	U	Turpentine	S
Dimethyl formamide	U	Methylene chloride	D	Water (distilled)	S
Dioctyl phthalate	A	Mineral oil (white)	S	Xylene	D
Ethyl acetate	D				

This list does not include all possible chemical incompatibilities and safe compounds. Acrylic products should be cleaned with warm water, a mild detergent such as Alconox™, and can also be exposed to a mild bleach solution (10:1). In addition, RNAse removal products are also safe for acrylic.

Section 6 Optional Equipment

JGC Gel Caster units are sold without accessories to allow for maximum flexibility. All accessories need to be purchased separately. In addition to the stock items listed below, custom glass, spacers and combs can be made for these units. Call Technical Services for details.

Table 6-1. Accessories

Description	JGC-4	JGC-2	JGC-3
Blank Glass Plates 3/32" Thick	P710G, 10cmW x 10cmL	N/A	N/A
Blank Glass Plates 3/16" Thick	N/A	N/A	P2-20G, 20cmW x 20cmL
Blank Glass Plates 1/8" Thick	N/A	P1-14G, 16cmW X 14cmL	P10-20G, 20cmW x 20cmL
Notched Glass Plates 3/32" Thick	P7-10R, 10cmW x 10cmL	N/A	N/A
Notched Glass Plates 3/16" Thick	N/A	N/A	P2-20R, 20cmW x 20cmL
Notched Glass Plates 1/8" Thick	N/A	P1-14R, 16cmW x 14cmL	P10-20R, 20cmW x 20cmL
Frosted Notched Glass Plates 3/32" Thick	P7-10FR, 10cmW x 10cmL	N/A	N/A
Frosted Notched Glass Plates 3/16" Thick	N/A	N/A	P2-20FR, 20cmW x 20cmL
Frosted Notched Glass Plates 1/8" Thick	N/A	P1-14FG, 16cmW x 14cmL	N/A
Frosted Blank Glass Plates 3/32" Thick	P7-10FG, 10cmW x 10cmL	N/A	N/A
Frosted Blank Glass Plates 3/16" Thick	N/A	N/A	P2-20FG, 20cmW x 20cmL
Frosted Blank Glass Plates 1/8" Thick	N/A	P1-14FG, 16cmW x 14cmL	N/A
Offset Glass 3/16" Thick	N/A	N/A	P2-18G, 20cmW x 18cmL
Offset Glass 1/8" Thick	N/A	N/A	P10-18G, 20cmW x 18cmL
Notched Alumina Plates 1.0mm Thick	P7-10RA, 10cmW x 10cmL	N/A	N/A
Spacers, 0.5mm Thick	P7-SA	N/A	N/A
Spacers, 0.8mm Thick	P7-SC	P1-CS	P2-CS
Spacers, 1.5mm Thick	N/A	P1-SD	P2-SD
Spacer Placer (pkg of 3)	JG4-PL	JG2-PL	JG3-PL
Blocking Plate	JGC4-006	JGC2-003	JGC3-003
Gel Pouches (25 pouches)	GP4-25	GP2-25	GP3-25
Gel Pouches (100 per package)	GP4-100	GP2-100	GP3-100
Thumbscrew	R10013	R10013	R10013
Bubble Level	R10416	R10416	R10416

Table 6-3. Combs Options

Model JCG-4					
Catalog Number	**Comb Type**	**Number of Teeth**	**Thickness of Tooth**	**Width of Teeth**	**EST Well Volume (ul)**
MP-6A	Well	6	0.5	11.1	89
MP-6C	Well	6	0.8	11.1	142
MP-6D	Well	6	1.5	11.1	266
MP-8A	Well	8	0.5	7.7	62
MP-8C	Well	8	0.8	7.7	99
MP-8D	Well	8	1.5	7.7	185
MP-10A	Well	10	0.5	5.7	46
MP-10C	Well	10	0.8	5.7	73

Table 6-4. Combs (continued)

Model JCG-2					
Catalog Number	**Comb Type**	**Number of Teeth**	**Thickness of Tooth (mm)**	**Width of Teeth (mm)**	**EST Well Volume (ul)**
P1-10C	Well	10	0.8	10.4	183
P1-10D	Well	10	1.5	10.4	343
P1-15C	Well	15	0.8	6.1	107
P1-15D	Well	15	1.5	6.1	201
P1-20C	Well	20	0.8	3.9	69
P1-20D	Well	20	1.5	3.9	129
P1-24C	Well	24	0.8	2.9	51
P1-24D	Well	24	1.5	2.9	96
P1-PREP	Prep	2	1.5	119.7/4.7	3630/152
XCM	Custom		0.5, 0.8, 1.5, 2.0, 3.0		

Table 6-5. Combs (continued)

Model JCG-3					
Catalog Number	**Comb Type**	**Number of Teeth**	**Thickness of Tooth (mm)**	**Width of Teeth (mm)**	**EST Well Volume (ul)**
P2-10C	Well	10	0.8	13.6	239
P2-10D	Well	10	1.5	13.6	449
P2-15C	Well	15	0.8	8.2	144
P2-15D	Well	15	1.5	8.2	271
P2-20C	Well	20	0.8	5.5	97
P2-20D	Well	20	1.5	5.5	182
P2-25C	Well	25	0.8	3.9	69
P2-25D	Well	25	1.5	3.9	129
P2-PREP	Prep	2	1.5	148.1/4.7	4885/155
XCM	Custom		0.5, 0.8, 1.5, 2.0, 3.0		

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The Warranty Period starts two weeks from the date your equipment is shipped from our facility. This allows shipping time so the warranty will go into effect at approximately the same time your equipment is delivered. The warranty protection extends to any subsequent owner.

During the first thirty-six (36) months, component parts proven to be non-conforming in material or workmanship will be replaced at Thermo's expense, including labor. Installation, calibration and certification is not covered by this warranty agreement. The Technical Services Department must be contacted for warranty determination and direction prior to performance of any repairs. Expendable items, glass, filters and gaskets are excluded from this warranty.

Replacement or repair of component parts or equipment under this warranty shall not extend the warranty to either the equipment or to the component part beyond the original warranty period. The Technical Services Department must give prior approval for return of any component or equipment. At Thermo's option, all non-conforming parts must be returned to Thermo postage paid and replacement parts are shipped FOB destination.

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Rev. 0 9/12

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