

ACE GLASS

Pilot Plant Reactors





Specifications

The products in this catalog represent what we believe to be the most advanced design and construction. However, design improvements are constantly being made, and we reserve the right to modify specifications where we feel that a change is warranted.

Apparatus fabricated in accordance with ASTM, API, AOAC and other technical organization specifications such as USP, NIST, and NIOSH, are subject to modification by these organizations.

All precision-grade ware is warranted to be within the tolerance prescribed in ASTM Specifications. All laboratory-grade ware is twice precision-grade tolerances.

Special Apparatus

Orders or inquiries for special apparatus should be accompanied by prints or drawings, if possible. To prevent delay, and to enable us to more intelligently quote on your specials, all necessary dimensions and tolerances should be noted. **For technical information, design assistance and help please visit www.aceglass.com.**

The following information should also be furnished where applicable: joint sizes, Ace-Thred sizes, capacity, whether "to contain" or "to deliver," porosity of filter, and any abnormal operating conditions, such as extremely high pressure or temperature, to which the apparatus may be subjected.

We reserve the right to overrun or under run by 10% on orders for special items and to ship and invoice for amounts within this variation.

NOTE: Special items are not returnable.

Our research and drafting departments are always available to assist you in designing special apparatus. Your special will be assigned a permanent drawing number for future reference, duplication or change. You will be sent a drawing of your special for your approval/sign off before manufacturing begins.

Types of Glass

All ACE-manufactured glassware items listed in this catalog are, unless otherwise noted, fabricated from 33 expansion borosilicate glass, such as Pyrex® Brand Glass, a product of Corning Incorporated; KG-33 Glass, a product of Kimble Glass Company; Duran Glass, a product of Schott Glaswerke; Simax, a product of Kavalier Glaswork.

Breakage or Loss

In case of **Breakage**:

1. Notify ACE immediately.
2. Please retain all inner and outer cartons and packing material.
3. ACE will advise you whether the carrier will report to your location for inspection or if item(s) are to be returned for inspection.

In case of **Shortage**:

1. Notify ACE immediately.
2. A replacement will be issued upon confirming inventory discrepancy.

In case of **Loss**:

1. First, please verify with all your receiving departments that delivery was not made.
2. Notify ACE immediately.
3. ACE will contact the carrier for tracking information as applicable.
4. A replacement will be issued upon verification that the shipment was not delivered and upon confirmation that the carrier cannot locate shipment.

PLEASE NOTE:

All breakages and shortages must be reported within two weeks of receipt.

Returns and Repairs

Incoming material (returns or repairs) must be pre-approved by our Product Return Specialist. Please follow these steps to ensure our Receiving Department does not refuse your shipment.

1

Contact ACE for an **RA# (Return Authorization Number)**.
1-800-223-4524 (Vineland)
E-mail: returns@aceglass.com

2. Once an RA# is given, properly pack the item(s) in an inner and outer box/carton and write the RA# on the outside of the box. All used items are to be thoroughly cleaned and defined in the assignment of an RA#.
3. A 20% restocking fee will be assessed for returns (items ordered incorrectly or items no longer needed, etc.) unless arranged otherwise. ACE cannot accept responsibility for damage or destruction of glassware that occurs in your shipment to us. We strongly advise you to purchase additional insurance with your carrier.
4. For *Returns* that are the result of your receiving the item(s) broken, ACE cannot accept responsibility for **further** damage or destruction of glassware that occurs in the return shipment due to improper packing.
5. *Repairs* will be evaluated by our technicians. You will be advised if any pieces are beyond repair or cannot be salvaged economically. ACE cannot accept responsibility for further damage or destruction of any glassware that is damaged during return shipment.

PLEASE NOTE:

ACE cannot accept responsibility for material sent in without proper authorization

Order by Code

Each item in this catalog has a two- or three-digit code in addition to the four- or five-digit number. This code appears above or immediately preceding the price of the item, and no other ordering information is needed since each individual size, capacity, etc. has its own code. **Example:** 5000 \$10/30 top \$14/35 bottom would be ordered as 5000-05.

The majority of items listed in this catalog are normally available from stock at our plant in Vineland, NJ.

In the event your entire order cannot be filled immediately, a partial shipment will be sent, with the back-ordered items following shortly. If you should desire the entire order to be sent in one shipment, please so specify on your purchase order.

Unless otherwise specified on the order, we will ship material by what we consider the "best way."

ACE Glassware Discounts

All ACE-manufactured glassware, identified with a spade (♠), listed in this catalog is subject to the following dollar value discounts. Items marked by a star (★) or that have no designation whatsoever are not subject to this discount.

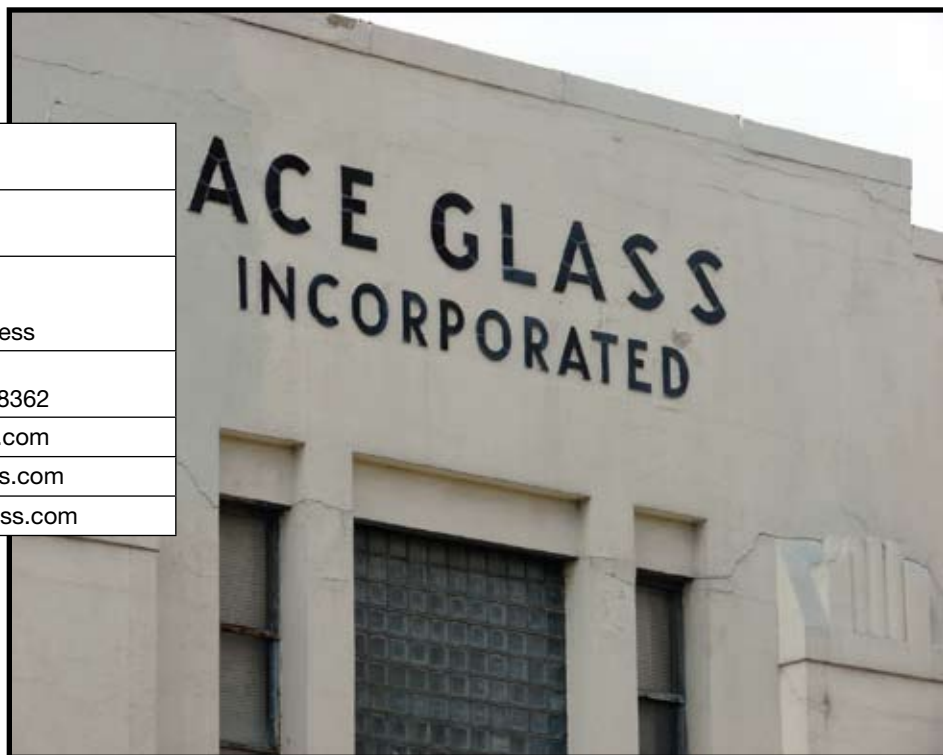
- 10% on purchases of \$500.00 and over
- 12% on purchases of \$1000.00 and over
- 15% on purchases of \$1500.00 and over

Terms: Net 30 days (Domestic only)

Minimum Order: \$25.00

Ways to Order

PHONE	856-692-3333 800-223-4524
FAX	856-692-8919 800-543-6752
CREDIT CARD	VISA MasterCard American Express
MAIL	P.O. Box 688 Vineland, NJ 08362
WEB SITE	www.aceglass.com
E-MAIL	sales@aceglass.com
INTERNATIONAL	export@aceglass.com



INTERNATIONAL SALES

Ways to Order

- Mail:** ACE GLASS Incorporated
International Sales Dept.
1430 N. West Blvd — P.O. Box 688
Vineland, NJ 08360-0688 USA
- Phone:** 856-692-3333
- Fax:** 856-692-8919
- E-mail:** export@aceglass.com

Methods of Payment

- Wire Transfer
- Irrevocable, payable on-sight, and confirmed letter of credit
- Payment in advance by check or money order, in US Funds only
- Credit Card: Amex, Visa, MasterCard, etc.

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ACE Pilot Plant Reactors

ACE cylindrical and spherical pilot plant reactors have been field tested and improved to provide a portable, self-contained reaction system for research and production purposes.

Standard Design Specifications:

- Complete listing of domed as well as flat head Reactor Assemblies.
- Cylindrical, jacketed, and spherical type flasks.
- Various bottom outlet valve versions available.
- Stainless Steel Support Frame with reactor support platform/ring, and stirring motor mount.
- Three-point adjustable top bracing system that provides greater stability of flask and head on four-post stands.
- Large, locking wheels on support frame for easier movement and greater stability.
- Unique design for securing bottom and upper agitators on shaft.
- Digital Temperature Control System for added safety.
- Various stirring motor combinations and types
- Clear Safety Shields for Support Frame available, call or email for details.

LIMITATIONS AND PRECAUTIONS

The strength of glass is primarily determined by its surface condition, thickness, and uniformity. Mechanical stress applied to glass contributes to strain, which results in breakage when the total strain exceeds its allowable limit (i.e., tensile strength). Thus, careful handling and use of glassware are important to avoid scratching and mechanical shock to outside and inside surfaces.

Thermal stress may produce the same result — catastrophic breakage. It is important to avoid rapid or uneven temperature changes across any glass wall. This refers to temperature increases from externally applied heat (mantles) or internally generated heat (exothermic reactions), as well as temperature decreases such as rapidly introducing large quantities of cold liquids to hot reactants, etc. Remember: Mechanical and Thermal Stresses are additive.

MAXIMUM ALLOWABLE TEMPERATURES

The standard reactors have a maximum operating temperature of 160°C. The maximum allowable temperature difference (ΔT) across the glass wall for units with domed head is 80°C; 30°C for flat head.

Also, these values limit the rate at which a reactor may heat up or cool down. ACE recommends continuous monitoring of internal and external temperatures to avoid exceeding allowable temperature differences. Caution must be used when heating a reactor vessel with mantles since they produce local temperatures in excess of 350°C. When using variable voltage controllers, we suggest 3/4 voltage (i.e., half power) during warm-up and gradually increasing voltage until desired internal temperature is reached, never exceeding the maximum ΔT .

MAXIMUM PRESSURE

Maximum pressure for reactors is 5 psi with standard taper joints (domed head) using clips. Flat head NOT recommended for use with pressure.

MAXIMUM VACUUM

Maximum permissible operating vacuum for spherical and cylindrical vessels with 50°C max. ΔT :

10 liter = "Full" Vacuum (i.e., 5 mm Hg)

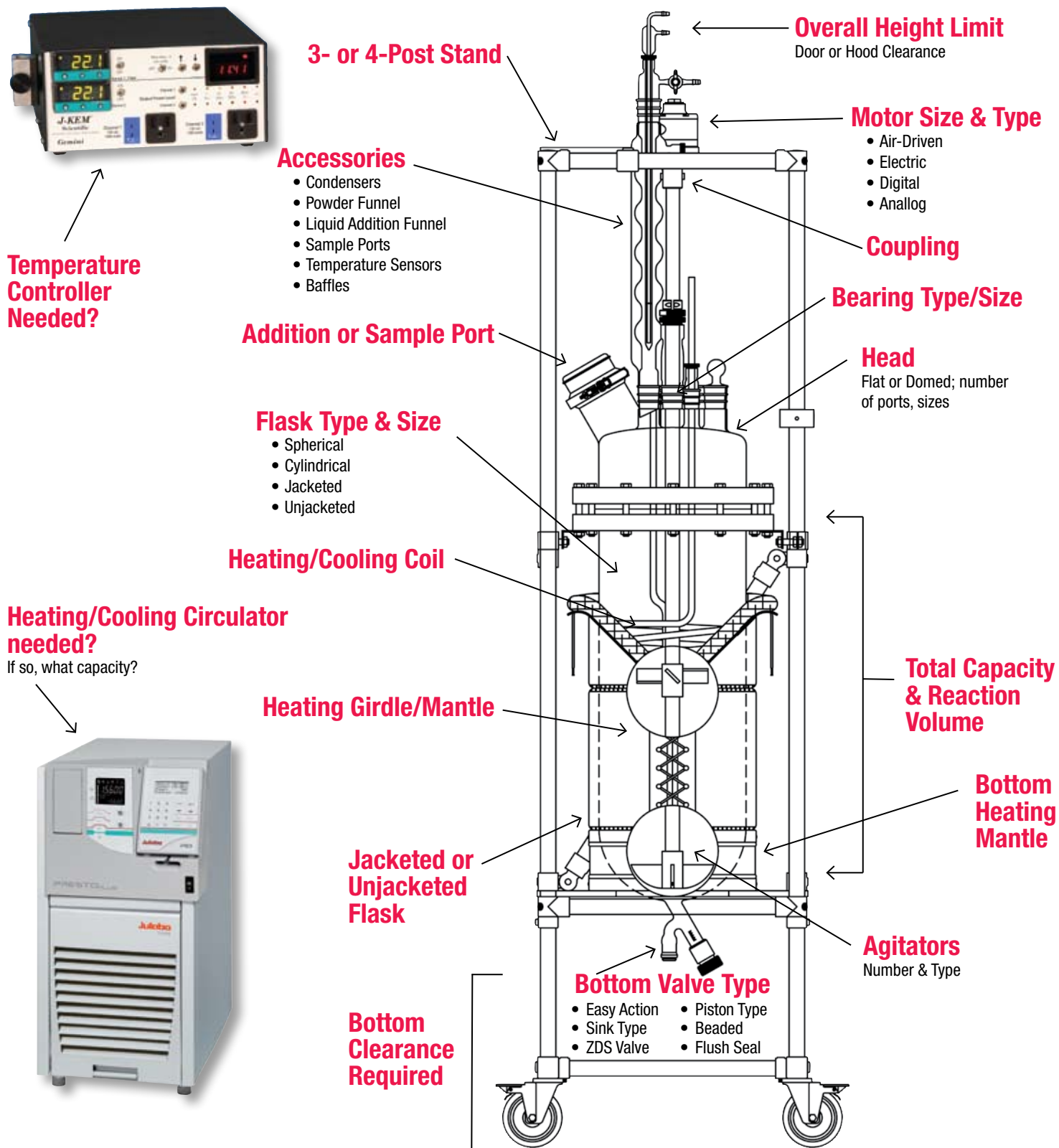
30 & 50 liter Cylindrical
50, 72 & 100 liter Spherical } 50mm Hg

100 & 200 liter Cylindrical
200 liter Spherical } 200mm Hg

Flat head NOT recommended for use under vacuum.

A Guide to Ordering Custom Pilot Plants

It's easy to customize one of our standard listings with a Pilot Plant Reactor design that will meet your specific application needs. Here are some key points to consider when specifying a Pilot Plant that will work for you:





6469

*Flask with Sink Valve
or Zero Dead Space Valve
available upon request.*

- ▶ **Complete 12 & 22 liter**
- ▶ **Elevated mantle support**
- ▶ **Bottom outlet**

6469 REACTION ASSEMBLY *Complete, 12 and 22 Liter*

Complete self-supporting pilot plant assembly. Needs only to be located near electrical outlet. When not in use, entire assembly can be moved, intact, without breakdown.

Features

- Flask with 4 inch (10.2 cm) center opening, two $\frac{1}{4}$ 45/50 side necks, one #7 Ace-Thred thermometer opening and one $\frac{1}{8}$ 28/15 ball joint take-off at bottom.
- Electric stirring motor, Cat. No. 13649-07, is self-standing on flask-mounted motor mount. (Air motor also available.)
- Flat-sided powder funnel offers easier additions.
- With PID Digital readout temperature controller and PFA coated thermoprobe for better temperature control.
- Rugged steel-reinforced PTFE stirring rod needs no lubrication. Turns in a precision Trubore® economy bearing. The PTFE paddle agitator is removable for cleaning.
- Mantle supports raise the mantle about 91.4 cm (36 inches) to allow easy access to bottom of flask.
- Approximate overall height: 12 L and 22 L, 71 inches; Base width: 28 inches

	12 Liter Order Code	22 Liter Order Code
FLASK, Center Neck 10.2cm Flange, Two $\frac{1}{4}$ 45/50 Side Necks, One #7 Ace-Thred and One $\frac{1}{8}$ 28/15 Ball Outlet At Bottom	6469-16 ♠	6469-18 ♠
HEAD, $\frac{1}{4}$ 45/50	6469-26 ♠	6469-26 ♠
GASKET, PTFE	6495-10 ♠	6495-10 ♠
CHUCK, "Flex-Grip"	8124-10 ♠	8124-15 ♠
ROD, PTFE with Stainless Steel Core	8071-07 ♠	8079-03 ★
AGITATOR, PTFE Paddle	8089-08 ♠	8091-10 ♠
MOTOR, only	13649-07 ★	13649-07 ★
MOTOR MOUNT	6469-30 ★	6469-32 ★
MOTOR CONTROLLER, only	13530-10 ★	13530-10 ★
BEARING, Economy, $\frac{1}{4}$ 45/50	8042-121 ♠	8065-64 ♠
CLAMP, Head, Aluminum	6468-13 ★	6468-13 ★
ADAPTER, Stopcock, $\frac{1}{8}$ 28/15, PTFE, 6mm Bore	6469-40 ♠	6469-40 ♠
TEMPERATURE CONTROLLER	12126-24 ★	12126-24 ★
SENSOR, PFA Coated, 12 inch x 1/4 inch	12141-25 ★	12141-25 ★
SENSOR LEAD, only, Type "J"	12141-80 ★	12141-80 ★
FUNNEL, Powder, $\frac{1}{4}$ 45/50	6469-52 ♠	6469-52 ♠
STOPPER, $\frac{1}{4}$ 45/50	8250-20 ♠	8250-20 ♠
CLAMP, $\frac{1}{8}$ 28/15	7666-15 ♠	7666-15 ♠
CLAMP Holder, Regular	11080-19 ★	11080-19 ★
MANTLE, Heating, with Hole	12044-28 ★	12044-30 ★
MANTLE, Support	12097-45 ★	12097-47 ★
COMPLETE	6469-62 ★	6469-67 ★

ACE Reaction Assemblies are available as listed. If you require a design change or just a modification, we'll fabricate to order.

Email, phone or fax for a quotation.

- ▶ **Full range of pilot size flasks**
- ▶ **Rugged, steel-reinforced PTFE stirring rod**
- ▶ **Heavy duty mechanical lab stirrer**

6470 REACTION ASSEMBLY 12 thru 72 Liter

Complete reaction assembly using standard ACE reaction equipment. The 12 thru 72 liter flasks have three $\frac{1}{2}$ 65/40 in-line spherical joints and two $\frac{1}{2}$ 29/42 standard taper joints.

Features

- Full range of pilot-size flasks from 12 liter to 72 liter with spherical and standard taper joints.
- Rugged 19mm diameter, steel-reinforced PTFE stirring rod needs no lubrication. Runs in a precision Trubore® bearing. The PTFE paddle is removable and other interchangeable agitators, available from ACE, may be substituted.
- The 12 liter assembly has a 10mm diameter, steel-reinforced PTFE rod as well as a 10mm bearing, chuck, and paddle. No stuffing box is supplied.
- Highly efficient **6016** condenser attached directly to $\frac{1}{2}$ 65/40 side joint.
- Thermowell depth is completely adjustable via an Ace-Thred adapter.
- Unit as supplied has a heavy-duty mechanical lab stirrer; for situations that call for non-electric motors, ACE can supply a compact air-driven motor and support. Call or email for a quotation.
- Approximate overall height: 12 L and 22L– 59 inches; 50 L and 72L – 63 inches.



6470

	12 Liter		22 Liter		50 Liter		72 Liter
	Order Code		Order Code		Order Code		Order Code
FLASK, Center and Two Side $\frac{1}{2}$ 65/40, Two $\frac{1}{2}$ 29/42	6470-20 ♠		6470-24 ♠		6470-26 ★		6470-28 ★
CONDENSER, Pilot Plant	6016-75 ★		6016-77 ★		6016-79 ★		6016-79 ★
BEARING, $\frac{1}{2}$ 65/40, Water-Cooled	8040-55 ♠		8060-10 ♠		8060-10 ♠		8060-10 ♠
ROD, PTFE with S-S Core	8071-10 ♠		8079-05 ★		8079-10 ★		8079-10 ★
AGITATOR, PTFE, Single Blade	8088-10 ♠		8092-10 ♠		8092-10 ♠		8092-10 ♠
CHUCK, "Flex-Grip"	8124-10 ♠		8124-20 ♠		8124-20 ♠		8124-20 ♠
FUNNEL, Pressure Equalizing, $\frac{1}{2}$ 24/40, 1000 mL	7297-37 ♠		7297-37 ♠		7297-37 ♠		7297-37 ♠
STOPPER, $\frac{1}{2}$ 24/40	8250-12 ♠		8250-12 ♠		8250-12 ♠		8250-12 ♠
ADAPTER, $\frac{1}{2}$ 24/40 - $\frac{1}{2}$ 65/40	5025-24 ♠		5025-24 ♠		5025-24 ♠		5025-24 ♠
ADAPTER, Maxi $\frac{1}{2}$ 29/42	5030-42 ♠		5030-42 ♠		5030-42 ♠		5030-42 ♠
ADAPTER, Midi $\frac{1}{2}$ 29/42	5030-24 ♠		5030-24 ♠		5030-24 ♠		5030-24 ♠
THERMOWELL, 10 mm O.D.	6470-42 ♠		6470-44 ♠		6470-46 ♠		6470-46 ♠
STIRRER MOTOR & CONTROLLER	13649-19 ★		13647-35 ★		13647-35 ★		13647-35 ★
CLAMPS, $\frac{1}{2}$ 65/40 Union Type (3)	7666-30 ♠		7666-30 ♠		7666-30 ♠		7666-30 ♠
HEATING MANTLE, Alum. Housing	12043-27 ★		12043-29 ★		12043-31 ★		12043-33 ★
MANTLE SUPPORT	12097-08 ★		12097-10 ★		12097-12 ★		12097-14 ★
VOLTAGE CONTROLLER (2)	12087-10 ★		12087-10 ★		—		12082-10 ★
VOLTAGE CONTROLLER (3)	—		—		12087-10 ★		—
COMPLETE	6470-60 ★		6470-64 ★		6470-68 ★		6470-72 ★

6472 Cylindrical Pilot Plants

Domed Head Unjacketed

10 & 20 Liter Reactors

With Stainless Steel Support

- ▶ **10 & 20 Liter Flasks with bottom outlet**
- ▶ **Large side port on head for material addition**
- ▶ **Internal heat exchange coil***
- ▶ **Rugged stainless steel support frame on casters for mobility**
- ▶ **Adjustable height flask support**



6472-282



6472-284

*Supplied with PTFE-coated copper tubing; also available in Hastalloy C-276 or 316 stainless steel.

	Order Code	
10-Liter COMPLETE, Unjacketed Flask, with Electric DIGITAL Motor	6465-405	★
10-Liter COMPLETE, Unjacketed Flask, with Electric ANALOG Motor	6465-401	★
10-Liter COMPLETE, Unjacketed Flask, with AIR DRIVEN Motor	6472-47	★
20-Liter COMPLETE, Unjacketed Flask, with Electric DIGITAL Motor	6472-280	★
20-Liter COMPLETE, Unjacketed Flask, with Electric ANALOG Motor	6472-282	★
20-Liter COMPLETE, Unjacketed Flask, with AIR DRIVEN Motor	6472-284	★



6472-280

6472 PILOT PLANT REACTOR *Cylindrical, 10 & 20 Liter Unjacketed Flask, Domed Head*

Complete cylindrical pilot plant reactor on one-inch stainless steel tubing mobile support frame: 10 liter size measures 56 inches high, 15 inches wide, 15 inches deep; 20 liter size measures 60 inches high, 15 inches wide, 15 inches deep. Note: Frame shipped assembled.

Flask opening is 200mm (8 inches), Schott style flange with O-Ring groove. Bottom outlet is 0-14mm Easy Action adjustable threaded valve opening. O-Rings supplied on valves are Chemraz (PTFE elastomeric material) for excellent chemical resistance. Flasks with other bottom outlet types are available.

Head is traditional domed style, with

seven openings. One $\text{\text{F}}$ 45/50 center neck, one $\text{\text{F}}$ 45/50, two $\text{\text{F}}$ 29/42 and two $\text{\text{F}}$ 24/40 openings plus a 60mm I.D. side port. Motor is secured on an epoxy coated mounting plate over center $\text{\text{F}}$ 45/50 opening; other openings are for condenser, thermoprobe, cooling coil, etc. Head is secured to flask with a "Quick Release" clamp.

Stirring motor can be air-driven or electric, either digital or analog.

Stirring rod is a 19mm (3/4 inch) O.D., precision ground and polished glass stirring shaft with a "pinned" multi-paddle PTFE agitator at bottom and a "pinned" turbine blade

PTFE agitator higher on shaft for grease-free operation with 8067 PTFE bearing. Note: Steel reinforced PTFE shafts or ground glass shafts can be supplied along with other bearings.

Cooling coil is copper tubing encapsulated with PTFE; also available in 316 Stainless Steel or Hastalloy C-276.

A digital Temperature Control System is supplied to control heating mantles. This prevents overheating, overshoot and gives an instant readout of temperature.

	10 LITER		20 LITER	
	Order Code		Order Code	
STIRRING MOTOR, Air Driven, 1-1/2 HP with 1/2 inch Motor Shaft	13370-10	★	13370-10	★
SUPPORT ASSEMBLY, Complete	6472-27	★	6472-364	★
CHUCK, "Flex-Grip", 12.7mm — 19mm	8124-20	♣	8124-20	♣
FILTER/REGULATOR/LUBRICATOR for Air Motor	13372-45	★	13372-45	★
COMPLETE AIR DRIVEN MOTOR SYSTEM	6472-47	★	6472-284	★
STIRRING MOTOR, Analog	13544-20	♣	13544-20	♣
SUPPORT ASSEMBLY, Complete	6472-362	★	6472-362	★
CHUCK, "Flex-Grip", 9.5mm — 19mm	8124-17	♣	8124-17	♣
COMPLETE ANALOG MOTOR SYSTEM	6465-401	★	6472-282	★
STIRRING MOTOR, Digital	13504-41	★	13504-41	★
SUPPORT ASSEMBLY, Complete	6472-360	★	6472-360	★
CHUCK, "Flex-Grip", 13mm — 19mm	8124-22	♣	8124-22	♣
COMPLETE DIGITAL MOTOR SYSTEM	6465-405	★	6472-280	★
All the above COMPLETE items contain these components:	Order Code		Order Code	
FLASK, with CAPFE O-Ring and 0-14 E-Z Action Bottom Valve	6522-21	★	—	
FLASK, with 200mm Flange, O-Ring groove, Bottom "Flush Valve" seal	—		6472-02	★
HEAD, Domed, with seven (7) openings	6530-37	★	6530-37	★
GLASS CAP, Side Port	15312-30	★	15312-30	★
CAPFE O-Ring, Side Port	7855-878	★	7855-878	★
CLAMP, Side Port, "Quick Release"	6517-22	★	6517-22	★
CLAMP, Head, 200mm, "Quick Release"	6517-31	★	6517-31	★
DRAIN VALVE, only "Flush Seal"	—		6472-245	★
CLAMP, Drain Valve, 1 inch	—		8856-07	★
CLAMP, Drain Valve, 2 inch	—		8856-11	★
SWEEP ELBOW, 60°, 1 inch Beaded Pipe	—		8830-207	★
MANTLE, Bottom, Alum., with hole, 1-180w115v	12053-50	★	—	
MANTLE, Bottom, Alum., with hole, 1-250w115v	—		12053-64	★
MANTLE, #2 & #3, Fabric, Remov. 1-495w115v	12041-10	★	—	
MANTLE, #2 & #3, Fabric, Remov. 1-775w115v (2)	—		12041-12	★
HEAT EXCHANGE COIL, Cooling, Copper/PTFE	12067-39	★	12067-48	★
TEMPERATURE CONTROL SYSTEM, Complete	6472-67	★	6472-67	★
AGITATOR, Lower, PTFE, Multipaddle	8091-10	♣	8091-10	♣
AGITATOR, Upper, PTFE, Turbine, 102mm	8093-12	♣	8093-12	♣
STIRRING SHAFT, 19mm Polished Glass	8076-43	♣	8076-40	♣
BEARING, PTFE, $\text{\text{F}}$ 45/50	8067-30	♣	8067-30	♣
COLLAR, with PTFE Gasket	8127-20	♣	8127-20	♣
ADAPTER, #7 — $\text{\text{F}}$ 24/40 (2)	5028-30	♣	5028-30	♣
ADAPTER, #7 — $\text{\text{F}}$ 29/42	5028-32	♣	5028-32	♣
ADAPTER, #11 — $\text{\text{F}}$ 29/42	5030-24	♣	5030-24	♣
ADAPTER, #11 — $\text{\text{F}}$ 24/40	—		5030-06	♣
ADAPTER, Offset — $\text{\text{F}}$ 24/40	—		5268-10	♣
ADAPTER, Offset — $\text{\text{F}}$ 29/42	—		5268-15	♣
ADAPTER, with 2mm bore PTFE stopcock	—		5202-12	♣
CONDENSER, 300mm, $\text{\text{F}}$ 29/42	5945-24	★	—	
CONDENSER, 300mm, $\text{\text{F}}$ 24/40	—		5946-18	♣
STOPPER, $\text{\text{F}}$ 24/40 (2)	8250-12	♣	8250-12	♣
STOPPER, $\text{\text{F}}$ 29/42 (2)	8250-14	♣	8250-14	♣
CLAMP HOLDER, Large Scale	11081-21	★	11081-21	★
ROD, 6 inch x 1/2 inch for Temperature Controller	11166-22	★	11166-22	★
GREASE, Krytox GPL	8115-08	♣	8115-08	♣

6472 Cylindrical Pilot Plants

Domed Head Unjacketed

30 & 50 Liter Reactors

With Stainless Steel Support

- ▶ **30 & 50 Liter Reactors with bottom outlet**
- ▶ **Domed glass head with large side port opening**
- ▶ **Internal heat exchange coil***
- ▶ **Rugged stainless steel pipe support frame on casters for mobility**
- ▶ **Adjustable height flask support**

*Supplied with PTFE-coated copper tubing; also available in Hastalloy C-276 or 316 stainless steel.



6472-56

Order Code

30-Liter COMPLETE, Unjacketed Flask, with AIR DRIVEN Motor	6472-56	★
50-Liter COMPLETE, Unjacketed Flask, with AIR DRIVEN Motor	6472-60	★

6472 PILOT PLANT REACTOR *Cylindrical, 30 & 50 Liter Unjacketed Flask, Domed Head*

Complete cylindrical pilot plant reactor on one-inch pipe self-supporting, stainless steel mobile support frame: 30 liter size measures 76 inches high, 26 inches wide, 26 inches deep; 50 liter size measures 84 inches high, 26 inches wide, 26 inches deep. Note: Frame shipped assembled.

Flask opening is 300mm (12 inch), flat-ground flange. Bottom outlet is 0-20mm Easy Action adjustable threaded valve opening with O-Ring ball joint outlet tube. O-Rings supplied on valves are Chemraz (PTFE elastomeric material) for excellent chemical resistance. Flasks with other bottom outlet types are available.

Black epoxy coated aluminum flask support plate is adjustable, vertically, to allow

room under flask for various outlet configurations.

Head is traditional domed style, with eight openings. One $\frac{1}{2}$ 45/50 center neck, four $\frac{1}{2}$ 45/50 and two $\frac{1}{2}$ 29/42 openings plus a 100mm I.D. side port. Motor is secured on an epoxy coated mounting plate over center $\frac{1}{2}$ 45/50 opening; other openings are for condenser, thermoprobe, cooling coil, etc. Head is secured to flask with a PTFE gasket and polymer coupling. Maximum bolt-tightening torque for plastic coupling (cold state) is 30 in-lbs. In place of domed head, ACE also offers a flat glass or flat stainless steel head.

Stirring motor is a compact, air driven motor that develops 1.5 HP at 90 lbs. air pressure. As an optional item, ACE also offers

electric stirrer motors: see No. 13554.

Stirring rod is a 28mm (1-1/8 inch) O.D., precision ground and polished glass stirring shafts with a "pinned" multi-paddle PTFE agitator at bottom and a turbine blade PTFE agitator higher on shaft for grease-free operation with 8067 PTFE bearing. Note: Steel reinforced PTFE shafts or ground glass shafts can be supplied along with other bearing types.

Cooling coil is copper tubing encapsulated with PTFE; available in 316 Stainless Steel or Hastalloy C-276.

A digital Temperature Control System is supplied to control heating mantles. This prevents overheating, overshoot and gives an instant readout of temperature.

	30 LITER			50 LITER		
	Order Code			Order Code		
FLASK, with Flat Flange and Bottom Valve	6472-03	★		6472-05	★	
HEAD, Domed, with eight (8) openings	6530-45	★		6530-45	★	
GLASS CAP, Side Port	15312-33	★		15312-33	★	
CAPFE O-Ring, Side Port	7855-880	★		7855-880	★	
CLAMP, Side Port, "Quick Release"	6517-25	★		6517-25	★	
GASKET, Head, PTFE	6525-51	★		6525-51	★	
COUPLING, Head, with Inserts and Hardware	6525-30	★		6525-30	★	
WRENCH, Torque, 30 in-lbs.	6525-60	★		6525-60	★	
SOCKET, 1/4 inch	6525-61	★		6525-61	★	
MANTLE, Bottom, Alum., with hole, 1-370w115v	12053-54	★		12053-54	★	
MANTLE, #2, Fabric, Remov. 2-880w115v	12041-16	★		12041-18	★	
MANTLE, #3, Fabric, Remov. 2-725w115v	—			12041-35	★	
HEAT EXCHANGE COIL, Cooling, Copper/PTFE	12067-40	★		12067-44	★	
SUPPORT ASSEMBLY, Complete	6472-31	★		6472-32	★	
TEMPERATURE CONTROL SYSTEM, Complete	6472-77	★		6472-79	★	
AIR MOTOR, 1-1/2 Hp with 1/2 inch Motor Shaft	13370-10	★		13370-10	★	
FILTER/REGULATOR/LUBRICATOR for Air Motor	13372-45	★		13372-45	★	
AGITATOR, Lower, PTFE, Multipaddle	8091-36	★		8091-36	★	
AGITATOR, Upper, PTFE, with four Pitched Blades, 152mm	8093-35	★		8093-35	★	
STIRRING SHAFT, Polished Glass	8080-14	★		8080-18	★	
BEARING, PTFE, $\frac{1}{2}$ 45/50	8067-105	★		8067-105	★	
CONNECTOR, Beam Connects 1/2 inch Motor Shaft to Chuck	6472-155	★		6472-155	★	
CHUCK, 28mm Connects Beam Connection to Stirring Shaft	6472-157	★		6472-157	★	
COLLAR, with PTFE Gasket	8127-28	♣		8127-28	♣	
ADAPTER, #7 - $\frac{1}{2}$ 24/40	5028-30	♣		5028-30	♣	
ADAPTER, #15 - $\frac{1}{2}$ 29/42, (2)	5030-42	♣		5030-42	♣	
ADAPTER, #11 - $\frac{1}{2}$ 45/50	5030-60	♣		5030-60	♣	
ADAPTER, #15 - $\frac{1}{2}$ 45/50	8042-17	♣		8042-21	♣	
ADAPTER, #15 - $\frac{1}{2}$ 45/50, with 4mm PTFE Stopcock	5274-22	♣		5274-22	♣	
ADAPTER, #11 and #15 - $\frac{1}{2}$ 45/50	5031-86	★		5031-86	★	
ADAPTER, Side Arm, $\frac{1}{2}$ 45/50M - $\frac{1}{2}$ 45/50M - $\frac{1}{2}$ 24/40F	5040-96	♣		5040-96	♣	
ADAPTER, Angle, $\frac{1}{2}$ 45/50F - $\frac{1}{2}$ 45/50M	5075-45	★		5075-45	★	
BUSHING, Nylon, #11	7506-02	♣		7506-02	♣	
BUSHING, Nylon, #15, (4)	7506-06	♣		7506-06	♣	
CONDENSER, 500mm, $\frac{1}{2}$ 45/50	5945-76	★		5945-76	★	
CONDENSER, Cold Finger, 14mm O.D., 625mm	5958-99	★		5958-99	★	
STOPPER, $\frac{1}{2}$ 45/50, (4)	8250-20	♣		8250-20	♣	
CLAMP HOLDER, Large Scale	11081-21	★		11081-21	★	
ROD, 6 inch x 1/2 inch for Temperature Controller	11166-22	★		11166-22	★	
GREASE, Krytox GPL	8115-08	♣		8115-08	♣	
COMPLETE	6472-56	★		6472-60	★	

Custom variations and other stirring motors are available via special order. Contact ACE Engineering and Technical Staff.

6472 Cylindrical Pilot Plants**Flat Head**
Unjacketed**30 & 50 Liter Reactors***With Stainless Steel Support*

- ▶ **30 & 50 Liter Reactors with bottom outlet**
- ▶ **Flat head with large port opening**
- ▶ **Internal heat exchange coil***
- ▶ **Rugged stainless steel pipe support frame on casters for mobility**
- ▶ **Adjustable height top and bottom flask supports**



6472-51

**Supplied with PTFE-coated copper tubing; also available in Hastalloy C-276 or 316 stainless steel.*

6472 PILOT PLANT REACTOR *Cylindrical, 30 & 50 Liter Unjacketed Flask, Flat Head*

Complete cylindrical pilot plant reactor on self-supporting, mobile support frame: 30 liter size on one-inch Stainless Steel pipe, measures 70 inches high, 26 inches wide, 26 inches deep; 50 liter size on one-inch Stainless steel pipe, measures 78 inches high, 26 inches wide, 26 inches deep (frame shipped assembled).

Flask opening on 30 and 50 liter is 300mm (12 inch) flat-ground flange. Bottom outlet on 30 and 50 liter is 0-20mm valve. O-Rings supplied on valves are Chemraz (PTFE elastomeric material) for excellent chemical resistance. Flasks with other bottom outlet valves are available.

Black epoxy coated aluminum flask support plate is adjustable, verti-

cally, to allow room under flask for various outlet configurations.

Unique head is 1-1/4 inches (32mm) thick, flat glass plate with eight openings; five $\frac{1}{4}$ 45/32 and two $\frac{1}{4}$ 29/32 and one $\frac{1}{4}$ 71/32 port for sampling or addition. Maximum bolt-tightening torque of head clamp (cold state) is 30 in-lbs. Motor is secured on an epoxy coated mounting plate over center $\frac{1}{4}$ 45/32 opening; other openings are for condenser, thermoprobe, cooling coil, etc. Head is secured to flask with PTFE gasket and polymer coupling. In place of flat glass head, ACE offers a flat Stainless Steel head or a domed glass head with traditional raised joints.

Stirring motor is a compact, air driven motor that develops 1.5 HP at 90 lbs. air

pressure. As an optional item, ACE also offers electric stirrer motors: see No. 13554.

Stirring rod is a 28mm (1-1/8 inch), precision ground and polished glass stirring shaft with a "pinned" multi-paddle PTFE agitator at bottom and a turbine blade PTFE agitator higher on shaft for grease-free operation with 8067 PTFE bearing.

Cooling coil is copper tubing encapsulated with PTFE; available in 316 Stainless Steel or Hastalloy C-276.

A digital Temperature Control System is supplied to control heating mantles. This prevents overheating, overshoot and gives an instant readout of temperature.

30 LITER			50 LITER		
Order Code			Order Code		
FLASK, withBottom Valve	6472-03	★	6472-05	★	
HEAD, Flat, with 8 openings	6472-21	★	6472-21	★	
GASKET, Head, PTFE	6525-51	★	6525-51	★	
COUPLING, Head, with Inserts and Hardware	6525-30	★	6525-30	★	
NUTS & BOLTS, 8-inch (12)	6472-161	★	6472-161	★	
WRENCH, TORQUE, 30 in-lbs.	6525-60	★	6525-60	★	
SOCKET, 1/4 inch	6525-61	★	6525-61	★	
MANTLE, Bottom, Alum., with hole, 1-370w-115v	12053-54	★	12053-54	★	
MANTLE, #2, Fabric, Remov. 2-880w-115v	12041-16	★	12041-18	★	
MANTLE, #3, Fabric, Remov. 2-725-w115v	—		12041-35	★	
COIL, Cooling, Copper/PTFE, 1/2 inch	12067-40	★	12067-44	★	
SUPPORT ASSEMBLY, Complete	6472-38	★	6472-42	★	
TEMPERATURE CONTROL SYSTEM, Complete	6472-77	★	6472-79	★	
AIR MOTOR, 1-1/2 HP with 1/2 inch Motor Shaft	13370-10	★	13370-10	★	
FILTER/REGULATOR/LUBRICATOR for Air Motor	13372-45	★	13372-45	★	
AGITATOR, Lower, PTFE, Multipaddle, 178mm	8091-36	★	8091-36	★	
AGITATOR, Upper, PTFE, with 4 Pitched Blades, 152mm	8093-35	★	8093-35	★	
STIRRING SHAFT, Polished Glass	8080-14	★	8080-18	★	
BEARING, PTFE, $\frac{1}{4}$ 45/50	8067-105	★	8067-105	★	
CONNECTOR, Beam, Conn. 1/2 inch Motor Shaft to Chuck	6472-155	★	6472-155	★	
CHUCK, 28mm, Connects Beam Conn. to Stirring Shaft	6472-157	★	6472-157	★	
COLLAR, with PTFE Gasket	8127-28	♣	8127-28	♣	
ADAPTER, #7 – $\frac{1}{4}$ 24/40	5028-30	♣	5028-30	♣	
ADAPTER, #15 – $\frac{1}{4}$ 29/42 (2)	5030-42	♣	5030-42	♣	
ADAPTER, #11 – $\frac{1}{4}$ 45/50	5030-60	♣	5030-60	♣	
ADAPTER, #15 – $\frac{1}{4}$ 45/50	8042-21	♣	8042-21	♣	
ADAPTER, #15 – $\frac{1}{4}$ 45/50, with 4mm PTFE S/C	5274-22	♣	5274-22	♣	
ADAPTER, #11 & #15 – $\frac{1}{4}$ 45/50	5031-86	★	5031-86	★	
ADAPTER, Side Arm, $\frac{1}{4}$ 45/50M – $\frac{1}{4}$ 45/50M – $\frac{1}{4}$ 24/40F	5040-96	♣	5040-96	♣	
ADAPTER, Angle, $\frac{1}{4}$ 45/50F – $\frac{1}{4}$ 45/50M	5075-45	★	5075-45	★	
BUSHING, Nylon, #11	7506-02	♣	7506-02	♣	
BUSHING, Nylon, #15 (4)	7506-06	♣	7506-06	♣	
CONDENSER, 500mm, $\frac{1}{4}$ 45/50	5945-76	★	5945-76	★	
CONDENSER, Cold Finger, 14mm O.D., 625mm	5958-99	★	5958-99	★	
STOPPER, $\frac{1}{4}$ 45/50 (4)	8250-20	♣	8250-20	♣	
STOPPER, $\frac{1}{4}$ 71/60	8250-28	♣	8250-28	♣	
ROD, 6 inch x 1/2 inch for Temperature Controller	11166-22	★	11166-22	★	
GREASE, Krytox GPL	8115-08	♣	8115-08	♣	
COMPLETE	6472-51	★	6472-54	★	

6473 Cylindrical Pilot Plants*Jacketed or Unjacketed Flask***30 Liter Reactors****3-Post Stand**

6473-150

- ▶ ***New 3-post support stand with open top offers easier access to head and/or placement of condensers, probes, etc.***
- ▶ ***Portable 30 Liter Reactor with bottom outlet***
- ▶ ***Internal heat exchange coil (unjacketed flask)****
- ▶ ***Rugged user-friendly support frame has flanges with captive hardware***
- ▶ ***PTFE-covered bottom flask support shelf***

For Heating/Cooling Circulators, see listing starting on page 90.

**Supplied with PTFE-coated copper tubing; also available in Hastalloy C-276 or 316 stainless steel.*



6473-275

6473 PILOT PLANT REACTOR *Cylindrical, 30 Liter Jacketed or Unjacketed Flask, Domed Head*

Complete cylindrical pilot plant reactor on self-supporting 3-post, mobile support frame. Frame is fabricated from Stainless Steel and powder coated aluminum: measures 74 inches high, 24 inches wide, 20 inches deep (frame shipped assembled).

Flask can be jacketed or unjacketed with 300mm (12 inch) opening, flat ground flange. Bottom outlet is a 0-20mm Easy Action adjustable opening threaded valve with Chemraz (PTFE elastomeric material) O-Rings for excellent chemical resistance on unjacketed flask; and a "Flush Seal" drain with one-inch beaded drain discharge with CAPFE and Kalrez O-Rings on jacketed flask. Flasks with other bottom valves are available.

Jacket on flask is direct sealed to inner

vessel at top and silicone rubber sealed at bottom. Jacket inlet/outlet 35/25 O-Ring ball joints sealed tangentially

Flask support is adjustable, vertically, to allow room under flask for various outlet configurations.

Head is traditional domed style, with eight openings: 45/50 center neck, four 45/50 and two 29/42 side necks, plus a 100 mm (4 inch) I.D. side port with grooved flange. Head is secured to flask with a new "swing open" front flange clamp, torqued to 30 in-lbs (tools supplied).

Stirring motor is a 1/2 HP, 120v, 50/60Hz electric motor, for hazardous locations, mounted over center of 45/50 center neck.

Stirring rod is a 28mm (1-1/8 inch) O.D. precision ground and polished solid glass stirring shaft with a "pinned" multi-paddle PTFE agitator at bottom and a turbine blade PTFE agitator higher on shaft for grease-free operation with 8067 PTFE bearing.

Heat exchange coil for unjacketed Reactor is a 1/2 inch O.D. copper tubing encapsulated with PTFE; available in 316 Stainless Steel or Hastalloy C-276.

A digital Temperature Control System is supplied with unjacketed Reactor consisting of a Type "J" digital controller with a PFA covered thermoprobe to control heating mantles.

A type "J" temperature monitoring system is supplied with the jacketed flask version.

30 LITER UNJACKETED (12 inch Flange; 12 inch Body)			30 LITER JACKETED (12 inch Flange; 12 inch Body)		
Order Code			Order Code		
FLASK, with Valve	6472-03	★	6472-030	★	
Head, Domed, with Eight Openings	6530-45	★	6530-45	★	
GLASS CAP, 100mm	15312-33	★	15312-33	★	
CAPFE O-Ring, 100mm	7855-880	★	7855-880	★	
CLAMP, "Quick Release," 100mm	6517-25	★	6517-25	★	
GASKET, PTFE	6525-51	★	6525-51	★	
WRENCH, TORQUE, 30 in-lbs.	6525-60	★	6525-60	★	
SOCKET	6525-61	★	6525-61	★	
DRAIN VALVE, "Flush Seal"	—		6472-245	★	
CLAMP, Drain Valve, 1 inch	—		8856-07	★	
CLAMP, Drain Valve, 2 inch	—		8856-11	★	
SWEEP ELBOW, 60°, 1 inch BP	—		8830-207	★	
MANTLE, Bottom, Alum., with hole, 1-370w-115v	12053-54	★	—		
MANTLE, #2, Fabric, Remov., 2-880w-115v	12041-16	★	—		
COIL, Cooling, Copper/PTFE, 1/2 inch	12067-40	★	—		
SUPPORT ASSEMBLY, 3-Post Complete	6473-47	★	6473-51	★	
TEMPERATURE CONTROL SYSTEM, Complete	6472-77	★	—		
TEMPERATURE MONITORING SYSTEM, Complete	—		8318-207	★	
STIRRER MOTOR AND CONTROLLER, 1/2 HP	13554-55	★	13554-55	★	
AGITATOR, Lower, PTFE, Multipaddle, 178mm	8091-36	★	8091-36	★	
AGITATOR, Upper, PTFE, with 4 Pitched Blades, 152mm	8093-35	★	8093-35	★	
STIRRING SHAFT, Polished Glass, 28mm	8080-14	★	8080-14	★	
BEARING, PTFE, 45/50	8067-105	★	8067-105	★	
CONNECTOR, Beam Coupling, 5/8 inch Motor Shaft to Chuck	6472-156	★	6472-156	★	
CHUCK, 28mm, Connects Beam Conn. to Stirring Shaft	6472-157	★	6472-157	★	
COLLAR, with PTFE Gasket	8127-28	♣	8127-28	♣	
ADAPTER, #7 - 45/40	5028-30	♣	5028-30	♣	
ADAPTER, #15 - 45/42 (2)	5030-42	♣	5030-42	♣	
ADAPTER, #11 - 45/50	5030-60	♣	5030-60	♣	
ADAPTER, #15 - 45/50	8042-21	♣	8042-21	♣	
ADAPTER, #15 - 45/50, with 4mm PTFE S/C	5274-22	♣	5274-22	♣	
ADAPTER, #11 and #15 - 45/50	5031-86	★	5031-86	★	
ADAPTER, Side Arm, 45/50M - 45/50M - 45/50F	5040-96	♣	5040-96	♣	
ADAPTER, Angle, 45/50F - 45/50M	5075-45	★	5075-45	★	
ADAPTER, Offset, 45/50F - 45/50M	5268-21	★	5268-21	★	
BUSHING, Nylon, #11	7506-02	♣	7506-02	♣	
BUSHING, Nylon, #15 (4)	7506-06	♣	7506-06	♣	
CONDENSER, 500mm, 45/50	5945-76	★	5945-76	★	
CONDENSER, Cold Finger, 14mm O.D., 625m	5958-99	★	5958-99	★	
STOPPER, 45/50 (4)	8250-20	♣	8250-20	♣	
CHAIN CLAMP	11079-40	★	11079-40	★	
ROD, 6 inch x 1/2 inch for Temperature Controller	11166-22	★	11166-22	★	
GREASE, Krytox GPL	8115-08	♣	8115-08	♣	
COMPLETE	6473-150	★	6473-275	★	

6473 Cylindrical Pilot Plants**Domed Head**
Unjacketed**100 Liter Reactor***With Stainless Steel Support*

- ▶ **100 Liter Reactor with bottom outlet**
- ▶ **Domed glass head with large side port opening**
- ▶ **Internal heat exchange coil***
- ▶ **Rugged stainless steel pipe support frame on casters for mobility**
- ▶ **Adjustable height top and bottom flask supports**



6473-60

*Supplied with PTFE-coated copper tubing; also available in Hastalloy C-276 or 316 stainless steel.

6473 PILOT PLANT REACTOR *Cylindrical, 100 Liter Unjacketed Flask, Domed Head*

Complete cylindrical pilot plant reactor on self-supporting, mobile support frame on one-inch Stainless Steel pipe, measures 88 inches high, 28 inches wide, 28 inches deep. Note: Frame shipped assembled. Other bottom outlet vaves available.

Flask opening is 300mm (12 inch) flat-ground flange. Flask body is 18 inch outside diameter. Bottom outlet is 0-20 mm adjustable opening threaded valve with Chemraz (PTFE elastomeric material) O-Rings for excellent chemical resistance. Other bottom valve types are available.

Black epoxy coated aluminum flask support plate is adjustable, vertically, to allow room under flask for various outlet recep-

tacles. Upper support brackets supplied to stabilize flask.

Head is traditional domed style, with eight openings; five $\frac{1}{2}$ 45/50 and two $\frac{1}{4}$ 29/42 plus one 100mm I.D. side port.

Motor is secured on black epoxy coated mounting plate over center $\frac{1}{2}$ 45/50 opening on head; other openings are for condenser, thermoprobe, cooling coil, etc. Head is secured to flask with PTFE gasket and polymer coupling. Maximum bolt tightening torque for coupling (cold state) is 30 in-lbs. In place of domed head, ACE offers a flat glass or flat stainless steel head.

Stirring motor is heavy duty, 1/2 HP electronic motor for hazardous area duty, complete

with controller. Motor shaft is 5/8 inch O.D. Controller operates on 120 volts 50/60 Hz (air motor available — call for quotation).

Features a 28mm (1-1/8 inch) O.D. precision ground and polished glass stirring shaft with a "pinned" multi-paddle PTFE agitator at bottom and a turbine blade PTFE agitator higher on shaft for grease-free operation with 8067 PTFE bearing.

Cooling coil is 1/2 inch O.D. copper tubing encapsulated with PTFE; also available in 316 Stainless Steel or Hastalloy C-276.

A digital Temperature Control System is supplied to control heating mantles. This prevents overheating, overshoot and gives an instant readout of temperature.

100 LITER (12 inch Flange; 18 inch Body)

Order Code

FLASK, with Valve	6473-02	★
Head, Domed, with 8 Openings	6530-45	★
GLASS CAP, 100mm	15312-33	★
CAPFE O-Ring, 100mm	7855-880	★
CLAMP, "Quick Release," 100mm	6517-25	★
GASKET, PTFE	6525-51	★
COUPLING, with Inserts and Hardware	6525-30	★
WRENCH, TORQUE, 30 in-lbs.	6525-60	★
SOCKET	6525-61	★
MANTLE, Bottom, Alum., with hole, 1-775w-115v	12053-74	★
MANTLE, #2, Fabric, Remov., 4-1100w-115v	12041-52	★
COIL, Cooling, Copper/PTFE, 1/2 inch	12067-79	★
SUPPORT ASSEMBLY, Complete	6473-34	★
TEMPERATURE CONTROL SYSTEM, Complete	6472-79	★
STIRRER MOTOR AND CONTROLLER, 1/2 HP	13554-55	★
AGITATOR, Lower, PTFE, Multipaddle, 178mm	8091-36	★
AGITATOR, Upper, PTFE, with 4 Pitched Blades, 152mm	8093-35	★
STIRRING SHAFT, Polished Glass, 28mm	8080-22	★
BEARING, PTFE, $\frac{1}{2}$ 45/50	8067-105	★
CONNECTOR, Beam, Conn. 5/8 inch Motor Shaft to Chuck	6472-156	★
CHUCK, 28mm, Connects Beam Conn. to Stirring Shaft	6472-157	★
COLLAR, with PTFE Gasket	8127-28	♣
ADAPTER, #7 — $\frac{1}{4}$ 24/40	5028-30	♣
ADAPTER, #15 — $\frac{1}{4}$ 29/42 (2)	5030-42	♣
ADAPTER, #11 — $\frac{1}{4}$ 45/50	5030-19	♣
ADAPTER, #15 — $\frac{1}{4}$ 45/50	8042-21	♣
ADAPTER, #15 — $\frac{1}{4}$ 45/50, with 4mm PTFE S/C	5274-22	♣
ADAPTER, #11 and #15 — $\frac{1}{4}$ 45/50	5031-86	★
ADAPTER, Side Arm, $\frac{1}{4}$ 45/50M — $\frac{1}{4}$ 45/50M — $\frac{1}{4}$ 24/40F	5040-96	♣
ADAPTER, Angle, $\frac{1}{4}$ 45/50F — $\frac{1}{4}$ 45/50M	5075-45	★
ADAPTER, Offset, $\frac{1}{4}$ 45/50F — $\frac{1}{4}$ 45/50M	5268-21	★
BUSHING, Nylon, #11	7506-02	♣
BUSHING, Nylon, #15 (4)	7506-06	♣
CONDENSER, 500mm, $\frac{1}{4}$ 45/50	5945-76	★
CONDENSER, Cold Finger, 14mm O.D., 625mm	5958-99	★
STOPPER, $\frac{1}{4}$ 45/50 (4)	8250-20	♣
CLAMP, Chain	11079-24	★
CLAMP HOLDER, Pilot Plant (2)	11081-21	★
SUPPORT ROD, 1/2 inch diameter, 12 inches long	11166-37	★
END-TO-END ROD CONNECTOR	11175-23	★
ROD, 6 inch x 1/2 inch for Temperature Controller	11166-22	★
GREASE, Krytox GPL	8115-08	♣
COMPLETE	6473-60	★

6473 Cylindrical Pilot Plants Domed Head Unjacketed

200 Liter Reactor

With Stainless Steel Support

- ▶ **200 Liter Reactor with bottom outlet**
- ▶ **Domed glass head with large side port opening**
- ▶ **Internal heat exchange coil***
- ▶ **Rugged stainless steel pipe support frame on casters for mobility**
- ▶ **Adjustable height top and bottom flask supports**



6473-72

**Supplied with PTFE-coated copper tubing; also available in Hastalloy C-276 or 316 stainless steel.*

6473 PILOT PLANT REACTOR *Cylindrical, 200 Liter Unjacketed Flask, Domed Head*

Complete cylindrical pilot plant reactor on self-supporting, mobile support frame on one-inch Stainless Steel pipe, measures 118 inches high, 32 inches wide, 32 inches deep (shipped assembled).

Flask opening is 300mm (12 inch) flat-ground flange. Flask body is 18 inch outside diameter. Bottom outlet is a "Flush Seal" drain valve with a one-inch beaded drain discharge. O-Ring supplied on valve is a CAPFE (silicone encapsulated with PTFE), and Kalrez for excellent chemical resistance.

Black epoxy coated aluminum flask support plate is adjustable, vertically, to allow room under flask for various outlet receptacles. Plate is supplied with three adjustable braces to hold mantle in place. Upper sup-

port brackets supplied to stabilize flask.

Head is traditional domed style, with eight openings; five $\frac{1}{2}$ 45/50, two $\frac{1}{2}$ 29/42, plus one 100mm I.D. side port.

Motor is secured on black epoxy coated mounting plate over center $\frac{1}{2}$ 45/50 opening on Head; other openings are for condenser, thermoprobe, cooling coil, etc. Head is secured to flask with PTFE gasket and plastic coupling. Maximum bolt tightening torque for coupling (cold state) is 30in-lbs. In place of domed head, ACE offers a flat glass or flat stainless steel head that use PTFE joint inserts.

Stirring motor is heavy duty, 1/2 HP electronic motor for hazardous area duty. Motor shaft is 5/8 inch O.D. Controller operates on

120 volts 50/60 Hz. (Air motor available, call for quotation).

28mm (1-1/8 inch) O.D. precision ground and polished glass stirring shaft with a "pinned" multi-paddle PTFE agitator at bottom and two turbine blade PTFE agitators higher on shaft for grease-free operation with 8067 PTFE bearing.

Cooling coil is 1/2 inch O.D. copper tubing encapsulated with PTFE; also available in 316 Stainless Steel or Hastalloy C-276.

A digital Temperature Control System is supplied to control heating mantles. This prevents over-heating and overshoot, and gives an instant readout of temperature.

200 LITER (12 inch Flange; 18 inch Body)

Order Code

FLASK, with Valve	6473-11	★
Head, Domed, with 8 Openings	6530-45	★
GLASS CAP, 100mm	15312-33	★
CAPFE O-Ring, 100mm	7855-880	★
CLAMP, "Quick Release," 100mm	6517-25	★
GASKET, PTFE	6525-51	★
COUPLING, with Inserts and Hardware	6525-30	★
WRENCH, TORQUE, 30 in-lbs.	6525-60	★
SOCKET 1/4 inch	6525-61	★
DRAIN VALVE, "Flush Seal"	6472-245	★
CLAMP, Drain Seal 1 inch	8856-07	★
CLAMP, Drain Seal 2 inch	8856-11	★
SWEEP ELBOW, 60°, 1 inch BP	8830-207	★
MANTLE, Bottom, Alum., with hole, 1-775w-115v	12053-74	★
MANTLE, #2, Fabric, Removable, 4-1100w-115v (2)	12041-52	★
COIL, Cooling, Copper/PTFE, 1/2 inch	12067-80	★
SUPPORT ASSEMBLY, Complete	6473-37	★
TEMPERATURE CONTROL SYSTEM, Complete	6472-87	★
STIRRER MOTOR AND CONTROLLER, 1/2 HP	13554-55	★
AGITATOR, Lower, PTFE, Multipaddle, 178mm	8091-36	★
AGITATOR, Upper, PTFE, with 4 Pitched Blades, 152mm (2)	8093-35	★
STIRRING SHAFT, Polished Glass, 28mm	8080-25	★
BEARING, PTFE, $\frac{1}{2}$ 45/50	8067-105	★
CONNECTOR, Beam, Conn. 5/8 inch Motor Shaft to Chuck	6472-156	★
CHUCK, 28mm, Connects Beam Conn. to Stirring Shaft	6472-157	★
COLLAR, with PTFE Gasket	8127-28	◆
ADAPTER, #7 - $\frac{1}{2}$ 24/40	5028-30	◆
ADAPTER, #11 - $\frac{1}{2}$ 45/50	5030-19	◆
ADAPTER, #15 - $\frac{1}{2}$ 29/42	5030-42	◆
ADAPTER, #15 - $\frac{1}{2}$ 45/50	8042-21	◆
ADAPTER, #15 - $\frac{1}{2}$ 45/50, with 4mm PTFE stopcock	5274-22	◆
ADAPTER, #11 and #15 - $\frac{1}{2}$ 45/50	5031-86	★
ADAPTER, Side Arm, $\frac{1}{2}$ 45/50M - $\frac{1}{2}$ 45/50M - $\frac{1}{2}$ 24/40F	5040-96	◆
ADAPTER, Angle, $\frac{1}{2}$ 45/50F - $\frac{1}{2}$ 45/50M	5075-45	★
ADAPTER, Offset, $\frac{1}{2}$ 45/50F - $\frac{1}{2}$ 45/50M	5268-21	★
BUSHING, Nylon, #11	7506-02	◆
BUSHING, Nylon, #15 (4)	7506-06	◆
CONDENSER, 500mm, $\frac{1}{2}$ 45/50	5945-76	★
CONDENSER, Cold Finger, 14mm O.D., 625mm	5958-99	★
STOPPER, $\frac{1}{2}$ 45/50 (4)	8250-20	◆
CLAMP, Chain	11079-24	★
CLAMP HOLDER, Pilot Plant (2)	11081-21	★
SUPPORT ROD, 1/2 inch diameter, 12 inches long (2)	11166-37	★
END-TO-END ROD CONNECTOR	11175-23	★
GREASE, Krytox GPL	8115-08	◆
COMPLETE	6473-72	★

6472 Cylindrical Pilot Plants

Domed Head Jacketed

10 & 20 Liter Reactors

With Stainless Steel Support

- ▶ **10 & 20 Liter Jacketed Reactors with bottom outlet**
- ▶ **Domed glass head with large side port opening**
- ▶ **Internal heat exchange coil available, not supplied**
- ▶ **Rugged stainless steel pipe support frame on casters for mobility**
- ▶ **Adjustable height flask support**



6472-365



6472-367



6472-363

For Heating/Cooling Circulators, see listing starting on page 90.

	Order Code	
10-Liter COMPLETE, Jacketed Flask, with Electric ANALOG Motor	6465-501	★
10-Liter COMPLETE, Jacketed Flask, with Electric DIGITAL Motor	6465-505	★
10-Liter COMPLETE, Jacketed Flask, with AIR DRIVEN Motor	6472-147	★
20-Liter COMPLETE, Jacketed Flask, with Electric DIGITAL Motor	6472-363	★
20-Liter COMPLETE, Jacketed Flask, with Electric ANALOG Motor	6472-365	★
20-Liter COMPLETE, Jacketed Flask, with AIR DRIVEN Motor	6472-367	★

6472 PILOT PLANT REACTOR *Cylindrical, 10 & 20 Liter Jacketed Flask, Domed Head*

Complete cylindrical pilot plant reactor on 1-inch stainless steel tubing mobile support frame: 10 liter size measures 56 inches high, 15 inches wide, 15 inches deep; 20 liter size measures 60 inches high, 15 inches wide, 15 inches deep. Note: Frame shipped assembled.

Jacketed flask opening is 200mm (8 inch), Schott style flange with O-Ring groove. Bottom outlet on 10L flask is 0-14mm Easy Action adjustable threaded valve opening; bottom outlet on 20L flask is low dead space "flush seal" valve. O-Rings supplied on valves are Chemraz (PTFE elastomeric material) for excellent chemical resistance. Flasks with other bottom

outlet types are available. Jacket on flask is direct sealed at the top and silicone rubber sealed at bottom. 35/25 O-Ring ball joint on inlet/outlet sealed tangentially.

Head is traditional domed style, with seven openings. One $\frac{1}{2}$ 45/50 center neck, one $\frac{1}{2}$ 45/50, two $\frac{1}{4}$ 29/42 and two $\frac{1}{4}$ 24/40 openings plus a 60mm I.D. side port. Motor is secured on an epoxy coated mounting plate over center $\frac{1}{2}$ 45/50 opening; other openings are for condenser, thermoprobe, cooling coil, etc. Head is secured to flask with a "Quick Release" clamp.

Stirring motor can be air-driven or electric,

either digital or analog.

Stirring rod is a 19mm (3/4 inch) O.D., precision ground and polished glass stirring shafts with a "pinned" multi-paddle PTFE agitator at bottom and a turbine blade PTFE agitator higher on shaft for grease-free operation with 8067 PTFE bearing. Note: Steel reinforced PTFE shafts or ground glass shafts can be supplied along with other bearings.

A Temperature Monitoring System, with PTFE-covered Type "J" Thermocouple, is supplied to give an instant readout of temperature.

	10 LITER		20 LITER
	Order Code		Order Code
STIRRING MOTOR, Air Driven, 1-1/2 HP with 1/2 inch Motor Shaft	13370-10 ★		13370-10 ★
SUPPORT ASSEMBLY, Stainless Steel, Complete	6472-328 ★		6472-337 ★
CHUCK, "Flex-Grip", 12.7mm — 19mm	8124-20 ♣		8124-20 ♣
FILTER/REGULATOR/LUBRICATOR for Air Motor	13372-45 ★		13372-45 ★
COMPLETE AIR DRIVEN MOTOR SYSTEM	6472-147 ★		6472-367 ★
STIRRING MOTOR, Analog	13544-20 ♣		13544-20 ♣
SUPPORT ASSEMBLY, Stainless Steel, Complete	6472-335 ★		6472-335 ★
CHUCK, "Flex-Grip", 9.5mm — 19mm	8124-17 ♣		8124-17 ♣
COMPLETE ANALOG MOTOR SYSTEM	6465-501 ★		6472-365 ★
STIRRING MOTOR, Digital	13504-41 ★		13504-41 ★
SUPPORT ASSEMBLY, Stainless Steel, Complete	6472-329 ★		6472-329 ★
CHUCK, "Flex-Grip", 13mm — 19mm	8124-22 ♣		8124-22 ♣
COMPLETE DIGITAL MOTOR SYSTEM	6465-505 ★		6472-363 ★
All the above COMPLETE items contain these components:	Order Code		Order Code
FLASK, Jacketed with O-Ring Groove and 0-14mm Bottom Valve	6524-23 ★		—
FLASK, Jacketed with 200mm Flange, O-Ring groove, Bottom "Flush Valve" seal	—		6472-16 ★
HEAD, Domed, with seven (7) openings	6530-37 ★		6530-37 ★
GLASS CAP, Side Port	15312-30 ★		15312-30 ★
CAPFE O-Ring, Side Port	7855-878 ★		7855-878 ★
CLAMP, Side Port, "Quick Release"	6517-22 ★		6517-22 ★
CLAMP, Head, 200mm, "Quick Release"	6517-31 ★		6517-31 ★
DRAIN VALVE, only "Flush Seal"	—		6472-245 ★
CLAMP, Drain Valve, 1 inch	—		8856-07 ★
CLAMP, Drain Valve, 2 inch	—		8856-11 ★
SWEEP ELBOW, 60°, 1 inch Beaded Pipe	—		8830-207 ★
TEMPERATURE MONITORING SYSTEM, Complete	8318-204 ★		8318-204 ★
AGITATOR, Lower, PTFE, Multipaddle	8091-10 ♣		8091-10 ♣
AGITATOR, Upper, PTFE, Turbine, 102mm	8093-12 ♣		8093-12 ♣
STIRRING SHAFT, 19mm Polished Glass	8076-43 ♣		8076-40 ♣
BEARING, PTFE, $\frac{1}{2}$ 45/50	8067-30 ♣		8067-30 ♣
COLLAR, with PTFE Gasket	8127-20 ♣		8127-20 ♣
ADAPTER, #7 — $\frac{1}{4}$ 29/42	5028-32 ♣		5028-32 ♣
ADAPTER, #11 — $\frac{1}{4}$ 29/42	5030-24 ♣		—
ADAPTER, #11 — $\frac{1}{4}$ 24/40	—		5030-22 ♣
ADAPTER, Offset — $\frac{1}{4}$ 24/40	—		5268-10 ♣
ADAPTER, Offset — $\frac{1}{4}$ 29/42	5268-15 ♣		—
ADAPTER, with 2mm bore PTFE stopcock	—		5202-12 ♣
CONDENSER, 300mm, $\frac{1}{4}$ 29/42	5945-24 ★		—
CONDENSER, 300mm, $\frac{1}{4}$ 24/40	—		5946-18 ♣
STOPPER, $\frac{1}{4}$ 24/40 (2)	8250-12 ♣		8250-12 ♣
STOPPER, $\frac{1}{4}$ 29/42 (2)	8250-14 ♣		8250-14 ♣
CLAMP HOLDER, Large Scale	11081-21 ★		11081-21 ★
ROD, 6 inch x 1/2 inch for Temperature Monitor	11166-22 ★		11166-22 ★
GREASE, Krytox GPL	8115-08 ♣		8115-08 ♣

6472 Cylindrical Pilot Plants

Domed Head Jacketed

30 & 50 Liter Reactors

With Stainless Steel Support

- ▶ **30 & 50 Liter Jacketed Reactors with bottom outlet**
- ▶ **Domed glass head with large side port opening**
- ▶ **Rugged stainless steel pipe support frame on casters for mobility**
- ▶ **Adjustable height flask support**

For Heating/Cooling Circulators, see listing starting on page 90.



6472-153

	Order Code	
30-Liter COMPLETE, Jacketed Flask, with AIR DRIVEN Motor	6472-153	★
50-Liter COMPLETE, Jacketed Flask, with AIR DRIVEN Motor	6472-160	★

6472 PILOT PLANT REACTOR *Cylindrical, 30 & 50 Liter Jacketed Flask, Domed Head*

Complete cylindrical pilot plant reactor on one-inch self-supporting, stainless steel pipe mobile support frame: 30 liter frame size measures 76 inches high, 26 inches wide, 26 inches deep; 50 liter size measures 84 inches high, 26 inches wide, 26 inches deep (frame shipped assembled).

Flask opening is 300mm (12 inch), flat-ground flange. Bottom outlet is a "Flush Seal" drain valve with a one-inch beaded pipe outlet. O-Rings supplied on valves are CAPFE (silicone encapsulated with PTFE) & Kalrez, for excellent chemical resistance. Flasks with other bottom outlet types are available. Jacket on flask is direct sealed at the top and silicone rubber sealed at bottom. 35/25 O-Ring ball joint on inlet/outlet sealed tangentially.

Flask support is adjustable, vertically, to allow room under flask for various outlet con-

figurations. 30L and 50L flasks sit on a padded metal alloy (coated) ring secured directly to the one-inch pipe frame.

Head is traditional domed style, with eight openings. Five \$ 45/50 and two \$ 29/42 openings plus a 100mm I.D. side port with cap, CAPFE O-Ring and clamp.

Motor is secured on an epoxy coated mounting plate over center \$ 45/50 opening; other openings are for condenser, thermo-probe, etc. Head is secured to flask with a PTFE gasket and plastic coupling. Maximum bolt-tightening torque for plastic coupling (cold state) is 30 in-lbs. In place of domed head, ACE offers a flat glass head with ground-in \$ joints, or a stainless steel flat head that uses PTFE joint inserts.

Standard stirring motor is a compact, air driven motor that develops 1.5 HP at 90 lbs.

air pressure. As an optional item, ACE also offers electric stirring: see No. 13554.

Stirring rod is a 28mm (1-1/8 inch) O.D., precision ground and polished glass stirring shaft with a "pinned" multi-paddle PTFE agitator at bottom and a turbine blade PTFE agitator higher on shaft for grease-free operation with 8067 PTFE bearing. Note: Steel reinforced PTFE shafts or ground glass shafts can be supplied along with other bearings.

Cooling coil is NOT supplied, but available in copper tubing encapsulated with PTFE; also available in 316 Stainless Steel or Hastalloy C-276.

A Temperature Monitoring System, with PTFE-covered Type "J" Thermocouple, is supplied to give an instant readout of temperature.

30 LITER			50 LITER		
Order Code			Order Code		
FLASK, Jacketed, with Flat Flange and Bottom Valve	6472-030	★	6472-050	★	
HEAD, Domed, with eight (8) openings	6530-45	★	6530-45	★	
GLASS CAP, Side Port	15312-33	★	15312-33	★	
CAPFE O-Ring, Side Port	7855-880	★	7855-880	★	
CLAMP, Side Port, "Quick Release"	6517-25	★	6517-25	★	
GASKET, Head, PTFE	6525-51	★	6525-51	★	
COUPLING, Head, with Inserts and Hardware	6525-30	★	6525-30	★	
WRENCH, Torque, 30 in-lbs.	6525-60	★	6525-60	★	
SOCKET, 1/4 inch	6525-61	★	6525-61	★	
DRAIN VALVE, "Flush Seal"	6472-245	★	6472-245	★	
CLAMP, Drain Valve, 1 inch	8856-07	★	8856-07	★	
CLAMP, Drain Valve, 2 inch	8856-11	★	8856-11	★	
SWEEP ELBOW, 60°, 1 inch Beaded Pipe	8830-207	★	8830-207	★	
SUPPORT ASSEMBLY, Complete	6472-331	★	6472-332	★	
TEMPERATURE MONITORING SYSTEM, Complete	8318-207	★	8318-209	★	
AIR MOTOR, 1-1/2 Hp with 1/2 inch Motor Shaft	13370-10	★	13370-10	★	
FILTER/REGULATOR/LUBRICATOR for Air Motor	13372-45	★	13372-45	★	
AGITATOR, Lower, PTFE, Multipaddle	8091-36	★	8091-36	★	
AGITATOR, Upper, PTFE, with four Pitched Blades, 152mm	8093-35	★	8093-35	★	
STIRRING SHAFT, Polished Glass	8080-14	★	8080-18	★	
BEARING, PTFE, \$45/50	8067-105	★	8067-105	★	
CONNECTOR, Beam Connects 1/2 inch Motor Shaft to Chuck	6472-155	★	6472-155	★	
CHUCK, 28mm Connects Beam Connection to Stirring Shaft	6472-157	★	6472-157	★	
COLLAR, with PTFE Gasket	8127-28	♣	8127-28	♣	
ADAPTER, PTFE, #25 x 1/4 inch FPT (2)	5844-104	♣	5844-104	♣	
ADAPTER, #7 - \$29/42	5028-32	♣	5028-32	♣	
ADAPTER, #11 - \$45/50	5030-60	♣	5030-60	♣	
ADAPTER, #15 - \$45/50	8042-21	♣	8042-21	♣	
ADAPTER, #15 - \$45/50, with 4mm PTFE Stopcock	5274-22	♣	5274-22	♣	
ADAPTER, #11 and #15 - \$45/50	5031-86	★	5031-86	★	
ADAPTER, Side Arm, \$45/50M - \$45/50M - \$24/40F	5040-96	♣	5040-96	♣	
ADAPTER, Angle, \$45/50F - \$45/50M	5075-45	★	5075-45	★	
BUSHING, Nylon, #11	7506-02	♣	7506-02	♣	
BUSHING, Nylon, #15, (4)	7506-06	♣	7506-06	♣	
CONDENSER, 500mm, \$45/50	5945-76	★	5945-76	★	
CONDENSER, Cold Finger, 14mm O.D., 625mm	5958-99	★	5958-99	★	
STOPPER, \$45/50, (4)	8250-20	♣	8250-20	♣	
CLAMP HOLDER	11081-21	★	11081-21	★	
ROD, 6 inch x 1/2 inch for Temperature Monitor	11166-22	★	11166-22	★	
GREASE, Krytox GPL	8115-08	♣	8115-08	♣	
COMPLETE	6472-153	★	6472-160	★	

6472 Cylindrical Pilot Plants**Flat Head**
Jacketed**30 & 50 Liter Reactors***With Stainless Steel Support*

- ▶ **30 & 50 Liter Jacketed Reactors with bottom outlet**
- ▶ **Flat head with large sample port opening**
- ▶ **Rugged pipe support frame on casters for mobility**
- ▶ **Adjustable height top flask support**

**For Heating/Cooling
Recirculators, see
listing starting on
page 90.**



6472-151

6472 PILOT PLANT REACTOR *Cylindrical, 30 & 50 Liter Jacketed Flask, Flat Head*

Complete cylindrical pilot plant reactor on one-inch, self-supporting, stainless steel pipe mobile support frame: 30 liter size, measures 70 inches high, 26 inches wide, 26 inches deep; 50 liter size measures 78 inches high, 26 inches wide, 26 inches deep (frame shipped assembled).

Jacketed flask opening on 30 and 50 liter is 300mm (12 inch), flat ground flange. Bottom outlet on 30 and 50 liter is a "Flush Seal" drain valve with a one-inch beaded pipe drain outlet. O-Rings supplied on valve are CAPFE (silicone encapsulated with PTFE) & Kalrez, for excellent chemical resistance. Flasks with other bottom outlet valves are available.

Jacket on flask is direct sealed at top and silicone rubber sealed at bottom. 35/25 O-Ring ball joint on inlet/outlet sealed tangen-

tially.

Flask support is adjustable, vertically, to allow room under flask for various outlet configurations. 30L and 50L flasks sit on a padded metal alloy (coated) ring secured directly to the one-inch pipe frame.

Unique head is 1-1/4 inch (32 mm) thick, flat glass plate with eight ground-in $\frac{1}{8}$ openings; five $\frac{1}{8}$ 45/32 and two $\frac{1}{8}$ 29/32 and one $\frac{1}{8}$ 71/32. Head is secured to flask with PTFE gasket and plastic coupling. Maximum bolt tightening torque for coupling (cold state) is 30 in-lbs. ACE also offers a domed glass head.

Motor is secured on black epoxy coated mounting plate over center $\frac{1}{8}$ 45/32 opening on Head; other openings are for condenser, thermoprobe, etc.

Stirring motor is a compact, air driven motor that develops 1.5 HP at 90 lbs. air pressure. As an optional item, ACE also offers electronic stirring; see No. 13554.

Stirring rod on 30L and 50L sizes is a 28 mm (1 $\frac{1}{8}$ inch) O.D. precision ground and polished glass stirring shaft with a "pinned" multi-paddle PTFE agitator at bottom and a turbine blade PTFE agitator higher on shaft for grease-free operation with 8067 PTFE bearing.

Optional cooling coil is available in copper tubing encapsulated with PTFE; also available in 316 Stainless Steel or Hastalloy C-276.

A Temperature Monitoring System, with PTFE-covered Type "J" Thermocouple, is supplied to give an instant readout of temperature.

	30 LITER			50 LITER		
	Order Code			Order Code		
FLASK, Jacketed, with Flat Flange and 2 inch BP Bottom Opening	6472-030	★		6472-050	★	
Head, Flat, 1-1/4 inch with 8 Openings	6472-21	★		6472-21	★	
DRAIN VALVE, "Flush Seal"	6472-245	★		6472-245	★	
CLAMP, Drain Valve, 1 inch	8856-07	★		8856-07	★	
CLAMP, Drain Valve, 2 inch	8856-11	★		8856-11	★	
SWEEP ELBOW, 60°, 1 inch Beaded Pipe	8830-207	★		8830-207	★	
GASKET, PTFE	6525-51	★		6525-51	★	
COUPLING, with Inserts and Hardware	6525-30	★		6525-30	★	
NUTS & BOLTS, 8-inch (12)	6472-161	★		6472-161	★	
WRENCH, TORQUE, 30 in-lbs.	6525-60	★		6525-60	★	
SOCKET, 1/4 inch	6525-61	★		6525-61	★	
SUPPORT ASSEMBLY, Complete	6472-38	★		6472-42	★	
TEMPERATURE MONITORING SYSTEM, Complete	8318-207	★		8318-209	★	
AIR MOTOR, 1-1/2 HP with 1/2 inch Motor Shaft	13370-10	★		13370-10	★	
FILTER/REGULATOR/LUBRICATOR for Air Motor	13372-45	★		13372-45	★	
AGITATOR, Lower, PTFE, Multipaddle (178mm)	8091-36	★		8091-36	★	
AGITATOR, Upper, PTFE, with 4 Pitched Blades, 152mm	8093-35	★		8093-35	★	
STIRRING SHAFT, Polished Glass, 28mm	8080-14	★		8080-18	★	
BEARING, PTFE, $\frac{1}{8}$ 45/50	8067-105	★		8067-105	★	
CONNECTOR, Beam, Conn. 1/2 inch Motor Shaft to Chuck	6472-155	★		6472-155	★	
CHUCK, 28mm, Connects Beam Conn. to Stirring Shaft	6472-157	★		6472-157	★	
COLLAR, w/PTFE Gasket	8127-28	♣		8127-28	♣	
ADAPTER, #7 - $\frac{1}{8}$ 29/42	5028-32	♣		5028-32	♣	
ADAPTER, #11 - $\frac{1}{8}$ 45/50	5030-60	♣		5030-60	♣	
ADAPTER, #15 - $\frac{1}{8}$ 45/50	8042-21	♣		8042-21	♣	
ADAPTER, #15 - $\frac{1}{8}$ 45/50, w/4mm PTFE S/C	5274-22	♣		5274-22	♣	
ADAPTER, #11 and #15 - $\frac{1}{8}$ 45/50	5031-86	★		5031-86	★	
ADAPTER, Side Arm, $\frac{1}{8}$ 45/50M - $\frac{1}{8}$ 45/50M - $\frac{1}{8}$ 24/40F	5040-96	♣		5040-96	♣	
ADAPTER, Angle, $\frac{1}{8}$ 45/50F - $\frac{1}{8}$ 45/50M	5075-45	★		5075-45	★	
BUSHING, Nylon, #11	7506-02	♣		7506-02	♣	
BUSHING, Nylon, #15 (4)	7506-06	♣		7506-06	♣	
CONDENSER, 500mm, $\frac{1}{8}$ 45/50	5945-76	★		5945-76	★	
CONDENSER, Cold Finger, 14mm O.D., 625mm	5958-99	★		5958-99	★	
STOPPER, $\frac{1}{8}$ 45/50 (4)	8250-20	♣		8250-20	♣	
STOPPER, $\frac{1}{8}$ 71/60	8250-28	♣		8250-28	♣	
CLAMP HOLDER	11081-21	★		11081-21	★	
ROD, 6 inch x 1/2 inch for Temperature Monitor	11166-22	★		11166-22	★	
GREASE, Krytox, GPL	8115-08	♣		8115-08	♣	
COMPLETE	6472-151	★		6472-154	★	

6473 Cylindrical Pilot Plants

Domed Head Jacketed



6473-66

100 Liter Reactor

With Stainless Steel Support

- ▶ **100 Liter Reactor with bottom outlet**
- ▶ **Domed glass head with large side port opening**
- ▶ **Rugged stainless steel pipe support frame on casters for mobility**
- ▶ **Adjustable height flask support**

For Heating/Cooling Circulators, see listing starting on page 90.

6473 PILOT PLANT REACTOR *Cylindrical, 100 Liter Jacketed Flask (12 inch Flange), Domed Head*

Complete cylindrical pilot plant reactor on self-supporting, mobile support frame on one-inch stainless steel pipe, measures 94 inches high, 28 inches wide, 28 inches deep (frame shipped assembled).

Flask opening is 300mm (12 inch) flat-ground flange. Bottom outlet is a "Flush Seal" drain valve with a one-inch beaded drain discharge. O-Rings supplied on valve are CAPFE (silicone encapsulated with PTFE) & Kalrez, for excellent chemical resistance.

Jacket on flask is direct sealed at top and silicone sealed at bottom. 35/25 O-Ring ball joints on inlet/outlet ports sealed tangentially. Flask sits on a padded metal alloy (coated) ring secured directly to one-inch pipe, and is adjustable, vertically, to allow room for vari-

ous outlet configurations.

Head is traditionally domed style, with eight openings: five $\frac{1}{2}$ 45/50, two $\frac{1}{2}$ 29/42 plus one 100 mm I.D. side port.

Motor is secured on black epoxy coated mounting plate over center $\frac{1}{2}$ 45/50 opening on head; other openings are for condenser, thermoprobe, cooling coil, etc. Head is secured to flask with PTFE gasket and plastic coupling. Maximum bolt tightening torque for coupling (cold state) is 30 in-lbs. In place of domed head, ACE offers a flat glass or flat stainless steel head.

Stirring motor is heavy duty, 1/2 HP electric motor for hazardous area duty. Motor shaft is 5/8 inch O.D. Controller operates on 120 volts 50/60 Hz. (Air motor available, call

for details).

28mm (1-1/8 inch) O.D. precision ground and polished glass stirring shaft with a "pinned" multi-paddle PTFE agitator at bottom and a turbine blade PTFE agitator higher on shaft for grease-free operation with 8067 PTFE bearing.

Optional cooling coil is 1/2 inch O.D. copper tubing encapsulated with PTFE; also available in 316 stainless steel or Hastalloy C-276.

A Temperature Monitoring System, with PTFE-covered Type "J" Thermocouple, is supplied to give an instant readout of temperature.

100 LITER (12 inch Flange)

Order Code

FLASK	6473-09	★
Head, Domed, with Eight Openings	6530-45	★
GLASS CAP, 100mm	15312-33	★
CAPFE O-Ring, 100mm	7855-880	★
CLAMP, "Quick Release," 100mm	6517-25	★
GASKET, PTFE	6525-51	★
COUPLING, with Inserts and Hardware	6525-30	★
WRENCH, TORQUE, 62 in-lbs.	6525-60	★
SOCKET 1/2 inch	6525-61	★
DRAIN VALVE, "Flush Seal"	6472-245	★
CLAMP, Drain Seal, 1 inch	8856-07	★
CLAMP, Drain Seal, 2 inch	8856-11	★
SWEEP ELBOW, 60°, 1 inch BP	8830-207	★
SUPPORT ASSEMBLY, Complete	6473-35	★
TEMPERATURE MONITORING SYSTEM, Complete	8318-209	★
STIRRER MOTOR AND CONTROLLER, 1/2 HP	13554-55	★
AGITATOR, Lower, PTFE, Multipaddle, 178mm	8091-36	★
AGITATOR, Upper, PTFE, with 4 Pitched Blades, 152mm (1)	8093-35	★
STIRRING SHAFT, Polished Glass, 28mm	8080-30	★
BEARING, PTFE, $\frac{1}{2}$ 45/50	8067-105	★
CONNECTOR, Beam, Conn. 5/8 inch Motor Shaft to Chuck	6472-156	★
CHUCK, 28mm, Connects Beam Conn. to Stirring Shaft	6472-157	★
COLLAR, with PTFE Gasket	8127-28	♣
ADAPTER, #7 - $\frac{1}{2}$ 24/40	5028-30	♣
ADAPTER, #11 - $\frac{1}{2}$ 45/50	5030-19	♣
ADAPTER, #15 - $\frac{1}{2}$ 29/42 (2)	5030-42	♣
ADAPTER, #15 - $\frac{1}{2}$ 45/50	8042-21	♣
ADAPTER, #15 - $\frac{1}{2}$ 45/50, with 4mm PTFE stopcock	5274-22	♣
ADAPTER, #11 and #15 - $\frac{1}{2}$ 45/50	5040-96	♣
ADAPTER, Side Arm, $\frac{1}{2}$ 45/50M - $\frac{1}{2}$ 45/50M - $\frac{1}{2}$ 24/40F	5031-86	★
ADAPTER, Angle, $\frac{1}{2}$ 45/50F - $\frac{1}{2}$ 45/50M	5075-45	★
ADAPTER, Offset, $\frac{1}{2}$ 45/50F - $\frac{1}{2}$ 45/50M	5268-21	★
BUSHING, Nylon, #11	7506-02	♣
BUSHING, Nylon, #15 (3)	7506-06	♣
CONDENSER, 500mm, $\frac{1}{2}$ 45/50	5945-76	★
CONDENSER, Cold Finger, 14mm O.D., 625mm	5958-99	★
STOPPER, $\frac{1}{2}$ 29/42 (2)	8250-14	♣
STOPPER, $\frac{1}{2}$ 45/50 (4)	8250-20	♣
CLAMP, Chain	11079-24	★
CLAMP HOLDER, Pilot Plant (2)	11081-21	★
SUPPORT ROD, 1/2 inch diameter, 12 inch long (2)	11166-37	★
END-TO-END ROD CONNECTOR	11175-23	★
GREASE, Krytox GPL	8115-08	♣
COMPLETE	6473-66	★

6559 Low-Profile Pilot Plant**Flat Head
Jacketed****50 Liter Reactor***With Stainless Steel Support***New**

- ▶ **Portable 50 Liter Jacketed Reactor with bottom outlet**
- ▶ **Low profile for smaller, walk-in hoods**
- ▶ **Rugged pipe support frame on casters for mobility**
- ▶ **Also available with domed head**
- ▶ **Also available with three-post stand**

For Heating/Cooling Circulators, see listing starting on page 90.



6559-10

6559 PILOT PLANT REACTOR *Low-Profile, 50 Liter Jacketed Flask, Flat Head*

Complete cylindrical pilot plant reactor on 1-inch stainless steel pipe, self supporting, mobile support frame; measures 22 inches wide by 22 inches deep x 68 inches high. Note: Frame shipped assembled.

This system has new low-profile 50L jacketed flask which has a reduced height vs. the standard 50L flask by 25%. The reactor has the same capacity as the standard 50L but with the shorter frame and flask enables it to fit into hoods easier. Jacketed flask has a 300mm (12-inch) opening, flat ground flange top. Bottom outlet is a flush-seal drain valve with a 1inch beaded pipe outlet. O-rings provide for valve are CAPFE, (silicone encapsulated with PTFE) for excellent chemical

resistance. Flasks with other bottom outlet valves are available. Jacket on flask is direct sealed at top and silicone rubber sealed at bottom. 35/25 O-Ring ball joint inlet/outlet connections are sealed tangentially.

Bottom padded flask support is adjustable to allow room under flask for various outlet configurations.

Unique flat reactor head 32mm (1-1/4-inch) thick, flat, borosilicate glass plate with eight ports; five 45/32, two 29/32, and one 71/32 sample port. Head is secured to flask with PTFE gasket and plastic coupling. Max bolt tightening torque for coupling is 30 in-lbs. Dome-head version is also available. Motor is secured on a black epoxy coated mounting

plate over center 45/32 neck on head. Other openings are for condenser, thermoprobe, etc.

Stirring motor is high powered, 1/2HP explosion proof motor complete with controller box and with a side drive gear box to save even more head space. Stir rod is 28mm (1-1/8-inch) O.D. precision ground and polished glass shaft with a "pinned" multi-paddle PTFE agitator at the bottom and a turbine blade PTFE agitator in the middle of the shaft. Running through an ACE precision bearing.

A J-Kem temperature monitor and 36-inch "T" thermocouple is included to give an instant readout of vessel temperature.

50 LITER

Order Code

FLASK, Jacketed, with Flat Flange and 2 inch BP Bottom Opening	6543-30	◆
Head, Flat, 1-1/4 inch with 8 Openings	6472-21	★
DRAIN VALVE, "Flush Seal"	6472-245	★
CLAMP, Drain Valve, 1 inch	8856-07	★
CLAMP, Drain Valve, 2 inch	8856-11	★
SWEEP ELBOW, 60°, 1 inch Beaded Pipe	8830-207	★
GASKET, PTFE	6525-51	★
COUPLING, with Inserts and Hardware	6525-30	★
NUTS & BOLTS, 8-inch (12)	6472-161	★
WRENCH, TORQUE, 30 in-lbs.	6525-60	★
SOCKET, 1/4 inch	6525-61	★
SUPPORT ASSEMBLY, Complete	6472-334	★
J-KEM TEMPERATURE MONITORING SYSTEM, Complete	12327-03	★
PROBE T 36 inch	12180-11	★
EXTENSION CORD, 11-foot	12190-11	★
1/2 HP ELECTRIC MOTOR	13554-50	★
CONTROLLER	13554-26	★
SIDE DRIVE GEAR BOX	13557-10	★
AGITATOR, Lower, PTFE, Multipaddle (178mm)	8091-36	★
AGITATOR, Upper, PTFE, with 4 Pitched Blades, 152mm	8093-35	★
STIRRING SHAFT, Polished Glass, 28mm, 40 inch Length	8080-12	★
BEARING, PTFE, Inner Body, \$45/50	8067-55	◆
GLASS FILLED PTFE BUSHING	8067-58	◆
GLASS FILLED PTFE LOCK-NUT	8067-60	◆
SADDLE O-RING	8067-65	◆
GLASS BODY ONLY, \$45/50-36	5030-78	◆
CONNECTOR, Beam, Conn. 5/8-inch Motor Shaft to Chuck	6472-156	★
CHUCK, 28mm, Connects Beam Conn. to Stirring Shaft	6472-157	★
COLLAR, w/PTFE Gasket	8127-28	◆
ADAPTER, #7 - \$29/42	5028-32	◆
ADAPTER, #11 - \$45/50	5030-60	◆
ADAPTER, #15 - \$45/50	8042-21	◆
ADAPTER, #15 - \$45/50, w/4mm PTFE S/C	5274-22	◆
ADAPTER, #11 and #15 - \$45/50	5031-86	★
ADAPTER, Side Arm, \$45/50M - \$45/50M - \$24/40F	5040-96	◆
ADAPTER, Angle, \$45/50F - \$45/50M	5075-45	★
BUSHING, Nylon, #11	7506-02	◆
BUSHING, Nylon, #15 (4)	7506-06	◆
CONDENSER, 500mm, \$45/50	5945-76	★
CONDENSER, Cold Finger, 14mm O.D., 625mm	5958-99	★
STOPPER, \$45/50 (4)	8250-20	◆
STOPPER, \$71/60	8250-28	◆
ADAPTER, Offset, \$45/50F - \$45/50M	5268-21	★
CLAMP, Chain	11079-24	★
END-TO-END ROD CONNECTOR	11175-23	★
CLAMP HOLDER (2)	11081-21	★
ROD, 6 inch x 1/2 inch for Temperature Monitor (2)	11166-22	★
GREASE, Krytox, GPL	8115-08	◆
COMPLETE	6559-10	★

6474 Spherical Pilot Plants**Domed Head
Unjacketed****50/72/100 Liter Reactors***With Stainless Steel Support*

- ▶ **50, 72 & 100 Liter Reactors with bottom outlet**
- ▶ **Internal heat exchange coil***
- ▶ **Rugged stainless steel pipe support frame on casters for mobility**
- ▶ **Adjustable height flask supports**



6474-60

**Supplied with PTFE-coated copper tubing; also available in Hastalloy C-276 or 316 stainless steel.*

6474 PILOT PLANT REACTOR *Spherical, 50/72/100 Liter Unjacketed Flask (8 inch Flange), Domed Head*

Complete spherical pilot plant reactor on self-supporting, mobile one-inch stainless steel pipe support frame: 50 liter size measures 72 inches high, 26 inches wide, 26 inches deep; 72 liter size measures 85 inches high, 32 inches wide, 32 inches deep; 100 liter size measures 85 inches high, 40 inches wide, 40 inches deep (frame shipped assembled).

Flask opening is 200 mm (8 inch); Schott-style flange with O-Ring groove as center neck (supplied with 7855-884 CAPFE O-Ring); three 45/50 side necks on all capacities. Bottom outlet is a 0-20mm adjustable opening threaded valve on all sizes. O-Ring supplied on valves are Chemraz (PTFE elastomeric material) for excellent chemical resistance. Other bottom outlet

valves available, contact ACE.

Black epoxy coated aluminum flask support plate is adjustable, vertically, to allow room under flask for various outlet configurations.

Domed style head has one 45/50 center joint, two 29/42 side joints and connects to flask head with 6517 Quick Release Clamp.

Motor is secured on black epoxy coated mounting plate over center 45/50 opening on head; other openings are for condenser, thermoprobe, cooling coil, etc.

Stirring motor is a heavy duty, 1/4 HP (50 L and 72 L, 1/2 HP (100 L) electric motor for hazardous area duty. Motor shaft is 5/8 inch O.D. Controller operates on 120 volts, 50/60 Hz. (Air motor available, call for quotation).

Precision ground and polished glass stirring shaft: 50 L Reactor has a 19 mm O.D. rod; 72 L and 100 L have 28 mm (1-1/8 inch) O.D. rods, with a "pinned" multi-paddle PTFE agitator at bottom and a turbine blade PTFE agitator higher on shaft for grease-free operation with 8067 PTFE bearing.

Cooling coil is 3/8-inch O.D. copper tubing encapsulated with PTFE; also available in 316 Stainless Steel or Hastalloy C-276.

A digital Temperature Control System is supplied to control heating mantles. This prevents over-heating and overshoot, and gives an instant readout of temperature.

	50 LITER (8 inch I.D. Flange) Order Code		72 LITER (8 inch I.D. Flange) Order Code		100 LITER (8 inch I.D. Flange) Order Code	
FLASK, with Side Necks and Bottom Valve	6530-10	★	6530-17	★	6530-23	★
Head, 45/50 Center Neck, 29/42 Side Necks	6530-33	★	6530-33	★	6530-33	★
CLAMP, "Quick Release"	6517-31	★	6517-31	★	6517-31	★
MANTLE, Bottom, Low Profile, w/Twist-Lock Connector (Wattage-Voltage)	12050-41 (370w-115v)	★	12050-43 (1300w-230v)	★	12050-45 (1600w-230v)	★
MANTLE, Girdle, Low Profile, w/Twist-Lock Connector (Wattage-Voltage)	12041-40 (2-1200w-115v)	★	12041-42 (2-1800w-230v)	★	12041-44 (3-1400w-230v)	★
SUPPORT ASSEMBLY, Complete	6474-370	★	6474-371	★	6474-372	★
TEMPERATURE CONTROL SYSTEM, Complete	6472-73	★	6472-75	★	6472-75	★
STIRRING MOTOR AND CONTROLLER, 1/4 HP	13554-45	★	13554-45	★	—	
STIRRING MOTOR AND CONTROLLER, 1/2 HP	—		—		13554-55	★
AGITATOR, Lower, PTFE, Multipaddle, 140mm	8091-26	★	—		—	
AGITATOR, Lower, PTFE, Multipaddle, 140mm	—		8091-34	★	8091-34	★
AGITATOR, Upper, PTFE, with 4 Pitched Blades, 140mm	—		—		8093-25	◆
STIRRING SHAFT, Polished Glass, 19mm	8076-45	◆	—		—	
STIRRING SHAFT, Polished Glass, 28mm	—		8080-14	★	8080-14	★
BEARING, PTFE, 45/50	8067-30	◆	8067-105	★	8067-105	★
CHUCK, "Flex-Grip," 19mm	8124-23	◆	—		—	
CONNECTOR, Beam, Connects 5/8 inch Motor Shaft to Chuck	—		6472-156	★	6472-156	★
CHUCK, 28mm, Connects Beam Conn. to Stirring Shaft	—		6472-157	★	6472-157	★
COLLAR, with PTFE Gasket	8127-20	◆	8127-28	◆	8127-28	◆
COIL, Cooling/Heating, Copper/PTFE, 3/8 inch	12067-61	★	12067-63	★	12067-65	★
ADAPTER, #11 – 29/42 (2)	5030-24	◆	5030-24	◆	5030-24	◆
ADAPTER, #15 – 45/50	8042-21	◆	8042-21	◆	8042-21	◆
ADAPTER, #15 – 45/50, with 4mm PTFE S/C	5274-22	◆	5274-22	◆	5274-22	◆
ADAPTER, #11 and #15 – 45/50	5031-86	★	5031-86	★	5031-86	★
ADAPTER, Side Arm, 45/50M – 45/50M – 24/40F	5040-96	◆	5040-96	◆	5040-96	◆
ADAPTER, Angle, 45/50F – 45/50M	5075-45	★	5075-45	★	5075-45	★
ADAPTER, Offset, 45/50F – 45/50M	5268-21	★	5268-21	★	5268-21	★
BUSHING, Nylon, #11	7506-02	◆	7506-02	◆	7506-02	◆
BUSHING, Nylon, #15 (4)	7506-06	◆	7506-06	◆	7506-06	◆
CONDENSER, 500mm, 45/50	5945-76	★	5945-76	★	5945-76	★
CONDENSER, Cold Finger, 14mm O.D., 625m	5958-99	★	5958-99	★	5958-99	★
STOPPER, 45/50 (3)	8250-20	◆	8250-20	◆	8250-20	◆
CLAMP, Chain	11079-24	★	11079-24	★	11079-24	★
CLAMP HOLDER, Pilot Plant (2)	11081-21	★	11081-21	★	11081-21	★
SUPPORT ROD, 1/2 inch diameter, 12 inch long (2)	11166-37	★	—		—	
SUPPORT ROD, 1/2 inch diameter, 18 inch long (2)	—		11166-25	★	11166-25	★
END-TO-END CONNECTOR	11175-23	★	11175-23	★	11175-23	★
GREASE, Krytox GPL	8115-08	◆	8115-08	◆	8115-08	◆
COMPLETE	6474-60	★	6474-64	★	6474-68	★

6474 Spherical Pilot Plants

Domed Head Unjacketed

200 Liter Reactor

With Stainless Steel Support

- ▶ **200 Liter Reactor with bottom outlet**
- ▶ **Internal heat exchange coil***
- ▶ **Rugged stainless steel pipe support frame on casters for mobility**
- ▶ **Adjustable height flask support**



6474-75

**Supplied with PTFE-coated copper tubing; also available in Hastalloy C-276 or 316 stainless steel.*

6474 PILOT PLANT REACTOR *Spherical, 200 Liter Unjacketed Flask (12 inch Flange), Domed Head*

Complete cylindrical pilot plant reactor on self-supporting, mobile support frame on one-inch stainless steel pipe, measures 90 inches high, 42 inches wide, 42 inches deep (frame shipped assembled).

Flask opening is 300mm (12 inch) flat-ground flange. Bottom outlet is a "Flush Seal" drain valvewith a one-inch beaded drain discharge. O-Ring supplied on valve is a CAPFE (silicone encapsulated with PTFE), and Kalrez for excellent chemical resistance. Flask has 100mm I.D. side port, angled 45 degrees.

Black epoxy coated aluminum flask support plate is adjustable, vertically, to allow room under flask for various outlet configurations. Upper support brackets supplied to

stabilize flask.

Head is traditional domed style, with eight openings; five $\frac{1}{2}$ 45/50, two $\frac{1}{2}$ 29/42.

Motor is secured on black epoxy coated mounting plate over center $\frac{1}{2}$ 45/50 opening on Head; other openings are for condenser, thermoprobe, cooling coil, etc. Head is secured to flask with PTFE gasket and plastic coupling. Maximum bolt tightening torque for coupling (cold state) is 30 in-lbs.

Stirring motor is heavy duty, 1/2 HP electric motor for hazardous area duty. Motor shaft is 5/8 inch O.D. Controller operates on 120 volts 50/60 Hz. (Air motor available, call for details.)

Features a 28mm (1-1/8 inch) O.D. preci-

sion ground and polished glass stirring shaft with a "pinned" multi-paddle PTFE agitator at bottom and a turbine blade PTFE agitator higher on shaft for grease-free operation with 8067 PTFE bearing.

Cooling coil is 1/2 inch O.D. copper tubing encapsulated with PTFE; also available in 316 Stainless Steel or Hastalloy C-276.

A digital Temperature Control System is supplied to control heating mantles. This prevents over-heating and overshoot, and gives an instant readout of temperature.

200 LITER

(12 inch I.D. Flange)

Order Code

FLASK, with Side Necks and 2 inch BPBottom Opening	6474-29	★
HEAD, Domed, with Seven Openings	6472-23	★
GASKET, PTFE	6525-51	★
COUPLING, with inserts and hardware	6525-30	★
WRENCH, Torque, 30 in-lbs	6525-60	★
SOCKET, 1/4 inch	6525-61	★
DRAIN VALVE, "Flush Seal"	6472-245	★
CLAMP, Drain Valve, 1 inch	8856-07	★
CLAMP, Drain Valve, 2 inch	8856-11	★
SWEEP ELBOW, 60°, 1 inch BP	8830-207	★
CAP, 4 inch	15312-33	★
O-Ring, CAPFE, for 4 inch Flange	7855-880	★
CLAMP, "Quick Release"	6517-25	★
MANTLE, Bottom, Aluminum, w/hole, 4-2000x-230v, wired w/plugs	12053-78	★
SUPPORT ASSEMBLY, Complete	6474-373	★
TEMPERATURE CONTROL SYSTEM, Complete	6472-83	★
STIRRING MOTOR AND CONTROLLER, 1/2 HP	13554-55	★
AGITATOR, Lower, PTFE, Multipaddle, 178mm	8091-36	★
AGITATOR, Upper, PTFE, with 4 Pitched Blades, 152mm	8093-35	★
STIRRING SHAFT, Polished Glass, 28mm	8080-24	★
BEARING, PTFE, $\frac{1}{2}$ 45/50	8067-105	★
CONNECTOR, Beam, Connects 5/8 inch Motor Shaft to Chuck	6472-156	★
CHUCK, 28mm, Connects Beam Conn. to Stirring Shaft	6472-157	★
COLLAR, w/PTFE Gasket	8127-28	♣
COIL, Cooling/Heating, Copper/PTFE, 1/2 inch	12067-68	★
ADAPTER, #15 - $\frac{1}{2}$ 29/42 (2)	5030-42	♣
ADAPTER, #15 - $\frac{1}{2}$ 45/50	8042-21	♣
ADAPTER, #15 - $\frac{1}{2}$ 45/50, with 4mm PTFE S/C	5274-22	♣
ADAPTER, #11 and #15 - $\frac{1}{2}$ 45/50	5031-86	★
ADAPTER, Side Arm, $\frac{1}{2}$ 45/50M - $\frac{1}{2}$ 45/50M - $\frac{1}{2}$ 24/40F	5040-96	♣
ADAPTER, Angle, $\frac{1}{2}$ 45/50F - $\frac{1}{2}$ 45/50M	5075-45	★
ADAPTER, Offset, $\frac{1}{2}$ 45/50F - $\frac{1}{2}$ 45/50M	5268-21	★
BUSHING, Nylon, #11	7506-02	♣
BUSHING, Nylon, #15 (4)	7506-06	♣
CONDENSER, 500mm, $\frac{1}{2}$ 45/50	5945-76	★
CONDENSER, Cold Finger, 14mm O.D., 625m	5958-99	★
STOPPER, $\frac{1}{2}$ 45/50 (3)	8250-20	♣
CLAMP, Chain	11079-24	★
CLAMP HOLDER, Pilot Plant (2)	11081-21	★
SUPPORT ROD, 1/2 inch diameter, 18 inch long	11166-25	★
END-TO-END CONNECTOR	11175-23	★
GREASE, Krytox GPL	8115-08	♣
COMPLETE	6474-75	★

Ace Glass introduces our new systems for totally automated reactions. Systems are available in bench scale from 1L up to 6L and kilo class scale from 10L up to 100L jacketed reactors. The systems coupled with the new HEL MicroNOTE can control and data log three parameters including jacket temperature, motor speed/torque and system vacuum. Optional parameters can include pH or control pumps for dosing. The MicroNOTE control system features either a 7-inch or 15.6-inch color touch screen computer module. The software can control, data log and graph reactions as they occur in real time.

Size Capability:

Bench Scale:

- 1L up to 6L plain or jacketed
- Pressure and Filter reactors

Kilo Scale:

- 10L up to 200L, Plain, Cylindrical
- Up to 100 L Jacketed
- Triple wall up to 20L
- Up to 100L Spherical

The MicroNOTE can interact with new or existing components such as IKA or Heidolph stir motors, Heidolph peristaltic pumps, Huber or Julabo Circulators and other components. You can purchase a standard system as noted below or contact our tech engineers at **1-800-223-4524** or at www.aceglass.com to design a custom system just for your application.

6460 Auto Reactor Complete 20 Liter System

Complete 20L reactor with new stainless steel stand includes; 20L jacketed vessel, 7-port reactor head, Heidolph stir motor, stir shaft, PTFE agitators, Debris-free stir bearing, clamps, gaskets and o-rings, bottom drain valve, 1L addition funnel, condenser, HEL MicroNOTE system, with 15.6-inch touch screen, cables and expander box. J-Kem Model DVR 1000 vacuum controller and Julabo model FP51-SL heating and cooling circulator.

Touch Screen Size	Order Code
15.6 inches	6460-100
7 inches	6460-50

Systems available in other sizes from 10L up to 100 Liter. Also available with other chillers or motors and many other accessory combinations such as a clean-in-place system and pump, etc. The three parameters mentioned above are also standard, but other parameters are available on special quote such as pH or to control pumps for dosing, etc.

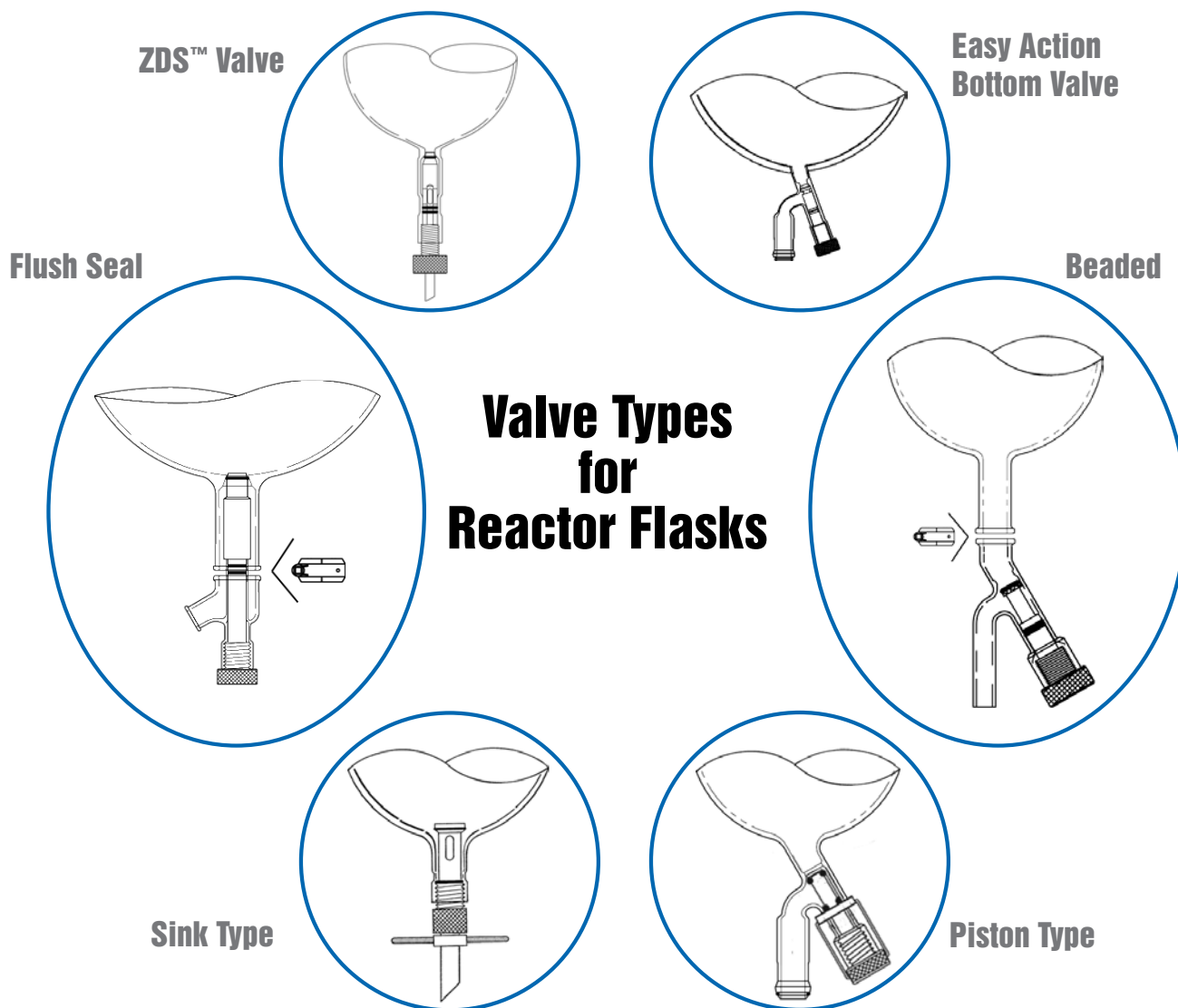


***“Quality reactions
require quality glass
and systems”***

Ace Glass combines 74 years of glass fabricating expertise with many, many years building glass reactor systems. Along with our key equipment partners, such as Julabo, Lauda, Heidolph, and J-Kem, we assemble process auto-reactors to fit today's tough reaction requirements.

**Ace Glass Introduces the
newest addition to our
reactor family –**

**The
ACE
Auto
Reactor
Series!**



Easy Action Bottom Valve

Flask has Easy Action Plug bottom outlet with Chemraz® O-Rings for draining contents. Bottom outlet has size 35/25 O-Ring ball joint connection. Supplied with one 7855-884 CAPFE O-Ring (PTFE encapsulated silicone O-Ring). Plain silicone O-Rings also available.

Sink Type Valve

Flask is fabricated with a #36 Ace-Thred on bottom. The all-PTFE valve is inserted into the Ace-Thred from inside the flask. A stainless steel handle is then secured to the drain tube. By rotating the handle, plug rises into the flask and contents drain through three (3) 1/2 inch wide x 1-1/2 inch long slit openings. Rotate handle in opposite direction and plug seals at bottom of flask, with NO dead space. Supplied with two Chemraz® O-Rings: one 7859-540, to secure valve in #36 Ace-Thred; the other, 7859-542, on bottom of plug to make seal at bottom of flask.

ZDS™ Valve

Flask has new Zero Dead Space (ZDS™) valve. When in the full open position, the ZDS™ valve allows for complete product drainage, and has no "hang-up" where material can be trapped or suspended. The product drains through openings in the valve stem, and will completely empty — including even dissolved and small solid particles. When closed, the valve plug seals flush to the bottom of the flask. The valve is available in two standard sizes. All wetted parts are borosilicate glass or inert PTFE. The PTFE plug stem O-Rings are made from Chemraz®, so the valve can handle almost any type of material or chemical.

Piston Type Valve

Flask has 35/25 O-Ring ball joint on outlet and utilizes a sealed-in threaded stopcock assembly that rotates CLOSED into the bottom of the flask thereby offering nearly zero dead space. Turn stopcock handle counterclockwise and piston plunger retracts to allow contents to drain. Drain opening is approximately 15mm. Piston plunger supplied with FETFE O-Rings (two 7855-726, one 7855-721); Chemraz® O-Rings can be offered as replacements.

Beaded

Flask is supplied with a 1 inch beaded pipe-type flange extension off bottom for connection to a 0-20 mm threaded stopcock as the outlet. Stopcock assembly has a mating 1 inch beaded flange that connects to extension off bottom via a Viton lined coupling. Takeoff on stopcock is 1 inch O.D. tubing. Drain assembly plug supplied with FETFE O-Rings; Chemraz® O-Rings can be offered as replacements. ACE could supply the takeoff with beaded flange, Ace-Thred, hose connection, etc.; call or email for quotation.

Flush Seal Valve

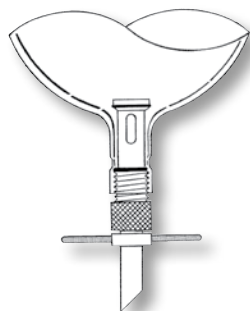
Flask is fabricated with a 2 inch beaded valve seat, for 30L and 50L. The plug, with a CAPFE O-Ring, is inserted into valve seat and secures within a coupling. By rotating the handle, plug rises into the flask and seals to afford zero dead space. Back thread out to drain through 1 inch beaded pipe angled side port. Supplied with CAPFE O-Ring for seal at flask, two Kalrez O-Rings supplied on valve stem. Other O-Ring materials available.

**6472-41**
6472 FLASK *Reaction, Pilot Plant, Cylindrical, with Piston Type Drain* ★

Similar to flask supplied with 6472 Pilot Plant Reactor except this flask has a bottom outlet with O-Ring ball joint and utilizing a sealed-in threaded stopcock assembly that rotates CLOSED into the bottom of the flask thereby offering nearly zero dead space. Turn stopcock handle counterclockwise and piston plunger retracts to allow contents to drain. Drain opening is approximately 15mm. Piston plunger supplied with FETFE O-Rings (two 7855-726, one 7855-721); Chemraz O-Rings can be offered as replacements. Offered as Flask only with Drain Assembly. For COMPLETE Pilot Plant Reactor with this flask, replace flask listed on pages 10 thru 29. Can also be substituted for outlets on 6473 or 6474 Assemblies, call for details.

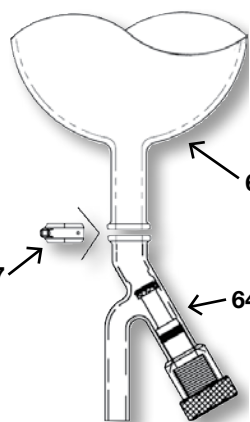
FLASK with Drain Assembly, ONLY

Capacity, Liters	O-Ring Ball Joint Size	Order Code
10	28/15	6472-39
30	35/25	6472-40
50	35/25	6472-41

**6472-66**
6472 FLASK *Reaction, Pilot Plant, Cylindrical, with "Sink Type" Drain* ★

Similar to flask supplied with 6472 Pilot Plant Reactor except this flask has a "Sink Type" Drain assembly as a bottom outlet. Flask is fabricated with a #36 Ace-Thred on bottom. The all- PTFE valve is inserted into the Ace-Thred from inside the flask. A stainless steel handle is then secured to the drain tube. By rotating the handle, plug rises into the flask and contents drain through three (3) 1/2-inch wide x 1-1/2-inch long slit openings. Rotate handle in opposite direction and plug seals at bottom of flask, with NO dead space. Supplied with two Chemraz® O-Rings: one 7859-540, to secure valve in #36 Ace-Thred; the other, 7859-542, on bottom of plug to make seal at bottom of flask. Offered as flask with thread only, Drain Assembly only, or Flask with Drain Assembly. For COMPLETE Pilot Plant Reactor with this flask and drain assembly, replace flask listed on pages 10 thru 29. Can also be substituted for outlets on 6473 or 6474 Assemblies, call for details.

FLASK, with Thread, only		SINK DRAIN ASSEMBLY, only		FLASK COMPLETE w/SINK DRAIN ASSY.	
Cap., Liters	Order Code	Cap., Liters	Order Code	Cap., Liters	Order Code
10	6472-64	10	6472-69	10	6472-164
30	6472-65	30	6472-69	30	6472-165
50	6472-66	50	6472-69	50	6472-166

**6472-98****6472-99**
6472 FLASK *Reaction, Pilot Plant, Cylindrical, with Beaded Drain Assembly* ★

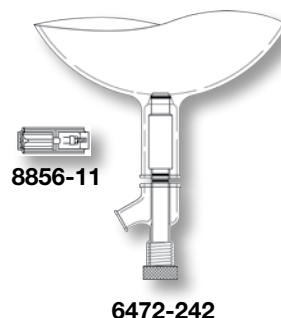
Similar to flask supplied with 6472 Pilot Plant Reactor except this flask is supplied with a 1-inch beaded pipe-type flange extension off bottom for connection to a 0-20 mm threaded stopcock as the outlet. Stopcock assembly has a mating 1-inch beaded flange that connects to extension off bottom via a Viton lined coupling. Takeoff on stopcock is 1-inch O.D. tubing. Drain assembly plug supplied with FETFE O-Rings; Chemraz O-Rings can be offered as replacements. ACE could supply the takeoff with beaded flange, Ace-Thred, hose connection, etc.; phone for quotation. Listed as Flask with beaded pipe extension only, Drain Assembly only (includes 0-20 plug plus glass thread with mating beaded pipe) or Flask with Drain Assembly. Order coupling separately. For COMPLETE Pilot Plant Reactor with this flask and drain assembly, replace flask listed on pages 10 thru 29. Can also be substituted for outlets on 6473 or 6474 Assemblies, call for details.

FLASK, with Bead, only		BEADED DRAIN ASSEMBLY, only		FLASK COMPLETE w/BEADED DRAIN ASSEM.	
Cap., Liters	Order Code	Cap., Liters	Order Code	Cap., Liters	Order Code
10	6472-96	10	6472-99	10	6472-196
30	6472-97	30	6472-99	30	6472-197
50	6472-98	50	6472-99	50	6472-198
Coupling, only		8856-07			

6472 FLASK *Reaction, Pilot Plant, Cylindrical, with "Flush Seal" Drain Assembly* ★

Similar to flask supplied with 6472 Pilot Plant Reactor except this flask has a "MARTIN STYLE" Flush Seal Drain Assembly as a bottom outlet. Flask is fabricated with a 2-inch beaded valve seat, for 30L and 50L. The plug with a CAPFE O-Ring is inserted into valve seat and secures within a coupling. By rotating the handle, plug rises into the flask and seals to afford zero dead space. Back thread out to drain through 1-inch beaded pipe angled side port. Supplied with CAPFE O-Ring for seal at flask, two Kalrez O-Rings supplied on valve stem. Other O-Ring materials are available. Offered as flask with valve seat only, Drain Assembly only, or Flask with Drain Assembly. For COMPLETE Pilot Plant Reactor with this flask and drain assembly, replace flask listed on pages 10 thru 29. Can also be substituted for outlets on 6473 or 6474 Assemblies, call for details.

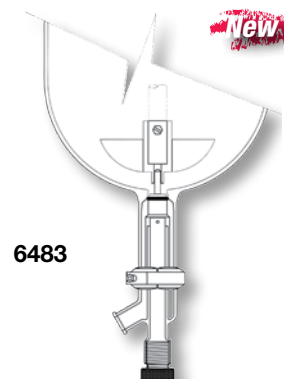
FLASK, with Bead, only		BEADED DRAIN ASSEMBLY, only		FLASK COMPLETE w/BEADED DRAIN ASSEM.	
Cap., Liters	Order Code	Cap., Liters	Order Code	Cap., Liters	Order Code
30	6472-241	30	6472-245	30	6472-248
50	6472-242	50	6472-245	50	6472-249
		Coupling, only 8856-11			



6483 VALVE ASSEMBLY *PTFE, Flush Seal, with Top Pin* ★

Redesigned "drain-seal" type valve similar to 6472-245 except that the top of the valve has a 1-1/2-inch x 3/8-inch O.D. pin that extends upward. The pin fits into the receptacle on the bottom of the 8100 and 8101 bottom agitators. This assembly is designed to reduce shaft wobble or "flexing" on the larger reactors. Top opening is 2-inch beaded pipe and the side drain port is 1-inch beaded pipe.

	Order Code
Complete Valve Assembly	6483-20



6540 FLASK *Reaction, Spherical, with ZDS™ Valve* ♦

The new Zero Dead Space (ZDS™) valve is designed for larger reaction flasks from bench scale to pilot plant scale. This new valve, when in the full open position allows for complete product drainage and has no "hang-up" where material can be trapped or suspended. The product drains through openings in the valve stem and will completely empty even including dissolved and small solid particles. When closed, the valve plug seals flush to the bottom of the flask.

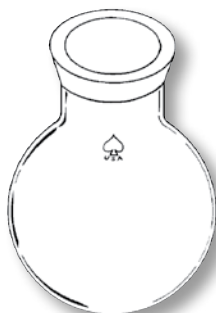
The ZDS valve is available as a stand-alone ready to be sealed to any vessel or, already sealed to an ACE reaction flask. The valve is available in two standard sizes. All wetted parts are borosilicate glass or inert PTFE. The PTFE plug stem O-Rings are made from Chemraz, so that the valve can handle almost any type of material or chemical.

Heavy wall spherical reaction flask with large Schott flat grooved flange opening. Flask uses 6517 Quick Clamps and heads found in the Ace General Catalog. Flask comes with one CAPFE O-Ring.

Capacity, L	Bottom Valve Size	Approx. Diameter, mm	Nominal Flange I.D., mm	Order Code
12	0-20mm	285	150 (6-inches)	6540-115
22	0-20mm	350	150 (6-inches)	6540-120



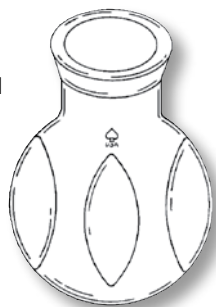
6479

**6479 REACTION FLASK** ♠

Rugged spherical flask with neck opening of 4-inches (10.2cm). Standard size flasks use regular Glas-Col heating mantles of equivalent capacity. Length of straight section including flange, approximately 9.5cm (3-3/4 inches). Uses 6496 Clamp for securing flask head to flask.

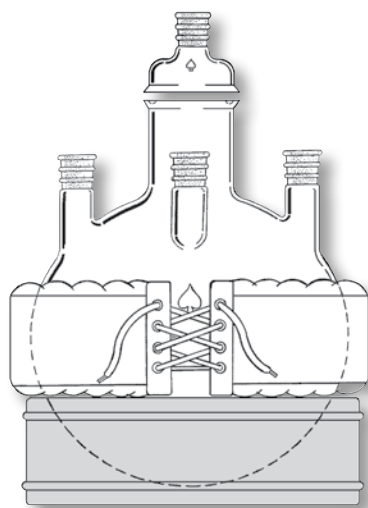
Capacity, mL	Order Code
12000	6479-15
22000	6479-20
50000	6479-25
72000	6479-30

6481

**6481 REACTION FLASK** *with Indents* ♠

Same as 6479, except with side indents for improved stirring characteristics. Not suitable for vacuum operation. Uses 6496 Clamp for securing flask head to flask.

Cap., mL	Order Code
12000	6481-15



6530

6530 REACTION ASSEMBLY *Spherical, 200 mm (8-inch) Flange* ★

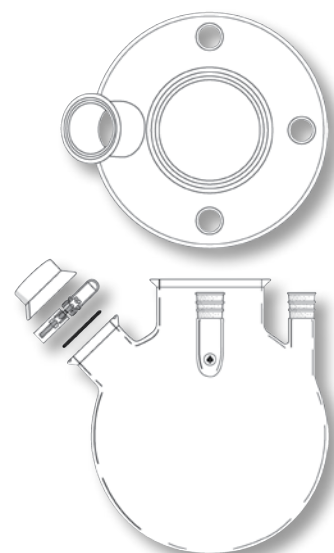
Spherical reaction flask with 200mm (8-inch) Schott flange with O-Ring groove as center neck and three (3) 45/50 side necks. Large center neck affords easy clean-out and allows insertion of a heat exchange coil, 12067. Use 6530 head on center neck and secure head to flask with 6517 "quick release" clamp. Flask is supplied with one 7855-288 silicone rubber O-Ring. For replacement silicone O-Ring or CAPFE O-Ring. Also listed are a low-profile, aluminum-housed heating mantle for bottom and a removable fabric (girdle) mantle for the sides. Order all parts individually.

	50 Liter	72 Liter	100 Liter
	Order Code	Order Code	Order Code
Flask, 200mm Flange, 8-inch Center Neck and (3) 45/50 Side Necks	6530-08	6530-15	6530-20
Head, only, 45/50	6530-32	6530-32	6530-32
Clamp, only	6517-31	6517-31	6517-31
Coil, Cooling, Copper/PTFE, 1/2-inch	12067-71	12067-71	12067-84
Mantle, Bottom, Low-Profile (Wattage)	12050-34 (1000w-115v)	12050-36 (1300w-230v)	12050-38 (1600w-230v)
Mantle, Girdle (Wattage)	12041-40 (2-1200w-115v)	12041-42 (2-1800w-230v)	12041-44 (2-2200w-230v)

6530 FLASK *Reaction, Spherical, 5-Neck, Side Port ★*

Rugged, spherical reaction flask with Schott-style 100mm (4 in.) I.D. O-Ring grooved side port, angled 45° for ease in adding material to flask. In addition to the 100mm side port, flask has three 45/50 side necks, all vertical. Center neck is a Schott-style O-Ring grooved flange supplied with a CAPFE (PTFE encapsulated silicone) O-Ring for use with 6517 Quick Release Clamp. Supplied with capacity reference gradations. For 100mm side port, order cap, O-Ring and clamp separately.

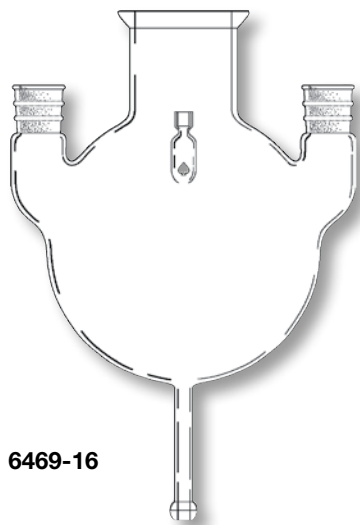
Capacity, Liters	Center Neck, mm (Inches)	Side Port Size (mm)	Order Code
22	100 (4)	60	6530-06
50	200 (8)	60	6530-08
72	200 (8)	100	6530-15
50	100 (4)	60	6530-42
50	150 (6)	60	6530-43
50	200 (8)	60	6530-44
50	100 (4)	100	6530-47
50	150 (6)	100	6530-48
50	200 (8)	100	6530-49
72	100 (4)	100	6530-52
72	150 (6)	100	6530-54
72	200 (8)	100	6530-56
100	100mm (4)	100	6530-64
100	150mm (6)	100	6530-65
100	200mm (8)	100	6530-66
Glass Cap, 100mm			15312-33
CAPFE O-Ring, 100mm			7855-880
Clamp, 100mm, Quick Release			6517-25
Clamp, 150mm, Quick Release			6517-27
Clamp, 200mm, Quick Release			6517-31


6530-47
6530 FLASK *Reaction, Spherical, with Bottom Outlet ★*

Spherical reaction flask with flat, ground flange and bottom valve. Supplied with capacity reference gradations. Nominal Flange I.D. is 200 mm (8 inches). Uses 6517-31 clamp and 7855-884 CAPFE O-Ring. Flask has three 45/50 side joints. 28/15 O-Ring/ball joint connection off valve.

Capacity, Liters	Full Capacity, Liters	Approx. Diameter, mm	Bottom Outlet Style	Order Code
50	56	557	0-20 mm	6530-10
50	56	557	Piston	6530-11
50	56	557	Sink	6530-12
50	56	557	Beaded	6530-13
50	56	557	Flush	6530-14
72	75	585	0-20 mm	6530-17
72	75	585	Piston	6530-18
72	75	585	Sink	6530-19
72	75	585	Beaded	6530-50
72	75	585	Flush	6530-21
100	102	710	0-20 mm	6530-23
100	102	710	Piston	6530-24
100	102	710	Sink	6530-25
100	102	710	Beaded	6530-26
100	102	710	Flush	6530-27


6530-11

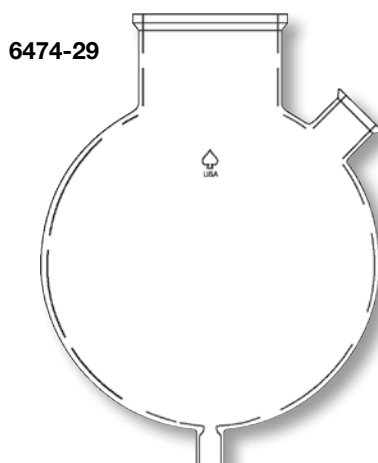


6469-16

6469 FLASK *Reaction, Spherical, with Bottom Outlet* ♦

Spherical reaction flask with flat, ground flange and bottom valve. Supplied with capacity reference gradations. Nominal Flange I.D. is 100 mm (4 inches). With three side ports: one #7 Ace-Thred and two 45/50 outer joints. Uses 6486-13 clamp and 6495-10 gasket. Bottom outlet is 28/15 ball joint.

Capacity, Liters	Full Capacity, Liters	Approx. Diameter, mm	Order Code
12	56	385	6469-16
22	56	450	6469-18

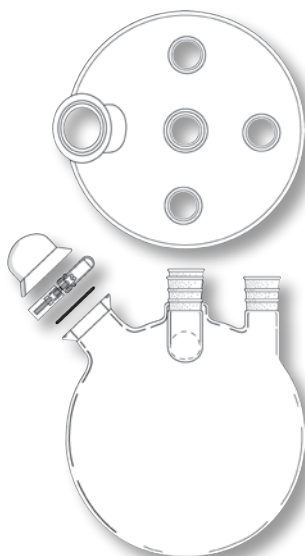


6474-29

6474 FLASK *Reaction, Spherical, with Bottom Outlet* ★

Spherical reaction flask with flat, ground flange and bottom valve. Supplied with capacity reference gradations. Nominal Flange I.D. is 300 mm (12 inches). Side sample port is angled at 45° and 60 mm (2.5 inches) in diameter. Uses 6525-30 clamp and 6525-51 gasket.

Capacity, Liters	Full Capacity, Liters	Approx. Diameter, mm	Bottom Outlet Style	Order Code
200	202	925	0-20 mm	6474-16
200	202	925	Piston	6474-18
200	202	925	Sink	6474-23
200	202	925	Beaded	6474-25
200	202	925	Flush	6474-29



6597-65

6957 FLASK *Reaction, Spherical, 5-Neck, 60mm Side Port*

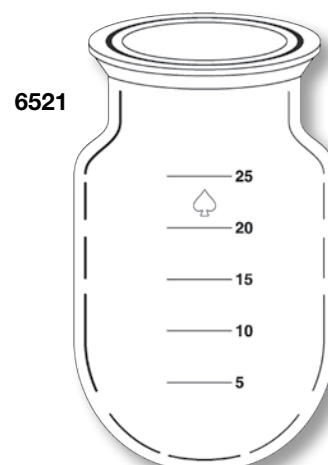
Rugged, spherical reaction flask with Schott-style 60mm (2.4 inch) I.D. O-Ring grooved side port, angled 45° for ease in adding material to flask. In addition to the 60mm side port, flask has either a 45/50 center neck. Supplied with capacity reference gradations. Flask has three additional 45 side necks, all vertical. For 60mm side port, order cap, O-Ring and clamp separately.

Capacity, Liters	Center Neck	Side Necks	Order Code	
22	45/50	45/50	6957-28	★
22	45/50	29/42	6957-26	★
22	45/50	24/40	6957-24	★
50	45/50	45/50	6957-65	
Glass Cap, 60mm			15312-30	★
CAPFE O-Ring, 60mm			7855-878	♦
Clamp, 60mm, Quick Release			6517-22	★

6521 FLASK *Reaction, Cylindrical, Plain* ★

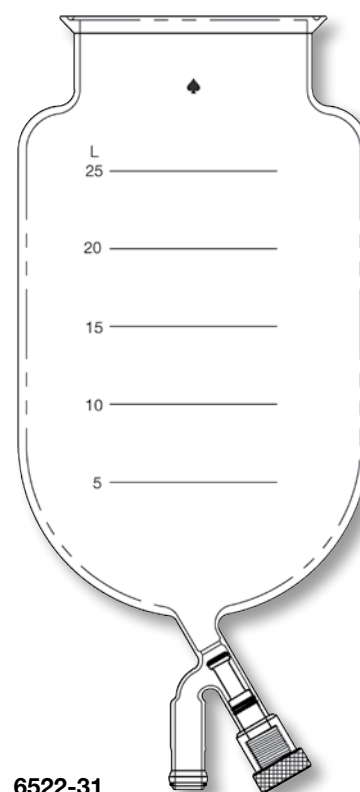
Rugged cylindrical reaction flask with Schott flat flange with O-Ring groove, for use with 6517 Quick Release Clamp. 10 liter and larger are supplied with capacity reference graduations. Each flask is supplied with one CAPFE O-Ring (PTFE encapsulated silicone O-Ring). Plain silicone O-Rings are also available. For reaction heads, see 6528 or 6530. For cooling/heating coils, see 12067.

Capacity, Liters	Full Capacity, Liters	Approx. Depth, mm	Nominal Flange I.D., mm (In.)	Use Clamp	Repl. CAPFE O-Ring	Order Code
10	14	470	200 (8)	6517-31	7855-884	6521-20
15	18	470	200 (8)	6517-31	7855-884	6521-25
20	22	570	200 (8)	6517-31	7855-884	6521-27
30	31	540	200 (8)	6517-31	7855-884	6521-30
50	56	890	200 (8)	6517-31	7855-884	6521-35
100	107	1040	200 (8)	6517-31	7855-884	6521-40
200	205	1540	200 (8)	6517-31	7855-884	6521-44

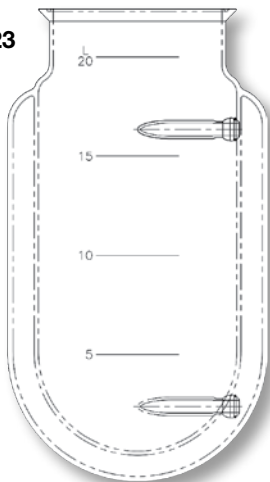

6522/6472 FLASK *Reaction, Cylindrical, with Bottom Outlet* ★

Similar to 6521 but with an Easy Action Plug bottom outlet with Chemraz® O-Rings for draining contents. Bottom outlet has 28/15 O-Ring ball joint connection. Nominal flange I.D. is 200 mm (8 inches) — use 6517-31 clamp. Flasks have capacity reference graduations, and each flask is supplied with one 7855-884 CAPFE O-Ring (PTFE encapsulated silicone O-Ring). Plain silicone O-Rings are also available.

Cap., Liters	Full Cap., Liters	Approx. Depth, mm	Outlet Size, mm	Bottom Outlet Style	Order Code
10	14	470	0-14	Easy Action	6522-21
15	18	470	0-20	Easy Action	6522-26
20	22	570	0-20	Easy Action	6472-167
30	31	540	0-20	Easy Action	6522-31
50	56	890	0-20	Easy Action	6522-36
100	107	1040	0-20	Easy Action	6522-41
200	205	1540	0-20	Easy Action	6522-45
10	14	470	0-20	Piston	6522-51
15	18	470	0-20	Piston	6522-52
20	22	570	0-20	Piston	6472-168
30	31	540	0-20	Piston	6522-53
50	56	890	0-20	Piston	6522-54
100	107	1040	0-20	Piston	6522-55
200	205	1540	0-20	Piston	6522-56
10	14	470	—	Sink	6522-61
15	18	470	—	Sink	6522-62
20	22	570	—	Sink	6472-169
30	31	540	—	Sink	6522-63
50	56	890	—	Sink	6522-64
100	107	1040	—	Sink	6522-65
200	205	1540	—	Sink	6522-66
10	14	470	—	Beaded	6522-71
15	18	470	—	Beaded	6522-72
20	22	570	—	Beaded	6472-170
30	31	540	—	Beaded	6522-73
50	56	890	—	Beaded	6522-74
100	107	1040	—	Beaded	6522-75
200	205	1540	—	Beaded	6522-76
10	14	470	—	Flush Valve	6522-81
15	18	470	—	Flush Valve	6522-82
20	22	570	—	Flush Valve	6472-02
30	31	540	—	Flush Valve	6522-83
50	56	890	—	Flush Valve	6522-84
100	107	1040	—	Flush Valve	6522-85
200	205	1540	—	Flush Valve	6522-86



6523

**6523 FLASK** *Reaction, Cylindrical, Jacketed* ★

Rugged cylindrical reaction flask with Schott flat flange and O-Ring groove, for use with 6517-31 Quick Release Clamp. Inlet and outlet connections on jacket, sealed tangentially, are O-Ring size 35/25 ball joints. Ten liter and larger are supplied with capacity reference graduations. Each flask is supplied with one 7855-884 CAPFE O-Ring (PTFE encapsulated silicone O-Ring) for flange. Plain silicone O-Rings are also available. For reaction heads, see 6528 or 6530. For cooling/heating coils, see 12067.

Capacity, Liters	Full Capacity, Liters	Approx. Depth, mm	Nominal Flange I.D. mm (In.)	Order Code
10	14	470	200 (8)	6523-22
15	18	470	200 (8)	6523-27
20	22	570	200 (8)	6523-30
30*	31	540	200 (8)	6523-32
50*	56	890	200 (8)	6523-37

6524/6472 FLASK *Reaction, Cylindrical, w/Bottom Outlet, Jacketed* ★

Rugged cylindrical reaction flask with Schott flat flange with O-Ring groove, for use with 6517-31 Quick Release Clamp. With an Easy Action Plug bottom outlet with Chemraz® O-Rings for draining contents. Inlet and outlet connections on jacket, sealed tangentially, are size 35/25 O-Ring ball joints. Ten liter and larger are supplied with capacity reference graduations. Each flask is supplied with one 7855-884 CAPFE O-Ring (PTFE encapsulated silicone O-Ring). Plain silicone O-Rings are also available. For reaction heads, see 6528 or 6530. For cooling/heating coils, see 12067. Bottom outlet has size 35/25 O-Ring ball joint.

6524-33



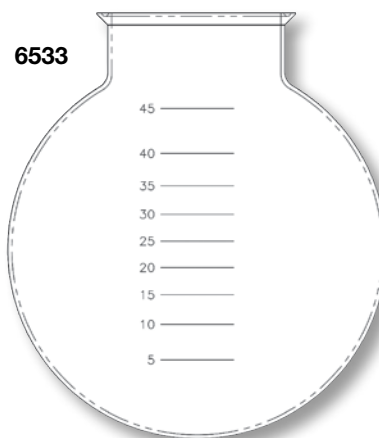
Cap., Liters	Full Cap., Liters	Approx. Depth, mm	Nominal Flange I.D. mm (In.)	Outlet Size, mm	Bottom Outlet Style	Order Code
10	14	470	200 (8)	0-14	Easy Action	6524-23
15	18	470	200 (8)	0-20	Easy Action	6524-28
20	22	570	200 (8)	0-20	Easy Action	6472-175
30*	31	540	200 (8)	0-20	Easy Action	6524-33
50*	56	890	200 (8)	0-20	Easy Action	6524-38
10	14	470	200 (8)	0-20	Piston	6524-43
15	18	470	200 (8)	0-20	Piston	6524-44
20	22	570	200 (8)	0-20	Piston	6472-176
30*	31	540	200 (8)	0-20	Piston	6524-45
50*	56	890	200 (8)	0-20	Piston	6524-46
10	14	470	200 (8)	—	Sink	6524-53
15	18	470	200 (8)	—	Sink	6524-54
20	22	570	200 (8)	—	Sink	6472-177
30*	31	540	200 (8)	—	Sink	6524-55
50*	56	890	200 (8)	—	Sink	6524-56
10	14	470	200 (8)	—	Beaded	6524-63
15	18	470	200 (8)	—	Beaded	6524-64
20	22	570	200 (8)	—	Beaded	6472-178
30*	31	540	200 (8)	—	Beaded	6524-65
50*	56	890	200 (8)	—	Beaded	6524-66
10	14	470	200 (8)	—	Flush Seal	6524-73
15	18	470	200 (8)	—	Flush Seal	6524-74
30*	31	540	200 (8)	—	Flush Seal	6524-75
50*	56	890	200 (8)	—	Flush Seal	6524-76

*Jackets on 30 and 50 Liter capacities are silicone rubber sealed at bottom only.

6533 FLASK *Reaction, Spherical, Plain*

Rugged spherical reaction flask with Schott flat flange with O-Ring groove, for use with 6517 Quick Release Clamp. Each flask is supplied with one CAPFE O-Ring (PTFE encapsulated silicone O-Ring). Flasks are supplied with capacity reference graduations. Plain silicone O-Rings are also available. For reaction heads, see 6529 or 6530. For cooling/heating coils, see 12067. For mantles, see 12043.

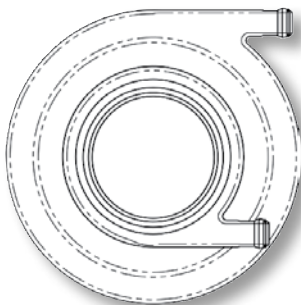
Capacity, Liters	Full Capacity, Liters	Approx. Diameter, mm	Nominal Flange I.D., mm (In.)	Use Clamp	Repl. CAPFE O-Ring	Order Code	
12	12.1	285	150 (6)	6517-27	7855-881	6533-12	♠
22	22.4	350	150 (6)	6517-27	7855-881	6533-15	★
50	49.9	457	200 (8)	6517-31	7855-884	6533-25	★
72	68.5	508	200 (8)	6517-31	7855-884	6533-28	★


6534 FLASK *Reaction, Spherical, with Bottom Outlet ★*

Rugged spherical reaction flask with Schott flat flange and O-Ring groove, for use with 6517 Quick Release Clamp. Flasks have capacity reference graduations, and can be configured with one of several different bottom outlets (see page 37 for a description of each outlet style). Each flask is supplied with one CAPFE O-Ring (PTFE encapsulated silicone O-Ring). Plain silicone O-Rings are also available. For reaction heads, see 6529 or 6530. For cooling/heating coils, see 12067. For mantles, see 12044. Easy-Action bottom outlet has size 35/25 O-Ring ball joint connection.

Cap., Liters	Full Cap., Liters	Approx. Dia., mm	Nominal Flange I.D., mm (In.)	Use Clamp	Repl. CAPFE O-Ring	Outlet Size, mm	Bottom Outlet Style	Order Code
12	12.1	285	150 (6)	6517-27	7855-881	0-14	Easy Action	6534-13
22	22.4	350	150 (6)	6517-27	7855-881	0-20	Easy Action	6534-16
50	49.9	457	200 (8)	6517-31	7855-884	0-20	Easy Action	6534-26
72	68.5	508	200 (8)	6517-31	7855-884	0-20	Easy Action	6534-29
12	12.1	285	150 (6)	6517-27	7855-881	0-20	Piston	6534-30
22	22.4	350	150 (6)	6517-27	7855-881	0-20	Piston	6534-32
50	49.9	457	200 (8)	6517-31	7855-884	0-20	Piston	6534-34
72	68.5	508	200 (8)	6517-31	7855-884	0-20	Piston	6534-36
12	12.1	285	150 (6)	6517-27	7855-881	—	Sink	6534-40
22	22.4	350	150 (6)	6517-27	7855-881	—	Sink	6534-42
50	49.9	457	200 (8)	6517-31	7855-884	—	Sink	6534-44
72	68.5	508	200 (8)	6517-31	7855-884	—	Sink	6534-46
12	12.1	285	150 (6)	6517-27	7855-881	—	Beaded	6534-50
22	22.4	350	150 (6)	6517-27	7855-881	—	Beaded	6534-52
50	49.9	457	200 (8)	6517-31	7855-884	—	Beaded	6534-54
72	68.5	508	200 (8)	6517-31	7855-884	—	Beaded	6534-56
12	12.1	285	150 (6)	6517-27	7855-881	—	Flush Seal	6534-60
22	22.4	350	150 (6)	6517-27	7855-881	—	Flush Seal	6534-62
50	49.9	457	200 (8)	6517-31	7855-884	—	Flush Seal	6534-64
72	68.5	508	200 (8)	6517-31	7855-884	—	Flush Seal	6534-66



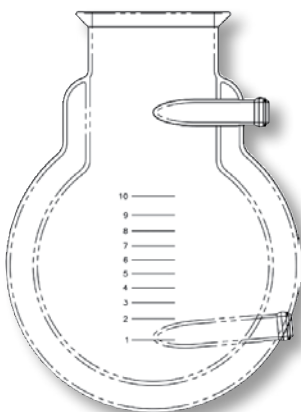


6535

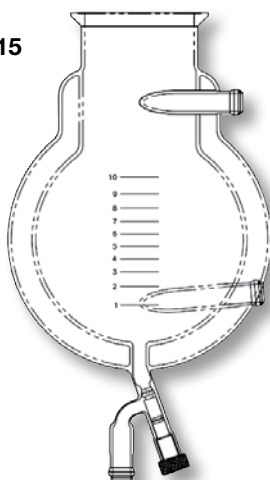
6535 FLASK *Reaction, Spherical, Jacketed* ★

Rugged spherical jacketed reaction flask with Schott flat flange with O-Ring groove, for use with 6517-27 Quick Release Clamp. Each flask is supplied with one 7855-881 CAPFE O-Ring (PTFE encapsulated silicone O-Ring). 12 liter are supplied with capacity reference graduations. Plain silicone O-Rings are also available. Inlet and outlet are size 28/15 O-Ring ball joints, sealed tangentially. For reaction heads, see 6529. For cooling/heating coils, see 12076.

Capacity, Liters	Full Capacity, Liters	Approx. Diameter, mm	Nominal Flange I.D., mm (In.)	Order Code
12	12.1	285	150 (6)	6535-12



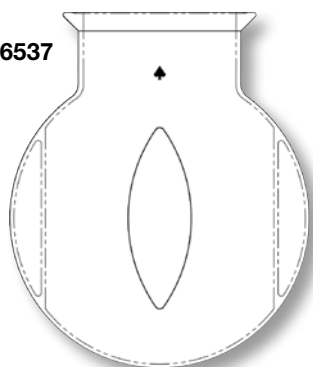
6536-15


6536 FLASK *Reaction, Spherical, Jacketed, with Bottom Outlet* ★

Rugged spherical reaction flask with Schott flat flange and O-Ring groove, for use with 6517-27 Quick Release Clamp. See listing below for different bottom outlet styles. The Easy-Action Plug bottom has a 28/15 bottom connector. Each flask is supplied with one 7855-881 CAPFE O-Ring (PTFE encapsulated silicone O-Ring). Plain silicone O-Rings are also available. All capacities have size 28/15 O-Ring ball joints on inlet and outlet, sealed tangentially. For reaction heads, see 6529. For cooling/heating coils, see 12067.

Capacity, Liters	Full Capacity, Liters	Approximate Diameter, mm	Nominal Flange I.D., mm (In.)	Bottom Outlet Style	Order Code
12	12.1	285	150 (6)	0-14mm	6536-15
12	12.1	285	150 (6)	Piston	6536-25
12	12.1	285	150 (6)	Sink	6536-35
12	12.1	285	150 (6)	Beaded	6536-45
12	12.1	285	150 (6)	Flush	6536-55

6537


6537 FLASK *Reaction, Spherical, Indented Style* ★

Rugged spherical reaction flask with Schott flat flange with O-Ring groove, for use with 6517-27 Quick Release Clamp but with indents for greater agitation. Each flask is supplied with one 7855-881 CAPFE O-Ring (PTFE encapsulated silicone O-Ring). Plain silicone O-Rings are also available. For reaction heads, see 6529. For cooling/heating coils, see 12067. NOT suitable for vacuum operation.

Capacity, Liters	Full Capacity, Liters	Approx. Diameter, mm	Nominal Flange I.D., mm (In.)	Order Code
12	12.1	285	150 (6)	6537-24

6310 FLASK *Three-Wall, Double-Jacketed*

Unique Ace proprietary designed triple wall or double jacketed flasks, available with various bottom outlets. These flasks are designed with an outside, third wall, vacuum evacuated and sealed for better thermal control and stability of the jacketed reactor. The first wall is the main reactor body, the second is the thermal fluid compartment with inlet/outlet O-ring ball joints and the third is the evacuated compartment. The double jacket also eliminates “frosting-up” on the outer jacket as seen in low temperature with traditional jacketed flasks. The jacket I/O are 35/25 O-ring ball joints for easier recirculator hose connection. The top has an 8-inch O-Ring groove Duran style flange. All sizes have reference graduations. Flask comes with CAPFE O-ring. Other sizes and bottom valves are available on special request.

Inner Flask Cap., Liters	Overall Length, mm	Inner Flask ID, mm	Inner Flask Length, mm	Bottom Outlet Style	Order Code
10	626	201	490	2-inch Bead/Flush Valve	6310-100
10	626	201	645	No Outlet/Rounded	6310-105
15	785	201	645	2-inch Bead/Flush Valve	6310-120
15	785	201	645	No Outlet/Rounded	6310-125
20	800	235	665	2-inch Bead/Flush Valve	6310-130
20	800	235	665	No Outlet/Rounded	6310-135



6310

**See the Ace Bench Reactor Catalog for a
complete listing of bench-scale reactors.
Sizes 150mL up to 6 Liter.**



6472-21

6472 HEAD *Glass, Flat, Pilot Plant* ★

Borosilicate glass head with standard taper joints ground directly into glass. Head is 1-1/4-inch (32mm) thick designed for use with 300mm (12-inch) flat ground flanges on Reaction Flasks.

Center ⌘ Joint	Side ⌘ Joints	Order Code
45/32	(4) 45/32; (2) 29/32	6472-18
45/32	(4) 45/32; (2) 29/32; (1) 71/32	6472-21
Accessories		Order Code
71/60 Stopper		8250-28
300mm Coupling		6525-30
Nuts & Bolts, 8 inch		6472-161



6472-25, -26

6472 HEAD *Stainless Steel, Pilot Plant* ★

Reaction flask head fabricated from 316 Stainless Steel replaces flat or domed glass heads. This 1/4-inch thick head has the same openings as flat glass head and accepts ⌘ PTFE joint inserts secured top and bottom of plate with threaded nuts. 10L size uses one ⌘ 45/50, three ⌘ 29/42 and three ⌘ 24/40 inserts; 30L and 50L sizes use five ⌘ 45/50 and two ⌘ 29/42 inserts. See 6472-09 (below) for inserts. Stainless head is assembled to reaction flask in the same manner as flat glass head using 6525 Coupling and one spacer. Optional: Flat sheet of PTFE — covers entire underside of stainless steel head and is secured by coupling and ⌘ joint inserts. Makes system all glass and PTFE.

For Reactor Size	Head only Order Code	Flat PTFE Cover, only	Order Code
10L	6472-25	For 10L	6472-29
30L & 50L	6472-26	For 30L & 50L	6472-30

Use 6525-30 coupling and 6472-161 bolt/nut assembly (not included).



6472-09

6472 JOINT INSERT *PTFE, Pilot Plant* ★

PTFE joint inserts for use with Flat Head, stainless steel, on ACE Pilot Plant Reactors to allow use of standard taper jointed accessories, i.e., bearings, funnels, thermocouples, etc. Inserts are secured from the bottom of the flat head with a threaded nut.

For ⌘ Joint Size	Order Code
24/40	6472-09
29/42	6472-10
45/50	6472-14



6484

6484 REACTION FLASK HEAD *4 Necks, Conical Flange* ♦

Standard 4-inch (100mm) head for use with 6479, 6481, and 6498 ACE Reaction Flasks. Supplied with three ⌘ outer joints in line, plus a ⌘ 10/30 joint for a ground joint thermometer. Use 6496 Clamp for securing to flasks.

Center ⌘ Joint	Side ⌘ Joints	Thermometer ⌘ Joint	Order Code
24/40	24/40	10/30	6484-10
29/42	24/40	10/30	6484-20
45/50	24/40	10/30	6484-40

6485 REACTION FLASK HEAD *Ace-Thred, Conical Flange, 4 Necks ♦*

Standard 4-inch (100mm), four-outlet head for use with 6479, 6481, and 6498 ACE Reaction Flasks. Supplied with three ♂ outer joints in line, plus a thermometer side neck which is internally threaded (with Ace-Thred) for use with 5029 Nylon Bushing. Use of the threaded side neck permits easy adjustment of thermometer depth. Use 6496 Clamp for securing to flasks. Supplied complete with 5029 Bushing and FETFE O-Ring.

For extra bushings, see 5029-10. For extra O-Rings, see 7855-704.

Center ♂ Joint	Side ♂ Joints	Order Code
24/40	24/40	6485-16
29/42	24/40	6485-22


6485
6486 REACTION FLASK HEAD *Conical Flange, 3 Necks ♦*

Standard 4-inch (100mm), three-outlet head for use with 6479, 6481, and 6498 ACE Reaction Flasks. Supplied with three ♂ outer joints. Use 6496 Clamp for securing to flasks.

Center ♂ Joint	Side ♂ Joints	Order Code
24/40	24/40	6486-10
29/42	24/40	6486-20
29/42	29/42	6486-25
45/50	24/40	6486-40


6486
6487 REACTION FLASK HEAD *Conical Flange, 3 Necks ♦*

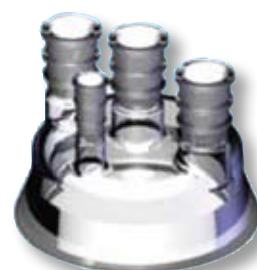
Standard 4-inch (100mm), three-outlet head for use with 6479, 6481, and 6498 ACE Reaction Flasks. Supplied with three ♀ socket joints. Use 6496 Clamp for securing to flasks.

Center ♀ Joint	Side ♀ Joints	Order Code
35/25	35/25	6487-25


6487
6488 REACTION FLASK HEAD *Conical Flange, 4 Necks ♦*

This standard 4-inch (100mm) head has three ♂ outer joints in line, plus a ♂ 14/35 outer joint which takes a 5021 Bushing Adapter to be used with ACE 8315 ♂ 10/30 Thermometer. The 6500 Thermometer Well can also be used with this head, when using a standard thermometer. For use with 6479, 6481, and 6498 ACE Reaction Flasks. Use 6496 Clamp for securing head to flask.

Center ♂ Joint	Side ♂ Joints	Thermometer ♂ Joint	Order Code
24/40	24/40	14/35	6488-10
29/42	24/40	14/35	6488-15
29/42	29/42	14/35	6488-20
45/50	24/40	14/35	6488-40


6488



6489

6489 REACTION FLASK HEAD *Conical Flange, 4 Necks ♠*

Standard 4-inch (100mm) head with three J socket joints in line, plus a J 14/35 outer joint for thermometer. Use 6496 Clamp for securing to flasks. For use with 6479, 6481, and 6498 ACE Reaction Flasks.

Center J Joint	Side J Joint	Thermometer J Joint	Order Code
35/25	35/25	14/35	6489-20



6499

6499 HEAD *Reaction Flask, for 100mm (4-inch) Flange, 4 Necks, Conical Flange ♠*

Conical shaped head with 4-inch (100mm) opening. One J center joint and three J side necks. Similar to 6488 series except all the side necks are J 24/40. Use 6496 clamp to secure head.

Center J Joint	(3) Side J Joints	Order Code
24/40	24/40	6499-10
29/42	24/40	6499-14
45/50	24/40	6499-18



6528-31

6528 HEAD *Reaction Flask, for 100mm (4-inch) Flange, 4 Necks ♠*

Flat ground flange for use with all Reaction Flasks that have a 100mm (4-inch) Schott ground mating flange. Supplied with three in-line ground J joints and one 90° J joint. For clamp, order 6517-25.

Center J Joint	(3) Side J Joints	Order Code
24/40	24/40	6528-31
29/42	24/40	6528-35
45/50	24/40	6528-38



6528-49

6528 HEAD *Reaction Flask, for 100mm (4-inch) Flange, 5 Necks ♠*

Flat ground flange for use with all Reaction Flasks that have a 100mm (4-inch) Schott ground mating flange. Supplied with three in-line ground J joints and two 90° J joints, for thermal probe connection, etc. For clamp, order 6517-25.

Center J Joint	(4) Side J Joints	Order Code
24/40	24/40	6528-42
29/42	24/40	6528-44
29/42	29/42	6528-46
45/50	24/40	6528-49

6529 HEAD *Reaction Flask, for 150mm (6-inch) Flange, 4 Necks* ♦

Flat ground flange for use with all Reaction Flasks that have a 150mm (6-inch) Schott ground mating flange. Supplied with four ground ⌘ joints. For clamp, order 6517-27.

Center ⌘ Joint	(3) Side ⌘ Joints	Order Code
24/40	24/40	6529-32
29/42	24/40	6529-36
45/50	24/40	6529-39


6529
6529 HEAD *Reaction Flask, for 150mm (6-inch) Flange, 5 Necks* ♦

Flat ground flange for use with all Reaction Flasks that have a 150mm (6-inch) Schott ground mating flange. Supplied with five ground ⌘ joints. For clamp, order 6517-27.

Center ⌘ Joint	(4) Side ⌘ Joints	Order Code
24/40	24/40	6529-23
29/42	24/40	6529-25
29/42	29/42	6529-27
45/50	24/40	6529-29


6529-29
6529 HEAD *Reaction Flask, for 150mm (6-inch) Flange, 4 Necks* ♦

Flat ground flange for use with all Reaction Flasks that have a 150mm (6-inch) Schott ground mating flange. Supplied with two in-line ground ⌘ joints and one side, 10/30 ⌘ joint, for thermal probe connection, etc. For adapter with #7 Ace-Thred for connecting thermometer or other type probe and permits easy vertical depth adjustment, see 5028. For clamp, order 6517-27.

Center ⌘ Joint	(2) Side ⌘ Joints	Order Code
24/40	24/40	6529-03
29/42	24/40	6529-04
29/42	29/42	6529-05
45/50	24/40	6529-06


6529
6530 HEAD *Reaction Flask, for 200mm (8-inch) Flange* ★

Flat ground flange for use with all Reaction Flasks that have a 200mm (8-inch) Schott ground mating flange. Supplied with single, three, four or five ground ⌘ joints. For clamp, order 6517-31.

Center ⌘ Joint	Side ⌘ Joints	Order Code
45/50	—	6530-32
45/50	(3) 24/40	6530-30
45/50	(2) 29/42	6530-33
45/50	(3) 29/42	6530-31
45/50	(3) 45/50	6530-34
45/50	(2) 45/50 – (2) 29/42	6530-35
45/50	(4) 24/40	6530-36
45/50	(3) 45/50 – (3) 29/42	6530-38
45/50	(2) 29/42 – (2) 24/40	6530-39
45/50	(2) 45/50	6530-40


6530

6530-37

**6530 HEAD** *Domed, 200mm (8-inch) Flange, 7 Necks*

Domed-style glass head with Schott-style 8-inch flange for use with matching flanged reactors and flasks like 6472-02, 6472-16, 6522-21, etc. Features a 60mm (2.4-inch) I.D. side port with O-Ring groove, angled 45 degrees, for ease in adding materials to the reactor. In addition to the 60mm port, head has a F 45/50 center neck, (1) F 45/50, (2) F 29/42, (2) F 24/40 side necks. Complete item includes Head, 60mm glass Cap, CAPFE (PTFE encapsulate silicone) O-Ring, and 60mm "Quick Release" Clamp.

	Order Code	
HEAD, only	6530-37	★
GLASS CAP, 60mm	15312-30	★
CAPFE O-Ring, 60mm	7855-878	◆
CLAMP, 60mm, Quick Release	6517-22	★
COMPLETE	6530-50	★

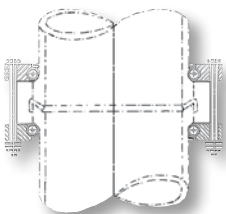


6530-45

6530 HEAD *Domed, 300mm (12-inch) Flange, 8 Necks*

Domed-style glass head for use with matching flanged reactors like 6472-03, 6472-05, 6472-030, 6472-050 etc. Features a large 100mm (4-inch) I.D. side port with O-Ring groove, angled 30 degrees, for ease in adding materials to the reactor. In addition to the 100mm port, head has a F 45/50 center neck, (4) F 45/50, (2) F 29/42 side necks. Complete item includes Head, 100mm glass Cap, CAPFE (PTFE encapsulate silicone) O-Ring, and 100mm "Quick Release" Clamp.

	Order Code	
HEAD, only	6530-45	★
GLASS CAP, 100mm	15312-33	★
CAPFE O-Ring, 100mm	7855-880	◆
CLAMP, 100mm, Quick Release	6517-25	★
COMPLETE	6530-60	★



6525-30

6525 COUPLING, ACCESSORIES

Coupling for clamping Reaction Flask to Reaction Flask Head like 6530. Consists of two half-rings, plastic (phenolic resin) for Codes -20, -25, -30; grey cast iron for codes -33, -38. Gaskets, 6525, are placed between the ground surfaces of the glass flanges. Complete coupling consists of two half-rings and appropriate number of cadmium-plated steel bolts, with nuts and washers. For gaskets, see 6525-46, -51 below. Preset T-Handle torque wrench 6525, 30 in-lbs max., and 1/4-inch socket available for safe tightening of coupling.

	Size	Order Code
Coupling	200mm	6525-25
Coupling	300mm	6525-30
Clamp Insert (each insert = 3 arcs)	200mm	6525-72
Clamp Insert (each insert = 3 arcs)	300mm	6525-74
Clamp Insert Clips (package of three)	—	6525-80



6525-51

6525 GASKET ★

PTFE crescent ring gaskets for use with 6525 Coupling. Consists of a ring with locating skirt. Temperature limit, 200°C.

Description	Size	Order Code
Gasket	200mm	6525-46
Gasket	300mm	6525-51

Note: Flat heads require 6525 coupling, but with 6472-161 bolts/nuts

5031 ADAPTER “Twin” Ace-Thred ♠

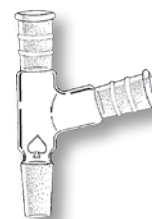
With F inner joint at bottom and two off-set Ace-Threds ports at top. Two threaded openings enable you to insert two inner tubes, such as a thermometer and bleed tubes, through the same joint. The F 24/25 medium length joint is compatible with F 24/40 full length outer joints. Supplied complete with two Nylon bushings and FETFE O-Rings. For extra O-Rings, order 7855-704 (for #7), 7855-708 (for #11) or 7855-716 (for #15).

Thread Size	Joint	Order Code
#7	F 24/25	5031-10
#7	F 29/42	5031-12
#11	F 45/50	5031-24
#15	F 45/50	5031-33
#11 & #15	F 45/50	5031-86


5031
5050 ADAPTER 105° Side Arm ♠

With outer joints at top and side, inner joint at bottom.

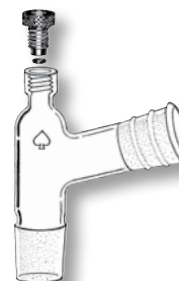
F Joints	Order Code
24/40	5050-10
29/42	5050-12


5050-10
5050 ADAPTER 105° Side Arm, with Ace-Thred ♠

With outer joint on side, inner joint at bottom, and Ace-Thred at Top. Not supplied with Bushing and O-Ring, which must be ordered separately.

F Joints	Ace-Thred Size	Order Code
45/50	#25	5050-86
45/50	#15	5050-96

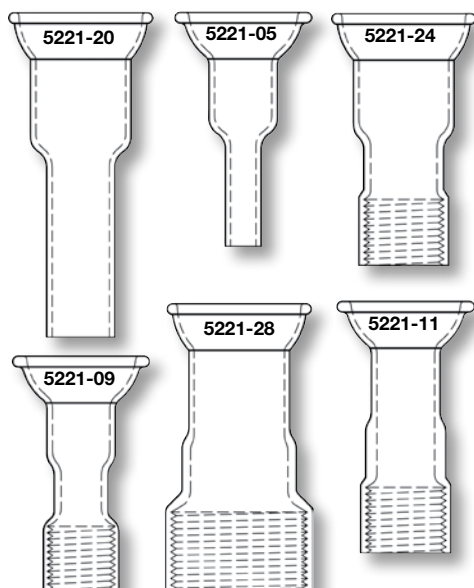
	For Size	Order Code
Bushing w/O-Ring, only	#15	7506-06
Bushing w/O-Ring, only	#25	7506-10


5050-86
5090 ADAPTER 75° Angle ♠

With F joint at bottom and side. Top thermometer joint is for 76mm immersion.

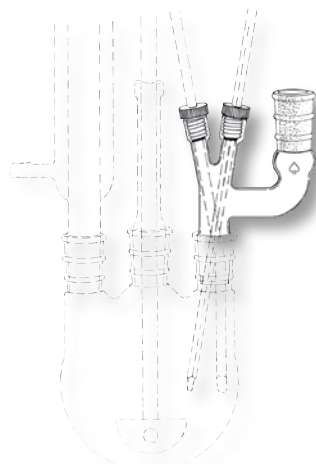
Top Outer Joint	Immersion Depth	Side Inner Joint	Bottom Inner Joint	Order Code
F 10/30	76mm	F 24/40	F 24/40	5090-10
F 10/30	76mm	F 29/42	F 29/42	5090-15


5090


5221 ADAPTER *Connecting, Outer Socket Joint, Glass*

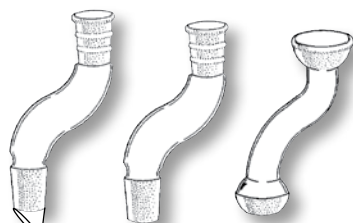
For connecting to comparable O-Ring /ball joints.

Outer Joint Connects to	Size	Order Code
10mm tube	28/15	5221-05
#11 Ace-Thred	28/15	5221-09
#15 Ace-Thred	28/15	5221-11
3/4-inch tube	35/25	5221-20
#15 Ace-Thred	35/25	5221-24
#25 Ace-Thred	35/25	5221-28


5263
5263 ADAPTER *Multineck, "Mini" #7 Ace-Thred ♠*

With inner joint at bottom, two #7 Ace-Threds and one side outer joint at top. Ace-Threds would commonly be used for thermometers and gas inlet tubes thus leaving joint for condenser, addition funnel, still head, etc. 24/25 medium length joint is compatible with 24/40 full length joint. Supplied complete with two 5029-10 Nylon bushings and FETFE O-Rings. For extra O-Rings, order 7855-704.

Top Outer	Bottom Inner	Order Code
24/40	24/25	5263-17


5268-54
9089-40
5268-10
9089-08
5268-35
5268/9089 ADAPTER *Offset*

WITHOUT DRIP TIP			WITH DRIP TIP		
Joints	Order Code		Joints	Order Code	
14/20	9089-08	♠	14/20	9089-40	♠
24/40	5268-10	♠	24/40	5268-54	♠
29/42	5268-15	♠	29/42	5268-56	♠
45/50	5268-21	★	45/50	5268-58	★
35/25	5268-35	♠			

5278 ADAPTER *pH Probe, Pilot Plant*

Adapter Tube, 25mm O.D., with a #15 Ace-Thred at one end, other end open. Insert 1/2-inch probe in open end down to and thru the Ace-Thred, leaving enough exposed to secure with 7506 Bushing and O-Ring to make a compression seal. Adapter Tube is held in flask \S joint with 5030 "Maxi" Adapter, again with a compression seal, thus making the tube vertically adjustable. Complete item consists of Glass Adapter Tube, 7506 PTFE Bushing with FETFE or Chemraz O-Ring and 5030 "Maxi" Adapter. Takes any standard size pH probe.

Length, cm (Inches)	With FETFE O-Ring		With Chemraz O-Ring	
	Order Code		Order Code	
61 (24)	5278-40	♠	5278-141	★
91 (36)	5278-44	♠	5278-145	★
122 (48)	5278-48	♠	5278-149	★

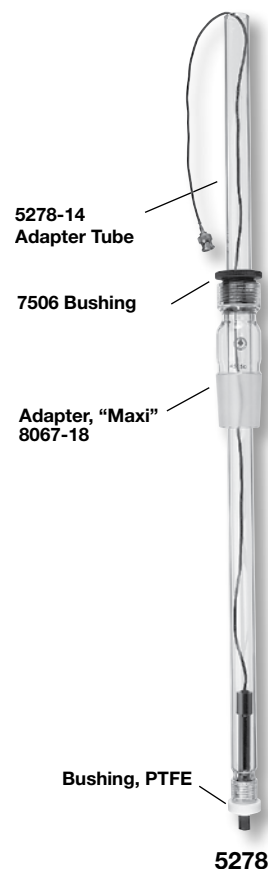
Replacement Items:

ADAPTER TUBE, Glass only			BUSHING, PTFE only, with O-Ring			
Length, cm (Inches)	Order Code		For Thread Size	O-Ring Type	Order Code	
61 (24)	5278-14	♠	15	FETFE	7506-27	♠
91 (36)	5278-18	♠	15	Chemraz	7506-127	★
122 (48)	5278-23	♠				

ADAPTER, "Maxi," #25 Ace-Thred to \S 45/50 Joint, only

\S Joint	Order Code		Order Code		Order Code	
45/50	8067-18	♠	7506-10	♠	5030-84	♠

*pH probe not included.



6472 ADAPTER *Beaded Pipe, for "Flush Valve", Glass ♠*

Attach to 1-inch Beaded Pipe outlet on 6472-245 "Martin Style" Flush Valve to adapt to tubing NPT fitting.

Style	Order Code
1-inch BP x 1/2-inch O.D. Tube	6472-275
1-inch BP x 1/2-inch I.D. Hose Conn. (Size G)	6472-276
1-inch BP x #15 Ace-Thred	6472-277
1-inch BP x #25 Ace-Thred	6472-278



6472-276

12067 ADAPTER *Connecting, Heat Exchange Coil ★*

Stainless steel adapter for connecting 12067 Heat Exchange Coil tubing to pipe thread (NPT). Adapter fits over tubing and makes a compression seal via O-Ring for working pressure of 25 psig. Complete item includes compression adapter, elbow, and pipe nipple.

Adapter Size (Inches)	Elbow (FPT)	Nipple (MPT)	O-Ring (Size)	Order Code
1/4 O.D. tube x 1/4	1/4-inch	1/4-inch	-010	12067-02
3/8 O.D. tube x 1/4	1/4-inch	1/4-inch	-012	12067-04
1/2 O.D. tube x 1/2	1/2-inch	1/2-inch	-014	12067-06

See coils on page 68



12067-02

12560 FUNNEL *Buchner, Table Top* ★

POROUS FILTER PLATE type or PERFORATED PLATE type, fixed or removable, polyethylene Buchner funnel. Features one-piece, welded construction with welded-in plate and multiple-ring support grid below plate. A non-porous ring around plate seals filter paper. Vacuum connection accepts 1/2-inch I.D. tubing. For use below 125°F (52°C).

FILTER PLATE is available in medium (M) or coarse (C) porosity, 1/4-inch (6.4mm) thick.

PERFORATED PLATE is 3/16-inches (4.8mm) thick with 3/16-inch perforations on 7/16-inch (11mm) centers. Good for coarse filtration or use with cloth or paper filter.



12560

Plate Type/ Porosity ()	I.D., Inches (cm)	Overall Height (Inches)	Rim to Plate (Inches)	Order Code	Order Code
Fixed/(M)	10-1/4 (26)	7	5	12560-02	12560-14
Fixed/(C)	10-1/4 (26)	7	5	12560-04	12560-14
Removable/(M)	10-1/4 (26)	7	5	12560-30	12560-50
Removable/(C)	10-1/4 (26)	7	5	12560-32	12560-50
Fixed/(M)	18 (45.7)	11-1/2	9	12560-05	12560-16
Fixed/(C)	18 (45.7)	11-1/2	9	12560-06	12560-16
Removable/(M)	18 (45.7)	11-1/2	9	12560-35	12560-57
Removable/(C)	18 (45.7)	11-1/2	9	12560-37	12560-57
Fixed/(M)	24 (61)	13	10-1/2	12560-07	12560-18
Fixed/(C)	24 (61)	13	10-1/2	12560-08	12560-18
Removable/(M)	24 (61)	13	10-1/2	12560-38	12560-59
Removable/(C)	24 (61)	13	10-1/2	12560-39	12560-59
Fixed/(M)	36 (91.4)	14-3/4	12	12560-09	12560-20
Fixed/(C)	36 (91.4)	14-3/4	12	12560-10	12560-20
Removable/(M)	36 (91.4)	14-3/4	12	12560-41	12560-63
Removable/(C)	36 (91.4)	14-3/4	12	12560-53	12560-63

FILTER PAPER is to fit 12560 Funnels. Rough crepe surface, 0.25mm thick, flow rate 235mL / min., retention of 24 microns and wet strength of 25cm of water. Packed 100 per box.

For Funnel Size
(Inches)

Order Code

10-1/4	12560-70
18	12560-72
24	12560-74
36	12560-76

12563 FUNNEL *Buchner, All Stainless Steel*

316 Stainless Steel Buchner Funnel for organic or inorganic chemical synthesis. This funnel incorporates a removable perforated plate that allows thorough manual cleaning and autoclaving. Since the plate is removable, yield is increased because internal supports that would trap product are eliminated. Will not chip, crack or break. Offered in 24cm and 50cm sizes that accept commercially available filter sizes. Completely electropolished for critical applications, i.e., pharmaceuticals. Outlet port is 1/2-inch O.D. for both sizes.



12563

Inside Dia., cm	Height Above Disc (Inches)	Overall Height (Inches)	Grit Finish	Order Code
24	5	7	240	12563-09
50	10	12	240	12563-27

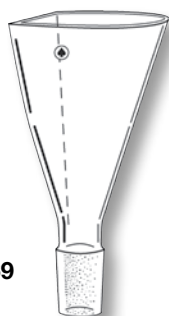
6469 FUNNEL *Powder, Flat Side* ♠

Jointed powder funnel with one side flat to allow use in tight places such as reactor heads.

Inner Joint
45/50

Order Code
6469-52

45/50	6469-52
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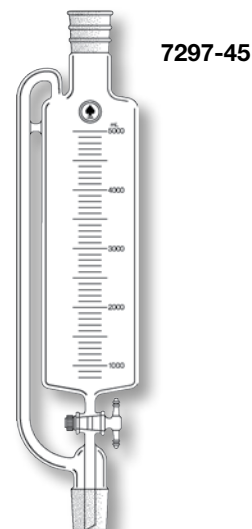


6469

7297 FUNNEL *Pressure Equalizing, Graduated, Pilot Plant* ★

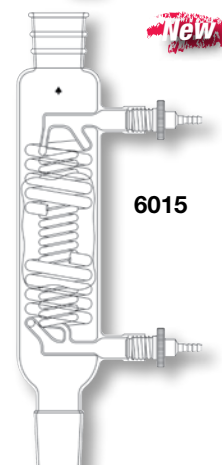
Cylindrical, pilot plant size, 5 liter capacity funnel. With K 45/50 joint top and bottom, drip stem, pressure equalizing arm and single scale graduations in 100mL subdivisions. Drip stem does not extend beyond male joint, thereby eliminating possible source of breakage. Stopcock is 8mm bore PTFE plug. Body height is approximately 350mm, O.D. is 152mm.

Capacity, mL	Order Code
5000	7297-45


6015 CONDENSER *Double Coil, High Capacity, Pilot Plant* ★

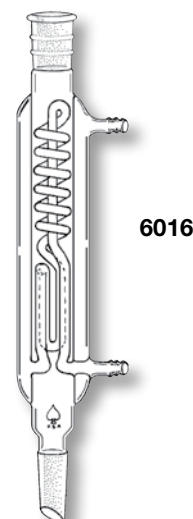
High through-put double coil condensers are made for larger systems and reactors, especially Pilot Plants to handle larger scale reactions. These are also similar to Rotary Evaporator type condensers where a lot of material is being condensed at a higher temperature and where large amounts of cooling water are needed to generate higher efficiency. The unit can be ordered with standard taper joints or beaded pipe end connections. The overall length is approximately 390mm and O.D. is approximately 85-90 mm. Both units have #15 Ace-Thred connections for Ace-Safe hose connections. Supplied with full Ace Safe connections.

Jacket Length, mm	Condensing Area, cm ²	End Finish	Order Code
315	1480	1-inch bead pipe	6015-12
290	1400	K 45/50	6015-17

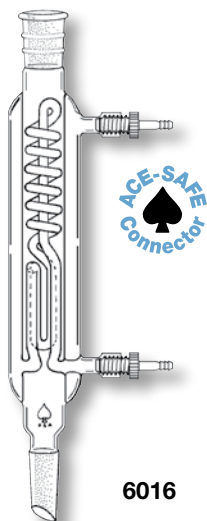

6016 CONDENSER *Pilot Plant* ★

Highly efficient. May be used either for through condensation or refluxing. Internal baffling acts as impinging surface for entrained particles and discourages diffusion loss. Use with 7/16-inch or 1/2-inch I.D. Tubing. Available with either spherical or standard taper joint.

Jacket Length, mm	Joint Size K 45/50	Joint Size K 71/60	Joint Size K 35/25	Joint Size K 65/40
	Order Code	Order Code	Order Code	Order Code
500	6016-36	— —	6016-66	6016-75
750	6016-39	6016-52	— —	6016-77
1000	6016-41	— —	6016-69	6016-79

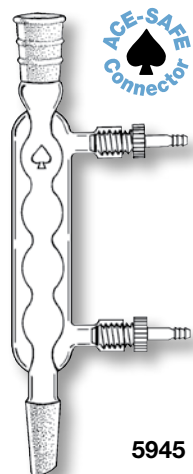


Custom condensers with various joint or length sizes are available upon special request.

**6016**
6016 CONDENSER *Pilot Plant, with Ace-Thred Connectors* ★

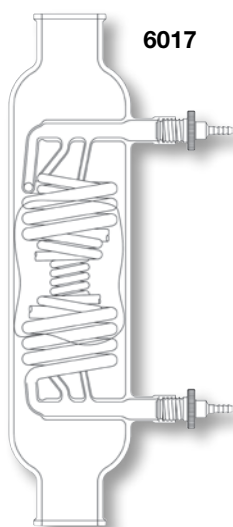
Highly efficient. May be used either for thorough condensation or refluxing. Internal baffling acts as impinging surface for entrained particles and discourages diffusion loss. With #11 Ace-Thred and "Ace-Safe" hose connections on inlet and outlet with barb for 1/4-inch I.D. tubing. Available with either spherical or standard taper joints.

Jacket Length, mm	Joint Size ₣45/50	Joint Size ₣35/25	Joint Size ₣65/40
	Order Code	Order Code	Order Code
500	6016-137	6016-167	6016-176
750	6016-139	—	6016-178
1000	6016-141	6016-170	6016-180

**5945**
5945 CONDENSER *Allihn, with Ace-Thred Connectors, Pilot Plant* ★

Bulb type, approximately one bulb per 50mm, with ₣ 45/50 inner and outer joint at bottom and top #11 Ace-Thred and "Ace-Safe" hose connections on inlet and outlet with barb for 3/8-inch I.D. tubing. For replacement connectors, see 5853. This condenser is used with 6472 Pilot Plant Reactor.

Jacket Length, mm	Order Code
500	5945-76

**6017**
6017 CONDENSER *Triple Coil, High Capacity* ★

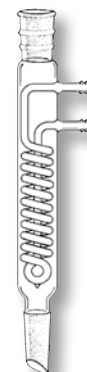
With three internal cooling coils, this new design gives even higher through-put than the double coil or any rotary evaporator condenser. Designed for pilot plants and larger reactors where a lot of cooling area is needed for condensing or for higher temperature reactions where more through-put is needed. Comes with #15 Ace-Thred ports with or without Ace-Safe Connections. Top and bottom connections are 2-inch beaded pipe. Overall length is approximately 460 mm and O.D. is approximately 110 mm.

Coil Length, mm	Condensing Area, cm ²	Glass only	Complete
		Order Code	Order Code
220	1600	6017-210	6017-212

6020/9270 CONDENSER *Spiral, Reflux ♦*

With spiral condensing tube having both inlet and outlet connections at top, on same side. With inner and outer joints at bottom and top. Length between joints is approximately 80-90 mm longer than coil length.

Coil Length, mm	§ Joints	Tubing Size (Inches)	Order Code
300	24/40	3/8 (D)	6020-06
400	24/40	3/8 (D)	6020-08

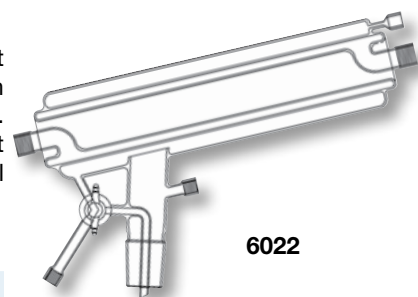


**6020
9270**

6022 CONDENSER *Keenan, Single Tube, Horizontal*

Highly efficient, newly designed condenser. Features a horizontal angle for low clearance but extremely good capacity and throughput. Especially useful when assembling large reactor in limited height clearance situations. Surface area is 710 cm². Cooling fluid volume: 600 mL. Condenser has a § 45/50 bottom joint. All other connections are #7 or #15 Ace-Thred that accepts a 7mm O.D. tube or 5853 "Ace-Safe" Connectors (supplied) to attach tubing. Overall length: 475mm.

§ Joints	Stopcock Type	Order Code
45/50	Glass	6022-22
45/50	PTFE	6022-30

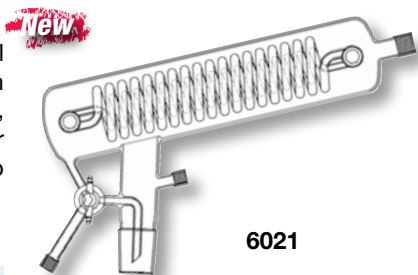


6022

6021 CONDENSER *Modified Keenan, Dual Coil, Horizontal*

Highly efficient, double coil, condenser with 30 degree horizontal angle vs. typical vertical style. Great for under hoods or on pilot plant reactors where height maybe an issue and a high level of distillation is required. Condenser has a § 45/50 bottom joint to fit on reactor heads, all other connections are either #7 or #15 Ace-Safe, (supplied). Comes with either a PTFE or glass stopcock. Overall length is approximately 470mm. Height from top of bottom join to highest point at top is 90 mm.

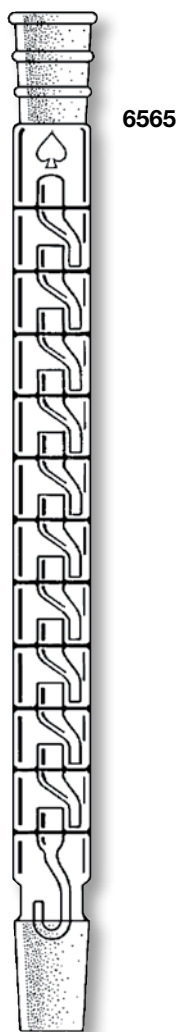
§ Joints	Stopcock Type	Order Code
45/50	PTFE	6021-20
45/50	Glass	6021-30



6021

6565 DISTILLATION COLUMN *Perforated Plate*

Perforated plate column, without jacket. Holes are 0.032-inch diameter



No. of Plates	Plate Dia., mm	Joint	Order Code	No. of Plates	Plate Dia., mm	Joint	Order Code
5	28	29/42	6565-02	5	50	55/50	6565-32
10	28	29/42	6565-04	10	50	55/50	6565-34
15	28	29/42	6565-06	15	50	55/50	6565-36
20	28	29/42	6565-08	20	50	55/50	6565-38
30	28	29/42	6565-10	30	50	55/50	6565-40
5	33	34/45	6565-12	5	75	71/60	6565-42
10	33	34/45	6565-14	10	75	71/60	6565-44
15	33	34/45	6565-16	15	75	71/60	6565-46
20	33	34/45	6565-18	20	75	71/60	6565-48
30	33	34/45	6565-20				
5	40	45/50	6565-22	5	100	103/60	6565-52
10	40	45/50	6565-24	10	100	103/60	6565-54
15	40	45/50	6565-26	15	100	103/60	6565-56
20	40	45/50	6565-28	20	100	103/60	6565-58
30	40	45/50	6565-30				

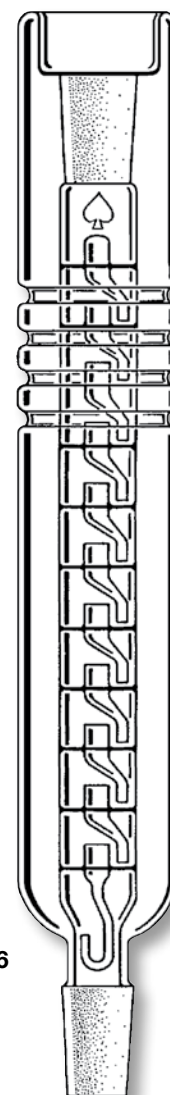
Column Lengths

Catalog No.	Effective Lgth, mm	Overall Lgth, mm
6565-02/6566-03	275	359
6565-04/6566-05	415	499
6565-06/6566-07	555	639
6565-08/6566-09	695	779
6565-10/6566-11	975	1059
6565-12/6566-13	275	365
6565-14/6566-15	415	505
6565-16/6566-17	555	645
6565-18/6566-19	695	785
6565-20/6566-21	975	1065
6565-22/6566-23	275	375
6565-24/6566-25	415	515
6565-26/6566-27	555	655
6565-28/6566-29	695	795
6565-30/6566-31	975	1075
6565-32/6566-33	275	375
6565-34/6566-35	415	515
6565-36/6566-37	555	655
6565-38/6566-39	695	795
6565-40/6566-41	975	1075
6565-42/6566-43	275	395
6565-44/6566-45	415	535
6565-46/6566-47	555	675
6565-48/6566-49	695	815
6565-52/6566-53	275	395
6565-54/6566-55	415	535
6565-56/6566-57	555	675
6565-58/6566-59	695	815

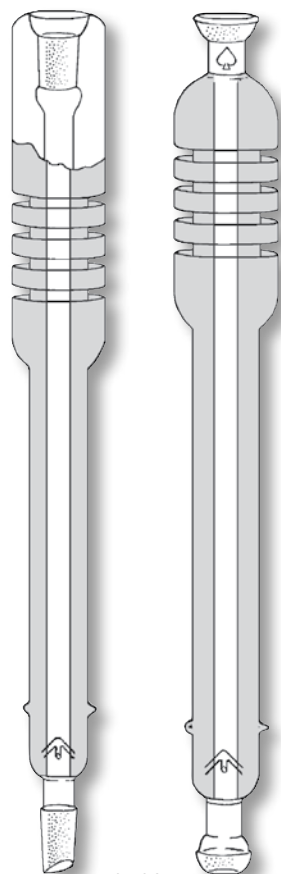
6566 DISTILLATION COLUMN *Perforated Plate, Internal Bellows, Silvered*

Similar to 6565 except with vacuum-jacketed internal bellows and silvered internally.

No. of Plates	Plate Dia., mm	Joint	Order Code	No. of Plates	Plate Dia., mm	Joint	Order Code
5	28	29/42	6566-03	5	50	55/50	6566-33
10	28	29/42	6566-05	10	50	55/50	6566-35
15	28	29/42	6566-07	15	50	55/50	6566-37
20	28	29/42	6566-09	20	50	55/50	6566-39
30	28	29/42	6566-11	30	50	55/50	6566-41
5	33	34/45	6566-13	5	75	71/60	6566-43
10	33	34/45	6566-15	10	75	71/60	6566-45
15	33	34/45	6566-17	15	75	71/60	6566-47
20	33	34/45	6566-19	20	75	71/60	6566-49
30	33	34/45	6566-21				
5	40	45/50	6566-23	5	100	103/60	6566-53
10	40	45/50	6566-25	10	100	103/60	6566-55
15	40	45/50	6566-27	15	100	103/60	6566-57
20	40	45/50	6566-29	20	100	103/60	6566-59
30	40	45/50	6566-31				



6566



6569

6569 DISTILLATION COLUMN *Vacuum Jacketed*

With internal expansion bellows. Baked out and evacuated to 10^{-6} Torr. All top joints are jacketed. Spherical joints are not jacketed in order to allow for clamping. All vacuum jacketed distilling columns are furnished with internal type expansion bellows to compensate for the unequal expansion between the inside tube and the outer jacket and will withstand a temperature differential of 180°C . All columns, regardless of length, are supplied with the proper number of bellows to withstand the above temperature differential at all times. Standard silvered columns are supplied with an observation stripe running down the entire length of the jacket.

The packing support is a conical tripod in which the free area is at least 90% of the diametrical area. *In addition to the columns listed, we also have facilities for fabricating a complete line of special vacuum jacketed units to your specifications.* This includes additional bellows to enable you to maintain temperature differentials greater than 180°C . When ordering a special column, please specify the highest temperatures which may be reached in the column, so that we can supply the unit with sufficient bellows to take care of the expansion which may take place during distillation.

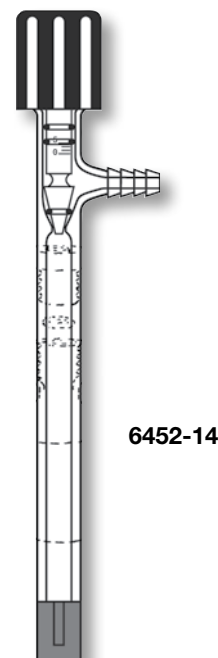
Length, cm	I.D.,mm	Joints	Order Code
61	12.7	24/40	6569-40
61	25.4	29/42	6569-50
61	38.1	35/25	6569-60
91	12.7	24/40	6569-42
91	25.4	29/42	6569-52
91	38.1	35/25	6569-62
122	12.7	24/40	6569-44
122	25.4	29/42	6569-54
122	38.1	35/25	6569-64

Columns can be custom designed and quoted to meet your specifications. Non-silvered columns are available on special order.

6452 SPARGER *Easy Action Stopcock and Hose Connection* ♦

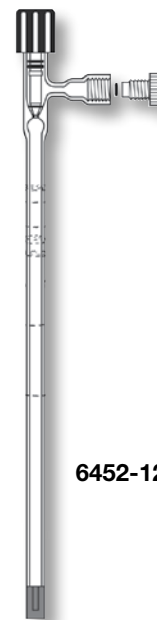
Sparger tube with Ace Frit at one end and an Easy Action Stopcock with 90 degree hose connection at opposite end.

Overall Length, mm	Porosity	Stopcock Size	Tubing Size (Inches)	Tube O.D., mm	Order Code
575	A (145-174 micron)	0-5	3/8 (E)	14	6452-14
575	B (70-100 micron)	0-5	3/8 (E)	14	6452-16
575	C (25-50 micron)	0-5	3/8 (E)	14	6452-18
775	B (70-100 micron)	0-5	3/8 (E)	14	6452-33
915	B (70-100 micron)	0-5	3/8 (E)	14	6452-44


6452-14
6452 SPARGER *Easy Action Stopcock and #7 Ace-Thred* ♦

Sparger tube with Ace Frit at one end and an Easy Action Stopcock with #7 Ace-Thred connection at opposite end for 7 mm O.D. tube connection. Supplied with 5029-10 Nylon Bushing and FETFE O-Ring.

Overall Length, mm	Porosity	Stopcock Size	Tube O.D., mm	Order Code
575	A (145-174 micron)	0-5	14	6452-121
575	B (70-100 micron)	0-5	14	6452-123
575	C (25-50 micron)	0-5	14	6452-125
775	B (70-100 micron)	0-5	14	6452-132
915	B (70-100 micron)	0-5	14	6452-145


6452-121



6453-21

6453 SPARGER *Straight with Hose Connection* ♠

Straight sparger tube with Ace Frit at one end and size F hose connection at opposite end for 1/2-inch I.D. hose.

Overall Length, mm	Porosity	Tube O.D., mm	Order Code
575	A (145-174 micron)	14	6453-21
575	B (70-100 micron)	14	6453-23
575	C (25-50 micron)	14	6453-25
775	B (70-100 micron)	14	6453-32
915	B (70-100 micron)	14	6453-45



12177

12177 BAFFLE *PTFE* ♠

Fabricated from virgin PTFE (meets USP Class 6 requirements), this fully encapsulated, seamless Baffle with a Stainless Steel reinforcing core fits through standard taper joint of Reaction Flasks to increase agitation and promote mixing. Takes the place of indented or Morton vessels that can be a problem when using pressure or vacuum. Shaft of Baffle is sized to be secured using 5030 Ace-Thred Adapter with Nylon bushing and FETFE O-Ring. This connection allows vertical and rotational adjustment of the Baffle inside the flask for optimum effect. In place of O-Ring, a PTFE ferrule can be used for maximum chemical resistance. Baffle uses 5030-80 \$ 45/50 adapter (sold separately).

Shaft Diameter, mm	Shaft Length, mm	Fits Ace-Thred Size	Baffle W x L x D, mm	Overall Length, mm	Order Code
25.4	250	#25	32 x 360 x 14	610	12177-157

6453 SPARGER *Straight and #7 Ace-Thred ♠*

Straight sparger tube with Ace Frit at one end, #7 Ace-Thred connection at opposite end for 7 mm O.D. tube connection. Supplied with 5029-10 Nylon Bushing and FETFE O-Ring.

Overall Length, mm	Porosity	Tube mm	Order Code
575	A (145-174 micron)	14	6453-122
575	B (70-100 micron)	14	6453-124
575	C (25-50 micron)	14	6453-126
775	B (70-100 micron)	14	6453-133
915	B (70-100 micron)	14	6453-146



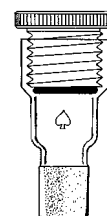
Use 5853-06
Ace-Safe Con-
nector here!

6453-122

5030/7506/8067 ADAPTER *"Giant" #25 or #36 Ace-Thred ♠*

With ground inner joint at bottom and either a #25 or #36 Ace-Thred that accepts outside diameters of 24-25mm and 34-35mm, respectively (Note: Joint size limits size O.D. of inserted tube). This item can be used with Sonochemical Equipment. Code -70 will accept 9852-41 Slide Adapter; code -76 will accept 9852-45 Slide Adapter and/or 9814 Sonochemical Horn with extenders. (Note: When using horn with extenders, depth distances must be determined for proper operation.) Complete item supplied with Nylon bushing and FETFE O-Ring.

Joint	Thread Size	Order Code
§24/25	#25	5030-70
§24/25	#36	5030-76
§45/50	#36	5030-80
§45/50	#25	5030-84
§50/55	#25	5030-86
§71/60	#25	5030-88
§55/50	#36	5030-90



5030-70

6472 TEMPERATURE CONTROL SYSTEM *Pilot Plant*

A complete package to enable the user to control the temperature of Pilot Plant Reactors.

Consists of:



6472-77

- 1) 12111-15, Type "J" Auto-tune PID Temperature Controller with Fuzzy logic featuring digital display of reactor temperature. Hi and Lo alarm set points, 120 volt/3 amp alarm outlet, a 16-segment ramp and soak program, and an auto rate circuit to control temperature rise time.
- 2) 7832, auxiliary relay control unit allowing simultaneous control of heating mantles. Relay unit is activated by temperature controller and requires a 230 volt, 30A with neutral and ground 4-wire, 50/60 Hz power source¹.
- 3) 12141, PFA-covered Type "J" Temperature Sensor, with detachable lead, for use with 12111 Temperature Controller to measure temperature inside reactor. 24-inch for 10L & 20L Cylindrical, 50L, 72L and 100L Spherical; 36-inch for 36L Cylindrical; 48-inch for 50L and 100L Cylindrical/200L Spherical; 60-inch for 150L; 72-inch for 200L Cyl.
- 4) 7482-33 or 5028-30, Glass and PTFE Adapter, #25-#7
- 5) 8067-18, Adapters to secure temperature sensor in head of reactor.
- 6) 5029-10, Nylon Bushing.

FOR 10L & 20L CYLINDRICAL			FOR 30L CYLINDRICAL		FOR 50L SPHERICAL		FOR 72L & 100L SPHERICAL	
Item	Order Code		Order Code		Order Code		Order Code	
Temperature Controller	12111-15	★	12111-15	★	12111-15	★	12111-15	★
Power Strip, Four Outlets	12195-20	♠	—		—		—	
Adapter, #7 — 3/29/42	5028-32	♠	—		—		—	
Auxiliary Relay Control	—		7832-14	★	7832-14	★	7832-19	★
Adapter, Glass, 3/45/50-#25	—		8067-18	♠	8067-18	♠	8067-18	♠
Adapter, PTFE, #25-#7	—		7482-33	★	7482-33	★	7482-33	★
Bushing, Nylon, #7	—		5029-10	♠	5029-10	♠	5029-10	♠
“J” Thermocouple Sensor, PFA Covered, Detachable	12141-26	★	12141-28	★	12141-26	★	12141-26	★
Sensor Lead, only	12141-80	★	12141-80	★	12141-80	★	12141-80	★
Complete	6472-67	★	6472-77	★	6472-73	★	6472-75	★

FOR 50L & 100L CYLINDRICAL			FOR 200L SPHERICAL		FOR 200L CYLINDRICAL	
Item	Order Code		Order Code		Order Code	
Temperature Controller	12111-15	★	12111-15	★	12111-15	★
Auxiliary Relay Control	7832-14	★	7832-17 ¹	★	7832-23	★
Adapter, Glass, 3/45/50-#25	8067-18	♠	8067-18	♠	8067-18	♠
Adapter, PTFE, #25-#7	7482-33	★	7482-33	★	7482-33	★
Bushing, Nylon, #7	5029-10	♠	5029-10	♠	5029-10	♠
“J” Thermocouple Sensor, PFA Covered, Detachable	12141-29	★	12141-29	★	12141-30	★
Sensor Lead, only	12141-80	★	12141-80	★	12141-80	★
Complete	6472-79	★	6472-83	★	6472-87	★

¹7832-17 is 230v, 50A with ground wire.

8318 THERMOMETER *Digital Display, Electronic, with Recorder Output* ★

A complete package to enable the user to monitor the temperature of jacketed Pilot Plant Reactors.

Consists of:

- 8318-35, Type "J" input digital thermometer with 5/8 inch LED display for reading across the room. 120v 50/60 Hz operation, 1°C resolution, -20°C to 390°C range, $\pm 2\%$ accuracy reading, $\pm 1^\circ\text{C}$ with recorder output, fused with clamp for mounting to 1/2 inch bars.
- 12141 PFA covered Type "J" Thermocouple Sensor, with detachable cord, to measure temperature inside reactor. 24 inch for 10L Cylindrical, 36 inch for 30L Cylindrical, 48 inch for 50L Cylindrical.
- 7482-33 or 5028-30, PTFE Adapter, #25-#7
- 8067-18, Adapters to secure temperature sensor in head of reactor
- 5029-10, #7 Nylon Bushing



Item	For Use with 10L & 20L Cylindrical	For Use with 30L Cylindrical	For Use with 50L & 100L Cylindrical
	Order Code	Order Code	Order Code
Thermometer, Digital	8318-35	8318-35	8318-35
Adapter, Glass 45/50 — #25	—	8067-18	8067-18
Adapter, PTFE, #25 — #7	—	7482-33	7482-33
Bushing, Nylon, #7	—	5029-10	5029-10
Adapter, #7 — 24/40	5028-30	—	—
"J" Thermocouple Sensor, PFA Covered, Detachable	12141-26	12141-28	12141-29
Sensor Cord, only	12141-80	12141-80	12141-80
COMPLETE	8318-204	8318-207	8318-209

12327 DIGITAL TEMPERATURE MONITOR ★

Monitors and displays the temperature of an attached piece of equipment on a bright LED display. Built-in USB port and free data logging software allows remote temperature monitoring, and provides a GMP, GLP compliant temperature history. Audible digital alarm available as an option. A 230VAC, CE-approved model is also available via special order. Complete with thermocouple, adapter, and cord.

2.5-inch x 4.75-inch x 5.5-inch (HxWxD) / 120vac, 50 watts, USB 2.0

J-Kem Model	Temperature Range (°C)	Thermocouple Type	Order Code
DM120-T	-200 to 250	T	12327-03
DM120-J	0 to 800	J	12327-05
DM120-K	-50 to 1200	K	12327-07



12327

6470 THERMOWELL *without Joint* ♠

For use with 5030 "Midi" Ace-Thred Adapter. The completely adjustable depth feature of this combination means the well is less expensive and more versatile than the jointed style. Outside diameter, 10mm.

For Flask Cap., mL	Length, mm	Order Code
250-3000	300	6470-38
3000-5000	350	6470-40
12000	400	6470-42
22000	465	6470-44
50000-72000	570	6470-46

6470





12067

12067 COIL Cooling/Heating, Cylindrical Flasks ★

For use with Pilot Plant Reactors with Cylindrical Flasks, with 200mm (8-inch) or 300mm (12-inch) size flanges. Coils are ideal for steam heating or water cooling of reactor contents. See chart below for tubing size and materials selection; PTFE coated copper, Hastelloy or Stainless steel. Available in 1/4-inch or 1/2-inch OD sizes.

Flask Size, L	Neck Size, In.	Tubing Size (Inches)	Copper/PTFE Order Code	316 Stainless Steel Order Code	Hastalloy C-276 Order Code
10	8	1/4	12067-39	12067-239	12067-439
10	8	1/2	12067-71		
15	8	1/2	12067-71		
20	8	1/4	12067-48	12067-248	12067-448
20	8	1/2	12067-71		
30	8	1/2	12067-40	12067-240	12067-440
50	8	1/2	12067-44	12067-244	12067-444
100	12	1/2	12067-79	12067-279	12067-479
200	12	1/2	12067-80	12067-280	12067-480

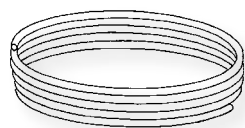


12067

12067 COIL Cooling/Heating, Spherical Flasks ★

For use with Pilot Plant Reactors with Spherical Flasks, with 200mm (8-inch) or 300mm (12-inch) size flanges. Coils are ideal for steam heating or water cooling of reactor contents. See chart below for tubing size and materials selection; PTFE coated copper, Hastelloy or Stainless steel. Available in 1/4-inch, 1/2-inch and 3/8-inch OD sizes.

Flask Size, L	Neck Size, In.	Tubing Size (Inches)	Copper/PTFE Order Code	316 Stainless Steel Order Code	Hastalloy C-276 Order Code
12	6	3/8	12067-58		
22	6	3/8	12067-58		
50	8	3/8	12067-61	12067-261	12067-461
50	8	1/4	12067-52		
72	8	3/8	12067-63	12067-263	12067-463
72	8	1/4	12067-54		
100	8	3/8	12067-65	12067-265	12067-465
100	8	1/2	12067-84		
100	8	1/4	12067-56		
200	12	1/2	12067-68	12067-268	12067-468



12067

12067 HEAT EXCHANGER TUBING Fluorocarbon Covered ★

Copper tubing encapsulated with Fluorocarbon for use as a make-your-own heat exchanger coil.* Can be used in corrosive solutions or strong solvents like ammonia, fuming sulfuric acid, potassium hydroxide concentrate, sodium sulfate, etc. Eliminates need for costly metals like Tantalum. Highly temperature resistant, electrically insulated and will not stain, corrode or contaminate. Does not support bacteria, and anti-stick property of Fluorocarbon rinses easily of sticky or clinging materials.

Easy to custom make your own exchanger for heat or cooling by wrapping around simple mandrel or form to desired size.* Tubing ends can be connected to most any compression type fitting.

*Shipped in 2-3 foot diameter coils for forming to desired shape, 50 foot max. continuous run. ACE can supply coiled exchanger to suit your needs. For a quotation, please send us specifications.

Nominal Copper O.D., in.	Fluorocarbon Wall (Inches)	Copper Wall (Inches)	Approx. Min. Bend Dia., in.	Approx. Sq. Ft. of Surface Per Linear Ft.	Order Code
1/4	.015	.030	2	.0733	12067-15
3/8	.015	.030	4	.106	12067-20
1/2	.020	.030	8	.141	12067-25

12111 TEMPERATURE CONTROLLER *Time Proportional, Digital* ★

Microprocessor based, compact, temperature controller, with bright LED display. Temperature range is -70° to 870° C with 0.1° C resolution. Temperature readout in fahrenheit or centigrade is field selectable. Designed to use Type "J" thermocouple sensors. The code -15 and -33 units have two, 120V front outlets. The -47 and -58 units have 2-120 volt rear outlets and one selectable, 20V or 40V front outlet. Both models have 16 segment ramp and soak selectable profile. This model has an over-temp cutoff and alarm output for added safety. Output circuitry utilizes zero-crossing fired solid state relay for proportional control that provides interference free power, (RFI) to electric heater type resistive loads. 120volt, 15Amp, 60Hz input. Unit is 6-inch x 6.5-inch x 5.5-inch (HxDxW); weight = 4 lbs. Three-year conditional warranty. Complete unit comes with Type "J" thermocouple.

With Two Front 120v Outlets

	Order Code
Controller, only	12111-15
Sensor, Type J Thermocouple, 318mm, 1/4-inch O.D.	12110-15
Complete (above two components)	12111-33

With Front 20v and 40v Outlets, Two Rear 120v Outlets

Controller, only	12111-47
Sensor, Type J Thermocouple, 318mm, 1/4-inch O.D.	12110-15
Complete (above two components)	12111-58

OPTIONAL COMPONENTS:

Sensor, Type J Thermocouple, 102mm, 3/16-inch	12110-17
Sensor, Type J Thermocouple, 305cm, fiberglass insulated, w/ot sheath	12110-24
Sensor, Type J Thermocouple, 305cm, double PTFE insulated, w/o sheath	12110-25
Sensor Extension, 2.4M (8-inch) w/mating connectors, double PTFE insulated	12110-26

12111-15



12310 GEMINI SERIES, J-Kem

The Gemini Series features two temperature controllers in a single cabinet to regulate two independent reactions. This versatile controller has high-power outlets and a 100-hour digital timer (on Channel One) to turn heating on or off at a user-entered time. Features include: over-temperature protection circuit with audible alarms; dual temperature displays; selectable operating modes; twin circuit breakers; and 100% solid-state design.

3.75-inch x 7.75-inch x 9.25-inch (HxWxD) / 120vac, 15 amps, 1800 watts total
 1200 watts maximum per channel

J-Kem Model	With Sensor, Cord and Adapter	Temperature Range (°C)	Thermocouple Type	Order Code
Gemini-T	No	-200 to 250	T	12310-04
Gemini-J	No	0 to 800	J	12310-06
Gemini-K	No	-50 to 1200	K	12310-08
Gemini-Pt	No	-200 to 400	RTD	12310-10
Gemini-T-S	Two of each	-200 to 250	T	12310-25
Gemini-J-S	Two of each	0 to 800	J	12310-27
Gemini-K-S	Two of each	-50 to 1200	K	12310-29
Gemini-Pt-S	Two of each	-200 to 400	RTD	12310-31

NEW



12310

For complete sensor and temperature control listings, see the Ace General Catalog or visit our website at www.aceglass.com.

12312 APOLLO SERIES, J-Kem

Has all the features of the Gemini series, above, but also has an independent 100-hour digital timer on each controller channel.

4-inch x 8-inch x 9-inch (HxWxD) / 120vac, 15 amps, 1800 watts total
1200 watts maximum per channel



12312

J-Kem Model	With Sensor, Cord and Adapter	Temperature Range (°C)	Thermocouple Type	Order Code
Apollo-T	No	-200 to 250	T	12312-03
Apollo-J	No	0 to 800	J	12312-05
Apollo-K	No	-50 to 1200	K	12312-07
Apollo-Pt	No	-200 to 400	RTD	12312-09
Apollo-T-S	Two of each	-200 to 250	T	12312-23
Apollo-J-S	Two of each	0 to 800	J	12312-25
Apollo-K-S	Two of each	-50 to 1200	K	12312-27
Apollo-Pt-S	Two of each	-200 to 400	RTD	12312-29

The Apollo and Gemini Series units noted above each come with two thermocouple sensors, two cords and two adapters.

12314 QUAD SERIES, J-Kem

The Quad is your solution when bench space is at a premium — the Quad packs four independent temperature controllers into a single unit! Each of the four controller channels has 1200 watts of power, an independent display, and an over-temperature protection circuit.

5.25-inch x 7-inch x 7.5-inch (HxWxD) / 120vac, 15 amps, 1800 watts total
1200 watts maximum per channel



12314

J-Kem Model	With Sensor, Cord and Adapter	Temperature Range (°C)	Thermocouple Type	Order Code
Quad-T	No	-200 to 250	T	12314-05
Quad-J	No	0 to 800	J	12314-07
Quad-K	No	-50 to 1200	K	12314-09
Quad-Pt	No	-200 to 400	RTD	12314-11
Quad-T-S	Four of each	-200 to 250	T	12314-20
Quad-J-S	Four of each	0 to 800	J	12314-22
Quad-K-S	Four of each	-50 to 1200	K	12314-24
Quad-Pt-S	Four of each	-200 to 400	RTD	12314-26

The Quad Series units noted above each come with four thermocouple sensors, four cords and four adapters.

All J-Kem units come with free KemNet Data Logging and Control Software and a two-year warranty.

Trubore® Stirring Equipment — Precision Fit and Performance

Bearings and shafts guaranteed interchangeable

Trubore® stirrers, pioneered and developed by ACE, are the most widely used precision glass stirrers in research today.

If both shaft and bearing of a given size are manufactured by ACE, we guarantee them to be interchangeable.

Precision fit and performance

Every shaft and bearing is individually inspected and air gauged to insure clearance fit of less than 0.025 mm (0.001 inches).

ACE bearings are smooth and transparent. This feature automatically reduces leak path for a given fit clearance and surface roughness; it also prolongs bearing life.

Special "plateau" grinding is employed on shafts. This provides maximum smoothness consistent with optimum retention of lubricant. In terms of performance, this texture means a low leak rate, which permits attainment of

at least 1mm Hg absolute with unlubricated surfaces at speeds less than 100 rpm. It also means that plastic shafts, including Fluoro-carbon coated glass shafts, may be used with bearings — a practice not feasible with ground bearings.

Operation

If the components have been properly cleaned prior to operating, a Trubore® stirring unit can be run unlubricated for a limited time at a maximum speed of 500 rpm.

For continuous operation, or operation at speeds greater than 500 rpm, proper lubrication is required. We recommend ACE 8117 Stir-Lube® be used as a proper all-purpose lubricant up to 2000 rpm.

For high-speed stirring over 2000 rpm, we recommend a thin base of 8229 grease with application of 8119 Hi-Lube heavy-duty liquid stirrer lubricant. Both materials are also chemically inert. If accidentally introduced into

a solvent system reaction, they will not react into your product, but will be removed with the solvent. Under no circumstances should glycerin be used; it acts as a grinding medium rather than a lubricant.

Note that only a small lubricant well is provided at the top of ACE bearings; this is because only a slight amount of Stir-Lube® is needed for many hours of stirring.

Care and cleaning

Because of the very close fit between shaft and bearing, a slight amount of dust or grit will quickly scratch the smooth surface of the bearing. To prevent this, both shaft and bearing should be washed with a good detergent and dried with acetone — instead of with a wiping cloth — prior to use.

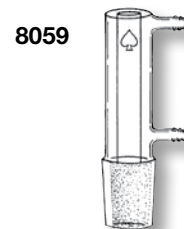
ACE lubricants may be completely removed with acetone or most other ketones.

19mm Rods, Bearings & Agitators

8059 BEARING *Trubore, Water Cooled, 19mm ♦*

Trubore 19mm ID, stirrer bearing with ground tapered joint bottom. Jacketed for water cooling. Designed for use with 19mm O.D. 8077 and 8078 precision ground glass shafts and 8079 PTFE shafts with stainless steel core. Hose connections are size D for use with 3/8-inch I.D. tubing.

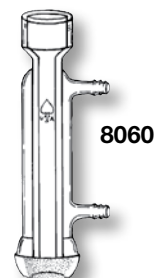
§ Joint	Order Code
45/50	8059-05
55/50	8059-09



8060 BEARING *Trubore, Water Cooled, 19mm ♦*

Trubore 19mm ID, glass stirrer bearing with bottom spherical ground joint. Joint can be clamped to prevent rotation. Length is 15.2cm (6 inch). Designed to accommodate ACE 8112-10 packing box which sits directly into the top of the bearing. Designed for use with 19mm O.D. 8077 and 8078 precision ground glass shafts and 8079 PTFE shafts with stainless steel core. Hose connections are size D for use with 3/8-inch I.D. tubing.

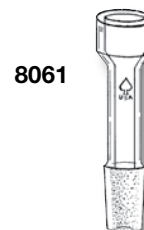
§ Joint	Order Code
65/40	8060-10



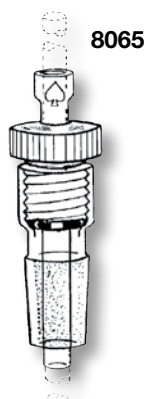
8061 BEARING *Trubore, Heavy Duty, 19mm ♦*

Heavy duty, 19mm ID, Trubore stir bearing with bottom standard taper joint. Designed to accommodate ACE 8112-10 packing box which sits directly into the top of the bearing. Designed for use with 19mm O.D. 8077 and 8078 precision ground glass shafts and 8079 PTFE shafts with stainless steel core. Length is 20.3 cm (8 inches). Heavy duty style for use with larger capacity flasks.

§ Joint	Order Code
45/50	8061-04



19mm Rods, Bearings & Agitators



8065

8065 BEARING *Tribore, Glass, Heavy Duty, 19mm ♦*

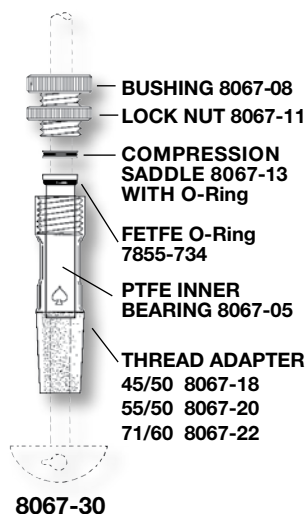
Tribore, self aligning, heavy duty three piece bearing. Complete consists of inner 19mm ID Tribore bearing, compression seal nylon busing, with o-ring and #25 Ace-Thred adapter with standard taper, ground joint bottom. Design allows for slight misalignment of stir motor and the bearing without breaking or shaft seizing as the inner bearing will spin. Designed for use with 19mm O.D. 8077 and 8078 precision ground glass shafts and 8079 PTFE shafts with stainless steel core. Heavy duty style for use with larger capacity flasks. For replacement O-ring, see 7855-734.

§34/45 Bottom Joints

	Order Code
Inner Bearing, only	8065-06
Bushing with O-Ring	8065-10
#25 Ace-Thred Adapter, only	8065-14
Complete	8065-60

§45/50 Bottom Joints

	Order Code
Inner Bearing, only	8065-06
Bushing with O-Ring	8065-10
#25 Ace-Thred Adapter, only	8065-16
Complete	8065-64



8067-30

8067 BEARING *Tribore, PTFE Inner Bearing, Ace-Thred, 19mm ♦*

Self-aligning, lubricant-free PTFE Tribore bearing for use with 8076, 19mm polished glass stirring shaft. Complete consists of PTFE inner Tribore bearing, #25 Ace-Thred glass adapter, non-flaking PTFE compression saddle with O-Ring and glass-reinforced PTFE bushing and lock nut with FETFE O-Ring. The lock nut permits stirring in either direction without fear of unthreading. The compression saddle with O-Ring maintains constant force with little attention. Vacuum down to 1mm of Hg. Not recommended for precision ground glass shafts. For replacement "saddle" O-Ring, order 7855-730; for bearing O-Ring, order 7855-734.

Order Code

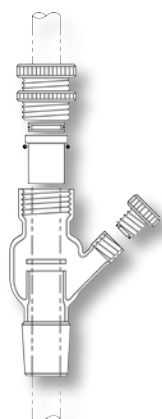
PTFE Inner Bearing w/O-Ring, only	8067-05
Glass Filled/PTFE Bushing, only	8067-08
Glass Filled/PTFE Lock Nut, only	8067-11
Saddle O-Ring, only	8067-13

#25 Ace-Thred Glass Adapter, only

§ Joint	Order Code
45/50	8067-18
55/50	8067-20
71/60	8067-22

Complete Assembly

Bottom § Joint	Order Code
45/50	8067-30
55/50	8067-34
71/60	8067-38



8067-54

8067 BEARING *Debris Trap, PTFE Inner Bearing, Ace-Thred, 19mm ♦*

Combination all-in-one stirring shaft bearing and debris trap. Designed to prevent particles from entering the reaction vessel. Lubricant-free PTFE Bearing with compression saddle O-Ring makes a mechanical seal against 8076 polished glass shaft. Debris trap section consists of a PTFE washer and particle well. #11 Ace-Thred on glass body side allows access for clean-out, or may be used for evacuation/gas purge port. Complete item supplied with glass body, inner PTFE bearing, PTFE bushing and lock nut, Rulon saddle O-Ring, "Ace-Safe" connector for 3/8-inch tubing, and PTFE plug.

Order Code

PTFE Inner Bearing w/O-Ring, only	8067-07	PTFE Washer	8067-09
Glass Filled/PTFE Bushing, only	8067-08	PTFE Plug, #7	5846-46
Glass Filled/PTFE Lock Nut, only	8067-11	"Ace-Safe" Connector, #7 x 1/4-inch	5853-15
Compression Saddle w/O-Ring, only	8067-13		

#25 Ace-Thred Glass Adapter, only

Bottom § Joint	Order Code
45/50	8067-45
55/50	8067-47
71/60	8067-49

Complete Assembly

Bottom § Joint	Order Code
45/50	8067-54
55/50	8067-57
71/60	8067-59

NOTE: Glass Trap Body is available without side port. Call or e-mail for details.

19mm Rods, Bearings & Agitators

8076 STIRRING SHAFT *Borosilicate, Polished, 19mm* ♦

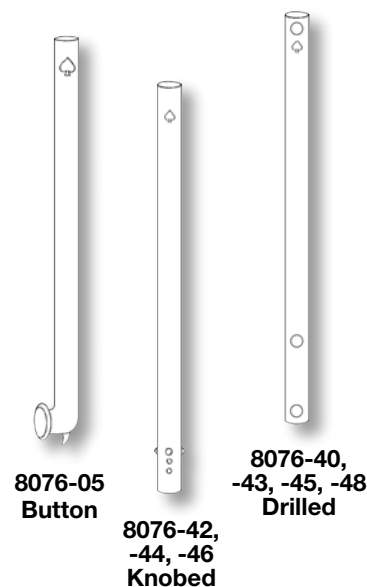
19mm O.D. button type, hollow shaft for use with 8067, 8050 or 13445 bearings. Fits 8124 chuck. Polished surface. For stir blades, see 8085.

For Flask Cap., Liters	Length, Meters (feet)	Order Code	Bottom Style
22	0.7 (2.3)	8076-05	Button
22	0.9 (3)	8076-07	Button
50-72	1.2 (4)	8076-10	Button

8076 STIRRING SHAFT *Borosilicate, Polished, 19mm* ♦

19mm O.D. polished stirring shaft. Can be used with 8050, 8060, 8061, 8065 or 8067 bearings and 8091, 8092 or 8093 Agitators. Fits 8124 chuck.

For Flask Cap., Liters	Type Shaft	Length, Meters (Inches)	Order Code	Bottom Style
10	Hollow	0.8 (32)	8076-42	Knobed Bottom
10	Solid	0.8 (32)	8076-43	Drilled Holes
20	Solid	0.9 (36)	8076-40	Drilled Holes
30	Hollow	1.2 (48)	8076-44	Knobed Bottom
50	Solid	1.14 (45)	8076-45	Drilled Holes
50	Hollow	1.4 (54-1/2)	8076-46	Knobed Bottom
50	Solid	1.4 (54-1/2)	8076-48	Drilled Holes



8077 STIRRING SHAFT *Precision-Ground, Borosilicate, 19mm* ♦

19mm O.D. button type, hollow shaft for use with all 19mm I.D. ACE Trubore Bearings, 8059, 8060, 8061 or 8065. Also compatible with 8050 mechanical seal and 13445 PTFE bearing. Fits 8124 chuck. Ground surface approximately 380mm long. For stir blades, see 8085.

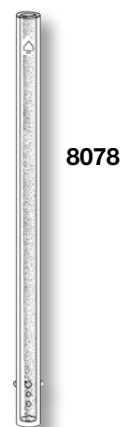
For Flask Cap., Liters	Length, Meters (feet)	Order Code
22	0.7 (2.3)	8077-23
22	0.9 (3)	8077-25
50-72	1.2 (4)	8077-27



8078 STIRRING SHAFT *Precision-Ground, Heavy Duty, 19mm* ♦

Hollow, 19mm O.D., heavy-wall borosilicate glass stirring shaft for flasks up to 72 liters. Extra long to accommodate units with reaction flask heads and the longer Trubore bearings. Use with 8059, 8060, 8061 or 8065 bearings. Also compatible with 8050 mechanical seal and 13445 PTFE bearing. Knob type bottom accommodates 8091, 8092 or 8093 Agitators. Fits 8124 chuck.

For Flask Cap., Liters	Length, Meters (feet)	Order Code
22	0.9 (3)	8078-05
50-72	1.2 (4)	8078-10



19mm Rods, Bearings & Agitators

8079

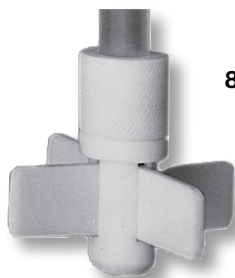


8079 STIRRING SHAFT *Precision, PTFE, Heavy Duty, 19mm* ★

Precision PTFE shaft with stainless steel core to fit 19mm Trubore Bearings 8059, 8060, 8061 or 8065. Bottom drilled holes for attaching 8091, 8092 or 8093 Agitators. Does not require lubrication. For flasks up to 72 liters. Fits 8124 chuck. *Not recommended for 8050, 8067 or 13445 bearings.*

For Flask Cap., Liters	Length, Meters	Order Code
22	0.7 (29 inches)	8079-03
22	0.9 (3 feet)	8079-05
50-72	1.2 (4 feet)	8079-10

8091-10

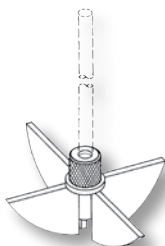


8091 AGITATOR *PTFE, Multi-Paddle, for 19mm Shafts* ♦

Multi-paddle agitator with 102mm or 152mm long x 4.8mm thick paddles. Paddles are interchangeable. Other lengths available on request. Unit fits 19mm O.D. shafts, 8076-42, 8078 or 8079 with knob-type or drilled-type bottoms. NOT supplied with shaft.

Complete		Replacement Blades
Size, mm	Order Code	Order Code
102	8091-10	8091-14
152	8091-20	8091-15

8091-40

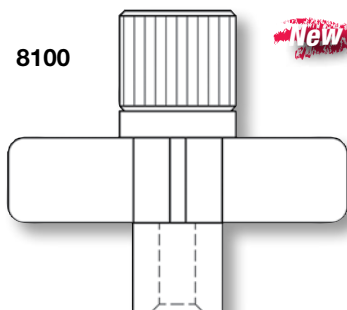


8091 AGITATOR *PTFE, Large Scale, Multi-Paddle, for 19mm Shafts* ★

Similar to 8091 above except for use with large-scale pilot plant reactors such as 30L and 50L cylindrical or 50L and 72L spherical flasks. Code -26 for use with 6-inch and 8-inch flanged reactor flasks; code -40 for use with 12-inch flanged reactor flasks. Blades are 140mm (5-1/2 inches) or 203mm (8 inches) long x 6.35mm (1/4-inch) thick. The increased length and depth of the blades imparts more energy to the load. The offset at bottom accommodates heavy slurries. Unit fits 19mm O.D. shafts 8076-42, 8078 or 8079 with knob-type or drilled-type bottoms. NOT supplied with shaft.

Complete		Replacement Blades
Size, Inches	Order Code	Order Code
5-1/2	8091-26	8091-28
8	8091-40	8091-44

8100



8100 AGITATOR *PTFE, Multi-Paddle with Receptacle, for 19mm Shafts* ♦

PTFE bottom agitator for large reactors. Multi-paddle assembly fits 8076-42, -44 and -46, or 8078, 19mm glass shafts. Agitator is "pinned" to the shaft. The bottom of the center piece is bored out to receive the pin from the #6483 flush seal valve. This agitator when coupled to the 6483 valve greatly reduces flexing or wobble from the shaft. Each blade is either 140mm or 200mm full length. Order shaft separately.

Complete		Replacement Blades
Size, mm	Order Code	Order Code
140	8100-09	8091-28
200	8100-19	8091-44

19mm Rods, Bearings & Agitators

8092 AGITATOR *PTFE, Single Blade, for 19mm Shafts* ♦

PTFE bottom agitator, with single 15.2cm length, removable blade. Agitator body is secured to 19mm shaft by removable PTFE "pin". Top forked tines are then secured with threaded PTFE nut. Blade will fit through a 45/50 joint opening. Fits 8067, 8078 and 8079 19mm shafts.

Complete		Replacement Blade	
Order Code		Order Code	
8092-10		8092-14	


8092

8093 AGITATOR *PTFE, Turbine, for 19mm Shafts* ♦

A 102mm or 152mm total diameter agitator for 19mm O.D. 8076, 8078 or 8079 drilled or knob-type bottom shafts. Turbine blade unit is removable. Shaft opening is open straight through to allow positioning of agitator at any height on shaft. NOT supplied with shaft.

Complete		Replacement Blades	
Size, mm	Order Code	Order Code	
102	8093-12	8093-15	
152	8093-22	8093-16	


8093

8124 CHUCK *"Flex-Grip," for 19mm Shafts* ♦

Nylon chuck for use with ACE stirring shafts or other shafts of the same dimensions. Chuck has flexible insert which allows for misalignment of shaft without danger of breakage.

For Stirring Shaft Size, mm	For Motor Shaft, mm (Inches)	Order Code
19	8 (5/16)	8124-15
19	9.5 (3/8)	8124-17
19	12.7 (1/2)	8124-20
19	13	8124-22
19	15.9 (5/8)	8124-23

Insert Only Size	Pkg. Quantity	Order Code
19 mm	3	8124-30

8124


8050 STIRRER BEARING *Mechanical Seal, PTFE* ★

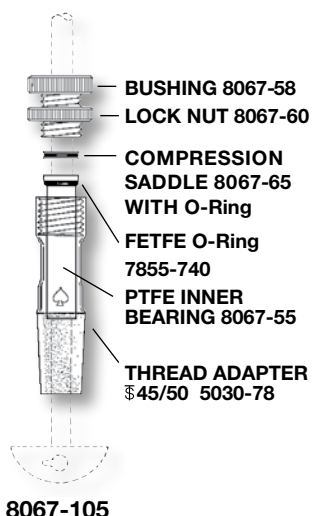
Newly designed mechanical stirrer bearing from ACE. All PTFE, Rulon or PEEK wetted area construction provides for low extractables. Completely contained bearing and internal parts also provides non-shedding of materials into the reaction. The bearing is excellent for vacuum applications and can be operated at sub-torr levels. Rated for up to 400rpm speeds. Available in three popular shaft and joint sizes; 10mm, 19mm and 28mm. It can be used on either glass polished or stainless steel stir shafts. See below for joint sizes.

Shaft Size, mm	Joint Size	Order Code
10	24/40	8050-02
10	24/42	8050-04
19	45/50	8050-06
28	45/50	8050-08
10	#15 Ace-Thred	8050-10
12	#25 Ace-Thred	8050-12

8050

new

28mm Rods, Bearings & Agitators



8067 BEARING *Trubore, PTFE, Ace-Thred, 28mm* ★

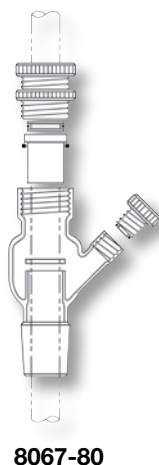
Self-aligning, lubricant-free PTFE Trubore bearing for use with 8080 28mm polished glass stirring shaft. Complete consists of PTFE inner Trubore bearing, Ace-Thred glass adapter (#36 to $\frac{1}{2}$ 45/50), PTFE compression saddle with O-Ring and glass-reinforced PTFE bushing, and lock nut with FETFE O-Ring. The lock nut permits stirring in either direction without fear of unthreading. The compression saddle with O-Ring maintains constant force with little attention. Vacuum down to 1mm Hg. Not recommended for precision ground glass shafts. For replacement "saddle" O-Ring, see 7855-739; for bearing O-Ring, see 7855-740.

	Order Code
PTFE Inner Bearing w/O-Ring, only	8067-55
Glass Filled/PTFE Bushing, only	8067-58
Glass Filled/PTFE Lock Nut, only	8067-60
Compression Saddle w/O-Ring, only	8067-65
Threaded Glass Adapter, $\frac{1}{2}$ 45/50, only	5030-78
Complete	8067-105

8067 BEARING *Debris Trap, PTFE, Ace-Thred, 28mm*

Combination all-in-one stirring shaft bearing and debris trap. Designed to prevent particles from entering the reaction vessel. Lubricant free PTFE Bearing with compression saddle O-Ring makes a mechanical seal against an 8080 polished glass shaft. Debris trap section consists of a PTFE washer and particle well. #15 Ace-Thred on glass body side allows access for clean-out, or may be used for evacuation/gas purge port. Complete item supplied with glass body, inner PTFE bearing, PTFE bushing and lock nut, Rulon saddle O-Ring, "Ace-Safe" connector for 3/8-inch tubing, and PTFE plug.

NOTE!
Glass Trap Body is available without side port. Call or e-mail for details.

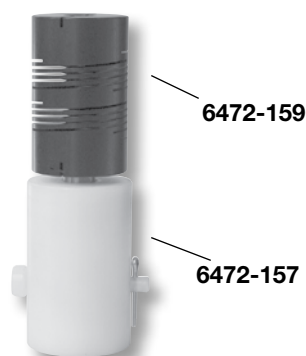


	Order Code	
PTFE Inner Bearing w/O-Ring, only	8067-70	★
Glass Filled/PTFE Bushing, only	8067-58	★
Glass Filled/PTFE Lock Nut, only	8067-60	★
Compression Saddle w/O-Ring, only	8067-65	★
PTFE Washer	8067-72	★
PTFE Plug, #15	5846-48	♠
"Ace-Safe" Connector, #15 x 3/8 inch	5853-23	♠
Glass Trap Body, only, $\frac{1}{2}$ 45/50	8067-75	★
Complete, $\frac{1}{2}$ 45/50	8067-80	★

6472 CONNECTOR *Flexible Beam for Motor Shaft to Chuck, 28mm* ★

For connecting 3/8-inch, 1/2-inch or 5/8-inch motor shaft to chuck that connects a 28mm O.D. Rod on Pilot Plant Reactors.

Motor Shaft Size, in. (mm)	Order Code
3/8 (9.5)	6472-159
1/2 (12.7)	6472-155
5/8 (15.9)	6472-156



6472 CHUCK *for 28mm Rod* ★

For connecting a 28mm O.D. Rod (8080) to 6472-159, -155 and -156 Beam Connector.

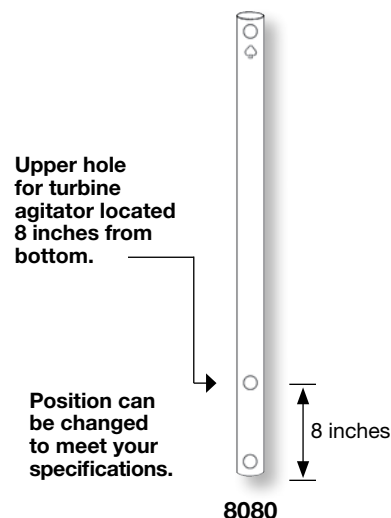
Chuck, only	Replacement Pin, only
Order Code	Order Code
6472-157	6472-158

28mm Rods, Bearings & Agitators

8080 STIRRING SHAFT *Polished Heavy Duty, 28mm* ★

Heavy-duty, 28mm O.D. borosilicate glass stirring shaft for use with ACE 6472, 6473 and 6474 Reactors. Shaft has pre-drilled holes at top and bottom for positive attachment to motor coupling and agitator, respectively. Use with 8067-105 Bearing and 8091 and 8093 Agitators for 28mm rods. Fits ACE 6472-155 Beam Connector and 6472-157 Chuck.

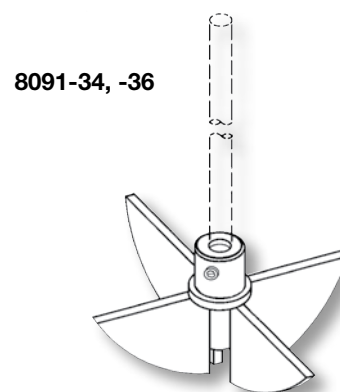
For Flask Capacity	Length, Meters (Inches)	Order Code
30L Cylindrical	1.14 (45)	8080-14
50L Cylindrical	1.32 (52)	8080-18
72L & 100L Spherical	1.14 (45)	8080-14
100L Cylindrical	1.47 (58)	8080-22
100L Cylindrical	1.60 (63)	8080-30
200L Spherical	1.40 (55)	8080-24
200L Cylindrical	2.03 (80)	8080-25



8091 AGITATOR *PTFE, Large Scale, Multi-Paddle, 28mm Shafts* ★

A four-blade, multipaddle agitator, used at lower end of 8080 28mm Stirring Shaft. Supplied with PTFE bolt and nut for securing to 8080 Shaft to prevent detachment during operation. Blades on code -34 are 140mm (5.5 inches) long; on code -36 they are 178mm (7 inches) long x 6.35mm (1/4 inches) thick. The increased length and depth of the blades imparts more energy to the load. NOT supplied with shaft.

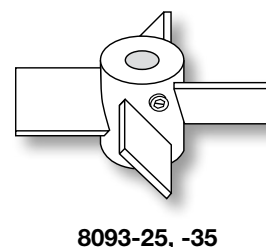
Complete		Replacement Nut & Bolt
For Flask Capacity	Order Code	Order Code
72L & 100L Spherical	8091-34	8091-134
200L Spherical; 30L, 50L, 100L & 200L Cylindrical	8091-36	



8093 AGITATOR *PTFE, Large Scale, Turbine, for 28mm Shafts* ★

A four-blade, 45-degree-pitch, turbine-type agitator, used at upper section of 8080 28mm Stirring Shaft. Supplied with PTFE bolt and nut for securing to 8080 Shaft to prevent detachment during operation. Blades on code -25 are 140mm (5.5 inches) long, overall; on code -35 they are 152mm (6 inches) long, overall x 6.35mm (1/4 inches) thick. The increased length and depth of the blades imparts more energy to the load. NOT supplied with shaft.

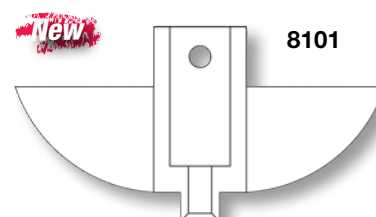
Complete		Replacement Nut & Bolt
For Flask Capacity	Order Code	Order Code
100L Spherical	8093-25	8093-125
100L & 200L Spherical; 30L, 50L, 100L & 200L Cylindrical	8093-35	



8101 AGITATOR *PTFE, Multi-Paddle with Receptacle, for 28mm Shafts* ♦

PTFE bottom agitator for large reactors. Multi-paddle solid +assembly fits 8080 - 28mm glass shafts. Agitator is attached to the shaft by a PTFE bolt. The bottom of the center piece is bored out to receive the pin from the #6483 flush seal valve. This agitator when coupled to the 6483 valve greatly reduces flexing or wobble from the shaft. Each blade on -28 is 140mm full length. Blades on -38 are 178 mm overall length. Order shaft separately.

Size, mm	Order Code
140	8101-28
178	8101-38



13365 AIR STIRRER *Light Duty*
Model A

13365-05

This small, compact and quiet model is ideal for stirring all types of solvents, lacquers, paints, oils, synthetics, fine and heavy chemicals where danger of explosion may exist, as there are no sparks. It is a complete unit, ready for mounting on a laboratory stand. Air supply of only 30 to 100 PSI is necessary. Variable speeds range from 200 rpm to 10,000 rpm merely by turning the air supply line valve. For bath sizes to 20 liters, this smooth running unit has little or no service cost. Unit adjusts itself to compensate for wear. The shaft and propeller are made of stainless steel to resist most acids and chemicals and for easier cleaning. Will start in most stalled positions with low air pressure and cannot burn out from overload. Air Motor 0-1/3 hp. at 80 lbs. Coupler and stainless steel shaft 30.5cm overall. Propeller: stainless steel 6.4cm diameter. Shaft is 9.5mm (3/8-inch) O.D. For Filter/Regulator/Lubricator, see 13372. Air consumption = 13 cfm.

Order Code
13365-05
13365 AIR STIRRER *Heavy Duty*
Model G
13365-10


Specially designed for use with more viscous materials. More constant speed is attained through gear reduction, lowering speed fluctuations due to changes in air pressure. Speeds range from 50 to 1200 rpm by merely turning valve on air supply line. This smooth running unit is complete and ready to mount on laboratory stand. Air supply of only 30 to 80 PSI is necessary. Another outstanding feature of the unit is the muffler, which provides quiet operation. The shaft and propeller are stainless steel to resist most acids and chemicals and for easier cleaning. Service costs are low as the unit adjusts itself to compensate for wear. Air Motor 0-1/3 hp. at 80 lbs. Gear Ratio 7-1. coupler and stainless steel shaft 30.5cm overall. Propeller: stainless steel 6.4cm diameter. Shaft is 9.5mm (3/8-inch) O.D. For Filter/Regulator/Lubricator, see 13372. Air consumption = 13 cfm.

Order Code
13365-10
13370 AIR MOTOR *Heavy Duty, High Torque*
Model 1500
13370


A compact, heavy duty air motor. Complete unit consists of an air hose with a snap coupling on motor end and shut-off valve on the other. Motor will develop 1.5 hp. at 90 lbs. air pressure. Speeds are variable from 300 to 3000 rpm. It consumes approximately 42 cfm at 3000 rpm. Shaft is 12.7mm (1/2-inch) diameter for use with 8124 chuck, not included.

Order Code
13370-10
13372 FILTER/REGULATOR/LUBRICATOR
13372

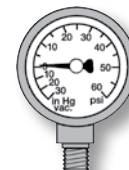

Space-saving unit, recommended for use with 13665, 13665G and 13370 Air Motors. Pressurized air flows through louvered deflector in swirling pattern, with liquids and dirt falling into lower baffle where they are prevented from re-entering the air stream. Element removes impurities down to 40 microns. Clean air then passes through precision needle valve feed mist lubricator that can be filled under pressure. 150 PSI maximum pressure range is adjustable through spring action of T-handle. Maximum operating temperature is 125°F. Manual drain. Shatter-proof polycarbonate bowls not recommended for use in atmospheres containing acetone, benzene, carbon tetrachloride, ethylene dichloride, gasoline or toluene. Inlet and outlet connections are 1/4-inch NPT. Supplied complete with gauge and mounting bracket.

Order Code
13372-45

13385 GAUGE *Pressure*

Pressure gauges for monitoring pressure in laboratories; especially suited for use with Pressure Reactors or other applications when pressure monitoring is necessary. Available with brass or 316 SS internals. *Note: Code -52 is a compound gauge, pressure and vacuum.*

Pressure Range, psi	Dial Size (Inches)	Male npt Connector (Inches)	Internals	Order Code
0-400	2-1/2	1/4	Brass	13385-12
0-400	2-1/2	1/4	Stainless Steel	13385-14
0-60	1-1/2	1/8	Stainless Steel	13385-44
0-160	1-1/2	1/8	Stainless Steel	13385-48
Full vacuum-60	1-1/2	1/8	Stainless Steel	13385-52


13385-12

13385-52

13385-44

10015-10 PRESSURE RELIEF MANIFOLD *for Ace Pilot Plants*

This pressure relief manifold is designed to fit into process systems between the circulator and the glass reaction vessel for added protection and safety. The manifold gives further protection to the glass vessel itself and the vessel inlet fittings and alleviates excess pressure build-up that could damage the reactor. Most circulators have an excess pressure relief built-in, but may not be able to react fast enough to protect the glass. The system is supplied complete with the anodized aluminum body-clamp, outlet connections and hoses, inlet pressure gauge, relief valve assembly, which is factory preset and sealed at 10PSI. The manifold will fit 10L and larger pilot plant systems.

See separate hose listings by manufacturer for inlet/outlet hoses and connector fittings. See also Stainless steel fittings to match to 3/4-in. female manifold inlet.

Order Code
10015-10


12187 CIRCULATOR ADAPTERS *Universal*

Ace Glass universal pilot plant/circulator couplings designed for use with various manufacturer's circulators and our reaction systems. Secures glass joints to stainless steel adapters on circulator hoses.

Adapter Size	Order Code
28/15	12187-28
35/25	12187-35

New

12187

13557 GEAR BOX *Fits Both Standard & Hazardous duty series*

Right-angle drive 5:1 gear box only. Bolts directly to motors with a 5/8-inch diameter shaft.

Order Code

For 1/4 or 1/2 horse power motors

13557-10
New

13557-10

***UL Classified:**

**Class I, Div. I, Group D
Atmospheres
(Flammable gases
or vapors)**

**Class II, Div. I, Group F & G
(combustible dust)**

13554 STIRRING MOTOR* AND CONTROLLER *Pilot Plant, for Hazardous Area (Motor Only)*

MOTOR: For hazardous area*, heavy duty, 1/4 or 1/2 hp. permanent magnet (PM), DC reversible, 90 volt DC armature type. This 56C base frame, continuous duty, ball bearing, totally enclosed fan cooled (XPFC) motor has a variable speed range up to 1750 r.p.m. Operates at a maximum temperature of 40°C. Supplied with 30-foot cord with mating twistlock cap. Overall length: code -40 is 10-1/2 inches; code -50 is 12-3/4 inches. Maximum torque rating: code -40 is 9.1 in.-lbs.; code -50 is 18.3 in.-lbs., NEMA C-face. Shipping weight: code -40 is 34 lbs.; code -50 is 50 lbs. Motor shaft is 5/8 inches O.D.

CONTROLLER: Converts 120 volts AC 50/60 Hz to 90 volts DC. Supplied with 6-foot cord to a twistlock connector for connection to motor. (NOTE! Controller should be mounted remote of hazardous area.) NEMA classification 4/12 (water- and dust-proof for industrial use). Maximum speed preset at factory at 900 r.p.m. for safety, can be increased or decreased internally; see instructions. Also has torque and current limit adjustments, all factory set. Use 6472-872 Mounting Plate when using with some Reactors. Use Offset Adapters when using this motor with 6472 Reactors to move condenser, etc. away from motor mount. See listing below.

13554-45, -55

**Order Code**

Motor, 1/4 hp, only

13554-40

Controller, only

13554-24

Complete, 1/4 hp

13554-45

Motor, 1/2 hp, only

13554-50

Controller, only

13554-26

Complete, 1/2 hp

13554-55**IMPORTANT:**

The controller and connectors between controller and motor should be in line of sight of the motor. DO NOT disconnect controller from motor while operating or when controller is powered: damage to motor or controller could result.

13557 OFFSET STIRRING MOTOR *Hazardous duty series**

Stirring motor, controller and right-angle, off-set drive. Same motor and analog controller as 13554 hazardous area unit except complete with right-angle drive gear box.

Order Code

Analog, 1/4 horse power, complete

13557-110

Analog, 1/2 horse power, complete

13557-120

Stirring motor, controller and right-angle, off-set drive. Same motor and controller as 13554 hazardous area unit except complete with right-angle drive gear box and digital control.

Order Code

Digital, 1/4 horse power, complete

13557-220

Digital, 1/2 horse power, complete

13557-240

13554-26



13557-220



**Side gear drive available separately.*

13557 OFFSET STIRRING MOTOR *Standard duty series**

Stirring motor, controller and right-angle, off-set drive. Same motor and analog controller as 13554 — standard unit except complete with right-angle drive gear box.

	Order Code
Analog, 1/4 horse power, complete	13557-310
Analog, 1/2 horse power, complete	13557-320

Stirring motor, controller and right-angle, off-set drive. Same motor and controller as 13554 — standard unit except complete with right-angle drive gear box and digital control.

	Order Code
Digital, 1/4 horse power, complete	13557-420
Digital, 1/2 horse power, complete	13557-440

IMPORTANT:

The controller and connectors between controller and motor should be in line of sight of the motor. DO NOT disconnect controller from motor while operating or when controller is powered: damage to motor or controller could result.

**Side gear drive also available separately.*



13554 STIRRING MOTOR AND CONTROLLER *Pilot Plant*

MOTOR: Non-hazardous area, heavy duty, 1/4 or 1/2 hp, permanent magnet (PM), DC reversible, 90 volt DC armature type. This 56C base frame, continuous duty, ball bearing, totally enclosed fan cooled (TEFC) motor has a variable speed range up to 1750 rpm. Operates at a maximum temperature of 40°C. With 5/8 inch O.D. motor shaft. No UL classification. Supplied with 30-foot cord with mating twistlock cap. Overall length: code -05 is 10½ inches; code -09 is 12½ inches. Maximum torque rating: code -05 is 9.1 in-lbs.; code -09 is 18.3 in-lbs., NEMA C-face. Shipping weight: code -05 is 17 lbs.; code -09 is 25 lbs.

CONTROLLER: Converts 120 volts AC to 90 volts DC. Supplied with 6-foot cord to a twistlock connector for connection to motor. (NOTE! Controller should be mounted remote of hazardous area). NEMA classification 4/12 (water- and dust-proof for industrial use). Maximum speed preset at factory at 900 rpm for safety, can be increased or decreased internally, see instructions. Also has torque and current limit adjustments, all factory set.

See listing below of offset adapters necessary for use when using this motor with 6472 Reactors. Use 6472-872 Mounting Plate when using with some Reactors.

	Order Code	
Motor, 1/4 hp, only	13554-05	★
Controller, only	13554-24	★
COMPLETE, 1/4 hp	13554-07	★
Motor, 1/2 hp, only	13554-09	★
Controller, only	13554-26	★
COMPLETE, 1/2 hp	13554-10	★

OFFSET ADAPTER, only

⌘ Joints	Order Code	
24/40	5268-10	♠
29/42	5268-15	♠
45/50	5268-21	★

13554-07, -10



IMPORTANT:

The controller and connectors between controller and motor should be in line of sight of the motor. DO NOT disconnect controller from motor while operating or when controller is powered; damage to motor or controller could result.

Overhead Stirrers

RZR Standard Series Stirrers

FROM HEIDOLPH

- **Digital or analog/dial speed display**
- **Two gear stages for high torque at low speeds**
- **Over-load protection – reset by power switch**
- **Over-load protection LED display**



13501-21



13504-41

Designed for power and reliability. Easy to operate, safe, suitable for continuous operation. Stirrers are equipped with a maintenance-free, brushless, D.C. capacitor motor with overheating protection feature, which can be reset by power switch. Large speed range (40 to 2000 rpm) has a mechanical speed adjustment and is monitored via a digital speed display on 13501-21 and 13504-41 making them ideal for reproducible applications. On 13500-10 analog, the speed is adjusted and monitored with the help of a scaled control knob.

Supplied with 13 mm O.D. x 160 mm long (approximately 1/2-inch x 6.3-inch) motor support rod and key adjustable metal chuck, .5 to 10.5 mm, for metal shafts like ACE 8074, 10 mm O.D. (*Units feature a shaft that can be extended through the top to allow variable depth adjustment. To accomplish this, you need to order 7mm O.D. shafts, supplied by Heidolph. Contact ACE for details.*)

To use 10 mm O.D. glass or PTFE shafts, metal chuck should be replaced with ACE 8124-13 "Flex-Grip" Chuck.

13500/13502/13504 STIRRER

Number of Gears		2	2	2
Speed Range [rpm]		40–2000	40–2000	40–2000
Speed Display		Analog/Dial	Digital	Digital
Max. Torque [lb-in]		42.79	42.79	55.63
Torque at 100/1000 rpm [lb-in]		17.12/1.71	17.12/1.71	24.07/2.35
Max. Viscosity [cp]		60,000	60,000	100,000
Max. Mixing Vol. (H ² O) [liters]		25	25	40
Dimensions (W x H x D) mm		82 x 206 x 176	82 x 206 x 176	82 x 211 x 176
	in.	3.23 x 8.1 x 6.9	3.23 x 8.1 x 6.9	3.23 x 8.3 x 6.9
Weight [Kg/lbs]		3.0/6.62	3.0/6.62	3.3/7.28
Input Power*		115v/60Hz	115v/60Hz	115v/60Hz
Motor Input/Output [Watts]		50/27	50/27	70/37
Order Code		13500-10	13501-21	13504-41

*230V/50Hz version also available. Contact ACE Glass.

Analog 13500.10 not shown.

RZR Control Electronic Series Stirrers

FROM HEIDOLPH

- **Digital speed display**
- **Two gear stages for constant speed**
- **Overheating protection – self reset**
- **Over-load protection LED display**

Similar to “Standard Series,” except with added features such as constant power. The electronic automatic control allows almost constant torque over respective speed range. The two-stage gear provides excellent mixing results even in highly viscous media, using only as much energy as actually needed. The speed desired is kept constant under changing loads, even in overload mode. (Power can be increased for a limited time to 175% or 200%, so there is no premature cutoff when overloaded.)

Changes in viscosity during the process can be followed via a digital display of the torque on both 13507 and 13511. Also, both models are equipped with an analog interface enabling output of speed and torque reading to an external device, or specification of the desired speed via PC. Analog speed and torque output, along with computer controllability (speed), is 0-10 V/4-20 mA.

13507/13511 MODEL RZR CONTROL

Number of Gears		1	2
Speed Range	[rpm]	50–2000	12–400, 60–2000
Speed Display		Digital	Digital
Torque Display		Digital	Digital
Controller Response		Constant rpm under changes in viscosity	
Overload Response		Constant rpm under overload	
Max. Torque (continuous/limited)	[lb-in]	13.91/31.02	27.81/48.14
Torque at 100/1000 rpm	[lb-in]	13.37/2.67	26.74/5.35
Power Reserve under Overload		up to 200%	up to 200%
Max. Viscosity	[cp]	10,000	100,000
Max. Mixing Volume (H ² O)	[Liters]	40	100
Dimensions (W x H x D)	$\frac{mm}{in.}$	$\frac{72 \times 206 \times 176}{3.23 \times 8.1 \times 6.9}$	$\frac{82 \times 211 \times 176}{3.23 \times 8.3 \times 6.9}$
Weight	[Kg/lbs]	2.8/6.17	3.7/8.16
Input Power*		115v/60Hz	115v/60Hz
Motor Input/Output	[Watts]	80/50	140/100
Order Code		13507-51	13511-02

*230V/50Hz version also available. Contact ACE Glass.

Overhead Stirrers



13511-02

Overhead Stirrers

Variable Speed Stirrers

FROM IKA

13517 STIRRER *Basic, Variable Speed, Digital*

Eurostar power control-visc

Powerful digital stirrer for tasks up to the "high viscosity" range. Same features as 13516, except Labworld® software* is available to allow speed and torque parameters to be controlled, regulated and documented via a PC.

- Digital display presents rated actual speed
- Integrated torque trend display for viscosity control
- Analog interface for recording speed and torque
- RS 232 interface

Input Power	Order Code
115V 50/60 Hz	13517-03

*Contact ACE regarding IKA Labworld software.



For stirring
up to 40 liters
(H₂O)

13517

13519/13520 STIRRER *Eurostar Power*

Control-visc, Variable Speed

Eurostar power control-visc P4 & P7

Laboratory stirrer with high torque, 13519-four-fold transmission reduction, 13520-seven-fold transmission reduction for processing highly viscous media. Agitator shafts are NOT push-through. For volumes up to 40L in size.

- Constant speed by microprocessor control
- Digital display presents rated actual speed
- Slim casing
- Quiet operation
- Infinitely adjustable without gear shifting
- Safety circuit
- Non-locking, overload capabilities
- Enhanced safety as a result of smooth start
- Integrated torque trend display for viscosity control
- Analog interface for recording speed and torque
- RS 232 interface

Specifications:

MODEL	13519	13520
Maximum viscosity	100,000 mPas	150,000 mPas
Motor rating, input/output	153/134W	153/134W
Output at stirring shaft	95W	95W
Maximum ON time	100%	100%
Maximum torque at chuck	200 Ncm	380 Ncm
Speed range	14-530 rpm	8-290 rpm
Speed display	digital	digital
Chuck range	0.5-10 mm	0.5-10 mm
Diameter/length of extension arm	16mm/200 mm	16mm/200 mm
Dimensions: (W x D x H)	80 x 190 x 330 mm	80 x 190 x 330 mm
Weight	4.9 kg	4.9 kg
Permissible ambient temperature	5-40°C	5-40°C
Protection Class acc. to DIN EN 60529	IP 42	IP 42
Interface	RS 232/analog	RS 232/analog
Torque measurement	trend	trend

Input Power	Order Code
115V 50/60 Hz	13519-25

Order Code
13520-40



For stirring
up to 40 liters
(H₂O)

13519/
13520

State-of-the-Art Pilot Plant Stirrers

FROM ARROW

**Overhead
Stirrers**

- **Totally enclosed, non-ventilated, permanent magnet D.C. motor for long service life**
- **Control knob electronically regulates speed of application required**
- **Overload protection — a manually resettable circuit breaker for total safety**
- **Stirrers come complete as shown, including 9/16-inch dia. x 10-inch long aluminum support rod**

Not supplied with shaft, propeller or coupling.
 For stainless steel shaft, propeller and coupling, order 13542-60.



Optional Accessory

11082 CLAMP

"Power Hold"

Fits stirring stand with 3/8-inch to 5/8-inch diameter shaft and stirrers with mounting rod from 3/8-inch to 5/8-inch diameter. Stop collar included.

Order Code
11082-07



13542 STIRRER *Laboratory, Heavy Duty, Variable Speed*

- Handles high viscosity fluids up to 4400 Viscosity in five gallon batch or up to 100L water
- Variable speed — up to 1000 rpm, Gear Head
- Constant torque throughout speed range is 7.35 in-lbs.
- 1/10 hp motor operates at 120 VAC, 60 hz
- Motor shaft is 3/8 inches (9.5mm)

Order Code
13542-25

13543 STIRRER *Laboratory, Light Duty*

- Handles watery to light syrupy mixtures, or up to 20L water
- Variable speed — up to 6000 rpm, Direct Drive
- Constant torque throughout speed range is 1.05 in-lbs.
- 1/10 hp motor operates at 120 VAC, 60 hz
- Motor shaft is 3/8 inches (9.5mm)

Order Code
13543-12

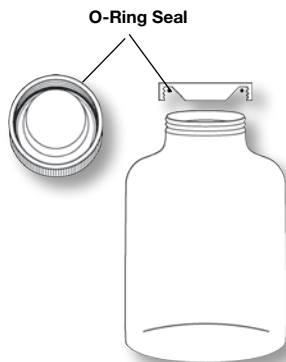
13544 STIRRER *Laboratory, Medium Torque, Variable Speed*

- Handles light to syrupy mixtures, or up to 100L water
- Variable speed — up to 2000 rpm, Direct Drive
- Constant torque throughout speed range is 2.43 in-lbs.
- 1/15 hp motor operates at 120 VAC, 60 hz
- Motor shaft is 3/8 (9.5mm)

Order Code
13544-20

SPECIFICATIONS

Model #	Type	Speed Range	Constant Torque	Motor	Power	Shipping Wgt.
13542-25	Gear Head	to 1000 rpm	7.35 in-lbs	1/10 HP	120 VAC	8 lbs.
13543-12	Direct Drive	to 6000 rpm	1.05 in-lbs	1/10 HP	120 VAC	8 lbs.
13544-20	Direct Drive	to 2000 rpm	2.43 in-lbs	1/15 HP	120 VAC	8 lbs.



4048-19

4048 BOTTLE *Solution, Threaded Neck* ★

PYREX® brand, borosilicate glass bottle designed for storage of solutions. Bottles have GL120 external thread finish neck with large 106mm (4.2-inch) I.D. opening. The 9.5 liter and 13.25 liter sizes have a conventional bottle shape. The 19 liter and 45.5 liter sizes are similar in design to a carboy. A glass-filled PTFE cap with CAPFE (PTFE encapsulated silicone) O-Ring is available. Cap sold separately.

Capacity, Liters	Capacity, Gallons	Approx. Dia., mm	Approx. Height, mm	Order Code
9.5	2.5	187	460	4048-09
13.25	3.5	238	380	4048-13
19.0	5	292	480	4048-19
45.5	12	406	520	4048-45
CAP, PTFE, Solid, GL 120, with CAPFE O-Ring				7622-155

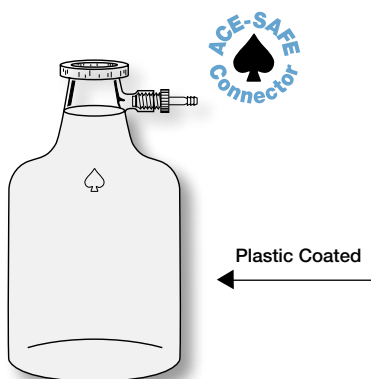


5393

5393 BOTTLE *Solution, Plastic Coated* ♠

Bottle is coated to the neck with PVC safety coating to reduce potential breakage and exposure to laboratory personnel when handling hazardous material. The 19L bottle is Carboy style, with sloping shoulders. The 9.5L and 13.25L sizes are "bottle" shaped. Necks are tooled for uniform fit with stoppers.

Cap., Liters	Approx. Cap., Gal.	Approx. Dia., mm	Approx. Height, mm	Rubber Stopper No.	Order Code
9.5	2.5	187	470	12	5393-06
13.25	3.5	238	445	12	5393-07
19.0	5	292	508	12	5393-09



5395

5395 BOTTLE *Solution, with "Ace-Safe," Plastic Coated* ♠

Same as 5393 bottle, except this bottle has a vacuum takeoff and is coated to the neck with PVC safety coating to reduce potential breakage and exposure to laboratory personnel when handling hazardous material. Takeoff has a #15 Ace-Thred in place of a serrated fitting for use with an "Ace-Safe" tubing connection barb for 3/8-inch I.D. tubing. For replacement hose connections, see 5853. Supplied complete with hose connection, Nylon bushing and O-Ring.

Cap., Liters	Approx. Cap., Gal.	Approx. Dia., mm	Approx. Height, mm	Rubber Stopper No.	Order Code
9.5	2.5	187	470	12	5395-103
13.25	3.5	238	445	12	5395-105
19.0	5	292	508	12	5395-107

**5393 and 5395 Bottles are also available
Surlyn® coated via special request.**

6233 BIG JAR ★

Cylindrical jars with side indents for easier handling. Made of heavy wall glass, the jars are graduated. **Caution: Do not apply open flame or heat.** Also available with poly safety coating.

Capacity, L	Subdiv., mL	Order Code
7.25	500	6233-07
9.25	500	6233-09
17	1,000	6233-17
26.5	2,000	6233-26
32	2,000	6233-32



6472 SPRAYER "Clean-In-Place"

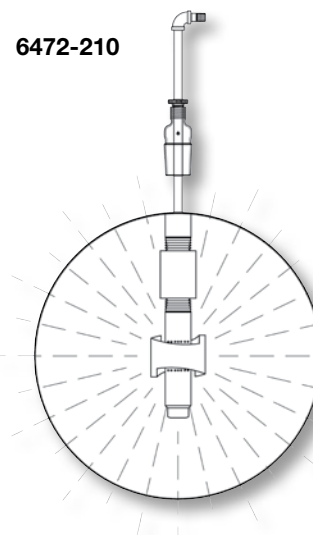
Designed for cleaning ACE Reactors without dismantling, or Clean-In-Place (CIP). One moving part, a rotating disc at end of extension, produces heavy droplets in a 39-inch diameter, 360° pattern to simultaneously cover entire surface of reactor. Rotating disc is constructed of carbon-filled PTFE and stainless steel.

Wash fluid enters through a series of holes onto a precision-shaped disc. The disc rotates freely at high speed and the wash fluid is distributed in a dense spray. Can be operated in any position. Working pressure is 15-60 psi; maximum temperature is 120°C. For pressure and flow rates, see chart at right.

Fits through openings as small as 1-1/8-inch diameter, including a $\frac{1}{4}$ 45/50 outer joint. Assembly consists of spray disc, stainless steel coupling, extension tube, elbow, nipple, and a $\frac{1}{4}$ 45/50 inner to #15 Ace-Thred glass adapter with a Nylon bushing and FETFE O-Ring.

Pressure (PSI)	Flow Rate L/Min	GPM
15	16	4.22
20	19	5.01
30	23	6.07
40	26	6.86
50	29	7.65
60	33	8.71

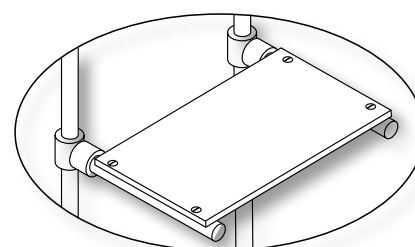
	Order Code		Order Code
Spray Disc, 1/4-inch MPT	6472-200	Nipple, 1/4-inch MPT	6472-208
Coupling, 1/4-inch FPT	6472-201	Adapter, Glass, $\frac{1}{4}$ 45/50-#15	8042-21
Ext. Tube, 24-inch, 1/4-inch MPT	6472-204	Nylon Bushing & O-Ring, #15	7506-06
Elbow, 1/4-inch FPT	6472-206	COMPLETE	6472-210



6472 SIDE SHELF Pilot Plant Support Stand ★

Removable side shelf, add-on for Ace Pilot Plant reactor support stands. Suitable for placement of motor controllers, temperature controllers, relay units, etc. The black powder-coated aluminum plate has a 3/8-inch wide x 3/8-inch high ledge to prevent items from falling or sliding off. Attaches to stand with galvanized iron clamp-on tee with set screws and backing bolt.

For Support Stand	Reactor Capacity/Type	Shelf Size (W x L, inches)	Order Code
6473-34, -35, -36	100 & 150 Liter Cylindrical	12 x 28	6472-343
6473-34, -35, -36	100 & 150 Liter Cylindrical	12 x 28	6472-343
6472-37	200 Liter Cylindrical	12 x 32	6472-344
6474-370	50 Liter Spherical	12 x 26	6472-342
6474-371	72 Liter Spherical	12 x 32	6472-344
6474-372	100 Liter Spherical	12 x 40	6472-345
6474-373	200 Liter Spherical	12 x 42	6472-346



6472-342



6517-54, 56, 60

6517-22, 25, 27, 31

6517 CLAMP “Quick Release” ★

Stainless steel “quick release” clamp for use with reaction flasks and heads with Schott flanges. Available with or without extension rod, 5/8-inch O.D. x 12-inch long for clamping to a support frame. Welded extension is used to stabilize reaction assemblies. **Note! Reactors should be supported from below in usual manner — namely mantles, rings, jacks, etc.**

Duran

WITHOUT EXTENSION		WITH EXTENSION
For Flange Size	Order Code	Order Code
60 mm	6517-22	—
100 mm (4-inches)	6517-25	6517-54
120 mm (4.8-inches)	6517-24	—
150 mm (6-inches)	6517-27	6517-56
200 mm (8-inches)	6517-31	6517-60

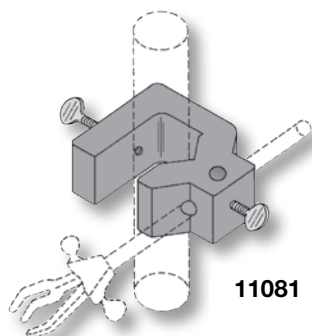


7855

7855 O-RING Replacement ♠

Replacement O-Rings for use with 6310, 6521, 6522, 6523, 6533, 6535, 6536, 6537, 6540, 6469, and 6472 only Reaction Flasks with groove in ground flange.

CAPFE		Silicone
For Flange I.D., mm (In.)	Order Code	Order Code
60 (2)	7855-878	7855-251
100 (4)	7855-880	7855-254
150 (6)	7855-881	7855-260
200 (8)	7855-884	7855-288



11081

11081 CLAMP HOLDER Pilot Plant

Used with 11065 versatile jaw clamp to secure condenser, etc., on 6472 Pilot Plant Reactor. Holder clamps to 1-inch bar frame of Reactor Stand; 11065 Clamp is held in clamp holder with thumb screw. Vertical hole to accommodate straight bar or clamp. Fabricated of aluminum, epoxy powder coated black.

Order Code
11081-21



12100

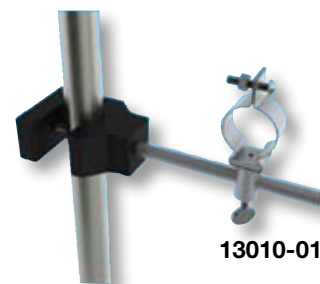
12100 TILTING SUPPORT ★

Tilting support provides a finger-tip method of emptying flasks by pouring. Mantle support ring may be adjusted to and locked at any convenient height. Upper cross member strengthens assembly; serves as stop for tilted mantle. Base is compact, 91 x 98cm, but extremely stable. Complete item sold with one set of rings.

For Flask Size, mL	Order Code	Order Code
12000	12100-04	12100-34
22000	12100-07	12100-38
50000	12100-11	12100-42
72000	12100-15	12100-46

13010 CLAMP *Recirculator Hose Support, Stainless Steel* ★

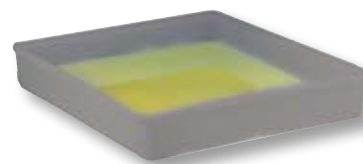
All stainless steel, fully adjustable clamp for securing and supporting circulator hoses used with jacketed pilot plants. The universal clamp adjusts to any pipe style pilot plant stand, and the clip will accommodate any standard circulator hose size.

Order Code
13010-01

13010-01

13219 CONTAINMENT TRAY *Stainless Steel* ★

Trays are heavy 14 Gauge, 304 stainless steel. For safe containment of spills from larger reactors see recommended sizes below.

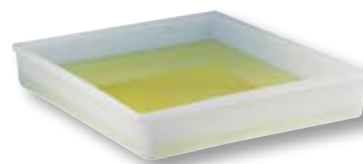
Size (LxWxH, inches)	For Vessel or Reactor Size	Order Code
24 x 24 x 2	10, 20L	13219-03
24 x 24 x 3	3 post/30L	13219-05
28 x 28 x 3	30, 50L	13219-07
28 x 28 x 4	100, 150L	13219-09
36 x 36 x 5	72, 100, 150, 200L	13219-11

13219


13220 CONTAINMENT TRAY *Low Density Polyethylene* ★

Trays are made of rugged, molded Low Density Polyethylene (LDPE).

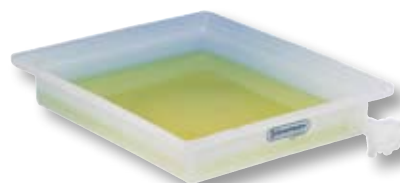
Size (LxWxH, inches)	For Vessel or Reactor Size	Order Code
23 x 21 x 2	10L	13220-16
24 x 24 x 3	20L	13220-18
24 x 24 x 4	36L	13220-20
26 x 20 x 4	30L	13220-22
30 x 28 x 4	50L	13220-24
51 x 31 x 4	100L	13220-26

13220-16


13220 CONTAINMENT TRAY *Low Density Polyethylene, w/Spigot* ♠

Trays are made of rugged, molded Low Density Polyethylene (LDPE). Models listed below feature a wide lip at the top and a 1/2-inch spigot for easy draining of fluids.

Size (LxWxH, inches)	For Vessel or Reactor Size	Order Code
21.5 x 25.5 x 4	up to 10L	13220-37
17.5 x 23.5 x 6	up to 20L	13220-39

13220-37


12187 ADAPTERS *Stainless Steel, Circulator Hose* ★

304 Stainless steel adapters designed for use with Ace jacketed glass pilot plant reactors and circulator hoses for popular circulating chillers. Connects O-ring ball joints on jacket inlet/outlet to hoses to/from circulator.

Description	Order Code
Adapter, flask to hose, Stainless Steel 28/15 Socket to M16x1 Male	12187-05
Adapter, flask to hose, Stainless Steel, 35/25 Socket to M16x1 Male	12187-07
Adapter, flask to hose, Stainless Steel, 35/25 Socket to M24x1 Male	12187-10
Adapter, flask to hose, Stainless Steel, 35/25 Socket to M30x1 Male	12187-12
Adapter, flask to hose, Stainless Steel, 35/25 Socket to M38x1.5 Male	12187-14
Adapter, Hose to Circulator, Stainless Steel, M16x1 Male to 3/4 inch NPT Male	12187-100
Adapter, Hose to Circulator, Stainless Steel, M30x1.5 Male to 3/4 inch NPT Male	12187-101
Adapter, Hose to Circulator, Stainless Steel, M24x1.5 Male to 3/4 inch NPT Male	12187-102

12187-100

12187-05

huber

Unistats

13045 HUBER RECIRCULATORS/CHILLERS

Standard Features:

- RS 232/485 Interfaces via ComBox on side of units.
- One thermofluid for entire temp range.
- Large color TFT, touch screen display.
- Extremely fast cooling rates
- Coolnet® unique control expansion valve with stepper motor
- Non-linear Ramp function
- VPC, Variable Pressure Control compensates for viscosity changes.
- CFC free refrigerants consume 1/3 of the water of conventional systems.
- Water cooled standard – air cooled available.
- Low energy consumption with high output.
- Full safety features – over-temp control, low fluid, pressure sensors, alarms, etc.
- Unistats can be electrically isolated for critical environments.
- Unique “Spy – Software” controls numerous parameters.
- External Pt100 sensors
- Two-year warranty

13045-10



13045-20

Contact Ace for full information on Huber recirculators and accessories.

Huber Model	930W	950W	1005W
Operating Temperature Range-°C	-90 to 200	-90 to 200	-120 to 120
Temperature Stability-°C	0.1	0.5	0.5
Cooling Capacity @ -20°C-kW	0.6	16	1.5
Pump Maximum Pressure-bar	2.5	2.5	0.8
Heating Capacity-kW	24	36	2
Overall Size, Inches	36.3 x 47.2 x 65.2	94.2 x 47.2 x 68.9	27.6 x 31.5 x 59.6
Weight-Lbs.	2,180	4,300	781
Electrical*	460v, 60Hz, 2 ph	460v, 60Hz, 3 ph	460v, 60Hz, 3 ph
ACE Order Code	13045-10	13045-20	13045-100

Julabo

Presto Series

12262 JULABO RECIRCULATORS/CHILLERS

Standard Features:

- Two splash proof keypads, one remote.
- VFD and LCD displays
- RS232 & 485 interfaces.
- Can be air or water cooled
- Automatic de-gas mode
- Rapid cool and heat-up
- External Pt temperature sensor
- Presto doesn't absorb any air humidity into the bath and prevents the formation of ice.
- Compensates quickly for exothermic and endothermic reactions
- Integrated high and low temperature safety cut-off.
- Integrated warning, safety and supervision functions via 9 different sensors
- Built-in castors for easy mobility.
- All connections easily accessible in rear of unit.
- Space saving footprint, LH 85 can be placed under a bench



12262-40



12262-38



12262-30

Contact Ace for full information on Julabo recirculators and accessories.

Julabo Model	LH45	LH85	LH50
Operating Temperature Range-°C	-40 to +250	-80 to +250	-50 to +250
Temperature Stability-°C	0.01...0.05	0.01...0.05	0.01...0.05
Cooling Capacity @ -20°C-kW	0.5	0.9	2.8
Pump Flow Maximum-L/min.	24-33	24-33	24-33
Fill Volume-L	2.5	2.5	2.5
Compressor Cooling	Air/Water	Air/Water	Air/Water
Overall Size, Inches	23.2 x 29.2 x 45.7	33.5 x 29.9 x 45.7	16.6 x 19.3 28.3
Weight-Lbs.	170	287	375
Electrical*	230v, 60Hz	230v, 60Hz	230v, 60Hz
ACE Order Code	12262-30	12262-38	12262-40

Julabo Magnum 91 Temperature Control System

12274 JULABO MAGNUM 91 TEMPERATURE CONTROL SYSTEM

Standard Features:

- Two splash proof keypads, one remote.
- VFD and LCD displays
- RS232 & 485 interfaces.
- Water cooled
- 3 point calibration
- Rapid cool and heat-up
- External Pt temperature sensor
- Doesn't absorb any air humidity into the bath and prevents the formation of ice.
- Compensates quickly for exothermic and endothermic reactions
- Integrated high and low temperature safety cut-off and low liquid level.
- Integrated warning, safety and supervision functions via 9 different sensors
- Built-in castors for easy mobility.
- Electronically adjustable pump stages and pressures



Contact Ace for full information on Julabo recirculators and accessories.

Julabo Model	Magnum 91
Operating Temperature Range-°C	-91 to +250
Temperature Control	ICC
Temperature Stability, External-°C	±0.05
Display Resolution-°C	0.01
Heater Capacity-W	6000
Cooling Capacity @ -20°C-kW	4.5
Refrigerant	R404a+R23
Fill Volume-L	21.5
Overall Size, Inches	28 x 34.7 x 65
Weight-Lbs.	926
Pump Flow Maximum-L/min.	24-35 @ 11.6...31.9 psi
Ambient Temperature-°C	5...40
Electrical*	230v, 3 pH, 50Hz
ACE Order Code	12274-100

LAUDA

Wk & WKL Series Circulators

11506 LAUDA RECIRCULATORS/CHILLERS

Lauda® WK and WKL Series recirculating chillers eliminate temperature and pressure fluctuations, minimize particle build-up and improve the efficiency of your processes. Innovative design and engineering keep the footprint small and ensure quiet, smooth operation — even in the more powerful WKL models.

Standard Features:

- Narrow footprint compact WK300
- Handles at front and rear
- Locking castors
- Several drain valves on side of unit
- Built-in pressure transducer
- Automatic over pressure shut-off
- Safety features also include: Low and excess liquid level; over-temperature; Pump/motor overload protection; Flow control Instrumentation included
- Hi-res LED readout
- RS2322/485 interface
- Two-year warranty
- CE marked

For rotary evaporators and jacketed Pilot Plants



11506-10



11506-20

Contact Ace for full information on Lauda recirculators and accessories.

Lauda Model	WK300	WKL1000	WKL3200
Operating Temperature Range-°C	0 to 40	-10 to 40	-25 to 40
Temperature Stability-°C	0.5	0.1	1.0
Cooling*	Air	Air	Air
Cooling Capacity @ 20°C-kW	0.3	1.1	3.5
Pump Pressure Maximum-bar	2.9	1.0	3.2
Pump Flow Maximum-L/min.	8	30	40
Fill Volume-L	6	12	45
Overall Size, cm	20 x 35 x 50	48 x 35 x 60	46 x 55 x 128.5
Weight-Lbs.	53	101	229
Electrical	115v, 60Hz	115v, 60Hz	208-230V, 60Hz, 3ph
Refrigerant — Non-CFC	R-134a	R-134a	R-134a
ACE Order Code	11506-10	11506-15	11506-20

**Water-cooled versions are also available via special order.*

LAUDA

Integral XT Hi-Temp Circulators

11505 LAUDA RECIRCULATORS/CHILLERS

Lauda® Integral XT high-temperature circulators are ideal for precise temperature control of reactors and closed-circuit systems. They feature a unique control principle that expands the upper and lower temperature ranges for this class of circulators. This also allows for extremely fast temperature changes and highly efficient heating and cooling.

Standard Features:

- Narrow footprint
- Handles at front and rear, locking castors
- Several drain valves on side of unit
- Eight different programmable levels for Variopump
- Flow pressure can be set to "Not to Exceed"
- Safety features also include low and excess liquid level, over-temperature, pump overload and flow control instrumentation
- Real time clock and timer
- Hi-res backlit LCD readout
- RS2322/485 interface
- Editable programmer for up to 150 segments in five programs
- Detachable control module, Can be used as remote control

**For larger scale jacketed
Pilot Plants**

11505-15



11505-75



Contact Ace for full information on Lauda recirculators and accessories.

Lauda Model	XT 150	XT 750	XT 750H
Operating Temperature Range-°C	-45 to +200	-50 to 200	-50 to 300
Temperature Stability-°C	0.05	0.05	0.05
Resolution	0.01	0.01	
Heating Capacity-kW	3.5	5.2	5.2
Cooling	Air	Air	Air
Cooling Capacity @ 20°C-kW	1.5	6.7	6.7
Pump Pressure Maximum-bar	2.9	2.9	2.9
Pump Flow Maximum-L/min.	45	45	45
Fill Volume-L	2.6	5.0	5.3
Fill Volume, Expansion Vessel-L	5.5	6.7	6.7
Overall Size, cm	33.5 x 55 x 66	46 x 55 x 128.5	46 sx 55 x 128.5
Weight-Lbs.	190	341	352
Electrical	220v, 60Hz, 3Ph	208-220V, 60Hz, 3P	208-220V, 60Hz, 3P
Refrigerant — Non-CFC	R-404a	R-404a	R-404a
ACE Order Code	11505-15	11505-75	11505-85

Water-cooled versions are also available via special order.

HEIDOLPH LABOROTA 20 Control

Large-Scale Rotary Evaporators

Up to 20 Liter Capacity

For safe, unattended, large-scale distillation of any solvent or mixture in any research lab, pilot plant or scale-up facility, the LABOROTA 20 series provides the perfect tool for basic solvent purification, recovery and scale-up applications!

The LABOROTA 20 series has been designed to incorporate all leading safety features, giving you trust not only in the product and the results of the distillation, but also in the safety and well-being of the laboratory and your sample. In addition, the LABOROTA 20 series is available with a wide range of options, including 10 different condenser configurations from which to choose, water and oil baths for various heat load requirements, integrated vacuum controllers and a host of other exclusive features that offer the benefit of the most efficient distillations and the highest recovery rates.

Product Features:

- Totally programmable through digital operating panel
- Designed for 24-hour continuous use
- Condensate is automatically drained off to any receptacle
- Auto system automatically delivers sample to evaporating flask via an intricate, accurate sensor system
- Auto controlled self filling bath system
- Affordable alternative to 50 and 100L evaporators
- Integrated vacuum sensor and valve
- Auto distillation capability through the use of either the constant set-point pressure feature (P const program) or via the vapor temperature control feature
- Built-in timer can automatically stop and start reaction
- Wide choice of glassware sets
- Three-year manufacturers warranty from Heidolph

Digital Operating Panel

Features individually programmable ramps for all parameters



Need high-capacity cooling?

Use your Heidolph LABOROTA 20 Series Rotary Evaporator with the Lauda Model WKL3200 Recirculating Chiller. See page 93.

13302 LARGE SCALE ROTARY EVAPORATOR *Economy*

Economically priced LABOROTA 20 Control, Economy, is ideal for basic, large-scale distillations. Unit includes all the product features listed on 95, plus choice of water bath with temperatures up to 100°C for low-boiling solvents, or oil bath (available upon request) with temperatures up to 180°C for high boiling point solvents and more demanding distillations. 230V, 50Hz.

Bath Type	Glassware Style	Order Code
Water	R	13302-04
Water	R Shorty	13302-08
Water	RC	13302-12
Water	RC Shorty	13302-16
Water	A	13302-20
Water	AC	13302-24
Water	A2	13302-28
Water	A2C	13302-32



LABOROTA 20 Control — Economy

13302-04



Non-Fogging Safety Glass

LABOROTA 20 Control — Safety

13302-55

Metal Framed Safety Shield

13302 LARGE SCALE ROTARY EVAPORATOR *Safety*

Designed for maximum safety and user protection, the LABOROTA 20 Control, Safety, includes all the features listed on page 95, and includes a safety shield and glass panels. It is ideal for large-scale distillations where maximum protection is needed. Its safety shield is constructed of a metal frame, and the safety glass completely covers the bath and evaporating flask — providing excellent protection against implosion and splashing. A safety sensor stops the rotation if the safety shield is opened during the distillation process, and the non-fogging safety glass provides clear, visible monitoring of the process in your evaporation flask. 230V, 50Hz.

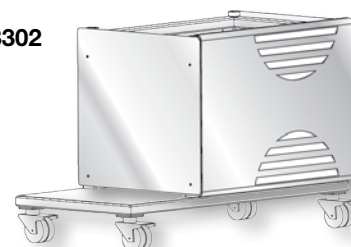
Bath Type	Glassware Style	Order Code
Water	R	13302-55
Water	R Shorty	13302-59
Water	RC	13302-63
Water	RC Shorty	13302-67
Water	A	13302-71
Water	AC	13302-75
Water	A2	13302-79
Water	A2C	13302-83

13302 BASE/SUPPORT STAND *Fits all LABOROTA 20 Units*

This fully maneuverable, optional base unit features removable panels for storage of glassware, solvents or accessories.

Order Code
13302-310

13302



Automatic Version

Designed for unattended distillations, especially for the most demanding production and scale-up requirements!

With the unique LABOROTA 20 Control, Automatic, solvents or samples intended for distillation are automatically delivered into the evaporating flask via an intricate and highly accurate sensor system that detects the need for replenishing the evaporating flask. Throughout the distillation, the condensate is automatically drained off to any receptacle, carboy drum or vessel of choice. Upon completion of the distillation, and once the distillate has been collected, the LABOROTA 20 Control, Automatic completely shuts down and prepares itself for your next application.

In addition, the self-filling, digitally controlled heating bathallows for use over an unlimited time, including evenings and weekends, so there's no need to worry about manually replenishing the bath liquid, either — the LABOROTA 20 Control, Automatic does that, too!

13302 LARGE SCALE ROTARY EVAPORATOR *Automatic, Economy*

Unit includes all the product features listed on page 95, plus choice of water bath with temperatures up to 100°C for low-boiling solvents, or oil bath (available upon request) with temperatures up to 180°C for high boiling point solvents and more demanding distillations. 230V, 50Hz.

Bath Type	Glassware Style	Order Code
Water	A	13302-108
Water	A2	13302-112

Control Pump



LABOROTA 20 Control — Automatic



NEW



Control Panel

13302 LARGE SCALE ROTARY EVAPORATOR

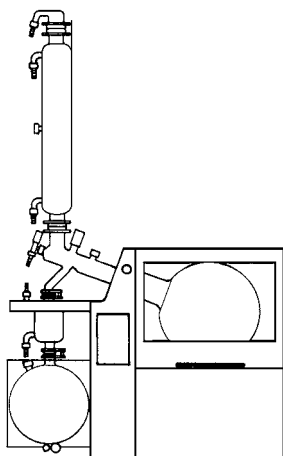
Automatic, Safety

Designed for maximum safety and user protection, the LABOROTA 20 Control, Safety, includes all the features listed on page 95, and includes a safety shield and glass panels. It is ideal for large-scale distillations where maximum protection is needed. Its safety shield is constructed of a metal frame, and the safety glass completely covers the bath and evaporating flask — providing excellent protection against implosion and splashing. A safety sensor stops the rotation if the safety shield is opened during the distillation process, and the non-fogging safety glass provides clear, visible monitoring of the process in your evaporation flask. 230V, 50Hz.

Bath Type	Glassware Style	Order Code
Water	A	13302-208
Water	A2	13302-212

Glassware Assemblies for 13302 Rotary Evaporators

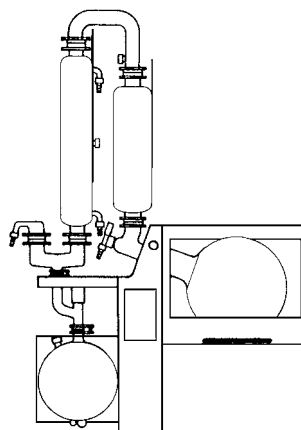
Glassware Assembly R



This glassware assembly includes one ascending condenser, one 20 L evaporating flask and one 10 L receiving flask and is recommended for all standard distillations.

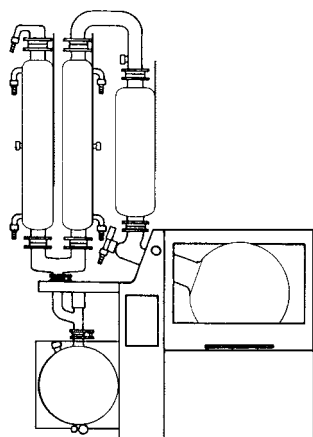
Also comes in a "shorty" version that features a condenser 320mm shorter than standard version. Distillation capacity remains the same. Ideal for use with hoods where height is restricted.

Glassware Assembly A



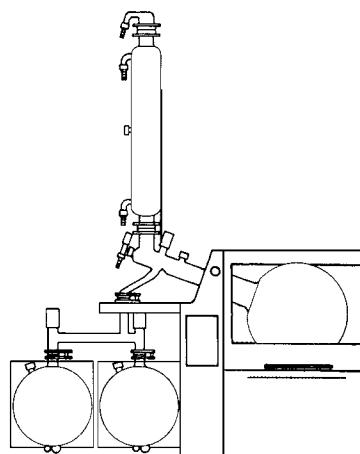
This glassware assembly includes one descending condenser, one expansion vessel, one 20 L evaporating flask, and one 10 L receiving flask, and is recommended for solvents that tend to splash and foam.

Glassware Assembly A2



This glassware assembly includes one ascending and one descending condenser, one expansion vessel, one 20 L evaporating flask and one 10 L receiving flask, for low-boiling solvents and highest recovery rates.

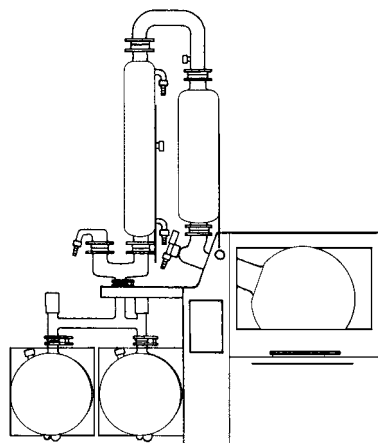
Glassware Assembly RC



This glassware assembly is identical to Assembly R and features two receiving flasks.

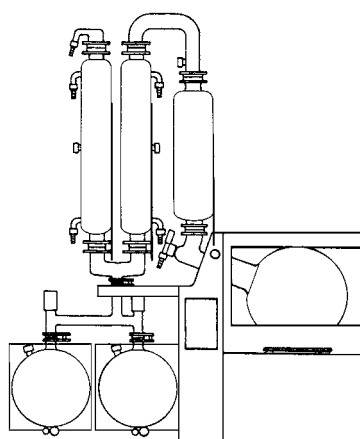
Also comes in a "shorty" version that features a condenser 320mm shorter than standard version. Distillation capacity remains the same. Ideal for use with hoods where height is restricted.

Glassware Assembly AC



This glassware assembly is identical to Assembly A and features two receiving flasks.

Glassware Assembly A2C



This glassware assembly is identical to Assembly A2 and features two receiving flasks.

BIG COLUMNS

5844 ADAPTER for Swagelok ♦

PTFE adapter for use at top of 5860 Column Head or at bottom of 5862 Column to connect tubing via Swagelok type connector to #50 Ace-Thred, other end has 1/4-inch NPT female thread. Supplied with one FETFE O-Ring. For extra O-Rings, see 7855-729.

Order Code

5844-78

5860 COLUMN HEAD ♦

For use with 5862 Chromatography Column. With #50 Ace-Thred center neck and/or two #15 Ace-Thred side necks and 4-inch or 6-inch flange at bottom, ground flat. Use with 6517 Clamp.

Flange Size	Center Neck	Side Necks	Order Code
4-inches	50	None	5860-24
6-inches	50	None	5860-28
6-inches	50	15	5860-32

5862 COLUMN (#50) Chromatography ♦

Large size chromatography columns with O-Ring grooved flat flange at top for easy access to column. Flange is *supplied with* silicone O-Ring to make seal when using 5860 Head with 6517 Clamp. 4-inch and 6-inch I.D. columns are tapered to #50 *Ace-Thred* at bottom that accepts 5844 Adapter, or 5848 and 5835 Adapters. For replacement O-Rings, see below.

Flange Size/ Col. I.D., in.	Length mm (in.)	Order Code
4	300 (12)	5862-43
4	450 (18)	5862-45
4	600 (24)	5862-47
4	1200 (48)	5862-49
6	450 (18)	5862-58
6	600 (24)	5862-62
6	1200 (48)	5862-65
6	1800 (72)	5862-68

Replacement Silicone O-Rings

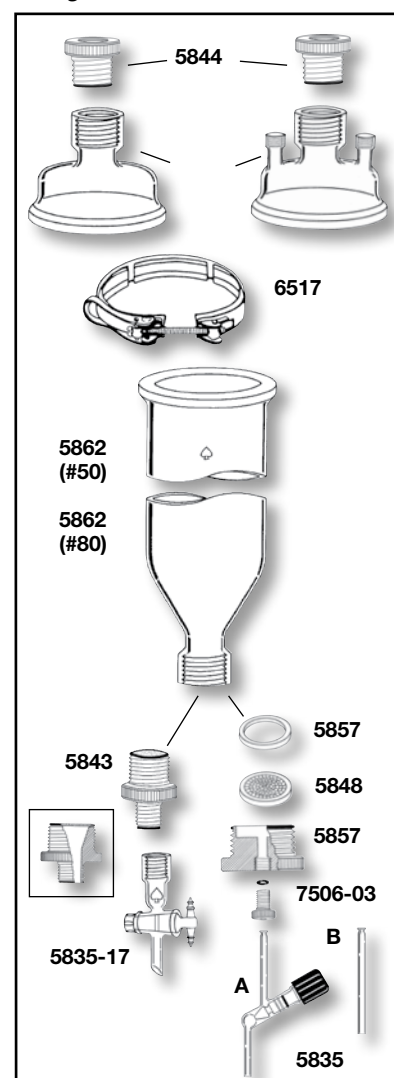
	Order Code
For 4-inch Flange	7855-254
For 6-inch Flange	7855-260

Replacement CAPFE O-Rings

	Order Code
For 4-inch Flange	7855-880
For 6-inch Flange	7855-881

All types of special combinations made to order

- Heads can be supplied with additional threads or joints or combination of both
- Columns available in various lengths and diameters



BIG COLUMNS

5862



5862 COLUMN (#80) Chromatography ♦

Large size columns with O-Ring grooved flat flange at top for easy access to column. Flange is supplied with silicone O-Ring to make seal when using 5860 Head with 6517 Clamp. Columns are tapered to #80 Ace-Thred at bottom that accepts 5857 Adapter. For replacement O-Rings, see above.

Length	Flange Size	Inner Diameter	Order Code
18 inches	6 inches	6 inches	5862-10
18 inches	6 inches	8 inches	5862-18
18 inches	6 inches	12 inches	5862-26
24 inches	6 inches	6 inches	5862-12
24 inches	6 inches	8 inches	5862-20
24 inches	6 inches	12 inches	5862-28
48 inches	6 inches	6 inches	5862-14
48 inches	6 inches	8 inches	5862-22
48 inches	6 inches	12 inches	5862-30



6517

6517 CLAMP ★

Stainless Steel quick release clamp with three retaining clips for connecting 5860 Head and 5862 Column.

For Flange Size	Order Code
4 inches	6517-25
6 inches	6517-27



5848

5848 SUPPORT PLATE Perforated ♦

73mm diameter glass plate with 1x3mm rectangular slits for supporting column packing. Used with 5857.

Order Code
5848-60



5843

5843 COUPLING Reducing, with Support ♦

For connecting 5835 Bottom Drip Stopcock Adapter to bottom of 5862 Chromatography Column with leak-tight O-Ring seals. One end is #50 Ace-Thred for connecting to column, the other #25 Ace-Thred is for connecting to 5835B Adapter. #50 end of coupling is supplied with Porosity A glass packing support, press fitted, with taper below disc to 25 I.D. For replacement supports, see below. Supplied with two FETFE O-Rings. For replacement O-Rings, see 7855-729 (for #50); or 7855-727 (for #25).

Order Code
5843-74

Replacement Glass Packing Supports

	Order Code
Por. A (145-175 micron)	5848-49
Por. B (70-100 micron)	5848-58

BIG COLUMNS

5835 ADAPTER *Bottom Drip, with 1:5 PTFE Stopcock* ♦

Drip tip for bottom of 5862 Column using 5843 Coupling. One end has #25 Ace-Thred, other with drip tip and 4mm bore PTFE stopcock for controlling flow.



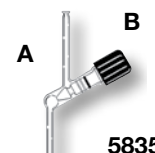
Order Code

5835-17

5835 BOTTOM OUTLET VALVE *with or without Stopcock* ♦

Type A — With 0-8mm threaded stopcock for controlling flow.

Type B — Straight stem without stopcock. Both stems to take 3/8-inch Swagelok fittings. Secured to 5857 Bottom Adapter with 7506-03 Bushing.



Type	Order Code
A	5835-32
B	5835-34

5857 BOTTOM ADAPTER *UHMWPE* or PTFE* ♦

Fits #80 Ace-Thred. Recessed for 5848 perforated support plate and 5857 retaining ring. Your choice of bottom threaded for #11 Ace-Thred Bushing 7506-03 to secure 5835 Outlet Valve, or threaded to accept 3/8-inch NPT fitting. For replacement O-Rings, order 7855-764.

	#11 Ace-Thred	3/8-inch NPT
<i>UHMWPE*</i>	Order Code	Order Code
Adapter, #80 Thred	5857-30	5857-35
Support Plate	5848-60	5848-60
Retaining Ring	5857-50	5857-50
Bushing	7506-03	—
Connector, 3/8-inch	—	12770-27
COMPLETE	5857-44	5857-46
	#11 Ace-Thred	3/8-inch NPT
<i>PTFE</i>	Order Code	Order Code
Adapter, #80 Thred	5857-60	5857-64
Support Plate	5848-60	5848-60
Retaining Ring	5857-52	5857-52
Bushing	7506-03	—
Connector, 3/8-inch	—	12770-27
COMPLETE	5857-67	5857-69



*UHMWPE — Ultra High Molecular Weight Polypropylene

5862 COLUMN EXTENDER *Chromatography* ♦

Extenders that can be added to 5862 Columns to increase column height. Extenders have an O-Ring grooved flat flange on one end to attach 5860 Column Head and ground flat flange at other end to attach the 5862 Column. Supplied with one silicone O-Ring. Use 6517 Clamp to secure sections.

Flange Size/ Column I.D., in	Length mm (in)	Order Code
4	300 (12)	5862-72
4	450 (18)	5862-73
4	600 (24)	5862-74
6	300	5862-77
6	450	5862-78
6	600	5862-79



5867**5867 SUPPORT STAND** *for Large Chromatography Columns* ★

Newly designed four-post stands for large scale chromatography columns feature all stainless steel construction. Each stand is designed to accept either 24-inch, 48-inch or 72-inch length 5862 columns. With 150mm (6-inch) flange and 6-, 8-, or 12-inch diameter body. Supplied with two (2) column support rings with 140mm and 175mm openings. Each stand is designed to accommodate the height of the column and has a PTFE collar at the bottom that accepts and supports the tapered bottom of the column. Each stand has an adjustable stainless upper collar assembly that supports the top of the column. All stands have locking casters for mobility.

Fits Column (Height)	Order Code	Dimensions, Inches (W x D x H)
24 inches	5867-24	15 x 15 x 40
48 inches	5867-48	15 x 15 x 60
72 inches	5867-72	15 x 15 x 85

Custom Sizes are available!

5868**5868 SUPPORT STAND** *for Bench-Scale Chromatography Columns* ★

Newly designed single-post stand for 12-inch and 18-inch height chromatography columns. "H" shaped base and a single 122cm high x 1-inch diameter stainless steel bar give great stability for the large-scale columns. Stand comes complete with base, rod, base plate, clamp holder and chain clamp.

Overall Height	Order Code
125cm	5868-122

Beaded Process Pipe

Ace Glass has been manufacturing and fabricating glassware and equipment for the scientific and research communities for over seventy years. Ace fabricates glass process pipe here in the USA, from medium- and heavy-wall borosilicate tubing such as Scimax and Schott Duran, to provide you with a high quality product to fit into your process stream. From glass process pipe to glass reactors and pilot plants, to temperature equipment and sensors, Ace offers a broad line of products to the process engineer. Ace will also fabricate custom sizes and shapes for your needs — if you don't see what you need in this catalog, contact us at www.aceglass.com to discuss your needs with our engineering staff.

Glass meets an ASTM spec for borosilicate glass, ASTM E-438 and Federal spec DD-G-541B. The "system" can be constructed by a contractor to meet ASTM spec C1053-90, ASTM spec C1053-00, Federal spec DD-G-541B, Military spec MIL-P 2256B(YD) when it is all put together using the same pipe and couplings.

Glass also meets specs for USP Type 1 glass.

Process Piping Systems

Industry has long regarded borosilicate glass piping components to be one of the best corrosion resistant materials of construction. For a wide range of manufacturing and process piping applications Ace Glass brand glass pipe installations have provided excellent service in the most difficult piping applications, positive evidence of its outstanding performance. The use of glass offers many advantages over other conventional piping materials such as:

Long Service Life

Low-expansion borosilicate glass is resistant to almost all substances except hydrofluoric acid, hot concentrated phosphoric acid and strong alkalis at elevated temperatures.

Product Purity

All glass piping systems are comprised of chemically inert borosilicate glass and TFE gaskets to ensure no chemical contamination of process fluids. Materials that do not corrode do not contaminate.

Smooth Interior Surface

The hard, liquid smooth surface inhibits or prevents scale formation and product buildup. For example, sticky latex dispersions easily move through smooth glass pipe. Glass resists fouling and is easy to clean.

Transparency

You can see what is happening inside glass systems. Process and product can be inspected at a glance. Trouble can not hide behind glass so processes stay in better control.

Low Maintenance Cost

Over the life of a piping system this can be the smallest cost component for glass piping systems and the largest cost consideration for many other competitive piping systems. Chances are that low maintenance cost is the prime reason for considering, specifying, and operating a glass piping system.

Properties of Borosilicate Glass

Chemical Composition

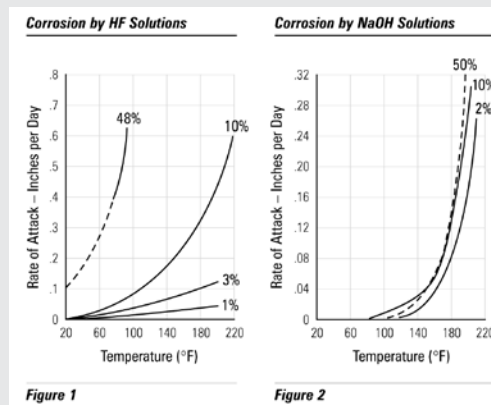
The borosilicate glass used in the manufacture of our pipeline components conforms to the standard ASTM E 438 and has the following approximate composition.

Component	% By Weight
SiO ₂	81%
B ₂ O ₃	13%
Na ₂ O	4%
Al ₂ O ₃	2%

Chemical Resistance

Borosilicate glass is resistant to almost all substances except hydrofluoric acid, phosphoric acid and hot strong caustic solutions. Of these, hydrofluoric acid has the most serious effect and, even when a solution contains a few parts per million, corrosion will occur. Phosphoric acid and caustic solutions at elevated temperatures will also attack glass.

Under service conditions, the effects of turbulence and some trace chemicals in solution may increase or decrease the rate of attack. Therefore, it is not possible to give precise figures for corrosion by hydrofluoric acid and caustic solutions, but Figures 1 and 2 show typical rates.



Beaded Process Pipe

Physical Properties

Coefficient of mean linear expansion Between 20°C and 300°	$(3.3 \pm 0.1) \times 10^{-6} \text{ K}^{-1}$
Mean thermal conductivity Between 20°C and 200°C	1.3 W/mK
Mean specific heat capacity Between 20°C and 200°	0.98 kJ/kgK
Density at 20°C	2.23 g/cm ³

Versatility

For comparison purposes, weights of various 2-inch pipes are given in the table below.

Material	Approx. Weight of 2-inch Pipe, Lbs/Ft.
Glass Process Pipe	1.13
Steel (Schedule 40)	3.65
High Silicon Iron	7.70
Stainless Steel (Schedule 40)	3.65
TFE Lined Steel	4.10
Glass Lined Steel	3.95
FRP	1.25

Relative Thermal Expansion

The thermal expansion of Ace brand pipe is 0.022 inches per 100 feet of pipe and 100°F temperature change. Values of other materials relative to this (assuming glass Pipe = 1) are given below. These relative thermal expansions should be considered when connecting glass pipe into other materials. When other materials expand more than glass pipe, allowance must be made for the expansion difference. A common way to accommodate this differential expansion is with flexible "bellows" or hose at critical locations.

Material	Relative Thermal Expansion
Glass Process Pipe	1.00
Steel (Schedule 40)	3.60
High Silicon Iron	4.90
Stainless Steel (Schedule 40)	6.20
TFE Lined Steel	3.65
Glass Lined Steel	3.65
FRP	7.00

Beaded Pressure System

A large bead design feature assures a tight leak-free joint under pressure conditions.

The one-bolt compression coupling shell is made from 300-series stainless steel. The flexible, elastomeric sleeve is lined with a tough layer of TFE fluorocarbon plastic. The flexibility feature allows deflections up to 3° per joint from the axis under bending loads due to misalignment or pitching.

Pressure

The Permissible operating gauge pressure Ace beaded pipe and fittings depends on the pipe diameter.

Pipe Diameter	Maximum Working Pressure
1-inch	100 psig
1-1/2-inch	75 psig
2-inch	75 psig
3-inch	50 psig
4-inch	50 psig
6-inch	30 psig

When a system is assembled from several glass components with different pressure ratings, the maximum operating pressure of the system is limited to the pressure rating of the component with lowest permissible working gauge pressure.

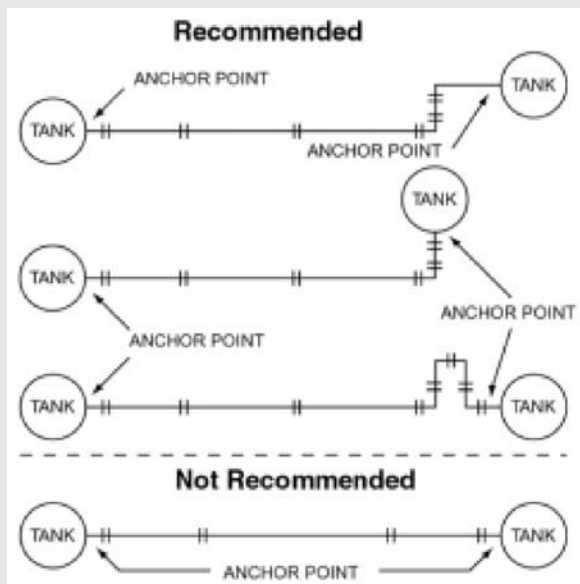
All sizes of glass piping are suitable for full vacuum service. Full vacuum is defined as 29.92-inch (760mm) of Hg below standard sea-level pressure. Of course the vacuum actually achieved is a function of system design, tightness of the gasket joints, types of gasket used and other operating factors.

Permissible operating pressures require the use of Ace bead to bead process couplings.

Anchor Points

An anchor point is a rigid support for the glass line tying it into the building structure, or to fixed equipment such as tanks, pumps or independently supported valves. There should be one and only one anchor point in each straight run of pipe. The diagrams below show the correct and incorrect installation methods between anchor points. Note the use of right-angle bends to obtain flexibility.

Beaded Process Pipe



All valves, strainers, meters or other heavy equipment must be supported rigidly and independently of the glass pipeline. This prevents transmitting the dead weight to the glass pipeline. It also prevents transmitting stresses to the line when valves are operated; equipment shifts positions, or expands more than the glass pipe. Rigidly supported equipment such as the above are considered anchor points. No more than one anchor point should be used in any straight run of glass pipe. Flexible "bellows" or hose can be used at the tie-in place.

Pipe Hanging and Support

Glass piping must be installed without mechanical restraint and the pipe should be free to move to prevent stresses. A mechanical restraint may set up a tensile stress that over a period of time will cause the pipe to fail. Hangers should not clamp the pipe tightly. Some lengthwise and sidewise movements are desirable. Padded hangers should always be used and spaced 8-10 feet apart. Use an extra hanger where there are two or more couplings in an 8-10 foot span. Do not pull or spring the pipe into place. Always move the hanger to the pipe do not force the pipe to the hanger.

Vertical Line Support

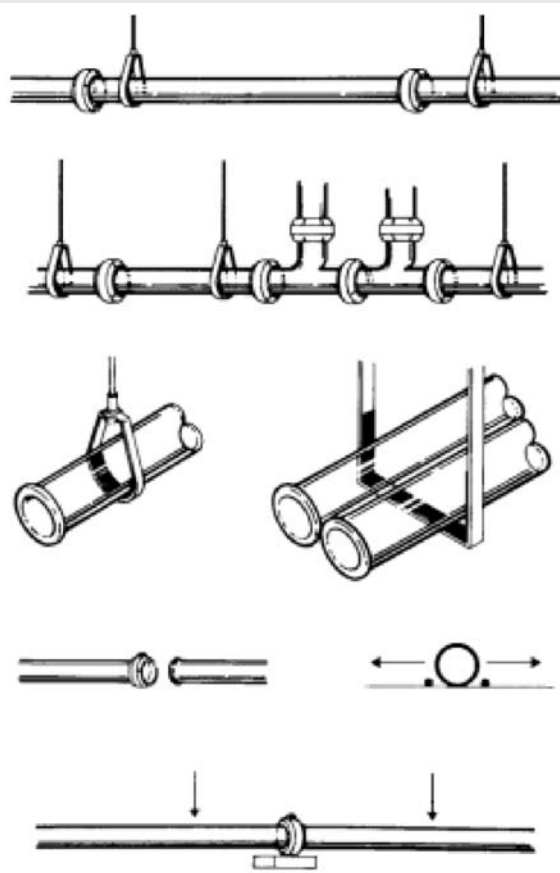
Vertical lines should be supported by plates beneath the couplings or by padded saddles beneath 90-degree elbows at the bottom of vertical rises. Do not support by rigid clamp anchorages around the vertical pipe. Usually only one rigid support is used. Lateral guides should be used approximately every 20 feet of unsupported riser. The horizontal run at the top of the riser should not be supported within 7 feet of the riser. This reduces bending strains in the horizontal run.

Vibration

Connection to vibrating machinery such as a pump can be made with the use of a flexible connection consisting of either hoses, or Teflon "bellows" as determined by the characteristics of the service.

Pressure Surges

Pressure surges must be controlled to prevent end motion in a line. If lines have hydraulic pressure surges, (positive displacement pumps or shutoff valves), it may be necessary to provide a pressure relief valve. It is usually necessary to provide a protected air dome to reduce the pressure surge. The domes can be installed on the discharge side of the pump, next to a valve, or at the highest point in the vertical rise of the discharge line. Use a tee at the top of the riser, plus a straight section and a cap.



Beaded Process Pipe

Protection

It is usually desirable to run glass pipe close to structures such as walls, columns, ceilings, etc., where conditions are favorable for obtaining a firm support. This also would keep the pipelines away from the heaviest traffic. When the pipelines are run through congested areas, provision should be made for protection. Angle or channel iron, or expanded metal guards, should be provided around exposed sections of glass pipe.

Testing

Tighten bolts on all couplings and flanges at the time of installation. The pipeline when empty should be examined for stresses by gently shaking the line. There should be some limited movement the lines. To make sure all joints are tight when line is ready for service, test at 1-1/2 times the working pressure. However do not test at more than the maximum working pressure. All air must be removed from the pipeline so there is no trapped air. **DO NOT TEST WITH AIR PRESSURE.** If a joint leaks carefully check the joint assembly, retighten to recommended torque value and retest. If leaking persists, remove coupling, check the gasket surface to be sure they are free from dirt, sand or other particles and replace if necessary.

Spare Parts

Generally one spare for every twelve should be provided. The proper storage of spare parts will ensure they are available when required. Keep lengths of pipe on racks and store them in a protected area. Keep fittings in their original packaging.

Cleaning

Flush line clean with water, other cleaning fluids, or atmospheric pressure steam (open drain). Do not use hydrofluoric acid, hot caustic solutions, abrasives or metallic tube cleaners.

Tools Required

Tools need to install glass piping (installation tools):

a) Wrenches	7/16-inch Open End, 1/2-inch Open End 9/16-inch Open End, 3/4-inch Open End
b) Ratchet	3/8-inch Drive
c) Sockets	7/16-inch Deep Socket, 1/2-inch Deep Socket 9/16-inch Deep Socket, 3/4-inch Deep Socket
d) Torque Wrench	Calibrated in inch-lbs. Preferred ratchet type 3/8-inch Drive.
e) Water-pump pliers	3/8-inch Drive
f) Various screw-drivers	
g) Hammer	Plastic or rubber head

Structural Tools:

a) Allen wrenches	5/16-inch and 3/8-inch
b) Hammer	
c) Hack saw	

Making Joints with Process Pipe Couplings

1. Dip coupling in water or wipe beaded ends with damp cloth.
2. Snap coupling over one end of pipe making certain TFE liner is behind bead... then stab other section of pipe into opposite side of coupling.
3. Tighten coupling bolt with 6-inch ratchet wrench until the gap between segments is approximately 3/16-inch.



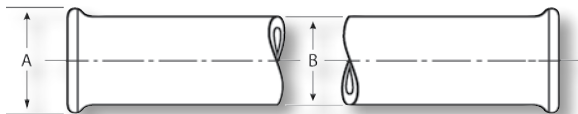
1



2



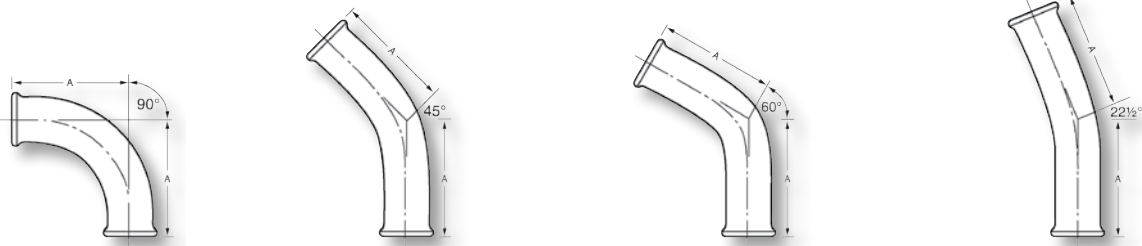
3



8828 BEADED PIPE ★

All pipe is available from stock in lengths shown; special lengths available at slightly higher cost.

1/2-inch I.D. Length (Inches)	A 57/64-inch Order Code	B 3/4-inch	3/4-inch I.D. Length (Inches)	A 1-5/32-inch Order Code	B 1-inch	1-inch I.D. Length (Inches)	A 1-17/32-inch Order Code	B 1-5/16-inch	1-1/2-inch I.D. Length (Inches)	A 2-1/16-inch Order Code	B 1-27/32-inch
3	8828-02		3	8828-102		3	8828-202		—	—	
4	8828-03		4	8828-103		4	8828-203		4	8828-303	
6	8828-05		6	8828-105		6	8828-205		6	8828-305	
12	8828-09		12	8828-109		12	8828-209		12	8828-309	
18	8828-11		18	8828-111		18	8828-211		18	8828-311	
24	8828-13		24	8828-113		24	8828-213		24	8828-313	
30	8828-15		30	8828-115		30	8828-215		30	8828-315	
36	8828-20		36	8828-120		36	8828-220		36	8828-320	
48	8828-25		48	8828-125		48	8828-225		48	8828-325	
60	8828-30		60	8828-130		60	8828-230		60	8828-330	
72	8828-38		72	8828-138		72	8828-238		72	8828-338	
84	8828-45		84	8828-145		84	8828-245		84	8828-345	
96	8828-56		96	8828-156		96	8828-256		96	8828-356	
						108	8828-260		108	8828-360	
						120	8828-262		120	8828-362	
2 I.D. Length (Inches)	A 2-9/16 Order Code	B 2-5/16-inch	3-inch I.D. Length (Inches)	A 3-11/16-inch Order Code	B 3-7/16-inch	4-inch I.D. Length (Inches)	A 4-7/8-inch Order Code	B 4-9/16-inch	6-inch I.D. Length (Inches)	A 7-1/8-inch Order Code	B 6-5/8-inch
4	8828-403		4	8828-503		—	—		—	—	
6	8828-405		6	8828-505		6	8828-605		6	8828-705	
12	8828-409		12	8828-509		12	8828-609		12	8828-709	
18	8828-411		18	8828-511		18	8828-611		18	8828-711	
24	8828-413		24	8828-513		24	8828-613		24	8828-713	
30	8828-415		30	8828-515		30	8828-615		30	8828-715	
36	8828-420		36	8828-520		36	8828-620		36	8828-720	
48	8828-425		48	8828-525		48	8828-625		48	8828-725	
60	8828-430		60	8828-530		60	8828-630		60	8828-730	
72	8828-438		72	8828-538		72	8828-638		72	8828-738	
84	8828-445		84	8828-545		84	8828-645		84	8828-745	
96	8828-456		96	8828-556		96	8828-656		96	8828-756	
108	8828-460		108	8828-560		108	8828-660		108	8828-760	
120	8828-462		120	8828-562		120	8828-662		120	8828-762	

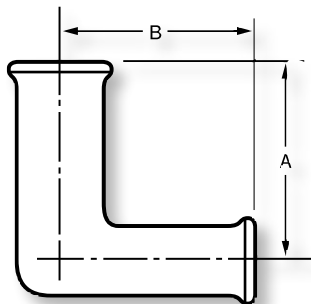


8830 SWEEP ELBOW ★

90°				45°				60°				22½°			
Size (inches)	A (In.)	Order Code		Size (inches)	A (In.)	Order Code		Size (inches)	A (In.)	Order Code		Size (inches)	A (In.)	Order Code	
1/2 - 90°	2¼	8830-03		1/2 - 45°	2¼	8830-103		1/2 - 60°	2¼	8830-203		1/2 - 22°	2¼	8830-303	
3/4 - 90°	2½	8830-05		3/4 - 45°	2½	8830-105		3/4 - 60°	2½	8830-205		3/4 - 22°	2½	8830-305	
1 - 90°	2¾	8830-07		1 - 45°	2¾	8830-107		1 - 60°	2¾	8830-207		1 - 22°	2¾	8830-307	
1-1/2 - 90°	5	8830-09		1-1/2 - 45°	3½	8830-109		1-1/2 - 60°	3½	8830-209		1-1/2 - 22°	3½	8830-309	
2 - 90°	6	8830-11		2 - 45°	4	8830-111		2 - 60°	4	8830-211		2 - 22°	4	8830-311	
3 - 90°	7	8830-13		3 - 45°	5	8830-113		3 - 60°	5	8830-213		3 - 22°	5	8830-313	
4 - 90°	10	8830-15		4 - 45°	7	8830-115		4 - 60°	7	8830-215		4 - 22°	7	8830-315	
6 - 90°	12	8830-17		6 - 45°	9	8830-117		6 - 60°	9	8830-217		6 - 22°	9	8830-317	

Use catalog dimensions for piping layout as gasket thickness allowance is included.

8831 REDUCER ELBOW ★

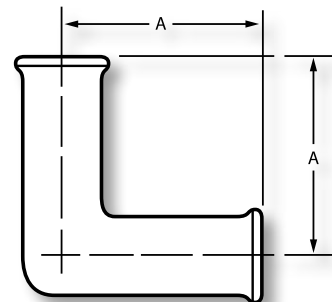


8831

Size (inches)	A (inches)	B (inches)	Order Code
3/4 x 1/2	2-1/2	2-1/2	8831-02
1 x 1/2	2-3/4	2-3/4	8831-04
1 x 3/4	2-3/4	2-3/4	8831-06
1-1/2 x 1/2	3-1/2	3	8831-08
1-1/2 x 3/4	3-1/2	3	8831-10
1-1/2 x 1	3-1/2	3	8831-12
2 x 1/2	4	3	8831-14
2 x 3/4	4	3	8831-16
2 x 1	4	3	8831-18
2 x 1-1/2	4	3-1/2	8831-20
3 x 1	5	3-1/2	8831-22
3 x 1-1/2	5	4	8831-24
3 x 2	5	4-1/2	8831-26
4 x 1	7	4	8831-28
4 x 1-1/2	7	4-1/2	8831-30
4 x 2	7	5	8831-32
4 x 3	7	5-1/2	8831-34
6 x 1-1/2	9	5-1/2	8831-36
6 x 2	9	6	8831-38
6 x 3	9	6-1/2	8831-40
6 x 4	9	8	8831-42

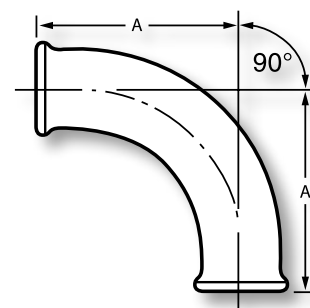
8832 90° MITERED ELBOW ★

Size (inches)	A (inches)	Order Code
1-1/2 – 90°	3-1/2	8832-03
2 – 90°	4	8832-05
3 – 90°	5	8832-07
4 – 90°	7	8832-09
6 – 90°	9	8832-11

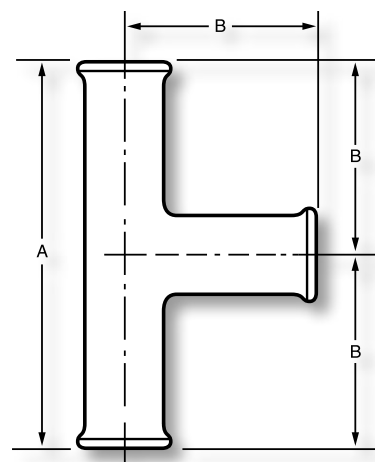

8832
8833 90° SHORT RADIUS ELBOW ★

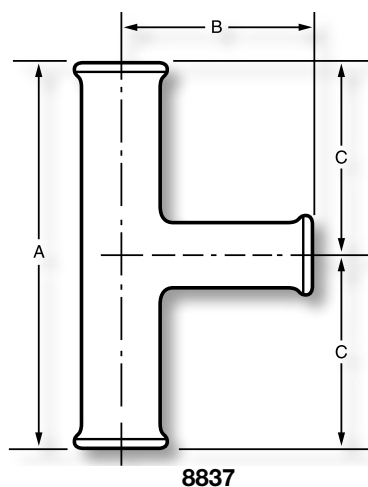
Size (inches)	A (inches)	Order Code
1-1/2 – 90°	3-1/2	8833-32
2 – 90°	4	8833-34
3 – 90°	5	8833-36
4 – 90°	7	8833-38

Interchangeable with 8836 – TEE

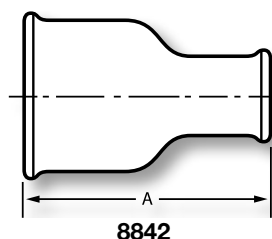

8833
8836 STRAIGHT T ★

Size (inches)	A (inches)	B (inches)	Order Code
1/2	4-1/2	2-1/4	8836-02
3/4	5	2-1/2	8836-04
1	5-1/2	2-3/4	8836-06
1-1/2	7	3-1/2	8836-08
2	8	4	8836-10
3	10	5	8836-12
4	14	7	8836-14
6	18	9	8836-16

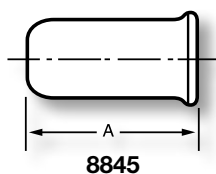

8836

8837 REDUCING T ★

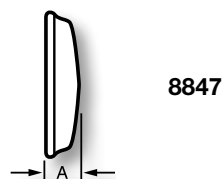
Size Run x Branch (Inches)	A (inches)	B (inches)	C (inches)	Order Code
3/4 x 1/2	5	2-1/2	2-1/2	8837-03
1 x 1/2	5-1/2	2-3/4	2-3/4	8837-05
1 x 3/4	5-1/2	2-3/4	2-3/4	8837-07
1-1/2 x 1/2	7	3	3-1/2	8837-09
1-1/2 x 3/4	7	3	3-1/2	8837-11
1-1/2 x 1	7	3	3-1/2	8837-13
2 x 1/2	8	3	4	8837-15
2 x 3/4	8	3	4	8837-17
2 x 1	8	3	4	8837-19
2 x 1-1/2	8	3-1/2	4	8837-21
3 x 1	10	3-1/2	5	8837-23
3 x 1-1/2	10	4	5	8837-25
3 x 2	10	4-1/2	5	8837-27
4 x 1	14	4	7	8837-29
4 x 1-1/2	14	4-1/2	7	8837-31
4 x 2	14	5	7	8837-33
4 x 3	14	5-1/2	7	8837-35
6 x 1-1/2	18	5-1/2	9	8837-37
6 x 2	18	6	9	8837-39
6 x 3	18	6-1/2	9	8837-41
6 x 4	18	8	9	8837-43

8842 REDUCER (Straight) ★

Size (Inches)	A (inches)	Order Code	Size (Inches)	A (inches)	Order Code
3/4 x 1/2	4	8842-03	3 x 1-1/2	5	8842-25
1 x 1/2	4	8842-05	3 x 2	5	8842-27
1 x 3/4	4	8842-07	4 x 1	7	8842-29
1-1/2 x 1/2	4	8842-09	4 x 1-1/2	7	8842-31
1-1/2 x 3/4	4	8842-11	4 x 2	7	8842-33
1-1/2 x 1	4	8842-13	4 x 3	7	8842-35
2 x 1/2	4	8842-15	6 x 1	9	8842-37
2 x 3/4	4	8842-17	6 x 1-1/2	9	8842-39
2 x 1	4	8842-19	6 x 2	9	8842-41
2 x 1-1/2	4	8842-21	6 x 3	9	8842-43
3 x 1	5	8842-23	6 x 4	9	8842-45

8845 END CAP ★

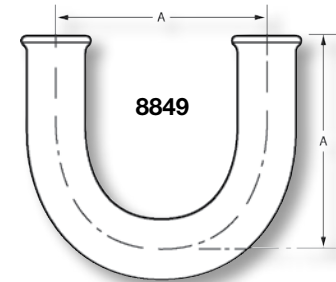
Size (inches)	A (inches)	Order Code
1/2	2	8845-03
3/4	2	8845-05
1	2	8845-07
1-1/2	3	8845-09
2	4	8845-11
3	4-3/4	8845-15
4	6	8845-17
6	7	8845-19

8847 END PLUG ★

Size (inches)	A (inches)	Order Code
1-1/2	7/8	8847-02
2	1	8847-04
3	1-1/8	8847-06
4	1-1/4	8847-08
6	1-1/2	8847-10

8849 U BEND ★

Size	A (inches)	Order Code
1/2	2-1/4	8849-03
3/4	2-1/2	8849-05
1	5-1/2	8849-07
1-1/2	7	8849-09
2	7	8849-11
3	9	8849-13
4	12	8849-15



8856 PROCESS PIPE COUPLINGS *(Bead to Bead)*

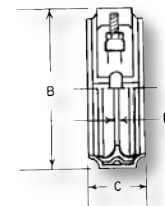
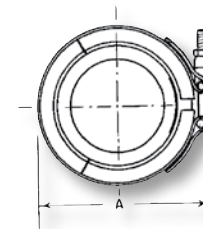
Coupling assemblies consist of a .300 series stainless steel outer band with T-Bolt and hex nut; Buna-N liner and a TFE seal ring.

No. 8856 coupling is designed for temperature service up to 450°F.

High Temperature – Buna-N Liner (450°) (Black)

Size	A (inches)	B (inches)	C (inches)	D (inches)	Max. Torque, in-lbs	Order Code
1/2	1-5/8	1-3/8	7/8	3/16	20	8856-03
3/4	1-3/4	1-1/2	7/8	3/16	25	8856-05
1	2-5/8	1-7/8	1	3/16	35	8856-07
1-1/2	3	2-5/8	1-5/16	3/16	50	8856-09
2	3-1/2	3-1/8	1-5/16	3/16	60	8856-11
3	4-3/4	4-1/4	1-7/16	3/16	75	8856-13
4	6	5-1/2	1-1/2	3/16	80	8856-15
6	8-3/4	8	1-3/4	1/4	90	8856-17

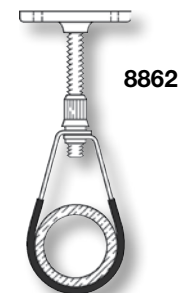
Use catalog dimensions for piping layout as gasket thickness allowance is included.



8856

8862 PADDED PIPE HANGER *with Mounting Foot*

Size	Order Code
1-inch (25mm)	8862-03
2-inch (50mm)	8862-07
3-inch (76mm)	8862-11

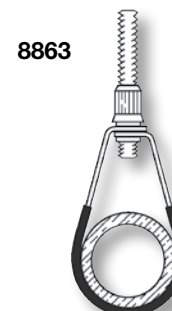


8862

8863 PADDED PIPE HANGER *without Foot*

All hangers are zinc coated and have factory- applied plastic sleeve to prevent glass-to-metal contact. Use one hanger every 8 or 10 feet. Support all valves and meters individually.

Size (inches)	Order Code
1/2	8863-02
3/4	8863-04
1	8863-06
1-1/2	8863-08
2	8863-10
3	8863-12
4	8863-14
6	8863-16



8863

8867 COUPLING KIT COMPONENTS ★
**Gasket for 8868
 T.F.E. Machined (Full Flow) Gasket**

Description	Size (Inches)	Order Code
Style II	1	8868-16
Style II	1-1/2	8868-17
Style II	2	8868-18
Style II	3	8868-19
Style II	4	8868-20
Style II	6	8868-21

Flange for 8866 (Need 2)

Size (Inches)	Order Code	Size (Inches)	Order Code
1	8867-68	4	8867-72
1-1/2	8867-69	4	8867-73
2	8867-70	6	8867-74
3	8867-71	6	8867-75

**8868 Bolts & Nuts
 For All Coupling Kits & Assemblies**

Description (Inches)	Qty.	Order Code
5/16 – 18 x 2-1/4	4	8868-03
5/16 – 18 x 2-1/2	4	8868-04
5/16 – 18 x 3	8	8868-05
3/8 – 16 x 3	8	8868-06
1/2 – 13 x 2	4	8868-07
1/2 – 13 x 2-1/4	4	8868-08
1/2 – 13 x 2-1/2	4	8868-09
5/8 – 11 x 2-1/2	4	8868-10
5/8 – 11 x 3	4	8868-11
5/8 – 11 x 3-1/2	4	8868-12
3/4 – 10 x 3-1/2	4	8868-13

Inserts for 8866 (one each)

Size (Inches)	Order Code
1	8867-76
	8867-77
1-1/2	8867-78
	8867-79
2	8867-80
	8867-81
3	8867-82
	8867-83
4	8867-84
	8867-85
6	8867-86
	8867-87

8871 ADAPTER *Beaded Process Pipe to Female NPT, Stainless Steel ★*

304 Stainless steel adapter for matching glass beaded process pipe to male NPT fittings, gauges and flanges.


8871

Size	Order Code
3/4-inch beaded pipe to 3/4-inch female NPT	8871-20
1-inch beaded pipe to 1-inch female NPT	8871-22
1.5-inch beaded pipe to 1.5-inch female NPT	8871-24
2-inch beaded pipe to 2-inch female NPT	8871-28

8872 ADAPTER *Beaded Process Pipe to Sanitary Flange, Stainless Steel ★*

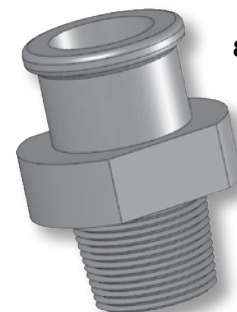
304 Stainless steel adapter with sanitary type flange on one end. Mates glass beaded pipe to sanitary type flanges.


8872

Size	Order Code
3/4-inch beaded pipe to 3/4-inch sanitary flange	8872-04
3/4-inch beaded pipe to 1-inch sanitary flange	8872-06
1-inch beaded pipe to 1-inch sanitary flange	8872-08
1-inch beaded pipe to 3/4-inch sanitary flange	8872-10
1-inch beaded pipe to 1.5-inch sanitary flange	8872-12
1.5-inch beaded pipe to 1.5-inch sanitary flange	8872-14
1.5-inch beaded pipe to 1-inch sanitary flange	8872-16
1.5-inch beaded pipe to 2-inch sanitary flange	8872-18
2-inch beaded pipe to 2-inch sanitary flange	8872-20
2-inch beaded pipe to 1.5-inch sanitary flange	8872-22
2-inch beaded pipe to 1-inch sanitary flange	8872-24

8870 MALE THREADED ADAPTER *304 Stainless Steel ★*

Used to join threaded female fittings, valves and flanges to beaded pipe. Size refers to bead and NPT thread.


8870

Size (Inches)	A (Inches)	Order Code
1/2	2-9/16	8870-02
3/4	2-9/16	8870-04
1	2-9/16	8870-06
1-1/2	2-9/16	8870-08
2	2-9/16	8870-10
3	2-9/16	8870-12

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