

Product Overview

Reaction Unit
Filter Reactor
Nutsche Filter
Thin Film Evaporator
Short Path Evaporator
Rotary Evaporator
Pressure Reactor
Quartz Glass Products

AG!
Asahi Glassplant Inc.



**Blue
Label**

The Blue Label line is our answer to basic needs of glassware users. Designs and specifications of this product line are predetermined by AGI to carry out carefree experiments. Equipment configurations can be chosen in a "mix-and-match" style from a vast selection of standard parts.

**Gold
Label**

The Gold Label line provides advanced options for users whose demands are more specific and detailed such as sizes, positions, orientations, combinations, special configurations, etc.

**Platinum
Label**

The Platinum Label is our prestigious custom engineered products for manufacturing and/or production applications. Custom Pilot Plant and Acid recovery Plants are complimented by our engineering and design teams. AGI has the capability to provide an engineered turn key solution to meet your requirements.

Reaction Unit

Bench-top Reactor
Bench-top Reactor Options
Mini and Pilot Plant Reactor
Ring Baffle for Reactor

Filter Reactor

Bench-top Filter Reactor
Bench-top Filter Reactor Options
Mini and Pilot Plant Filter Reactor

Nutsche Filter

Bench-top Nutsche Filter
Bench-top Nutsche Filter Options
Mini and Pilot Plant Nutsche Filter

Evaporator

Thin Film Evaporator
Short Path Evaporator

Additional Apparatus

 Pressure Reactor
 Rotary Evaporator
 Flexible Customized Solutions

Quartz Glass Products

Product Information

Product Options
Complete Package
Vessel Variations

Reaction Unit

Filter Reactor

Nutsche Filter

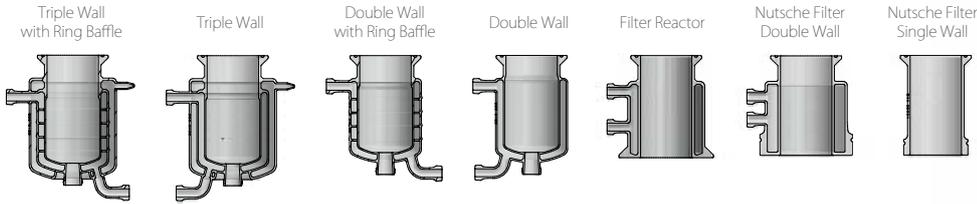
Evaporator

Additional Apparatus

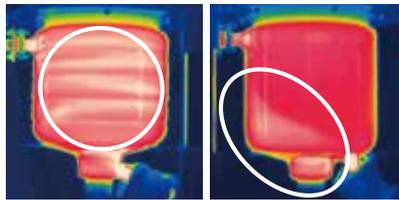
Quartz Glass Products

Product Information

1 Variety of Vessel Options



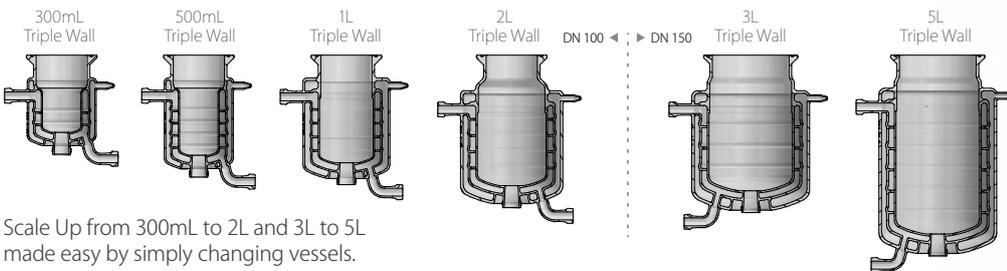
2 AG! Proprietary Ring Baffle Technology



AG! Glass Ring Baffle guides the flow of the heat transfer fluid to prevent hot and cold spots for even heat distribution.

- Optimizes the heat transfer to the internal vessel
- Uniform and efficient temperature stability

3 Interchangeable Scale-up



Scale Up from 300mL to 2L and 3L to 5L made easy by simply changing vessels.

- * DN 100 Vessel Clamp for 300mL to 2L
- * DN 150 Vessel Clamp for 3L and 5L

4 Vessel Arm Swing



Allows for easy access for cleaning. Simply adjust the knob to release vessel and motor.

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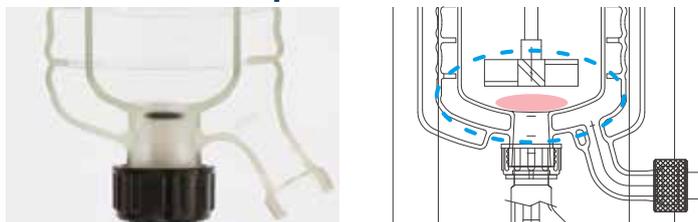
Vessel Capacity : 1L

5 Leak-proof Flush Valve



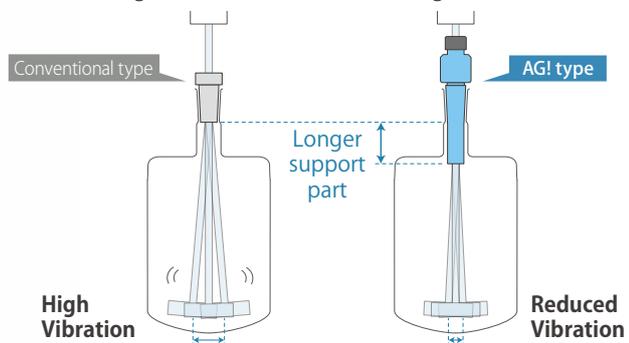
Pressure sensitive spring loaded flush valve prevents leakage. Easily removal for cleaning.

6 Zero Dead Space



7 Reduced Vibration and Flaking

Stirrer bearings reduce vibration and Flaking



8 A Choice of Popular Stirrer Shafts



Anchor type

Screw propeller type

Retreat curve type

Bench-top Reactor

- Vessel Capacity : 300mL, 500mL, 1L, 2L, 3L, 5L
- Vessel Type : Double Wall (Jacket), Triple Wall (Jacket and Vacuum Jacket)
*Optional Ring Baffles available for both type.
- Operating Pressure : Full Vacuum to Atm
- Operating Jacket Pressure : Up to +0.5 bar G (+0.05 MPa)
- Operating Temperature : -90 ° C to +230 ° C
- ΔT : 110 ° C (Double Wall), 60 ° C (Triple Wall)
- * This system does not include overhead stirrer, circulator and chiller.

1 OPTION Lift Assist Mechanism



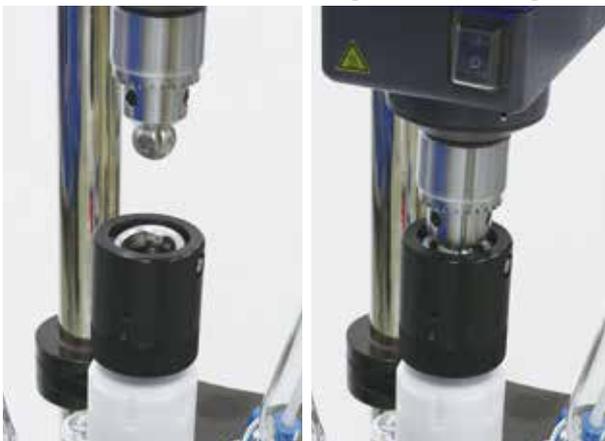
Easy lowering/lifting with single handed operation for motor and vessel. This allows for easy assembly and cleaning.

2 OPTION Rotating Vessel Support Mechanism



360° rotation allows for easy removal and cleaning.

3 OPTION Flexible Bearing Coupling

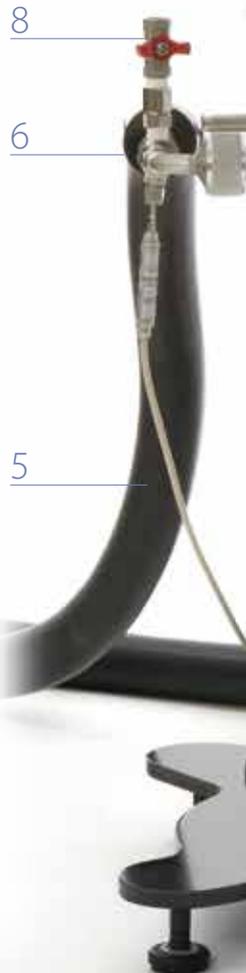


AGI designed Flexible Bearing Coupling creates flexibility between the motor and stir shaft allowing for efficient stirring even if the motor and connection is not aligned perfectly.

4 OPTION Lid Holder



The cover need not be removed.





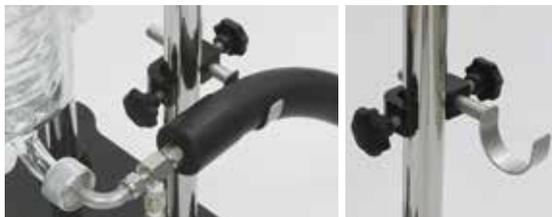
Vessel Capacity : 1L

5 ^{OPTION} Insulated Flexible Hose



Flexibility facilitates limited space installation in such as draft chambers.
Operating temperature : -90°C~+250°C

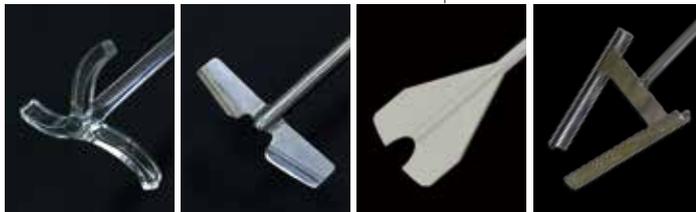
6 ^{OPTION} Hose Support Clamp



Eliminates stress on the glass inlet and outlet of the jacket.

7 ^{OPTION} Advances Stir Rods

Glass shaft Metal shaft HB impeller Wall Wetter®



Wide Range of Viscosity
* Temperature sensor can not be inserted from the cover.

Improved Evaporation Efficiency
* Temperature sensor can not be inserted from the cover.

8 ^{OPTION} Vent Valve



Quick and easy to drain thermal fluid.

9 ^{OPTION} Drain Valve



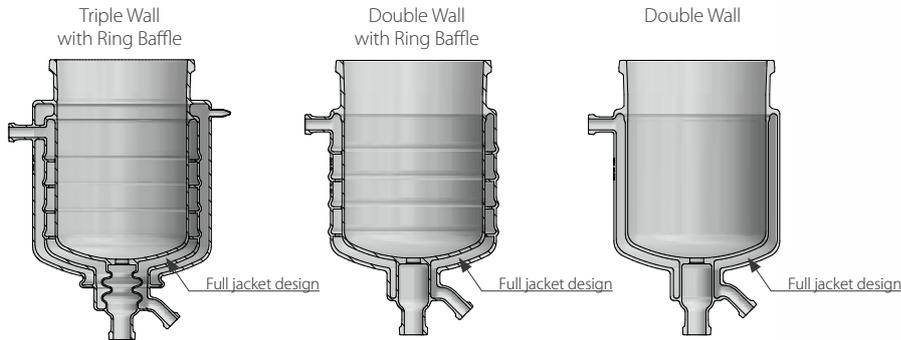
10 ^{OPTION} HTF In-Line Pt100 Sensor (inlet/outlet)



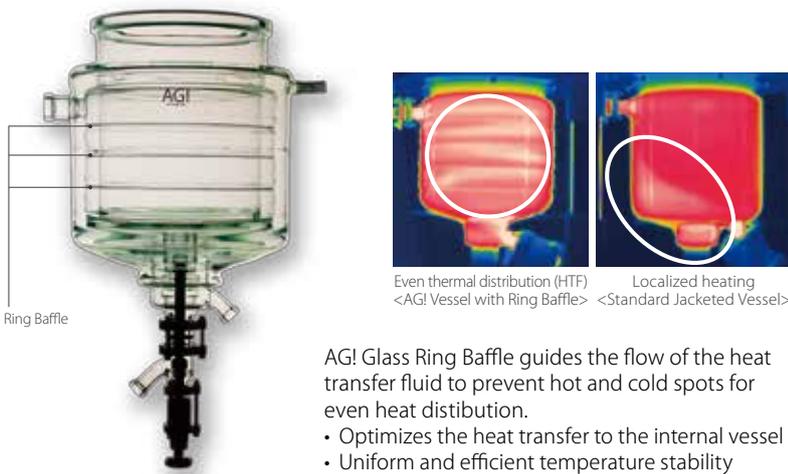
Temperature can be measured at either or both inlet and outlet.

Operating Pressure : Up to 0.5 bar G is also available

1 Variety of Vessel Options



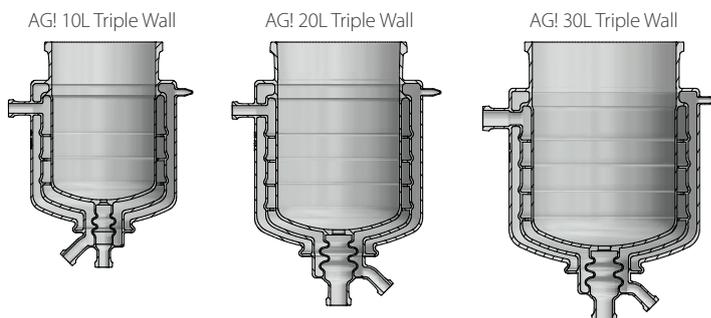
2 AG! Proprietary Ring Baffle Technology



3 Easy Scale Up

Our triple Wall reactors are designed to keep the ID (W) width and (H) height ratio within 1 : 1 to 1 : 1.5 for structural integrity, performance for easy scalability.

	AG! Triple Wall	Competitors
Aspect Ratio ID(W) : Height(H)	1 : 1 ~ 1 : 1.5	1 : 1 ~ 1 : 2.5
Bottom Shape	Similar to that of conventional glass lined reactors (10% head plate)	Round bottom





Flat Flange allows for easy cleaning.



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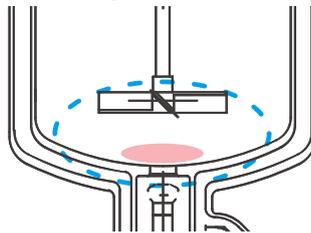
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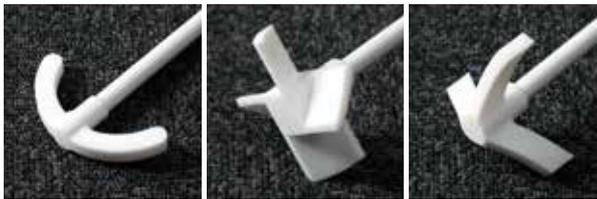
Easy Rolling and Locking Castor's

Vessel Capacity : 30L

4 Unique Flush Valve Minimizes Dead Space



5 A Choice of Popular Stirrer Shafts



Anchor type

Screw propeller type

Retreat curve type

6 OPTION Vent Valve



Quick and easy to drain thermal fluid.

7 OPTION Drain Valve



8 OPTION Insulated Flexible Hose



High flexibility and thermal insulation.
Operating temperature : -90°C ~+250°C

Mini and Pilot Plant Reactor - Stationary Stand -

- Vessel Capacity : 10, 20, 30L
- Vessel Type : Double Wall (Jacket), Triple Wall (Jacket and Vacuum Jacket)
*Triple Wall Vessel available only with Ring Baffle
- Operating Pressure : Full Vacuum to Atm
- Operating Jacket Pressure : Up to +0.5 bar G (+0.05 MPa)
- Operating Temperature : -90 ° C to +230 ° C
- ΔT : 110 ° C (Double Wall), 60 ° C (Triple Wall)
- *This system does not include overhead stirrer, circulator and chiller.

Customized Configurations are Available!

Maximum Capacity		
Single Wall	Double Wall	Triple Wall
400L	300L	100L

Please contact us about customized systems.

1 Simple and Efficient Handling



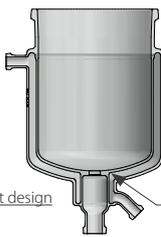
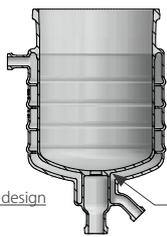
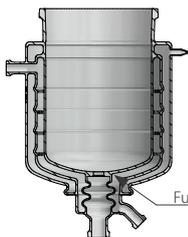
Lifting mechanism to lower, raise, or swing the vessel.

2 Variety of Vessel Options

Triple Wall with Ring Baffle

Double Wall with Ring Baffle

Double Wall



Full jacket design

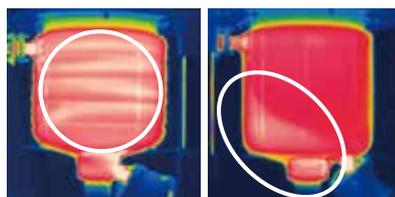
Full jacket design

Full jacket design

3 AG! Proprietary Ring Baffle Technology



Ring Baffle



Even thermal distribution (HTF)

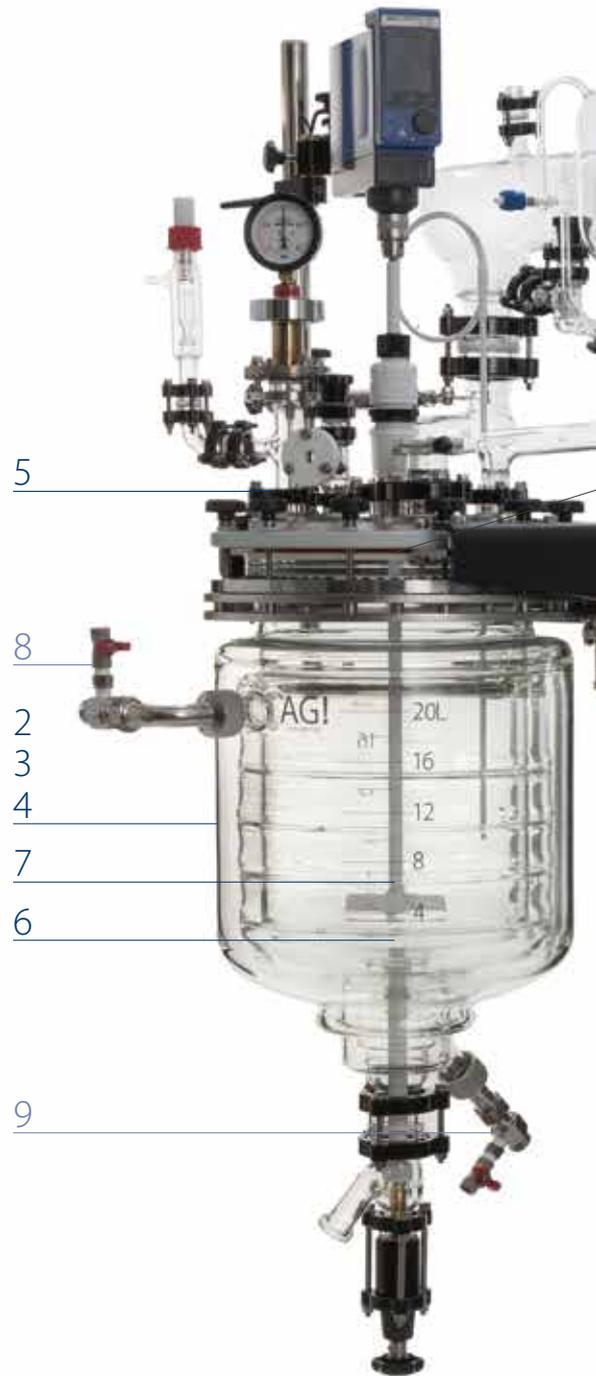
<AG! Vessel with Ring Baffle>

Localized heating

<Standard Jacketed Vessel>

AG! Glass Ring Baffle guides the flow of the heat transfer fluid to prevent hot and cold spots for even heat distribution.

- Optimizes the heat transfer to the internal vessel
- Uniform and efficient temperature stability





Configuration for 10L



Flat Flange allows for easy cleaning.



Vacuum Connection (Rc 3/4-inch, Female)

1



Vessel lifting mechanism can be outfitted on either side of the stand



Easy Rolling and Locking Castor's

Vessel Capacity : 20L

4 Easy Scale Up

Our Triple Wall reactors are designed to keep the ID (W) width and (H) height ratio within 1 : 1 to 1 : 1.5 for structural integrity, performance for easy scalability.

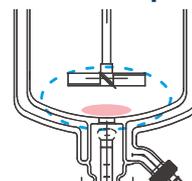
	AGI Triple Wall	Competitors
Aspect Ratio ID(W) : Height(H)	1 : 1 ~ 1 : 1.5	1 : 1 ~ 1 : 2.5
Bottom Shape	Similar to that of conventional glass lined reactors (10% head plate)	Round bottom

5 Adaptable Port Orientation



All ports are multi-purpose 40A

6 Minimized Dead Space



7 A Choice of Popular Stirrer Shafts



Anchor type



Screw propeller type



Retreat curve type

8 ^{OPTION} Vent Valve



9 ^{OPTION} Drain Valve



Quick and easy to drain thermal fluid.

10 ^{OPTION} Insulated Flexible Hose



Mini and Pilot Plant Reactor - Fully Functional Stand -

- Vessel Capacity : 10, 20, 30 L
- Vessel Type : Double Wall (Jacket), Triple Wall (Jacket and Vacuum Jacket)
*Triple Wall Vessel available only with Ring Baffle
- Operating Pressure : Full Vacuum to Atm
- Operating Jacket Pressure : Up to +0.5 bar G (+0.05 MPa)
- Operating Temperature : -90 ° C to +230 ° C
- Δ T : 110 ° C (Double Wall), 60° C (Triple Wall)
- * This system does not include overhead stirrer, circulator and chiller.

Customized Configurations are Available!
Operating Pressure : Up to 0.5 bar G is also available

Ring Baffle for Reactor

Reaction Unit

Filter Reactor

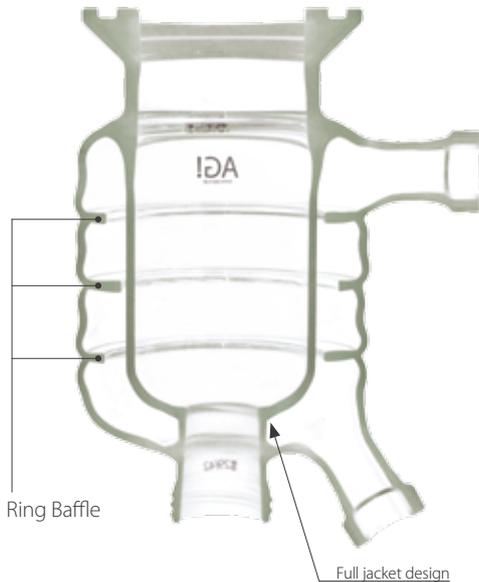
Nutsche Filter

Evaporator

Additional Apparatus

Quartz Glass Products

Production Information



Uniquely Engineered for Precise Temperature Control

Our Proprietary Ring Baffle Technology forces the thermal fluid in a specific "path" to ensure equal heat distribution while maximizing the working surface area promoting even heat transfer by providing rapid temperature recovery due to endothermic or exothermic reactions quickly and efficiently while maximizing the energy provided by the temperature control unit. Only AG! offers this advanced design for all our glass reactors.

Less Time and More Productivity

Precise and uniform temperature control will improve productivity by decreasing process times while increasing higher yields and reducing your operating costs in your process.

Precise Temperature Process Control with Integrated Glass Ring Baffle Technology

AG! Jacketed Ring Baffle Technology



Heat Transfer Fluid In

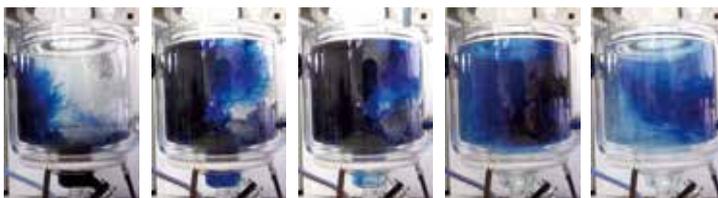
Optimal heat Transfer

Heat Transfer Fluid Out

AG! Glass Ring Baffle Technology Benefits:

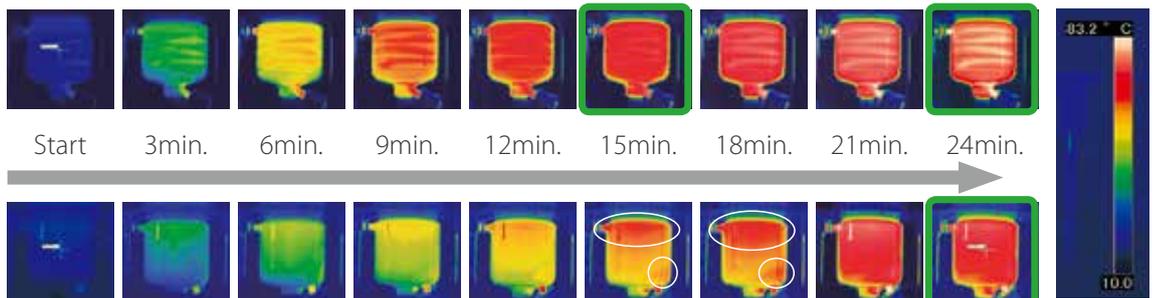
- The AG! design maximizes the heat transfer area
- Integrated full jacket design
- Optimal heat transfer
- Eliminates hot/cold zones
- Maximizes the energy of the TCU

Standard Jacketed Vessel

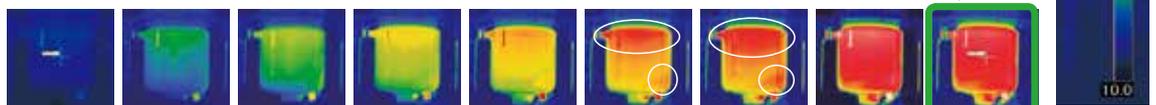


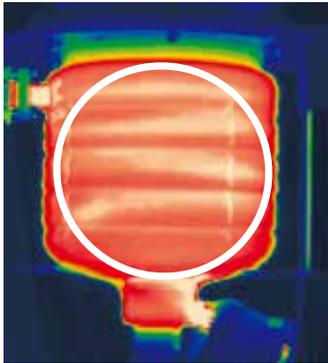
◀ Hot/Cold Zones

AG! Jacketed Ring Baffle Technology

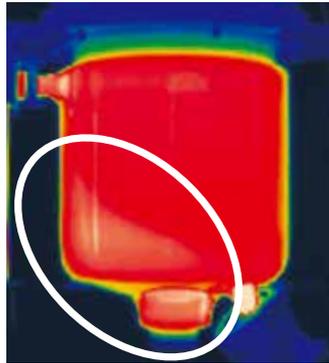


Standard Jacketed Vessel





Even thermal distribution (HTF)
<AG! Vessel with Ring Baffle>



Localized heating
<Standard Jacketed Vessel>

Even Heating / Cooling

AG! Glass Ring Baffle prevents 'Short-path' of HTF.

- Optimizes the heat transfer to the internal vessel
- Uniform and efficient temperature stability

Time to Temperature Study

Case Study 1

Comparison:

AG! Triple Wall 1L Reactor

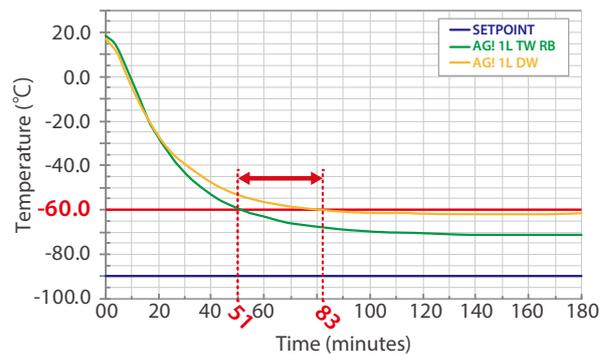
vs.

AG! Double Wall 1L Reactor

[Terms of Exam] Thermostat: LAUDA RP890C, HTF: Silicone Oil

Result 30 minutes of Time Saving

Note. Double Wall Ring Baffle 1L Reactor: 51.4min. vs. Double Wall 1L Reactor: 83.1min.



Case Study 2

Comparison:

AG! Triple Wall Ring Baffle 60L Reactor

vs.

Competitor Standard Double Wall; Jacketed 50L Reactor

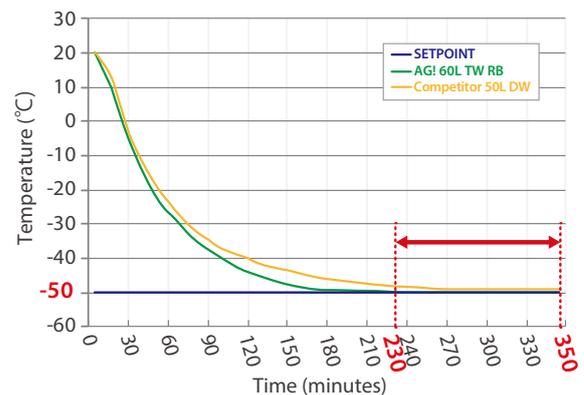
[Terms of Exam] Thermostat: HUBER Unistat 510w, HTF: Silicone Oil

Result 120 minutes of Time Saving

Note. AG!: 230min. vs. Other : 350min. (-49°C)

AG! Advantage:

Competitor reactor did not achieve the targeted temperature(-50°C); 10L difference in reactor volumes



Case Study 3

Comparison:

AG! Triple Wall Ring Baffle 20L Reactor

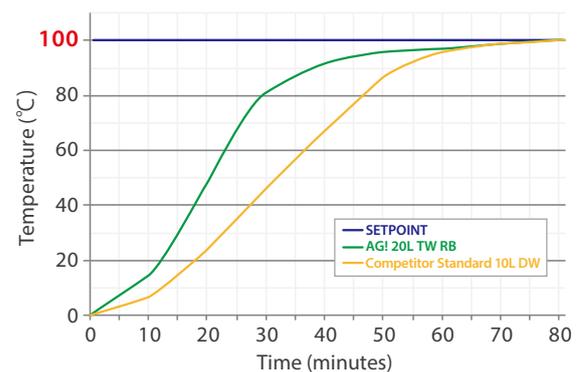
vs.

Competitor Standard Double Wall; Jacketed 10L Reactor

[Terms of Exam] Thermostat: JULABO PRESTO A40, HTF: Silicone Oil

Result 75 mins. to temp; 10L volume difference

Note. AG!: 75min. vs. Competitor: 75min.



Bench-top Filter Reactor

- 1L to 5L -

Reaction Unit

Filter Reactor

Nutsche Filter

Evaporator

Additional Apparatus

Quartz Glass Products

Product Information

1 Removable Filter Housing



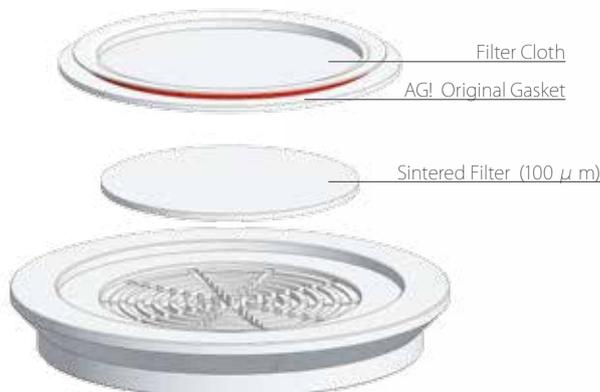
Filter released



Lab Jack supports filter housing



2 Leak Proof Housing Designed to Seal and Maximize Filtration Area.



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Sintered filter maximizes filtration area.
AG! original gasket prevents bypass leakage around filter cloth.

3 Stand Rotation Mechanism Allows for Easy Removal of Cake



360° rotation allows for easy removal and cleaning.



Vessel Capacity : 1L

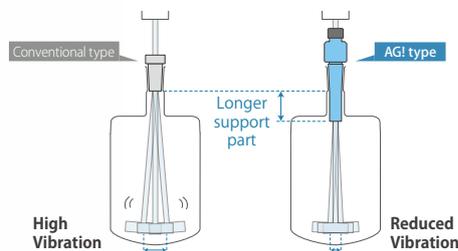
4 Maximizes the Heat Transfer

5 Minimized Dead Space



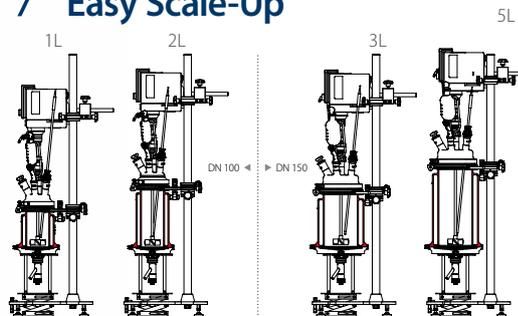
Heat transfer fluid runs from top to bottom.
Flush Valve minimizes dead space.

6 Reduced Vibration and Flaking



Stirrer Bearings reduce vibration and flaking

7 Easy Scale-Up



Same Structure, Glass Cover, etc.
*3L and over vessels require larger clamp.

8 A Choice of Popular Stirrer Shafts



Bench-top Filter Reactor

- Vessel Capacity : 1, 2, 3, 5 L
- Filtration Area : 78.5 cm² (1, 2L), 176.7 cm² (3, 5L)
- Vessel Type : Double Wall; Full Jacket
- Operating Pressure : Full Vacuum to Atm
- Operating Jacket Pressure : Up to +0.5 bar G (+0.05 MPa)
- Operating Temperature : -90 ° C to +200 ° C (Δ T:110 ° C)
- * This system does not include overhead stirrer, circulator and chiller.

1 OPTION Lift Assist Mechanism



Lower and lift the motor and/or vessel easily using one hand. This allows for easy preparation and cleaning.

2 OPTION Lid Holder



The lid does not need to be removed.

3 OPTION Buffer Tank

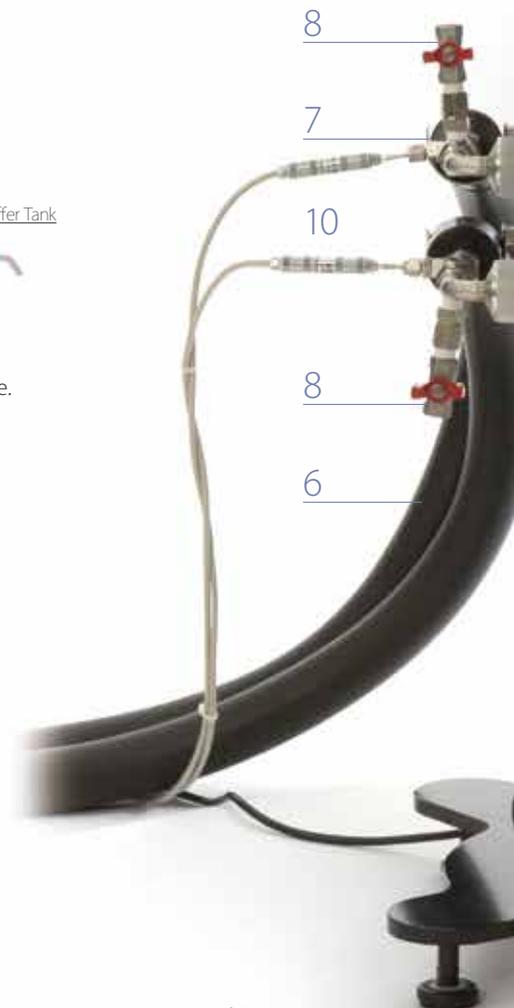


Filtrate can be collected by the Vacuum Bottle.

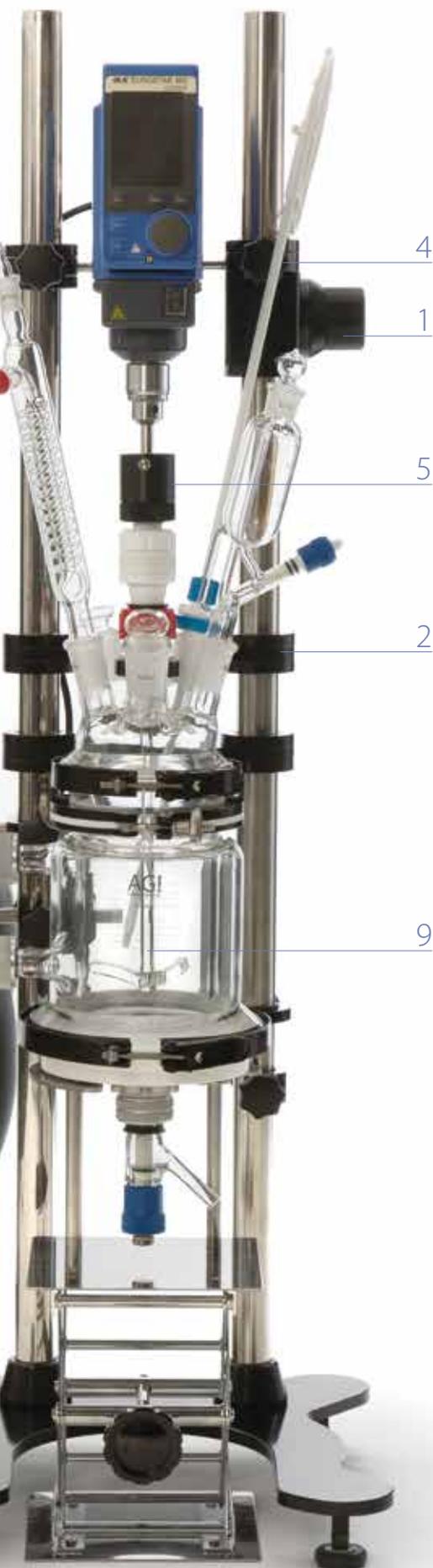
4 OPTION Manual Stirring



Manual stirring is used to smooth and/or break apart the cake.



Vessel Capacity : 1L



5 OPTION Flexible Bearing Coupling



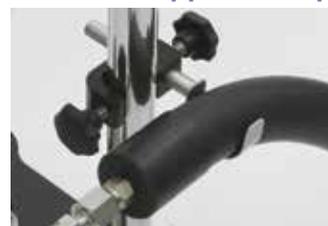
AGI designed Flexible Bearing Coupling creates flexibility between the motor and stir shaft allowing for efficient stirring even if the motor and connection is not aligned perfectly.

6 OPTION Insulated Flexible Hose



High flexibility and thermal insulation.
Operating temp. : -90°C ~ +250°C

7 OPTION Hose Support Clamp



Eliminates stress on the glass inlet and outlet of the jacket.

8 OPTION Vent Valve & Drain Valve



Quick and easy to drain thermal fluid.

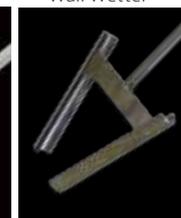
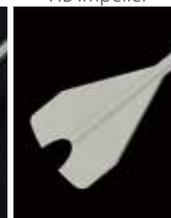
9 OPTION Advances Stir Rods

Glass shaft

Metal shaft

HB impeller

Wall Wetter®



Wide Range of Viscosity
* Temperature sensor can not be inserted from the cover.

Improved Evaporation Efficiency
* Temperature sensor can not be inserted from the cover.

10 OPTION HTF In-Line Pt100 Sensor (inlet/outlet)

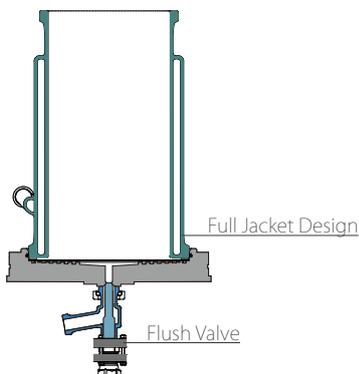
Temperature can be measured at either or both inlet and outlet.

Operating Pressure : Up to 0.5 bar G is also available

Mini and Pilot Plant Filter Reactor

- Fully Functional Stand -

1 Maximizes the Heat Transfer & Minimized Dead Space

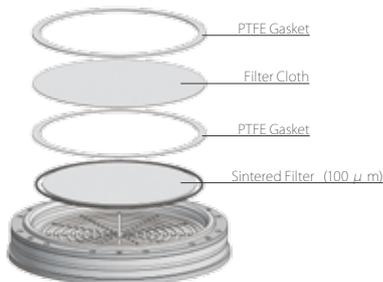


Heat transfer fluid runs from top to bottom. Flush Valve minimizes dead space.

2 Easy Installation, Double Seal Maintains Vacuum



Wetted Surface : PTFE, FFKM, PFA

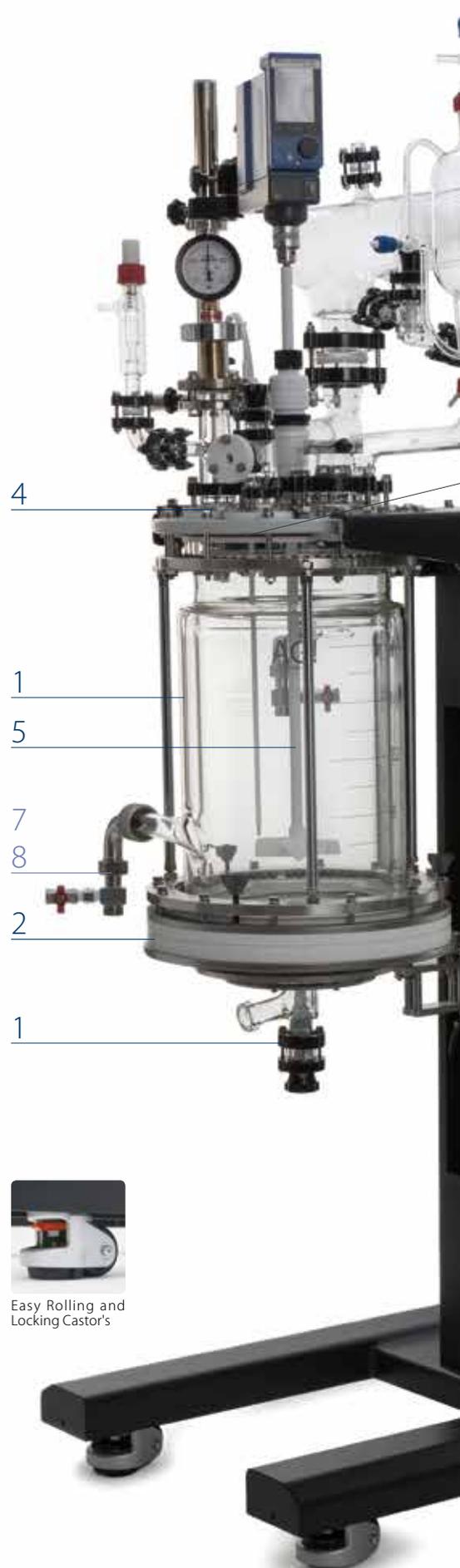


Separated filter components and filter cloth placement.

3 Allows for Easy Removal of Cake



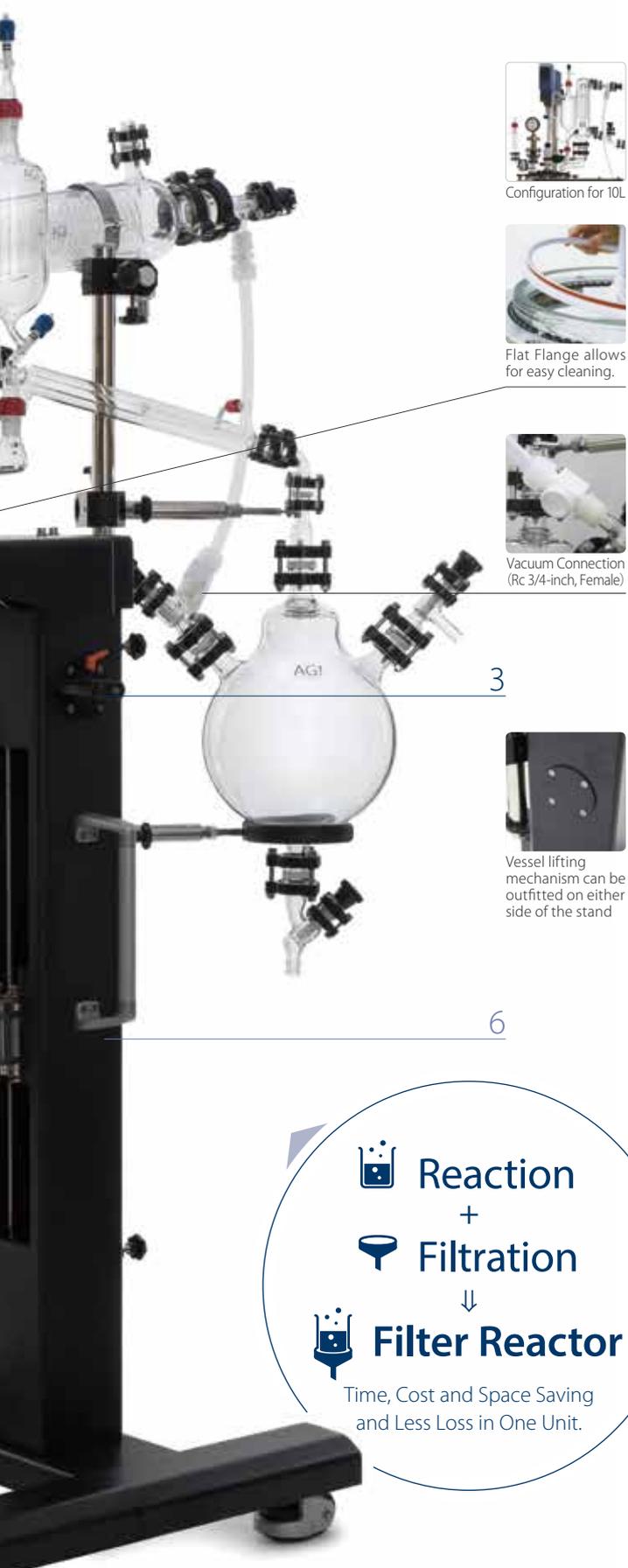
Operator can adjust and align the filter unit without tools. You need not make frequent filter adjustments. The swinging mechanism helps with filter access, and you can retrieve the cake easily.



Easy Rolling and Locking Castor's

Mini and Pilot Plant Filter Reactor - Fully Functional Stand -

- Vessel Capacity : 10, 20, 30 L
- Filtration area : 317.3cm² (10L), 514.7cm² (20L), 711.6cm² (30L)
- Vessel Type : Double Wall; Full Jacket
- Operating Pressure : Full Vacuum to Atm
- Operating Jacket Pressure : Up to +0.5 bar G (+0.05 MPa)
- Operating Temperature : -90 ° C to +200 ° C (Δ T:110 ° C)
- * This system does not include overhead stirrer, circulator and chiller.



Configuration for 10L



Flat Flange allows for easy cleaning.



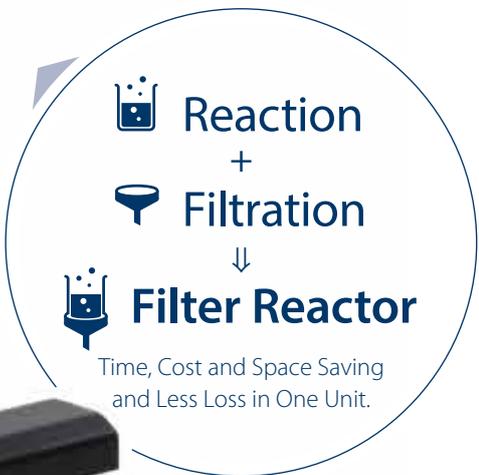
Vacuum Connection (Rc 3/4-inch, Female)

3



Vessel lifting mechanism can be outfitted on either side of the stand

6



Vessel Capacity : 20L

4 Adaptable Port Orientation

All ports are multi-purpose 40A



5 A Choice of Popular Stirrer Shafts



Anchor type



Screw propeller type



Retreat curve type

6 OPTION Buffer Tank Available



7 OPTION Vent Valve & Drain Valve

8 OPTION Insulated Flexible Hose



Vent Valve

Drain Valve

Insulated Hose

Vent Valve and Drain Valve allows for quick and easy to drain thermal fluid. Our insulated hose has high flexibility and thermal insulation. Operating temperature : -90°C ~+250°C

AG! ADVANTAGE

Together we can work to find the perfect solution to suit your application requirements.

Flexibility to Customize and Upgrade Custom Designed Filtration Unit

Operating Pressure
Up to 0.5 bar G is also available

Please contact us about customized systems.



Custom Tilting Stand

Gold Label

Bench-top Nutsche Filter

Reaction Unit

Filter Reactor

Nutsche Filter

Evaporator

Additional Apparatus

Quartz Glass Products

Product Information

1 Sealed for Up to 2 bar G Use

AGI proprietary stir seal.

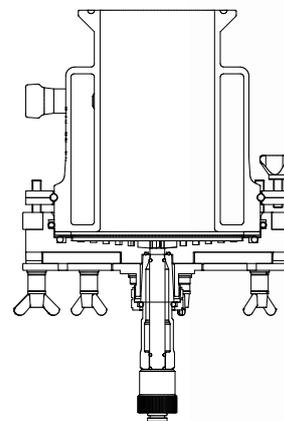
Nutsche Filter prevents leakage during hand stirring and while raising and lowering the stir shaft.



All joints are SQG



Double Seal



Cross Section View

2 Filtration System



Filter Housing detached



Lab Jack stably supports the Filter Housing.

3 Filtration Stir Blade



Clockwise rotation allows for smoothing the cake. Counterclockwise Rotation allows for mixing to break up the cake.

4 Filter Cloth

Easy placement and cleaning. Filter cloth thickness : ~ 3mm

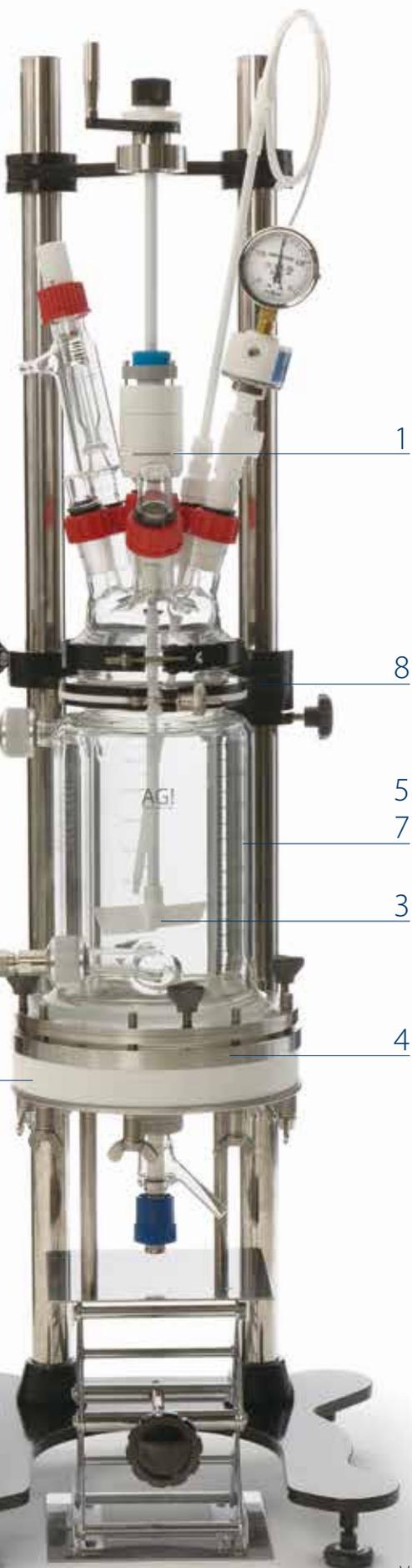


Suitable with most Filter Cloths



Separated Filter Components and Filter Cloth placement.

1
2



1

8

5

7

3

4

Vessel Capacity : 2L

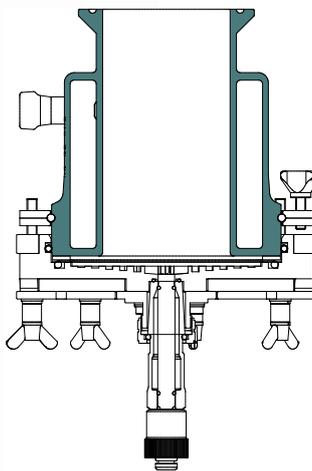
5 Non Jacketed Vessels also Available



6 Protective Shield



7 Maximizes the Heat Transfer



Heat transfer fluid runs from top to bottom.

8 Rotating Vessel Support Mechanism



Allows for easy access for cleaning.
*Unavailable in 3L and 5L Double Wall Vessels

Bench-top Nutsche Filter

- Vessel Capacity : 1, 2, 3, 5 L
- Filtration area : 78.5 cm² (1, 2L), 176.7 cm² (3, 5L)
- Vessel type : Single Wall, Double Wall; Full Jacket
- Operating Pressure : Full Vacuum to +2 bar G (+0.2 MPa)
- Operating Jacket Pressure : Up to +0.5 bar G (+0.05 MPa) (Double Wall)
- Operating Temperature : -90 ° C to +200 ° C (Δ T : 110 ° C)
- * This system does not include overhead stirrer, circulator and chiller.

1 OPTION Lift Assist Mechanism



Lower and lift the shaft easily using one hand. This allows for easy simple height adjustment for stirring shaft.

2 OPTION Filter Dryer



Liquid heated filter housing allows for drying of cake.



Separated Filter Dryer Components.

3 OPTION Overhead Motor Support



Simply attach an overhead stirrer for motorized mixing.

4 OPTION Lid Holder



The lid need not be removed.

5

8

6

7





Vessel Capacity : 2L

5 OPTION Vent Valve



Quick and easy to drain thermal fluid.

6 OPTION Drain Valve



7 OPTION Insulated Flexible Hose



Flexibility of the hose accommodates tight spaces such as in a fume hood.
Operating temperature : -90°C~+250°C



Simple and secure connection. (M16, M30 threads)

8 OPTION Hose Support Clamps



Eliminates stress on the glass inlet and outlet of the jacket.

Mini and Pilot Plant **Nutsche Filter**

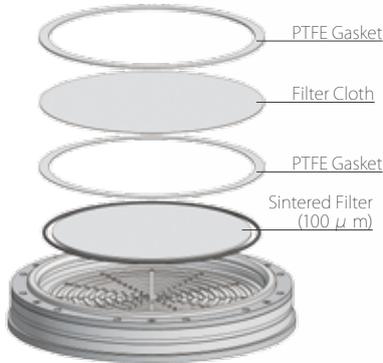
- Fully Functional Stand -

1 Sealed for Up to 1.5bar G Use

AGI proprietary filter with paired O-rings effectively seals the filtration system.



Wetted Surface : PTFE, FFKM, PFA

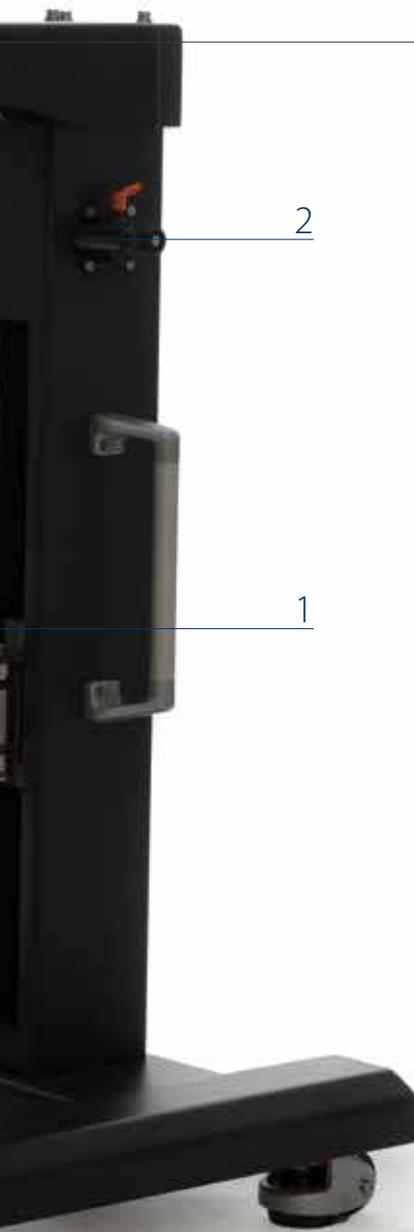


Separated filter components and filter cloth placement.

2 Allows for Easy Removal of the Cake



Operator can adjust and align the filter unit without tools. You need not make frequent filter adjustments. The swinging mechanism helps with filter access, and you can retrieve the cake easily.



1



Easy Rolling and Locking Castor's

Vessel Capacity : 20L

2



Vessel lifting mechanism can be outfitted on either side of the stand

4



Flat Flange allows for easy cleaning.

3



Rupture Disk
[+1.8 bar G (+0.18 MPa)]

3 Port Orientation



- Agitation Handle
- N2 Point
- Rupture Disk with Pressure Gage
- PT100 with Holder
- Spray Ball
- Blind Flange Connection

4 Superior Air Tight Seal



AG! uniquely engineered stir bearing seal.
The Nutsche Filter prevents leakage during hand agitation and raising and lowering the stir shaft manually.

5 OPTION Vent Valve & Drain Valve

6 OPTION Insulated Flexible Hose



Vent Valve and Drain Valve allows for quick and easy drainage.
Our insulated hose has high flexibility and thermal insulation.

Fully Functional Nutsche Filter

- Vessel Capacity : 10, 20, 30 L
- Filtration area : approx. 317.3cm² (10L), approx. 514.7cm² (20L) , approx. 711.6cm² (30L)
- Vessel type : Single Wall, Double Wall; Full Jacket
- Operating Pressure : Full Vacuum to +1.5 bar G (+0.15 MPa)
- Operating Jacket Pressure : Up to +0.5 bar G (+0.05 MPa) (Double Wall)
- Operating Temperature : -90 ° C to +200 ° C (Δ T : 110 ° C)
- * This system includes protective shield.
- * This system does not include overhead stirrer, circulator and chiller.

Customized Configuration Available!

Together we can work to find the perfect solution to suit your application requirements.

Maximum Capacity

Single Wall : **300L**

Double Wall : **100L**

Please contact us about customized systems.



Nutsche Filter 100L



Thin Film Evaporator



Size : DN60

- High Evaporation Efficiency
- Minimum Thermal Decomposition
- Gas and Vacuum Tight
- Uniform Thin Film
- Jacketed Evaporator for Easy Viewing
- Uniform Rotating Wiper System
Up to 300°C (Option)
- Greaseless Magnetic Sealed Bearing, Valves and Joints
- Perfect for Heat Sensitive Materials
- Short Residence Time

Thin Film Evaporator

- Evaporation Surface Area : 0.05m² (DN60), 0.1m² (DN100)
- Max. Temperature :
+200° C (Jacket), +300° C (Jacket) is also available.
[PTFE Wiper : +200° C, PBI* Wiper : +300° C]
- Operating Pressure : Atm to +0.1 mbar
- Operating Jacket Pressure : Up to +0.5 bar G (+0.05 MPa)
- Feed rate : 0.1 to 1.5kg/h (DN60), 0.3 to 3.0kg/h (DN100)
- Max. viscosity at operating temperature :
1,000mPa·s (Custom-made)
- Max. Rotation Speed : 400rpm
- All parts that come into contact with fluid are either Borosilicate 3.3, glass, PTFE or SS316.
- Stirrer Seal : Magnetic Stirrer
- * PBI = Polybenzimidazole
- * This system does not include overhead stirrer, circulator and chiller.



Main body (TFE)



External Condenser (TFE)

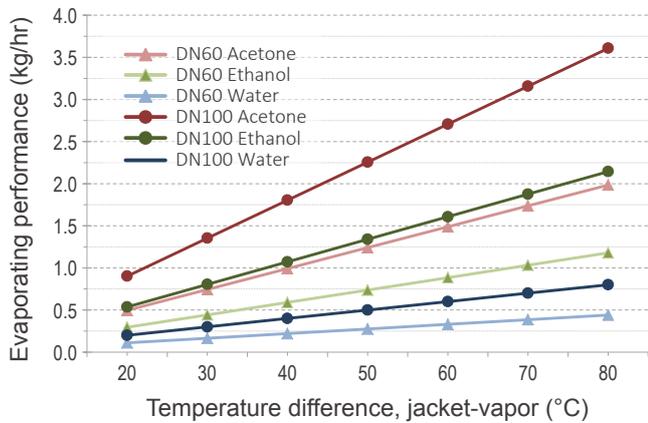


Internal Condenser (SPE)



Easy Installation and Removal
(TFE, SPE)

Evaporation Performance



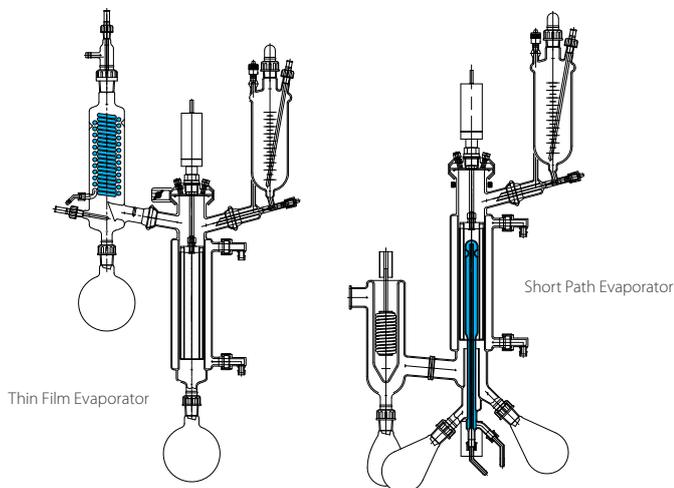
Experimental condition
 • Pressure : Atmospheric pressure
 • Flow rate of heat transfer fluid : 18L/min

Short Path Evaporator

- Evaporation Surface Area : 0.05m² (DN60), 0.1m² (DN100)
- Max. Temperature :
 - +200° C (Jacket), +300° C (Jacket) is also available.
 - [PTFE Wiper : +200° C, PBI* Wiper : +300° C]
- Operating Pressure : Atm to +0.001 mbar
- Operating Jacket Pressure : Up to +0.5 bar G (+0.05 MPa)
- Feed rate : 0.1 to 1.5kg/h (DN60), 0.3 to 3.0kg/h (DN100)
- Max. viscosity at operating temperature : 1,000mPa·s (Custom-made)
- Max. Rotation Speed : 400rpm
- All parts that come into contact with fluid are either Borosilicate 3.3, glass, PTFE or SS316.
- Stirrer Seal : Magnetic Stirrer
- * PBI = Polybenzimidazole
- * This system does not include overhead stirrer, circulator and chiller.



Size : DN60



	Thin Film Evaporator	Short Path Evaporator
Design Pressure	0.1mbar	0.001mbar
Condenser	External Condenser	Internal Condenser

AG! ADVANTAGE

Together we can work to find the perfect solution to suit your application requirements.

Fully corrosion resistant models also available.
 Evaporation surface area : 0.15m² to 1.5m² (DN450)



Please contact us about customized systems.

Reaction Unit

Filter Reactor

Nutsche Filter

Evaporator

Additional Apparatus

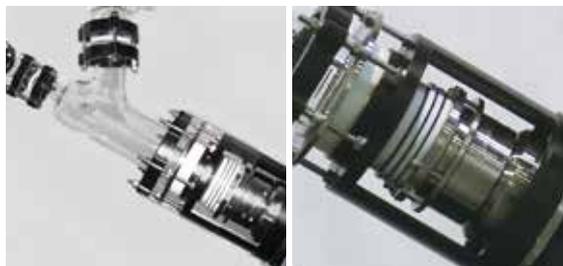
Quartz Glass Products

Product Information

Other Apparatus

Blue Label Rotary Evaporator

- Rotation Flask Capacity: 20L, 30L, 50L, 100L, 200L
- Descending versions and explosion proof models are available.
 - Please contact us about customized systems.



Reinforced PTFE Mechanical Seal and Bearing

Flask Handling Cart for 50L, 100L and 200L Models



- No need to wait for cool down
- Material easily emptied from flask
- Safe transporting of the flask
- Easy Cleaning



World's
Largest
200L

Rotary Evaporator 50L

Blue Label Pressure Reactor

- 6 and 12bar
- With Flush Valve
- Individually Pressure Tested
- Visually Monitor the Process
- Wide Temperature Range



Double Wall Type



Pressure Reactor 1L

Pressure Reactor

- Vessel Capacity : 500mL, 1L, 1.5L
- Vessel Type : Double Wall, Triple Wall
- Operating Pressure : Full Vacuum to +12 bar G (+1.2 MPa), Full Vacuum to +6 bar G (+0.6 MPa)
- Operating Jacket Pressure : Up to +0.5 bar G (+0.05 MPa)
- Operating Temperature : -90°C to +200 °C
- * The parts that come into contact with fluid are made of borosilicate glass 3.3, PTFE, SS316 and perfluor (FFKM).
- * Support Structure [Poly-carbonate sliding window, epoxy-coating]
- * The system does not include overhead stirrer, circulator and chiller.
- * Please contact us about customized systems.

Contact AG!

Together we can work to find a viable solution to meet your application requirements.

! Complete Custom Acid Recovery and Pilot Plant Design and Engineering Capabilities World Wide.



Nutsche Filter



Ultra Low Temp. Reaction Unit



Chemical Acid Plant



Thin Film Evaporators



Filter Reactor



Distillation Unit



Molecular Distillation Unit

Platinum Label
 Gold Label
 Blue Label

- Custom Chemical Engineering Solutions
- Flexible Customized Solutions for All Standard Products
- Standard Complete Package: Ready to Use

Reaction Unit

Filter Reactor

Nutsche Filter

Evaporator

Additional Apparatus

Quartz Glass Products

Product Information

Quartz Glass Products

Various Quartz Glass Products and Capabilities to suite your needs



AG! Quartz Burner

for VAD/OVD Method

Multiple Nozzle Burner

- The O₂ Nozzle is Surrounded by the H₂ Nozzle.
- Maximum Heat Efficiency and Superior Flame
- Excellent Mixing Rate of O₂ Gas and H₂ Gas
- Accurate Focal Distance

»Size

- Max. OD 110mm
- »Customized Shape and Nozzle Configurations Available
- »Documented 3D Inspection for Accuracy

Multiple Pipe Burner

- Max. OD 130mm

Unit:mm

Size	Tube Tolerance	Concentricity Tolerance
Up to 50 OD	±0.05	±0.10
Up to 80 OD	±0.10	±0.15
Up to 100 OD	±0.15	
Over 100 OD	±0.20	±0.20

»Documented 3D Inspection for Accuracy

AG! Quartz Burner

for MCVF Method

Multiple Nozzle Burner

- Superior Flame
- Accurate Focal Distance

»Documented 3D Inspection for Accuracy

Multiple Nozzle Burner



Japanese Patent No. 3640071



Multiple Pipe Burner



Multiple Nozzle Burner

Extension Rod

Precisely Straight and Measured Rod Circumference Achieving Superior Rotation

»Size

- Max. OD : 100mm
- Max. Length : 4200mm
- DIA. Tolerance : ±0.05mm
- Rotation Tolerance : ±0.10mm



Support Rod

Coupler

Stable Connection with Extension Rod and Seed Rod

»Size

- Set-in Tolerance with Extension Rod : ±0.05mm



Coupler

Seed Rod

Precisely Constructed for Easy Insertion into Coupler

»Size

- Max. OD : 120mm
- Max. Length : 3000mm
- DIA. Tolerance : ±0.05mm
- Rotation Tolerance : ±0.10mm



Production Rod

Muffle Tube

Main Body and Flange are Accurately Perpendicular

»Size

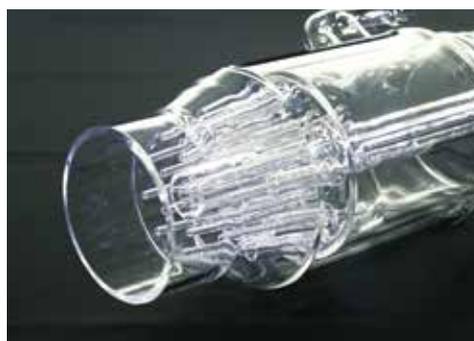
- Max. OD : 350mm
- Max. Length : 3500mm
- Rotation Tolerance : ±1.0mm



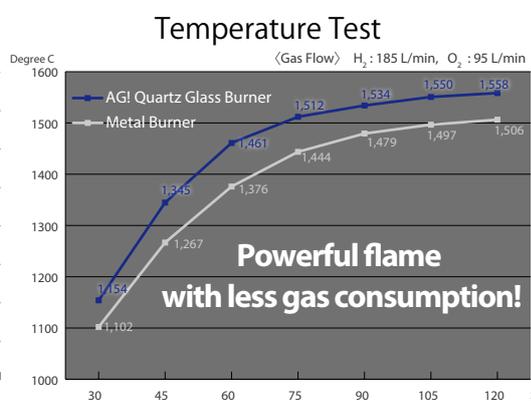
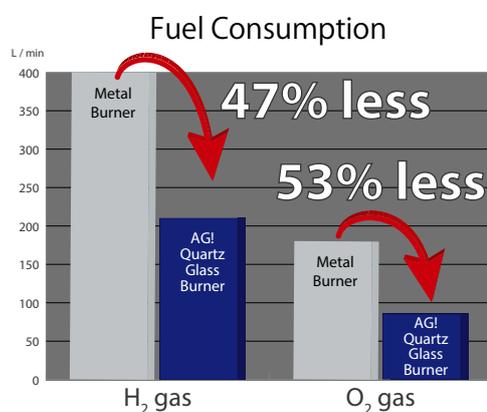
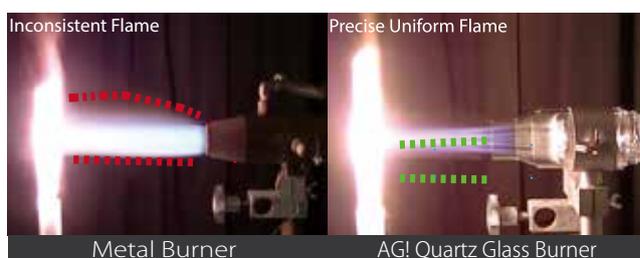
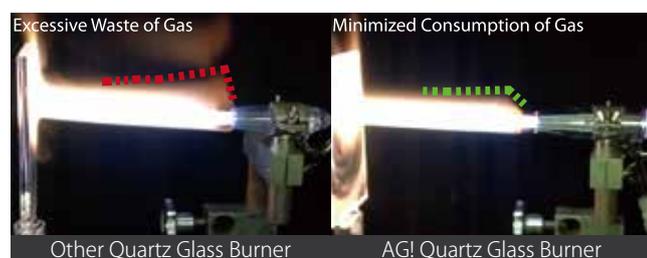
Muffle Tube

- **High Heat Output / Efficiency**
- **High Accuracy**
- **No Contamination (100% Quartz Glass)**

AG! developed proprietary gas mixture for superior heat, accuracy and efficiency



- Our nozzle system greatly improves the gas mixing rate and provides maximum heat efficiency and superior flame.
- Stable, powerful flame is achieved through the precise mixing of gases, while optimizing gas consumption. (Japanese patent 3640071)
- Made of 100% Quartz Glass, the Quartz Glass burner does not collect unwanted contamination during use in production.
- Documented 3D inspection sheet is available.



Quartz Glass Distillation Unit (Oldershaw Column) **Gold Label**

AG! ADVANTAGE

Together we can work to find the perfect solution to suit your application requirements.

Flexibility to Customize and Upgrade

We can also make products in any combination of quartz glass and borosilicate glass. Please contact us about customized systems.

Product Options

Reaction Unit

Filter Reactor

Nutsche Filter

Evaporator

Additional Apparatus

Quartz Glass Products

Product Information

R	FR	NF	TFE	SPE
R	FR	NF		



Insulated Flexible Hose

High Flexibility and Thermal Insulation. This hose allows for eliminating stress on the glass inlet and outlet and saving space. Operating temperature : -90°C ~+250°C

R	FR	NF	TFE	SPE
---	----	----	-----	-----



Hose Clamp

Easy attachable to hold hoses and help reduce stress on the glass vessel.

R	FR	NF
---	----	----



Lid Holder

The structure holds the cover stably as the vessel is swing out.

R



Tilting Clamp

Tilting allows for easy retrieval and cleaning of glass vessel.

R	FR	NF
---	----	----



Lifting Apparatus

Lower and lift the motor and/or vessel easily using one hand. This allows for easy preparation and cleaning.

R	FR	NF
---	----	----



Flexible Bearing Coupling (HJC-10)

Enables flexibility between the motor and stirring shaft saving time and trouble.

R Bench-top Reactor

FR Bench-top Filter Reactor

NF Bench-top Nutsche Filter

TFE Thin Film Evaporator

SPE Short Path Evaporator

R Mini and Pilot Plant Reactor

FR Mini and Pilot Plant Filter Reactor

NF Mini and Pilot Plant Nutsche Filter



R FR NF TFE SPE
R FR NF

Vent Valve, Drain Valve

Quick and easy to drain thermal fluid.



R FR NF TFE SPE

Temperature Sensor Block

Temperature can be measured at either or both inlet and outlet.



FR
FR

Buffer Tank

Filtrate can be collected by adding the Buffer Tank to the structure.

FR Suction Bottle (2L)

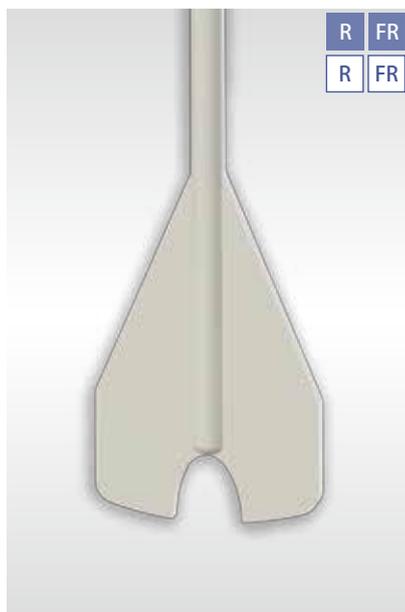
FR Filtrate Flask (20L)



NF

Heated Filter Housing

Heating of the Filter Housing assists in drying the cake.



R FR
R FR

HB impeller

Wide range of viscosity.



R FR
R FR

Wall Wetter®

Improves Evaporation Efficiency of Batch Evaporator.

* Temperature sensor can not be inserted from the cover.
* Wall Wetter® is a trademark of KANSAI CHEMICAL ENGINEERING CO., LTD.



<http://www.theglassplant.com/l-movies04.html>

Reaction Unit

Filter Reactor

Nutsche Filter

Evaporator

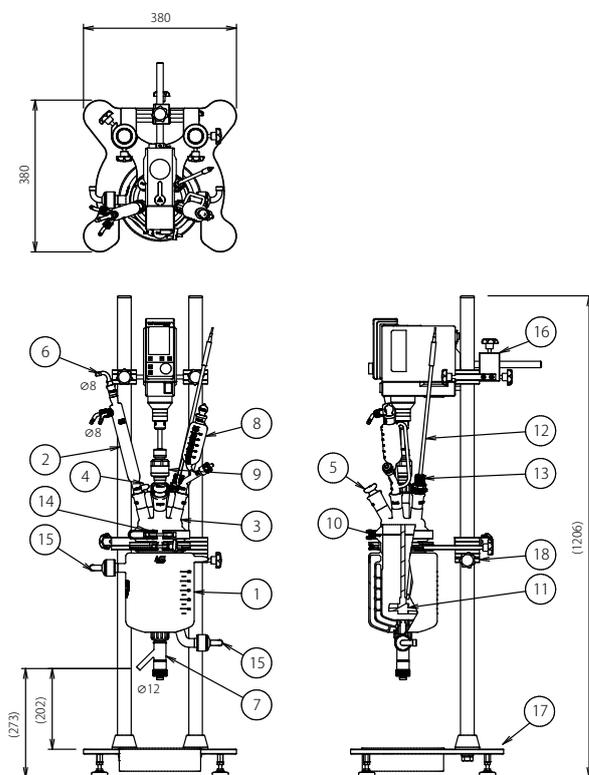
Additional Apparatus

Quartz Glass Products

Product Information

Complete Package

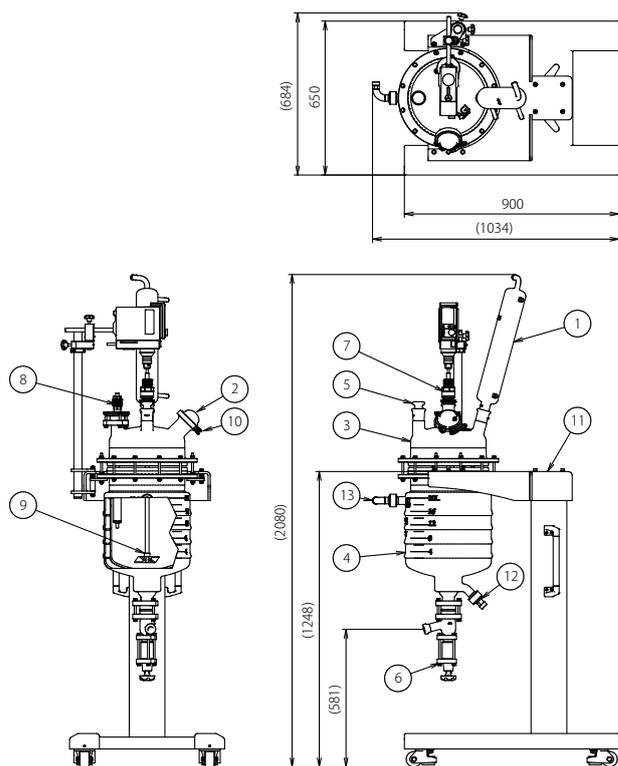
Bench-top Reactor



Vessel Capacity : 1 L

No.	Parts
1	Vessel, DN100 (300mL to 2L), DN150 (3L, 5L)
2	Dimroth Condenser, TS24/40, TS15/25
3	Glass Cover, DN100 (300mL to 2L), DN150 (3L, 5L), 6 Ports (SQG29/42 x1, TS24/40 x4, TS29/42 x1)
4	Stopper for Additional Hole, TS24/40
5	Stopper for Hand Hole, TS29/42
6	Vent Adapter, TS15/25
7	Flush Valve / PTFE Shaft, SQG-29/42
8	Dropping Funnel with Stopper, Graduated, TS24/40
9	PTFE Stirrer Guide, Glass Ball Bearing, SQG29/42, Shaft OD:10mm
10	O-ring, FKM
11	PTFE Stirrer Shaft, Shaft OD: 10mm
12	Temperature Sensor Probe, OD:8mm, L:660mm
13	Temperature Probe Holder, PTFE, TS24/40, Probe OD:8mm
14	Quick Release Clamp, DN100 (300mL to 2L), DN150 (3L, 5L)
15	Metal Adapter for HTF, Screw Coupling, M16
16	Motor Support
17	Support Structure
18	Swinging Clamp

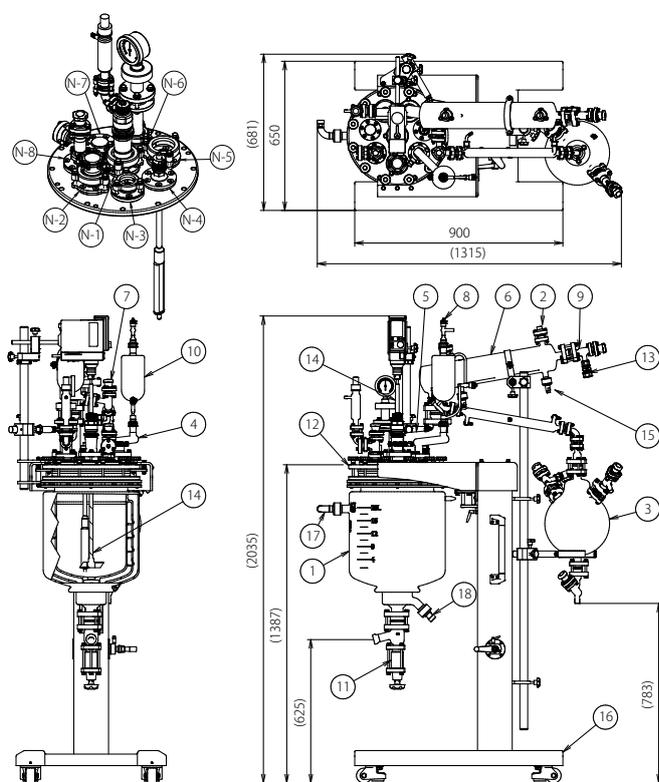
Mini and Pilot Plant Reactor - Stationary Stand -



Vessel Capacity : 20 L

No.	Parts
1	Condenser
2	Glass Cap for Hand Hole, DN60
3	Vessel Cover, 5 Ports
4	Vessel (Detail : p.39)
5	Stopper, TS45/50
6	Flush Valve
7	PTFE Stirrer Guide, Glass Ball Bearing, TS45/50
8	PT100 Sensor with Holder
9	PTFE Stirrer Shaft, Shaft OD:16mm
10	Quick Release Clamp, DN60
11	Support Structure
12	Metal Adapter for HTF
13	Metal Adapter for HTF

Mini and Pilot Plant Reactor - Fully Functional Stand -



Vessel Capacity : 20 L

No.	Parts
1	Vessel (Detail : p.39)
2	Thermometer Pocket
3	Receiver
4	Adapter (25A, SQG24)
5	Adapter (40A, 50A)
6	Condenser with Reflux Divider
7	Straight Valve L Type
8	Greaseless Valve (SQG24, Ø 12)
9	Vacuum Vent Valve (PVH25, Ø 19)
10	Dropping Funnel
11	Flush Valve
12	Cover Plate, SUS304, PFA coating
13	Fitting
14	PTFE Stirrer Shaft, Shaft OD:16mm
15	Adapter for HTF, 15A
16	Structure Base
17	Metal Adapter for HTF, M30
18	Metal Adapter for HTF, M30
N-1	Port for PTFE Stirrer Guide
N-2	Hand Hole
N-3	Port for Dropping Funnel
N-4	PT100 Sensor with Holder
N-5	Port for Condenser
N-6	Compound Pressure Gauge, Pressure Relief Valve
N-7	Spare Port
N-8	Purge Port (Rc 3/8)

*Ports on Cover Plate : 7 Ports (10L), 8 Ports (20L, 30L)

*8 Ports include a Spare Port

Innovation
Sincerity
Progress



At Asahi Glassplant Inc.

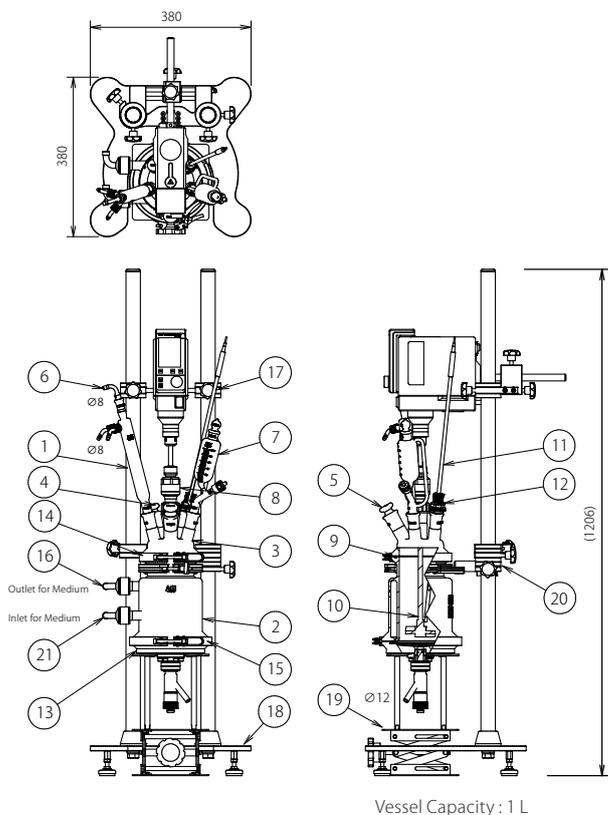
Our corporate philosophy is Innovation, Sincerity and Progress.

With our state-of-the-art facility and committed staff we develop and manufacture glass processing techniques day and night, continually achieving precision and innovative glassware designs for science and industry.

AG! is committed to continually meet and exceed the needs and requirements of our customers, without resting on our laurels, making AG! a world leader.

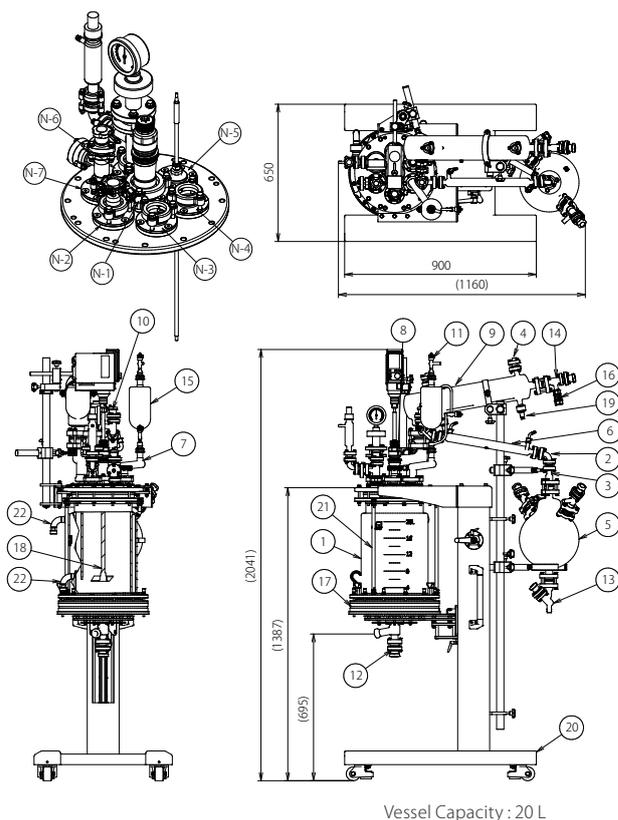
Complete Package

Bench-top Filter Reactor



No.	Parts
1	Dimroth Condenser, TS24/40, TS15/25
2	Full Jacket Glass Body, DN100 (1L, 2L) / DN150 (3L, 5L)
3	Glass Cover, DN100 (1L, 2L) / DN150 (3L, 5L), 6 Ports (SQG29/42 x1, TS24/40 x4, TS29/42 x1)
4	Stopper for Additional Hole, TS24/40
5	Stopper for Hand Hole, TS29/42
6	Vent Adapter, TS15/25
7	Dropping Funnel with Stopper, Graduated, TS24/40
8	PTFE Stirrer Guide, Glass Ball Bearing, SQG29/42, Shaft OD:10mm
9	O-ring, FKM
10	PTFE Stirrer Shaft, Shaft OD: 10mm
11	Temperature Sensor Probe, OD:8mm, L:660mm
12	Temperature Probe Holder, PTFE, TS24/40, Probe OD:8mm
13	Filtration Part, PTFE, DN150 (1L, 2L) / DN200 (3L, 5L)
14	Quick Release Clamp, DN100 (1L, 2L) / DN150 (3L, 5L)
15	Quick release clamp for bottom, DN150 (1L, 2L) / DN200 (3L, 5L)
16	Metal Adapter for HTF, screw coupling, M16
17	Motor Support
18	Support Structure
19	Lab Jack
20	Tilting Clamp
21	Metal Adapter for HTF, screw coupling, M16

Mini and Pilot Plant Filter Reactor - Fully Functional Stand -

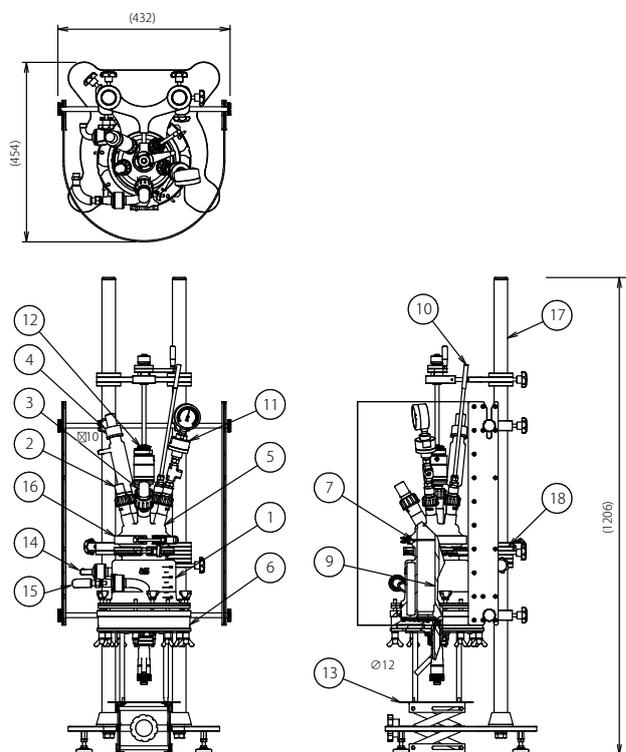


No.	Parts
1	Full Jacket Glass Body, DN200 (10L) / DN250 (20L) / DN300 (30L)
2	Bend Adapter (80°)
3	Reducer
4	Thermometer Pocket
5	Receiver
6	Product Cooler
7	Adapter (25A, SQG24)
8	Adapter (40A, 50A)
9	Condenser with Reflux Divider
10	Straight Valve, L Type
11	Greaseless Valve (SQG24, Ø 12)
12	Flush Valve
13	Drain Valve (PVD-25, Ø 20)
14	Vacuum Vent Valve (PVH25, Ø 19)
15	Dropping Funnel
16	Fitting
17	Filtration Part, PTFE, DN250 (10L) / DN300 (20L) / DN350 (30L)
18	PTFE Stirrer Shaft, Shaft OD:16mm
19	Adapter for HTF, 15A
20	Support Structure
21	Original Flange Set
22	Metal Adapter for HTF, Screw Coupling, M30
N-1	Port for PTFE Stirrer Guide
N-2	Hand Hole
N-3	Port for Dropping Funnel
N-4	PT100 Sensor with Holder
N-5	Port for Condenser
N-6	Compound Pressure Gauge, Pressure Relief Valve
N-7	Purge Port (Rc 3/8)

*Ports on Cover Plate : 7 Ports (10L, 20L), 8 Ports (30L)

*8 Ports include a Spare Port

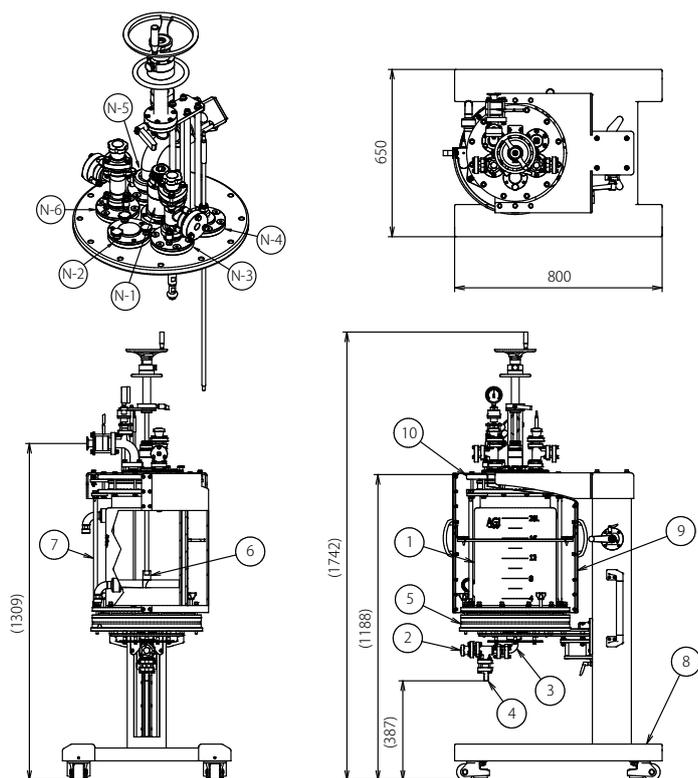
Bench-top Nutsche Filter



Vessel Capacity : 1 L

No.	Parts
1	Glass Body (Double Wall, Single Wall), DN100 (1L, 2L) / DN150 (3L, 5L)
2	Stopper for Additional Hole, SQG24/40
3	Stopper for Hand Hole, TS29/42
4	Pressure Relief Valve
5	Glass Cover, DN100 (1L, 2L) / DN150 (3L, 5L), 6 Ports (SQG29/42 x2, SQG24/40 x4)
6	Filtration Part, PTFE (Detail of DN : p.39)
7	O-ring, FKM
8	Protective Shield
9	PTFE Stirrer Shaft, Shaft OD: 10mm
10	Temperature Sensor Probe, OD:8mm, L:660mm
11	Compound Pressure Gauge
12	PTFE Stirrer Guide, Glass Ball Bearing, SQG29/42, Shaft OD:10mm
13	Lab Jack
14	Metal Adapter for HTF, screw coupling, M16
15	Metal Adapter for HTF, screw coupling, M16
16	Quick Release Clamp, DN100 (1L, 2L) / DN150 (3L, 5L)
17	Support Structure
18	Tilting Clamp

Mini and Pilot Plant Nutsche Filter - Fully Functional Stand -



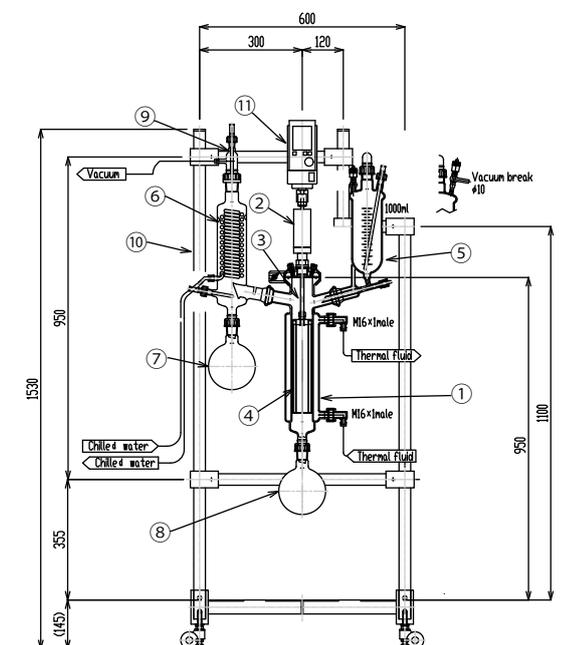
Vessel Capacity : 20 L

No.	Parts
1	Glass Body (Double Wall, Single Wall), DN200 (10L) / DN250 (20L) / DN300 (30L)
2	Valve
3	Bend Adapter
4	Hose Connector
5	Filtration Part, PTFE (Detail of DN : p.39)
6	PTFE Stirrer Shaft, Shaft OD:16mm
7	Original Flange Set
8	Support Structure
9	Protective Shield
10	Cover Plate, SUS304, PFA coating
N-1	Agitating Handle
N-2	Blind Flange Connection
N-3	Spray Ball
N-4	PT100 Sensor with Holder
N-5	Rupture Disk with Pressure Gage
N-6	N2 Point

*Ports on Cover Plate : 6 Ports (10L, 20L, 30L)

Complete Package

Thin Film Evaporator

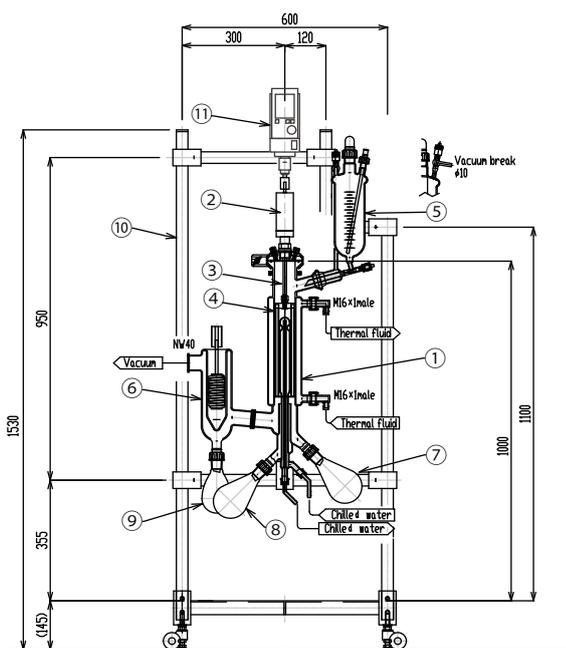


Jacketed Evaporator : DN 60

No.	Equipment	DN60	DN100
1	Jacketed Evaporator	ID 60mm Evaporation Surface Area : 0.05m ²	ID 100mm Evaporation Surface Area : 0.1m ²
2	Magnetic Seal with Cover	Torque : 1.1N · m, Cover : SS 316	
3	Stirrer Shaft	SS 316	
4	Wiper	PTFE Wiper : +200° C (Polybenzimidazole Wiper : +300° C)	
5	Feed Vessel	Feed Vessel : 1000mL Vent Valve : Φ 10 Thermometer Pocket, SQG 14/25, Φ 8, 245(L) Cap, SQG 29/32 Needle Valve, NGTV-12L	Feed vessel : 2000mL Vent valve : Φ 10 Thermometer Pocket, SQG 14/25, Φ 8, 330(L) Cap, SQG 29/32 Needle Valve, NGTV-12L
6	External Condenser	Thermal Transfer Area : 0.1m ² Thermometer Pocket : SQG 14/25, Φ 8 Water Connectors × 2 : Φ 8	Thermal Transfer Area : 0.2m ² Thermometer Pocket : SQG 14/25, Φ 8 Water Connectors × 2 : Φ 8
7	Receiver for High Molecular Weight	1000mL, Borosilicate glass 3.3	2000mL, Borosilicate glass 3.3
8	Receiver for Low Molecular Weight	1000mL, Borosilicate glass 3.3	2000mL, Borosilicate glass 3.3
9	Adapter	Adapter : SQG 34/45, NW25 Thermometer Pocket : SQG 14/25	
10	Structure	W 600 × D 305 × H 1530mm, SS+Epoxy Coating	
11	Motor	Optional	

*Continuous feed configurations are also available. Please contact AGI.

Short Path Evaporator



Jacketed Evaporator : DN 60

No.	Equipment	DN60	DN100
1	Jacketed Evaporator	ID : 60mm Evaporation Surface Area : 0.05m ²	ID : 100mm Evaporation Surface Area : 0.1m ²
2	Magnetic Seal with Cover	Torque : 1.1N·m, Cover : SS 316	
3	Stirrer Shaft	SS 316	
4	Wiper	PTFE Wiper : +200° C (Polybenzimidazole Wiper : +300° C)	
5	Feed Vessel	Feed vessel : 1000ml Vent valve : Φ 10 Thermometer Pocket, SQG 14/25, Φ 8, 245(L) Cap, SQG 29/32 Needle Valve, NGTV-12L	Feed vessel : 2000ml Vent Valve : Φ 10 Thermometer Pocket, SQG 14/25, Φ 8, 330(L) Cap, SQG 29/32 Needle Valve, NGTV-12L
6	Trap	DN50, 200H, NW25, Borosilicate glass 3.3	DN50, 200H, NW40, Borosilicate glass 3.3
7	Receiver for High Molecular Weight	500ml, Borosilicate glass 3.3	1000ml, Borosilicate glass 3.3
8	Receiver for Low Molecular Weight	500ml, Borosilicate glass 3.3	1000ml, Borosilicate glass 3.3
9	Receiver	300ml, Borosilicate glass 3.3	500ml, Borosilicate glass 3.3
10	Structure	W 600 × D 305 × H 1530mm, SS+Epoxy Coating	
11	Motor	Optional	

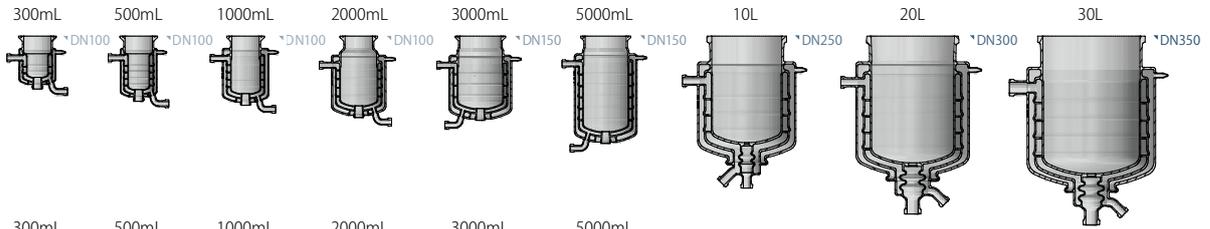
*Continuous feed configurations are also available. Please contact AGI.

Vessel Variations

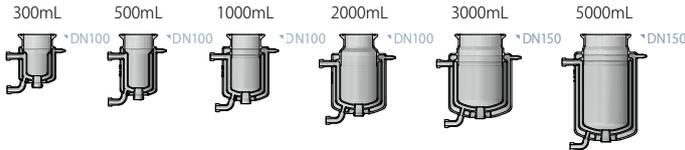
for Blue Label "Reaction Unit, Filter Reactor, Nutsche Filter"

Reaction Unit

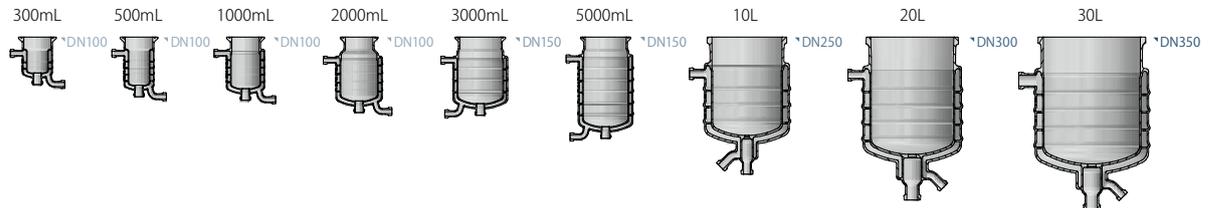
Triple Wall with Ring Baffle
AGI Advantage



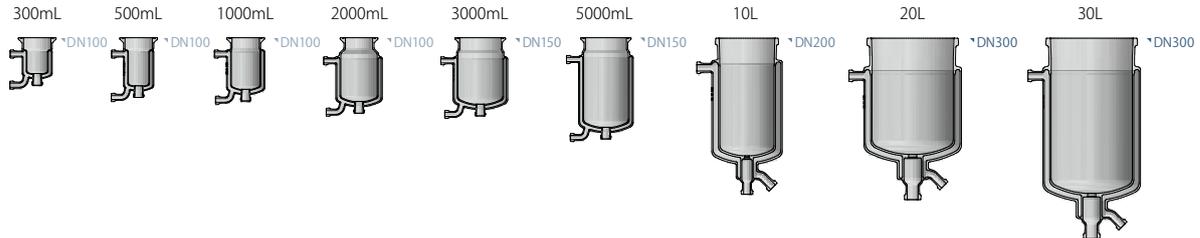
Triple Wall



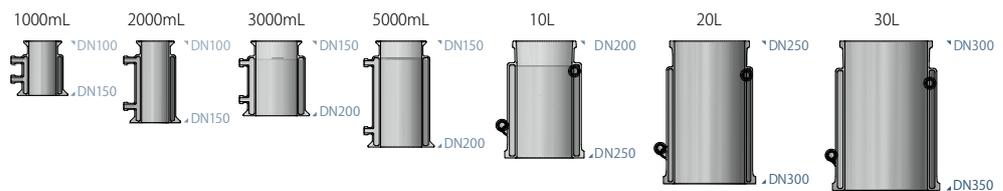
Double Wall with Ring Baffle
AGI Advantage



Double Wall

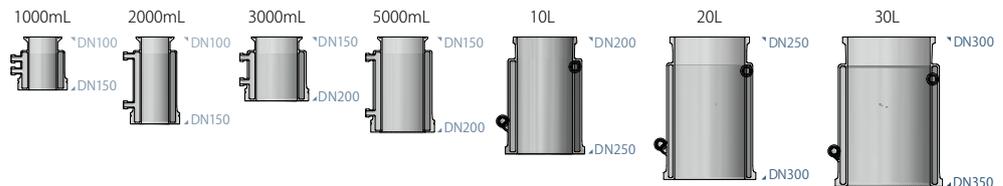


Filter Reactor

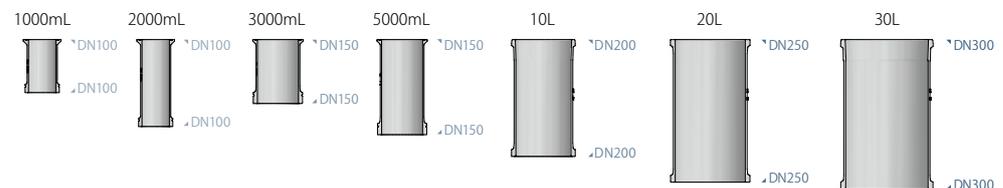


Nutsche Filter

Double Wall



Single Wall



Reaction Unit

Filter Reactor

Nutsche Filter

Evaporator

Additional Apparatus

Quartz Glass Products

Product Information



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