GLASS-LINED VESSELS

Reactors, Storage Tanks, Nutsche Filters, Columns

De Dietrich
PROCESS SYSTEMS

De Dietrich Process Systems

glass-lined reactors have been at the heart of chemical operations for over a century. Robustly designed and manufactured to stand up to very harsh environments, our vessels are built to ASME code and then lined internally with our proprietary 3009 Glass.

De Dietrich's 3009 glass is a time-tested material of construction for processes where corrosion resistance, inertness and cleanability are key concerns. The raw glass material is produced at our worldwide headquarters in Zinswiller, France, ensuring universal quality. The vessel and the glass lining are manufactured at our state-of-the-art glassing facility in Corpus Christi, Texas.

DDPS employs a proprietary process using electric furnaces and controlled cooling booths to reduce built-in stresses in the glass. Spark and thickness tests between coats ensure the highest quality of finished lining. The result is an impermeable, smooth coating of glass that is ideal for pharmaceutical and chemical applications.

3009 Glass Benefits

- Excellent resistance to corrosion
- Mechanical resistance to shocks and abrasion
- Smooth, non-stick properties
- Non-catalytic inertness - will not affect purity, color or flavor of your product
- Multipurpose material for versatility
- Meets cGMP requirements for cleaning, cleanliness and sterilization
- Suitable for high pressure and full vacuum at elevated temperatures
- Customization upon specification

Features

- Standard thickness between 40 and 90 mils
- Available in blue (3009) or white (3009U)
- Plug-free standard on new equipment

For more information on 3009 glass, refer to our Introduction to Glass-Lined Equipment eBook.

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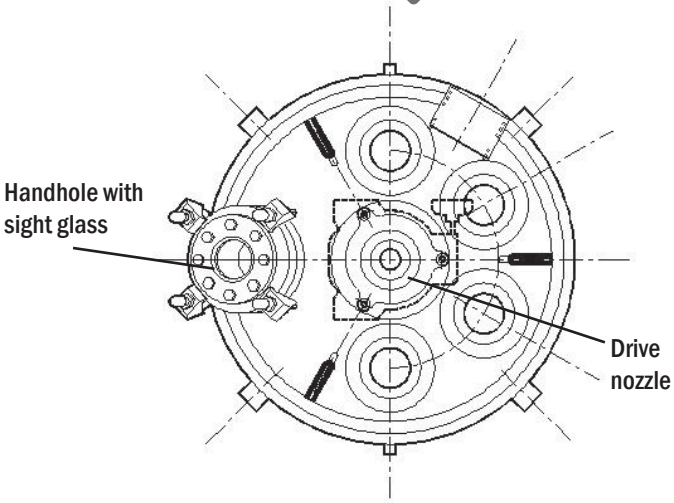
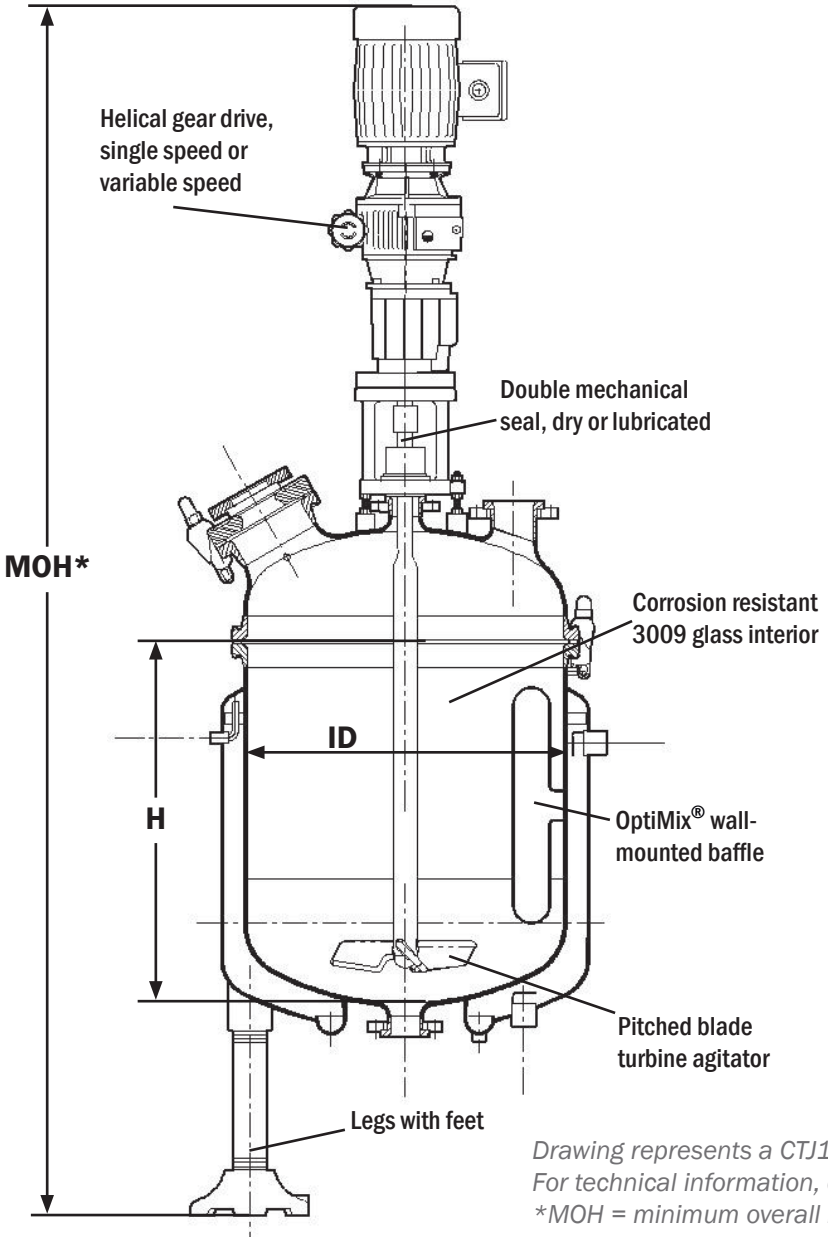
CTJ Reactors





Features

- Flanged-top (up to 100 gallon) or clamped reactors with removable top head
- Designed for today's cleanability demands
- Guaranteed plug-free
- Volumes from 5 to 2,000 gallons
- Pressures from full vacuum to 90/150 psig
- Temperatures from -20°F to 500°F
- Jacket options include conventional, Hemi-Coil® (split-pipe coil) or full conventional to the flange on bolted designs
- Standard OptiMix wall-mounted baffle included, or option for legacy design with single baffle

Standard Sizes

Model	Dimensions (in)			Motor (HP)
	ID	H	MOH*	
CTJ-5	13 1/4	9 3/4	78 1/8	1
CTJ-10	13 1/4	16 3/4	85 1/8	1
CTJ-20	19 1/4	19 5/16	84 13/16	1.5
CTJ-30	19 1/4	27 3/16	92 11/16	1.5
CTJ-50	22 7/8	28	94 5/8	2
CTJ-100	32	36 1/4	115 15/16	3
CTJ-200	38 1/4	45 1/2	124 7/8	3
CTJ-300	48	49 1/4	127 1/2	5
CTJ-48-500	48	76	150 7/8	5
CTJ-54-500	53 3/4	64 1/4	143 3/4	5
CTJ-60-500	59 5/8	52 1/2	132 3/4	5

Drawing represents a CTJ100 reactor. Nozzle placement varies based on vessel size. For technical information, drawings and specifications see individual cut sheets.
**MOH = minimum overall height required*

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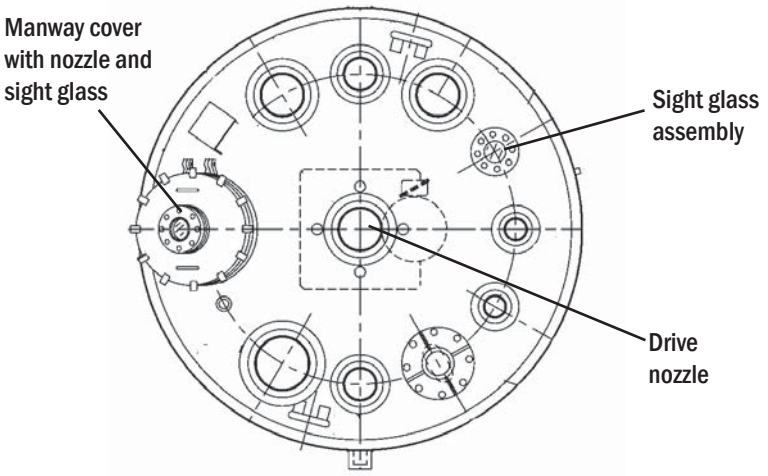
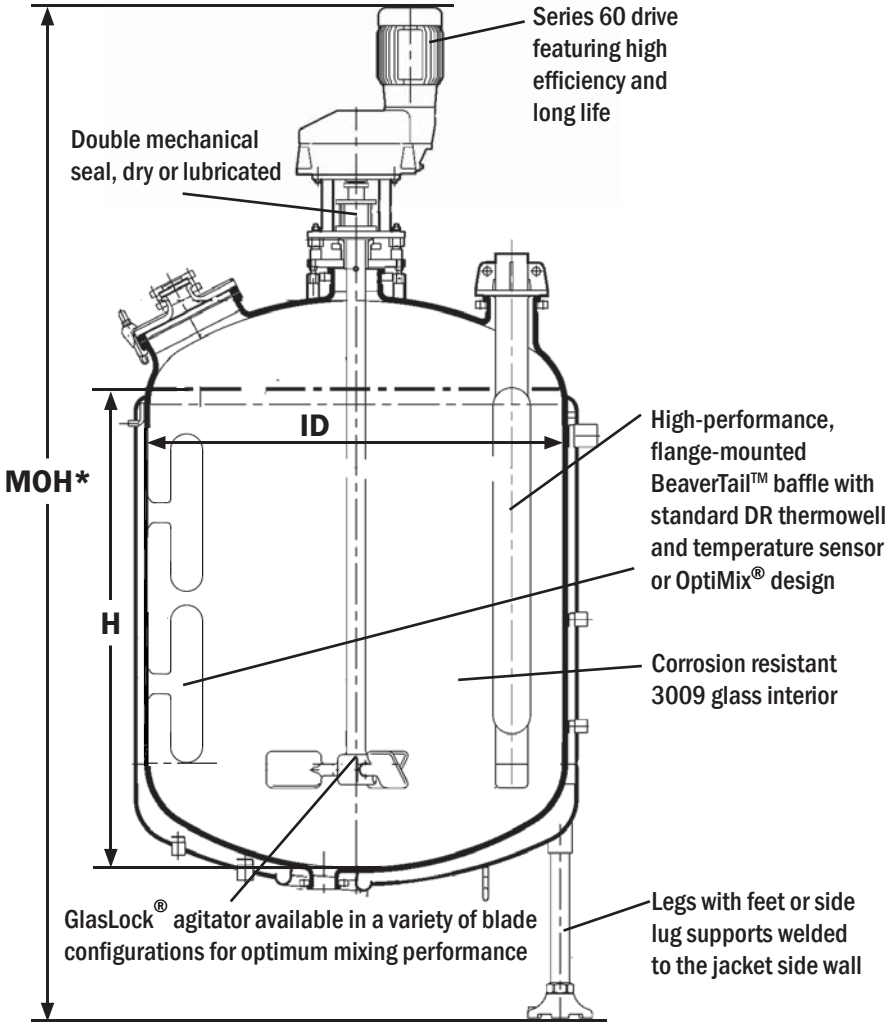
GL Reactors



Features

- More and larger process nozzles and larger manways than CTJ and SA series
- GlasLock® agitator standard
- Guaranteed plug-free
- Volumes from 300 to 20,000 gallons
- Pressures from full vacuum to 130 psig
- Temperatures from -20°F to 500°F
- Jacket options include conventional (GL) or HemiCoil® split-pipe coil design (CGL)



Standard Sizes

Model	Dimensions (in)			Motor (HP)
	ID	H	MOH*	
GL-300	48	44 7/8	130 1/4	3
GL-500	48	69 7/8	155 1/4	5
GL-750	61 7/16	66 3/8	162	7 1/2
GL-1000	61 7/16	86 3/8	184 1/2	10
GL-1500	76 7/8	84 1/2	186 7/8	15
GL-2000	76 7/8	103 1/2	205 7/8	15
GL-3000	96 6/16	100 1/2	216 1/4	20
GL-4000	96 6/16	132 1/2	248 1/4	20
GL-5000	107 15/16	136 1/16	277 13/16	40
GL-6000	107 15/16	160 5/8	314 3/8	50
GL-8000	119 11/16	173 5/8	333 3/8	60
GL-10000	131 3/8	147 3/8	353	60
GL-15000	144	188	376	75

Drawing represents a GL2000 reactor. Nozzle placement varies based on vessel size. For additional technical information, drawings and specifications see individual cut sheets.
**MOH = minimum overall height required*

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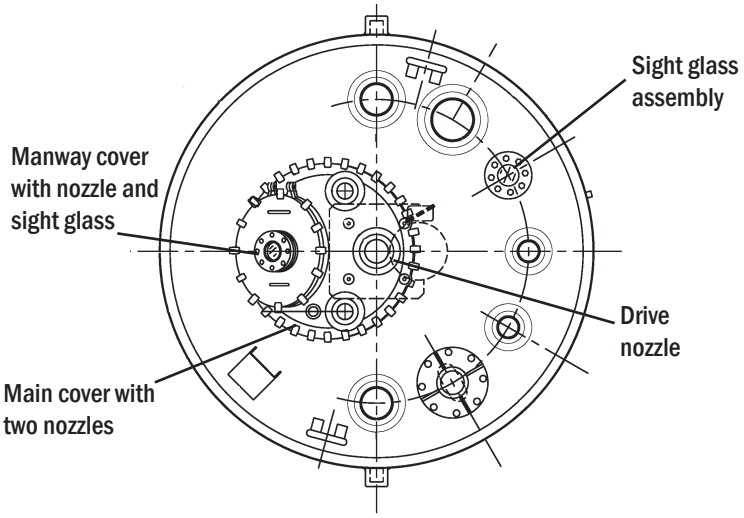
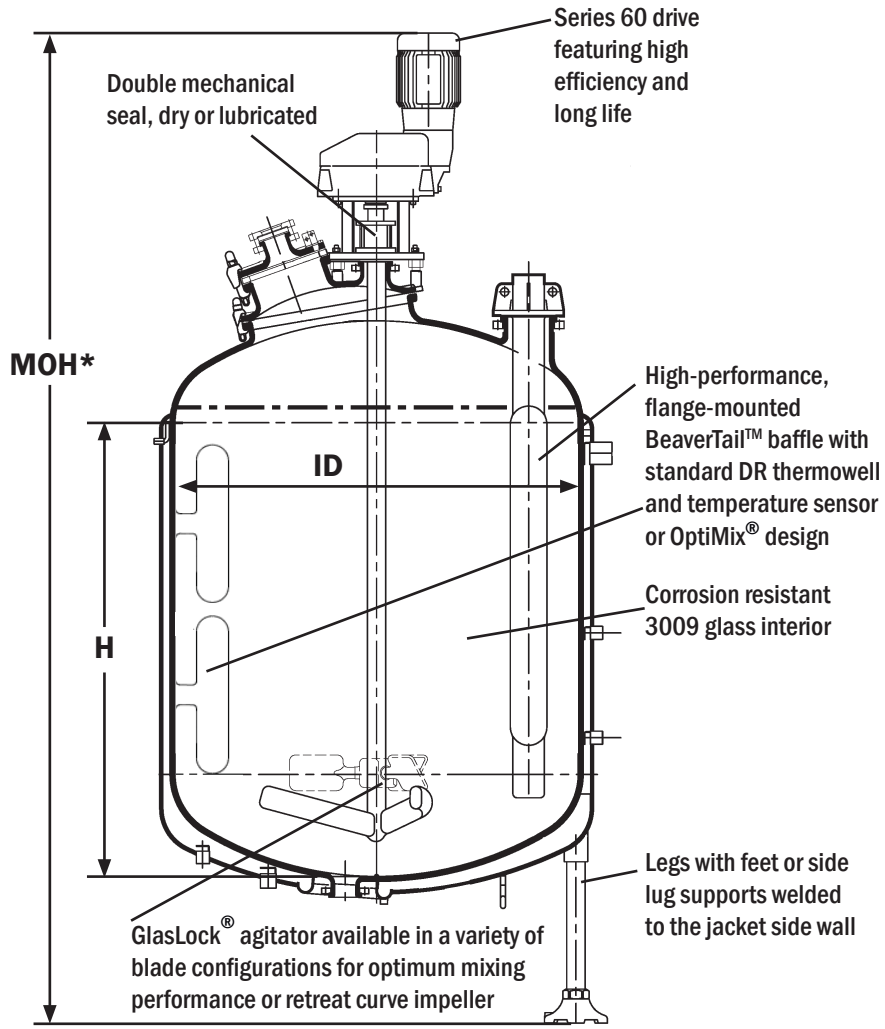
SA Reactors



Features

- Rugged, heavyweight reactors with large top head main cover that allows for installation and removal of one-piece agitators.
- Narrow annulus jacket spacing enables quick heat up and cool down
- GlasLock® agitator standard (or retreat curve impeller)
- Guaranteed plug-free
- Volumes from 300 to 25,000 gallons
- Pressures from full vacuum to 100 psig
- Temperatures from -20°F to 500°F
- Jacket options include conventional (SA) or HemiCoil® split-pipe coil design (CSA)



Standard Sizes

Model	Dimensions (in)			Motor (HP)
	ID	H	MOH*	
SA-300	48	44 7/8	130 1/4	3
SA-500	48	69 7/8	155 1/4	5
SA-750	61 7/16	66 3/8	162	7 1/2
SA-1000	61 7/16	86 3/8	184 1/2	10
SA-1500	76 7/8	84 1/2	187	15
SA-2000	76 7/8	103 1/2	206 1/4	15
SA-3000	96 6/16	100 1/2	223 9/16	20
SA-4000	96 6/16	132 1/2	255 9/16	20
SA-5000	107 15/16	135 9/16	278 11/16	40
SA-6000	107 15/16	160 5/8	314 3/8	50
SA-8000	119 11/16	173 5/8	333 3/8	60
SA-10000	131 3/8	147	353	60
SA-15000	144	188	376	75

Drawing represents a SA2000 reactor. Nozzle placement varies based on vessel size. For additional technical information, drawings and specifications see individual cut sheets.
**MOH = minimum overall height required*

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OptiMix®

OptiMix

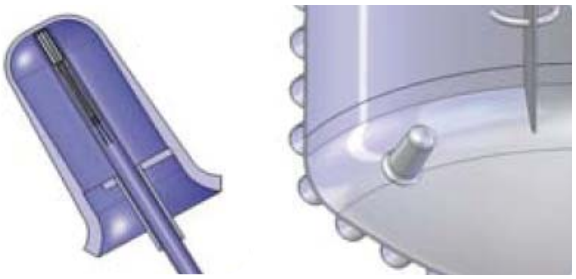
OptiMix is an innovative baffle design that integrates three baffles on the vessel wall to greatly improve clean-in--place (CIP) efficiency, mixing and heat transfer rates.

- Eliminates the difficult to clean top head pocket at the baffle/nozzle interface.
- Significantly reduces vortexing and splashing, resulting in less product drying and sticking to the heated wall above the liquid surface.
- Enhances heat transfer, solids suspension and distribution, gas dispersion, gas flow rates, and mass transfer through improved mixing.
- Symmetrical baffling reduces the shaft deflection and extends seal life by minimizing the bending loads that are imposed on the agitator shaft.
- Available in reactors sizes 20 gallons and larger and QVF borosilicate glass reactor designs.
- Baffles can be added to existing vessels during reglassing.

OptiMix-HE

OptiMix-HE combines HemiCoil (split-pipe) jacket technology with OptiMix's wall-mounted baffle system to offer a high performance reactor with superior efficiences in both mixing and heat transfer.

- Circulates heating and cooling media in jacket through the baffles.
- Increases heat transfer by up to 25% over standard OptiMix design, enabling more homogeneity and faster thermal management.



Temperature probe integrated in the wall (for both OptiMix and OptiMix-HE designs).

See OptiMix data sheet for more information.

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Accessories and Instrumentation

Whether your process application is R&D, bulk production or anything in between, DDPS has a variety of accessories and instrumentation to optimize reactor performance.

POWDER HANDLING SOLUTIONS

Our Powder Pump Systems can safely contain and transfer explosive, toxic, and difficult-to-flow powders from bags. drums and FIBC supersacks into most types of reactors and mixing vessels.

Clean Valve

This self-draining bottom flush alve is designed for use where batch to batch cleanability is important. It enables functions such as sampling, gas dispersion and maintenance to be performed without the need to interrupt the process or dismantle the valve.

Dip Pipe/Baffle

All from one single nozzle, this innovative product functions as a baffle, dip pipe and temperature measure, freeing an additional nozzle for process piping.

Sampling

Sampling solutions of all levels of sophistication are available, from simple manual sampling to remote automated sampling and analysis systems. Representative samples can be safely obtained, including toxic, flammable and corrosive media.

Temperature Sensors

Completely glass-lined, our temperature measuring probes have a short response time and are externally removable for reduced downtime.

CIP Capabilities

A spray ball system, installed and certified with a Riboflavin test, ensures thorough cleaning of the vessel walls, nozzles, agitator and baffles for batch to batch cleanability.

QuickViewPort-GL

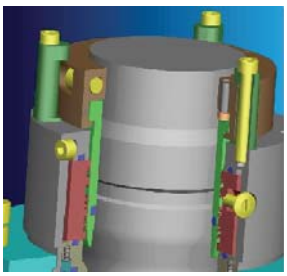
Our QuickViewPort-GL allows the reactor nozzle to be used as a sight glass, charge port, spray nozzle port, light port, test vessel, and for powder addition, glove box isolation, and vessel sampling.

Insulation and Sheathing

This option compliments high internal reactor performance and increases reaction efficiency by helping to maintain temperatures.

Safety Clamp

Designed for safety and efficiency, the safety clamp only unthreads so far and then stops, eliminating the potential for the clamp to separate into pieces and possibly damage the vessel.



OptiSeal

This innovative seal technology was designed to meet stringent process requirements in today's pharmaceutical and chemical manufacturing environments, helping users establish compliance with USP and BPE guidelines.

FlexLight Bundle

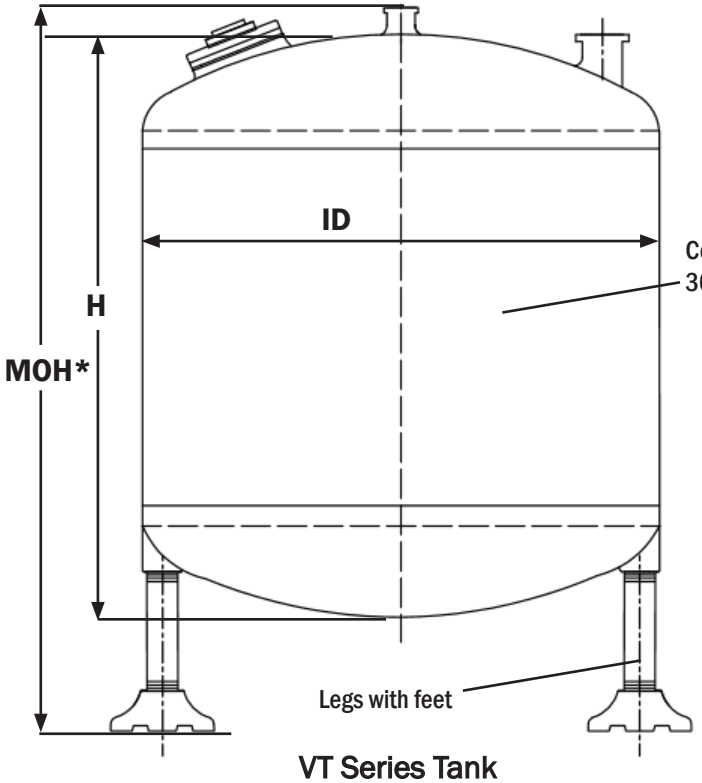
Illuminate and view into a vessel through one port, with a cold light to eliminate product bake-on.

Condensers

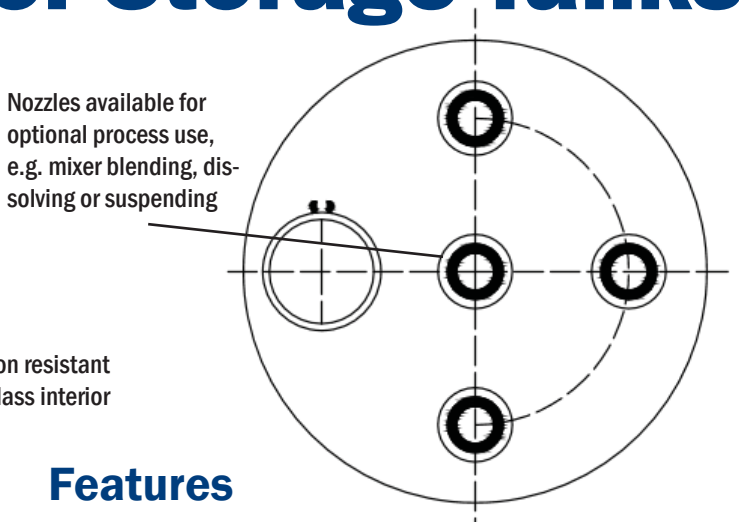
Overheads of glass, glass-lined steel, and alloy materials of construction are available in a variety of arrangements for process requirements.

For more information on accessories and instrumentation, download individual data sheets on www.ddpsinc.com/literature.

Glastor Storage Tanks

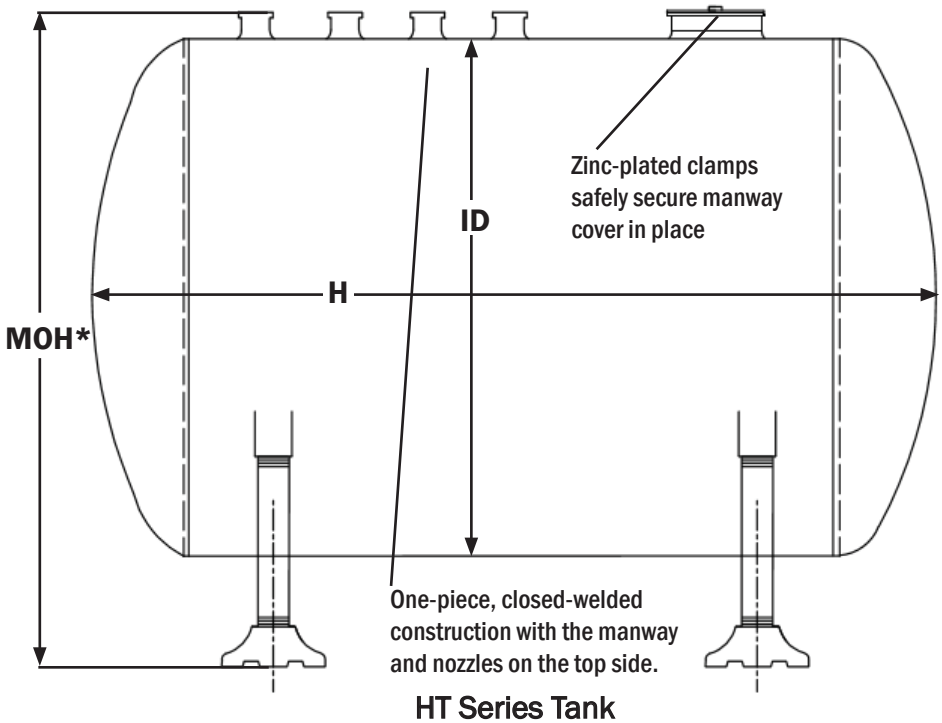


VT Series Tank



Features

- Tanks lined with 3009U glass to handle the toughest storage needs
- Superior lining for corrosive chemicals or high purity pharmaceuticals
- Cost-effective solution for chemical storage
- Available with pipe leg supports, crescent leg supports or saddle supports
- Vertical or horizontal tanks, volumes from 13 to 35,000 gallons
- Special protective coatings for exterior available



HT Series Tank

Standard Sizes

Model	Dimensions (in)		
	ID	H	MOH*
VT-500	48	78	96
VT-1000	63	90.5	115.5
VT-5000	102	162	186
VT-10000	118	328.5	254.5
VT-15000	134	279	305
VT-20000	142	328	354
VT-25000	150	355	381
VT-30000	157	409	435
HT-500	48	78	64.5
HT-1000	63	90.5	79.5
HT-5000	102	162	118.5
HT-10000	118	238.5	134.5
HT-15000	134	279	150.5
HT-20000	142	328	158.5
HT-25000	150	355	166.5
HT-30000	157	409	173.5

Drawings represent standard VT and HT storage tanks. For additional technical information, drawings and specifications see our Glastor Brochure.
**MOH = minimum overall height required*

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Services

Reglassing

Reglassing is the process by which older or damaged glass-lined steel equipment is refurbished to like-new condition.

Once a vessel has been approved for reglassing, the old glass lining is removed by grit blasting. Next, steel repairs and modifications are made by welding. Highly corrosion-resistant 3009 glass is then fused onto the prepared steel in powerful, computer-controlled electric furnaces. External protective coatings are applied leaving you with an end product that is indistinguishable from new vessels.

- Ideal for situations when time and cost are a primary issue
- Turnaround time is weeks vs. months to fabricate a new vessel
- Nearly 50% cost savings compared to buying a new vessel
- All reglassing is performed in the US in accordance to NBIC code
- Upgrades such as extra nozzles and insulation rings can be performed during reglassing
- All vessels reglassed by DDPS come with the same standard warranty as new vessels

For more information refer to our Introduction to Reglassing Brochure.

Systemization

DDPS can design, engineer, and construct stand-alone equipment and systems to meet clients' individual requirements. Through systemization, we can provide the most comprehensive technical solutions in the most streamlined way to maximize equipment life and productivity and to achieve the greatest possible return on your capital investement. Benefits of systemization include:

- Modularization
- Quality equipment assurance
- Superior service
- Single source accountability

Field Service

DDPS technical service specialists are continuously trained in the most advanced technology available for the repair and maintenance of your equipment, complying with all applicable OSHA and National Board regulations. Here's what our specialists can do for you – anywhere in North America:

- Spare parts
- Onsite inspection and repair
- Installation and start-up assistance
- Preventative maintenance programs
- Equipment evaluation
- Training seminars

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Other Glass-Lined Equipment

Nutsche Filters

- Ideal for processing phramaceuticals, high-purity organic chemicals, dyes and precious metals
- Easy to clean glass surfaces are fire-polished to ensure highest purity and no metallic intrusion
- Top head is clamped on and completely removable for full access
- Options include jacket, closed-welded top, hydraulic or pneumatic mechanism for lifting, etc.
- Volumes from 13 to 137 gallons
- Pressures from 38 to 85 psig and full vacuum

Columns

- Diameters from 6” to 84” and lengths up to 236”
- Jacket options include conventional or HemiCoil jackets
- Full range of column internals can be provided
- Full vacuum and high temperature ratings
- Accessories include donut support rings, perforated plates and slotted plates
- Clamps, gaskets, split flanges and bolting all supplied with a complete column system
- Assistance on installation and packing of columns upon request
- Special conical, eccentric, stepped and angled column sections can be made to fit specific process requirements

SR Series Dryer/Blenders

- Suited for processing corrosive products for drying, mixing, or concentrating pharmaceuticals, dyes, pigments, synthetic resins, etc.
- Volumes from 30 to 1,900 gallons (12.5 to 203 ft^2 heating area)
- Standard working pressure of 90 psig/FV in the jacket with vacuum in inner vessel (inner vessel is stamped for 40 psig/FV)
- Steel support stand designed with an open front for operating convenience

Pipe and Fittings

- Tough glass lining not subject to liner collapse due to full vacuum at high temperatures
- Diameters from 1 1/2” to 8” and lengths up to 196”
- Suitable for 150 psig (10 bar) maximum allowable working pressure (MAWP)
- Available in jacketed and unjacketed configurations

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