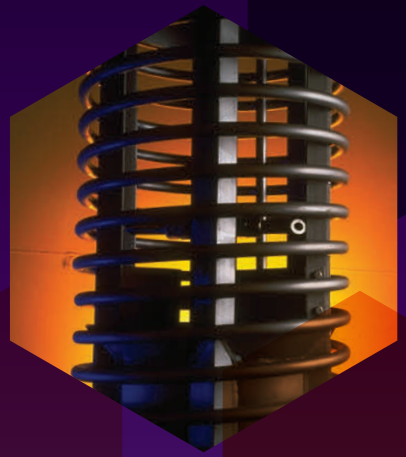
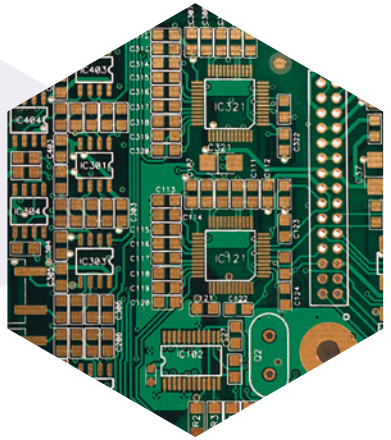
PRESSURE® CHEMICAL

YOUR SCALE UP PARTNERS





PRESSURE CHEMICAL®

YOUR SCALE UP PARTNERS

Pressure Chemical Co. (PCC) has provided process development, piloting, scale up and manufacturing services to the chemical industry for over 50 years. From the world's leading chemical and oil companies to start up ventures, PCC aids its customers in realizing their goals. PCC supports rapid scale-up facilitated by regulatory flexibility of hazardous chemistries, new processes, and first commercial quantities for market introduction, in addition to custom contract manufacturing of high value low volume materials.

Although it's in our name, Pressure Chemical is much more than just high pressure. Our facility includes 10 pilot and semi-works units with equipment constructed of Glass, Glassteel, Stainless Steel, Hastelloy®, and Nickel, and ranging in capacity from 300mL to 1000 gallons.

Our capabilities include Full Vacuum to 10,000 psi, and -15°C to 450°C depending on the equipment, and distillation capabilities at the 200 liter, as well as the 100, 200, 500, and 1000 gallon scale.

Our specialties include:

- Alkoxylation
- Alkylation
- Carbonylation
- Hydroformylation
- Condensations
- Esterifications
- Halogenation
- High pressure chemistries
- Hydrogenation
- Polymerization
- Quaternization
- Collaborate development with Customers

In addition to these chemistries and specializations, PCC works hand in hand with our customers on development and implementation of customer specific processes.

We are a proud affiliate of the Minafin Group, which today includes Minakem, Minakem High Potent, Minascent, Minasolve, and Pennakem. This unique partnership has expanded our manufacturing capabilities and broadened our resources so we can better assist our clients with their process development and larger scale commercialization needs.

EQUIPMENT

GLASS LINED REACTORS

NAME	CONSTRUCTION MATERIAL	VOLUME (GALLONS)	WORKING PRESSURE & TEMPERATURE*	MOTOR hP	IMPELLER STYLE	COLUMN D X H	PACKING
R-0002-GL	Glassteel	2	FV to 750 @ 600°F (316°C)	0.75 hP	Straight Blade Turbine	no	no
R-25-GL	Glassteel	25	FV to 30 psig	N/A	N/A	no	no
R-30-GL	Glassteel	30	FV to 15 psig	1 hP	2-Blade Paddle	no	no
R-51-GL/FEP	Glassteel & FEP	50	FV to 15 @ 350°F (177°C)	5 hP air	Dual A310, 16”	no	no
R-53-GL	Glassteel	50	FV to 300 @ 650°F (343°C)	3 hP	3-bl Retreat Crv	no	no
R-55-GL	Glassteel	50	FV to 100 @ 450°F (232°C)	1 hP	3-bl Retreat Crv	no	no
R-56-GL	Glassteel	50	FV to 25 @ 450°F (232°C)	N/A	(Receiver)	no	no
R-58-GL	Glassteel	50	FV to 150 @ 350°F (177°C)	3 hP	3-bl Retreat Crv	no	no
R-100-GL	Glassteel	100	FV to 25 @ 350°F (177°C)	2 hP	3-bl Retreat Crv	6” x 6’	3/8” Ceramic Saddles
R-101-GL	Glassteel	100	FV to 15 @ 350°F (177°C)	2 hP	3-bl Retreat Crv	no	no
R-104-GL	Glassteel	100	FV to 25 @ 450°F (232°C)	N/A	(Receiver)	no	no
R-202-GL	Glassteel	200	FV to 25 @ 350°F (177°C)	3 hP	3-bl Retreat Crv	no	no
R-203-GL	Glassteel	200	FV to 90 @ 500°F (260°C)	2 hP	3-bl Retreat Crv	4”	No Packing — Flash Over

*Refers to the maximum rated name plate capabilities, actual temperature and pressures achievable will vary based on equipment setup.

GLASS LINED REACTORS CONT.

NAME	CONSTRUCTION MATERIAL	VOLUME (GALLONS)	WORKING PRESSURE & TEMPERATURE*	MOTOR hP	IMPELLER STYLE	COLUMN D X H	PACKING
R-204-GL	Glassteel	200	FV to 25 @ 450°F (232°C)	N/A	(Receiver)	no	no
R-205-GL	Glassteel	200	FV to 25 @ 450°F (232°C)	N/A	(Receiver)	no	no
R-206-GL	Glassteel	200	100 @ 450°F (232°C)	N/A	3-bl Retreat Crv	no	no
R-300-GL	Glassteel	300	FV to 15 @ 650°F (343°C)	N/A	(Receiver)	no	no
R-501-GL	Glassteel	500	FV to 100 @ 450°F (232°C)	7.5 hP	4-bl Cryolok	6" x 8'	1/4" Hastelloy-C DePak
R-502-GL	Glassteel	500	FV to 100 @ 450°F (232°C)	7.5 hP	3-bl Retreat Crv	6"	Glass Tube Condenser—Flash
R-504-GL	Glassteel	500	FV to 100 @ 450°F (232°F)	10 hP	3-bl Retreat Crv	6"	No Packing — Flash Over
R-505-GL	Glassteel	500	FV to 100 @ 450°F (232°C)	7.5 hP	3-bl Retreat Crv	6" x 5'	1/2" Hastelloy-C DePak
R-1000-GL	Glassteel	1000	FV to 40 @ 350°F (177°C)	10 hP	3-bl Retreat Crv	8" x 4'	3/4" Ceramic Saddles
R-1002-GL	Glassteel	1000	FV to 100 @ 650°F (343°C)	15 hP	3-bl Retreat Crv	12" x 8'	No Packing — Flash Over
R-1003-GL	Glassteel	1000	FV to 100 @ 450°F (232°C)	15 hP	3-bl Retreat Crv	8" x 5'	No Packing — Flash Over

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EQUIPMENT

SPECIAL ALLOY REACTORS

NAME	CONSTRUCTION MATERIAL	VOLUME (GALLONS)	WORKING PRESSURE & TEMPERATURE*	MOTOR HP	IMPELLER STYLE	COLUMN D X H	PACKING
R-52-H	Hastelloy-B	50	FV to 15 @ 350°F (177°C)	3 hP	3-bl Retreat Crv	no	no

SPECIAL ALLOY HIGH PRESSURE REACTORS

NAME	CONSTRUCTION MATERIAL	VOLUME (GALLONS)	WORKING PRESSURE & TEMPERATURE*	MOTOR HP	IMPELLER STYLE	COLUMN D X H	PACKING
A-1gal-Hc	Hastelloy-C	1	10,000 @ 842°F (450°C)	0.5 hP	Magnedrive 2" Dispersamax	no	no
R-103-Ni	Nickel 2000	100	FV to 500 @ 400°F (204°C)	2 hP	3-bl Propeller	8' x 8'	Goodloe, SS

304 STAINLESS STEEL REACTORS

NAME	CONSTRUCTION MATERIAL	VOLUME (GALLONS)	WORKING PRESSURE & TEMPERATURE*	MOTOR HP	IMPELLER STYLE	COLUMN D X H	PACKING
R-102-SS	Stainless Steel	100	FV to 90 @ 250°F (127°C)	3/4 hP	Lightnin	no	no

316 STAINLESS STEEL REACTORS

NAME	CONSTRUCTION MATERIAL	VOLUME (GALLONS)	WORKING PRESSURE & TEMPERATURE*	MOTOR HP	IMPELLER STYLE	COLUMN D X H	PACKING
R-31-SS	Stainless Steel	30	FV to 60 @ 350°F (177°C)	3 hP	4-bl Strt Turbine	no	no
R-60-SS	Stainless Steel	60	FV to 150 @ 450°F (232°C)	5 hP	Lightnin A-310/A-100	no	no
R-503-SS	Stainless Steel	500	FV to 75 @ 650°F (343°C)	7.5 hP	3-bl Retreat Crv	no	no

*Refers to the maximum rated name plate capabilities, actual temperature and pressures achievable will vary based on equipment setup.

316 SS HIGH PRESSURE REACTORS

NAME	CONSTRUCTION MATERIAL	VOLUME (GALLONS)	WORKING PRESSURE & TEMPERATURE*	MOTOR HP	IMPELLER STYLE	COLUMN D X H	PACKING
A-0.3L-SS	Stainless Steel	300 ml	5400 @ 650°F (343°C)	0.5 hP	Magnedrive Variable Speed Dispersamax	no	no
A-2L-SS	Stainless Steel	2 liter	5500 @ 650°F (343°C)	1 hP	Magnedrive Variable Speed Dispersamax	no	no
A-3L-SS	Stainless Steel	3 liter	8550 @ 100°F (38°C)	N/A	None	no	no
A-1gal-SS	Stainless Steel	1	3000 @ 650°F (343°C)	0.33 hP	Magnedrive Variable Speed Dispersamax	no	no
A-30-SS	Stainless Steel	30	2500 @ 600°F (316°C)	5 hP	Magnedrive Variable Speed Dispersamax	no	no
A-100-SS	Stainless Steel	100	5000 @ 662°F (350°C)	7.5 hP	Magnedrive Variable Speed, 8 Impellers 4-Rushton & 4 Pumper Props	no	no
A-250-SS	Stainless Steel	250	2000 @ 650°F (343°C)	7.5 hP	Advanced Gas Rxr Mixer with Variable Speed Magnedrive	no	no
R-201-SS	Stainless Steel	200	FV to 300 @ 400°F (204°C)	3 hP	Dual A100, 14”	no	no
R-1001-SS	Stainless Steel	1000	FV to 250 @ 600°F (316°C)	7.5 hP	Dual A-320, 30”	no	no

*Refers to the maximum rated name plate capabilities, actual temperature and pressures achievable will vary based on equipment setup.

EQUIPMENT

TUBULAR FIXED BED REACTORS

CAPACITY (VESSEL ID NO.)	WORKING PRESSURE (PSIG)	RATED MAXIMUM TEMPERATURE	AGITATOR MOTOR	IMPELLER STYLE
1.0 Liter 1.5" x 40" Tube Jacketed	4,500	800°F (427°C)	N/A	N/A

ALL GLASS PILOT PLANT REACTOR SYSTEMS

CAPACITY (VESSEL ID NO.)	VACUUM / PRESSURE	RATED MAXIMUM TEMPERATURE	AGITATOR MOTOR	IMPELLER TYPE
200 Liter Reboiler/Reactor 6" x 5' Column (23 HETP) Goodloe™ Hastelloy™ Packing Electric Mantle Heat 2 x 50 Liter Receivers	Vacuum to 0.5 torr	508°F (250°C)	0.5 hP	Variable Speed
50 Liter Electric Mantle Heat or Cooling Bath	Vacuum to 0.1 torr	508°F (250°C)	0.5 hP	Variable Speed
20 Liter Jacket Process Reactor, ChemGlass	Vacumm to 2 torr, 10 psig max	392°F (200°C)	Air	Variable Speed, Teflon Paddle and Pitched Blade
10 Liter Glass Rotary Evaporator External Condenser (BUCHI-ROTOVAP™)	Vacuum to 1 torr	255°F (110°C)	0.5 hP	Rotating Flask

SHORT PATH DISTILLATION APPARATUS

NAME	CONSTRUCTION MATERIAL	VACUUM / PRESSURE	WORKING PRESSURE & TEMPERATURE	AGITATOR MOTOR	IMPELLER TYPE
POPE WFE 316 SS	316 Stainless Steel	1.0 ft^2 Pope WFE 316 SS Internal & External Condensers	0.05 torr @ 650°F (343°C)	0.5 hP	4-Wipers
UIC WFE 316 SS	316 Stainless Steel	3.2 ft^2 UIC WFE 316 SS Internal & External Condensers Equipped with 2-Stage Degasser	0.02 torr @ 650°F (343°C)	1 hP	4-Roller Wipers

ANCILLARY EQUIPMENT

FILTRATION

316 SS Perforated Basket Centrifuges:

- 48" x 30", Bottom Discharge, 25 hP
- 48" x 24", Top Unloading, 25 hP
- 24" x 14", Top Unloading, 10 hP

316 SS Nutsche Pressure Filter, 92 gal., 80 psig

316 SS Sparkler Pressure Filters, 12" & 18", jacketed

Stainless Steel and Polypropylene Bag & Cartridge Filters (Single and Multiple Element/Bag)

Sintered Metal Mott Filters

Large Ceramic and Polypropylene Buchner Filters

DRYING

Abbe, 304 SS Double Cone Tumble Dryer
50 ft^3, to 250°F (121°C)

Stokes, 316 SS Double Cone Tumble Dryer/Blender,
25 ft^3, to 250°F (121°C)

Patterson Kelly, 316 SS, V-Cone Tumble Dryer/Blender,
5 ft^3, to 180°F (82°C)

Vacuum Tray Dryer, 250 ft^2, to 180°C

Large Lab and Pilot Plant Size Vacuum and Air Ovens

PROCESS HEATING

(2) Fulton Hot Oil Boilers, 1.6 MM Btus/Hour, to 650°F (343°C)

High Pressure Steam Boiler
2.4 MM Btus/Hour, 2425 lbs/Hr Steam @ 90 psig, 320°F (160°C)

High Pressure Steam Boiler
1.32 MM Btus/Hour, 713 lbs/Hr Steam @ 90 psig, 320°F (160°C)

40 kW Electric Heater to 625°F (330°C), 0.14 MM Btus/Hour

PROCESS COOLING

Edwards Air Chiller, 30 Ton Capacity at -4°C

Lab Chillers, -15°C to 110°C

VACUUM CAPABILITY

(9) Kinney Vacuum Pumps, 130 cfm at 2-10 torr

Lab Vacuum Pumps, 5.6 to 35.4 cfm at $1x10^{-4}$ torr

Kinney Vacuum Pump, 107 cfm at 0.02 torr

AUXILIARY EQUIPMENT

High Pressure Liquid Feed Pumps to 0.43 gpm @ 5,000 psig

High Pressure Gas Feed Compressors to 9 lbs/Hr H_2 @ 5,000 psig

Heat Exchangers (Glass, Glass-Lined Steel, 316 SS, Teflon®)

Hot Boxes (24 Drum Capacity) 10°C to 180°C

316 SS DeLumper™

ANCILLARY EQUIPMENT CONT.

ENVIRONMENTAL

- Packed Tower Liquid Scrubber Systems for Ventilation of All Production Areas
- Primary Emission Control Scrubbers (Packed Tower, Eductor Type, and Bubbler)
- Carbon Bed Absorption System
- Zero Process Discharge to POTW or Rivers
- Controlled Waste Management Program Utilizing Properly Certified Waste Haulers and Disposal Firms
- Solvent Recovery Condensers on Vacuum Exhaust

SAFETY

- Portable and Area Hazardous Condition Monitors/Alarms
- Facility Fully Sprinklered
- Segregated Hazardous Material Storage Areas
- Operators Trained and Certified in SOCMA's Chemical Operations Training Program
- Nitrogen Supply via Liquid Bulk Tank Facility Wide
- Natural Gas Fired Back Up Electrical Generator 135 Kva, 100 KW

ANALYTICAL SERVICES

- Chromatography (HPLC, GPC, and GC)
- FTIR Spectrophotometry
- UV/Visible Spectrophotometry
- Viscometry (Capillary and Brookfield)
- Karl Fischer (Coulometric and Volumetric) Analysis
- Titrimetric Analysis

Note: NMR, GC/MS, and other instrumental analyses available locally through special arrangements with Pittsburgh Universities and outside laboratories.

MINAFIN®
GROUP

In November 2012, Pressure Chemical Co. was acquired by the Minafin Group. Minafin currently has four chemical manufacturing sites in Europe (Minakem, Minakem High Potent, Minascent Technologies, Minasolve) as well as two in the United States (Pennakem and Pressure Chemical).

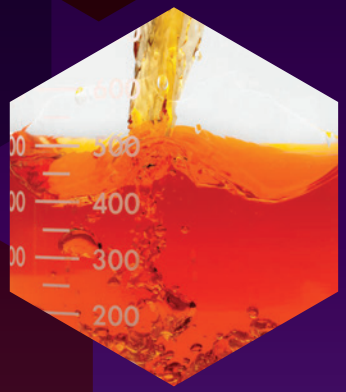
Minakem, with operations in France, is a manufacturer of pharmaceutical API's, while Minakem High Potent, in Belgium, manufactures high potent and controlled substances for the pharmaceutical market. Minasolve is a supplier of unique ingredients and blends to the cosmetic market. Minascent Technologies is located in Leuna, Germany, and produces specialty chemicals as well as serving the Food and Drug markets. Also involved in specialty chemical manufacturing, Pennakem and Pressure Chemical are located in the United States. Pennakem produces its own hydrogen and operates a major hydrogenation facility that sits on 50 acres equipped with rail service in Memphis, Tennessee producing furfural and furan derivatives based on renewable resource chemistry. Our partnerships with these groups give Pressure Chemical the added resources and capabilities our clients need to move from pilot scale to commercial quantities.

Minakem, Dunkirk, France

Minakem Beuvry
Lille, France

Minascent Technologies,
Leuna, Germany

Minakem High Potent,
Mont-Saint-Guibert, Belgium



PRESSURE CHEMICAL CO.

3419 Smallman St.
Pittsburgh, PA 15201-1997
412.682.5882

presschem.com