English Version

Www.Geenbellon.com

Geenbellon®
Industrial Products

Turbine Flowmeters

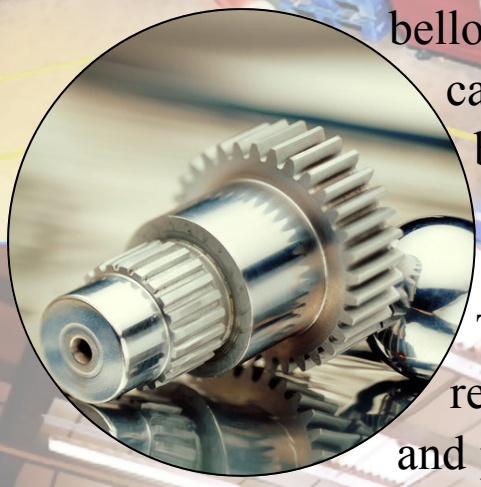
GENBELON®

- High Accuracy
- High Pressure
- High Temperature
- Corrosion Resistance
- Abrasion Resistance
- Connection Flexible
- Weight Light
- Wide Flow Range
- Less Maintenance
- Long Service Life

GEENBELLON INDUSTRY LLC

Part NO.207000004

Geenbellon Industry Limited is a branch company of Geenbellon Group LLC. It is professional manufacturer and distributor of industrial instruments. The products categories of Geenbellon involve 9 products lines, e.g. Pressure, Flow, Temperature, Level, Pump, Valve, Data Acquisition, Special Instruments and Accessories. The services of Geenbellon include instrument Calibration, Adjustability, Verification and Maintain. Geenbellon products are renowned for withstanding the rugged condition of the industrial environments, high accuracy, high temperature and pressure resistance, corrosive resistance, light weight, easy installation and maintains. The advantage of Geebellon's services is quick response, satisfaction, carefulness and precise. Over the years, it has built an outstanding reputation for withstanding severe punishments while maintaining operational and measurement integrity.



The products which Geenbellon produce or represents, are guaranteed with its best quality and performance in mind. Therefore the excellent standards of employees must be strictly adhere to. Geenbellon is now aiming to set up more overseas branches and subsidiaries as per high demands from our customers. These centers of excellence are dedicated to the development of measurement and control solutions for existing and potential customers.

Geenbellon products strength lies in petrochemicals, food processing, oil refinery, the military etc, particularly with a strong historical position in oil and gas.

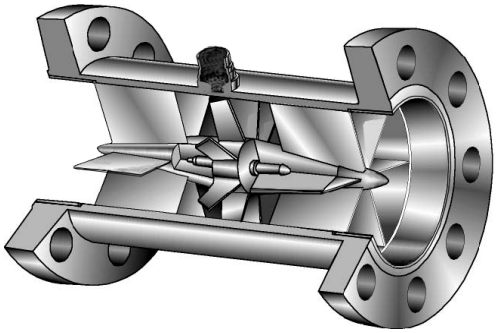
The company is also a leading oil field service contractor. Leading the products in integrated professional services, engineering and maintenance is our goal. Customer satisfaction is of paramount importance.

CONTENTS

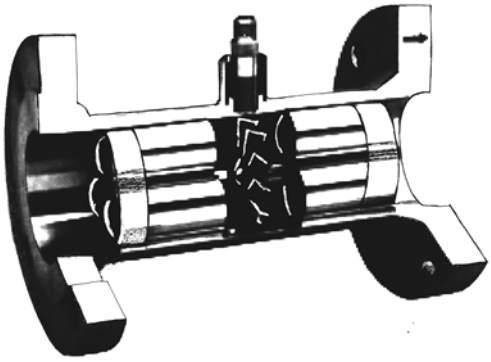
Geenbellon® Turbine Flow meters

***Geenbellon Industry LLC** is a flow meter professional manufacturer and distributor, particularly the turbine flow meter the company make is the most famous with excellent technical strength in the world. The company inherited the world's highest technical standards to make various of turbine flow meters suitable for different measurement field.*
The first flow meter of Geenbellon is high pressue and anti-abrasion for the oilfield fracturing Measurement. The meter applies the professional technology on Tungsten carbide shaft and Hybrid ceramic bearing to withstand the rugged conditions in the oil field and Mining environment to extend life-duration long.
Geenbellon turbine flow meter serve customers in petrochemical, food and beverage and process control industries and military throughout the world. After running in the field many years , it has won an unsurpassed reputation for withstanding severe operating condition.

Geenbellon® Turbine Flow meters could divided into two patterns in the structure：Y Serial/O Serial



Y Serial
used in the Measurement-Difficult field



O Serial
used in the High-Accuracy field

Features

- **High accuracy and High accuracy repeatable measurement**
- **Rugged to withstand continual rig up/down**
- **Most economical solution for flow measurement applications**
- **High frequency digital output easy interface with other digital equipment.**
- **Symmetrical Bi-directional Design**
- **Wide temperature & Pressure Ranges**
- **Wide flow range (Typically 15:1)**
- **More connection type for easy installation**
- **Minimum maintenance**
- **Long service life, even in severe applications**

Usage Field

- Water-injection in Oil Field measurement
- CO_2/N^2 injection in Oil industry
- Test and production separators
- Water and Dirty Water in Municipal Engineering
- Steam generator fuel and feed water
- Liquid in Food and beverage industry
- Metering liquid fertilizer
- Fuel chemical measurement in plant settings
- Application in drainage system in Ship tank loading and unloading

Technology Data & Specifications

Accuracy
Geenbellon Turbine flow meters have 3 Accuracy grade rates- classified as Standard Grade, Industrial Grade and Super-accuracy Grade, based on the accuracy of the meter. The Standard Grade meter offers a professional and reasonable measurement solution for applications where higher accuracy is not required.
• Standard Grade ± 1.0% of reading
• Industrial Grade ± 0.5% of reading
• Super Accuracy Grade ± 0.25% of reading
If need Enhanced Accuracy, Consult Factory
Note: 1/4, 3/8-in. Meters
• Standard Grade ± 1.5% of reading
• Industrial Grade ± 1% of reading
• Super Accuracy Grade ± 0.5% of reading

Repeatability
• Standard Grade ± 0.05%
• Industrial Grade ± 0.02%
• Accuracy Grade ± 0.02%
(Based on water calibration)
***Temperature* Range (Pickup)**
• Extr-Low –268 ~ 232℃ (-450 ~ +450°F)
• Standard -67 to 250° F (-55 to 120° C)
• High -67 to 450° F (-55 to 230° C)
• Super high -67 to 850° F (-55 to 455° C)
(Requires special pickup and pickup adapter and Shaft and bearings must be silver-soldered.)
Mating Output Connection AN3106A-10SL-4S/or AN3106A-10SL-3S
Compliances:
@ CSA Certified Hazardous Locations Class I, Group A, B, C, D, Div. 1
@ NACE MR01-75(On request)

Materials of Construction

Meter Body and Vanes:
Grade 316L /304L stainless steel (Optional)
Rotor: 17-4 pH SS/AlloyCD-4MCu
Shaft and Bearings:
Tungsten Carbide/Ceramic hybrid ball bearings
Optional Materials
• **Shaft** Binderless carbide for enhanced corrosion resistance to chemicals liquids.
• Silver brazing to withstand temperatures to 1000°F(537℃) and chemicals that attack epoxy bonding bearing materials
• **Rotor** Duplex electroless nickel /or copper plating for enhanced corrosion resistance to selected chemicals (especially acids that corrode ferrous materials)

Size Selection and Installation

***Size Selection*:** When selecting a specific size of Geenbellon Turbine Flow meter, the instantaneous flow rate of the line into which the meter will be installed should be based on. Meter size should not be based only on the nominal piping size of the installation. Refer to Linear Flow Range Chart for meter size selection. The meter will keep accurate at flow rates higher than its rating, but bearing wear and pressure drop across the meter can shorten the life span of the meter. Geenbellon flow meters can be over-ranged by 20% for short periods with safety.
Installation:
• Clearance should be made for the operating pipe line a flow meter will be installed in.
• The meter should be mounted along with flow direction of the line and the arrow on the meter body.
• A 5-diameter at least length of straight pipe must be upstream and a five-diameter length of straight pipe must be downstream of the flow meter. Both pipe sections should be the same nominal pipe size as the flow meter.
• Both pipe sections should be the same bore diameter as the flow meter end connections.
• Control valves/Throttling Device should be located downstream of the flow meter.

Linear Flow Range

Flowmeter Size		O Series				Y Series				Nominal Calibration Factor		Max. Frequency	Max. Pressure Drop	
		Linear Range		Expand Range		Linear Range		Expand Range						
inch	mm	GPM	M^3/h	GPM	M^3/h	GPM	M^3/h	GPM	M^3/h	Pulse/ Gallon	Pulse/ Liter	Pulse/ Second	PSi	Kpa
1/4	8	0.25-2.5	0.09-0.6	0.15-3	0.034-0.68	-	-	-	-	48900	12918	2040	5.0	34
3/8	10	0.51-5.1	0.1-1.1	0.3-6	0.068-1.36	0.3-3	0.067-0.67	0.2-3.6	0.05-0.82	20000	5284	1625	4.0	28
1/2	15	1-11	0.2-2.3	0.55-12	0.125-2.73	0.75-7.5	0.167-1.67	0.5-9	0.11-2.04	13000	3435	1625	12.0	83
5/8	18	1.4-16	0.3-3.6	0.85-20	0.193-4.54	-	-	-	-	7700	2034	2050	15	103
3/4	20	2.5-28	0.6-6.4	1.5-35	0.341-7.95	2-15	0.45-3.41	1.3-18	0.30-4.09	3000	793	750	18	124
7/8	22	3-45	0.7-10	2-54	0.454-12	3-30	0.667-6.81	2-36	0.45-8.18	1600	423	800	20	138
1	25	4-60	0.9-13	2-75	0.456-17	5-50	1-11	3.3-60	0.75-13.6	870	230	725	20	138
1-1/4	32	6-93	1.4-21	3-115	0.68-26	-	-	-	-	620	163.8	930	16	110
1-1/2	40	8-130	1.8-29	5-175	1.14-39	15-180	3-41	10-216	2.2-49	330	87	990	16	110
2	50	15-225	3.4-51	11-275	2.52-62	40-400	9-90	26-480	6-109	55	14.5	365	22	152
2-1/2	65	25-400	5.7-90	15-500	3.4-113	-	-	-	-	110	29.1	825	22	152
3	80	40-650	9-147	20-800	4.5-181	80-800	18-181	50-960	12-218	57	15.2	570	20	138
4	100	75-1250	17-283	50-1500	11-340	100-1200	23-271	68-1440	15-327	29	7.7	580	10	69
5	125	140-2000	32-454	100-2500	22-567	-	-	-	-	18	4.8	460	10	69
6	150	200-2900	45-658	125-3600	28-817	200-2500	45-583	120-3000	30-681	7	1.8	350	10	69
8	200	330-5200	74-1180	270-6400	61-1453	350-3500	79-795	230-4200	53-953	3	0.8	200	6.0	41
10	250	650-8000	147-1816	540-9800	122-2225	500-5000	114-1140	330-6000	75-1362	1.6	0.4	140	6.0	41

Note: 1.The Data above is based on Water-Calibration.

2. The Best linear flow range for Non-lubricating Liquid is at 60% of the standard range.

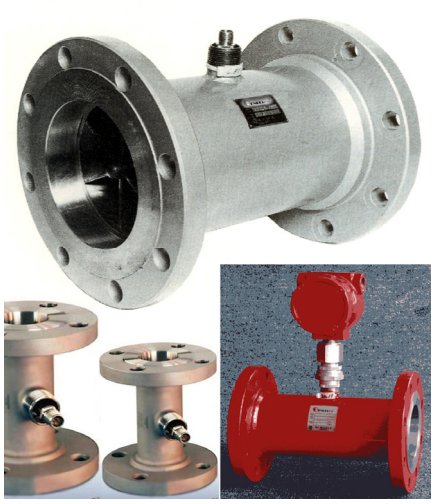
3. Consult factory for engineering assistance when the viscosities of the liquids measured greater than 5 centistokes.

End Connections

Geenbellon flow meters have in a variety of end connections.

Flanged Connections

Turbine flow meters with flanged end connections are available in both raised-face (RF 150#

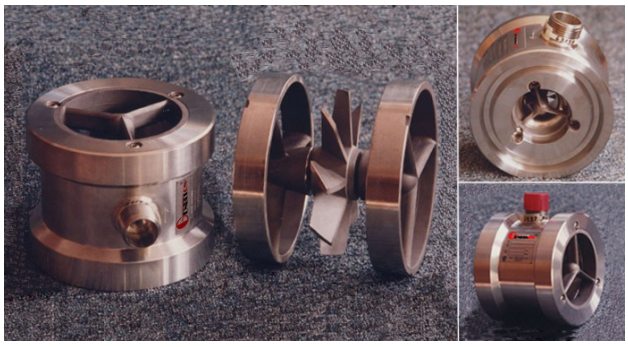


to 1500#) models and ring-type joint (RTJ 600# to 2500#) models in Standard ANSI B16.5. Geenbellon routinely supplies other type flange end connections including DIN, API and a variety of proprietary flange and clamp end connections especially for high pressure services. Consult factory for any specific requirement.

Flanged materials can be carbon steel or stainless steel. All flanged Geenbellon meters are equipped with slip-on flanges, which are then welded to the outside of the meter rather than being welded to the end of the meter body. Thus, the flange never comes into contact with the fluid being measured.

Between-Flanged Connections

Series BF Turbine Flow meters with Between-Flanged connections provide a cost-effective alternative to typical flanged-meter applications. Series BF meters with EZ-IN connections offer the accuracy, rugged construction, and maintenance-free operation of conventional Geenbellon flow meters plus the following advantages:



• Lower installation cost.
• Less expensive than a conventional, flanged meter.
• Spreader nuts enable easy removal and inspection .
• The raised-face BF meter will mate to any flange rated ANSI 150# to 1500#. The new ring joint (RTJ) version will mate to ANSI 900#, 1500# or 2500# RTJ flange. Specify flange type when ordering

Grooved Connections

Flow meters with grooved end connections

are available in 7/8-in. through 10-in. It is easy for continual rig up/down. It is right choice for cleaning flow meter after using.

Threaded (NPT/MS/BSP) Connections

Threaded meter sizes range from 1/4-in. to 4-in. The most popular threaded type end connec-

tions for Geenbellon turbine flow meters are the male/female NPT type and the male 37° flared MS type. Geenbellon can readily supply other thread forms including BSP, JIS, SAE and metric to name a few. See the details in the following data table .

Tri-Clover Connections

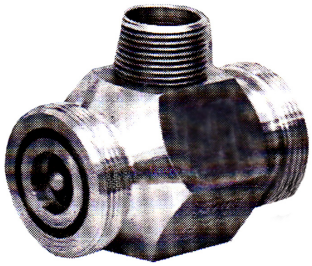
Tri-clover end connections enable fast, easy removal of the meter from the line for cleaning

and routine maintenance

Weco Union Connections

Weco union connections enable fast, easy removal and installation of the meter from the High pressure (≤137.9 MPa) line for oil fracturing. These meters can be ordered in 7/8-in to 4-in size.

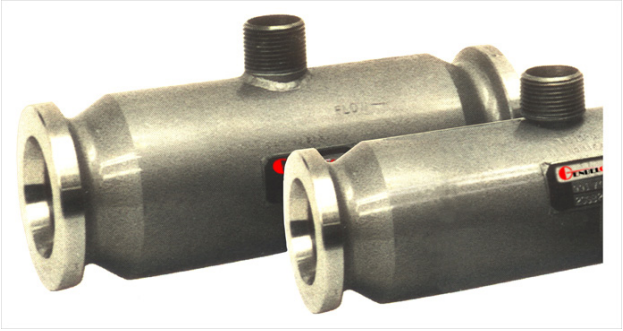
Union Connections



Union connections enable fast, easy removal of the meter from the line for cleaning and routine maintenance

Grayloc Connections

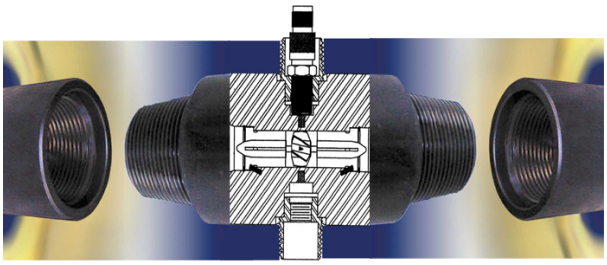
Grayloc connections enable fast, easy removal



of the meter from the line for cleaning and routine maintenance

Drillpipe Connections

Drillpipe connections turbine flow meters enable bear high pressure and fast, easy removal of the meter from the line for cleaning



and routine maintenance.

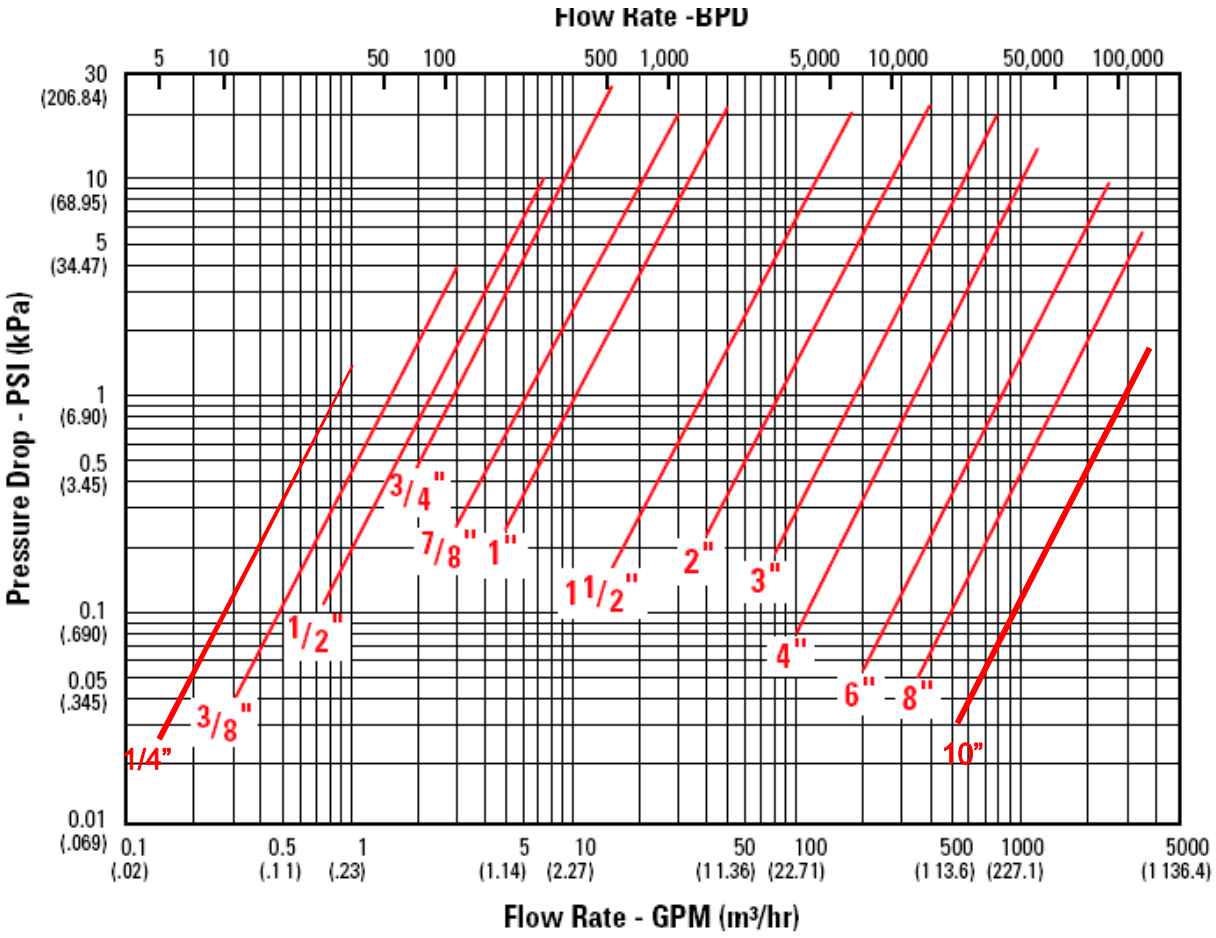
BigInch Connections

Big Inch connections turbine flow meters enable fast, easy removal of the meter from the line for cleaning and routine maintenance.

Customization

The other end connections could be ordered by customers according to the need in the working field.

Pressure Drop Curve



End to End Dimensions

Size inch (mm)	Flanged	Between-Flanged			Grooved	Threaded			Weco® Union	Union
		1"Flange	2"Flange	2" Ring Joint 1500#/2500#		NPT	MS	BSPP		
1/4(8)	5.00(127.0)	N/A	N/A	N/A	N/A	4.00(101.6)	2.45(62.23)	2.45(62.23)	N/A	2.50(63.5)
3/8(10)	5.00(127.0)	4.00(102.0)	2.50(63.5)	N/A	N/A	4.00(101.6)	2.45(62.23)	2.45(62.23)	N/A	2.50(63.5)
1/2(15)	5.00(127.0)	4.00(102.0)	2.50(63.5)	N/A	N/A	4.00(101.6)	2.45(62.23)	2.45(62.23)	N/A	2.50(63.5)
5/8(18)	5.00(127.0)	N/A	N/A	N/A	N/A	4.00(101.6)	2.75(69.85)	2.45(62.23)	N/A	2.75(69.85)
3/4(20)	5.00(127.0)	4.00(102.0)	2.50(63.5)	N/A	N/A	4.00(101.6)	3.25(82.55)	3.25(82.55)	N/A	3.25(82.55)
7/8(22)	6.00(152.4)	4.00(102.0)	2.50(63.5)	N/A	4.00(101.6)	4.00(101.6)	3.50(88.90)	3.50(88.90)	8.00(203.2)	3.50(88.90)
1(25)	6.00(152.4)	4.00(102.0)	2.50(63.5)	3.50(88.90)	4.00(101.6)	4.00(101.6)	3.50(88.90)	3.50(88.90)	8.00(203.3)	3.50(88.90)
1-1/4(32)	6.00(152.0)	N/A	N/A	3.50(88.90)	6.00(152.0)	6.00(152.0)	3.875(98.43)	3.875(98.43)	N/A	3.875(98.43)
1-1/2(40)	7.00(177.8)	N/A	2.50(63.5)	3.50(88.90)	6.00(152.0)	6.00(152.0)	4.375(111.25)	4.375(111.25)	8.60(218.4)	4.375(85.73)
2(50)	8.50(215.9)	N/A	2.50(63.5)	3.50(88.90)	10.00(254.0)	10.00(254.0)	4.75(120.65)	4.75(120.65)	9.00(228.6)	4.75(120.65)
2-1/2(65)	7.00(177.8)	N/A	N/A	3.50(88.90)	10.00(254.0)	N/A	N/A	6.0(152.40)	N/A	6.0(152.40)
3(80)	10.00(254.0)	N/A	4.25(108.0)	4.25(107.95)	12.50(318.0)	10.00(254.0)	N/A	8.0(203.20)	13.0(330.2)	8.0(203.20)
4(100)	12.00(304.8)	N/A	5.00(127.0)	5.00(127.0)	12.00(304.8)	12.00(254.0)	N/A	N/A	15.1(383.5)	N/A
5(125)	14.00(355.6)	N/A	N/A	5.00(127.0)	12.00(304.8)	16.00(254.0)	N/A	N/A	N/A	N/A
6(150)	12.00(304.8)	N/A	5.75(146.1)	5.75(146.05)	12.00(304.8)	16.00(254.0)	N/A	N/A	N/A	N/A
8(200)	12.00(304.8)	N/A	6.25(158.8)	6.25(158.75)	12.00(304.8)	N/A	N/A	N/A	N/A	N/A
10(250)	20.00(508.0)	N/A	7.00(177.8)	7.00(177.80)	12.00(304.8)	N/A	N/A	N/A	N/A	N/A

Flanged End Connection - ANSI B16.5 Pressure Ratings

Flange Rating		150#		300#		600#		900#		1500#		2500#	
ANSI Material Group		A	B	A	B	A	B	A	B	A	B	A	B
Design-Operating Temperature range		Maximum Working Pressure											
-28.8~37.7℃ (-20~100℉)	Mpa	1.96	1.89	5.10	4.96	10.2	9.92	15.3	14.9	25.5	24.8	42.5	41.3
	Psi	285	275	740	720	1480	1440	2220	2160	3705	3600	6170	6000
-28.8~93.3℃ (-20~200℉)	Mpa	1.79	1.65	4.65	4.27	9.31	8.54	13.9	12.8	23.2	21.3	38.8	35.5
	Psi	260	240	675	620	1350	1240	2025	1860	3375	3095	5625	5160
-28.8~204.4℃ (-20~400℉)	Mpa	1.38	1.34	4.38	3.96	8.76	7.09	13.1	10.6	21.8	17.7	36.4	29.5
	Psi	200	195	635	515	1270	1030	1900	1540	3170	2570	5280	4280
-28.8~315.5℃ (-20~600℉)	Mpa	0.96	0.96	3.79	3.10	7.55	6.23	11.3	9.33	18.8	15.5	31.4	25.9
	Psi	140	140	550	450	1095	905	1640	1355	2735	2255	4560	3760
Test Pressure & Material Info		1.5 times maximum working pressure at -28.8~37.7℃(-20~100℉) Material A=Carbon Steel Flanges / Material B=Stainless Steel Flanges											

Measured Fluid List

01. Acetic Acid	15. Ethane	29. Liquid Sulfur
02. Adipic Acid	16. Ethylene Diamind (EDA)	30. LPG
03. Allyl Chloride	17. Ethylene Dichloride (EDC)	31. Mercaptans (odorizers)
04. Anhydrous Ammonia	18. Ethylene Glycol	32. Methyl Chloride
05. Animal Fats	19. Fresh Water	33. Nitric Acid
06. Brine	20. Fuel Oils	34. Octylphenol
07. Butadiene	21. Gasoline	35. Oxides
08. Butane	22. Hydrazine Fuel	36. Perchiorethylene
09. Carbon Tetrachloride	23. Industrial Solvents	37. Propane
10. 5% Caustic Solution	24. JP4 Aviation Fuel	38. Remaining Chlorides (RCL)
11. 50% Caustic Solution	25. Lacquer Thinner	39. Toluene
12. Crude Oil	26. Liquid Chemical Waste	40. Trimethylamine
13. Deionized Water	27. Liquid CO2	41. Vinyl Forms
14. Diesel	28. Liquid Fertilizers	42. Weak Solution of EDA and Water

Geenbellon Products Lines

Pressure
Pressure Transducers / Strain Gages / Load Cells, Force Sensors &Torque Transducers / Pressure Gauges / Pressure Switches / Displacement & Proximity Transducers / Dynamic Measurement

Flow
Turbine / Electromagnetic / Dual-Rotor (Gear; Oval Gear; Screw Rod) / Ultrasonic / Vortex Shedding / Mass / Mini-flow / Rotameters / Different Pressure / Sliding & Rotary Vane (PD)

Level
Continuous Ultrasonic Level Transmitters / Continuous Capacitive Level Transmitters / Continuous Radar Level Measurement / Ultrasonic Point Level Switches / Solid State Radio Frequency Level Switches

Temperature
Thermocouples / Thermowells and Head & Well Assemblies / Thermistor Elements, Probes and Assemblies / Transmitters

Pump
Gear Pumps / Rubber Impeller Pumps / Drum Pumps / Centrifugal Pumps and Motors / Peristaltic Pumps / Chemical Metering Pumps

Valve
General Purpose Solenoid Valves / Solenoid Valves for Select Corrosives / Air Operated Diaphragm Valves / Solenoid Valve Timers / Ball Valves / Drain Valves / Proportional Valves

Data Acquisition
I/O Hardware (Analog Input Cards; Analog Output Cards; Digital I/O & Counter/Timer Cards; Stand-Alone Systems; Ethernet & USB Systems) / Presentation, Communications & Conditioning / Recording & Storage

Special Tool & Instruments
Medical / Oil-Field / Aerospace

Accessory
Smalley Spiral Retaining Rings & Wave Spring / Weco Union, Valve, Swivels(Valves; Fittings; Unions; Chiksan Swivels) / Hose Couplings / Tube Fitting / Sensors / Flanges / Groove rigid coupling / GrayLOC connector / Safety Barrier

For more information about how Geenbellon products and services can enhance your life and value of the field you are working in, contact your local Geenbellon representative or our equipment and product centers.

INTERNATIONAL REGIONAL OFFICE

CAN REP. OFFICE
201-6350 Willingdon Avenue,
Burnaby, BC, V5H 2V4 CAN
Tel: 1-(604) 872 2932
Fax: 1-(604) 821 0739
Email: can@Geenbellon.us

UK REP. OFFICE
30a Devonshire Road,
London, UK SW19 2EF
Tel: 44-(776) 561 2930
Fax: 44-(776) 872 2932
Email: uk@Geenbellon.us

CHINA REP. OFFICE
No.311,Building 4,Lvyin villa
Community, Huoxian Town,
Tongzhou Dist. Beijing P.R.China
Tel: 86-(10) 81155778
Fax: 86-(10) 80583174
Email: cha@Geenbellon.us

DUBAI REP. OFFICE
14th Floor, Citibank Tower, Dubai,
United Arab Emirates
Tel: 971-(4) 303 6363
Fax: 971-(4) 303 6364
Email: dub@Geenbellon.us

Headquarters Address: 122 S Hardy DR, #25, Tempe, AZ, USA 85281-2583
Mailing address: P.O. Box 1063, Tempe, AZ, USA 85280
Telephone: 1-480-526-0866 Fax: 1-480-361-7010
Email: info@Geenbellon.us sales@Geenbellon.us