

Uppgiftslämnaren reserverar sig för eventuella fel i produktinformationen eller felaktigt registrerade uppgifter och förbehåller sig rätten att korrigera och/eller komplettera produktinformation utan föregående avisering

1 GRUNDDATA

Varubeskrivning

Rör och rördelar av PVC-U - för limning

Övriga upplysningar

Klassificeringar

ETIM ›	<ul style="list-style-type: none"> -EC010882 - Plaströr slätt -EC003024 - Rördel med 2 anslutningar -EC003025 - Rördel med 3 anslutningar -EC003026 - Rördel med 4 anslutningar -EC010256 - Flänskrage/Bordring -EC003023 - Rördel med 1 anslutning
BK04 ›	-20512 - Plaströrssystem industri
BSAB ›	-PB-.51 - Ledning av plaströr, tryckrör
UNSPSC ›	

Leverantörsuppgifter

Företagsnamn

Georg Fischer AB

Organisationsnummer

5560744285

Adress

Liljeholmstranden 5

Hemsida

www.georgfischer.se/

Miljökontaktperson

Namn

Jan Nordgren

Telefon

08 50677513

E-post

jan.nordgren@georgfischer.com

2 HÅLLBARHETSARBETE

Företagets certifiering

- ISO 9000
- ISO 14000

Policys och riktlinjer

Affärsidé Georg Fischer AB:

Vi skall erbjuda våra kunder optimala och kostnadseffektiva tekniska lösningar, med produkter, tjänster och kundservice av hög kvalitet. Vi eftersträvar en marknadsledande position inom valda marknadssegment.

Vi arbetar med försäljning, sammansättning och marknadsföring av rörsystem för säker transport av vätskor och gaser.

Vi skall i vår verksamhet hushålla med naturens resurser.

3

INNEHÅLLSDEKLARATION

Kemisk produkt	Nej
Omfattas varan av RoHS-direktivet	Nej
Innehåller produkten tillsatt nanomaterial, som är medvetet tillsatta för att uppnå en viss funktion	Nej
Varans vikt	0,04 - 106 kg

Vara / Delkomponenter

Koncentrationen har beräknats på hela varan

Ingående material /komponenter	Vikt-% i komponent	CAS-nr (alt legering)	EG-nr (alt legering)	Vikt % i produkt	Kommentar
Färgämne	1%	Övrigt, kemikalier		1%	Pigment (ej kadmiumhaltiga) för ändamålet godkända
styv PVC, Polyvinylklorid, Ethene, chloro-, homopolymer	99%	9002-86-2		99%	

Del av materialinnehållet som är deklarerat 100%

Särskilt farliga ämnen

Varan innehåller INTE några ämnen med särskilt farliga egenskaper (Substances of very high concern, SVHC-ämnena) som finns med på kandidatförteckningen i en koncentration som överstiger 0,1 vikts-%

Utgåva av kandidatförteckningen som har använts

2020-01-16 00:00:00

Övrigt

Ämnen är redovisade ned till 0.01 viktprocent enligt iBVDs redovisningskrav. Eventuell avvikelse

från redovisningskraven redovisas nedan

4 RÅVAROR

Återvunnet material

Innehåller varan återvunnet material: Nej

Träråvara

Träråvara ingår i varan: Nej

5 MILJÖPÅVERKAN

Finns en miljövarudeklaration framtagen enligt EN15804 eller ISO14025 för varan

Nej

Finns annan miljövarudeklaration

Nej

6 DISTRIBUTION

Beskrivning av emballagehantering för distribution av varan

Produkterna levereras till grossist i fulla kartonger

7 BYGGSCKEDET

Ställer varan särskilda krav vid lagring?

Ja

Förvaras i originalförpackning, iakttag följande:

-Konstant lagringstemperatur ej över +30°C

-Skydda mot ljus, speciellt solljus

Ställer varan särskilda krav på omgivande byggvaror?

Nej

8 BRUKSSKEDET

Finns skötselanvisningar/skötselråd?

Nej

Finns en energimärkning enligt energimärkningsdirektivet (2010/30/EU) för varan?

Ej relevant

9

RIVNING

Kräver varan särskilda åtgärder för skydd av hälsa och miljö vid rivning/demontering? Nej

10

AVFALLSHANTERING

Omfattas den levererade varan av förordningen (2014:1075) om producentansvar för elektriska och elektroniska produkter när den blir avfall? Nej

Är återanvändning möjlig för hela eller delar av varan? Ja

Plaströrsbranschen har eget återvinningssystem.

Är materialåtervinning möjlig för hela eller delar av varan? Nej

Är energiåtervinning möjlig för hela eller delar av varan? Ja

Brännbart material

Har leverantören restriktioner och rekommendationer för återanvändning, material- eller energiåtervinning eller deponering? Ja

Plaströrsbranschen har eget återvinningssystem.

När den levererade varan blir avfall, klassas den då som farligt avfall? Nej

Avfallskod (EWC) för den levererade varan 170203

RSK-nummer	Eget Artikel-nr	GTIN
225 25 03	161017037	
225 25 04	161017038	
225 25 05	161017039	
225 25 06	161017040	
225 25 07	161017041	
225 25 08	161017042	
225 25 09	161017043	
225 25 10	161017044	
225 25 11	161017045	
225 25 12	161017046	
225 25 13	161017047	
225 25 14	161017048	
225 25 15	161017060	
225 25 16	161017061	
225 25 17	161017062	
225 25 18	161017063	
225 25 19	161017064	
225 25 20	161017065	
225 25 21	161017066	
225 25 22	161017067	
225 25 23	161017068	
225 25 24	161017069	
225 25 25	161017070	
225 25 26	161017071	
225 25 27	161017072	
225 25 28	161017073	
225 25 29	161017074	
225 25 30	161017082	
225 25 31	161017083	
225 25 32	161017084	
225 25 33	161017085	
225 25 34	161017086	
225 25 35	161017087	
225 25 36	161017088	
225 25 37	161017089	
225 25 38	161017090	
225 25 39	161017091	
225 25 40	161017092	
225 25 41	161017093	
225 25 42	161017094	
225 25 43	161017095	
225 25 44	161017096	

225 25 45	161017097	
225 25 46	161017098	
225 25 47	161017104	
225 25 48	161017105	
225 25 49	161017106	
225 25 50	161017107	
225 25 51	161017108	
225 25 52	161017109	
225 25 53	161017110	
225 25 54	161017111	
225 25 55	161017112	
225 25 56	161017113	
225 25 57	161017114	
225 25 58	161017115	
225 25 59	161017116	
225 25 60	161017117	
225 25 61	161017126	
225 25 62	161017127	
225 25 63	161017128	
225 25 64	161017129	
225 25 65	161017130	
225 25 66	161017131	
225 25 67	161017132	
225 25 68	161017133	
225 25 69	161017134	
225 25 70	161017135	
225 25 71	161017136	
225 25 72	161017137	
225 25 73	161017138	
225 25 74	161017139	
225 26 00	192017036	
225 26 01	192017037	
225 26 02	192017038	
225 26 03	192017039	
225 26 04	192017040	
225 26 05	192017041	
225 26 06	192017042	
225 26 07	192017044	
225 26 08	192017045	
225 26 09	192017046	
225 26 10	192017047	
225 26 11	192017082	
225 26 12	192017083	
225 26 13	192017084	
225 26 14	192017085	
225 26 15	192017086	

225 26 16	192017087	
225 26 17	192017088	
225 26 18	192017089	
225 26 19	192017104	
225 26 20	192017105	
225 26 21	192017106	
225 26 22	192017107	
225 26 23	192017108	
225 26 24	192017109	
225 26 25	192017110	
225 26 26	192017111	
226 10 22	721000106	
226 10 30	721000107	
226 10 48	721000108	
226 10 55	721000109	
226 10 63	721000110	
226 10 71	721000111	
226 10 89	721000112	
226 10 97	721000113	
226 11 05	721000114	
226 11 13	721000116	
226 11 21	721000117	
226 11 47	721010120	
226 20 04	721100104	
226 20 12	721100105	
226 20 20	721100106	
226 20 38	721100107	
226 20 46	721100108	
226 20 53	721100109	
226 20 61	721100110	
226 20 79	721100111	
226 20 87	721100112	
226 20 95	721100113	
226 21 03	721100114	
226 21 11	721100116	
226 21 29	721100117	
226 21 37	721100115	
226 21 45	721100119	
226 21 52	721100101	
226 21 60	721100102	
226 21 78	721100103	
226 21 86	721100120	
226 25 00	721100306	
226 25 01	721100307	
226 25 02	721100308	
226 25 03	721100309	

226 25 04	721100310	
226 25 05	721100311	
226 25 06	721150306	
226 25 07	721150307	
226 25 08	721150308	
226 25 09	721150309	
226 25 10	721150310	
226 25 11	721150311	
226 25 12	721200306	
226 25 13	721200307	
226 25 14	721200308	
226 25 15	721200309	
226 25 16	721200310	
226 25 17	721200311	
226 25 39	721910903	
226 25 40	721910905	
226 25 41	721910906	
226 25 42	721910908	
226 25 43	721910909	
226 25 44	721910910	
226 25 45	721910911	
226 25 46	721910912	
226 25 47	721910913	
226 25 48	721910914	
226 25 49	721910915	
226 25 50	721910916	
226 25 51	721910917	
226 25 52	721910918	
226 25 53	721910919	
226 25 54	721910920	
226 25 55	721910921	
226 25 56	721910922	
226 25 57	721910923	
226 25 58	721910924	
226 25 59	721910925	
226 25 60	721910926	
226 25 61	721910927	
226 25 62	721910928	
226 25 63	721910929	
226 28 14	721150105	
226 28 22	721150106	
226 28 30	721150107	
226 28 48	721150108	
226 28 55	721150109	
226 28 63	721150110	
226 28 71	721150111	

226 28 89	721150112	
226 28 97	721150113	
226 29 05	721150114	
226 29 13	721150116	
226 29 21	721150117	
226 29 39	721150115	
226 29 46	721150119	
226 29 47	721150120	
226 40 00	721200104	
226 40 18	721200105	
226 40 26	721200106	
226 40 34	721200107	
226 40 42	721200108	
226 40 59	721200109	
226 40 67	721200110	
226 40 75	721200111	
226 40 83	721200112	
226 40 91	721200113	
226 41 09	721200114	
226 41 17	721200115	
226 41 25	721200114	
226 41 33	721200117	
226 41 41	721200119	
226 41 58	721200101	
226 41 66	721200102	
226 41 74	721200103	
226 41 82	721200120	
226 42 57	721200134	
226 42 81	721200141	
226 42 99	721200138	
226 43 31	721200155	
226 43 49	721200151	
226 43 56	721200147	
226 43 80	721200009	
226 43 98	721200010	
226 44 06	721200164	
226 44 14	721200161	
226 44 48	721200011	
226 44 55	721200178	
226 44 63	721200174	
226 44 71	721200170	
226 61 12	721250106	
226 61 20	721250107	
226 61 38	721250108	
226 61 46	721250109	
226 61 53	721250110	

226 61 61	721250111	
226 61 79	721250112	
226 61 87	721250113	
226 61 95	721250114	
226 61 97	721250105	
226 61 98	721250116	
226 61 99	721250117	
226 62 00	721300105	
226 62 01	721300112	
226 62 02	721300113	
226 62 03	721300114	
226 64 27	721300106	
226 64 35	721300107	
226 64 43	721300108	
226 64 50	721300109	
226 64 68	721300110	
226 64 76	721300111	
226 70 03	721910104	
226 70 11	721910105	
226 70 29	721910106	
226 70 37	721910107	
226 70 45	721910108	
226 70 52	721910109	
226 70 60	721910110	
226 70 78	721910111	
226 70 86	721910112	
226 70 94	721910113	
226 71 02	721910114	
226 71 10	721910115	
226 71 28	721910116	
226 71 36	721910117	
226 71 44	721910119	
226 71 51	721910101	
226 71 69	721910102	
226 71 77	721910103	
226 71 85	721910120	
226 80 01	721910334	
226 81 35	721910352	
226 81 50	721910358	
226 82 25	721910337	
226 82 33	721910341	
226 82 58	721910346	
226 82 84	721910364	
226 87 04	721910323	
226 87 12	721910326	
226 87 20	721910325	

226 87 61	721910332	
226 89 44	721910370	
226 89 52	721910385	
226 94 05	721900329	
226 94 13	721900331	
226 94 21	721900334	
226 94 47	721900337	
226 94 62	721900342	
226 94 70	721900341	
226 94 96	721900348	
226 95 04	721900347	
226 95 12	721900346	
226 95 38	721900353	
226 95 46	721900352	
226 95 61	721900360	
226 95 79	721900359	
226 95 87	721900358	
226 96 03	721900365	
226 96 11	721900364	
226 96 37	721900372	
226 96 45	721900371	
226 96 52	721900370	
226 96 60	721900378	
226 96 86	721900376	
226 97 02	721900379	
226 97 36	721900386	
226 97 44	721900385	
226 97 51	721900384	
226 97 69	721900396	
226 97 77	721900391	
226 97 85	721900390	
226 97 93	721900388	
227 50 14	721800105	
227 50 22	721800106	
227 50 30	721800107	
227 50 48	721800108	
227 50 55	721800109	
227 50 63	721800110	
227 52 12	721810105	
227 52 20	721810106	
227 52 38	721810107	
227 52 46	721810108	
227 52 53	721810109	
227 52 61	721810110	
227 52 79	721810111	
227 52 87	721810112	

227 52 95	721810113	
227 53 03	721810114	
227 53 11	721810115	
227 53 29	721810116	
227 53 37	721810117	
227 53 45	721810119	
227 53 52	721810120	
227 55 19	721790111	
227 55 20	721790119	
227 55 27	721790112	
227 55 35	721790113	
227 55 43	721790114	
227 55 50	721790115	
227 55 68	721790116	
227 55 76	721790117	
227 55 92	721790120	
227 64 00	721960304	
227 64 18	721960305	
227 64 26	721960306	
227 64 67	721960303	
227 65 09	721960404	
227 65 17	721960405	
227 65 25	721960406	
227 65 33	721960407	
227 65 41	721960408	
227 65 58	721960409	
227 65 66	721960403	
227 65 90	721960704	
227 66 08	721960705	
227 66 16	721960706	
227 66 24	721960707	
227 66 32	721960708	
227 66 40	721960709	
227 67 07	721960104	
227 67 15	721960105	
227 67 23	721960106	
227 67 31	721960107	
227 67 49	721960108	
227 67 56	721960109	
227 67 64	721960110	
227 67 72	721960111	
227 67 80	721960112	
227 67 98	721960113	
227 68 06	721960114	
227 68 14	721960116	
227 68 22	721960117	

Produktdatablad	gfps-6220-brochure-pvc-u-pvc-c-abs-system-en.pdf
Prestandadeklaration	gfps-system-specification-pvc-u-metric-en.pdf
Säkerhetsblad	
Miljövarudeklaration	
Skötselansvisning	
Övriga bifogade dokument	

Cemented Systems

PVC-U System
PVC-C System
ABS System

Universal use, excellent chemical resistance, easy to install

Metric and british standard range



Solutions for any challenge

Cemented systems are qualified for universal usage in highly diverse industrial applications.

For safe, reliable and cost effective treatment and distribution of water and chemicals, GF Piping Systems has a comprehensive cemented system portfolio, which includes corresponding jointing technologies, fittings, valves, sensors, pipes and related tools as well as services. The PVC-U range of GF Piping Systems, which has been leading the industry for decades through continuous innovation and proven benefits on safety, efficiency and reliability, covers all aspects required to build, maintain and operate industrial piping systems.

+ Main benefits

- Safety** = **System lifetime warranty ***
- Simplicity** = **Simple installation with low costs for tools**
- Efficiency** = **Excellent price-performance ratio**
- Environment** = **Low carbon & water footprint**

* Detailed information regarding the warranty can be found under: www.gfps.com - Planning Fundamentals

+ Everything from one source – From the planning stage to installation

Cemented systems are ideally adapted to customer needs.

We offer our customers not only reliable and innovative products, we supply tailor-made solutions from one source, which generate assurance for our customers. With a comprehensive system solution, GF Piping Systems provides the right fit and quality for many industrial applications and projects worldwide. The diversity of pipes, fittings, valves, jointing as well as automation technologies in the cemented systems portfolio is as diverse as our customers and their individual challenges.

Customizing

The focus of our global customizing teams is manufacturing custom parts for special systems. Standardized processes warrant the highest level of quality.

Technical support

Technical support and material selection are key factors for a successful installation. A team of experts is available for individual support all around the world.



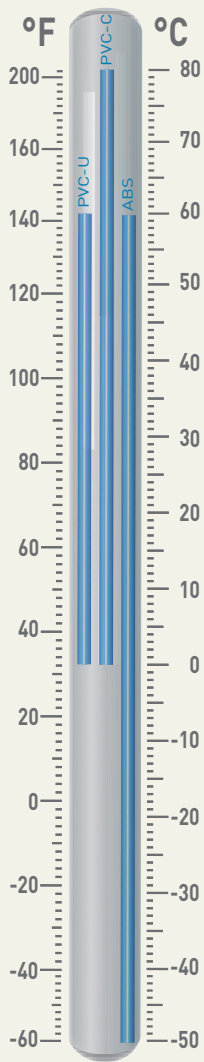
Pipes



Fittings



Valves



PVC-U System (0 °C to +60 °C)

The universal character of PVC-U and its excellent chemical and corrosion resistance offer numerous fields of application. The system is widely used in the chemical and textile industry, in water treatment processes, for drinking water applications and vacuum lines.



PVC-C System (0 °C to +80 °C)

The corrosion-resistant system has a long service life and a high safety factor in aggressive or corrosive environments. PVC-C systems are in use wherever aggressive media such as mixed acid waste or acids at a high temperature are transported, for example, in the chemical, paper and pulp industry or in metal treatment and microelectronic production.



ABS System (-50 °C to +60 °C)

ABS systems offer an energy efficient solution for industrial low temperature applications, refrigeration and cooling systems. The high impact resistance even at low temperatures and the low heat conductivity support its use in cold and climate-controlled areas.



Technical documentation

Our extensive know-how of more than 50 years is fully documented in detail in our technical manuals, planning fundamentals and application guides.

Chemical resistance

In the area of chemical resistance our specialist teams offer individual support and advice in selecting the right material for the corresponding requirements.

Online and mobile calculation tools

Our numerous online and mobile calculation tools - available in ten languages - support our customers in configuring and commissioning automation products.

CAD library

The extensive CAD library is the most frequently used planning tool. The freely available database comprises over 30 000 drawings as well as technical data for our customers. Many formats are available.

Training courses and on-site training

GF Piping Systems offers a wide range of training courses that allow participants to gain confidence in working with our products and the proven jointing technologies.

System lifetime warranty *

Confirming confidence in the premium quality of our PVC-U product and system range, we grant a limited system lifetime warranty.



Automation



Jointing technology



Customizing and training

* Detailed information regarding the warranty can be found under: www.gfps.com - Planning fundamentals

System range

More than a system

We are committed to absolute conformity to standards and material approvals in diverse areas of application. Covering all requirements of the most significant international standards - as stated below - proves the quality, safety and reliability of our products. Therefore, with our cemented system range, our customers can be assured that their needs are covered and comply with most applicable standards.

Standards *: ISO, EN, ASTM, JIS, BS, CE, RoHS, DIN, DVS

Metric range

Products	bar	d																											
		DN	bar	6	8	10	12	16	20	25	32	40	50	63	75	90	110	125	140	160	180	200	225	250	280	315	355	400	
Pipes	PN6-16																												
Fittings	PN6-16																												
Ball Valves	PN6-16																												
Butterfly Valves	PN6-10																												
Check Valves	PN6-16																												
Diaphragm Valves	PN6-16																												
Flanges	PN6-16																												
Gaskets & Pipe Clips	PN16			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sensors & Controllers (P, T, pH, flow, analytical)	-			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

British standard range

Products	bar	d																											
		DN	bar	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	5"	6"	8"	10-16"											
Pipes	PN9-15																												
Fittings	PN9-15																												
Ball Valves	PN16																												
Butterfly Valves	PN10																												
Check Valves	PN6-16																												
Diaphragm Valves	PN6-16																												
Flanges	PN10-16																												
Gaskets & Pipe Clips	PN16			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sensors & Controllers (P, T, pH, flow, analytical)	-			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

■ PVC-U system
■ PVC-C system
■ ABS system

Approvals *:



* The most significant standards and approvals are shown above. An overview of all approvals online: www.gfps.com

Chemical resistance

For your operational safety

Our special teams offer individual support and advice in selecting the right material of inner pipe for the corresponding requirements.

Chemical resistance at 20 °C

(Applications can be very dependent on the concentration)

		Amorphous thermoplastics	
		PVC-U	PVC-C
Oxidizing Acids (HNO ₃ , H ₂ CrO ₄ , H ₂ SO ₄ , etc.)	HNO ₃ ≤ 25 %	+	+
	25 % ≤ HNO ₃ ≤ 65 %	o	+
	H ₂ CrO ₄ aqueous solution	o	o
	H ₂ SO ₄ ≤ 70 %	+	+
	70 % ≤ H ₂ SO ₄ ≤ 96 %	+	+
Non Oxidizing Acids (HCl, HF, etc.)	HCl ≤ 30 %	+	+
	HF ≤ 40 %	+	-
	40 % ≤ HF ≤ 75 %	-	-
Organic (formic acid, acetic acid, citric acid, etc.)	HCOOH ≤ 25 %	+	+
	25 % ≤ HCOOH ≤ 50 %	+	-
	CH ₃ COOH ≤ 50 %	+	o
	50 % ≤ CH ₃ COOH ≤ tech. pure	o	-
	C ₃ H ₄ (COOH) ₃	+	+
Bases	Inorganic (NaOH, KOH, etc.)	+	o
	Organic (amine, imidazole, etc.)	o	-
Salts	NaCl, FeCl ₂ , FeCl ₃ , CaCl ₂ , etc.	+	+
Halogens	Chlorine, bromine, iodine, (no fluorine)	o	o
Fuels / Oils	Aliphatic hydrocarbons	+	o
	Aromatic hydrocarbons	-	-
	Chlorinated hydrocarbons	-	-
Solvents	Ketones	-	-
	Alcohols	o	-
	Esters	-	-
	Aldehydes	-	-
	Phenols	Phenol, Kresol, etc.	-
Oxidizing agents	NaOCl, ozone, etc.	o	o

+ resistant o conditionally resistant, please consult us - not resistant

The ABS material used by GF is chemically resistant against a wide range of cooling media based on glycols and aqueous solutions of alkali metal formates and acetates. Due to the individual chemical composition of the commercial products used as cooling media please contact GF (chem@georgfischer.com) for detailed advice. For additional information, please check the GF Online Tools: ChemRes and Cooling Calculation Tool.

Please note: The above list is only intended as a guideline and does not replace an in-depth review of material suitability for the particular application. The information is based on our experience and is state of the art. These data are general indicators only. In practice, however, other factors such as concentration, pressure and jointing technology must also be taken into consideration. The technical data are not binding and are not expressly warranted characteristics of the goods. Please contact us for help in selecting the right materials.

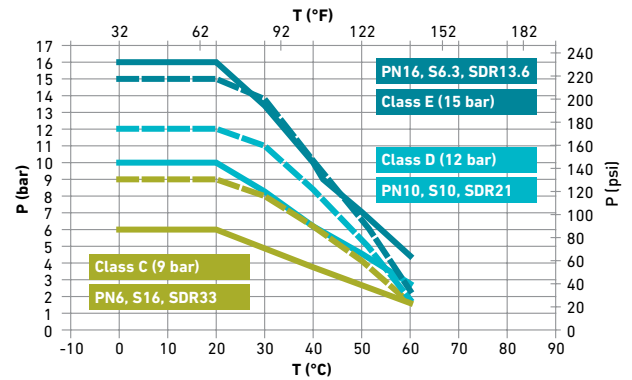
Exceeding quality standards

Pressure-temperature diagram and further system specifications

PVC-U (Metric + British standard)

PVC-U shows very good characteristics in the temperature range from 0-60 °C. Ensuring highest possible thermal stability and chemical resistance PVC-U systems stand up to the most demanding conditions, particularly where media such as acids, bases and salts are transported. The universal solution covers all aspects of safety, efficiency and reliability required to build, maintain and operate industrial piping systems.

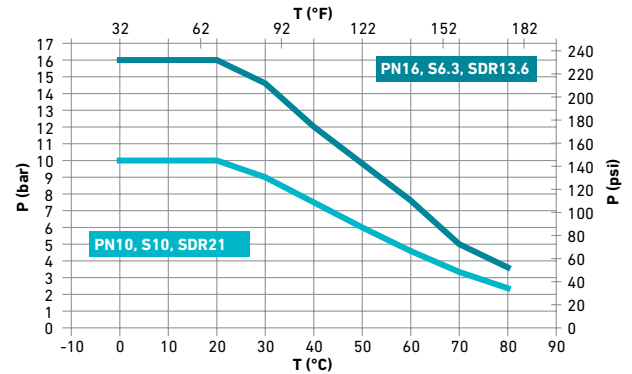
Pressure-temperature diagram



PVC-C (Metric standard)

PVC-C piping materials, having an operational temperature range from 0-80 °C, are suitable for high temperature environments. The excellent mechanical characteristics such as a high tensile strength, stiffness and impact strength are evident even at increased temperatures.

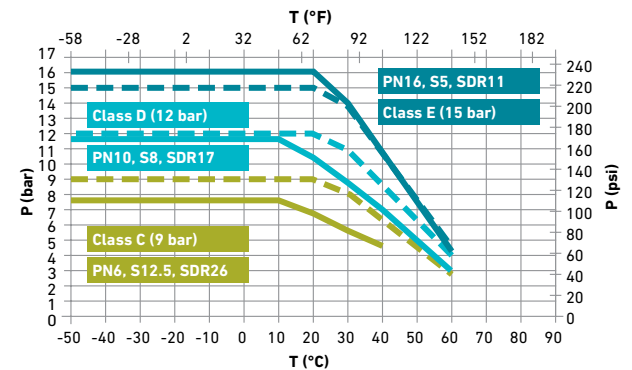
Pressure-temperature diagram



ABS (Metric + British standard)

The outstanding characteristics of ABS allow its application in a wide temperature range between -50 °C and +60 °C. The exceptionally high notched impact strength values, even at low temperatures, indicate the material's high robustness and tolerance to surface damage.

Pressure-temperature diagram



- C** Design factor (C=2)
- P** Permissible pressure in bar, psi
- T** Temperature °C (Celsius), °F (Fahrenheit)

— Metric standard
 - - - British standard

Where mixed chemicals and/or high or low temperature and pressure factors are added to chemical resistance factors in the use of a particular piping material, it is advisable to test the suitability of the material under the proposed temperature and pressure conditions.

Pressure-temperature diagrams of GF Piping Systems reflect the physical characteristics and properties of the different cemented systems, which have to be considered to warrant a successful operation.

Our team of experts offers individual support services to assist our customers in determining the right system selection, considering factors such as pressure, temperature and chemical resistance as well as valve maintenance cycles, sealing material and automation.



Material specifications	Cemented systems		
	PVC-U	PVC-C	ABS
Systems			
Material	Polyvinylchloride	Polyvinylchloride	Acrylnitrile-Butadien-Styrene
Colour	RAL 7011	RAL 7038	RAL 7001
Density	1.38 g / cm ³	1.50 g / cm ³	1.035 g / cm ³
Thermal Expansion Coefficient	0.075 mm / m K	0.065 mm / m K	0.1 mm / m K
Heat conductivity at 23 °C	0.17 W / m K	0.15 W / m K	0.15 W / m K
Yield Stress at 23 °C	≥ 52 N / mm ²	≥ 53 N / mm ²	≥ 40 N / mm ²
VICAT Temperature	≥ 76 °C	≥ 103 °C	≥ 94 °C
Silicone Free	√	√	√
Drinking Water Certificates	√		

More information regarding technical specifications can be found online in our planning fundamentals: www.gfps.com

From planning to installation

Providing jointing technologies in the portfolio strengthens the integrated system approach offered by GF Piping Systems. With the invention of the cement jointing system, GF Piping Systems leads the industry in jointing technology. Today the cemented systems benefit from excellent jointing technology complemented with all the planning and preparation tools needed to successfully accomplish customers' projects. Factors such as reliability, simplicity in application, chemical resistance and the highest possible thermal stability were always emphasised and still play a major role. The cemented jointing system has proven to be reliable with over a billion joints installed. The system lifetime warranty * on our PVC-U system warrants you peace of mind.

Planning tools



The material selection, technical data, application area and the medium represent the key criteria in the planning process. Our customers benefit from easy access to all our planning tools.

Preparation



The additional range of preparation tools and installation equipment ensures a safe, efficient and simple jointing process. Time saving "dry fit" installations on PVC-U are most of the time possible due to our excellence in production and tight tolerances.

Jointing techniques



Solvent cementing

Solvent cementing is the simplest and most efficient jointing method, suitable for almost every medium and requiring no investment in expensive equipment.



Mechanical

Mechanical jointing is a versatile connection with a high number of removable or permanent joints for numerous applications and environments. Our range covers flanges, unions, transition fittings and special adaptors.

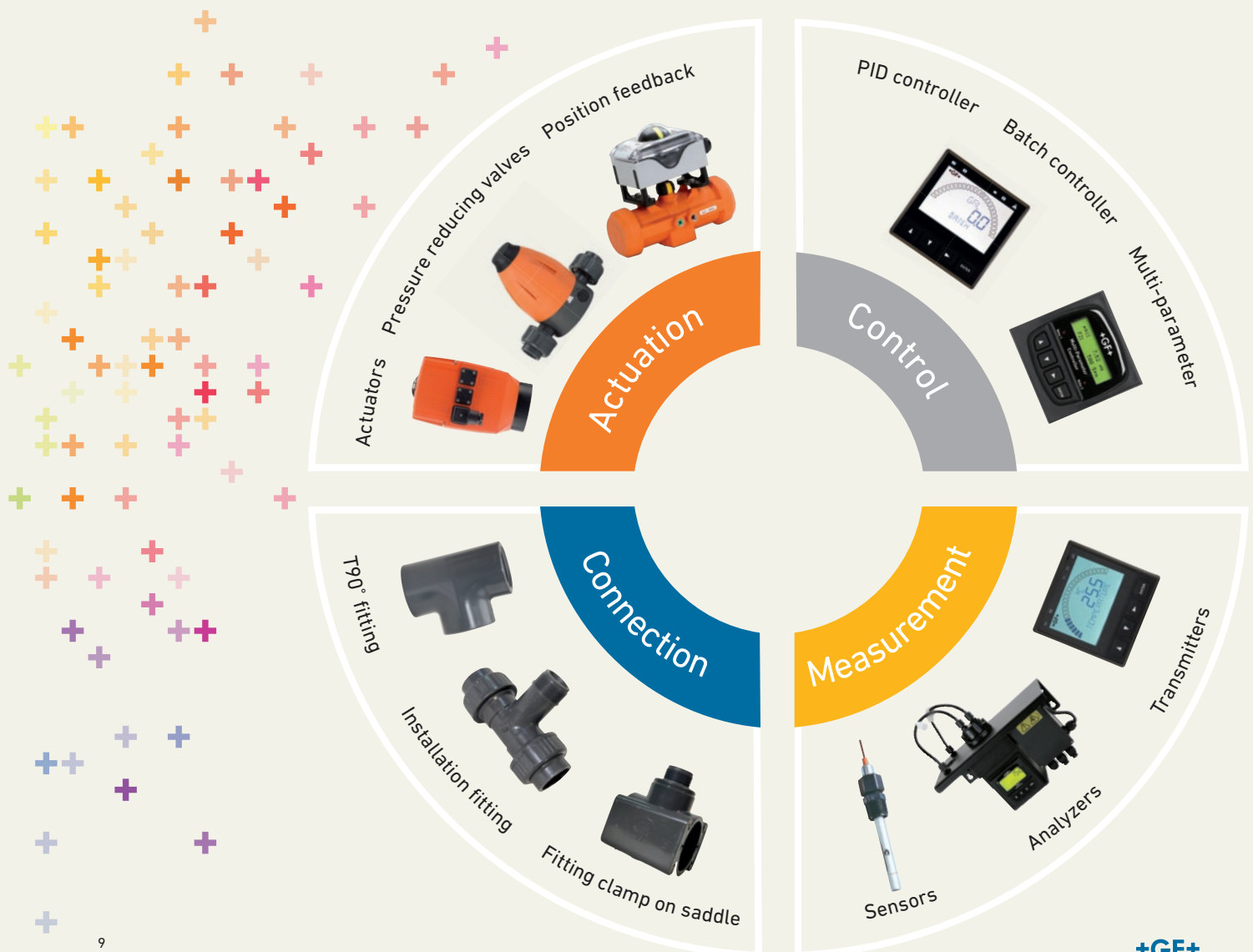
* Detailed information regarding the warranty can be found under: www.gfps.com - Planning Fundamentals

The smarter way of automation

Automation made easy

A unique system-based approach that bundles and integrates competencies, knowledge, best-in-class resources and technologies.

With an innovative product portfolio in the field of measurement, control and actuation devices, GF Piping Systems follows its system approach consistently. The complete solution combines measurement, control and actuation technology together with high quality piping systems and therefore represents a unique form of product and competence bundling. The system-integrated devices that measure values such as temperature, pressure and flow deliver accuracy, productivity, reliability and safety to customers in a wide range of industries. Providing the entire range of automation technology from simple instrument panels to complex measurement installations, GF Piping Systems has not only the product resources and the technical know how, but also the global service and support infrastructure needed to meet the high customer requirements.



Applications

As versatile as your applications

Application-oriented systems of highest safety and reliability to fit your demanding industrial applications.



Outstanding solutions for the microelectronics industry

PVC-U high-quality system solutions with fittings and valves warrant efficient processes with a long operational life span and a maximum of security and profitability for reliable and cost-optimized Di- or mid-range water qualities.



Automated mixing facility for chemical process industries

Reliable PVC-U solutions for flexible mixing of chemicals complies with the respective health and safety regulations. User- and maintenance-friendly systems are the standard of GF Piping Systems.

Key products in focus

+ Safety



Adapter union / Transition fittings

The adapter unions ensure a safe metal to plastic transition covering materials such as stainless steel, brass, copper or malleable iron. The innovative transition fitting is also offered with metal inserts. Leak tightness is ensured even in case of vibration and temperature fluctuations. All unions are available with male and female threads.

+ Simplicity



PRO-FIT Socket-spigot system

The unique socket-spigot system saves labour time, space as well as material and installation costs. Its compact design with up to 20 % closer spacing in axial distances, less cementing effort and reduced material requirements through direct transitions are big advantages that result in a maximum of efficiency.

GF Piping Systems develops customized best-in-class solutions, aligned to the specific requirements of our customers, enabling profitable operations. Most notably our systems are ideally suited for the water treatment and the chemical process industry.

With our system knowledge and product expertise, we support our customers during the planning process, the sustainable realization of the projects and provide valuable added services. Expertise in developing and producing piping systems, combined with profound industry and market knowledge, based on longstanding experience, makes GF Piping Systems a qualified and professional partner for our customers.



precise tank filling solutions for water treatment

Highly chemical resistant PVC-U piping system installed in a tank top construction with batch filling offers fast, precise and safe filling of tanks. A solution that provides benefits in quality, productivity and maintenance costs.



Water recycling in high-performance shipbuilding

PVC-U piping systems, combined with innovative measurement and control technology, provide a highly economical solution for water treatment and recycling. Chemical compatibility is warranted within the water cycle process.

+ Efficiency



**Diaphragm valve
Type 604 / 605**

The full-plastic diaphragm valve 604 / 605 with integrated pneumatic actuator ensures best flow performance in compact design. With this corrosion free valve we offer an additional product with the most economic price-performance ratio which is suitable for many applications.

+ Environment



**Cone check valve
Type 561 / 562**

The valve is compact, easy to install and very reliable. The wide range of products and materials, as well as the many connection options, make this valve ideal for many different applications. Installation in any orientation is possible.

Worldwide at Home

Our sales companies and representatives ensure local customer support in over 100 countries

www.gfps.com

Argentina / Southern South America

Georg Fischer Central Plastics
Sudamérica S.R.L.
Buenos Aires, Argentina
Phone +54 11 4512 02 90
gfcentral.ps.ar@georgfischer.com
www.gfps.com/ar

Australia

George Fischer Pty Ltd
Riverwood NSW 2210 Australia
Phone +61 (0) 2 9502 8000
australia.ps@georgfischer.com
www.gfps.com/au

Austria

Georg Fischer
Rohrleitungssysteme GmbH
3130 Herzogenburg
Phone +43 (0) 2782 856 43-0
austria.ps@georgfischer.com
www.gfps.com/at

Belgium / Luxembourg

Georg Fischer NV/SA
1070 Bruxelles/Brüssel
Phone +32 (0) 2 556 40 20
be.ps@georgfischer.com
www.gfps.com/be

Brazil

Georg Fischer Sist. de Tub. Ltda.
04571-020 São Paulo/SP
Phone +55 (0)11 5525 1311
br.ps@georgfischer.com
www.gfps.com/br

Canada

Georg Fischer Piping Systems Ltd
Mississauga, ON L5T 2B2
Phone +1 (905) 670 8005
Fax +1 (905) 670 8513
ca.ps@georgfischer.com
www.gfps.com/ca

China

Georg Fischer Piping Systems Ltd
Shanghai 201319
Phone +86 21 3899 3899
china.ps@georgfischer.com
www.gfps.com/cn

Denmark / Iceland

Georg Fischer A/S
2630 Taastrup
Phone +45 (0) 70 22 19 75
info.dk.ps@georgfischer.com
www.gfps.com/dk

Finland

Georg Fischer AB
01510 VANTAA
Phone +358 (0) 9 586 58 25
Fax +358 (0) 9 586 58 29
info.fi.ps@georgfischer.com
www.gfps.com/fi

France

Georg Fischer SAS
95932 Roissy Charles de Gaulle
Cedex
Phone +33 (0) 1 41 84 68 84
fr.ps@georgfischer.com
www.gfps.com/fr

Germany

Georg Fischer GmbH
73095 Albershausen
Phone +49 (0) 7161 302-0
info.de.ps@georgfischer.com
www.gfps.com/de

India

Georg Fischer Piping Systems Ltd
400 083 Mumbai
Phone +91 224007 2001
branchoffice@georgfischer.com
www.gfps.com/in

Indonesia

Georg Fischer Pte Ltd –
Representative Office
Phone +62 21 2900 8564
Fax +62 21 2900 8566
sgp.ps@georgfischer.com
www.gfps.com/sg

Italy

Georg Fischer S.p.A.
20063 Cernusco S/N (MI)
Phone +39 02 921 861
it.ps@georgfischer.com
www.gfps.com/it

Japan

Georg Fischer Ltd
556-0011 Osaka,
Phone +81 (0) 6 6635 2691
jp.ps@georgfischer.com
www.gfps.com/jp

Korea

GF Piping Systems
Georg Fischer Korea Co., Ltd.
Unit 2501, U-Tower
120 HeungdeokJungang-ro
(Yeongdeok-dong)
Giheung-gu, Yongin-si, Gyeonggi-do,
Korea
Phone: +82 31 8017 1450
Fax: +82 31 217 1454
kor.ps@georgfischer.com
www.gfps.com/kr

Malaysia

Georg Fischer (M) Sdn. Bhd.
40460 Shah Alam, Selangor Darul
Ehsan
Phone +60 (0) 3 5122 5585
Fax +603 5122 5575
my.ps@georgfischer.com
www.gfps.com/my

Mexico / Northern Latin America

Georg Fischer S.A. de C.V.
Apodaca, Nuevo Leon
CP66636 Mexico
Phone +52 (81) 1340 8586
Fax +52 (81) 1522 8906
mx.ps@georgfischer.com
www.gfps.com/mx

Middle East

Georg Fischer
Piping Systems (Switzerland) Ltd
Dubai, United Arab Emirates
Phone +971 4 289 49 60
gcc.ps@georgfischer.com
www.gfps.com/int

Netherlands

Georg Fischer N.V.
8161 PA Epe
Phone +31 (0) 578 678 222
nl.ps@georgfischer.com
www.gfps.com/nl

Norway

Georg Fischer AS
1351 Rud
Phone +47 67 18 29 00
no.ps@georgfischer.com
www.gfps.com/no

Philippines

Georg Fischer Pte Ltd
Representative Office
Phone +632 571 2365
Fax +632 571 2368
sgp.ps@georgfischer.com
www.gfps.com/sg

Poland

Georg Fischer Sp. z o.o.
05-090 Sekocin Nowy
Phone +48 (0) 22 31 31 0 50
poland.ps@georgfischer.com
www.gfps.com/pl

Romania

Georg Fischer
Piping Systems (Switzerland) Ltd
020257 Bucharest - Sector 2
Phone +40 (0) 21 230 53 80
ro.ps@georgfischer.com
www.gfps.com/int

Russia

Georg Fischer
Piping Systems (Switzerland) Ltd
Moscow 125040
Phone +7 495 748 11 44
ru.ps@georgfischer.com
www.gfps.com/ru

Singapore

Georg Fischer Pte Ltd
11 Tampines Street 92, #04-01/07
528 872 Singapore
Phone +65 6747 0611
Fax +65 6747 0577
sgp.ps@georgfischer.com
www.gfps.com/sg

Spain / Portugal

Georg Fischer S.A.
28046 Madrid
Phone +34 (0) 91 781 98 90
es.ps@georgfischer.com
www.gfps.com/es

Sweden

Georg Fischer AB
117 43 Stockholm
Phone +46 (0) 8 506 775 00
info.se.ps@georgfischer.com
www.gfps.com/se

Switzerland

Georg Fischer
Rohrleitungssysteme (Schweiz) AG
8201 Schaffhausen
Phone +41 (0) 52 631 30 26
ch.ps@georgfischer.com
www.gfps.com/ch

Taiwan

Georg Fischer Co., Ltd
San Chung Dist., New Taipei City
Phone +886 2 8512 2822
Fax +886 2 8512 2823
www.gfps.com/tw

United Kingdom / Ireland

Georg Fischer Sales Limited
Coventry, CV2 2ST
Phone +44 (0) 2476 535 535
uk.ps@georgfischer.com
www.gfps.com/uk

USA / Caribbean

Georg Fischer LLC
9271 Jeronimo Road
92618 Irvine, CA
Phone +1 714 731 88 00
Fax +1 714 731 62 01
us.ps@georgfischer.com
www.gfps.com/us

International

Georg Fischer
Piping Systems (Switzerland) Ltd
8201 Schaffhausen/Switzerland
Phone +41 (0) 52 631 30 03
Fax +41 (0) 52 631 28 93
info.export@georgfischer.com
www.gfps.com/int

The technical data are not binding. They neither constitute expressly warranted characteristics nor guaranteed properties nor a guaranteed durability. They are subject to modification. Our General Terms of Sale apply.



700.671.539
GFDO-6220-4a (04.16)
© Georg Fischer Piping Systems Ltd
CH-8201 Schaffhausen/Switzerland, 2016

- System Specification - for PVC-U metric piping systems

1. Scope

This specification covers requirements for the GF **PVC-U** Piping System intended for a wide range of applications including water, wastewater and effluent treatment as well as a wide range of chemical applications. The components of the **PVC-U** piping systems are in accordance with the following standards.

2. Basic System Data

2.1 Material Specification for Unplasticised Polyvinylchloride (PVC-U)

PVC-U pipes, fittings and valves from GF Piping Systems shall be manufactured from unplasticised polyvinylchloride and are designed for 25 years of operation with water as medium (20°C). **PVC-U** has also an optimal chemical resistance against many mineral acids, bases and salt solutions. For detailed information, please refer to the list of chemical resistance provided by GF Piping Systems. The raw material used shall be material designed for use with pressure bearing piping systems with long term hydrostatic properties in accordance with EN ISO 15493, as supplied by GF Piping Systems.

2.2 Characteristics of PVC-U Material

Characteristic	Value	Test Standards
Density	1.38 g/cm ³	ISO 1183-1
Tensile E-modules	>2400 N/mm ²	EN ISO 527-1
Charpy notched impact strength at 23° C	>8 kJ/m ²	EN ISO 179-1/1eA
Charpy notched impact strength at 0° C	>3 kJ/m ²	EN ISO 179-1/1eA
Vicat heat distortion temp. B/50N	≥76° C	ISO 306
Chemical resistance	DIBT agreement	based on the medium list 40.1.4
Thermal expansion coefficient	0.07 - 0.08 mm/mK	DIN 53752
Temperature range in °C	0°C - 60°C	
Colour	dark grey; 7011	RAL

2.3 PVC-U Product Range

Products	DN	d																											
		6	8	10	12	16	20	25	32	40	50	63	75	90	110	125	140	160	180	200	225	250	280	315	350	400			
	bar																												
Pipes	16	available																											
	10	available																											
	6	available																											
Fittings	16	available																											
	10	available																											
	6	available																											
Ball Valve*	10	available																											
	16	available																											
Butterfly Valve*	10	available																											
Check Valve*	6	available																											
	10	available																											
	16	available																											
Diaphragm Valve*	10	available																											
Pressure Regulating Valve*	10	available																											
Flange*	16	available																											
	10	available																											
Gaskets & Pipe Clips	16	available																											
Sensors & Controllers	--	available																											

* For detailed information please consult the GF Piping Systems online catalogue

available

For more detailed physical properties and product pressure – temperature curves, please see the GF Planning Fundamentals and the website (www.gfps.com).

2.4 Approvals / Acceptance / Conformance

This material specification for **PVC-U** is met by GF Piping Systems. Therefore GF Piping Systems is approved according to different categories all over the world. For more information please consult our approvals database on the GF Piping Systems website.

Approvals	DVGW	DIBT	GOST-R	DGS (ACS)	WRAS	FDA	Lebensmittel EU 1012011	KIWA	CSTB	BSI	IIP	ABS	BV	CCS	DNV-GL	LR	RINA	RMRQS	
												Marine approvals							
Raw Material	available			available		available		available											
Pipe		available		available			available					available	available	available	available	available	available	available	available
Fittings		available		available			available					available	available	available	available	available	available	available	available
Valves*		available		available		available	available					available	available	available	available	available	available	available	available
Flange		available																	
gaskets	available			available				available											

* For details on which valve (ball, butterfly, diaphragm etc. ...) please contact GF database
No test basis for PVC fittings from DVGW available

3. Pipes

Pipes are made of **PVC-U** and processed according to the quality specifications and dimensions according to EN ISO 15493. Pipe formulation has been designed for an enhanced chemical resistance (content of CaCO₃ < 3%), enhanced thermo stabilizer package etc.

Processed pipes are straight and show a very low out-of-roundness. The wall structure is homogeneous and even.

OD-tolerances surpass the requirements of ISO 15493 and are compatible with the fitting programme of GF Piping Systems for easy pre-assembly and minimized gaps. For highly demanding applications in the chemical industry, the application of pressure rating SDR 9 pipes and PN 16 fittings is strongly recommended for OD ≤110 mm.

Any installation should follow the GF Piping Systems installation guidelines for industrial piping and the guidelines issued by the DVS.

Approved pipes comply with the corresponding quality specifications of DIN Certco ZP 1.1.1.

4. Fittings

All **PVC-U** fittings manufactured by GF Piping Systems are suitable for solvent cementing, with dimensions and tolerances in accordance with EN 1452-1 & 3 and EN ISO 15493. All the requirements of those standards must be fulfilled. All threaded connections shall have pipe threads in accordance with the requirements of ISO 7-1.

4.1 PRO-FIT Fittings in PVC-U

All PRO-FIT PVC-U fittings manufactured by GF Piping Systems (elbows 45° and 90°, tee equal, reducing bushes, and unions) have a special combination of spigot and socket connection and are available in metric sizes from d20-63.

The PRO-FIT fittings have a 45° angle marking as well as integrated marking for vertical mounting integrated length marking on the spigots indicate the insertion depth. Reducing bushes shall offer the possibility of a spigot and cemented socket connection on each side of the fitting.

4.2 Product Identification

All parts are identified as specified by EN ISO 15493:

- Manufacturer's logo
- Dimension (without the letter "d")
- Material
- Nominal pressure (PN)
- Permanent stamped (impressed) date with year and production lot

4.3 Packaging and Labelling

The packaging must ensure that the fittings are not damaged during transportation. Packaging and labelling must meet the following requirements:

- Identification of the content, in type, quantity and product details
- Information about standards and approvals covered by the product
- Content of the label has to accomplish legal requirements
- Labels must be EAN coded for automatic identification
- Comply to GF standards as well as to international standards such as ISPM15

5. Accessories

5.1 Flanges

Backing flanges in metric sizes DN15-400 shall be designed according to EN ISO 15493, in a thermo plastic-oriented design, consisting of 100% glass fibre reinforced polypropylene, PP-GF30, graphite black and UV stabilized. These flanges are manufactured in a seamless technology injection moulding process by GF Piping Systems. The backing flange shall be optimised with a V-groove in the inner diameter to ensure an evenly distributed force on the thermo plastic flange adapter. The backing flanges shall be marked with dimension, PN-value, standards, brand and lot number. Connecting dimensions metric according to ISO 7005, EN 1092; Bolt circle diameter PN 10; Inch: ANSI B 16.5, BS 1560; class 150.

Alternatively backing flanges in metric sizes DN15-400 shall be designed according to EN ISO 15493, consisting of unplasticised polyvinyl chloride (PVC-U), in a thermo plastic-oriented design. The backing flanges shall be marked with dimension, PN-value, standards, brand and lot number. Connecting dimensions metric according to ISO 7005, EN 1092; Bolt circle diameter PN 10; Inch: ANSI B 16.5, BS 1560; class 150.

5.2 Gaskets

Gaskets in metric sizes DN10-300 shall consist of elastomeric material according to EN681, designed with or without metal reinforcement for use with flange adaptors according to EN ISO 15493. Gaskets with reinforcement shall be designed to be centred by the outer diameter and shall provide fixation aids to fit on the flange bolts.

5.3 Pipe Support System

Pipe Support System shall be KLIP-IT, sizes d10-400, supplied by GF Piping Systems. The product range includes two different types of pipe clamps, type 060 and type 061. Type 60 is available for d90-400 and shall be made of PP. Type 061 is available for d10-160 and shall be made of PP or PE. Pipe clamps bigger than d40 shall be equipped with a security bow to secure the pipe.

6. Valves

All **PVC-U** valves shall be metric sizes manufactured by GF Piping Systems or equal in accordance with EN ISO 16135 (ball valves), 16136 (butterfly valves), 16137 (check valves), 16138 (diaphragm valves), tested according to the same standard.

6.1 Ball Valves

All **PVC-U** ball valves, with metric sizes DN10-100, shall be GF Piping Systems Type 546 with true double union design, manufactured by GF Piping Systems in accordance with EN ISO 16135. Incorporated into its design shall be a safety stem with a predetermined breaking point above the upper O-ring, preventing any media leaking in the event of damage. The valve nut threads shall be buttress type to allow fast and safe radial mounting and dismounting of the valve during installation or maintenance work. Seats shall be PTFE with backing rings creating self-adjusting seals and constant operating torque. Backing rings and seals shall be EPDM or FKM. The handle shall include in its design an integrated tool for removal of the union bush. Union bushes shall have left-hand threads to prevent possible unscrewing when threaded end connectors are removed from pipe.

Following accessories shall be available:

- A Multi-Functional Model (MFM) in PPGF equipped with internal limit switches for reliable electrical position feedback, is mounted directly between the valve body and the valve handle. This MFM is also the necessary interface for later mounting of actuators.
- Mounting plate in PPGF with integrated inserts for later screw mounting on any support

- Lockable multi-functional handle

6.1.1 Electric Ball Valves

Electric actuators shall be Types EA15 (metric sizes DN10-50), EA25 (metric sizes DN10-50), EA45 (metric sizes DN65) and EA120 (metric sizes DN80-100) shall be available manufactured by GF Piping Systems in accordance with EN 61010-1, EC directives 89/336/EWG-EMV and 73/23/EWG (LVD). Additionally they need to be CE marked. Actuator housing shall be made of PPGF (polypropylene glass fibre reinforced), flame retardant with external stainless steel screws. All electric actuators shall have an integrated emergency manual override and integrated optical position indication.

All electric actuator types (shall have the following accessories available:

Additional Accessories

EA15 / EA25 / EA45 / EA120 / EA250:

- Failsafe return unit
Battery incorporated into the housing for moving to a safe position in case of power outage (open or closed).

EA25 / EA45 / EA120 / EA250:

- positioner

For continuous valve control with 4-20mA or 0-10V and 4-20mA feedback

- Monitoring board
 - Cycle time extension
 - Cycle time monitoring
 - Cycle counter
 - Motor current monitoring
- Fieldbus connection
 - Profibus DP auxiliary card
 - AS interface module

The system Specifications for electric actuators are as follows:

* at rated torque

Specification			
Combinations	EA15	2-Way Ball valve type 546 up to DN50 3-Way Ball valve type 543 up to DN50	
	EA25	2-Way Ball valve type 546 up to DN50 3-Way Ball valve type 543 up to DN50	
	EA45	2-Way Ball valve type 546 up to DN65 Butterfly valve types 567/578, Type 038/039	
	EA120	2-Way Ball valve type 546 up to DN100 Butterfly valve types 567/578, Type 038/039	
	EA250	Butterfly valve types 567/578, Type 038/039	
	Rated voltage	AC	100 – 230 V, 50/60 Hz
		AC/DC	24 V, 50/60 Hz
Rated voltage tolerance	- 10 ... + 15 %		
Protection class	IP67per EN 60529		
Contamination level	2 according to EN 61010-1		
Overload protection	Current/time-dependent (resetting)		
Overvoltage category	II		
Ambient temperature	-10 °C to +45 °C		
Allowable humidity	Max. 90% relative humidity, non-condensing		
Housing material	PP-GF for very good chemical resistance		

	EA15	EA25	EA45	EA120	EA250
Power input max.	45 VA	45 VA	65 VA	60 VA	70 VA
Rated torque MDN. (peak)	10 (20)	10 (25)	20 (45)	60 (120)	100 (250)
Duty cycle at 25 °C / 15 min	40%	100%	50 %	50 %	35 %
Cycle time s/90 at Mdn.	5s	5 s	6s	15 s	20 s
Connection	F05	F05	F05	F07	F07
Tested cycles (at 20 °C and Mdn.)	150 000	250 000	100 000	100 000	75 000
Weight	1.85 kg	2.193 kg	2.193 kg	3.356 kg	4.995 kg
Actuating angle	Max. 355°, set to 90 °				

6.1.2 Pneumatic Ball Valves

6.1.2.1 Pneumatic Ball Valves DN15 to DN50

Pneumatic actuators shall be GF Piping Systems Types PA11 (metric sizes DN15-25) and PA21 (metric sizes DN32-50). Pneumatic actuators shall be available as fail safe close, fail safe open and double acting and have an integrated optical position indication. Actuator housing shall be made of Polypropylene fibre glass reinforced (PPGF) and flame retardant. Actuators shall contain a preloaded spring assembly to ensure safe actuator operation and maintenance. Actuators shall contain integrated Namur interface for the easy mounting of positioners, limit switches and accessories. The valve shall be equipped with a Multi-functional-module for reliable electric feedback, mounted directly between the valve body and the actuator as manufactured by GF Piping Systems.

6.1.2.2 Pneumatic Ball Valves DN65 to DN100

- For valve size DN65 pneumatic actuators shall be Type PA 30 (fail safe to close or open function), Type PA35 (double acting function).
- For valve size DN80 pneumatic actuators shall be Type PA 40 (fail safe to close or open function), Type PA40 (double acting function).
- For valve size DN100 pneumatic actuators shall be Type PA 45 (fail safe to close or open function), Type PA45 (double acting function)

Pneumatic actuators shall have an integrated optical position indicator. Actuator housing shall be made of hardened anodized aluminium. Actuators shall contain integrated Namur interface for the easy mounting of positioners, limit switches and accessories.

All pneumatically actuated ball valves shall have the following accessories available:

- Pilot valve remote or direct mounted in voltages 24VDC/AC, 110VAC, 230VAC
- Positioner Type DSR 500-3
- Limit switch kits Ag-Ni, Au, NPN, PNP
- Stroke limiter
- Manual override for all sizes up to DN100
- AS Interface control module with incorporated position feedback and a solenoid pilot valve

6.2 Diaphragm Valves

6.2.1 Manual Diaphragm Valves

6.2.1.1 Manual Diaphragm Valves DN15 to DN50

All **PVC-U** diaphragm valves, with metric sizes DN15-50, shall be either:

- Type 514 (true double union design, DN15-50)
- Type 515 (spigot design, DN15-50)
- Type 517 (flange design, DN15-50)

All diaphragm valves shall be manufactured by GF Piping Systems in accordance with EN ISO 16138. The upper body shall be PPGF (polypropylene glass fibre reinforced) connected to the lower body with a central union avoiding exposed screws. A two coloured position indicator integrated into the hand wheel must be present to determine diaphragm position. The hand wheel shall have an integrated locking mechanism. Diaphragms are to be EPDM, FKM, NBR, PTFE with EPDM or FKM backing diaphragm.

Following options shall be available:

- PN16 pressure rating
- Electrical feedback unit with either Ag-Ni or AU contacts
- Pressure proof housing

The diaphragm valve shall have following KV values:

d [mm]	DN [mm]	KV [l/min @ $\Delta P=1$ bar]
20	15	125
25	20	271
32	25	481
40	32	759
50	40	1263
63	50	1728

6.2.1.2 Manual Diaphragm Valves DN65 to DN150

All **PVC-U** diaphragm valves, with metric sizes DN65-150, shall be Type 317 (flanged design). All diaphragm valves shall be manufactured by GF Piping Systems in accordance with EN ISO 16138.

The upper body shall be PPGF (polypropylene glass fibre reinforced) connected to the lower body with exposed stainless steel bolts. A position indicator integrated into the hand wheel must be present to determine diaphragm position. Diaphragms are to be EPDM, FKM, NBR, or PTFE with EPDM or FKM backing diaphragm.

6.2.2 Pneumatic Diaphragm Valves

6.2.2.1 Pneumatic Diaphragm Valves DN15 to DN50

All **PVC-U** diaphragm valves, with metric sizes DN15-50, shall be:

- true double union design, DN15-50
- spigot design, DN15-50
- flange design, DN15-50

All diaphragm valves shall be manufactured by GF Piping Systems in accordance with EN ISO 16138. The upper body shall be connected to the lower body with a central union nut avoiding exposed screws. Diaphragms are to be EPDM, FKM, NBR, PTFE with EPDM or FKM backing diaphragm.

The diaphragm valve shall have following KV values:

d [mm]	DN [mm]	KV [l/min @ ΔP=1 bar]
20	15	125
25	20	271
32	25	481
40	32	759
50	40	1263 (960*)
63	50	1728 (1181*)

* DIASTAR Six

Pneumatic actuators shall be GF Piping Systems Type DIASTAR or 604/605 and shall be available as

- Type 604/605 d20DN15 to PN6
- DIASTAR Six for PN6
- DIASTAR Ten for PN10
- DIATARR TenPlus of PN10
- DIASTAR Sixteen for PN16

The mode of operation shall be fail safe close (FC), fail safe open (FO) and double acting (DA). The valves shall have an integrated optical position indicator. Actuator housing shall be made of PPGF (polypropylene glass fibre reinforced).

Actuators with FC mode shall contain a preloaded galvanised steel spring assembly to ensure safe actuator operation and maintenance.

The actuator DIASTAR Ten, DIASTAR TenPlus and DIASTAR Sixteen shall have following accessories available:

- Solenoid pilot valve remote or direct mounted in voltages 24VDC/AC, 110VAC, 230VAC
- Positioner Type DSR 500-1
- Feedback with following limit switches Ag-Ni, Au, NPN, PNP, NAMUR
- Stroke limiter & emergency manual override
- ASI controller

6.2.2.2 Pneumatic Diaphragm Valves DN65 to DN150

All **PVC-U** diaphragm valves, with metric sizes DN65-150, shall be flanged design. All diaphragm valves shall be manufactured by GF Piping Systems in accordance with EN ISO 16138. The upper body shall be connected to the lower body with exposed stainless steel bolts. Diaphragms are to be EPDM, FKM, NBR, or PTFE with EPDM or FKM backing diaphragm.

Pneumatic diaphragm actuators shall be GF Piping Systems Type DIASTAR Type 025. The mode of operation shall be fail safe close (FC), fail safe open (FO) and double acting (DA). The valves shall have an integrated optical position indicator. Actuator housing shall be made of PPGF (polypropylene glass fibre reinforced). Actuators with FC mode shall contain a preloaded galvanised steel spring assembly to ensure safe actuator operation and maintenance.

The actuator DIASTAR 025 shall have following accessories available:

- Solenoid pilot valve remote or direct mounted in voltages 24VDC/AC, 110VAC, 230VAC
- Positioner Type DSR 500-2
- Feedback with following limit switches AgNi, Au, NPN, PNP, NAMUR
- Stroke limiter & emergency manual override
- ASI Controller

6.3 Butterfly Valves

All **PVC-U** butterfly valves, with metric sizes DN50-300, shall be GF Piping Systems 567 (wafer type) or 578 (lug type) with a double eccentric disc design manufactured by GF Piping Systems in accordance with EN ISO 16136. Seals shall be available in both EPDM and FKM. The lever handle shall be lockable in increments of 5 degrees. There shall always be six teeth engaged between the ratchet and the index plate to ensure accurate and safe positioning of the lever. There shall be the option of fine adjustment by use of a specific hand lever, allowing the disc to be exposed at any angle between 0° und 90°. As an option, the hand lever shall be lockable. The hand lever shall be manufactured of high strength PPGF (polypropylene glass fibre reinforced). The option of an integrated electric position indicator shall be available. Optional the valves can be actuated by gear box with hand wheel. The electric position indicator shall be integrated into the mounting flange. Butterfly valves shall have low actuation torque to enable easy operation. All butterfly valves Type 567 / 578 manufactured by GF Piping Systems are designed for a nominal pressure rate of 10bar. All butterfly valves Type 563 are designed for a nominal pressure rate of 4bar.

6.3.1. Electric Butterfly Valves

Electric actuators shall be GF Piping Systems Types EA45, EA120 or EA250 dependent on valve size up to DN300.

They shall be manufactured by GF Piping Systems in accordance with EN 61010-1, as per the above specifications. Actuator housing shall be made of PPGF (polypropylene glass fibre reinforced), flame retardant and feature external stainless steel screws. All electric actuators shall have an integrated emergency manual override and integrated optical position indication.

All electric actuator types shall have the following accessories available:

- Failsafe return unit
Battery incorporated into the housing for moving to a safe position in case of power outage (open or closed).
- positioner

For continuous valve control with 4-20mA or 0-10V and 4-20mA feedback

- Monitoring board
 - Cycle time extension
 - Cycle time monitoring
 - Cycle counter
 - Motor current monitoring
- Fieldbus connection
 - Profibus DP auxiliary card
 - AS interface module

6.3.2 Pneumatic Butterfly Valves

Pneumatic actuators shall be GF Piping Systems Types PA 35 (metric sizes DN50-65), PA40 (metric size DN80), PA45 (metric sizes DN100-125), PA55 (metric sizes DN150-200), PA65 (metric size DN250 FC) PA70 (metric size DN300 FC).

They shall be supplied by GF Piping Systems. Pneumatic actuators shall be available as fail safe close, fail safe open and double acting and have an integrated optical position indication.

Actuator housing shall be made of hardened anodized aluminium. Actuators shall contain integrated Namur interfaces for the easy mounting of positioners, limit switches and accessories.

All pneumatically actuated butterfly valves shall have the following accessories available:

- Solenoid pilot valve remote or direct mounted in voltages 24VDC/AC, 110VAC, 230VAC
- Positioner Type DSR 500-3
- Feedback with following limit switches AgNi, Au, NPN, PNP, NAMUR
- Stroke limiter & emergency manual override
- ASI-controller

6.4 Check Valves

6.4.1 Check Valves

All **PVC-U** check valves, according to EN ISO 16137, with metric sizes DN10-100, shall be Type 561 / 562 true double union design. Seals shall be EPDM or FKM, FFKM can be an option. Union bushes shall have a left hand thread to prevent possible unscrewing when threaded end connectors are removed from pipe. This valve shall be suitable for mounting in a vertical and horizontal position. Type 562 shall be equipped with a spring made of stainless steel (V2A) or as an option stainless steel HALAR coated or Nimonic 90 to allow position independent installation. The valves are designed for a nominal pressure of 16bar. Type 561 shall be leakproof from a water column of 2m (0.2bar). Type 562 shall be leakproof from a water column of 1m (0.1bar).

check valves manufactured by GF Piping Systems are designed for a nominal pressure rate of 10bar.

6.4.2 Wafer Check Valves

All **PVC-U** wafer check valves, with metric sizes DN32-300, shall be GF Piping Systems Type 369. The minimum water column of 2 m is required for sealing. They must be equipped with a spring (either in 316 stainless steel or Hasteloy C) guaranteeing closure in all installation positions. Attention: A stabilizing pipe zone of at least 5 times nominal diameter (DN) (recommended 10 times nominal diameter) before and after the wafer check valve should be provided. The wafer check valves are dimensioned in metric sizes DN32-125 for nominal pressure 10 bar and in metric sizes DN150-300 for nominal pressure 6 bar.

6.5 Pressure Regulating Valves

Pressure ranges for all **PVC-U** pressure regulating valves as supplied by GF Piping Systems are the following:

- DN10-50 max. 10bar
- DN65-80 max. 6bar
- DN100 max. 4bar

6.5.1 Pressure Reducing Valves

All **PVC-U** pressure reducing valves, manufactured by GF Piping Systems, reduce the pressure within the system to a pre-set value. By using the differential pressure, the pressure reducing valve adjusts itself to the set working pressure. The outlet pressure (working pressure) is not directly related to the inlet pressure. If the outlet pressure increases above the set value, the diaphragm is lifted against the spring force. If the outlet pressure falls below the set value, the diaphragm is pressed down by the spring force. The pressure reducing valve begins to close/open until a state of equilibrium is re-established; in other words, the outlet pressure remains constant irrespective of an increasing or decreasing inlet pressure.

Following types and sizes are available:

- Type 582, compact Pressure Reducing Valve, sizes DN10–50

Features:

- Metal free central housing union nut
- Set pressure selectable 0.5 - 9 bar or 0.3 – 3 bar
- Manometer optional
- Manometer assembly possible on both sides

- Selection of direct manometer assembly or with gauge guard
- Possibility to show either inlet or outlet pressure
- Injection molded directional arrow for direction of flow
- Threaded inserts for assembly
- Type V82, Pressure Reducing Valve with an integrated manometer, sizes DN65-100

6.5.2 Pressure Retaining Valves

All **PVC-U** pressure retaining valves, manufactured by GF Piping Systems, serve to keep the working or system related pressures constant, to balance out pressure pulsation, and to reduce pressure peaks in chemical process systems. If the inlet pressure rises above the set value, the pressurized valve piston is lifted against the spring force. Consequently, the valve opens and there is a reduction of pressure through the outlet pipe. The valve closes as soon as the inlet pressure sinks below the pre-set spring tension. Following types and sizes are available:

- Type 586, compact Pressure Retaining Valve, sizes DN10-50

Features:

- Metal free central housing union nut
- Set pressure selectable 0.5 - 9 bar or 0.3 – 3 bar
- Manometer optional
- Manometer assembly possible on both sides
- Selection of direct manometer assembly or with gauge guard
- Possibility to show either inlet or outlet pressure
- Injection moulded directional arrow for direction of flow
- Threaded inserts for assembly
- Type V86, Pressure Retaining Valve, sizes DN65-100

6.6 Direct-acting Solenoid Valves

Direct-acting solenoid valves as supplied by GF Piping Systems serve to regulate and control fluids, if no compressed air is available or not wanted. They are used for diverse functions, e.g. opening, shutting, dosing, distribute and mixing. The medium flow is switched directly by the armature moved by the magnetic force. Safety position shall be available.

Following type and sizes are available:

- Type 157, sizes DN4-8

- Type 160/161, sizes DN10-20

6.7 Servo-assisted Solenoid Valves

Servo-assisted solenoid valves as supplied by GF Piping Systems serve to regulate and control fluids, if no compressed air is available or unwanted. They are used for miscellaneous functions, e.g. opening, shutting, dosing, distributing and mixing. Opening large orifices using the direct-acting method would require enormous and expensive coils. Servo assisted valves use the power of the fluid to open the flow channel by controlling a small pilot channel to alter the forces on a larger main seal. A minimum differential pressure of 0.5bar is required to fully open the valve.

Following type and sizes are available:

- Type, 165, sizes DN15-50

6.8 Ventilating- and Bleed Valves

All **PVC-U** ventilating- and bleed valves shall be GF Piping System type 591. Dimensions DN10-100 are with pressure rating PN16. They shall be equipped with a PP-H floater with density of 0.91 g/cm³.

6.9 Ventilating Valves

All **PVC-U** ventilating valves shall be GF Piping System type 595. Dimensions DN10-100 are with pressure rating PN16. They shall be equipped with HALAR coated stainless steel spring with minimal opening pressure (10-80 mbar).

7. Solvent Cement & Cleaner

For adhesive jointings can either applied the solvent cement Tangit PVC-U or the solvent-free cement Tangit RAPID. All specifications are based on using Tangit PVC-U and RAPID, including strength and chemical resistance. For all other cements please refer to the manufacturers' instructions.

The jointing surfaces of pipe and fitting must be clean and free of grease. They must be cleaned with TANGIT PVC/ABS cleaner. If Tangit RAPID will be used they must be cleaned with Tangit PE/PP/PVDF/PB cleaner.

For critical media must be used special cement either Tangit DTX or GF DYTEX. You can find detailed informations on the CHEMRES Plus website (www.gfps/chemres)

8. Measurement & Control / Instrumentation

The following parameters can be measured (Sensors), indicated and/ or transmitted (transmitters) to PLC, PC and other Data Acquisition Systems. All products comply with the CE standard.

Parameter	Technology	Compatible liquids (*)
Flow	Paddlewheel	clean liquids
	Rotameter	clean liquids
	Magmeter	contaminated liquids
Level	Hydrostatic/Ultrasonic/Radar	all liquids
pH-ORP	Glas electrodes	all liquids
Conductivity	Contact	all liquids
Pressure	Piezoresistive	all liquids
Temperature	Pt1000	all liquids

(*) please check first the sensors limitations in material, pressure and temperature (data sheet) and chemical resistance list

8.1 Sensors

The sensors listed hereafter will transfer the measured value to a GF Piping Systems Transmitter, to indicate the measured value and allowing simple calibration and maintenance of the devices. Alternatively the measured values of the sensors can be sent directly to a PLC, PC or other local made electronics using either an analogue signal (4-20mA, open collector or sinusoidal voltage) or a digital signal called S3L (GF Piping Systems Signet serial signal).

8.1.1 Installation Fittings

Depending on the sensor type, special installation fittings shall be used for connection to the pipeline: Installation T-Fitting metric sizes DN15-50 with double true union, Screw-On Saddle metric sizes DN65-300, Glue-On Saddle metric sizes DN65-300, Weld-On Fitting ("Weld-o-let") metric sizes DN65-600, Clamp-On Saddle metric sizes DN65-200 and Wafer Fittings metric sizes DN65-300. Sensor thread connection for flow- and pH-sensors shall be 1 ¼" NPSM. For all further sensors standard threaded fittings, as well as adaptor sockets or nipples with ½", ¾" ISO, or ¾" NPT thread shall be used.

8.1.2 Flow sensors

8.1.2.1 Paddlewheel sensors

515 and 525 sensors:

All sensors of this family are "sinusoidal" sensors. This sensor from GF Piping Systems SIGNET requires no external power source to produce a signal. Internal to the body of the sensor is a wire coil which when excited by the rotor assembly produces a small sinusoidal signal. The rotor assembly consists of four paddles; inserted into each of the paddles of the rotor are magnets. As liquid flows past the rotor assembly it rotates each of the four paddles produces a sine wave signal as it passes the centre of the body (two paddles of the rotor produces a full AC sine wave).

The sensors as manufactured by GF Piping Systems SIGNET produce a signal output which is proportional to the flow rate. A K-factor (number of pulses generated by the sensor per 1 liter or 1 gallon of fluid the sensor) is used to define the size of the pipe that the sensor is inserted into.

3-2536 and 3-2537 sensors:

All sensors of this family of sensors are "Hall Effect" sensors. Internal to the GF Piping Systems SIGNET sensors body is an open collector relay. The sensor is supplied with a voltage from the 3-8550 transmitters or an external power supply ranging from 5 to 24 volts. This voltage is switched through the open collector relay as the paddlewheel (rotor) of the sensor rotates. The sensor's rotor assembly has four paddles. Inserted in two of the paddles is a magnet. As the paddles pass the centre of the sensors body, the magnetic field switches the open collector relay on and off which generates a square wave pulse as manufactured by GF Piping Systems SIGNET. Two pulses indicates a complete rotation (on/off cycle) of the open collector relay. The pulse output is directly proportional to the fluid velocity. A K-factor (number of pulses generated by the sensor per 1 litre or 1 gallon of fluid passing the sensor) is used to define the size of the pipe that the sensor is inserted into.

8.1.2.2 Rotameters

As supplied by GF Piping Systems are radially installed dismountable meters for flow rate measuring in industrial piping applications. If needed, minimum or maximum flow can also be monitored via limit switches. Also, analogue flow measurement with a 4...20mA Signal is possible.

The working principle of the rotameter is based in gravity and equilibrium of forces. If a medium flows upwards at a sufficient flow rate through the vertically mounted taper tube, the float is raised to the point at which a state of equilibrium sets in between the lifting force of the medium and the weight of the float. Since the mean rate of flow is proportional to the quantity flowing through per unit of time, this state of equilibrium corresponds to the measurement of the instantaneous flow rate.

Following types and sizes are available:

- Type SK, DN10–65mm
- Type 335, DN25–65mm
- Type 350, DN25–65mm

8.1.2.3 Magmeter

The Magmeter sensor from GF Piping Systems SIGNET consists of two metallic pins that produce a small magnetic field across the inside of the pipe. The The Magmeter measures the velocity of a conductive liquid (20 μ S or greater) as it moves across the magnetic field produced by the Magmeter. A voltage occurs on the sensor tips, which is directly proportional to the flow rate of the fluid. The magnetic signal is conditioned and translated in to a pulse signal. A K-factor (number of pulses generated by the sensor per 1 liter or 1 gallon of fluid passing the sensor) is used to define the size of the pipe that the sensor is inserted into. The Magmeter of GF Piping Systems SIGNET is offered as a blind frequency, 4-20 mA or digital S3L output, or with integral display and control relays.

8.1.2.4 Ultrasonic Flowmeter

The U3000/4000 and PF220/330 from GF Piping system are transit time ultrasonic flow meter designed to work with clamp-on transducers, to provide accurate measurement of liquid flowing within a closed pipe, without the need for any mechanical parts to be inserted through the pipe wall or to protrude into the flow system. It takes just a few minutes to install and there is no need to shut down flow or drain the system! From process control in industrial applications, to water management from raw to deionized water, the Ultraflow 3000/4000 for fixed

installation and the PF220/330 for portable flow monitoring cover a wide spectrum of flow monitoring and process control in many industries.

Using ultrasonic transit time techniques enables to be used with pipes having an outside diameter range from d13 to d2000 as standard and up to d5000 as an option. The instruments will also operate over a wide range of fluid temperatures. All of the Ultrasonic Flowmeters have the same basic features.

However, the standard U4000 and PF330 can also perform data logging and allows site details and flow data to be reordered with a memory, that is able to log more than 150 000 separate readings. The standard U4000 and PF330 is also capable of downloading the stored data via the USB or RS232 interface to the Portagraph software supplied with the unit.

8.2 Level Sensor and Level Switches

8.2.1 Hydrostatic Level Sensors

Hydrostatic pressure is the pressure exerted on a column of fluid by the weight of the fluid above it. Internal to the GF Piping Systems SINGET PVDF sensor body is a ceramic diaphragm sensor and capillary tube/cable assembly. The ceramic diaphragm sensor exposed to the fluid senses the hydrostatic pressure of the fluid and compares the pressure to the atmospheric pressure monitored the capillary tube/cable assembly. The hydrostatic level sensor from GF Piping Systems SINGET only senses the hydrostatic pressure of the fluid. The Level Sensor is offered as a blind output 4-20 mA or digital S3L output connected to the GF Piping Systems SINGET Transmitter unit.

8.2.2 Ultrasonic Level

8.2.2.1 Ultrasonic Level Sensors (Series 2260 / 2270)

Ultrasonic level sensors are non-contact devices, using the travel time of sound and its reflection, for measuring the distance to a liquid or solid surface. Based on this information, GF Piping Systems sensors are capable of calculating a liquid level or volume. Their outstanding narrow 5° beam, allow reliable measurement even at the presence of disturbing objects or when space is limited. The GF Piping Systems portfolio contains sensing ranges 4 m, 6 m and 15 m.

Sensors with integrated display or blind sensors are available and provide 4-20 mA, HART protocol or relay outputs. GF Piping Systems ultrasonic level sensors are compatible with GF Piping Systems transmitters, indicators, controllers and valve actuators.

8.3 Radar

8.3.1 Radar 2290

The 25 GHz (K-band) 2290 Pulse Radars are the most progressive non-contact level transmitters for industrial processes. With an excellent accuracy, compact antennas and a user-friendly set-up the 2290 is an effective, simple, low cost choice for demanding level applications. GF's new K-band radar featuring ± 3 mm (± 0.1 inch) accuracy and short dead band excels with its robust full plastic housing. Its antenna range incorporates a stainless steel horn and enclosed plastic tube choices. The enclosed antenna versions can be replaced without removing the antenna enclosure from the process. Local programming of type 2290 is aided by a plug-in display module. The signal processing algorithm of the 2290 is based on years of experience with non-contact level measurement making it an excellent choice for applications simple and challenging alike. Process enclosures are available in PTFE, PP & PE

8.3.2 Radar 2291

With its ability to read accurately when other non-contacting or invasive methods fail, the guided level transmitter type 2291 using GWR (guided wave radar) is the solution to your level needs.

The radar signal is sent down the probe assembly eliminating the interferences caused by low dielectric liquids, heavy fuming, slightly conductive foams, internal tank obstructions, etc. By focusing its energy along the probe, the type 2291 can be installed in tanks with limited space. The type 2291 is also less sensitive to turbulence that would normally upset the readings in ultrasonic and unguided radar technologies. The probes are also available as coated options in FEP & PFA

8.4 Point Level Switches (Series 2280)

The GF Piping Systems portfolio of point level switches contains various different detection technologies, to provide a solution for various liquids and application requirements.

- Type 2280
Vibration Forks detect a liquid level with two vibrating stainless steel wings. In air they vibrate with a specific, calibrated frequency. By the contact with a liquid the frequency changes which forces an electrical output to switch. GF Piping Systems vibration forks are equipped with digital PNP/NPN or relay output. Versions with ATEX or WHG approval are available.
- Type 2281
Conductive Multipoint Switch contains up to 5 stainless steel electrodes, which allow to detect 4 different liquid levels in a tank. Up to 2 external relay pairs allow to switch pumps or valves. GF Piping Systems conductive multipoint switches work with liquids of min. 10 μ S conductivity.

Their four-in-one design allows fast installation and provides attractive solutions concerning costs.

- **Type 2282**
Guided Float Switches are equipped with an air filled float with embedded magnet. Rising liquid lifts up the float. The magnetic field forces a reed contact to switch. GF Piping Systems guided float switches are available in PP and PVDF to provide best chemical compatibility to corrosive liquids.
- **Type 2284**
Ultrasonic Gap Switches are equipped with an ultrasonic transducer and receiver in their fork tips. Based on the switch design, the sound waves are damped in air. Thus the output is disabled. In contact with liquid the sound waves start to travel from transmitter to receiver, which enables the output. GF Piping Systems ultrasonic gap switches provide an electronic relay output which allows to control pumps and valves. Thanks to their PPS full-plastic body they provide a very high resistance against mechanical impacts and corrosive liquids. They work with no moving parts, so they do not require any maintenance.
- **Type 2285**
Float Switches are primarily used in open basins and pump shafts for detecting liquid level. In an empty tank they hang in vertical position, attached to the tank wall at their cable. Rising liquid carry them on the liquid surface. At an angle of approximately 45° an integrated switch is enabled. GF Piping Systems float switches are double chambered and equipped with a mercury-free switch. Hence they may be used for drinking and for waste water applications.

8.5 Analytic

8.5.1 pH Sensors

All pH sensors from GF Piping Systems SIGNET are constructed commonly called combination electrodes. The measuring cell is constructed of hydrogen sensitive glass that can detect the concentration of hydrogen ions (+H) in a solution. The concentration of +H ions directly determines the pH of the fluid. The reference cell is used to provide a stable reference signal. The pH signal is measured against the stable reference signal. The reference junction allows the reference cell to come in contact with the fluid being measured. The measured signals are then conditioned and sent as a blind 4-20 mA or as a digital S3L signal to the GF Piping Systems SIGNET Transmitter unit.

8.5.2 ORP Sensors

All ORP sensors from GF Piping Systems SIGNET are constructed similar to the pH sensors, except that a noble metal like platinum or gold replaces the silver chloride element of the measuring and reference cell of the pH electrode. Temperature compensation is not used in ORP measurements as well. ORP is an abbreviation for Oxidation-Reduction Potential. Oxidation is a term used to denote the occurrence of a molecule losing an electron. Reduction occurs as a molecule gains an electron. The “potential” is simply an indication of a solution’s propensity to contribute or accept electrons. ORP reactions (sometimes referred to as REDOX) always take place simultaneously. There is never oxidation without reduction, and ORP electrodes are used to detect electrons exchanged by molecules as these reactions occur. The measured signals are then conditioned and sent as a blind 4-20 mA or as a digital S3L signal to the GF Piping Systems SIGNET Transmitter unit.

8.5.3 Conductivity Sensors

All Conductivity sensors from GF Piping Systems SIGNET are manufactured using two stainless steel electrodes. Alternative materials are available in case of chemical incompatibility. Conductivity sensors measure the ability of a fluid to conduct an electrical current between two electrodes. The proper term for this ability of a solution is electrolytic conductivity, since only ions conduct electric current in solution. Electrolytic conductivity (or simply conductivity) is therefore an indirect measure of the ionic concentration of a solution. Generally, conductivity increases and decreases with the concentration of ions.

Most conductivity electrodes consist of two measuring half-cells. The geometry of the half-cells can be tailored to provide highly accurate measurements over a specific conductivity range. Cell constants help to describe electrode geometry for the purpose of selecting the appropriate electrode for a given application.

A cell constant is defined as the length between the two half cells divided by the area of the cells. All conductivity sensors have a temperature compensation circuits in order to increase the sensors accuracy.

The measured signals are then conditioned and sent as a blind 4-20mA or as a digital S3L signal to the GF Piping Systems SIGNET Transmitter unit.

8.6 Multi Parameter Instruments

8.6.1 Transmitters

The GF Piping Systems Signet 9900 Transmitter provides a single channel interface for many different parameters including Flow, pH/ORP, Conductivity/Resistivity, Salinity, Pressure, Temperature, Level and other sensors that output a 4 to 20 mA signal. The display shows separate lines for units, main and secondary measurements as well as a dial-type digital bar graph.

The 9900 is offered in both panel or field mount versions. Both configurations can run on 12 to 32 VDC power (24 VDC nominal). The 9900 can also be loop powered with compatible sensors.

Designed for complete flexibility, plug-in modules allow the unit to easily adapt to meet changing customer needs. Optional modules include Relay, Direct Conductivity/Resistivity, H COMM and a PC COMM configuration tool.

- 1 sensor input (Flow, pH/ORP, Conductivity/Resistivity, Salinity, Pressure, Temperature, Level and other sensors that output a 4 to 20 mA signal, Signet 8058 i-Go™ Signal Converter required)
- 1 analogue output (4-20 mA)
- 1 Open Collector output
- Optional relay module with 2 Dry Contact Relay SPDT
- Power supply 12-32 VDC

The GF Piping Systems Signet 8900 Multi-Parameter Controller takes the concept of modularity. Each 8900 is field commissioned with the users specified combination of inputs, outputs, and relays using simple-to-install modular boards into the base unit. Configure the system by selecting either two, four, or six input channels which accepts any of the Signet sensors listed below, and/or other manufacturer's sensors via a 4 to 20 mA signal converter (Signet Model 8058). To complete your unit, choose a power module with universal AC line voltage or 12 to 24 VDC. Analog output and relay modules are available and easily installed. Derived measurements include difference, sum, ratio, percent recovery, percent rejection, percent passage and BTU.

The menu system can be programmed to display in multi-languages including English, German, French, Spanish, Italian, and Portuguese.

- 2,4 or 6 sensor input (Flow, Level, pH-ORP, Conductivity, Pressure Temperature)
- 0,2 or 4 analogue output (4-20 mA or 0-10 Volts)
- 0,2,4,6 or 8 relay output
- Power supply 12-30 VDC or 110-230 VAC

8.7 Batch Control

The batch controller manufactured by GF Piping Systems Signet Type 5600 allows batching a pre-selected quantity of liquid. After selection of the quantity to be dosed, a start signal (local or remote) will close a batch controller contact to energize or de-energize a valve and/or switch on a pump. The batch controller counts the pulses coming from any Signet sensor with frequency output and stops the batch process as the pre-selected quantity is reached. Advanced features include a user-set security code, an automatic calibration option, and overrun compensation. The batch process is repeatable and is designed for intensive industrial applications.

9. Quality

9.1 Production Conditions

Pipes, fittings, solvent cement, cleaner, valves and accessories shall be manufactured in an environment operating a Quality Assurance System to ISO 9001 and an Environmental Management System conform to ISO 14001.

9.2 Marking

All components are embossed with a permanent identification during the production process to ensure full traceability.

The following information will be mentioned:

- Manufacturer's name or trade mark
- Production lot number
- Material
- Dimension
- Pressure rating

9.3 Uniformity

Pipes, fittings, valves, solvent cement and cleaner shall be supplied from one manufacturer, namely GF Piping Systems, to ensure correct and proper jointing between components and uniform chemical and physical properties of the piping system.

9.4 CAD Library

All components shall be available in GF Piping Systems CAD and BIM library.
Available at: <http://cad.georgfischer.com> & <http://bim.gfps.com>

9.5 Training, Certification and Installation

Site personnel, involved with **PVC-U** piping installation, shall undergo training and certification from an authorised local institution prior to performing any jointing operations on site. For further information and training please contact GF Piping Systems support under

Contact:

GF Piping Systems Ltd.
Phone: +41 52 631 1111
E-mail: info.ps@georgfischer.com

The technical data are not binding. They neither constitute expressly warranted characteristics nor guaranteed properties nor a guaranteed durability. They are subject to modification. Our General Terms of Sale apply.