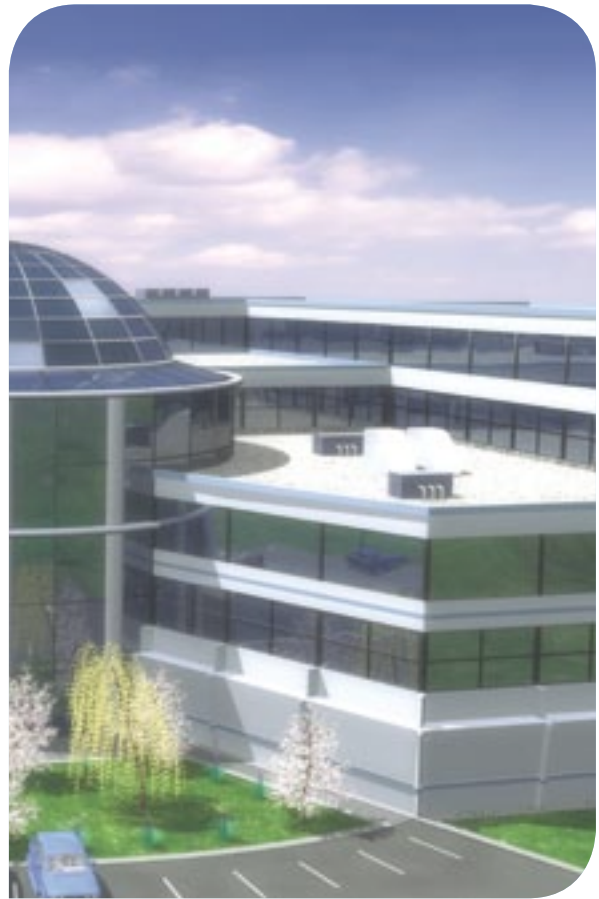




## Microelectronics Applications



From Applications  
to Products

## Table of Contents

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# GF Piping Systems

## Your global system provider

**We are dedicated to designing, manufacturing and marketing piping systems for the safe and secure conveyance of liquids and gases.**

### **We put customers first**

- Customer needs guide our product development
- We offer customer support and training worldwide
- We measure your satisfaction

### **We act fast**

- Local presence worldwide
- Superior logistics
- Speed in all details

### **We do what we say**

- Tested quality
- Always trustworthy

## Your benefits at a glance

### **Global training**

- Different materials and products
- Installation techniques
- Connection and jointing techniques

### **Global planning**

- Professionally trained staff
- Planning documentation (online, CD-ROM and Media Cockpit)
- Product library (online and CD-ROM)
- Online catalogues

### **Global standards**

- DIN
- ISO
- BS
- ASTM
- JIS

### **Global distribution network and availability**



We supply what you are looking for

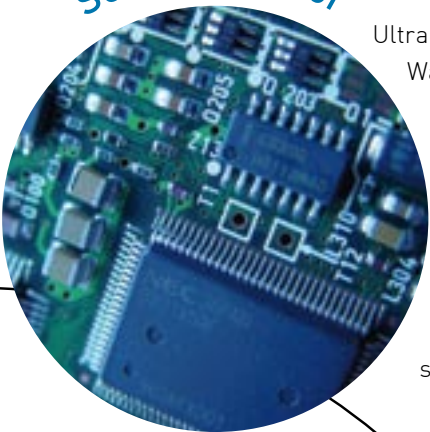
#### Microelectronics

At GF Piping Systems we realize that your high tech factory runs 24/7. Having dependable, safe piping systems that can consistently deliver critical processing fluids is a must.

Avoiding unnecessary shutdowns is a goal that we share. Our supply of quality plastic piping system products and welding technologies coupled with our dedicated and knowledgeable staff has kept factories like your own running 24/7 for more than two decades. During this time, end users like yourself have seen the added benefits of plastic piping systems and replaced other materials to achieve safety, quality and productivity.

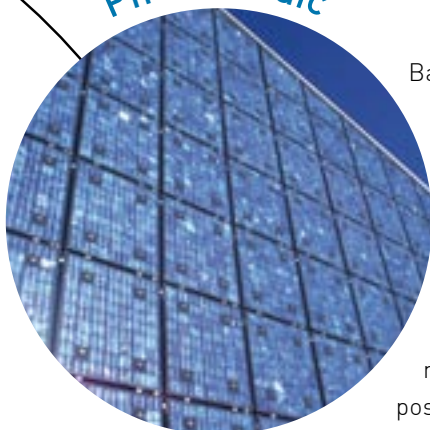
All around Microelectronics

## Semiconductor



Ultrapure and Hot Ultrapure Water are the lifeblood of semiconductor wet processing. SYGEF® Plus systems out of PVDF high purity material with the corresponding IR Plus® fusion technology offers the industrial benchmark solution.

## Photovoltaic



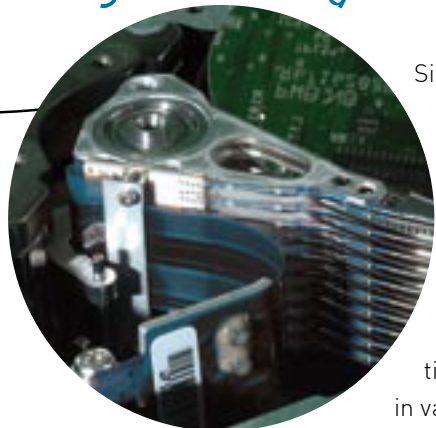
Based on its wide experience, GF Piping Systems has developed comprehensive system solutions for these markets to meet customer needs in the best possible manner.

## TFT/LED/OLED



Our Total Plastic Solutions are perfectly serving the increasing demands of guaranteeing consistent water qualities for the TFT/LCD/OLED industry.

## Storage Media



Since memory capacity per footprint is continuously increasing, producers of mechanical memory devices showing also an increased demand for pure and high pure materials of constructions for their facilities in various applications.



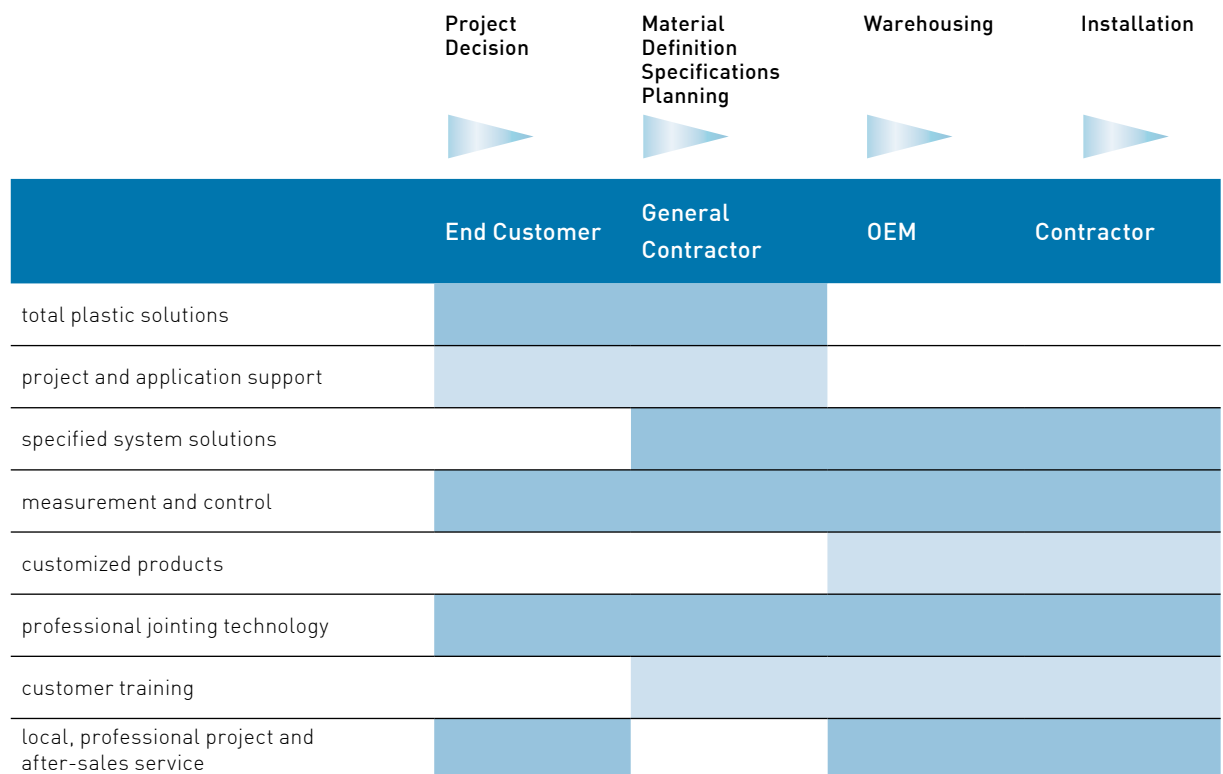




## Added Value

### GF Piping Systems at your service

We support you throughout



Brandname	Material
SYGEF® Plus	→ PVDF High Purity
SYGEF® Standard	→ PVDF
SYGEF® Exhaust	→ PVDF
SYGEF® PFA	→ PFA
PROGEF® Plus	→ PP Cleaned
PROGEF® Standard	→ PP
PROGEF® Natural	→ PP-R Natural
CONTAIN-IT PLUS	→ Double Containment Piping
FUSEAL	→ PP Flame-retardant or PVDF
IR Plus®	→ Infrared Welding Technology



# How to use the brochure



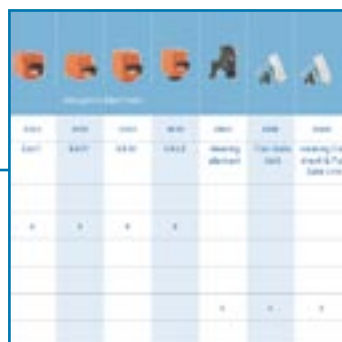
1  
Select your  
Application



2  
Find your  
System Solution



3  
Material  
Selection



4  
Add Products



### The Specifiabiles

In close coordination with the endcustomers and based on their needs GF Piping Systems introduced the SYGEF® and PROGEF® productlines product lines for various applications within the micro-electronic world.

To best meet these needs, the SYGEF® and PROGEF® pipes, fittings, valves and the related fusion technologies are compatible to each other in order to guaranty maximum safety and performance.

### They are a SYSTEM

SYGEF® and PROGEF® are strictly fulfilling the internal specifications to ensure the customer expected performance.

**They are specified products.**





# High purity system solution for high end water applications

SYGEF® Plus, IR Plus®

## Ultrapure Water and Hot Ultrapure Water.

Ultrapure Water (UPW) and Hot Ultrapure Water (HUPW) are the lifeblood of semiconductor wet processing. UPW contacts the wafer at least 20% of the manufacturing cycle. The primary uses for UPW and HUPW are rinse water, humidification water, CMP and ultrapure chemical blending. SYGEF® Plus systems out of PVDF high purity material with the corresponding IR Plus® fusion technology offers an industrial benchmark solution.



## Each chain is only as strong as it's weakest link.

Therefore GF Piping Systems ensures:

- completely controlled processes
- optimized packaging and logistic concepts
- documented manufacturing process steps
- ISO certified factories
- unsurpassed BCF and IR Plus® welding technology
- field proven industrial benchmark technology with more than 10 million IR welds in the field
- 100 % repeatability
- 100 % traceability
- worldwide certification training program for installation
- worldwide support



UPW  
HUPW

Ultrapure Water and  
Hot Ultrapure Water



### DI Water and Specified Water

DI or less demanding UPW water (e.g. used in the TFT/LCD industry) requires defined water qualities at different levels. PROGEF® Plus offers a high quality system solution with a favorable price/performance ratio, showing better leach out characteristics than any PVC clean.



System solutions for mid-range  
water applications with a favorable  
price performance ratio

PROGEF® Plus

**DI Water and Specified Water**

- cost effective solution for UPW return lines
- great surface finish and leachout characteristics
- packaged product for clean delivery to your jobsite



*DI and Specified Water*

*DI Water*



## Exhaust

Designed to meet the requirements of even the newest 300 mm semiconductor fabrication facilities, SYGEF® Exhaust is tailored to the customer needs where the safe conveying of high volumes of critical exhaust gases and fumes is essential.

The combination of easy planning, handling and installation with superior performance characteristics meeting the FM-4910 Standard adds to the cost benefits. Working with a polymer system is simply just more flexible in terms of design and commissioning when compared to stainless steel installations.

SYGEF® Exhaust is available in SYGEF® PVDF (polyvinylidene fluoride) thinwall pipe. The combination with butt fusion jointing technology and market available dampers and fittings, is offering engineers increased flexibility for designing and also upgrading existing exhaust systems. The easy to repair system, being 100 % metal and corrosion free offers high strength, low weight, abrasion resistance, and a wide operating temperature range. These features culminate in making up the material of choice for the stringent requirements of the semiconductor industry.



With a successful history already behind it, SYGEF® Exhaust has been proven in pilot references, which are available upon request.

Butt fusion, hot Gas Back Welding, Fix Flanging as well as joining with GF Piping Systems Flange Adaptors is possible to complete the system.

# Non corroding Exhaust System Solution for conveying critical gases and fumes within the Microelectronics and Chemical Industry

SYGEF® Exhaust

## Exhaust

- 100 % metal/corrosion free
- favourable price and performance ratio compared to coated Stainless Steel
- FM-4910 listing
- easy planning and installation
- easy repair
- dimensions up to d400
- customized products
- pilot references



Exhaust

Exhaust

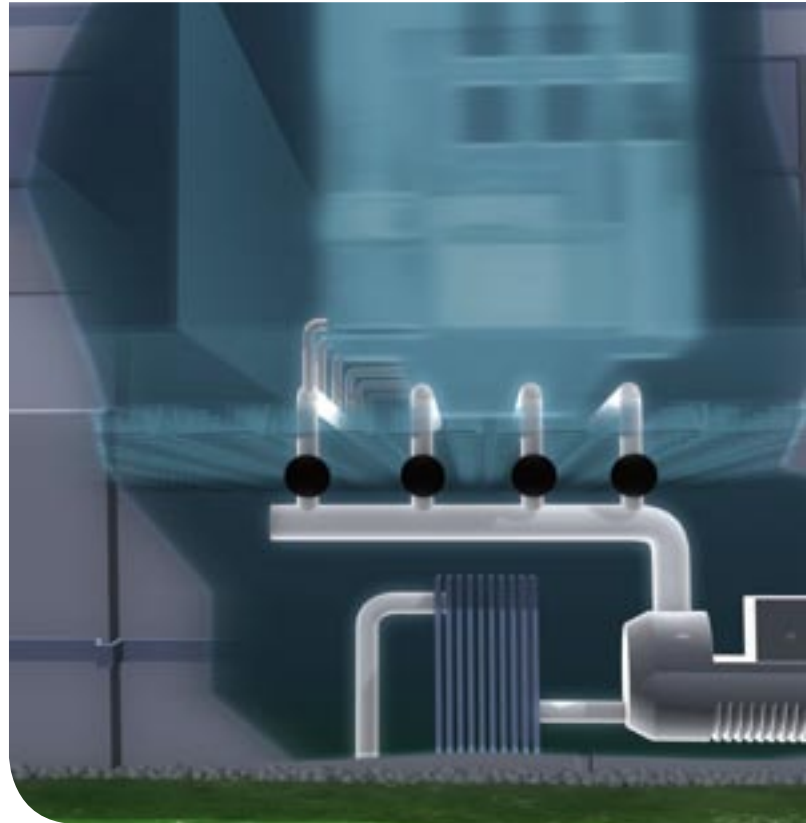




### Process Cooling Water (PCW)

Temperature-controlled water is used extensively throughout high tech manufacturing processes to cool critical components in OEM, environmental and reclaim equipment.

The PROGEF® Standard product line of GF Piping Systems offers a cost-effective solution versus stainless steel with an excellent, non-corrosive surface finish. In addition our products guarantee superior insulating properties compared to steel.



# Non corroding system solution in large diameter

## PROGEF® Standard

### Advantages of PROGEF® Standard

- improved impact strength high thermal ageing
- thermal forming resistance corrosion resistance
- high long-term creep strength
- high stress fracture resistance and pressure resistance
- good abrasion resistance
- homogeneous, fine structure
- outstanding weldability



Water



PCW

Process Cooling



### Chemical Drain and Waste Systems

Chemical waste drain as well as water reclaim and recycle applications offer environmental challenges to any factory.

All grades of plastics from the GF Piping Systems product list have found their way into this important worldwide role, offering cost-effective solutions to help mitigate pollution and maintain a clean environment for future generations.

GF Piping Systems FUSEAL products in flame-retardant PP or PVDF and the double containment piping system CONTAIN-IT Plus provide you with a safe and efficient method of conveying corrosive fluids even at elevated temperatures.



### FUSEAL

- weldable (electro-fusion) and MJ (mechanical jointing)
- PP and PVDF chemical resistant properties and temperature capabilities
- flame retardant and available in double containment
- product range: 1½ – 12 inch



# Cost-effective solutions for conveying corrosive fluids even at elevated temperatures

## FUSEAL, CONTAIN-IT Plus

### A safe waste handling

as well as reclaim and recycle applications offer environmental challenges to any factory. All standard grades of GF Piping Systems plastics are cost-effective solutions to help mitigate pollution and maintain a clean environment for future generations. FUSEAL products in flame-retardant PP or PVDF are the electrofusion drain systems of choice. Even the highest economic demands can be met with our PE-HD drain thinwall electrofusion system.

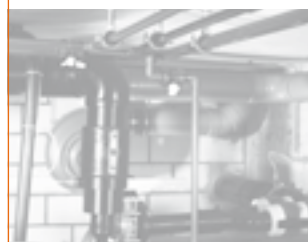


### CONTAIN-IT Plus

The industry benchmark solution for double containment systems CONTAIN-IT Plus is strictly compliant to DVS standards ensuring safe and reliable installations.

In addition GF Piping Systems offer the PVC clear slipt pipe system CONTAIN-IT as a retrofit solution and the Polypropylene Fuseal Squared system for scheduled applications.

Waste System



CD & WS

Chem. Drain

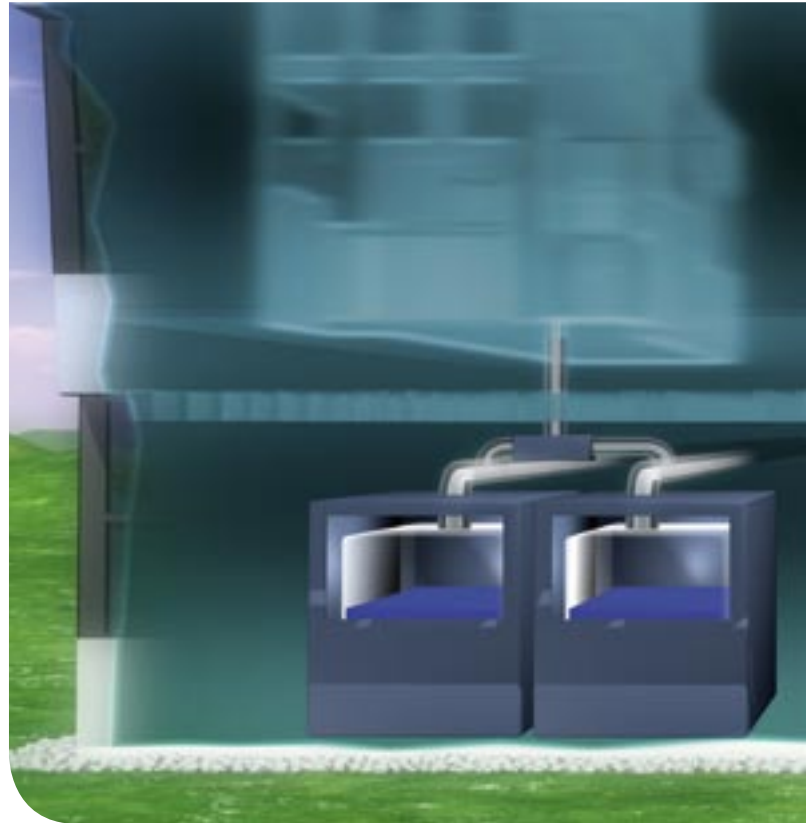


### CMP/Slurry process

Chemical mechanical planarization and polishing, CMP, is a wafer flattening and polishing process that combines mechanical buffing with chemical removal.

Replacement of PFA with PROGEF® Natural for this application has been a recent success story for GF Piping Systems. PP-N meets all the needs of a delivery system for CMP chemicals and at a better cost to performance ratio.

PROGEF® Natural can provide a fully welded system solution that meets all your requirements, possibly even eliminating the need of double containment.



GF Piping Systems is the only supplier who can truly offer a complete piping system solution for reliable slurry supply.

This added value for our customers is maximized by using PROGEF® Natural for large diameter slurry supply lines and SYGEF® PFA, our flexible high purity piping system solution for the smaller hook-up dimensions.



# Economical and pure system solutions for chemical sanitized water application and abrasive fluids

## PROGEF® Natural

### Chemical Mechanical Planarization

State of the art fusion technology keeps shear forces low at high velocities in slurry processes

- prevents media from crystallization

High material stiffness compared to PFA

- may eliminate the requirement for secondary containment support

Product range up to d63 (2")

- cost effective, flexible design solution for CMP supply systems

Specified range

- reliable components for the manufacturing of your top product

- Industry's only PN10 Diaphragm Valves fulfilling additional qualification testing: Tightness in passage: 10 bar, 1000h at 20° C



Slurry Process



CMP

CMP



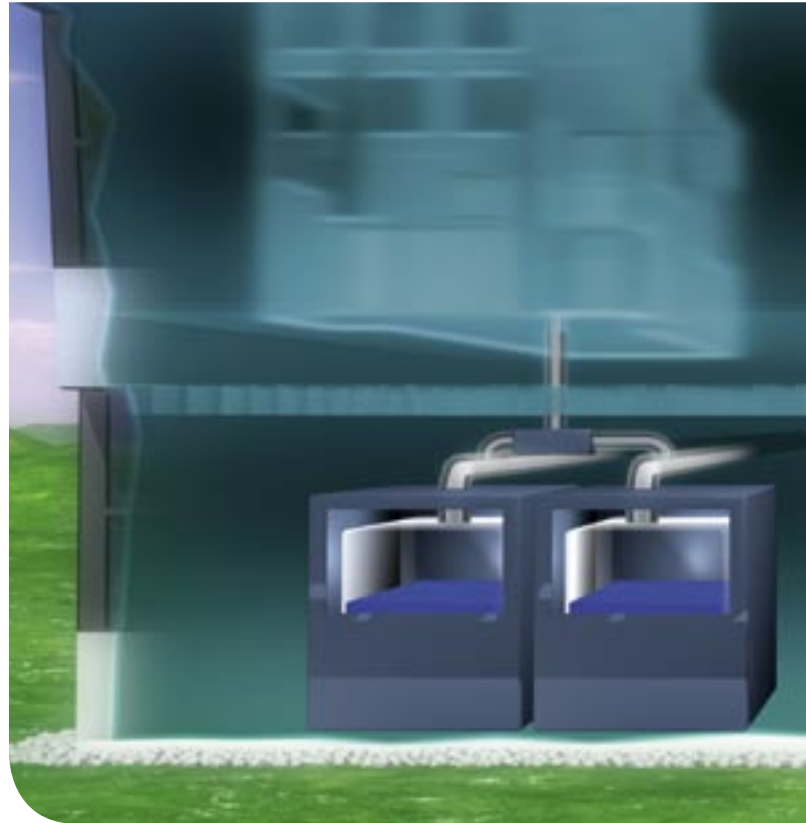
### Chemical Distribution

GF Piping Systems is uniquely equipped to provide the proper material with excellent life span expectations for temperatures up to 140°C to meet your chemical delivery needs.

Our plastics in PVDF, PVC-U, PVC-C and Polypropylene are top quality, reliable solutions, for various chemical media.

SYGEF® PFA completes the Total Plastic Solution for the distribution of high purity chemicals. The highly innovative PFA tubing, valves and Flaretype fittings sustain your needs up to 200°C.

We offer written guarantees of life span and chemical resistance on request. Just ask us.



A very strong tool to multiply the wide GF Piping Systems know-how in plastics and standard applications is our customizing capability. Hereby we can benefit from our long term experience in providing system solutions and also serve site or customer specific demands.

Our goal is to continuously increase the added value for our customers by consistently pursuing the total plastic solution approach which has been proven in several factories all over the world.

# High Purity piping system

## SYGEF® PFA

SYGEF® PFA Tubing (inch and metric)  
1/8" - 1 1/4", Dupont 451 HP, smooth  
surface, less residence of chemicals,  
less extractables, less permeation.

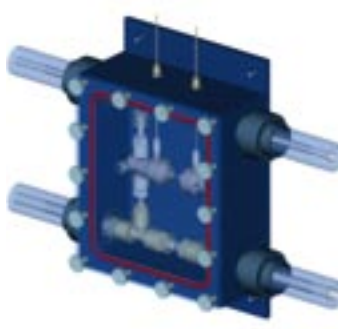
SYGEF® PFA LQ3 Fittings, triple seal  
construction, compatible to Flaretek  
Industry Standard, improved design  
for High Temperature Applications  
(200°C).

SYGEF® PFA LVQ Valves Prevention  
of micro-bubbles (gentle open-close),  
min. dead space, lowest particle,  
highest lifetime (bumper).



Examples for the wide range of GF  
Piping Systems customized products  
are plug-and-play solutions like:

- transition fittings and assemblies
- junction boxes for Chemical delivery
- completely assembled submodules  
and customized products (e.g. ultrafil-  
tration). Just ask us.



*Chem. Distribution*



*Chem.  
Distribution*



### **SYGEF® Plus**

#### **Piping Systems in PVDF-HP**

High purity system solution for high end water applications

- completely controlled process
- superior for TOC, Metals, Anions (SEMI F57)
- surface quality  $Ra \leq 0.2\mu m$  ( $d \leq 225$ )



### **SYGEF® Standard**

#### **Piping Systems in PVDF**

Excellent system solution for demanding chemical applications.



### **SYGEF® PFA**

High purity system solution for high end applications in PFA

- triple seal construction
- compatible to Flaretek Industry Standard
- improved design for High Temperature applications (200°C).

# The GF Piping Systems Specifiabes for Microelectronics

Technical Information



## **PROGEF® Plus** **Piping Systems in state-of-the-art** **Polypropylene**

System solutions for mid-range water applications with a favourable price performance.



## **PROGEF® Natural** **Piping Systems in PP-N**

Economical and pure system solutions for chemical sanitized water application and abrasive fluids.



## **SYGEF® Exhaust** **Exhaust Systems in PVDF**

Non corroding Exhaust piping system in PVDF.

- 100 % metal/corrosion free
- favourable price and performance ratio to coated SS
- FM-4910 listing.



Technical  
Information





### PROGEF® Standard

- improved impact strength
- high thermal ageing and thermal forming resistance
- corrosion resistance
- high long-term creep strength
- high stress fracture resistance
- pressure resistance
- good abrasion resistance
- homogeneous, fine structure
- outstanding weldability



### PE 100 Polyethylene

The economical solution for cold water applications.

- good chemical resistance
- superior price-performance ratio
- UV resistant
- also available as thinwall electrofusion system for drain applications
- ELGEF® Electrofusion Technology



### ABS

Acrylonitrile-Butadiene-Styrene.

- high impact strength at low temperature to -40°C
- easy handling due to solvent cementing jointing
- available as COOL-FIT™ system
- pre-insulated pipes in ABS

# The GF Piping Systems Engineered Plastics for Microelectronics

Technical Information



## **PVC-U / PVC-C** **Polyvinyl Chloride**

The fastest solution for your application excellent chemical resistance easy and fast jointing complete system in global standards [EN/DIN, BS, ASTM, JIS] proven in millions of applications over nearly 50 years.



## **CONTAIN-IT Plus**

The industry benchmark solution for double containment systems  
CONTAIN-IT Plus is strictly compliant to DVS standards ensuring safe and reliable installations. In addition GF Piping Systems offers the PVC clear split pipe system CONTAIN-IT as a retrofit.



## **Fuseal 25/50** **PVDF**

Economical electrofusion piping system solution for waste applications in Fuseal 25/50 PVDF and Fuseal II PP. Thousands of successful references world wide.



Technical  
Information

### Butterfly Valves Type 365

They are ideally suited for shut-off, flow control and throttling of corrosive and abrasive process media in either liquid, powdery or gaseous state.

Butterfly Valves Type 365 are available as DIN- or ANSI-Valves, with bare shaft as per standard. Valves can be delivered as complete units, i.e. with mounted-on locking handles, manual gearboxes or with quarter turn pneumatic actuators double- or single-acting.

The sturdy design bodies are made of cast steel 1.0619 (WCB A216), powder-coating RAL 5005 signal-blue, with resistant liners made of PTFE.

### Butterfly Valves Type 567 and 568

GF Piping Systems presents the new 567/568 type series of butterfly valves with a comprehensive range of products and a multitude of interesting combination possibilities. We can offer you, for example, manual valves with hand lever or reduction gear. The program also includes pneumatically or electrically actuated valves from DN50 to DN200.

Our system's modular design principle allows you to exchange individual system components – fast, easily and at very little expense. You also have a choice of materials:

PVC-U, PVC-C, ABS, or Polypropylene and PVDF. Our standard sealing materials are EPDM and FPM, but other materials are available on request.

### Components list for Butterfly Valve Type 365

Bareschaft			
ISO/DIN	Code	ANSI	Code
DN50	160 365 551	2"	160 365 423
DN65	160 365 552	2½"	160 365 424
DN80	160 365 553	3"	160 365 425
DN100	160 365 554	4"	160 365 426
DN125	160 365 555	5"	160 365 427
DN150	160 365 556	6"	160 365 428
DN200	160 365 557	8"	160 365 429
DN250	160 365 558	10"	160 365 430
DN300	160 365 559	12"	160 365 431

### One system - Many options

All the customary installation pipe standards are supplied:

- metric: DIN, EN, ISO
- inch: BS, ASTM
- JIS (only wafer-type valves)

With this wide range of products to choose from you can always be sure of having the best possible solution for your application.



Standard  
Lug-style butterfly valve/  
end installation  
Type 568

Standard  
Wafer-type butterfly  
valve  
Type 567

Butterfly valve  
with fine adjustment

Lever		
Size		Code
2" - 3"	DN50 - DN80	161 486 065
4/5"	DN100/125	161 486 066
6"	DN150	161 486 067
Gearoperator		
Size		Code
2" - 3"	DN50 - DN80	198 806 690
4" - 5"	DN100 - DN125	198 806 691
6" - 8"	DN150 - DN200	198 806 692
10" - 12"	DN250 - DN300	198 806 693



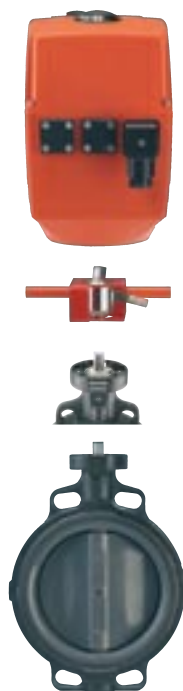
Butterfly valve  
with reduction gear



Butterfly valve  
with pneumatic  
actuator  
– single acting



Butterfly valve with  
pneumatic actuator  
– double acting; optional  
manual override



Butterfly valve with  
electric actuator;  
optional manual  
override and electric  
position indicator





## Measurement and Control

### Your benefits at a glance

GF Signet provide fluid handling solutions for every application to our industrial clients.

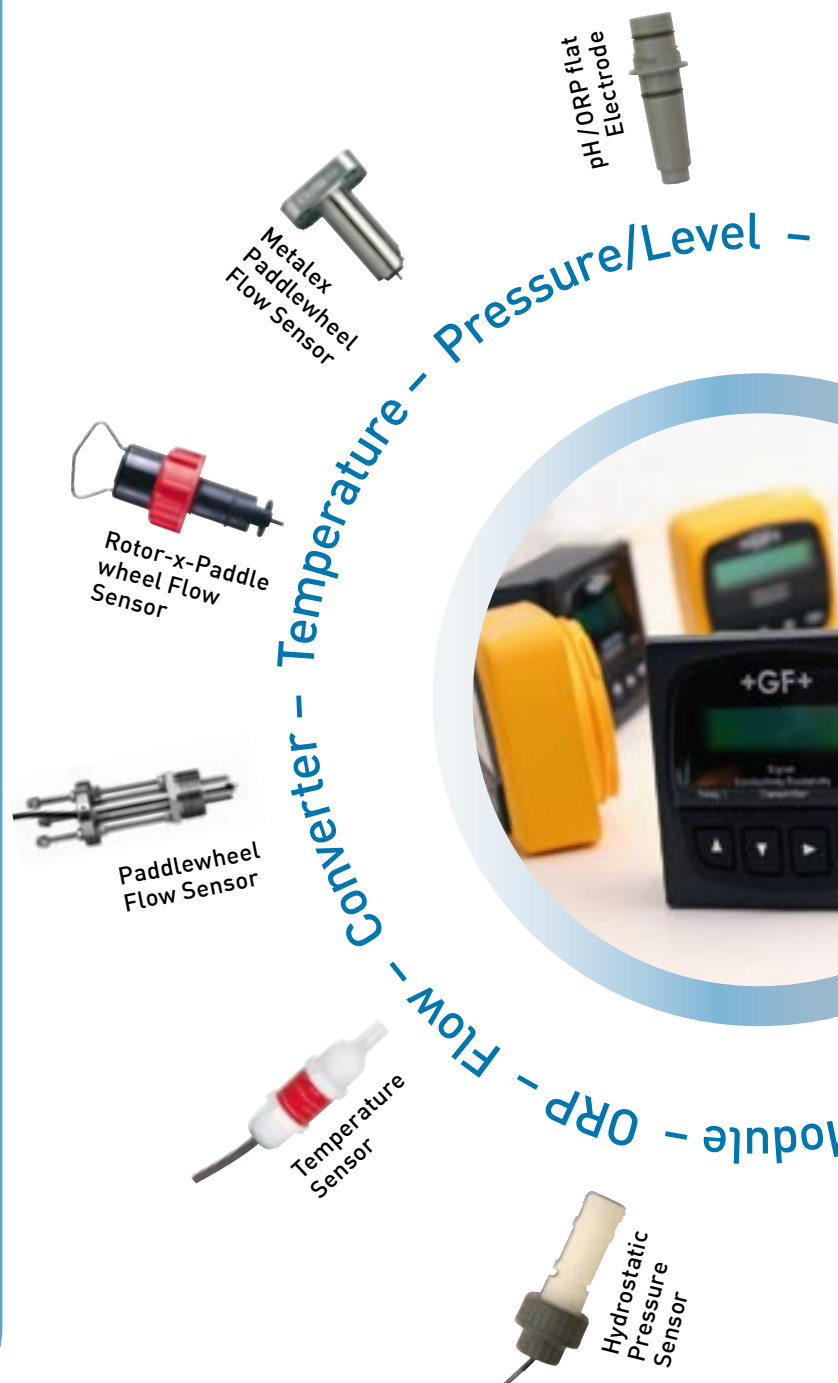
For almost 40 years, GF Signet has manufactured high-quality liquid flow and analytical measurement equipment.

The GF Signet product line includes sensors and instruments to cover a variety of process controls:

- Flow – paddlewheel, vortex, magmeter,
- pH/ORP
- Conductivity/Resistivity
- Temperature
- Pressure
- Level
- Multi-Parameter

The GF Signet product line also features trademarked and patented technologies that lead the fluid measurement industry. Committed to product excellence, we continue our pursuit of quality through innovative, leading-edge technology in flow control and measurement. We're proud of our:

- Award-winning innovative design
- ISO 9001 and 14001 certification
- Comprehensive customer support
- Product quality and reliability
- Easy-to-use instrumentation
- Extensive network of worldwide distributors
- Unmatched delivery





# GF Signet 8900 Multi-Parameter Compatibility Overview

Below is an overview of the GF Signet sensors. Further detailed information on GF Signet can be obtained from page 54 ff and your local sales office, or via [www.gfsignet.com](http://www.gfsignet.com)



Technical Information



Technical  
Information

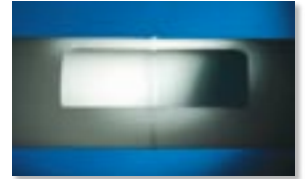
### IR Plus®

short welding time combined with high traceability of each weld and minimal welding seams



### IR Plus® Fusion

– the clean connection



### BCF® Plus

best welding quality with highest welding factor and no welding seams



### BCF® Plus Fusion

– the smooth connection



### Butt Fusion

economical welding up to big diameters



### Butt Fusion

– the connection for larger dimensions



### Electro Fusion

semi-automatic welding with lowest expenditure of human labour



### Electro Fusion

– the easy connection



### Socket Fusion

fast and easy welding



### Socket Fusion

– the strong connection



### Solvent Cementing

simple and reliable jointing – no machine is needed only gap filling cement and a few simple tools



### Solvent Cemented

– the fast connection



### Mechanical Joints

fast exchangeability, detachable, customising, transitions and washing are just a few of the benefits

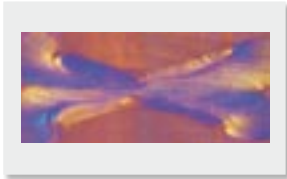


### Mechanical Joints

– the fast connection for High Purity applications



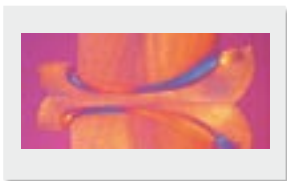
For the most suitable piping system the best jointing technology is needed to install reliable and high quality piping systems. GF Piping Systems has developed it for you.



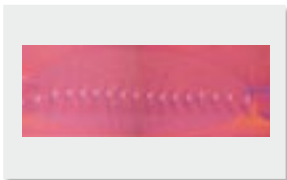
Fusion components are heated without contact in this method. There is no contamination and much smaller weld beads as compared to conventional butt fusion.



No beads or crevices are formed with BCF (bead and crevice-free fusion), no deposits, no pressure loss and almost no stress in the fusion zone.



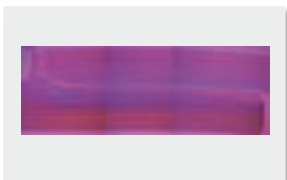
Butt fusion is a universal connection for all sizes; large bead may however affect deposits.



Ideal for in-place fusion, standard connection for the outer double containment pipe; the heating coil is embedded entirely in plastic – there is no contact with the medium.



Socket fusion enables creating heavy-duty connections, no reduction of the clear pipe opening by beads (important for small diameters).



Chemical and pressure resistance of solvent cemented joints is identical to that of the pipe.



#### **Mechanical Joints**

Seals for mechanical connections are available for any application. Ideal connection for tanks, pumps and metal piping.

# Technical Information



Technical  
Information

# Pipes

Outside-Diameter d			6	8	10	12	16	20	25	32	40	50	63	75	90
SYGEF® Plus	SDR 13,5	PN 16	-	-	-	-	-	x	x	x	x	x	x	x	x
	SDR 21	PN 10	-	-	-	-	-	-	-	-	-	-	-	-	x
SYGEF® Standard	SDR 13,5	PN 16	-	-	-	-	-	x	x	x	x	x	x	x	x
	SDR 21	PN 10	-	-	-	-	-	-	-	-	-	-	-	-	-
SYGEF® Exhaust		-ΔP <sub>max</sub> 1500 Pa	-	-	-	-	-	-	-	-	-	-	-	x	x
PROGEF® Plus	SDR 11	PN 10	-	-	-	-	-	x	x	x	x	x	x	x	x
PROGEF® Natural	SDR 11	PN 10	-	-	-	-	-	x	x	x	x	x	x	-	-
PROGEF® Standard	SDR 41 / 33 / 26 + Air conditioning	PN 2,5 / 3,2 / 4	-	-	-	-	-	-	-	-	-	x	x	x	x
	SDR 17,6	PN 6	-	-	-	-	-	-	-	-	-	x	x	x	x
	SDR 11	PN 10	-	-	-	-	x	x	x	x	x	x	x	x	x
	SDR 7,4	PN 16	-	-	-	-	-	x	x	-	-	-	-	-	-
	SDR 6	PN 20	-	-	x	x	-	-	-	-	-	-	-	-	-
PVC-U grey	Air conditioning		-	-	-	-	-	-	-	-	-	-	-	-	-
	SDR 51	PN 4	-	-	-	-	-	-	-	-	-	-	-	x	x
	SDR 34,3	PN 6	-	-	-	-	-	-	-	-	-	x	x	x	x
	SDR 21	PN 10	-	-	-	-	-	-	x	x	x	x	x	x	x
	SDR 13,5	PN 16	-	-	-	x	x	x	x	x	x	x	x	x	x
	SDR 9	PN 25	x	x	x	x	x	x	x	x	x	x	x	x	x
	ASTM	Sched 40/80	-	-	-	-	-	½"	¾"	1"	1¼"	1½"	2"	2½"	3"
PVC-C	SDR 21	PN 10	-	-	-	-	-	-	-	-	-	-	-	x	x
	SDR 13,6	PN 16	-	-	-	-	-	-	-	x	x	x	x	x	x
	SDR 9	PN 25	-	-	-	-	x	x	x	x	x	x	x	-	-
	ASTM	Sched 80	-	-	-	-	-	½"	¾"	1"	1¼"	1½"	2"	2½"	3"
PVC-U transparent	SDR 51 / 34,3 + special	PN 4/6	-	-	-	-	-	-	-	-	-	x	x	x	x
	SDR 21	PN 10	-	-	-	-	-	-	x	x	x	x	x	x	x
	SDR 13,5	PN 16	-	-	-	x	x	x	x	x	x	x	x	-	-
	SDR 9	PN 25	x	x	x	x	-	-	-	-	-	-	-	-	-
	ASTM	sched 40	-	-	-	-	-	-	-	1"	-	1½"	2"	-	3"
PE 100	SDR 41/ 33	PN 4 / 5	-	-	-	-	-	-	-	-	-	x	x	x	x
	SDR 17,6	PN 9,6	-	-	-	-	-	-	x	x	x	x	x	x	x
	SDR 11	PN 16	-	-	-	-	x	x	x	x	x	x	x	x	x
	SDR 7,4	PN 25	-	-	x	x	x	x	x	-	-	-	-	-	-
PP-s	Air conditioning		-	-	-	-	-	-	-	x	x	x	x	x	x

110	125	140	160	180	200	210	225	250	260	280	315	355	400	450	500	560	600
x	x	x	x	x	x	x	x	-	-	-	-	-	-	-	-	-	-
x	x	x	x	x	x	x	x	x	x	x	x	-	-	-	-	-	-
x	x	x	x	x	x	x	x	-	-	-	-	-	-	-	-	-	-
x	x	x	x	x	x	x	x	x	x	x	x	-	-	-	-	-	-
x	-	-	x	-	x	-	-	x	-	-	x	-	x	-	-	-	-
x	x	x	x	x	x	-	x	x	-	x	x	x	x	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
x	x	x	x	x	x	-	x	x	-	x	x	x	x	x	x	-	-
x	x	x	x	x	x	-	x	x	-	x	x	x	x	x	x	-	-
x	x	x	x	x	x	-	x	x	-	x	x	x	x	x	x	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	-	x
x	x	x	x	x	x	-	x	x	-	x	x	-	-	-	-	-	-
x	x	x	x	x	x	-	x	x	-	-	x	x	x	-	-	-	-
x	x	x	x	x	x	-	x	x	-	x	x	-	-	-	-	-	-
x	x	x	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-
x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4"	-	-	6"	-	-	-	8"	10"	-	11"	12"	14"	16"	-	-	-	-
x	-	x	x	-	-	-	x	-	-	-	x	-	-	-	-	-	-
x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4"	-	-	6"	-	-	-	8"	10"	-	11"	12"	-	-	-	-	-	-
x	x	x	x	-	x	-	x	x	-	x	x	-	x	-	x	-	-
x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
x	x	x	x	x	x	-	x	x	-	-	x	x	x	x	x	-	-
x	x	x	x	x	x	-	x	x	-	x	x	x	x	-	-	-	-
x	x	x	x	x	x	-	x	x	-	x	x	x	x	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
x	x	x	x	x	x	-	x	x	-	x	x	x	x	x	x	-	-

# Product Range













Product Range



# Fittings

## Socket Systems

Material		Dimension	Pressure range PN											
					Bend 90°	Elbow 90°	Angle 45°	T 90°	Socket	Double nipple	Reducer	Endcap	Trans- mission fitting	Union
	SYGEF® Plus	d20 - 315		PN16	x	x	x	x		x	x	x	x	x
				PN10	x	x	x	x		x	x	x	x	x
	SYGEF® Standard	d20 - 315		PN16	x	x	x	x	x	x	x	x	x	x
				PN10	x	x	x	x	x	x	x	x	x	x
	PROGEF® Plus	d20 - 315		PN10	x	x	x	x		x	x	x	x	x
	PROGEF® Natural	d20 - 63		PN6	x		x	x		x	x			
				PN10		x	x	x		x	x		x	x
	PROGEF® Standard	d16 - 110	SDR17.6	PN6										
			SDR11	PN10	x	x	x	x	x	x	x	x	x	x
	PVC-U	d6 - 400		PN10/16 Sched 40/80	x	x	x	x	x	x	x	x	x	x
	PVC-C	d20 - 225		PN10/16 Sched 40	x	x	x	x	x		x	x	x	x
	PE	d20 - 630		PN6										
				PN10		x	x	x	x		x	x	x	

## Butt Fusion Systems

Material		Dimension	Pressure range PN											
					Bend 90°	Elbow 90°	Angle 45°	T 90°		T 90° red	Reducer	Endcap	Transition fitting	Union
	PROGEF® Standard	d20 - 500	SDR11	PN10	x	x	x	x		x	x	x	x	x
			SDR17.6	PN6	x	x	x	x		x	x	x		x
	PROGEF® Natural	d20 - 63	SDR11	PN10		x	x	x			x		x	x
	PROGEF® Plus	d20 - 315	SDR11	PN10	x	x	x	x		x	x	x		x
	PE	d20 - 400	S5/SDR11		x	x	x	x		x	x	x	x	x
			S8.3/SDR17.6		x		x	x		x	x	x		x
	SYGEF® Standard	d20 - 225		PN16	x	x	x	x		x	x		x	x
				PN10	x		x	x		x	x			
	SYGEF® Plus	d20 - 315		PN16	x	x	x	x		x	x	x	x	x
				PN10	x			x		x	x			

Tank adapter	Adaptor unions-R	Union end
		x
		x
		x
		x
	x	x
		x
x		
	x	x
	x	x
	x	x
x		
	x	x







Tank adapter	Flange adapter	Sanitary adaptor
x	x	
x	x	
	x	x
x	x	
x	x	
x	x	
x	x	
	x	
	x	x
	x	



Product Range

# Product Range




# Valves Manual

																			
Document No. GMST					5368	5368	5677 6000	5348	5348	5348		5552	5109	5109		8241 5885	8241 5885	8258 6001	8258 6001
Type		322/324	323	343 Plus	343 vertical	546	314	315	317	319		367	037-M	037-G	038-M	567	567	568	568
Material	PVC-U	x	x <sup>△</sup>	x <sup>○</sup>	x <sup>○</sup>	x <sup>○</sup>	x <sup>○</sup>	x <sup>○</sup>	x <sup>○</sup>	x <sup>○</sup>		x <sup>○</sup>				x <sup>○</sup>	x <sup>○</sup>	x <sup>○</sup>	x <sup>○</sup>
	PVC-C			x <sup>○</sup>		x <sup>○</sup>	x	x <sup>○</sup>	x <sup>○</sup>							x <sup>○</sup>	x <sup>○</sup>	x <sup>○</sup>	x <sup>○</sup>
	ABS			x <sup>■</sup>		x <sup>■</sup>	x <sup>■</sup>	x <sup>■</sup>	x <sup>○</sup>							x <sup>○</sup>	x <sup>○</sup>	x <sup>○</sup>	x <sup>○</sup>
	PROGEF® Standard		x	x <sup>○</sup>		x <sup>○</sup>	x	x	x <sup>○</sup>	x	x <sup>○</sup>					x <sup>○</sup>	x <sup>○</sup>	x <sup>○</sup>	x <sup>○</sup>
	PROGEF® Natural							x		x									
	SYGEF® Standard			x <sup>○</sup>		x <sup>○</sup>	x	x	x <sup>○</sup>							x <sup>○</sup>	x <sup>○</sup>	x <sup>○</sup>	x <sup>○</sup>
	SYGEF® Plus						x	x	x <sup>○</sup>	x									
	Metall												x <sup>○</sup>	x <sup>○</sup>	x <sup>○</sup>				
	Silicon free	x	x	x		x	x	x	x	x PP-H	x					x	x	x	x
	Oil free					x	x	x	x	x						x	x	x	x
Sealing material	EPDM	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	NBR						x	x	x	◆		◆	◆	◆					
	FPM	x	x	x	x	x	x	x	x	◆	x	x	x	x	x	x	x	x	x
	FFPM					x (PVDF)													
	FPM/PTFE coated															◆	◆	◆	◆
	PTFE/EPDM	x	x	x	x	x	x	x	x	x									
	CSM						x	x	x	◆		◆	◆	◆					
	Other						◆	◆	◆	◆		◆	◆	◆	◆	◆	◆	◆	◆
Dimension DN		6-8	10-15	10-50	10-50	10-100	15-50	15-50	15-150	15-15/100-50	250-300	50-300	50-300	50-300	50-300	50-300	50-300	50-300*	50-300
Pressure range PN		10	10	10	10	PVC-U/ PVC-C/ PVDF 16 PP 10 ABS 10	10	10	10	10	6-4	10	10	10	10	10	10	10	10

x	metric standard	△	JIS
		■	BS
○	ASTM/ANSI	◆	on request







# Automation Actuated Valves

		 Electric ball valve							 Electric 3-way ball valve				 Pneumatic ball valve				
Document No. GMST		8259	8259	8259	8259	8259	8259	8259	5804	5804	5804	5804	5749	5749	5749	5749	5749
Type		107	130	131	132	133	134	135	175	176	177	178	230	231	232	233	234
Material	PVC-U	x <sup>○</sup> ▲■	x			○	■	▲	x <sup>○</sup> ▲■			x	x			○	■
	PVC-C	x <sup>○</sup> ▲	x			○	■	▲	x <sup>○</sup>				x			○	■
	ABS	x <sup>■</sup>	x				■		x				x				■
	PROGEF® Standard	x <sup>○</sup> ▲		x				▲		x <sup>○</sup>				x			
	PROGEF® Natural																
	SYGEF® Standard	x <sup>▲</sup>			x			▲			x <sup>○</sup>				x		
	SYGEF® Plus																
	Oil free																
Sealing material	EPDM	✓	✓	✓		✓	✓	✓	✓	✓		✓	✓	✓		✓	✓
	PTFE																
	PP-H																
	FPM	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	FPM/PTFE coated																
	CSM																
	Other																
Dimension DN		10-50	10-100	10-100	10-50	10-100	10-100	10-100	10-50	10-50	10-50	10-50	10-100	10-100	10-50	10-100	10-100
Pressure range PN		10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10

✓	available	▲	JIS
x	metric standard	■	BS
○	ASTM/ANSI	◆	on request



	 Pneumatic 3-way ball valve			   Diastar diaphragm valve		
5749	5804	5804	5804	5398/5917	5398 5917	5398 5917
235	275	276	277	025 and 028	025	Eco
▲	x○▲■			x○▲■	x○▲	x○▲■
▲	x○			x○▲■	xx▲	x○
	x			x○▲■	x○▲	x■
▲		x○		x○▲■	x○▲	x○▲■
				x		
▲			x○		x○▲■	x○▲
					x○▲■	x○▲
				x	x	x
✓	✓	✓		x x x x x ◆	x	x
				x x x x x x	x	
				◆ ◆ ◆	◆	
✓	✓	✓	✓	◆ ◆ ◆ ◆ ◆	◆	◆
				◆ ◆ ◆	◆	◆
				◆ ◆ ◆	◆	◆
10-100	10-50	10-50	10-50	DN15- DN50	65-150	15-50
10	10	10	10	10	6-10	6

Product Range














Product  
Range

# Automation Actuated Valves

		  			  								  				
Document No. GMST		5109	5109	5109	5109	5109	5109	8241 5885	6001 8258	8241 5885	8258 6001						
Type		035	037	038	036	037	038	140	141 ISO 142 ANSI	240	241 ISO 242 ANSI	211	157	160	161	165	166
Material	PVC-U	x <sup>○</sup> ▲			x <sup>○</sup> ▲			x <sup>○</sup> ▲■	x <sup>○</sup>	x <sup>○</sup> ▲■	x <sup>○</sup>	x	x	x	x	x	
	PVC-C							x <sup>○</sup> ▲■	x <sup>○</sup>	x <sup>○</sup> ▲■	x <sup>○</sup>						
	ABS							x <sup>○</sup> ▲■	x <sup>○</sup>	x <sup>○</sup> ▲■	x <sup>○</sup>						
	PROGEF® Standard	x <sup>○</sup> ▲			x <sup>○</sup> ▲			x <sup>○</sup> ▲■	x <sup>○</sup>	x <sup>○</sup> ▲■	x <sup>○</sup>						x
	PROGEF® Natural																
	SYGEF® Standard							x <sup>○</sup> ▲■	x <sup>○</sup>	x <sup>○</sup> ▲■	x <sup>○</sup>					x	x
	SYGEF® Plus																
	Metall		x <sup>○</sup> ▲■	x <sup>○</sup>		x <sup>○</sup> ▲■	x <sup>○</sup>										
Sealing material	EPDM	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	PTFE																
	NBR		◆	◆		x	x										
	FPM	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	FPM/PTFE coated							◆	◆	◆	◆						
	PTFE/EPDM																
	CSM		◆	◆		◆	◆										
	Other		◆	◆		◆	◆	◆	◆	◆	◆	10-50	x				
Dimension DN		250	50-300	50-300	250-300	50-300	50-300	50-300	50-200	50-300	50-200		4-8	10-20	10-20	15-50	3-6
Pressure range PN		6	10	10	4-6	10	10	10	10	10	10	2-10	0-4	0-3	0-1	0.5-6	0-10

x	metric standard	▲	JIS
		■	BS
○	ASTM/ANSI	◆	on request












      									 	
Pressure reducing valve							Pressure relief valve	Water jet suction pump	Variable area flow meter	
5558	5093	5095	5558	5558	5558	5558	5558	5558	8222	8222
V 82	V 182	V 782	V 786	V 86	V 186	V 85	V 185	P 20	SK 10 - SK 41	SK 50 - SK 73
x	x	x	x	x	x	x	x	x	PVCU transparent	PVCU transparent
									Polyamid	Polyamid
									Ploysulfon	Ploysulfon
x	x	x	x	x			x	x		
x	x	x	x	x	x	x	x	x		
x		x	x		x		x		x	x
x	x	x	x	x	x	x	x	x	x	x
	x							x	◆	◆
x		x	x	x	x	x	x			
10-100	10-40	10-40	10-40	65-100	10-50	65-100	10-50	10-80	25-65	10-25
DN10-50: 10 DN65-80: 6 DN100: 4	10	10	DN10-25: 10 DN32-40: 4	DN65-80: 6 DN100: 4	10	DN65-80: 6 DN100: 4	10	10	10	10

# Product Range













Product  
Range

# Pneumatic Actuators

													
		Accessory pneumatic rotary actuators											
Document No. GMST		5950	5950	5950				5650	5920	5398/5917		5398/5917	5398/5917
Type		PA11	PA21	PA30...90	Limit switches box AgNi/Au NPN/PNP	Namur connecting plate	Namur mounting bracket	Positioner	Positioner	DIASTAR Type 025    Type 028		Type 025	Type Eco
Type of actuator	pneumatic rotary	x	x	x									
	accessory for pneumatic				x	x	x	x	x				
Mode of Operation	FC	x	x	x						x	x	x	x
	F0	x	x	x						x		x	
	DA	x	x	x						x		x	

x	metric standard	▲	JIS
		■	BS
○	ASTM/ANSI	◆	on request

									
Accessory for pneumatic stroke actuators							Accessory pneumatic actuators		
	5938	5938	5938	5938	5938	5938	5913	5913	5657
ASI Module	Limit switches ER 52 Ag/Ni/ Au NPN/PNP	Limit switches ER 55 with reed contacts	Namur connecting plate	Stroke limiter and manual override	Positioner Type DSR 100	ASI Module Type Topmatic	Pilot solenoid valves ( $\frac{3}{2}$ way) PV 94/95	Pilot solenoid valves ( $\frac{3}{2}$ way or $\frac{5}{2}$ way))	Pilot solenoid valves cluster ( $\frac{3}{2}$ way and $\frac{5}{2}$ way) PV 2000
x	x	x	x	x	x	x	x	x	x

Product Range



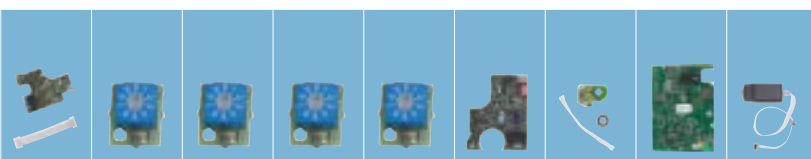
Product  
Range

# Electrical Actuators & Accessories

													
		Electrical actuators				Accessories							
Document No. GMST		5907	5907	5907	5907	5907	5907	5907	5907	5907	5907	5907	5907
Type		EA11	EA21	EA31	EA42	Heating element	Fail-Safe unit	Heating element & Fail safe unit	Limit switches AgNi	Limit switches Au	Limit switches NPN	Limit switches PNP	Middle position
Type of actuator	Electric rotary	x	x	x	x								
	Accessory for electric					x	x	x	x	x	x	x	x
Voltage	24V =	x	x	x	x					x			
	24V, 50/60Hz	x	x	x	x					x	x	x	
	100-230V, 50-60Hz	x	x	x	x				x				
Power Consumption		22VA at 24V AC/DC	22VA at 24V AC/DC	32VA at 24V AC/DC	40VA at 24V AC/DC				250V AC, 6A	30V DC, 100 mA	10-30V DC, 100 mA	10-30V DC, 100 mA	
		40VA at 100-230V AC	40VA at 100-230V AC	40VA at 100-230V AC	60VA at 100-230V AC								
Torque	Nominal	10 Nm	10 Nm	60 Nm	100 Nm								
	PEAK	20 Nm	20 Nm	120 Nm	250 Nm								
Available Accessories	Heating element	x	x	x	x	x		x					
	Fail-safe unit	x	x	x	x		x	x					
	Limit switches Ag Ni	x	x	x	x				x				
	Limit switches Au		x	x	x					x			
	Limit switches NPN		x	x	x						x		
	Limit switches PNP		x	x	x							x	
	Intermediate position		x	x	x								x
	Monitorings		x	x	x								
	4...20mA feedback		x	x	x								
	Positioner		x	x	x								
	Test adapter	x	x	x	x								

x	metric standard	▲	JIS
		■	BS
○	ASTM/ANSI	◆	on request











5907	5907	5907	5907	5907	5907	5907	5907	5907
Monitoring print	Cycle time extension	Cycle time monitoring	Cycle counter	Current monitoring	4-20mA feedback	Position indicator	Positioner	Test adapter
x	x	x	x	x	x	x	x	x
x	x	x	x	x				
					x	x	x	
						x	x	
								x



## Product Range

# Joining Technologies

	Welding technique	d Types	16	20	25	32	40	50	63	75	90	110	125	140	160	180
	Socket fusion PE, PP, PB, PVDF	MSE 63														
		MSE 110														
		SG 110														
		SG 160														
	Butt fusion conventional/hydraulic PROGEF, SYGEF PP/PE/PVDF	manual workshop	SSE 120/200/300													
			SG 160													
			SG 315													
			TM 160													
		site	TM 250													
			TM 315													
			GF 400													
			GF 500													
			GF 630													
			GF 800													
			GF 1000													
			GF 1200													
			WM 315													
			WM 500													
		workshop	WM 630													
			WM 1200													
	BCF SYGEF PROGEF® Natural	BCF® Plus														
	IR SYGEF PROGEF® Natural PE100	IR-63 Plus®														
		IR-110 Plus®														
		IR-225 Plus®														
		IR-315 Plus®														
	Electro fusion tools PE100/80	HWSG PB														
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