Worldwide competence in plastics

世界领先的塑料技术

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Competence
in Plastics

Purad-High Purity Piping System

Purad-超纯管路系统

www.agru.at

PREFERRED MATERIALS 首选材料

- **Product features**
  产品特点
  - PVDF-UHP
  超纯PVDF
  - PP-Pure/Polypure
  超纯PP/本色PP
  - ECTFE
  ECTFE
  - Leach out test
  滤出性测试
  - Production
  生产
- Supply range
  供货范围
- Application areas
  应用领域

Materials which do not contain any or only leach-out resistant additives and avoid the growth of micro-organisms like:
不含或者只含抗滤出添加剂以避免微生物滋生的材料如:

- **PVDF UHP (PVDF Ultra High Purity PVDF超纯)**
- **PP-Pure (PP-HP grey PP超纯灰色)**
- **Polypure (PP-natural PP本色)**
- **ECTFE**

PURAD program includes all those piping systems which transport ultra pure water or exhausts. PURAD系列包括所有用于输送超纯水或者排气的管道系统。

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PVDF PROPERTIES PVDF性能

- Product features
  产品特点
  - PVDF-UHP
  超纯PVDF
  - PP-Pure/Polypure
  超纯PP/本色PP
  - ECTFE
  ECTFE
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- Translucent material
  半透明的材料
- Density of 1.78 g/cm^3
  密度1.78 g/cm^3
- FM approved material
  FM认证材料
- Fire resistant (UL 94-V0)
  阻燃(UL 94-V0)
- Excellent chemical resistance (even at high temperature)
  出色的耐化性（即使在较高的温度下）
- Resistant against UV- and gamma radiation
  抗紫外线-抗伽马辐射
- Excellent mechanical, insulating and abrasion properties
  出色的机械性能、绝缘性和耐磨性
- Very good processing characteristics
  非常好的加工特性
- Physiologically non-toxic
  生物无毒

MATERIAL GRADES AVAILABLE 可用的原料等级

- Product features
  产品特点
  - PVDF-UHP
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  超纯PP/本色PP
  - ECTFE
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PVDF

Solef®	Kynar®
Suspension Grade 悬浮级	Emulsion Grade 乳液级

Suspension Grade 悬浮级

- lower number of molecular defects
  较低的分子缺陷数
- higher crystalinity
  较高的结晶度
- higher melting temperature
  较高的熔点
- better mechanical properties
  更好的机械性
- better long term behaviour
  更长的使用寿命
- higher cleaniness
  更高的清洁度

Emulsion Grade 乳液级

- higher number of molecular defects
  较高的分子缺陷数
- lower crystalinity
  较低的结晶度
- limited mechanical properties
  机械性具有局限性
- reduced pressure resistance at elevated tempeture
  在高温下抗压力性减弱
- lower purity and higher yellowness
  较低的纯度和较高的偏黄色

- Product features
  产品特点
  - PVDF-UHP
  超纯PVDF
  - PP-Pure/Polypure
  超纯PP/本色PP
  - ECTFE
  ECTFE
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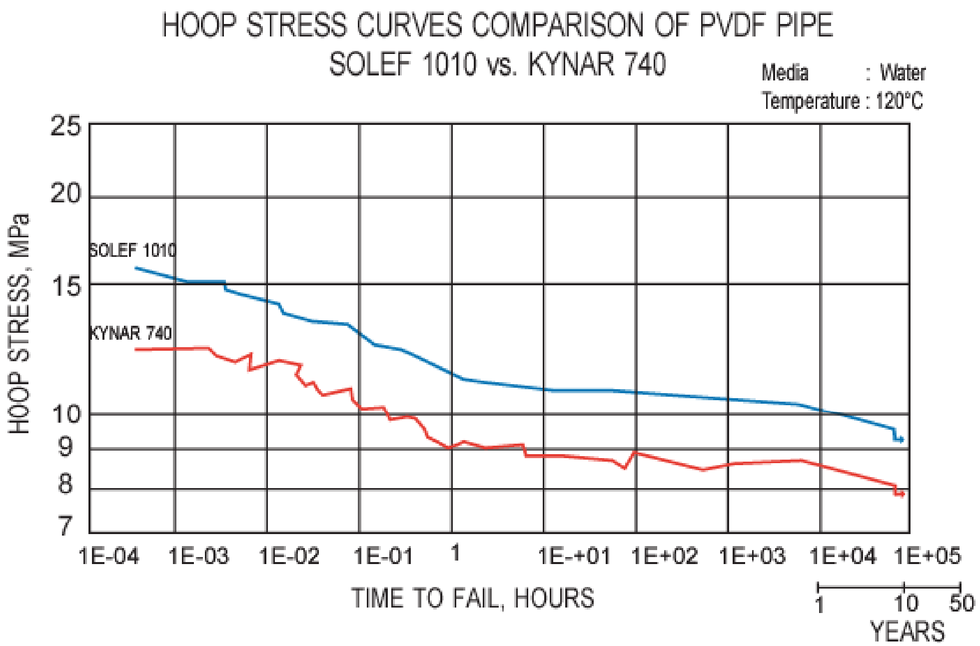
  应用领域

MATERIAL GRADES AVAILABLE 可用的原料等级

Suspension Grade PVDF 悬浮级PVDF

– Superior mechanical strength
  出色的机械强度
– Better purity performance
  更好的纯度表现
– Stronger welds
  更高的焊接强度



MATERIAL GRADES AVAILABLE 可用的原料等级

Higher service life based on similar stress levels

在相同的应力等级下拥有更长的使用寿命

- Product features
  产品特点
  - PVDF-UHP
  超纯PVDF
  - PP-Pure/Polypure
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  - ECTFE
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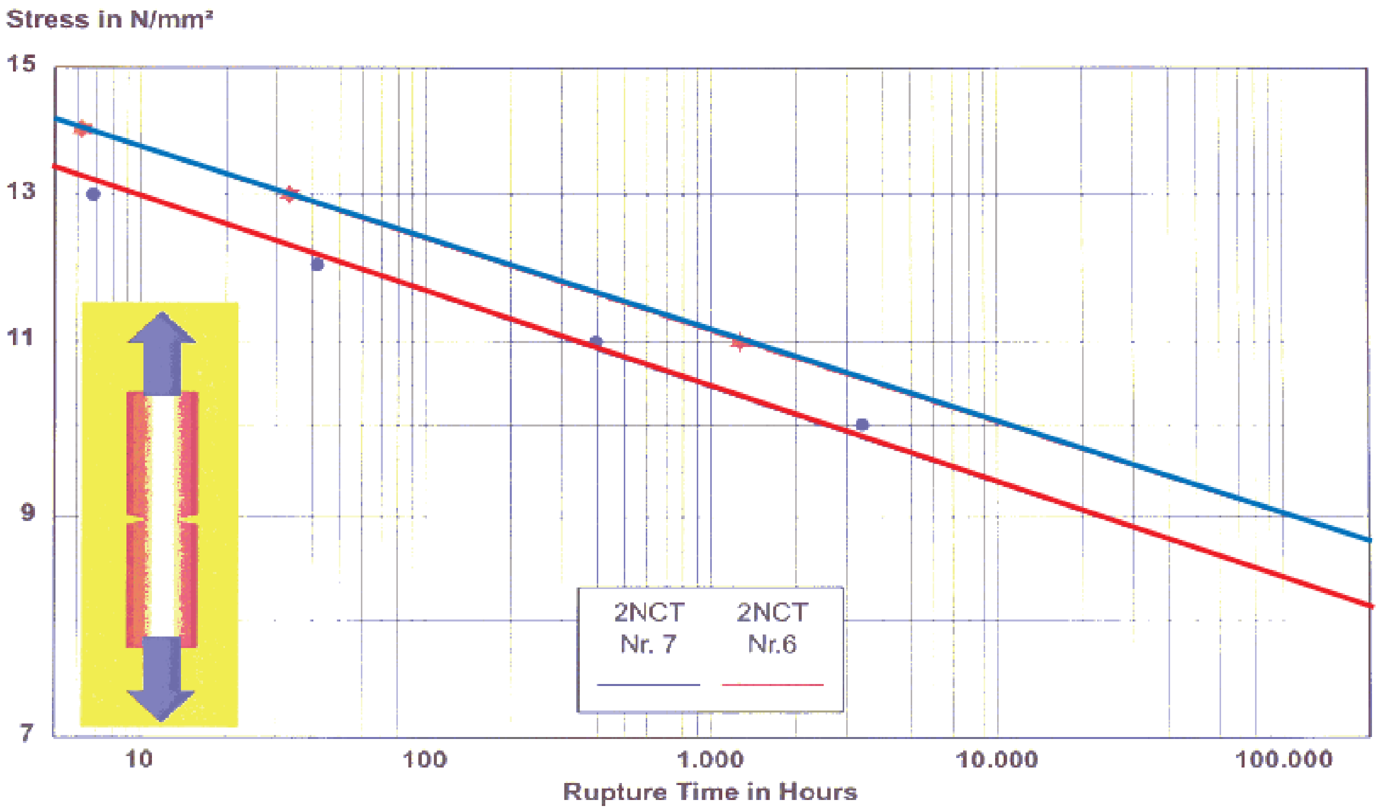
  滤出性测试
  - Production
  生产
- Supply range
  供货范围
- Application areas
  应用领域



Time factor: service life *SOLEF* - service life *KYNAR* ~ **3,5** 使用寿命比值：**SOLEF比KYNAR~3.5**

- Product features
  产品特点
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  ECTFE
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  生产
- Supply range
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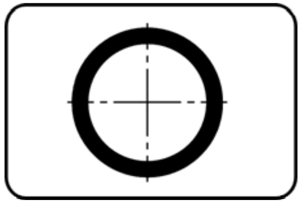
- Application areas
  应用领域

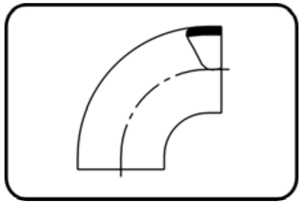
TYPE OF RAW MATERIAL 原料类型

Pipes, fittings, valves and semi-finished products are produced with one type of raw material.
管道、管件、阀门和半成品使用相同原料生产

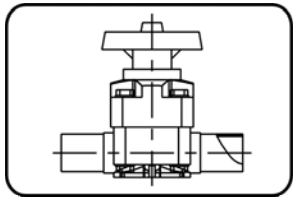
PVDF UHP → **Solef**



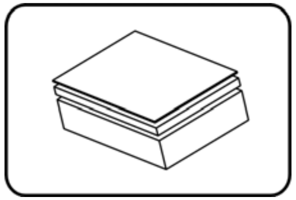
Pipe管道
Solef 1010



Fitting 管件
Solef 1008



Valve阀门
Solef 1008



Semi-finish.
半成品
Solef 6010

Solef is a product of SOLVAY Solexis S.A. Belgium
Solef是比利时苏威公司的一种产品

PVDF UHP COMPONENT ADVANTAGES
超纯PVDF部件的优点

- Product features
  产品特点
  - PVDF-UHP
  超纯PVDF
  - PP-Pure/Polypure
  超纯PP/本色PP
  - ECTFE
  ECTFE
  - Leach out test
  滤出性测试
  - Production
  生产
- Supply range
  供货范围
- Application areas
  应用领域

Pipes, fittings, valves and semi-finished products out of the same resin type:
管道、管件、阀门和半成品使用同种类型原料：

- Identical colour index
  相同的色彩索引
- Better weldability of the components (MFR)
  部件拥有更好的焊接性能（MFR）
- Better long term welding factor → Higher reliability
  更好的长期焊接因素→可靠性更高
- Better pressure resistance
  更好的耐压性能
- Identical mechanical properties
  相同的机械性能
- Product cleanliness
  产品洁净度高
- Best surface smoothness
  最佳表面光洁度
- Best leach-out behaviour
  最好的滤出性能

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PVDF APPROVALS PVDF认证

- Product features
  产品特点
  - PVDF-UHP
  超纯PVDF
  - PP-Pure/Polypure
  超纯PP/本色PP
  - ECTFE
  ECTFE
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PVDF meets the following standards:
PVDF满足以下标准：

- US FDA Title 21, Part 177, Sect. 177.2510
  美国FDA标题21,177部分，177.2510段
- NSF/ANSI Standard 51 Food Equipment Materials
  NSF/ANSI标准51部分食品设备材料
- NSF/ANSI Standard 61 Drinking Water System Components
  NSF/ANSI标准61部分饮用水系统部件
- 3A Sanitary Standards for MultipleUse Plastic Materials Used as Product Contact Surfaces for Dairy Equipment
  3A卫生标准中多次使用塑料产品原料和乳品接触表面的认证
- United States Pharmacopia (USP) Classification VI
  美国药典（USP） VI级
- E215817 UL/ Bulletin 94V0
  E215817 UL/ 公告 94V0
- ASTM E84 Modified Steiner Tunnel Test
  ASTM E84 改进的斯坦纳隧道测试
- FM Global 4910 specification tested products
  FM全球4910标准测试合格产品

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in Plastics

PP PROPERTIES PP特点

- Product features
  产品特点
  - PVDF-UHP
  超纯PVDF
  - PP-Pure/Polypure
  超纯PP/本色PP
  - ECTFE
  ECTFE
  - Leach out test
  滤出性测试
  - Production
  生产
- Supply range
  供货范围
- Application areas
  应用领域

- Low specific weight of 0.91 g/cm³ (PVC 1.40)
  低比重0.91 g/cm³ (PVC 1.40)
- High creep and ageing resistance
  高蠕变性和耐老化性
- Very good chemical resistance
  非常好的耐化性
- Physiological non-toxic
  生物无毒
- Excellent abrasion resistance
  出色的耐磨性
- Non-conductive
  不导电
- Very good welding characteristic
  非常好的焊接特能

TYPE OF RAW MATERIAL 原料类型

- Product features
  产品特点
  - PVDF-UHP
    超纯PVDF
  - PP-Pure/Polypure
    超纯PP/本色PP
  - ECTFE
    ECTFE
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    滤出性测试
  - Production
    生产
- Supply range
  供货范围
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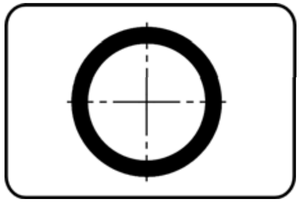
  应用领域

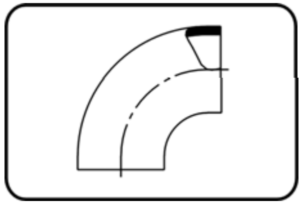
Pipes, fittings, valves and semi-finished products are produced with one type of raw material.
管道、管件、阀门和半成品使用同种原料生产

PP-Pure
(PP-HP grey 灰色)

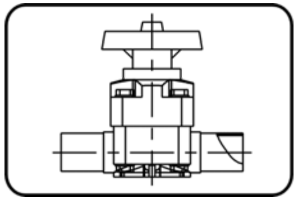
PP-R



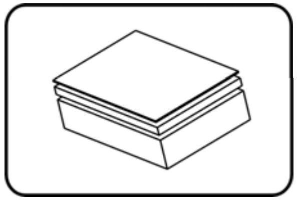
Pipe管道
PP-R grey



Fitting 管件
PP-R grey



Valve阀门
PP-R grey



Semi-finish.
半成品
PP-R grey

- Product features
  产品特点
  - PVDF-UHP
    超纯PVDF
  - PP-Pure/Polypure
    超纯PP/本色PP
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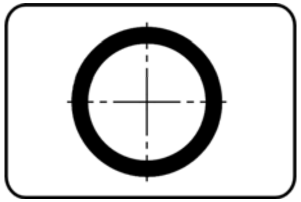
TYPE OF RAW MATERIAL 原料类型

Pipes, fittings, valves and semi-finished products are produced with one type of raw material.
管道、管件、阀门和半成品使用同种原料生产

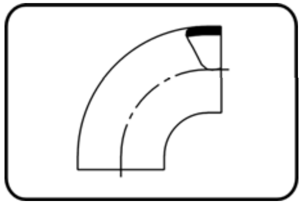
Polypure
(PP natural 本色)

→

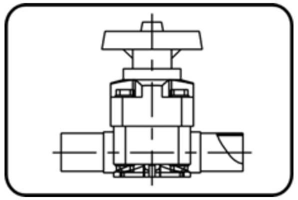
PP-R



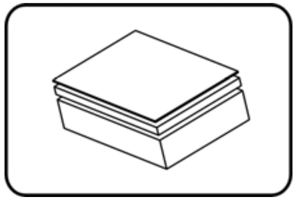
Pipe管道
PP-R natural



Fitting 管件
PP-R natural



Valve阀门
PP-R natural



Semi-finish.
半成品
PP-R natural

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- Product features
  产品特点
  - PVDF-UHP
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ECTFE FEATURES ECTFE特点

- Stable and highly resistant to crack growth
  稳定，对裂纹增长有极高的抵抗力
- High cleanliness
  洁净度高
- Flame resistant (UL94-V0)
  (FM 4910 tested raw material)
  阻燃(UL94-V0) (FM 4910 认证原材料)
- Physiologically non-toxic
  生物无毒
- Excellent chemical resistance
  出色的耐化性
  - Most organic and inorganic chemicals (max. 120 ° C) (sulphuric acid H_2SO_4, hydrochloric acid HCl, nitric acid HNO_3, etc.)
  大部分的有机和无机化学品(最高120℃)（硫酸、盐酸、硝酸等）
- Excellent resistant against UV and gamma radiation
  对紫外线和伽马射线有着出色的抗性
- Excellent diffusion and permeation resistance (best behaviour compared to all other fluoropolymers)
  优秀的抗扩散和渗透性（在所有氟化物中最佳）

Competence in Plastics

- Product features
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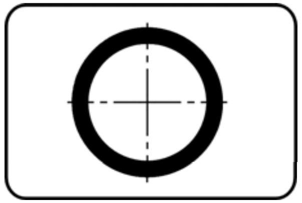
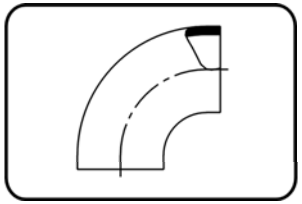
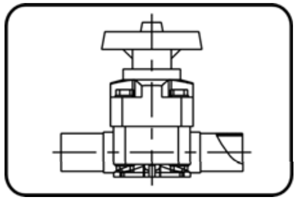
ECTFE → **Halar®**



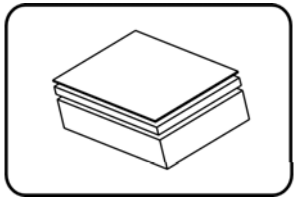
Pipe管道
Halar® 901



Fitting管件
Halar® 350



Valve阀门
Halar® 350



Semi-finish.
半成品
Halar® 901

Halar is a Product of SOLVAY Solexis S.A. Belgium
Halar是比利时苏威公司的一种产品

Cleanliness Performance 洁净度表现

- Product features
  产品特点
  - PVDF-UHP
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  应用领域

Static Leach out test acc. Semi F057 can verify the product cleanliness and determine application suitability
根据SEMI F057标准的静态滤出性测试可以检验产品的洁净度并确定其所适合的应用领域

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Competence in Plastics

STATIC LEACH OUT TEST ACC. SEMI F 057
静态滤出性测试

- Product features
  产品特点
  - PVDF-UHP
    超纯PVDF
  - PP-Pure/Polypure
    超纯PP/本色PP
  - ECTFE
    ECTFE
  - **Leach out test**
    滤出性测试
  - Production
    生产
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  供货范围
- Application areas
  应用领域

Source:
Test reports from M+W

values given in [µg/m2]

	PVDF-UHP µg/m² Feb. 2002 OD 63	PP-PURE µg/m² May 2003 OD 63	POLYPURE µg/m² Feb. 2002 OD 63	ECTFE µg/m² Jan. 2012 OD 63	*SEMI Specification*
Fluoride	7732	< 1,8	< 3,9	14309	60000
Chloride	78	6	348	1127	3000
Nitrite	< 9,1	1,7	< 6,7	30,9	100
Bromide	< 5,5	< Blank	< 3,9		100
Nitrate	< 18,7	1,8	< 9,9	< 1,5	100
Phosphate	74,2	< Blank	< 12,7	7,6	300
Sulphate	11,4	< 2,0	56,8	146,0	300
Lithium	< 0,9	< Blank	< 0,6	< 1,4	2
Sodium	6,8	0,6	< 87,7	< 9,2	15
Potassium	3,8	9,6	< 4,1	< 11,2	15
Magnesium	2,5	1,8	27,4	< 3,3	5
Calcium	19,5	4,1	22,2	7,7	30
Iron	1,1	0,5	1,5	2,6	5
Copper	0,7	< 0,3	< 0,3	< 0,1	15
Nickel	< 0,2	< 0,3	0,0	< 0,1	1
Zinc	3,1	27,9	13,7	6,1	10
Manganese	< 0,5	< 0,6	4,9	< 0,0	5
Aluminum	2,0	9,4	43,8	1,0	10
Barium	< 0,3	26,0	0,7	3,7	15
Boron	< 0,7	< Blank	< 2,2	3,9	10
Chromium	< 0,7	< Blank	0,8	< 0,0	1
Lead	< 0,3	< 0,6	< 0,2	< 0,0	1
Strontium	< 0,3	< 0,3	< 0,2		1
TOC	**8975**	**49071**	**88841**	**34696**	**60000**

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PRODUCTION 生产

- Product features
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  - PVDF-UHP
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- All Purad pipes and fittings were produced out of virgin resin.
  所有的超纯管道和管件都是用纯原料生产。
- Production on designated production lines
  生产在特定的生产线上进行
- Production under cleanroom class 5 conditions (acc. ISO 14644-1)
  生产在5级洁净室下进行 (根据 ISO 14644-1标准)
- QC-testing in fixed intervals during production and at final product including documentation to ensure product consistency and full traceability.
  产品在生产过程中会定期进行质量检测，在最终的产品中包含的文件信息保证了产品的一致性和完整的追溯性

SUPPLY RANGE 供货范围

- Product features
  产品特点
  - PVDF-UHP
  超纯PVDF
  - PP-Pure/Polypure
  超纯PP/本色PP
  - ECTFE
  ECTFE
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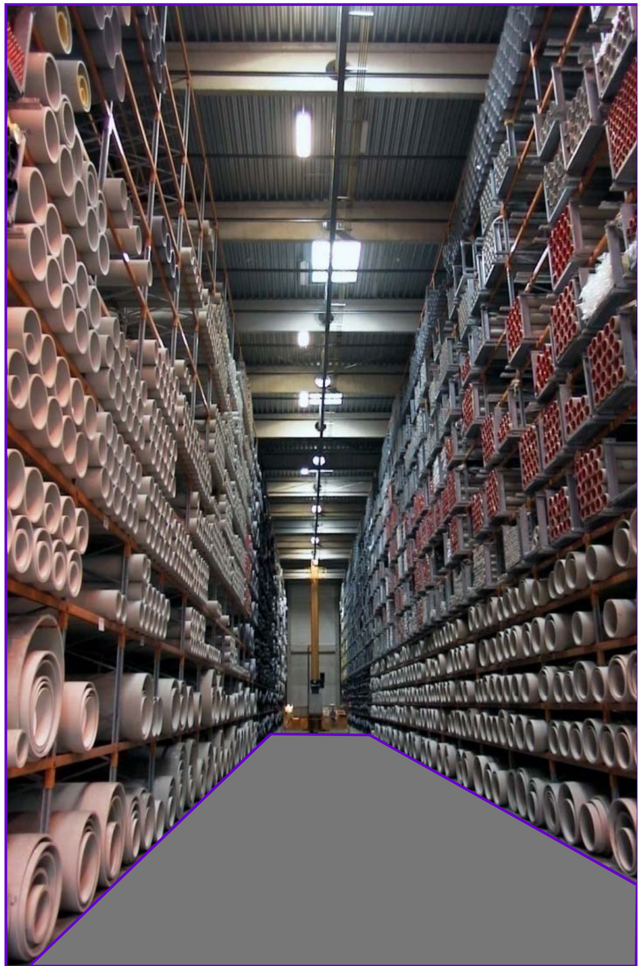
"One-Stop Shopping"
一站式购物

Complete portfolio of:
完整的产品组合

- Pipes, fittings & valves
  管道、配件和阀门
- Electro fusion fittings
  电熔焊配件
- Semi-finished products
  半成品
- Flow meters
  流量计
- Custom made fittings
  客户定制配件
- Pipe clips
  管夹
- Sanitary joint fitting
  清洁接头
- Welding equipment
  焊接设备
- Service & training
  服务和培训

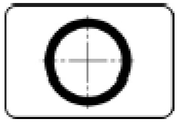


Pipe & Sheet stock
管道和板材库存

SUPPLY RANGE 供货范围

- Product features
  产品特点
  - PVDF-UHP
  超纯PVDF
  - PP-Pure/Polypure
  超纯PP/本色PP
  - ECTFE
  ECTFE
  - Leach out test
  滤出性测试
  - Production
  生产
- Supply range
  供货范围
- Application areas
  应用领域

Pipes:
管道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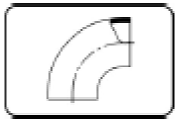
Fittings:
管件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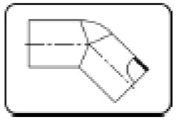
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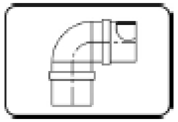
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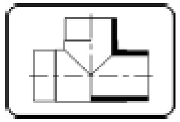
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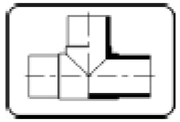
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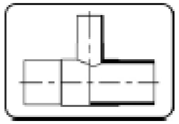
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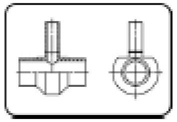
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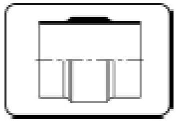
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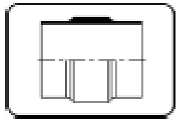
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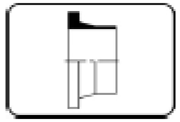
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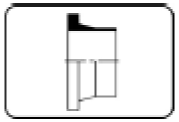
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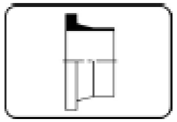
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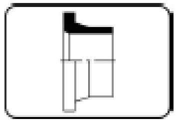
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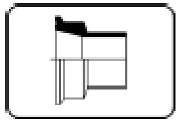
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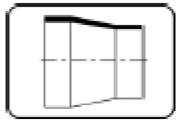
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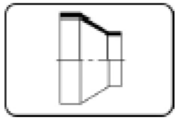
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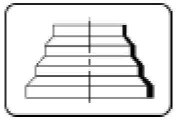
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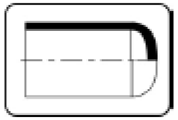
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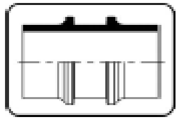
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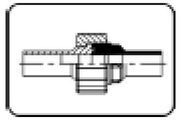
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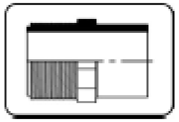
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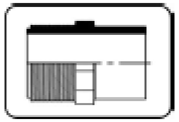
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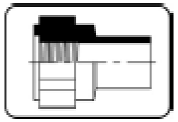
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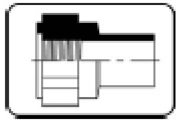
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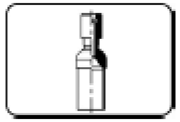
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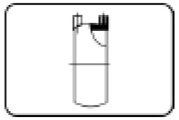
SUPPLY RANGE 供货范围

Electro Fusion Fittings:
电熔焊配件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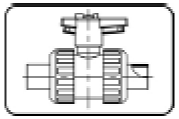
Valves, Flow Meters, Fittings:
阀门、流量计、管件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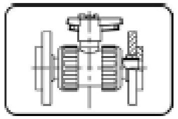
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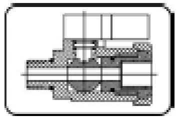
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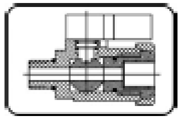
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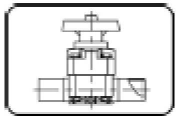
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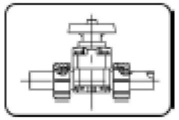
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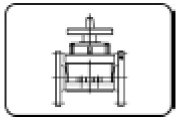
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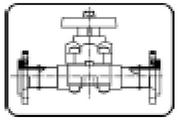
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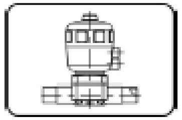
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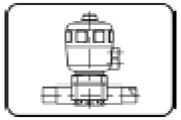
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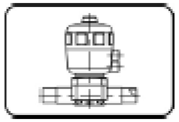
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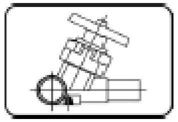
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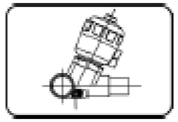
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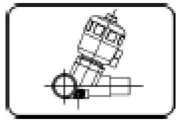
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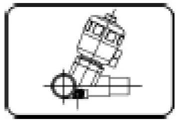
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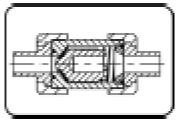
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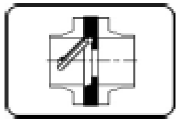
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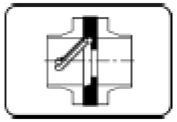
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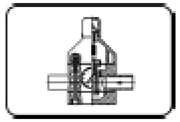
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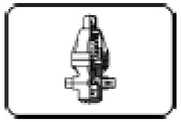
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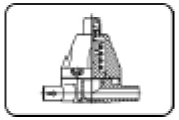
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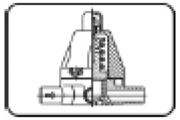
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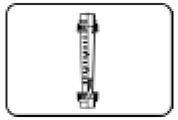
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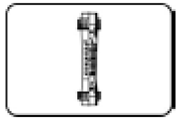
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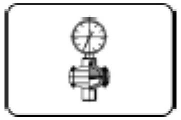
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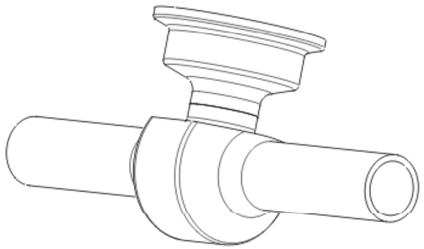
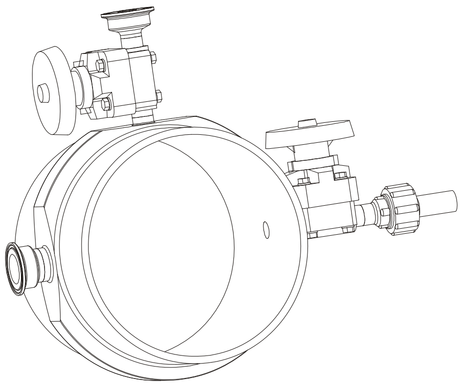
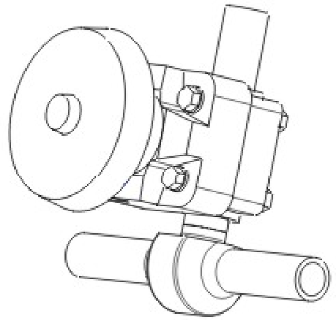
SUPPLY RANGE 供货范围

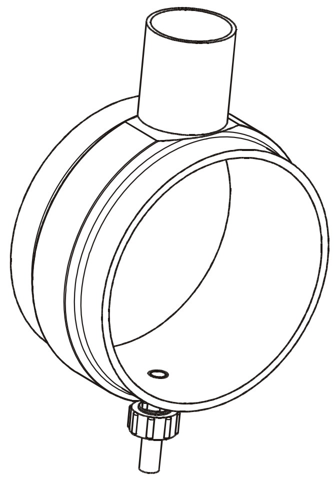
- Product features
  产品特点
  - PVDF-UHP
  超纯PVDF
  - PP-Pure/Polypure
  超纯PP/本色PP
  - ECTFE
  ECTFE
  - Leach out test
  滤出性测试
  - Production
  生产
- Supply range
  供货范围
- Application areas
  应用领域

Custom made components: 客户定制部件









APPLICATION AREAS 应用领域

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Worldwide Competence
in Plastics

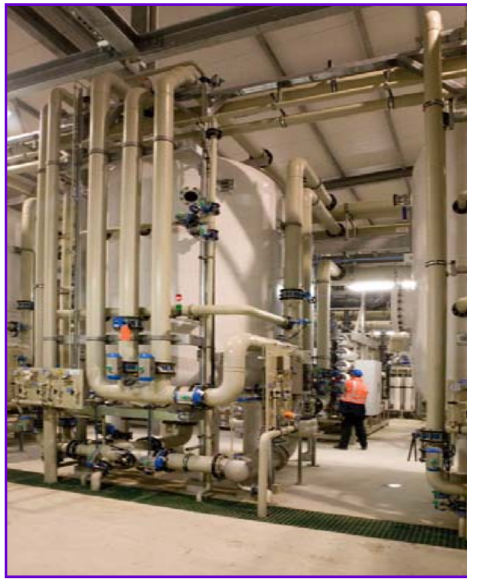
CENTRAL UPW SUPPLY SYSTEM 中央超纯水供应系统

CENTRAL UPW SUPPLY SYSTEM 中央超纯水供应系统

- Product features
  产品特点
  - PVDF-UHP
  超纯PVDF
  - PP-Pure/Polypure
  超纯PP/本色PP
  - ECTFE
  ECTFE
  - Leach out test
  滤出性测试
  - Production
  生产
- Supply range
  供货范围
- Application areas
  应用领域

Project facts: 项目资料

Central supply of highly purified water for chemical and petrochemical companies located in the port area
港区化工厂和石化公司中的中央高纯水供应



Location: 地点

- **Belgium / Port of Antwerp** 比利时/安特卫普港

Water Treatment Plant capacity: 水处理工厂产能

- **Largest plant in Belgium, set up in port area**
  比利时最大的工厂，坐落在港区
  Surface water is used to produce high purified water (99% of all minerals are removed)
  地表水用于生产高纯水（99% 的矿物质被去除）
- **19 200 m³/day** 19 200 m³/天
  (plant is set up to triple capacity in coming years)
  在未来的几年中工厂的处理量将达到目前的3倍
- **Pure water treatment plant design** 纯水处理工厂设计
  - *Flotation and double layer filtration* 浮选和双层过滤
  - *active carbon and UV sterilization* 活性炭和紫外线杀菌
  - *ion exchange with polishers* 用混床进行离子交换
- **Construction time** 施工时间
  - *less than 1 year* 少于1年
  - *large amount of plastic piping installed for interconnection*
    大量的塑料管路用于相互连接
  - *PPR pipes up to OD 355 mm (14") SDR 11*
    PPR管道最大外径355mm (14寸) SDR11

CENTRAL UPW SUPPLY SYSTEM 中央超纯水供应系统

- Product features
  产品特点
  - PVDF-UHP
  超纯PVDF
  - PP-Pure/Polypure
  超纯PP/本色PP
  - ECTFE
  ECTFE
  - Leach out test
  滤出性测试
  - Production
  生产
- Supply range
  供货范围
- Application areas
  应用领域

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- Product features
  产品特点
  - PVDF-UHP
  超纯PVDF
  - PP-Pure/Polypure
  超纯PP/本色PP
  - ECTFE
  ECTFE
  - Leach out test
  滤出性测试
  - Production
  生产
- Supply range
  供货范围
- Application areas
  应用领域

SEMICONDUCTOR INDUSTRY 半导体产业

- UPW plant installation
  超纯水工厂安装
- Distribution and hook up systems (supply + return)
  分配和连接系统（供水和回水）
- Piping in process equipments
  工艺设备管路

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Competence in Plastics

- Product features
  产品特点
  - PVDF-UHP
  超纯PVDF
  - PP-Pure/Polypure
  超纯PP/本色PP
  - ECTFE
  ECTFE
  - Leach out test
  滤出性测试
  - Production
  生产
- Supply range
  供货范围
- Application areas
  应用领域

LIFE SCIENCE INDUSTRY 生命科学产业

- Purified water plant installation and distribution
  纯水设备工厂安装和分配

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FOOD AND BEVERAGE INDUSTRY 食品和饮料行业

- Product features 产品特点
  - PVDF-UHP 超纯PVDF
  - PP-Pure/Polypure 超纯PP/本色PP
  - ECTFE ECTFE
  - Leach out test 滤出性测试
  - Production 生产
- Supply range 供货范围
- Application areas 应用领域

- **FOR DIRECT FOOD HANDLING** 用于食品的直接处理
  - **Tabasco** 塔巴斯哥
    Hot sauce manufacturer, used PVDF to handle vinegar, main ingredient in hot sauce
    辣酱制造商，采用PVDF来处理醋、辣酱的主要成分
  - **Orval Kent Food** 欧瓦肯特食品
    Sausages & Meats and also Pet food, Polypure; PolyPure for DI process water supply system
    香肠和肉类以及宠物食品，本色PP用于去离子工艺水供应系统
  - **Land O'Lakes** 蓝德雷
    Margarine (substitute butter), Polypure; PolyPure for DI process water supply system
    人造黄油（替代黄油）；本色PP用于去离子工艺水供应系统
- **FOR WASTE LINES, CHEMICAL LINES OR SANITIZATION LINES** 用于废水线、化学品线或者消毒线
  - **Coca Cola, Heineken, Zipfer, Tekate Brewery, Kraft foods,...**
    可口可乐、喜力、 Zipfer啤酒、塔咖提啤酒、卡夫食品…

PVDF EXHAUST PIPING SYSTEM PVDF风管系统

- Product features
  产品特点
  - PVDF-UHP
  超纯PVDF
  - PP-Pure/Polypure
  超纯PP/本色PP
  - ECTFE
  ECTFE
  - Leach out test
  滤出性测试
  - Production
  生产
- Supply range
  供货范围
- Application areas
  应用领域

- For hook up installation and submain systems
  用于连接安装和支管系统
- Successfully applied since more than 12 years in the semiconductor industry
  已经在半导体行业中成功应用超过12年
- FM 4910 specification tested
  FM4910标准测试合格

Competence
in Plastics

ECTFE PIPING SYSTEM ECTFE管道系统

- Product features
  产品特点
  - PVDF-UHP
  超纯PVDF
  - PP-Pure/Polypure
  超纯PP/本色PP
  - ECTFE
  ECTFE
  - Leach out test
  滤出性测试
  - Production
  生产
- Supply range
  供货范围
- Application areas
  应用领域

- Piping systems
  管道系统
- Piping and tanks in process equipment
  工艺设备上的管路和储罐
- Lining of tanks
  储罐内衬

Thanks for your attention!

感谢您的关注！

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