GUNZE
a touch of *comfort*

Products Catalog

郡是株式会社　工程塑料事业部

GUNZE LIMITED　ENGINEERING PLASTICS DIVISION

http://www.gunze-group.cn/functional/epd/

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公司手册
Corporate data

郡是公司概要

■创立/明治29年（1896年）
■董事长 / 児玉 和
■注册资金 / 26100（百万JPY）
（截止到2015年3月31日）
■职工人数 / 1889人（日本）
7354人（全球）
截止到2015年3月31日

从事行业

■机能解决方案事业
工程塑料事业，塑料薄膜事业，电子部件事业，机电事业，医疗器材事业
■服装事业
内衣事业，袜子事业，家居服事业，纤维资财事业
■生活创造事业
体育俱乐部事业，绿化事业，商业地产事业，温泉事业，住宅房地产事业，工程事业

历史变迁

1896年　郡是制丝株式会社创立（8月10日）
1934年　在塚口娟制品工厂开始成产成型女袜
1946年　棉织内衣（宫津工厂）开始生产
1950年　在东京、名古屋、京都、大阪证券交易所上市
1958年　在江南工厂拓展合成纤维纺织工厂
1967年　公司更名为【郡是株式会社】
1968年　创立守山工厂（塑料薄膜生产）
1972年　开拓绿化事业
1984年　开拓健康食品事业
创立工程塑料事业
（现在的工程塑料事业部）
1985年　开展电子机能材料事业
成立医疗器材事业
1987年　退出生丝行业（郡是制丝解散）
1989年　将江南工厂搬迁至现在公司地址
1992年　成立郡是贩卖株式会社
1994年　守山工厂获得【ISO9001】认证
1995年　工程事业部获得【ISO9001】认证
1996年　创业100周年
1997年　制定【郡是环境宪章】
2000年　设立绫部工程塑料株式会社
2002年　工程塑料事业部 江南工厂获得【ISO9001】认证
2004年　[tukasin]天然温泉【温泉的华廊】开放
2005年　设立郡是工程塑材（香港）有限公司【销售工程塑料】产品

ISO 9001認証取得
JQA-1086
エンプラ事業部

ISO14001認証取得
JQA-EM2091
江南工場
綾部エンプラ（株）

Company Outline

■Estabished : 1896
■President & COO : Nodoka Kodama
■Capital : 26,071 million yen (as of March 31, 2015)
■No. of employees
Gunze Limited (non-consolidated) : 1,889
Gunze Group (consolidated) : 7,354
(as of March 31, 2015)

Group line

■Functional Solutions
Engineering Plastics, Plastic Films, Electronic Components, Mechatronics, Medical Materials

■Apparel
Innerwea, Leg Wear, House Casual Wear, Threads and Accessories

■Lifestyle Creations
Sports Club Business, Landscaping and Greening Business, Commercial Facility Development, Spa Business, Real Estate Development, Engineering Business

History

1896 Gunze Silk Manufacturing Co., Ltd. established. (as of August 10)
1934 Ladies' silk stocking production launched at Tsukaguchi Factory.
1946 Innerwear production launched at Miyazu Factory
1950 Company stocks listed on Tokyo, Osaka and Nagoya stock exchanges.
1958 Konan Factory established to start synthetic fiber spinning .
1967 Company renamed Gunze Limited.
1968 Moriyama Factory established to start plastic film production.
1972 Greenery business launched (presently Greenery Division).
1984 health food bussiness iaunched
Shiga Film Co., Ltd. established for plastic film production.
(engineering plastics division present)
1985 Electronic component business launched.
medical material bussiness launched
Shopping complex, Tsukashin, opened .
1987 Gunze Silk Co., Ltd. ceases operations to withdraw from silk yarn manufacturing business.
1989 Konan Factory is relocated to the present address.
1992 Gunze Sales Inc. formed by integrating local sales companies throughout Japan.
1994 Moriyama plant got the certification [ISO 9001]
1995 engineering plastics division got the certification [ISO 9001]
1996 Company centenary celebrated.
1997 Gunze Environmental Charter established.
2000 Ayabe Engineering Plastics Co., Ltd. established for engineering plastics production.
2002 engineering plastics division Konan plant got the certification [ISO 14001]
2004 Tsukashin natural spa, Yunokaro, opened.
2005 Gunze Engineering Plastics(Hong Kong)Limited established for engineering plastics marketing.

GFTUBE

【热熔融类型氟树脂产品】

- GRC（氟树脂PFA.FEP热收缩管）
- GRC-PB（氟树脂PFA防静电型热收缩管）
- EIT（氟树脂PFA.FEP小口径热收缩管）
- NSP/SWP(氟树脂管PFA卷取型/直线型）
- FLP（氟树脂PFA弹性管）
- ROD（氟树脂PFA焊条/焊带）
- FFY（氟树脂PFA丝线）
- NET（氟树脂PFA网格）
- NST/SMT（氟树脂PFA薄壁非收缩管/收缩管）
- TST(氟树脂无切断长尺寸热收缩管）
- 工程塑料片材及无缝皮带
- PI材质，可粘结的绝缘放热板
- 技术资料
- 关于GRC的施工

Thermally Fused fluoro resin Products

- GRC (heat-shrinkable tube made from PFA and FEP fluoro resin)
- GRC-PB (anti-static heat-shrinkable tube made from PFA fluoro resin)
- EIT (heat-shrinkable small-diameter tube made from PFA and FEP fluoro resin)
- NSP/SWP (tube products made from PFA fluoro resin)
- FLP (flexible tube products made from PFA fluoro resin)
- ROD (rod/thin plate roll products made from PFA fluoro resin)
- FFY (filament products made from PFA fluoro resin)
- NET (mesh products made from PFA fluoro resin)
- NST/SMT (thin-walled non-shrinkable tube and shrinkable tube made from PFA fluoro resin)
- TST(Continuous heat-shrinkable tube made from FEP fluoro resin)
- Engineering plastic sheets and seamless belts
- Adhesive thermal conductive sheet made from polyimide
- Technical materials
- How to apply GF tubu

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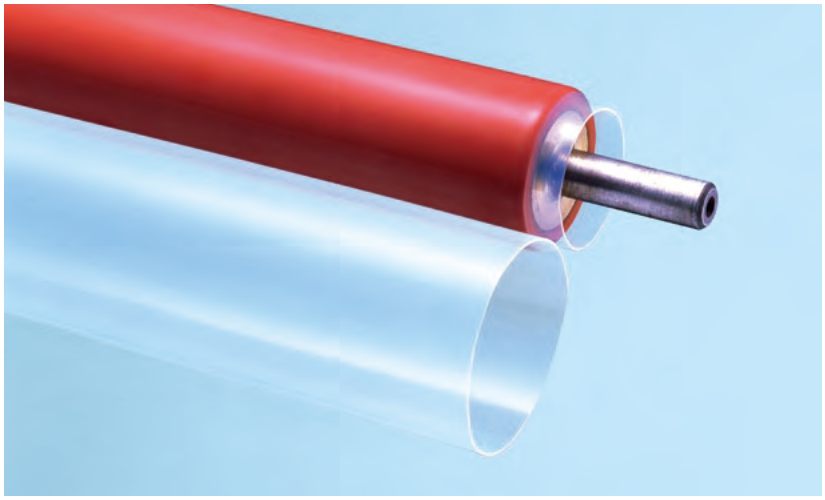
GRC

氟树脂PFA.FEP热收缩管

Heat-shrinkable tube made from
PFA and FEP fluoro resin

最适合用于辊轴的套筒!!
具有各种卓越特性的
氟树脂热收缩套管。

GRC is perfect for roller coverings!
Fluoro resin heat-shrinkable tube provides excellent durability.



特 点

GRC主要作为辊轴套筒而开发，其主要材质为氟树脂PFA和FEP,仅需要在辊轴表面加热使其收缩，便可赋予辊轴氟树脂的优良特性。

1. 绝缘性
2. 离型性（不易粘附灰尘，胶水等杂质）
3. 耐腐蚀性

用 途

- OA机器（复印机与打印机等）
- 造纸，纸加工相关领域（抄纸机，微粘胶带）
- 薄膜，板材加工机（复合机，磁带加工等）
- 与纤维，染色相关的领域（染色机，树脂加工机等）
- 印刷机（高速轮转印刷，商务型印刷等）
- 绝缘保护（各种电缆配线的捆扎等）
- 产业机械（与印刷电路板，半导体，液晶屏等相关产业）

Features

GRC is a heat-shrinkable tube made from PFA and FEP fluoro resin, and has been developed for use as a roller covering. By simply heat-shrinking GRC onto a roller surface, the roller inherits the highly-functional characteristics of fluoro resin.

1. Electrical insulation
2. Non-adhesive surface resists contamination.
3. Chemical resistance

Applications

- Photocopiers and printers
- Paper manufacturing and paper product manufacturing (paper and adhesive tape manufacturing machines)
- Film and sheet processing machines (laminators, and magnetic tape manufacturing machines)
- Textile and dyeing equipment (Dyeing and resin processing equipment)
- Printing machinery (high-speed offset rotary press and printing machines for business forms)
- Insulation (Bundling of Electrical Cables)
- Industrial machinery (printed circuit board, semiconductor, and FPD related equipment)

注意 NOTE

GRC使用于100℃以上的高温环境或压力过大的情况下，很可能发生错位或褶皱，如有疑问，请与郡是联系咨询。
If GRC is used in places where the temperature exceeds 100℃ or where the nip pressure is too high, there is a strong possibility that the GRC may slip or cause wrinkle. Consult Gunze regarding such cases.

■请在咨询及订货时，向我们提供所需配备GRC的辊轴的准确直径和长度，以便我们能帮您选到最合适的热收缩管。
■When making inquiries or placing an order, be sure to supply us with the accurate roller diameter and length so that we can select the optimum tube for your application.

▼ 在本册第26页的技术资料中有关于GRC的施工方法详解。/ Construction method of GRC tube is given on page 26.

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规 格 Specifications

品名 Article number	规格 Item Code	内径(mm) inside dia.		厚度 (mm) Thickness	最大裁切长度(mm) Max cut length		材质 Material
		收縮前 Before shrinkage	收縮後 After shrinkage		标准 Standard	特别订货(注1) Special order (Note1)	
GRC	17P	19	16.5	0.5	1200	3600	PFA
	20P	21	18.5	0.5	1200	3600	
	22P	24	19.5	0.5	1200	3600	
	25P	26	21.5	0.5	1200	3600	
	27P	30	24	0.5	1200	3600	
	30P	33	27	0.5	1200	3600	
	35P	36	28.5	0.5	1200	3600	
	40P	43	35	0.5	1200	3600	
	50P	51	40	0.5	1200/1800		
	55P	57	49	0.5	1200		
	60P	63	50	0.5	1200/1800	3600	
	65P	67	54	0.5	1800		
	70P	71	61	0.5	1800		
	75P	75	61	0.5	1800		
	80P	81	64	0.5	1800		
	85P	91	74	0.5	1800		
	95P	98	82	0.5	1800		
	100P	106	85	0.5	1800/3600		
	105P	109	86	0.5	1800		
	115P	117	96	0.5	1800		
	125P	127	106	0.5	1800/3600		
	130P	136	107	0.5	1800/3600		
	140P	144	125	0.5	1800		
	150P	154	125	0.5	1800/3600		
GRC	160F	163	131	0.5	3600		FEP
	170F	174	133	0.5	3600		
	180F	190	163	0.5	4000		
	200F	206	164	0.5	4000		
	215F	220	166	0.5	4000		
	230F	235	185	0.5	4000		
	240F	249	187	0.5	4000		
	250F	259	206	0.5	4000		
	265F	278	245	0.5	4000		
	280F	298	246	0.5	4000		
	290F	305	247	0.5	4000		
	300F	316	247	0.5	4000		

※ 在咨询及订货时，请告知贵司辊轴的精确直径和长度，我们将为您选择最合适的尺寸。
※ 如果长度超过400mm，以每100mm为单位进行裁切，1根起订。
※ 为防止发生自然收缩，请务必把产品保存在阴凉处（30℃以下）。
※ P表示PFA材质，F表示FEP材质。
※ 收缩后的内径尺寸是在200℃下加热10分钟的测定值，并非保证值。
注1：特别定制的长尺寸的产品，在成型时会留下模具的印痕，基本可通过加热使其消失。

* Inform us of the exact diameter and length of the Roll in your inquiries or POs. A suitable product will be selected accordingly.
* Cut length is 400 mm or above, with a pitch of 100 mm. Any quantity of tube order is welcome.
* Product specifications are subject to modification without notice.
* Store the tubing in a cool and dark location (30℃ or below). At higher temperatures, tubes may naturally shrink.
* P indicates a PFA product, and F indicates an FEP product.
* The inside diameter after shrinkage is the measurement made after heating to 200℃ for 10 minutes. It is not a guaranteed value.

Note1 : Specially ordered long-size product might have die mark as a result of forming. Check at your side beforehand especially on the condition that surface accuracy is necessary.

提示 Point

若您需要壁厚更厚，长度更长的产品，请联系我们
Contact for regarding requirements of thickness and length.

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GRC-PB

氟树脂PFA防静电型收缩管

Anti-static heat-shrinkable tube
made from PFA fluoro resin

在GRC添加防静电特性的氟树脂热收缩管。

GRC-PB is anti-static fluoro resin heat-shrinkable tube.

特 点

在保证氟树脂PFA离型性效果的同时，添加了防静电效果。

1. 防静电特性
2. 离型性（不易粘附灰尘、胶水等杂质）
3. 耐腐蚀性

Features

In addition to the non-adhesive characteristics of PFA fluoro resin, GRC-PB is anti-static.

1. Anti-static characteristics
2. Non-adhesive surface resists contamination.
3. Chemical resistance

用 途

- OA机器（复印机与打印机等）
- 造纸，纸加工相关领域（抄纸机，微粘胶带）
- 薄膜，板材加工机（复合机，磁带加工等）
- 与纤维，染色相关的领域（染色机，树脂加工机等）
- 印刷机（高速轮转印刷，商务型印刷等）
- 绝缘保护（各种电缆配线的捆扎等）
- 产业机械（与印刷电路板，半导体，液晶屏等相关产业）

Applications

- Photocopiers and printers
- Paper manufacturing and paper product manufacturing (paper and adhesive tape manufacturing machines)
- Film and sheet processing machines (laminators, and magnetic tape manufacturing machines)
- Textile and dyeing equipment (Dyeing and resin processing equipment)
- Printing machinery (high-speed offset rotary press and printing machines for business forms)
- Industrial machinery (printed circuit board, semiconductor, and FPD related equipment)

注意 NOTE

GRC使用于100℃以上的高温环境或压力过大的情况下，很可能发生错位或褶皱，如有疑问，请与郡是联系咨询。
If GRC is used in places where the temperature exceeds 100℃ or where the nip pressure is too high, there is a strong possibility that the GRC may slip or cause wrinkle. Consult Gunze regarding such cases.

■请在咨询及订货时，向我们提供所需配备GRC的辊轴的准确直径和长度，以便我们能帮您选到最合适的热收缩管。
■When making inquiries or placing an order, be sure to supply us with the accurate roller diameter and length so that we can select the optimum tube for your application.

▼ 在本册第26页的技术资料中有关于GRC的施工方法详解。 / Construction method of GRC tube is given on page 30.

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规 格 Specifications

品名 Article number	规格 Item Code	内径(mm) Inside dia.		厚度 (mm) Thickness	最大裁切长度(mm) Max cut length		材质 Material
		收缩前 Before shrinkage	收缩后 After shrinkage		标准 Standard	特别订货 Special order	
GRC-PB	20PB	21.5	19.5	0.5	1200		导电PFA Conductive PFA
	25PB	26	24	0.5	1200		
	30PB	32	29	0.5	1200		
	35PB	36	33	0.5	1200		
	40PB	41	37	0.5	1200		
	45PB	51	43	0.5	1200		
	50PB	53	47	0.5	1200/1800		
	55PB	59	51	0.5	1200		
	60PB	65	56	0.5	1200/1800		
	70PB	74	62	0.5	1800		
	75PB	79	70	0.5	1800		
	80PB	84	75	0.5	1800		
	85PB	89	76	0.5	1800		
	90PB	94	83	0.5	1800		
	100PB	103	92	0.5	1800		
	100PB	106	93	0.5	3600		
	105PB	108	94	0.5	1800		
	110PB	113	100	0.5	1800		
	120PB	122	107	0.5	1800		
	123PB	127	115	0.5	3600		
	125PB	132	117	0.5	1800/3600		
	135PB	141	125	0.5	1800		
	145PB	150	129	0.5	1800		
	150PB	156	138	0.5	1800/3600		

※ 在咨询及订货时，请告知贵司辊轴的精确直径和长度，我们将为您选择最合适的尺寸
※ 如需了解上述规格以外的产品，欢迎联系咨询
※ 本产品采取特殊处理，使之不易产生静电，但不能完全防止静电的产生（电阻值10^8 以下）
※ 为防止发生自然收缩，请务必把产品保存在阴凉处（30℃以下）
※ 收缩后的内径尺寸是用200℃加热10分钟的测定值，并非保证值
※ 如果长度超过400mm，以每100mm为单位进行裁切，1根起订

* Inform us of the exact diameter and length of the Roll in your inquiries or POs. A suitable product will be selected accordingly.
* Contact for regarding requirements that exceed the specifications in the above table.
* This product has been specially treated to suppress generation of static electricity. It is not guaranteed to totally eliminate generation of static electricity. (Surface resistance is under $10^{8.}$)
* Product specifications are subject to modification without notice.
* The inside diameter after shrinkage is the measurement made after heating to 200℃ for 10 minutes. It is not a guaranteed value.
* Cut length is 400 mm or above, with a pitch of 100 mm. Any quantity of tube order is welcome.

提示 Point

若您需要壁厚更厚，长度更长的产品，请联系我们
Contact for regarding requirements of thickness and length.

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EIT

氟树脂PFA.FEP
小口径热收缩管
Heat-shrinkable small-diameter tube made from PFA and FEP fluoro resin

最适合用于电绝缘！！
离型性卓越，
氟树脂小口径热收缩管

EIT is ideal for applications requiring electrical insulation and small-diameter fluoro resin heat-shrinkable tube with superior separability.

特 点

ＥＩＴ是具有卓越耐热性，耐腐蚀性，离型性的小口径收缩管，除了绝缘用途之外，在各种细小直径的辊轴上安装ＥＩＴ，可使辊轴具有氟树脂的特性

1.绝缘性

2.离型性

3.耐药品性（耐腐蚀性）

4.耐热性

Features

EIT is small-diameter fluoro resin heat-shrinkable tube that features, Electrical insulation, superior heat, chemical resistance and separability. In addition to applications requiring insulation, EIT allows you to add the high-level characteristics of fluoro resin to the covered rollers in a wide range of fields.

1. Electrical insulation

2. Separability

3. Chemical resistance

4. Heat resistance

用 途

- 耐热，绝缘保护
  用于连接器，终端设备等电器零部件、电线
  电力电缆，光纤，电缆，温度传感器等

- 辊轴套筒

Applications

- Heat resistance and insulation protection
  Electrical components such as connectors, terminals, electrical cables, signal wiring, optical fiber, power cables, and temperature sensors

- Roller covering

注意 NOTE

ＥＩＴ收缩时在横向上会有略微的伸展，所以若安装在尺寸较长的滚轴上，在加热收缩时应拉住未收缩的一端，以防止产生褶皱。
EIT stretches slightly in the longitudinal direction when shrunk. When covering longer items, shrink the tube from one end while pulling from the other end to prevent wrinkles from forming.

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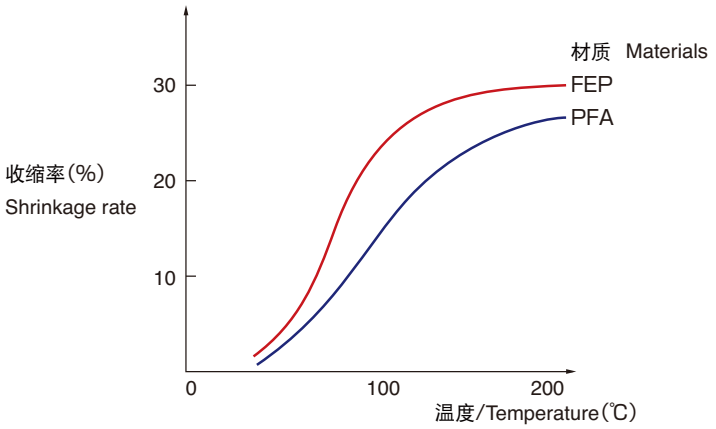
收缩温度的标准　Standard shrinkage



规 格　Specifications

■ F型(FEP制品)F type (made from FEP)

品名 Article number	规格 Item Code	收缩前内径 (mm) Inside diameter before shrinkage	收缩后内径 (mm) Final diameter	厚度 (mm) Thickness	裁切长度 (m) Cut length
EIT	1.5F	1.9	1.3	0.2	1
	2F	2.5	1.8		
	2.5F	3.2	2.3		
	3F	3.8	2.7		
	4F	4.5	3.3		
	5F	5.5	4.3		
	6F	7.0	5.1		
	7F	7.9	6.0		
	9F	10.6	7.4	0.3	
	10F	12.5	8.8		
	12F	14.5	10.7		
	15F	17.3	12.8	0.4	

■ P型(PFA制品)P type (made from PFA)

品名 Article number	规格 Item Code	收缩前内径 (mm) Inside diameter before shrinkage	收缩后内径 (mm) Final diameter	厚度 (mm) Thickness	裁切长度 (m) Cut length
EIT	1.5P	1.8	1.4	0.2	1
	2P	2.2	1.8		
	2.5P	3.0	2.4		
	3P	3.5	3.0		
	4P	4.0	3.5		
	5P	5.2	4.2		
	6P	6.0	5.4		
	7P	7.1	6.3		
	9P	9.5	7.5	0.3	
	10P	11.0	9.2		
	12P	12.9	10.7		
	15P	16.0	13.0	0.4	

※ 请以10根为一个单位订购。
※ 如需超长品，加厚品，以及有色品，欢迎联系咨询。
※ 导电型商品也请联系咨询。
※ 为保证收缩前内径尺寸不发生变化，请把商品保存在阴凉处（30℃以下）。
※ 收缩后的内径尺寸是用200℃加热10分钟的测定值，并非保证值。
※ P型产品比F型产品，耐热程度更高。

* Place your order in lots of 10pcs.
* Contact us regarding long, thick or colored tubes.
* Electro - conductive type is available.
* Store in a cool dark location (30℃ or below) to prevent shrinkage.
* The inside diameter after shrinkage is the measurement made after heating to 200℃ for 10 minutes. It is not a guaranteed value.
* P type has better heat resistance than F type.
* Contact us regarding smaller diameter tubes.

提示 Point

若您需要直径1mm以下的的管材或高收缩率的管材，请联系我们
Contact us regarding smaller diameter tubes and high shrinkage tubes.

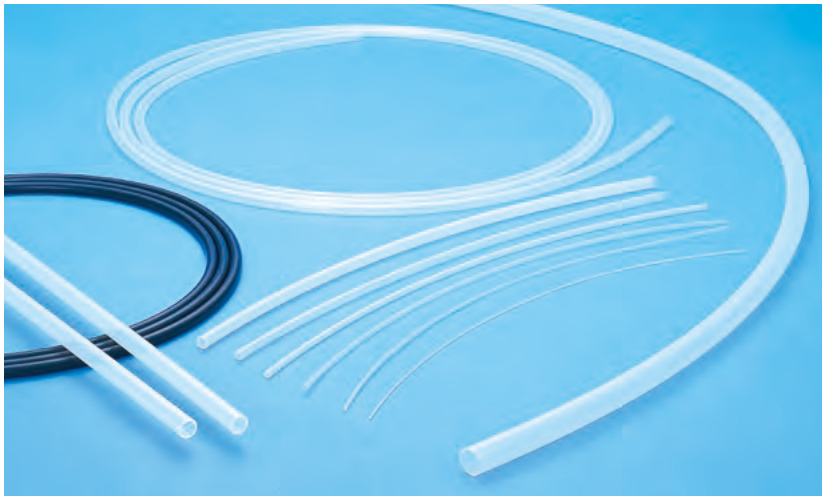
GUNZE
a touch of *comfort*

NSP/SWP

氟树脂PFA
卷取型/直线型
Tube products made from
PFA fluoro resin

可连续生产超长尺寸的管材，采用热熔融氟树脂挤出成型

Elongated tube is available by continuous extrution!
Thermally-fusable fluoro resin tube manufactured by extrusion.



特 点

NSP是把热熔融型氟树脂PFA,挤出成型的管材，可生产弯曲状，及壁厚加厚型。

1. 纯度高
2. 耐腐蚀性
3. 耐热性

Features

NSP is extruded tube made from thermally-fused fluoro resin (PFA).
It is suitable for bending, and also thick types are available for a wide range of applications.

1. Purity
2. Chemical resistance
3. Heat resistance

用 途

- 半导体、液晶制造装置
- 化学、药品机械设备装置
- 热交换器、蒸汽管道
- 零部件搬送用管道。

Applications

- Semiconductor and liquid crystal manufacturing equipment
- Chemical and pharmaceutical plant equipment
- Heat exchangers and steam piping
- Parts conveying piping

▼ 在本册P22和P23，有关于NSP物性的资料/ Data regarding the properties of NSP is given on page 22 and 23.

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规 格 Specifications

■ NSP规格表 [卷取型] NSP Standard chart [roll type]

● 毫米 mm size

品名 Article number	规格 (外径×内径) Item Code (Outside dia.×Inside dia.) (mm)	外径公差 Outside dia. tolerance	内径公差 Inside dia. tolerance	最大卷长 (m) Max. winding length
NSP	2×1	±0.10	±0.10	500
	3×2			
	4×2			
	4×3			
	5×4			
	6×4		±0.12	
	6×5			
	7×5	±0.12		
	8×6			
	8×7			
	10×7			300
	10×8			
	12×10			
	14×12			200
	15×13		±0.15	
	16×13			
	16×14			
	18×15			
	18×16			
	19×16			
	22×19	±0.15		150
	25×22			20
	28×25			

● 英寸 inch size

品名 Article number	规格 (外径×内径) Item Code (Outside dia.×Inside dia.) mm (inch)	外径公差 Outside dia. tolerance	内径公差 Inside dia. tolerance	最大卷长 (m) Max. winding length
NSP	3.17×1.59 (1/8×1/16)	±0.10	±0.10	500
	3.18×2.18 (1/8-0.5t)			
	6.35×3.17 (1/4×1/8)		±0.15	
	6.35×3.96 (1/4×5/32)		±0.12	
	6.35×4.35 (1/4-1.0t)			
	9.53×6.35 (3/8×1/4)	±0.12	±0.15	350
	9.53×7.53 (3/8-1.0t)		±0.12	
	12.7×9.53 (1/2×3/8)		±0.15	250
	12.7×10.7 (1/2-1.0t)			
	19.05×15.88 (3/4×5/8)			200
	25.4×22.2 (1×7/8)	±0.15		20

■ SWP规格表 [直线型] SWP Standard chart [straight type]

● 毫米 mm size

品名 Article number	规格 (外径×内径) Item Code (Outside dia.×Inside dia.) (mm)	裁切长度(m) Cut length
SWP	6×4	3
	8×6	
	10×8	
	12×10	
	19×16	
	25×22	
	28×25	

● 英寸 inch size

品名 Article number	规格 (外径×内径) Item Code (Outside dia.×Inside dia.) mm (inch)	裁切长度(m) Cut length
SWP	6.35×4.35 (1/4-1.0t)	3
	9.53×6.35 (3/8×1/4)	
	12.7×9.53 (1/2×3/8)	
	19.05×15.88 (3/4×5/8)	
	25.4×22.2 (1×7/8)	

※ 如需了解上述规格以外的产品，欢迎咨询。
※ NSP长度在10M以上时，以10米为单位进行裁切销售
※ 若需要FEP,ETFE材质的管材，请另行联系咨询
※ 如需导电型产品，也请联系咨询

* Contact for regarding requirements that exceed the specifications in the above table.
* Required specification for NSP : over 10m length/ 10m pitch.
* Contact for regarding tube made from FEP and ETFE.
* Contact for Electric condition type.

GUNZE
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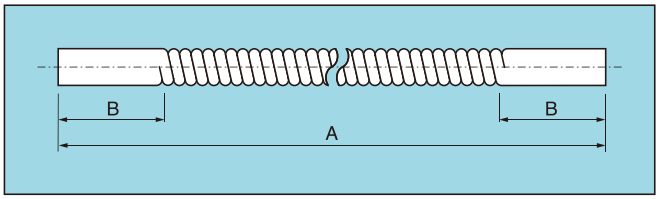
FLP

氟树脂PFA弹性管

FlexibleTube products made from PFA fluoro resin

可根据用途选择，具有PFA特性的管材加工品

You can select the optimum product for your application! Processed tube products of PFA qualities.



规 格 Specifications

● 毫米 mm size（英寸 inch size）

品名 Article number	规格 Size	长度(mm) Length	
		(A)	(B)
SWP-S	6×4	300 500 800 1,000	60
	8×6		
	10×8		
	12×10		
	14×12		
	19×16		
	6.35×4.35 (1/4-1.0t)		
	9.53×6.35 (3/8×1/4)		
	12.7×9.53 (1/2×3/8)		
	12.7×10.7 (1/2-1.0t)		
	19.05×15.88 (3/4×5/8)		

※ 如需特别定制，请指定A和B的长度。
※ 特别订制的最大长度为2000mm。（9.53×6.35 的最大长度为1500mm）。
※ 若使用温度在50℃以上，请务必在试验，确认后使用。

* Inform us the length of A and B when long-size product is necessary.
* Max length of long-size product is 2000mm.(9.53×6.35 size:Max length is 1500mm.)
* Order tubes after testing and confirming in the use of high temperatures (over 50℃).

特 点

1. 可弯曲，节省配管空间
2. 减少接口的数量
3. 可用于可活动的部分

Features

1. Flexible and easy to use in a narrow space.
2. Replacing connecting parts.
3. Suitable in universal movements.

用 途

- 半导体，液晶制造装置。
- 化学、药品机械设备装置。
- 热交换器、蒸汽管道。
- 零部件搬送用管道。

Applications

- Semiconductor and liquid crystal manufacturing equipment
- Chemical and pharmaceutical plant equipment
- Heat exchangers and steam piping
- Parts conveying piping

GUNZE
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ROD

氟树脂PFA
焊条/焊带

Rod/thin plate roll products made from PFA fluoro resin

可连续成型超长尺寸，热熔融型氟树脂挤出成型的焊条

Elongated tube is available by continuous extrution! Thermally-fusable fluoro resin rods manufactured by extrusion.

规 格 Specifications

■ NSP-R规格表 [焊条（卷取型）]
NSP-R Standard chart [Rod (roll type)]

品名 Article number	规格(直径 mmφ) Item Code (Diamater)	最大卷长(m) Max. winding length
NSP-R	2	500
	3	
	3.5	
	4	
	5	

※NSP-R卷长在10M以上时，以每10M为单位进行裁切销售。
＊ Required specification for NSP-R : over 10m length/ 10m pitch.

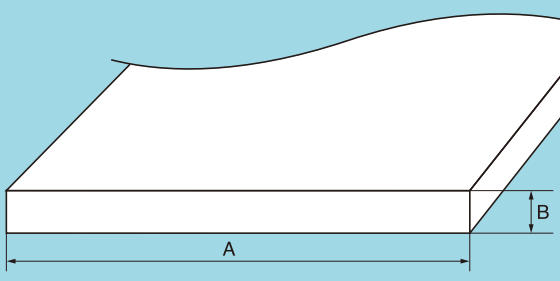
■ SWP-R规格表 [焊条（直线型）]
SWP-R Standard chart [Rod (straight type)]

品名 Article number	规格(直径 mmφ) Item Code (Diamater)	裁切长度(m) Cut length
SWP-R	4	1
	6	
	8	
	10	
	12	
	13	
	15	
	16	
	18	
	20	
	25	

■ NSP-R规格表 [焊带]
NSP-R Standard chart [Thin plate roll]

品名 Article number	宽度(mm) Standard width (A)	厚度(mm) Thickness (B)	最大卷长(m) Max. winding length
NSP-R	14.5	2.4	500
	17	2.4	

[焊带 Thin plate roll]



■ SP等级规格表 [焊条(直线型)]
SP Grade Standard chart [Rod (straight type)]

品名 Article number	规格(直径 mmφ) Item Code (Diamater)	裁切长度(m) Cut length
51-SWP-R	15	1
	20	
	30	

用 途

- 焊接材料
- 切削加工材料

Applications

- Material for welding to fill a Gap
- Material to be cut out to shape

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FFY

氟树脂PFA丝线

Yarn products made from
PFA fluoro resin

卓越的耐热性!!
充分运用了独创性技术的氟树脂纤维。

Superior heat resistance!
Fluoro resin fiber was developed by full use of our original technology.

特 点

FFY是用可热熔，耐热性卓越的PFA树脂，并用郡是独创的纺织技术而制成的长纤维

1. 耐热性
2. 耐腐蚀性
3. 纯度高

Features

FFY is a long fiber developed by original Gunze spinning technology. It is made from PFA fluoro resin that can be thermally fused and has superior heat resistance.

1. Heat resistance
2. Chemical resistance
3. Purity

规 格 Specifications

品名 Article number	纤维直径(μmφ) Fiber diameter	纤维强度(dtex) The degree of fiber
FFY	35~550	21~5084

※ 如需上述规格直径以外的纤维，请联系咨询
※ 若需要异形线，空心线，导电线，欢迎垂询
※ 若需要PFA之外材质的丝线（如PEP,ETFE,PEEK),欢迎垂询
※ 可制造多纤维丝线

* Contact us regarding fiber diameters that exceed the specifications above.
* Contact us regarding hollow or electro - conductive filaments.
* Contact us regarding other materials. ex) FEP, ETFE, PEEK
* Multi-filaments are available.

▼ 在本册的第24页的技术资料中有关于FFY物品性质的数据。/ Data regarding the properties of FFY is given on page 24.

GUNZE
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NET

氟树脂PFA网格

Net products made from
PFA fluoro resin

郡是传统的纺织技术
正向着高科技发展，
用经线和纬线织造未来

Gunze traditional weaving technology
is making your future!

规 格　Specifications

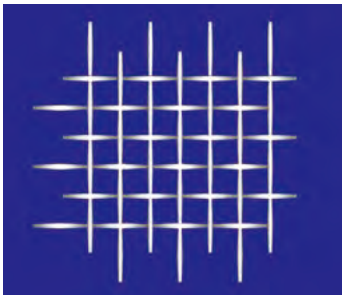
品名 Article number	规格 Standard	纤维直径 (μmφ) Fiber diameter	厚度 (μm) Thickness	标准宽度 (mm) Standard width	最大长度※ (m) Standard length
NET	250μmφ-25mesh	250	500	1000	100
	110μmφ-60mesh	110	220	1000	200
	80μmφ-80mesh	80	160	1000	200
	110μmφ-100mesh	110	220	1000	200
	50μmφ-100mesh	50	100	1000	200
	35μmφ-150mesh	35	70	1000	200

※ 如需要上述规格以外的纤维直径和网眼密度，欢迎垂询
※ 欢迎咨询网格的幅宽及长度
※ 欢迎咨询织造的种类
※ 最小起订量为10M,且以10M为单位进行裁切
※ 有平纹，斜纹，双层纱，筒状等织法
※ 最大长度仅供参考，可调整

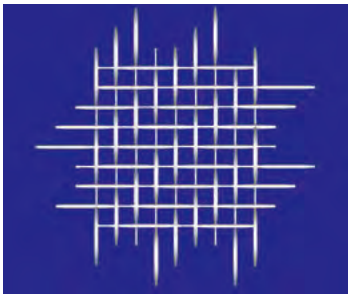
* Contact us regarding fiber diameters and mesh numbers that exceed the specifications above.
* Contact us regarding available Width and length.
* Contact us regarding available types of fiber cloth.
* Required specification for PFA-NET : over 10m length/ 10m pitch.
* Plain weave, twill, duplication weave, tube weave are available.
* Max length have the possibility of changing.

纤维构造例图　Weave Construction

平纹
Plain weave



斜纹
Twill



▼ 在本册的第28页的技术资料中有关于NET物品性质的数据。/ Data regarding the properties of NET is given on page 24.

GUNZE
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NST/SMT

氟树脂PFA
薄壁收缩管/非收缩管
Thin-walled non-shrinkable tube and shrinkable tube made from FEPfluoro resin

郡是独特的技术开发出的薄壁管材，具有广泛用途的氟树脂管

Thin tubing made possible by Gunze technology! Fluorine-contained resin tube with a wide range of applications.

特 点

NST/SMT是用PFA制成的薄壁管材。
充分发挥氟树脂特性的全氟薄壁管材，加入碳素可导静电的管材，提高散热性能，内面粗化的管材
NST为非收缩管，SMT为收缩管。

Features

NST/SMT are tubular film made from PFA fluoro resin.
Varieties of thin tubes are available,
eg. Purity type, PB type for controlled electric resistance, Heat dissipation type and inner surface etching type.
NST is non-shrinkable tube, and SMT is shrinkable tube.

用 途

- 用于OA打印机的定影辊和转印辊
- 用作包装材料
- 防止荧光灯破裂飞溅
- 防止模具沾脏污

Applications

- Heating rollers in photocopies and printers, pressure rollers and electrified rollers.
- Packing material
- Preventing Fluorescent tube scattering
- Resisting contamination for molding applications

规 格 Specifications

品名 Article number	内径(mmϕ) Inside dia.	厚度(μm) Thickness	PB型 PB Type	E型 Etched
NST	10 ～ 150	15 ～ 150	○	×
NSE	10 ～ 100	20 ～ 110	○	○
SMT	8 ～ 60	15 ～ 150	○	×
SME	18 ～ 60	30 ～ 110	○	○

※ 根据内径，膜厚，长度三者的平衡，成型尺寸会发生变化，如需了解，欢迎垂询
※ 当加热温度在180-290℃时，收缩率为8-12%，关于加工问题，欢迎联系咨询。
※ 关于内面处理，欢迎垂询

* Forming size varies according to combination of those, inner die, thickness and length.
* SMT shrinks between 8 to 12% in circumference when heated to between 180 to 290 ℃.
* Contact us regarding or etching.

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TST

氟树脂FEP
长尺寸热收缩管
Long size heat shrinkable tube
made from FEP fluoro resin.

郡是独创的连续成型技术，可生产氟树脂长尺寸热收缩管

Gunze's stretching technique has made this continuous stretched tube available!!
Long size heat shrinkable tube made from fluoro resin.

特 点

TST是用FEP生产的连续挤出成型的热收缩管，可制造长尺寸产品并降低成本。
把氟树脂管装到所需对象上，就可使其具有氟树脂的特性。

Features

TST is continuously stretched heat shrinkable tube made from FEP fluoro resin.
Long size product is available by continuous stretching process and it reduces production cost. Superior features of fluoro resin can be added by covering an object with TST.

用 途

- 保护生产工具
- 用作离型材料和成形材料
- 防止荧光灯飞溅
- 保护传送带，并防止粘脏污
- 用于电子相关部件的绝缘作用

Applications

- Protection of manufacturing tool.
- Release material for molding material.
- Shatterproof of fluorescent lump.
- Antifouling or protection of conveyor.
- Insulating covering for electronic components.

规 格 Specifications

●对応可能サイズ　Available size

品名 Article number	内径(mmφ) Inside diamater	厚度(μm) Thickness	最大卷长(m) Max.winding length
TST	8～100	50～250	200

※ 根据内径，膜厚，长度三者的平衡，成型尺寸会发生变化，如需了解，欢迎垂询
※ 用150～180℃的温度加热，TST将有5%～18%的收缩率
※ 可进行内面粗化处理，然后粘结加工
※ 可进行着色和导电功能加工

* Forming size varies according to combination of those,inner die,thickness and length.
* TST shrinks between 8 ～ 15% in circumference when heater to between 150 to 200°C
* Contact us regarding Etched type for Adhesion.
* Electro-conductive and coloerd type are available.

●参考量産事例　Reference mass production sizes

品名 Item Code	対象直径 Object diamater	收缩前内径(mmφ) Inside diamater before shrinkage	收缩后内径(mmφ) Inside diameter After shrinkage	厚度(μm) Thickness	形状 Figure	材質 Material
TST	32.5	33.5以上	29.0以下	250	卷物　scroll	FEP
	28.0	29.5以上	25.5以下	200	卷物　scroll	FEP
	25.5	26.5以上	23.0以下	200	卷物　scroll	FEP

GUNZE
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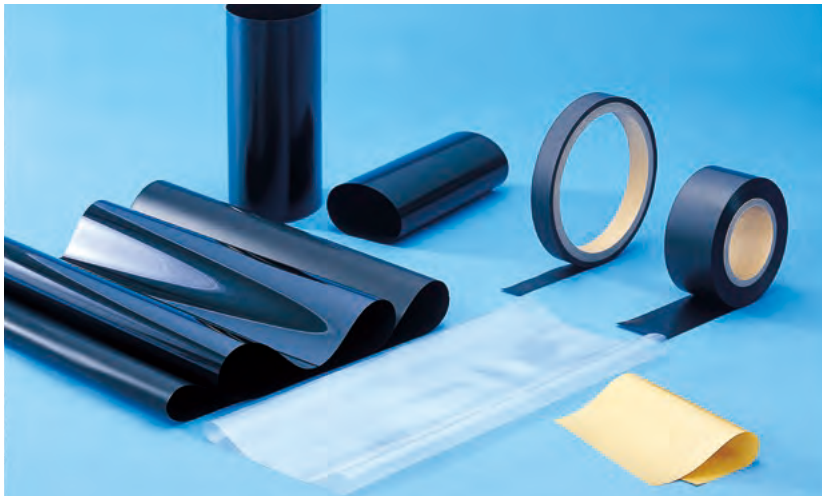
工程塑料片材以及无缝皮带

Engineering plastic sheets and seamless belts

用途广泛，用工程塑料制造的片材和无缝皮带

Extremely versatile! Sheets and seamless belts made from engineering plastics.



本公司技术优点

1.将导电材料进行均匀分散处理，可对导电率进行任意调整（$10^3\Omega$～$10^{14}\Omega$），并可保持导电率的稳定性

2.通过填充材料的分散可提高产品的热传导性和硬度。可根据需要调整耐热性和机械性质。

3.可在表面涂硅胶或氟树脂材料，增强离型性

4.薄膜可分为里外两层，分别具有不同的功能。

5.为防止出现蛇形褶皱，两端贴有加强胶带。

Technical features

1. By spreading uniformly with a conductive material, control over the resistance value is possible. It is possible to stabilize the surface resistance value to within a multiplier factor of 10 over the range 10^3 to $10^{14}\ \Omega$.

2. The dispersion of a thermal-conductive filler and a high-rigidity filler has contributed to the improvement of the whole thermal conductivity and rigidity of the material to the level of rivaling metallic materials. In this way, the thermal and mechanical properties of the material has become flexible to meet your variety of requests.

3. The surface of the material can be coated with silicon resin or fluorine-contained resin to give the material separability characteristics.

4. Two layers are possible, and the front and back can be given different functional properties.

5. The edges can be treated to prevent snaking and taped for reinforcement.

▼ 在本册第25页的技术资料中有关于工程塑料的物性资料/ The physicul properties of the engineering plastics are given inthe technical materials on page 25.

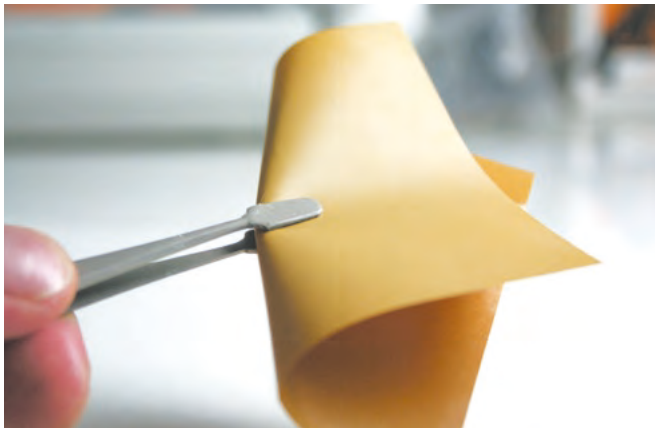
GUNZE
a touch of comfort

开发中
绝缘放热PI薄片

(Under developing)
Adhesive thermal conductive sheet
with polymide resin.

郡是成形技术和合成技术的结晶！
工程素材复合材料的结晶

Crystallization of Gunze's casting technique and compounding technique! New product of engineering plastic composite material.



特 点

PI绝缘放热PI薄片，具有耐热性，绝缘性，热传导性，可粘结性等功能。
可根据客户需求定制生产。

Features

Polyimide sheet for insulation and radiation has excellent heat resistance, electric insulation, thermal conductivity and adhesive properties. Customized product is available.

用 途

- 半导体装置耐热性能
- 基盘放热对策
- 车载用电源组件，变压器
- 太阳能发电变流器
- 其他需要电绝缘和放热性特点的地方

Applications

- Countermeasure against the heat around semiconductor manufacturing equipment.
- Countermeasures against the radiation from printed circuits and electronic device.
- Power module inverter for automotive.
- Photovoltaic power generation inverter.
- Insulation for lithium battery.
- An area where electric insulation and radiation are required.

规 格 Specifications

●样品尺寸 Sample size

	尺寸 Size	厚度 Thickness
薄片状 Sheet size	A5尺寸 (148×210mm) A4尺寸 (210×297mm)	30μ～100μm
滚筒状 Roll size	幅宽350mm×长5M(最大试做尺寸)	30μ～100μm

●代表物性值 Representative properties

项目（评价方法，样品信息） Item(test method, sample detail)	单位 Units	A型 Type A	B型 Type B
热传导率 Thermal conductivity	W/（m·K）	1.0～3.0	
绝缘性（破坏电压：2W-50μm薄膜） Dielectric strength	kV	>2.5	
耐热性（TGA5%分解度） Heat resistance(decomposition temperature)	℃	～320	～360
可粘接性（对粘接处理铜箔的压力条件：1.0MPa/150℃） Adhesiveness(Against etched copper foil ,Press condition 1.0Mpa/150℃)	N/cm	5～10	
弹性率 Elasticity	Gpa	約0.5	約2.0

※ A,B为代表值，可根据客户需求调整各个物性。 ＊ Type A and B are representative values. Each properties are customizable for your request.

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技术资料
Technical materials

氟树脂的特性
Characteristics of fluoro reisins

项目 Item			单位 Units	ASTM试验方法 ASTM test method	PFA	FEP	ETFE	PVDF	PTFE
物理性质 Physical properties	密度 Specific gravity			D792	2.12~2.17	2.12~2.17	1.70	1.75~1.78	2.14~2.20
	熔点 Melting point		℃		300~310	260	270	156~170	327
机械性质 Mechanical properties	拉伸强度 Tensile strength		MPa	D638	24~34	22~31	45	34~43	27~34
	延展性 Elongation		%	D638	300	250~330	100~400	80~300	200~400
	压缩强度 Compressive strength		MPa	D695	17	15	49	67~96	12
	弹性弯曲率 Flexural rigidity		GPa	D790	0.66~0.69	0.65	1.4	2.0~2.5	0.55
	抗击强度 Impact strength (Izod strength)		J/m	D256A	不破坏 No breakage	不破坏 No breakage	不破坏 No breakage	160~370	160
	硬度 Hardness		邵氏 Durometer	D2240	D64	D60~65	D75	D65~70	D50~65
	摩擦系数(0.7MPa·3m/min) Coefficient of dynamic friction				0.20	0.30	0.40	0.39	0.10
热性能 Thermal properties	热传导率 Thermal conductivity		W/(m.k)	C177	0.25	0.25	0.24	0.10~0.13	0.25
	比热 Specific heat		10_3J/(kg·K)	D240	1.0	1.2	1.9~2.0	1.4	1.0
	线膨胀系数 Linear expansion coefficient		10^{-5}/K	D696	12	8.3~11	5.9	7~14	10
	最高使用温度 UL temperature		℃		260	200	150~180	150	260
	负荷弯曲温度 Heat deformation temperature	0.45MPa	℃	D648	74	72	104	87~120	121
		1.8MPa	℃	D648	50	50	74	149	55
电力能 Electrical properties	体积电阻率 Volume resistivity		Ω·cm	D257	>10_{18}	>10_{18}	>10_{16}	2×10_{14}	>10_{18}
	表面电阻率 Surface resistivity		Ω	D257	>10_{16}	>10_{16}	5×10_{14}	-	>10_{16}
	绝缘破坏强度 Dielectric strength		KV/mm(3.2mm厚度) (3.2mm thickness)	D149	20	20~24	16	10	19
	电容率10_6Hz Dielectric constant			D150	<2.1	2.1	2.6	6.43	<2.1
	电容正切 10_6Hz Dielectric loss tangent			D150	0.0003	<0.0005	0.005	<0.015	<0.0002
其它 Other	耐弧度性 Arc resistance		sec	D495	>300	>300	75	50~70	>300
	耐腐蚀性 Chemical resistance				优 Excellent	优 Excellent	优 Excellent	良 Good	优 Excellent
	极限氧气指数 Oxygen index		%	D2863	>95	>95	30	44	>95
	吸水率24h Water absorption		%	D570	<0.01	<0.01	0.029	0.04~0.06	<0.01

【氟树脂制品的使用注意事项】
※超过上述最高使用温度进行加工时，需进行充分的换气，防止吸入分解气体，必要时需戴上保护器具。
※氟树脂制不可以植入人体，也不能与体液和人体组织相接触。
※废弃本产品时，请依据有关废弃物处理的法律法规进行处理，切勿私自处理。

【Remark】
*You need good ventilation and don't draught cracked gas in case of processing the tube over UL temperature in the above table. if necessary, please wear protective equipment.
*Fluoro reisins products are not produced for contacting the bodily fluid and body tissue.
*If you waste the tube, please follow the regulation about the waste and cleaning , and never buru up the tube.

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技术资料
Technical materials

氟树脂的特性
Characteristics of fluoro reisins

持续使用耐热温度　UL temperature

	代表值(℃) Representative temperature(℃)
氟树脂PFA PFA	260
氟树脂FEP FEP	200
氟树脂ETFE ETFE	150～180
氟树脂PVDF PVDF	150
氟树脂PTFE PTFE	260
硅树脂 Silicon	250
聚乙烯砜 Polyether sulfon	200
聚芳酯 Polyarylate	180
聚酰胺(NY66) Polyamide(NY66)	120
聚酯 Polyester	120

※此数据是树脂单质可承受的UL温度，而非加工品的UL温度。

＊ This data is UL temperature of fluoro's element substances and is not UL temperature of manufuctured goods like a roller with shrinkage tube.

燃烧性　Flammability

	氟树脂PFA PFA	硅胶 Silicon rubber	聚氯乙烯 PVC	聚乙烯 Polyethylene
烧失量(%) LOI	>95	25～40	40	18
燃烧発熱量 (cal/g) Calorific value	约1,000 approx. 1,000	约4,500 approx. 4,500	约4,300 approx. 4,300	约11,100 approx. 11,100

※烧失量…LOI(Limiting Oxygen Index : ASTM D2863)
在增加氮气中的氧气浓度时，燃烧时表示氧气浓度Vol%值越接近100%，越不易燃烧。

＊ LOI: Limiting oxygen index (ASTM D2863)
In case of increasing the nitrogenous gas-oxygen concentration and burning the material, the closer the value for oxygen concentration (expressed as Vol%) approaches to 100%, the more difficult the material is to burn.

氟树脂的最高及最低温度机械特征
Mechanical characteristics of fluorine-contained resins at high and low temperatures

特性 Characteristic	ASTM	温度℃ Temp.(℃)	PFA	FEP	PTFE
拉伸强度　MPa Tensile strength MPa	D638	23	33	25	27
		250	10	2	7
	–	−196	130	120	100
拉伸屈服点 MPa Tensile yield point MPa	D1708	23	16	14	7
		250	3	1	1.5
	–	−196	130	130	91
延展度% Elongation %	D638	23	380	380	300
		250	680	200	350
	–	−196	8	7	7
弯曲弹性率 GPa Flexural modulus GPa	D790	23	0.69	0.66	0.56
		250	0.069	–	0.045
	–	−196	5.8	4.7	4.7

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氟树脂的特性
Characteristics of fluoro reisins

耐药性 Chemical resistance

	酸 Acid	碱 Alkaline	丙酮 Acetone	苯 Benzene	四氟化碳 Tetrafluoro-methane	酒精 Alcohol	脂 Ester
氟树脂PFA PFA	○	○	○	○	○	○	○
聚酰胺 Polyamide	△	○	○	○	○	△	○
聚酯 Polyester	△	△	△	○	○	○	△
聚酯砜 Polyether sulfon	△	○	×	○	○	○	–
硅树脂 Silicon	△	○	○	–	×	○	○
聚氯乙烯 PVC	○	○	×	×	×	○	×
聚烯烃 Polyolefin	△	○	△	△	×	○	△

○…可使用　△…要注意　×…不可使用

※除此以外，会危害氟树脂的药品及条件
※熔融状态下反应的碱性金属、钠、钾、锂等
※高温下的氟元素气体
※连续使用、达到温度的上限值；或者靠近上限温度的、高浓度金属氢素化合物和氨
※加压下、250℃、浓度为70%的硝酸
※还需要注意的是，轻微粉碎的金属粉和氟树脂粉末在充分混合后，一旦点燃，将会发生剧烈反应。

○…Can be used　△…Caution required　×…Cannot be used
* Exceptions: Chemicals that penetrate fluoro resin and relevant conditions
・ Reactive alkaline metals in melted state (sodium, potassium and lithium etc.).
・ High-temperature fluorine gas.
・ High-concentration metal hydride compounds or ammonia at or near the upper limit of the UL temperature.
・ Pressurized nitric acid at 250 ℃ and 70% concentration.
・ Other substances that require caution include finely pulverized metallic particles that have been well mixed with powdered fluoro resin. It reacts violently at flash point.

非粘着性 Non-adhesive characteristics

与液体的接触角越大、粘着力越小，可视为其非粘着性和离型性就越高。

Materials with large contact angles with respect to liquids and low adhesion energy are regarded as non-adhesive, with good separability.

	水的接触角度 Contact angle against water	与水的粘着力一(dyne/cm) Adhesion energy
氟树脂PFA PFA	109	42~43
氟树脂FEP FEP	115	42~43
氟树脂PTFE PTFE	114	42~43
硅树脂 Silicon	90~110	47.8~72.7
石蜡 Paraffin	10.5~10.6	52.7~53.8
聚乙烯 Polyethylene	88	75.2
聚酰胺 Polyamide	77	97.7
酚树脂 Phenol	60	109.0
铜 Copper	9.6	144.2
铝 Aluminum	4.6	145.0

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技术资料
Technical materials

氟树脂的特性
Characteristics of fluoro reisins

收缩管内测平滑性比较
Comparison of tube internal smoothness

■表面厚度 Surface roughness

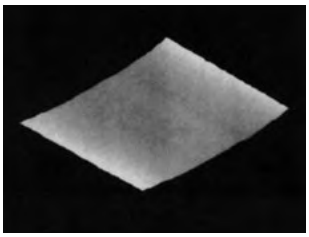
直径(mmφ) Diamater	NSP	传统PFA套筒 Conventional PFAtube
Ra	0.04	0.04
Rmax	0.30	1.95

(单位:μm)
(Units:μm)

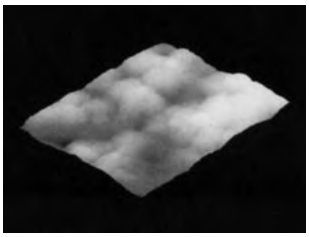
Ra:中心线平均厚度
Rmax:最大高度

Ra : Mean roughness of centerline.
Rmax : Maximum height

■3套管内侧面·3D平面图 3D display of tube internal surface



NSP



传统PFA套筒
Conventional PFAtube

※在同一条件下郡是挤出成型的套管内面
＊ Internal surfaces of tube extruded under the same conditions by Gunze.

溶出氟元素·TOC比较 Eluted fluorine/TOC comparison

直径(mmφ) Diamater	NSP	传统PFA套筒 Conventional PFAtube
溶出氟离子 F ions	1.6	4.7
全有机碳素 TOC Total organic carbon	20	390

(单位:ppm)
(Units:ppm)

※抽出液：纯净水
※室温条件下放置24小时后的测定值

＊ Extractant:ultrapure water
＊ Measured after the duration of 24Hrs.

静电量（带电量）比较 Static electricity (charge) comparison

	10秒 10 sec.	30秒 30 sec.	1分 1 min.	3分 3 min.	10分 10 min.
NSP	2.39	2.29	2.22	2.09	1.92
传统PFA套筒 Conventional PFA tube	2.61	2.51	2.45	2.30	2.07

·n=3×4次 ·测定方法
※上述为测定值，而非保证值

(单位:kv)
(Units:kv)

· n = 3 x 4 times · Measurement method
＊ The values given above are measured values, not guaranteed values.

NSP金属离子溶出数据 NSP metal ion elution data

■硝酸基液的溶出 Nitric acid elution

溶出种类 Eluted material	溶出量(ppb) Test
Na	0.1
Mg	<0.1
Al	0.1
Cr	0.3
Cu	<0.1
Sn	<0.1
Fe	0.2
Ca	0.5
K	<0.1
Si	<5.0

※室温环境下放置6天后的测定值 ＊ Measured after the duration of 144Hrs.

■氟酸基液的溶出 Fluoric acid elution

溶出种类 Eluted material	溶出量(ppb) Test
Na	<0.1
Mg	0.1
Al	<0.1
Cr	0.3
Cu	<0.1
Sn	<0.1
Fe	0.2
Ca	0.5
K	<0.1
Si	<5.0

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技术资料
Technical materials

FFY/NET物性数据
FFY/NET properties data

FFY特征　FFY properties

项目 Item		单位 Units	FFY
机械特征 Mechanical properties	拉伸强度 Tensile strength	(g/dtex) (Pa)	0.4～1.8 700～290
	拉伸弹性率 Tensile modulous	(g/dtex) (Pa)	3.8～14.4 640～2550
	断裂时拉伸度 Elongation at breaking point	(%)	8.5～40

（以上为单丝数值）(Values for mono-filament)

NET的特性　NET properties

项目 Item	单位 Units	试验方法 Test method		35μmφ	50μmφ	80μmφ	110μmφ	110μmφ	250μmφ
				150mesh	100mesh	80mesh	60mesh	100mesh	25mesh
纤维直径 Fiber diameter	(μmφ)			35	50	80	110	110	250
厚度 Thickness	(μm)			75	101	158	215	231	478
编织密度 Knit density	(本/25.4mm [inch])		MD	148	100	80	62	102	27
	(Strads/25.4mm [inch])		TD	154	100	82	64	102	28
网孔长度 Mesh-opening	(mm)			0.13	0.2	0.24	0.31	0.14	0.77
网格附着力 Mesh adhesion	(g/m^2)			24.8	36	76	88	167	189
空隙率 Voids	(%)			66.0	65	77.4	80.9	66.3	81.6
断裂强度 Breaking point	(N)	JIS L 1096	MD	34.5	49	89	124	204	323
			TD	18.7	48	74	97	190	290
断裂延伸度 Elongation until breaking point	(%)	JIS L 1096	MD	28.9	44	69	85	72	32
			TD	27.9	46	81	85	102	34
抗扯强度 Tear strength	(N)	JIS L 1096	MD	4.8	3.3	12	15	11	70
			TD	4.2	3.2	8	15	10	46
冲击强度 Impact strengt	(J)	JIS P 8134		—	0.55	0.95	1.37	2.19	2.66
透气性 Air resistance	(KPa.s/m)	KES-F8-AP1 （郡是式） (GUNZE method)		—	0.037	0.028	0.027	0.114	0.015
损耗性 Wearability	（次） (Times)	JIS通用方法 JIS universal method		—	1	7	72	2353	3153

※编织密度：以上数据为实际测量数值。编织密度=每英寸线的根数
※网孔长度：以上数值为计算值

* Knit density: The vales given above are measured values, not guaranteed values.
* Mesh-opening: The vales given above are calculated values, not guaranteed values.

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技术资料
Technical materials

NSP/SWP物性数据
NSP/SWP properties data

耐压力及最小可弯曲半径
Pressure resistance and minimum bending radius

■NSP/SWP（PFA套管）
NSP/SWP (PFA tube)

规格 Item Code	厚度(mm) Thickness	常温下破裂所受压力 (MPa) Bursting pressure	最小弯曲半径 (mm) Minimum bending radius
3×2	0.5	15	12
4×2	1.0	12	18
4×3	0.5	5.3	24
6×4	1.0	6.2	30
8×6	1.0	4.6	60
10×8	1.0	3.9	72
12×10	1.0	3.2	108
14×12	1.0	3.0	150
18×16	1.0	2.8	240
19×16	1.5	2.8	210
6.35×3.96	1.2	7.5	24
6.35×4.35	1.0	6.0	36
9.53×6.35	1.59	6.5	60
9.53×7.53	1.0	4.0	84
12.7×9.53	1.59	4.9	84
12.7×10.7	1.0	3.1	150
19.05×15.88	1.59	3.0	192

■FLP（PFA柔韧软管）
FLP (PFA Flexible tube)

规格 Item Code	厚度(mm) Thickness	常温下破裂所受压力 (MPa) Bursting pressure	最小弯曲半径 (mm) Minimum bending radius
6×4	1.0	6.0	18
8×6	1.0	4.2	24
10×8	1.0	3.5	30
12×10	1.0	3.1	36
14×12	1.0	3.0	60
19×16	1.5	3.0	90
6.35×4.35	1.0	5.7	18
9.53×6.35	1.59	6.1	24
12.7×9.53	1.59	4.1	24
12.7×10.7	1.0	2.7	36
19.05×15.88	1.59	2.6	72

[SI单位换算　1MPa=10.197kgf/cm^2]
[SI Unit conversion　1MPa=10.197kgf/cm^2]

【实际压力】
实际应用中的最大参考压力，仅为上述破裂压力的1/3～1/5。高温条件下大概的最大参考压力，请用上表数据乘以下表数据计算得出。

【Service pressure】
The recommended service pressure is 1/3 to 1/5 of the bursting pressure given in the table above. Apply the compensation factors given in the table below to obtain the recommended service pressure for use at high temperatures.

温度 Temperature	50℃	100℃	150℃	200℃
系数 Coefficient	0.7	0.5	0.3	0.1

能源工程塑料的物性值
Physical properties of engineering plastics

项目 Item / 树脂 Resin	拉伸强度 (MPa) Tensile strength	延展度(%) Elongation	杨氏模量 (GPa) Young's modulus	玻璃转移温度(℃) Glass transition point	熔点(°C) Melting point	耐腐蚀性 Chemical resistance	UL	应力断裂 (Counts) Stress cracks
聚碳酸酯(PC) Polycarbonate(PC)	65	12	2.5	150	240	×	V-2	100
尼龙(PA) Nylon(PA)	51	62	1.1	115	178	○	未评价 no data	3000
聚醚醚酮(PEEK) Polyether etherketone(PEEK)	95	8	2.4	143	340	○	V-0	5000
聚酰亚胺(PI) Polyimide(PI)	331	20	6.3	None	None	○	V-0	>10000
变性聚酰亚胺(MPI) Modified polyimide(MPI)	177	20	4.7	250	None	○	V-0	>5000
PES合金 PES alloy	103	195	2.1	210	210	△	V-2	5000
聚偏氟乙烯(PVDF) Polyvinylidene fluoride(PVDF)	43	75	1.3	室温以下 Below room temp.	170	○	V-0	>10000
聚氟乙烯(ETFE) Copolymerizedethylene/ tetrafluoroethylene(ETFE)	50	218	1.6	室温以下 Below room temp.	265	○	V-0	>10000

※以上为代表值并非保证值
*These are representative values, (not guaranteed values).

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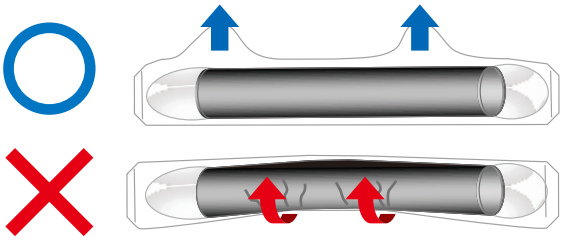
关于GRC的施工
How to apply GF tube

1. GRC的处理 / Handling of GF tube

●氟树脂管的搬动并安装到辊轴上，请拎着外包装PP袋，轻轻提起来装到辊轴上，注意不要折树脂管。切勿用手托着抬起从下往上装

●When carrying Tube or when applying Tube onto Roller, hang up Tube at Outer Poly-bag, not to push up Tube from bottom, in order to prevent Crease.



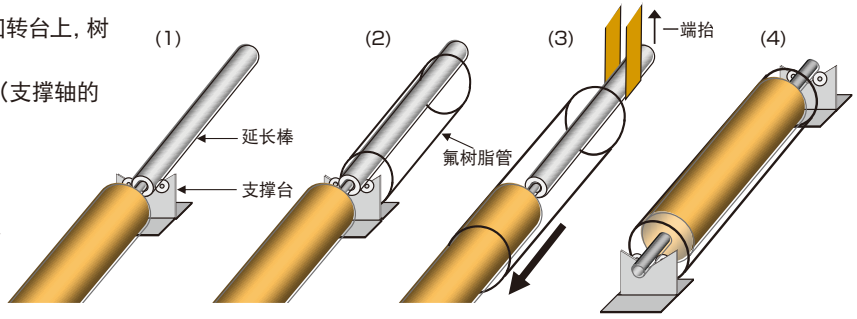
2. 氟树脂管的安装 / Attaching GF tube

●如果辊轴较短在1米左右的话，将辊轴立起，放在回转台上，树脂管从上向下安装

●如果辊轴又长又重，需要使用支撑轴，将一端抬起（支撑轴的使用方法）

●In case Roller is short, for example by 1m, stand Roller and apply Tube from upper side, then put it on Rotation Base.

●In case Roller is long and heavy, One-end Lift is necessary by using Extension Bar.(How to use Extension Bar)



3. 收缩作业 / Shrinkage operation

●将装好GRC的辊轴，放在旋盘或回转台上，一边转动，一边用约150℃~180℃的热风，朝着一个方向，缓慢的使GRC管收缩

●Put Roller around which Tube is applied on Lathe or Rotation Base. Slowly shrink Tube from one-end by Heat Supply of about 150-180 degrees C, while Roller is rotated. (Refer to Standard Operation below.)

(1) 辊轴两端向外长出约50-100mm

(1) Confirm that Tube is longer than Roller by 50-100mm at both ends.

(2) 以60rpm的速度转动辊轴，从距辊轴两端以内40-50mm的部分开始加热收缩，使氟树脂管固定，在热收缩管上部60-70mm的距离，用热风加工。

(2) While Roller is rotated at the speed of about 60 rpm, shrink the part of 40-50mm from Roller Edge, and then Tube is fixed. During this operation, keep the gap of about 60-70mm between Tube and Heat Supply.

(3) 辊轴的一端形成罗口之后，接下来向相反的方向（未收缩部分）进行热收缩加工
请注意：这时热风的出风方向一定要与氟树脂管的收缩方向相反
*若热风的出风方向和进行方向相同，易出现褶皱，气泡等

(3) After Cuff is created at one edge of Roller, proceed Heat Supply to the opposite direction (Unshrunk Area). Pay attention to direct Blow Exit toward opposite to Movement Direction. If Blow Exit is directed toward Movement Direction, skip-shrinkage may occur, which cause Wrinkle or Air Bubble.

(4) 让辊轴保持一定的速度持续旋转，注意已收缩部分和未收缩部分的界线，缓慢移动热风出风口、

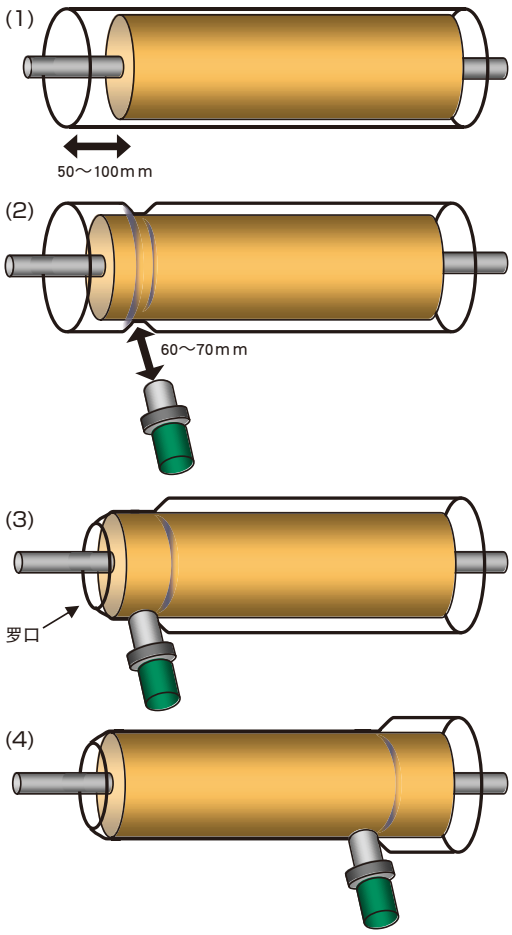
(4) Successively rotate Roller at constant speed, and proceed Blow Exit slowly while checking the boarder between shrunk and unshrunk area.

(5) 一直到辊轴的另一端也完成收缩，请和最开始一样，制作罗口

(5) After shrinkage at the opposite end of Roller, create Cuff like the start.

(6) 根据需要，对氟树脂管两端的边耳进行长度修剪，修剪时请注意不要在两端留下伤痕，一般这时容易产生裂缝。

(6) Cut off both ends of Tube neatly upon necessity while paying attention not to create damage on the edge side of Tube. Crack may be created from the damaged area.



GUNZE
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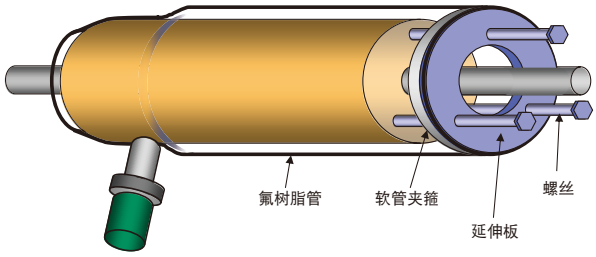
关于GRC的施工
How to apply GF tube

4. 有关延伸架的使用 / Using stretcher

(1) 首先在延伸板上，装好螺丝钉（参考图片）
(2) 延伸板另一端的氟树脂管，需要收缩10cm左右
(3) 将延伸版安装在轴轴的一端
(4) 将氟树脂管夹在延伸版和软管夹箍之间，用螺丝上紧
(5) 将螺丝以均等的力度装在延伸板上，氟树脂管就会有张力，如果螺丝装的太紧氟树脂管被拉伸，会有尺寸不够的危险，这点还需要注意。
(6) 随着收缩作业的进行，氟树脂管的张力会越来越小、适度增大螺丝的力度，使施工保持在有张力的情况下进行



(1) Set Bolt to Stretcher Board in advance. (See below.)
(2) Shrink Tube opposite to Stretcher by about 10cm.
(3) Attach Stretcher Board at the edge of Roller.
(4) Pinch Tube between Stretcher Board and Hose Band, and then tighten it firmly.
(5) By fastening Bolts with even tension,Tube can be strained. Pay attention not to fasten Bolt too tightly. Otherwise Tube is pulled, which may cause shortage of Tube.
(6) While shrinkage operation is proceeded, Tube tension will be less. In such a case, fasten up Bolts to keep tension of Tube.

收缩作业的注意点 / Caution on shrinkage operation

(1) 若热风的出口方向和氟树脂管的收缩方向相同，热风可能会导致未收缩部分产生火花。热风口方向务必与已收缩方向反方向进行。

(1) If Blow Exit is aheaded to Tube's shrinkage direction, heat blow may be skipped to unshrunk area. Be sure to ahead Blow Exit to opposite side from unshrunk area, that is, shrunk area.

(2) 请务必保持同一个方向进行热风源加工，如果由两端加工收缩，到最后中间部分的空气无法排出，导致褶皱的形成

(2) Be sure to advance heat supply from one-end. In case of shrinkage from both ends, no air-pass is provided at the center, which may cause crease.

(3) 辊轴和热风源要保持匀速转动，使氟树脂管保持一定的速度加工，如果局部温度过高，会导致收缩变形，变形是产生褶皱的原因。

(3) Rotate Roller or Heat Supply evenly, and proceed over Tube at constant speed.
Biased shrinkage by partial overheat on Tube may cause wrinkle at the distorted area.

(4) 如果作业中断重新开始时，从已收缩部分和未收缩部分分界线稍微前面开始加工，如果从分界线开始，会留下衔接的痕迹

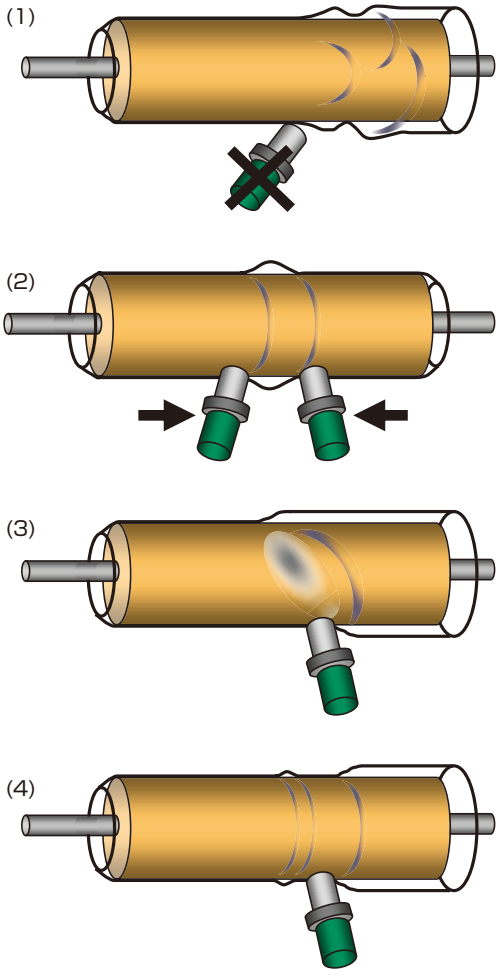
(4) If the operation is resumed after a break for a certain time, proceed from the point a little back from the boarder between shrunk and unshrunk area. If the operation is resumed from the boarder, ring mark may be remained there.

(5) 特别是冬天，对金属辊轴进行热加工收缩时，乍一看好像完全贴合，但是氟树脂管本身接触金属表面冷却，有可能收缩不完全，在这种状况下施工，有些地方贴合很好，有些地方不好。寒冷的季节，需要特别细心的移动热风源。

(5) Especially in winter, in case Tube is shrunk to Metal Roller, sometimes shrinkage is not enough even though Tube looks like attaching to Roller perfectly. Tube itself is cooled on the surface of Metal. If operation is proceeded in such condition, unsticked areas are sometimes spotted in the sticked area. In cold season, move Heat Supply carefully.

(6) 施工过程中，轴轴及其侧面的赃物、垃圾碎屑会混入轴轴和氟树脂管的中间，异物夹杂可以用胶带清除掉

(6) Dirt or foreign particles on the side or axis of Roller may cause their insertion between Tube and Roller during operation. Action such as to attach tape is required.



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