CORROLINE

PTFE Lined Hose for the Chemical Industry

- CHEMICAL RESISTANT
- SELF-CLEANING
- FLEXIBLE
- KINK RESISTANT

CONTENTS

PTFE – THE OPTIMUM CHOICE FOR HOSE LININGS

聚四氟乙烯，英文简称PTFE，其化学结构式为：CF3(CF2CF2)nCF3，PTFE分子长链由碳原子构成，每个碳原子又与两个氟原子相链接。

氟原子几乎覆盖了整个螺旋状高分子链的碳原子表面，非常好的保护了内部碳原子。

此分子结构创造了PTFE其无与伦比的各项物理化学特性。

优异的化学抗性

PTFE是已知材料中化学抗性最好的，只有某些特殊用途或介质可以影响它，比如高温高压状态下的氟气/液态氟，熔融状态的某些碱性金属。

鉴于其优异特性，内衬PTFE的软管较普通软管的使用范围、化学抗性更广，是输送腐蚀性介质或某些复杂介质的理想软管。

表面不粘性

日常生活中的不粘锅厨具就已经很好的说明了PTFE表面的不沾特性。

同样，内衬PTFE软管也就较其他种类的软管在易于清洗方面更快速、可靠。

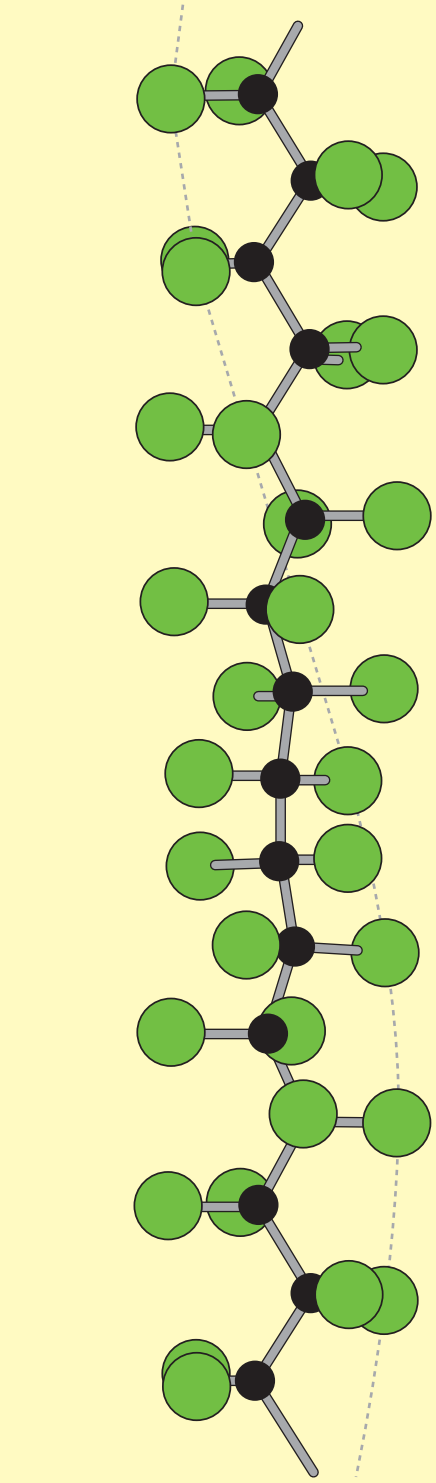
耐温范围广

不粘锅等厨具也从另一个方面展示了PTFE材料的另一个特性：耐高温。软管的PTFE材料本身可耐-150°C的低温与260°C的高温，不过软管的耐温范围需要根据软管的设计与应用条件来估算。

PTFE材料的耐温范围超出了任何橡胶和塑料软管的耐温范围。

软管设计

用PTFE作为软管内衬，需要考虑的主要问题是如何用更好的软管设计来发挥PTFE的物理化学特性优势，这也是Aflex在过去三十多年一直成功的原因所在。



Section from a PTFE Molecule, 16 Angstrom Units long

Fluorine Atom **Carbon Atom**

简介：

Corroline软管被设计用作一款通用耐腐蚀特氟龙软管，软管耐化学抗性广泛，柔韧性也非常好。

Corroline软管不仅可以替代目前很多耐腐蚀性特氟龙软管，而且很大程度上提高了软管的耐化学腐蚀的范围。

Corroline结构：

Corroline软管内衬建立在我们的一个专利设计上，内壁上有轻微凹凸感，但是内衬外壁是螺旋的，结合嵌入螺旋凹槽处的缠绕钢丝可显著增强软管的柔韧性与强度。

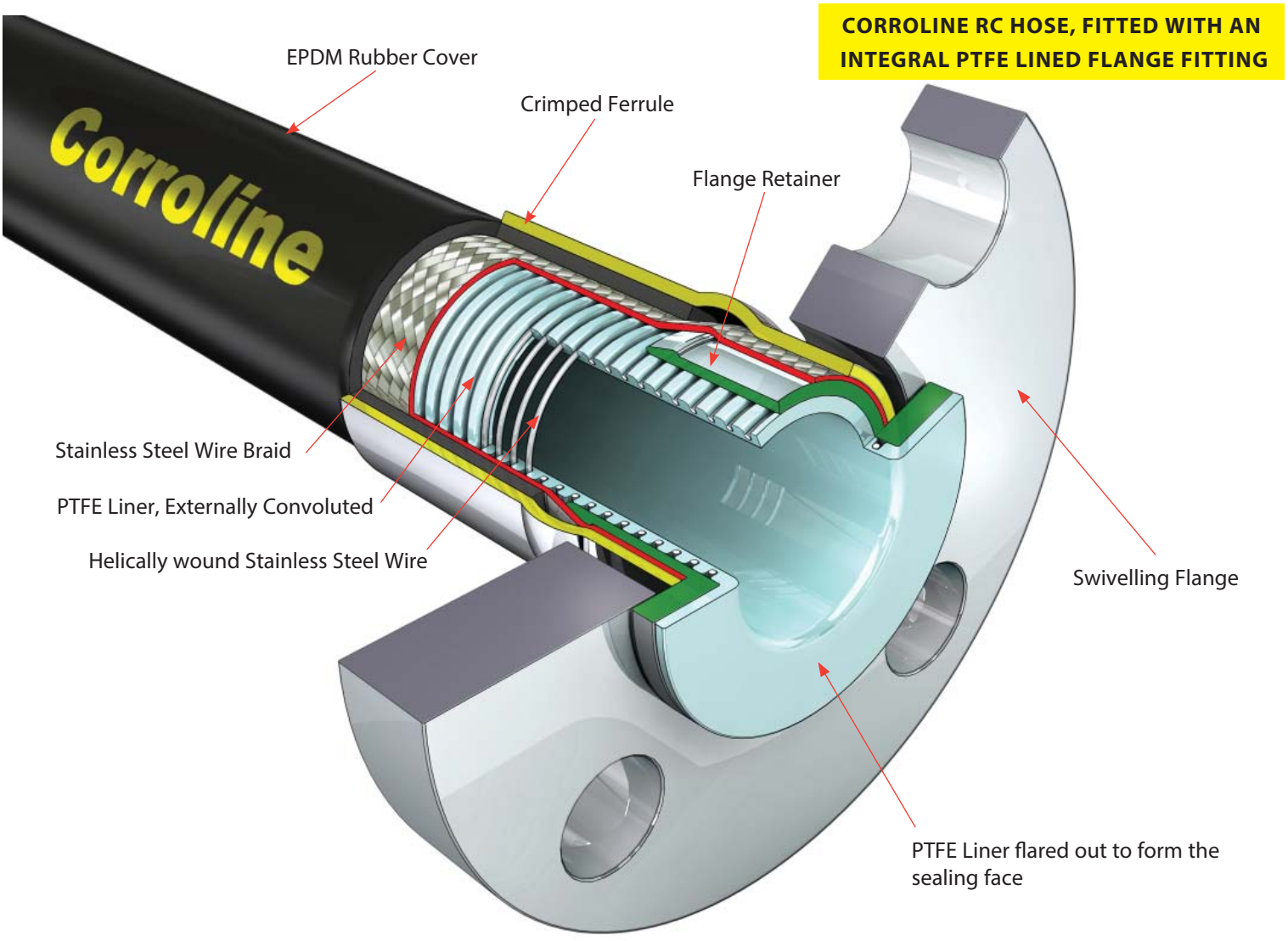
一根螺旋不锈钢丝嵌入内衬的外表面凹槽处，大大增强了软管的耐扭结、耐机械弯折性能，也显著提高了软管的耐压和耐真空性能。

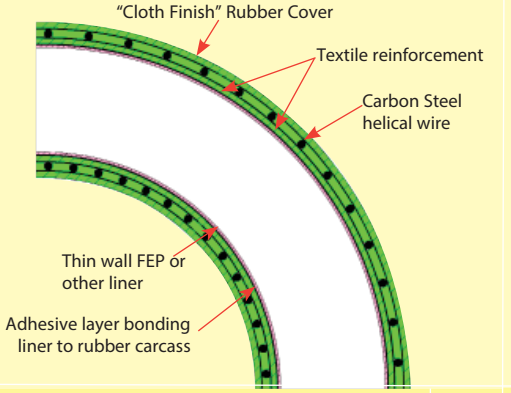
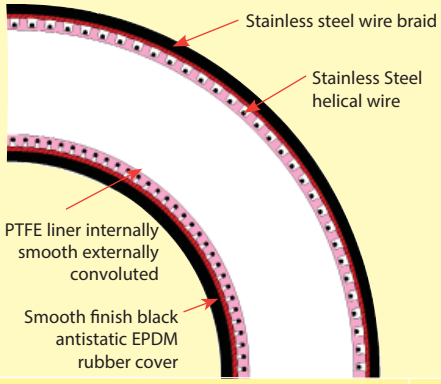
这种螺旋钢丝强化的PTFE内衬结构即使没有螺旋结构的内衬或没有外层橡胶的包覆，也有足够的强度耐受真空和大幅度扭结，这样的设计，显著提高了市面上常见的普通特氟龙软管的性能。

钢丝强化PTFE内衬外边有不锈钢编织层或PP编织层，给软管提供双重保护与强化。

此系列软管最受欢迎的是一款外包黑色、抗静电EPDM橡胶的Corroline软管，外层橡胶采用挤压工艺光滑而且耐磨，软管内外都便于清洗。外层橡胶也可以“防火”，橡胶外层上有黄色“CORRLINE”字样彩条，其他文字或有颜色要求，下单时请备注。

CORROLINE HOSE - THE BEST FLEXIBLE HOSE FOR CHEMICAL PLANT APPLICATIONS



	竞争对手的内衬FEP\PFA软管 或其他塑料或氟塑料薄壁橡胶 软管		Corroline软管（螺旋不锈 钢丝与网纹编织加强、外包橡胶）	
				
软管内壁	光滑内壁、有凹凸感 流速好，易清洗	✓	光滑内壁、轻微凹凸感 流速好，易清洗	✓
内衬材质	FEP或其他氟塑料内衬 不如纯PTFE好	✗	PTFE内衬，具有最好 的耐化学、耐温性	✓
	XLPE或UHMWPE 化学抗性一般	x		
介质受污染风险	高风险，胶合层中的胶质存可能通过管壁上的微孔隙（静电引起、或由于扭结）渗透并污染所输送介质。	x	无风险，无胶合层，软管成分不存在不符合FDA认证的物质	✓
柔韧性	比较差，非常硬 其最小弯曲半径 比较大	x	优，比较软，可 减少最小弯曲的 大小	✓
弯折寿命 （U形 测试）	差，一般50-10000次弯折就损坏	x	优秀，100万次+都不会损坏	✓
耐扭结特性	一般	✗	好	✓
螺旋钢丝材质	碳钢（容易锈蚀）	x	304不锈钢	✓
切割/穿刺抗性	一般（网纹布保护）	✗	好（不锈钢编织保护）	✓
抗静电内衬是否	炭黑含量经常超过2.5%， 容易造成由于炭黑的聚 集而脱落污染输送的介 质	x	符合FDA要求（<2.5% 高纯度炭黑）	✓
耐火灼烧	没有相关测试进行	x	橡胶包覆的软管都根据BS5173 103.13规范经过 “ 耐火灼烧 ” 测试	✓

*The "Rolling U" test is shown on the Aflex Hose website "Aflex News" → "Bioflex and Corroflon compared with Competitors' Products".

Corroline软管规格

Nominal Hose Size ALL GRADES		Actual Bore Size ALL GRADES		Outside Diameter						Maximum Working Pressure				Minimum Bend Radius ALL GRADES		*Max Cont. Length ALL GRADES	
				SS GRADE		PB GRADE		RC GRADE		SS & RC GRADE		PB GRADE					
in	mm	in	mm	in	mm	in	mm	in	mm	psi	Bar	psi	Bar	in	mm	Ft	Mtrs
1/2	13	0.530	13.5	0.685	17.4	0.785	19.9	0.842	21.4	700	48	350	24	2 3/8	60	60	18
3/4	20	0.770	19.8	0.950	24.1	1.065	27.0	1.110	28.1	625	43	320	22	2 1/2	65	60	18
1	25	1.030	26.1	1.250	31.7	1.455	36.9	1.445	36.7	600	41	300	20	4	100	60	18
1 1/4	32	1.250	32.0	1.530	38.9	1.715	43.5	1.740	44.2	550	38	275	19	5 1/4	135	60	18
1 1/2	40	1.530	38.8	1.840	46.7	1.980	50.3	2.035	51.7	500	34	250	17	6 3/4	170	55	17
2	50	2.030	51.5	2.340	60.85	2.580	65.5	2.590	65.7	400	28	200	14	8 1/4	210	42	13

*Sizes up to 1" are available in continuous lengths up to 120 ft (36 mtrs) to special order.

- 软管压力和温度范围：

	耐受介质温度范围	最大工作压力（MWP）
SS（不锈钢编织）	-70?C to +260?C	此最大工作压力是针对130?C以下的情况所测值，130?C以上每升高1?C降低1%的耐受最大工作压力
RC（橡胶包覆）	-40?C to +140?C	
PB（PP编织）	-30?C to +100?C	此最大工作压力是针对80?C一下所测值，此温度以上超过1?C所耐受的最大工作压力相应降低5%

耐受环境温度范围：RC软管（橡胶包覆）最高耐受温度为121?C，PB编织软管为90?C。

爆破压力：最小爆破压力是最大工作压力的4倍

- 耐真空性能：
  橡胶包覆不锈钢编织软管：介质温度在130°C以下都能在完全真空状态下使用
  聚丙烯编织软管：100°C以下可完全真空下使用
- 流速：
  流速是螺旋软管的2倍以上，有特定流速要求，请联系AFLEX咨询
- 气密性：
  Corroline软管的气密性比其他品牌你同类产品要好很多（漏气量是其他品牌的1/3），这主要得益于其厚实的内壁。
- Rolling U 弯折寿命：
  Corroline软管的弯曲寿命是普通PTFE内衬软管的100倍还多（测试对象为橡胶包覆软管）
- 柔韧性：
  Corroline软管较普通PTFE内衬软管更容易弯曲，更柔软。
- 耐纠结特性：
  此系列特氟龙软管比其他品牌的平滑PTFE内衬软管耐纠结性能有大幅度提高。
- 防火性能：
  橡胶包覆Corroline特氟龙软管符合BS5173 103.13 6.2-6.3的防火要求，如果客户需要，总成的防火性能可以进一步提高。

Aflex自1973年就开始生产PTFE软管，这之后一直引领流体输送用PTFE软管最新的设计理念与技术创新，Corroline系列软管是我们最新研发、拓展的特氟龙软管。

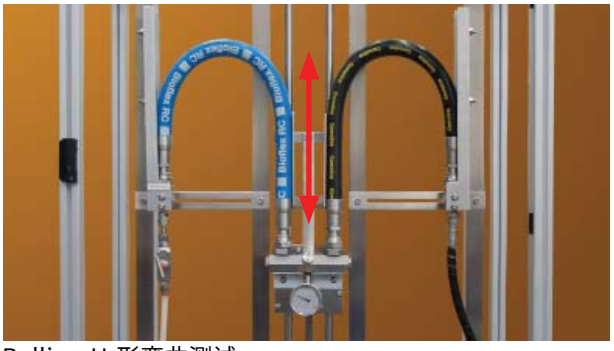
Corroline软管

Corroline系列软管被设计成独特的平滑内壁，并且拥有极佳的耐扭结性与超高耐机械挤压特性。Corroline非常适合用于化工厂，如果客户对特氟龙软管内壁要求平滑、易于清洁，而且又要求软管强度高、寿命长，此款软管非常适合。

Technically trained Aflex Hose sales staff are available to respond quickly and effectively to every kind of enquiry, and to advise the optimum hose solution for any application.

其他品牌类似产品

Aflex品牌的软管应用范围广，针对特定流体输送应用我们都有相应的PTFE软管想对应。除此系列软管外，你还可以访问我们的网站浏览关于Corroflon、Bioflex、Pharmaline和Pharmalex系列软管。



Rolling U 形弯曲测试

Rolling U 形弯曲测试是我们对所有软管进行的众多测试项目的一项，用来证明其应用的独特性。

Rolling U 形弯曲测试用于测试软管的弯曲寿命，Corroline软管经检测后被确认其弯曲寿命至少是同类型其他品牌软管的100倍。

TOTAL MANUFACTURE

The primary reason for the success of the Aflex Hose range of products is that Aflex is the only PTFE hose company in the world to carry out all the hose design and manufacturing operations in house, from raw materials to finished products, at Aflex Hose plants in Yorkshire (UK) and Pennsylvania (USA).

- PTFE powder is extruded into tube and convoluted.
- Stainless steel wire is wound and braided onto the tube.
- Rubber extruders are used to apply external covers.
- End fittings are machined from bar stock on state of the art CNC lathes.
- And, finally, the hoses are assembled to individual customer requirements.

Because Aflex Hose perform all these operations in house, Aflex is able to achieve unbeatable levels of build quality, design excellence and economy of scale, which are unmatched by our competitors.

HOW TO ORDER CORROLINE HOSE ASSEMBLIES

CORROLINE HOSE ASSEMBLIES

Corroline hose is custom built into hose assemblies after the hose size and grade, length and end fittings have been selected.

The specification and information contained in this brochure can be used to make these selections, but if there are any doubts concerning the hose usage limitations or performance capabilities, customers should request expert advice from Aflex Hose.

SELECTING THE HOSE GRADE

There are two types of PTFE hose liner tube available, natural GP grade and antistatic (black) AS grade, fully described on page 10

There are 3 types of cover available, as described on Page 11:

- Stainless Steel Wire Braid (SS Grade)
- Stainless Steel Wire and extruded Rubber Cover (RC Grade)
- Polypropylene Braid (PB Grade)

There are 3 options for further protection of the hose against externally applied mechanical damage, fully described on page 12:

- Double Rubber Cover end protection cuffs (DRC)
- Safegard HDPE spiral-wrap for abrasion protection (SG)
- Helically wound, heavy guage SS wire outer Protection Coil (PC)

SELECTING THE HOSE ASSEMBLY LENGTH

The lengths of Corroline hose assemblies are as specified by the customer and the length is measured from the sealing face at one end fitting to the same at the other end of the hose.

Length tolerances are normally +5% -0%.
Maximum lengths are given under Specifications on page 6
Minimum lengths can be calculated from the configuration data on pages 27 - 29.

SELECTING THE END FITTINGS

The range of standard end fittings and materials are given on pages 13 - 24

Flange fittings, Cam and Groove fittings and DIN 11851 Female fittings are available with or without integral PTFE lined and flared ends.

All other fittings are non-lined only.

STAINLESS STEEL END FITTING MATERIALS

Non-Lined Spigots - are all made from Grade 316L SS
PTFE Lined Spigots - are all made from Grade 316L or Grade 316C SS
Cam and Groove Female Fittings - are made from Grade 316C SS (Body) and 316L SS (Spigot)
Swivelling Nuts and Flanges - are all made from Grade 304 SS
Ferrules - most ferrules are made from Grade 304 SS, except some which are made from Grade 316L SS. Consult Aflex Hose if necessary.

The equivalent specification for the different Grades of Stainless Steel are listed below:

Specification Equivalents List

Grade	BS - British Standard	AISI - American Standard or C = Casting Grade	EN - European Norm
316L SS	BS 316 S11	AISI 316 L	EN 1.4404
316C SS	BS 316 C16	CF8M	EN 1.4408
304 SS	BS 304 S15	AISI 304	EN 1.4301

To special order, end fitting components can be made in non-standard grades of SS such as 1.4571, 1.4435, or other materials such as Hastelloy or Monel

HOW TO ORDER

The quantity, hose size, grade, length and fittings must be specified in full.

EITHER by a full, written description. The hose grade can be specified by the code initials e.g.. "Corroline AS, SS, SG" defines an antistatic PTFE lined hose with an SS wire braid which includes an outer Safegard sleeve.
The quantity, length and fittings can then be written in - e.g. "4 off x 1" bore Corroline AS, SS, SG hose x 3.00 metres long. Both ends non-lined ANSI 150# S/S Flanges".

OR by Part Numbers, as defined on page 9 - e.g. 4 off Part No. 16-CLNAS-SS-SG-3.00m-12-12
Any special requirements relating to the hose construction, or information required on Tags, or Certificates, or special testing requirements, must be specified in full on the enquiry or purchase order.

CONDITIONS OF SALE

Corroline hose and hose assemblies are only supplied on the basis that the customer has read and accepted the Conditions of Sale as given on page 30.

PART NUMBERS FOR CORROLINE HOSE ASSEMBLIES

Corroline Hose Assemblies are defined by an individual Part Number made up of (7) entries as follows:

(1)

Hose Size	Size Part No.
1/2"	08
3/4"	12
1"	16
1 1/4"	20
1 1/2"	24
2"	32

(2)

Hose Type	Type Part No.
Corroline GP (Natural PTFE Liner)	CLN
Corroline AS (Antistatic PTFE Liner)	CLNAS

(3)

Braid & Cover	Part No.
Stainless Steel Braid	SS
Rubber Cover	RC
Polypropylene Braid	PB

(4)

External Protection	Type Part No.
Double Rubber Cover	DRC
Safegard HDPE Sleeve	SG
S/S Wire Protection Coil	PC

(5)

Length
The overall hose length between the sealing faces at each end is given as the Length Part No, either in decimal Metres followed by "m" or Inches followed by "in".

(6 & 7)

Assembled End Fitting Description *All Components in Stainless Steel	End Fitting Part No.
JIC Female	02
Fixed Male Pipe, NPT Thread	03
Fixed Female Pipe, NPT Thread	06
JIC-to-NPT Male Union	08
JIC-to-Female Male Union	08F
Straight Sanitary Tri Clamp, 50.5mm, 1.984" Diameter 22mm, 0.870" Exit Diameter (Standard) 34.9mm, 1.370" Exit Diameter (Step-Up)	 10 10/S
Straight Mini Sanitary, 0.984" Diameter 0.370" Exit Diameter (Standard) 0.620" Exit Diameter (Step-Up)	 11 11/S
*ANSI 150# Swivelling Flange, Non-Lined	12
*ANSI 150# Swivelling Flange, PTFE Lined	12L
Cam and Groove, Locking Arm Swivelling Female, Non-Lined	16
Cam and Groove Locking Arm Swivelling Female PTFE Lined	16L
Cam and Groove Male, Non-Lined	17
Cam & Groove Male, PTFE Lined	17L
DIN11851 Female, Non-Lined	23
DIN11851 Female, PTFE Lined	23L

*For flange only, Carbon Steel Zinc Plated, add "/ZP" or Epoxy coated add "/EC"

Notes: ELBOWS - Elbow Fittings for all types are indicated by adding "/90˚" for 90˚ elbows, Non-Lined or "/90˚ L" for 90˚ elbows, PTFE Lined.

Example: a 3/4" bore Corroline Hose Assembly with an Antistatic PTFE Liner, SS Braid and Rubber Cover and an outer Safegard sleeve.

End (1) - a 3/4" ANSI 150# Swivel Flange, PTFE Lined

End (2) - a Cam and Groove Swivelling Female, PTFE Lined

Length - 2.35 metres

Part No: 12-CLNAS-RC-SG-2.35m-12L-16L

(1) (2) (3) (4) (5) (6) (7)

GP-一般用途PTFE

目的：

Corroline GP（一般用途）软管一般用于对静电不作要求的应用场合，输送不会产生静电荷的流体或气体。

材质与相关认证：

Corroline GP软管完全由聚四氟乙烯（PTFE）生产，材质符合的标准有

FDA 21 CFR 177.1550

螺旋强化钢丝材质是高强度304L不锈钢

GP与AS软管符合的标准：

所批准与符合的标准、认证列表请参考第27页，这两个类型的系列软管依照BPSA规范通过其析出物检测试验，结果符合相关标准。

Aflex可以提供相关的测试报告。

AS-抗静电PTFE内衬

目的：

Bioflex AS（抗静电）软管主要设计用于对静电释放存在危险的应用场合，软管内的介质在通过软管的过程中会产生静电荷，静电荷的积聚很容易对外放电引发危险。特别是对某些电导率小于10-8S/M货104PS/M的介质，诸如燃油、有机溶剂、氟利昂、注射用水（超纯水）和某些无极性有机物，在高速通过软管的过程中很容易产生静电荷。

所有双极性或多级性介质和不相容介质（比如含有粉尘的空气、含有水珠的蒸汽、普通气体或油、胶状流体）都容易产生静电，用于输送这些介质时需要使用AS抗静电软管。

如果还有疑问，请与我司联系。

设计要求与标准：

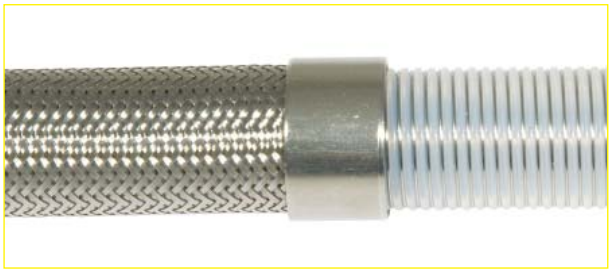
Bioflex AS抗静电PTFE内衬软管是由符合FDA 21 CFR 177.1550标准的PTFE材质生产出来的，软管中添加的2.5%的“高纯度”炭黑材料符合FDA 21 CFR 178.3297的标准。这些炭黑完全被PTFE分子包裹，一般情况下（无摩擦）不会剥离出来污染所输送的介质，这在进行析出物检测后已经被确认证实。

抗静电软管总成

一般情况下，如果应用中需要抗静电（AS）处理，软管和软管总成就需要进行测试，软管需要符合EN ISO 8031：2009的标准，达到此项标准附录A的抗静电要求。此标准要求针对软管内衬层和外覆层，金属接头与软管任意两个电极之间的电阻都必须介于103-108 ohms，对于满足此标准的总成，可以依据EN 1SO 8031：2009附录A的规定在总成上标注“Ω”标示。

注意：在应用中，至少有个接头需要接地，来消除使用过程中产生的静电荷。

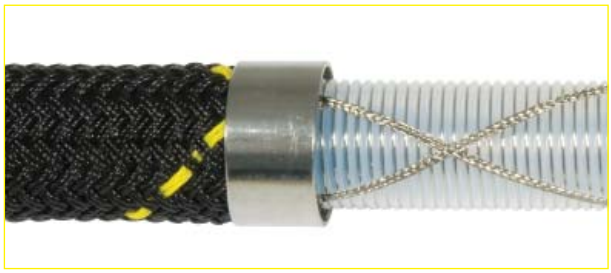
SS-不锈钢编织



目的：

不锈钢编织系列此类特氟龙软管可耐受高温高压流体处理应用，高强度AISI 304L不锈钢编织给软管更好的保护，也使得软管更耐压。

PB-聚丙烯编织



聚丙烯编织软管比起不锈钢编织特氟龙软管要轻便，适用于经常移动和手动操作的场合，不过要求工作温度在-30 ° C至100 ° C之间。聚丙烯编织质量轻，而且即使编织层有破裂也不会伤到操作员的手，更安全。另外，聚丙烯编织耐 “ 氯化物腐蚀 ”，有更好的化学抗性。

PB编织特氟龙管，为了能满足 “ EC ” 电连续性需要在总成两端的接头间链接两根蒙乃尔合金线（内衬与编织层之间），这两根合金线在扣压总成时，要折叠扣压在套筒底下，来确保总成的导电性。

注意：PB编织如果长时间暴露在阳光下，紫外线会导致PB材料的降解。

RC-橡胶包覆

目的：

橡胶包覆Corroline软管是此系列软管的常规产品，应用范围广泛。黑色抗静电EPDM橡胶通过挤压包覆在不锈钢编织层上，有效的保护了编织层，使得此款特氟龙软管耐磨性和强度大幅度提高。

橡胶层拥有广外的外表，易于清洗擦拭。

软管表面有一条黄色字体条带 “ CORROLINE ”，该字的颜色和内容都可根据需要更改。

RC系列软管总成符合BS5173 10313 6.2-6.3的 “ 防火 ” 规范。如果总成需要 “ 耐火灼烧 ” 我们可以在总成两末端增加一个防火保护橡胶层（DRC-300，详见12页）

特别提示：

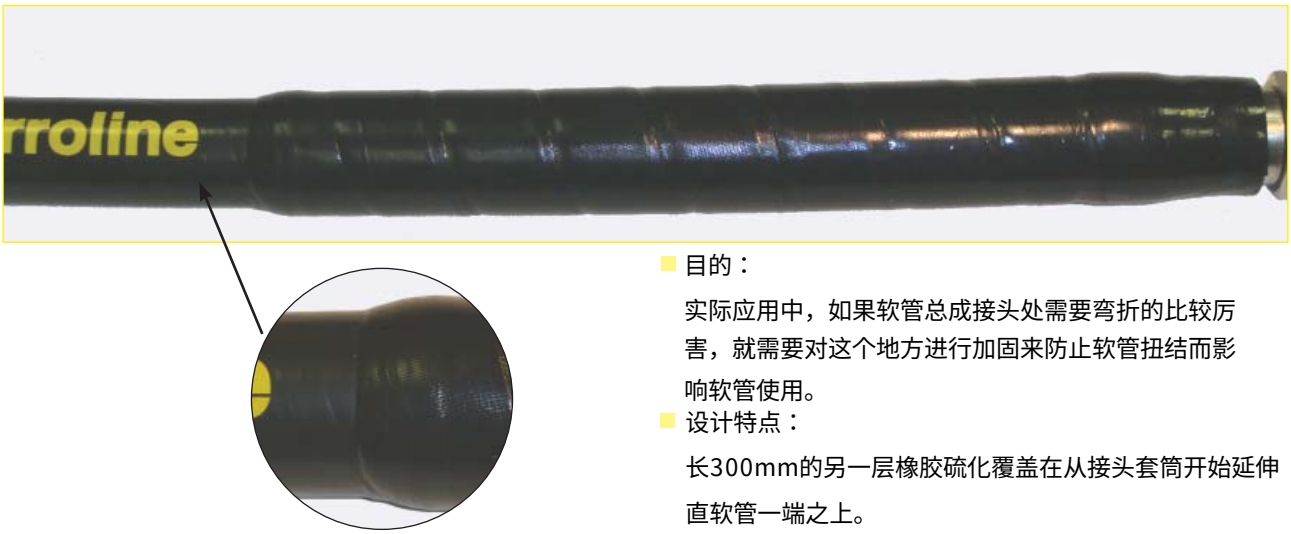
电连续（也叫 “ 电保持 ”）

电连续要求软管总成的金属接头之间要保证电的连续性或者说可导电性，这对于GP和AS软管都是可以。

“ 电连续 ” 这个要求在德国BRG132规范和EN ISO 8031：2009 A中有相应的规定，比如对于后者EN ISO 8031：2009进行检测就要要求两个接头之间的电阻要低于102OHMS，符合M标示的软管总成可以依照EN ISO 8031：2009 A 规范来应用。

Corroline软管总成电阻都低于20 OHMS，符合电连续

DOUBLE RUBBER COVER END PROTECTION - DRC 300



- 目的：

  实际应用中，如果软管总成接头处需要弯折的比较厉害，就需要对这个地方进行加固来防止软管扭结而影响软管使用。

- 设计特点：

  长300mm的另一层橡胶硫化覆盖在从接头套筒开始延伸直软管一端之上。

- 此方法可以直接在不锈钢编织软管上实施（RC-300），也可以对外包橡胶的软管进行操作，但是不能用于PB编织软管。

HDPE 螺旋缠绕保护套 - SG

- 目的：

  此设计主要是为了增强软管外壁的耐磨性，抵御外部机械损伤

- 设计特点：

  一根黑色、质轻的HDPE(高密度聚乙烯)条带螺旋包裹在软管的外层之上，扣压总成时条带要被扣压在套筒之下。

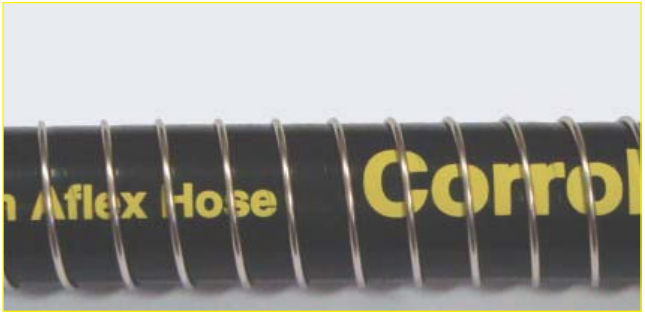
- 对Corroline系列软管都可应用

- 局限性：

  适用温度范围：-40?C 至100?C

  软管总成最短长度是普通总成的最短长度的两倍，最长不超过20米。

STAINLESS STEEL WIRE PROTECTION COIL - PC



- 目的：

  为了保护软管不受外部过度磨损和机械碾压，可以使用此钢丝保护装置，而且此装置较SG保护套更有优势，它不受外部温度的限制。

- 设计特点：

  一根粗不锈钢丝螺旋缠绕在橡胶层上，并且两端与总成接头焊接在一起

  Corroline系列软管都可以应用此结构

- 总成最长不得超过20米

CORROLINE NON-LINED SWIVEL FLANGE FITTINGS

Flange Specification

- ANSI B16.5 (also ASME B16.5) Class 150# and 300#
- *DIN PN10/PN16/PN40
- JIS 10K
- Other Pressure Ratings and Flange Specifications are also available.

*DIN PN10, PN16 and PN40 Flanges all have the same dimensions, and so are fully interchangeable.

Pressure Ratings

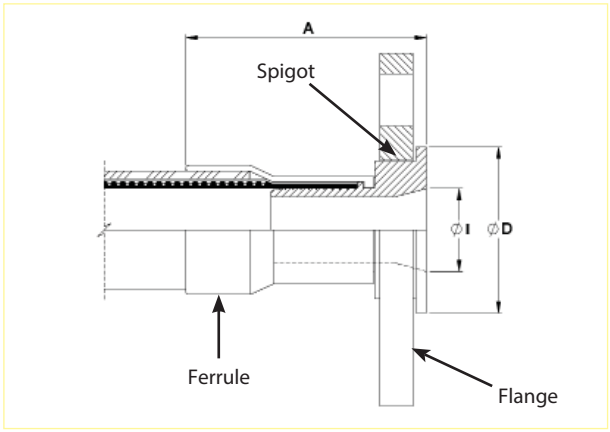
- ANSI 150# = 230 psi (16 Bar), ANSI 300# = 460 psi (32 Bar).
- DIN PN10 = 145 psi (10 Bar), DIN PN16 = 230 psi (16 Bar). DIN PN40 = 580psi (40 Bar)

End Fitting Materials

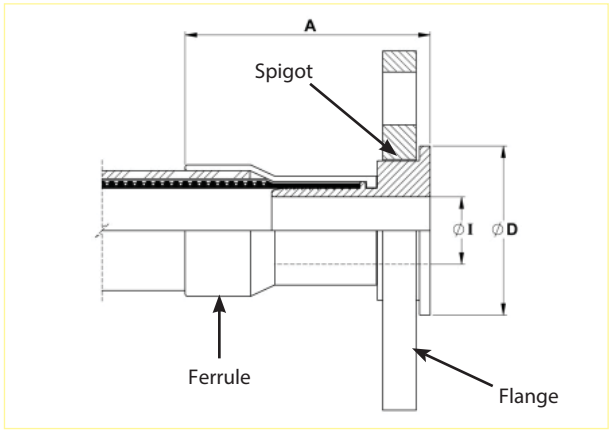
- Flanges in Grade 304 SS
- Flange Retainers in Grade 316L SS
- Ferrules, most in Grade 304 SS, some sizes in Grade 316L SS

Alternative Options for Flange Component only:

- Zinc Plated Carbon Steel
- Blue Epoxy Coated Carbon Steel



The above drawing relates to sizes 1", 1 1/2", 2"



The above drawing relates to all other sizes

Nominal Hose Size		*Fitting Length A (Corroline RC) ASA150		Flared Diameter D ASA150		Fitting Inside Diameter I ASA150		Weight of Fitting	
in	mm	in	mm	in	mm	in	mm	Kg	Lbs
1/2	13	2.80	71	1.38	35.00	0.38	9.53	0.77	1.69
3/4	20	3.15	80	1.69	42.90	0.63	15.88	1.061	2.35
1	25	3.27	83	2.00	50.80	0.79	20.24	1.361	3.00
1 1/2	40	4.09	104	2.87	73.00	1.25	31.75	2.49	5.50
2	50	4.17	106	3.62	92.00	1.75	44.45	3.57	7.87

Nominal Hose Size		*Fitting Length A (Corroline RC) PN10/16		Flared Diameter D PN10/16		Fitting Inside Diameter I PN10/16		Weight of Fitting	
in	mm	in	mm	in	mm	in	mm	Kg	Lbs
1/2	13	2.87	73	1.77	45.00	0.38	9.53	0.77	1.69
3/4	20	3.27	83	2.28	58.00	0.63	15.88	1.061	2.35
1	25	3.58	91	2.68	68.00	1.12	28.50	1.361	3.00
1 1/2	40	4.53	115	3.49	88.00	1.70	43.10	2.49	5.50
2	50	4.49	114	4.02	102.00	2.15	54.50	3.57	7.87

*Fitting Lengths listed are for RC Grade Hose end fittings. SS and PB Grades end fittings are shorter in length.

CORROLINE INTEGRAL PTFE LINED FLANGE FITTINGS and "STEP-UP" DESIGN

Flange Specifications

- ANSI B16.5 (also ASME B16.5) Class 150# and 300#
- *DIN PN10/PN16 and PN40
- JIS 10K
- Other Pressure Ratings and Flange Specifications are also available.

*DIN PN10, PN16 and PN40 Flanges all have the same dimensions, and so are fully interchangeable.

Pressure Ratings For Flanges

- ANSI 150# = 230 psi (16 Bar), ANSI 300# = 460 psi (32 Bar)
- DIN PN10 = 145 psi (10 Bar), DIN PN16 = 230 psi (16 Bar)

End Fitting Materials

- Flanges in Grade 304 SS
- Flange Retainers in Grade 316L SS
- Ferrules, most in Grade 304 SS, some sizes in Grade 316L SS

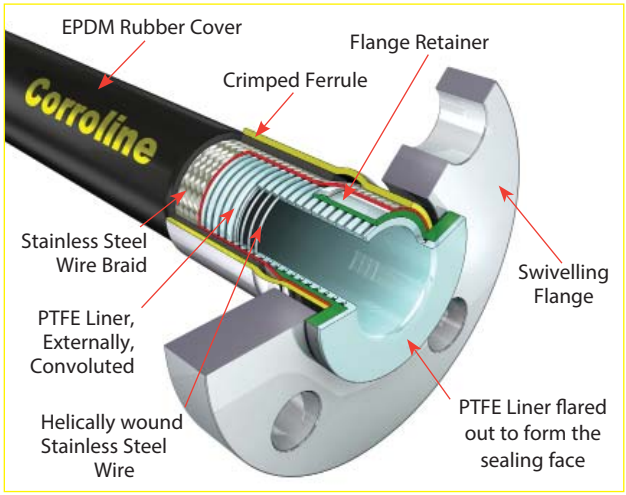
Alternative options for Flange component only:

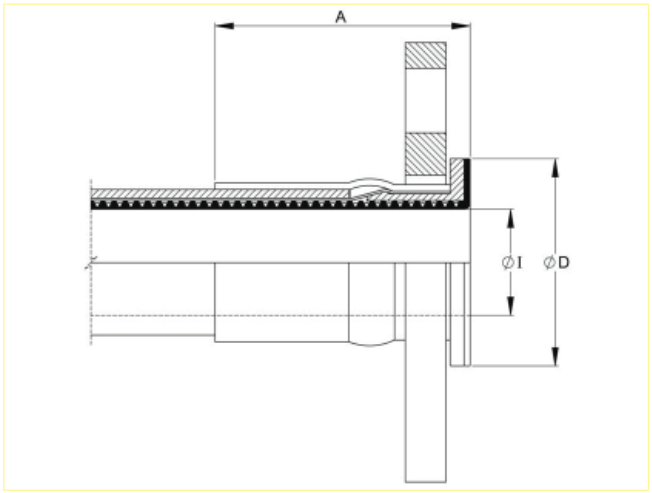
- Zinc Plated Carbon Steel
- Blue Epoxy Coated Carbon Steel.

90˚ Elbow Flange Fittings

90˚ Elbow Integral PTFE lined Flange Fittings are available for sizes 1", 1 1/2" and 2" - Consult Aflex Hose for details

INTEGRAL PTFE LINED SWIVEL FLANGE FITTINGS





Nominal Hose Size		*Fitting Length A				Flared Diameter D				Fitting Inside Dia. and Hose Bore I		Recommended Bolt Tightening Torques		Weight/Fitting	
		ASA		PN		ANSI 150#		**DIN PN10/16/40							
in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	ft.lbs	mtr. kgs	Kgs	Lbs
1/2	13	2.24	57	2.24	57	1.25	32	1.25	32	1/2	12.7	8	1.10	0.54	1.20
3/4	20	1.89	48	1.93	49	1.690	43	1.97	50	3/4	19.0	8	1.10	0.88	1.90
1	25	2.40	61	2.48	63	2.00	50	2.50	63	1	25.4	10	1.40	0.96	2.10
1 1/4	32	2.24	57	2.32	59	2.500	63	3.00	78	1 1/4	32.0	12	1.70	1.36	2.99
1 1/2	40	2.36	60	2.44	62	2.875	73	3.47	88	1 1/2	38.0	15	2.10	1.75	3.80
2	50	2.80	71	2.83	72	3.625	92	4.00	102	2	50.8	25	3.50	2.70	5.95

*Fitting Lengths listed are for RC Grade Hose end fittings. SS and PB Grades end fittings are shorter in length.

**The listed Flare Diameters are not all full size, due to limitations on PTFE flare diameters.

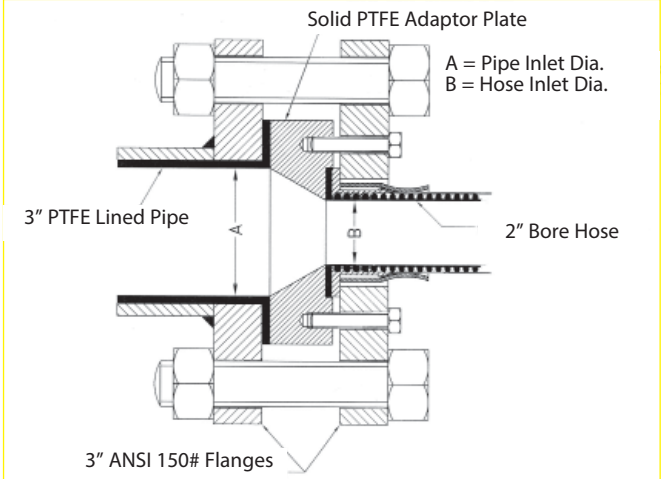
"STEP-UP" PTFE LINED FLANGE FITTING DESIGN FOR CORROLINE HOSE

Because Corroline Hose has better flow rates than some larger bore sizes of Convoluted PTFE hose, it represents a superior alternative when fitted with the larger size flanges in some applications.

It is, however, necessary to also "Step-Up" the PTFE-lined bore, to ensure a diameter match with the mating connector.

This is best achieved using a solid PTFE Adaptor Plate, as shown in the drawing.

Example: a 2" hose to 3" ANSI 150# PTFE Lined Flange Joint



CORROLINE FEMALE CAM & GROOVE FITTINGS PTFE LINED and NON-LINED

End Fitting Specification

- Generally in accordance with A-A-59326 (replaces MIL-C-27487) and EN14420-7:2004 (replaces DIN 2828), and all are fully interchangeable.

Temperature and Pressure Ratings

- All sizes up to 230 psi (16 Bar)
- Up to 212˚F (100˚C) Buna N Gasket or 400˚F (204˚C) FEP Gasket.

End Fitting Materials

- Spigot in Grade 316L SS
- Body in Grade 316C SS
- Ferrules, most in Grade 304 SS, some sizes in Grade 316L SS
- Standard Gasket is Buna N (Nitrile) Rubber.
- FEP encapsulated Silicone Rubber Gaskets also available.

90˚ Elbow Cam & Groove Fittings

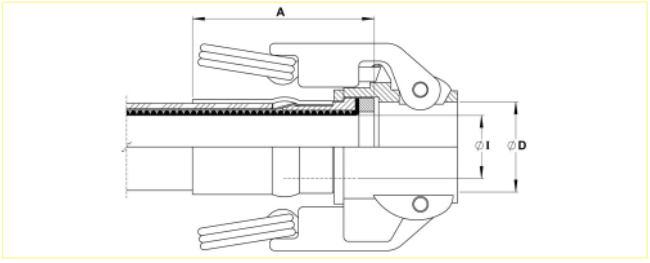
90˚ Elbow Integral PTFE lined Cam & Groove Fittings are available for sizes 1", 1½" and 2". Consult Aflex Hose for details.

Notes: For Integral PTFE Lined Fittings Only

FEP Gaskets require higher clamping forces to flatten the Seal and make the joint. This is made easier by "pre-setting" these gaskets by clamping Polypropylene Cam Male Inserts to the assembled fittings, which must then be kept in place during storage, until use.

Any Customer's Own "Special" Gaskets must be pre-supplied to Aflex for special assembly and testing of hose assemblies, to ensure suitability.

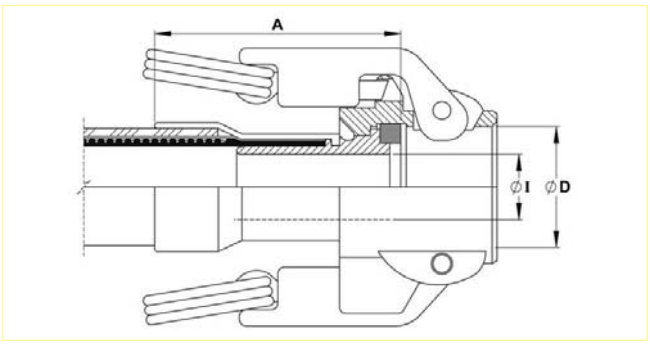
SWIVELLING, LOCKING ARM FEMALE CAM AND GROOVE FITTING - INTEGRAL PTFE LINED



Nominal Hose Size		*Fitting Length A		Cam Sleeve Inside Diameter D		Fitting Inside Diameter I		Weight/Fitting	
in	mm	in	mm	in	mm	in	mm	Kgs	Lbs
3/4	20	2.155	54.75	1.260	32.0	0.77	19.8	0.54	1.19
1	25	2.716	69.00	1.456	37.0	1.03	26.1	0.71	1.56
1 1/2	40	2.612	66.35	2.126	54.0	1.53	38.8	1.23	2.71
2	50	2.966	75.35	2.520	64.0	2.03	51.5	1.52	3.35

*Fitting Lengths listed are for RC Grade Hose end fittings. SS and PB Grades end fittings are shorter in length.

SWIVELLING, LOCKING ARM FEMALE CAM AND GROOVE FITTINGS - NON-LINED



Nominal Hose Size		*Fitting Length A		Cam Sleeve Inside Diameter D		Fitting Inside Diameter I		Weight/Fitting	
in	mm	in	mm	in	mm	in	mm	Kgs	Lbs
3/4	20	3.22	82.0	1.260	32	0.625	15.88	0.42	0.93
1	25	3.39	86.5	1.456	37	0.797	20.24	0.59	1.30
*1 1/2	40	3.97	101.0	2.126	54	1.25	31.75	1.15	2.50
*2	50	4.09	104.0	2.520	64	1.75	44.45	1.40	3.08

*Fitting Lengths listed are for RC Grade Hose end fittings. SS and PB Grades end fittings are shorter in length.

CORROLINE MALE CAM & GROOVE FITTINGS, PTFE LINED & NON-LINED and LINED FLANGE ADAPTORS

PTFE LINED OR NON-LINED MALE CAM AND GROOVE FITTINGS

End Fitting Specification

- Generally in accordance with A-A-59326 (replaces MIL-C-27487) and EN14420-7:2004 (replaces DIN 2828), and all are fully interchangeable.

Temperature and Pressure Ratings

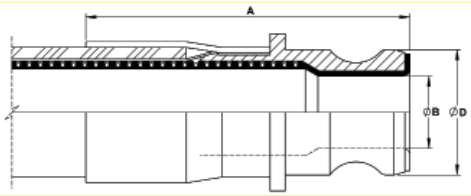
- Temperature determined by the type of gasket in the Female connecting component.
- Pressures up to 230 psi (16 Bar)

End Fitting Materials

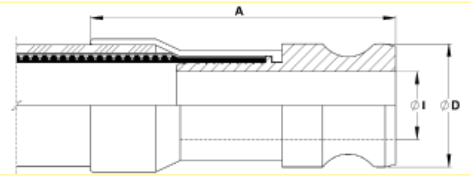
- Fittings in Grade 316L SS
- Ferrules, most in Grade 304 SS, some sizes in Grade 316L SS
- Adaptor Flange Only in Grade 304 SS

NON-LINED CAM & GROOVE MALE

INTEGRAL PTFE LINED CAM & GROOVE MALE FITTING



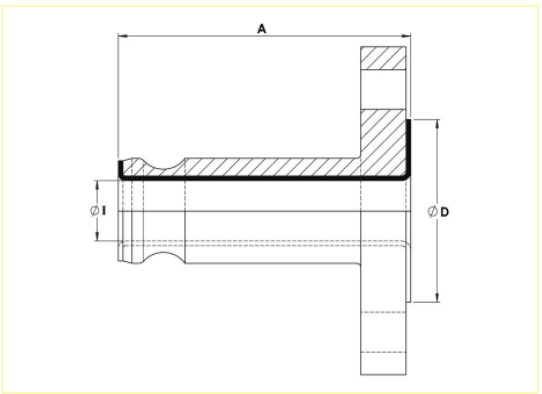
NON-LINED CAM & GROOVE MALE FITTING



Nominal Hose Size		ØD		*Fitting Length A		Non-Lined Inside Diameter I		Lined Inside Diameter B		Weight/Fitting	
in	mm	in	mm	in	mm	in	mm	in	mm	Kgs	Lbs
3/4	20	1.260	32.0	3.50	89.0	0.625	15.88	0.72	18.2	0.35	0.77
1	25	1.456	37.0	3.97	101.0	0.797	20.24	0.77	19.6	0.45	0.99
*1 1/2	40	2.106	53.5	4.88	124.0	1.25	31.75	1.26	32.1	0.84	1.84
*2	50	2.480	63.0	5.47	139.0	1.75	44.45	1.59	40.5	1.10	2.42

*Fitting Lengths listed are for RC Grade Hose end fittings. SS and PB Grades end fittings are shorter in length.

PTFE LINED MALE CAM and GROOVE X FLANGE ADAPTORS



Cam Action Adaptor Size		Flange Size & Specification	ØD		A		I		Weight/ Fitting	
in	mm		in	mm	in	mm	in	mm	Kgs	Lbs
1	25	1" ANSI 1507	2.00	50	4 1/8	105	0.84	21	1.246	2.75
1	25	DN25/PN16	2.58	64	4 1/8	105	0.84	21	1.538	3.39
1 1/2	40	1 1/2" ANSI 1507	2.87	73	4 3/8	118	1.35	34	2.228	4.92
1 1/2	40	DN40/PN16	3.47	88	4 3/8	118	1.35	34	2.753	6.07
2	50	2" ANSI 1507	3.63	92	4 3/8	118	1.69	43	3.359	7.40
2	50	DN50/PN16	4.00	102	4 3/8	118	1.69	43	3.714	8.19

Note: Other Flange Specifications and Pressure Ratings are also available. Non-Lined adaptors and Female Cam and Groove X Flange Adaptors are also available, to special order.

CORROLINE SANITARY & MINI SANITARY TRICLAMP (TRICLOVER) FITTINGS

End Fitting Specification

- Generally in accordance with BS4825:Pt 3 and ASME BPE-a-2007, or DIN 32676 (The DN sizes)

Temperature and Pressure Ratings

For Standard Clamp and Standard (EPDM) Gasket

- Pressures up to 230 psi (16 Bar)
- Temperatures up to 250˚F (120˚C)
- Higher Pressures and Temperatures with Special Clamps and Gaskets.

Hygienic Fitting Design

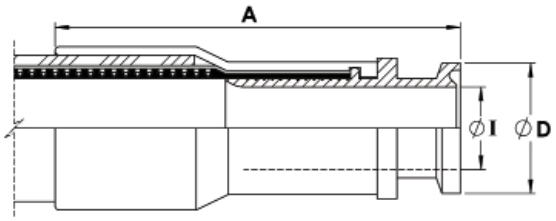
The leading edge of the fitting tail is internally chamferred to ensure that no fluid entrapment can occur.

End Fitting Materials

- Fittings in AISI 316L = EN 1.4404 = BS 316 S11. Internal Bores all Electropolished to <15µin Ra (<0.375µ mtr).
- Ferrules, most in Grade 304 SS, some sizes in Grade 316L SS.

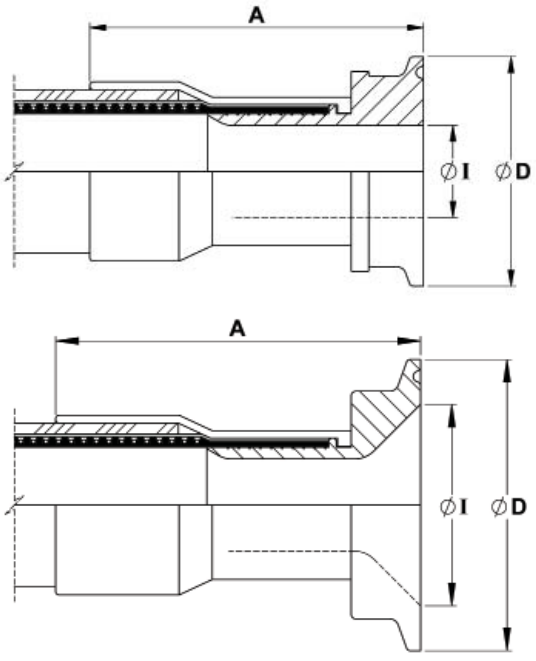
Outlet Diameters (Inch pipe sizes only)

The outlet diameters as listed are in accordance with BS4825. The ASME specification, however, requires these diameters to be 0.005" (0.125mm) less in each case. An Outlet Diameter tolerance of +0.000 -0.005" has therefore been applied, so that the same fitting satisfies the requirements of both specification.



MINI-SANITARY TRICLAMP (TRICLOVER) FITTINGS

Nominal Hose Size	Nominal Pipe Size	*Fitting Length A		Flange Dia. D		*Outlet Dia. I		Weight/ Fitting	
		in	mm	in	mm	in	mm	Kgs	Lbs
1/2"	1/2" & DN10	2.8	72	0.984	25.0	3/8	9.5	0.05	0.11
1/2"	3/4"	2.8	72	0.984	25.0	5/8	16.0	0.04	0.09
3/4"	3/4"	3.1	79	0.984	25.0	5/8	16.0	0.05	0.11

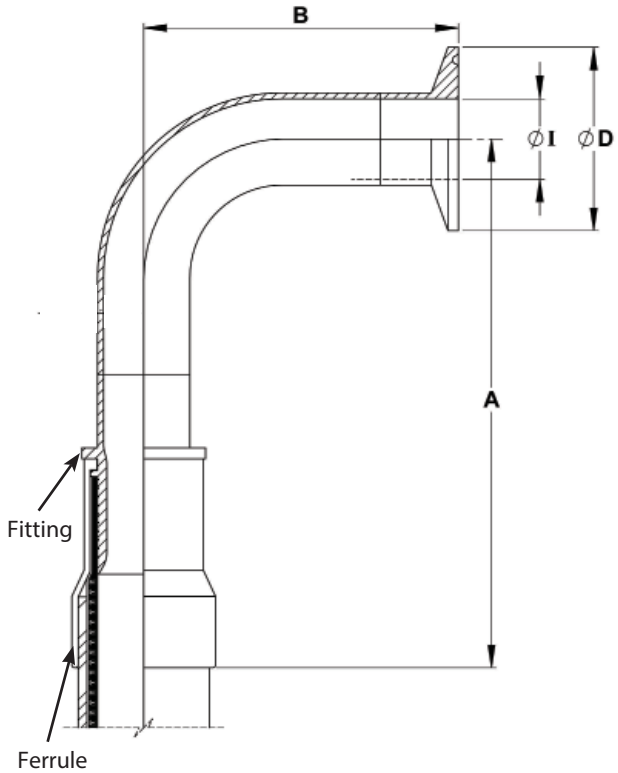


SANITARY TRICLAMPS (TRICLOVER) FITTINGS

Nominal Hose Size	Nominal Pipe Size	*Fitting Length A		Flange Dia. D		*Outlet Dia. I		Weight/ Fitting	
		in	mm	in	mm	in	mm	Kgs	Lbs
1/2"	1"	2.7	69	1.984	50.5	7/8	22.2	0.13	0.28
3/4"	DN15	3.0	77	1.156	34.0	5/8	16.0	0.12	0.26
1"	1"	3.2	82	1.984	50.5	7/8	22.2	0.25	0.54
1"	DN25	3.2	82	1.984	50.5	1	26.0	0.24	0.52
1"	1 1/2"	3.2	82	1.984	50.5	1 3/8	34.9	0.22	0.48
1 1/2"	1 1/2"	3.9	98	1.984	50.5	1 3/8	34.9	0.27	0.59
1 1/2"	DN40	3.9	98	1.984	50.5	1 1/2"	38.0	0.25	0.56
2"	2"	4.1	103	2.516	64.0	1 7/8	47.6	0.39	0.86
2	DN50	4.1	103	2.516	64.0	1.975	50.0	0.37	0.82
2"	2 1/2"	4.3	110	3.047	77.5	2 3/8"	60.3	0.42	0.93
2"	DN65	4.3	110	3.047	77.5	2.600	66.0	0.40	0.88
2"	3"	4.3	110	3.579	91.0	2 7/8"	73.0	0.68	1.50
2"	DN80	4.3	110	4.176	106.0	3.191	81.0	1.12	2.47

*Fitting Lengths listed are for RC Grade Hose end fittings. SS and PB Grades end fittings are shorter in length.

CORROLINE 90° ELBOW SANITARY TRICLAMP (TRICLOVER) FITTINGS



End Fitting Specification

- Generally in accordance with BS4825:Pt 3 and ASME BPE-a-2007

End Fitting Materials

- Fittings in Grade AISI 316L = EN 1.4404 = BS 316 S11
- Internal Bore average 15µin Ra, Electropolished if required
- Ferrules, most in Grade 304 SS, some sizes in Grade 316 SS

Temperature and Pressure Ratings

For Standard Clamp and Standard (EPDM) Gasket

- Pressures up to 230 psi (16 Bar)
- Temperatures up to 250˚F (120˚C)
- Higher Pressures and Temperatures with Special Clamps and Gaskets

Outlet Diameters

The outlet diameters as listed are in accordance with BS4825. The ASME specification, however, requires these diameters to be 0.005" (0.125mm) less in each case. An Outlet Diameter tolerance of +0.000 -0.005" has therefore been applied, so that the same fitting satisfies requirements of both specifications.

Nominal Hose Size		Centre Line To Fitting End A		Centre Line to Face B		Flange Diameter D		*Outlet Diameter I		Weight/Fitting	
in	mm	in	mm	in	mm	in	mm	in	mm	Kgs	Lbs
1/2	13	5.78	147	1.60	41.0	0.984	25.0	3/8	9.5	0.13	0.30
3/4	20	6.41	163	1.60	41.0	0.984	25.0	5/8	16.0	0.20	0.45
1	25	6.53	166	2.00	51.0	1.984	50.5	7/8	22.2	0.35	0.77
1 1/2	40	7.99	203	2.75	70.0	1.984	50.5	1 3/8	34.9	0.59	1.30
2	50	9.33	237	3.50	88.9	2.16	64.0	1 7/8	47.6	0.93	2.05

CORROLINE DIN11851 FEMALE FITTINGS
PTFE LINED and NON-LINED

End Fitting Specification

- Generally to German DIN 11851 specifications.

Temperature & Pressure Ratings

- Sizes up to 1 1/4" MWP = 40 Bar (580 psi) up to 130˚C (266˚F)
- Sizes 1 1/2" & 2" MWP = 25 Bar (360 psi) up to 130˚C (266˚F)

Except where the applicable hose pressure/temperature ratings are lower (page 6).

End Fitting Materials

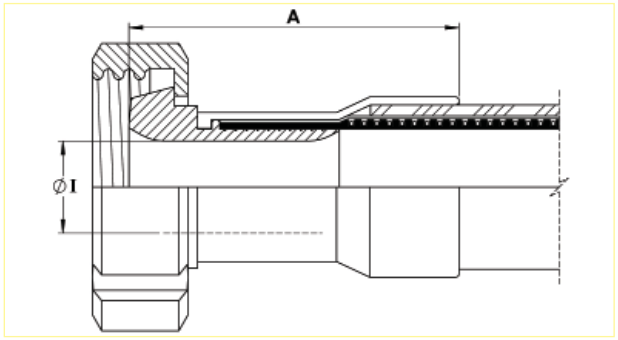
- PTFE Lined Spigots in Grade 316L SS
- Non-Lined Spigots in Grade 1.4571*
- Nuts in Grade 304 SS
- Ferrules, most in Grade 304 SS, some sizes in Grade 316L SS

*1.4571 is a special grade of 316 stainless steel, equivalent to AISI 316Ti

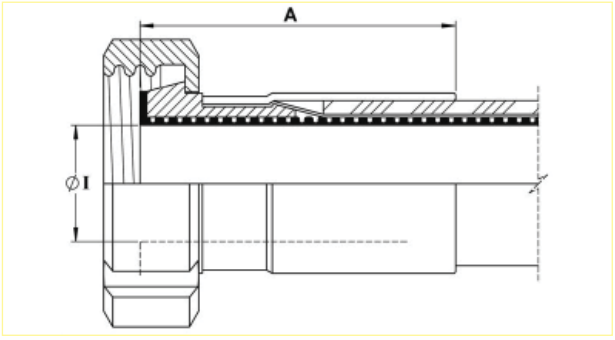
DIN11851 FEMALE FITTING, NON-LINED

Nominal Hose Size = 'I' Dia.		*Fitting Length A		Fitting Inner Diameter I		Fitting Thread Size	Weight/Fitting	
in	mm	in	mm	in	mm		Kgs	Lbs
1/2	15	2.58	65	0.375	9.53	Rd 34 x 1/8"	0.18	0.40
3/4	20	2.99	76	0.625	15.88	Rd 44 x 1/6"	0.24	0.53
1	25	3.19	81	0.797	20.24	Rd 52 x 1/6"	0.41	0.90
1 1/4	32	3.82	97	1.03	26.21	Rd 58 x 1/6"	0.52	1.15
1 1/2	40	3.82	97	1.25	31.75	Rd 65 x 1/6"	0.75	1.65
2	50	3.94	100	1.75	44.45	Rd 78 x 1/6"	1.11	2.45

*Fitting Lengths listed are for RC Grade Hose end fittings. SS and PB Grades end fittings are shorter in length.



DIN11851 FEMALE FITTING, PTFE LINED



Nominal Hose Size = 'I' Dia.		*Fitting Length A		Fitting Inner Diameter I		Fitting Thread Size	Weight/Fitting	
in	mm	in	mm	in	mm		Kgs	Lbs
1/2	15	2.00	51	0.53	13.50	Rd 34 x 1/8"	0.17	0.37
3/4	20	2.17	55	0.78	19.80	Rd 44 x 1/6"	0.23	0.51
1	25	2.76	70	1.03	26.10	Rd 52 x 1/6"	0.40	0.88
1 1/4	32	2.52	64	1.25	31.75	Rd 58 x 1/6"	0.51	1.12
1 1/2	40	2.99	76	1.53	38.80	Rd 65 x 1/6"	0.73	1.60
2	50	3.54	90	2.03	51.50	Rd 78 x 1/6"	1.10	2.42

*Fitting Lengths listed are for RC Grade Hose end fittings. SS and PB Grades end fittings are shorter in length.

CORROLINE 37° JIC FEMALE FITTINGS and NPT MALE and FEMALE UNIONS

End Fitting Specification

- SAE J514 37° Flare JIC Female Fitting
- 37° JIC Male-to-NPT Male/Female Adaptors
- NPT Threads to ANSI/AMSE B1.20.1

Temperature and Pressure Ratings

Same Maximum Working Pressure and Temperature as for the relevant size of Corroline Hose, on page 6

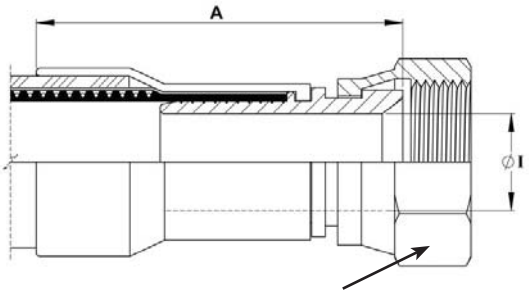
End Fitting Materials

- Spigots in Grade 316
- Nuts in 316L SS
- Ferrules, most in Grade 304 SS, some sizes in Grade 316L SS

Note - Not usable with SAE 45° Flare fittings which have the same thread.

Alternatives - Can be supplied in other materials, such as zinc plated carbon steel, Hastelloy, Monel etc.

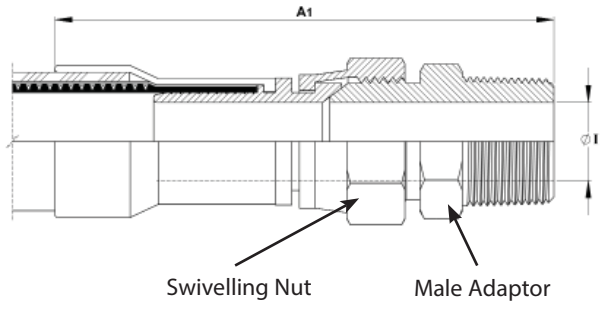
37° JIC FEMALE FITTING



Nominal Hose Size		37° JIC Thread Size	*Fitting Length A		Fitting Inner Diameter I		Weight/Fitting	
in	mm	in	in	mm	in	mm	Kgs	Lbs
1/2	13	3/4 -16	2.76	70	0.38	9.5	0.11	0.24
3/4	20	1 1/16 -12	3.07	78	0.63	15.9	0.15	0.34
1	25	1 5/16 -12	3.23	82	0.80	20.2	0.23	0.52
1 1/2	40	1 7/8 -12	4.00	102	1.25	31.7	0.72	1.58
2	50	2 1/2 -12	4.33	110	1.75	44.4	0.99	2.18

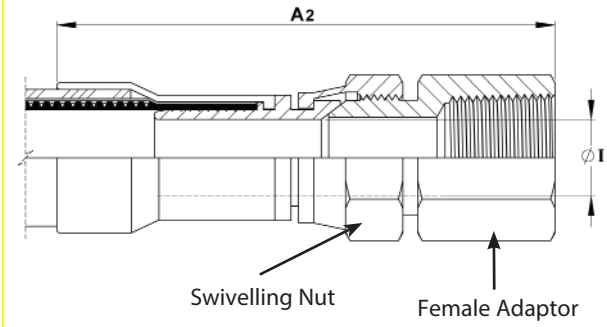
*Fitting Lengths listed are for RC Grade Hose end fittings. SS and PB Grades end fittings are shorter in length.

JIC TO NPT MALE UNION (Including a JIC MALE-TO-NPT MALE ADAPTOR)



Nominal Hose Size		*Male Union Length A1		Weight/Fitting	
in	mm	in	mm	Kgs	Lbs
1/2	13	4.13	105	0.22	0.48
3/4	20	4.92	125	0.33	0.72
1	25	5.43	138	0.52	1.15

JIC TO NPT FEMALE UNION (Including a JIC MALE-TO-NPT FEMALE ADAPTOR)



*Female Union Length A2		Fitting Inner Diameter I		Weight/Fitting	
in	mm	in	mm	Kgs	Lbs
4.25	108	0.38	9.5	0.21	0.47
4.80	122	0.63	15.9	0.33	0.74
5.12	130	0.80	20.2	0.68	1.50

*Fitting Lengths listed are for RC Grade Hose end fittings. SS and PB Grades end fittings are shorter in length.

CORROLINE TUBE ADAPTOR (GROOVED STANDPIPE) FITTINGS

Specifications

- Compatible with existing Industrial Standard Tube Fitting Components.

Temperature and Pressure Ratings

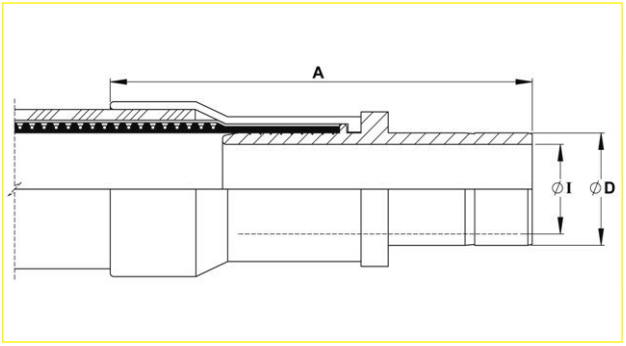
As for the relevant size of hose on Page 6.

End Fitting Materials

- Fitting in Grade 316L SS
- Ferrule (for hose attachment) in Grade 304 or 316L SS

Alternatives -Can be supplied with matching Female Nuts & Ferrules (clamping Ferrules) to suit.

NON-LINED TUBE ADAPTOR (GROOVED STANDPIPE) FITTING



Nominal Hose Size		*Fitting Length A		Diameter D		Fitting Inside Diameter I		Weight/Fitting	
in	mm	in	mm	in	mm	in	mm	Kgs	Lbs
3/4	20	3.10	79.0	3/4	19.05	0.58	14.70	0.18	0.40
1	25	3.58	91.0	1	25.4	0.80	20.32	0.20	0.44

*Fitting Lengths listed are for RC Grade Hose end fittings. SS and PB Grades end fittings are shorter in length.

CORROLINE NPT and BSPT FIXED MALE and NPT FIXED FEMALE FITTINGS

End Fitting Specification

NPT Taper Threads to American National Standard Pipe Taper Thread design to ANSI B2.1

BSPT Threads to British Standard Pipe Taper Thread design to BS21

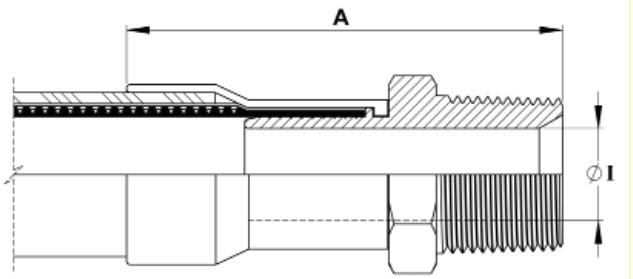
Alternatives - Parallel Threads, Metric Threads and Others.

End Fitting Materials

- Fittings in Grade 316L SS
- Ferrules, most in Grade 304 SS, some sizes in Grade 316L SS

Alternatives - Fittings in Zinc Plated Carbon Steel

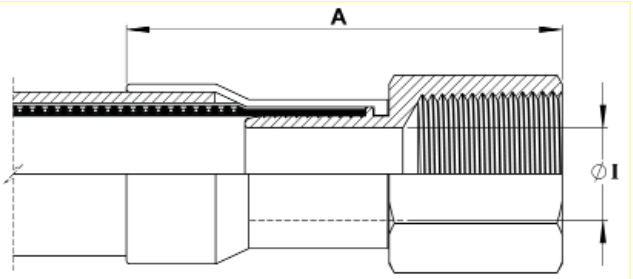
FIXED MALE NPT or BSPT



Nominal Hose Size		NPT or BSPT Thread Size	*Fitting Length A		Fitting Inside Diameter I		Weight/Fitting	
in	mm	in	in	mm	in	mm	Kgs	Lbs
1/2	13	1/2	3.30	84	0.38	9.53	0.10	0.22
3/4	20	3/4	3.74	95	0.63	15.88	0.18	0.40
1	25	1	4.13	105	0.80	20.24	0.29	0.64
1 1/4	32	1 1/4	4.90	124	1.00	26.20	0.45	0.99
1 1/2	40	1 1/2	5.19	132	1.25	31.75	0.60	1.32
2	50	2	5.78	142	1.75	44.45	0.84	1.85

*Fitting Lengths listed are for RC Grade Hose end fittings. SS and PB Grades end fittings are shorter in length.

FIXED FEMALE NPT



Nominal Hose Size		NPT Thread Size	*Fitting Length A		Fitting Inside Diameter I		Weight/Fitting	
in	mm	in	in	mm	in	mm	Kgs	Lbs
1/2	13	1/2	3.42	87	0.38	9.53	0.18	0.40
3/4	20	3/4	3.66	93	0.63	15.88	0.22	0.49
1	25	1	4.13	105	0.80	20.24	0.33	0.73
1 1/2	40	1 1/2	4.80	122	1.25	31.75	0.75	1.65
2	50	2	4.96	126	1.75	44.45	1.06	2.34

*Fitting Lengths listed are for RC Grade Hose end fittings. SS and PB Grades end fittings are shorter in length.

CORROLINE BSP 60° CONE SEAT FEMALE UNIONS and BSP FLAT SEAT LUG NUT FEMALE FITTINGS

End Fitting Specification

BSPP Threads to British Standard Pipe Parallel Thread design to BS21, 60° Cone Seat design, or Flat Seat.

Alternatives - Cone Seat Female Union Fittings can be supplied with a BSPP/BSPT Taper Male Adaptor if required.

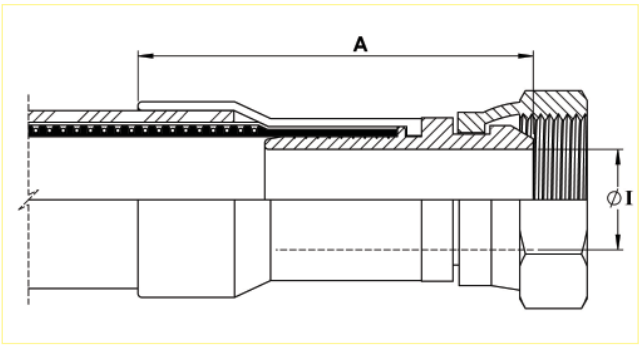
End Fitting Materials

- Spigots in Grade 316L SS
- Nuts in Grade 316L SS
- Ferrules, most in Grade 304 SS, some sizes in Grade 316L SS

Alternatives

- Cone Seat Female Unions can be supplied in Zinc Plated Carbon Steel if required.
- Lug Nuts can be supplied in Gun Metal (Bronze) if required.

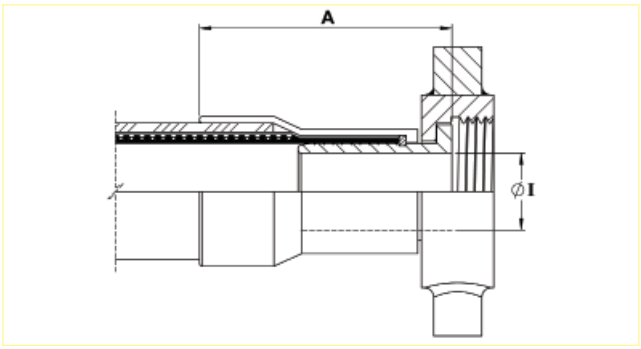
BSP 60° CONE SEAT FEMALE UNION FITTING



Nominal Hose Size		NPT or BSPT Thread Size	*Fitting Length A		Fitting Inside Diameter I		Weight/Fitting	
in	mm	in	in	mm	in	mm	Kgs	Lbs
1/2	13	1/2	3.27	83	0.37	9.35	0.11	0.25
3/4	20	3/4	3.62	92	0.63	15.88	0.15	0.34
1	25	1	3.86	98	0.80	20.24	0.24	0.53
1 1/4	32	1 1/4	4.25	108	1.00	25.4	0.44	0.97
1 1/2	40	1 1/2	4.65	118	1.25	31.75	0.72	1.59
2	50	2	4.80	122	1.75	44.45	0.99	2.19

*Fitting Lengths listed are for RC Grade Hose end fittings. SS and PB Grades end fittings are shorter in length.

BSP FLAT FACE LUG NUT FEMALE FITTING



Nominal Hose Size		BSPP Thread Size	*Fitting Length A		Fitting Bore Diameter I		Weight/Fitting	
in	mm	in	in	mm	in	mm	Kgs	Lbs
1	25	1	3.70	94	0.80	20.24	0.25	0.55
1 1/2	40	1 1/2	3.66	93	1.25	31.75	0.61	1.33
2	50	2	3.70	94	1.75	44.45	0.88	1.95

*Fitting Lengths listed are for RC Grade Hose end fittings. SS and PB Grades end fittings are shorter in length.

FIXED DIP PIPES

Description

Fixed Dip Pipes are fairly rigid, thick wall PTFE tubes, either straight or 90˚ elbowed, which are directly crimped to the end of Corroline hoses. They are designed for insertion into drums, tanks and reaction vessels in order to suction drain (or inject) process fluids transferred through the hose.

Materials

Standard dip pipes are in anti-static (AS) PTFE.

How to order

Specify the size and material of the dip pipe, whether it is straight or 90˚ elbowed. Give the length of the find leg of the dip pipe and the length of the rest of the hose assembly separately.

Maximum Working Pressures

Dip Pipes are normally only tested to 4 Bar Pressure, and are not suitable for use at pressures higher than 3 Bar. They are usable at negative pressure up to full vacuum.

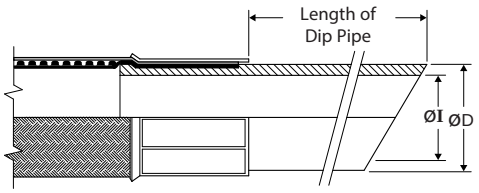
If higher pressure ratings are required, consult Aflex Hose.

Lengths

Dip Pipes are supplied as standard in 1 metre lengths, but can be supplied in any length to individual requirements.

Nominal Hose Bore Size		Approximate Dip Pipe Dimensions			
		Outside Diameter D		Inside Diameter I	
in	mm	in	mm	in	mm
3/4	20	0.87	22	0.51	13
1	25	1.14	29	0.83	21
1 1/2	40	1.54	39	1.00	27
2	50	2.17	55	1.58	40

FIXED DIP PIPE (STRAIGHT)



DETACHABLE DIP PIPES

Description

As Fixed Dip Pipes above, but connected to the hose through an end fitting, not by crimping direct to the hose.

Design

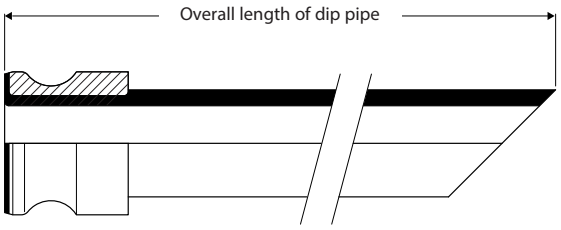
A straight, or 90˚ elbowed anti-static PTFE Dip Pipe, fitted with a Flange or Cam & Groove Male PTFE Lined & Flared end fitting.

The most usual end fitting is a Cam Male (as shown), so the dip pipe can then be connected to a hose with a Cam Female end fitting.

Specifications

As above for Fixed Dip Pipes.

DETACHABLE DIP PIPE



CORROLINE STANDARD AND PURETAG LABELLING AND COLOUR CODING SYSTEMS

STANDARD LABELLING

All Corroline hose assemblies are labelled with the following information:

- Manufacturer's Name (Aflex Hose Ltd)
- Hose Size and Grade
- Max. Working Pressure
- Unique Serial Number
- Month & Year of Manufacture
- Aflex Hose Telephone Number
- CE Mark (if applicable)

This information is normally laser-etched on to a loose stainless steel Ring mounted on the hose.

In some cases, at the discretion of Aflex Hose, the information may be etched on to a thin stainless steel plate which is clamped to the hose, or on to the end fitting ferrule at one end. This may be necessary for example, if the customer requires additional information which may not fit on to a Ring.

Customers may specify which labelling system they require, and may request additional information on the label.

PURETAG LABELLING AND COLOUR CODING

Puretag Labelling and Colour Coding (Patent Pending)

A label and/or Colour Code is encapsulated on to the braid by a transparent rubber cover which is integrally vulcanised and fully bonded to the rubber cover on the hose.

Further information is available on the Puretag product information document on the website.

Note: 1/2" size, Colour Code only, no text.

Colour Coding

A coloured PTFE spiral strip is wound on to the hose.

It can be left loose, or it can be encapsulated under a transparent, heat-shrunk polyolefin sleeve.

Cleaning & Sterilising Systems - CIP, SIP and Autoclave

CIP & SIP – PTFE liner tubes are chemically resistant to all CIP, SIP and Autoclave conditions. The primary consideration is whether the cleaning and purging cycle is likely to develop an electrostatic charge on the internal surface of the liner, in which case AS (Anti-Static) grade hose is required.

AS grade hose and Electrostatic charge generating systems are fully described in the hose liner section.

CIP systems using high electrical resistivity solvents like Toluene will require AS grade hose.

Another electrostatic generation problem arises when wet steam is used, or when the cleaning fluids or WFI are purged out of the line using nitrogen, compressed air or another gas, because droplets of liquid or water in the gas then generate a multi-phase condition until they are cleared out, which will generate a static charge, and so will require AS grade hose.

In static generating applications where AS grade hose is not acceptable due to the black PTFE liner, alternative solutions are available – please consult Aflex Hose for advice.

Autoclave – Autoclave sterilisation does not normally involve any high flow rates through the hose bore, so static generation is not a problem. Aflex hose grades GP and AS, with SS or HB braids are fully resistant to all autoclave conditions throughout the service life of the hose.

The rubber covered grades EPDM, (RC) and Silicone Rubber (RC, SI) are able to withstand at least 100 x 30 minute autoclave cycles at relatively high autoclave temperatures (121°C, 250°F or 135°C, 275°F). Consult Aflex Hose for more specific information.

PTFE Hose-Use with Alkali Metals, Halogens and Halogen containing Chemicals

PTFE hose liners react chemically with Fluorine, Chlorine Trifluoride and molten Alkali Metals.

When PTFE lined hose is used to carry Chlorine or Bromine, either as gasses or fluids, they will diffuse into and through the PTFE liner wall thickness. Trace quantities will then combine with atmospheric moisture to corrode any braid/rubber outer coverings.

Heavily halogenated chemicals, like Hydrogen Fluoride, Hydrogen Chloride, Phosgene (Carbonyl Chloride) Carbon Tetrachloride and other organic chemicals with a high halogen content can also be absorbed and transmitted through the PTFE liner tube.

Other "Penetrating" Fluids and Gases

Sulphur Trioxide, Methyl Methacrylate, Caprolactam and Glacial Acetic Acid are some other chemicals which can be absorbed and transmitted through the PTFE liner tube wall.

Generally, however, as a hydrophobic (non-wetting) material, PTFE is very resistant to the absorption of chemicals. In some cases, PTFE has superior resistance to diffusion, for example to the diffusion of automotive fuels, in comparison with all other plastics and rubbers.

Gas/Fluid Cycling

There are some applications where the fluid passing through the hose turns into a gas, then back into a fluid, then into a gas etc, in a cyclic sequence.

This is normally associated with changes in temperature and/or pressure. For complex reasons these conditions are extremely damaging to the hose liner, whatever material it is made from.

For example, hoses are sometimes used to pass steam, water, steam etc into rubber moulding presses, in order to heat the mould, then rapidly cool it before reheating in the next cycle. Hoses of all types fail rapidly in such an application and PTFE lined hoses are no exception.

Please contact Aflex Hose for further information if these conditions apply.

Connecting Assemblies for Use in Applications

The lengths of hose assemblies and their configuration in use when connected into the application must always be in accordance with the Hose Configuration information at the end of this product literature.

When being connected for use in applications, the end fittings on hose assemblies must be connected to correct mating parts in the correct way, using the correct tools, spanners, clamps, nuts and bolts etc. The connections must be sufficiently tightened to ensure that the joint is leak free but not be over tightened as this can damage the sealing surfaces, especially with PTFE lined and flared end fittings.

In applications involving the transfer through the hose of expensive or dangerous fluids or gases, the hoses and connections must be pressure tested in situ before being put in to service. This should be done with some harmless media to 1½ times the maximum working pressure of the hose assembly, as stated in the product literature.

If in doubt please contact Aflex Hose for advice.

Special Applications

Aflex Hose PTFE lined hose products are not rated as suitable for use in the following, special applications:

All Radioactive Applications involving high energy radiation, including Gamma radiation (degrades PTFE)

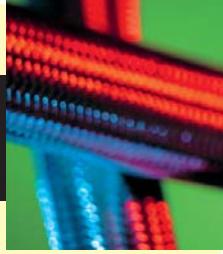
All Medical Implantation Applications.

All Aerospace Applications.

Silicone-Free Application Requirements

Some applications, particularly paint manufacturing plants, and other specialised applications require that hoses do not include any silicone containing materials in their manufacture (which is possible), or sometimes that hoses are 100% Silicone Free (which may not be possible). Customers or Distributors must identify and define any such requirements in writing on all enquiries/orders.

QUALITY ASSURANCE, CERTIFICATION & APPROVALS and HOSE TESTING



BS EN ISO 9001:2008
Aflex products are all manufactured in accordance with BS EN ISO 9001: 2008 Quality Management Systems independently assessed and registered by National Quality Assurance Limited (NQA).

FDA
The Materials used to manufacture the natural PTFE Tube liner conforms to FDA 21 CFR 177.1550, and the antistatic PTFE liner conforms to FDA 21 CFR 178.3297.

3-A SANITARY STANDARDS
The PTFE used in the liner is manufactured solely from materials which meet the requirements of the 3-A Sanitary Standards.

CHEMICAL MANUFACTURERS APPROVALS
Most of the major chemical manufacturing companies in the world have audited and/or approved Aflex Hose as a Hose Supplier.

BPSA LEACHABLES and EXTRACTABLES TESTING
Aflex Hose Natural and Antistatic PTFE Hose Liner Tube has been independently tested in accordance with BPSA recommendations, and found to be satisfactory.

Copies of the Test Report are available for specific assessments to be made.

DECLARATION OF CONFORMITY to COMMISSION REGULATION (EU) NO 10/2011
On plastic materials and articles intended to come into contact with food.

Available for both Natural and Antistatic hose.

CE MARKING (EUROPE ONLY)
Aflex has been assessed by Zurich Engineering and found to comply with the Pressure Equipment Directive 97/23/EC (European Community) Conformity Assessment Module D1, approved to CE Mark applicable hose products, accompanied by a Hose Usage Data Sheet, and a Declaration of Conformity.

ATTESTATIONS OF CONFORMITY TO ATEX DIRECTIVE 94/9/EC (POTENTIALLY EXPLOSIVE ATMOSPHERES)
Available for hose and assemblies for components used in Gas Zones 1 & 2 and Dust Zones 21 & 22, when applicable.

MATERIAL CERTIFICATION TO EN10204
Available for all the hose or hose assembly components.

CERTIFICATES OF CONFORMITY TO BS EN ISO/IEC 17050
Are available for all products.

HOSE TESTING
Each assembly is pressure tested to 1.5 times maximum working pressure before despatch, and pressure test certificates can be supplied.

FIRE RESISTANCE to BS5173 Section 103.13 Part 6.2 and 6.3
RC Grade Corroline hose assemblies are “Fire Resistant”. If DRC-300 is added at both ends, the assemblies are upgraded to “Fire Proof”.

Hose Configuration Requirements

Hose Assemblies are usually connected at both ends in service. They may then either remain in a fixed, or static configuration or in a flexing, or dynamic configuration.

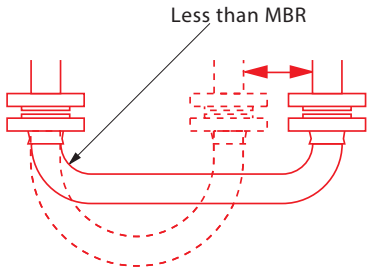
Whether static or dynamic, the First Rule concerning the configuration of the hose is that the bend radius of the hose must never be less than the Minimum Bend Radius (MBR) for the hose as listed in the relevant hose brochure.

The most common situation when this is likely to occur is when the hose is flexed at the end fitting, with stress being applied to the hose at an angle to the axis of the end fitting. Typically, this happens either because the length of the hose is too short, or because the weight of the hose plus contents creates a stress at an angle to the end fitting.

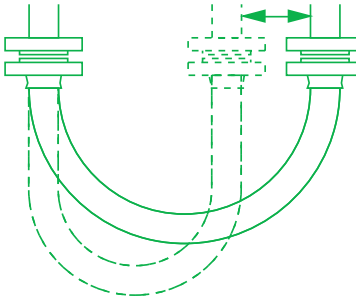
The Second Rule, therefore, if possible, is to design the configuration to ensure that any flexing in the hose takes place away from the end fittings.

(Dynamic) Configuration

INCORRECT - Hose too short

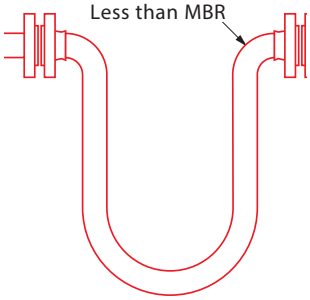


CORRECT - No flex at end fittings

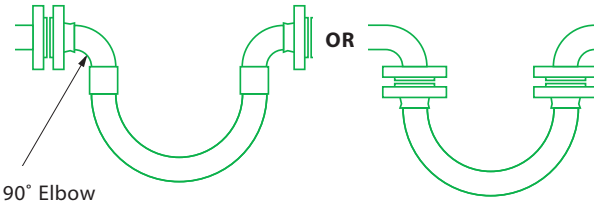


(Static) Configuration

INCORRECT - Weight of hose is at 90˚ to Axis of End Fittings

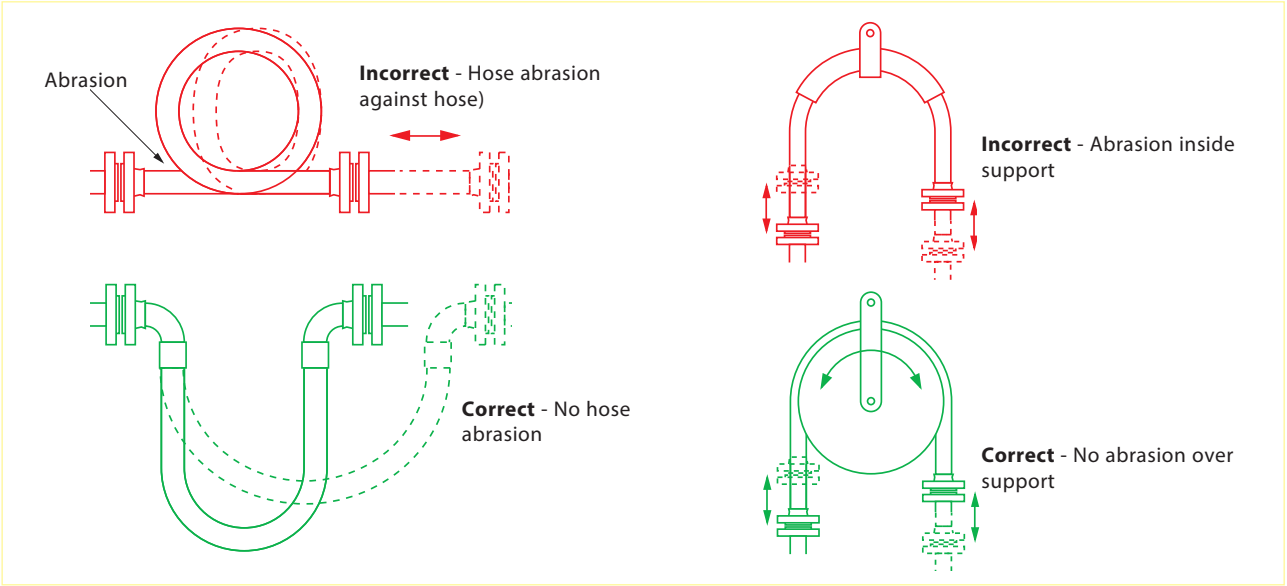


CORRECT - No flex at end fittings



The Third Rule is that the hose configuration should always be designed, and supported where necessary, to avoid any possibility of external abrasion.

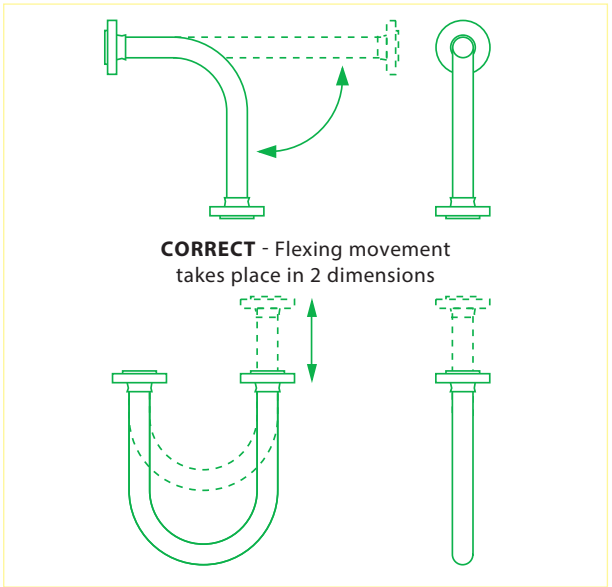
In some cases, the length, configuration and angle of the hose can be designed to avoid abrasion. In others, static or moving support frames or support wheels are required.

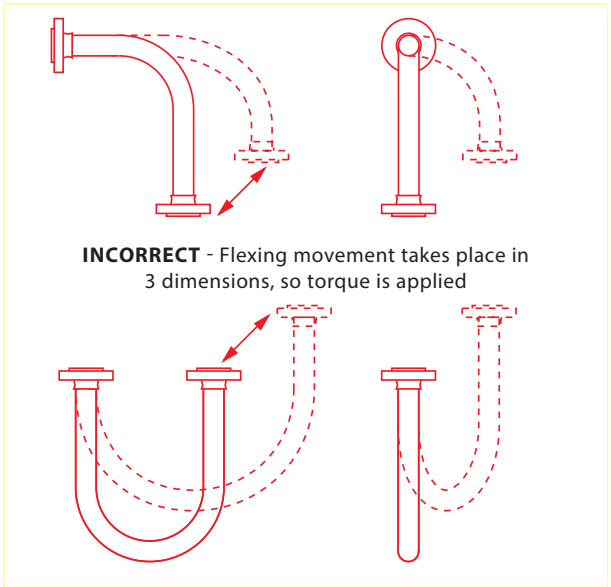


The Fourth Rule is that the hose must not be subjected to torque, either during connection, or as a result of the flexing cycle.

Torque (twist) in the hose can be applied during connection if the hose is accidentally twisted, or if the second end being connected is a screwed connection, and the hose is subjected to torque during final tightening.

In a flexing application, if any flexing cycle of the hose occurs in 3 dimensions instead of 2, then torque will also occur:

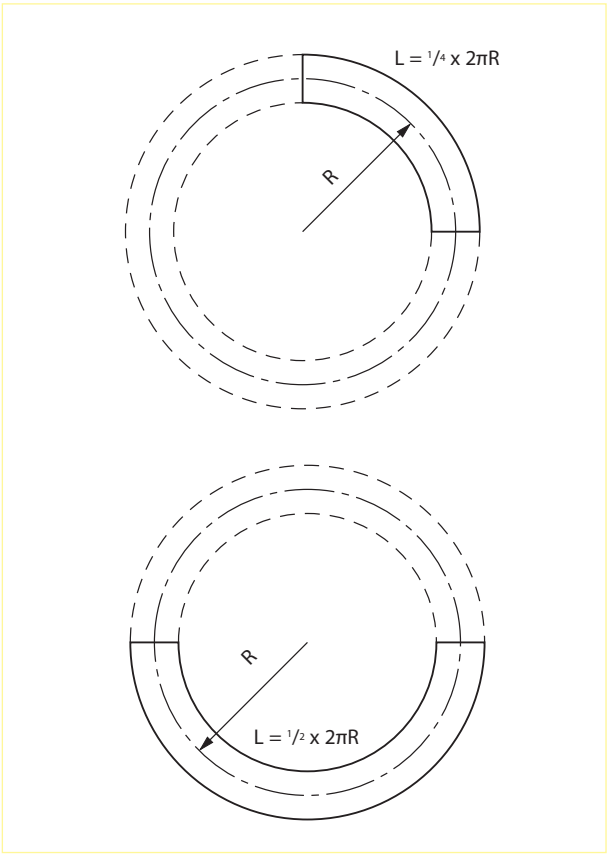




Both Corroflon and Corroline hose have good resistance to a small level of torque, much better resistance that rubber or SS hose types, but it is still the best practice to take whatever steps are necessary to eliminate torque. If in doubt, consult Aflex Hose.

Calculating The Hose Length

The formula for calculating the bent section of the hose length around a radius is derived from the basic formula that the circumference of a circle = 2πR, where R = the radius of the circle, and π = a constant, = 3.142.
So, if the hose goes around a 90˚ bend, which is 1/4 of a full circumference, and the radius of the bend is R, then the length of the hose around the bend is = 1/4 x 2πR. Or half way round, in a U-shape, = 1/2 x 2πR.



Note :

In calculating the length of a hose assembly, the (non-flexible) length of the end fittings must be added in, also the length of any straight sections of hose, as in the following example:

Example :

To calculate the length for a 2" bore size hose with flange end fittings, to be fitted in a 90˚ configuration with one leg 400mm long, the other 600mm long.

Length of Bent Section (yellow)= 1/4 x 2πR (334)

= 1/4 x 2 x 3.142 x 334 = **525mm**

Length of top, Straight Section, including the top end fitting length

= 600 - 334 = **266mm**

Length of bottom end fitting = **66mm**

Total length of Hose Assembly = 525 + 266 + 66 = **857mm**

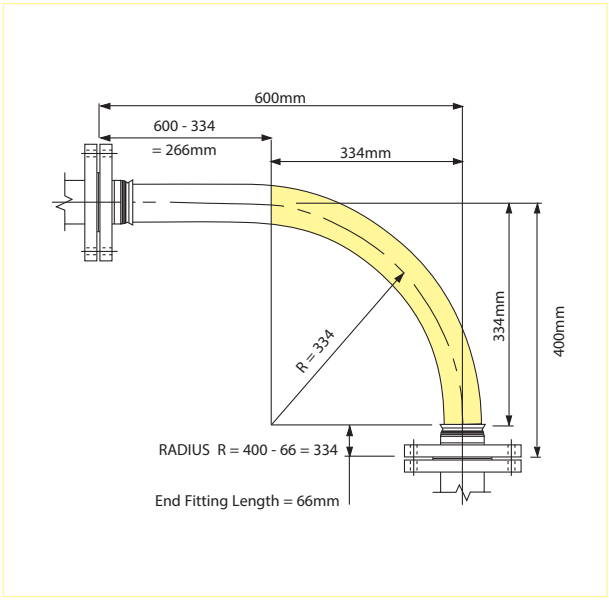
Things to consider

(a) A hose will normally take the longest radius available to it to go around a corner, not the MBR! Also - always remember to include the **non-flexible** end fitting lengths.

(b) In dynamic applications, remember to always calculate the lengths for the most extended configuration during the flexing cycle, not the least extended.

(c) If the configuration is simply too complex for calculation, then obtain a length of flexible tubing of some kind, mark on paper, or a wall, or floor, or both where the connection points will be relative to each other, scaled down if necessary, then manually run the flexible tubing between them with full radii round bends. Measure the extended length, then scale up if necessary to determine the approximate length of the hose.

If in doubt, consult Aflex Hose.



CONDITIONS OF SALE

Definitions

(1) "Aflex Hose" shall mean Aflex Hose Limited

(2) "Aflex Hose Products" shall mean those products the Customer is purchasing from Aflex Hose.

(3) "Customer" shall mean the individual or entity that is purchasing Aflex Hose Products hereunder.

(4) "Full Product Brochure" shall mean the brochure for each specific product available at http://www.aflex-hose.com/products/.

General

(5) These Conditions of Sale form the basis of the contract of sale between Aflex Hose and the Customer. In the event of any conflict between the terms and conditions set forth in these Conditions of Sale and any other Customer document, these Conditions of Sale shall govern, unless otherwise agreed to in writing and authorized and signed for by a Director or General Manager of Aflex Hose.

(6) Unless otherwise agreed to in writing, delivery will be at cost from Aflex Hose's facilities Brighouse, West Yorkshire, England. Title and all risks of loss or damage pass to the Customer upon delivery to the Customer or third party carrier. Delivery dates specified by Aflex Hose are only Aflex Hose's best estimates and Aflex Hose's only responsibility will be to use reasonable commercial efforts to meet all specified delivery dates.

Customer Responsibilities and Obligations

(7) It is the Customer's strict responsibility to review all of the usage conditions and usage limitations given for the Aflex Hose Products which are intended for use in a particular application, to ensure that the application conditions are in compliance with those usage limitations. The usage conditions and limitations are referred to in these Conditions of Sale, and are further specified in the relevant Full Product Brochure. The Customer shall consult the latest, up to date hose product information and Full Product Brochure at the time of ordering, which are only available and downloadable from the Aflex Hose website at http://www.aflex-hose.com/products/, or on request from Aflex Hose. The Customer here represents and warrants that it has read and understands the applicable Full Product Brochure and the usage conditions and the usage limitations set forth therein, and has ensured their compliance with the application conditions.

(8) If the Customer sells or assigns any Aflex Hose Products to any other person or entity, the Customer shall ensure that the final end user of the Aflex Hose Products is supplied with these Conditions to Sale, the applicable Full Product Brochures, the Aflex Hose website address, together with notification of the requirement to review the usage conditions and limitations. The Customer shall include the terms and conditions set forth herein in its Conditions of Sale to any third party. The Customer hereby agrees and acknowledges that Aflex Hose shall have no liability whatsoever for claims arising in whole or in part out of the Customer selling or assigning the Aflex Hose Products to a third party that does not use the Aflex Hose Products in accordance with Aflex Hose's usage requirements and limitations ("Non-Conforming Use Claims"). The Customer shall indemnify and hold harmless Aflex Hose, its officers, directors, employees, affiliates and representatives for any and all claims, damages, penalties and losses arising out of or related to Non-Conforming Use Claims.

(9) The Customer agrees and acknowledges that for any intended hose application in which special conditions apply which are not defined, or not defined sufficiently in the Product Brochure, the Customer shall write to Aflex Hose requesting written advice relating to any usage limitations resulting from special conditions. The Customer shall ensure the design suitability and safety of the Aflex Hose Products in their intended applications, giving particular consideration to any special condition relating to, but not restricted to the chemical and electrostatic compatibility of the fluids or gases passing through, the possibility of diffusion of fluid or gases through the PTFE hose lining, the possibility of external corrosive conditions, the types and likelihood of excessive mechanical abuse, such as abrasion (internal or external), crushing, excessive flexing or vibrations, etc. and any excessive temperature and/or pressure "pulsing" conditions, or any other condition which may cause premature hose failure. The Customer shall consider, and take account of the degree of risk involved in any hose failure, including the provision of adequate protection in the event of any risk to any persons. In applications where any type of hose failure would lead to financial losses if the hose is not replaced immediately, the Customer agrees and acknowledges that it shall be the Customer's responsibility to order and hold in stock spare hose(s) accordingly. The Customer shall advise Aflex Hose in writing at the time of placing the enquiry and on any purchase order if there are any special requirements for the hose, including special cleaning, or drying, or extra testing requirements which are in addition to normal industrial standards. The Customer agrees and acknowledges that Aflex Hose, its officers, directors, employees, affiliates and representatives shall not be held liable for any claims or obligations arising out of the Customer's failure to fulfill any or all of its responsibilities set forth in this Section 9.

(10) If the Customer has any doubts concerning these or any other usage conditions and limitation or safety parameters, the Customer shall consult Aflex Hose at the number and address in the Notice Provisions below and request a written response to any queries.

Hose Service Life; 24 Month Warranty

(11) It is not possible to guarantee a minimum service life for any of the Aflex Hose Products which can be applicable for every type of application. As such, Customer acknowledges that, except as provided below in Sections 12, 13 and 14 Aflex Hose is not guaranteeing a minimum service life of any of the Aflex Hose Products.

(12) Service life predictions or guarantees can only be given in cases where all the relevant information concerning the application is given in writing to Aflex Hose, and Aflex Hose subsequently replies in writing with the service life prediction prior to the order being placed.

(13) If such a written undertaking is not sought and given, Aflex Hose shall not be held liable for any Aflex Hose Product failure which the Customer considers to be premature, excepting failures which are due to faulty materials or manufacturing defects which occur within 24 months or 12 months, as applicable, of supply as provided in Section 14 below.

(14) Aflex Hose warrants its Aflex Hose Products to be free from faulty materials or manufacturing defects from the date of the delivery, for 24 months; provided, however, that all Hose Assemblies which are "ETH" (Electrical Trace Heated) Grade are only warranted for 12 months.

(15) AFLEX HOSE MAKES NO WARRANTY OF ANY KIND WHATSOEVER, EXPRESS OR IMPLIED OTHER THAN AS SPECIFICALLY STATED HEREIN, AND THERE ARE NO WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR PURPOSE WHICH EXCEED THE OBLIGATIONS AND WARRANTIES SPECIFICALLY STATED HEREIN.

Product Failure

(16) In the event of a product failure during the applicable warranty period set forth in Section 14, the Customer shall provide Aflex Hose with written notification within forty-eight (48) hours of discovering the fault. Aflex Hose requires that the Aflex Hose Products not be cut up or tampered with, but should be decontaminated and returned to Aflex Hose, plus a decontamination certificate, for examination and analysis of the fault. The Customer should also provide full details in writing of the application conditions under which the hose failed, including Pressure, Vacuum, Temperature, Flexing and any cycling of any of these, also the fluids, gases and any cleaning products passed through the hose, and the total time that the hose has been in service also the original order number and the Serial Number for the hose. The Customer may send its own witness to the examination if required. Aflex Hose will provide a Non-Conformance Report to the Customer. The Customer shall bear the cost of returning the Aflex Hose Products that have failed; provided, however, as set forth in Section 17 below, Aflex Hose shall reimburse the Customer for any shipping costs if it is determined that the failure is covered by the warranty set forth in Section 14.

(17) If Aflex Hose determines that the faulty materials or a manufacturing defect in the hose is responsible for the hose failure, Aflex Hose's maximum liability shall be the invoice value of the failed hose itself, or the invoice value of the whole customer order as determined by Aflex Hose in its sole discretion, along with any reasonable costs for removal and replacement of the hose, and costs for packing and despatching the failed hose back to Aflex Hose.

Untested Hose for Self Assembly by Customers

(18) Aflex Hose sometimes supplies "loose" hose, without end fittings attached to a Self Assembly Customer, who will then cut the hose to length and attach end fittings to make up Hose Assemblies for their own use, or for sale to their own customers.

(19) Unless the Customer requests, and Aflex Hose confirms that the 'loose' hose is pressure tested before supply, such testing is not normally applied by Aflex Hose, because this testing requirement is otherwise satisfied by the Self Assembly Customer during his own testing of the finished Hose Assemblies made up using the "loose" hose. Self Assembly Customers agree and acknowledge that they are solely responsible for carrying out hydrostatic pressure testing of 100% of such assemblies to $1^1/_2$ times the Maximum Working Pressure (MWP) of the hose assembly as specified in the relevant Full Product Brochure before supply for end use, to validate both the hose and the end fitting attachment.

(20) When pressure testing braided hoses with a plastic or rubber outer cover, the cover will mask any signs of leakage for a time. The Customer agrees and acknowledges that after the hydrostatic pressure test, it is required to test each covered hose assembly with an internal helium gas pressure of 30 Bar (450 psi) for hose sizes up to 1" and 15 Bar (225 psi) for hose sizes above 1", with the hose assembly immersed in water to enable leak detection by gas bubbles, for a minimum test period of 5 minutes.

(21) The "Self Assembly" Customer agrees and acknowledges that it shall determine and approve the Design Suitability of the hose assemblies for their intended use before supply and that, except as set forth in Section 22, it shall indemnify and hold Aflex Hose harmless from any Claims and Losses arising from Design Suitability for a Self Assembly Customer. This includes proceeding in accordance with Section (7) and Section (8) above.

(22) Aflex Hose's liability is limited to Aflex Hose Products which are assembled by approved Self Assembly Customers if all the hose and fitting components were supplied by Aflex Hose or approved for use by Aflex Hose in writing, and they were assembled and tested in accordance with Aflex Hose's current Manufacturing and Testing Instructions, available to approved Self Assemblers in an I-Bay on the Aflex Hose website.

Untested Hose Assemblies

(23) Aflex Hose is sometimes requested by Customers to attach non-standard end fittings to hose assemblies which they, supply, and in some cases it is not possible to connect these fittings to the Aflex Hose pressure test system. In such cases a "concession not to test" is obtained from the Customer, and a label is attached to the hose assembly, warning that it requires pressure testing before use. The Customer agrees and acknowledges that Aflex Hose shall have no liability whatsoever if the Customer does not comply with the warning that requires pressure testing before use.

Force Majeure

(24) Aflex Hose shall not be liable for any delay in delivery, failure to deliver or default in performing in accordance with any Customer's order if the delay or default is due to: (a) fires, floods, strikes, or other labor disputes, accidents to Aflex Hose's production facilities, acts of sabotage, riots, natural disasters, difficulties procuring materials, shortages of raw materials, interference by civil or military authorities, whether legal or de facto, governmental restrictions, including but not limited to failure to obtain export licenses, delays in transportation or lack of transportation facilities, restrictions imposed by federal, state or other governmental legislation or, rules or regulations thereof, including a force majeure event occurring in respect to one of Aflex Hose's suppliers; or (b) any other cause beyond Aflex Hose's control.

Governing Law; Jurisdiction

(25) These Conditions of Sale and all rights, duties and obligations hereunder, including any and all other Customer agreements and orders shall be governed by and subject to English Law.

(26) The Customer acknowledges and agrees that any disputes arising out of or related in any way to this Agreement, including a breach of this Agreement, shall be brought exclusively in the courts of England, United Kingdom. Furthermore, Customer knowingly, voluntarily and irrevocably (a) consents to the exclusive jurisdiction of these courts, (b) waives any immunity or objection, including any objection to personal jurisdiction or the laying of venue or based on the grounds of forum non conveniens, which it may have from or to the bringing of the dispute in such jurisdiction, (c) waives any personal service of any summons, complaint or other process that may be made by any other means permitted by England, United Kingdom, (d) waives any right to trial by jury, (e) agrees that any such dispute will be decided by court trial without a jury, (f) understands that it is giving up valuable legal rights under this Section 26, including the right to trial by jury, and that it voluntarily and knowingly waives those rights.

Limitations of Liability

(27) Aflex Hose Products have not been designed or tested for use in aerospace, medical implantation or radioactive applications, and such use is therefore strictly prohibited unless written approval from Aflex Hose has been given. Customer agrees and acknowledges that it is aware of the limitations set forth in this Section 26 and hereby agrees that Aflex Hose shall not have any liability whatsoever in the event Customer uses Aflex Hose Products for aerospace, medical implantation or radioactive applications. Customer agrees to indemnify Aflex Hose, its officers, directors, employees, affiliates and representatives for any and all Claims and Losses arising out of Customer's use of the Aflex Hose Products for aerospace, medical implantation or radioactive applications.

(28) Aflex Hose will not accept liability for any failures of the Aflex Hose Products which are caused by Customers failing to perform their Responsibilities as specified in these Conditions of Sale.

(29) NOTWITHSTANDING ANYTHING TO THE CONTRARY HEREIN, IN NO EVENT SHALL AFLEX HOSE BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, CONSEQUENTIAL, EXEMPLARY, OR PUNITIVE DAMAGES, LOSS OF PROFITS OR REVENUE, LOSS OF PROCESS PRODUCTS, DAMAGE TO EQUIPMENT, DOWNTIME COSTS, OR LOSS OF USE EVEN IF INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. TO THE EXTENT PERMITTED BY APPLICABLE LAW, THESE EXCLUSIONS AND LIMITATIONS WILL APPLY REGARDLESS OF WHETHER LIABILITY ARISES FROM FAILURE OF THE PRODUCT(S), BREACH OF CONTRACT, FAILURE TO DELIVER ON TIME, WARRANTY, TORT (INCLUDING, BUT NOT LIMITED TO, NEGLIGENCE), BY OPERATION OF LAW, OR OTHERWISE.

Notice Provisions

(30) Any written notice required to be provided to Aflex Hose shall be sent to the following address: Aflex Hose Limited, Spring Bank Industrial Estate, Watson Mill Lane, Sowerby Bridge, Halifax, West Yorkshire, HX6 3BW.

Exclusion of CISG

(31) The United Nations Convention on Contracts for the International Sale of Goods shall not apply to these Conditions of Sale and any and all other Customer documents.

AFLEX HOSE LTD
Spring Bank Industrial Estate, Watson Mill Lane,
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6111 Keller's Church Road, Unit B
Pipersville, Pennsylvania, PA18947

T: 215 766 1455 F: 215 766 1688

W: www.aflex-hose.com

Certificate No. 1977