

PTFE LINED HOSE

for Chemical Process Fluids, also Foodstuffs,
Paints, Resins and Others
from Aflex Hose



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

CORROFLON HOSE

CORROLINE HOSE

PTFE – THE OPTIMUM CHOICE FOR HOSE LININGS

PTFE, or Polytetrafluoroethylene, comprises long-chain molecules of carbon atoms, each linked to two fluorine atoms.

The fluorine atoms provide a helical spiral which surrounds the carbon chain and protects it.

It is this structure which creates the unique properties for which PTFE is well-known.

EXCELLENT CHEMICAL RESISTANCE

PTFE is renowned as the most chemically resistant material known. Only a very few, very unusual substances and conditions can affect it, like fluorine gas at high temperature and pressure and liquid, boiling sodium metal.

PTFE lined hoses can therefore be used for a wider variety of chemicals than any other hose type, making it the ideal choice for very corrosive chemical applications and multi-product applications.

NON-STICK SURFACE

The use of PTFE as a surface for cookware products has demonstrated to the world how easily cleanable PTFE surfaces are.

This means that PTFE lined hoses can be purged 100% clean more quickly, easily and reliably than any other type of hose.

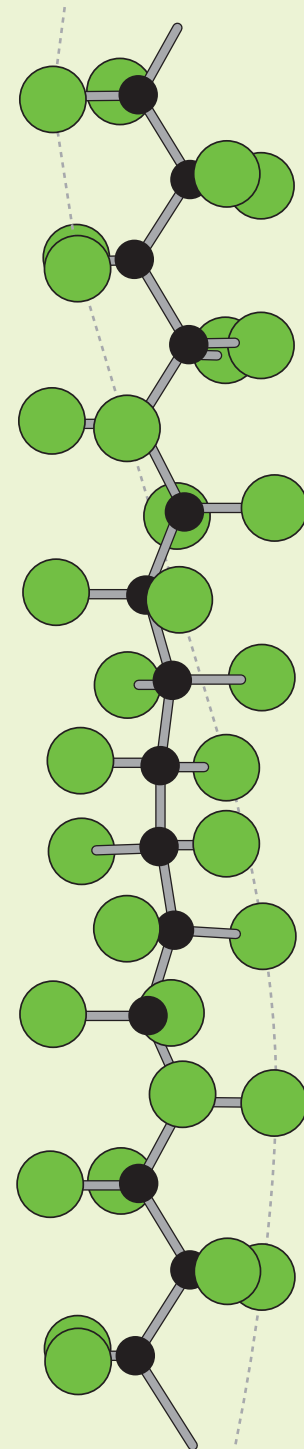
EXCELLENT TEMPERATURE RANGE

The cookware application also demonstrates another of PTFE's many attributes – temperature resistance. PTFE itself can be used as a hose liner at temperatures from -150°C up to $+260^{\circ}\text{C}$, dependent upon the hose design and the application conditions.

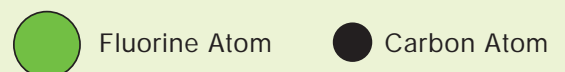
This is the widest temperature range of any rubber or plastic hose lining material.

HOSE DESIGN

The only issue with PTFE as a hose lining material is the best way it can be integrated in to the hose design. This is where Aflex Hose have a proven record of success over the last 30 years.



Section from a PTFE Molecule, 16 Angstrom Units long



INTRODUCTION TO AFLEX HOSE



Aflex Hose was established as a PTFE hose manufacturing company in 1973 and, since then, has led the world in inventing and developing all the major innovations in PTFE hose design for use in process fluids transfer applications. Pharmaceutical, Biotech and Chemical manufacturing plants worldwide recognise the Aflex PTFE hose product range to be the best available, and have adopted them as 'site standard' over many years.



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.

CUSTOM HOSES FOR CRITICAL ENVIRONMENTS

Aflex Hose takes particular pride in our ability to design, specify and custom build special purpose hose assemblies to customers' non-standard requirements. From hose assemblies for fluorine, with non-standard hastelloy end fittings to an electrically trace heated hose assembly with a colour coded rubber cover for viscous fluids transfer – whatever the customer requires, Aflex Hose can develop a specific solution.

TOTAL MANUFACTURE

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

- PTFE powder is extruded into tube and convoluted
- Stainless steel or polypropylene yarn is wound and braided onto the tube
- Plastic and rubber extruders are used to apply external covers when required
- End fittings are machined from bar stock on state of the art CNC lathes
- And, finally, the hoses are assembled to individual customer requirements, tested and dispatched to end users

Because of this, Aflex is able to achieve unbeatable levels of build quality, design excellence and economy of scale, which are unmatched by our competitors.

PHARMACEUTICAL & BIOTECH

Aflex Hose manufactures another range of PTFE lined hose products for use in Pharmaceutical and Biotech manufacturing plants. Bioflex, Pharmaline and Pharmalex are described on the Aflex Hose website.

AUTOMOTIVE, MOTOR SPORT AND GENERAL PURPOSE APPLICATIONS

Aflex Hose also manufactures another range of PTFE hose products for use in automotive, motor sport and general industrial applications. The Smoothbore and Hyperline FX, SB and V ranges of hose are described in another brochure, and information is also available on our website.

CORROFLON HOSE

Corroflon hose was the first convoluted PTFE lined hose product in the world to be developed specifically for process fluids transfer applications in pharmaceutical and chemical plants.

Corroflon was launched in 1978, and since then all of the major advances in convoluted PTFE hose design have been pioneered by Aflex Hose and incorporated into the Corroflon hose product range. These include anti-static PTFE, polypropylene braid, and EPDM or silicone rubber hose covers. Aflex Hose also developed and introduced PTFE lined and flared end fittings which protect the end fitting from contact with the process fluid, and provide clean, uninterrupted fluid flow through the end fitting.

Over the years, Corroflon hose and end fittings have been continuously developed and improved to maintain market leadership, and design features which have been identified as prime requirements have been incorporated at every stage.

These include the thickest wall and the best processed tube lining available, to prevent the development of porosity in the PTFE, which is the primary cause of premature failure in competitors' products.

Corroflon is also fully kink resistant and vacuum resistant due to the tight helical wire reinforcement and the convoluted design profile.

The build quality and design excellence of Corroflon hose have been tested and proved in numerous applications worldwide, and hundreds of thousands of Corroflon hoses have been applied and used successfully over the last 30 years.

Corroflon Hose Assembly with a
PTFE lined Swivelling Flange End Fitting



CORROFLON HOSE

SIZE RANGE

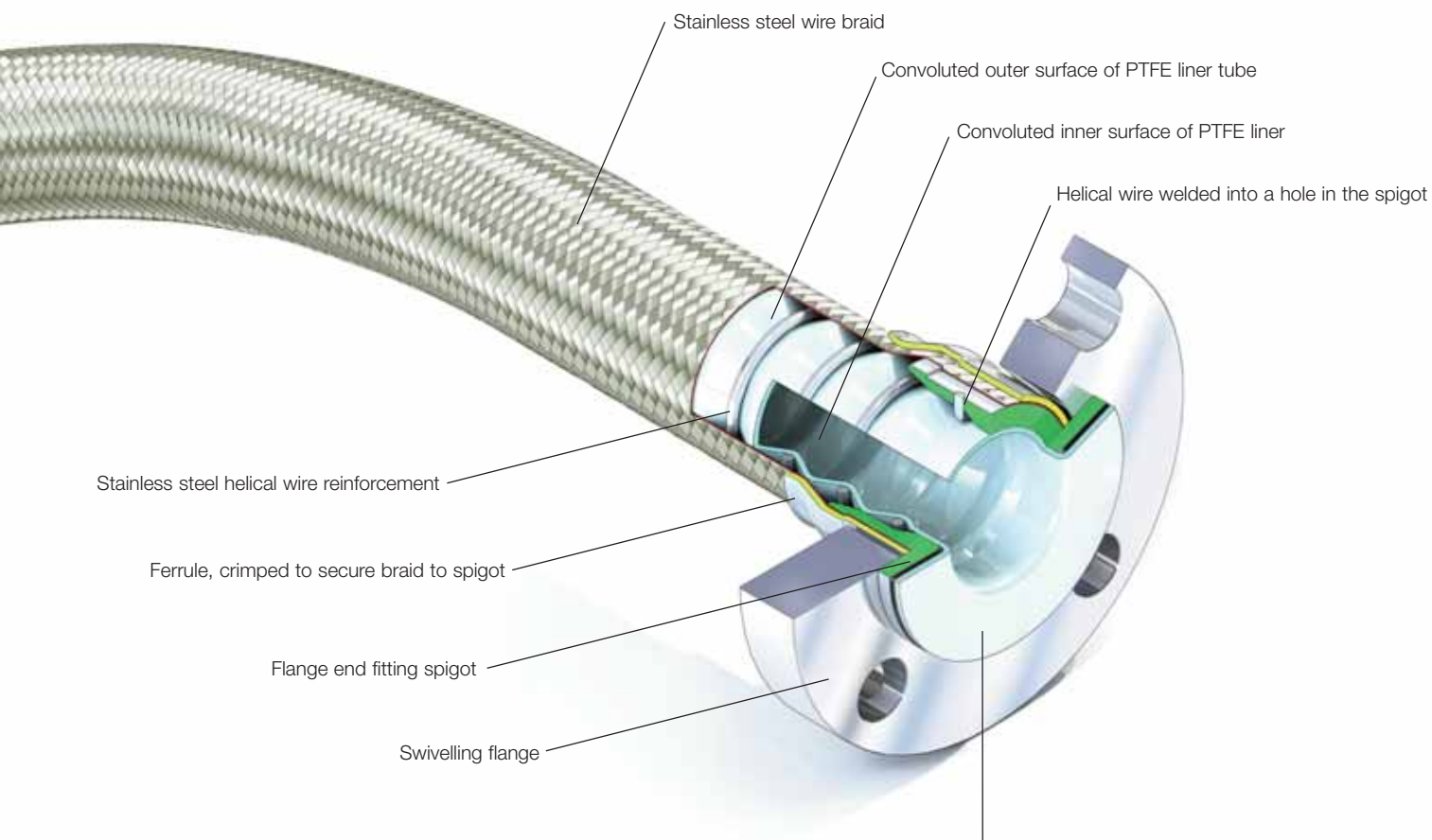
- 1/2" (12.75mm) to 6" (150mm)

HOSE DESIGN OPTIONS

- Natural or anti-static PTFE, stainless steel braid, with or without an EPDM or silicone rubber cover, or polypropylene, PVDF or hastelloy braid

END FITTING OPTIONS

- ASA150 or DIN flanges, Sanitary Triclamps (Triclosures), Camlocks, DIN11851, RJT, RJP and SMS fittings, BSPT or NPT fixed males, BSP or NPSM females, JIC, I-Line and many other standard and special fitting designs



PTFE liner tube extended through the end fitting, then flared out to form the sealing face.

ADVANTAGES

1. Internally "wetted" parts are all PTFE, protecting the end fitting from any corrosive fluids.
2. No bore restriction, so fluid flow through the fitting is clean, without entrapment zones.

CORROLINE HOSE

INTRODUCTION

Corroline hose was designed and developed to provide customers with a universal hose product which combined all the requirements they had requested for process applications, particularly the need for improved flexibility.

Corroline hose not only supersedes but also improves upon the wide variety of alternative Process Hose products currently available.

CONSTRUCTION

Corroline is built around a patented PTFE hose liner design, which has a slightly rippled smooth bore inside, but convoluted outside to generate excellent flexibility combined with "hoop strength".

A stainless helical wire is wound in to the external convolutions, which adds to the kink resistance, crush resistance and the resistance of the hose to both pressure and vacuum.

This reinforced PTFE Liner construction is strong enough to withstand full vacuum and kinking without the need for either internal convolutions or the need to bond the liner to an outer cover, making it an ideal hose liner design, and a significant improvement upon standard products currently available.

The PTFE liner is then further reinforced with an outer braid, either a Stainless Steel wire braid (SS Grade) or a Polypropylene braid (PB Grade) to provide two braided hose grades.

The most popular grade (RC Grade) includes an outer cover of abrasion resistant, black antistatic EPDM rubber which is extruded on to a SS braided liner, with a super-smooth surface finish to aid external cleaning. A yellow, "CORROLINE" stripe is printed on to the cover. Other texts and coloured stripes are also available to special order.

CORROLINE HOSE - THE BEST FLEXIBLE HOSE FOR CHEMICAL AND PROCESS APPLICATIONS

Corroline SS hose, fitted with an integral PTFE lined flange fitting



CORROLINE HOSE

SIZE RANGE

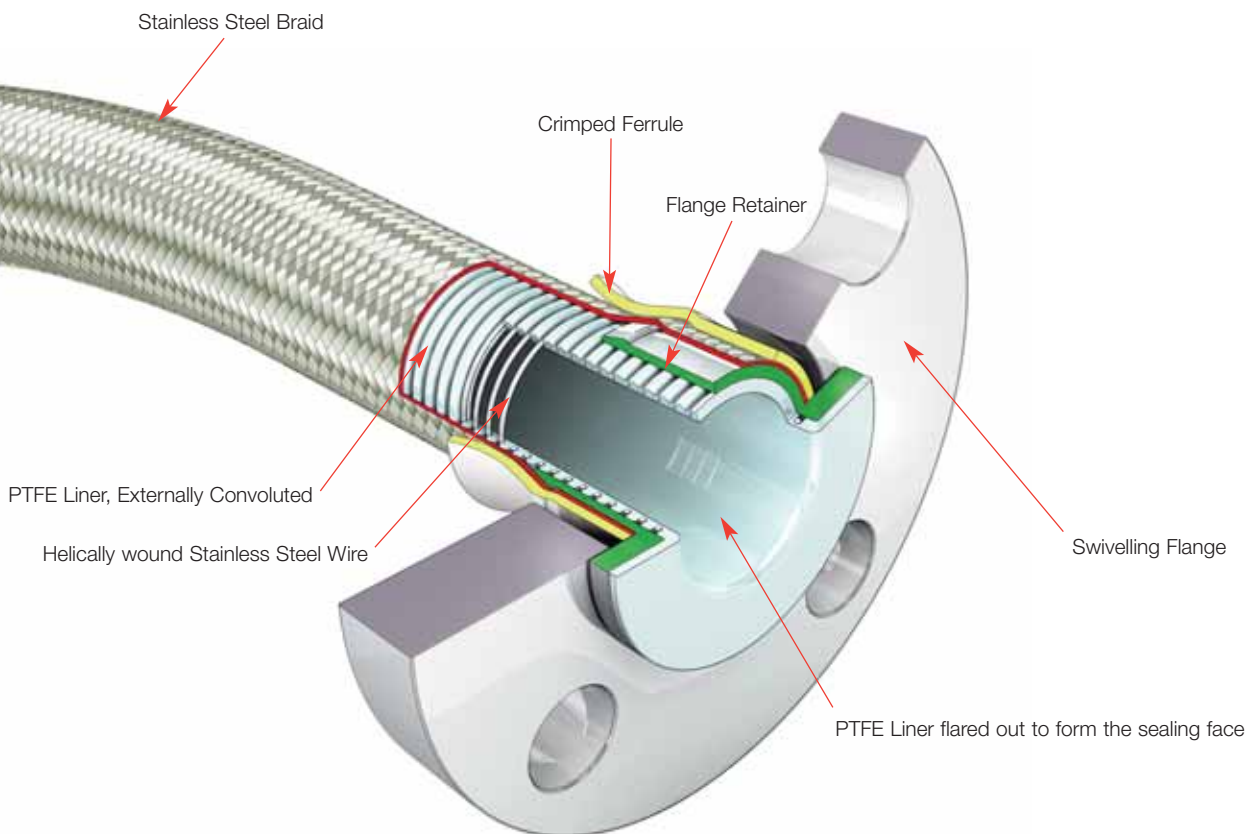
- 1/2" (13mm) to 2" (50mm)

HOSE DESIGN OPTIONS

- Natural or anti-static PTFE, stainless steel braid, with or without an EPDM rubber cover, or polypropylene, PVDF or hastelloy braid

END FITTING OPTIONS

- ASA150 or DIN flanges, Sanitary Triclamps (Triclosures), Camlocks, DIN11851, RJT, RJP and SMS fittings, BSPT or NPT fixed males, BSP or NPSM females, JIC, I-Line and many other standard and special fitting designs



AFLEX DIP PIPES

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/Corroflon 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.

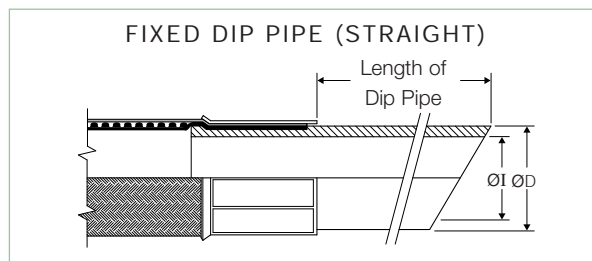
If higher pressure ratings are required, consult Aflex Hose.

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



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.

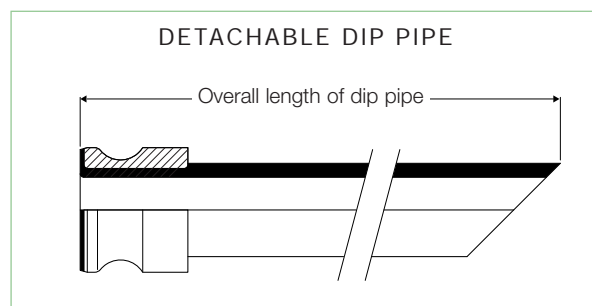
Design

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.



STANDARD LABELLING, PURETAG LABELLING AND COLOUR CODING SYSTEMS

STANDARD LABELLING

All 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 vibro-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

Puretag Labelling (Patent Pending)

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

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



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.



AFLEX HOSE: SPECIAL USAGE CONDITIONS

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 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.

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.

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

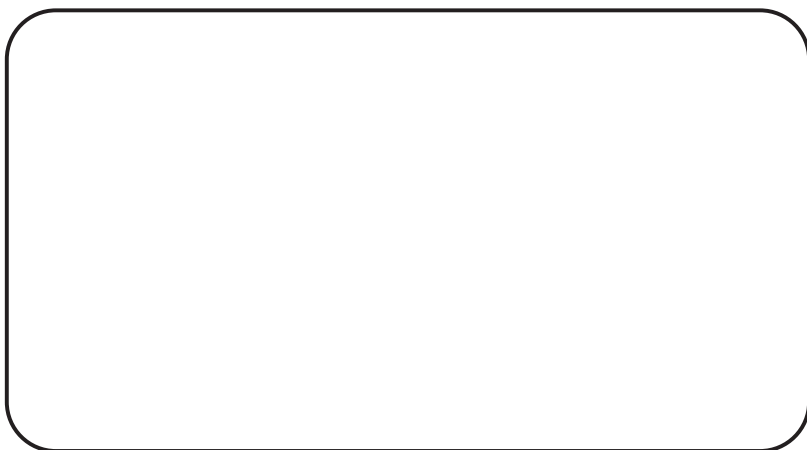
Available for all the hose or hose assembly components.

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.



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Certificate No. 1977