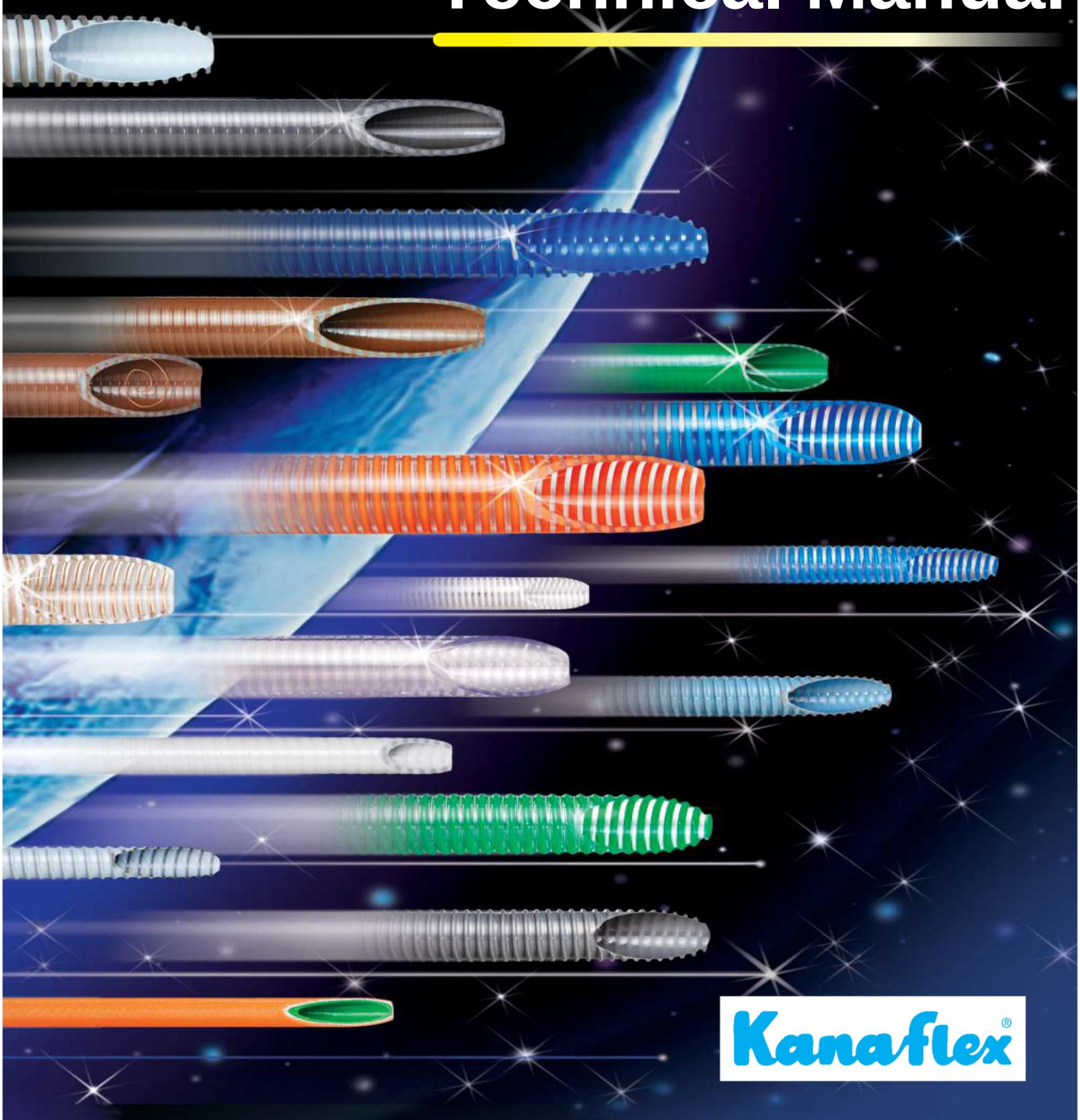
Kanaflex®

Flexible Hoses Division

Technical Manual



Kanaflex®

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1. Introduction

Kanaflex has an extensive line of hoses produced with thermoplastic materials that are used in a wide range of applications in the food, chemical, construction and agricultural industries, among others. Each product line has a commercial name and characteristic colors that differentiate it.
They feature an excellent bending radius, smooth internal surface and good resistance to chemical and mechanical actions, in addition to being manufactured only with high-quality virgin raw materials.
The products are supplied in a wide range of diameters, thus allowing the customers to choose the best hose option, according to their needs.
Kanaflex has manufacturing and quality control processes that complies with ISO 9001:2015 certification; hoses are distributed throughout the country, with pre- and post-sales service to provide support for consultations and technical questions.

2. General Applications

Kanaflex hoses have a portfolio of products that serve several segments such as:

- agriculture: agricultural irrigation and spraying, water discharge, agricultural implements;
- civil construction: conduction of concrete, gravel, water under pressure, washing of galleries and deposits;
- mining: conduction of pasty liquids, minerals and water discharge;
- industry: discharge of chemical products, food, petroleum derivatives, industrial suction, exhaust, air conduction, transportation of granules, roller coating, furniture, wind power etc.;
- residential: water trucks, washing machines, swimming pools.

3. Chemical resistance table

CHEMICAL	MATERIAL				
	PVC	Thermoplastic Rubber	PU	Nitrile Rubber	SILICONE
ALUMINUM ACETATE	R		R		NR
AMYL ACETATE	NR	R			
AMMONIA ACETATE	R	Rr			
ANILINE ACETATE	NR	Rr			
BUTYL ACETATE	NR	Rr			
LEAD ACETATE	R	Rr	R		
ETHYL ACETATE	NR	Rr		NR	Rr
METHYL ACETATE	NR	Rr			
SILVER ACETATE	R	Rr			
SODIUM ACETATE	R	Rr	R		
VINYL ACETATE	NR	Rr			
ACETONE (DIMETHYL KETONE)	NR	Rr	NR	NR	Rr
ACETIC ACID 5%	R	Rr	Rr	NR	Rr
ACETIC ACID 50%	Rr	Rr	NR	NR	Rr
ACETIC ACID 100%	NR	Rr	NR	NR	
ARSENIC ACID	R				R
BENZOIC ACID	R	R			
BORIC ACID	R	R			R
HYDROBROMIC ACID 100%	R			NR	NR
BUTYRIC ACID	NR	R			
CITRIC ACID 10%	R				R
HYDROCHLORIC ACID 5%	R	R			R
HYDROCHLORIC ACID 20%	R				NR
HYDROCHLORIC ACID 35%	Rr				NR
CHLOROACETIC ACID	NR	R			
CHLOROSULFONIC ACID	NR				NR
CHROMIC ACID 50%	R	R		NR	
STEARIC ACID	R				Rr
HYDROFLUORIC ACID 4%	R			NR	
HYDROFLUORIC ACID 40%	Rr			NR	
HYDROFLUORIC ACID 60%	NR			NR	
FORMIC ACID 3%	R	R			R
FORMIC ACID 50%	R	R		NR	R
FORMIC ACID 85%	R	R		NR	R
FORMIC ACID 100%	NR	R		NR	
PHOSPHORIC ACID 5%	R	R	Rr	Rr	
PHOSPHORIC ACID 50%	R	R	NR	Rr	R
PHOSPHORIC ACID 85%	R	R	NR		
FATTY ACIDS	R				Rr
LACTIC ACID 3%	R				
LACTIC ACID 85%	R				
LAURIC ACID	R				
MALIC ACID	R				R
MURIATIC ACID 10%	R				
MURIATIC ACID 25%	R				
MURIATIC ACID CONC.	R				
NITRIC ACID 10%	R	R	Rr	NR	R
NITRIC ACID 50%	R	Rr	NR	NR	NR
NITRIC ACID 70%	NR	NR	NR	NR	NR
OLEIC ACID	R	Rr		Rr	NR
OXALIC ACID 10%	R			NR	R
PALMITIC ACID	R				NR
PERCHLORIC ACID 70%	NR			Rr	NR
PICRIC ACID	R				NR
SALICYLIC ACID	R				
SULFURIC ACID 6%	R	R	Rr	Rr	
SULFURIC ACID 20%	R	Rr	Rr	NR	
SULFURIC ACID 30%	Rr	Rr	Rr	NR	R
SULFURIC ACID 60%	Rr	NR	NR	NR	
SULFURIC ACID 98%	NR	NR	NR	NR	NR

CHEMICAL	MATERIAL				
	PVC	Thermoplastic Rubber	PU	Nitrile Rubber	SILICONE
TANNIC ACID	R				R
TARTARIC ACID	R				R
TRICHLOROACETIC ACID	Rr				
CANE SUGAR	R				
CHLORINE WATER	Rr				
DISTILLED WATER	R				
SEA WATER	R	R	R	R	
ALLYL ALCOHOL	R	Rr			
AMYL ALCOHOL	R	Rr	Rr		
BENZYL ALCOHOL	Rr	Rr		NR	
BUTYL ALCOHOL	R	Rr	Rr		R
ABSOLUTE ETHYL ALCOHOL	R	Rr		R	
ISOPROPYL ALCOHOL	R	Rr	Rr	Rr	R
LAURYL ALCOHOL	R	Rr			
METHYL ALCOHOL	Rr	Rr	R	R	
AMMONIA (LIQUID GAS)	R				
AMMONIA (DRY GAS)	R				
ACETIC ANHYDRIDE	NR	R	NR	NR	
PHTHALIC ANHYDRIDE	R				
ANILINE	NR	Rr	NR		R
BENZALDEHYDE	NR	Rr	NR		R
BENZENE OR BENZOL	NR	NR	NR	NR	Rr
AMMONIA BICARBONATE	R				
POTASSIUM BICARBONATE	R				
BAKING SODA	R				
SODIUM BISULFATE	R				
CARBON BISULFIDE	NR				
CALCIUM BISULFITE	R				R
SODIUM BISULFITE					R
SODIUM BORATE					
BORAX	R		R		R
HYDROGEN BROMIDE	Rr				
BROMINE	NR	R	NR	NR	Rr
BUTANE	R	Rr	R		NR
AMMONIUM CARBONATE	R				R
POTASSIUM CARBONATE	R				
SODIUM CARBONATE	R				R
CASEIN	R				
BEER	R			R	R
COPPER CYANIDE	R				
MERCURY CYANIDE	R				
POTASSIUM CYANIDE	R				
SILVER CYANIDE	R				
SODIUM CYANIDE	R		R		
CYCLOHEXANOL	NR	NR	NR		
CYCLOHEXANONE	NR		NR	NR	
POTASSIUM CHLORATE	Rr				
SODIUM CHLORATE	Rr				
ALLYL CHLORIDE	NR				
AMYL CHLORIDE	NR				
AMMONIA CHLORIDE	R		R		
HYDROGEN CHLORIDE	Rr				
MAGNESIUM CHLORIDE	R				R
MERCURY CHLORIDE	NR		R		
METHYL CHLORIDE	NR				NR
METHYLENE CHLORIDE	NR				
NICKEL CHLORIDE	Rr				R
POTASSIUM CHLORIDE	R				R
SODIUM CHLORIDE	R				
ZINC CHLORIDE 10%	R				

CHEMICAL	MATERIAL				
	PVC	Thermoplastic Rubber	PU	Nitrile Rubber	SILICONE
FERRIC CHLORIDE	Rr				R
FERROUS CHLORIDE	Rr				
CHLORINE (DRY GAS)	R	R	NR	NR	
CHLORINE (WET GAS)	Rr	R	NR	NR	
CHLOROBENZENE	NR	NR			
CHLOROFORM	NR	NR	NR		NR
CREOSOTE	NR				NR
SYNTHETIC DETERGENTS	R		R		
DEXTROSE	Rr				
ETHYLENE DICHLORIDE	NR		NR		
PROPYLENE DICHLORIDE	NR				
DICHLOROBENZENE	NR				NR
CARBON DIOXIDE	Rr				R
SULFUR DIOXIDE (LIQUID)	NR			NR	
SULFUR DIOXIDE (DRY)	NR			NR	
SULFUR DIOXIDE (WET)	R			NR	
CARBON DISULFIDE	NR			NR	Rr
EMULSIFIERS	R				
PHOTOGRAPHIC EMULSIONS	R				
SULFUR	R		R		R
ZINC STEARATE	R				
ETHER	NR	Rr	NR	NR	NR
ETHYLENE GLYCOL	R	R	R		R
TANNIN EXTRACTS	R				
PHENOL	NR	Rr	Rr		R
SODIUM FERROCYANIDE	R				
NITROGEN FERTILIZERS	R				
FLUORINE	Rr		NR		
HYDROGEN FLUORIDE	R				
FORMALDEHYDE 10%	R	R	Rr		
FORMALDEHYDE 40% (FORMALDEHYDE)	Rr	R	NR	Rr	
AMMONIUM PHOSPHATE	R				R
SODIUM PHOSPHATE	R			R	
TRISODIUM PHOSPHATE	R				
NATURAL GAS	R	R			R
NITROUS GASES	NR				
GASOLINE (CROSS)	Rr	NR	NR	R	NR
REFINED GASOLINE	Rr	NR	NR	R	NR
GLYCERIN OR GLYCEROL	R	R	R	R	R
GLUCOSE	R		R		R
HEXANE	Rr	NR	R	R	NR
CALCIUM HYDROCHLORIDE	Rr				
SODIUM HYDROCHLORIDE	R				
HYDROGEN	R		R		R
AMMONIUM HYDROXIDE	R	R		NR	
CALCIUM HYDROXIDE	R			R	R
POTASSIUM HYDROXIDE	R	R		Rr	Rr
SODIUM HYDROXIDE 1%	R	R	R	Rr	
SODIUM HYDROXIDE 50% (CAUSTIC SODA)	R	R	R	NR	
SODIUM HYPOCHLORITE 15% (BLEACH)	Rr	R	R	NR	R
POTASSIUM IODIDE	Rr				
IODINE (IN ALCOHOL)	R	R			
SOLVENT LACQUER	Rr			NR	R
MILK	R				R
BUTTER	R				
MOLASSES	R				
METHYL ETHYL KETONE	NR	Rr	Rr	NR	Rr
NAPHTHA	NR	NR			Rr
NAPHTHALENE	NR		NR		
AMMONIUM NITRATE	R		R		R

CHEMICAL	MATERIAL				
	PVC	Thermoplastic Rubber	PU	Nitrile Rubber	SILICONE
SILVER NITRATE	R				
SODIUM NITRATE	R		R		
NITROBENZENE	NR	Rr		NR	NR
OLIVE OIL	NR	R			Rr
LINSEED OIL	NR	R	Rr		Rr
MINERAL OIL	NR	R	Rr		NR
SULFUR OXIDE	Rr				
ETHYLENE OXIDE	R		NR		Rr
NITROGEN OXIDE	R	R			
PROPYLENE OXIDE	Rr				
OXYGEN	R	R	R	Rr	R
OZONE	R		R	NR	R
PARAFFIN	NR				
POTASSIUM PERMANGANATE	R		Rr	Rr	R
HYDROGEN PEROXIDE 3% (HYDROGEN PEROXIDE)	R	R	Rr	NR	R
HYDROGEN PEROXIDE 30% (HYDROGEN PEROXIDE)	R	R	Rr	NR	R
HYDROGEN PEROXIDE 90% (HYDROGEN PEROXIDE)	NR	R	Rr	NR	NR
OIL	Rr	N	Rr		NR
PYRIDINE	NR	Rr	NR		Rr
PROPANE	Rr				
RESIN	R				
ALUMINUM SALTS	R				
BARIUM SALTS	R	R			
CALCIUM SALTS	R	NR			
SULFUR SALTS	R				
FERRIC SALTS	R				
SEBUM	R				
SODIUM SILICATE	R				
COPPER SULFATE	R				
ZINC SULFATE 10%	R				
AMMONIA SULFIDE	R				
SODIUM SULFITE	R				
TETRAHYDROFURAN	NR			NR	NR
SODIUM THIOSULFATE	R				R
TOLUENE OR TOLUOL	NR	NR	NR	NR	NR
TRICHLOROETHYLENE	NR	N	NR	NR	NR
UREA	R	R	NR		
VARNISH	Rr				
VINEGAR	R		Rr	Rr	
XYLENE OR XYLOLE	NR	NR	NR	NR	NR

NOTES:

The chemical and physical characteristics are based on typical data obtained in tests performed in the laboratory at room temperature (25ºC) and are not subject to warranty due to the diversity of conditions of use that may affect the characteristics of the hoses. Please always consult our technical department to ensure the quality of your services. Working pressure is generally calculated by dividing the burst pressure by a factor ranging from 2.5 to 4.0 depending on working conditions. The higher the temperature, the higher the factor and vice versa. The smaller the bending radius, the larger the factor and vice versa. Any changes to products may occur without prior notice.

CAPTION:

R = Recommended
Rr = Recommended with restrictions
NR = Not recommended

4. How to specify the hose correctly

Kanaflex has a wide range of products, each one with its own characteristics and particularities. For the correct specification, you must ensure it is necessary that all the items below are checked:

- Types of application;
- Inner diameter;
- Transported material;
- Temperature;
- Bending radius;
- Working pressure;
- Workplace conditions;
- Loss of load.

4.1 Application Types

4.1.1 Suction

The hose is used at the inlet of the motor-pump assembly, where the internal pressure decreases and, due to the action of atmospheric pressure, the liquid to be transported is forced in.
In this situation, some factors influence the hose's performance, such as its length, the difference in height between the pump and the liquid level, and the altitude of the location in relation to sea level.
The longer the hose, the lower the suction capacity of the system; ideally, the pump must be located very close to the liquid level, which prevents the hose from collapsing due to the large difference in pressure applied.
Altitude also has its influence, as the atmospheric pressure forces the liquid into the hose, and in higher places this pressure is lower, thus causing the pump to have to do more work, reducing the system's capacity. The closer to sea level, the better the system performance.

Altitude (m)*	Atmospheric pressure (mca)	Practical suction limit (m)
0	10.33	7.60
300	10.00	7.40
600	9.64	7.10
900	9.30	6.80
1200	8.96	6.50
1500	8.62	6.25
1800	8.27	6.00
2100	8.00	5.70
2400	7.75	5.50

Table II - Reference of maximum suction heights
for different altitudes. (Source: Manual de Hidráulica, Azevedo Netto, 2010)

*Important: The permissible suction height for a given type of pump depends on other conditions and must be verified in each case.

4.1.2 Discharge

The hose is used at the outlet of a motor-pump set and, consequently, is subjected to the action of positive pressure applied to compensate for the loss of pressure. There are two types of discharge: free and the pressurized.

In the free discharge, the hose is located at the end of the line, after the motor pump set or by gravity conduction.
In the pressurized system, the hose is installed between the motor pump set and a pipe, or a system in which the two ends of the hose are connected. Due to the natural stretching of the hose in response to the applied pressure, a snaking reaction may occur; This reaction must be considered as an aggravating factor to the working pressure since where the curvature occurs, there is an accumulation of tension in the material, reducing the useful life of the hose or even making its use unfeasible.

4.1.3 Exhaust

These are systems used to remove gases or suspended particles from a specific area. In this case, similar to suction, a decrease in the internal pressure of the hose is caused, thus forcing gases or particles to enter.
A very clear example is household vacuum cleaners; Hoses for this application suffer wear on their walls over time due to impacts from suspended particles, with said wear being greater in areas of curvature and when there are higher exhaust speeds.

4.1.4 Roller Coating

In this case, the hose aims to protect the metal that makes up the pipe from chemical attacks caused by corrosive substances. Hoses made of PVC replace rubber coatings, due to their lower cost and shorter assembly time.

4.1.5 Protection of Wires and Cables in Machinery and Equipment

Since they are very flexible and good appearance, they have the function of protecting wire harnesses and cables on display in mobile areas of machinery and equipment.

4.2 Inner diameter

Flexible hoses manufactured by Kanaflex always have their internal diameter as a reference, which is characterized by their gauge, which can be expressed in inches or millimeters.
For design purposes, flow rates, speeds, couplings etc. must be checked to correctly select the hose diameter.
We do not recommend adopting the external diameter as a parameter for choosing the hose, as its measurements are a consequence of the combination between the internal diameter and thickness of the hose wall, which makes the external diameter variable, and thus may cause fitting problems.

4.3 Transported Material

Consult the chemical resistance table to check that the material to be transported will not chemically attack the chosen hose.
For products with high viscosity or in pasty forms, it is recommended to carry out more in-depth studies of working pressures, pressure losses, abrasion etc.
In vacuum-air applications, there is usually the transport of suspended solid particles (powder). When passing through the hoses, said particles collide with their internal walls, causing wear to the material. The useful life of the hose is directly linked to the type of particle that is transported, its abrasiveness, concentration etc.

4.4 Working Temperature

Temperature is a characteristic that we must be concerned about, since depending on the region, work regime, work location and temperature of the transported material, the properties of the hose may change; that is, affect its mechanical properties (flexibility, resistance to closing, pressure resistance etc.).

In general, we use the following values:

Material	Working Temperature
PVC	5°C to 50°C
TPU	-25°C to 90°C
TPE	-40°C to 125°C

Note 1: Please remember that these are extreme values that can be achieved. However, for continuous work, a safety margin must be applied.
Note 2: The characteristics presented in the hose specifications are determined at a controlled temperature (21° to 25°C). Therefore, in applications at extreme temperatures there is a change in the properties of the materials and, as a consequence, the mechanical resistance characteristics of the hoses change.

4.5 Bending Radius

The hose curvature is defined by its radius.
Implications for specifying the bending radius:

- in assembly where it is necessary to change the flow direction (curve)
- reduction in working pressure and increase in pressure loss at bend points
- more pronounced wear of the hose at curved points.

Figure 1 demonstrates a correct way to measure this radius.

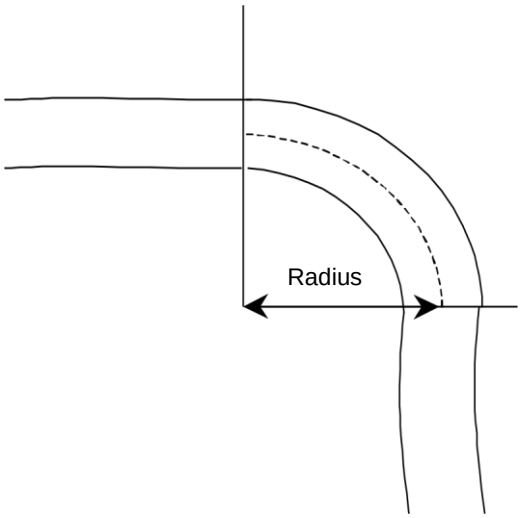

Figure 1 - Measurement of hose bending radius

4.6 Working Pressure

The working pressure of a hose is generally calculated by dividing its burst pressure by a safety factor defined by Kanaflex, which depends on its type and application, always considering the ambient working temperature condition (25°C).
Factors affecting the nominal working pressure value:

a) working temperature: the higher the temperature, the lower the working pressure of the hose must be.
b) bending radius: the smaller the radius used in the installation, the lower the working pressure must be.
c) In cases where the applied pressure is higher than the specified working pressure, the service life of the hose will be compromised.

4.7 Conditions of use location

The environmental installation conditions must be suitable to avoid damage to the hoses due to external causes that could compromise their useful life, such as: place them near heat sources, sharp or cutting objects, vehicle and pedestrian crossings, vandalism etc.

4.8 Pressure Loss

Pressure loss is the energy lost by the fluid's path when it flows through a pipe and depends on some factors:

- inner diameter of the pipe;
- flow, or more specifically the flow speed;
- pipe internal roughness of the pipe manufacturing material (steel, PVC etc.);
- pipe length;
- devices or connections existing on the circuit/route;
- working temperature.

Any type of complementary (auxiliary) accessories where localized load losses occur is considered devices or connections (bends, reduction sleeves, bifurcations, valves, registers, check valves).

Some pipe manufacturers' catalogs contain tables or abacuses that indicate the pressure loss as a function of the flow rate for the several pipe diameters. These values are usually given for every 1 meter or 100 meters.

4.8.1 Calculation

The basic calculation to estimate the pressure loss in a discharge system is divided into three stages, where the result of each one is obtained, everything is added up to obtain the total pressure loss for the system and thus verify the type of equipment to be used and whether the hose or pipe to be used supports the pressure that the system will receive.
The three calculation steps consist of:

- calculation of the pressure loss distributed along the piping;
- calculation of localized pressure loss in registers, connections, foot valves, check valves etc.;
- calculation of the pressure loss caused by the manometric height (action of the acceleration of gravity).

4.8.1.1 Calculation of Distributed Pressure Loss along the Piping

It is calculated using the following equation:

$$\Delta P = \lambda \times \frac{V^2}{2xg} \times \frac{L}{D}$$

Where: ΔP = distributed pressure loss (m)
λ = friction factor of the pipe material (example: PVC use 0.03)
V = velocity of the fluid inside the pipe (m/s)
g = acceleration of gravity (9.81 m/s^2)
L = pipe length (m)
D = pipe inner diameter (m)

If the speed used in the pressure loss calculation equation is not known, but the flow rate recommended or desired by the user is provided, we can calculate the speed according to the expression below:

$Q = V \times A$

Where: Q = flow rate (m^3/s)
V = speed (m/s)
A = pipe internal area (m^2)

There are cases where the user already has a motor-pump set and wants to use it in a specific application. In this case, they should consult the pump manufacturer's catalog to obtain the performance curve.

4.8.1.2 Calculation of Localized Pressure Loss

Localized pressure loss is normally defined in tables and abacuses. These losses are related to curves, reductions or changes of the section areas due to the accessories installed throughout the system. Basically, the pressure loss cause in these situations is due to the turbulence created within the piping. The pressure loss value is normally expressed in meters.

4.8.1.3 Calculation of pressure loss caused by manometric height

This pressure loss is due to the action of gravity based on the difference in height between two points, a value measured in meters.

4.8.1.4 Total Pressure Losses

$$\Delta total\ (m) = \Delta distributed\ (m) + \Delta localized\ (m) + \Delta manometric\ height\ (m)$$

As the value found is expressed in meters (mca = meters of water column), divide by 10 to obtain the answer in kgf/cm^2.

5. Kanaflex Product Lines by Application

5.1 Light Duty

KE: *Light Duty Suction and Discharge - Clear with Green, Yellow, Black or Blue Spiral*
KM-L: *Light to Medium Duty Suction and Discharge - Clear with Blue Spiral*

5.2 Medium Duty

KM: *Medium Duty Suction and Discharge - Clear with Blue Spiral*
KMV: *Medium Duty Suction and Discharge - Green*
KTS-T: *Medium Duty Suction and Discharge - Clear with Spring Steel Spiral*
KP-L: *Medium to Heavy Duty Suction and Discharge - Clear with Orange Spiral*

5.3 Medium Duty - Drag Resistant

KMH: *Liquid Discharge - Drag Resistance - Clear with Blue Spiral*

5.4 Heavy Duty

KP: *Heavy Duty Suction and Discharge - Clear with Orange Spiral*
KPG: *Heavy Duty Suction and Discharge Reinforced - Clear with Orange Spiral*
KCL: *Super Heavy Duty Suction and Discharge - Abrasive Materials - Dark Gray with Orange Spiral*

5.5 Extra Heavy Duty and Concrete

KC: *Suction and Discharge Extra Heavy Duty - High Abrasion - Dark Gray*
KCG: *Extra Heavy Duty Suction and Discharge - High Abrasion - Dark Gray with Gray Spiral*

5.6 Fuel or Petroleum Derivatives

KO: *Suction and Discharge - Petroleum Derivatives - Brown with White Spiral*
KFA: *Suction and Discharge - Petroleum Derivatives - Brown with White Spiral and Antistatic Wire*
K-TANK: *Suction and Discharge - Petroleum Derivatives - Black with Orange Spiral and Antistatic Wire*

5.7 Super Light Air Vacuum

KVL: *Super Light Duty Air Vacuum - Light Grey*

5.8 Light Air Vacuum

KV: *Light Air Vacuum Duty - Light Gray*

5.9 Reinforced Air Vacuum

KEV: *Reinforced Air Vacuum Heavy Duty - Metallic Blue*

5.10 Medium Air Vacuum

KEL-S: *Medium Duty Air Vacuum - Dark Blue or Metallic with Gray Spiral*
KEL-SC: *Medium Duty Vacuum Air - Dark Gray*

5.11 For Washers

KEL-B: Washing Machines - Gray

5.12 Non-toxic

KA: *Non-toxic - Transparent with White Spiral*
KA-L: *Non-toxic - Transparent with White Spiral - Light*
KA-NP: *Non-toxic - Phthalate Free - Transparent with Light Blue Spiral*
KAF: *Non-toxic - Transparent with White Spiral and Antistatic Wire*
KAT: *Non-toxic - Transparent*
KAT-L: *Non-toxic - Transparent - Light*
KAV: *Non-toxic - Transparent with Red Spiral*
KEF: *Non-toxic - Transparent with White Spiral and Anti-static Wire - Lightweight*
KTS: Non-*toxic - Transparent with Spring Steel Spiral*

5.13 Polyurethane/Elastomer

KPU-BOR: *Hot Gas Conduction - Black with Spring Steel Spiral*
KPU-C: *Abrasive Suction and Conduction - Transparent with Copper - Plated Steel Spiral*
KPU-C-HD: *Abrasive Suction and Conduction - Transparent with Copper - Plated Steel Spiral - Reinforced*
KPU-Z: *Abrasive Suction and Conduction - Transparent with Zinc Plated Steel Spiral*

5.14 Self Floating for the Pool

KF: *Swimming Pools - Floating - Clear with Blue Spiral*

5.15 Flexible Water Pipe

CDF-A: *Flexible Water Pipe - Blue*
CDF-HD: *Flexible Water Pipe - Red*

5.16 For Welding Machines

KANASOLDA: *Industrial Welds - Green/Red with Black Interior*

5.17 Braided

KANAGARDEN: *Gardening - Green, Blue or Orange with Black Interior*
PT150 / PT250: *Braided Crystal - Transparent*
KANASPRAY: *With Mesh - Irrigation Pivot - Black*
KAR: *With Mesh - Air Water - Black*
KANAFLEX500: *With Mesh - Spray - Orange or Black with Green Interior*
SANSUY SUPER: *With Mesh - Spray - Black or Orange with Green Interior*
KLA: *With Mesh - Car Wash - Blue with Black Interior*
OFFSHORE-PRO: *Diving - Yellow*

5.18 Exhaustion

KANAESCAPE: *Gas Exhaust - Gray with Spring Steel Spiral*

6. Useful Recommendations

6.1 Concrete Pumping

This specific application requires several precautions as there are greater demands on the hose used, which is the KC type.
The hose in this case is located at the end of the line and has the function of enabling the distribution of concrete over a certain area through its movement (flexion).
As concrete is a material with high viscosity, the pumps used have great power, generating high system pressure. In the event of a blockage, there is a high chance that the hose will be damaged, such as its bursting.
Another factor is the high abrasiveness of concrete, which causes wear on the product's walls over time.

Some recommendations to increase the lifespan of your hoses are presented below:

- before pumping the concrete, pass water through the hose;
- before pumping the concrete, pump the mortar into the hose;
- avoid making sudden turns during pumping, as this can cause clogging and rupture;
- avoid sharp turns;
- for concrete mixes where a lot of stone is used, be very careful (it is subject to clogging);
- for use at the tip of the spear, tie the hose with rope to prevent it from falling;
- where there is a risk of localized wear, using the rubber sheet as protection increases its durability (on the outside of the hose);
- change the position of the hose in relation to the spear flange frequently to avoid localized wear. (see figure 2)

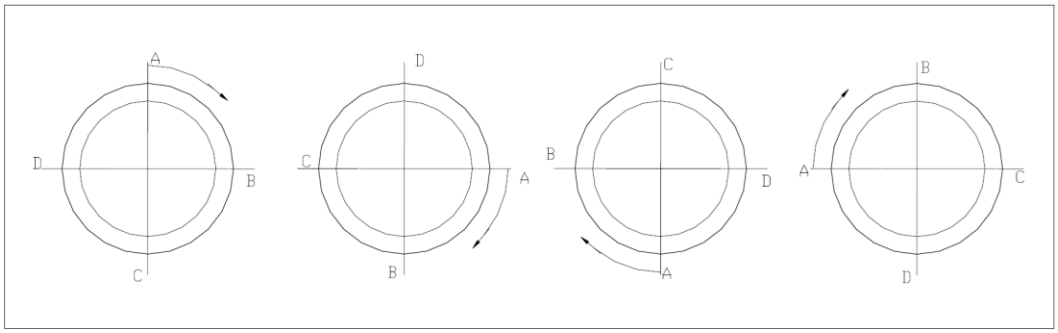

Figure 2

- avoid using the ferrule at the end of the hose, as it reduces the cross-section and increases the internal pressure in the hose. (see figure 3)

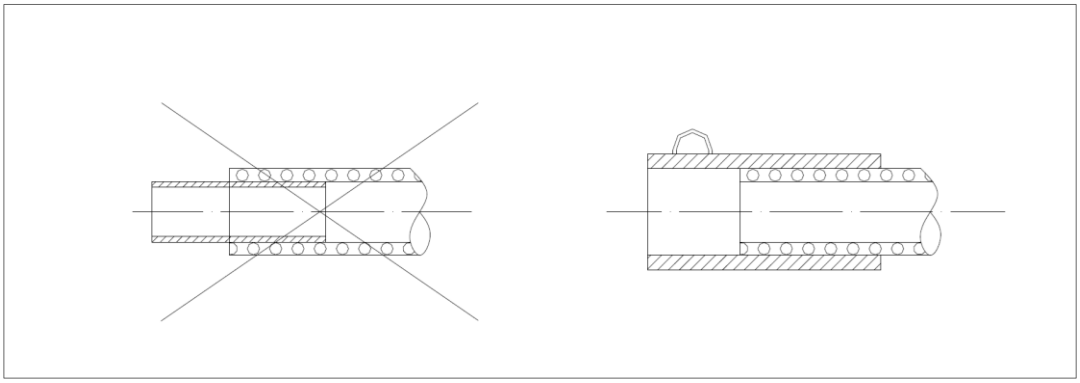

Figure 3

- During pumping, avoid immersing the tip in the concrete mass. (see figure 4)

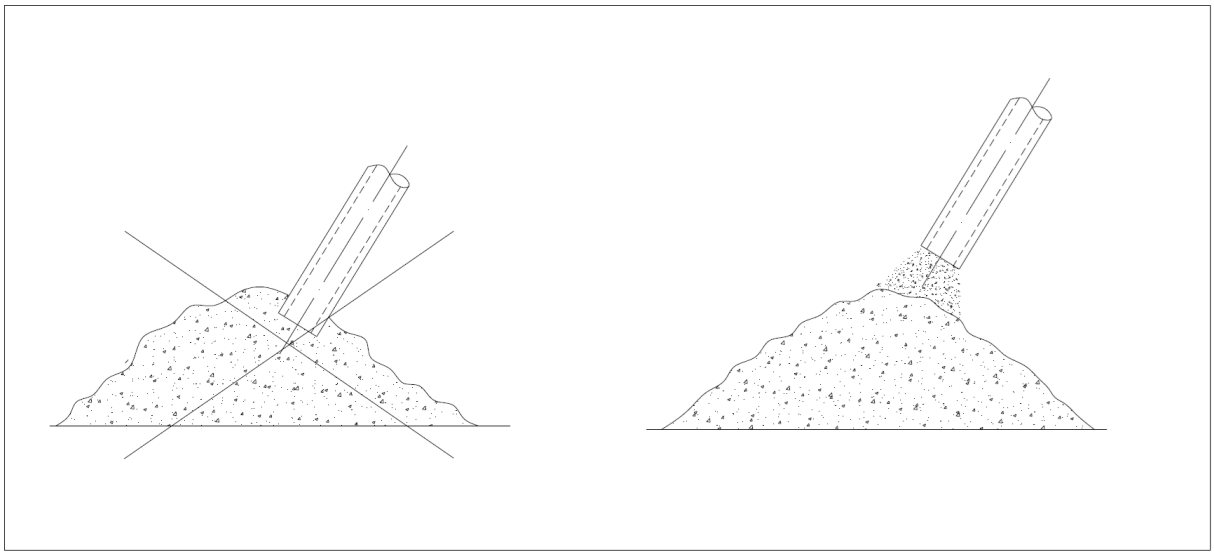

Figure 4

- gradually increase the pumping pressure until reaching the working mode;
- completely use up the concrete during stops, especially at lunchtime, or during stops lasting more than 1 hour;
- wash with water after each pumping.

6.2 Assembly Procedures for PVC Spiral Hoses

6.2.1 Cold Couplings

It is the simplest system, where the hose is inserted into a tube with an external diameter equal to the internal diameter of the hose and then fixed with clamps.

- *Advantages*: simplicity and easy disassembly;
- *Limitations*: supports limited pressures, being recommended only for small diameters (maximum 2”), possible sealing problems.

6.2.2 Coupling by Heating the Hose (Without Prior Expansion)

Most common system, taking advantage of the elasticity of the heated hose to couple it to a pipe or coupling with an external diameter slightly larger than the internal diameter of the hose.

Hoses can be expanded as follows:

- Ø1” to Ø3” – up to 10% of the diameter;
- Ø4” – up to 8% of the diameter;
- Ø5” to Ø12” – up to 5% of the diameter.

Most standard types of couplings found on the market can be used.
For special cases, with greater pressure, we recommend the metal union type (metal spike), with spaced grooves, as shown in Figures 6, 7 and 8.
Give the clamps a gentle first tightening immediately after coupling. Once cold, finish tightening.

- *Advantages:* withstands even the maximum hose pressures. Applicable to all diameters.

6.2.3 Heating with Water

- To assemble connections or tubes in smaller hoses, where handling is easier, use boiling water;
- To soften the hose, it must be submerged in boiling water for a certain amount of time;
- This heating time, in minutes, must be proportional to the hose gauge and its thickness, that is, the larger the gauge and thickness, the longer the heating time should be. For example, for a 5" hose, it takes approximately 8 to 10 minutes;
- To avoid deformation during heating, avoid pressing the hose against the walls or bottom of the container with boiling water;
- Before coupling, also heat the coupling with boiling water so that the hose does not cool before the fitting is completed;
- Apply grease or petroleum jelly to the coupling for lubrication;
- Once the hose has softened, insert the end of the coupling into the hose and tap it against a surface (floor for example).

6.2.4 Flame Heating

- Option for when there is no possibility of using the previous method;
- For larger gauges that are difficult to handle, use two torches simultaneously to heat the external and internal surfaces of the hose;
- Leave the tip free from the ground to facilitate the application of flames;
- Take due care not to burn the hose, and always move the flame carefully;
- Heating time is longer compared to boiling water, and can take 20 to 30 minutes for large gauges;
- To facilitate assembly, it is important that the rigid PVC that makes up the spiral must also be softened;
- Before coupling, also heat the coupling so that the hose is not cooled before the fitting is completed;
- Apply grease or petroleum jelly to the coupling for lubrication;
- Once the hose has softened, insert the end of the coupling into the hose and tap it against a surface (floor for example).

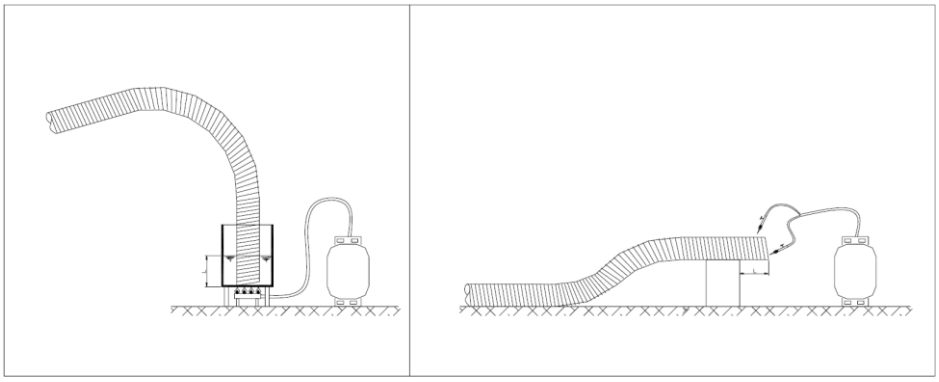

Figure 5 - Hose heating methods

6.2.5 Coupling with Spaced Grooves (Metal Spike)

- Option for use with cold coupling using a metal spike directly mounted on the internal diameter of the hose.

b = distance between grooves (twice the width of the clamps)

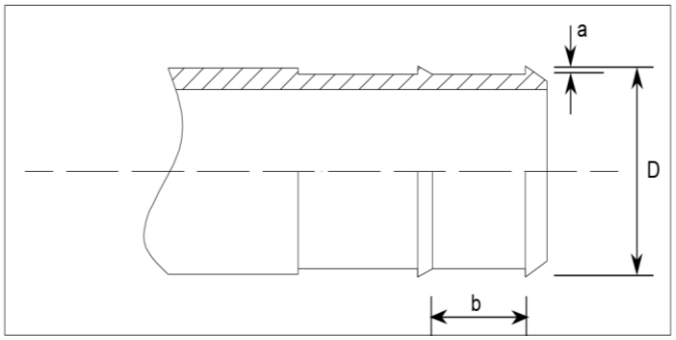

Figure 6 - Coupling with grooves

Hose Diameter (in.)	D – groove diameter (mm)	a – groove height (mm)
2/1”	15	1.0
8/5”	19	1.0
4/3"	22	1.0
1”	29	1.0
1.1/4”	36	1.0
1.1/2”	41	1.25
2”	54	1.25
2.1/2”	67	1.25
3”	79.5	1.5
4”	105	1.5
5”	133	2.0
6”	158	2.0
8”	210	2.5
10”	262	2.5

Table IV

- Correctly positioned clamps: right in the center of the space between the grooves (Figure 7).

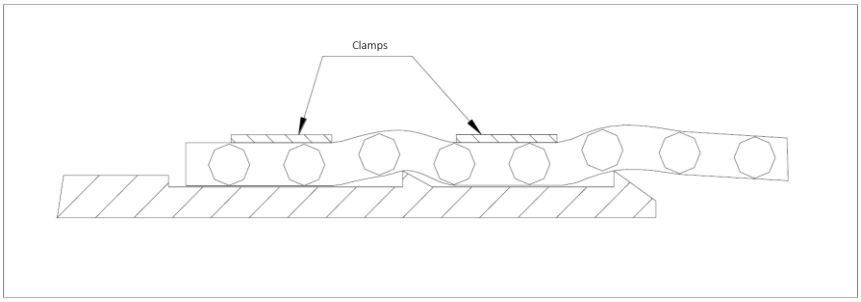

Figure 7

- Incorrectly positioned clamps: situations like this or similar may damage the hose (Figure 8).

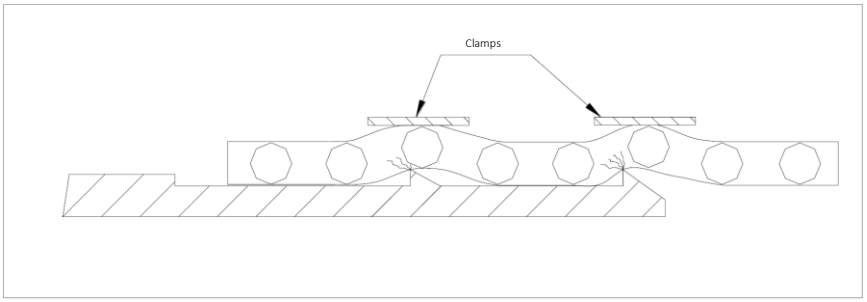

Figure 8

6.2.6 Coupling with Pre-Expansion (Cuffs)

Two-step coupling system to obtain a joint with equal internal diameters in hoses and couplings.

Recommendations:

- To heat the tip of the hose that will be expanded, follow all the instructions in the method described in item 6.2.3, except for the heating liquid, which in this case must be glycerin,

ethylene glycol or mineral oil, heated to approximately 150ºC. (If you do not have a suitable thermometer, heat the bath until there is plenty of smoke);

- To expand, use the expanding mold, as shown in Figure 9, which can be made of metal or good quality wood;
- Before the expansion operation, the mold must be heated in boiling water and then lubricated with grease or oil;
- If the final coupling is made immediately after expansion, we recommend to leave the expansion mold inserted into the hose for a few minutes, remove it and wash the hose with boiling water and detergent to remove any lubricant residue. Then, before the hose cools down, connect it following the instructions in the previous method;
- If there is a delay between the expansion and coupling operation, the hose must be completely cooled still mounted in the expansion mold. The coupling must be done according to the instructions of the method described in item 6.2.3, reheating the hose with hot water for a short period of time.
- For the coupling pipe or spike, all the recommendations and figures from the previous methods are valid, except for the diameter, which must now correspond to the internal diameter of the expanded hose.

Advantages: the coupling withstands the maximum hose pressures; the system is applicable to any hose diameter; the flow conditions in the coupling are excellent.

Hose Expanding Mold:
A = diameter of the expanding mold
B = length sufficient to couple with two clamps
C = equal to or slightly smaller than the hose diameter

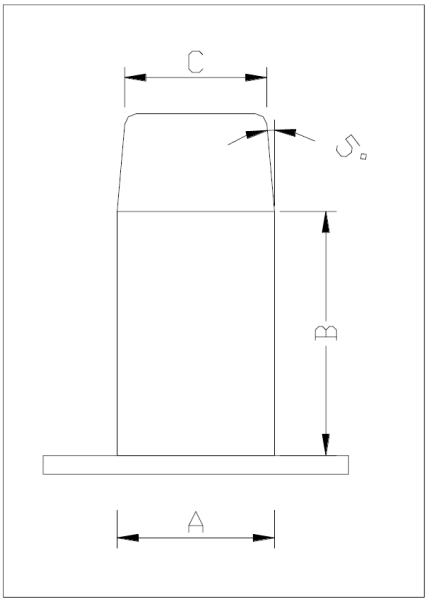

Figure 9

Hose Inside Diameter (in.)	A = Expander diameter (mm)
2/1"	16
8/5”	16
4/3"	20
1”	32
1.1/4”	41
1.1/2”	47
2”	60
2.1/2”	71
3”	87
4”	113
5”	140
6”	166
8”	216
10”	270

Table V

6.2.7 Flanged coupling

Two-step process, recommended for hoses with diameters greater than 2”, which allows hoses to be coupled to normal couplings or to other hoses.
The details for heating the hose are similar to those described in the immediately preceding method described in item 6.2.3, using liquids heated to 150ºC.

The flanging mold can be made of metal or good quality wood, with a very well polished surface (see figure 10).

Hose Diameter	A	B	C	D
(in.)	(mm)	(mm)	(mm)	(mm)
2”	70	50.0	150	10
2 ½”	70	62.5	175	10
3”	90	75.5	190	15
4”	110	100.5	225	20
5”	130	125.5	250	22
6”	150	150.5	275	25
8”	150	201.5	340	30
10”	150	252.0	405	32

Table IV

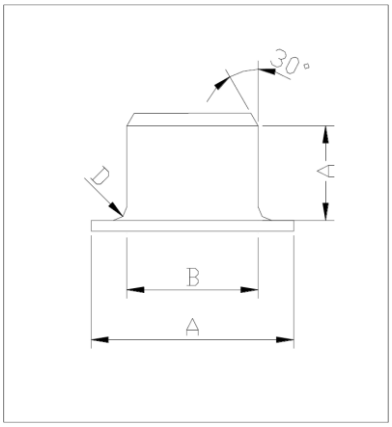

Figure 10

The mold is introduced heated and lubricated, and will only be removed when the hose is completely cool.
The flanged hose must be washed with cold water and detergent.

6.2.8 General Recommendations for Coupling our Hoses

- Avoid any form of heating more intense than those described, such as direct electrical resistances, etc. Either of these will burn the surface of the hose without properly heating the inside;
- Avoid non-specific adhesives, which generally do not solve sealing problems and can affect the hose;
- Never couple the hose to threaded surfaces;
- The clamps must completely enclose the hose, as in the common types available on the market and which we reproduce below (Figures 11 and 12). For best results, we recommend to apply grease to the inner surface of the clamp. This improves pressure distribution, making it uniform.

Figure 11

Figure 12

6.3 Assembly Procedures for Hoses Braided with Synthetic Yarns

Correct installation of the connections is essential for good system performance and increased hose life.

Therefore, we have defined some simple but very important steps to ensure that the hoses and connections are assembled correctly, to eliminate any problems that may arise over time.

6.3.1 Example of Braided Hose Composition

Braided hoses are made up of 3 basic elements:

1. inner tube;
2. reinforcement or mesh, and
3. outer covering.

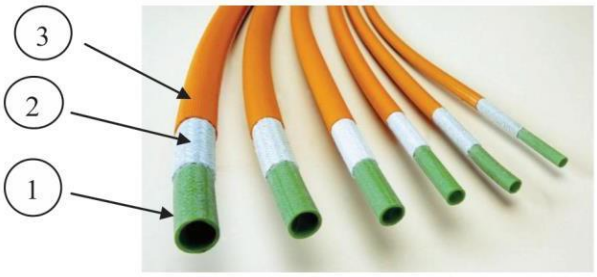

Figure 13 – The 3 basic elements of a braided hose

The inner tube's main function is to facilitate the liquid conduction.
The reinforcement or mesh consists of a weave of textile threads, whose function is to provide the necessary resistance to internal pressure forces.
The main function of the external coating is to protect the reinforcement and the inner tube against damage caused by abrasion, weather and chemical agents.

6.3.2 Materials Required for the Correct Assembly (Not Supplied)

- screwdriver;
- stylus;
- clamps;
- connections compatible with the diameter of the hoses;
- fine file or sandpaper.

NOTE: Connections and other accessories are found in farm shops and hardware stores.

Figure 14

Figure 15

Figure 16

Figure 17

6.3.3 Assembly of Connections in Braided Hoses

1	Using the stylus, cut the ends of the hoses at a 90° angle.	 
2	Place the clamp loosely on the end of the hose to be connected.	 
3	Check if the ends of the connections have sharp corners or burrs that could cause cuts in the hose. Remove them with the help of a fine file or sandpaper.	
4	After placing the clamp, immerse the end of the hose in hot water and leave it for a few minutes to facilitate the connection fitting. Then, apply lubricating paste, detergent or soap to the connection to reduce friction and prevent possible damage to the inner layer of the hose. Insert the connection into the hose in a straight line with uniform force, avoiding jerks.	
5	To secure the clamp, tighten it with extreme caution, using a screwdriver. Check that the hose is not twisted after assembly.	 
6	**We do not recommend** the use of any type of wire to secure the connections to the hoses, as they can cause cuts or holes in the inner layer, due to the small contact area.	 

Observation: We do not recommend assembling pressed terminals used in hydraulic hoses, as they can damage the structure of the braided hose and cause possible infiltrations, bubbles or ruptures along the length of the hose.

6.4 Storage

Kanaflex hoses must be stored in places free from any elements that could damage them, such as: metal objects, stones, hard surfaces with sharp edges etc.
Avoid dragging the hose excessively over very abrasive floors, with stones or sharp objects.
We recommend that hoses are stored in covered and ventilated places, as when exposed to excessive sunlight and heat, the loss of their properties may accelerate, thus reducing their useful life.
Do not store heavy hoses on top of lighter ones, thus avoiding damage to the diameter (deformation).

6.5 Transport / Handling

During the transportation and handling of hoses, shocks, friction or contact with elements that could compromise their integrity must be avoided, such as: metallic or sharp-edged objects, stones etc. The same guidelines described in item 6.4 must be followed.
In the case of hoses braided with polyester thread, when winding and unwinding the hose, avoid twisting and/or strangling it, as this may damage it.

7. Pre- and Post-Sales Services Available

7.1 Technical Visits

Technical visits must be requested by the customer via email or phone call; Requests are analyzed by the Sales team who can schedule a visit and provide more technical details about our products.

7.2 Technical Consultations

Technical consultations must be made via email or telephone; and they are received by the Sales or Marketing team to be previously analyzed to:

- Check the feasibility of using products manufactured or sold by us;
- Check the feasibility of developing or customizing a new product;
- Determine which product/type/gauge is ideal for the application in question;
- Identify particularities/problems/suggestions to improve the application.

7.3 After-Sales

Customer service to request information, answer questions or make complaints.

NOTES:

1) A Kanaflex S.A. Indústria de Plásticos has as its principle the continuous improvement of the products it produces.
   Any changes, corrections and additions may be inserted into your specification without prior notice, always aiming at its improvement.

Any doubts?
Please call 55 (11) 4785-2100

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