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## NORMALISATION AFNOR T 47-212 / Septembre 1986

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Tuyaux souples et flexibles à base de caoutchouc et/ou de matières plastiques

### **GUIDE DE BONNE PRATIQUE POUR LE CHOIX, LE STOKAGE, L'UTILISATION ET L'ENTRETIEN**

E: Code of practice for the selection, storage use and maintenance of rubber and plastics hoses and hose assemblies

D : Schläuche auf Gummi-und/oder Kunststoffbasis - Praktischer Leitfadenauswahl, Lagerung, Benutzung und Wartung

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#### Correspondance

A la date de publication du présent fascicule de documentation, il existe l'ISO/DIS 8331 traitant du même sujet. Les deux documents sont équivalents.

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#### Analyse

Le présent fascicule de documentation est destiné à permettre aux utilisateurs de tuyaux souples et de flexibles à base de caoutchouc et/ou de matières plastiques d'obtenir une durée de service optimale de ces articles, compte tenu des différentes conditions d'utilisation.

#### Descripteurs

Thésaurus International Technique : tube en caoutchouc, tube en matières plastiques, choix, stockage, conditions d'utilisation, entretien, spécification.

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#### Modifications

#### Correction

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## ***SUBJECT AND APPLICATION AREA***

This documentation provides you recommendation regarding the hoses use. Both hoses made of rubber and/or plastic material.

It also contains recommendations which allow you to maintain your goods in the same state as you received them and in good working and serviceable order.

### **Part A – GENERAL RECOMMENDATION**

Chapter 1 : Choice test

Chapter 2 : Stocking conditions

Chapter 3 : Uses and Upkeep rules

### **Part B – SPECIFIC APPLICATION – FURTHER RECOMMENDATION**

Chapter 1 : Welding and oxy-cutting

Chapter 2 : Steam

Chapter 3 : Products and foodstuffs for alimentation

Chapter 4 : Abrasive products

Chapter 5 : Aggressive and corrosive products

Chapter 6 : Inflammable products

## **Part A – GENERAL RECOMMENDATION**

### **1 – CHOICE TEST**

*1. Several points must be taken when you choose a hose for a use*

2. Pressure – Depression

Working pressure – Depression

Pressure shock

1.1.2 Flowed products

Nature – Description – Concentration – Temperature of use –

State : liquid, gaseous, solid (density, granulised)

Nature : carrying solid

frequency of use

1.1.3 Environment

Place of use – Ambient temperature – Protection from ozone – Products which can be in contact with extremities exceeding that of the hose.

1.1.4 Mechanical constraints

Bending radius – Eventual constraints, traction, to consider twisting, deflection, vibration, compression, Check the working position on the ground, immersed, suspended.

1.1.5 Assembly

Fitting : Type, dimension, type of thread

Tubulure : Internal and external diameters fitting lengths

Flange : Type, dimension

Methods of securing

1.1.6 Particular points

Check customers requirements carefully. Make sure that the hose is suitable.

*1.2 If any needed information is not included in the leaflet, please get in touch with the hose manufacturer.*

## **2 – STOCKING CONDITIONS**

### *2.1 General information*

When stocked a long time, hoses lose their properties. Please take the following precautions in order to avoid damage to stock.

### *2.2 Length of time in stock*

You must reduce the time in stock as much as you can. You will need to enforce a rotation with your products as the first in and first out method.

If you can not avoid holding stock for more than one year, the product must be checked before being used.

### *2.3 Temperature and humidity*

Keep the time in stock as short as possible. Make sure that your first ones to be sold. If any stock is kept for over a year, you must verify that the ambient temperature is between 0° and 35° C (the optimal temperature is 15° C). The temperature must not exceed 50° C or – 38° C as this could render the hose useless.

Under low temperatures, hoses become rigid and precautions must be taken when temperatures drop below –15° C. The relative humidity must not exceed 65% for the hoses to perform correctly.

### *2.4 Light*

Flexible hoses must be stocked in a dark place with no sun or high artificial light. If the stock room possesses windows, they must be covered with paint or a film with colour such as red, orange or white.

### *2.5 Ozone*

Ozone has an adverse effect on the rubber products. The stocking area must not have material which can produce it, such as lamps, vapour tubes with mercury, electrical material, high voltage, electrical engine, or other material which can make sparks.

### *2.6 Environment*

Flexible hoses must be in contact with some products, and have no exposure to their vapour, such as solvents, petroleum, oils, acids and disinfectant products. Again avoid some metal like copper, iron, manganese : These are harmful when in contact with rubber.

### *2.7 Sources of heat*

If you can, it is the best to put a thermos screen between the heating source and hoses.

### *2.8 Electrical or magnetic area*

You must exclude any electrical or magnetic variation because it can provide some electrical running in the fittings and warm them up.

### *2.9 Stocking conditions*

Flexible hose must be stocked without any constraint, excessive deformation or stretching. Please avoid contact with cutting or angular tools.

They must be stocked on dry floors, and if it is possible, put them on setting boxes.

Please do not squeeze them and just lay them down randomly. If you can not avoid them piling up, please limit the height, in order to not make any deformation in the hoses.

Furthermore, the internal diameter of the coiled hose must be equal to the bending radius specified by the manufacturer or the product standard. Do not make any ply when hoses are delivered in length. The heaviest one must be at the bottom, the highest on the top.

### *2.10 Rodents*

You must keep flexible hoses away from rodents (as rats and mice). If there is any risk, you must take some precautumary measures.

### *2.11 Coming out of the workshop*

Please always check that the delivery goods are correct, and correspond to the customers needs. A correct identification is essential.

If flexible hoses are kept in stock for any length of time, the fittings must be checked for correct tightness and stability.

### *2.12 Coming back to the workshop*

Before putting them back in stock, you must check that the flexible hoses are empty. Special care must be given to the hoses which have flowed chemical and corrosive products. After cleaning and before putting back them in stock, verify their state for a further use.

### *2.13 Cleaning*

You can clean the flexible hoses with soap and water, along with rags and sponges. Again take precautions with chemical or corrosive products. Use of wire brush, abrasive and cutting tools must be avoided.

### **3 – MAINTENANCE AND RULES USED**

#### *3.1 Handling*

When you want to move flexible hoses, it is better to carry them rather than dragging them. They must be treated with care, with no sudden shocks and in particular no vehicles must drive on them.

#### *3.2 Pressure*

Flexible hoses must be used with higher pressure than their specified working pressures.

#### *3.3 Temperature*

Hoses can be only used at manufactured specified temperature.

#### *3.4 Carrying products*

Products can be vehiculed only by hoses made for these specification. If you do not know, the manufacturer must be consulted. Out of the working time, flexible hoses must be out of pressure. When dangerous products are used (toxic, corrosive, explosive and inflammable), some measures have to be taken in order to limit the consequences of a lack of an accidental burst on a hose.

#### *3.5 Environment*

The flexible hoses must be used in the environment at conditions they are made for. If used in an environment out of the ordinary, please contact the manufacturer.

#### *3.6 Bending radius*

The flexible hoses must be used under bending radius equal or more than the minimal bending radius specified by the manufacturer. Furthermore, bending and kicking , just after the swaging ferrules have to be avoided.

#### *3.7 Torsion*

In general, flexible hoses are not made to work in torsion.

#### *3.8 Traction*

The traction effect has to follow the specified limits. Ask your manufacturer.

### *3.9 Vibrations*

Vibrations make the hoses suffered. Friction will cause the fittings to overheat and can burst the hose too early. Before ordering, you must check that the hoses can resist these constraints.

### *3.10 Folding*

Some users stop the fluid by folding the hose. Please be aware that repeated floding will make your hose suffered and can cause them to burst.

### *3.11 Choice and assembling of fittings.*

#### 3.11.1 General information

You must respect the recommendations of the manufacturers concerning the compatibility of the used fittings pressure with the used hose pressure.

#### 3.11.2 Particular points

You have to assure that the fittings used are compatible with the inner diameter of the hose because of pressure. Please consult the manufacturer, because if the fittings diameter is too big or too small, constraints can appear.

To make easier the penetration of the fittings, you can use soap and water. Please do not use oil (except is it is the vehiculed product).

Before assembling, do not try to make your extremities hose supple with a hammer for example because the reinforcement can be stressed. During the assembly, avoid too many torsion constraints.

#### 3.11.3 Concerning the fixation and external ring clamp, you must :

- Respect the recommendation of the hoses manufacturer,
- Check that there is no cutting parts,
- Avoid excessive tightening which can damage the covering and the reinforcement of the hose.

### *3.12 Pressure test*

After the assembly, it is recommended to provide an hydraulic test under pressure in order to check the fittings (no leak and no slide of the fittings from the hose). If the test pressure is not fixed by approvals, it will be indicated by the hoses manufacturer. If in doubt, consult it.

### *3.13 Draining off the static electricity*

While you have to respect some exigencies on the continuity of the electricity, you have to follow exactly the recommendations of the manufacturer. You have to control the fittings after assembling.

When there is no flexible resistance, the control can be made by simplified equipment (as a quick test), on the other hand, use of an elaborated machine is required.

### *3.14 Fixed installation*

Hoses used on fixed installation have to be supported by a convenient stable fixation but allowing normal movement of the hose under pressure (length variation, external diameter variation, ...).

### *3.15 Mobile units*

When flexible hoses must be connected to mobile units, you have to be sure of :

- The length of the hose, ensuring the minimum length is sufficient,
- That these movements would not give any shocks to the flexible hoses, jamming, rubbing, would not make abnormal constraints, bending, folding or torsion. That all fittings are secured and safe from leakage and loosening.

### *3.16 Reference marks*

If you need more than the normal marking, you can use a reference mark with an adhesive tape ring. If you must use paint, you have to consult the manufacturer as not all the hose material are compatible with the solvents used in the paint industries.

### *3.17 Maintenance*

Routine maintenance is needed on hoses because of their recommendations and used at periodic service has to be made in order to check their capacities to work.

In particular, you need to keep attention to the fittings. Please look for the following points :

- Cracks, fissures, stresses, unsticking,
- Deformation, blisters, localised swelling because of the pressure,
- Sticky or softened areas because of chemical products attacking on the hose,
- Leakage.

These abnormatives justify the substitution of the hose. Furthermore in some utilisation and for security, on the hose can appear a pre-emption date. Please do adhere to this date, even though the hose seems in a good state.

### *3.18 Repairing*

In general, we do not advise you to repair a defect hose. But in some case, if a repair is possible, the manufacturer's inscription must be strictly followed and at the end, a control must be done under a test pressure.

If an area of hose is below standard and the length permits the effected area can be cut out.

## **Part B : COMPLEMENTARY RECOMMENDATIONS FOR SPECIFIC APPLICATIONS**

These recommendations complete the general recommendations in part A, which have to be respected in all application areas.

### **1 – WELDING AND OXY-CUTTING**

For these application, the used fluids are oxygen, acetylene, liquefied petroleum gas (LPG), non combustible neutral gas (argon, azote, carbonic gas). In order to avoid any connection mistakes, and allow you to use an adapted hose for each fluid, the hoses are identified with colours :

Blue : oxygen

Red : acetylene

Orange : LPG

Black : Non combustible neutral gas

In no case should these hoses be used for another application.

### **2 – STEAM**

Other than the general recommendations given in part A, particular points need to be highlighted.

#### 2.1 How to choose

The hoses which are in the manufacturer catalogue are made for the carrying of saturated vapour, there is a direct relation between the temperature and the pressure.

In the case of the carrying of superheated vapour or water, you must consult the manufacturers because in one hand, there is no direct relation between the temperature and the pressure, and on the other hand, the constraints are different.

Furthermore, if the work is not continuous, or if some cooling stages exist, the hoses tube is submitted to thermic shocks and can cause “POP CORNING”. In this case, the manufacturer has to be consulted before ordering.

## **POP CORNING**

### Development

When the circulation of the vapour is stopped or during the cooling stage, there will be a low temperature causing the water to condense, leading to a fall of the vapour pressure which is in the tube.

When the temperature is higher, this water vaporises again, with a rising of the pressure. With these thermic shocks, some bursting can be localised in the tube. The shape caused reminds us of the one of the maize grain, that is why it is known as pop coming.

### 2.2 Installation

You need to take care of the temperature, take precaution and technical measures in order to protect operators against the possibility of an eventual bursting.

## **3 – FOOD PRODUCTS – FOODSTUFFS**

In this area application, there are some strict rules and regulations. You have to be sure that these kind of hoses possess these regulation exigencies.

Furthermore, this usage imposes some rules concerning the cleaning and the rinsing for the hoses.

## **4 – ABRASIVE PRODUCTS**

To obtain an optimal life time, where possible, hoses should be kept straight.

the bending radius has to be the largest one. Narrow bending radius causes localised wears.

Furthermore, you need to pay attention to the electrical continuity in order to drain off the static electricity load because of the friction of carrying particles.

In the other case, hoses will be damaged because of the electrical flashes causing perforations.

For the fittings, you are advised to use external fittings in order to avoid abrasion. Please try to ensure that none of the fittings create turbulence, leading to localised wears.

## **5 – CORROSIVE AND AGGRESSIVE PRODUCTS**

These involve acids, bases, solvents, agro-pharmaceutical products and some chemical products.

When these carrying products do not appear in the vehiculed products list given in the technical documentation, or if the temperature limits or concentration are not within in the specified limits, then you must contact the manufacturer.

You must avoid the stagnation of products in hoses, particularly in the case of emulsions or solutions. And because of the decantation, permissible limits can be exceeded. It is recommended that the hoses are cleaned and rinsed.

## **6 – INFLAMMABLE PRODUCTS**

This family is based on liquid hydro-carbons (gasoline, fuel-oil, kerosene) liquefied or carbonated. For the stocking and the carrying of these products, in nearly all countries, there are some rules. Please abide by them.