

SPECIAL DETAILS

BULK HOSE SYSTEMS RECOMMENDATION

INTRODUCTION

The following recommendations were drawn up to improve the safety in the various processes involved with the application of the "PL" hoses during bunkering operations or loading/unloading between the supply vessel and rig.

Past evidence shows that a significant amount of oil spills into the sea were hose related.

The most common cause for a bulk hose failure is due to abrasion of the outer cover of the hoses rubbing against the sides of the installation structures/rig.

For this reason, the continuous commitment towards safety during the operations of loading and unloading of bulk hoses plays a very important role.

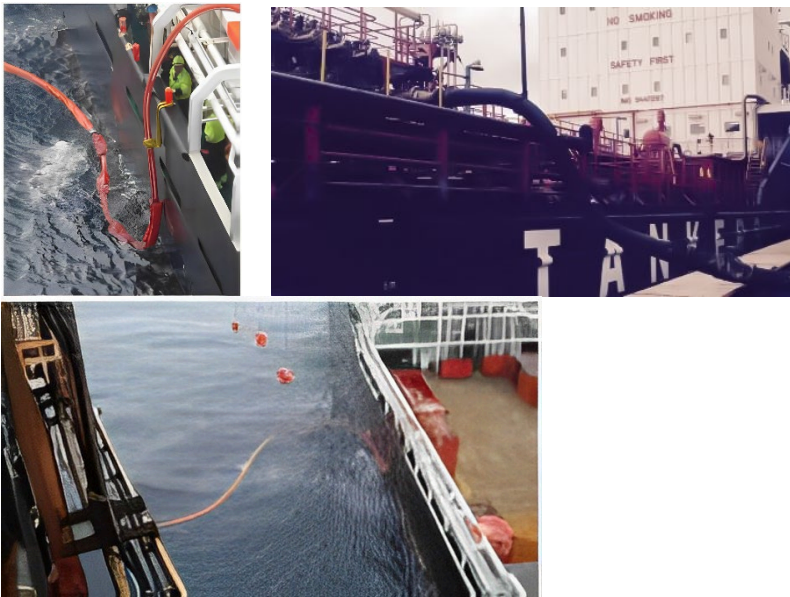
By complying with the proposed recommendations in these types of operations there will be a significant reduction of hose failure incidents.

When the hose is working in the position between the rig and supply vessel and is in contact with the installation structure/rig, contact areas need to be adequately protected.

Hose strings must never be suspended by wire slings as they may cut into the hose and damage the hose structure.

Incidences of wear and damage are accelerated when the hoses work close to the minimum bending radius recommended by the manufacturer.

We recommend visual inspections of the hose strings both prior to use and on completion of bunkering operations before returned to storage. In the following are some recommendations proposed by Assogomma in their Recommendation regarding choice, storing, use and maintenance of rubber hoses, June 2004 and Guidelines for Offshore Marine Operations, November 2013, by Norwegian Ship owners Association, OLF (Norwegian Oil Industry Association), Netherlands Oil & Gas Production Association, Danish Ship owners Association, Oil & Gas UK, United Kingdom Chamber of Shipping.



CHOICE CRITERIA

In order to choose a hose suitable for a specific use it is necessary to determine at least the following basic points:

Pressure - suction

It is necessary to determine the maximum working pressure or suction values. It should be taken into consideration that the normal life of the hose will be negatively affected in the case of a sudden pressure variation or pressure peaks exceeding the maximum allowed.

Compatibility of conveyed substances

The nature, designation, concentration, temperature, and state (liquid, solid, gaseous) must be determined. In the case of solid substances conveyed, it is necessary to indicate granulometry, density, quantity of the solid substance conveyed as well as the nature, speed and flow of the fluid carrying it.

Environment

It is necessary to know, ambient temperature, hygrometric conditions and exposure to atmospheric agents.

Specific environment conditions such as ultraviolet rays, ozone, sea water, chemical agents and other aggressive elements could cause early degeneration of the hose.

Mechanical stress

The minimum bend radius must be established as well as any stress related to traction, torsion, bending, vibration, compression, deflection and longitudinal or transversal loads.

Cover abrasion

Even though the hoses are manufactured to guarantee good resistance to abrasion, it is advisable to use further protection when damage to the hose may be caused by shock, corrosion and/or dragging.

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Used or foreseen couplings

This must be selected according to:

- coupling and flanges: type, dimension, type of thread, standard references and kind of application;
- ruffles: internal and external diameter and coupling length;
- brackets: type and dimension.

In order to guarantee good performance, the compatibility between the hose and type of coupling must be ensured. The assembly must guarantee the working pressure suggested by the manufacturer.

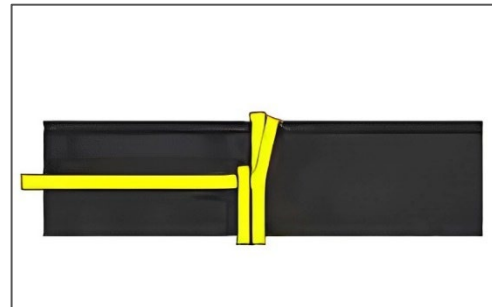
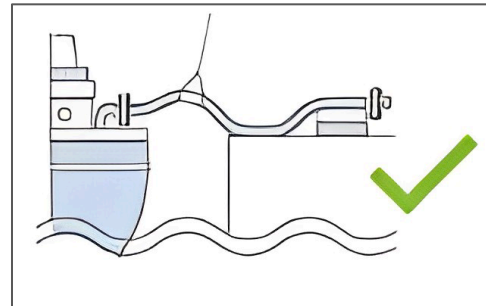
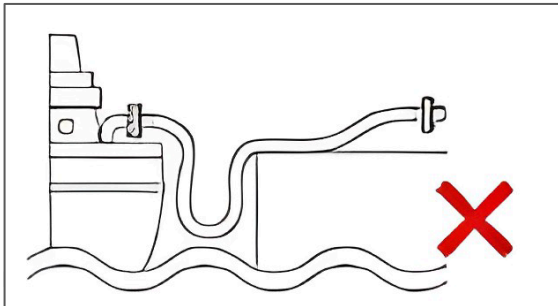
Marking

Manufacturers must mark hoses with the information necessary for the proper use of the product. Prescriptions from North West European Area Guidelines (NWEA) are recommended.

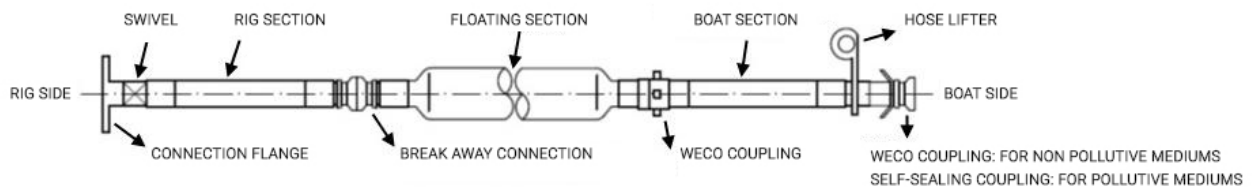
HANDLING AND ATTACHING HOSES

The handling and attaching of suspended hoses during the loading/unloading operations must be carried out with the suitable equipment e.g. round slings. The sling will be attached to the bulk hose using the "double wrap and choke" method and attached to the supply vessel.

The hose should not be suspended near the fittings; however if the hose is suspended when in movement or in use, it is necessary to apply a saddle to the hose to avoid damaging the hose cover.



EXAMPLE OF THE LAYOUT OF A STRING



This example covers the minimum constructive characteristics that make up a string.

The minimum configuration consists of at least three hoses where the first two sections of hose are a "hardwall" construction, whereas the last section, on the boat side, is a "softwall" construction. The central section must be floating, obtained by using flotation collars or self-floating hoses.

Flotation collars can also be used for the protection of hoses to help avoid accidental contacts with the installation structure/rig.

If flotation collars are used, we recommend reflective collars to assist during nocturnal operations.

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Technical specification of the string based on the application

HOSE APPLICATION	DIMENSION	COUPLING COLOUR	TYPE OF COUPLING	IVG HOSE TYPE
Dry cement	127 mm (5")	Yellow	Hammer union	PL Abrasive range
Dry barytes	127 mm (5")	Orange	Hammer union	PL Abrasive range
Potable water	102 mm (4")	Blue	Hammer union or self-sealing	PL Potable range
Diesel / Fuel	102 mm (4")	Brown	Self sealing	PL Fuel range
Base oil	102 mm (4")	White	Self sealing	PL Fuel range
Drill water	102 mm (4")	Green	Hammer union or self-sealing	PL Sea Water range
Oil based mud	102 mm (4")	Black	Hammer union or self-sealing	PL Mud range
Brine	102 mm (4")	Red	Hammer union or self-sealing	PL Brine range
Glycol	102 mm (4")	Purple	Hammer union or self-sealing	PL Sea Water or PL Fuel range
Scale inhibitor	102 mm (4")	No colour	Self sealing	Depending on fluid and concentration different compounds are available

The above colour and couplings information are recommendation from Northwest European Area Guidelines (NWEA). When a hose needs to be replaced in the string, it is recommended that the new hose be in accordance with the above specifications.

RECOMMENDATION FOR CORRECT STORAGE

Rubber by nature is subjected to change its physical properties. These changes, which normally occur over the course of time, according to the kind of rubber used, can be accelerated by one particular factor or by a combination of these. Reinforcement materials are also adversely affected by unsuitable conditions of storage. The following recommendations are some precautions to be taken to ensure the minimum deterioration to stored articles.

Storage life

Storage time should be reduced to the minimum through programmed rotation. When it is not possible to avoid long term storage, it is necessary that the user, as indicated in ISO 8331, carries out a complete check of the hose before its use.

Temperature and humidity

The best temperature for the storage of rubber hoses varies from 10 to 25 degrees centigrade. Hoses should not be stored at temperature above 40°C or below 0°C. When the temperature is below -15°C it is necessary to take precautions when handling. Hoses should not be stored near sources of heat nor in conditions of high or low humidity. A humidity level of a maximum of 65% is recommended.

Light

Hoses must be stored in dark places, avoiding direct sun light or strong artificial light.

Oxygen and ozone

Hoses should be protected from circulating air by suitable packing. As ozone has a particularly aggressive action on all rubber products, the store house must not contain material producing ozone like devices under high electrical tension, electric engines or other materials provoking sparks or electric arcs.

Contact with other materials

Hoses should not come into contact with solvents, fuels, oils, greases, volatile chemical mixtures, acids, disinfectants and other organic liquids in general. Furthermore, direct contact with some metals (for example manganese, iron, copper and its alloys) and relative mixture exercise harmful effects on some types of rubber. Contact with PVC and creosote impregnated timber or fabrics should be avoided.

Heat sources

The temperature limits given above must be respected.

Electric or magnetic field

Variation in electric or magnetic fields must be eliminated in store houses as these could provoke currents in metal coupling, heating them. Similar fields could be caused by high-tension cables or high frequency generators.

Storage conditions

Hoses must be stored in a relaxed condition free from tension, compression or other deformation and contact with objects that could pierce or cut must be avoided. It is preferable to store hoses on special shelves or on dry surfaces. Coiled hoses must be stored horizontally avoiding piling. When this is not possible the height of the piles must be such to avoid permanent deformation of hoses stored underneath. The inside diameter of the coil, during the storage, must be such as to not compromise the performances of the products. In particular, this diameter must

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not have value less than those indicated by the manufacturers. It is advisable to avoid storing coiled hoses on poles or hooks. Furthermore it is advisable to store hoses to be delivered straight, horizontally, without bending.

Marking of packaged items

It is advisable that hoses are always easy to identify even if packed.

Exit from storage

Prior to delivery hoses must be checked for integrity and must correspond to the required use. After long storage if couplings are not clipped, swaged or built-in, it is necessary to check that locking collars are tight.

Return to storage

Hoses that have been used must be free from all substances prior to storage. Particular attention must be paid when chemical, explosive, inflammable, abrasive and corrosive substances have been conveyed. After cleaning, the hose must be checked for integrity.

MAINTENANCE

Even though choice, storage and installation have been carried out correctly regular maintenance is necessary. Frequency of the latter is determined according to use involved. During regular check special attention must be paid to couplings and to the appearance of the following irregularities which show deterioration of hose.

As a basic guideline the following visual inspections should be in place:

- weekly inspections;
- pre and post use inspections;
- visual inspection after a storm.

Care should be taken when using cutting tools to remove packaging from a new hose. It is imperative that no damage comes to the hose section during unpacking.

Prior to commencing any offloading operations, the hose string should be visually inspected for damage using the list below as a minimum check:

- leaks at the hose fitting or in the hose make up;
- damaged, cut or abraded covers;
- exposure of reinforcement wires from the hose material;
- signs of kinked, cracked, crushed, flattened or twisted areas in the hose sections;
- hose ends degraded, pitted or badly corroded at the fittings;
- identify sufficient numbers of floatation collars are on the hose string;
- on completion of bunkering operations, the hose should be re-examined for any damage that may have occurred during the transfer operation.

Such irregularities justify hose substitutions. When cover bears date of expiry this must be kept to even if the hose shows no apparent signs of wear.

Repairs

Hose repairs are not advisable. However, when deterioration occurs at an end section, and if the full length allows for such, the worn section may be eliminated.