

Flexible solutions for the Oil and Gas Industry

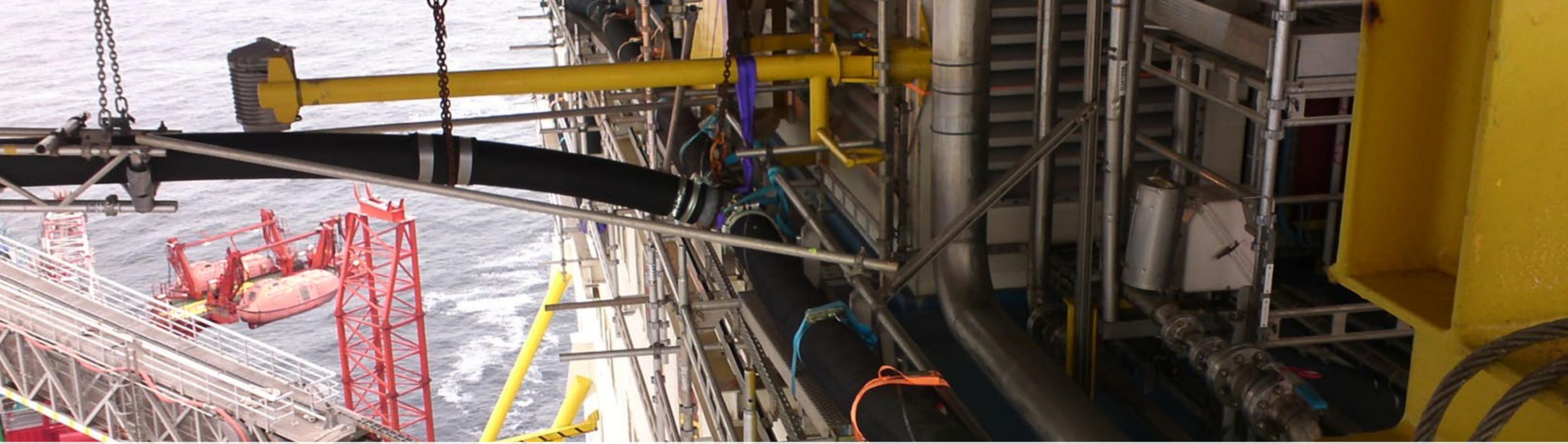


ivg colbachini spa



INDUSTRIAL RUBBER HOSE

www.ivgspa.it



Flexible solutions for the **Oil and Gas Industry**

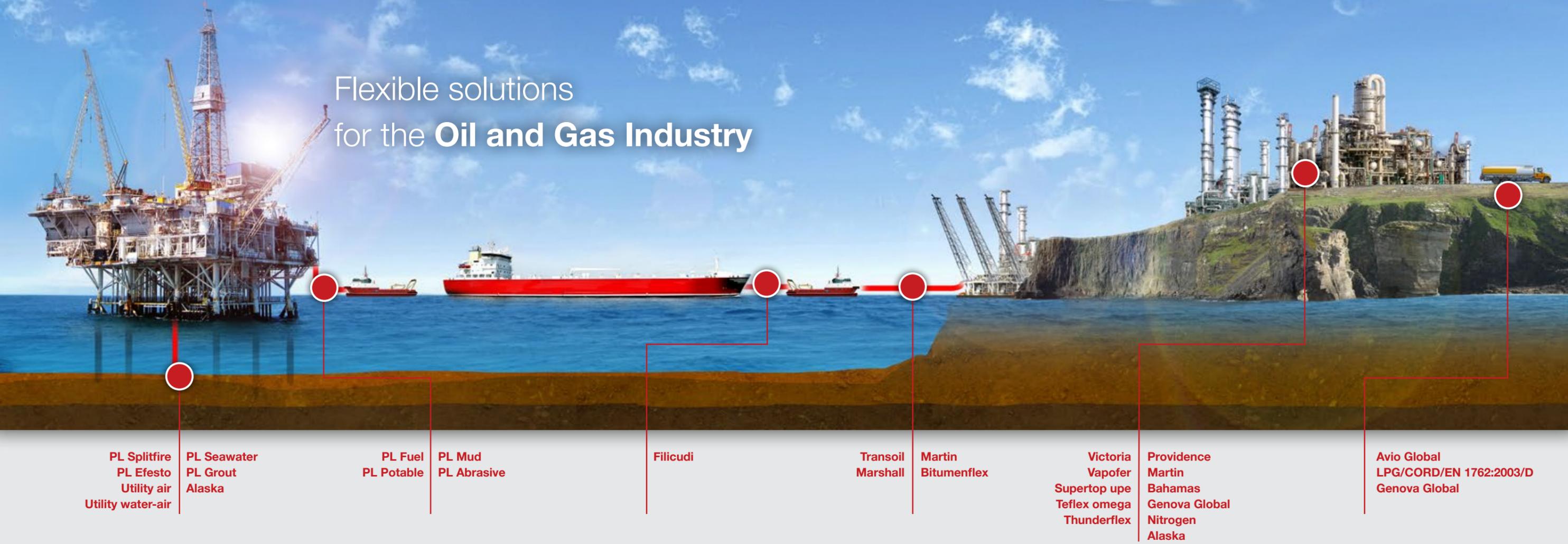
IVG rubber hoses are protagonists in the industrial market because they represent solid technical knowledge, design, and safety. We have a team of specialized professionals dedicated to oil & gas connection systems.



IVG Colbachini provides a complete line of industrial hoses and fittings: we help our customers maximize every stage of oil and gas exploration and refining. Whether it's drilling, fracking, cementing, water transfer or site preparation, every product is built to be tough, reliable and efficient in the harshest environments.

IVG's quality system is ISO 9001 certified. The internal quality tests that are carried out according to the main international specifications, guarantee our products to meet or exceed all the standards for which they are designed.

Flexible solutions for the Oil and Gas Industry



PL Splitfire
PL Efesto
Utility air
Utility water-air

PL Seawater
PL Grout
Alaska

PL Fuel
PL Potable

PL Mud
PL Abrasive

Filicudi

Transoil
Marshall

Martin
Bitumenflex

Victoria
Vapofer
Supertop up
Teflex omega
Thunderflex

Providence
Martin
Bahamas
Genova Global
Nitrogen
Alaska

Avio Global
LPG/CORD/EN 1762:2003/D
Genova Global

IVG production includes a complete range for:

- offshore oil rig hoses and couplings
- dock oil hoses and couplings
- land oil rig hoses and couplings
- petrochemical industries hoses and couplings

Strong points:

- ABS Type Approved hoses
- Complete and varied **product range**.
- **All IVG** hoses can be produced with **fully floating integrated system**.
- Excellent resistance to hard work and difficult conditions.
- **Certified quality** of the components.
- Hoses can be supplied with **fittings, tested** and **certified** by the manufacturer.



IVG GROUP COMPANIES

www.bassioffshore.eu



Bassi Offshore

is able to offer a full range of OCIMF 1991 - GMPHOM 2009 single carcass and double carcass hoses, including Catenary and Reeling solutions and applications for both floating and submarine hoses.

Bassi Offshore produces OCIMF 1991 - GMPHOM 2009 products from 6" to 24" ID and 15 to 21 bar and they are also prototyped and certified according to API 17 K. **Single Carcass Hoses** (textile or metallic reinforcement / with or without helix) and **Double Carcass Hoses** (textile or metallic reinforcement with helix).

www.mibitaliana.it



MIB Italiana

manufactures quick connection and emergency release systems for the Oil&Gas industry, both Onshore applications (marine loading arms) and Offshore applications (Platforms, Systems loading / unloading with flexible hoses, FPSO, FSO, FLNG, FSRU, et al).

ONSHORE: Double Valve Emergency Release Systems (ERS); hydraulic and manual Quick Connect/Disconnect Coupling (QCDC).

OFFSHORE: Multibore releasable FPSO turret systems; flexible riser connector/release solutions; export Hose Protection

Systems; tanker loading systems bow connection packages; manual Quick Connect/Disconnect Couplers; Marine Breakaway Coupling with petal and ball valve; Ship to Ship LNG transfer system; universal cardanic joint.



Rig supply hoses

Size

Temperature

WP - BP

Tensile breaking load



PL Fuel
Drilling mud and oil delivery hose*.
ABS Type Approval certificate 15-GE1415740-PDA.

51 - 152 mm (2 - 6")

-20°C +90°C (-4°F +194°F)

20 - 80 bar (300 - 1200 psi)
27 - 108 bar (405 - 1620 psi)

2000 kgf for inside diameter 51 mm (2")
4000 kgf for inside diameter 76 mm (3")
7000 kgf for diameters ≥ 102 mm (4")



PL Fuel SD
Drilling mud and oil suction and delivery hose*.
ABS Type Approval certificate 15-GE1415740-PDA.

51 - 203 mm (2 - 8")

-20°C +90°C (-4°F +194°F)

20 - 80 bar (300 - 1200 psi)
27 - 108 bar (405 - 1620 psi)

2000 kgf for inside diameter 51 mm (2")
4000 kgf for inside diameter 76 mm (3")
7000 kgf for diameters ≥ 102 mm (4")



PL Fuel SD floating D1
Self floating delivery hose for oil and mud*.
ABS Type Approval certificate 15-GE1415740-PDA.
D2 type available.

76 - 152 mm (3 - 6")

-20°C +90°C (-4°F +194°F)

20 - 80 bar (300 - 1200 psi)

4000 kgf for inside diameter 76 mm (3")
7000 kgf for diameters ≥ 102 mm (4")



PL Potable
Potable water delivery hose*.
FDA tit.21, BfR XXI cat.2, CE 1935/04 and CE 2023/06.
ABS Type Approval certificate 15-GE1415740-PDA.

51 - 102 mm (2 - 4")

-40°C +100°C (-40°F +212°F)

20 - 80 bar (300 - 1200 psi)

2000 kgf for inside diameter 51 mm (2")
4000 kgf for inside diameter 76 mm (3")
7000 kgf for inside diameter 102 mm (4")



PL Potable SD
Potable water suction and delivery hose*.
FDA tit.21, BfR XXI cat.2, CE 1935/04 and CE 2023/06.
ABS Type Approval certificate 15-GE1415740-PDA.

51 - 102 mm (2 - 4")

-40°C +100°C (-40°F +212°F)

20 - 80 bar (300 - 1200 psi)

2000 kgf for inside diameter 51 mm (2")
4000 kgf for inside diameter 76 mm (3")
7000 kgf for inside diameter 102 mm (4")



PL Potable SD floating D1
Self floating delivery hose for potable water*.
FDA tit.21, BfR XXI cat.2, CE 1935/04 and CE 2023/06.
ABS Type Approval certificate 15-GE1415740-PDA.

51 - 102 mm (2 - 4")

-40°C +100°C (-40°F +212°F)

20 - 80 bar (300 - 1200 psi)

2000 kgf for inside diameter 51 mm (2")
4000 kgf for inside diameter 76 mm (3")
7000 kgf for inside diameter 102 mm (4")



PL Abrasive
Abrasive material discharge hose*.
ABS Type Approval certificate 15-GE1415740-PDA.

102 - 127 mm (4 - 5")

-25°C +70°C (-13°F +158°F)

20 - 80 bar (300 - 1200 psi)

7000 kgf



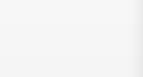
PL Abrasive SD
Abrasive material suction and discharge hose*.
ABS Type Approval certificate 15-GE1415740-PDA.

102 - 127 mm (4 - 5")

-25°C +70°C (-13°F +158°F)

20 - 80 bar (300 - 1200 psi)

7000 kgf



PL Abrasive SD float D2
Self floating abrasive material discharge hose.

102 - 127 mm (4 - 5")

-25°C +70°C (-13°F +158°F)

20 - 80 bar (300 - 1200 psi)

4000 kgf



PL Splitfire
Fire protection hose in offshore applications.
EN ISO 15540:99, fire resistance at 800°C for 30'.
DNV-GL Type Approval certificate P-14987.

19 - 203 mm (3/4 - 8")

-30°C +70°C (-22°F +158°F)

25 - 100 bar (375 - 1500 psi)
B.P. 75 bar (1125 psi) for 203 mm (8")

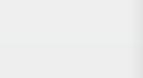


PL Efesto
Suction and delivery hose for seawater, mud, oil and petroleum products.
EN ISO 15540:99, fire resistance at 800°C for 30'.
ABS Type Approval certificate 15-GE1415740-PDA.

19 - 203 mm (3/4 - 8")

-30°C +90°C (-22°F +194°F)

25 - 105 bar (375 - 1575 psi)



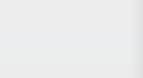
PL Mud
Drilling mud delivery hose.

76 - 102 mm (3 - 4")

-25°C +70°C (-13°F +158°F)

40 - 120 bar (600 - 1800 psi)

4000 kgf for inside diameter 76 mm (3")
7000 kgf for inside diameter 102 mm (4")

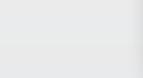


PL Grout
Liquid mud discharge hose.

51 mm (2")

-10°C +42°C (+14°F +108°F)

70 - 210 bar (1050 - 3150 psi)



PL Seawater
Seawater delivery hose.

102 - 203 mm (4 - 8")

-30°C +70°C (-22°F +158°F)

Depending on service



Dock hoses

Size

Temperature

WP - BP



Marshall
Dock oil hose for discharge of petroleum products.
EN 1765 type L 15, BS 1435 type L 15.

51 - 203 mm (2 - 8")

-20°C +82°C (-4°F +180°F)

15 - 60 bar (225 - 900 psi)



Transoil
Dock oil hose for suction and discharge of petroleum products.
EN 1765 type S 15, BS 1435 type S 15. RINA approved n. MAC054314CS/002.

51 - 254 mm (2 - 10")

-20°C +82°C (-4°F +180°F)

15 - 60 bar (225 - 900 psi)



Filicudi
Ship to ship petroleum products loading and unloading hose.
EN 1765 type S 15 - BS 1435 type S 15. RINA approved n. MAC054314CS/003.

51 - 254 mm (2 - 10")

-20°C +82°C (-4°F +180°F)

15 - 60 bar (225 - 900 psi)



Bahamas
Roof drain hose.

76 - 152 mm (3 - 6")

-25°C +80°C (-13°F +176°F)

5 - 20 bar (75 - 300 psi)



Martin
Tank cleaning hose.

38 - 51 mm (1-1/2 - 2")

-30°C +100°C (-22°F +212°F)

20 - 60 bar (300 - 900 psi)



Bitumenflex
Asphalt and tar hose, wire reinforced.
EN 13482:2001.

152-203 (6-8")

-15°C +175°C (+5°F +347°F)

15-45 bar (225-675 psi)



Fuel and oil hoses

Size

Temperature

WP - BP



Genova global
Fuel and oil delivery hose.
EN 12115:11 (16 bar), EN 1761 (10 bar), ISO 2929 (10 bar), TRbF.

13 - 100 mm (1/2 - 3-15/16")

-30°C +90°C (-22°F +194°F)
w/peaks +110°C (+230°F)

16 - 64 bar (240 - 960 psi)



Genova global LL
Fuel and oil suction and delivery hose.
EN 12115:11 (16 bar), EN 1761 (10 bar), ISO 2929 (10 bar), TRbF.

25 - 100 mm (1 - 3-15/16")

-30°C +90°C (-22°F +194°F)
w/peaks +110°C (+230°F)

16 - 64 bar (240 - 960 psi)



Avio Global C
Aircraft refuelling hose, type C.
BS EN ISO 1825, API 1529, AS 2683, VG 95955, NFPA 407.

19 - 100 mm (3/4 - 3-15/16")

-25°C +70°C (-13°F +158°F)

20 - 80 bar (300 - 1200 psi)



Avio Global E
Fuel hose for aircrafts, type E.
BS EN ISO 1825, API 1529, AS 2683, VG 95955, NFPA 407.

25 - 100 mm (1 - 3-15/16")

-25°C +70°C (-13°F +158°F)

20 - 80 bar (300 - 1200 psi)



Avio Global F
Aircraft refuelling hose, type F.
BS EN ISO 1825, API 1529, AS 2683, VG 95955, NFPA 407.

38 - 63,5 mm (1-1/2 - 2-1/2")

-25°C +70°C (-13°F +158°F)

20 - 80 bar (300 - 1200 psi)

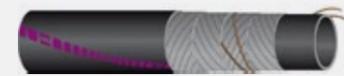


LPG/CORD/EN 1762:2003/D
Gas delivery hose.
EN 1762:2003.

13 - 102 mm (1/2 - 4")

-30°C +100°C (-22°F +212°F)

25 - 100 bar (375 - 1500 psi)



Pittsburgh Frac
Fracturing hose.

76 - 102 mm (3 - 4")

-30°C +70°C (-22°F +158°F)

27 - 81 bar (405 - 1216 psi)



Pittsburgh Frac Har
Fracturing hose, highly abrasion resistant cover.

76 - 102 mm (3 - 4")

-20°C +70°C (-4°F +194°F)

27 - 81 bar (405 - 1216 psi)



Steam hoses

	Size	Temperature	WP - BP
 Victoria EN ISO 6134 Steel wire hose for steam at 210°C. EN ISO 6134/05 type 2 class A (Ω).	13 – 51 mm (1/2 - 2")	-40°C +210°C (-40°F +410°F) w/peaks +230°C (+446°F)	18 – 180 bar (270 – 2700 psi)
 Victoria Premium Steel wire hose for steam at 210°C. IIR tube.	13 – 51 mm (1/2 - 2")	-40°C +210°C (-40°F +410°F) w/peaks +230°C (+446°F)	18 – 180 bar (270 – 2700 psi)
 Vapofer EN ISO 6134 Steel wire hose for steam at 210°C. EN ISO 6134/05 type 2 class B (Ω).	13 – 51 mm (1/2 - 2")	-40°C +210°C (-40°F +410°F) w/peaks +230°C (+446°F)	18 – 180 bar (270 – 2700 psi)



Chemical hoses

	Size	Temperature	WP - BP
 Supertop upe/LL Suction and delivery of chemicals, solvents and food, UPE tube. EN 12115:11. Tube FDA tit.21, BfR III. CE 1935/04 and CE 2023/06.	19 – 102 mm (3/4 - 4")	-40°C +100°C (-40°F +212°F)	16 – 64 bar (240 – 960 psi)
 Supertop upe cond/LL Conductive hose to convey chemicals and petroleum products, UPE tube. EN 12115:11, tested acc. EN 13463-1 / EN 60079-0.	19 – 102 mm (3/4 - 4")	-40°C +100°C (-40°F +212°F)	16 – 64 bar (240 – 960 psi)
 Teflex omega Hose for chemicals and solvents, FEP tube. EN 12115:11. Tube USP Class VI and FDA tit.21. CE 1935/04 and CE 2023/06.	19 – 76 mm (3/4 - 3")	-40°C +150°C (-40°F +302°F)	16 – 64 bar (240 – 960 psi)
 Thunderflex Conductive hose for chemicals, food and petroleum products, UPE tube. EN 12115:11. Tube FDA tit.21, BfR III. Tested acc. to EN 13463-1/EN 60079-0 CE 1935/04 and CE 2023/06.	19 – 102 mm (3/4 - 4")	-30°C +100°C (-22°F +212°F)	16 – 64 bar (240 – 960 psi)
 Providence Chemical and solvents suction and discharge, Viton® tube.	19 – 102 mm (3/4 - 4")	-25°C +100°C (-13°F +212°F)	10 – 40 bar (150 – 600 psi)



Utility air - water hoses

	Size	Temperature	WP - BP
 Utility air Compressed air hose.	16 – 51 mm (5/8 - 2")	-40°C +70°C (-40°F +158°F)	20 – 60 bar (300 – 900 psi)
 Alaska Steel wire compressed air hose.	13 – 102 mm (1/2 - 4")	-30°C +70°C (-22°F +158°F)	Depending on size
 Nitrogen Nitrogen gas hose.	13 – 51 mm (1/2 - 2")	-25°C +100°C (-13°F +212°F)	20 – 60 bar (300 – 900 psi)
 Utility water - air Water and compressed air discharge hose.	19 – 51 mm (3/4 - 2")	-40°C +70°C (-40°F +158°F)	10 – 30 bar (150 – 450 psi)

Coupling solutions



IVG Fittings Division is a flexible unit working in synergy with IVG' R&D. It can make assemblies fitted with any type of end connection, or design special "low profile" couplings for joining different lengths, applied by swaging, clamps, collars, etc.

Different types of fitting styles available



Swaged fitting



Built-in fitting



Fitting with bolted clamps

Types of couplings

THREADED	Type of thread	DN	Material
	NPT for the ABS Type Approved hoses	from 3/4" to 8"	E 355, A333 GR 6, API 5L GRB, AISI 304, AISI 316L, or better
	BSP	from 1" to 12"	E355 AISI 304 AISI 316
	BSPT		
	API		
	special upon request		

FLANGE	Type of thread	DN	Material
	ASME B16.5 150lbs ASME B16.5 300lbs ASME B16.5 400lbs ASME B16.5 600lbs EN1092 - 1 PN6 EN1092 - 1 PN10 EN1092 - 1 PN16 EN1092 - 1 PN25 EN1092 - 1 PN40 special upon request	from 1" to 12"	A105 AISI 304 AISI 316

DRY BREAK COUPLINGS	Types of terminals connection	DN	Material
	NPT male/female BSP male/female flange UNI EN 1092-1 flange ASME B16.5 flange DIN other upon request	from 1" to 6"	aluminum brass stainless steel 316 titanium other upon request



HAMMER UNION	Types	DN	Material
	the couplings are differentiated by their use in: figure, color, working pressure, fluid conveyed.	from 1/2" to 12"	carbon steel stainless steel 316 other upon request

For different couplings please consult www.ivgspa.it

BREAKAWAY VALVES	Types of terminals connection	DN	Material
	NPT male/female BSP male/female flange UNI EN 1092-1 flange ASME B16.5 flange DIN other upon request	from 1" to 6"	aluminum brass stainless steel 316 titanium other upon request

ACCESSORIES FOR HOSES	Type	Material	Description
	HOOKE HOOK	carbon steel bronze	Hooking and lifting hose system. This equipment is placed at the ends of the hose, on the couplings.
	HOSE SADDLE	polyurethane	Hose lifting system. This equipment is positioned in the middle of the hose.
	FLOATING COLLARS	foam	Number and size of the floats is given by the study of following variables: weight of the hose - fluid conveyed - hose size - fluid buoyancy.

KAMLOCKING According to MIL A-A-59326D	Type	DN	Material	Gasket material
	A B C D E F DC DP LAS LBS	from 1/2" to 8"	SS 316 brass aluminum polypropylene	nbr epdm viton® epdm covered with ptfе

Kamlocking working pressures

Material	1/2"		3/4"-2"		2"1/2		3"		4"		6"	
	bar	psi	bar	psi	bar	psi	bar	psi	bar	psi	bar	psi
SS 316	10	150	10	150	10	150	10	150	10	150	5	75
brass	10	150	10	150	10	150	10	150	10	150	10	150
aluminium	10	150	10	150	10	150	10	150	10	150	5	75
polypropylene	--		10	150	--		5	75	5	75	5	75

Kamlocking gaskets characteristic

Material	Shore hardness	Temperature		Medium resistance
nbr	60 +/-5 Shore A	-30°C / +120°C	-22°F / +248°F	hydraulic oil, animal and vegetable oils, liquids, greases, water and air
epdm	70 +/-5 Shore A	-40°C / +145°C	-40°F / +293°F	acids, steam, alcohol
viton®	70 +/-5 Shore A	-30°C / +200°C	-22°F / +392°F	mineral and other oils, aromatic oils, gasoline and diesel, silicone oils and greases, steam
epdm / ptfе	85 +/-5 Shore A	-25°C / +100°C	-13°F / +212°F	alcohol, acids, oils and greases

TANKWAGEN	Type	DN	Coupling material	Gasket material
	MK (female) VK (male) MB (female cap) VB (male cap)	2" 3" 4"	stainless steel 316 brass	buna viton® ptfе

According to EN 14420-6 / DIN 28450.

Working temperature: from -30°C to +120°C (from -22°F to +248°F).

TW couplings can be swaged or fixed through DIN 2817 (EN14420-6) clamps.

STEAM	Type of thread	DN	Material
	NPT	from 1/4" to 6"	carbon steel stainless steel 316

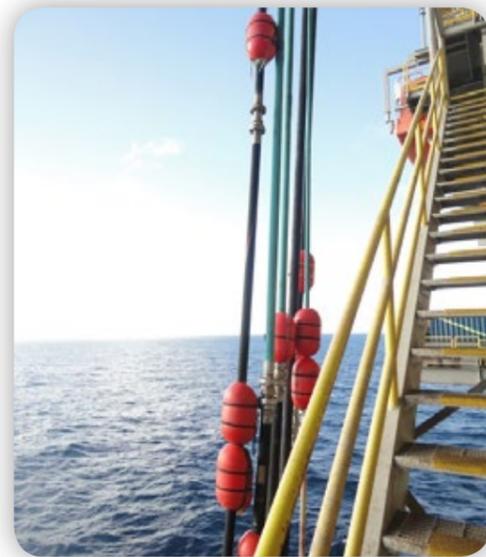
For saturated steam at +210°C (+410°F)

Steam couplings can be fixed just through specific adjustable clamps with bolts.



Bulk Hose Systems Recommendations

INTRODUCTION



The following recommendations were drawn up to improve the safety in the various processes involved with the application of the platform 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

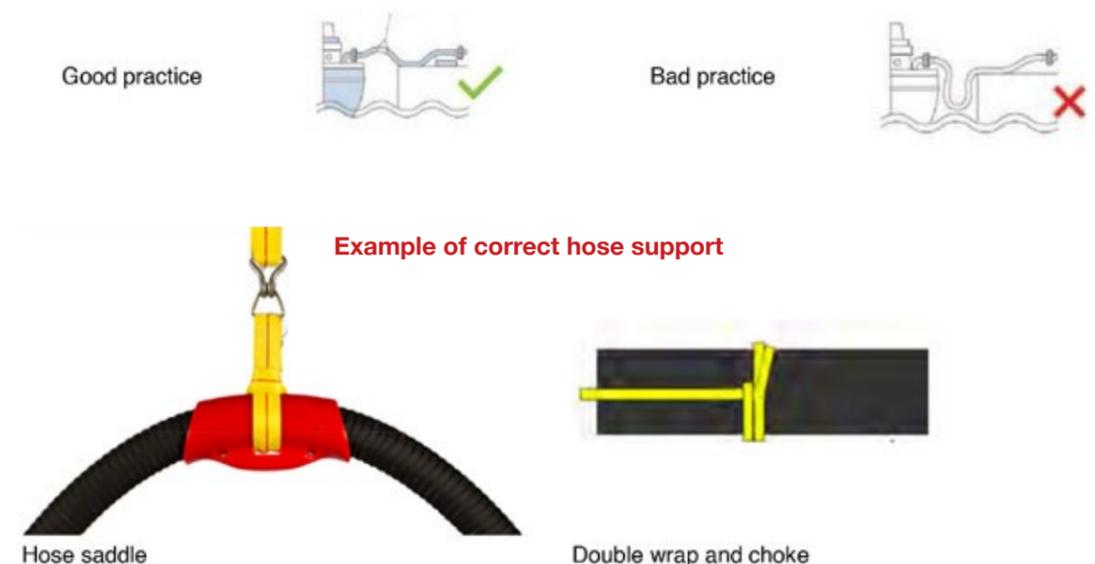
In order to choose a hose suitable for a specific use it is necessary to determine at least the following basic points:

- **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, we suggest using further protection to avoid possible damage caused by shock, corrosion and/or dragging.

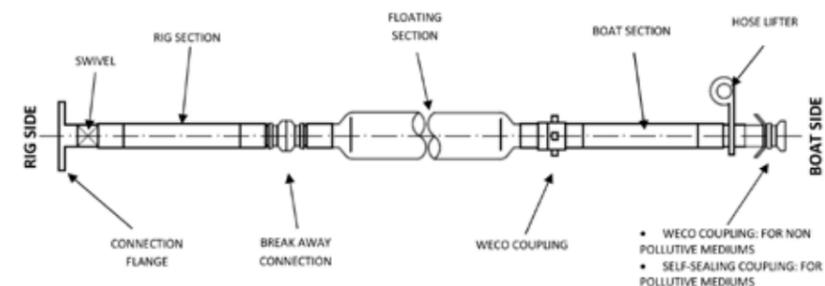
- **Couplings:** this must be selected according to:
 - couplings and flanges: type, dimension, type of thread, standard references and kind of application;
 - ruffles: internal and external diameter and coupling length;
 - brackets: type and dimension.
 Compatibility between hose and couplings must be ensured to guarantee performance. 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 A STRING LAYOUT



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 floatation collars or self-floating hoses. Floatation collars can also be used to protect hoses from accidental contacts with the installation structure/rig. If floatation collars are used, we recommend reflective collars to assist during nocturnal operations.

Technical specification of the string based on the application

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

The above colour and couplings information are recommendations from North West 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.

RECOMMENDATIONS FOR CORRECT STORAGE

Rubber by nature is subjected to change its physical properties. These changes, which normally occur over the course of time, depending on 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 storage conditions. 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 temperatures 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 sunlight or strong artificial light.
- **Oxygen and ozone:** hoses should be protected from circulating air by suitable packing. The ozone has a particularly aggressive effect on all rubber products, therefore the storehouses must not contain material producing ozone such as 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 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 or 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.

if it concerns rubber hose it concerns us

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