

EMERGENCY HYDRAULICS



BOP & FIRE SUPPRESSION SYSTEM CONNECTORS

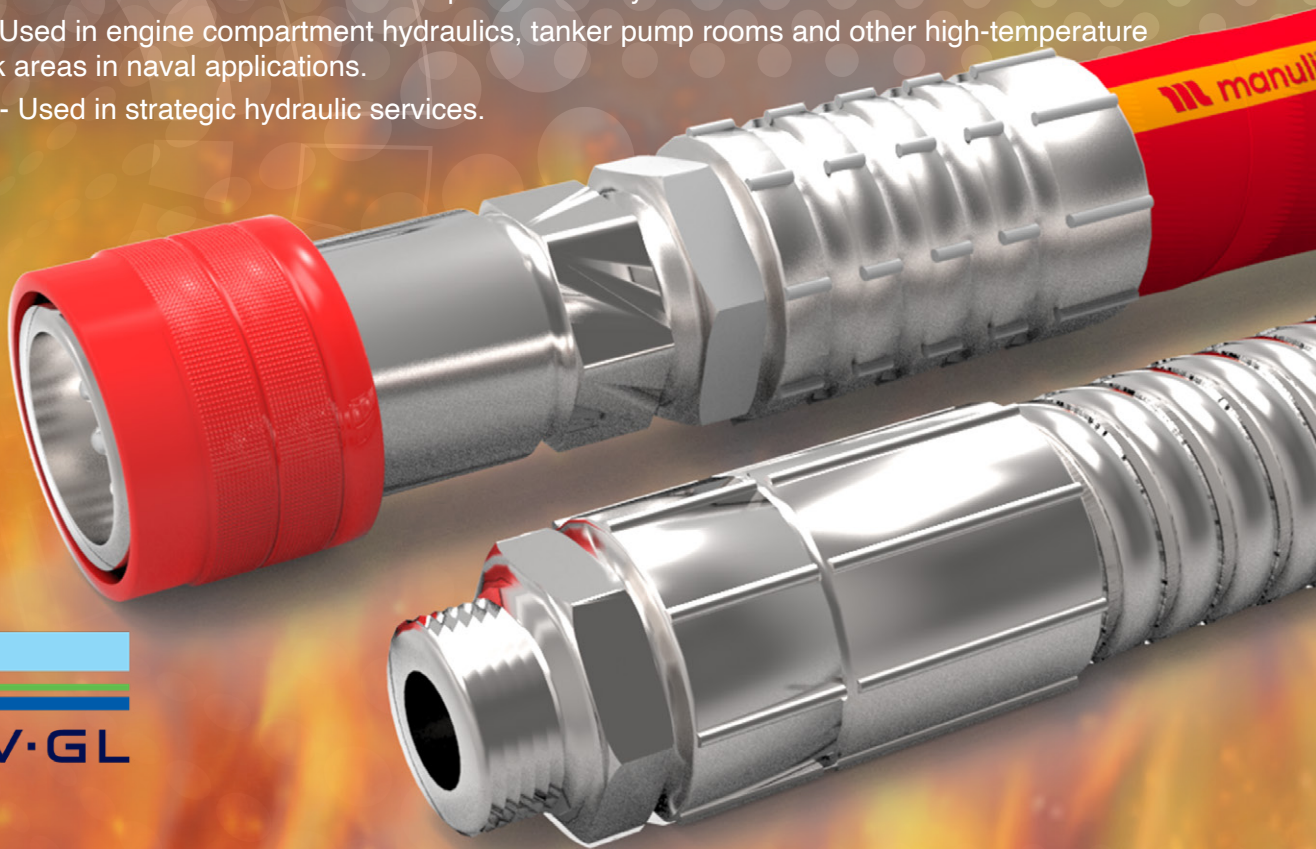
FIRE RATED PRODUCTS – THE MANULI ADVANTAGE

Active safety systems are widely used in industrial environments to mitigate damage and counter the effects of accidents should they occur. Under normal operating conditions these systems are usually inactive but, more than any other system, they require guaranteed, continuous availability under the most arduous of environmental conditions.

Many of these systems require hydraulics to function, and as they are safety critical these systems must not fail!

The number of sectors where these emergency hydraulic systems are used is constantly increasing and includes:

- **Drilling** - Used in Blow-Out Preventer (BOP) systems.
- **Mining** - Used in general safety systems and areas at risk of fire.
- **Steel Mills** - Used in foundaries, forging shops and other areas with potentially explosive atmospheres.
- **Off-Shore and Refineries** - Used in critical plant control systems.
- **Marine** - Used in engine compartment hydraulics, tanker pump rooms and other high-temperature or fire-risk areas in naval applications.
- **Defence** - Used in strategic hydraulic services.



API 16D TEST REQUIREMENTS

This API 16D specification requires hose assemblies to withstand a particularly severe fire carried out under the following conditions:

- Test duration: 5 minutes
- Test temperature: 700°C
- Water pressurised inside at WP
- No fluid circulation
- Proof pressure after test up to WP



In contrast to other industry standard fire tests (eg: ISO 15540), the pressurised water inside the hose does not flow and therefore reaches a high temperature. This impacts heavily on the sealing performance of the fittings, and it is for this reason that additional heat protection is normally used in this area.

GOLDENGUARD/3000

A 3,000psi hose commonly used in the North American market. Designed to meet the most common pressure requirements for land rigs, and fitted with the new OPK (one-piece) fittings line. Both easy and cost effective to assemble, there is no need for an additional fire-sleeve in the fitting area and a partial skive is sufficient to guarantee a hose assembly that will meet the requirements of API 16D both in the lab and in the field.

GOLDENGUARD/5000

Suitable for even the most demanding of high-pressure applications, this 5,000psi hose is supplied with a choice of two fitting solutions, Interlock Plus™ and SpiralFit™.

FITTING OPTIONS

Interlock Plus

A reliable double-skive solution with an additional fire-sleeve underneath the ferrule to protect the crimped area from heat.

SpiralFit

Applied with a partial-skive in order to leave an insulating layer of rubber below the ferrule. This prevents the need for any additional heat protection in the crimped area.

Note: For large and heavy-duty rigs the Interlock Plus solution is usually recommended.



GOLDENGUARD

THE SECRET

A special blend of mineral fillers, refractory materials and flame retardant additives has been engineered to provide the outstanding insulation and self-extinguishing properties of the GoldenGuard cover compound.

This compound, dubbed BRICKOAT™, exceeds the requirements of API 16D whilst being free from asbestos and other fibrous materials which are known to be hazardous to human health.

This unique cover also guarantees the high standard of ozone and environmental resistance that you would naturally expect from a Manuli Hydraulics hose.

BRICKOAT



manuli[®]
CONVEYORS LP & HP

GOLDENARMOUR

Often preferred in tough environments, the GoldenArmour™ integrated hose assembly protects the rubber hose from both external mechanical damage and fire. Available in a unique 5,000psi rated line, GoldenArmour has been fully tested and approved to API 16D.

The GoldenArmour integrated hose assembly kit comprises of the following items:

- An appropriate RockMaster™ hydraulic hose
- Interlock™ stainless steel fittings (carbon steel available on request)
- A flexible stainless-steel armour guard - offers outstanding fire protection and resistance to both abrasion and mechanical stresses
- A stainless-steel ferrule - used to fix the armour guard over the hose ferrule according to the specifications of the relevant crimp chart
- An additional stainless-steel joint - used to connect different lengths of the armour guard to utilise short lengths or to make longer hose assemblies.



GOLDENARMOUR



CUSTOMER ADDED VALUES

The Manuli Hydraulics GoldenGuard and GoldenArmour ranges offer the end user a reliable solution for all kind of applications with fire hazards, which is guaranteed to perform to the toughest industrial standards. The GoldenGuard and GoldenArmour ranges also offer a wide choice of:

- Mechanical construction
- Pressure ratings
- Sizes

Hose assemblers and distributors have easy access to a premium integrated product line for the Oil and Gas market. This product range, supported and guaranteed by Manuli Hydraulics, meets all likely performance requirements of the end user and offers a highly competitive solution.

This product range also offers a variety of crimping solutions, allowing distributors flexibility to meet unplanned demands and/or short delivery lead-times. As the product line is also a multi-purpose solution for any kind of emergency hydraulics application, it offers an opportunity to cover a wide range of applications with a minimal stock profile.

KEY FEATURES

GOLDENGUARD

Easily identifiable red cover

- Outstanding resistance to fire hazards
- API 16D fire rating
- MSHA approval
- ISO 8030 Fire Test resistance compliance
- DNV-GL approval
- Free from Asbestos and other thermal insulating fibrous minerals impacting human health
- 3,000psi and 5,000psi pressure ratings
- Skive and no-skive fittings
- Integrated heat protection for the fitting area

GOLDENARMOUR

Integrated kit of hose, connectors and accessories

- Standard Rockmaster/13 hose style
- Outstanding resistance to fire hazards
- API 16D fire rating
- MSHA approved
- ISO 8030 Fire Test resistance compliant
- DNV-GL approval
- Stainless steel armour guard
- Stainless steel armour joint
- Stainless steel Interlock Plus fittings (carbon steel fittings also available)

MQS-BOP QUICK COUPLING

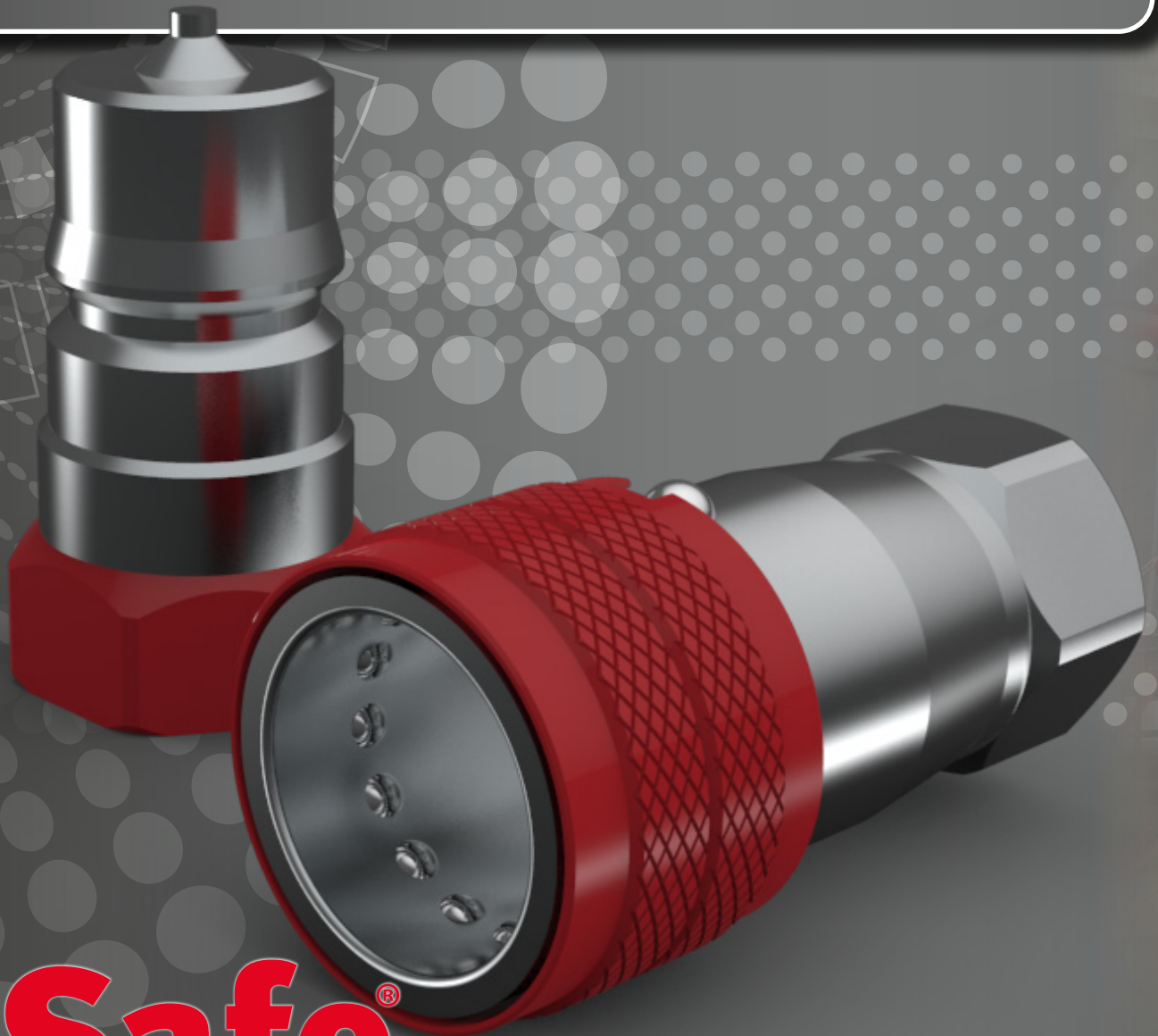
Q.Safe™ is the Manuli Hydraulics solution for connecting and disconnecting two parts of a hydraulic system quickly, easily and safely, whilst also providing a seal against leakage in both situations.

The Manuli Hydraulics Q.Safe range has been developed to satisfy our customers' needs by providing a reliable, high-performance, integrated quick couplings range.

Manuli Hydraulics have expanded this range to include a specially developed range of quick couplings dedicated to BOP applications. This range of couplings exceed fire test requirements of API 16D and are painted red for easy identification.

- Working pressure: 5,000psi with safety factor 4.1 (burst 20,000psi)
- Working Temperature from -20°C to +200°C (FKM -Viton seals)
- ISO 7241-1 B series interchangeable
- Sizes ½", ¾", 1"
- Painted red for easy identification
- Safety lock system to avoid accidental disconnections
- Fire resistant according to API 16D

Note: the MQS-FS flat-face screw type quick couplings range is also suitable for BOP applications



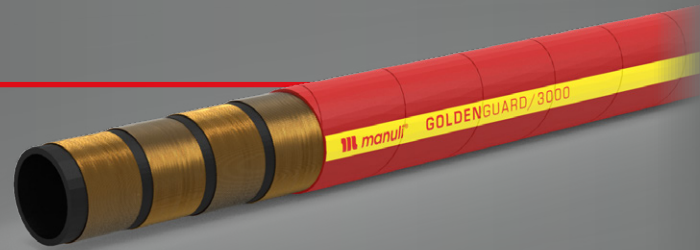
Q.Safe[®]
QUICK COUPLINGS



GoldenGuard and GoldenArmour hoses along with MQS-BOP quick couplings in use in BOP applications by customers in Poland and Italy

GOLDENGUARD/3000

EMERGENCY HYDRAULIC SYSTEMS & BOP



TECHNICAL DATA

PART REF.	HOSE SIZE			R.O.D		O.D		MAX. W.P		BURST		MIN. BEND		WEIGHT		FITTINGS	
	DN	dash	inch	mm	inch	mm	inch	bar	psi	bar	psi	mm	inch	g/m	lb/ft	Std 1	Std 2
	H11022019*	19	-12	3/4"	26.9	1.06	32.3	1.27	207	3,000	828	12,000	180	7.09	1,288	0.87	OPK-12
H11022025*	25	-16	1"	34.1	1.34	40.1	1.58	207	3,000	828	12,000	230	9.06	1,876	1.26	OPK-16	

KEY FEATURES

- Highly robust hose structure
- Thermal insulation of the hose with a special cover material
- Long lasting resistance of the cover layer
- Cover has flame retardant properties
- High ozone and weather resistance

APPLICATIONS & FLUIDS

- Hydraulics: designed for use in areas where the continuous hydraulic function is required to drive the emergency systems (industrial, marine, off-shore and refineries, defence, mining)
- Flexible hose for hydraulic systems of Blow Out Preventer control lines on drilling rigs
- Mineral oils, glycols and polyglycols, mineral oils in aqueous emulsion

CONTINUOUS SERVICE TEMPERATURE RANGE

-40 °C, -40 °F

121 °C, 250 °F

TUBE

High grade NBR oil resistant synthetic rubber

REINFORCEMENT

Four high tensile steel wire spirals

COVER

Red insulant and flame retardant synthetic rubber

APPLICABLE SPECS

API 16D Fire Test (pr.10.1.2), ISO 18752-C

TYPE APPROVALS

DNV-GL; CU-TR; MSHA; API 16D Fire Test (DNV); LR; CCS; ABS

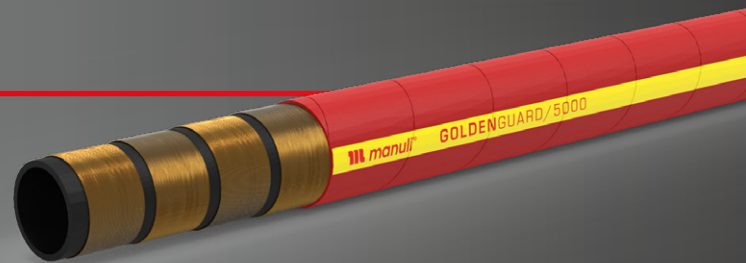
REMARKS



- Refer to GoldenGuard assembling instructions and crimp chart for correct assembling (partial skive required)

GOLDENGUARD/5000

EMERGENCY HYDRAULIC SYSTEMS & BOP



TECHNICAL DATA

PART REF.	HOSE SIZE			R.O.D		O.D		MAX. W.P		BURST		MIN. BEND		WEIGHT		FITTINGS	
	DN	dash	inch	mm	inch	mm	inch	bar	psi	bar	psi	mm	inch	g/m	lb/ft	Std 1	Std 2
	H11020010*	10	-6	3/8"	16.7	0.66	20.7	0.81	345	5,000	1,380	20,010	127	5.00	651	0.44	MF+M00910-06
H11020012*	12	-8	1/2"	20.1	0.79	24.1	0.95	345	5,000	1,380	20,010	150	5.91	820	0.55	MF+M00910-08	OPK-08
H11020016*	16	-10	5/8"	25.5	1.00	30.9	1.22	345	5,000	1,380	20,010	180	7.09	1,490	1.00	IP+M01500-10	
H11020019*	19	-12	3/4"	29.0	1.14	36.2	1.43	345	5,000	1,380	20,010	240	9.45	2,024	1.36	IP+M01500-12	SP+M05400-12
H11020025*	25	-16	1"	36.0	1.42	44.0	1.73	345	5,000	1,380	20,010	300	11.81	2,742	1.84	IP+M01500-16	SP+M05400-16
H11020031*	31	-20	1.1/4"	47.0	1.85	55.0	2.17	345	5,000	1,380	20,010	420	16.54	4,293	2.88	IP+M01600-20	SP+M05500-20
H11020038*	28	-24	1.1/2"	54.6	2.15	62.6	2.46	345	5,000	1,380	20,010	500	19.69	5,531	3.72	IP+M01600-24	SP+M05500-24
H11020051*	51	-32	2"	68.4	2.69	76.4	3.01	345	5,000	1,380	20,010	630	24.80	7,712	5.18	IP+M01800-32	SP+M05500-32

KEY FEATURES

- Highly robust hose structure
- Thermal insulation of the hose with a special cover material
- Long lasting resistance of the cover layer
- Cover has flame retardant properties
- High ozone and weather resistance

APPLICATIONS & FLUIDS

- Hydraulics: designed for use in areas where the continuous hydraulic function is required to drive the emergency systems (industrial, marine, off-shore and refineries, defence, mining)
- Flexible hose for hydraulic systems of Blow Out Preventer control lines on drilling rigs
- Mineral oils, glycols and polyglycols, mineral oils in aqueous emulsion

CONTINUOUS SERVICE TEMPERATURE RANGE

-40 °C, -40 °F

121 °C, 250 °F

TUBE

High grade NBR oil resistant synthetic rubber

REINFORCEMENT

Multiple plies of high tensile steel wire spirals (DN 16-25); 2 wire braids (DN 10-12)

COVER

Red insulant and flame retardant synthetic rubber

APPLICABLE SPECS

API 16D Fire Test (pr.10.1.2), DN 10-12: ISO 18752-A; DN 16-51: ISO 18752-C (STD2 fitting) and Type C "Plus" (STD1 fitting), ISO 3862 & SAE J517-100R13 performance

TYPE APPROVALS

DNV-GL; CU-TR; MSHA; API 16D Fire Test (DNV); LR; CCS; ABS

REMARKS





- Refer to GoldenGuard assembling instructions and crimp chart for the use of accessories when required:
 - STD1 fitting solution: Fire sleeve & metal sleeve over the fitting area required
 - STD2 fitting solution: No accessories required
- The STD1 fitting solution has been selected for the most demanding applications
- DN 10 & 12: Max. continuous temperature 100 °C for these wire braided references

GOLDENARMOUR

EMERGENCY HYDRAULIC SYSTEMS & BOP



TECHNICAL DATA

PART REF.	HOSE TYPE	HOSE SIZE			MAX. W.P		BURST		PROOF TEST		FITTINGS	ACCESSORIES
		DN	dash	inch	bar	psi	bar	psi	bar	psi		
		      										
H01101010*	ROCKMASTER/2PLUS	10	-6	3/8"	345	5,000	1,380	20,000	690	10,000	MF+IM00910-06	JP45G090280099
H01101012*	ROCKMASTER/2PLUS	12	-8	1/2"	345	5,000	1,380	20,000	690	10,000	MF+IM00910-08	JP45G090320099
H10044016*	ROCKMASTER/4SH	16	-10	5/8"	345	5,000	1,380	20,000	690	10,000	IP+IM01500-10	JP45G090400099
H10035019*	ROCKMASTER/13	19	-12	3/4"	345	5,000	1,380	20,000	690	10,000	IP+IM01500-12	JP45G090450099
H10035025*	ROCKMASTER/13	25	-16	1"	345	5,000	1,380	20,000	690	10,000	IP+IM01500-16	JP45G090500099
H10035032*	ROCKMASTER/13	31	-20	1.1/4"	345	5,000	1,380	20,000	690	10,000	IP+IM01600-20	JP45G090650099
H10035040*	ROCKMASTER/13	38	-24	1.1/2"	345	5,000	1,380	20,000	690	10,000	IP+IM01600-24	JP45G090750099
H10035051*	ROCKMASTER/13	51	-32	2"	345	5,000	1,380	20,000	690	10,000	IP+IM01800-32	JP45G090900099

KEY FEATURES

- Highly robust hose structure
- Thermal insulation of the hose with a stainless steel armour cover
- Long lasting resistance of the cover layer
- Flame retardant properties
- High ozone and weather resistance

APPLICATIONS & FLUIDS

- Hydraulics: designed for use in areas where the continuous hydraulic function is required to drive the emergency systems (industrial, marine, off-shore and refineries, defence, mining)
- Flexible hose for hydraulic systems of Blow Out Preventer control lines on drilling rigs
- Mineral oils, glycol and polyglycol based oils, mineral oils in aqueous emulsion

CONTINUOUS SERVICE TEMPERATURE RANGE

-40 °C, -40 °F

100 °C, 212 °F (DN 10-12); 121 °C, 250 °F DN 16-51

TUBE

High grade NBR oil resistant synthetic rubber

REINFORCEMENT

Two high tensile steel braids (DN 10-12); Multiple plies of high tensile steel spirals (DN 16-51)

COVER

STRONG - TYPE "SD"

Synthetic rubber with high abrasion, ozone, weather and heat resistance

APPLICABLE SPECS


API 16D Fire Test (pr.10.1.2);
ISO 18752-A (DN 10-12);
ISO 18752-C, ISO 3862, SAE J517 Type 100R13 performance (DN 16-51)

TYPE APPROVALS

DNV-GL; LR; API 16D Fire Test (DNV); ABS; CCS; CU-TR

REMARKS

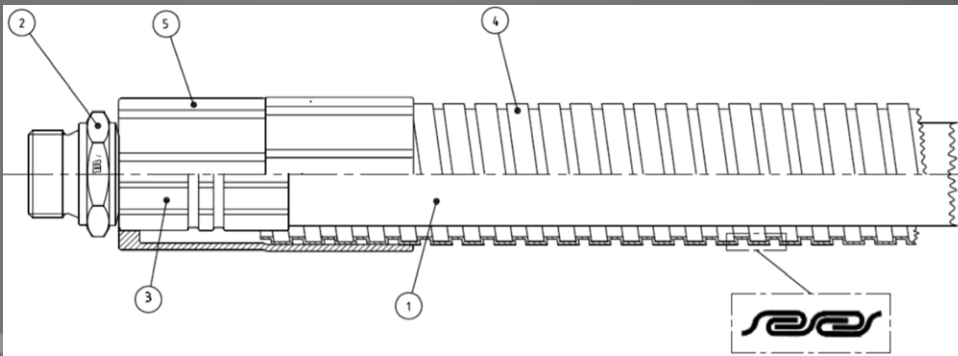


- Refer to Golden Armour assembling instructions and crimp chart for the correct assembly of the hose
- Hose Assembly Branding: The Golden Armour assembly must report at least the following information in the hose brand:
 -  - inch size - WP 5,000 psi (on the metal sleeve)
 - assembling date - assembler identification (additional tag or on the metal sleeve)

GOLDENARMOUR

EMERGENCY HYDRAULIC SYSTEMS & BOP

GOLDENARMOUR MAKE-UP



1. Hydraulic hose
2. Hydraulic MF2000 insert type, with additional tail o-ring only for IP fitting solution
3. Hydraulic MF2000 ferrule type
4. External flexible Metal Armour (interlocked flexible metal hose)
5. Metal Sleeve

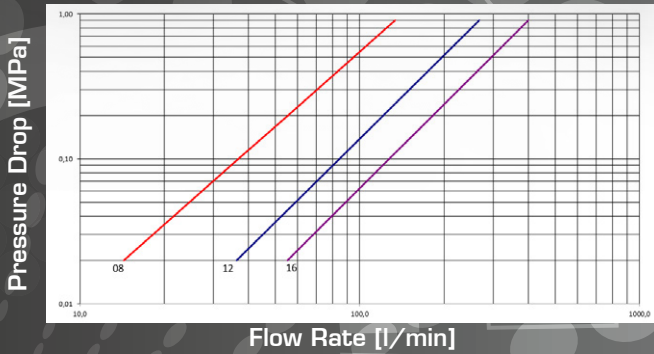
ACCESSORIES TECHNICAL DATA

ARMOUR PART REF.	TO SUIT HOSE SIZE			ARMOUR SIZE				MIN. BEND		WEIGHT		METAL SLEEVE			ARMOUR JOINT		
	DN	dash	inch	d		D		mm	inch	g/m	lb/ft	PART REF.	D	L	PART REF.	D	L
				mm	inch	mm	inch										
JP45G090280099	10	-6	3/8"	25	1"	32.0	1.26	127	5.00	565	0.38	IO82110-06GA	40.5	60	IO84210-06	40.5	65
JP45G090320099	12	-8	1/2"	31	1.1/4"	36.5	1.44	150	5.91	703	0.47	IO82110-08GA	46.8	75	IO84210-08	46.8	65
JP45G090400099	16	-10	5/8"	38	1.1/2"	44.5	1.75	180	7.09	939	0.63	IO82110-10GA	53.2	90	IO84210-10	53.2	65
JP45G090450099	19	-12	3/4"	46	1.3/4"	51.0	2.01	240	9.45	1,118	0.75	IO82110-12GA	59.5	105	IO84210-12	59.5	70
JP45G090500099	25	-16	1"	51	2"	57.5	2.26	300	11.81	1,301	0.87	IO82110-16GA	66.0	120	IO84210-16	66.0	75
JP45G090650099	31	-20	1.1/4"	63	2.1/2"	70.0	2.76	420	16.54	1,636	1.10	IO82110-20GA	78.6	135	IO84210-20	78.6	95
JP45G090750099	38	-24	1.1/2"	76	3"	82.5	3.27	500	19.69	1,920	1.29	IO82110-24GA	91.5	150	IO84210-24	91.5	105
JP45G090900099	51	-32	2"	89	3.1/2"	96.0	3.78	630	24.80	2,386	1.60	IO82110-32GA	106.5	165	IO84210-32	106.5	115

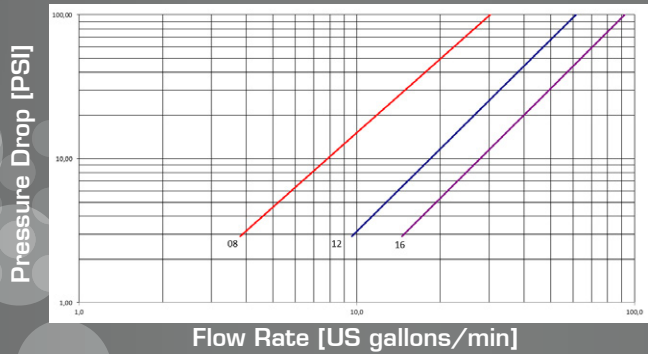
ISO B FOR DRILLING BOP UNITS



Pressure Drop



Pressure Drop



TECHNICAL DATA

SIZE			WORKING PRESSURE (Connected)		WORKING PRESSURE (Disconnected)		RATED FLOW at 0.2 MPa of pressure drop		CONNECTION EFFORT		OIL SPILLAGE Connection/ Disconnection		MINIMUM BURST PRESSURE						CONNECTION/ DISCONNECTION UNDER PRESSURE
DN	inch	Dash	MPa	PSI	MPa	PSI	l/min	US GPM	N	lb.	cc.	cubic inch	Male		Female		M & F		Not allowed
			MPa	PSI	MPa	PSI							MPa	PSI	MPa	PSI	MPa	PSI	
12.5	½	08	42	6090	35	5075	55	14.6	70	156	2.5	0.153	140	20300	140	20300	180	26100	Not allowed
20	¾	12	35	5075	25	3625	122	32.1	90	200	8.5	0.519	100	14500	100	14500	150	21750	Not allowed
25	1	16	35	5075	25	3625	183	48.3	90	200	15	0.916	100	14500	100	14500	140	20300	Not allowed

The rated flow represents the normal operating condition. The maximum recommended flow rate is equal to 1.5 times the rated flow

PRODUCT DESCRIPTION

- MQS-B BOP VERSION is designed for BOP (Blow-out preventer) service in Oil & Gas Industry
- Simple connection & disconnection by pulling back the sleeve
- Safety system on the female part to avoid accidental disconnection
- Positive quick connection of the male into the female by latching ball system
- Poppet valve sealing system that guarantee high sealing performance at low & high pressure
- E-COAT zinc plating with improved corrosion protection and environmentally friendly process
- Female & Male Coupling with red identification for an easy visual verification
- ISO 7241 series B interchangeable
- API 16D approval.

MATERIAL

Female & male couplings in high grade carbon steel with hardened areas in correspondence to the most stressed points. Seal in Viton with back-up in PTFE.

WORKING TEMPERATURE

-25°C to +200°C

SAFETY FACTOR

4:1 in CONNECTED & DISCONNECTED conditions

IMPULSE PRESSURES

100,000 cycles at 133% of the rated one (freq. 1Hz)

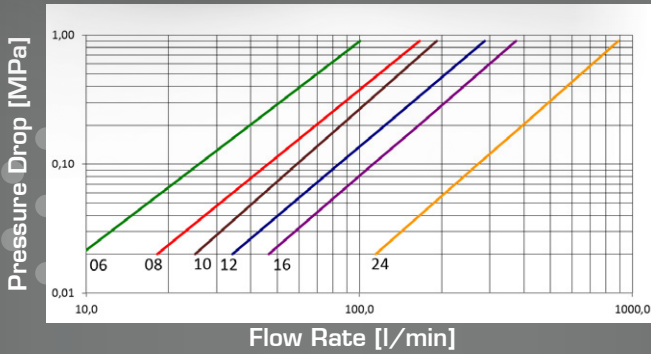
TEST SPECIFICATIONS

ISO 18869 , Flame resistance test to API 16D

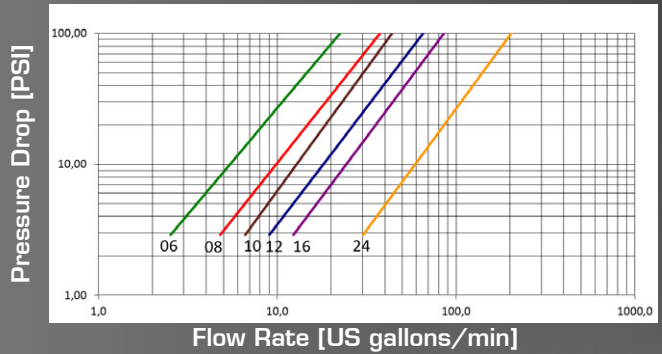
FLAT FACE SCREW TYPE



Pressure Drop



Pressure Drop



TECHNICAL DATA

SIZE			MPa				FLOW RATE		OIL SPILLAGE Connection/ Disconnection		MINIMUM BURST PRESSURE						CONNECTION/ DISCONNECTION UNDER PRESSURE
DN	inch	Dash	WORKING PRESSURE CONNECTED (Dynamic)		WORKING PRESSURE DISCONNECTED (Dynamic)		l/min	US GPM	cc.	cubic inch	Male		Female		M & F		Allowed
			MPa	PSI	MPa	PSI					MPa	PSI	MPa	PSI	MPa	PSI	
10	3/8	06	42	6090	35	5075	40	10.6	0.007	0.0004	190	27550	145	21025	175	25375	Allowed
12.5	1/2	08	42	6090	35	5075	69	18.2	0.008	0.0005	180	26100	145	21025	170	24650	Allowed
16	5/8	10	42	6090	35	5075	86	22.7	0.008	0.0005	200	29000	145	21025	185	26825	Allowed
19	3/4	12	42	6090	35	5075	124	32.8	0.009	0.0005	145	21025	145	21025	175	25375	Allowed
25	1	16	38	5510	35	5075	165	43.6	0.02	0.0012	145	21025	145	21025	155	22475	Allowed
38	1 1/2	24	32	4640	32	4640	396	104.6	0.05	0.0031	130	18850	130	18850	130	18850	Allowed

The rated flow represents the normal operating condition. The maximum recommended flow rate is equal to 1.5 times the rated flow

PRODUCT DESCRIPTION

- Screw coupling with quick connection system
- Working pressure 35MPa
- Triple valve system that guarantees connection under pressure safely
- Interchangeable according to Manuli Q.Safe specifications
- Sealing system with flat valve
- Polyurethane seals
- Compact design
- Wide range of termination ends
- E-Coat 1000 plating

MATERIAL

Couplings in steel with some stressed area hardened, carbonitrided valve, springs in C98 steel, seals in polyurethane and NBR, back-up ring PTFE

WORKING TEMPERATURE

-22°F up to +230°F (-30°C up to +110°C)

SAFETY FACTOR

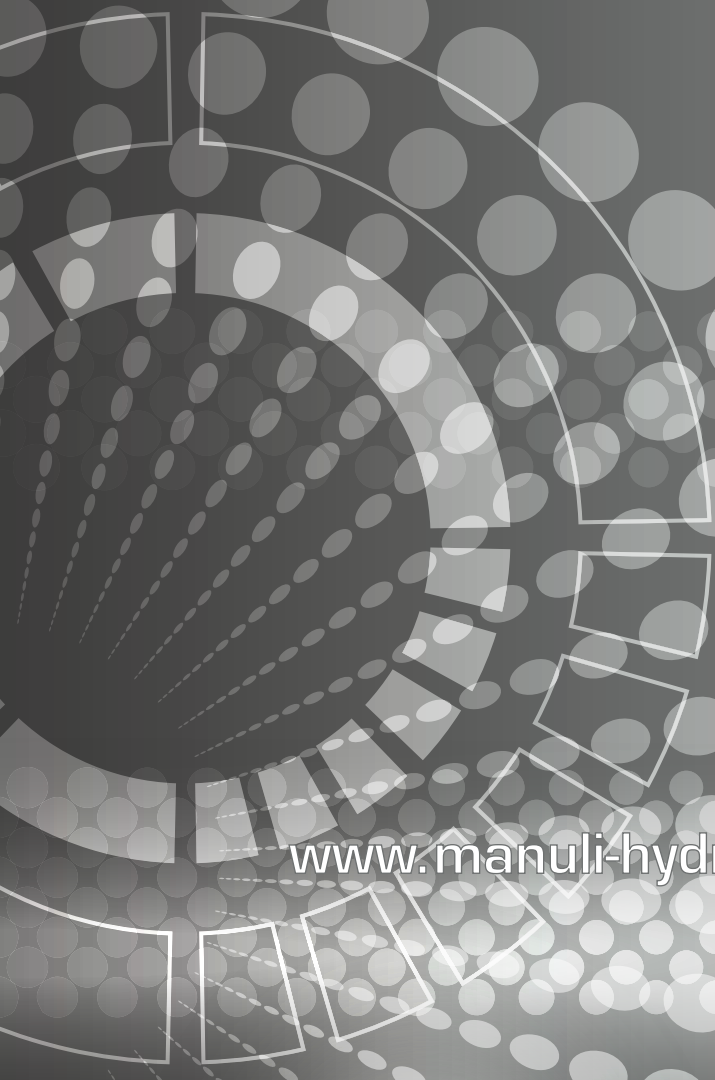
4:1 for dynamic pressures

IMPULSE PRESSURES

1,000,000 cycles at 120% of rated one (freq. 1Hz) in connected and disconnected conditions

TEST SPECIFICATIONS

ISO 18869



www.manuli-hydraulics.com/conveyors



Global Marketing Office
Email: marketing@manuli-hydraulics.com

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