



HYDRAULICS

**OUTSTANDING FIRE RESISTANCE WITH
SUPERIOR HYDRAULIC PERFORMANCE**



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



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)

GoldenArmour hoses and MQS-BOP quick couplings in use in BOP application by customers in Italy (2014).

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 (2014).

GOLDENGUARD/3000

EMERGENCY HYDRAULIC SYSTEMS & BOP



KEY FEATURES

- High robustness of the hose structures
- Thermal insulation of the hose with a special cover material
- Long lasting resistance of the cover layer
- Flame retardant properties of the cover
- 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, defense, 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

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	Std1	Std2
H11022019*	19	- 12	3/4"	26,9	1,06	32,3	1,27	207	3000	828	12000	180	7,09	1288	0,87	OPK-12	
H11022025*	25	- 16	1"	34,1	1,34	40,1	1,58	207	3000	828	12000	230	9,06	1876	1,26	OPK-16	

CONTINUOUS SERVICE TEMPERATURE RANGE

-40 °F / 250 °F
-40 °C / 121 °C

TUBE

High grade NBR oil resistant 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 type C

TYPE APPROVALS

DNV-GL; CU-TR; MSHA; API 16D fire test (DNV), LR



Remarks:

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

GOLDENGUARD/5000

EMERGENCY HYDRAULIC SYSTEMS & BOP



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TECHNICAL DATA

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	DN	dash	inch	mm	inch	mm	inch	bar	psi	bar	psi	mm	inch	g/m	lb/ft	Std1	Std2
H11020010*	10	- 6	3/8"	16,7	0,66	20,7	0,81	345	5000	1380	20010	127	5,00	651	0,44	MF+M00910-06	OPK-06
H11020012*	12	- 8	1/2"	20,1	0,79	24,1	0,95	345	5000	1380	20010	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	5000	1380	20010	180	7,09	1490	1,00	IP+M01500-10	
H11020019*	19	- 12	3/4"	29,0	1,14	36,2	1,43	345	5000	1380	20010	240	9,45	2024	1,36	IP+M01500-12	SP+M05400-12
H11020025*	25	- 16	1"	36,0	1,42	44,0	1,73	345	5000	1380	20010	300	11,81	2742	1,84	IP+M01500-16	SP+M05400-16
H11020031*	31	- 20	1.1/4"	47,0	1,85	55,0	2,17	345	5000	1380	20010	420	16,54	4293	2,88	IP+M01600-20	SP+M05500-20
H11020038*	38	- 24	1.1/2"	54,6	2,15	62,6	2,46	345	5000	1380	20010	500	19,69	5531	3,72	IP+M01600-24	SP+M05500-24
H11020051*	51	- 32	2"	68,4	2,69	76,4	3,01	345	5000	1380	20010	630	24,80	7712	5,18	IP+M01800-32	SP+M05500-32

CONTINUOUS SERVICE TEMPERATURE RANGE

-40 °F / 250 °F
-40 °C / 121 °C

TUBE

High grade NBR oil resistant rubber

REINFORCEMENT

Multiple plies of high tensile steel wire spirals (DN 16 to 51), 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 and SAE J517-100R13 performance

TYPE APPROVALS

DNV-GL; CU-TR; MSHA; API 16D fire test (DNV), LR



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 are required
- STD2 fitting solution: No accessories required

The STD1 fitting solution has to be selected for the most demanding applications.

DN 10 & 12: Max. continuous temperature 100°C for these wire braided references.

GOLDENARMOUR

EMERGENCY HYDRAULIC SYSTEMS & BOP



KEY FEATURES



- High robustness of the hose structures
- Thermal insulation of the hose with a stainless armour
- 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, defense, 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.

HOSE SIZE			MAX W.P.		TEST PRESSURE		BURST PRESSURE		HOSE	PART. REF.	FITTING		ACCESSORIES	
			bar	psi	bar	psi	bar	psi			Insert	Ferrule	Armour guard	Metal Sleeve
DN	dash	inch	bar	psi	bar	psi	bar	psi						
10	-6	3/8"	345	5000	690	10000	1380	20000	ROCKMASTER/2PLUS	H01101010	MF	IM00910-06	JP45G090280099	IO82110-06GA
12	-8	1/2"	345	5000	690	10000	1380	20000	ROCKMASTER/2PLUS	H01101012	MF	IM00910-08	JP45G090320099	IO82110-08GA
16	-10	5/8"	345	5000	690	10000	1380	20000	ROCKMASTER/4SH	H10044016	IP	IM01500-10	JP45G090400099	IO82110-10GA
19	-12	3/4"	345	5000	690	10000	1380	20000	ROCKMASTER/13	H10035019	IP	IM01500-12	JP45G090450099	IO82110-12GA
25	-16	1"	345	5000	690	10000	1380	20000	ROCKMASTER/13	H10035025	IP	IM01500-16	JP45G090500099	IO82110-16GA
31	-20	1-1/4"	345	5000	690	10000	1380	20000	ROCKMASTER/13	H10035032	IP	IM01600-20	JP45G090650099	IO82110-20GA
38	-24	1-1/2"	345	5000	690	10000	1380	20000	ROCKMASTER/13	H10035040	IP	IM01600-24	JP45G090750099	IO82110-24GA
51	-32	2"	345	5000	690	10000	1380	20000	ROCKMASTER/13	H10035051	IP	IM01800-32	JP45G090900099	IO82110-32GA

CONTINUOUS SERVICE TEMPERATURE RANGE: TUBE: High grade NBR oil resistant rubber

DN 10, 12:
-40°C / +100°C
-40°F / +212°F

DN16-51:
-40°C / +121°C
-40°F / +250°F

REINFORCEMENT: Multiple plies of high tensile steel wire spirals (DN 16 to 51), 2 wire braids (DN 10, 12)

COVER: High abrasion and ozone resistant rubber

FITTINGS: MF2000 Interlock Plus crimped fittings (DN 10, 12 Multifit fittings), stainless steel and carbon steel

EXTERNAL PROTECTION: stainless steel flexible armour

APPLICABLE SPECS: API 16D Fire Test (pr. 10.1.2).

DN 10, 12: ISO 18752-A
DN 16-51: ISO 18752-C, ISO 3862 and SAE J517 type 100R13 performance

TYPE APPROVALS: MSHA, DNV-GL, LR, (API 16D fire test)




Remark:

Refer to GOLDENARMOUR assembling instructions and crimp chart for the correct assembling of the hose.



Hose assembly branding:

The GOLDENARMOUR must report at least the following information in the hose brand:

 - inch size - WP 5000 psi (on the metal sleeve)

- assembling date - assembler identification (additional tag or on the metal sleeve)

BOP QUICK COUPLINGS



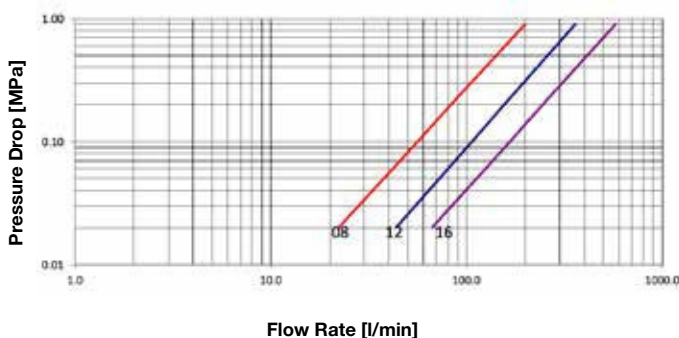
ISO B FOR DRILLING BOP UNITS



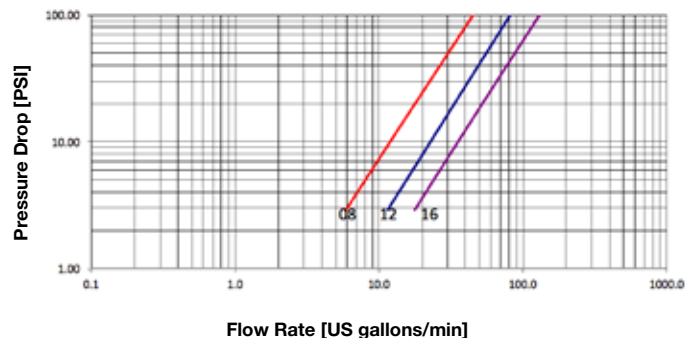
SIZE	WORKING PRESSURE (Dynamic)	RATED FLOW at 0.2 MPa of pressure drop	CONNECTION EFFORT	OIL SPILLAGE Connection/ Disconnection	MINIMUM BURST PRESSURE	CONNECTION/ DISCONNECTION UNDER PRESSURE

mm	inch	dash	MPa	PSI	l/min	US GPM	N	lb.	cc.	cubic inch	Male		Female		M & F		
											MPa	PSI	MPa	PSI	MPa	PSI	
12.5	½	08	42	6090	51	13.5	70	156	2.5	0.153	140	20300	140	20300	180	26100	Not allowed
20	¾	12	35	5075	102	26.9	90	200	8.5	0.519	100	14500	100	14500	150	21750	Not allowed
25	1	16	35	5075	170	44.9	90	200	15	0.916	100	14500	100	14500	140	20300	Not allowed

Pressure Drop



Pressure Drop



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
- ECOAT zinc plating with improved corrosion protection and environmentally friendly process
- Female & Male Coupling with red identification for an easy visual verification
- ISO 7241-1 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	Withstands 100,000 cycles of impulse pressure at 133% of the rated one (freq. 1Hz)
Test Specifications	ISO 7241-2 , Flame resistance test to API 16D

BOP QUICK COUPLINGS

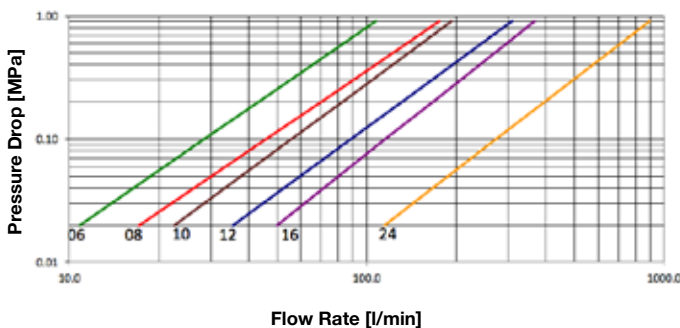
FLAT FACE SCREW TYPE



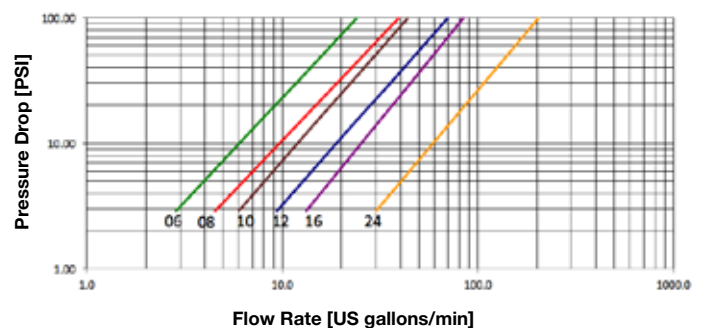
							
MPa		N	OIL SPILLAGE Connection/Disconnection	MINIMUM BURST PRESSURE	CONNECTION/DISCONNECTION UNDER PRESSURE		
SIZE	WORKING PRESSURE - CONNECTED (Dynamic)	WORKING PRESSURE - DISCONNECTED (Dynamic)	RATED FLOW at 0.2 MPa of pressure drop	TIGHTENING TORQUE		MINIMUM BURST PRESSURE	CONNECTION/DISCONNECTION UNDER PRESSURE

mm	inch	dash	MPa		PSI		l/min	US GPM	Nm	cc.	cubic inch	Male		Female		M & F		
			MPa	PSI	MPa	PSI						MPa	PSI	MPa	PSI			
10	3/8	06	35	5075	35	5075	43	11.4	60	0.007	0.0004	160	23200	140	20300	170	24650	Allowed
12.5	1/2	08	35	5075	35	5075	70	18.5	100	0.008	0.0005	170	24650	150	21750	150	21750	Allowed
16	5/8	10	35	5075	35	5075	85	22.5	100	0.008	0.0005	200	29000	160	23200	160	23200	Allowed
19	3/4	12	35	5075	35	5075	135	35.7	150	0.009	0.0005	145	21025	145	21025	160	23200	Allowed
25	1	16	35	5075	35	5075	170	44.9	200	0.02	0.0012	145	21025	145	21025	160	23200	Allowed
38	1 1/2	24	32	4640	32	4640	396	104.6	400	0.05	0.0031	130	18850	130	18850	130	18850	Allowed

Pressure Drop



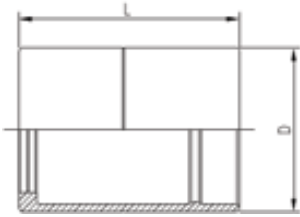
Pressure Drop



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

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	100,000 cycles at 133% of the rated one (freq. 1Hz) in disconnected conditions. 1,000,000 cycles at 133% of the rated one (freq. 1Hz) in connected conditions
Test Specifications	ISO 7241-2 and ISO 16028:1997aMD.1.2006 (E)



IO82110
METAL SLEEVE (STAINLESS STEEL)

PART NUMBER	SIZE			DIMENSIONS mm	
	DN	inch	Size	D	L
IO82110-06	10	- 6	3/8"	36,1	51,0
IO82110-08	13	- 10	1/2"	44,5	59,0
IO82110-10	16	- 10	5/8"	48,0	65,0
IO82110-12	19	- 12	3/4"	55,5	75,0
IO82110-16	25	- 16	1"	64,5	90,0
IO82110-20	31	- 20	1.1/4"	75,0	112,0
IO82110-24	38	- 24	1.1/2"	83,3	117,0
IO82110-32	51	- 32	2"	95,4	128,0



Global Sales & Marketing Office

Suite 9A, 111 Piccadilly,
Manchester, M1 2HY
Phone: +44[0]161 871 1130
Fax: +44 [0]161 247 7862
Email: info@manuli-hydraulics.com



Email: drilling@manuli-hydraulics.com