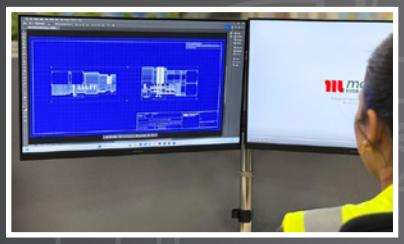
RAILWAY APPLICATIONS

Superior Performance in Railway Applications

manuli® HYDRAULICS

"Manuli Hydraulics is focused on achieving excellence in the design, manufacture, and supply of fluid conveyance solutions, components and associated equipment for high pressure hydraulics, industrial material conveyance, refrigeration and cooling applications."



Our experienced Research & Development team take 2D drawings to 3D models to real life products.

Our world-class hoses, fittings and assembly equipment are manufactured in-house to the highest standards.

We test and validate our products to meet and exceed technical industry standards.

DESIGN → **MANUFACTURE** → **TEST**

SUPPLY ← **INTEGRATED SYSTEMS**

We provide the complete solution: hoses, fittings, crimping parameters and assembly equipment for a fully integrated system.

We supply fluid conveyance solutions directly to our customers whenever and wherever they are.

From design to manufacture, and assembly, Manuli Hydraulics' continual commitment to this unified philosophy makes us a global leader in providing integrated solutions for fluid and material transfer connector applications including hydraulics, refrigeration & air conditioning, oil & gas, water and industrial low-pressure.

Manuli Hydraulics offer a complete range of hoses, fittings and assembly equipment which are purposely designed to work seamlessly together. This harmonized approach allows us to guarantee the quality and performance of our hose assemblies.

Every metre of hose and every single fitting is backed by industry knowledge and experience, made available to you through our dedicated team of application engineers.

From advice on component selection and configuration, our technical expertise allows us to support and work directly with our customers whenever and wherever they are based.

Disclaimer: We reserve the right to modify our products and/or related services and/or discontinue the manufacture and/or supply of any of the products and/or related services, without notice. This document supersedes all previous versions and previously issued documentation. The only official source of technical crimping parameters regarding our products is our Digital Crimp Tools. Printed copies are uncontrolled therefore, please be sure to use the latest versions of our Ryco hydraulics Crimp App or Crimp Web Tool. Do not mix and match: always use Ryco hydraulics original hoses and fittings. For more information, see our 'Safety Guide' by scanning the QR code.

DON'T MIX & MATCH

MANULI HOSES FOR RAILWAY APPLICATIONS

In 2013 the European standard for fire safety on railway, rolling stock, EN 45545, was issued and has since become mandatory in Europe. These harmonised fire safety requirements require almost everything weighing more than 100 grams on an item of rolling stock to undergo stringent fire safety testing. This has had a major effects on a wide range of operators and manufacturers, including upholsterers, cable suppliers and, of course, hydraulic hose manufacturers.

Manuli has developed a dedicated range of hoses designed to meet the requirements of this standard, using materials that limit fire development and produce low levels of smoke and toxic fumes in the event of a fire. Compliance with the standard is broken down into 3 Hazard Levels (HL1, HL2 & HL3) and tests are conducted for both internal and external use.

The Manuli Railway Applications range consists of four specific hose families, SafeMaster/2SN, SafeMaster/2SC, SafeMaster/2TE and RockMaster/4SP, each of which has been independently tested and qualified to the following Hazard Levels:

Railway SafeMaster/2SN (DN 6 - 38)

- R22 (Internal): HL2
- R23 (External): HL3

Railway SafeMaster/2SC (DN 6 - 25)

- R22 (Internal): HL2
- R23 (External): HL3

Railway SafeMaster/2TE (DN 5 - 31)

- R22 (Internal): HL1
- R23 (External): HL2

RockMaster/4SP (DN 6 - 51)

- R22 (Internal): HL1
- R23 (External): HL2

EN 45545-2 TEST REQUIREMENTS & CLASSIFICATIONS

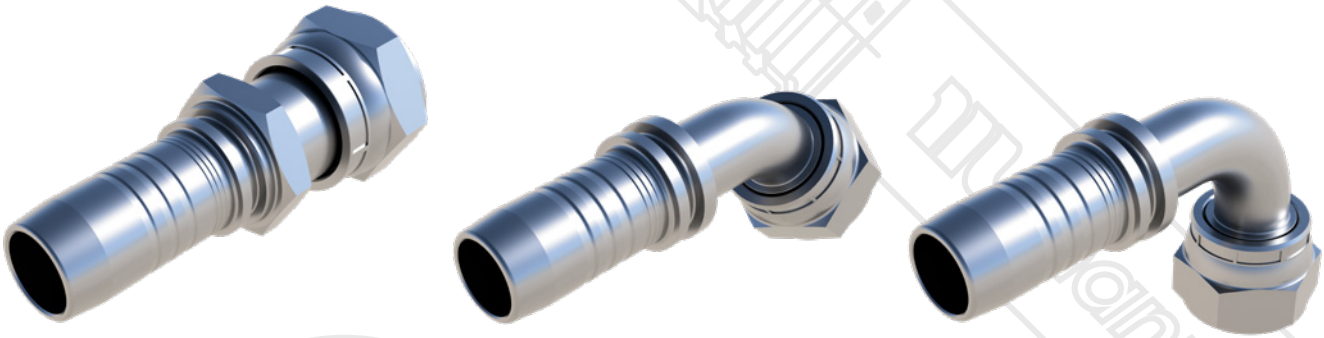
Requirement for	Test Method & Reference	Test Measurement (Units)	Required	Thresholds		
				HL1	HL2	HL3
Inside Uses (R22)	EN ISO 4589-2	Oxygen content (%)	Min.	28	28	32
	EN ISO 5659-2 (25kW/m²)	Smoke density (Ds max. dimensionless)	Max.	600	300	150
	NF X70-100-1 & -2 (600°C)	Smoke toxicity (CITnlp dimensionless)	Max.	1.2	0.9	0.75
Outside Uses (R23)	EN ISO 4589-2	Oxygen content (%)	Min.	28	28	32
	EN ISO 5659-2 (25kW/m²)	Smoke density (Ds max. dimensionless)	Max.	-	600	300
	NF X70-100-1 & -2 (600°C)	Smoke toxicity (CITnlp dimensionless)	Max.	-	1.8	1.5

COMPLEMENTARY PRODUCTS

As the world leader in supplying integrated hydraulic connector solutions it is only to be expected that Manuli Hydraulics has a wealth of products designed to support and complement their railway applications hose range.

Zinc-Nickel and Stainless Steel Fittings

In order to maximise efficiency and minimise downtime Manuli offer both zinc-nickel coated and stainless steel fittings. These highly corrosion-resistant fittings allow for extended mission profiles and significant cost savings over the life of the hose assembly.

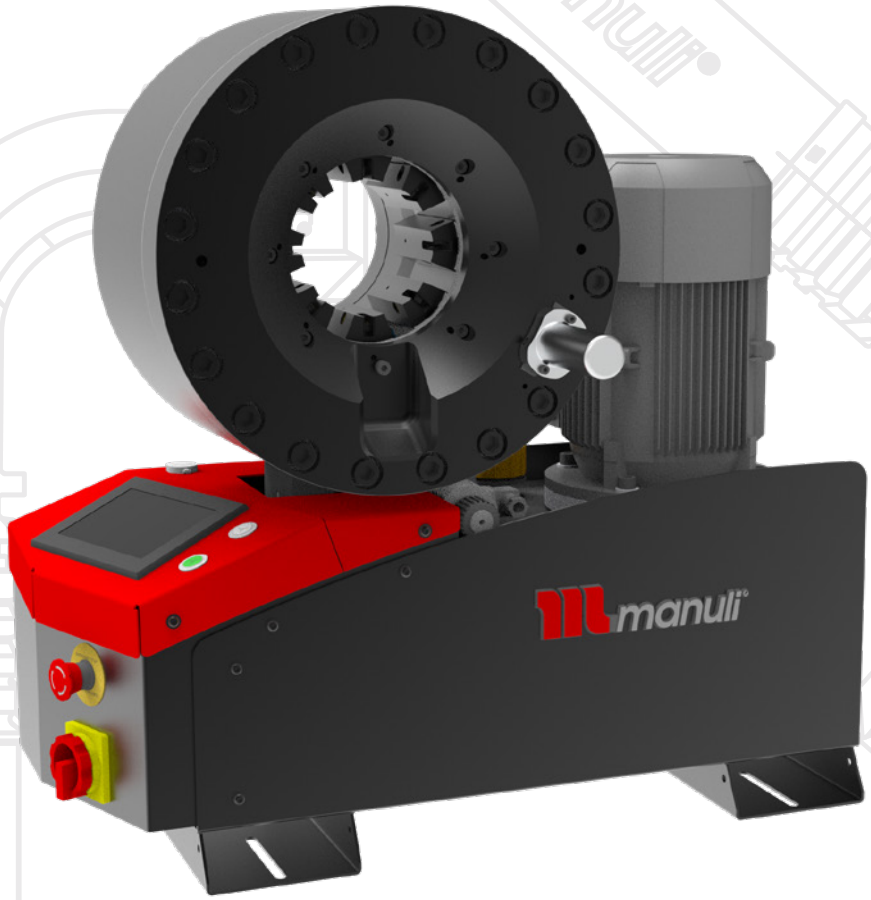


Flat Face Quick Couplings

In an industry where rolling stock is coupled and uncoupled frequently, the use of quick couplings is a normal part of everyday life. The Q.Safe Flat Face range from Manuli are not only the industry gold-standard for hydraulic performance, but they also have a zinc-nickel coating as standard with stainless steel versions also available.

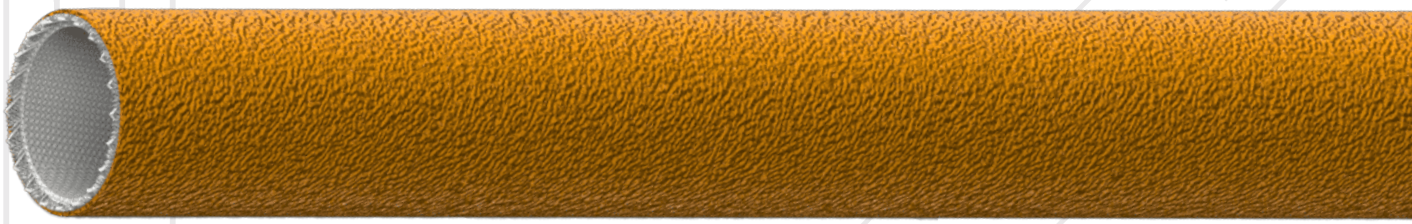
Goldencrimp/420 Crimping Machine

With a crimping force of 420 tonnes the GoldenCrimp/420 offers a maximum crimping diameter of up to 3”, whilst its robust design and split architecture make it ideal for transport and operation on-site.



External Fire Sleeves

Designed to further enhance the fire retardant properties of hose assemblies, the Manuli FSL sleeve is a blend glass fibre and fire resistant silicon. Easily identifiable due to its bright orange exterior, the FSL provides a maximum service temperature of 260°C (500°F).



RAILWAY SAFEMASTER/2SN

RAILWAY - EN 45545-2

FEATURES & BENEFITS:

- Good abrasion resistance
- High ozone and weather resistance
- Cover has flame retardant properties
- Cover has low density smoke when burning (EN 45545-2)
- Over-standard working pressures

APPLICATIONS & FLUIDS:

Hydraulics: medium-high pressure lines in severe environmental conditions, specific installations with tough abrasion conditions, railway hydraulic applications.

Mineral oils, vegetable and rape seed oils and synthetic ester based oils, glycols and polyglycols, oils in aqueous emulsion, water, low pressure compressed air up to 70°C max.

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
H01165006*	6	-4	1/4"	12.7	0.50	14.7	0.58	400	5800	1750	25380	50	1.97	356	0.24	MF+M03400-04	OPF-04
H01165008*	8	-5	5/16"	14.3	0.56	16.3	0.64	350	5070	1480	21460	60	2.36	394	0.26	MF+M03400-05	OPF-05
H01165010*	10	-6	3/8"	16.7	0.66	18.7	0.74	350	5070	1400	20300	70	2.76	520	0.35	MF+M03400-06	OPF-06
H01165012*	12	-8	1/2"	19.8	0.78	21.8	0.86	350	5070	1400	20300	89	3.50	651	0.44	MF+M03450-08	OPF-08
H01165016*	16	-10	5/8"	23.0	0.91	25.0	0.98	250	3620	1020	14790	100	3.94	713	0.48	MF+M03400-10	OPF-10
H01165019*	19	-12	3/4"	27.0	1.06	29.0	1.14	215	3110	900	13050	130	5.12	910	0.61	MF+M03400-12	OPF-12
H01165025*	25	-16	1"	34.8	1.37	36.8	1.45	175	2530	670	9710	160	6.30	1256	0.84	MF+M03400-16	OPF-16
H01165031*	31	-20	1.1/4"	44.3	1.74	47.0	1.85	140	2030	600	8700	419	16.50	1898	1.28	MF+M03400-20	OPK-20
H01165038*	38	-24	1.1/2"	50.7	2.00	53.4	2.10	100	1450	500	7250	500	19.69	2227	1.50	MF+M03400-24	OPK-24

Refer to the latest Manuli Digital Crimp Tools for crimping parameters.

TECHNICAL SPECIFICATIONS:

Continuous Service Temperature Range

-40.0 °F, 212 °F
-40.0 °C, 100 °C

Tube

Oil resistance synthetic rubber.

Reinforcement

Two high tensile steel wire braids.

Cover

Synthetic rubber with high ozone, weather and heat resistance and flame retardant properties.

Applicable Standards

Exceeds EN 853 2SN; SAE 100 R2AT; ISO 1436 2SN/ R2AT;

Type Approvals

EN 45545-2; ISO 15540 (pending)

Remarks: Hose cover must be pin-pricked for use with compressed air.

RAILWAY SAFEMASTER/2SC

RAILWAY - EN 45545-2

FEATURES & BENEFITS:

- Compactness and flexibility
- Good abrasion resistance
- High ozone and weather resistance
- Cover has flame retardant properties
- Cover has low density smoke when burning (EN 45545-2)
- Over-standard working pressures

APPLICATIONS & FLUIDS:

Hydraulics: medium-high pressure lines in severe environmental conditions, specific installations with tough abrasion conditions, railway hydraulic applications.

Mineral oils, vegetable and rape seed oils and synthetic ester based oils, glycols and polyglycols, oils in aqueous emulsion, water, low pressure compressed air up to 70°C max.

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
H01162006*	6	-4	1/4"	11.3	0.44	13.1	0.52	400	5800	1850	26830	45	1.77	290	0.19	MF+M03300-04	OPF-04
H01162008*	8	-5	5/16"	12.9	0.51	14.7	0.58	350	5070	1700	24650	55	2.17	322	0.22	MF+M03300-05	OPF-05
H01162010*	10	-6	3/8"	15.0	0.59	16.8	0.66	330	4780	1500	21750	65	2.56	388	0.26	MF+M03300-06	OPF-06
H01162012*	12	-8	1/2"	18.5	0.73	20.3	0.80	275	3980	1220	17690	80	3.15	496	0.33	MF+M03300-08	OPF-08
H01162016*	16	-10	5/8"	21.8	0.86	23.6	0.93	250	3620	1050	15220	90	3.54	615	0.41	MF+M03400-10	OPF-10
H01162019*	19	-12	3/4"	25.6	1.01	27.6	1.09	245	3550	980	14210	120	4.72	788	0.53	MF+M03400-12	OPF-12
H01162025*	25	-16	1"	33.0	1.30	35.2	1.39	210	3040	840	12180	150	5.91	1188	0.80	MF+M03400-16	OPF-16

Refer to the latest Manuli Digital Crimp Tools for crimping parameters.

TECHNICAL SPECIFICATIONS:

Continuous Service Temperature Range

-40.0 °F, 212 °F
-40.0 °C, 100 °C

Tube

Oil resistance synthetic rubber.

Reinforcement

Two high tensile steel wire braids.

Cover

Synthetic rubber with high ozone, weather and heat resistance and flame retardant properties.

Applicable Standards

Exceeds EN 857 2SC; SAE 100R16; ISO 11237 2SC/ R16;

Type Approvals

EN 45545-2; ISO 15540 (pending)

Remarks: Hose cover must be pin-pricked for use with compressed air.

SAFEMASTER/2TE

RAILWAY - EN 45545-2

FEATURES & BENEFITS:

- Wide range of fluid compatibility
- High flexibility of the hose structure
- Cover has low smoke density when burnt (EN 45545-2)

APPLICATIONS & FLUIDS:

Hydraulics: low pressure lines, return lines

Low pressure compressed air up to 70°C max.

Mineral oils, vegetable and rape seed oils, glycol and polyglycol based oils, synthetic ester based oils, oils in aqueous emulsion, water, low pressure compressed air up to 70°C max.

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
H09076005*	5	-3	3/16"	-	-	11.6	0.45	80	1,160	320	4,640	35	1.37	131	0.09	MF+M00310-03	-
H09076006*	6	-4	1/4"	-	-	13.0	0.51	75	1,080	300	4,350	40	1.57	148	0.10	MF+M00830-04	-
H09076008*	8	-5	5/16"	-	-	14.6	0.57	68	980	272	3,940	50	1.97	169	0.11	MF+M00830-05	-
H09076010*	10	-6	3/8"	-	-	16.1	0.63	63	910	252	3,650	60	2.36	202	0.14	MF+M00820-06	-
H09076012*	12	-8	1/2"	-	-	19.2	0.76	58	840	232	3,360	70	2.76	249	0.17	MF+M00820-08	-
H09076016*	16	-10	5/8"	-	-	23.6	0.93	50	720	200	2,900	90	3.54	333	0.22	MF+M00820-10	-
H09076019*	19	-12	3/4"	-	-	26.5	1.04	45	650	180	2,610	110	4.33	409	0.27	MF+M00820-12	-
H09076025*	25	-16	1"	-	-	33.4	1.31	40	580	160	2,320	130	5.12	522	0.35	MF+M00820-16	-
H09076031*	31	-20	1.1/4"	-	-	41.5	1.63	35	500	140	2,030	140	5.51	742	0.50	MF+M00820-20	-

Refer to the latest Manuli Digital Crimp Tools for crimping parameters.

TECHNICAL SPECIFICATIONS:

Continuous Service Temperature Range

-40.0 °F, 257 °F
-40.0 °C, 125 °C

Tube

Oil resistance synthetic rubber.

Reinforcement

One high resistance textile braid.

Cover

Weather resistant synthetic rubber.

Applicable Standards

EN 854 2TE; ISO 4079 2TE; EN 45545-2;

Type Approvals

EN 45545-2; ISO 15540 (pending)

Remarks: Size DN 31 is not listed in EN 854 2TE specification - Exceeds specification temperature resistance Hose cover must be pin-pricked for use with compressed air.

ROCKMASTER/4SP

ABRASION, WEATHER & HEAT RESISTANCE

FEATURES & BENEFITS:

- Validated for high fatigue resistance
- Superior abrasion resistance
- High ozone and weather resistance
- Flame resistance to a wide range of specs
- Antistatic and antitoxic cover
- Upgraded temperature resistance
- BIO biological and mineral oils compatibility

APPLICATIONS & FLUIDS:

Hydraulics: very high pressure power lines in severe environmental conditions, specific installations with tough abrasion conditions, marine applications, underground and open pit mining.

Mineral oils, vegetable oils and synthetic ester based oils (up to 100°C/212°F), glycols and polyglycols, mineral oils in aqueous emulsion, water.

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
H10008006*	6	-4	1/4"	14.7	0.58	17.6	0.69	485	7,030	2,400	34,800	125	4.92	590	0.40	MF+M00910-04	-
H10008010*	10	-6	3/8"	17.6	0.69	21.0	0.83	450	6,520	2,000	29,000	125	4.92	740	0.50	MF+M00910-06	-
H10008012*	12	-8	1/2"	20.3	0.80	24.2	0.95	420	6,090	1,750	25,380	175	6.89	880	0.59	MF+M00910-08	-
H10008016*	16	-10	5/8"	23.7	0.93	27.6	1.09	380	5,510	1,600	23,200	200	7.87	1,080	0.73	MF+M00910-10	-
H10008019*	19	-12	3/4"	28.2	1.11	31.7	1.25	380	5,510	1,600	23,200	240	9.45	1,450	0.97	MF+M00920-12	SP+M05400-12
H10008025*	25	-16	1"	35.0	1.38	39.0	1.54	320	4,640	1,400	20,300	340	13.39	1,880	1.26	MF+M00930-16	SP+M05400-16
H10008032*	31	-20	1.1/4"	46.1	1.81	49.7	1.96	210	3,040	1,250	18,120	460	18.11	2,990	2.01	MF+M00920-20	SP+M05500-20
H10008038*	38	-24	1.1/2"	52.4	2.06	56.1	2.21	185	2,680	1,000	14,500	560	22.05	3,500	2.35	MF+M00910-24	SP+M05500-24
H10008051*	51	-32	2"	65.4	2.57	69.0	2.72	175	2,530	1,000	14,500	660	25.98	5,010	3.37	MF+M00910-32	SP+M05400-32

Refer to the latest Manuli Digital Crimp Tools for crimping parameters.

TECHNICAL SPECIFICATIONS:

Continuous Service Temperature Range

-40.0 °F, 250 °F
-40.0 °C, 121 °C

Tube

Oil resistance synthetic rubber.

Reinforcement

Four high tensile steel wire braids.

Cover

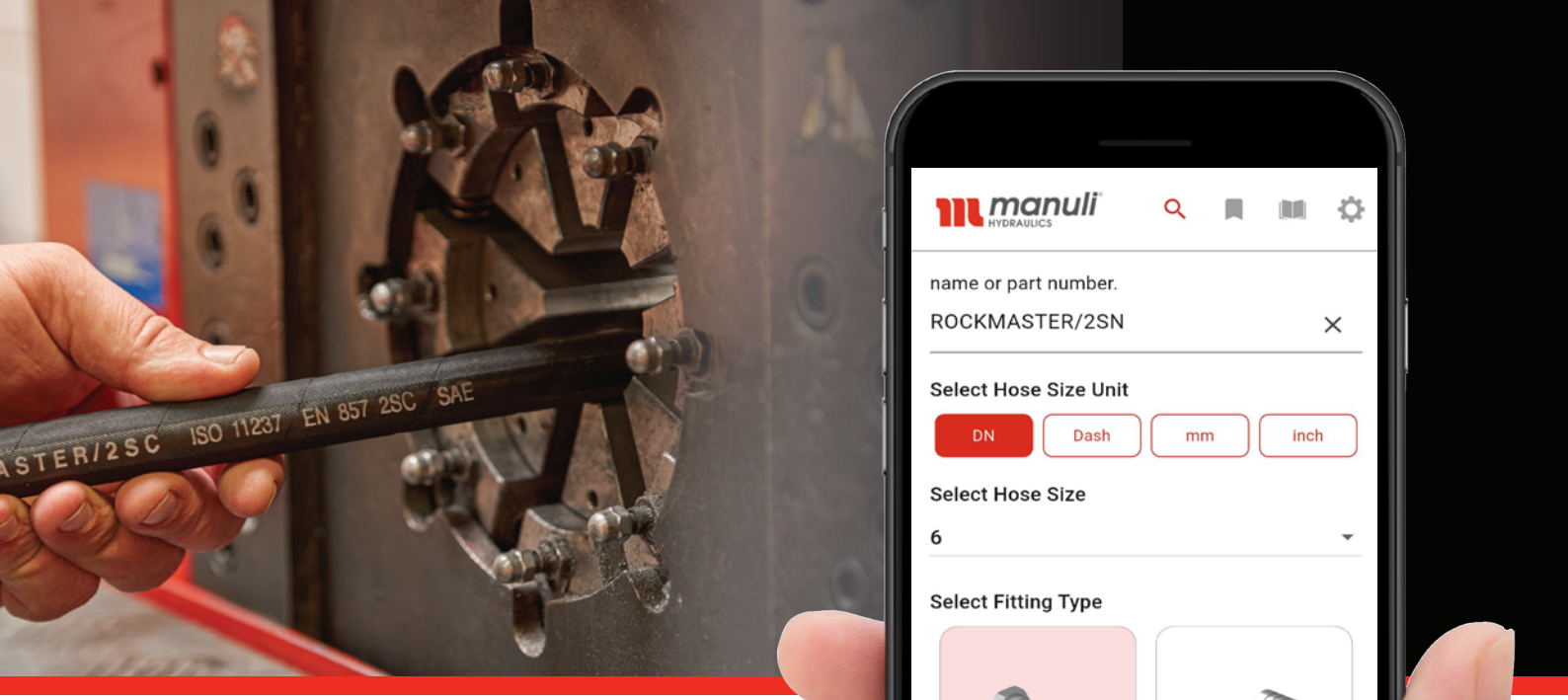
STRONG - TYPE “SD”
Synthetic rubber with high abrasion, ozone, weather and heat resistance.

Applicable Standards

Exceeds EN 856 4SP; ISO 3862 4SP; DN 16 & 19: thin cover style, exceeds EN 856 4SP and ISO 3862 4SP.

Type Approvals

ABS; DNV-GL; DNV-GL (MED); BV; FRAS; MA; MSHA; RINA; B; LR; NK; DB (EN 45545-2); CCS; KRS.



manuli® HYDRAULICS CRIMP

YOUR SOURCE FOR THE MOST UP TO DATE CRIMP PARAMETERS

Stay up to date using Manuli's Digital Crimp Tools, available as an App and a Web version, our Crimp Tools are your go-to resource for accurate, efficient, and safe hydraulic hose crimping. Designed with professionals in mind, this innovative tool grants instant access to the latest crimp specifications, ensuring precision, and reliability in every assembly.

Whether in the workshop or on the go, Manuli Digital Crimp Tools provide real-time access to an extensive database of hose and fitting specifications, helping to reduce downtime and boost productivity.

Key Features of Manuli's Digital Crimp Tools:

Print Feature: This feature supports printing crimping parameters as reference charts for both single or multiple hose sizes within a selected hose family, supporting workshop and warehouse use.

Saved Items: Frequently used hose and fitting combinations can be saved within the app, allowing quick access to commonly used crimping parameters during routine hose assembly tasks.

Technical Centre: The Digital Crimp Tools are supported by a dedicated section on our website called the Technical Centre. This integrated resource provides expert insights, practical tips, and industry knowledge, with access to in depth guides and best practice information.

Accurate Crimping Parameters: To ensure accuracy on their crimping parameters, customers should regularly access the Manuli Digital Crimp Tools to check for updates. It is also recommended that printed charts should be reprinted regularly to ensure crimping information remains up to date.

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