



Rail Hoses

The Hose Range
for European Rail Transportation



ENGINEERING YOUR SUCCESS.

INNOVATION AND COMPLIANCE

Parker is a certified and well-experienced partner with a global presence for the leading players of the rail industry.

Parker as the market leader in the hose business has developed a wide range of hoses from low to high pressure for all relevant rail applications within high speed trains, city trains, industrial transportation vehicles etc. to meet the extensive requirements of the new European standard EN 45545-2.

This new standard has been applied to all newly approved rail-bound vehicles since March 2016 and Parker can proudly say to be one of the first hose manufacturers to fulfil these new requirements in all classes.

- The objective of this European standard is to protect passengers and staff in rail-bound vehicles in the event of a fire on board.
- The EN 45545 was established to replace former national safety standards.
- Rail-bound vehicles concerned by this standard include:
 - Locomotives
 - High-speed trains
 - Regional trains
 - Trams
 - Suburban trains and metros
 - Passenger cars
 - Track maintenance vehicles



EN 45545-2

Everything you need to know

EN 45545-2 defines a classification system that specifies the requirements for the fire behaviour of materials and products used in trains.

This European standard raises the level of requirements compared to the previous national standards, which have now been withdrawn.

EN 45545-2 classifies all materials used on board into different groups which have to fulfil specific “requirement sets” including several test criteria.

Concerning the burning behaviour of hose materials, the EN 45545-2 contains specific requirements for:

- Oxygen index to EN ISO 4589-2
- Smoke density to EN ISO 5659-2
- Smoke toxicity to NF X70-100-1 & 2

For classification, the standard divides materials intended for installation into different areas (inside/outside) and three hazard levels (HL1, HL2, HL3 = highest level):

- Installed inside the vehicles: R22
- Installed outside the vehicles: R23

Areas	Classification			Hazard levels		
				HL1	HL2	HL3
R22 (IN16; E2; E6A; E7A; M2)	T01 EN ISO 4589-2: OI	Oxygen content %	min.	28	28	32
	T10.03 EN ISO 5659-2: 25 kWm ⁻²	D _S max. dimensionless	max.	600	300	150
	T12 NF X 70-100-1 and -2 600 °C	CIT _{NLP} dimensionless	max.	1,2	0,9	0,75
R23 (EX12; E2; E5; E6B; E7B; M3)	T01 EN ISO 4589-2: OI	Oxygen content %	min.	28	28	32
	T10.03 EN ISO 5659-2: 25 kWm ⁻²	D _S max. dimensionless	max.	–	600	300
	T12 NF X 70-100-1 and -2 600 °C	CIT _{NLP} dimensionless	max.	–	1,8	1,5

EN 45545-4 contains normative references to the EN 50553, which is furthermore important for hose assemblies installed in defined vehicle applications.

EN 50553 applies to “Railway applications – requirements for running capability in case of fire on board of rolling stock”.

- Hose assemblies which are installed within hydraulic/pneumatic circuits essential for the running capability of the vehicle have to pass a flame test according ISO15540 (min. 800 °C for at least 15 minutes).

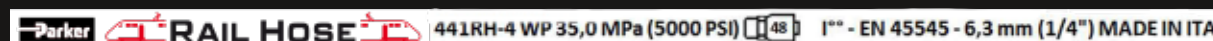
RAIL HOSE RANGE

Proven rail hoses focusing on the safety of people and property.

Range of hoses with technical details

Hose	Fitting series		Working pressure (MPa) by size										Temp. °C	Con-struction	EN 45545 Hazard levels / Fire test					
	Carbon steel	Stainless steel	-4	-5	-6	-8	-10	-12	-16	-20	-24	-32			Outside R23	Inside R22	Fire test ISO15540			
801RH	82	82	2.4	2.4											-40/+100	1 high-tensile fibre braid	HL2	HL2		
681DB	47 nipple 64 shell	64	7.5	6.8	6.3	5.8	5.0	4.5	4.0							-40/+100	2 braids, fibre	HL2	HL2	yes, 30 min. needs fire sleeve
441RH	48	47 nipple 46 shell	35.0	29.7	28.0	24.5	19.2	15.7	14.0							-40/+125	1 braid, wire	HL3	HL3	yes, 30 min.
477RH	48	-			40.0	38.0	35.0	35.0	25.0							-40/+100	2 braids, wire	HL3	HL2	
421RH	48	48								6.3	5.0	4.0				-40/+100	1 braid, wire	HL2	HL2	yes, 15 min.
372RH	70	70			44.5	41.5	35.0	35.0	28.0							-40/+100	3 braids, wire	HL3	HL3	yes, 30 min.
797RH	77	77				42.0	42.0	42.0	42.0							-40/+125	4 layer compact spiral, wire	HL2	HL2	yes, 15 min.

Hose layline example



Parkrimp No-Skive – the system for fast and leak-free assemblies

- No need to remove the cover
- One-piece No-Skive fittings in carbon steel or stainless steel
- Parkalign positions the fittings in the dies perfectly every time
- Fast and easy: no gauges to set on the machine
- Portable hose crimpers for field repair



797RH

No-Skive Compact Spiral™
Fire-retardant cover

Primary Applications

General high pressure hydraulic circuits for railway applications.

Type Approvals

Details please find on pages **Ab-16** to **Ab-19**

Applicable Specifications

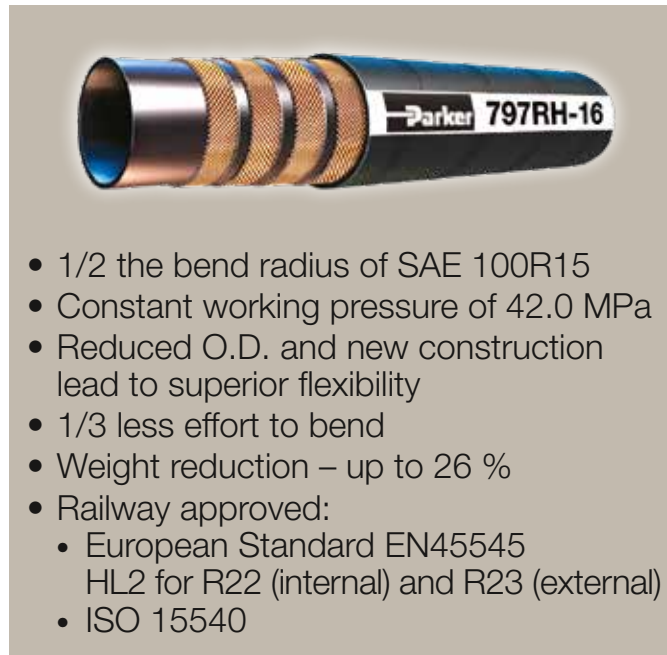
Exceed SAE 100R15 - ISO 3862 Type R15 - ISO 18752-DC

Construction

Inner tube: Proprietary synthetic rubber
Reinforcement: Four spiral high-tensile steel wire
Cover: Fire retardant synthetic rubber

Temperature Range -40 °C up to +125 °C

Exception: Air max. +70 °C
Water max. +85 °C



- 1/2 the bend radius of SAE 100R15
- Constant working pressure of 42.0 MPa
- Reduced O.D. and new construction lead to superior flexibility
- 1/3 less effort to bend
- Weight reduction – up to 26 %
- Railway approved:
 - European Standard EN45545 HL2 for R22 (internal) and R23 (external)
 - ISO 15540

42,0 MPa

Recommended Fluids

Petroleum base hydraulic fluids and lubricating oils.
Wide Compatibility exceeding Column III, with additional chemical resistance, especially for diesel and biodiesel.
Consult the chemical compatibility section on pages **Ab-24** to **Ab-32** for more detailed information.

Fitting Series



Part Number	Hose I.D.				Hose O.D. mm	Pressure Rating				min. bend radius mm	weight kg
	DN	Inch	Size	mm		max. working pressure		min. burst pressure			
						MPa	psi	MPa	psi		
797RH-8	12	1/2	-8	12.7	21.1	42.0	6000	168.0	24000	100	0.67
797RH-10	16	5/8	-10	15.9	23.9	42.0	6000	168.0	24000	115	0.80
797RH-12	19	3/4	-12	19.1	27.9	42.0	6000	168.0	24000	135	1.16
797RH-16	25	1	-16	25.4	35.7	42.0	6000	168.0	24000	165	1.74

Replace the hose when any deformation or damage on the hose cover are visible.
The combination of high temperature and high pressure could reduce the hose life.



Hose layline example

Parker 797RH-12 WP 42,0 Mpa (6000 PSI) 1" 19 mm (3/4") ISO 18752 - EN 45545 - MADE IN ITALY



TESTS AND CERTIFICATES

EN 45545-2 and EN 50553

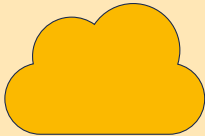
EN 45545-2 (Requirements for the burning behaviour of hose material)

Oxygen index



Fire retardancy test

Smoke density



Burning behaviour test

Smoke toxicity



Smoke gas analysis



EN 50553 (Requirements for the running capability in case of fire on board)



Flame test & functional pressure test for complete hose assemblies according to ISO15540 requirements.



477RH

Elite No-Skive

2 wire braids and fire-retardant cover

Primary Applications

For general-medium pressure hydraulic systems and demanding bend radii applications such as lifting equipment.

Type Approvals

For details please refer to catalogue C-4400/UK, pages **Ab-16** to **Ab-19**

Restrictions

Should not be used for high-impulse hydraulic applications to replace spiral construction hoses.

Construction

Inner Tube: Nitrile (NBR)

Reinforcement: Two braided layers of high-tensile steel wire

Cover: Fire-retardant synthetic rubber

Temperature Range -40 °C up to +100 °C

Exception: Air max. +70 °C

Water max. +85 °C



- *No-Skive* hose construction – Compact design
- Smaller bend radius and reduced outside diameter
- Fire-retardant cover
- Railway approved:
 - European Standard EN 45545 HL2 for R22 (internal) and HL3 for R23 (external)

up to 45.0 MPa

Recommended Fluids

Petroleum and water-glycol based fluids, lubricating oils, air and water. For air above 1.7 MPa, the hose cover must be pin-pricked.

Consult the chemical compatibility section in catalogue C-4400/UK, pages **Ab-24** to **Ab-32** for more detailed information.

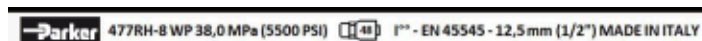
Fitting Series



Part Number	Hose I.D.				Hose O.D. mm	Pressure Rating				min. bend radius mm	weight kg
	DN	Inch	Size	mm		max. working pressure MPa	psi	min. burst pressure MPa	psi		
477RH-4	6	1/4	-4	6.4	13.1	45.0	6500	180.0	26000	65	0.32
477RH-5	8	5/16	-5	7.9	14.9	42.5	6100	170.0	24400	70	0.35
477RH-6	10	3/8	-6	9.5	17.2	40.0	5800	160.0	23200	75	0.42
477RH-8	12	1/2	-8	12.7	20.4	38.0	5500	152.0	22000	105	0.55
477RH-10	16	5/8	-10	15.9	23.4	35.0	5000	140.0	20000	160	0.65
477RH-12	19	3/4	-12	19.1	27.2	35.0	5000	140.0	20000	200	1.10
477RH-16	25	1	-16	25.4	34.8	28.0	4000	112.0	16000	250	1.34

The combination of high temperature and high pressure can reduce the hose life.

Hose layline example



up to 44.5 MPa

372RH

No-Skive Compact

3-wire braid with fire-retardant cover

Primary Applications

Dynamic and static high-pressure hydraulic systems

Type Approvals

Details please find on pages **Ab-16** to **Ab-19**

Applicable Specifications

Parker Specification

Working pressure and O.D. to EN 856-4SP



- **No-Skive** hose construction
- Nitrile (NBR) inner tube
– high chemical resistance
- Small bend radii
- Fire-retardant cover
- Railway approved:
 - European Standard EN45545 HL3 for R22 (internal) and R23 (external)
 - ISO 15540

Construction

Inner tube: Nitrile (NBR)

Reinforcement: Three high-tensile steel wire braids

Cover: Fire retardant synthetic rubber

Temperature Range -40 °C up to +100 °C

Exception: Air max. +70 °C

Water max. +85 °C

Recommended Fluids

Hydraulic fluids on a mineral-oil basis, water-glycol and lubricating oils, air and water. For air and gas applications with a pressure exceeding 1.7 MPa, the cover must be pin-pricked. Consult the chemical compatibility section on pages **Ab-24** to **Ab-32** for more detailed information.

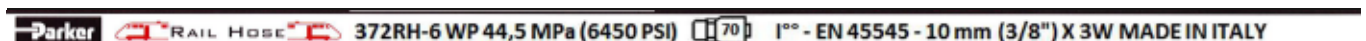
Fitting Series



Part Number	Hose I.D.				Hose O.D. mm	Pressure Rating				min. bend radius mm	weight kg
	DN	Inch	Size	mm		max. working pressure MPa	psi	min. burst pressure MPa	psi		
372RH-6	10	3/8	-6	9.5	21.4	44.5	6500	178.0	25800	120	0.73
372RH-8	12	1/2	-8	12.7	24.6	41.5	6000	166.0	24000	160	0.90
372RH-10	16	5/8	-10	15.9	28.2	35.0	5000	140.0	20000	210	1.09
372RH-12	19	3/4	-12	19.1	32.2	35.0	5000	140.0	20000	260	1.36
372RH-16	25	1	-16	25.4	39.7	28.0	4000	112.0	16000	310	1.78

The combination of high temperature and high pressure could reduce the hose life.

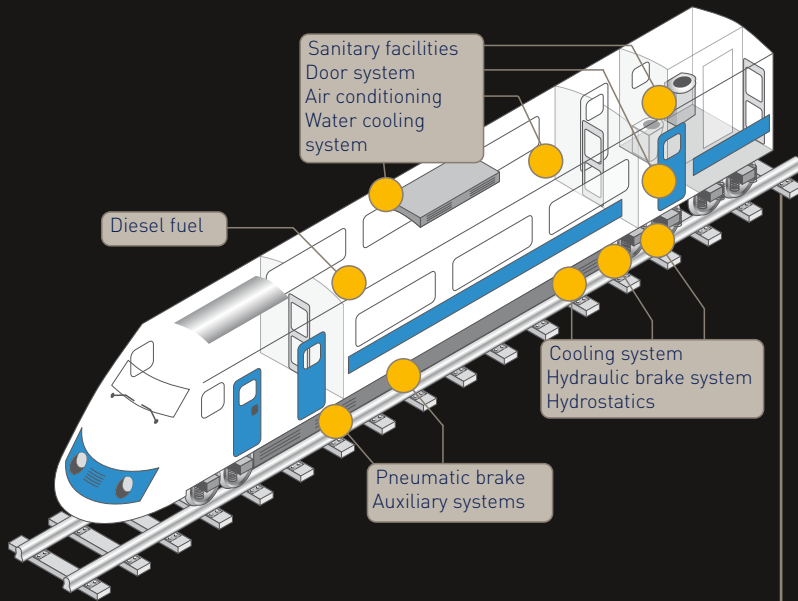
Hose layline example



RAIL HOSE SELECTION GUIDE

The right solution for any application where safety and reliability matter

For many years, Parker's rail hoses have been supporting all of the relevant applications within different types of railway trains and vehicles. The following selection guide is based on successful customer application experiences.



Area of application

- = oil
- = air
- = water

<p>801RH Push-Lok Hose with carbon steel, brass and stainless steel fittings</p>	<p>681DB - <i>No-Skive</i> 2TE Hose with carbon steel and stainless steel fittings</p>	<p>441RH - <i>No-Skive</i> Compact Hose with carbon steel and stainless steel fittings</p>	<p>477RH - <i>No-Skive</i> Compact Hose for very tight bend radii, with carbon steel fittings</p>	<p>421RH - <i>No-Skive</i> Hose for large dimensions (up to 2") with carbon steel/stainless steel fittings</p>	<p>372RH - <i>No-Skive</i> 3-Wire Braid Compact Hose for high pressures (4SP-level); with carbon steel/stainless steel fittings</p>	<p>797RH - <i>No-Skive</i> Compact Spiral™ for high pressures and applications with very tight bend radii and with carbon steel/stainless steel fittings</p>
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Hydraulics	Hydraulic brake system			■	■		
	Hydrostatics			■	■		■
	Other hydraulic systems			■	■	■	■
Pneumatics	Pneumatic brake system		■	■		■	
	Suspension	■	■	■		■	
	Auxiliary systems	■	■	■		■	
Cooling system	Water cooling system	■	■	■		■	
	Air conditioning	■	■	■		■	
Fluid conveyance	Diesel fuel (engines)		■	■		■	
	Water (sanitary facilities)	■	■			■	
Heating	Water	■	■			■	

801RH

Push-Lok

Fire retardant cover

Primary Applications

For low pressure railway applications

Restrictions

Not permitted for use in air brake systems.

Not suitable for high dynamic pulsation systems.

Not recommended for fuels (petrol, diesel etc.).

Not recommended for mineral based hydraulic and lubricating oils.

Construction

Tube: Synthetic rubber

Reinforcement: High-tensile fibre braid

Cover: Fire retardant synthetic rubber

Temperature Range -40 °C up to +100 °C

Exception: Air max. +70 °C

Water max. +85 °C



- Very flexible
- Railway approved:
 - European Standard EN45545 HL2 for R22 (internal) and R23 (external)

Recommended Fluids

Air, water, water-oil-emulsions and water-glycol-emulsions.

Consult the chemical compatibility section on pages **Ab-24** to **Ab-32** for more detailed information.

Fitting Series



Part Number	Hose I.D.				Hose O.D. mm	Pressure Rating				Vaccum* kPa	min. bend radius mm	weight kg
	DN	Inch	Size	mm		max. working pressure MPa	psi	min. burst pressure MPa	psi			
801RH-4-BLK-RL	6	1/4	-4	6.4	12.7	2.4	350	9.7	1400	95	65	0.13
801RH-6-BLK-RL	10	3/8	-6	9.5	15.9	2.4	350	9.7	1400	95	75	0.16

* The vacuum values listed in the table are vacuum pressure values in kPa. For an absolute value subtract the table value from 101 kPa

Colour code

BLK = black



The hose is available in black only

RL = only available on reels

Hose layline example



681DB

No-Skive 2TE

EN 854-2TE

(with approvals for rail transportation)

Primary Applications

General market: Low-pressure hydraulic applications

Rail Transportation market:

Hydraulic applications around railway vehicles

Type Approvals

For details please refer to catalogue C-4400/UK, pages **Ab-16** to **Ab-19**

Applicable Specifications

EN 854-2TE

Construction

Inner Tube: Synthetic rubber

Reinforcement: One braided layer of fibre

Cover: Flame-retardant synthetic rubber

Temperature Range -40 °C up to +100 °C

Exception: Air max. +70 °C

Water max. +85 °C



- One braided layer of fibre
- **No-Skive** hose construction
- Small bend radii
- Flame-retardant rubber cover
- Railway approved:
 - European standard EN 45545 HL2 for R22 (internal) and R23 (external)
 - ISO 15540 (FS-F fire sleeve needed)

Recommended Fluids

Petroleum based hydraulic fluids, water-glycol and water-oil emulsion hydraulic fluids, grease, lubricants, crude and fuel oils, air and water.

Consult the chemical compatibility section in catalogue C-4400/UK, pages **Ab-24** to **Ab-32** for more detailed information.

Fitting Series

- Compatible with 2-piece fittings for use with adjustable crimpers only (47 series nipple and 10064 series shell)

Part Number	Hose I.D.				Hose O.D. mm	Pressure Rating				min. bend radius mm	weight kg
	DN	Inch	Size	mm		max. working pressure MPa	psi	min. burst pressure MPa	psi		
681DB-4	6	1/4	-4	6.4	13.6	7.5	1090	30.0	4360	40	0.15
681DB-5	8	5/16	-5	7.9	14.8	6.8	980	27.0	3920	50	0.16
681DB-6	10	3/8	-6	9.5	16.6	6.3	910	25.0	3640	60	0.19
681DB-8	12	1/2	-8	12.7	19.6	5.8	840	23.0	3360	70	0.24
681DB-10	16	5/8	-10	15.9	23.9	5.0	725	20.0	2900	90	0.35
681DB-12	19	3/4	-12	19.1	27.0	4.5	650	18.0	2600	110	0.39
681DB-16	25	1	-16	25.4	34.4	4.0	580	16.0	2320	150	0.59

The combination of high temperature and high pressure can reduce the hose life.

Hose layline example

PARKER 681DB-6 WP 6,3 MPa (910 PSI) 1" 10 mm (3/8) EN854/2TE/10/DIN MADE IN ITALY



up to 7.5 MPa

421RH

No-Skive

Fire-retardant cover

Primary Applications

General medium-pressure hydraulic and pneumatic systems as well as water and oil cooling circuits

Type Approvals

For details please refer to catalogue C-4400/UK, pages **Ab-16** to **Ab-19**

Applicable Specifications

EN 853 1SN – ISO 1436 Typ 1 – SAE 100R1AT

Construction

- Inner Tube: Nitrile (NBR)
- Reinforcement: One braided layer of high-tensile steel wire
- Cover: Fire-retardant synthetic rubber

Temperature Range -40 °C up to +100 °C

- Exception: Air max. +70 °C
- Water max. +85 °C



- *No-Skive* thin cover hose construction
- Nitrile (NBR) core tube – extended fluid compatibility
- Suitable for 48 series fittings
- Fire-retardant cover
- Railway approved:
 - European Standard EN 45545 HL2 for R22 (internal) and R23 (external)
 - ISO 15540

up to 6.3 MPa

Recommended Fluids

Petroleum and water-glycol based fluids, lubricating oils, air and water. For air and gas above 1.7 MPa, the hose cover must be pin-pricked. Consult the chemical compatibility section in catalogue C-4400/UK, pages **Ab-24** to **Ab-32** for more detailed information.

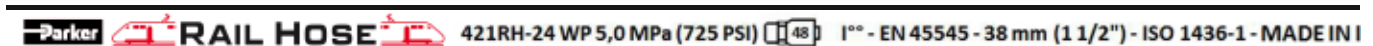
Fitting Series



Part Number	Hose I.D.				Hose O.D. mm	Pressure Rating				min. bend radius mm	weight kg
	DN	Inch	Size	mm		max. working pressure		min. burst pressure			
						MPa	psi	MPa	psi		
421RH-20	31	1 1/4	-20	31.8	44.8	6.3	900	25.0	3600	420	1.19
421RH-24	38	1 1/2	-24	38.1	51.1	5.0	725	20.0	2900	500	1.49
421RH-32	51	2	-32	50.8	64.7	4.0	575	16.0	2300	630	2.23

The combination of high temperature and high pressure can reduce the hose life.

Hose layline example



441RH

No-Skive Compact Fire-retardant cover

Primary Applications

General medium-pressure hydraulic and pneumatic systems as well as water and oil cooling circuits

Type Approvals

For details please refer to catalogue C-4400/UK, pages **Ab-16** to **Ab-19**

Applicable Specifications

Parker specification; working pressure to SAE 100R2; bend radius to SAE 100R16

Construction

- Inner Tube: Synthetic rubber
- Reinforcement: One braided layer of high-tensile steel wire
- Cover: Fire-retardant synthetic rubber

Temperature Range -40 °C up to +125 °C

- Exception: Air max. +70 °C
- Water max. +85 °C



- **No-Skive** hose construction
- One wire braid construction – two wire braid performance
- +125 °C working temperature
- Fire-retardant cover
- Railway approved:
 - European Standard EN 45545 HL3 for R22 (internal) and R23 (external)
 - ISO 15540

Recommended Fluids

Petroleum and water-glycol based fluids, lubricating oils, air and water. For air and gas above 1.7 MPa, the hose cover must be pin-pricked.

Consult the chemical compatibility section in catalogue C-4400/UK, pages **Ab-24** to **Ab-32** for more detailed information.

Fitting Series



Part Number	Hose I.D.				Hose O.D. mm	Pressure Rating				min. bend radius mm	weight kg
	DN	Inch	Size	mm		max. working pressure MPa	psi	min. burst pressure MPa	psi		
441RH-4	6	1/4	-4	6.4	13.4	35.0	5000	140.0	20000	50	0.27
441RH-5	8	5/16	-5	7.9	15.0	29.7	4250	118.8	17000	55	0.32
441RH-6	10	3/8	-6	9.5	17.4	28.0	4000	112.0	16000	65	0.42
441RH-8	12	1/2	-8	12.7	20.7	24.5	3500	98.0	14000	90	0.50
441RH-10	16	5/8	-10	15.9	23.8	19.2	2750	76.8	11000	100	0.65
441RH-12	19	3/4	-12	19.1	27.8	15.7	2250	62.8	9000	120	0.80
441RH-16	25	1	-16	25.4	35.8	14.0	2000	56.0	8000	150	1.22

The combination of high temperature and high pressure can reduce the hose life.



Hose layline example



up to 35.0 MPa

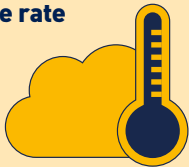
TESTS AND CERTIFICATES

NFPA 130 – Standard for Passenger Rail Systems
for the North American market



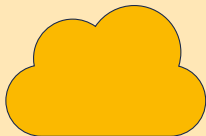
NATIONAL FIRE PROTECTION ASSOCIATION

**Heat & Visible smoke
release rate**



Method: ASTM E 1354-15a

Smoke density



Method: ASTM E 662

Surface Flammability



Method: ASTM E 162

Smoke toxicity



Method: BSS 7239



Certified hose types

441RH, 421RH, 477RH, 372RH

(* partially single sizes

COMPONENTS AND SYSTEM SELECTION

From one supplier and available worldwide.

Parker as the global leader in the hydraulic hose business can offer you the right hose products for all your rail applications and you can choose the way of product supply which best answers your individual manufacturing philosophy.

Our delivery options include:

Hose assemblies



Hose/tube assemblies



Hoses and fittings

If you prefer to make your own safe and reliable hose assemblies, the Parkrimp No-Skive system is the right choice. Parker offers No-Skive hoses, fittings, hose crimpers and tooling – the system for fast and leak-free assemblies meeting EN safety regulations.

We offer a broad range of carbon steel or stainless steel No-Skive fittings.

With over 60 different end configurations in DIN, BSP, SAE, JIC and ORFS they are connectable with our special fire-retardant covered No-Skive rail hoses. (Push-Lok fittings are also available in brass material).



Hose crimpers and tooling for self-assembly

The Parkrimp No-Skive crimping technology is recognised industry-wide as the easiest and most accurate crimping system available.



Crimp specifications can be found at www.parker.com/crimpsource-euro





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EMEA Product Information Centre

Free phone: 00 800 27 27 5374

(from AT, BE, CH, CZ, DE, DK, EE, ES, FI, FR, IE, IL, IS, IT, LU, MT, NL, NO, PL, PT, RU, SE, SK, UK, ZA)

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