Rail Hoses
The Hose Range
for European Rail Transportation

ENGINEERING YOUR SUCCESS.
INNOVATION AND COMPLIANCE

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

Parker is a certified and well-experienced partner with a global presence for the leading players of the rail industry.
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European standard raises the level of requirements compared to the previous national standards, which have now been withdrawn.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 fulfill 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

<table>
<thead>
<tr>
<th>Areas</th>
<th>Classification</th>
<th>Hazard levels</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>HL1</td>
</tr>
<tr>
<td>R22</td>
<td>T01 EN ISO 4589-2: 0I Oxygen content % min.</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>T10.03 EN ISO 5659-2: 25 kWm² D₅ max. dimensionless max.</td>
<td>600</td>
</tr>
<tr>
<td></td>
<td>T12 NF X 70-100-1 and -2 600 °C CITNL dimensionless max.</td>
<td>1,2</td>
</tr>
<tr>
<td>R23</td>
<td>T01 EN ISO 4589-2: 0I Oxygen content % min.</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>T10.03 EN ISO 5659-2: 25 kWm² D₅ max. dimensionless max.</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>T12 NF X 70-100-1 and -2 600 °C CITNL dimensionless max.</td>
<td>–</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Hose</th>
<th>Fitting series</th>
<th>Working pressure (MPa) by size</th>
<th>Temp. °C</th>
<th>Construction</th>
<th>EN 45545 Hazard levels / Fire test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Carbon steel</td>
<td>Stainless steel</td>
<td></td>
<td>Outside R23</td>
<td>Inside R22</td>
</tr>
<tr>
<td>801RH</td>
<td>82</td>
<td>82</td>
<td>-4 -5 -6 -8 -10 -12 -16 -20 -24 -32</td>
<td>-40/+100</td>
<td>1 high-tensile fibre braid</td>
</tr>
<tr>
<td>681DB</td>
<td>47 nipple</td>
<td>64</td>
<td>7.5 6.8 6.3 5.8 5.0 4.5 4.0</td>
<td>-40/+100</td>
<td>2 braids, fibre</td>
</tr>
<tr>
<td>441RH</td>
<td>48</td>
<td>47 nipple 46 shell</td>
<td>35.0 29.7 28.0 24.5 19.2 15.7 14.0</td>
<td>-40/+125</td>
<td>1 braid, wire</td>
</tr>
<tr>
<td>477RH</td>
<td>48</td>
<td>-</td>
<td>40.0 38.0 35.0 35.0 25.0</td>
<td>-40/+100</td>
<td>2 braids, wire</td>
</tr>
<tr>
<td>421RH</td>
<td>48</td>
<td>48</td>
<td>6.3 5.0 4.0</td>
<td>-40/+100</td>
<td>1 braid, wire</td>
</tr>
<tr>
<td>372RH</td>
<td>70</td>
<td>70</td>
<td>44.5 41.5 35.0 35.0 28.0</td>
<td>-40/+100</td>
<td>3 braids, wire</td>
</tr>
<tr>
<td>797RH</td>
<td>77</td>
<td>77</td>
<td>42.0 42.0 42.0 42.0 22.0</td>
<td>-40/+125</td>
<td>4 layer compact spiral, wire</td>
</tr>
</tbody>
</table>

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
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.
RAIL HOSE SELECTION GUIDE

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.

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

Area of application
- = oil
- = air
- = water

Pneumatic brake
Auxiliary systems
Sanitary facilities
Door system
Air conditioning
Water cooling system
Cooling system
Hydraulic brake system
Hydrostatics

801RH – Push-Lok Hose
with carbon steel, brass and stainless steel fittings

681DB – No-Skive 2TE Hose
with carbon steel and stainless steel fittings

441RH – No-Skive Compact Hose
with carbon steel and stainless steel fittings

477RH – No-Skive Compact Hose
for very tight bend radii, with carbon steel fittings

421RH – No-Skive Hose
for large dimensions (up to 2") with carbon steel / stainless steel fittings

797RH – No-Skive Compact Spiral™
for high pressures (4SP-level), with carbon steel / stainless steel fittings

372RH – No-Skive 3-Wire Braid Compact Hose
for high pressures and applications with very tight bend radii

For the area of application:
- Hydraulics
- Pneumatics
- Cooling system
- Fluid conveyance
- Heating

= oil
= air
= water
TESTS AND CERTIFICATES
NFPA 130 – Standard for Passenger Rail Systems for the North American market

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
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

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

Fitting Series

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Hose I.D.</th>
<th>Hose O.D.</th>
<th>max. working pressure</th>
<th>min. burst pressure</th>
<th>min. bend radius</th>
<th>weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>797RH-8</td>
<td>12</td>
<td>1/2</td>
<td>21.1</td>
<td>42.0</td>
<td>6000</td>
<td>100</td>
</tr>
<tr>
<td>797RH-10</td>
<td>16</td>
<td>5/8</td>
<td>23.9</td>
<td>42.0</td>
<td>6000</td>
<td>115</td>
</tr>
<tr>
<td>797RH-12</td>
<td>19</td>
<td>3/4</td>
<td>27.9</td>
<td>42.0</td>
<td>6000</td>
<td>135</td>
</tr>
<tr>
<td>797RH-16</td>
<td>25</td>
<td>1</td>
<td>35.7</td>
<td>42.0</td>
<td>6000</td>
<td>165</td>
</tr>
</tbody>
</table>

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) 77 1" = 18 mm (3/4") ISO 18752 • EN 45545 • MADE IN ITALY
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

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

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Hose I.D.</th>
<th>Hose O.D.</th>
<th>max. working pressure</th>
<th>min. burst pressure</th>
<th>min. bend radius</th>
<th>weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>477RH-4</td>
<td>6 1/4</td>
<td>6.4</td>
<td>13.1</td>
<td>45.0</td>
<td>180.0</td>
<td>65.0</td>
</tr>
<tr>
<td>477RH-5</td>
<td>8 5/16</td>
<td>7.9</td>
<td>14.9</td>
<td>42.5</td>
<td>170.0</td>
<td>70.0</td>
</tr>
<tr>
<td>477RH-6</td>
<td>10 3/8</td>
<td>9.5</td>
<td>17.2</td>
<td>40.0</td>
<td>160.0</td>
<td>75.0</td>
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<tr>
<td>477RH-8</td>
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<td>12.7</td>
<td>20.4</td>
<td>38.0</td>
<td>152.0</td>
<td>105.0</td>
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<tr>
<td>477RH-10</td>
<td>16 5/8</td>
<td>15.9</td>
<td>23.4</td>
<td>35.0</td>
<td>140.0</td>
<td>160.0</td>
</tr>
<tr>
<td>477RH-12</td>
<td>19 3/4</td>
<td>19.1</td>
<td>27.2</td>
<td>35.0</td>
<td>140.0</td>
<td>200.0</td>
</tr>
<tr>
<td>477RH-16</td>
<td>25 1</td>
<td>25.4</td>
<td>34.8</td>
<td>35.0</td>
<td>140.0</td>
<td>250.0</td>
</tr>
</tbody>
</table>

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

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

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

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

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Hose I.D.</th>
<th>Pressure Rating</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>DN Inch</td>
<td>Size</td>
</tr>
<tr>
<td></td>
<td>mm</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>372RH-6</td>
<td>10</td>
<td>3/8</td>
</tr>
<tr>
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<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>372RH-8</td>
<td>12</td>
<td>1/2</td>
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<td></td>
</tr>
<tr>
<td>372RH-10</td>
<td>16</td>
<td>5/8</td>
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<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>372RH-12</td>
<td>19</td>
<td>3/4</td>
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<tr>
<td></td>
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<tr>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>372RH-16</td>
<td>25</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
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</tr>
<tr>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>

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

#### 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.

#### Temperature Range
- **-40 °C up to +100 °C**
- **Air** max. +70 °C
- **Water** max. +85 °C

### Hose layline example

#### Colour code
- **BLK** = black
- The hose is available in black only
- **RL** = only available on reels

<table>
<thead>
<tr>
<th>Part Number</th>
<th>DN</th>
<th>Inch</th>
<th>Size</th>
<th>mm</th>
<th>Hose I.D.</th>
<th>Hose O.D.</th>
<th>max. working pressure</th>
<th>min. burst pressure</th>
<th>Vacuum*</th>
<th>min. bend radius</th>
<th>weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>801RH-4-BLK-RL</td>
<td>6</td>
<td>1/4</td>
<td>-4</td>
<td>6.4</td>
<td>12.7</td>
<td>2.4</td>
<td>350</td>
<td>9.7</td>
<td>1400</td>
<td>95</td>
<td>65</td>
</tr>
<tr>
<td>801RH-6-BLK-RL</td>
<td>10</td>
<td>3/8</td>
<td>-6</td>
<td>9.5</td>
<td>15.9</td>
<td>2.4</td>
<td>350</td>
<td>9.7</td>
<td>1400</td>
<td>95</td>
<td>75</td>
</tr>
</tbody>
</table>

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

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)

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
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

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

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Hose I.D.</th>
<th>Hose O.D.</th>
<th>max. working pressure</th>
<th>min. burst pressure</th>
<th>min. bend radius</th>
<th>weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DN</td>
<td>Inch</td>
<td>Size mm</td>
<td>MPa</td>
<td>psi</td>
<td>MPa</td>
</tr>
<tr>
<td>421RH-20</td>
<td>31</td>
<td>1 1/4</td>
<td>-20</td>
<td>44.8</td>
<td>6.3</td>
<td>900</td>
</tr>
<tr>
<td>421RH-24</td>
<td>38</td>
<td>1 1/2</td>
<td>-24</td>
<td>51.1</td>
<td>5.0</td>
<td>725</td>
</tr>
<tr>
<td>421RH-32</td>
<td>51</td>
<td>2</td>
<td>-32</td>
<td>64.7</td>
<td>4.0</td>
<td>575</td>
</tr>
</tbody>
</table>

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

Hose layline example
**441RH**

*No-Skive Compact*

Fire-retardant cover

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

**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**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>DN</th>
<th>Inch</th>
<th>Size</th>
<th>mm</th>
<th>Hose O.D.</th>
<th>mm</th>
<th>max. working pressure</th>
<th>MPa</th>
<th>psi</th>
<th>min. burst pressure</th>
<th>MPa</th>
<th>psi</th>
<th>min. bend radius</th>
<th>weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>441RH-4</td>
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The combination of high temperature and high pressure can reduce the hose life.

---

**Hose layline example**

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