Safety

- Eaton's mission is to provide safe, reliable, and efficient fluid conveyance solutions for our global customers.

Safety

- TIPCO Technologies AEROQUIP SAFETY TRAINING
- **Aeroquip Agenda:**
- Using STAMPED for Proper Hose Selection:
  S – Size
  T – Temperature
  A – Application
  M – Media
  P – Working Pressure
  E – Ends
  D – Delivery
  ****Why NOT to MIX and MATCH Competitors Hyd. Hose & Ends
- Hose Construction and Safety Points!:
  Update on enhancements extending the life of the hydraulic hose assembly.
- Safety Tips on Routing Hyd. Hose Assemblies.
- Hose Protection when needed. (refer to brochure)
- How vision and communication can prevent an accident and downtime:
  Some of the most common visual indications show a system is approaching the trouble zone. (brochure)
- New Technology & Enhancements
- Aeroquip Match MateCrimping System:
  Making a safe factory assembly with an Eaton AQ exclusive simplified Match Mate system.

- Eaton Aeroquip Technical Support 1-888-258-0222

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Safety

*Why Hydraulic Hose?

>Permits movement between components -- tubing will not.

>Absorbs “shock” created by hydraulic systems -- tubing does not.

>Will accommodate misalignment between components -- tubing will not.

Safety

- Don’t take for granted because your not dealing with a garden hose!
- Safety First - when dealing with **High Pressure** and **Hot Hyd. Oils**.
- Also Errors can lead to downtime, expensive clean ups (HAZ MAT), injuries or catastrophic consequences!

Safety

- **Use *Stamped > For Proper Hose Selection***
- ***S**ize- Inside Diameter, Length and Outside Diameter if for tubing*
- ***T**emperature- Internal, External; Normal, Minimum and Maximum*
- ***A**pplication- What is the hose supposed to do?*
- ***M**edia- What is the product being conveyed?*
- ***P**ressure- "Normal Working Pressure", Constant, Impulse (spikes), Vacuum, "Bend Radius"*
- **E**nds = *A MESS*
  M-Material(brass,steel,stainless steel,etc.)
  E-End Connection(Pipe, JIC, Flat Face O-Ring, etc)
  S-Shape/Configuration (Straight 45°,90°,120°)
  S-Size(Metric,etc.)
- ***D**elivery - When and Where is it needed*

******Do NOT Mix & Match competitors hose& ends !!!!!!!***

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Safety

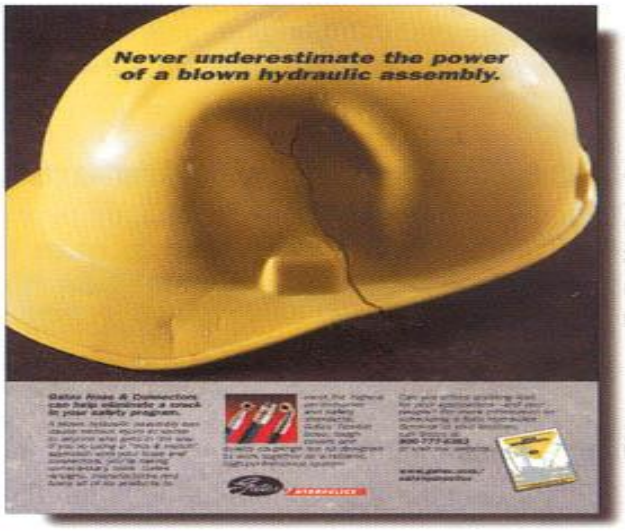
- No mixing & Matching
- **Because of NO mfg. Guidelines** S.A.E STATES the following:

- SAE J517 hose from one manufacturer is usually not compatible with SAE J516 fittings supplied by another manufacturer.
- It is the responsibility of the fabricator to consult the manufacturer's written assembly instructions or the manufacturer directly before intermixing hose and fittings from two manufacturers. Similarly, assembly equipment from one manufacturer is usually not interchangeable with that of another manufacturer…

Safety

- No Mix & Matching
- Even our competition agrees

The new ads carry a straightforward message - Gates hydraulic hoses and couplings are created and tested to work together as a system, and as a result, can help prevent unnecessary safety hazards. It's an important message, especially for end-users who "mix and match" hoses and couplings from different manufacturers. As the ads graphically illustrate, this mix and match approach can lead to catastrophic consequences.



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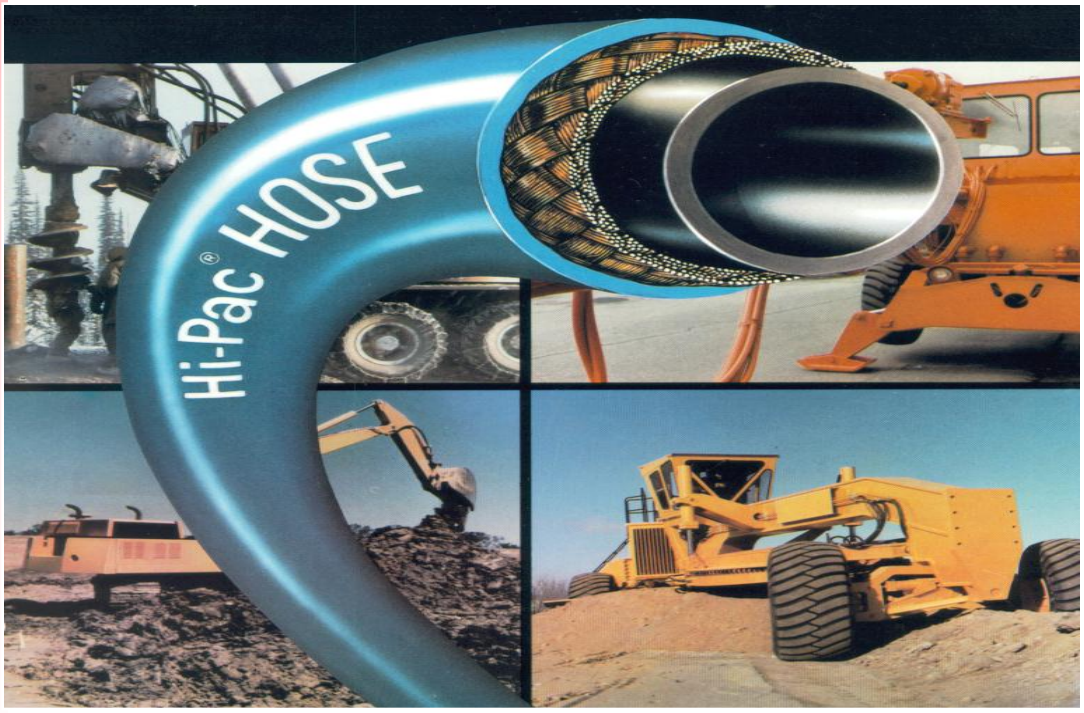
Safety

- ***Hose Construction:***
- **Tube**
- Reinforcement
- Cover
- What's important for your application?



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Safety

- **Purpose of the Tubing?**
  - Transfer Media
  - Any media ?
  - Tubing compound must be compatible with fluid
  - Questions? Call Chris O'Brien from Tipco or Eaton AQ Tech Service 888-258-0222

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Safety

- Tube Fluid Compatibility
- The key - proper hose for the application.
- Results of non-compatible tube

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Safety

Tubing Temperature Range

Fluid Temperature

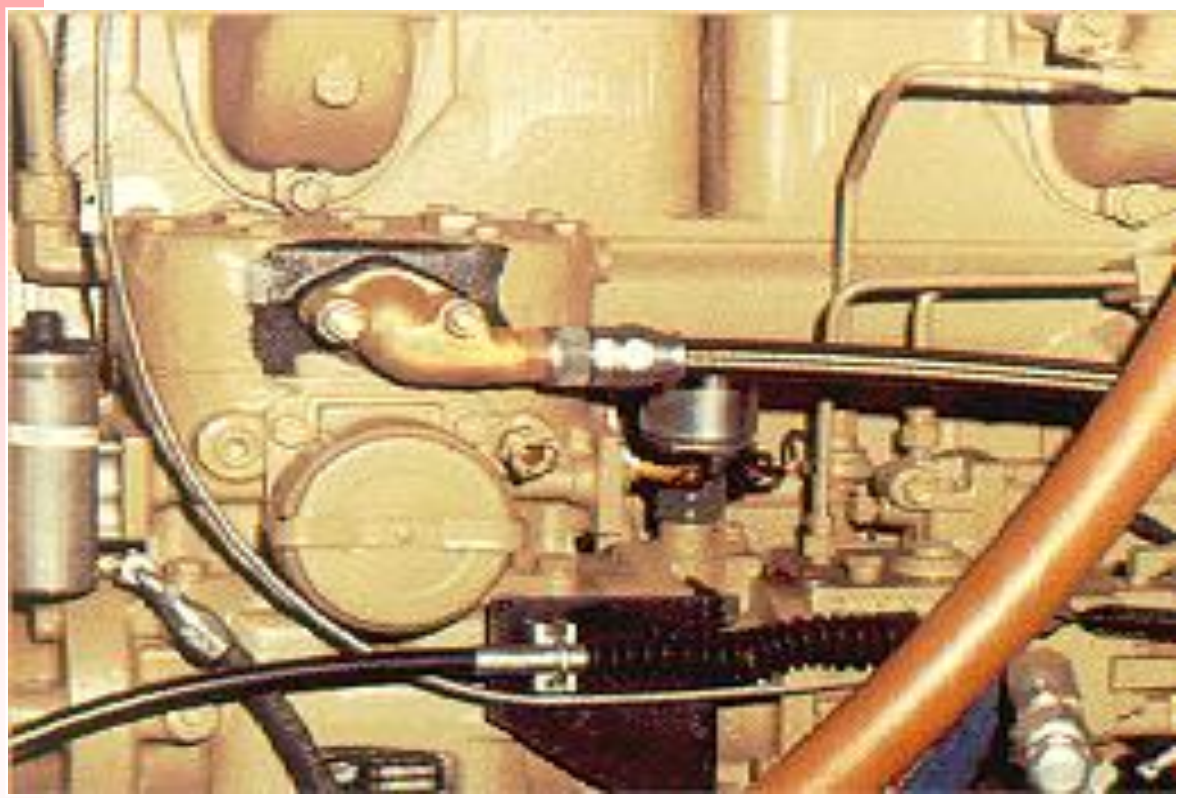
Petroleum oils are used in most hydraulic applications to lubricate parts as well as transmit power. As oil temperature increases, however, the lubricating film thins out. The result is rubbing parts supported by the oil film move closer together; friction increases temperature causing the rubber materials to become baked out.

Nitrile (Buna-N) can last almost indefinitely in 200°F (93°C) oil, but life is cut in half for every 25°F temperature rise.

Safety

Tube for excessive heat (+450 deg. F.) Teflon with Wire Cover

Compressor Discharge Application



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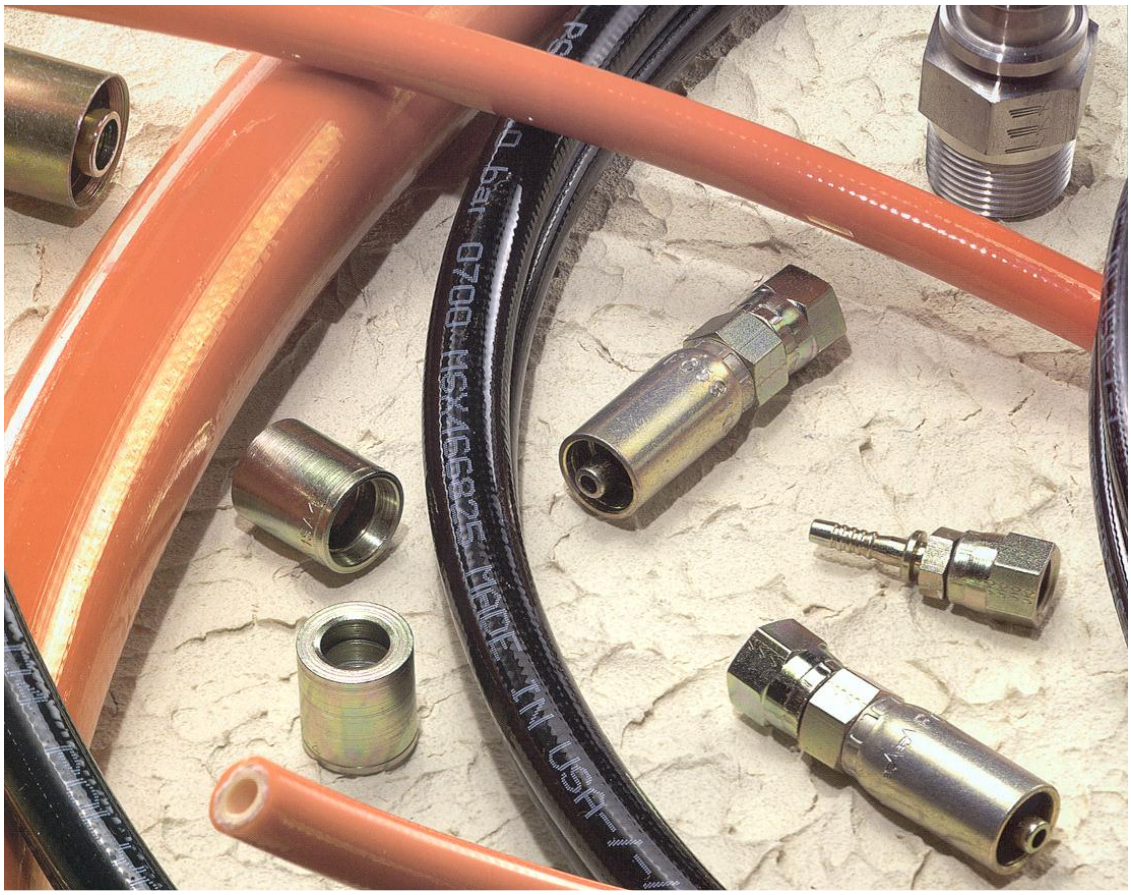
Safety

Eaton Synflex Thermoplastic tube -65°F to +200°F

Lightweight Application



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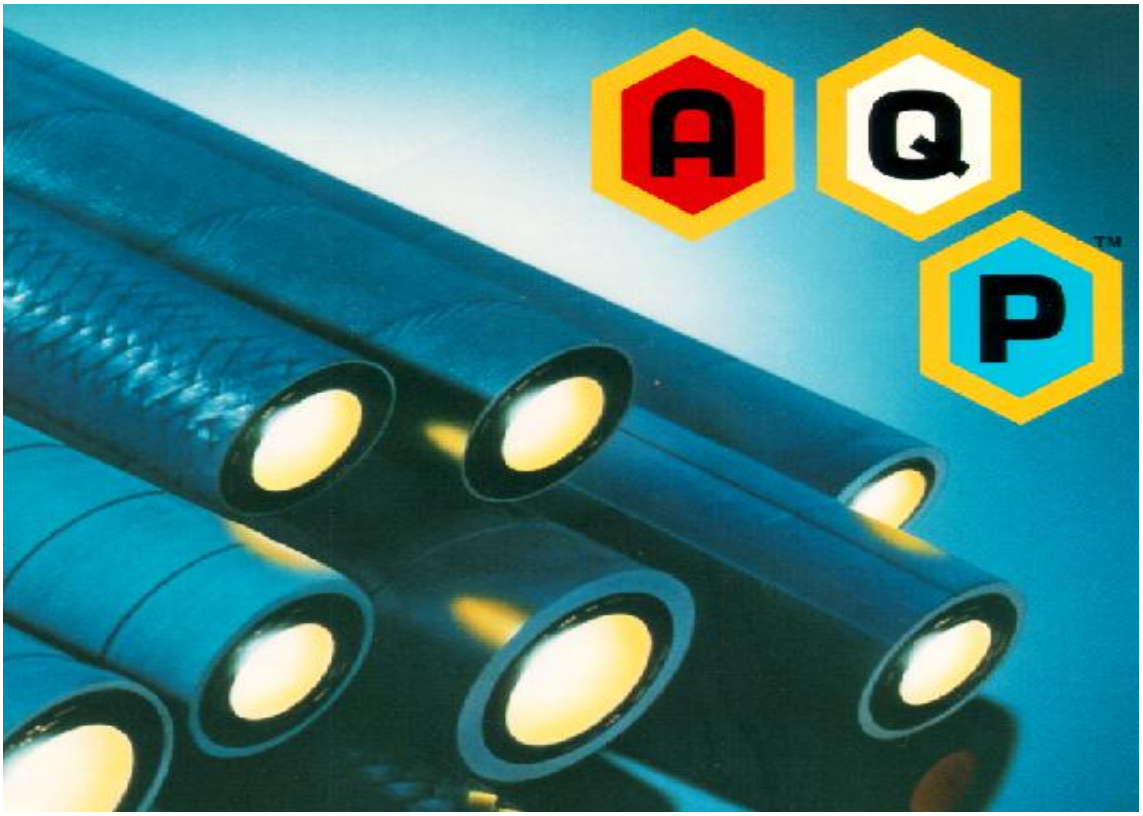
Safety

>High temperature capability up to +300 deg. F.

>Extensive fluid compatibility

>No special fittings required



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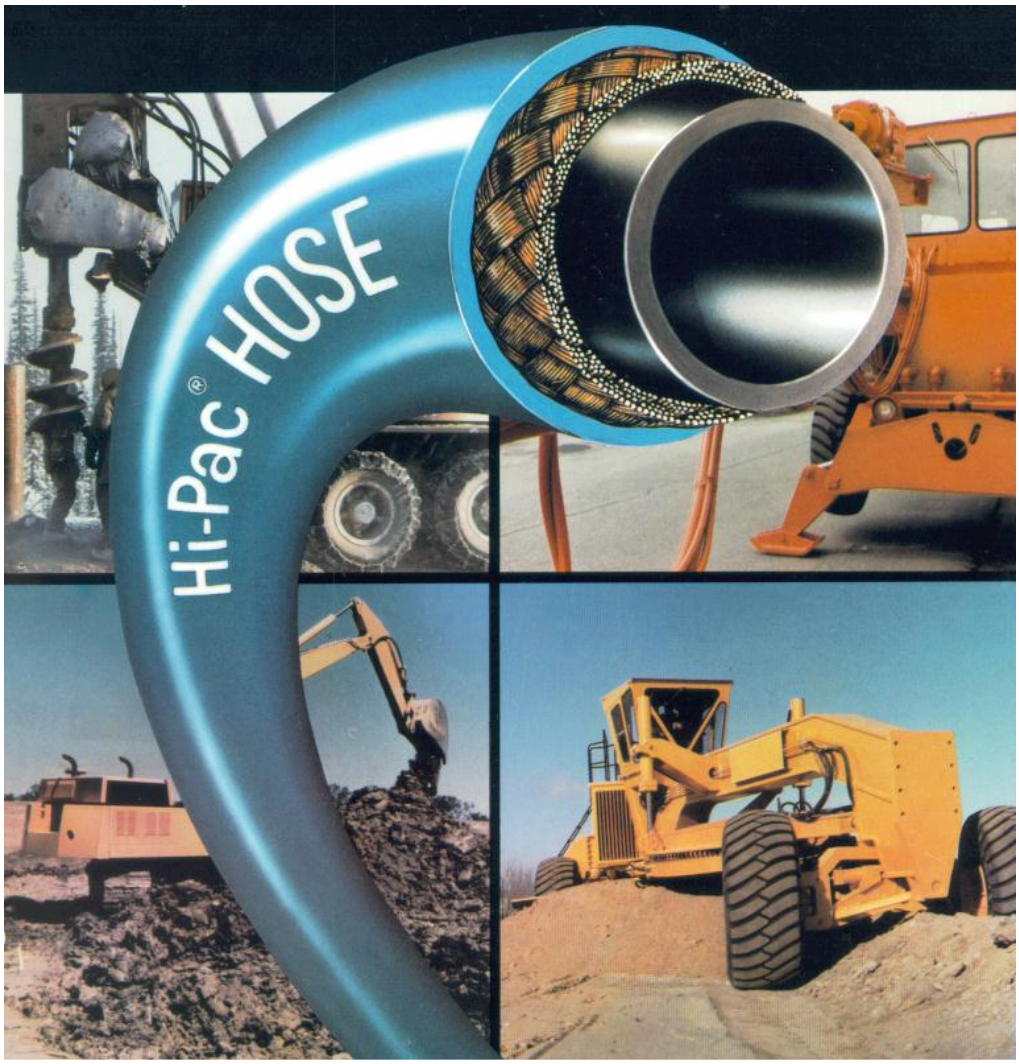
Safety

- ***Next*** ***Reinforcement***



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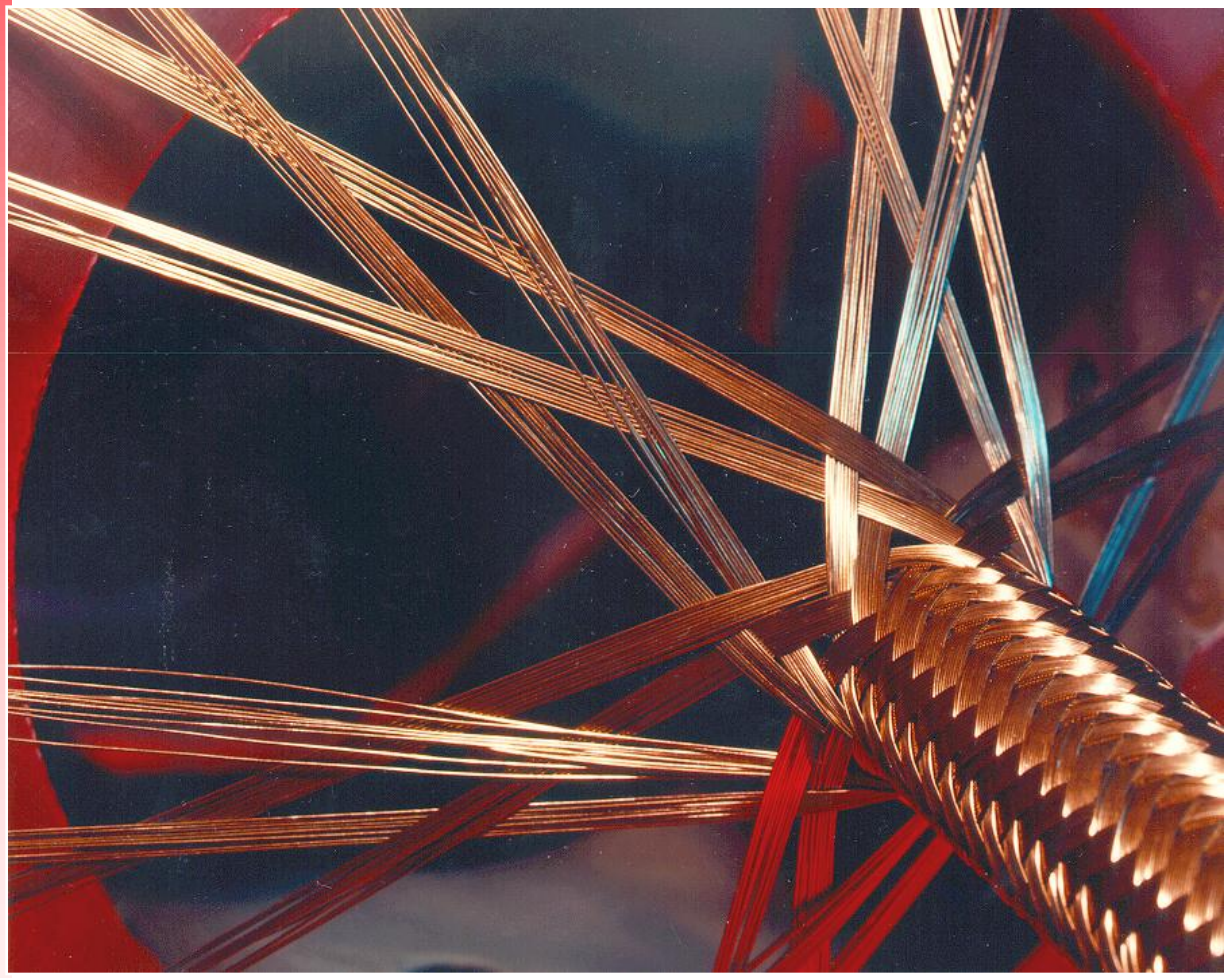
Safety

- ***Braided Reinforcement***



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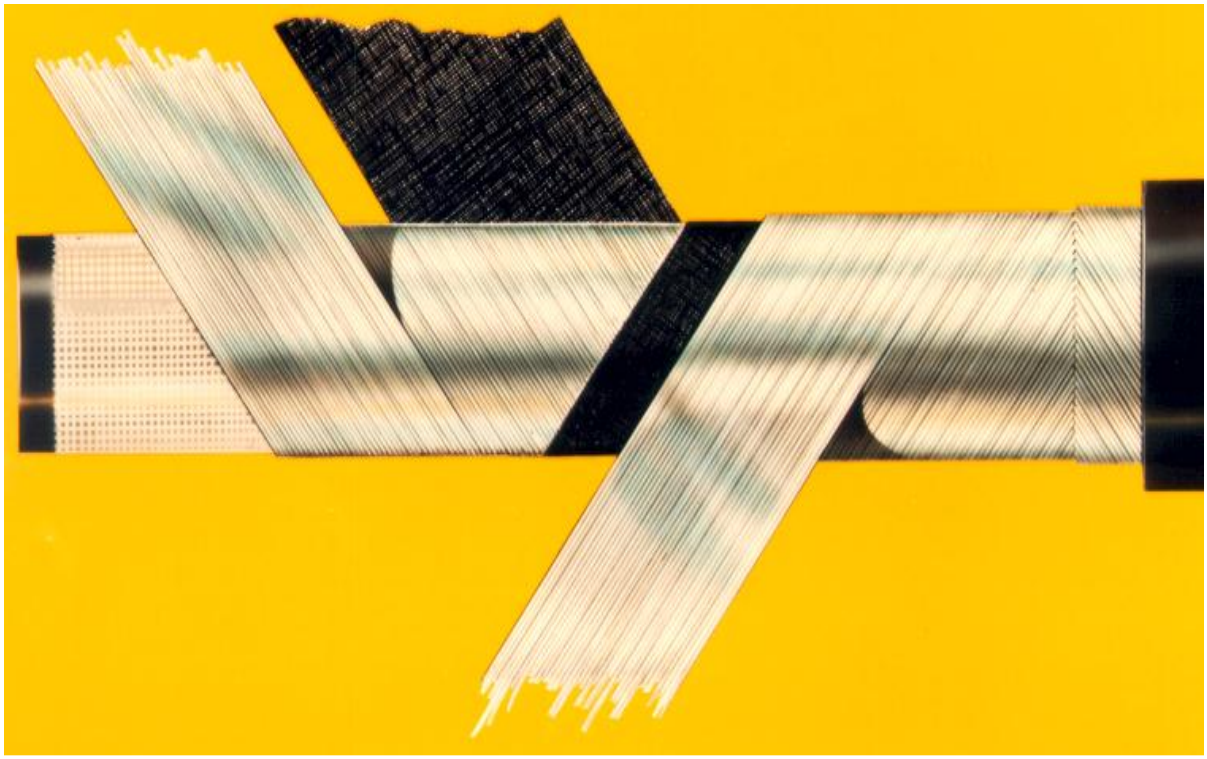
Safety

- ***Spiral Reinforcement***



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Safety

- ***Reinforcement applied***
  - **Spiraling**

    Higher pressure

    Longer impulse life

    4 to 6 layers of steel

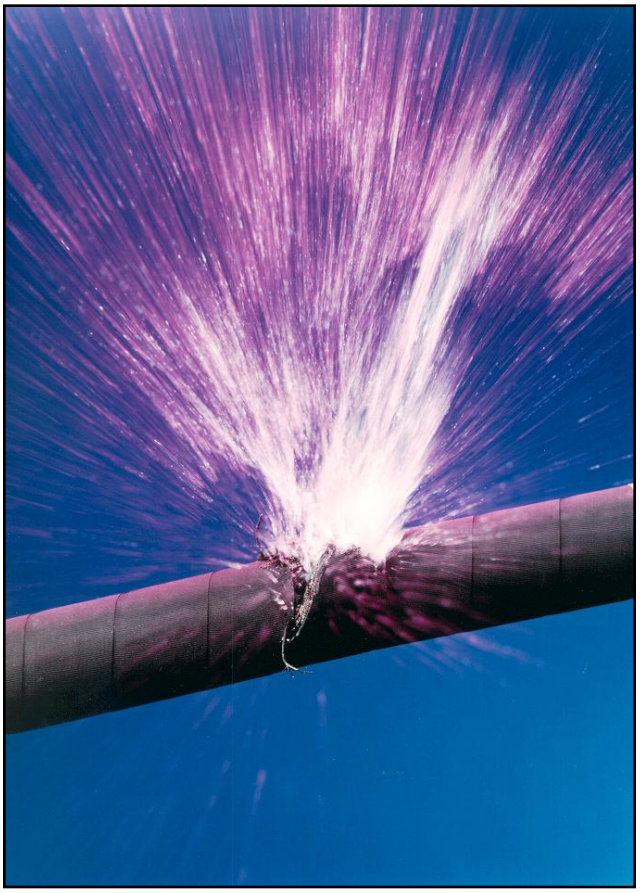
- ***Braiding***
  - 1 or 2 Layers
  - Offers choice of steel or textile

- ***Materials Used:***

- Carbon Steel - corrosive
- Stainless Steel
- Polyester Yarn
- Aramid Yarn (Kevlar/Nomex)

Safety

- Always spec. hose by Working Pressure:
- **Reinforcement Safety** - Eaton AQ Hyd. Hose is 4:1 Burst Pressure



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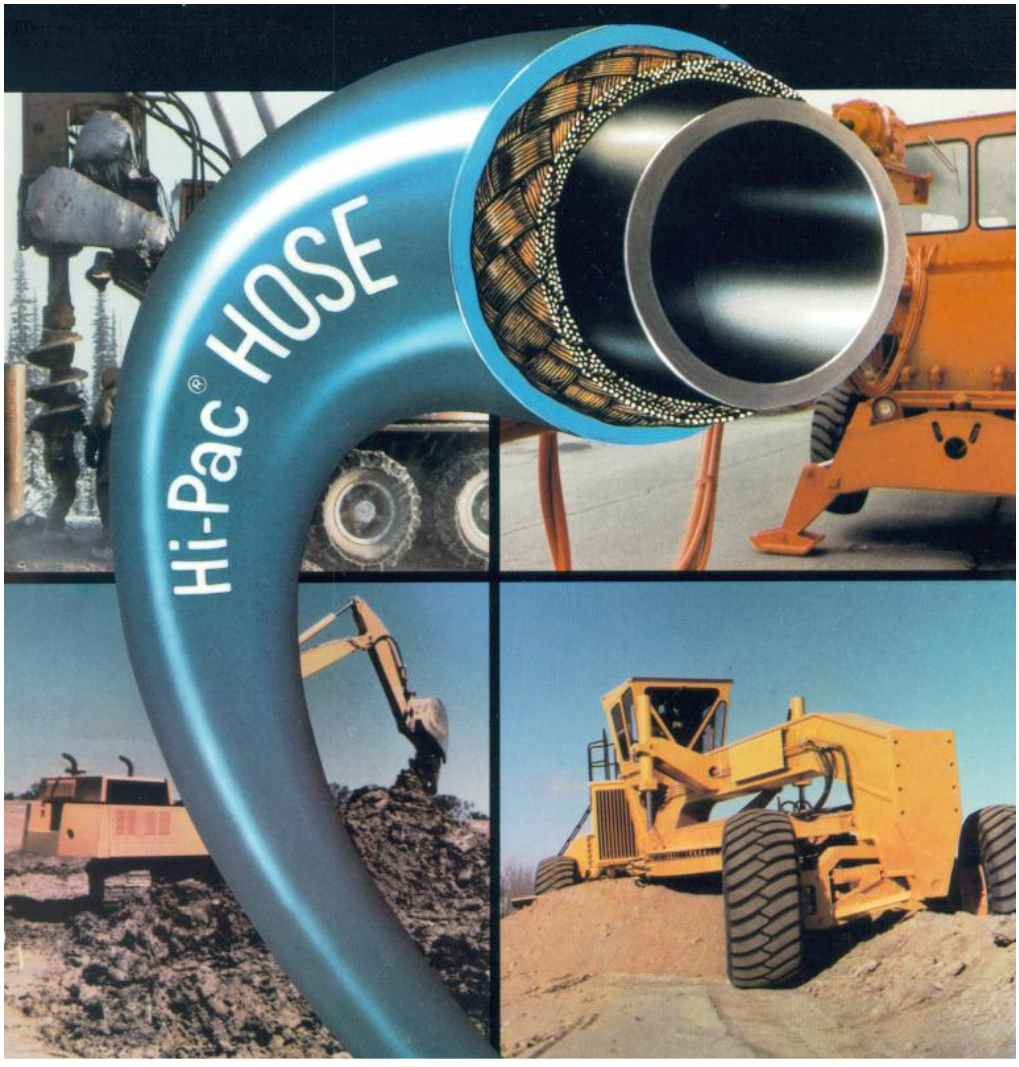
Safety

- ***Last > Hose Cover***



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Safety

- ***Hose Covers: .***
- Protects the reinforcement against...

  -*Abrasion*

  -Weathering

  -Ozone

  -Moisture

  -Chemicals

  - ***Types of Covers***
  - *-Rubber*
  - *-Textile*
  - *-Thermoplastic*

Safety

- ***Hose Covers***
- Prevents steel reinforcement from rusting
- -Wire supports high PSI
- ***What are the results if moisture gets under the cover?***
- How can moisture get under the cover?

Safety

- **REMEMBER** - Hoses may look the same and have the same SAE rating but be different.

  -Tubing

  -Reinforcement

  -Cover

  -Compounds

  -Spec’s

  SAE sets performance guidelines, NOT mfg. guidelines

Safety

- How important is the cover to prevent injury

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Routing & Safety

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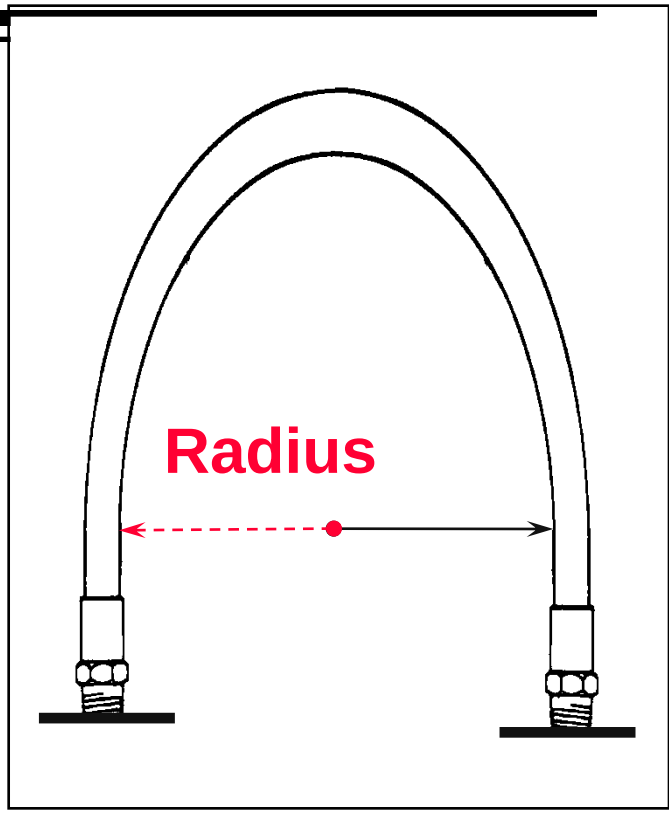
Safety

- Minimum Bend Radius
  - How tightly can a hose be routed without damaging hose or shortening performance life.
  - How much hose will be used.
- Vacuum –



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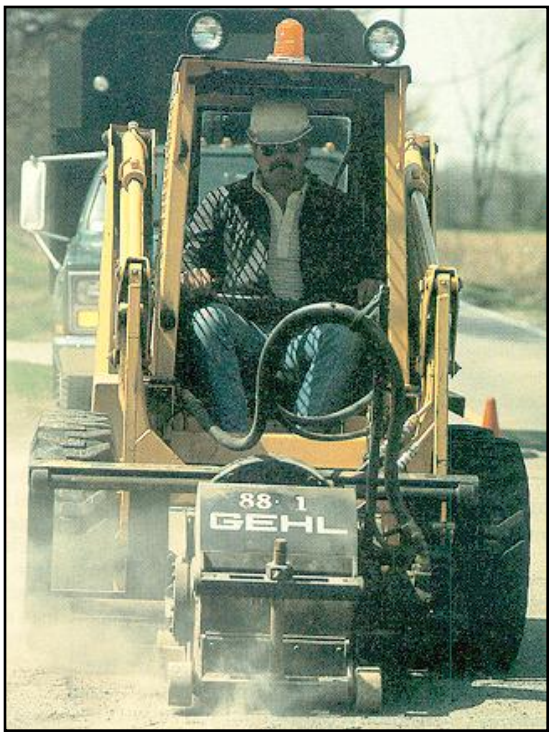
Safety

- Route assemblies so that any bends are directed away from the operator.



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Safety

- Use check valves at critical points in a hydraulic system. This could include loader bucket arms, counter-balances, etc.

Safety

- Check relief valve pressure settings to verify that it is within the limits of the hose line.

The Relief Valve "Knob Twister" at His Nefarious Work.

Safety

- During scheduled equipment maintenance, inspect hoses for signs of wear.

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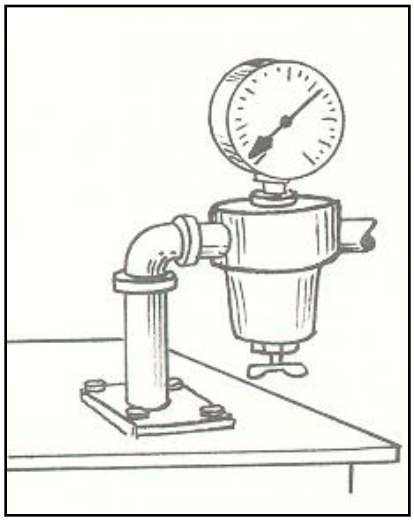
Safety

- When searching for leaks, use caution. Some areas can be dangerous for hands and face!

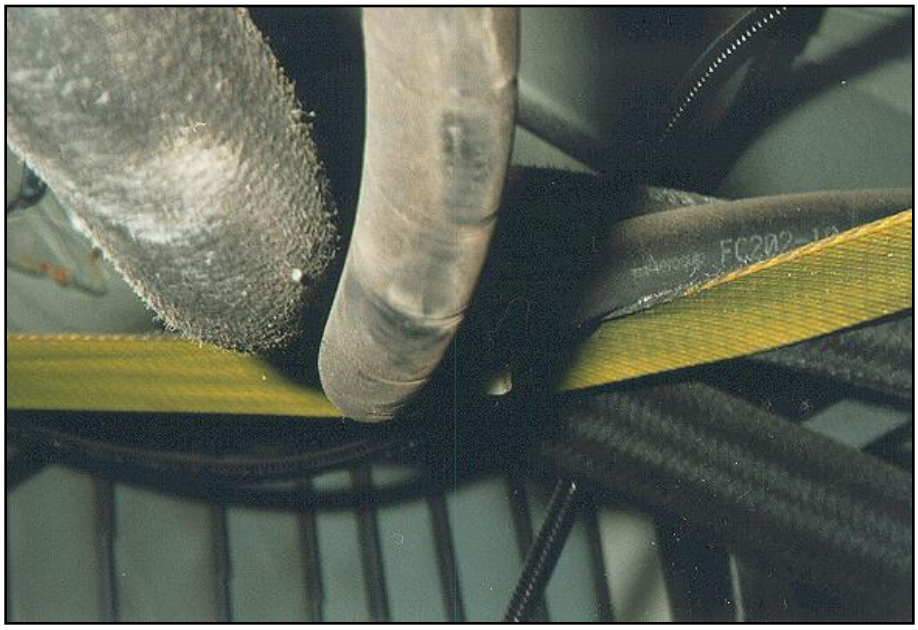
Safety

- When servicing or replacing hose lines, make sure pressure is relieved. Shut down the system and activate the control lever.



Safety

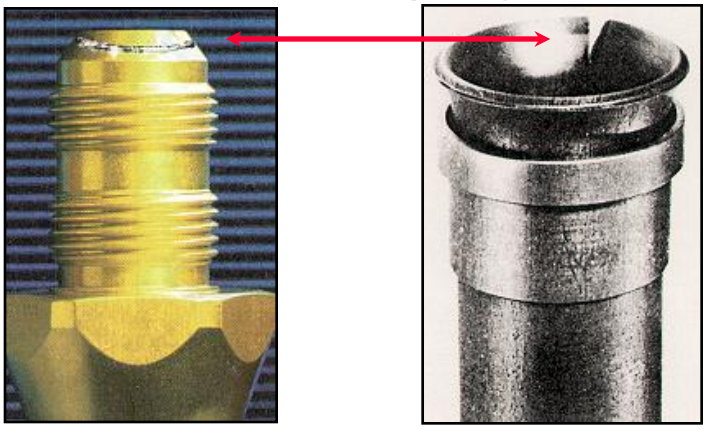
- Replace hoses that show abrasion. This can be the first sign of failure. Also, try to avoid abrasion in the future.



Safety

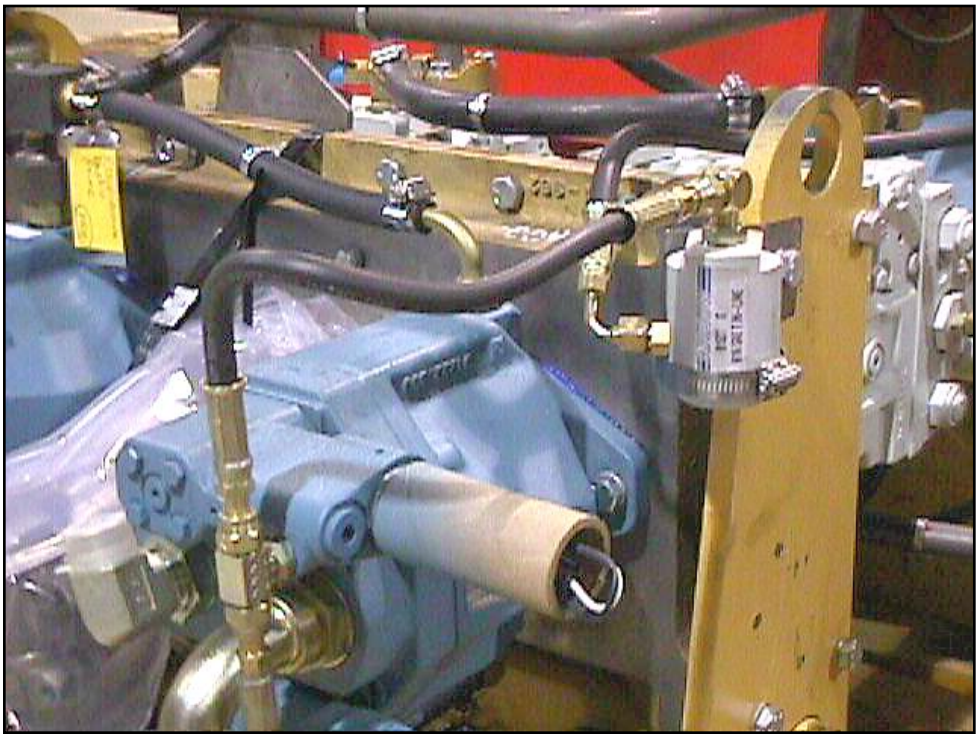
- Inspect hose assemblies prior to installation. This includes threads, length, bolts, flange halves, ports, etc.

Over Torquing



Safety

- A 7° twist, per foot of hose, may reduce its life by as much as 95%!



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Safety

- 80% of hydraulic component failures are contamination related. This can occur during hose assembly replacement.

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Safety

- Flexing and non-flexing lines should not be permitted to:
  - Twist
  - Exceed minimum bend radius
  - Chafe or abraid
  - Be clamped on bends

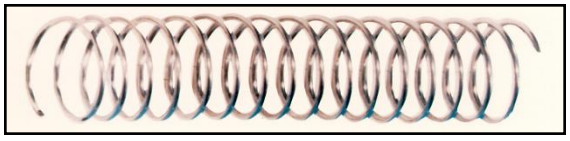
Safety

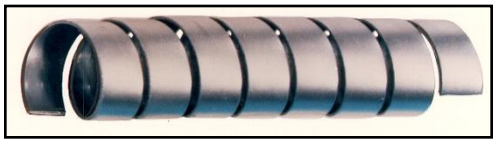
- Sufficient hose length should be provided for length changes:

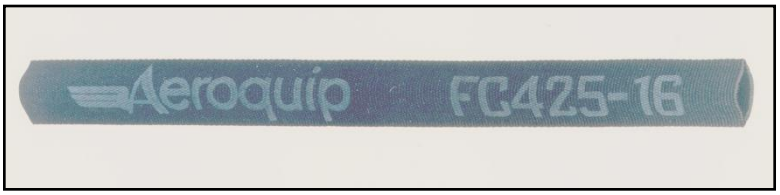
  +2% to -4%

Safety

- All lines that are subject to abrasion should be protected with some type of abrasion guard: "New Guardian Sleeve"
  - Nylon abrasion sleeve
  - Steel protective coil spring
  - Steel protection coil sleeve







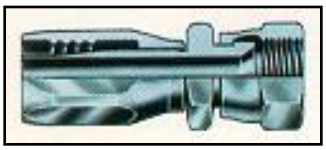
Safety

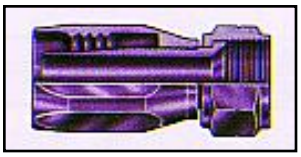
- Use rubber covered hoses in areas such as a battery compartment or other high contaminate areas. Textile covers will not last.

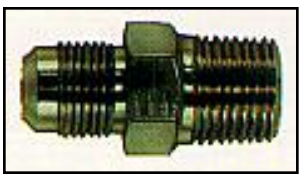
Safety

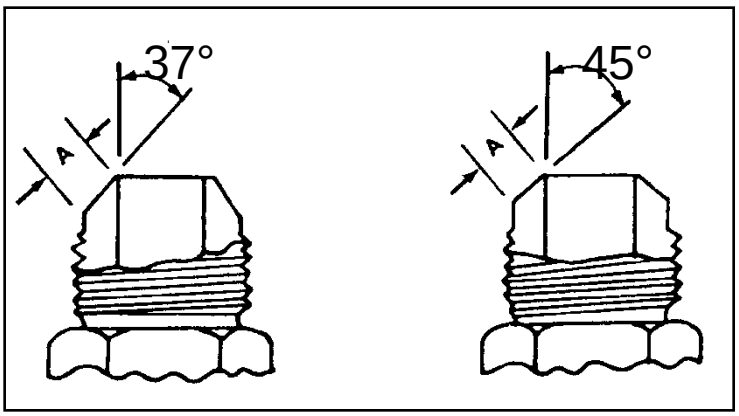
- Use care not to mix sealing surfaces.
  - For example, a 37° male will not seal with a 45° female.

SAE / JIC









Safety

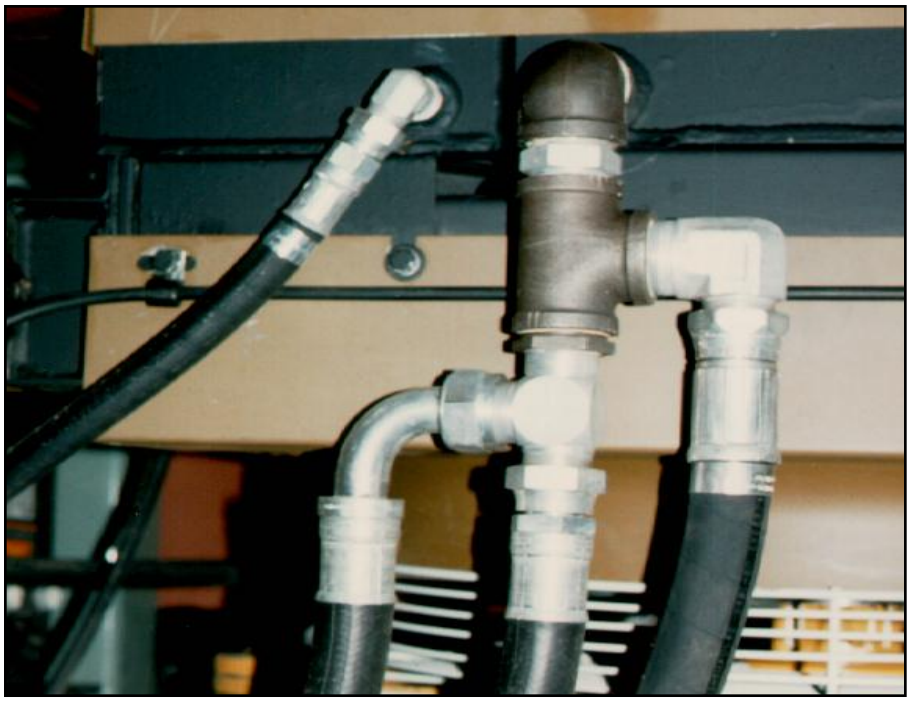
- Use proper O-rings
  - Size
  - Durometer
  - Material

Safety

- Allow at least two times the diameter of the hose as the proper length behind the fitting before starting a bend.
  - For example: -32 hose should not bend closer than 4” to the socket.

Safety

- Every connection is a potential leak. Use jump size fittings or adapters to achieve the fewest connections possible.



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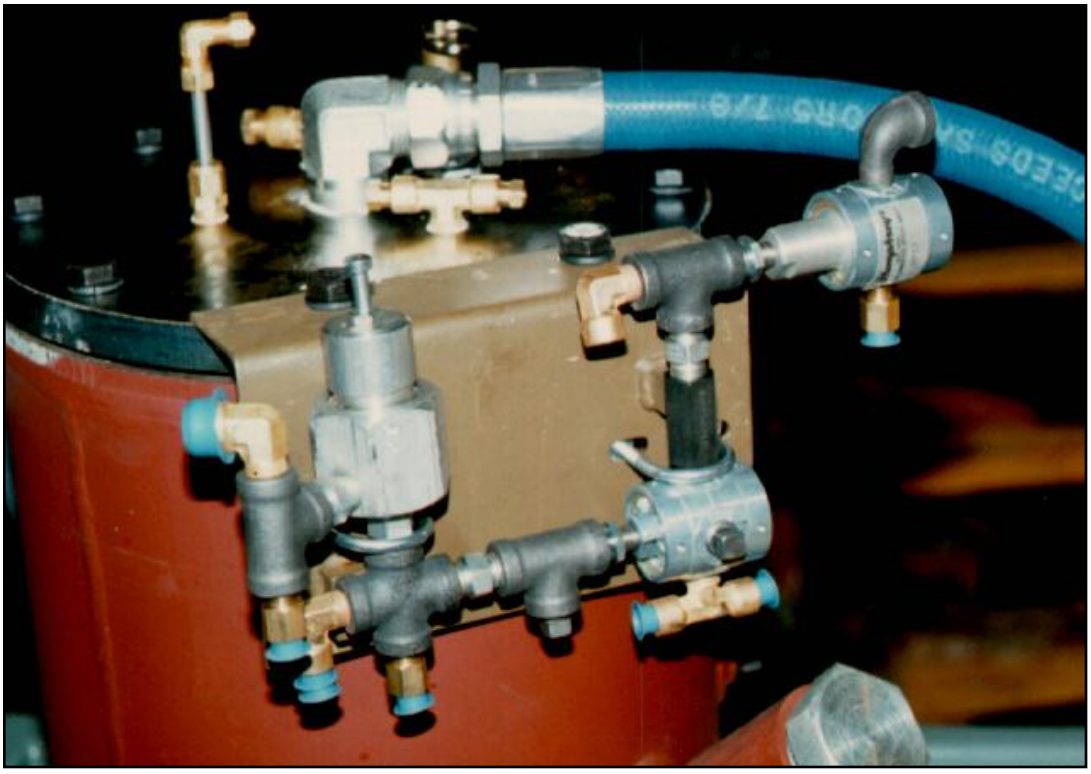
Safety



Safety

- Vision:

  "Vision" is probably the most often relied upon sensory tool. It provides an automatic spot-check each time the system is approaching the trouble zone:

*Dripping hyd. oil

*Discolored hyd. fluid

*Erratic cylinder movement

*Kinked hoses

*Wrong bend radius

*Worn, cracked or abraded hose covers

Safety

- **Eaton Aeroquip Enhancements and New Technology:**
- Triple Crown
  - Higher Working Pressures
  - Higher Temperatures
  - Better Abrasion Resistance
- STC (Snap to Connect)
- Life Sensor Technology

Safety

- Aeroquip GH781 and GH493 Hyd. Hose

  Review Enhancements with STAMPED…..

*Higher Pressures

*Improved Temperatures

*Improved Abrasion Resistance

>Extends the life of a hydraulic hose assembly!

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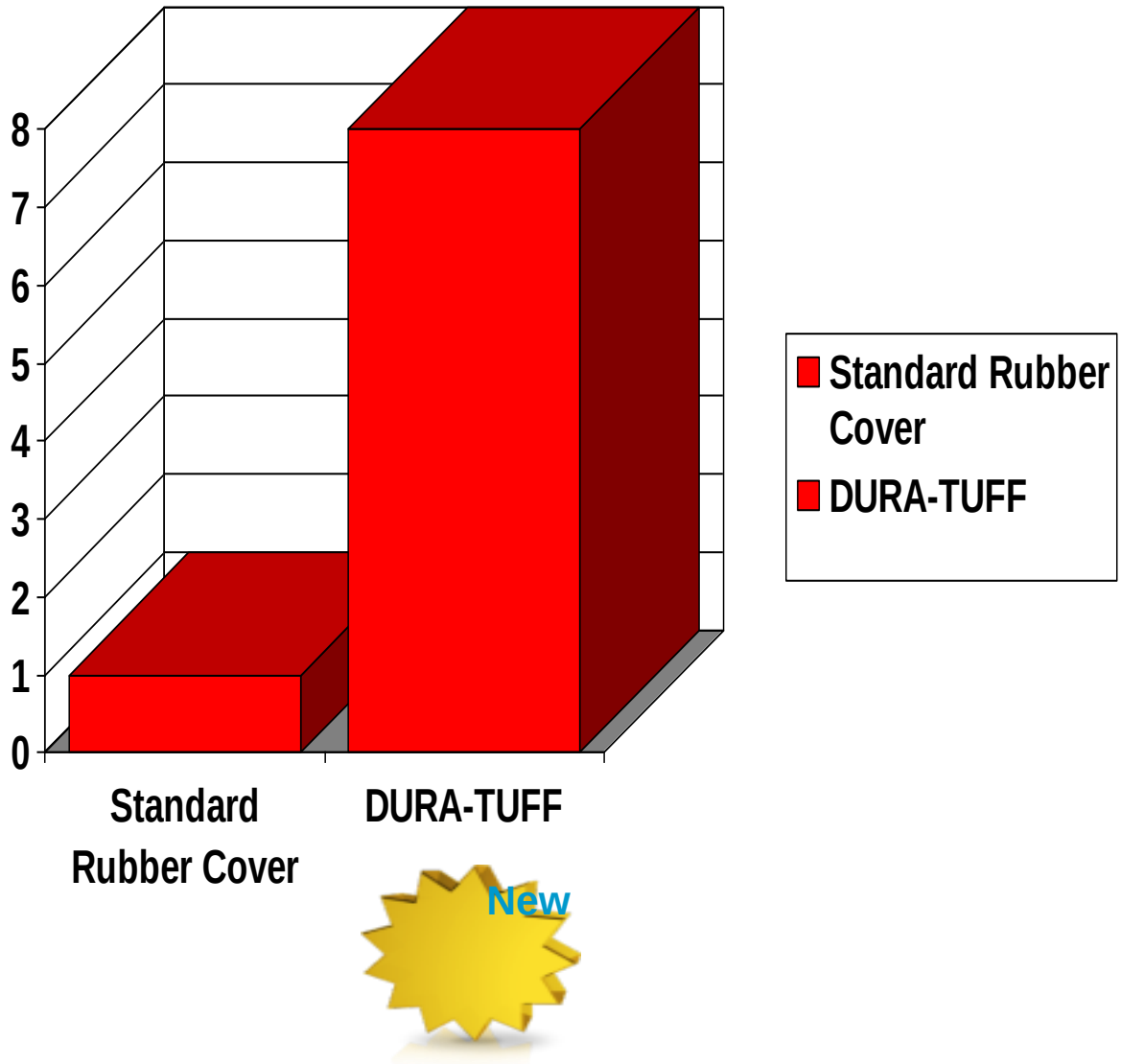
Hose Abrasion Resistance /Bruiser



Safety

- **STC “Snap To Connect”**
- The patented STC (snap-to-connect) high pressure fitting from Eaton has proven its reliability with over 30 million connections in service today and is now available in a -04 size that can be used in conjunction with the majority of Eaton’s rubber, thermoplastic and Hoses made with Teflon® hose styles.

Safety

- **Features/Benefits to you**
- Fast reliable one-hand connection requiring no assembly tools
- Low profile:compact design
- Elimination of cross-threading & hose twisting
- Zero leak performance per SAEJ1176
- Easy installation in limited access areas

Safety

New LifeSense Technology

Safety

Hydraulic Hose Condition Monitoring

LifeSense system monitors the health of hydraulic hose assemblies. As the hose approaches the end of its useful life, LifeSense detects events occurring within the hose that have been shown to lead to failure and notifies the designated individual that the hose needs to be replaced. This notification is provided with enough time to replace the hose during planned maintenance prior to failure thus saving downtime, clean-up costs, environmental damage and potential injury.

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Safety

- **Life Sense Benefits to you**
- **Save Time & Money by….**
- **Preventing downtime and Environmental Clean Up**
- **Preventing injury**
- **Prevent Equipment damage**

- **Gain full useful life of each hydraulic hose by planning replacement prior to failure.**

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Safety

MATCHMATE Plus™

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MATCHMATE Plus™

- 3 Easy Steps to Hose Assembly, Made Easy

“Select”

“Match”

“Mate”

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MATCHMATE Plus™

- Select a hose by pressure and size

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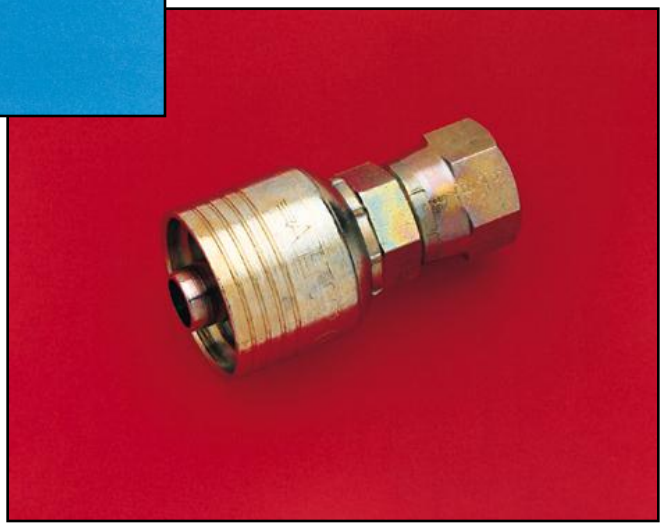
MATCHMATE Plus™

- Match the correct fitting to the hose by the number of rings on the hose and on the fitting

1 & 2



4 Rings

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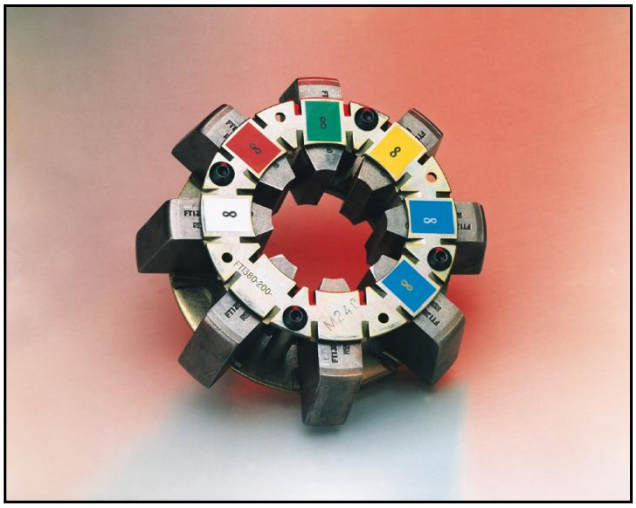
MATCHMATE Plus™

- Mate the hose and fitting by matching the proper color and size die cage to the color on the layline of the hose.



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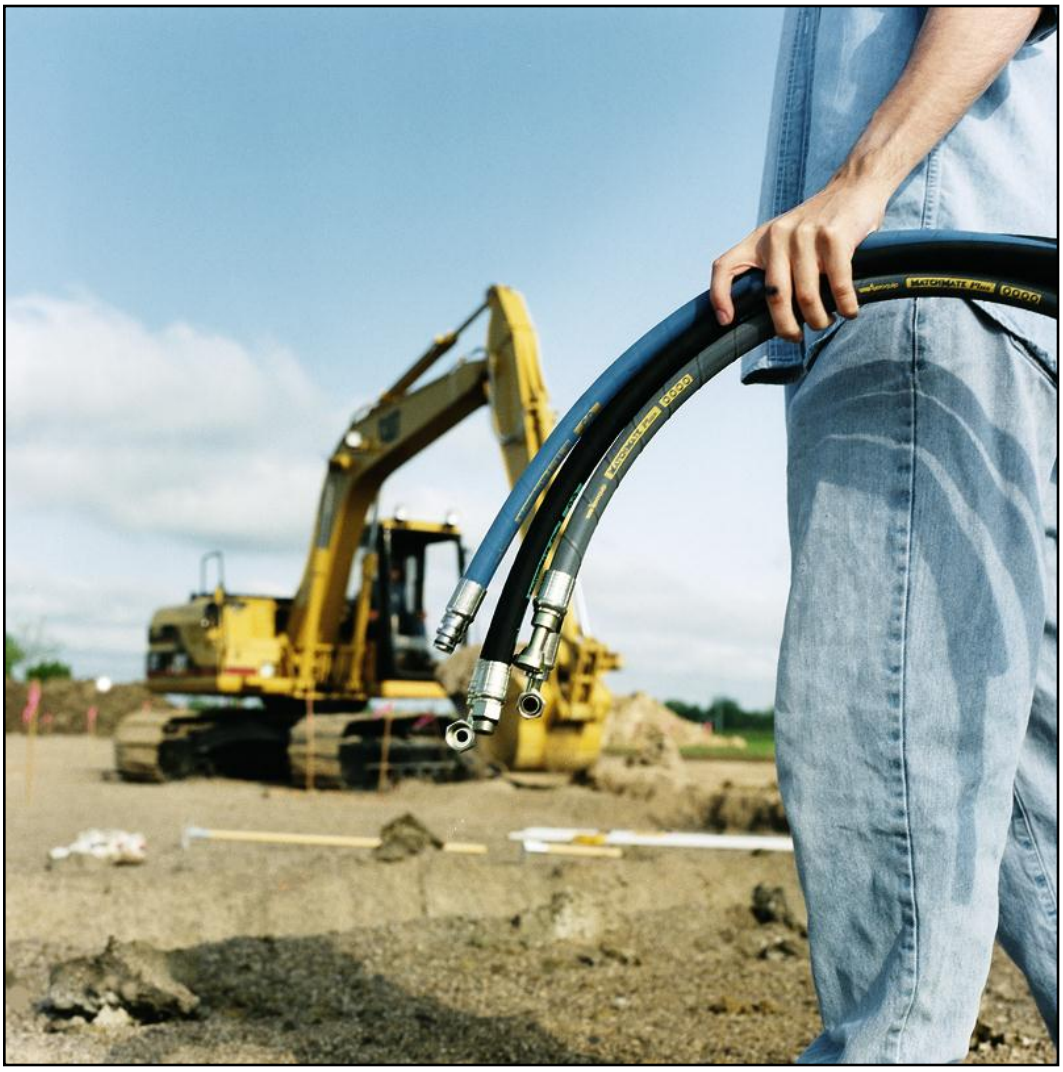
MATCHMATE Plus™

- A MatchMate Plus™ hose assembly in minutes



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MATCHMATE Plus™

Proper Crimper Operation On HandsTraining!

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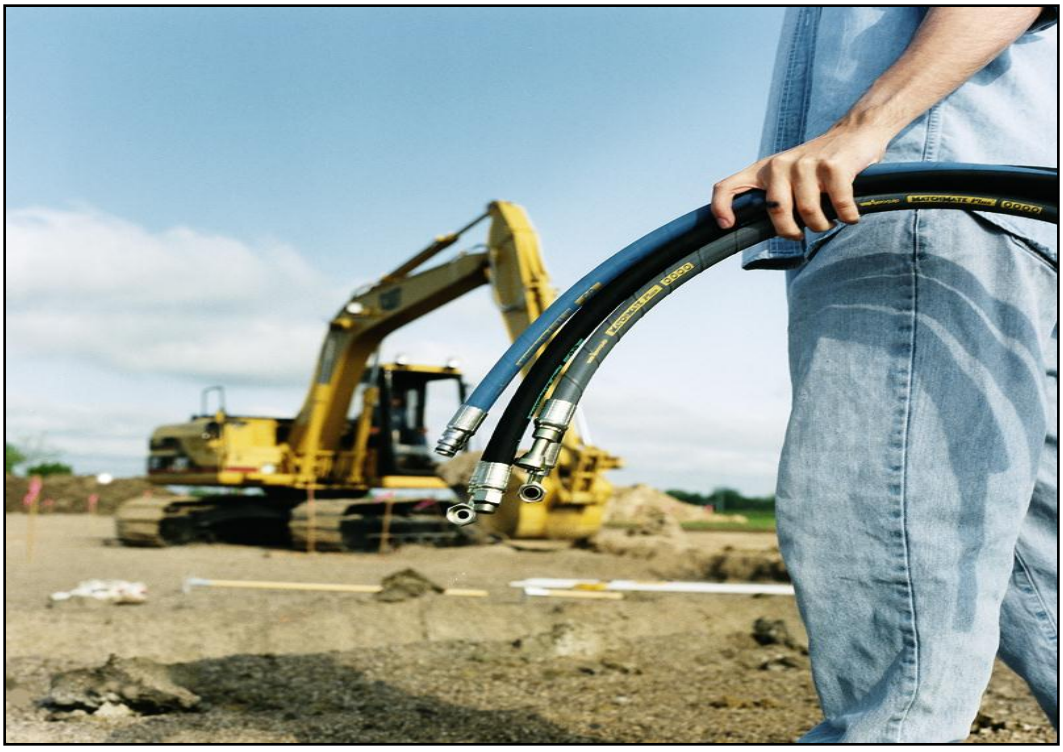
Aeroquip

MATCHMATE Plus™

- Tech . Support
  1-888-258-0222

- Thanks for your time!



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