

**"ENGINEERED SEALING SOLUTIONS"™****FORMED RUBBER HOSES*****For fluid and air transport and containment, hoses are integral components.***

CRS, Inc. is an excellent source for your extruded straight or formed, homogeneous or reinforced rubber hoses. CRS supplies tubes to SAE and JIS industry standards and can supply to EPA and FMVSS requirements from TS16949 registered factories.

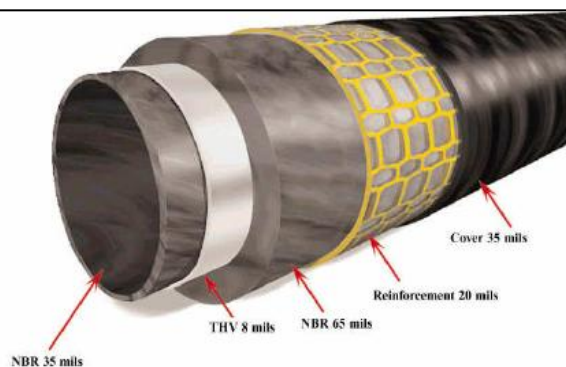
Choosing the right hose for a given application requires basic knowledge of how hoses are made and what their strengths are as well as knowledge of the industry standards governing proper callouts. Please contact your Territory Manager to educate your company and Engineers in this area. Here's a brief review of hose anatomy and a look at some common hose applications:

**Construction Anatomy**

Homogeneous tubes are made from one material compound and extruded. However, most rubber hoses have three layers. As the innermost layer, the "tube" has two functions: to contain the fluid being conveyed, and to resist being broken down by that fluid. In many instances, the tube is formed when rubber is forced (extruded) through a profile (die) to make it a particular size.

If the fluid to be contained undergoes any sudden increases in pressure and depending on the SAE or JIS callout for the type of hose, the tube may need to be reinforced by fabric or wire. This "reinforcement" is the second (or middle) layer of most hoses. Reinforcement helps protect the tube from internal pressure and outside forces. Reinforcing fabric or wire is applied by braiding, knitting, spiraling, wrapping, or weaving.

The third (and outermost) layer is the "cover." The cover further protects the tube from external damage and environmental deterioration (such as from ozone). The cover can be color-coded to aid identification or improve the look. Though both reinforcement and a cover are commonly used, "homogeneous" hoses with no added layers are available.

**Illustration of Anatomy Layers*****[www.sourcerubber.com](http://www.sourcerubber.com)***

## APPLICATIONS

Hoses are used in a variety of application to include Vacuum Brake line Hoses, Cooling System / Radiator Hoses, Oil and Fuel Hoses, Air Intake hoses and many others. Most of the physical and chemical requirements for the hoses are defined with SAE Automotive Callouts for hoses. These callouts will include all tolerance tables achievable for the process the parts are produced.

Automotive air brake systems often include hoses with an oil- and grease-resistant tube made of nitrile (NBR), chloroprene (CR), or a blend of NBR and styrene butadiene (SBR). Reinforcement is typically a synthetic textile yarn with high tensile strength. The cover may be CR, SBR, or chlorosulfonated polyethylene (CSM).

Automotive fuel hoses generally feature oil-resistant tubes of NBR (sometimes compounded with polyvinyl chloride, PVC). As with air brake hoses, reinforcement is often textile yarn made of polyester, polyamide, or rayon. Some fuel hoses don't have a cover; when one is added, it is commonly made of oil-resistant CR or CSM. Because fuel lines can be immersed inside the fuel tank, it may be necessary that the cover be as fuel-resistant as the tube.

Radiator (coolant) hoses can be factory-molded (using mandrels) into curves to fit specific spaces. Ethylene propylene (EPDM) is the typical tube material because of its strong resistance to heat, hot water, and ethylene glycol, the most common antifreeze. In some cases, SBR or NBR may be used instead. Fiber or textile reinforcement may be applied, and the cover may be EPDM, SBR, or CR.



CRS also provides specialty heavy equipment Turbochargers, Superchargers, Intakes and Intercoolers produced from hand wrapped silicone and FVMQ lining.



Contact your Territory Manager for additional details and with challenges to meet your applications requirements.

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