Choosing Elastomers

Give Your Rubber a Chance! It’s Unique Just Like Your Project!

With so many formulations and recipes choosing the right rubber formulation can be quite a challenge. That’s why we created the Aero Rubber Company®, Inc. Sales Engineering Team over 40 years ago. Every formulation has a trade off. We know what those are and want to pass on our years of experience to you. Before calling us, look over the charts on the next pages. This will serve as a general guide and give you a starting point for identifying the correct material for your needs. **Once you’ve taken a look at the chart, give us a call to discuss your choices and receive a quote.**

**Be prepared, we will ask questions.**

Tell us about your project! What will it be used as?  
Under what conditions will it be used?  
What chemicals will it encounter?  
*Do you have a specific material specification such as ASTM or Military Spec?*

Aero’s experienced sales engineers stand ready to guide you towards the best solution for your specific requirements. We even provide specification certifications at no charge when requested.

**A few words to the wise:**

1. Each rubber manufacturer has their own elastomer recipes. Each one is considered a trade secret.

2. A rubber compound can be a blend of two or more elastomers (elastomers are major ingredients in different rubber compounds). This formulation recipe influences the finished part’s function, service life and competitive pricing.

3. The chosen elastomers’ formulation (recipe) will affect the physical properties of the part, its function and service life. It is the user’s responsibility to make the final determination for specifying the elastomer to be used for an application or project, including performance characteristics & suitability for service life & function.

4. The information presented herein should be used only as a general “guide”. We cannot guarantee its completeness, nor accuracy, nor assume responsibility for its use due to the myriad of combinations and options available.
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| Natural Rubber Gum Rubber Polyisoprene | -55° F  | 200° F | Poor | Poor | Poor | Poor | Good | Good | Excellent | No | • Made from rubber tree latex  
• High elongation & resilience  
• Low compression set  
• Good flexing qualities at low temperature |
| Synthetic Natural Synthetic Polyisoprene | -55° F  | 200° F | Poor | Poor | Poor | Poor | Good | Good | Excellent | Yes | • The synthetic version of natural rubber |
| Neoprene Chloroprene Polychloroprene | -40° F  | 220° F | Good | Good | Good | Fair | Poor | Fair | Good | Good-Fair | Yes | • Popular elastomer - considered general purpose.  
• Poor resistance to strong acids, esters, ketones, chlorinated, aromatic and nitro hydrocarbons |
| Nitrile Buna 'N' NBR | -30° F  | 250° F | Poor | Poor | Excellent | Excellent | Excellent | Fair | Good | Good-Fair | Yes | • Poor resistance to ketones and chlorinated hydrocarbons |
| Hydrogenated Nitrile Butadiene Rubber (HNBR) | -20° F  | 300° F | Poor | Poor | Excellent | Excellent | Fair | Fair | Good | Excellent-Good | Yes | • Commonly used for seals & o-rings  
• Higher temperature version of Nitrite  
• Excellent resistance to common automotive fluids and many industrial chemicals  
• Poor resistance to ethers, esters, ketones and chlorinated hydrocarbons |
| SBR Buna 'S' GRS | -20° F  | 212° F | Good | Good | Poor | Poor | Poor | Excellent | Good | Good-Fair | Yes | • Fair resistance to weathering |
| EPDM EPT EP | -60° F  | 250° F | Excellent | Excellent | Poor | Poor | Poor | Good | Good | Good-Fair | Yes | • Popular for outdoor applications  
• Good resistance to steam, brake fluids and weak acids.  
• Poor resistance to oils, aromatic hydrocarbons and petroleum products |
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| EPDM Peroxide Cured       | -60° F     | 300° F     | Excellent        | Poor          | Poor                  | Good           | Excellent-Good    | Yes               |                |                 |           | ✓ Good resistance to steam, brake fluids and weak acids.  
  ✓ Poor resistance to oils, aromatic hydrocarbons and petroleum products |
| Silicone                  | -100° F    | 450° F     | Excellent        | Poor          | Poor                  | Poor           | Poor              | Poor              | No             |                 |           | ✓ Frequently used in medical, food processing and pharmaceutical fields due to its purity when processed  
  ✓ Long service life makes it ideal for industrial applications  
  ✓ Poor resistance to steam, oils & concentrated acids |
| Fluorosilicone            | -100° F    | 400° F     | Excellent        | Good          | Good                  | Good           | Poor              | Poor              | Fair           | Yes             |           | ✓ A substitute for silicone when improved chemical resistance is required.  
  ✓ Excellent resistance to moderate or oxidizing chemicals, ozone, aromatic chlorinated solvents and bases.  
  ✓ Poor resistance to brake fluids & ketones |
| Fluoroelastomer (FKM)     | -10° F     | 400° F     | Excellent        | Excellent     | Excellent             | Good           | Good              | Good              | Fair           | Yes             |           | ✓ Ideal when high temperature & chemical resistance are needed  
  ✓ Poor resistance to ketones, nitro-containing compounds, low molecular weight esters & alcohols  
  ✓ Limited hardness range |
| Viton (DuPont)            | -60° F     | 250° F     | Excellent        | Poor          | Poor                  | Poor           | Good              | Good              | Yes            |                 |           | ✓ Vacuum & pressure retention, low extractable, self-sealing, vibration damping.  
  ✓ Developed during WWII for inner tubes and tires.  
  ✓ Used for tank liners & gloves. |
| Fluorel (3-M)             |            |            |                  |               |                       |                |                   |                   |                |                 |           |                  |

*Temp. Min* and *Temp. Max* are the temperature ranges in °F.
Choosing Elastomers

The information provided above is for reference purposes only and is intended to be utilized as a “guide” when comparing the typical physical properties of different materials. Aero recommends that the buyer perform any tests required to determine the performance characteristics and suitability of a particular material for a specific application. We cannot guarantee its completeness, nor accuracy, nor assume responsibility for its use due to the myriad of combinations and uses.

A rubber compound can be a blend of two or more elastomers (when compatible) in order to influence the finished part’s function and service life as well as competitive pricing.

**“Typical Temperature Range” is unrelated to any particular use or application. It is a general guideline to compare with other elastomers. Field tests of part samples by the user and ASTM lab tests of compound slabs are necessary to determine functional acceptability and service life.**

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### Elastomer Characteristics

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<tr>
<td>Hypalon (trade name)</td>
<td>-40° F</td>
<td>250° F</td>
<td>Excellent</td>
<td>Excellent</td>
<td>Good</td>
<td>Poor</td>
<td>Good</td>
<td>Good</td>
<td>Good</td>
<td>Yes</td>
<td><strong>Note</strong></td>
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<td>(CSM) Clorsulphonated</td>
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<td>Commonly used as coating for fabric to make inflatable boats &amp; hoses.</td>
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<tr>
<td>Polyurethane (Ether or Ester Based)</td>
<td>-90° F</td>
<td>225° F</td>
<td>Excellent</td>
<td>Excellent</td>
<td>Good</td>
<td>Poor</td>
<td>Excellent</td>
<td>Excellent</td>
<td>Yes</td>
<td><strong>Note</strong></td>
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<td></td>
<td>Thermoplastic that has used for abrasion resistance &amp; flexibility. Can be more expensive than regular rubber. Bad for citric acids &amp; some solvents. 175° F maximum in hot water</td>
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