



**advanced rubber technologies**

[www.enarubber.com](http://www.enarubber.com)

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## **Considerations in Selecting Rubber Seal Material**

When selecting elastomeric seals for specific applications there are a number of important selection criteria that should be considered. If you are unsure of the most suitable material for your seal application, this information can be very important our Engineering staff to fully understand your application and provide assistance or recommendations. These criteria pertain to the following general areas:

- 1. Seal service conditions**
- 2. Design & Inspection of the particular application**
- 3. Inspection and quality control requirements**
- 4. Material specification and traceability**
- 5. Cost vs. Value**

Following are some questions or design topics that are useful and should be considered in your selection:

### **1. Service Conditions**

- a) What is the fluid to be sealed?
- b) Are there any contaminants or additives?
- c) What is the temperature range including the min and max conditions?
- d) What is the vacuum range (if applicable) including where the vacuum is applied and whether it is cyclic?
- e) What is the compression/decompression rate (if applicable)?
- f) Motion: Is the application static or dynamic? If dynamic (i.e. movement of a piston rod in a hydraulic cylinder), please describe the motion, function, operation, etc.?

## 2. Design and Inspection Requirements

- a) What is the component geometry/description of the part (i.e. o-ring, gasket, diaphragm, etc.)?
- b) To the best of your knowledge, please describe the material you envision and the media's (chemical or fluid) affect on the seal? Is there any notable wear or failure issues where ENA should evaluate alternate materials?
- c) What is your expected or desired Service Life of this seal? What service life are you realizing currently with your design or product (if existing product)? If replacement to an application where you are experiencing seal failure, which material are you using and what are the perceived reasons for the failures?
- d) Please describe any important or procedural assembly or installation considerations (i.e. do you require lubricants, degree of stretching required, etc.)?
- e) Please indicate critical dimensions and tolerances (preferably via CTQ , Critical-to-Quality, dimensional callouts on prints or drawings). Please indicate any groove dimensions and machining tolerances.
- f) Please provide critical sealing surface areas for the application (material, cleanliness, etc.)?

## 3. Inspection and Quality Control Requirements

- a) ENA provides 100% visual inspection of finished parts and random sampling and testing of all parts. Please provide additional inspection criteria required by your company for this part?
- b) Please define the requirement for Lot Sampling (if applicable)?
- c) Please provide any details on AQLs (Acceptable Quality Levels) and acceptable PPMs (Parts Per Million)?

## 4. Material Specification and Traceability

- a) Define ASTM (American Society for Testing and Material) or SAE (Society of Automotive Engineers) specification for your material (*See Standard ASTM Classification document under Technical Information of this website*)?
- b) Please describe any processes or procedures you use to specify and certify materials used in your parts. Are there any certifications or compliance testing you require ENA to provide?
- c) Please specify to the best of your ability any custom or "special" rubber compounds you require, or are aware of, for your part(s)?
- d) Is your current supplier providing hardness tensile bars or other test specimens for their incoming materials verification and record-keeping purposes?

## 5. Cost vs. Value

- a) When selecting materials for your particular seal application, the guiding principle should be to understand the "Value in Use". ENA can help you with that if we fully understand your application, service conditions and maintenance requirements (life expectancy). When evaluating seal performance, seal life and maintenance costs should be included. For example, a seal made from EPDM (Ethylene Propylene Rubber) may be appropriate for many general applications where heat and steam are encountered, but inappropriate at higher temperatures when contaminated steam is a factor or when frequent maintenance is necessary. In such case, investment in a higher priced Fluorelastomer or Perfluoroelastomer would be recovered many times over by the seal's long service life. Specifying the proper high performance seal can also prevent costly unscheduled downtime and dangerous fluid leakage. Please describe to the best of your ability your perception of cost versus value in your application: