

Engineering  
Quality  
Supply Chain  
Assembly  
Aftermarket & Production Kitting  
Vendor Manager Inventory

# FOOD & BEVERAGE

Food & Drug Administration (FDA)  
Food & Beverage (NSF 51)  
Drinking Water - Irrigation (NSF 61)  
3A Sanitary & E3A



**ENGINEERED**  
**SEAL PRODUCTS®**  
100% Employee-Owned

**espint.com | 319.393.4310**

# Seal Standards Within The Food & Beverage Industries



## The Food & Drug Administration (FDA)

The Food and Drug Administration has established a list of rubber compounding ingredients which tests have indicated are neither toxic nor carcinogenic. Rubber compounds produced entirely from those ingredients and which also pass the FDA extraction tests are said to “meet the FDA requirements”. The FDA does not approve rubber compounds. It is the responsibility of the manufacturer to compound food grade materials from the FDA list of ingredients and establish whether they pass the necessary extraction requirements.



## National Sanitation Foundation (NSF)

The National Sanitation Foundation, not to be confused with FDA or 3A, develops public health standards and certification programs that help protect the world’s food, water, consumer products and environment. The requirements are based on U.S. FDA regulations.

**NSF 51** (also referred to as NSF/ANSI Standard 51) establishes minimum public health and sanitation requirements for materials used in the construction of commercial food equipment.

**NSF 61** (also referred to as NSF/ANSI Standard 61) restricts certain substances from breaching into drinking water at any point in the production process.



## 3-A Sanitary & E-3A

3-A Sanitary Standards have been formulated by the United States Public Health Service, the International Association of Milk Food and Environmental Standards, and the Dairy and Food Industries Supply Association. A similar document, E-3A Sanitary Standards, was later formulated by this same group plus the United States Department of Agriculture and the Institute of American Poultry Industries.

**3-A Standards** are intended for elastomers to be used as product contact surfaces in dairy equipment.

**E-3A standards** are intended for elastomers used as product contact surfaces in egg processing equipment.

The requirements of the two specifications are essentially identical, the intent in each case being to determine whether rubber materials are capable of being cleaned and receiving an effective bactericidal treatment while still maintaining their physical properties after repeated applications of the cleaning process chemicals.

# MATERIALS

## Nitrile (NBR)

Nitrile is suitable for FDA, NSF and 3A because of its excellent abrasion resistance and high tensile strength. Nitrile o-rings are well-suited for oil or fatty contact, as well as harsh environments and are trusted to stay intact over long periods of time. Standard nitrile compounds can withstand extreme temperatures ranging from -34° to +212°F. It is well-versed in material properties, except ozone resistance - which doesn't come into play in a lot of food and beverage applications.

FDA	NSF 51	NSF 61	3A
•	•	•	•

## Ethylene Propylene (EPDM)

Ethylene-propylene is made from odorless and tasteless compounds that can withstand temperatures ranging from -70° to +300°F. When compounded using peroxide curing agents, EPDM offers high temperature resistance reaching +374°F. EPDM is known for its excellent chemical resistance, making it a smart choice for a variety of food and beverage applications.

FDA	NSF 51	NSF 61	3A
•	•	•	•

## Silicone (VMQ)

Silicone is popular in food and drug applications because it does not produce any odor or taste. Silicone can also be effectively sterilized in a cleanroom environment, making it a safe choice for the food industry. When it comes to extreme temperatures, silicone is trusted to remain durable with working temperatures of standard compounds ranging from -65° to +400°F.

FDA	NSF 51	NSF 61	3A
•			•

## Fluorocarbon (FKM)

Fluorocarbon, also known as Viton®, is an ideal compound for a universal o-ring material. Fluorocarbon is known for its high temperature resistance, chemical resistance, and improved resistance to steam with selective grades. Fluorocarbon o-rings do not absorb water, allowing them to seal effectively without excessive swell. These features make fluorocarbon an excellent choice for FDA grade and NSF 51 food and beverage applications.

FDA	NSF 51	NSF 61	3A
•	•		•

## Perfluorinated (FFKM)

Perfluorinated has broad chemical resistance in a large number of harsh chemical environments. Specialty compounds approach PTFE chemical resistance while resisting high temperatures up to 572°F.

FDA	NSF 51	NSF 61	3A
•			•

# PRODUCTS



## O-RINGS

### Applications

O-rings are utilized in numerous applications and in nearly all industries.

- Static cover seals, axial sealing
- Static piston or rod seals, radial sealing
- Dynamic seals involving translatory movement (hydraulic or pneumatic)
- Dynamic seals involving rotation
- Valve seals
- Flange seals

### ADVANTAGES

- Can be used universally
- Available in all dimensions
- Available in all types of elastomer
- Easy to install and assemble
- Good price-performance ratio
- Small installation space



## ENCAPSULATED O-RINGS

### Applications

Encapsulated o-rings are primarily used in challenging applications:

- With aggressive media that require universal chemical resistance
- In case of high thermal stresses at high and low temperatures
- For applications in equipment in the food and beverage industry using different media and aggressive cleaning agents
- In small quantities as an economical alternative since no tools are necessary for manufacture

### ADVANTAGES

- Highly resistant to nearly all chemicals
- Can be used universally



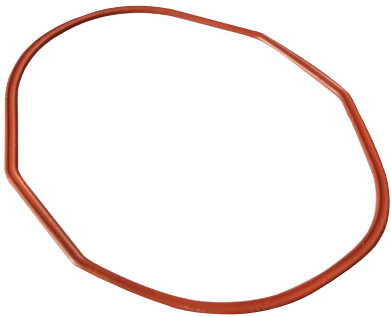
## RADIAL SHAFT SEALS

### Applications

Due to their variable designs, rotary shaft seals offer an enormous application range for production processes involving the sealing of media, the separation of lubricants and media and the secure sealing of cleaning processes.

### ADVANTAGES

- Variable and reliable use in the food and beverage industry
- Highly resistant to media and temperatures
- Minimal abrasion
- Economical to use, as they make secondary seals unnecessary



## CUSTOM MOLDED RUBBER

### Applications

- Filling head seals and valve seats for beverage systems
- Molded seals for double seat valves and sterile valves
- Profile gaskets for separators
- Frame gaskets for filters
- Joining technology (fittings)

### ADVANTAGES

- Engineering design expertise
- Media compatible
- Temperature & pressure compatible
- Variable design options



**ENGINEERED**  
**SEAL PRODUCTS®**  
100% Employee-Owned

**espint.com | 319.393.4310**