

# Chemraz® 694

## Exceptional Chemical Resistance and Best-in-Class in High-Temperature Steam Environments



*Prior best-in-class solution: before/after one week in 600°F steam*



*Chemraz® 694 seals: before/after one week in 600°F steam*

### Features and Benefits

- Retains physical properties in a hot steam environment, thus reducing mean time between failure (MTBF) of elastomeric components in critical steam environments
- Superior resistance to hostile reservoir chemistries, drilling fluid additives, and production chemicals for improved elastomeric performance
- Excellent compression set and thermal shock resistance for increased reliability of components used in critical steam and high-temperature environments

### Perfluoroelastomers Enable Sealing Solutions in High-Temperature Steam Applications

Greene Tweed developed Chemraz® 694, a perfluoroelastomer, for exceptional chemical resistance and best-in-class performance in high-temperature steam environments, including steam assisted gravity drainage (SAG-D) and other enhanced oil recovery (EOR) applications requiring steam injection. Chemraz 694® can be used in typical oilfield applications where sustained high-temperature resistance is a requirement.

With the increased use of steam injection as an EOR technique in maturing, as well as heavy oil fields, Greene Tweed has responded to the market demand for reliable and extended downhole service life capacity for sealing materials for that environment.

Greene Tweed undertook a stringent process to develop an FFKM that would retain its physical properties in a steam environment, thus meeting customer requirements for a more reliable sealing solution. Chemraz 694® outperformed competitor materials after an extended time at 500°F (260°C) in steam and short-term exposure to a peak excursion at 600°F (316°C). Other comprehensive testing regimes carried out under a variety of conditions have shown Chemraz 694® to be the go-to solution for critical steam environments.

Chemraz 694® also delivers exceptional chemical resistance to well fluids and gases commonly found in the oil & gas industry, including amine-based inhibitors, Toulene, Xylene, and other reservoir fluids including H<sub>2</sub>S. Chemraz 694® is rated for a working temperature range of 10°F to 600°F (-12°C to 316°C). In addition to SAG-D applications, the use of Chemraz® 694 can be considered for steam injection applications such as cyclic steam stimulation (CSS) and artificial lift methods, including electrical submersible pumps (ESPs).

Chemraz 694® is available in O-ring, V-ring, G-T® ring, and custom configurations.

### Contact Us

Greene Tweed  
Houston, TX, USA

Tel: +1.281.765.4500  
Fax: +1.281.821.2696

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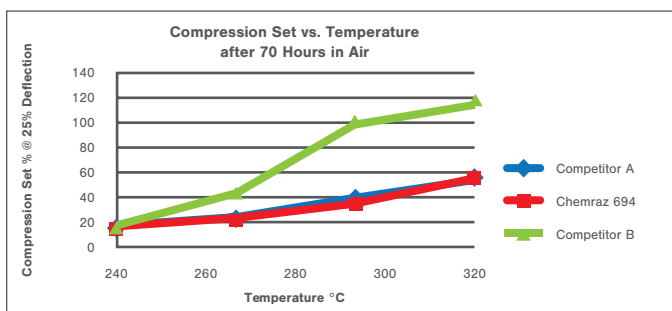


### Typical Properties

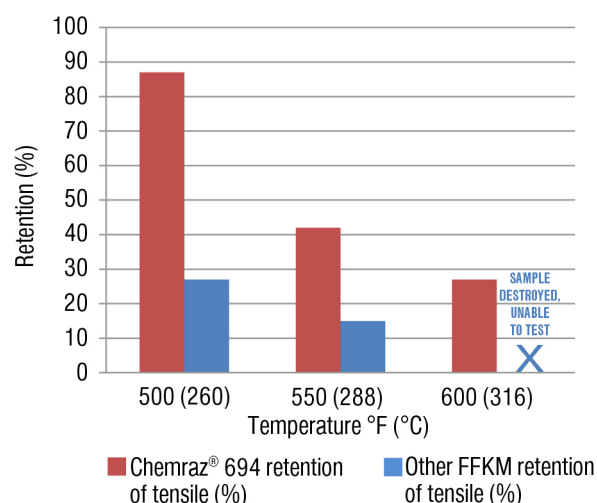
| Physical Properties (ASTM Standard)  | Typical            |
|--|--------------------|
| Color  | Black              |
| Polymer Type   | Perfluoroelastomer |
| Specific Gravity (D792)  | 1.94               |
| Hardness, Type A* (D2240)  | 87                 |
| <b>Mechanical (ASTM Standard)</b>  |                    |
| Compression Set @ 25% Deflection, %* (D1414)<br>– 70 hours @ 392°F (200°C) | 26                 |
| Tensile Strength, psi (MPa) (D1414)  | 2,650 (18.2)       |
| Elongation, % (D1414)  | 145                |
| Modulus @ 50% Elongation, psi (MPa) (D1414)                                | 1,100 (7.5)        |
| Modulus @ 100% Elongation, psi (MPa) (D1414)                               | 2,150 (14.8)       |
| <b>Thermal</b>   |                    |
| Maximum Service Temperature  | 600°F (316°C)      |

Unless otherwise indicated, all tests are performed on AS 568A (-214) o-rings.

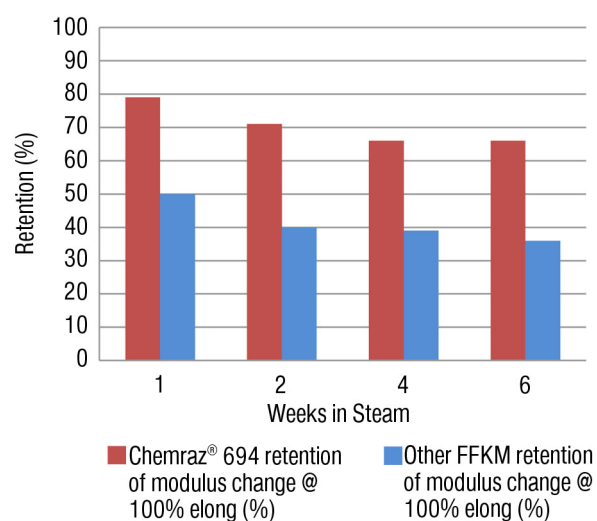
\*Note: Test performed on button samples.



% retention of tensile strength vs. temperature after 1 week exposure to steam



% retention of modulus @ 100% elongation vs. exposure to steam at 500°F (260°C)



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