

Ketron[®] PEEK Reference Guide



The industry's first NOROSOK M-710 certified stock shapes for oil, gas and petrochemical applications.



Ketron® PEEK

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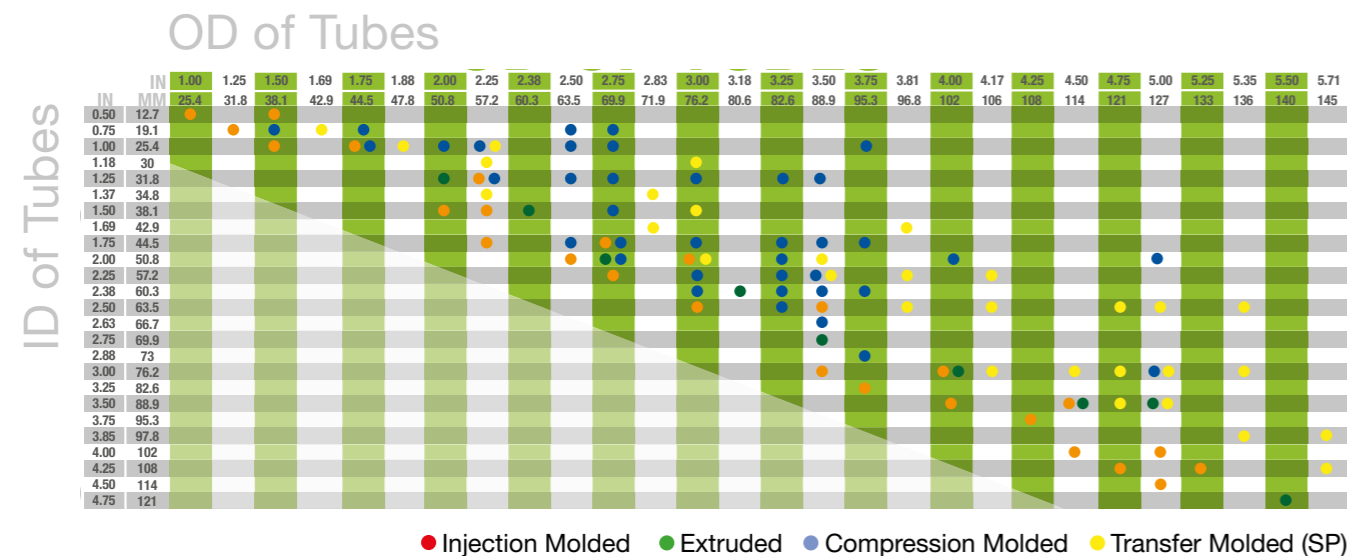
Competitive Advantage

Mitsubishi Chemical Advanced Materials develops the materials of choice for design engineers where performance and reliability are required in extreme and hostile environments. Advanced properties of chemical and abrasion resistance combined with HPLT/ HPHT ratings and superior strength make the Mitsubishi Chemical Advanced Materials family of materials the ideal choice for structural parts, bushings, bearings, seals and back up rings.

Mitsubishi Chemical Advanced Materials' global partnerships provide technical service and application development. Flexibility in material portfolio and manufacturing capabilities provide our clients with a competitive edge. Mitsubishi Chemical Advanced Materials can provide the platform for bringing your concept to the production line, from high volume molded parts to lower volume custom cast and machined components.



Near Net shapes Tooling Size Chart



NOTE: Other sizes are available, contact a Mitsubishi Chemical Advanced Materials representative for more information. This chart does not include segmented weld rings that are custom designed.

Materials	NORSOK M-710 Approved	Process Method	Max Operating Temperature	Material Advantages
Ketron® 1000 PEEK EXT		Extruded	480°F 250°C	Unfilled PEEK in extruded plate, rod & tube. Offers highest elongation of all PEEK grades. Ideal for large cross section tube in small quantities.
Ketron® 1000 PEEK IM		Injection Molded	480°F 250°C	Unfilled PEEK in injection molded tubes. Higher internal stress than extruded or compression molded. Excellent combination of thermal resistance and high compressive strength.
Ketron® 1000 PEEK SP		Compression Molded	480°F 250°C	Unfilled PEEK in compression molded rings.
Ketron® CA30 PEEK		Extruded	480°F 250°C	30% carbon fiber filled PEEK in extruded plate, rod & tube. More thermal conductivity than unreinforced PEEK with enhanced compressive strength and stiffness.

Segmented Welded Rings

Principle Objective:	Welding of segments into large OD rings consisting of 4, 6, or 8 segments
Materials:	depending on OD ring size & plate availability PEEK natural, PEEK + PTFE (completed) development of other materials on-going PEEK + carbon fibers, PEEK + glass fibers, PPS-HPV
Size Range:	OD range: min 700 mm – max 3 m Cross Section: 100 x 100 mm max, typically range 25 x 50 mm
Applications:	Industries: oil & gas, aerospace, industrial, military equipment Large dia. high temperature/high pressure seals, BU rings, guide ring
Required Equipment:	MCAM Tiel: dedicated high temperature mirror welding system, fully computer controlled welding system (temp, forces, displacements)

Near Net Shapes have: chemical resistance, low deformation, proven mechanical properties, dimensional stability, excellent machinability

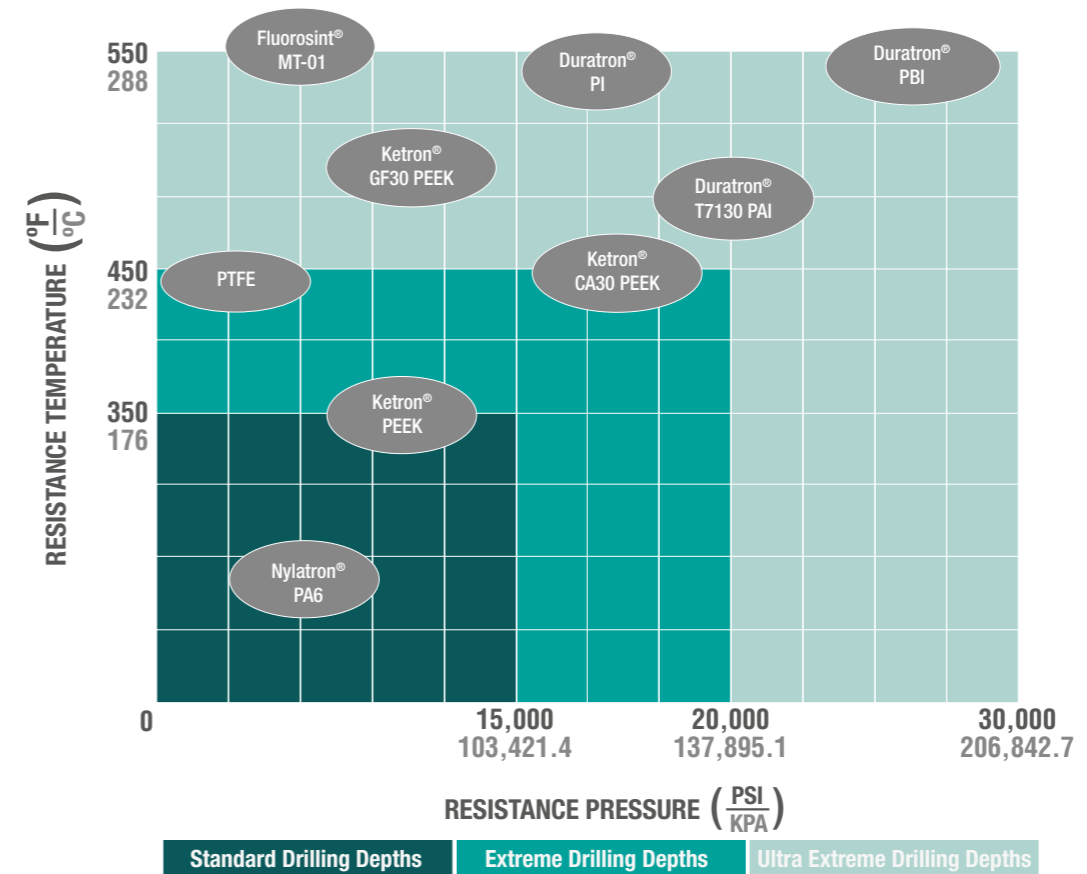




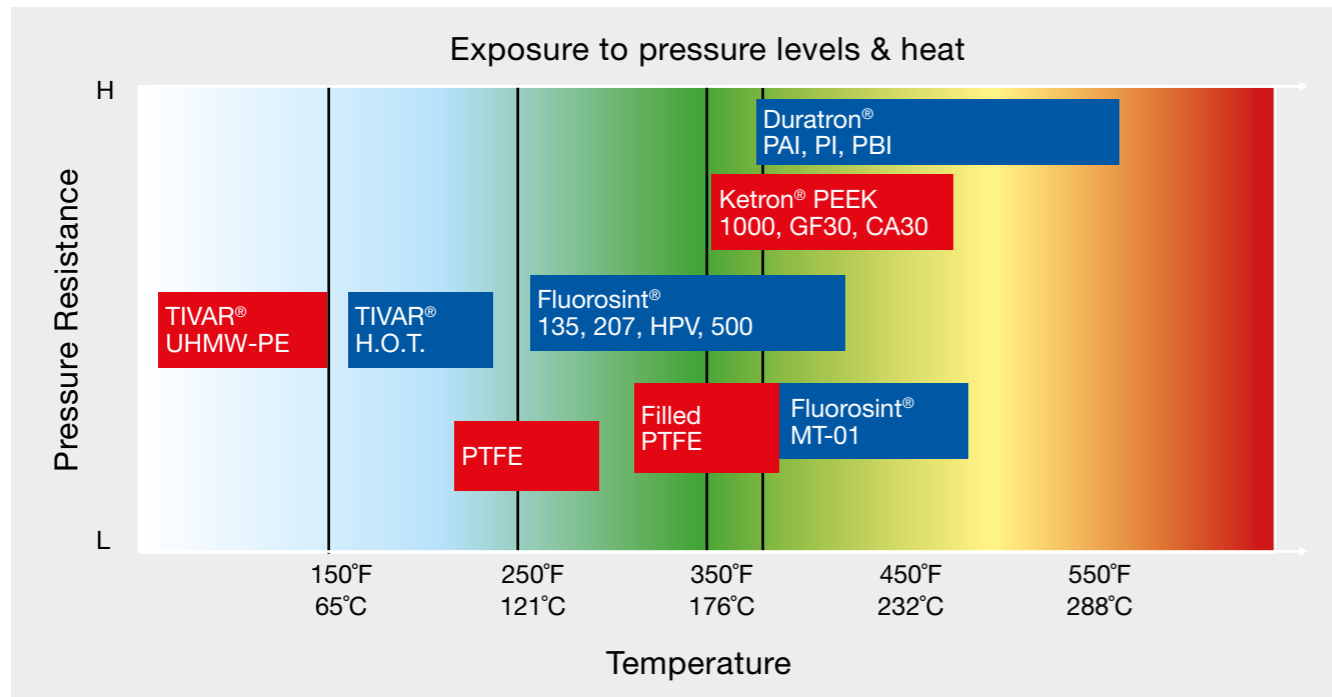
Photo courtesy of Elliott Compressor

“Polymer Labyrinth Seals provide much greater efficiency and provide the increased performance over a much greater service life”

Material options in changing environmental conditions HPHT (High Pressure High Temperature)



Seal Material Selection Matrix



TIVAR® H.O.T. / Fluorosint® / Duratron® Family - Fill in the performance gaps left by traditional materials. Mitsubishi Chemical Advanced Materials offers a wide variety of materials to solve current and future design challenges for improved MTBR (Mean Time Between Repairs).

Key Benefits

- High mechanical strength
- Chemical and corrosion resistant
- Materials operating in temperatures of -50°F (-45.5°C) to 480°F (250°C)
- Low weight compared to metal components
- Low coefficient of friction
- Low moisture absorption
- Excellent dimensional stability and quality
- Low coefficient of thermal expansion
- NORSOK M-710 (sour gas aging) compliance for Ketron® PEEK stock shapes

Common Applications

- Pipeline systems (pipe in pipe spacers, pipe clamps, lined pipe, pipe collars)
- Subsea vehicles (thruster cowlings, bearing, seals)
- Lifting equipment (cable sheaves, hook blocks, bearing pads)
- Instrumentation (insulators, sensor protectors, guidance probes, connectors)
- Compressor, pump and valve components (seals, bearings and wear components, backup rings, lantern rings)
- Offshore equipment (bushings, slide pads)
- Large diameter bouy seal rings to over 16.4ft (5m)



Mitsubishi Chemical Advanced Materials was the world's first stock shape manufacturer to earn NORSOK M-710 compliance and provides the most accurate and reliable data on their stock shapes.

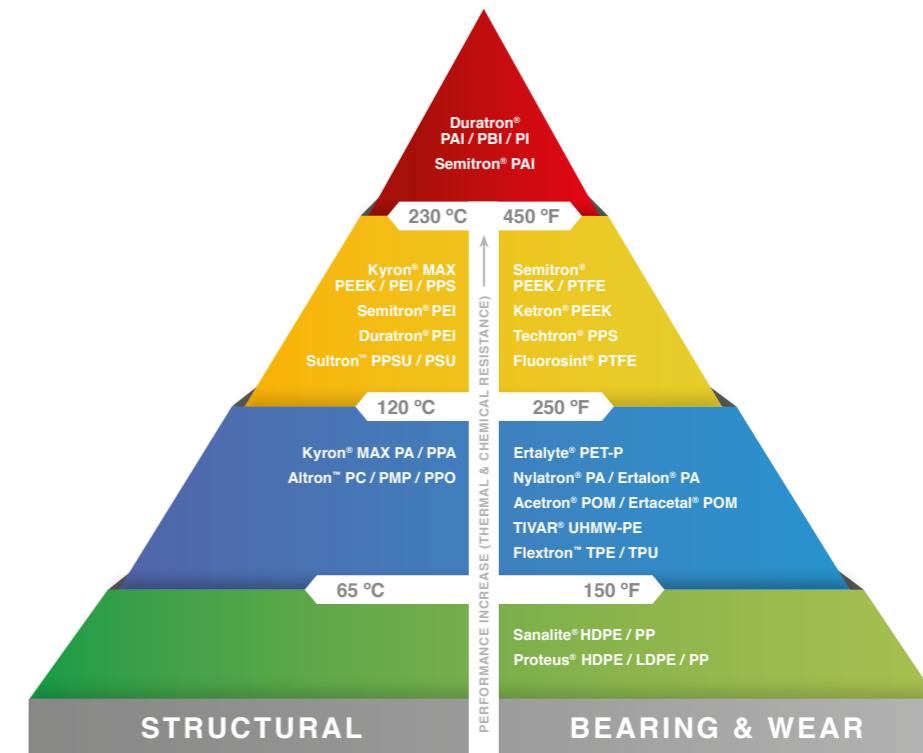
The NORSOK M-710 specification was developed by the Norwegian petroleum industry to ensure sufficient understanding and experience of oil and gas materials. It specifies a test procedure to predict the progressive degradation of thermoplastic materials exposed to a sour fluid at elevated pressure and temperature over an extended period of time. NORSOK M-710 defines

the requirements for critical non-metallic (polymer) sealing, seat and back-up materials and components for permanent use subsea, including well completion, christmas trees, control systems & valves, and topside valves in critical gas systems.

The global industry leader

replacing metals and alloys by delivering stronger, lighter-weight plastic and polymer materials with superior corrosion & extreme temperature resistance

Performance advantages start here



**MITSUBISHI CHEMICAL
ADVANCED MATERIALS:
LOW STRESS**

OTHER MARKET OFFERINGS:
HIGH STRESS

WE TAKE THE STRESS OUT

Specify the shape manufacturer and then you are specifying a process which includes consistent resin and consistent shape properties...including consistent low stress materials. Let Mitsubishi Chemical Advanced Materials eliminate the guess work and provide a consistent low stress shape regardless of the resin.



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