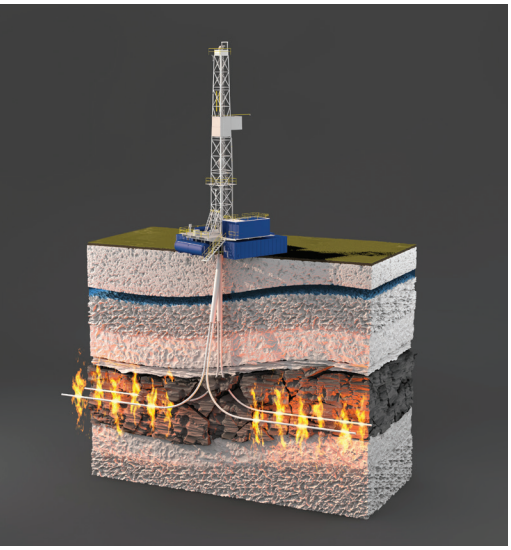
Highest Quality • Minimum Cost • Quick Turn-Around

PIPER PLASTICS, INC.

HIGH-PERFORMANCE POLYMERS
ENGINEERING • MOLDING • MACHINING • ASSEMBLY

Kyron™ BP Resin

The Ideal Choice for Hydraulic Fracturing



Kyron™ BP, is a biodegradable polymer that offers much higher mechanical strength than other traditional polymers like PEEK and nylon. The unique mechanical properties of BP coupled with the advanced polymer processing and machining technologies developed by Piper Plastics results in cost effective dissolvable components for your designs.

Kyron BP Resin in the Oil & Gas Industry

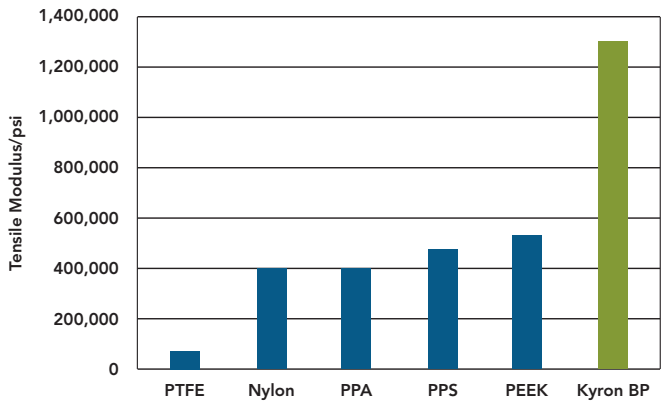
The time and cost associated with well completion has increased in association with number of stages now being used in hydraulic fracturing. Kyron BP resin is designed to eliminate the time consuming milling-out process of downhole tools for multistage fracturing after use.

Kyron BP resin is used in the hydraulic fracturing process of shale reservoirs because of its ability to withstand extreme environments and is the material of choice for components of degradable downhole tools including frac plugs, and other downhole components.

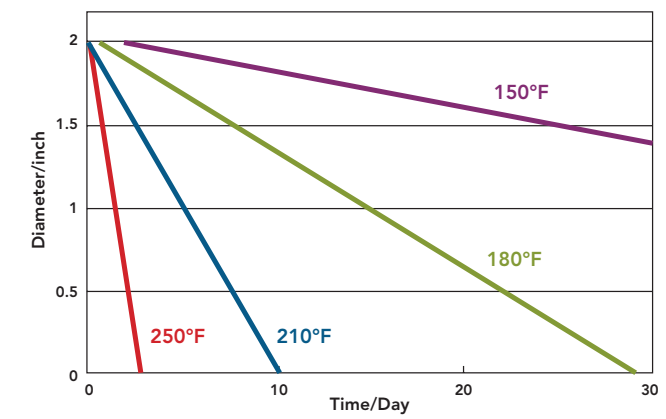
Kyron BP Biodegradable Polymer Benefits

- Optimized for wellbore applications and designed to degrade within 180-350°F environments
- Offers higher mechanical strengths than PEEK or nylon
- Dissolves at predictable rates in the presence of downhole conditions
- Easily machined into complex shapes and sizes.
- Saves money by eliminating drill-outs
- Used for zone isolation tools
- Predictable mechanical and dissolution performance
- Consistent properties without the worry of directional performance issues

Tensile Modulus of Various Oils and Gas Polymers



Degradability of Kyron BP Resin



PIPER PLASTICS, INC.

HIGH-PERFORMANCE POLYMERS
ENGINEERING • MOLDING • MACHINING • ASSEMBLY

Kyron™ BP Resin Material Properties

PROPERTIES	Units	Test Method	Kyron™ BP
PHYSICAL			
Tensile Modulus	psi	ASTM-D638	1,278,000
Tensile Strength	psi	ASTM-D638	18,370
Tensile Elongation @ Yield	%	ASTM-D638	2.3
@ Break	%	ASTM-D638	21
Flexural Strength	psi	ASTM-D790	37,600
Flexural Modulus	psi	ASTM-D790	1,239,000
Notched Izod Impact	ft-lb/in	ASTM-D256	0.63
THERMAL			
Melt Temperature	°F	DSC	440
Crystallization Temperature	°F	DSC	440
Thermal Expansion	in/in/°F	ASTM D696	5.4×10^{-5}
Thermal Conductivity	W/m-K	ASTM C177	0.4
GENERAL			
Density	g/cm^3	ISO 1183	1.56

www.piperplastics.com

Engineering & Design • Polymer Development • Precision Machining • Injection Molding • Distribution • Near Net Shapes
ISO 9001 • ISO 13485

Piper Plastics is part of the Quadrant Plastics Engineering Plastic Products (QEPP) Business Group.

USA – Arizona
Piper Plastics Inc.
257 East Alamo Drive
Chandler, AZ 85225 USA
Tel: 480.926.8100
Fax: 480.497.1530
azsales@piperplastics.com

USA – Illinois
Piper Plastics Inc.
1840 Enterprise Court
Libertyville, IL 60048 USA
Tel: 847.367.0110
Fax: 847.367.0566
ilsales@piperplastics.com

Asia – Thailand/Singapore
Piper Plastics Inc.
Eastern Seaboard Industrial Estate
Rayong 64/103, Moo 4, T. Pluakdaeng
A. Pluakdaeng, Rayong 21140
Thailand
Tel: +66 33 659 141
Fax: +66 33 659 143
thsales@piperplastics.com