

Collaborative Innovation: Practical Ways to Bring Products to Market Faster

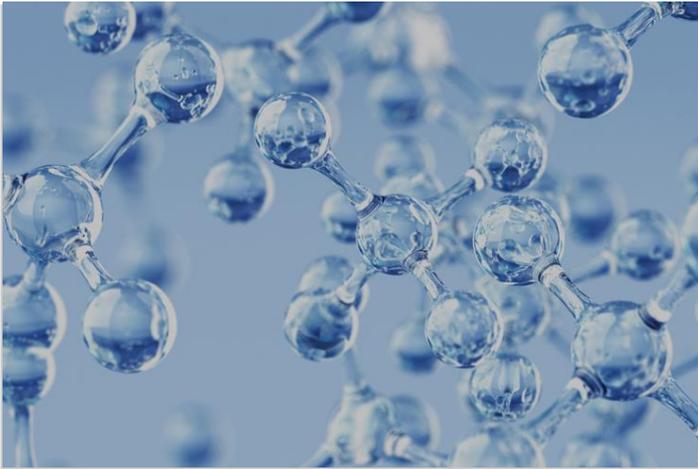
**Elevating product performance
through material science**

**Mike Hebert, Director of Research
and Development**



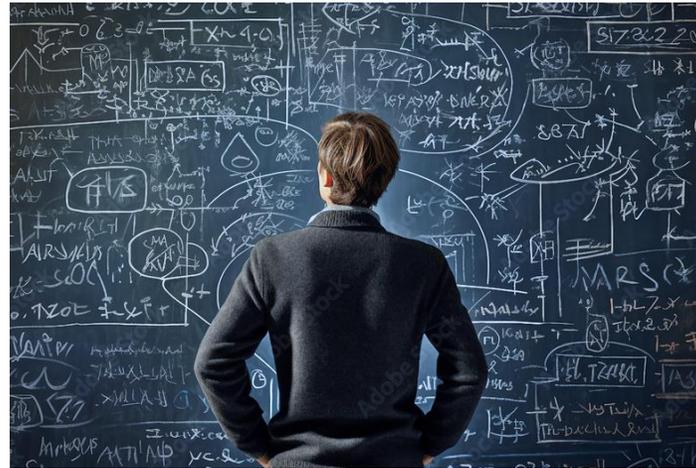
Key factors that drive value-added material solutions

DIFFERENTIATED MATERIALS



Standard options and on-site R&D lab capable of formulating custom compounds.

MATERIAL EXPERTISE



Over 115 years of combined local materials experience with global technical support at our fingertips.

GLOBAL COMPLIANCE



Compliance expertise ensuring materials meet global material accreditations.



Material expertise

1. Strong Global Collaboration
2. Rheology / Cure Kinetics Expertise
3. Processability Assessment
4. Test Method Development
5. Material Change Management

Standard material options

EPDM



- Excellent Chlorine and Chloramine resistance
- Low compression set
- Excellent heat resistance
- Good low temperature performance
- Used in Water, Food and Beverage sector

NBR



- Good compression set resistance and heat resistance
- Excellent resistance to petroleum oils, greases, and fuels
- Good low temperature performance
- General purpose sealing in automotive and energy sector

HNBR



- Excellent compression set and heat resistance
- Excellent resistance to petroleum oils, greases and fuels
- Good low temperature performance
- Used in demanding sealing applications; superior to NBR

FKM



- Excellent high temperature and chemical resistance
- Very good compression set resistance
- Moderate low temperature performance
- Used in demanding automotive, aerospace and energy applications

Standard material options

IR



- Suitable for biocompatible applications
- Outstanding mechanical durability (tear resistance)
- Performs well in surgical trocar membranes and medical seals

xIIR



- Suitable for biocompatible applications
- Offers very low extractables
- Best performance for low permeation of water vapor and gases
- Anti-coring performance (multiple syringe insertions) for medical syringe applications

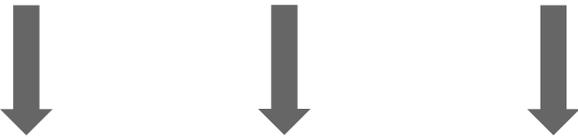
VMQ



- Suitable for biocompatible applications
- Excellent compression set resistance
- Superior heat resistance
- Good resistance to petroleum oils and greases
- Superior low temperature performance

Elastomer profile by application and performance

Comparative Chart



	Water/ Food/Bev	H&M	Low Extractables	Comp Set Resistant	Chemically Resistant	High Temp Resistant	Mechanical Durability	Low Hardness
EPDM	☑	☑		☑		☑		
VQM	☑	☑	☑	☑	☑	☑		☑
NBR					☑		☑	
HNBR				☑	☑	☑	☑	
IIR		☑	☑					
FKM		☑	☑	☑	☑	☑		
IR		☑					☑	☑

High performance plastics

High temperature resistance

- Operating temperatures up to 250-310°C
- High thermal stability

Good mechanical properties

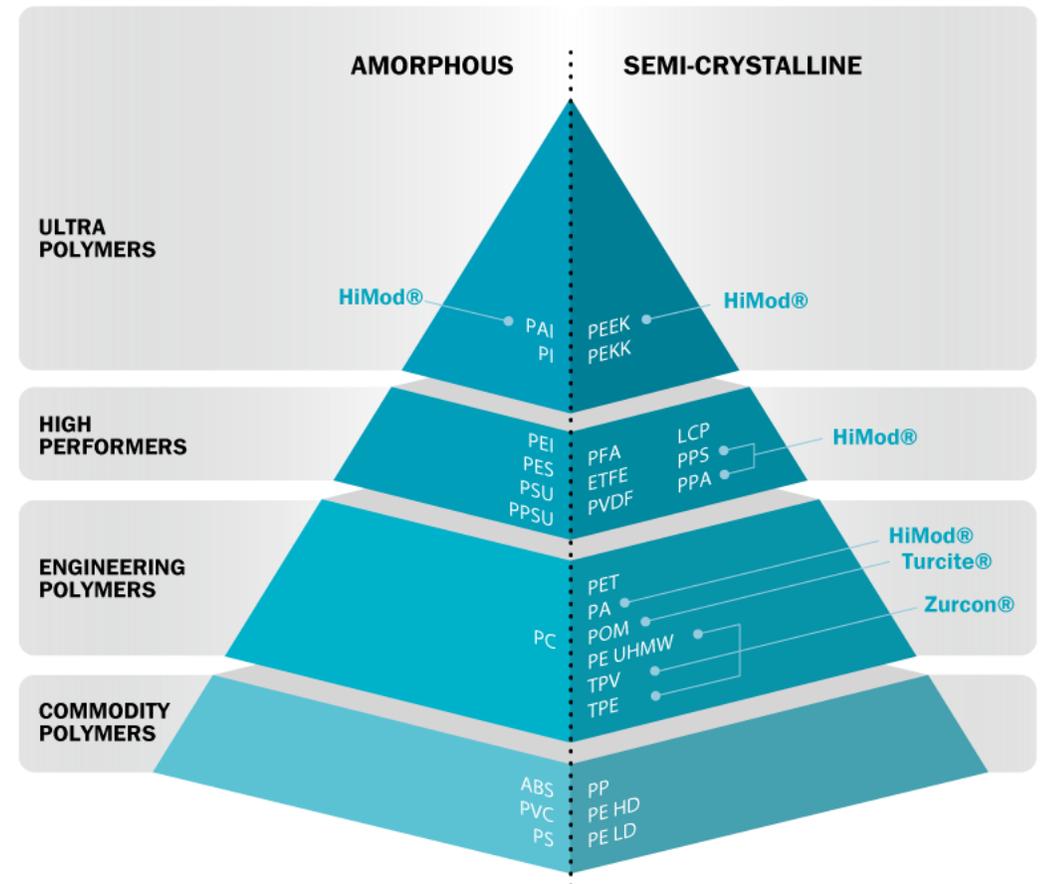
- Excellent mechanical strength and fatigue properties
- Strength can be enhanced with additives

Wear resistance

- Low wear properties
 - Self lubricating grades
- Friction can be reduced with additives

Chemical resistance

- Resistance to corrosive/caustic media





Specialized materials and custom formulations

- **Chlorine/chloramine** resistant EPDM for water market
- **VMQ** and **organic rubber** thermosets for medical market
- **Advanced filler** systems (conductive, fiber reinforced, abrasion resistance)
- **Low extractable** elastomers for industrial, water, food & beverage markets
- **Self-lubricating** materials for reduced **CoF**
- Outstanding **compression set** and **heat-resistant** materials
- Compound development with **sustainable** polymers & fillers

Advanced surface treatments provide differentiated performance

Surface Modification

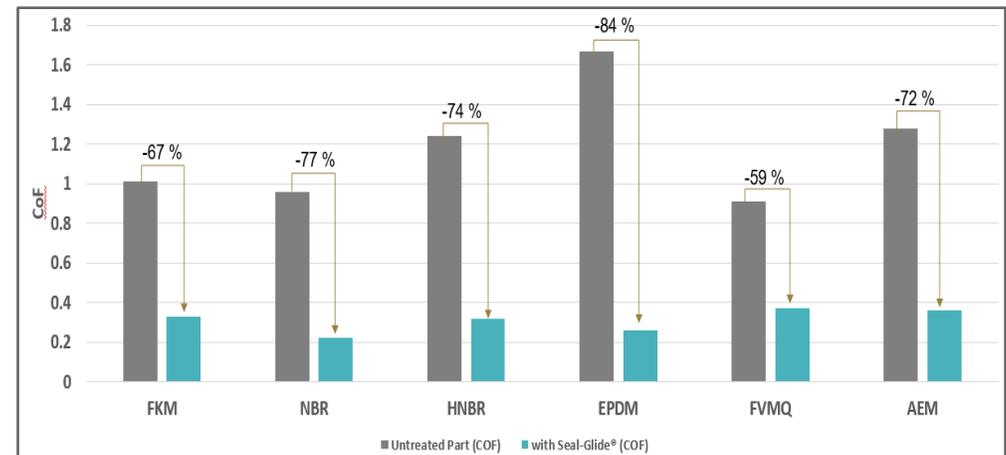
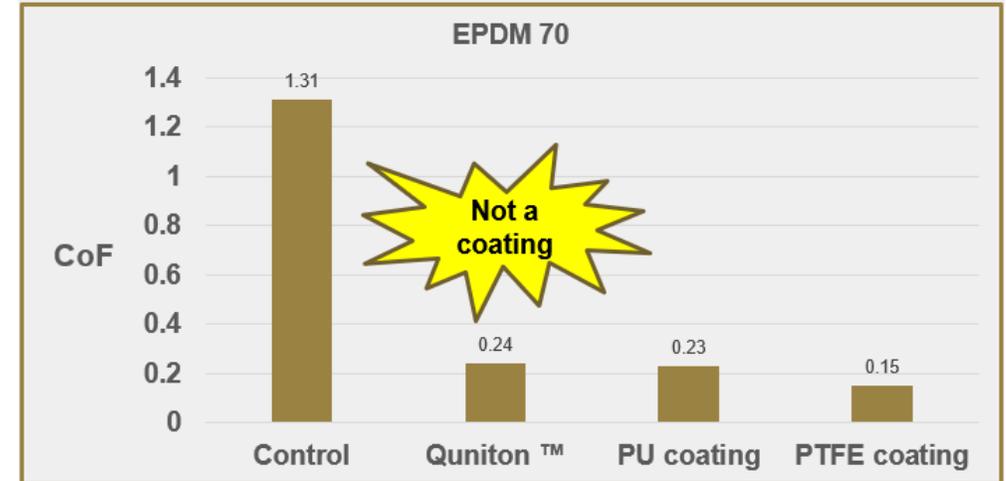
- **Quniton™**: An innovative surface modification
- Significantly reduces CoF, similar to conventional coatings

Surface Treatments

- **Seal-Glide®**: Innovative surface treatment that significantly reduces friction of elastomers

Conventional Coatings

- Powder coatings of talc, graphite, MoS₂, PTFE, etc.
- Conformal coatings – parylene, vapor deposition coatings





On-site R&D laboratory

Custom compounding

- Custom formulation development
- On-site lab scale mixing, milling and molding
- Analytical testing: chemical & thermal analysis
- Physical and mechanical testing
- Aging, conditioning and accelerated testing
- Forensic analysis



Global compliance and certification

Tailored formulations to meet today's standards

- **Water:**
 - NSF 61, KTW, WRAS, ACS
- **Food and Beverage:**
 - FDA 21 CFR, NSF 51, 3A, EC 1935/2004
- **Medical:**
 - ISO 10993 – 5 (and other sections), USP Class VI, DMF and MAF maintenance
- **Industrial/Automotive:**
 - UL 157 and IMDS
- **Regulatory:**
 - REACH, RoHS, Prop 65, CMRT, EU MDR

Elevating performance through material science

- Local and global material expertise available
- Standard portfolio offering everyday solutions
- Development group with supporting on-site R&D lab for rapid customized material development
- Continuous development for tomorrow's materials
- Globally-compliant and sustainable materials

