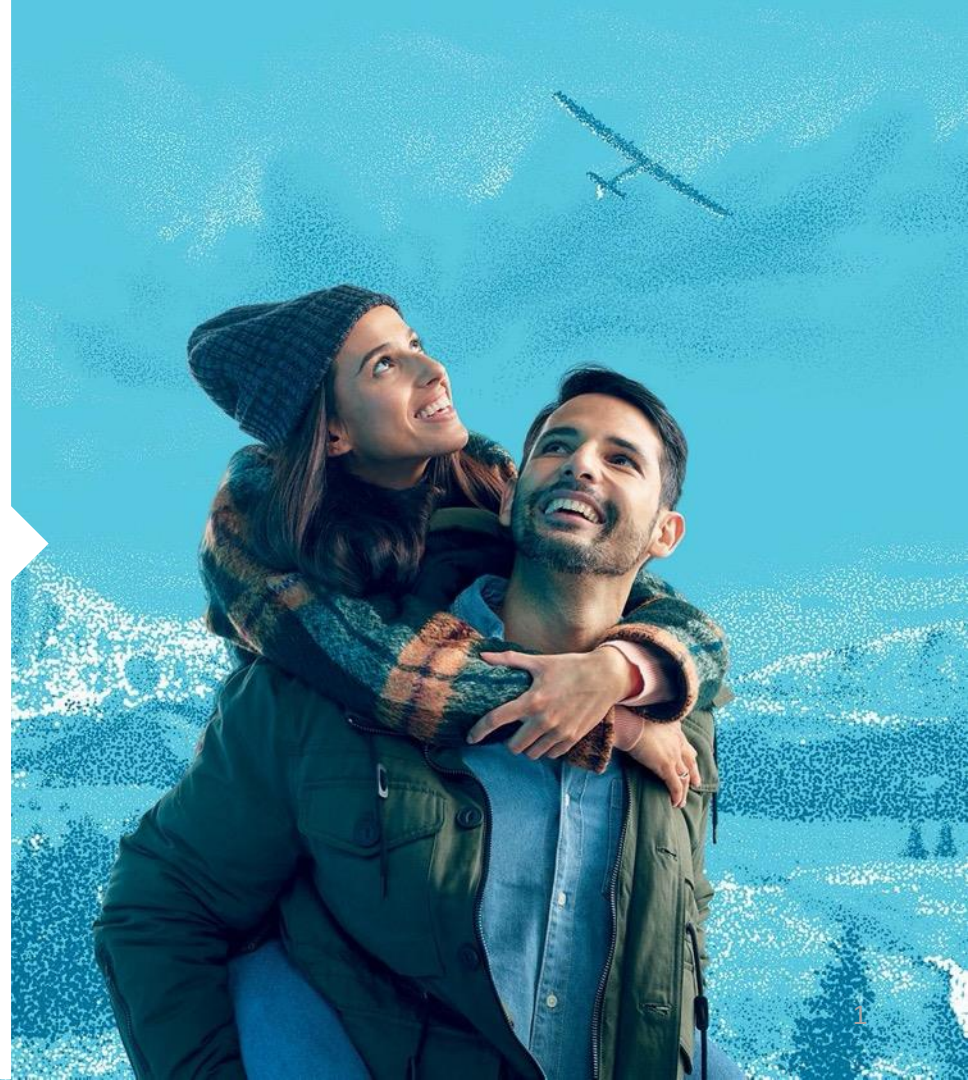




Progress beyond

Solvay Specialty Polymers

Plastiche ad alte prestazioni per ingranaggi



Safer, more sustainable gears for modern high performance engines & actuation



KEY TRENDS & FACTORS IN TRANSPORTATION SECTOR

- Efficiency targets & regulations
- Downsized or better right sized engines
- Increased electrification of the powertrain
- Lower noise, vibration and harshness
- Higher efficiency with lower weight



Stefano Montani
CTD Engineer for Transportation
Solvay Specialty Polymers



Rodolfo Patricio
Transportation Marketing Manager
Solvay Specialty Polymers



Which High Performing Plastics are good for High Performance Gears?



A BROAD SELECTION OF HIGH PERFORMANCE POLYMERS

KetaSpire® PEEK

Excellent strength and fatigue resistance
Continuous use temperature up to 240°C
Superior chemical resistance

Torlon® PAI

Strength and stiffness retention up to 275°C
Exceptional wear resistance in dry & lubricated environments

Amodel® PPA

Strength and stiffness retention in humid environments
Superior heat & chemical resistance vs aliphatic PAs

Xencor® LFT

Superior fatigue & wear resistance vs short-fiber compounds
High dimensional stability and low warpage

Ryton® PPS

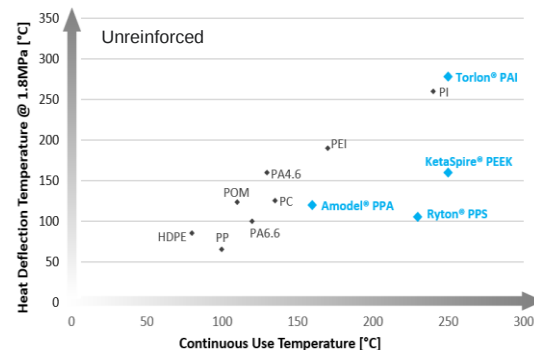
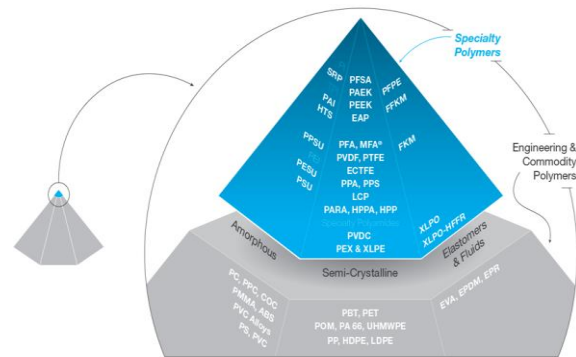
Exceptional dimensional stability for precision-molded components
Excellent heat & chemical resistance

Driver: Metal to Plastic

- NVH reduction
- Higher compliance
- Lower moment of inertia

Driver: More demanding gears

- Lower moisture absorption
- Higher chemical resistance
- Higher temperature resistance
- Better dimensional stability

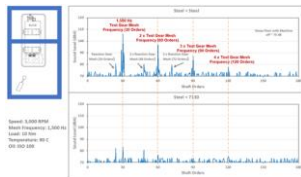
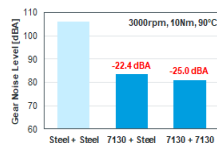


What makes us understand the specific performance of the portfolio in gears?



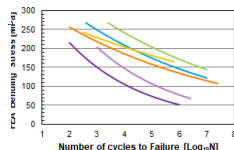
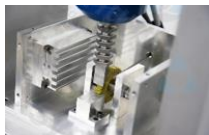
NOISE TESTING

Gears noise level detection during rotation



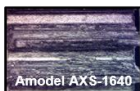
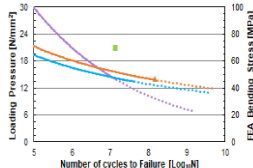
SINGLE TOOTH BENDING

Tooth root strength evaluation by hydraulic pulsator



4 SQUARE TESTING

Flank safety evaluation and failure mechanism



SOLVAY AS A GLOBAL TECHNOLOGY PARTNER



NETWORK OF CONSULTANTS & PARTNERS



GEAR DATA AVAILABILITY

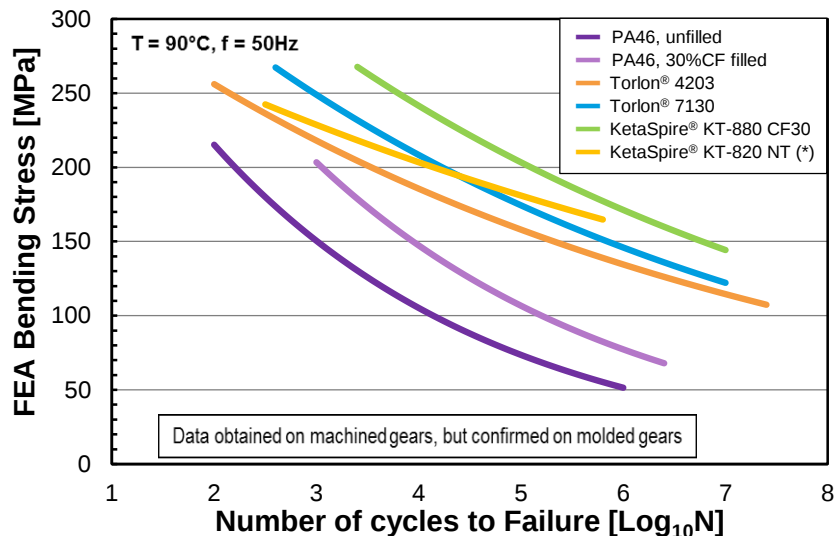


ULTRA-POLYMERS		STB	4Square	KISSsoft
KetaSpire® PEEK	KT-820 NT	90°C	90°C	-
	KT-880 CF30	90° 130°C 150°C	90°C	Material Data Root Safety
Torlon® PAI	4203	90°C 130°C	90°C	Material Data Root Safety
	7130	90°C 130°C	90°C	Material Data Root Safety
CRYSTALLINE		STB	4Square	KISSsoft
Amodel® PPA	AXS-1640HSL BK324	90°C	90°C	Material Data
	AT-6130HS BK324	90°C	-	-
Xencor™ PPA	LGF-1930FW HS BK545-9	90°C	90°C	Material Data
Ryton® PPS	R-4-200BL	90°C	90°C	Material Data
	XE-5430NA	90°C	90°C	Material Data

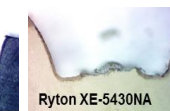
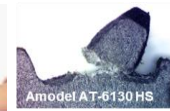
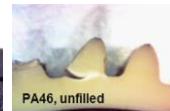
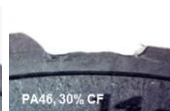
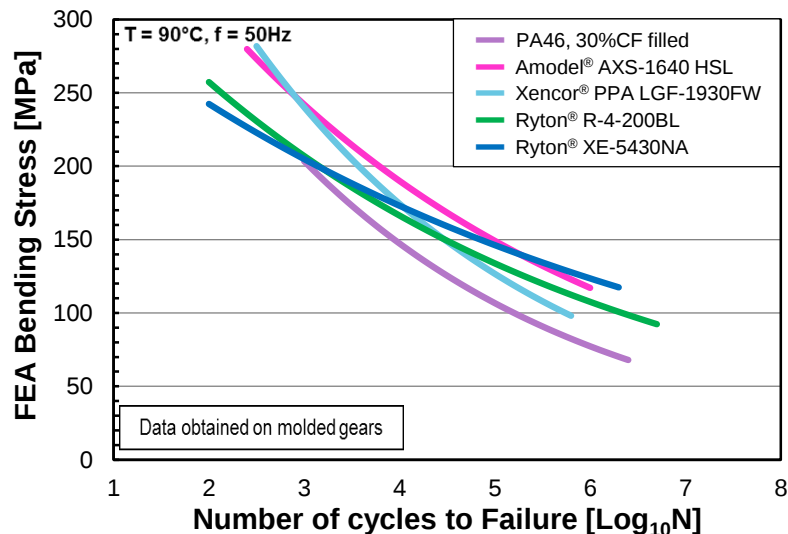
Technical Value of CrystalLines & UPM in Gear applications



Single Tooth Bending



Single Tooth Bending

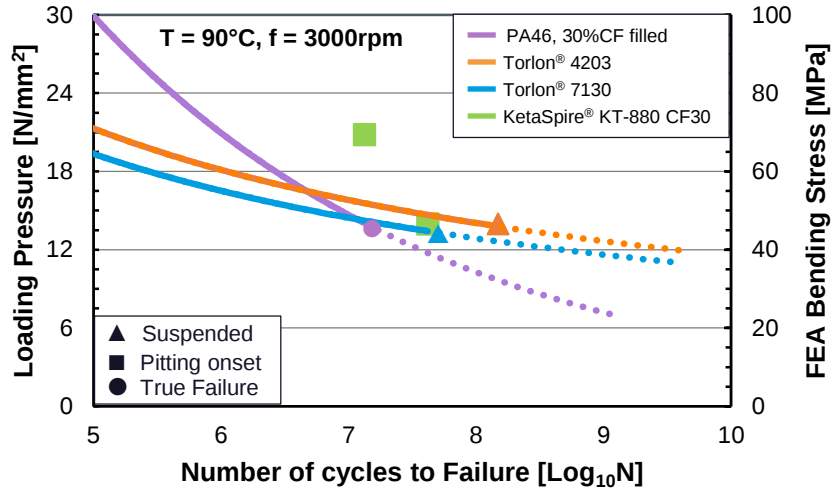


(*) Material failing in a *ductile* mode: failure recognised as a tooth deflection by 0.3mm

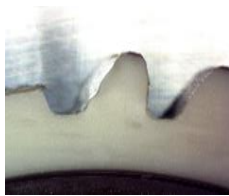
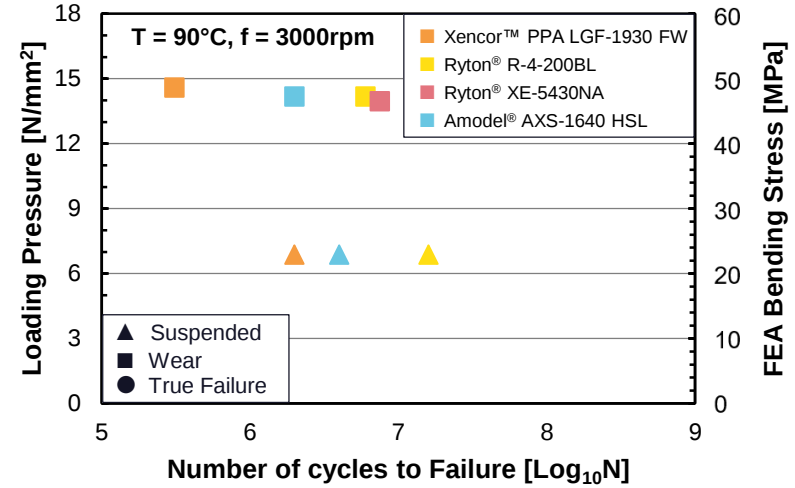
Technical Value of CrystalLines & UPM in Gear applications



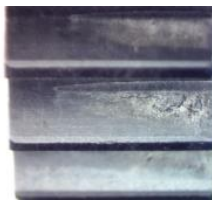
4-Square Testing



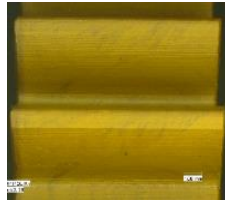
4-Square Testing



PA46, unfilled



PA46, 30% CF



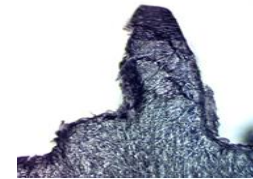
Torlon® 4203



KetaSpire® KT-880 CF30



Ryton® R-4-200BL



Xencor™ PPA LGF-1930 FW

Gear Examples



Amodel® PPA AT-6115 HS

(15%GF)

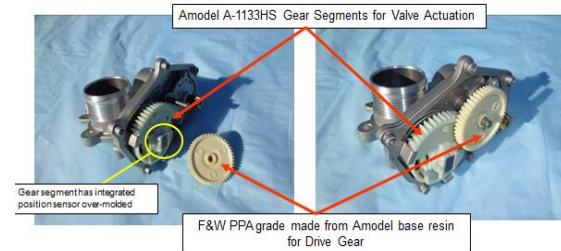
Adjunct Actuator



Amodel® PPA A-1133 HS (33%GF)

Amodel® PPA A-1133 FW (33%GF)

Electric Throttle Control



KetaSpire® PEEK KT-820NT

(unfilled)

Positioning Gear



KetaSpire® PEEK KT-820NT (unfilled)

Camera car regulator

Witte Automotive



Amodel® PPA AT-6130 HS (30%GF)

Ixef® PARA 1022 (50%GF)

Seat Adjustment Gears



Nevicolor at a Glance

Diversified product portfolio for Italian distribution



Ixef® PARA

Omnix® HPPA

Ryton® PPS

Amodel® PPA

KetaSpire® PEEK

Solef® PVDF

Halar® ECTFE

Hyflon® PFA/MFA®

Tecnoflon® FKM



Since 1964 an outstanding service to customers in Italy.



30M€
Net sales 2019



~43
employees



**Distribution &
Compounding
facilities**

Thank you.



Progress beyond

Are you curious to hear more?

We are happy to share specific technical data generated with you and your colleagues via virtual or in person meeting. Please contact your Nevicolor representative to schedule your presentation.