MITSUBISHI CHEMICAL GROUP

KYRONMAX® CASE STUDY: SPORTS & LEISURE

Reinventing the wheel with breakthrough materials

By partnering with a global leader in recreational sports equipment, KyronMAX® helped create a breakthrough archery idler wheel that was not only lightweight, but reliable enough to maintain the high-performance standards expected from a top-of-the-line compound bow.

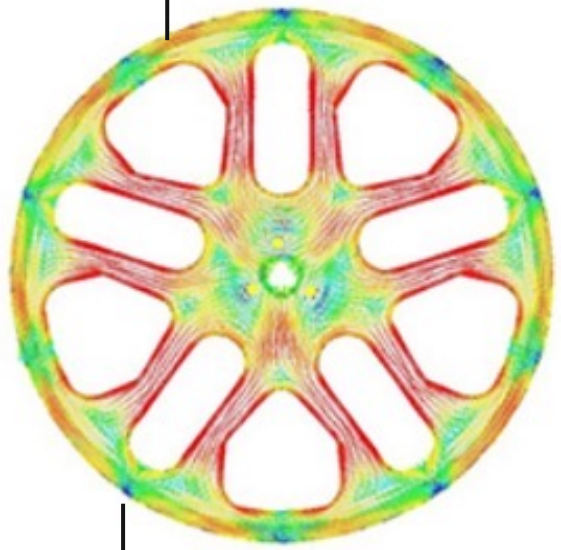
The KyronMAX® challenge

After replacing the original aluminum part with a lighter weight 50% Nylon Long Glass Fiber (LGF), the customer was still experiencing a 14% failure rate due to breakage.

The customer had purchased new molding tools and wanted to avoid further reinvestment. After many attempts to overcome the challenges with LGFs, the customer approached Mitsubishi Chemical Advanced Materials Engineered Solutions for a quick, off-the-shelf drop-in solution.

50% LGF Nylon

Incorrectly oriented fiber = weakened performance
This is due to the long fiber length in the LFT compound.



Only 20% of the datasheet strength is in this location (80% loss of strength).

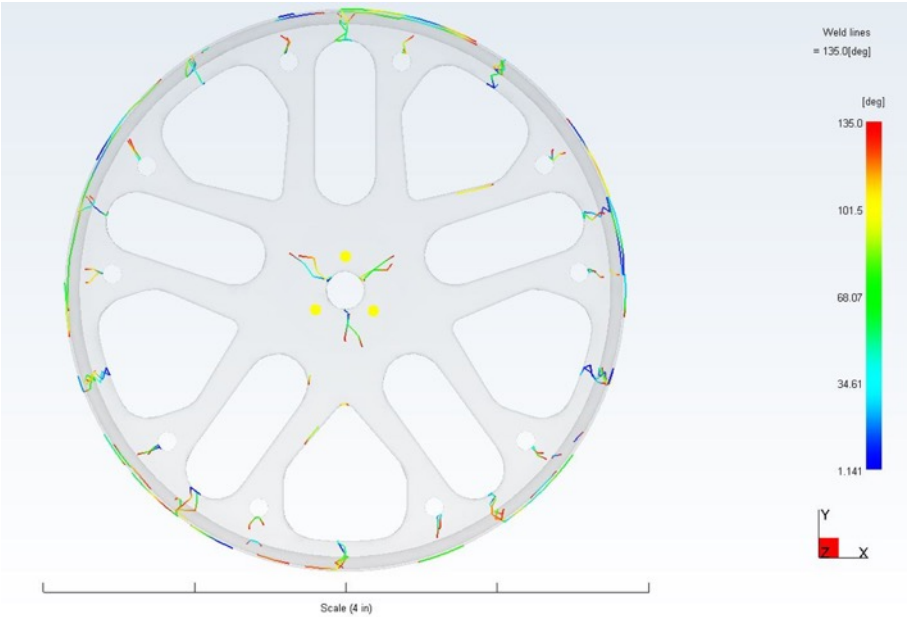
The KyronMAX® breakthrough

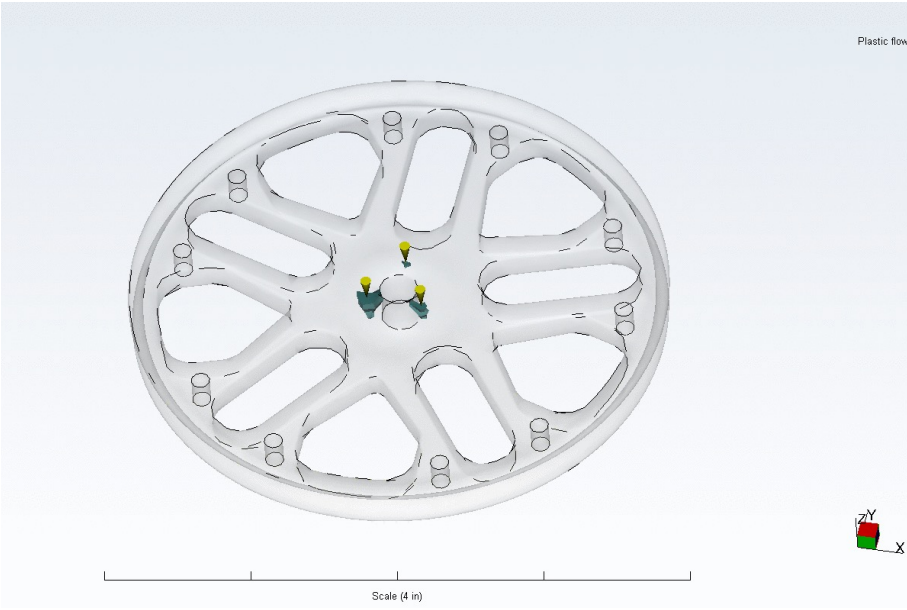
Because the customer was unable to achieve the required performance, the Advanced Materials team of Mitsubishi Chemical Group (MCG) recommended KyronMAX® S-2220, a 20% Carbon-Fiber filled product, and offered to run the molding trials using the customer's existing tool.

Benefits of KyronMAX®

Traditional, long glass fiber (LGF) nylons do not commingle well and have much lower strengths at the knit line resulting in lower performance.

KyronMAX® polymer technology allows for fiber mixing increasing the knit-line strength and decreasing failure rates. KyronMAX® ultimately allows for higher strength parts and difficult complex geometries. In addition, KyronMAX® S-2220 has less than half the filler loading which helps to increase toughness, improve knit-line strength, faster processability and consistency, while significantly reducing the part stress.





Weld Line Locations = Failure points

Breakthrough results

The KyronMAX® turn-key products offer customized solutions that can be quickly created and furnished to reduce lead times to market.

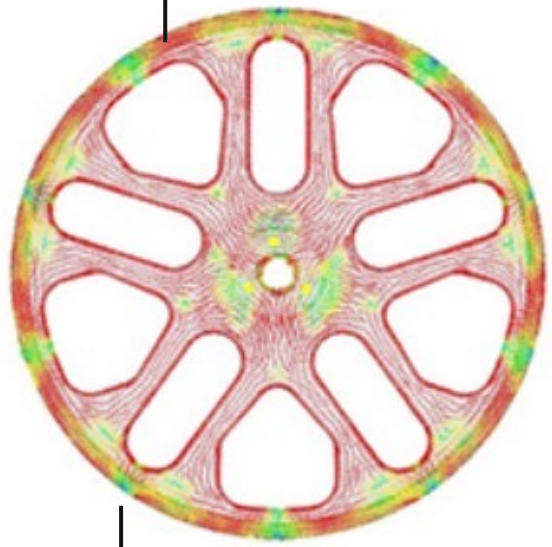
Finally, the KyronMAX® product capabilities offer:

- “Drop-in” availability
- Advanced design technology
- Increased part performance

KyronMAX® products are being used throughout multiple designs and applications.

KyronMAX®

Proper oriented fiber = increased performance
The shorter fiber KyronMAX® yields better fiber orientation.



Dramatically increased weld-line strength of KyronMAX®.

Breakthrough material results

Mechanical	Units	Method	KyronMAX® S-2220	Nylon 50% LGF
Tensile Strength	ksi	ASTM D638	44	36
Tensile Modulus	ksi	ASTM D638	3,045	2,610
Tensile Elongation	%	ASTM D638	2.8	2.5
Flexural Strength	ksi	ASTM D638	63	NA
Flexural Modulus	ksi	ASTM D638	2,600	NA
Charpy Impact	kJ/m^2	-	88	80
Specific Gravity	g/cm^3	ASTM D792	1.23	1.56

> 21%

Weight reduction

0%

Failure rate

Features & benefits

- High physical strength
- Lighter weight components
- Material toughness
- High wear resistance
- Exceptional processability

Get in touch

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Visit:
Growth Garage
Mitsubishi Chemical Group - Advanced Materials Division

To find out more about KyronMAX®
please visit our new website: **kyronmax.mcam.com**

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