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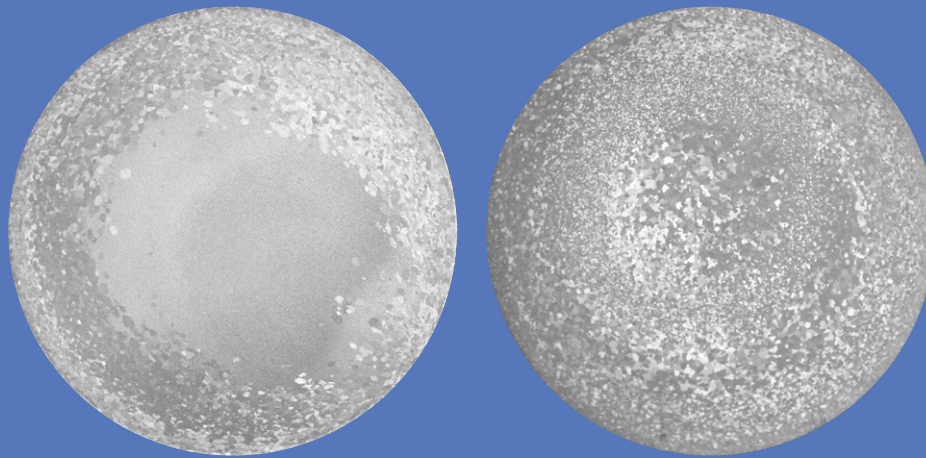
# OPTIGRAIN•MG

BY HYDRO

Hydro's machining grade stock, OptiGrain MG, delivers enhanced product characteristics, improved consistency, better performance, and lower total processing costs for our customers.

## OptiGrain MG is the right bar for the most demanding jobs!

- Increased mechanical properties
- Lead-free 6061 alloy
- Improved lot-to-lot consistency
- Improved surface finish
- Increased productivity



OptiGrain MG is a precision extruded 6061 aluminum alloy product designed for high-speed machining operations. Hydro's proprietary die design and advanced press control systems produce a product with improved straightness, tight tolerances, reduced twist, and elevated mechanical properties. OptiGrain MG offers improved and repeatable piece-to-piece and lot-to-lot performance over standard extruded aluminum products. And, OptiGrain MG provides good finishing characteristics, excellent corrosion resistance, and responds well to anodizing. OptiGrain MG is the right product for the most demanding jobs.

### Conventional bar

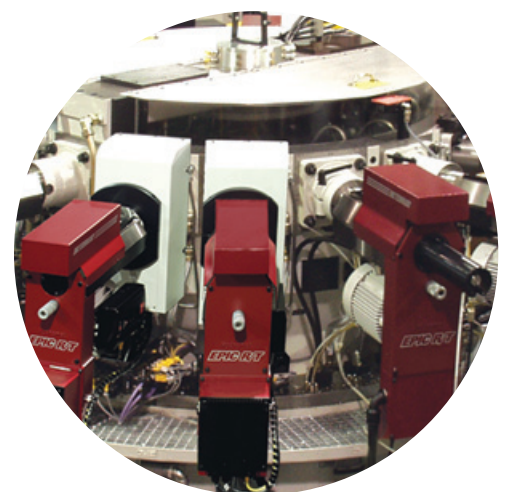
*Inconsistent, coarse grain = Slower machining  
 Chip build-up  
 Lower productivity*

### OptiGrain MG bar

*Consistent, fine grain = Faster machining  
 Enhanced chip characteristics  
 Higher productivity*

### Higher productivity for machining operations

- Consistent quality
- Reduced set-up time
- Reduced recalibration
- Enhanced chip characteristics
- Tighter tolerances
  - 1/3 commercial straightness
  - 1/2 commercial twist & bow



Due to dimensional stability and tolerance control, setup time is minimized. Enhanced straightness provides smooth feed-thru making it well suited for automated rod and bar feeders. OptiGrain MG generates compact chips allowing machinery to operate smoothly with minimal downtime, thereby improving efficiency and lowering costs. Chamfered ends, available on a variety of shapes, further reduces set-up time.

OptiGrain MG bar stock achieves 1/3 commercial extruded tolerances for straightness and 1/2 commercial tolerances for twist and bow. OptiGrain MG exceeds Aluminum Association Standard Tolerances and Precision Tolerances for extruded rod.

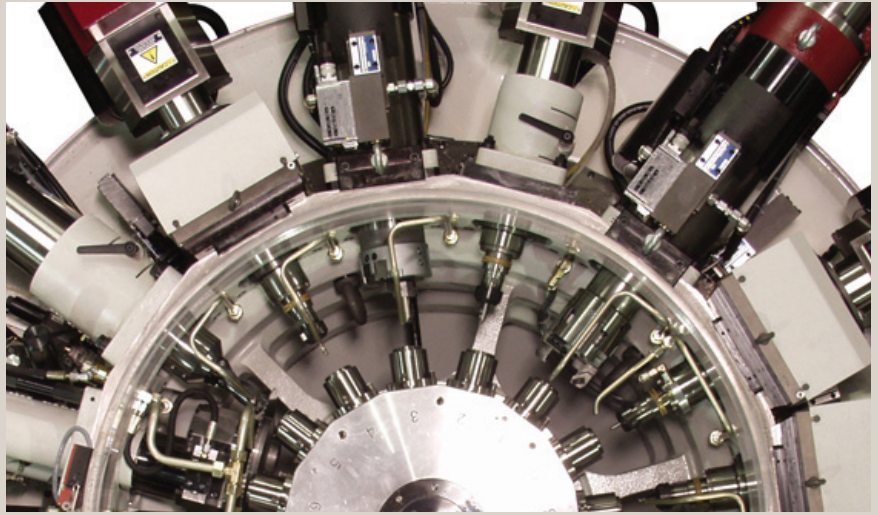
Typical applications for OptiGrain MG include:

- Automotive parts
- Hardware
- Couplings and connectors
- Fasteners
- Fittings
- Hinge pins
- Military components

... and any other application where close machining tolerances are needed!

#### Available shapes

OptiGrain MG is available in a variety of solid and hollow shapes including round, square, and hex. In addition, true custom shapes may be created to optimize machinability and material efficiency for your specific application.



#### Typical physical properties

Alloy and Temper	Hydro OptiGrain MG
Specific gravity	2.7
Density (lbs/in. <sup>3</sup> )	0.098
Electrical conductivity at 68°F (% IACS)	43
Electrical resistivity at 68°F (Ohm-Cir. Mil/ft)	24
Thermal conductivity at 77°F English units (btu-in./ft <sup>2</sup> hr.°F)	1160
Coefficient of thermal expansion 68°F to 212°F, per °F	13.1 x 10 <sup>-6</sup>

#### Typical mechanical properties

Alloy	Specification	Product	Heat Treatable Tempers	Tensile Strength				Elongation % Min
				Ultimate		Yield		
				ksi Min	MPa Min	ksi Min	MPa Min	
OptiGrain MG 6061	ASTM B221	Round rod	T6511	42	290	38	260	10
Standard Extrusion 6061	ASTM B221		T6511	??	???	??	???	??

#### Typical chemical composition

Element	Min	Max
Si	0.40	0.8
Fe	-	0.7
Cu	0.15	0.40
Mn	-	0.15
Mg	0.8	1.2
Cr	0.04	0.35
Zn	-	0.25
Ti	-	0.15
Others each	-	0.05
Others total	-	0.15

#### Hydro

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