

# A Cost Effective Approach for Wire Manufacturing

A case study of creating ready to install guide rollers

Metal guide rollers are used throughout wire manufacturing factories. They can be found guiding rod into draw boxes or strands on CV lines (FIGURE 1-3). At best, these metal rollers are maintenance hassles and at worst they are source for defects that impact quality or drives costly rejects. Why not mitigate maintenance and preserve quality with an *Izory*<sup>®</sup>HD zirconia roller (FIGURE 4) that can do both at a price that lowers your total costs?

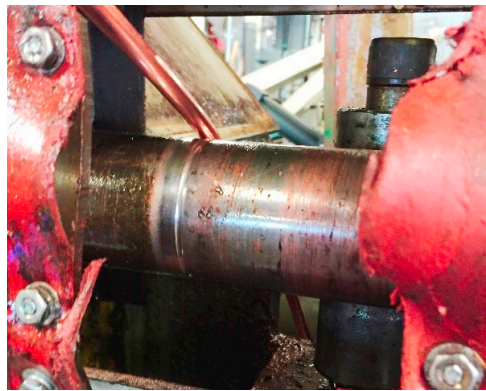


FIGURE 1

We collaborated with our customers to develop an *Izory*<sup>®</sup>HD assembly that met cost and performance targets with a ready to install guide roller. To meet the budgetary targets, we streamlined a list of sizes and created a smart design



FIGURE 4

that incorporated plated steel caps and standard bearings. This process reduced manufacturing costs associated with small production lots and created a resilient design with a pristine surface.

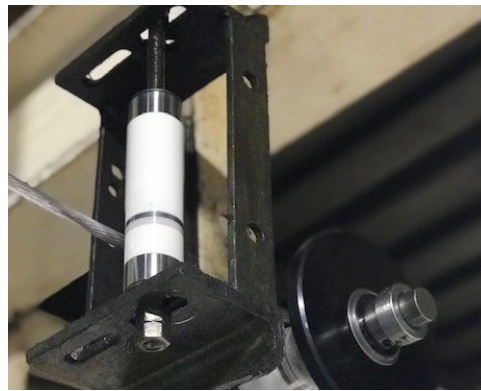


FIGURE 2

We know that personalized face to face meetings and our on-site assessments often lead to the best total solution. We'd be happy to meet with you to discuss your needs. Our expertise is rooted in collaboration on new designs like these guide rollers. We dig in to understand the requirements necessary to meet all your performance and supply chain requirements. Contact:

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## Why *Izory*<sup>®</sup>HD?

*Izory*<sup>®</sup>HD will reset your expectations for the performance of the draw rings, step cones, pulleys and guides used to manufacture wire (FIGURE 5).



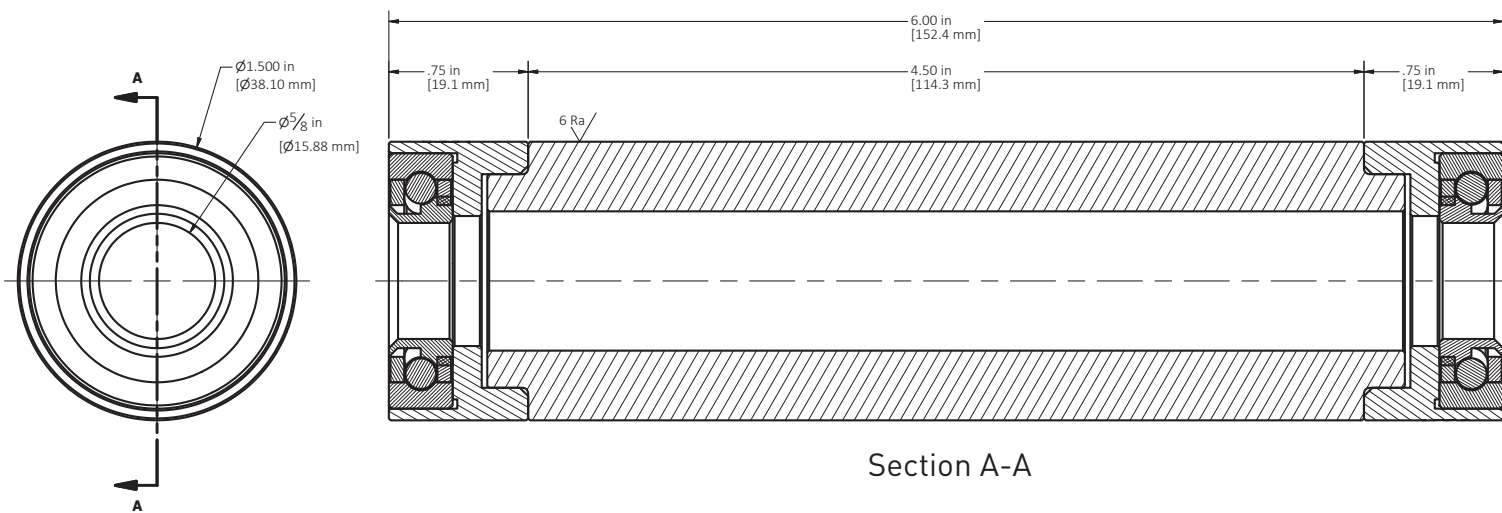
FIGURE 3

Refractron's latest evolution is ~15% harder, 30% stronger and offers a 40% improvement in standardized abrasion testing when compared to traditional magnesia stabilized zirconia's (MgPSZ) used throughout the wire industry. Don't worry *Izory*<sup>®</sup>HD still comes with the same great fracture toughness expected from MgPSZ's. Fracture toughness is the property which quantifies the ability of a material to resist crack propagation and chipping. It is critical to the durability required for parts used in wire factories. Improved ceramic properties probably sound nice, but how do they translate into wire quality and operational efficiency?



FIGURE 5

*Izory*<sup>®</sup>HD's improved microstructure and properties make it better equipped to resist dimensional changes that can wreak havoc on your process control. Its resiliency can translate into longer maintenance cycles, better wire quality and lower total costs. *Izory*<sup>®</sup>HD is specified on equipment made by major OEMs and trusted by manufacturers around the globe. It is made at our factory outside of Rochester NY.



## PROPERTIES

### MgPSZ

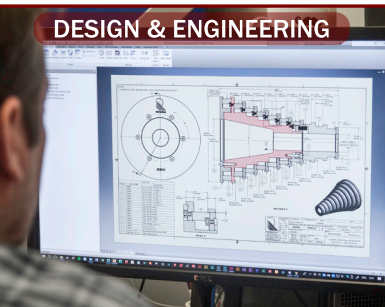
### Izory® HD

COLOR .....	Ivory
CHEMISTRY: ZrO <sub>2</sub> + HfO <sub>2</sub> + MgO [%] .....	97.14
ZrO <sub>2</sub> + HfO <sub>2</sub> + Y <sub>2</sub> O <sub>3</sub> [%] .....	
Al <sub>2</sub> O <sub>3</sub> [%] .....	
Other [%] .....	2.86
DENSITY [g/cm <sup>3</sup> ] ISO 18754 .....	5.78
WATER ABSORPTION ASTM-373 .....	nil
GRAIN SIZE [μm] ASTM E-112 .....	20
FRACTURE TOUGHNESS K <sub>IC</sub> [MPa√m] ASTM C-1421 .....	10
LOOP ABRASION [mm <sup>2</sup> ] ASTM G174 (d) .....	0.100
MODULUS OF ELASTICITY MOE [GPa] ASTM E1876-99 .....	214
MODULUS OF RUPTURE 4pt MOR [MPa] ASTM C-1161 .....	650
HARDNESS VICKERS [HV1] ASTM C1327-08 .....	1225
POISSON RATIO ASTM E1876-99 .....	0.31
COMPRESSIVE STRENGTH [MPa] ASTM C773 .....	1760
THERMAL CONDUCTIVITY RT [W/m K] ASTM C408 .....	2.50
COEFFICIENT OF THERMAL EXP. x10 <sup>-6</sup> /°C [25-1000 °C] ASTM C372 .....	10.2
MAXIMUM USE LIMIT [°C] ISO 18754 .....	500

*Izory*® HD (MgPSZ) was developed with an improved microstructure which translates into a 15% increase in hardness (HV1), a 30% increase in strength (MOR) and a 40% improvement in wear resistance. Since the hardness and the microstructure have a direct impact on wear resistance they are critical to the performance of wire machinery components that directly contact your wire and cable.

Refractron understands how critical *Izory*® HD parts are to wire quality so we verify the ceramic properties on every lot of in house made material and measure the surface finish and critical dimensions on every capstan. A unique laser mark is added to provide comprehensive traceability and ease inventory control in our factory and yours.

Refractron is a privately owned company that has been manufacturing ceramics in its 95K ft<sup>2</sup> factory near Rochester, New York since 1984. Contact us ([adamo@refractron.com](mailto:adamo@refractron.com)) if you have questions, or would like to set up an on site fit assessment with an engineer.



DESIGN & ENGINEERING



QUALITY



EXPERIENCE



PARTNERSHIPS