

Technology Delivers the Difference

**WHEAT**

**UNITED**

---

# *Synergy 100*

---

Cast HSS Work Rolls  
for Hot Strip and  
Cold Mill Applications

---

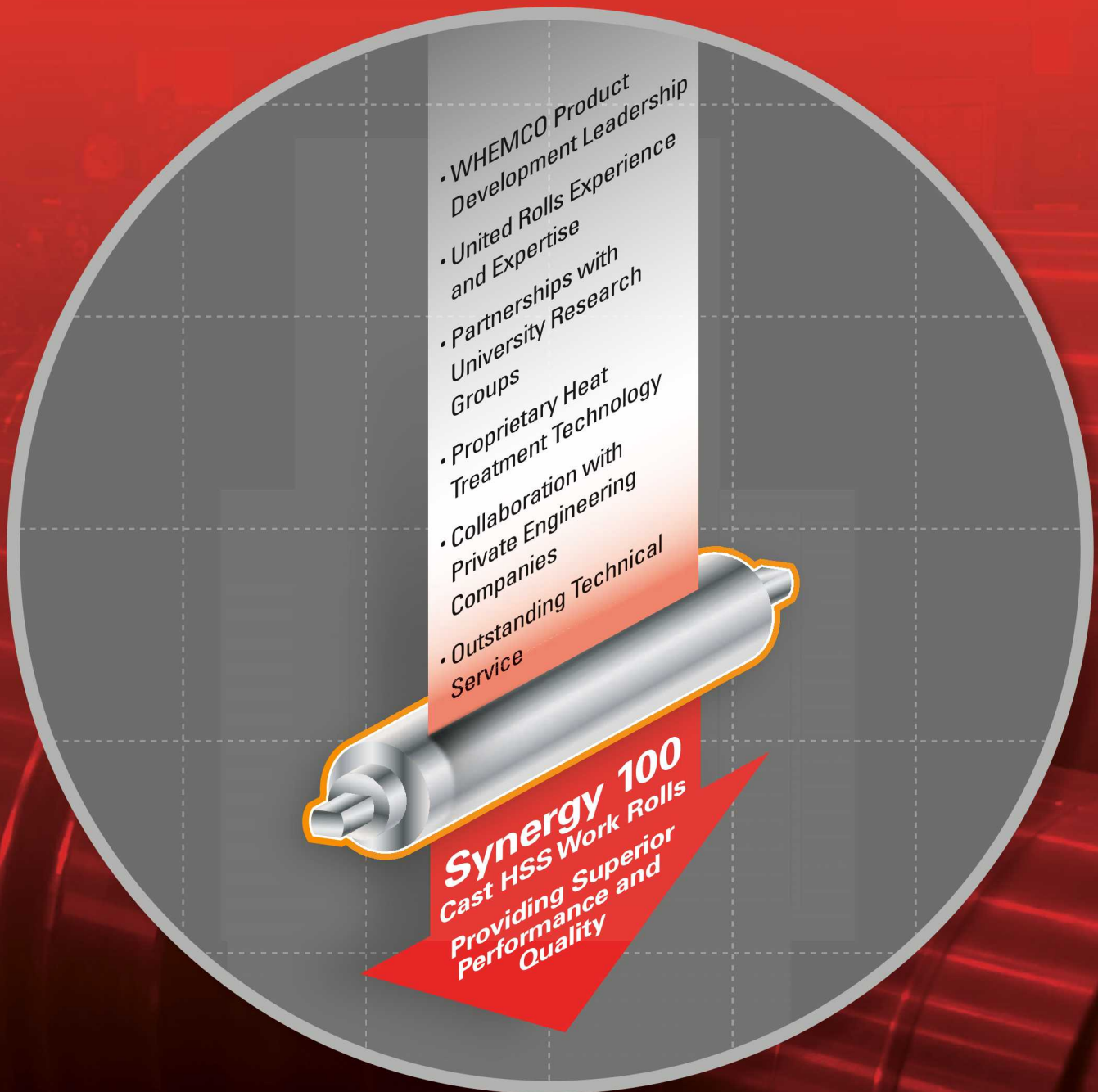
---

# *Bringing it all Together*

---

Developing a world-class product requires coordinating a broad combination of resources. For our new generation Cast HSS Work Rolls, we did just that.

---







## Introducing

# Synergy 100

a new line of Cast HSS rolls from  
WHEMCO and United Rolls

*Synergy. It's the extra value that comes from combining elements that reinforce each other. With the combination of WHEMCO and United Rolls, we've created a new synergy of minds, metallurgical resources, technical service and production capabilities. The result is Synergy 100, a new generation of cast HSS work rolls that combine world-class research and development, proprietary heat treatment technology and outstanding technical service.*

*Quality for today; new capabilities for tomorrow, sourced from a U.S.-based supply chain that can stand by you with expert service and support — all from WHEMCO, a world leader in the manufacture of both cast and forged rolling mill rolls.*

Our Synergy 100 shell microstructure consists of primary and secondary carbides in a matrix of tempered martensite, enhanced by proprietary heat treatment, producing superior wear resistance for the most demanding applications.

Synergy 100 work rolls are manufactured with nodular iron cores to withstand the loading, bending and shifting required by today's hot strip mills.

## Synergy 100

- Cast HSS work rolls
- Hot strip mill applications
- Cold mill applications
- Double poured bi-metallic work roll
- High Speed Steel (HSS) shell material
- Nodular iron core material
- Centrifugal Spin Casting Process
- Proprietary heat treatment
- **SUPERIOR WEAR RESISTANCE**
- **SUPERIOR OXIDE LAYER FORMATION FOR IMPROVED STRIP QUALITY**
- **EXTENDED MILL CAMPAIGNS AND REDUCED STOCK REMOVAL**

# Specifications

## Cast HSS Mechanical Properties

	Barrel	Journals & Axis
Property		Nodular Core
Tensile Strength - MPa	800 -1,200	400 - 550
Hardness - Ld	790 - 850	500 - 585

HSS 100 rolls are built for extended mill campaigns.

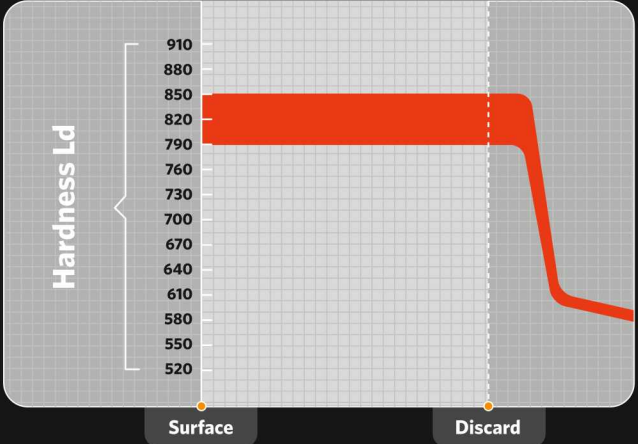
## Chemical Analysis and Hardness Range

(WT%)

C	Si	Mn	Ni	Cr	Mo	V	W
1.5 / 2.5	0.50 / 1.0	0.25 / 0.75	.1 / 1.0	3.0 / 9.0	3.0 / 9.0	3.0 / 6.0	0 / 6.0

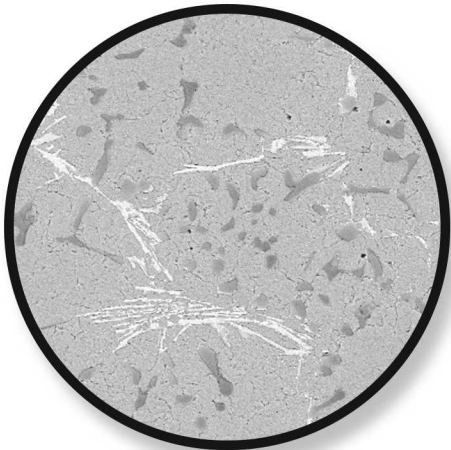
Chemical analysis can be customized for specific mill applications.

## Hardness vs. Depth



Synergy 100 maintains excellent hardness over depth for extended wear performance.

SYNERGY 100  
MICROSTRUCTURE  
CONSISTS OF PRIMARY  
AND SECONDARY  
CARBIDES IN A  
MATRIX OF TEMPERED  
MARTENSITE.



SEM and optical  
metallography reveal a fine  
dispersion of Cr, Mo and V-rich  
carbides for optimal  
roll performance.





---

## The next generation in Cast HSS rolls.

---

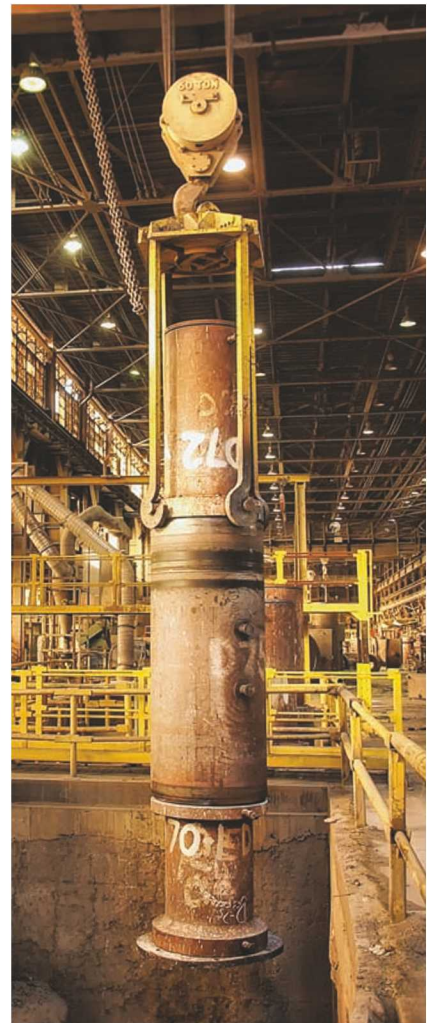
Synergy 100 represents a convergence of technology, capability and service that provides rolling mills around the world with the best possible opportunity for success.

### *Synergy 100 Series*

Synergy 100 grades can be tailored to application-specific needs depending on mill type, stand, product being rolled, and any special considerations. Our integrated manufacturing capabilities give us the flexibility to deliver what you need, when you need it.

### *Technical Service*

Every one of these new products comes with the WHEMCO advantage: an integrated, U.S.-based supply chain that delivers the industry's best technical service with every product. There's no company in the industry with more technical resources in the field than WHEMCO. Our engineers will work with you to evaluate product performance and optimize quality. As you plan for the future, count on the endless resources of WHEMCO and United Rolls to get you there.





#### **WHEMCO, Inc.**

5 Hot Metal Street  
Suite 300  
Pittsburgh, PA 15203-2351  
Ph: 412-390-2700  
Fax: 412-390-2737  
Email: [whsales@whemco.com](mailto:whsales@whemco.com)  
[www.whemco.com](http://www.whemco.com)

*WHEMCO, Inc. is wholly owned by Park Corporation, a private company headquartered in Cleveland, Ohio. WHEMCO was founded in 1983 and is headquartered in Pittsburgh, Pennsylvania. The company is a consolidation of North America's leading mill builders and roll manufacturers including Mesta Machine, Blaw Knox Mill and Foundry, Mackintosh Hemphill, Teledyne Ohio Steel, Beth Forge, Centec and United Foundries. All WHEMCO companies are ISO 9000 certified.*

#### **WHEMCO-STEEL CASTINGS, INC.**

Midland, PA  
*Cast Steel Rolls, Slag Pots, Castings, Coiler Drums*  
West Homestead, PA  
*Machining and Heat Treating of Rolls and Castings*

#### **WHEMCO-OHIO FOUNDRY, INC.**

Lima, OH  
*Spun Cast Iron and High Chrome Iron Rolls, Static Cast Iron Rolls*

#### **LEHIGH HEAVY FORGE CORPORATION**

Bethlehem, PA  
*Forged Steel Work and Back Up Rolls, Ship Shafts, Nuclear Reactor Components, Billets, Large Discs, Large Commercial Forgings*

#### **LEHIGH SPECIALTY MELTING, INC.**

Latrobe, PA  
*Bottom Poured Carbon and Alloy Ingots*

#### **ERIE FORGE & STEEL, INC.**

Erie, PA  
*Ship Propulsion Shafting, Large Forged Products*

#### **JOHNSTOWN SPECIALTY CASTINGS, INC.**

Johnstown, PA  
*Castings, Long Product Rolls, Sleeves, Mill Liners*

#### **UNITED ROLLS, INC.**

Canton, OH  
*Spun Cast Iron and High Chrome Iron Rolls, Cast HSS Work Rolls, Spun Cast Chrome Steel and Cast HSS Rougher Rolls*