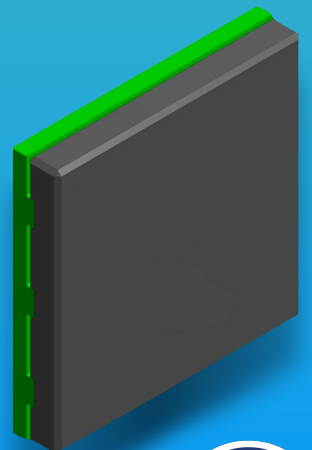
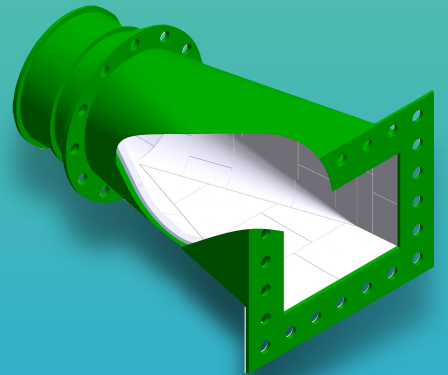
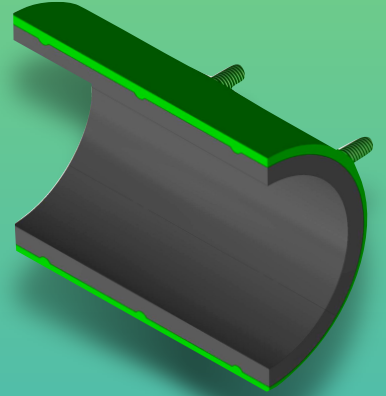
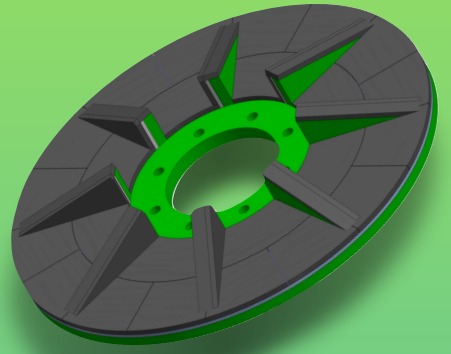


# N2W

*Winning The Battle Against Wear*  
Components - Systems - Standard Products



## Introducing N2W™

The Highest Strength & Most Reliable Connection For Non-Weldable To Weldable Materials

### Typical Industries



Fossil Fuel Power Plants

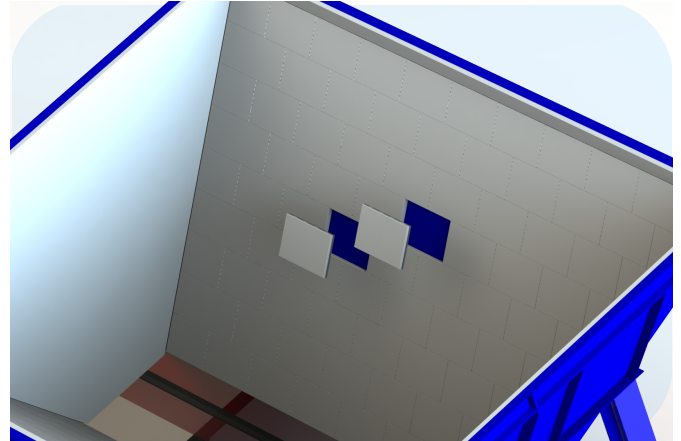


Oil & Gas Exploration

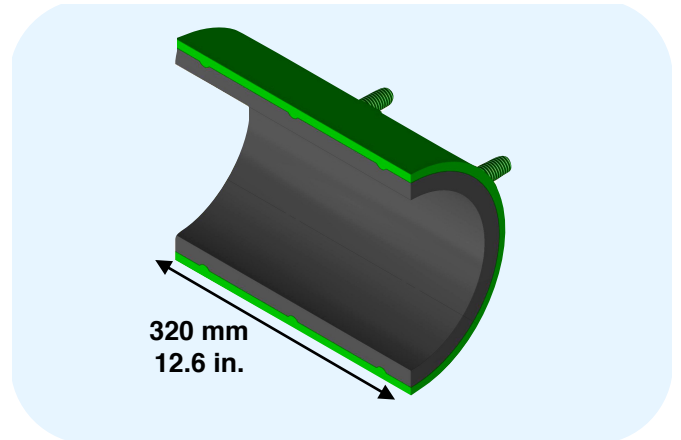


Cement & Clinker Production

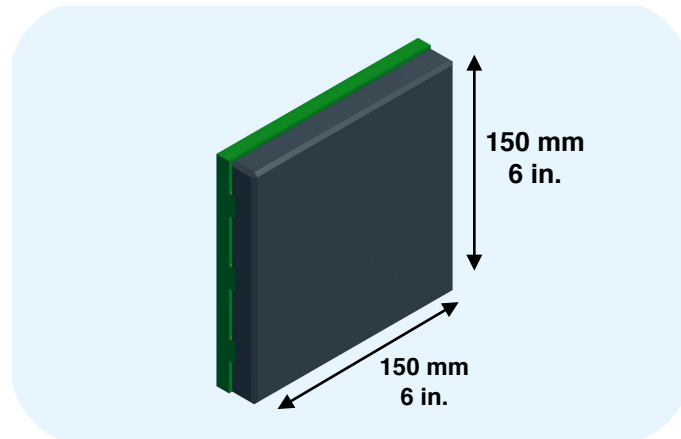
### Typical Configurations



Liners for Chutes & Hoppers



Curved & Helical Segments

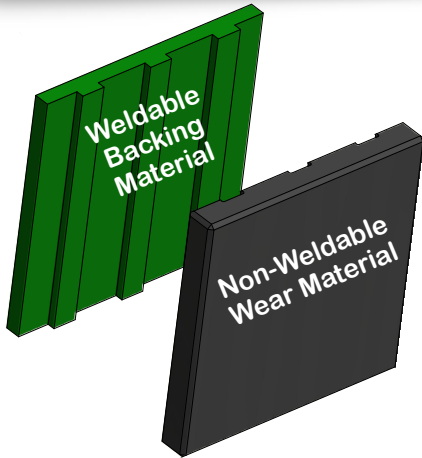


Standard Wear Tiles



## N2W™ Technology

**Combining Engineered Wear Components With Friction Stir Joining Transforms Impossible Into Possible**



- ◆ N2W utilizes *patent pending* technology to reliably and securely attach non-weldable materials to weldable materials.
- ◆ N2W can accommodate large section sizes and complex shapes.
- ◆ Targeted for high wear applications, N2W eliminates threaded plugs, thru holes and adhesives.
- ◆ Rated for 800°C and tested to 150MPa, easily exceeding currently available technology.

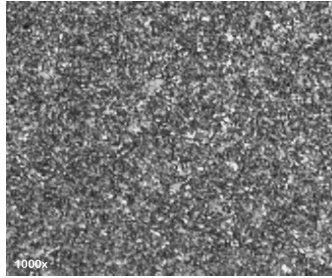
- ◆ N2W Technology combines Friction Stir Joining, engineered features in the non-weldable wear materials and weldable backing materials.
- ◆ Friction Stir Joining is a solid state process based upon patented, high temperature FSW technology.
- ◆ Specially shaped CBN tips, suitable for the high temperatures and pressures the process requires, are used in processing N2W.



- ◆ N2W is produced with dedicated machinery and tooling specifically designed and manufactured for N2W.
- ◆ Processing is precisely monitored and controlled by thermocouples, liquid cooled tool holders, wireless telemetry and inert gas shrouding.
- ◆ Engineered materials and processes produce consistent and repeatable products of the highest quality.

## N2W™ Wear Materials

**Standard & Application Specific Wear Materials  
Engineered For The Highest Levels Of Performance**



### CM6F

Sub-Micron Grain Size Cemented Carbide  
Extreme Abrasion & Wear Resistance

N2W

N2W Wear Material

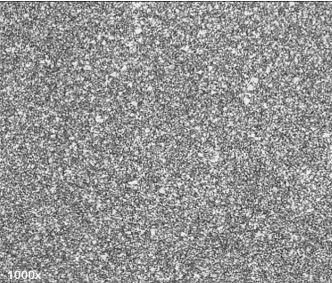


### CM10F

Sub-Micron Grain Size Cemented Carbide  
High Abrasion & Wear Resistance

N2W

N2W Wear Material

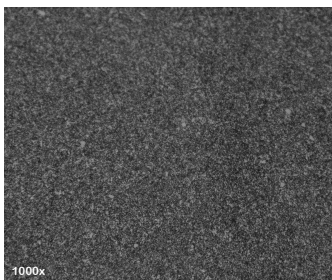


### CM15F

Sub-Micron Grain Size Cemented Carbide  
High Wear Resistance / Toughness / Impact

N2W

N2W Wear Material

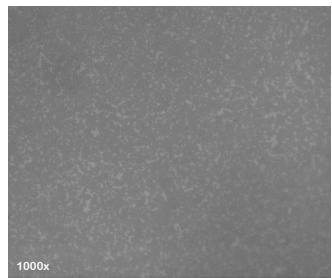


### CM10N

Medium Grain Size Cemented Carbide  
Medium Wear / Toughness / Impact Resistance

N2W

N2W Wear Material



### CM13C

Coarse Grain Size Cemented Carbide  
Extreme Toughness / Impact Resistance

N2W

N2W Wear Material

- ◆ N2W Carbide Wear Materials are engineered to provide long life and high performance.
- ◆ N2W Carbide Wear Materials are processed using the latest sinter-hip technology for maximum reliability.
- ◆ All of our N2W wear materials are subjected to rigorous quality standards

- ◆ Standard carbide grades for a wide range of applications.
- ◆ True sub-micron grain size grades for highest possible wear resistance.
- ◆ Medium and coarse grain size grades for high impact resistance.
- ◆ Custom tailored carbide grades available on a “Per Order” basis.

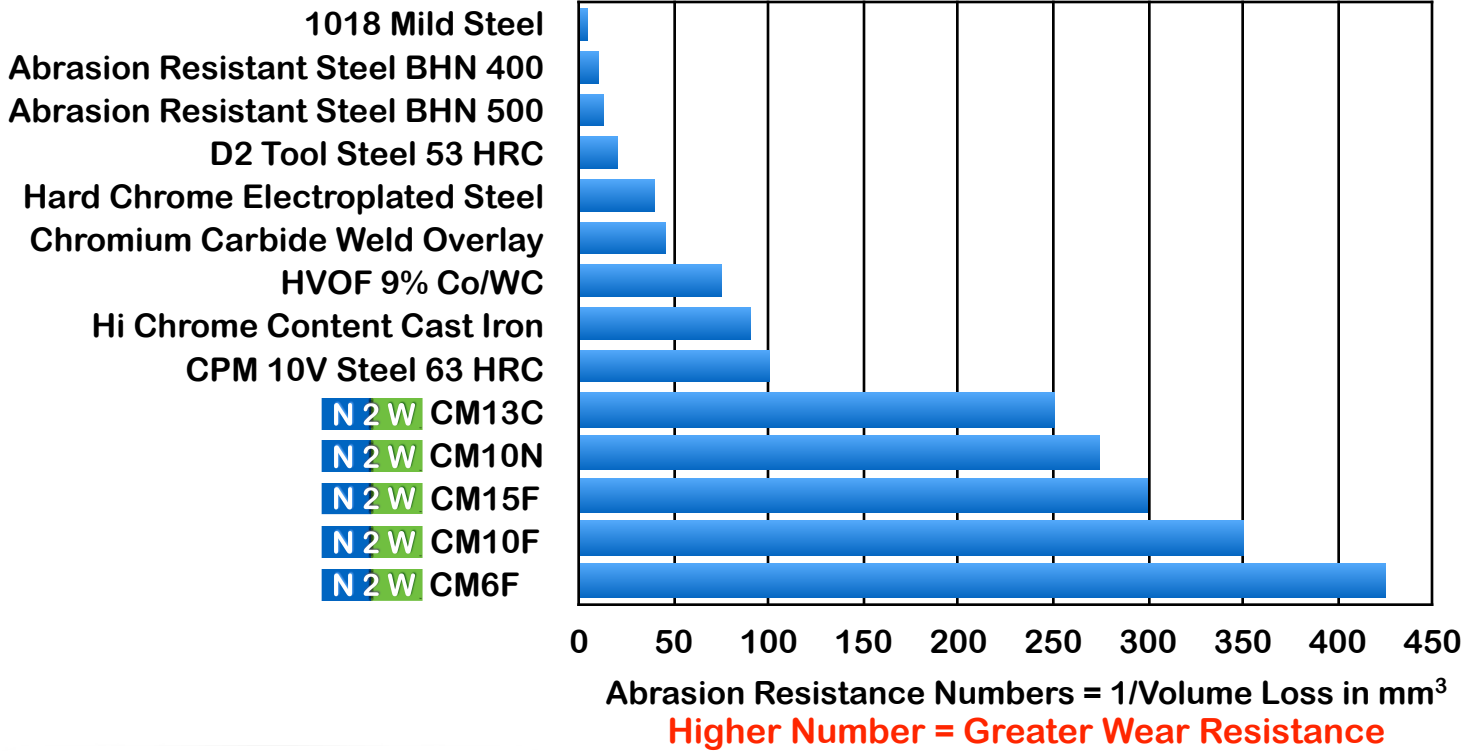
- ◆ N2W Ceramic Wear Materials available on “Per Order” basis.
- ◆ Alumina and Silicon Carbide for high hardness, corrosion resistance and high temperature applications.
- ◆ Alumina and Silicon Carbides in wide variety of standard grades.

## N2W™ Wear Material Test Results

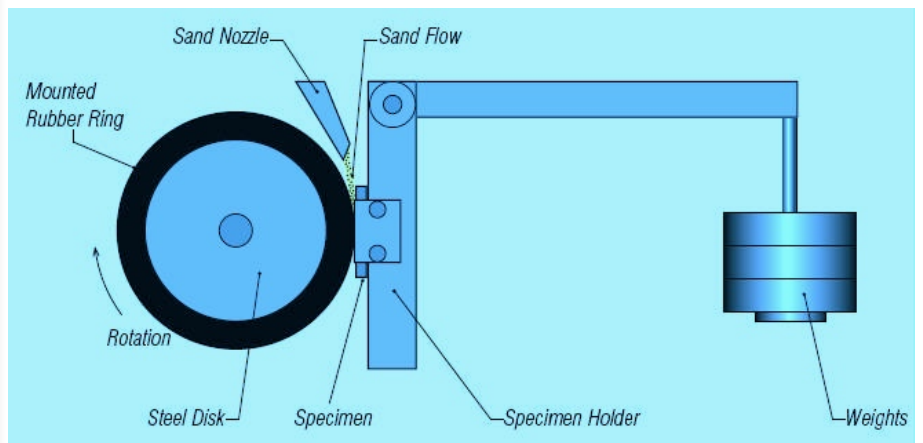
### ASTM G65 Abrasion Resistance Testing

### N2W Wear Materials / Commonly Used Materials

#### N2W Wear Material Abrasion Resistance Comparison



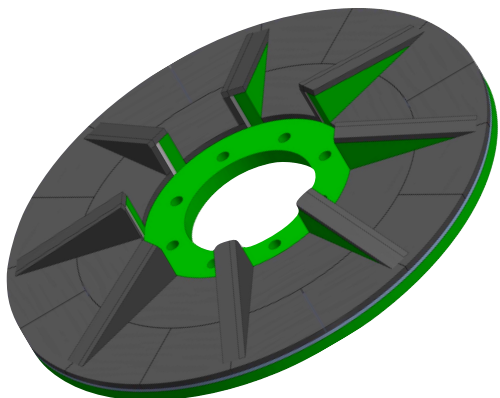
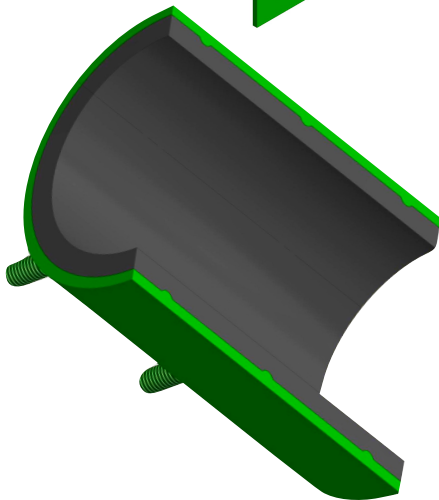
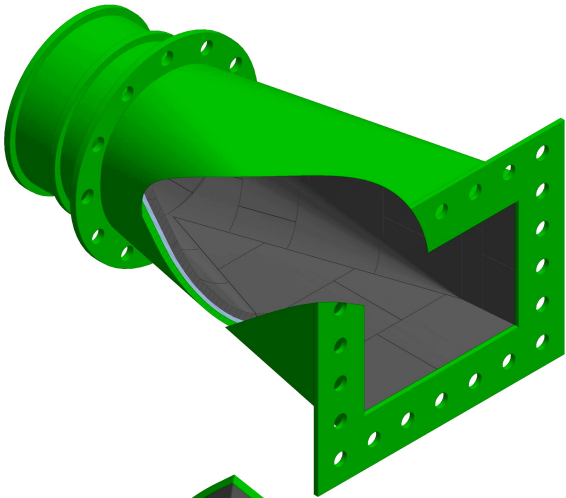
- ◆ The ASTM G65 test is a standardized method used to determine the abrasion resistance of materials.
- ◆ The test specimen is mounted and a specified weight is applied to produce a force against a rotating rubber wheel while sand is applied between the wheel and test specimen.
- ◆ Abrasion resistance is determined by weighing the test specimen before and after a set number of revolutions to measure total material loss.



# ***N2W™ Engineered Solutions***

***Application Specific, Custom Configurations  
Engineered For The Highest Performance***

## ***Custom Engineered N2W Examples***



- ◆ CMI provides custom, application specific N2W designs based on our customer's requirements.
- ◆ Examples of a few of these designs are illustrated at the left from top to bottom:
  1. Coal Burner Nozzle
  2. Half Round Pipe Section
  3. Coal Fan (Whizzer)
- ◆ N2W Technology allows large sections of cemented carbide to be securely applied in areas impossible with standard methods.
- ◆ Individual N2W components can be joined together to create large, easily replaced panels and components.

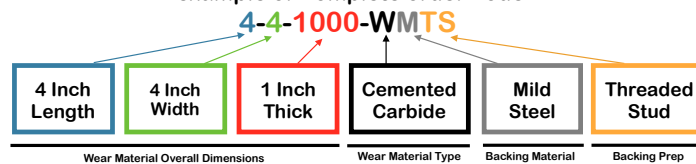


## Standard Product Ordering Codes & Weights

Inch Product Code	Wear Surface Length - Inches	Wear Surface Width - Inches	Wear Surface Thickness - Inches	Total Weight in Pounds Carbide with MS Backing	Total Weight in Pounds Alumina with AL Backing
4-2-375-XXXX	4.000	2.000	.375"	1.98	0.89
4-2-500-XXXX	4.000	2.000	.500"	2.50	1.01
4-2-750-XXXX	4.000	2.000	.750"	3.55	1.26
4-2-1000-XXXX	4.000	2.000	1.000"	4.60	1.51
4-4-375-XXXX	4.000	4.000	.375"	3.95	1.78
4-4-500-XXXX	4.000	4.000	.500"	5.00	2.02
4-4-750-XXXX	4.000	4.000	.750"	7.11	2.52
4-4-1000-XXXX	4.000	4.000	1.000"	9.21	3.02
6-4-375-XXXX	6.000	4.000	.375"	6.11	2.73
6-4-500-XXXX	6.000	4.000	.500"	7.69	3.11
6-4-750-XXXX	6.000	4.000	.750"	10.85	3.85
6-4-1000-XXXX	6.000	4.000	1.000"	14.01	4.60
6-6-500-XXXX	6.000	6.000	.500"	11.55	4.67
6-6-750-XXXX	6.000	6.000	.750"	16.29	5.79
6-6-1000-XXXX	6.000	6.000	1.000"	21.03	6.91
8-6-500-XXXX	8.000	6.000	.500"	15.41	6.23
8-6-750-XXXX	8.000	6.000	.750"	21.72	7.72
8-6-1000-XXXX	8.000	6.000	1.000"	28.04	9.21
<b>Wear Surface Material Codes</b> First Position After Product Code					
W	Cemented Carbide				
A	Alumina Ceramic				
<b>Backing Material Codes</b> Second Position After Product Code					
M	Mild Steel				
A	Alloy Steel				
S	Stainless Steel				
AL	Aluminum				
<b>Backing Preparation Codes</b> Third Position After Product Code					
F	Flat				
TS	Threaded Stud				

All dimensions and weights shown are nominal overall

example of complete order code





CMI provides a broad spectrum of industrial customers with an in-depth knowledge of engineered product development and materials. With decades of experience serving corporate clients, CMI engineers incorporate steel, cemented carbides, ceramics and synthetic diamond in a variety of parts and products tailored to meet a wide range of industrial needs. CMI provides consulting and products to industries such as steel manufacturing, material handling, oil and gas, power generation, fluid handling, mining and construction and crystal growth. We strive to add value at every step in the process while focusing on new and innovative ways to enhance our customer's operations.

## **CMI**

4925 Galaxy Parkway, Unit M  
Warrensville Heights, OH 44128  
Ph: 216-378-9277 / Fax: 216-378-9278  
Web: [www.cmiunlimited.com](http://www.cmiunlimited.com)