



Thermal spray powders

# Höganäs – expertise, quality and awareness for customers

Whenever ideas are to be turned into successful products or applications, the first step is to find the appropriate material supplier. Hardly any other company worldwide meets its customers' needs in terms of materials as precisely as we can.

Höganäs is the undisputable world leader in iron and metal powders. Ever since our beginning in 1797, we have been at the forefront of what has been technically possible at the time. Together with our customers, we develop tomorrow's solutions for a myriad of applications.

By acquiring H.C. Starck's Surface Technology & Ceramic Powders division, Höganäs has gained access to a valuable product portfolio consisting out of high quality surface coating, ceramic and metal powders. With innovativeness, a clear commitment to quality, and extensive technological expertise, we work side by side with our customers along the entire value chain. This close cooperation allows us to support our customers as an expert partner in development and solution creation.

## The key benefits of working with us

### On-target

Our close cooperation with our customers enables us to produce according to customer specifications. Our powders meet the highest quality demands and are consistent from lot to lot. We have gained profound experience in manufacturing powders over many decades and provide extensive know-how in manufacturing.

### Innovation

We continuously work on innovative products of tomorrow. For this purpose, we put special focus on research and development. These include innovative high-tech materials, precisely controlled production and customer-specific product solutions.

### Customer proximity worldwide

We have detailed knowledge of our markets. With sales offices and production sites located across Europe, America and Asia we are represented throughout the world and available for our customers both nationally and globally.

### Sustainability

Our actions are related to a strong sense of responsibility toward mankind and the environment. Accordingly, we consider customer relationships as sustainable and responsible partnerships.



Please visit us on our website at [www.hoganas.com](http://www.hoganas.com) for further information

# High-quality partnerships

For more than 40 years, *AMPERIT*<sup>®</sup> stands for high quality and reliability in the global thermal spray powder market.

Our business is defined by our customer focus and customer partnerships, which have made us one of the most successful spray powder manufacturers in the world. In order to meet customers' needs in coating processes, we pay particular attention to specific requirements of controlled chemistries, precisely defined grain forms and morphologies, as well as adjusted particle size distributions.

Over the past few decades, we have acquired the necessary knowledge of how to develop new materials and recycling processes, and how to improve the products we provide to our customers. Comprehensive application engineering offers a unique advantage for our products, ranging from powder development to complete coating solutions. Our experts provide customers with technical assistance and support, and a wealth of knowledge in materials and coating technology.

Our product portfolio covers the markets' needs for all major applications in thermal spraying:

- Carbides
- Oxides
- MCrAlYs
- Abradables
- Molybdenum and other pure metals and alloys

Our products are tailored for specific processes, such as for HVOF, HVAF or Plasma spraying.



Long-term partnerships with OEMs (original equipment manufacturers) and manufacturers of spraying systems as well as joint research and development activities have made us an experienced and reliable partner for material supply.

Höganäs and H.C. Starck's former surface coating division are now stronger together. The key benefits of our joint organisation include:

- Expanded product portfolio
- Extensive application know-how
- Enlarged product development capabilities
- Expanded global sales network



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for further information

# Customer-oriented application engineering and development

Our modern thermal spray and specialized metallographic laboratories represent top-quality application engineering. Modern, small-sized production facilities for agglomeration and sintering, and the latest atomization technology allow us to produce based on our customer's request.

Our pilot spray plant – the heart of our thermal spray application technology – has the ability to test and to optimize parameters and coatings for customers. In addition, it develops processing recommendations from the results. The plant is fully-equipped with spray systems for all major spraying processes. All coatings are tested on their corrosion, wear and cavitation in order to assist developing and completing coating solutions for various applications.

Spraying equipment includes:

- HVOF (JP-5000®, DJ Hybrid)
- Plasma (F4, 3/7/9 MB)
- Additional equipment (e.g. HVOF) is available on request

Test equipment includes:

- Corrosion tests (Salt Spray ASTM B117)
- Cavitation test
- Bond strength test
- Surface roughness measurement
- Wear tests (ASTM G65 method B, Pin on Disk, JIS H8503)
- Hardness measurement (Micro-, Macrohardness)
- Porosity measurement
- Elastic modulus

## **AMPERIT® spray lab**

The state-of-the-art equipment of our laboratory enables us to develop and to optimize our thermal spray powders. Furthermore, it allows us to establish spray parameters and to assess coating properties.

## **Development**

Standard powders are modified and new powders are designed in small production units. Our competency in modifying standard powders plays a significant role in terms of fast and economic customization along with prompt testing on a smaller-scale basis. Innovative materials – specifically geared to market needs – are developed to offer unique solutions to meet even the most challenging requirements.

Small-scale production equipment includes:

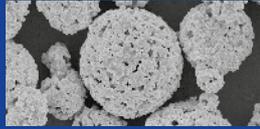
- Small spray dryers
- Small sintering furnaces
- Mixing, milling and classification equipment
- Small atomizer (for metals and alloys)



# Product values

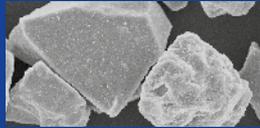
## AMPERIT® CARBIDES – for wear protection

Our carbides provide maximum reliability through extraordinary wear resistance, excellent bonding properties and low porosity. Outstanding product characteristics make AMPERIT carbides suitable for demanding requirements of e.g. steel, paper, oil and gas applications.



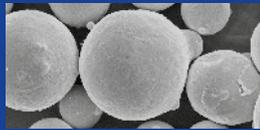
## AMPERIT® OXIDES – for wear protection, chemical resistance and heat protection

Through outstanding wear protection, chemical and thermal stability, our oxides offer maximum reliability even at extreme temperatures. AMPERIT oxides are well established e.g. in thermal barrier coatings in aviation, industrial gas turbines or in the printing industry.



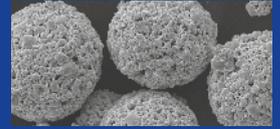
## AMPERIT® MCrAlYs – for high temperature applications

AMPERIT MCrAlY powders are used for coatings protecting parts from oxidation. Moreover, they are applied as a bond coat for thermal barrier coatings (TBC). They are essential for an excellent performance and reliability of highly stressed turbine parts.



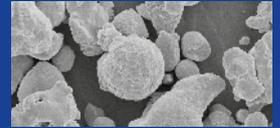
## AMPERIT® MOLYBDENUM – for technological solutions

AMPERIT molybdenum's excellent product characteristics, e.g. exceptional sliding properties, low friction coefficient, high sliding wear resistance and ductility, make this thermal spray powder exceedingly suitable for demanding automotive applications.



## AMPERIT® PURE METALS, ALLOYS & OTHERS – for wear resistance

AMPERIT metals and alloys are used in a wide variety of applications ranging from simple bond coats for thermally sprayed oxide coatings to functional coatings. The former provides effective protection against corrosion – even in extreme conditions.



## AMPERBRADE® – for abrasives

AMPERBRADE spray powders are being used for abrasible coatings for clearance control in stationary and aviation turbines to increase turbine efficiency. Our portfolio includes products for low temperature applications (e.g. AlSi) as well as full ceramic formulations for the toughest turbine operating environments.



	Fused and crushed	Sintered and crushed	Agglomerated and sintered	Gas atomized	Water atomized	Spheroidized	Blended
Powder type							
Process	Fusing in arc furnaces, followed by cooling and crushing	Sintering of raw materials, crushing	Spray drying of a suspension consisting of fine powders and organic binder and subsequent sintering	Atomizing molten metal or alloy with high pressure gas (Ar, N <sub>2</sub> ) stream into a chamber	Atomizing with water into a chamber and subsequent drying	Feeding of agglomerates into a plasma flame to produce spherical particles	Mixing of 2 or more powders
Characteristics	Blocky, irregular, dense	Blocky, irregular, relatively dense	Spherical, porous, constituents homogeneously distributed	Spherical, dense, high purity, low oxygen content	Irregular, dense, increased oxygen content compared to gas atomized	Spherical, porous or hollow, partly open (shells)	Different morphologies, segregation possible
Examples	Al <sub>2</sub> O <sub>3</sub> ; Cr <sub>2</sub> O <sub>3</sub> ; ZrO <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub>	WC-CoCr	WC-CoCr; Cr <sub>3</sub> C <sub>2</sub> -NiCr; ZrO <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub>	MCrAlY; Ni-, Co-base alloys; NiAl	NiCr; NiAl	ZrO <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub>	NiSF + WC-Co; Mo + NiSF; Cr <sub>3</sub> C <sub>2</sub> -NiCr AlSi-Polys

# Examples of applications

Our customer-specific products become more and more indispensable in terms of both innovative and challenging applications and new markets.

## Gas turbines for aerospace and power generation

*AMPERIT*<sup>®</sup> Yttrium stabilized zirconium oxide coatings combined with a MCrAlY bond coat are extremely resistant to high temperatures, thermal cycling and hot gas corrosion. Those properties make them well-suited for high-temperature applications such as aviation and industrial gas turbines or combustion engines.

Furthermore, *AMPERIT* WC-Co and Cr<sub>3</sub>C<sub>2</sub>-NiCr can be for example applied for wear resistant coatings of rotating parts operating in very demanding turbine environments.

## Steel

Typical applications for tungsten carbide-based spray powders include rolls for galvanizing lines in the steel industry. Cermets for coatings on furnace rolls are part of our specialty portfolio as well.

## Oil & gas

High standards in wear, erosion, abrasion, and corrosion resistance are the main reasons why Höganäs' tungsten carbides, metals and alloys are highly used in the oil and gas industry. Our tungsten carbide products make it possible for applications such as mud pump rotors, ball and gate valves, plungers and piston rods to generate excellent results in extreme conditions such as high water pressure and sub-sea environments, and permanent NaCl exposure.

## Pulp and paper / printing

Wear resistance is required across the entire range of pulp and paper production. Corrosion makes this production process particularly difficult. Therefore, Höganäs offers ceramic or carbide powders for wear-resistant paper roll coatings. Laser engravable Cr<sub>2</sub>O<sub>3</sub> coatings for printing rolls meet all coating layer requirements of this industry.



### Automotive

Driven by the growing demand for safe, reliable, and fuel saving vehicles, the automotive industry develops and uses new processes and materials. Thermal spray powders can help to reduce friction between piston rings and cylinder bores. Excellent examples are our Mo and NiSF powders for piston rings, or our  $\text{Cr}_3\text{C}_2$ -NiCr and T-800 for EGR valves.

### Solid oxide fuel cells (SOFC)

Our oxide powders for SOFC applications comprise customized and common oxides, e.g. LSM, LSCF and GCO for electrodes and interconnector protection applications. Furthermore, we provide electrolyte powders, e.g. Y- and REO-stabilized  $\text{ZrO}_2$ . All powders for SOFC applications are available as spray powders and as fine, sinteractive powders for pastes and slurry coatings. Höganäs' portfolio also comprises SOFC pastes which are available upon request.



# Product catalogue

In the following, you will find more information on our comprehensive product portfolio.

» You have not found what you are looking for? Please contact us!

**AMPERIT® CARBIDES**  
for wear protection

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**AMPERIT® OXIDES** for wear protection,  
chemical resistance and heat protection

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**AMPERIT® MCrAlYs**  
for high temperature applications

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**AMPERIT® MOLYBDENUM**  
for technological solutions

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**AMPERIT® Pure metals,  
alloys & others**

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**AMPERBRADE®** for abrasives

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**Aerospace approvals  
and turbine specifications**

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**AMPERIT® Units**

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# AMPERIT® | CARBIDES

for wear protection

## AMPERIT CARBIDES

AMPERIT	Particle size in µm	Chemistry / powder type	Approvals	Typical properties and applications	
507.059	30/5	WC-CoCr <sup>(1-6)</sup> 86-10-4 Agglomerated and sintered		<ul style="list-style-type: none"> <li>HVOF, HVOF</li> <li>Nanometric WC</li> <li>For nano structured coatings with superior surface finish</li> <li>For applications in paper and foil industry</li> </ul>	
507.074	45/15				
<b>NEW</b> 508.072	38/10	WC-CoCr <sup>(1-6)</sup> 86-10-4 Agglomerated and sintered		<ul style="list-style-type: none"> <li>HVOF</li> <li>Coarse WC</li> <li>Hydro, Oil &amp; Gas, pulp and paper</li> <li>Coatings with very good cavitation and impact resistance</li> </ul>	
512.059	30/5	WC-Co <sup>(1-6)</sup> 88-12 (Low Carbon) Agglomerated and sintered		<ul style="list-style-type: none"> <li>HVOF</li> <li>Coarse WC</li> <li>C: 3.6 - 4.1 %</li> <li>Used for Zn bath rolls in Continuous Galvanizing Lines (CGL)</li> </ul>	
512.074	45/15				
512.088	53/20				
515.001	45/22	WC-Co <sup>(1-6)</sup> 88-12 Sintered and crushed		<ul style="list-style-type: none"> <li>APS</li> <li>Very coarse WC</li> <li>C: 3.9 – 4.3 %</li> <li>Hard, dense coatings with good abrasion, erosion and sliding wear resistance</li> <li>Used for landing gears in the aviation industry.</li> </ul>	
515.002	90/45		MTS 1055		
515.074	45/15		AMS 7879		
515.203			BMS 10-67 Type 1		
515.400			PM 819-1 + PM 819-53		
515.830					
515.851			DMS 2049 Type 2		
515.949					
518.001	45/22	WC-Co <sup>(1-6)</sup> 88-12 Agglomerated and sintered		<ul style="list-style-type: none"> <li>HVOF, APS, HVOF</li> <li>Medium WC</li> <li>Max. operating temperature 500 °C</li> <li>Hard, dense coatings with good abrasion, erosion and sliding wear resistance</li> <li>Smooth coatings with fine microstructure and high bond strengths</li> <li>Low oxidation and corrosion resistance</li> <li>Used for general wear, paper rolls, wire drawing equipment, fan and compressor blades, pump seals and housing, machine parts, etc.</li> </ul>	
518.002	90/45				
518.054	45/10				
518.059	30/5				
518.063	75/45				
518.072	38/10				
518.074	45/15				
518.088	53/20				
518.280					GE B50TF27 Cl.A
518.768					GE B50TF27 Cl.B
518.874		PM 819-25			
519.059	30/5	WC-Co <sup>(1-6)</sup> 88-12 Agglomerated and sintered		<ul style="list-style-type: none"> <li>HVOF, HVOF</li> <li>Fine WC</li> <li>Higher apparent density</li> <li>Designed for kerosene guns</li> <li>See AMPERIT 518</li> <li>First choice for corrugating rolls</li> </ul>	
519.072	38/10				
519.074	45/15				

## AMPERIT® CARBIDES

AMPERIT	Particle size in µm	Chemistry / powder type	Approvals	Typical properties and applications
526.059	30/5	WC-Co <sup>(1)</sup> 83-17 Agglomerated and sintered	MTS 1058 RRMS 40032 (formerly: MSRR 9507/1) RRMS 40015 (formerly: MSRR 9507/69) PWA 36331-1 BAMS 561-001 Rev. Type 1 DMR 33-019 DHMS C4.19 BMS 10-67 Type 1 DMS 2049 Type 5	<ul style="list-style-type: none"> <li>• HVOF, HVOF, APS</li> <li>• Coarse WC</li> <li>• Max. operating temperature 500 °C</li> <li>• Higher ductility than WC-Co 88-12 due to higher Co content</li> <li>• Hard, dense coatings with low sliding wear and high impact resistance</li> <li>• Protection against fretting and abrasion</li> <li>• Low oxidation and corrosion resistance</li> <li>• Used in aviation applications (fan and compressor blades, mid-span stiffeners, flap tracks, etc.), extrusion dies, glass industry, paper mill rolls, pump parts, wire drawing equipment, etc.</li> </ul>
526.062	53/10			
526.074	45/15			
526.077	63/32			
526.088	53/20			
526.223				
526.350				
526.382				
526.454				
526.784				
526.729				
526.781				
526.831				
526.895				
528.764		WC-Co <sup>(1)</sup> Agglomerated and sintered	GE B50TF295 Cl.A	See <i>AMPERIT</i> 518
529.072	38/10	WC-NiMoCrFeCo <sup>(2, 7, 9, 10)</sup> 82-18 Agglomerated and sintered		<ul style="list-style-type: none"> <li>• HVOF, HVOF</li> <li>• Medium WC</li> <li>• Alternative to WC-CoCr</li> <li>• For very dense and ductile coatings with good abrasion, erosion and sliding wear resistance</li> <li>• Excellent corrosion resistance in seawater, diluted mineral and organic acids</li> <li>• Used for parts applied in marine environments, petrochemical and off-shore applications, etc.</li> </ul>
529.074	45/15			
<b>NEW</b> 531.074		WC-FeNiCrMoCu 85-15 Agglomerated and sintered		<ul style="list-style-type: none"> <li>• HVOF, HVOF</li> <li>• Fine WC</li> <li>• Alternative to 86-10-4</li> <li>• Cavitation resistance in seawater</li> <li>• Excellent corrosion resistance in sea water</li> </ul>
538.074	45/15	WC-WB-Co 60-30-10		<ul style="list-style-type: none"> <li>• Gas fired HVOF</li> <li>• Medium WC</li> <li>• Wear and corrosion protection in molten metal</li> <li>• Dense coatings</li> <li>• Used for Zn bath rolls in Continuous Galvanizing Lines (CGL)</li> <li>• See also <i>AMPERIT</i> 512</li> </ul>
<b>NEW</b> 539.054	45/10	WC-WB-CoCr 60-30-5-5 Agglomerated and sintered		<ul style="list-style-type: none"> <li>• Gas fired HVOF</li> <li>• Medium WC</li> <li>• Wear and corrosion protection in molten metal</li> <li>• Used for Zn bath rolls in Continuous Galvanizing Lines (CGL)</li> <li>• See also <i>AMPERIT</i> 512</li> </ul>

## AMPERIT® CARBIDES

AMPERIT	Particle size in µm	Chemistry / powder type	Approvals	Typical properties and applications
<b>NEW</b> 543.059	30/5	WC-CrC-Ni 42-42-16 Agglomerated and sintered		<ul style="list-style-type: none"> <li>• HVOF, HVOF</li> <li>• Fine WC</li> <li>• Max. operating temperature 750 °C</li> <li>• Dense and ductile coatings with high cavitation resistance for mud rotors, pump and valve parts, piston rods, rolls</li> <li>• Economical alternative to WC-CoCr for selected applications</li> <li>• Hard chrome replacement</li> </ul>
<b>NEW</b> 543.074	45/15			
547.002	90/45	WC-Ni <sup>(2, 9, 10)</sup> 88-12 Agglomerated and sintered		<ul style="list-style-type: none"> <li>• HVOF, HVOF</li> <li>• Fine WC</li> <li>• Max. operating temperature 500 °C</li> <li>• Higher corrosion resistance than WC-Co and better ductility</li> </ul>
547.059	30/5			
547.074	45/15			
547.088	53/20			
551.059	30/5	WC-CrC-Ni <sup>(2, 9, 12)</sup> 73-20-7 Agglomerated and sintered		<ul style="list-style-type: none"> <li>• HVOF</li> <li>• Fine WC</li> <li>• Max. operating temperature 750 °C</li> <li>• Higher oxidation and corrosion resistance than pure WC-Ni-based coatings</li> <li>• Smooth coatings with fine microstructure and high bond strengths</li> </ul>
551.074	45/15			
551.088	53/20			
554.067	15/5	WC-CoCr <sup>(1 - 6)</sup> 86-10-4 Sintered and crushed		<ul style="list-style-type: none"> <li>• HVOF, HVOF, APS</li> <li>• Medium WC</li> <li>• Max. operating temperature 500 °C</li> <li>• CoCr matrix shows higher corrosion and abrasion resistance than Co matrix</li> <li>• Useable in water based solutions and wet corrosive environments</li> <li>• Hard chrome replacement</li> <li>• Used for rolls, ball valves, oil field equipment, etc.</li> <li>• Used for hydro</li> </ul>
554.071	25/5			
554.074	45/15			
555.074	45/15	WC-CrC-Ni <sup>(2, 9, 12)</sup> 73-20-7 Agglomerated and sintered		<ul style="list-style-type: none"> <li>• HVOF</li> <li>• Medium WC</li> <li>• Max. operating temperature 750 °C</li> <li>• Higher oxidation and corrosion resistance than pure WC-Ni-based coatings</li> <li>• Dense coatings with fine microstructure and high bond strengths</li> <li>• Used for mud pump rotors and general machinery</li> </ul>
556.059	30/5	WC-CoCr <sup>(1 - 6)</sup> 86-10-4 Agglomerated and sintered		<ul style="list-style-type: none"> <li>• HVOF, HVOF</li> <li>• Sub-micron WC</li> <li>• Extremely smooth surface finish achievable</li> <li>• Used for paper processing</li> <li>• See <i>AMPERIT</i> 558</li> </ul>
556.074	45/15			
557.059	30/5	WC-CoCr <sup>(1 - 6)</sup> 86-10-4 Agglomerated and sintered		<ul style="list-style-type: none"> <li>• HVOF, HVOF</li> <li>• Medium WC</li> <li>• For coatings on valve components working in high pressure and salt water environments, e.g. in submarine oil&amp;gas fields</li> <li>• For cavitation resistance coatings and impact tolerance, e.g. on hydroturbine runners</li> <li>• For ductile coatings on strained and stressed machine parts, e.g. blades, knives</li> <li>• See <i>AMPERIT</i> 558 and <i>AMPERIT</i> 508</li> </ul>
557.072	38/10			
557.074	45/15			

## AMPERIT® CARBIDES

AMPERIT	Particle size in $\mu\text{m}$	Chemistry / powder type	Approvals	Typical properties and applications
558.002	90/45	WC-CoCr <sup>(1-6)</sup> 86-10-4 Agglomerated and sintered		<ul style="list-style-type: none"> <li>• HVOF, HVOF</li> <li>• Fine WC</li> <li>• Max. operating temperature 500 °C</li> <li>• CoCr matrix shows higher corrosion and abrasion resistance than Co matrix</li> <li>• Useable in water based solutions and wet corrosive environments</li> <li>• Smooth coatings with fine microstructure and high bond strengths</li> <li>• Hard chrome replacement</li> <li>• Used for paper rolls, gate and ball valves, hydraulic cylinders, compressor shafts, mud pump rotors</li> </ul>
558.052	20/5			
558.059	30/5			
558.072	38/10			
558.074	45/15			
558.088	53/20			
560.062	53/10	WC-Co 83-17 <small>(1, 2, 4, 5, 6, 9, 10)</small>		<ul style="list-style-type: none"> <li>• APS, HVOF</li> <li>• Protection against erosion and abrasion</li> <li>• Used for glass mold plungers, pump plungers and sleeves, extrusion screws, steel mill rolls, etc.</li> </ul>
560.077	63/32			
570.003	45/5	TiC Sintered and crushed		<ul style="list-style-type: none"> <li>• VPS/LPPS</li> <li>• Dense particles</li> <li>• Hard and wear resistant coatings</li> <li>• Component for blends</li> </ul>
578.059	30/5	CrC-NiCr 80/20 Agglomerated and sintered		<ul style="list-style-type: none"> <li>• HVOF, HVOF</li> <li>• Medium carbide</li> <li>• Max. operating temperature 870 °C</li> <li>• For dense oxidation and erosion resistant coatings</li> <li>• Hot gas corrosion resistant</li> <li>• Used for valve stems, turbine shafts, fuel rod mandrels, etc.</li> <li>• Hydraulic piston rods</li> </ul>
578.074	45/15			
580.002	90/45	Cr <sub>3</sub> C <sub>2</sub> Sintered and crushed		<ul style="list-style-type: none"> <li>• APS</li> <li>• Dense particles</li> <li>• Max. operating temperature 870 °C</li> <li>• Usually blended with metals or alloys</li> <li>• Hard and wear resistant coatings</li> </ul>
580.054	45/10		PWA 1304	
580.402			PWA 1306	
580.404				
584.001	45/22	Cr <sub>3</sub> C <sub>2</sub> -NiCr <sup>(2, 9, 10)</sup> 75-25 Agglomerated and sintered		<ul style="list-style-type: none"> <li>• HVOF, APS</li> <li>• Coarse CrC</li> <li>• Max. operating temperature 870 °C</li> <li>• For dense oxidation and erosion resistant coatings</li> <li>• Hot gas corrosion resistant</li> <li>• Used for valve seats, turbine components, fuel rod mandrels, etc.</li> </ul>
584.054	45/10			
584.072	38/10			
584.834			BMS 1067 Type 22	
584			HTCT 650560	
585.003	45/5	Cr <sub>3</sub> C <sub>2</sub> -NiCr <sup>(11, 12)</sup> 75-25 Blended		<ul style="list-style-type: none"> <li>• APS, HVOF</li> <li>• Coarse dense carbide</li> <li>• Max. operating temperature 870 °C</li> <li>• Good oxidation, abrasion, particle erosion, fretting and cavitation resistance</li> <li>• Hot gas corrosion resistant</li> <li>• Used in pump housing, machine parts, hydraulic valves, tooling, hot forming dies, turbine shafts, etc.</li> </ul>
585.351			RRMS 40015 (formerly: MSRR 9507/69)	
585.357			MSRR 9507/17	
585.405			PWA 1307	
585.435			AMS 7875	
585.868			PM 819-5	

## AMPERIT® CARBIDES

AMPERIT	Particle size in µm	Chemistry / powder type	Approvals	Typical properties and applications
587.072	38/10	Cr <sub>3</sub> C <sub>2</sub> -NiCr <sup>(2, 8, 9, 10)</sup> 65-35 Agglomerated and sintered		<ul style="list-style-type: none"> <li>• HVOF, HVOF</li> <li>• Coarse carbide</li> <li>• Max. operating temperature 870 °C</li> <li>• Lower hardness than 75-25 ratio</li> <li>• Dense coatings achievable</li> <li>• Used for valve seats, turbine shafts, turbine housing</li> </ul>
588.059	30/5	Cr <sub>3</sub> C <sub>2</sub> -NiCr <sup>(2, 9, 10)</sup> 75-25 Agglomerated and sintered	PWA 1364	<ul style="list-style-type: none"> <li>• HVOF, HVOF</li> <li>• Medium CrC</li> <li>• See <i>AMPERIT</i> 584</li> <li>• Designed for kerosene guns</li> </ul>
588.074	45/15			
588.088	53/20			
<b>NEW</b> 588.419				
593.059		Cr <sub>3</sub> C <sub>2</sub> -NiCr <sup>(2, 9, 10)</sup> (50/50) 90-10 Agglomerated and sintered		<ul style="list-style-type: none"> <li>• HVOF</li> <li>• Max. operating temperature 870 °C</li> <li>• Erosion resistant coatings for aerospace turbine applications</li> <li>• Used for hydraulic piston rods</li> </ul>
593.775	30/5	Sintered and crushed	GE B50TF281 Cl.A	
594.074	45/15	Cr <sub>3</sub> C <sub>2</sub> -CoNiCrAlY <sup>(1 - 6, 9, 10)</sup> 75-25 Agglomerated and sintered		<ul style="list-style-type: none"> <li>• HVOF, APS</li> <li>• Max. operating temperature 870 °C</li> <li>• Special product for hearth rolls in steel industry</li> </ul>
599.063	75/45	Mo <sub>2</sub> C Agglomerated and sintered		<ul style="list-style-type: none"> <li>• APS</li> <li>• Hard ingredient in powder blends for sliding wear protection</li> </ul>
599.074	45/15			
618.074 Green Carbides	45/15	WC-FeCrAl 85-15 Agglomerated and sintered		<ul style="list-style-type: none"> <li>• HVOF, HVOF</li> <li>• Fine WC</li> <li>• Excellent corrosion resistance in sea water</li> <li>• Wear resistant coating with Ni- and Co-free metallic binder, alternative to WC-Co or WC-Ni</li> </ul>

Hazards identification in Advertising (REGULATION (EC) No 1272/2008 Article 48): (1) Resp. Sens. 1; (2) Skin Sens. 1; (3) Eye Irrit. 2; (4) Repr. 2; (5) Aquatic Acute 1; (6) Aquatic Chronic 1; (7) Aquatic Chronic 2; (8) Aquatic Chronic 3; (9) Carc. 2; (10) STOT RE 1; (11) Acute Tox. 3; (12) STOT RE 2.

The values on above table are typical values and do not constitute a specification. Additional materials and grain sizes as well as high purity oxides for electronic applications are available on request. Product data sheets are available for download at [www.hoganas.com](http://www.hoganas.com)

### AMPERIT coating

We offer unique solutions with customized powder properties and spray parameters for the demanding requirements, such as gate- and ball valves, landing gears, hydro power turbines, mud rotors, etc.



Contact us directly under  
[amperit.technicalsupport@hoganas.com](mailto:amperit.technicalsupport@hoganas.com)  
to learn more about our customized powder and coating solutions.

# AMPERIT® | OXIDES

for wear protection, chemical resistance and heat protection

## AMPERIT OXIDES

AMPERIT	Particle size in $\mu\text{m}$	Chemistry / powder type	Approvals	Typical properties and applications
704.000	22/5	Cr <sub>2</sub> O <sub>3</sub> 99.5 % Fused and crushed		<ul style="list-style-type: none"> <li>• APS</li> <li>• Hard, corrosion and wear resistant ceramic coatings</li> <li>• Insoluble in acids, alkalis and alcohol</li> <li>• Used for anilox rolls in printing machines, pump seals areas, wear rings, etc.</li> </ul>
704.001	45/22			
704.053	25/10			
704.054	45/10			
704.072	38/10			
704.092	75/25			
704.216			MTS 1231	
707.000	22/5	Cr <sub>2</sub> O <sub>3</sub> 99.5 % Fused and crushed		<ul style="list-style-type: none"> <li>• APS</li> <li>• Rounded particle shape</li> <li>• See <i>AMPERIT 704</i></li> </ul>
707.001	45/22			
707.053	25/10		CPW 320	
707.054	45/10			
707.072	38/10			
707.092	75/25			
712.053	25/10	Cr <sub>2</sub> O <sub>3</sub> -TiO <sub>2</sub> 75-25 Fused and crushed		<ul style="list-style-type: none"> <li>• APS</li> <li>• Max. operating temperature 540 °C</li> <li>• Lower hardness but better toughness than pure Cr<sub>2</sub>O<sub>3</sub> coatings</li> <li>• Used in wear applications where more toughness is needed</li> </ul>
712.074	45/15			
716.054	45/10	Cr <sub>2</sub> O <sub>3</sub> -TiO <sub>2</sub> -SiO <sub>2</sub> 92-3-5 Blended		<ul style="list-style-type: none"> <li>• APS</li> <li>• Hard, dense and wear resistant coatings</li> <li>• Good corrosion resistance</li> <li>• Higher mechanical shock resistance than pure Cr<sub>2</sub>O<sub>3</sub></li> </ul>
716.066	53/15			
740.000	22/5	Al <sub>2</sub> O <sub>3</sub> Fused and crushed		<ul style="list-style-type: none"> <li>• APS</li> <li>• Max. operating temperature 1650 °C</li> <li>• Resistant against corrosion, abrasion, erosion and sliding wear</li> <li>• Good dielectric properties</li> <li>• Stable in most acids and alkalis</li> </ul>
740.001	45/22			
740.002	90/45			
740.003	45/5			
740.008	20/5			
740.050	< 5			
740.207				
740.355			RRMS 40020 (formerly: MSRR 9507/9)	
740.406			PWA 1310	

## AMPERIT® OXIDES

AMPERIT	Particle size in $\mu\text{m}$	Chemistry / Powder Type	Approvals	Typical properties and applications
742.001	45/22	Al <sub>2</sub> O <sub>3</sub> -TiO <sub>2</sub> 97-3 Fused and crushed		<ul style="list-style-type: none"> <li>• APS</li> <li>• Max. operating temperature 1100 °C</li> <li>• Grey alumina for use as corrosion, abrasion, erosion and sliding wear resistant coatings</li> <li>• Typical applications in textile machines for guiding and handling of thread, rolls in paper industry, etc.</li> </ul>
742.059	30/5			
742.068	35/15			
742.204			MTS 1059	
742.206			MTS 1061	
742.292			GE A50TF87 Cl.A	
742.298			GE A50TF87 Cl.B	
742.407			PWA 1311	
742.731			DMR 33-020	
742.850			PM 819-0	
742.867			PM 819-11	
742.966			GE A50TF87 Cl. C	
744.000	22/5	Al <sub>2</sub> O <sub>3</sub> -TiO <sub>2</sub> 87-13 Blended		<ul style="list-style-type: none"> <li>• APS</li> <li>• Max. operating temperature 540 °C</li> <li>• Compared with AMPERIT 742 less hard and corrosion resistant</li> </ul>
744.001	45/22			
744.003	45/5			
745.001	45/22	Al <sub>2</sub> O <sub>3</sub> -TiO <sub>2</sub> 60-40 Blended		<ul style="list-style-type: none"> <li>• APS</li> <li>• Max. operating temperature 540 °C</li> <li>• Lower hardness compared to AMPERIT 742 and 744</li> <li>• Wear and erosion resistant</li> <li>• Good grindability</li> <li>• Polished coatings with reduced wettability</li> <li>• Used in textile industry, household applications (pans), etc.</li> </ul>
745.003	45/5			
745.008	20/5			
762.069	40/10	Al <sub>2</sub> O <sub>3</sub> -SiO <sub>2</sub> 72-28 Fused and crushed		<ul style="list-style-type: none"> <li>• APS</li> <li>• Mullite</li> <li>• EBCs</li> </ul>
782.001	45/22	TiO <sub>2</sub> Fused and crushed (Black)		<ul style="list-style-type: none"> <li>• APS</li> <li>• Moderate wear resistance compared with Al<sub>2</sub>O<sub>3</sub> or Al<sub>2</sub>O<sub>3</sub>-TiO<sub>x</sub></li> <li>• Soluble in alkalis and sulfuric acids</li> <li>• Decorative black coatings</li> <li>• Slightly conductive</li> <li>• Used for the production of sputter targets</li> </ul>
782.002	90/45			
782.003	45/5			
782.054	45/10			
814.778		ZrO <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub> Fused and crushed	GE A50TF278 Class F	<ul style="list-style-type: none"> <li>• APS</li> </ul>
815		ZrO <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub> Agglomerated and sintered	GE A50TF278 Class F (conforms only)	<ul style="list-style-type: none"> <li>• APS</li> </ul>

## AMPERIT® OXIDES

AMPERIT	Particle size in µm	Chemistry / Powder Type	Approvals	Typical properties and applications
816.006	125/45	ZrO <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub> 93-7 Agglomerated and sintered		<ul style="list-style-type: none"> <li>• APS</li> <li>• Porous thermal barrier coatings</li> <li>• Colour "white"</li> <li>• High purity, low Al<sub>2</sub>O<sub>3</sub>/SiO<sub>2</sub></li> <li>• "Low NORM"</li> <li>• Low monoclinic phase</li> </ul>
818.138		ZrO <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub>	GE APMS000177	<ul style="list-style-type: none"> <li>• APS</li> </ul>
819.263		ZrO <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub> Agglomerated and sintered	GE A50TF278 Class E	<ul style="list-style-type: none"> <li>• APS</li> </ul>
819.264				
821.007	90/16	ZrO <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub> 80-20 Agglomerated and sintered		<ul style="list-style-type: none"> <li>• APS</li> <li>• Colour "yellow"</li> <li>• Max. operating temperature 1350 °C</li> <li>• Used for thermal barrier coatings, protection of graphite trays etc.</li> </ul>
821.084	75/20			
825.000	22/5	ZrO <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub> 93-7 Fused and crushed (White)		<ul style="list-style-type: none"> <li>• APS</li> <li>• Colour "white"</li> <li>• Blocky particle shape</li> <li>• For dense and vertically cracked coatings (DVCs)</li> </ul>
825.001	45/22			
825.218			MTS 1198	
825.242			MTS 1342	
<b>NEW</b> 825.289			GE A50TF278 Cl. A	
<b>NEW</b> 825.290			GE A50TF278 Cl. B	
825.381			RRMS 40042 (formerly: MSRR 9507/72)	
<b>NEW</b> 825.774			GE A50TF278 Cl. C	
<b>NEW</b> 825.998			GE A50AG1	
<b>NEW</b> 825.999			GE A50AG1	
827.006	125/45	ZrO <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub> 93-7 Agglomerated and sintered		<ul style="list-style-type: none"> <li>• APS</li> <li>• Max. operating temperature 1320 °C</li> <li>• Color „yellow“</li> <li>• Very good thermal shock resistance and thermal insulating properties</li> <li>• Hot corrosion resistant</li> <li>• Used for thermal barrier coatings in aerospace, stationary gas turbines and engines</li> <li>• For applications like combustion liners and airfoils, etc.</li> <li>• Highest coating porosity achievable (only for A827.006)</li> <li>• For DVC's (non columnar) (only for A827.054)</li> <li>• Low Apparent Density (A827.083)</li> </ul>
827.007	90/16			
827.054	45/10			
827.083	125/38		GE A50TF204	
827.238			MTS 1352	
827.289			GE A50TF278 Cl.A	
827.290			GE A50TF278 Cl.B	
827.423			PWA 1375	
827.772			GE A50A557	
827.773			GE A50A558	
827.774			GE A50TF278 Cl.C	
827.853			PM 819-20	
827.864			PM 819-57	
827.873			PM 819-84	
827.943			EMS57750 Type 1	
827			HTCT 650564	
827			DGTLV 504 009-001	

## AMPERIT® OXIDES

AMPERIT	Particle size in µm	Chemistry / powder type	Approvals	Typical properties and applications
828.007	90/16	ZrO <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub> 88-12 Agglomerated and sintered	PWA 36375	<ul style="list-style-type: none"> <li>• APS</li> <li>• Max. operating temperature 1320 °C</li> <li>• Good thermal barrier properties</li> </ul>
828.405				
831.006	125/45	ZrO <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub> 93-7 Plasma spherodized HOSP®	GE A50TF278 Cl.A GE A50TF278 Cl.B DMR 33-098 GE A50A557 GE A50A558 GE A50TF278 Cl.C GE A50TF278 Cl.D DGTLV 504 009-001 GE A50AG 1 Cl.A	<ul style="list-style-type: none"> <li>• APS</li> <li>• Max. operating temperature 1320 °C</li> <li>• Color „white“, high purity</li> <li>• Good thermal insulating properties</li> <li>• Hot corrosion resistant</li> <li>• Used for thermal barrier coatings in aerospace and stationary gas turbines</li> </ul>
831.007	90/16			
831.054	45/10			
831.063	75/45			
831.082	125/10			
831.289				
831.290				
<b>NEW</b> 831.733				
<b>NEW</b> 831.772				
<b>NEW</b> 831.773				
<b>NEW</b> 831.774				
831.967				
<b>NEW</b> 831				
1501				
835.006	125/45	Gd <sub>2</sub> Zr <sub>2</sub> O <sub>7</sub>	DPTI-00002446 PD-83336Y4 Class D2	<ul style="list-style-type: none"> <li>• APS</li> <li>• Availability according to local patent situation</li> <li>• Advanced TBCs with low thermal conductivity</li> </ul>
835.956				
835.957				
849.054	45/10	Y <sub>2</sub> O <sub>3</sub> Agglomerated and sintered		<ul style="list-style-type: none"> <li>• APS</li> <li>• Stable at high temperatures</li> <li>• Heat resistant in aggressive atmospheres</li> <li>• Used for protection of graphite sheets in the hard metal industry</li> <li>• Max. operating temperature in air 2200 °C (on graphite 1550 °C)</li> </ul>
860.074	45/15	LSM20 Agglomerated and sintered		<ul style="list-style-type: none"> <li>• APS</li> <li>• Used for protective coatings on Cr containing interconnectors (SOFC)</li> </ul>

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# AMPERIT® | MCrAlYs

for high temperature applications

## AMPERIT MCrAlYs

AMPERIT	Particle size in µm	Chemistry / powder type	Approvals	Typical properties and applications	
405.001	45/22	NiCoCrAlYHfSi <sup>(1 - 6, 9, 10)</sup> Gas Atomized Ni balance Co 22 %, Cr 17 %, Al 12.5 %, Y 0.6 %, Hf 0.2 %, Si 0.4 %		<ul style="list-style-type: none"> <li>• APS, HVOF, VPS (LPPS)</li> <li>• Max. operating temperature 1050 °C (VPS) or 850 °C (APS)</li> <li>• Stable at high temperatures in hot corrosive or oxidizing environments</li> <li>• Used as bond coat for TBCs, etc.</li> </ul>	
405.002	90/45				
405.006	125/45				
405.072	38/10				
410.001	45/22	NiCoCrAlY <sup>(1 - 6, 9, 10)</sup> Gas Atomized Ni remainder Co 23 %, Cr 17 %, Al 12.5 %, Y 0.45 %		<ul style="list-style-type: none"> <li>• APS, HVOF, VPS (LPPS)</li> <li>• Max. operating temperature 850 °C</li> <li>• Stable at high temperatures in hot corrosive or oxidizing environments</li> <li>• Used on turbine blades, etc.</li> </ul>	
410.424			PWA 1365-1		
410.429			PWA 1365-2		
410.860			PM 819-51 + CPW 387		
413.001	45/22	NiCrAlY <sup>(2, 8, 9, 10)</sup> Gas Atomized Ni remainder Cr 22 %, Al 10 %, Y 1 %		<ul style="list-style-type: none"> <li>• APS, HVOF, VPS (LPPS)</li> <li>• Stable at high temperatures in hot corrosive or oxidizing environments</li> <li>• Used on turbine blades, etc.</li> </ul>	
413.003	45/5				
413.006	125/45				
413.247					MTS 1545
<b>NEW</b> 413.265					GE B50A892
413.284					GE B50TF192 Cl.A
413.858					PM 819-44
413.981					GE B50TF192 Cl. B
415.001	45/22	CoNiCrAlY <sup>(1 - 6, 9, 10)</sup> Gas Atomized Co remainder Ni 32 %, Cr 21 %, Al 8 %, Y 0.5 %	GE B50AG5	<ul style="list-style-type: none"> <li>• APS, HVOF, VPS (LPPS)</li> <li>• Max. operating temperature 1050 °C (VPS) or 850 °C (APS)</li> <li>• Stable at high temperatures in hot corrosive or oxidizing environments</li> <li>• Used as bond coats for TBCs, etc.</li> </ul>	
415.002	90/45				
415.006	125/45				
415.072	38/10				
415.079	90/53				
415.220			MTS 1262		
415.221			MTS 1273		
415.288			GE B50TF195 Cl.A		
415.875		PM 819-86			
416	SL-30	MCrAlY <sup>(1 - 4, 7, 9, 10)</sup> Proprietary Gas Atomized		<ul style="list-style-type: none"> <li>• APS, HVOF, VPS (LPPS)</li> <li>• MCrAlY for stationary gas turbine applications</li> <li>• Availability only to OEM approved users</li> </ul>	

## AMPERIT® MCrAlYs

AMPERIT	Particle size in µm	Chemistry / powder type	Approvals	Typical properties and applications
418	SV-20	MCrAlY <sup>(2, 8, 9, 10)</sup> Proprietary Gas Atomized	HTCT 650557	<ul style="list-style-type: none"> <li>• APS, HVOF, VPS (LPPS)</li> <li>• MCrAlY for stationary gas turbine applications</li> <li>• Availability only to OEM approved users</li> </ul>
	SH-20		HTCT 650515	
	SL-20		HTCT 650565	
421.001	45/22	NiCoCrAlTaReY <sup>(1 - 6, 9, 10)</sup> Gas Atomized Ni remainder Cr 18 %, Co 10 %, Al 6.5 %, Ta 6.0 %, Re 2.0 %, Y 0.3 %, Si 1 %, Hf 0.5 %	<ul style="list-style-type: none"> <li>• APS, HVOF, VPS (LPPS)</li> <li>• Max. operating temperature 1050 °C (VPS) or 850 °C (APS)</li> <li>• Ta and Re containing MCrAlY for improved hot gas corrosion resistance</li> </ul>	
421.087	38/15			
421.240				MTS 1351
421.299				GE B50TF242 Cl.A
421.760				GE B50TF242 Cl.B <small>(1 - 4, 7 - 9)</small>
421.761				GE B50TF242 Cl.C <small>(1 - 4, 7 - 9)</small>
421.992				GE B50TF242 Cl.D
422	Sicoat 2231	MCrAlY <sup>(1 - 6, 9, 10)</sup> Proprietary Gas Atomized	DGTLV 511 114-001	<ul style="list-style-type: none"> <li>• APS, HVOF, VPS (LPPS)</li> <li>• MCrAlY for stationary gas turbine applications</li> <li>• Availability only to OEM approved users</li> </ul>
428	Sicoat 2453	MCrAlY <sup>(1 - 6, 9, 10)</sup> Proprietary Gas Atomized	DGTLV 511 114-001	<ul style="list-style-type: none"> <li>• APS, HVOF, VPS (LPPS)</li> <li>• MCrAlY for stationary gas turbine applications</li> <li>• Availability only to OEM approved users</li> </ul>
429	Sicoat 2464	MCrAlY <sup>(1 - 6, 9, 10)</sup> Proprietary Gas Atomized	DGTLV 511 114-001	<ul style="list-style-type: none"> <li>• APS, HVOF, VPS (LPPS)</li> <li>• MCrAlY for stationary gas turbine applications</li> <li>• Availability only to OEM approved users</li> </ul>
436	SV 349	MCrAlY <sup>(1 - 6, 9, 10)</sup> Proprietary Gas Atomized	HTCT 650585	APS, HVOF, VPS (LPPS) MCrAlY for stationary gas turbine applications Availability only to OEM approved users
	SL 349		HTCT 650581	
<b>NEW</b> 447.994			GE B50AG16 Cl.A	
<b>NEW</b> 448.996		CoNiCrAlY	GE B50AG12 Cl.A	
<b>NEW</b> 448.997			GE B50AG12 Cl.C	
<b>NEW</b> 453	Sicoat 2479	MCrAlY <sup>(1 - 6, 9, 10)</sup> Proprietary Gas Atomized	DGTLV 511 114-001	<ul style="list-style-type: none"> <li>• APS, HVOF, VPS (LPPS)</li> <li>• MCrAlY for stationary gas turbine applications</li> <li>• Availability only to OEM approved users</li> </ul>
<b>NEW</b> 481.984		CoCrAlHf	GE B50TF201 Cl.A	
<b>NEW</b> 481.985			GE B50TF201 Cl.B	
<b>NEW</b> 481.986			GE B50TF201 Cl.C	

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# AMPERIT® | MOLYBDENUM

for technological solutions

## AMPERIT MOLYBDENUM

AMPERIT	Particle size in $\mu\text{m}$	Chemistry / powder type	Approvals	Typical properties and applications	
105.002	90/45	Molybdenum Agglomerated and sintered		<ul style="list-style-type: none"> <li>• APS</li> <li>• Max. operating temperature 320 °C (in oxidizing atmospheres)</li> <li>• C max. 0.2 %</li> <li>• Tough coatings with acceptable hardness and excellent sliding properties</li> <li>• Good bond strength</li> <li>• Used for valves, synchronizers, piston rings, pump parts, etc.</li> </ul>	
105.074	45/15				
105.091	150/45				
106.002	90/45	Molybdenum Sintered and crushed		<ul style="list-style-type: none"> <li>• APS</li> <li>• Max. operating temperature 320 °C (in oxidizing atmospheres)</li> <li>• Dense blocky grains</li> <li>• Tough coatings with acceptable hardness and excellent sliding properties</li> <li>• Good bond strength</li> <li>• Used for valves, synchronizers, piston rings, pump parts, etc.</li> <li>• Also available as AMPERWELD (coarser grain sizes) for PTA and Laser Cladding</li> </ul>	
106.062	53/10				
106.158					PWA 1313
106.222					MTS 1054
106.282					GE 401-3083-630
106.707					CPW 213
106.870					PM 819-13
109.063	75/45	Molybdenum Agglomerated and sintered		<ul style="list-style-type: none"> <li>• APS</li> <li>• Max. operating temperature 320 °C (in oxidizing atmospheres)</li> <li>• C max. 1%</li> <li>• See AMPERIT 105</li> </ul>	
109.066	53/15				
109.832					BMS 1067 Type 21
110.002	90/45	Mo-Mo <sub>2</sub> C Agglomerated and sintered		<ul style="list-style-type: none"> <li>• APS</li> <li>• Max. operating temperature 320 °C (in oxidizing atmospheres)</li> <li>• C: 2.2 – 2.4 %</li> <li>• Tough coatings with high hardness, excellent sliding properties and good wear resistance</li> </ul>	
110.074	45/15				
119.075	90/15	Mo-NiSF <sup>(2, 9, 10)</sup> 75-25 Blended		<ul style="list-style-type: none"> <li>• APS, HVOF</li> <li>• Max. operating temperature 350 °C</li> <li>• Wear resistant coatings with excellent sliding properties</li> <li>• Low friction coefficient</li> <li>• Used for piston rings, etc.</li> </ul>	
920.054	45/10	MoSi <sub>2</sub>		<ul style="list-style-type: none"> <li>• APS</li> <li>• High temperature oxidation resistant coatings</li> </ul>	
920.894			DMS 2049		

Hazards identification in Advertising (REGULATION (EC) No 1272/2008 Article 48): (1) Resp. Sens. 1; (2) Skin Sens. 1; (3) Eye Irrit. 2; (4) Repr. 2; (5) Aquatic Acute 1; (6) Aquatic Chronic 1; (7) Aquatic Chronic 2; (8) Aquatic Chronic 3; (9) Carc. 2; (10) STOT RE 1; (11) Acute Tox. 3, (12) STOT RE 2.

The values on above table are typical values and do not constitute a specification. Additional materials and grain sizes are available on request. Product data sheets are available for download at [www.hoganas.com](http://www.hoganas.com)

# AMPERIT® | Pure metals, alloys & others

## AMPERIT Pure metals, alloys & others

AMPERIT	Particle size in µm	Chemistry / powder type	Approvals	Typical properties and applications
140.001	45/22	Tungsten Sintered		<ul style="list-style-type: none"> <li>• VPS (LPPS)</li> <li>• Corrosion resistant against acids</li> <li>• Good high temperature stability in non-oxidizing atmospheres</li> <li>• High melting point</li> <li>• Good adhesion to graphite, alumina and quartz</li> </ul>
140.002	90/45			
140.003	45/ 5			
140.067	15/5			
140.071	25/ 5			
146.003	45/15	Cr		
146.412			PWA 1331	
150.002	90/45	Tantalum <sup>(13)</sup> Fused and crushed		<ul style="list-style-type: none"> <li>• VPS (LPPS), APS</li> <li>• Corrosion protection for chemical equipment against acids</li> </ul>
150.074	45/15			
151.065	30/10	Tantalum <sup>(13)</sup> Special Grade		<ul style="list-style-type: none"> <li>• Cold Spray</li> <li>• Dense coatings for highest corrosion protection against sulfuric acid</li> <li>• Improved mechanical properties</li> <li>• High deposition efficiency</li> <li>• Corrosion protection for chemical equipment against acids</li> </ul>
154.007	90/16	Titanium <sup>(13)</sup>		<ul style="list-style-type: none"> <li>• VPS (LPPS)</li> <li>• Good corrosion resistance against salt water, Cl containing solutions and oxidizing acid solutions</li> <li>• High purity</li> <li>• Conforms to ASTM F-1580</li> <li>• Material for biomedical applications</li> </ul>
154.093	125/90			
154.096	355/200			
155.086	< 63	Titanium <sup>(13)</sup>		<ul style="list-style-type: none"> <li>• VPS (LPPS)</li> <li>• Good corrosion resistance against salt water, Cl containing solutions and oxidizing acid solutions</li> <li>• Material for biomedical applications</li> </ul>
155.093	125/90			
160.003	45/5	Niobium <sup>(13)</sup> Fused		<ul style="list-style-type: none"> <li>• VPS (LPPS)</li> <li>• Fused and crushed</li> <li>• Corrosion resistant against several acids</li> <li>• Good high temperature stability in non-oxidizing atmospheres</li> </ul>
165.965		Re	GE B50TF260 Cl. A	
170.084	75/20	Silicon		<ul style="list-style-type: none"> <li>• Bond Coat for EBC coatings</li> </ul>
170.266			GE A50TF350	
171.084	75/20	Silicon		<ul style="list-style-type: none"> <li>• High purity, metall impurities less than 350 ppm</li> <li>• Coatings for semiconductor applications</li> </ul>
175.001	45/22	Nickel <sup>(2, 8, 9, 10)</sup> Water Atomized		<ul style="list-style-type: none"> <li>• APS, HVOF (gas fueled)</li> <li>• Max. operating temperature 530 °C in air</li> <li>• Good corrosion protection</li> <li>• Repair and bond coat for Ni-based alloys</li> </ul>
175.002	90/45			
176.001	45/22	Nickel <sup>(2, 8, 9, 10)</sup> Gas Atomized		<ul style="list-style-type: none"> <li>• APS, HVOF, HVOF</li> <li>• Repair and build-up for Ni-based alloy components</li> </ul>
176.068	35/15			

**AMPERIT® Pure metals, alloys & others**

AMPERIT	Particle size in µm	Chemistry / powder type	Approvals	Typical properties and applications
<b>NEW</b> 186.063	75/45	AlSi 88-12 Gas Atomized		<ul style="list-style-type: none"> <li>• APS</li> <li>• Repair and build-up</li> </ul>
250.001	45/22	NiCr <sup>(2, 8, 9, 10)</sup> 80-20 Water Atomized		<ul style="list-style-type: none"> <li>• APS, Flame, HVOF (gas fueled)</li> <li>• Max. operating temperature 980 °C</li> <li>• Oxidation and corrosion resistant</li> <li>• Good machinability</li> <li>• Used for repair, bond coat and corrosion protection</li> </ul>
250.002	90/45			
250.071	25/5			
250.200			MTS 1050	
250.354			MSRR 9507/8	
250.410			PWA 1317	
250.411			PWA 1319	
250.425			PWA 1303	
250.428			PWA 1315	
250.968			GE B50TF40 Cl.A	
250.969			GE B50TF40 Cl.B	
251.001	45/22	NiCr <sup>(2, 8, 9, 10)</sup> 80-20 Gas Atomized		<ul style="list-style-type: none"> <li>• APS, HVOF</li> <li>• Spherical alternative to AMPERIT 250</li> <li>• Better flowability</li> </ul>
251.002	90/45			
251.051	12/5			
251.968			GE B50TF40 Cl.A	
251.969			GE B50TF40 Cl.B	
280.001	45/22	NiAl <sup>(2, 8, 9, 10)</sup> 95-5 Water Atomized		<ul style="list-style-type: none"> <li>• APS, Flame, HVOF (gas fueled)</li> <li>• Max. operating temperature 800 °C</li> <li>• Oxidation and abrasion resistant</li> <li>• Excellent machinability</li> </ul>
280.002	90/45			
280.003	45/5.5			
280.241			MTS 1309	
280.287			GE B50TF56 Cl.B	
280.616			DHS122-101	
280.732			DMR 33-011	
280.972			GE B50TF56 Cl.C	

## AMPERIT® Pure metals, alloys & others

AMPERIT	Particle size in µm	Chemistry / powder type	Approvals	Typical properties and applications
281.001	45/22	NiAl <sup>(2, 8, 9, 10)</sup> 95-5 Gas Atomized	MTS 1519 GE B50TF56 Cl.C RRMS 40022 (formerly: MSRR 9507/5) PWA 1380 PM 819-56	<ul style="list-style-type: none"> <li>• HVOF, HVOF, APS, Cold Spray</li> <li>• Spherical alternative to AMPERIT 280</li> <li>• Better flowability</li> </ul>
281.002	90/45			
281.003	45/5			
281.245				
281.267				
281.390				
281.420				
281.863				
291.003	45/5	NiAl <sup>(2, 8, 9, 10)</sup> 69-31 Fused and crushed		<ul style="list-style-type: none"> <li>• APS</li> <li>• Used as bond coat for various applications</li> <li>• Good corrosion resistance</li> <li>• High bond strength</li> </ul>
291.008	20/5			
291.059	30/5			
<b>NEW</b> 1660-02	53/20	NiCr <sup>15</sup> Fe <sup>4</sup> B <sup>3</sup> Si <sup>4</sup>		<ul style="list-style-type: none"> <li>• HVOF, APS, Flame</li> <li>• Max. operating temperature 820 °C</li> <li>• Self-fluxing alloy, 60 HRC</li> <li>• Hard dense coatings</li> <li>• Resistant against cavitation, fretting and particle erosion</li> <li>• Good corrosion and oxidation resistance</li> <li>• Used on pump sleeves, piston rings, forging tools, glass mould plungers, etc.</li> </ul>
340.074	45/15	CoMoCrSi <sup>(1 - 6)</sup> (Similar to T-400) Gas Atomized		<ul style="list-style-type: none"> <li>• HVOF, APS</li> <li>• Excellent dry sliding properties</li> <li>• Corrosion and oxidation resistant</li> <li>• Used for bearing journals and guide tracks</li> </ul>
340.088	53/20			
<b>NEW</b> 342.001	45/22	CoMoCrSi <sup>(1 - 6)</sup> (Similar to T-400) Gas Atomized		<ul style="list-style-type: none"> <li>• HVOF, APS</li> <li>• Excellent dry sliding properties</li> <li>• Corrosion and oxidation resistant</li> <li>• Used for bearing journals and guide tracks</li> </ul>
<b>NEW</b> 342.074	45/15			
<b>NEW</b> 342.088	53/20			
<b>NEW</b> 2637-02	53/20	CoCrWSiC <sup>(1 - 6)</sup> (Co Hardfacing Alloy #6) Gas Atomized		<ul style="list-style-type: none"> <li>• HVOF</li> <li>• Excellent wear and thermal shock resistance</li> <li>• Excellent corrosion and shock oxidation resistance</li> <li>• Used in valve seals, steam turbines, machine parts</li> </ul>
<b>NEW</b> 2.37	45/15			
348.430		Co Hardfacing alloy #31	PWA 1316	
348.431			PWA 1318	
<b>NEW</b> 351.752		CoCrWNiMn	GE B50A919	
<b>NEW</b> 351.762		CoCrWNiMn	GE B50A919	

## AMPERIT® Pure metals, alloys & others

AMPERIT	Particle size in µm	Chemistry / powder type	Approvals	Typical properties and applications
<b>NEW</b> 360.088	53/20	FeCrNiMn (Steel similar to 17-4 PH) Gas Atomized		<ul style="list-style-type: none"> <li>• HVOF, HVOF</li> <li>• Repair and build-up</li> </ul>
365.002	53/20	FeCrNiMoSiC		<ul style="list-style-type: none"> <li>• HVOF</li> <li>• Mild wear protection without corrosion protection</li> </ul>
3650-02	53/20	FeCrNiMoSiC		<ul style="list-style-type: none"> <li>• HVOF</li> <li>• Mild wear protection without corrosion protection</li> </ul>
377.088	53/20	FeCrNiMo <sup>(2, 9, 10)</sup> (Stainless Steel similar to 316 L) Gas Atomized		<ul style="list-style-type: none"> <li>• HVOF, HVOF, APS, Cold Spray</li> <li>• Used for corrosion and cavitation protection as well as for contour restoration</li> </ul>
380.002	90/45	NiCrMoNb <sup>(2, 8, 9, 10)</sup> (Ni Superalloy 625) Gas Atomized		<ul style="list-style-type: none"> <li>• HVOF, HVOF, APS, Cold Spray</li> <li>• Max. operating temperature 1000 °C</li> <li>• Excellent oxidation and corrosion resistance</li> <li>• Used in boilers and in chemical industry</li> <li>• Also available as <i>AMPERWELD</i>® (coarser grain sizes) for PTA and Laser Cladding</li> </ul>
380.074	45/15			
380.088	53/20			
380.993			GE B50TF270	
381.071	25/5	FeVCrCWMoMnSi Gas Atomized		<ul style="list-style-type: none"> <li>• HVOF, HVOF</li> <li>• Excellent sliding properties for machine parts, piston rods, and hard chrome replacement</li> <li>• For applications without wet corrosion resistance requirements</li> <li>• Also available as <i>AMPERWELD</i> (coarser grain sizes) for PTA and Laser Cladding</li> </ul>
381.088	53/20			
407.088	53/20	NiCrMoNbAlTi <sup>(2, 8, 9, 10)</sup> (Ni Superalloy 718) Gas Atomized		<ul style="list-style-type: none"> <li>• HVOF , Cold Spray, APS</li> <li>• Excellent for corrosion resistant coatings</li> <li>• Hardenable</li> <li>• Very good for high temperature applications</li> <li>• Used on turbines and chemical equipment</li> <li>• Acid resistant</li> <li>• Also available as <i>AMPERWELD</i> (coarser grain sizes) for PTA and Laser Cladding</li> </ul>
407.291				
407.987			GE B50TF202	
407.988			GE B50TF202	
409.002	90/45	NiMoCrFeW <sup>(2, 8, 9, 10)</sup> (Ni Superalloy C-276) Gas Atomized		<ul style="list-style-type: none"> <li>• HVOF, HVOF, Cold Spray, APS</li> <li>• Excellent for corrosion resistant coatings</li> <li>• Used in chemical equipment in corrosive environments</li> <li>• Also available as <i>AMPERWELD</i> (coarser grain sizes) for PTA and Laser Cladding</li> </ul>
409.074	45/15			
409.088	53/20			
442.974		NiCrSi	GE B50TF81 Cl. A	
442.975			GE B50TF81 Cl. B	
445.980		NiCoCrAlMoWTi	GE B50TF183	
469.063	75/45	CoCrAlYTaCSi <sup>(1 - 6)</sup> Gas Atomized Co balance Cr 25 %, Ta 8.2 %, Al 7.5 %, C 0.75 %, Si 0.75 %, Y 0.75 %		<ul style="list-style-type: none"> <li>• APS, HVOF, Detonation guns</li> <li>• Max. operating temperature 1050 °C</li> <li>• Excellent build-up resistance</li> <li>• Used on furnace rolls in steel sheet annealing</li> </ul>
469.001	45/22			
469.088	53/20			

## AMPERIT® Pure metals, alloys & others

AMPERIT	Particle size in $\mu\text{m}$	Chemistry / powder type	Approvals	Typical properties and applications
470.001	45/22	CoCrAlYTaCSi- $\text{Al}_2\text{O}_3$ <sup>(1-6)</sup> 90-10 Blended		<ul style="list-style-type: none"> <li>• APS, Detonation guns</li> <li>• Max. operating temperature 1050 °C</li> <li>• Excellent build-up resistance</li> <li>• Better wear resistance than AMPERIT 469</li> <li>• Used on furnace rolls in steel sheet annealing</li> </ul>
470.054	45/10			
3650-02	53/20	FeCrNiMoSiC		<ul style="list-style-type: none"> <li>• HVOF</li> <li>• Mild wear protection without corrosion protection</li> </ul>
471.063	75/45	CoCrAlYTaCSi- $\text{Al}_2\text{O}_3$ <sup>(1-6)</sup> 90-10 Agglomerated and sintered		<ul style="list-style-type: none"> <li>• .063 for kerosene HVOF</li> <li>• .074 for gas fueled HVOF</li> <li>• Max. operating temperature 1050 °C</li> <li>• Homogeneous distribution of fine <math>\text{Al}_2\text{O}_3</math> particles</li> <li>• Excellent build-up resistance</li> <li>• Good wear resistance at high temperature and thermal shock resistance</li> <li>• Used on furnace rolls in steel sheet annealing</li> </ul>
471.074	45/15			
<b>NEW</b> 473.054	45/10	CoNiCrAlY-CrC-CrB <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub> 43-25-7-25 Blended		<ul style="list-style-type: none"> <li>• HVOF, Plasma</li> <li>• Excellent build-up resistance</li> <li>• Good wear resistance at high temperature and thermal shock resistance</li> <li>• Used on furnace rolls in steel sheet annealing</li> </ul>

Hazards identification in Advertising (REGULATION (EC) No 1272/2008 Article 48): (1) Resp. Sens. 1; (2) Skin Sens. 1; (3) Eye Irrit. 2; (4) Repr. 2; (5) Aquatic Acute 1; (6) Aquatic Chronic 1; (7) Aquatic Chronic 2; (8) Aquatic Chronic 3; (9) Carc. 2; (10) STOT RE 1; (11) Acute Tox. 3, (12) STOT RE 2; (13) Flam. Sol. 1.

The values on above table are typical values and do not constitute a specification. Additional materials and grain sizes are available on request. Product data sheets are available for download at [www.hoganas.com](http://www.hoganas.com)

# AMPERBRADE® for abrasables

## AMPERBRADE for abrasables

AMPERBRADE	Particle size in µm	Chemistry / powder type	Approvals	Typical properties and applications
846		Proprietary ceramic	DGTLV 511143001	<ul style="list-style-type: none"><li>• APS</li><li>• For SIEMENS approved users only</li></ul>
214.006	125/45	Aromatic polyester		<ul style="list-style-type: none"><li>• APS</li><li>• Organic place-holder for abrasable coatings</li></ul>
215.082	125/10	AlSi <sup>(12)</sup> Polyester 60-40		<ul style="list-style-type: none"><li>• APS</li><li>• For abrasable coatings</li><li>• For compressor housings (low pressure stage)</li></ul>
215.083	125/38			



# AMPERIT® | Aerospace approvals and turbine specifications

## AMS Specifications

AMPERIT	Material	Specification	Remarks
515.400	WC-Co 88-12	AMS 7879	
526.437	WC-Co 83-17	AMS 7881	Method 1+2 (Kerosene)
556.440	WC-CoCr 86-10-4	AMS 7882	Method 4 (Jet Kote, DJ)
558.426	WC-CoCr 86-10-4	AMS 7882	Method 3 (Jet Kote)
558.433	WC-CoCr 86-10-4	AMS 7882	Method 2 (Kerosene)
558.434	WC-CoCr 86-10-4	AMS 7882	Method 1 (DJ)
558.443	WC-CoCr 86-10-4	AMS 7882	Method 4 (Jet Kote, DJ)
558.444	WC-CoCr 86-10-4	AMS 7882	Method 2 (Kerosene)
585.435	Cr <sub>3</sub> C <sub>2</sub> -NiCr 75-25	AMS 7875	

## Alstom (GE Power)

AMPERIT	Material	Material (Alstom)	Specification
416	MCrAlY Proprietary	SL30	HTCT 650559
418	MCrAlY Proprietary	SV20	HTCT 650557
418	MCrAlY Proprietary	SH20	HTCT 650515
418	MCrAlY Proprietary	SL20	HTCT 650565
436	MCrAlY Proprietary	SL349	HTCT 650581
436	MCrAlY Proprietary	SV349	HTCT 650585
584	Cr <sub>3</sub> C <sub>2</sub> -NiCr 75-25		HTCT 650560
587	Cr <sub>3</sub> C <sub>2</sub> -NiCr 65-35		HTCT 650560
827	ZrO <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub>	SS-93-07	HTCT 650564

## CPWA

AMPERIT	Material	Specification
106.707	Mo	CPW 213
282.705**	Ni-Al 95-5	CPW 247
410.429	NiCoCrAlY	CPW 387
707.053	Cr <sub>2</sub> O <sub>3</sub>	CPW 320

\*\* Available on request

## GE Aviation

	AMPERIT®	Material	Specification	Class
	106.282	Mo	401-3083-630	A
<b>NEW</b>	165.965	Re	GE B50TF260	A
	170.266	Silicium	GE A50TF350	A
<b>NEW</b>	250.968	Ni-Cr	GE B50TF40	A
<b>NEW</b>	250.969	Ni-Cr	GE B50TF40	B
<b>NEW</b>	251.968	Ni-Cr	GE B50TF40	A
<b>NEW</b>	251.969	Ni-Cr	GE B50TF40	B
<b>NEW</b>	280.287	Ni-Al 95-5	GE B50TF56	B
<b>NEW</b>	280.972	Ni-Al 95-5	GE B50TF56	C
<b>NEW</b>	380.993	Ni-SA 625	GE B50TF270	A
	413.284	NiCrAlY	GE B50TF192	A
	415.288	CoNiCrAlY	GE B50TF195	A
<b>NEW</b>	442.974	NiCrSi	GE B50TF81	A
	442.975	NiCrSi	GE B50TF81	B
	742.292	Al <sub>2</sub> O <sub>3</sub> -TiO <sub>2</sub> 97-3	GE A50TF87	A
	742.298	Al <sub>2</sub> O <sub>3</sub> -TiO <sub>2</sub> 97-3	GE A50TF87	B
<b>NEW</b>	742.966	Al <sub>2</sub> O <sub>3</sub> -TiO <sub>3</sub>	GE A50TF87	C
	825.289	ZrO <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub>	GE A50TF278	A
<b>NEW</b>	825.290	ZrO <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub>	GE A50TF278	B
<b>NEW</b>	825.774	ZrO <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub>	GE A50TF278	C
	827.774	ZrO <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub> 93-7	GE A50TF278	C
	827.289	ZrO <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub> 93-7	GE A50TF278	A
	827.290	ZrO <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub> 93-7	GE A50TF278	B
<b>NEW</b>	831.289	ZrO <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub> 93-7	GE A50TF278	A
	831.290	ZrO <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub> 93-7	GE A50TF278	B
	831.774	ZrO <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub> 93-7	GE A50TF278	C
<b>NEW</b>	831.967	ZrO <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub> 93-7	GE A50TF278	D

## GE Aviation

AMPERIT®	Material	Specification	Class
407.291	Ni-SA 718	GE B50TF202	B
407.987	Ni-SA 718	GE B50TF202	A
407.988	Ni-SA 718	GE B50TF202	D
421.299	NiCoCrAlTaReY	GE B50TF242	A
421.760	NiCoCrAlTaReY	GE B50TF242	B
<b>NEW</b> 421.761	NiCoCrAlTaReY	GE B50TF242	C
<b>NEW</b> 421.992	NiCoCrAlTaReY	GE B50TF242	D
<b>NEW</b> 445.980	NiCoCrAlMoWTi	GE B50TF183	A
<b>NEW</b> 481.984	CoCrAlHf	GE B50TF201	A
<b>NEW</b> 481.985	CoCrAlHf	GE B50TF201	B
481.986	CoCrAlHf	GE B50TF201	C
518.280	WC-Co 88-12	GE B50TF27	A
518.768	WC-Co 88-12	GE B50TF27	B
528.764	WC-Co 90-10	GE B50TF295	A
593.775	Cr <sub>3</sub> C <sub>2</sub> -NiCr 90-10	GE B50TF281	A

## GE Power

AMPERIT	Material	Specification
106.282	Mo	GE 401-3083-630
<b>NEW</b> 344.930	CoCrWSi	GE B50A960
351.752	CoCrWNiMn	GE B50A919
351.762	CoCrWNiMn	GE B50A919
<b>NEW</b> 413.265	NiCrAlY	GE B50A892
415.001	CoNiCrAlY	GE B50AG5
<b>NEW</b> 447.994	NiCrAlY	GE B50AG16 Cl. A
<b>NEW</b> 448.996	CoNiCrAlY	GE B50AG12 Cl. A
<b>NEW</b> 448.997	CoNiCrAlY	GE B50AG12 Cl. C
<b>NEW</b> 825.998	ZrO <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub> 93-7	GE A50AG1
<b>NEW</b> 825.999	ZrO <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub> 93-7	GE A50AG1
<b>NEW</b> 1501	ZrO <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub> 93-7	GE A50G1 Cl. A
827.772	ZrO <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub> 93-7	GE A50A557
827.773	ZrO <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub> 93-7	GE A50A558
<b>NEW</b> 831.772	ZrO <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub> 93-7	GE A50A557
<b>NEW</b> 831.773	ZrO <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub> 93-7	GE A50A558

## MTU

AMPERIT	Material	Specification	Class
106.222	Mo	MTS 1054	
250.200	Ni-Cr 80-20	MTS 1050	
280.241	Ni-Al 95-5	MTS 1309	
281.245*	Ni-Al 95-5	MTS 1519	Listed in MTS 1519 as 281.090
413.247*	NiCrAlY	MTS 1545	
415.220	CoNiCrAlY	MTS 1262	
415.221	CoNiCrAlY	MTS 1273	
421.240	NiCoCrAlTaReY	MTS 1351	
515.203	WC-Co 88-12	MTS 1055	
526.223	WC-Co 83-17	MTS 1058	
704.216	Cr <sub>2</sub> O <sub>3</sub>	MTS 1231	
740.207	Al <sub>2</sub> O <sub>3</sub>	MTS 1062	
742.204	Al <sub>2</sub> O <sub>3</sub> -TiO <sub>2</sub> 97-3	MTS 1059	
742.206	Al <sub>2</sub> O <sub>3</sub> -TiO <sub>2</sub> 97-3	MTS 1061	
825.218	ZrO <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub> 93-7	MTS 1198	
825.242	ZrO <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub> 93-7	MTS 1342	
827.238	ZrO <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub> 93-7	MTS 1352	

## PWA

AMPERIT®	Material	Specification	AMPERIT	Material	Specification
106.158	Mo	PWA 1313	281.420	Ni-Al 95-5	PWA 1380
348.430	Co-Hard Alloy 31	PWA 1316	828.405	ZrO <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub> 88-12	PWA 36375
348.431	Co-Hard Alloy 31	PWA 1318			
250.410	Ni-Cr 80-20	PWA 1317	Special	Cr <sub>2</sub> O <sub>3</sub> -Al <sub>2</sub> O <sub>3</sub> 70-30	PWA 36376
250.425	Ni-Cr 80-20	PWA 1303	250.411	Ni-Cr 80-20	PWA 1319
250.428	Ni-Cr 80-20	PWA 1315	526.454	WC-Co 83-17	PWA 36331-1
580.402	Cr <sub>3</sub> C <sub>2</sub>	PWA 1304	146.412*	Cr	PWA 1331
580.404	Cr <sub>3</sub> C <sub>2</sub>	PWA 1306	588.419*	Cr <sub>3</sub> C <sub>2</sub> -NiCr 75-25	PWA 1364
585.405	Cr <sub>3</sub> C <sub>2</sub> -NiCr 75-25	PWA 1307	410.424	NiCoCrAlY	PWA 1365-1
740.406	Al <sub>2</sub> O <sub>3</sub>	PWA 1310	410.429	NiCoCrAlY	PWA 1365-2
742.407	Al <sub>2</sub> O <sub>3</sub> -TiO <sub>2</sub> 97-3	PWA 1311	827.423	ZrO <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub> 93-7	PWA 1375

## Rolls Royce

AMPERIT	Material	Specification	AMPERIT	Material	Specification
281.390	Ni-Al 95-5	RRMS 40022 (formerly: MSRR 9507/5)			
526.350	WC-Co 83-17	RRMS 40032 (formerly: MSRR 9507/1)	825.381	ZrO <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub> 93-7 "white"	RRMS 40042 (formerly: MSRR 9507/72)
526.382	WC-Co 83-17	RRMS 40015 (formerly: MSRR 9507/69)			
585.351	Cr <sub>3</sub> C <sub>2</sub> -NiCr 75-25	RRMS 40029 (formerly: MSRR 9507/2)	740.355	Al <sub>2</sub> O <sub>3</sub>	RRMS 40020 (formerly: MSRR 9507/9)
585.357	Cr <sub>3</sub> C <sub>2</sub> -NiCr 75-25	MSRR 9507 / 17	250.354	Ni-Cr 80-20	MSRR 9507 / 8

## Siemens

AMPERIT	Material	Material (Siemens)	Specification
422	Proprietary MCrAlY	SICOAT 2231	DGTLV 511 114-001
428	Proprietary MCrAlY	SICOAT 2453	DGTLV 511 114-001
429	Proprietary MCrAlY	SICOAT 2464	DGTLV 511 114-001
827	ZrO <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub> 93-7		DGTLV 504 009-001
831	ZrO <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub> 93-7		DGTLV 504 009-001
835.956	Gd <sub>2</sub> Zr <sub>2</sub> O <sub>7</sub>		DPTI-00002446
835.957	Gd <sub>2</sub> Zr <sub>2</sub> O <sub>7</sub>		PD-83336Y6
846	Proprietary Ceramic		DGTLV 511 143-001 PD-83336Y5

## SNECMA

AMPERIT®	Material	Specification
280.732	NiAl 95-5	DMR 33-011
<b>NEW</b> 413.726	NiCrAlY	DMR 33-090
526.729	WC-Co 83-17	DMR 33-019
526.727	WC-Co 83-17	DMR 33-501
742.731	Al <sub>2</sub> O <sub>3</sub> -TiO <sub>2</sub>	DMR 33-020
831.733	ZrO <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub> 93-7	DMR 33-098

## Volvo (GKN)

AMPERIT	Material	Specification	AMPERIT	Material	Specification
106.870	Mo	PM 819-13	827.873	ZrO <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub> 93-7	PM 819-84
413.858	NiCrAlY	PM 819-44			
515.851	WC-Co 88-12	PM 819-1	515.851	WC-Co 88-12	PM 819-53
518.874	WC-Co 88-12	PM 819-25	416.877	NiCoCrAlSiTaY	PM 819-87
585.868	Cr <sub>3</sub> C <sub>2</sub> -NiCr 75-25	PM 819-5	281.863	Ni-Al 95-5	PM 819-56
742.867	Al <sub>2</sub> O <sub>3</sub> -TiO <sub>2</sub> 97-3	PM 819-11	827.864	ZrO <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub> 93-7	PM 819-57
827.853	ZrO <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub> 93-7	PM 819-20	415.875	CoNiCrAlY	PM 819-86

## Others

Customer	AMPERIT	Material	Specification	Type	Remarks
Boeing	109.832	Mo	BMS 1067	Type 21	
Boeing	515.830	WC-Co 88-12	BMS 1067	Type 1	
Boeing	526.831	WC-Co 83-17	BMS 1067	Type 1	
Boeing	584.834	Cr <sub>3</sub> C <sub>2</sub> -NiCr 75-25	BMS 1067	Type 22	in approval
Bombardier	526.784	WC-Co 83-17	BAMS 561-001 Rev. A	Type 1	
De Haviland	526.781	WC-Co 83-17	DHMS C4.19		listed as 526.062
Honeywell	827.943	ZrO <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub> 93-7	EMS57750	Type 1	
McDonnell Douglas	515.949	WC-Co 88-12	DMS2049	Type 2	
McDonnell Douglas	920.894	MoSi <sub>2</sub>	DMS2049	Type 3	
McDonnell Douglas	526.895	WC-Co 83-17	DMS2049	Type 5	

## AMPERIT grain size code guide

Grain size code	Grain size range in $\mu\text{m}$	Grain size code	Grain size range in $\mu\text{m}$	Grain size code	Grain size range in $\mu\text{m}$
.000	22/5	.061	150/53	.082	125/10
.001	45/22	.062	53/10	.083	125/38
.002	90/45	.063	75/45	.084	75/20
.003	45/5	.064	106/45	.085	106/20
.004	63/16	.065	30/10	.086	<63
.005	106/32	.066	53/15	.087	38/15
.006	125/45	.067	15/5	.088	53/20
.007	90/16	.068	35/15	.089	45/20
.008	20/5	.069	40/10	.090	Customized grain size (on request)
.049	300/45	.070	63/10	.091	150/45
.050	<5	.071	25/5	.092	75/25
.051	12/5	.072	38/10	.093	125/90
.052	20/5	.073	150/63	.094	106/38
.053	25/10	.074	45/15	.095	200/106
.054	45/10	.075	90/15	.096	355/200
.055	106/10	.076	12/2	.099	Customized grain size (fine, on request)
.056	100/60	.077	63/32		
.057	150/5	.078	75/15		
.058	<15	.079	90/53		
.059	30/5	.080	106/10		
.060	300/200	.081	106/53		

## Mesh to micron conversion chart

U.S. mesh	Microns	U.S. mesh	Microns	U.S. mesh	Microns
3	6730	18	1000	80	177
4	4760	20	841	100	149
5	4000	25	707	120	125
6	3360	30	595	140	105
7	2830	35	500	170	88
8	2380	40	400	200	74
10	2000	45	354	230	63
12	1680	50	297	270	53
14	1410	60	250	325	44
16	1190	70	210	400	37

## Mass

1 ounce (oz.)	28.35 g	1 g	0.0353 oz.
1 pound (lb.)	0.45359 kg	1 kg (= 1000 g)	2.205 lb.
1 ton (short ton US)	907.185 kg	1 to (= 1000 kg)	1.102 ton (short ton US)

## Density

1 lb.mass/in. <sup>3</sup>	27.68 g/cm <sup>3</sup>	1 g/cm <sup>3</sup>	0.362 lb.mass/in. <sup>3</sup>
1 lb.mass/ft. <sup>3</sup>	0.016 g/cm <sup>3</sup>	1 g/cm <sup>3</sup>	62.4 lb.mass/ft. <sup>3</sup>

## Temperature conversion

Kelvin (K)	Centigrade (°C)	Fahrenheit (°F)
273	0	32
373	100	212

$C = K - 273.15$	$K = C + 273.15$	$F = 1.8C + 32$	$C = (F-32) / 1.8$
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## Thermotechnical units

1 B.t.u.	0.252 kcal	1.05506 kJ	1 kJ	0.2388 kcal	0.9477 B.t.u
1 B.t.u./lb-mass	0.556 kcal/kg	2.329 kJ/kg	1 kJ/kg	0.2388 kcal/kg	0.4298 B.t.u./lb-m.

## Pressure

	1 Pa = 1 N/m <sup>2</sup>	1 bar = 1 Mdyn/cm <sup>2</sup>	1 at = 1 kp/cm <sup>2</sup>	1 atm = 1 pSTP	1 Torr = 1 mmHg	1 psi = 1 lbF/in <sup>2</sup>
1 Pa	1	$1.0000 \cdot 10^{-5}$	$1.0197 \cdot 10^{-5}$	$9.8692 \cdot 10^{-6}$	$75006 \cdot 10^{-3}$	$1.4504 \cdot 10^{-4}$
1 bar	$1.0000 \cdot 10^5$	1	$1.0197 \cdot 10^0$	$9.8692 \cdot 10^{-1}$	$7.5006 \cdot 10^2$	$1.4504 \cdot 10^1$
1 at	$9.8067 \cdot 10^4$	$9.8067 \cdot 10^{-1}$	1	$9.6784 \cdot 10^{-1}$	$7.3556 \cdot 10^2$	$1.4223 \cdot 10^1$
1 atm	$1.0133 \cdot 10^5$	$1.0133 \cdot 10^0$	$1.0332 \cdot 10^0$	1	$7.6000 \cdot 10^2$	$1.4696 \cdot 10^1$
1 Torr	$1.3332 \cdot 10^2$	$1.3332 \cdot 10^{-3}$	$1.3595 \cdot 10^{-3}$	$1.3158 \cdot 10^{-3}$	1	$1.9337 \cdot 10^{-2}$
1 psi	$6.8948 \cdot 10^3$	$6.8948 \cdot 10^{-2}$	$7.0307 \cdot 10^{-2}$	$6.8046 \cdot 10^{-2}$	$5,1715 \cdot 10^1$	1

## Volume

1 m <sup>3</sup>	= 1000 l	1 in <sup>3</sup>	= 0.0164 l
1 l	= 10 dl	1 l	= 0.2642 US gal
1 US gallon	= 3.7854 l	1 l	= 0.0353 ft <sup>3</sup>
1 ft <sup>3</sup>	= 28.3168 l	1 l	= 61.0237 in <sup>3</sup>

## Gas Flow

1 scfh (70 °F)	= 0.4719 slpm (70 °F)	= 0.4381 nl/min (0 °C)
1 nl/min (0 °C)	= 1.0773 slpm (70 °F)	= 2.2826 scfh (70 °F)

# We go the sustainable way

Höganäs strives to be a catalyst for change and become a truly sustainable business. For us, environmental and social care, and business success are intertwined. Our sustainability strategy, Mount Sustainability, sets the direction.

A great and meaningful place to work means respect, equal treatment, competence and leadership development. For us, people that prosper are the foundation for the timely and efficient delivery of quality products and services to our customers.

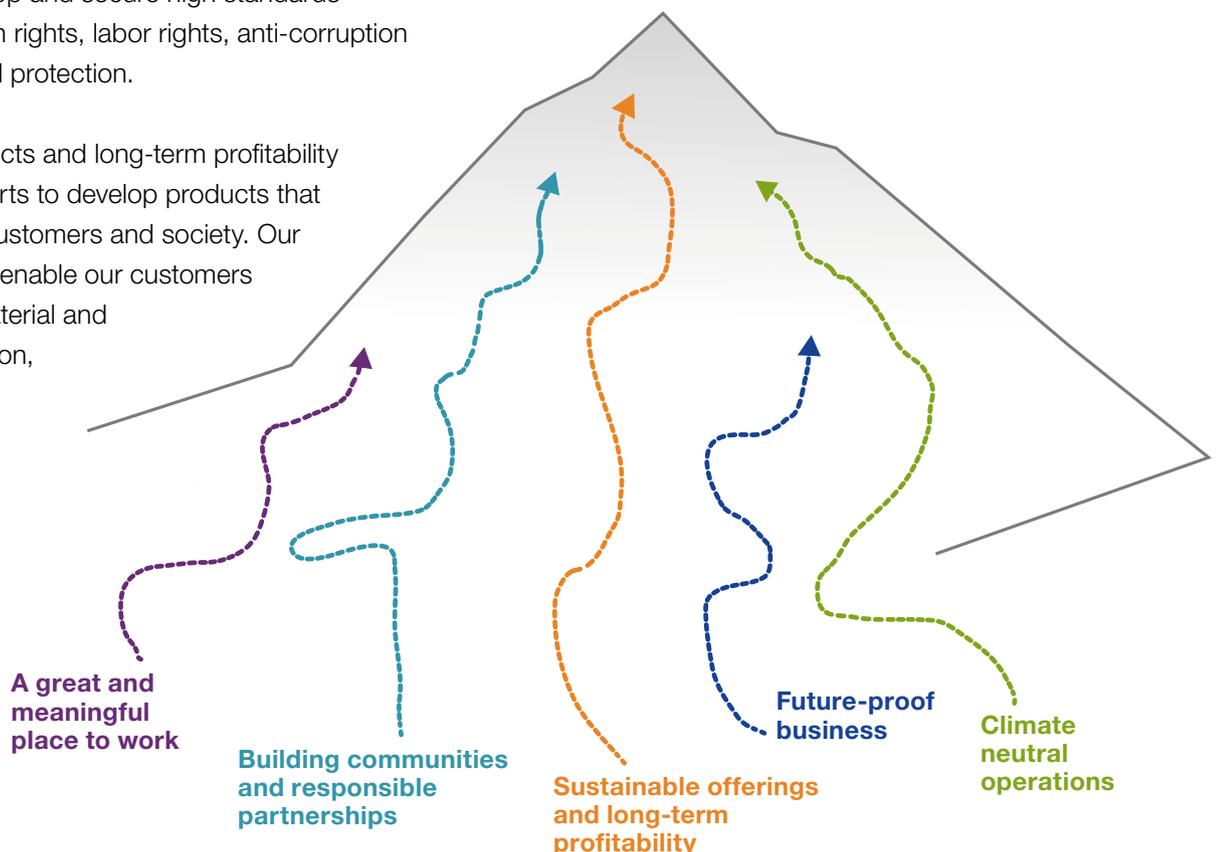
Building communities and responsible partnerships includes amongst other things our extensive work with responsible sourcing, working together with our suppliers to develop and secure high standards concerning human rights, labor rights, anti-corruption and environmental protection.

Sustainable products and long-term profitability describes our efforts to develop products that benefit both our customers and society. Our products not only enable our customers to reduce their material and energy consumption,

but also improve the efficiency of their final products. Future-proof business means ensuring high quality in our products through effective work methods, a clean work environment, responsible use of resources, Zero Waste and Zero Accidents.

Climate neutral operations is the guiding vision for our work with careful monitoring of our emissions, efficient use of energy and resources in production and transport, and gradually changing to renewable resources.

Höganäs aims to be the partner that enables sustainability and seeks cooperation with suppliers, end users, academia and communities to meet the expectations and requirements of society.





## Power of Powder®

Powder technology has the power to open up a world of possibilities. The inherent properties of powders provide unique possibilities to tailor solutions to match your requirements.

This is what we call Power of Powder®, a concept to constantly widen and grow the range of powder applications.

With its leading position in powder technology, Höganäs is perfectly placed to help you explore those possibilities as your application project partner.

To find out how you can apply the Power of Powder®, please contact your nearest Höganäs office.



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