Thermal Spray Materials Guide
Aluminum silicon based abradables for clearance control are generally used in the low temperature sections of turbine engines, such as the fan and LP compressor sections, as well as in turbo compressors. Coatings of these materials are appropriate for use with, and often run against, titanium based components. An adequate, but low cohesive strength, within the metal matrix is the result of the addition of the solid lubricant and polymer. This minimizes frictional heat and the possibility of melting wear.

**Metco 320NS**
- **Chemistry:** Al 8Si 20BN
- **Particle Size:** -212 +45 µm (-70 mesh +325 mesh)
- **Morphology:** Clad
- **Properties & Applications:**
  - High quality abradable coating material for use in compressor section of jet engines. Suitable for use against titanium and ferrous blades.

**OEM Specifications:**
- Rolls-Royce MSRR 9507/66

**Metco 311NS**
- **Chemistry:** Al 7Si 26Graphite
- **Particle Size:** -150 +7.8 µm (-100 mesh +7.8 µm)
- **Morphology:** Clad
- **Properties & Applications:**
  - High quality abradable coating material for use in the compressor section of jet engines. Operating temperature range of 315 - 415°C (600 - 800°F).

**OEM Specifications:**
- Rolls-Royce Allison EMS 56764

**Metco 313NS**
- **Chemistry:** Al 5.5Si 45.5Graphite
- **Particle Size:** -150 +7.8 µm (-100 mesh +7.8 µm)
- **Morphology:** Clad
- **Properties & Applications:**
  - High quality abradable coating material for use in the compressor section of jet engines. Operating temperature range of 315 - 415°C (600 - 800°F).

**OEM Specifications:**
- Canada Pratt Whitney CPW 555
- Rolls-Royce MSRR 9507/44
- Volvo PM 819-64

**Metco 601NS**
- **Chemistry:** Al 12Si 40Polyester
- **Particle Size:** -125 +11µm (-120 mesh +11 µm)
- **Morphology:** Blend
- **Properties & Applications:**
  - High quality abradable coating material for use in the compressor section of jet engines. Suitable for operating temperatures up to 325°C (617°F).

**OEM Specifications:**
- Canada Pratt Whitney CPW 517
- Chromalloy BZ-003, Type 34
- GE B50TF222, Class A
- Honeywell M3955
- Honeywell Allied Signal EMS 57735
- Honeywell Allied Signal FP 5091
- Pratt Whitney PWA 1349
- Rolls-Royce MSRR 9507/15
- Rolls-Royce Allison EMS 38900
- Sermatech Klock PAB 360
- SNECMA DMR 33.087
- Turbomeca LA 657 Ed.1 PW 1 Ind.0
- Volvo PM 819-30
- Williams WIMS 647

**AMDRY 2010**
- **Chemistry:** Al 12Si 40Polyester
- **Particle Size:** -125 +11µm (-120 mesh +11 µm)
- **Morphology:** Blend
- **Properties & Applications:**
  - High Quality abradable coating material for the compressor section of jet engines. Suitable for operating temperatures up to 325°C (617°F).

**OEM Specifications:**
- Canada Pratt Whitney CPW 517
- GE B50TF222, Class A & C
- Honeywell M3955
- Honeywell Allied Signal EMS 57735
### AMDRY 2000

<table>
<thead>
<tr>
<th>Chemistry:</th>
<th>Al 12Si 47Polyimide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Particle Size:</td>
<td>-176 + 16 µm</td>
</tr>
<tr>
<td>Morphology:</td>
<td>Composite</td>
</tr>
</tbody>
</table>

### OEM Specifications:

- Rolls-Royce Allison EMS 56767
- Rolls-Royce Allison PMI 1332
Cobalt-nickel based abradables are used in high pressure compressor of gas turbine engines. Typically, the materials are plasma sprayed and then heat-treated to burn off the polymer, resulting in high porosity coatings that are abradable and have the proper level of erosion resistance. Applications that cut against titanium have a 550 °C (1025 °F) temperature limit; those that cut against Inconel and stainless steel can be used at temperatures up to 850 °C (1550 °F). Bond coats of MCrAlY, NiCrAl or NiCr are recommended.

**Sulzer Metco 2043**

- **Chemistry:** Co 25Ni 16Cr 6.5Al 0.5Y
- **Particle Size:** -176 + 7.8 µm
- **Morphology:** Spheroidal, Composite Blend
- **Properties & Applications:** High temperature abradable good up to 750°C (1380°F) against Inconel® and steel blades. With tipped blades, maximum service temperature increases to 850°C (1560°F).

*Inconel is a registered trademark of INCO.*

**OEM Specifications:**
- Rolls-Royce Allison EMS 56768
- Williams WIMS 742

**Sulzer Metco 2042**

- **Chemistry:** CoNiCrAlY Polyester/BN
- **Particle Size:** -176 + 11 µm
- **Morphology:** Spheroidal, Composite Blend
- **Properties & Applications:** Gas path seals up to 850°C (1560°F). Gas path seals against titanium alloy blades up to 600°C (1110°F). Clearance control in compressor housings.
Copper based materials are used in aerospace and industrial abradable coating applications as a protective, clearance control surface for rotating titanium blades to cut into or as a labyrinth seal coating against 17-4 PH steel or Inconel knife edges, at services temperatures up to 650 °C (1200 °F). Corrosion resistance in marine environments is superior to aluminum based abradables. As with other soft matrix abradables, a polymer filler is used to reduce inter-particle cohesion and improve the friability of the coating structure. This helps to improve machinability prior to service and helps to prevent material transfer and component wear during service.

**Metco 605NS**
- Chemistry: Aluminum Bronze Alloy 10 Polyester
- Particle Size: -125 +11 µm (-120 mesh +11 µm)
- Morphology: Blend
- Properties & Applications: Abradable coating material having operational temperatures up to 650°C (1200°F).

**OEM Specifications:**
- GE A8Y5
- Honeywell M3964
- Honeywell Allied Signal EMS 57728
- Rolls-Royce MSRR 9507/40

**Metco 610NS**
- Chemistry: Aluminum Bronze Alloy 14 Polyester
- Particle Size: -125 +11 µm (-120 mesh +11 µm)
- Morphology: Clad
- Properties & Applications: Abradable coating material having operational temperatures up to 650°C (1200°F).

**OEM Specifications:**
- Honeywell Allied Signal EMS 57728

**Metco 604NS**
- Chemistry: Aluminum Bronze Alloy 95 (Cu 9.5 Al 1 Fe)
- Particle Size: -125 +11 µm (-120 mesh +11 µm)
- Morphology: Blend
- Properties & Applications: Abradable coating material having operational temperatures up to 650°C (1200°F).

**OEM Specifications:**
- Sikorsky SS9212 *(made to order as SP8847)*
Polymer materials are used for self-lubricating applications and to provide friability in clearance control coating systems with service temperatures below 350 °C (660 °F). Controlled porosity is achieved through entrapment of the polymer within the coating structure. For higher temperature applications, a post-coat burn-out of the polymer material can be performed. Sulzer Metco polyester products are high quality, liquid crystalline polymers (LCP) having consistent performance. The high quality of these products improves temperature capability. Coatings that undergo a post-heat treatment of 325 – 350 °C (615 – 660 °F) are less likely to sinter and change dimension when compared to more amorphous polymers.

**Metco 600NS**
- **Chemistry:** Polyester Reactor Product
- **Particle Size:** -125 + 45 µm (-120 + 325 mesh)
- **Properties & Applications:** Low friction, self-lubricating coating. Suitable for light compressive loading. Maximum service temperature 325°C (617°F).
- **OEM Specifications:**
  - Chromalloy C-68
  - GE A17 B111S-1
  - Rolls-Royce MSRR 9507/64
  - Technetics RM-1050

**Metco 600NS-1**
- **Chemistry:** Polyester Reactor Product
- **Particle Size:** -150 + 45 µm (-100 + 325 mesh)
- **Properties & Applications:** Low friction, self-lubricating coating. Suitable for light compressive loading. Maximum service temperature 325°C (617°F).
- **OEM Specifications:**
  - Pratt Whitney PWA 36097D
Aluminum alloys are used for repair of worn aluminum and magnesium substrates. They are also used for low temperature clearance control applications and machining purposes. Aluminum Silicon alloys should not be exposed to temperatures approaching 315 °C (600 °F) or greater, as they are prone to over ageing characterized by a reduction in hardness and the precipitation of secondary silicon based phases in the alloy. Aluminum-iron composites result in one-step exothermic reactions, producing coatings that are self-bonding to aluminum substrates.

**Metco 54NS-1**

- **Chemistry:** Al 99%
- **Particle Size:** -75 +45 µm (-200 +325 mesh)
- **Morphology:** Spheroidal, Gas Atomized
- **Properties & Applications:** Corrosion resistant in coastal and industrial atmospheric conditions. Good electrical and thermal conductivity. Relatively soft and ductile, can be used to repair aluminum and magnesium base alloy parts. Non-magnetic, can be used for electromagnetic shielding.

**OEM Specifications:**
- CFM International CP 6028
- GE B50TF57, Class A
- Jet Avion JA1320
- MTU MTS 1052
- Pratt Whitney PWA 1320
- Rolls-Royce MSRR 9507/13
- Volvo PM 819-23

**Metco 54NS**

- **Chemistry:** Al 99%
- **Particle Size:** -90 +45 µm (-170 +325 mesh)
- **Morphology:** Spheroidal, Gas Atomized
- **Properties & Applications:** Corrosion resistant in coastal and industrial atmospheric conditions. Good electrical and thermal conductivity. Relatively soft and ductile, can be used to repair aluminum and magnesium base alloy parts. Non-magnetic, can be used for electromagnetic shielding.

**OEM Specifications:**
- Boeing BMS 10-67, Type VII
- Canada Pratt Whitney CPW 220
- Honeywell Allied Signal EMS 57743
- Honeywell Allied Signal EMS 57742
- Pratt Whitney PWA 1320
- Rolls-Royce Allison EMS 38850
- SNECMA DMR 33.012
- U. S. Military USAF 67A 60753A
- Voight 207-2-402

**Metco 52C-NS**

- **Chemistry:** Al 12Si
- **Particle Size:** -90 +45 µm (-170 +325 mesh)
- **Morphology:** Spheroidal, Gas Atomized
- **Properties & Applications:** Salvage and build-up of parts made of aluminum, magnesium and their alloys. Good machine finish.

**OEM Specifications:**
- Canada Pratt Whitney CPW 235
- GE B50TF92, Class A
- Honeywell M 3962
- Honeywell Allied Signal EMS 57742
- Pratt Whitney PWA 1335
- Rolls-Royce MSRR 9507/60
- Rolls-Royce Allison EMS 38910
- SNECMA DMR 33.027
- U. S. Military MIL-P-83348, Type 1, Comp. E
- Volvo PM 819-35

**AMDRY 355**

- **Chemistry:** Al 12Si
- **Particle Size:** -45 µm (-325 mesh)
- **Morphology:** Spheroidal, Gas Atomized
- **Properties & Applications:** Suitable for chambered plasma. May also be used for APS.

**OEM Specifications:**
- Pratt Whitney PWA 1355

**Metco 446**

- **Chemistry:** Al 25Fe 7Cr 5Ni
- **Particle Size:** -106 +45 µm (-140 +325 mesh)
- **Morphology:** Clad
- **Properties & Applications:** Self-bonding, dense coatings. Good color match to aluminum and magnesium alloys. Excellent machinability.
Sulzer Metco’s family of cobalt based materials is used in applications to resist high temperature wear, hot corrosion and oxidation, as well as for restoration of cobalt substrates. The CoMoCrSi alloys (Tribaloy family) are known for their excellent high temperature sliding wear, corrosion, oxidation and general wear properties. They are characterized by molybdenum rich phases that are dispersed in a softer cobalt matrix. The CoCrNiWC (Stellite family) alloys benefit from the addition of carbon to improve hardness and wear properties. Post-coating heat-treatment of cobalt based alloys can enhance overall performance.

**Metco 45C-NS**

- **Chemistry:** Co 25.5 Cr 10.5Ni 7.5W 0.5C
- **Particle Size:** -75 + 45 µm (-200 +325 mesh)
- **Morphology:** Water Atomized
- **Properties & Applications:** Resists wear by abrasive grains, hard surfaces, fretting and particle erosion to high temperature environments between 540-840ºC (1000-1550ºF).
- **OEM Specifications:**
  - Canada Pratt Whitney CPW 218
  - Pratt Whitney PWA 1318
  - Rolls-Royce MSRR 9507/3
  - SNECMA DMR 33.007

**Metco 45VF-NS**

- **Chemistry:** Co 25.5 Cr 10.5Ni 7.5W 0.5C
- **Particle Size:** -45 + 5 µm (-325 +5 µm)
- **Morphology:** Water Atomized
- **Properties & Applications:** Resists wear by abrasive grains, hard surfaces, fretting and particle erosion to high temperature environments between 540-840ºC (1000-1550ºF).
- **OEM Specifications:**
  - Canada Pratt Whitney CPW 236
  - CFM International CP 6002
  - Honeywell M3963
  - Pratt Whitney PWA 1316
  - Rolls-Royce MSRR 9507/23
  - SNECMA DMR 33.008 *(supplied on a lot select basis only)*
  - Volvo PM 819-16

**AMDRY X40**

- **Chemistry:** Co 25.5Cr 10.5Ni 7.5W .5C
- **Particle Size:** -106 +37 µm (-140 +400 mesh)
- **Morphology:** Sphero idal, Gas Atomized
- **Properties & Applications:** Primarily used for surface restoration of worn or damaged parts, e.g. airfoils, combustors, blades and vanes in the gas turbine industry.

**AMDRY MM509**

- **Chemistry:** Co 24Cr 10Ni 7W 3.5Ta .6C
- **Particle Size:** -45 +5 µm (-325 mesh +5 µm)
- **Morphology:** Sphero idal, Gas Atomized
- **Properties & Applications:** Primarily used for surface restoration of worn or damaged parts, e.g. airfoils, combustors, blades and vanes in the gas turbine industry.

**Sulzer Metco 4451**

- **Chemistry:** Co 32Ni 21Cr 8Al 0.5Y
- **Particle Size:** -38 +5 µm (-400 mesh +5 µm)
- **Morphology:** Sphero idal, Gas Atomized
- **Properties & Applications:** Provides oxidation and hot corrosion resistance for hot section turbine components. Similar to AMDRY 9951 but with lower level of fine particles.
**AMDRY 995C**

**Chemistry:** Co 32Ni 21Cr 8Al 0.5Y  
**Particle Size:** -75 +45 µm (-200 +325 mesh)  
**Morphology:** Spheroidal, Gas Atomized  
**Properties & Applications:** For demanding aerospace applications in a coarse size that can be sprayed using air plasma. Used for protection in hot corrosive or oxidizing environments up to approximately 850ºC (1560ºF) for APS coatings.

**OEM Specifications:**  
Honeywell Allied Signal EMS 57741, Grd. A  
Rolls-Royce MSRR 9507/47  
Rolls-Royce Allison EMS 56769  
Turbohome LA 657 PE1 Ind. 0  
Volvo PM 819-58

**AMDRY 9951**

**Chemistry:** Co 32Ni 21Cr 8Al 0.5Y  
**Particle Size:** -37 +5 µm (-400 mesh + 5 µm)  
**Morphology:** Spheroidal, Gas Atomized  
**Properties & Applications:** For demanding aerospace applications in a size which suitable for chambered plasma spray. Used for protection in hot corrosive or oxidizing environments up to approximately 1050ºC (1920ºF) for heat treated chambered coatings.

**OEM Specifications:**  
Rolls-Royce MSRR 9507/73  
SNECMA DMR 33.095

**Metco 66F-NS**

**Chemistry:** Co 28Mo 8Cr 2Si  
**Particle Size:** -45 +15 µm (-325 mesh +15 µm)  
**Morphology:** Water Atomized  
**Properties & Applications:** Similar to Tribaloy® 400. Coatings perform well in reducing environments such as hydrochloric, formic and sulfuric acids; oxidizing environments, such as ferric chloride; non-oxidizing environments, such as phosphoric and acetic acid and salt water. Particularly suitable where lubrication is low or non-existent. Excellent sliding wear resistance combined with good hot corrosion resistance and moderate oxidation resistance, at temperatures to approximately 800ºC (1470ºF). (*Tribaloy is a registered trademark of Deloro Stellite, Inc.)

**OEM Specifications:**  
CFM International CP 6020  
GE B50TF155, Class A  
Honeywell Allied Signal EMS 52432, Class XVI  
Rolls-Royce Allison EMS 56712  
Volvo PM 819-62

**Metco 68F-NS-1**

**Chemistry:** Co 28Mo 17Cr 3Si  
**Particle Size:** -45 +15 µm (-325 mesh +15 µm)  
**Morphology:** Water Atomized  
**Properties & Applications:** Similar to Tribaloy® 800. Coatings perform well in reducing environments such as hydrochloric, formic and sulfuric acids; oxidizing environments, such as ferric chloride; non-oxidizing environments, such as phosphoric and acetic acid and salt water. Particularly suitable where lubrication is low or non-existent. Excellent sliding wear resistance combined with good hot corrosion resistance and moderate oxidation resistance, at temperatures to approximately 800ºC (1470ºF). (*Tribaloy is a registered trademark of Deloro Stellite, Inc.)

**OEM Specifications:**  
CFM International CP 6021  
GE B50TF190, Class A  
GE Std. Prac. C07-031 (material only)  
Honeywell Allied Signal EMS 52432, Class XV  
Rolls-Royce Allison EMS 56713  
Volvo PM 819-15

**AMDRY 345**

**Chemistry:** Proprietary MCrAlY  
**Morphology:** Spheroidal, Gas Atomized  
**Properties & Applications:** Used as hot corrosion and oxidation resistant bond coats, for example in the thermal barrier coating (TBC) system on turbine airfoils.

**OEM Specifications:**  
Pratt Whitney PWA 1348-2

**Sulzer Metco 4195**

**Chemistry:** Proprietary MCrAlY  
**Properties & Applications:** Proprietary alloy available to approved users.

**OEM Specifications:**  
GE B50AG5 (GT20)
### Air Plasma Spray / Metals, Alloys, Composites and Blends / Cobalt Base (continued)

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<thead>
<tr>
<th>Material</th>
<th>Chemistry</th>
<th>Properties &amp; Applications</th>
<th>OEM Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulzer Metco 4197</td>
<td>Proprietary MCrAlY</td>
<td>Proprietary alloy available to approved users.</td>
<td>GE B50AG11 (GT29)</td>
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<tr>
<td>Sulzer Metco 4198</td>
<td>Proprietary MCrAlY</td>
<td>Proprietary alloy available to approved users.</td>
<td>GE B50AG12 (GT33)</td>
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<td>Sulzer Metco 4201</td>
<td>Proprietary MCrAlY</td>
<td>Proprietary alloy available to approved users.</td>
<td>Siemens SICOAT 2231</td>
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</tbody>
</table>
Coatings of copper based materials have many diverse applications, including repair of copper based substrates, anti-fretting applications, soft bearing applications, electrical and thermal conductance and anti corrosion (befouling) applications. Mechanically composited alloys of copper with aluminum result in self-bonding one step materials that are used for repair applications. The additions of nickel into copper increases the operating temperature limits of pure copper and makes the alloy more corrosion resistant. Aluminum bronze alloys are more wear and oxidation resistant than pure copper materials. (Recommended upper application temperature limit of pure copper is 230 °C (450 F°)).

Metco 55
Chemistry: Cu 99%
Particle Size: -90 +45 µm (-170 +325 mesh)
Morphology: Spheroidal, Gas Atomized
Applications: Good electrical and thermal conductivity. Used in the paper and printing industry to resist corrosive effects of inks. Can be used for build-up and repair of copper base alloys. Non-magnetic, can be used for electromagnetic shielding.

OEM Specifications:
Rockwell Int. RB0170-251 (Made to order only as Metco 55NS)
Rolls-Royce MSRR 9507/11

Metco 445
Chemistry: Cu 10 Al Aluminum Bronze
Particle Size: -106 +45 µm (-140 +325 mesh)
Morphology: Clad
Applications: Typical parts which may be coated are pumps (cavitation resistance), piston guides (soft bearing surfaces), shifter forks and compressor air seals. Moderate oxidation, wear and fretting resistance at low temperatures, good emergency dry running properties. Can be used for build-up and repair of copper base alloy parts. Melting temperature 1040°C (1900°F).

OEM Specifications:
Honeywell Allied Signal FP 5045, Type XVII
Rolls-Royce MSRR 9507/38
U. S. Military MIL 1687

Metco 51NS
Chemistry: Cu 9.5Al 1Fe
Particle Size: -125 +45 µm (-120 +325 mesh)
Morphology: Spheroidal, Gas Atomized
Applications: Typical parts which may be coated are pumps (cavitation resistance), piston guides (soft bearing surfaces), shifter forks and compressor air seals. Moderate oxidation, wear and fretting resistance at low temperatures, good emergency dry running properties. Can be used for build-up and repair of copper base alloy parts. Melting temperature 1040°C (1900°F).

OEM Specifications:
GE B50TF161, Class A
Rolls-Royce MSRR 9507/24

Metco 51F-NS
Chemistry: Cu 9.5Al 1Fe Aluminum Bronze
Particle Size: -53 +11 µm (-270 mesh +11 µm)
Morphology: Spheroidal, Gas Atomized
Properties & Applications: Typical parts which may be coated are pumps (cavitation resistance), piston guides (soft bearing surfaces), shifter forks and compressor air seals. Moderate oxidation, wear and fretting resistance at low temperatures, good emergency dry running properties. Can be used for build-up and repair of copper base alloy parts. Melting temperature 1040°C (1900°F).

OEM Specifications:
Boeing BMS 10-67, Type II
CFM International CP 6011
GE B50TF161, Class B
Pratt Whitney PWA 1378-2
Rolls-Royce MSRR 9507/29
SNECMA DMR 33.092

Metco 57NS
Chemistry: Cu 38Ni
Particle Size: -75 +45 µm (-200 +325 mesh)
Morphology: Spheroidal, Gas Atomized
Applications: Coatings are very dense with low porosity and oxide content.

OEM Specifications:
GE B50TF42, Class A
Pratt Whitney PWA 1369
SNECMA DMR 33.015
Volvo PM 819-42
### AMDRY 500F
- **Chemistry:** Cu 36Ni 5In
- **Particle Size:** -45 +11 µm (-325 mesh +11 µm)
- **Morphology:** Spheroidal, Gas Atomized
- **Properties & Applications:** Produces dense coatings with good resistance to galling and fretting. Melting temperature 1150°C (2100°F). Applications: jet engine parts such as turbine blade roots.

### AMDRY 500C
- **Chemistry:** Cu 36Ni 5In
- **Particle Size:** -75 +45 µm (-200 +325 mesh)
- **Morphology:** Spheroidal, Gas Atomized
- **Properties & Applications:** Produces dense coatings with good resistance to galling and fretting. Melting temperature 1150°C (2100°F). Applications: jet engine parts such as turbine blade roots.

### Metco 58NS
- **Chemistry:** Cu 36Ni 5In
- **Particle Size:** -75 +45 µm (-200 +325 mesh)
- **Morphology:** Spheroidal, Gas Atomized
- **Properties & Applications:** Produces dense coatings with good resistance to galling and fretting. Melting temperature 1150°C (2100°F). Applications: jet engine parts such as turbine blade roots.

### OEM Specifications:
- **AMDRY 500F:** GE B50TF72, Class B, Rolls-Royce MSRR 9507/55
- **AMDRY 500C:** Boeing BMS 10-67, Type XIV, GE B50TF72, Class A, Honeywell Allied Signal EMS 52432, Class XXXII, Rolls-Royce MSRR 9507/31, Siemens/Westinghouse PD13445DB, SNECMA DMR 33.016
- **Metco 58NS:** GE B50TF72, Class A, Honeywell Allied Signal EMS 52432, Class XXXII, Rolls-Royce MSRR 9507/31, SNECMA DMR 33.016
In general, additions of boron and carbon are added to increase the hardness and wear resistance of ferrous based coatings, while additions of chromium and nickel increase the temperature capability. High molybdenum containing alloys improves the sliding wear capability and improves the chemical corrosion resistance of 300 series stainless steels. Alloys of FeNi have improved machinability over pure nickel alloys. Application and processing temperatures may affect hardness and wear resistance of these coatings.

**Metco 449P**
Chemistry: Fe 3Al 3Mo 3C 0.1B  
Particle Size: -125 +45 µm (-120 +325 mesh)  
Morphology: Clad  
Properties & Applications: Recommended for salvage and build-up of ferrous base substrates, such as crankshaft journals. High carbon "steel" composite.

**Sulzer Metco 4052**
Chemistry: Fe 1.4Cr 1.4Mn 1.2C  
Particle Size: -38 +15 µm (-400 mesh +15 µm)  
Morphology: Spherical, Gas Atomized  
Properties & Applications: Produces hard surfaces to provide wear resistance in cylinder bore applications for the automotive industry.

**Metco 42C**
Chemistry: Fe 16Cr 2Ni 0.2C (AISI Type 431 stainless steel)  
Particle Size: -106 +45 µm (-140 +325 mesh)  
Morphology: Water Atomized  
Properties & Applications: Corrosion resistant coating used mostly for repair and wear applications requiring a hard ground finish. The coatings may contain martensitic phases.

**Metco 41C-NS**
Chemistry: Fe 17Cr 12Ni 2.5Mo 2.3Si 0.1C (AISI Type 316 stainless steel)  
Particle Size: -106 +45 µm (-140 +325 mesh)  
Morphology: Water Atomized  
Properties & Applications: Premium grade austenitic nickel-chrome stainless steel. Coatings can be easily machined. Recommended for cavitation and low temperature erosion resistance.

**Metco 350NS**
Chemistry: Fe 18Mo 3C 0.25Mn  
Particle Size: -90 +11 µm (-170 mesh +11 µm)  
Morphology: Clad  
Properties & Applications: Developed as an alternative to hard chrome plating. Protection against abrasive grains, wear from hard bearing surfaces and fretting.

**AMDRY 959**
Chemistry: Fe 37Ni 6Al  
Particle Size: -106 +45 µm (-140 +325 mesh)  
Morphology: Clad  
Properties & Applications: Material undergoes an exothermic reaction during spraying and forms a strong metallurgical bond with the base metal. Machinable coatings that are oxidation resistant up to 815°C (1500°F).
## Air Plasma Spray / Metals, Alloys, Composites and Blends / Iron Base (continued)

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<tr>
<th>Metco 453</th>
<th>Chemistry:</th>
<th>Fe 35Ni 5Al 5Mo</th>
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<tbody>
<tr>
<td>Metco 453</td>
<td>Particle Size:</td>
<td>-125 +45 µm (-120 +325 mesh)</td>
</tr>
<tr>
<td>Metco 453</td>
<td>Morphology:</td>
<td>Clad</td>
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<tr>
<td>Metco 453</td>
<td>Applications:</td>
<td>Recommended for salvage and repair of components such as diesel firedocks and cylinder heads.</td>
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</table>

<table>
<thead>
<tr>
<th>Metco 452</th>
<th>Chemistry:</th>
<th>Fe 38Ni 10Al</th>
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<tr>
<td>Metco 452</td>
<td>Particle Size:</td>
<td>-125 +45 µm (-120 mesh +325</td>
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<tr>
<td>Metco 452</td>
<td>Morphology:</td>
<td>Clad</td>
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<tr>
<td>Metco 452</td>
<td>Applications:</td>
<td>Material undergoes an exothermic reaction during spraying and forms a strong metallurgical bond with the base metal. Machinable coatings which are oxidation resistant up to 815°C (1500°F).</td>
</tr>
</tbody>
</table>
Molybdenum based coatings are generally used for sliding wear applications. Common applications are piston rings and synchronizing rings in the automobile market. Self-fluxing alloy additions improve the wear resistance properties and reduce inter-particle oxidation. Carbon additions result in molybdenum carbide formation within the molybdenum coating, which enhances wear resistance. Typical upper operating limit for pure molybdenum in oxidizing environments is 315 °C (600 °F). Molybdenum coatings in non-oxidizing / reducing environments can be used at substantially higher temperatures. General properties of molybdenum are high thermal conductivity, low thermal expansion and self-bonding to steel substrates.

### Metco 63NS
- **Chemistry:** Mo 99%
- **Particle Size:** -75 +45 µm (-200 mesh +45 µm)
- **Morphology:** Sintered, Crushed
- **Properties & Applications:** Tough and hard, with excellent sliding properties and galling resistance; good emergency running properties. Fret resistant. Resistant to electric arc erosion. High-density coatings are possible. In oxidizing or atmospheric conditions, Mo should not be used above 340ºC (650ºF). Used for pump parts, diesel engine fuel injectors, piston rings, synchronizing rings, press fits, valves, gears, cam followers and similar applications. Bonds well to steel.

### Sulzer Metco 4207
- **Chemistry:** Mo 99.5%
- **Particle Size:** -90 +38 µm (-170 +400 mesh)
- **Morphology:** Sintered, Crushed
- **Properties & Applications:** Coatings are tough and hard with excellent sliding properties, wear resistance and emergency running characteristics. Resistant to arc erosion. Very thick coatings are possible. Should not be used above temperatures of 340 °C (650 °F) in oxidizing or atmospheric environments. Typical applications include pump parts, nozzles in diesel injection pumps, piston rings, synchronizing rings, press fits on valves, cam followers and similar applications. High bond strength on steel substrates.

### AMDRY 313X
- **Chemistry:** Mo 99.5%
- **Particle Size:** -90 +37 µm (-170 +400 mesh)
- **Morphology:** Spheroidal, Agglomerated and Densified
- **Properties & Applications:** Tough and hard, with excellent sliding properties and galling resistance; good emergency running properties. Fret resistant. Resistant to electric arc erosion. High-density coatings are possible. In oxidizing or atmospheric conditions, Mo should not be used above 340ºC (650ºF). Used for pump parts, diesel engine fuel injectors piston rings, synchronizing rings, press fits, valves, gears, cam followers and similar applications. Bonds well to steel.

### Metco 64
- **Chemistry:** Mo 3C
- **Particle Size:** -90 +45 µm (-170 mesh +325 mesh)
- **Morphology:** Agglomerated and Sintered
- **Properties & Applications:** Tough, hard, excellent sliding wear properties.

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**OEM Specifications:**
- Canada Pratt Whitney CPW 213
- CFM International CP 6019
- Chromalloy BZ-003, Type 1
- Honeywell M3953
- Honeywell Allied Signal EMS 57738
- Pratt Whitney PWA 1313
- Rolls-Royce MSRR 9507/19
- Rolls-Royce Allison EMS 56705
- SNECMA DMR 33.017
- U. S. Military MIL-P-83348, Type 1, Class II
- U. S. Military USAF 67A60753
- Volvo PM 819-13

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**EU Sulzer Metco 4207**
- **Chemistry:** Mo 99.5%
- **Particle Size:** -90 +38 µm (-170 +400 mesh)
- **Morphology:** Sintered, Crushed
- **Properties & Applications:** Coatings are tough and hard with excellent sliding properties, wear resistance and emergency running characteristics. Resistant to arc erosion. Very thick coatings are possible. Should not be used above temperatures of 340 °C (650 °F) in oxidizing or atmospheric environments. Typical applications include pump parts, nozzles in diesel injection pumps, piston rings, synchronizing rings, press fits on valves, cam followers and similar applications. High bond strength on steel substrates.

**OEM Specifications:**
- Pratt Whitney PWA 1313

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**AMDRY 313X**
- **Chemistry:** Mo 99.5%
- **Particle Size:** -90 +37 µm (-170 +400 mesh)
- **Morphology:** Spheroidal, Agglomerated and Densified
- **Properties & Applications:** Tough and hard, with excellent sliding properties and galling resistance; good emergency running properties. Fret resistant. Resistant to electric arc erosion. High-density coatings are possible. In oxidizing or atmospheric conditions, Mo should not be used above 340ºC (650ºF). Used for pump parts, diesel engine fuel injectors piston rings, synchronizing rings, press fits, valves, gears, cam followers and similar applications. Bonds well to steel.

**OEM Specifications:**
- Canada Pratt Whitney CPW 213 Amend. 1
- CFM International CP 6019
- Pratt Whitney PWA 1313
- Rolls-Royce MSRR 9507/19
- Rolls-Royce Allison EMS 56705

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**Metco 64**
- **Chemistry:** Mo 3C
- **Particle Size:** -90 +45 µm (-170 mesh +325 mesh)
- **Morphology:** Agglomerated and Sintered
- **Properties & Applications:** Tough, hard, excellent sliding wear properties.
Air Plasma Spray / Metals, Alloys, Composites and Blends / Molybdenum Base (continued)

**AMDRY 1371**
Chemistry: Mo 25(NiCrBSiFe)  
Particle Size: -90 +45 µm (-170 mesh +325 mesh)  
Morphology: Blend  
Properties & Applications: Self-fusing, produces coatings which have high wear resistance, a low coefficient of friction and good scuff resistance. Can be used for hardfacings, hard bearing surfaces and abrasive wear resistant coatings up to approx. 350°C (660°F). Used in piston ring applications.

**Sulzer Metco 7837**
Chemistry: 37.5Mo 50(NiAlMo) 12.5(NiCrBSiFe)  
Particle Size: -90 +44 µm (-140 +325 mesh)  
Morphology: Blend  
Properties & Applications: Coatings are wear resistant and lubricious. Appropriate for automotive industry piston ring applications.

**OEM Specifications:**  
Honeywell Allied Signal EMS 52432, Class XIV
The large class of nickel based materials is used in many different market segments and applications. Key functions include bond coats for ceramic materials, self-bonding one-steps for salvage and repair applications, repair and restoration of superalloy substrates using a coating material of similar chemistry and alloys for general corrosion and sliding wear. Key additives to nickel alloys for oxidation/hot corrosion applications are chromium, aluminum and yttrium, which affect the oxidation rate and, more importantly, the type of oxide scale and adherence. Alloys with high chromium content are preferred for hot corrosion / sulfidation resistance. Self-bonding composites rely on aluminum to create an exothermic reaction during spraying that results in micro-welding at the surface that improves bond strength and thickness limits.

**Metco 56C-NS**
Chemistry: Ni 99.5%
Particle Size: -75 +45 µm (-200 +325 mesh)
Morphology: Precipitated, Spheroidal
Properties & Applications: Can be used for salvage and build-up of nickel base alloy components that have been damaged or mis-machined.

**OEM Specifications:**
- Rolls-Royce MSRR 9513

**Metco 56F-NS**
Chemistry: Ni 99.5%
Particle Size: -45 +11 µm (-325 mesh +11 µm)
Morphology: Precipitated, Spheroidal
Properties & Applications: Can be used for salvage and build-up of nickel base alloy components that have been damaged or mis-machined.

**OEM Specifications:**
- Canada Pratt Whitney CPW 224
- Pratt Whitney PWA 1324
- U. S. Military USAF 67A60753A Type P4

**Metco 450P**
Chemistry: Ni 4.5 Al
Particle Size: -90 +45 µm (-170 +325 mesh)
Morphology: Clad
Properties & Applications: Premium grade composite powder results in coatings with excellent machinability. Coatings are dense and resistant to oxidation and abrasion. Recommended for use as oxidation-resistant bond coats which can be used up to 800°C (1470°F). Self-bonding and undergoes an exothermic reaction during spraying, resulting in excellent bonding to the substrate. Applications: salvage and build-up on machinable carbon and corrosion resistant steels, particle erosion resistance for exhaust valve seats, oxidation resistance for exhaust mufflers and heat treating fixtures.

**OEM Specifications:**
- Rolls-Royce MSRR 9507/43

**AMDRY 956**
Chemistry: Ni 5Al
Particle Size: -90 +45 µm (-170 +325 mesh)
Morphology: Clad
Properties & Applications: Coatings are dense and resistant to oxidation and abrasion. Recommended for use as oxidation resistant bond coats which can be used up to 800°C (1470°F). Self-bonding and undergoes an exothermic reaction during spraying, resulting in excellent bonding to the substrate. Applications: salvage and build-up on machinable carbon and corrosion resistant steels, particle erosion resistance for exhaust valve seats, oxidation resistance for exhaust mufflers and heat treating fixtures.

**OEM Specifications:**
- Canada Pratt Whitney CPW 247
- GE B50TF56, Class A
- Honeywell M3951
- Honeywell Allied Signal EMS 57746, Type I
- Honeywell Allied Signal FP 5045, Type XV
- MTU MTS 1080
- Pratt Whitney PWA 1337
- Rolls-Royce MSRR 9507/5
- Rolls-Royce Allison EMS 56757
- Rolls-Royce Allison PM1 1163
- SNECMA DMR 33.011
- Turbomeca LA 657 Ed. 1 PA2 Ind. 0
- Volvo PM 819-37
- Williams WIMS 644
**Metco 450NS**
Chemistry: Ni 5Al
Particle Size: -90 +45 µm (-170 +325 mesh)
Morphology: Clad
Properties & Applications: Coatings are dense and resistant to oxidation and abrasion. Recommended for use as oxidation-resistant bond coats which can be used up to 800°C (1470°F). Self-bonding and undergoes an exothermic reaction during spraying, resulting in excellent bonding to the substrate. Applications: salvage and build-up on machinable carbon and corrosion resistant steels, particle erosion resistance for exhaust valve seats, oxidation resistance for exhaust mufflers and heat treating fixtures.

**Metco 480NS**
Chemistry: Ni 5Al
Particle Size: -90+45 µm (-170+325 mesh)
Morphology: Sphero idal, Gas Atomized
Properties & Applications: Coatings are dense and resistant to oxidation and abrasion. Recommended for use as oxidation-resistant bond coats which can be used up to 800°C (1470°F). Self-bonding and undergoes an exothermic reaction during spraying, resulting in excellent bonding to the substrate. Applications: salvage and build-up on machinable carbon and corrosion resistant steels, particle erosion resistance for exhaust valve seats, oxidation resistance for exhaust mufflers and heat treating fixtures.

**Sulzer Metco 7012**
Chemistry: 91(Ni 10Cr 3Si 2.2B) 9(Ni 20Cr)
Particle Size: -106 +44 µm (-140 +325 mesh)
Morphology: Blend
Properties & Applications: Coatings provide wear resistance and may be fused after spraying. Similar to Metco 12C but less prone to cracking and with somewhat lower hardness.

**New! Metco 1102**
Chemistry: Ni 18Al
Particle Size: -90 +45 µm (-170 +325 mesh)
Morphology: Clad
Properties & Applications: Produces dense coatings that are resistant to oxidation and abrasion. For oxidation resistant bond coats which will operate at temperatures below 650°C (1200°F). Formerly supplied by Westaim Ambeon as Westaim 1101.

**AMDRY 955**
Chemistry: Ni 18Al
Particle Size: -125 +45 µm (-120 +325 mesh)
Morphology: Clad
Properties & Applications: Produces a coarser coating than Metco 404NS. Dense coatings, resistant to oxidation and abrasion. For oxidation resistant bond coats which will operate at temperatures below 650°C (1200°F).
**New!**

**Metco 2101**
- **Chemistry:** Ni 20Al
- **Particle Size:** -125 +45 µm (-120 +325 mesh)
- **Morphology:** Clad
- **Properties & Applications:** Produces a coarser coating than Metco 404NS. Dense coatings, resistant to oxidation and abrasion. For oxidation resistant bond coats which will operate at temperatures below 650°C (1200°F). Formerly supplied by Westaim Ambeon as Westaim 2101

**Metco 404NS**
- **Chemistry:** Ni 20Al
- **Particle Size:** -90 +53 µm (-170 +270 mesh)
- **Morphology:** Clad
- **Properties & Applications:** Dense coatings, resistant to oxidation and abrasion. For oxidation resistant bond coats which will operate at temperatures below 650°C (1200°F).

**New!**

**Metco 2501**
- **Chemistry:** Ni Al / Ni
- **Particle Size:** -125 +45 µm (-120 +325 mesh)
- **Morphology:** Clad / Blend
- **Properties & Applications:** Used to fill honeycomb then sintered at high temperatures to provide a thermal shield and improved abradability at temperatures up to 1100°C (2000°F). Formerly supplied by Westaim Ambeon as Westaim 2501

**Metco 451**
- **Chemistry:** Ni 9.5Cr 2.5Si 1.5B 0.5Al
- **Particle Size:** -106 +22 µm (-140 +22 mesh)
- **Morphology:** Blend
- **Properties & Applications:** Coatings are recommended for resistance to abrasive grains, particle erosion, cavitation resistance and salvage and build-up on grindable carbon and corrosion resistant steels.

**Sulzer Metco 5640NS**
- **Chemistry:** Ni 20Cr
- **Particle Size:** -106 +44 µm (-140 +325 mesh)
- **Morphology:** Spheroidal, Gas Atomized
- **Properties & Applications:** Appropriate to produce surfaces using the laser cladding process. Creates hard, corrosion resistant surfaces. Formerly supplied as XPT 647.

**OEM Specifications:**
- GE B50TF13, Class A & B
- Chromalloy C-72
- Chromalloy BZ-003, Type 2
- GE B50TF33 Class A
- Honeywell M3952
- Honeywell Allied Signal EMS 57746, Type II Class 2
- Honeywell Allied Signal FP5045, Type II
- Pratt Whitney PWA 1321
- Rolls-Royce MSRR 9507/4
- SNECMA DMR 33.010
- U. S. Military USAF 67A60753
- Volvo PM 819-21
- Rolls-Royce MSRR 9570
- GE B50TF40, Class A
Air Plasma Spray / Metals, Alloys, Composites and Blends / Nickel Base (continued)

**Metco 43C-NS**
Chemistry: Ni 20Cr
Particle Size: -106 +45 µm (-140 +325 mesh)
Morphology: Water Atomized
Properties & Applications: Coatings designed to resist oxidation and corrosive gases in temperatures to 980°C (1800°F). Used to resist heat and prevent scaling of carbon and low alloy steels in hot atmospheres. Can be used as a bond coat under ceramic coatings.

**Metco 43F-NS**
Chemistry: Ni 20Cr
Particle Size: -53 +11 µm (-270 mesh +11 µm)
Morphology: Water Atomized
Properties & Applications: Coatings designed to resist oxidation and corrosive gases in temperatures to 980°C (1800°F). Used to resist heat and prevent scaling of carbon and low alloy steels in hot atmospheres.

**Metco 43VF-NS**
Chemistry: Ni 20Cr
Particle Size: -45 +5 µm (-325 mesh +5 µm)
Morphology: Water Atomized
Properties & Applications: Coatings designed to resist oxidation and corrosive gases in temperatures to 980°C (1800°F). Used to resist heat and prevent scaling of carbon and low alloy steels in hot atmospheres.

**Sulzer Metco 4548**
Chemistry: Ni 20Cr
Particle Size: -106 +38 µm (-140 +400 mesh)
Morphology: Water Atomized
Properties & Applications: Recommended for resistance to oxidation and corrosive gases to service temperatures of 980 ºC (1800 ºF). Resists heat and prevents scaling on carbon and low alloy steel substrates as a bond coat under ceramic top coats. Formerly supplied as PEM 43C.

**AMDRY 7133**
Chemistry: Ni 14Cr 2(Nb+Ta) 1 Ti 6Al 0.01B 0.1Zr 0.15C
Particle Size: -45 µm (-325 mesh)
Morphology: Spheroidal, Gas Atomized
Properties & Applications: Designed for use on superalloys, especially Inconel® 713 and 718. Oxidation and corrosion resistant up to approximately 1000°C (1850°F).

**AMDRY 713C**
Chemistry: Ni 14Cr 2(Nb+Ta) 1 Ti 6Al 0.01B 0.1Zr 0.15C
Particle Size: -90 +45 µm (-170 +325 mesh)
Morphology: Spheroidal, Gas Atomized
Properties & Applications: Designed for use on superalloys, especially Inconel® 713 and 718. Oxidation and corrosion resistant up to approximately 1000°C (1850°F).

**OEM Specifications:**
- Boeing BMS 10-67, Type VI
- Canada Pratt Whitney CPW 215
- GE B50TF40 Class A
- MTU MTS 1050
- Pratt Whitney PWA 1315
- Rolls-Royce MSRR 9507/8
- Rolls-Royce Allison EMS 56760
- SNECMA DMR 33.078

**OEM Specifications:**
- Canada Pratt Whitney CPW 217
- GE B50TF40, Class B
- Jet Avion JA 1317
- Pratt Whitney PWA 1317
- Rolls-Royce MSRR 9507/27
- SNECMA DMR 33.079

**OEM Specifications:**
- Pratt Whitney PWA 1319
- U. S. Military MIL-P-85856/20

**OEM Specifications:**
- Pratt Whitney PWA 36118
- SAE International AMS 5391 (Chemistry Only)
Air Plasma Spray / Metals, Alloys, Composites and Blends / Nickel Base (continued)

AMDRY 961
Chemistry: Ni 17Cr 6Al 0.5Y
Particle Size: -106 +45 µm (-140 +325 mesh)
Morphology: Spheroidal, Gas Atomized
Properties & Applications: Coatings are usually used in aerospace applications and subsequently heat treated. Used as protective coatings in hot corrosive or oxidizing environments at high temperature, e.g. to protect gas turbine blades or valve systems.

OEM Specifications:
Williams WIMS 654, Class A

Metco 44
Chemistry: Ni 16Cr 8Fe
Particle Size: -106 +45 µm (-140 +325 mesh)
Morphology: Water Atomized
Properties & Applications: Produces machinable "stainless" coatings useful for salvage and build-up applications on corrosion resistant steels, nickel, or nickel alloy substrates where high hardness is not required.

OEM Specifications:
Honeywell Allied Signal EMS 52432, Class XXIX
Rolls-Royce Allison EMS 56762

Metco 444
Chemistry: Ni 9Cr 5Al 5.5Mo 5Fe
Particle Size: -125 +45 µm (-120 +325 mesh)
Morphology: Clad
Properties & Applications: Coatings are self bonding, machinable. Excellent resistance to oxidation and corrosion.

OEM Specifications:
Canada Pratt Whitney CPW 369
GE B50TF119 Class A
Honeywell M3956
MTU MTS 1077
Pratt Whitney PWA 1347
Rolls-Royce MSRR 9507/14
SNECMA DMR 33.018
Turbomeca LA 657 Ed.1,PC.2, Ind. 0
Williams WIMS 646

AMDRY 960
Chemistry: (NiCr) 6Al
Particle Size: -125 +37 µm (-120 +400 mesh)
Morphology: Clad
Properties & Applications: Plasma sprayed coatings are self bonding. ThermoSpray® coatings are not self bonding but can be used as abradable coatings, for ceramics or to resist oxidation and corrosion. Recommended for resistance to oxidation and corrosion at high temperatures. Applications: Salvage and build-up of worn or mis-machined nickel, nickel alloy or machinable corrosion resistant steel parts. Coatings can also be used as undercoats for ceramics.

OEM Specifications:
Canada Pratt Whitney CPW 369
GE B50A890
GE B50TF119, Class A
Honeywell M3956
Honeywell Allied Signal EMS 57748
Honeywell Allied Signal FP 5045, Type XVIII
MTU MTS 1077
Pratt Whitney PWA 1347
Rolls-Royce MSRR 9507/14
Rolls-Royce Allison EMS 56772
SNECMA DMR 33.018
Volvo PM 819-47
Williams WIMS 646

Metco 443NS
Chemistry: (NiCr) 6Al
Particle Size: 125 +45 µm (-120 +325 mesh)
Morphology: Clad
Properties & Applications: Plasma sprayed coatings are self bonding. ThermoSpray® coatings are not self bonding but can be used as abradable coatings, for ceramics or to resist oxidation and corrosion. Recommended for resistance to oxidation and corrosion at high temperatures. Applications: Salvage and build-up of worn or mis-machined nickel, nickel alloy or machinable corrosion resistant steel parts. Coatings can also be used as undercoats for ceramics.

OEM Specifications:
Canada Pratt Whitney CPW 369
GE B50A890
GE B50TF119, Class A
Honeywell M3956
Honeywell Allied Signal EMS 57748
Honeywell Allied Signal FP 5045, Type XVIII
MTU MTS 1077
Pratt Whitney PWA 1347
Rolls-Royce MSRR 9507/14
Rolls-Royce Allison EMS 56772
SNECMA DMR 33.018
Volvo PM 819-47
Williams WIMS 646
**Metco 461NS**  
Chemistry: Ni 17.5Cr 5.5Al 2.5Co 0.5Y₂O₃  
Particle Size: -150 +22 μm (-100 mesh +22 μm)  
Morphology: Clad  
Properties & Applications: Coatings are self bonding, oxidation and corrosion resistant. For use below 980ºC (1800ºF). Recommended for salvage and repair, and as bond coats for thermal barrier coatings systems.

**Metco 442**  
Chemistry: Ni 8.5Cr 7Al 5Mo 2Si 2B 2Fe 3TiO₂  
Particle Size: -125 +45 μm (-200 +325 mesh)  
Morphology: Clad  
Properties & Applications: Hard "stainless" type, self-bonding coatings with excellent wear resistance and very good corrosion and oxidation resistance.

**AMDRY 963**  
Chemistry: Ni 25Cr 6Al 0.4Y  
Particle Size: -75 +45 μm (-200 +325 mesh)  
Morphology: Spherical, Gas Atomized  
Properties & Applications: Coatings are usually used in aerospace applications and subsequently heat treated. Used as protective coatings in hot corrosive or oxidizing environments at high temperature, e.g. to protect gas turbine blades or valve systems.

**AMDRY 962**  
Chemistry: Ni 22Cr 10Al 1.0Y  
Particle Size: -106 +56 μm (-140 +270 mesh)  
Morphology: Spherical, Gas Atomized  
Properties & Applications: Coatings are usually used in aerospace applications and subsequently heat treated. Used as protective coatings in hot corrosive or oxidizing environments at high temperature, e.g. to protect gas turbine blades or valve systems.

**AMDRY 9625**  
Chemistry: Ni 22Cr 10Al 1.0Y  
Particle Size: -75 +45 μm (-200 +325 mesh)  
Morphology: Spherical, Gas Atomized  
Properties & Applications: Coatings are usually used in aerospace applications and subsequently heat treated. Used as protective coatings in hot corrosive or oxidizing environments at high temperature, e.g. to protect gas turbine blades or valve systems.

**AMDRY 625**  
Chemistry: Ni 21.5Cr 8.5Mo 3Fe 0.5Co  
Particle Size: -90 +45 μm (-170 +325 mesh)  
Morphology: Spherical, Gas Atomized  
Properties & Applications: Similar to Inconel® 625. Used primarily for surface restoration of worn or damaged parts, e.g. airfoils, combustors, blades or vanes in the gas turbine industry. (*Inconel is a registered trademark of INCO*)  

**OEM Specifications:**  
- Honeywell Allied Signal FP 5045, Type XXIII  
- Rolls-Royce MSRR 9507/48  
- Rolls-Royce Allison EMS 56719  
- GE B50A892  
- GE B50TF162  
- GEBS50TF192, Class A  
- SNECMA DMR 33.090  
- Turbomeca LA 657 Ed. 1 PD2 Ind.0  
- Volvo PM 819-44  
- Williams WIMS 654, Class B  
- Honeywell M3960  
- Honeywell Allied Signal EMS 57737, Type II
**AMDRY 964**
Chemistry: Ni 31Cr 11Al 0.6Y
Particle Size: -90 +37 µm (-170 +400 mesh)
Morphology: Sphero idal, Gas Atomized
Properties & Applications: Coatings usually used in aerospace applications and subsequently heat treated. Used as protective coatings in hot corrosive or oxidizing environments at high temperature, e.g. to protect gas turbine blades or valve systems.

**OEM Specifications:**
- Honeywell Allied Signal EMS 52432, Class XXI
- Honeywell Allied Signal EMS 57737
- Light Helicopter LH3 3315

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**Metco 700**
Chemistry: Ni 20Cr 10W 9Mo 4Cu 1C 1B 1Fe
Particle Size: -125 +16 µm
Morphology: Sphero idal, Water Atomized
Properties & Applications: Coatings offer sliding wear and corrosion protection. High hot hardness. Coatings resist scuffing and galling. Coatings contain glassy (amorphous / microcrystalline) phases due to additions of refractory metals and metalloids enhancing corrosion resistance.

**AMDRY 718**
Chemistry: Ni 19Cr 18Fe 3Mo 5(Nb+Ta) 0.5Al 1Ti .05C
Particle Size: -125 +45 µm (-120 +325 mesh)
Morphology: Sphero idal, Gas Atomized
Properties & Applications: Oxidation and corrosion resistant up to approximately 1000ºC (1850ºF). Designed for use on superalloys, especially Inconel® 713 and 718. (Inconel is a registered trademark of INCO)

**OEM Specifications:**
- GE B50TF202, Class A

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**AMDRY 718 Cl.B**
Chemistry: Ni 19Cr 18Fe 3Mo 5(Nb+Ta) 0.5Al 1Ti .05C
Particle Size: -90 +45 µm (-170 +325 mesh)
Morphology: Sphero idal, Gas Atomized
Properties & Applications: Oxidation and corrosion resistant up to approximately 1000ºC (1850ºF). Designed for use on superalloys, especially Inconel® 713 and 718. (Inconel is a registered trademark of INCO)

**OEM Specifications:**
- CFM International CP 6025
- GE B50TF202, Class B

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**AMDRY 1718**
Chemistry: Ni 19Cr 18Fe 3Mo 5(Nb+Ta) 0.5Al 1Ti .05C
Particle Size: -325 mesh +15 µm
Morphology: Sphero idal, Gas Atomized
Properties & Applications: Oxidation and corrosion resistant up to approximately 1000ºC (1850ºF). Designed for use on superalloys, especially Inconel® 713 and 718. (Inconel is a registered trademark of INCO)

**OEM Specifications:**
- GE B50TF202, Class D
- SNECMA DMR 33.502

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**AMDRY 350C**
Chemistry: Ni 50Cr
Particle Size: -106 +38 µm (-140 +400 mesh)
Morphology: Sphero idal, Gas Atomized
Properties & Applications: Coatings have higher corrosion resistance than 20% Cr materials. Used to combat fire-side corrosion of boiler tubes in fossil fuel power plants and can also be used as a corrosion resistant bond coat.
### AMDRY 997
Chemistry: Ni 23Co 20Cr 8.5Al 4Ta 0.6Y  
Particle Size: -37 µm (-400 mesh)  
Morphology: Spherical, Gas Atomized  
Properties & Applications: Can be used as hot corrosion and oxidation resistant bond coats for thermal barrier coatings (TBC) of zirconia.

### Metco 447NS
Chemistry: Ni 5Mo 5.5Al  
Particle Size: -90 +45 µm (~170 +325 mesh)  
Morphology: Clad  
Properties & Applications: General purpose material for producing medium hard coatings for hard bearing and wear resistance applications. Coatings are self bonding, extremely tough and capable of exhibiting good erosion and impact resistance. Can be used to protect parts such as machine elements, bearing seats and valves.

### AMDRY 387
Chemistry: Ni 5Mo 5Al  
Particle Size: -90 +37 µm (~170 +400 mesh)  
Morphology: Spherical, Gas Atomized  
Properties & Applications: General purpose material for producing medium hard coatings for hard bearing and wear resistance applications. Coatings are self bonding, extremely tough and capable of exhibiting good erosion and impact resistance. Can be used to protect parts such as machine elements, bearing seats and valves.

### Sulzer Metco 4485
Chemistry: Proprietary MCrAIY  
Properties & Applications: Proprietary alloy available to approved users.

### AMDRY 365-1
Chemistry: Proprietary MCrAIY  
Particle Size: -45 +5 µm (~325 mesh +5 µm)  
Morphology: Spherical, Gas Atomized  
Properties & Applications: Proprietary alloy available to approved users. The maximum operating temperature for the heat treated chambered-sprayed coatings is approximately 850°C (1560°F).

### AMDRY 365-2
Chemistry: Proprietary MCrAIY  
Particle Size: -53 +45 µm (~270 +325 mesh)  
Morphology: Spherical, Gas Atomized  
Properties & Applications: Proprietary alloy available to approved users. The maximum operating temperature for the heat treated chambered-sprayed coatings is approximately 850°C (1560°F).
Coatings of titanium based materials are commonly used in medical applications where biologic compatibility is required. It is often desirable to create coatings that have a porous structure, particularly in implant applications. For these applications, coarser particle sizes may be desirable.

**Sulzer Metco 4010**
- **Chemistry:** Ti 99.6%
- **Particle Size:** -90 +22 µm (-170 mesh +22 µm)
- **Morphology:** HDH Process, Uniform and Blocky
- **Properties & Applications:** Used in medical technology applications. Formerly supplied as XPT-D-W-310.

**Sulzer Metco 4018**
- **Chemistry:** Ti 99.6%
- **Particle Size:** -45 µm (-325 mesh)
- **Morphology:** HDH Process, Uniform and Blocky
- **Properties & Applications:** Used in medical technology applications. Formerly supplied as XPT-D-W-318.

**Sulzer Metco 4020**
- **Chemistry:** Ti 99.6%
- **Particle Size:** -250 +90 µm (-60 +170 mesh)
- **Morphology:** HDH Process, Uniform and Blocky
- **Properties & Applications:** Used in medical technology applications. Formerly supplied as XPT-D-W-310.
Cermets are blends of metals and metal oxide ceramics. The main use of these cermets is in thermal barrier or thick clearance control applications where thermal expansion mismatch between the substrate and the coating must be controlled. Cermets are usually intermediate coating layers that are applied between the bond coat and ceramic top coat. Originally designed for turbine applications, they can be used in applications where severe thermal cycling can cause issues for other coating systems.

**Metco 410NS**
- **Chemistry:** $\text{Al}_2\text{O}_3\text{, 30(Ni 20Al)}$
- **Particle Size:** $-90 +15 \ \mu\text{m} (-170 \text{ mesh} +15 \ \mu\text{m})$
- **Morphology:** Blend
- **Properties & Applications:** Coatings are denser, stronger, more abrasion and shock resistant than pure ceramics, and are very hard and smooth.
- **OEM Specifications:** GE B50A888 & B50TF64, Class A, SNECMA DMR 33.081, Volvo PM 819-31

**Metco 303NS-1**
- **Chemistry:** $\text{MgZrO}_3\text{, 35NiCr}$
- **Particle Size:** $-90 +11 \ \mu\text{m} (-170 \text{ mesh} +11 \ \mu\text{m})$
- **Morphology:** Blend
- **Properties & Applications:** Developed to be used as the intermediate coating in a three part graded coating system consisting of magnesium zirconate ceramic top coats and NiCr metallic bond coats.
- **OEM Specifications:** Jet Avion JA 1346, Pratt Whitney PWA 1346, Rolls-Royce MSRR 9507/28

**Metco 441NS-1**
- **Chemistry:** $65 \text{ MgZrO}_2\text{, 26Ni 7Cr 2Al}$
- **Particle Size:** $-90 +11 \ \mu\text{m} (-170 \text{ mesh} +11 \ \mu\text{m})$
- **Morphology:** Blend
- **Properties & Applications:** Developed to be used as the intermediate coating in a three part graded coating system consisting of magnesium zirconate ceramic top coats and NiCr metallic bond coats.
- **OEM Specifications:** Rolls-Royce MSRR 9507/20
Chrome Carbide materials are typically used for higher temperature applications than materials of the tungsten carbide family, with a recommended service temperature range that is generally from 540 to 815 °C (1000 to 1500 °F). Many chrome carbide materials contain secondary constituents, typically of nickel and chromium, to prevent chromium carbide decomposition during spraying (carbon loss) and also to serve as a matrix that improves overall coating integrity, corrosion resistance and wear resistance. Coatings of these materials can effectively combat solid particle erosion (SPE), high temperature wear (abrasion, erosion, fretting and cavitation) and hot corrosion.

**Metco 70C-NS**
Chemistry: Cr₂C₃
Particle Size: -106 +30 µm (-140 mesh +30 µm)
Morphology: Sintered, Crushed
Properties & Applications: Coarse grade crystalline chromium-carbide powder. Produces hard, somewhat porous coatings with relatively poor interparticle strength.

**Metco 70F-NS**
Chemistry: Cr₂C₃
Particle Size: -45 +5 µm (-325 mesh +5 µm)
Morphology: Sintered, Crushed
Properties & Applications: Similar to Metco 70C-NS except finer in size and produces smooth, dense coatings.

**EU Sulzer Metco 5265**
Chemistry: Cr₂C₃
Particle Size: -106 +30 µm (-140 mesh +30 µm)
Morphology: Sintered
Properties & Applications: Coarse, crystalline chromium carbide powder. Produces hard porous layers with relatively low interparticle strength. Formerly supplied as PEM 70C.

**Metco 430NS**
Chemistry: Cr₂C₃ 7(Ni 20Cr) Self-Fusing Nickel Alloy
Particle Size: -53 +11 µm (-270 mesh +11 µm)
Morphology: Blend
Properties & Applications: Coatings are recommended for resistance to wear by abrasive grains, hard surfaces, fretting and particle erosion at temperatures between 540-815°C (1000-1500°F).

**Metco 82VF-NS**
Chemistry: Cr₂C₃ 7(Ni 20Cr)
Particle Size: -45 +5.5 µm (-325 mesh +5.5 µm)
Morphology: Blend
Properties & Applications: Best chromium carbide for resistance to high temperature fretting and wear. Recommended for PWA 257-2 coatings.

**Metco 81NS**
Chemistry: Cr₂C₃ 25(Ni 20Cr)
Particle Size: -106 +11 µm (-140 mesh +11 µm)
Morphology: Blend
Properties & Applications: Good abrasion, particle erosion, cavitation and fretting resistance up to 815°C (1500°F). Good corrosion resistance. Good hot gas corrosion resistance, particularly in sulphurous gases. Oxidation and erosion resistant up to approximately 900°C (1650°F). Applications: fuel rod mandrels and hot forming dies, hydraulic valves, tooling, machine parts, pump housing and wear protection of aluminum parts.

**OEM Specifications**
- Pratt Whitney PWA 1306
- Pratt Whitney PWA 1307
- Honeywell Allied Signal EMS 57753, Type I
- GE B50TF137, Class B
- Honeywell Allied Signal EMS 57753, Type I
- Rolls-Royce MSRR 9507/2
- SNECMA DMR 33.005
- Volvo PM 819-07
- Williams WIMS 642
### Air Plasma Spray / Carbide Powders / Chrome Carbide (Continued)

#### Metco 81VF-NS
- **Chemistry:** Cr₃C₂ 25(Ni 20Cr)
- **Particle Size:** -45 +5 µm (-325 mesh +5 µm)
- **Morphology:** Blend
- **Properties & Applications:** Good abrasion, particle erosion, cavitation and fretting resistance up to 815°C (1500°F). Good corrosion resistance. Good hot gas corrosion resistance, particularly in sulphurous gases. Oxidation and erosion resistant up to approximately 900°C (1650°F). Applications: fuel rod mandrels and hot forming dies, hydraulic valves, tooling, machine parts, pump housing and wear protection of aluminum parts.

#### Sulzer Metco 5546NS
- **Chemistry:** Cr₃C₂ 25(NiCrAlY)
- **Particle Size:** -37 +5.5 µm (-400 mesh +5.5 µm)
- **Morphology:** Blend
- **Properties & Applications:** Provides high temperature wear resistance and corrosion resistance on turbine components.

#### Sulzer Metco 5255
- **Chemistry:** Cr₃C₂ 50(Ni 20Cr)
- **Particle Size:** -62 +7.8 µm
- **Morphology:** Blend
- **Properties & Applications:** High temperature erosion and corrosion resistant coatings.

#### OEM Specifications:
- GE B50A893
- GE B50TF137, Class A
- Honeywell M3965
- Honeywell Allied Signal EMS 52432, Class II
- Rolls-Royce MSRR 9507/17
- SAE International AMS 7875
- SNECMA DMR 33.006
- U. S. Military MIL-P-85856/39
- Volvo PM 819-05
- Williams WIMS 643

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Sulzer Metco Thermal Spray Materials Guide
Tungsten Carbide materials are generally recommended for wear applications with service temperatures of less than 500 °C (930 °F), as higher temperatures will result in the formation of brittle phases that reduce wear resistance and coating integrity. Chemistry, manufacturing process, individual carbide size and spray process are critical to overall performance, as is application tribology. Typical wear applications include erosion (low angle), abrasion, fretting, sliding wear and impact resistance. Matrixes of higher cobalt levels improve coating toughness. The addition of chromium improves atmospheric corrosion. Powder selection and spray process is important for applications with specific surface finish requirements, such as smooth as-sprayed surfaces, fine ground and finished surfaces or super finishes. Higher quality coatings are generally achieved using high energy plasma or HVOF processes such as Hybrid Diamond Jet®.

**Sulzer Metco 5810**
Chemistry: WC 12Co
Particle Size: -63 +11 µm (-230 mesh +11 µm)
Morphology: Spherical Composite

**Sulzer Metco 5812**
Chemistry: WC 12Co
Particle Size: -53 +11 µm (-270 mesh +11 µm)
Morphology: Agglomerated and Sintered

**Metco 439NS**
Chemistry: WC 12Co Self-Fusing Nickel Alloy
Particle Size: -63 +15 µm (-230 mesh +15 µm)
Morphology: Blend
Properties & Applications: As-sprayed coatings are partially fused and require no further fusing, which makes them ideal for use with substrates what cannot tolerate the fusing temperatures required by self-fluxing alloys. Coatings can be ground to very smooth finishes.

**Metco 439NS-2**
Chemistry: WC 12Co Self-Fusing Nickel Alloy
Particle Size: -90+15 µm (-170 mesh +15µm)
Morphology: Blend
Properties & Applications: As-sprayed coatings are partially fused and require no further fusing, which makes them ideal for use with substrates what cannot tolerate the fusing temperatures required by self-fluxing alloys. Coatings can be ground to very smooth finishes.

**Metco 72F-NS**
Chemistry: WC 12Co
Particle Size: -45 +15 µm (-325 mesh +15 µm)
Morphology: Sintered
Properties & Applications: Resistant to abrasion and erosion. Good sliding wear resistance. Do not use above 500°C (930°F) or in corrosive media. Coatings are hard and dense with good bond strengths. Good fretting resistance. Used for machine parts, pump housing, etc.

**OEM Specifications:**
- GE B50TF30, Class A
- Honeywell M3954
- Honeywell Allied Signal EMS 52432, Class I
- Pratt Whitney PWA 1322
- Rolls-Royce MSRR 9507/58
- Rolls-Royce Allison EMS 56756
- SAE International AMS 7880
- Volvo PM 819-25
**Metco 71NS**

Chemistry: W, C / WC 12Co  
Particle Size: -125 +31 μm  
Morphology: Fused  
Properties & Applications: Resistant to abrasion and erosion. Good sliding wear resistance. Do not use above 500°C (930°F) or in corrosive media. Coatings are hard and dense with good bond strengths. Good fretting resistance. Used for machine parts, pump housing, etc.

**OEM Specifications:**  
Canada Pratt Whitney CPW 42  
Honeywell Allied Signal EMS 52432, Class IX  
Pratt Whitney PWA 1302  
SNECMA DMR 33.033  
Volvo PM 819-02

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**Metco 71VF-NS**

Chemistry: W, C / WC 12Co  
Particle Size: -45 +5 μm (-325 mesh +5 μm)  
Morphology: Fused  
Properties & Applications: Resistant to abrasion and erosion. Good sliding wear resistance. Do not use above 500°C (930°F) or in corrosive media. Coatings are hard and dense with good bond strengths. Good fretting resistance. Used for machine parts, pump housing, etc.

**OEM Specifications:**  
Boeing BMS 10-67, Type 1  
Boeing McDonald-Douglas DMS 2049, Type II  
Rolls-Royce MSRR 9507/41  
SAE International AMS 7879  
Volvo PM 819-01

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**Metco 71VF-NS-1**

Chemistry: W, C / WC 12Co  
Particle Size: -45 +5 μm (-325 mesh +5 μm)  
Morphology: Fused  
Properties & Applications: Recommended for PWA 257-1 coating. Resistant to abrasion and erosion. Good sliding wear resistance. Do not use above 500°C (930°F) or in corrosive media. Coatings are hard and dense with good bond strengths. Good fretting resistance. Used for machine parts, pump housing, etc.

**OEM Specifications:**  
SAE International AMS 7879  
Volvo PM 819-53

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**AMDRY 301**

Chemistry: W, C / WC 12Co  
Particle Size: -45 +5 μm (-325 mesh +5 μm)  
Morphology: Fused  
Properties & Applications: Resistant to abrasion and erosion. Good sliding wear resistance. Do not use above 500°C (930°F) or in corrosive media. Coatings are hard and dense with good bond strengths. Good fretting resistance. Used for machine parts, pump housing, etc.

**OEM Specifications:**  
Pratt Whitney PWA 1379-2  
Rolls-Royce MSRR 9507/41  
SAE International AMS 7879

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**AMDRY 302**

Chemistry: W, C / WC 12Co  
Particle Size: -125 +45 μm (-120 +325 mesh)  
Morphology: Fused  
Properties & Applications: Resistant to abrasion and erosion. Good sliding wear resistance. Do not use above 500°C (930°F) or in corrosive media. Coatings are hard and dense with good bond strengths. Good fretting resistance. Used for machine parts, pump housing, etc.

**OEM Specifications:**  
Canada Pratt Whitney CPW 42  
Honeywell Allied Signal EMS 52432, Class IX  
Honeywell Allied Signal EMS 57745, Type I, Class A, Grade A  
Pratt Whitney PWA 1302

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**Sulzer Metco 5842**

Chemistry: WC 10Co 4Cr  
Particle Size: -22 +5 μm  
Morphology: Sintered  
Properties & Applications: Coatings provide protection against erosion and abrasion in aqueous solutions. The cobalt-chrome matrix offers higher abrasions and corrosion resistance than a cobalt matrix. Used in the paper industry for protection against corrosion in wet environments on machine rolls. Formerly supplied as PEX 227.
Air Plasma Spray / Carbide Powders / Tungsten Carbide (Continued)

**Sulzer Metco 5847**

- **Chemistry:** WC 10Co 4Cr
- **Particle Size:** -53 + 11 µm (-270 mesh + 11 µm)
- **Morphology:** Agglomerated and Sintered
- **Properties & Applications:** Ideal for hard chrome replacement. Produces compressive coatings. Excellent corrosion, erosion and abrasion resistance. Can be ground to high finishes. Applications: wet corrosive environments, aircraft landing gear, paper industry.

**OEM Specifications:**
- Boeing BMS 10-67K Type XVII

**Metco 73F-NS-1**

- **Chemistry:** WC 17Co
- **Particle Size:** -53 +11 µm (-270 mesh +11 µm)
- **Morphology:** Spray Dried / Sintered
- **Properties & Applications:** Higher toughness and fretting resistance than 12% Co coatings due to higher cobalt levels. For protection against sliding wear, hammer wear, abrasion and fretting. Do not use above 500ºC (930ºF) or in corrosive media. Applications: mid-span stiffeners (gas turbine engine blades), aircraft flap tracks, sucker rod couplings, extrusion dies and exhaust fans.

**OEM Specifications:**
- CFM International CP 6004
- GE B50TF167, Class A
- Honeywell M3975
- SNECMA DMR 33.019
- Volvo PM 819-52

**Metco 73F-NS-2**

- **Chemistry:** WC 17Co
- **Particle Size:** -53 +11 µm (-270 mesh +11 µm)
- **Morphology:** Spray Dried / Sintered
- **Properties & Applications:** Higher toughness and fretting resistance than 12% Co coatings due to higher cobalt levels. For protection against sliding wear, hammer wear, abrasion and fretting. Do not use above 500ºC (930ºF) or in corrosive media. Applications: mid-span stiffeners (gas turbine engine blades), aircraft flap tracks, sucker rod couplings, extrusion dies and exhaust fans.

**OEM Specifications:**
- Lucas Aerospace LA-M-093
- Rolls-Royce MSRR 9507/1

**Metco 73SF-NS**

- **Chemistry:** WC 17Co
- **Particle Size:** -38 +5.5 µm (-400 mesh +5.5 µm)
- **Morphology:** Spray Dried / Sintered
- **Properties & Applications:** Higher toughness and fretting resistance than 12% Co coatings due to higher cobalt levels. For protection against sliding wear, hammer wear, abrasion and fretting. Do not use above 500ºC (930ºF) or in corrosive media. Applications: mid-span stiffeners (gas turbine engine blades), aircraft flap tracks, sucker rod couplings, extrusion dies and exhaust fans.

**OEM Specifications:**
- Honeywell Allied Signal EMS 57745, Type II, Class 2, Grade C
- Rolls-Royce MSRR 9507/42
- Volvo PM 819-80

**AMDRY 9830**

- **Chemistry:** WC 17Co
- **Particle Size:** -53 +20 µm (-270 mesh +20 µm)
- **Morphology:** Spherical, Agglomerated and Densified
- **Properties & Applications:** Higher toughness and fretting resistance than 12% Co coatings due to higher cobalt levels. For protection against sliding wear, hammer wear, abrasion and fretting. Do not use above 500ºC (930ºF) or in corrosive media. Applications: mid-span stiffeners (gas turbine engine blades), aircraft flap tracks, sucker rod couplings, extrusion dies and exhaust fans.

**OEM Specifications:**
- CFM International CP 6004
- GE B50TF167, Class C
- Rolls-Royce MSRR 9507/1
- SNECMA DMR 33.019
- Turbomeca LA 657 Ed. 2 PL2 Ind. 0
### AMDRY 9831
- **Chemistry:** WC 17Co
- **Particle Size:** -53 +11 µm (-270 mesh +11 µm)
- **Morphology:** Spherical, Agglomerated and Densified
- **Properties & Applications:** Higher toughness and fretting resistance than 12% Co coatings due to higher cobalt levels. For protection against sliding wear, hammer wear, abrasion and fretting. Do not use above 500ºC (930ºF) or in corrosive media. Applications: mid-span stiffeners (gas turbine engine blades), aircraft flap tracks, sucker rod couplings, extrusion dies and exhaust fans.

### Metco 76F-NS
- **Chemistry:** WC 20Co
- **Particle Size:** -53 +11 µm (-270 mesh +11 µm)
- **Morphology:** Sintered
- **Properties & Applications:** Coatings are very dense and can be applied up to 0.05” thick (1.270 mm). Suitable for combustion spraying.

### AMDRY 5670
- **Chemistry:** WC 20Co
- **Particle Size:** -90 +45µm (-170 mesh +325)
- **Morphology:** Sintered
- **Properties & Applications:** Coatings are very coarse and recommended for traction or gripping applications (i.e. winder rolls). Suitable for combustion spraying.

### Sulzer Metco 5803
- **Chemistry:** (WC 12Co) 25(Ni-Based Superalloy)
- **Particle Size:** -45 +11 µm (-325 mesh +11 µm)
- **Morphology:** Blend
- **Properties & Applications:** Ideal for hard chrome replacement. Excellent corrosion resistance and easy machinability. Coatings resist abrasion, fretting and fatigue cracking.

### Metco 1123
- **Chemistry:** 75 (WC 12Co) 17.5 Ni 4.3Cr 1.0Fe 1.0Si 1.0B 0.2C
- **Particle Size:** -75 +45 µm (-200 +325 mesh)
- **Morphology:** Blend
- **Properties & Applications:** Coatings have excellent erosion and abrasion resistance. Applications: induced draft centrifugal fan blades found in coal, oil and gas fired power plants.

### Sulzer Metco 5860
- **Chemistry:** WC 12Co 35(Cr3C2 / 20(Ni 20Cr))
- **Particle Size:** -45 +5.5 µm (-325 mesh +5.5 µm)
- **Morphology:** Blend
- **Properties & Applications:** Ideal for hard chrome replacement. High corrosion resistance. Good abrasion, erosion and fretting resistance. Applications: petrochemical gate valves.
Air Plasma Spray / Ceramic Powders / Aluminum Oxide

Alumina is a wear resistant metal oxide ceramic that is chemically inert and stable at high temperatures. Key functions are for abrasive, sliding and erosive wear in applications where impact is not an issue. Typically applied by plasma spraying, this material has been used in many applications. Medium to coarse grades can be used as a cutting medium such as knife edge seals in turbine applications. High purity grades (white alumina) exhibit excellent dielectric characteristics. Blends with small to moderate amounts of titanium oxide increase overall coating toughness.

**Metco 105SFP**
Chemistry: $\text{Al}_2\text{O}_3$ 99.5+
Particle Size: -31 +3.9 µm
Morphology: Angular / Blocky, Fused and Crushed
Properties & Applications: Has the highest dielectric strength of all aluminum oxide coatings.

**AMDRY 6060**
Chemistry: $\text{Al}_2\text{O}_3$ 99.5+
Particle Size: -45 +5 µm (-325 mesh +5 µm)
Morphology: Angular / Blocky, Fused and Crushed
Properties & Applications: Coatings provide good resistance against abrasion, sliding wear, friction and oxidation at service temperatures up to approximately 800 °C (1470 °F) and exhibit high dielectric strength, suitable for electrical insulation. Should not be used where impact or shock loading occurs.

**AMDRY 6062**
Chemistry: $\text{Al}_2\text{O}_3$ 99.5+
Particle Size: -45 +22 µm (-325 mesh +22 µm)
Morphology: Angular / Blocky, Fused and Crushed
Properties & Applications: Coatings provide good resistance against abrasion, sliding wear, friction and oxidation at service temperatures up to approximately 800 °C (1470 °F) and exhibit high dielectric strength, suitable for electrical insulation. Should not be used where impact or shock loading occurs.

**Sulzer Metco 6051**
Chemistry: $\text{Al}_2\text{O}_3$ 99.5+
Particle Size: -22 +5 µm
Morphology: Angular / Blocky, Fused and Crushed
Properties & Applications: Coatings provide good resistance against abrasion, sliding wear, friction and oxidation at service temperatures up to approximately 800 °C (1470 °F) and exhibit high dielectric strength, suitable for electrical insulation. Should not be used where impact or shock loading occurs. Formerly supplied as PEM 105 SFP.

**Metco 105NS**
Chemistry: 98+ $\text{Al}_2\text{O}_3$
Particle Size: -45 +15 µm (-325 mesh +15 µm)
Morphology: Angular / Blocky, Fused and Crushed
Properties & Applications: Dense coatings which resist wear by fibers and threads and also resist erosion in high temperatures ranging from 840 - 1650°C (1550 - 3000°F).

**Metco 105SF**
Chemistry: 98+ $\text{Al}_2\text{O}_3$
Particle Size: -25 +5 µm
Morphology: Angular / Blocky, Fused and Crushed
Properties & Applications: Dense coatings which resist wear by fibers and threads and also resist erosion at temperatures ranging from 840 - 1650°C (1550 - 3000°F).
### Metco 101SF
**Chemistry:** $\text{Al}_2\text{O}_3 3\text{TiO}_2$  
**Particle Size:** $-22 +5 \mu m$  
**Morphology:** Angular / Blocky, Fused and Crushed  
**Properties & Applications:** Good resistance to abrasive wear, sliding wear, friction and oxidation up to approx. 1100°C (2040°F). Coatings are particularly suitable for applications in the textile or synthetic fiber manufacturing industries, where surface resistance is required on parts used for the guiding and handling of thread. Can be used in many environments including most acids and alkalis.

**OEM Specifications:**  
GE A50TF87, Class C  
Volvo PM 819-00

### Metco 101NS
**Chemistry:** $\text{Al}_2\text{O}_3 3\text{TiO}_2$  
**Particle Size:** $-45 +11 \mu m$ (-325 mesh +11 µm)  
**Morphology:** Angular / Blocky, Fused and Crushed  
**Properties & Applications:** Good resistance to abrasive wear, sliding wear, friction and oxidation up to approx. 1100°C (2040°F). Coatings are particularly suitable for applications in the textile or synthetic fiber manufacturing industries, where surface resistance is required on parts used for the guiding and handling of thread. Can be used in many environments including most acids and alkalis.

**OEM Specifications:**  
Boeing BMS 10-67, Type III  
GE A50TF87  
Rolls-Royce MSRR 9507/36  
SNECMA DMR 33.020  
Volvo PM 819-11

### Metco 101B-NS
**Chemistry:** $\text{Al}_2\text{O}_3 3\text{TiO}_2$  
**Particle Size:** $-75 +30 \mu m$ (-200 mesh +30 µm)  
**Morphology:** Angular / Blocky, Fused and Crushed  
**Properties & Applications:** Good resistance to abrasive wear, sliding wear, friction and oxidation up to approx. 1100°C (2040°F). Coatings are particularly suitable for applications in the textile or synthetic fiber manufacturing industries, where surface resistance is required on parts used for the guiding and handling of thread. Can be used in many environments including most acids and alkalis.

**OEM Specifications:**  
Canada Pratt Whitney CPW 281  
CFM International CP 6009  
GE A50A565  
GE A50TF87, Class B  
MTU MTS 1061  
Pratt Whitney PWA 1311-1  
Rolls-Royce MSRR 9507/50  
SNECMA DMR 33.013  
Volvo PM 819-12  
Williams WIMS 650

### AMDRY 187
**Chemistry:** $\text{Al}_2\text{O}_3 3\text{TiO}_2$  
**Particle Size:** $-75 +30 \mu m$ (-200 mesh +30 µm)  
**Morphology:** Angular / Blocky, Fused and Crushed  
**Properties & Applications:** Good resistance to abrasive wear, sliding wear, friction and oxidation up to approx. 1100°C (2040°F). Coatings are particularly suitable for applications in the textile or synthetic fiber manufacturing industries, where surface resistance is required on parts used for the guiding and handling of thread. Can be used in many environments including most acids and alkalis.

**OEM Specifications:**  
CFM International CP 6009  
GE A50TF87, Class B  
Pratt Whitney PWA 1311-1  
Rolls-Royce MSRR 9507/50  
SNECMA DMR 33.013

### AMDRY 6200
**Chemistry:** $\text{Al}_2\text{O}_3 3\text{TiO}_2$  
**Particle Size:** $-22 +5 \mu m$  
**Morphology:** Angular / Blocky, Fused and Crushed  
**Properties & Applications:** Coatings provide resistance to abrasive wear, sliding wear and oxidation for service temperatures up to approximately 1100 °C (2040 °F). Can be used in acidic or alkaline environments. Recommended for guiding or handling of thread in textile and synthetic fiber production.
Air Plasma Spray / Ceramic Powders / Aluminum Oxide (Continued)

**EU AMDRY 6204**
Chemistry: Al₂O₃ 3TiO₂
Particle Size: -45 +5 µm (-325 mesh +5 µm)
Morphology: Angular / Blocky, Fused and Crushed
Properties & Applications: Coatings provide resistance to abrasive wear, sliding wear and oxidation for service temperatures up to approximately 1100 ºC (2040 ºF). Can be used in acidic or alkaline environments. Recommended for guiding or handling of thread in textile and synthetic fiber production.

**EU AMDRY 6208**
Chemistry: Al₂O₃ 3TiO₂
Particle Size: -90 +5 µm (-170 mesh +5 µm)
Morphology: Angular / Blocky, Fused and Crushed
Properties & Applications: Coatings provide resistance to abrasive wear, sliding wear and oxidation for service temperatures up to approximately 1100 ºC (2040 ºF). Can be used in acidic or alkaline environments. Recommended for guiding or handling of thread in textile and synthetic fiber production.

**EU Sulzer Metco 6203**
Chemistry: Al₂O₃ 3TiO₂
Particle Size: -38 +16 µm (-400 mesh +16 µm)
Morphology: Angular / Blocky, Fused and Crushed
Properties & Applications: Coatings provide resistance to abrasive wear, sliding wear and oxidation for service temperatures up to approximately 1100 ºC (2040 ºF). Can be used in acidic or alkaline environments. Recommended for guiding or handling of thread in textile and synthetic fiber production. Formerly provided as PEM 10-231.

**Metco 130**
Chemistry: Al₂O₃ 13TiO₂
Particle Size: -53 +15 µm (-270 mesh +15 µm)
Morphology: Clad
Properties & Applications: Can be used for applications similar to Alumina / 3% Titania coatings, but have a lower dielectric strength and are less resistant to chemical attack. 550ºC (1020ºF) service temperature.

**Metco 130SF**
Chemistry: Al₂O₃ 13TiO₂
Particle Size: -30 +5 µm
Morphology: Clad
Properties & Applications: Can be used for applications similar to alumina / 3% Titania coatings, but have a lower dielectric strength and are less resistant to chemical attack. 550ºC (1020ºF) service temperature.

**EU AMDRY 6224**
Chemistry: Al₂O₃ 13TiO₂
Particle Size: -30 +5 µm (-400 mesh +5 µm)
Morphology: Angular / Blocky, Fused and Crushed
Properties & Applications: Recommended for abrasive wear, sliding wear and resistance for service temperatures up to approximately 1100 ºC (2040 ºF). Coating applications include thread production in textile and synthetic fiber manufacturing. Can be used in acidic and alkaline environments. Somewhat lower hardness and corrosion resistance than coatings of Al₂O₃ 3TiO₂.
EU | AMDRY 6228
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Chemistry: Al₂O₃:13TiO₂
Particle Size: -45 +22 µm (-325 mesh +22 µm)
Morphology: Angular / Blocky, Fused and Crushed
Properties & Applications: Recommended for abrasive wear, sliding wear and oxidation resistance for service temperatures up to approximately 1100 ºC (2040 ºF). Coating applications include thread production in textile and synthetic fiber manufacturing. Can be used in acidic and alkaline environments. Somewhat lower hardness and corrosion resistance than coatings of Al₂O₃:3TiO₂.

Metco 131VF
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Chemistry: Al₂O₃:40TiO₂
Particle Size: -45 +5 µm (-325 mesh +5 µm)
Morphology: Spheroidal, Spray Dried
Properties & Applications: Good abrasive wear resistance and erosion resistance below 550ºC (1020ºF). Lower wear resistance; better grindability than coatings containing less titania. Polished coatings are used in chemical industry because of their low degree of wetability for dilute solutions of common acids. Used for thread guides to resist abrasive fibers.

EU | AMDRY 6240
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Chemistry: Al₂O₃:40TiO₂
Particle Size: -22 +5 µm
Morphology: Angular / Blocky, Blend
Properties & Applications: Coatings are not as hard but more grindable than coatings with lower TiO₂ content.

EU | AMDRY 6244
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Chemistry: Al₂O₃:40TiO₂
Particle Size: -45 +5 µm (-325 mesh +5 µm)
Morphology: Angular / Blocky, Blend
Properties & Applications: Coatings are not as hard but have more grindable than coatings with lower TiO₂ content.

EU | AMDRY 6250
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Chemistry: Al₂O₃:40TiO₂
Particle Size: -22 µm +5 µm
Morphology: Angular / Blocky, Fused and Crushed
Properties & Applications: Polished coatings have low wetability. Recommended for applications in the chemical industry for resistance against weak, acidic environments.

EU | AMDRY 6254
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Chemistry: Al₂O₃:40TiO₂
Particle Size: -45 +5 µm (-325 mesh +5 µm)
Morphology: Angular / Blocky, Fused and Crushed
Properties & Applications: Polished coatings have low wetability. Recommended for applications in the chemical industry for resistance against weak, acidic environments.
Chromium oxide is the most chemically inert and wear resistant of all the oxides within the Sulzer Metco product line, and can be used at service temperatures below 540 °C (1000 °F). Applications such as in the laser engraved printing rolls, pump seals and textile manufacturing components are typical. Excellent coatings are achieved using by the plasma process. Additions of titanium oxide and silicon dioxide results in improved cohesive strength, better toughness and abrasive wear resistance. These coatings exhibit higher thermal conductivity than zirconia based ceramics but higher micro and macro hardness and wear resistance.

**AMDRY 6417**

**Chemistry:** Cr₂O₃

**Particle Size:** -22 +5 µm

**Morphology:** Blocky, Chemical Precipitate

**Properties & Applications:** Dense, corrosion resistant coatings used on pump seal areas, grounds, rolls and wear rings. Recommended for resistance to wear by abrasive grains, hard surfaces, particle erosion and cavitation all at temperatures below 540°C (1000°F). Coatings are insoluble in acids, alkalis and alcohol.

**AMDRY 6420**

**Chemistry:** Cr₂O₃

**Particle Size:** -45 +22 µm (-325 mesh +5 µm)

**Morphology:** Blocky, Chemical Precipitate

**Properties & Applications:** Dense, corrosion resistant coatings used on pump seal areas, grounds, rolls and wear rings. Recommended for resistance to wear by abrasive grains, hard surfaces, particle erosion and cavitation all at temperatures below 540°C (1000°F). Coatings are insoluble in acids, alkalis and alcohol.

**Metco 106NS**

**Chemistry:** Cr₂O₃

**Particle Size:** -106 +11 µm (-140 mesh +11 µm)

**Morphology:** Angular / Blocky, Sintered and Crushed

**Properties & Applications:** Dense, corrosion resistant coatings used on pump seal areas, grounds, rolls and wear rings. Recommended for resistance to wear by abrasive grains, hard surfaces, particle erosion and cavitation all at temperatures below 540°C (1000°F). Coatings are insoluble in acids, alkalis and alcohol.

**Metco 106**

**Chemistry:** Cr₂O₃ 2TiO₂

**Particle Size:** -125 +11 µm

**Morphology:** Angular / Blocky, Fused and Crushed

**Properties & Applications:** Produces dense, corrosion resistant coatings with higher toughness than pure chrome oxide materials. Used on pump seal areas, grounds, rolls and wear rings. Recommended for resistance to wear by abrasive grains, hard surfaces, particle erosion and cavitation at temperatures below 540°C (1000°F). Coatings are insoluble in acids, alkalis and alcohol.

**OEM Specifications:**

- Pratt Whitney PWA 1325 (made to order only)
- Rolls-Royce MSRR 9507/53
Air Plasma Spray / Ceramic Powders / Chrome Oxide (Continued)

**Metco 106F**
Chemistry: Cr₂O₃ 2TiO₂
Particle Size: -88 +3.9 µm
Morphology: Angular / Blocky, Fused and Crushed
Properties & Applications: Produces dense, corrosion resistant coatings with higher toughness than pure chrome oxide materials. Used on pump seal areas, grounds, rolls and wear rings. Recommended to resist to wear by abrasive grains, hard surfaces, particle erosion and cavitation at temperatures below 540ºC (1000ºF). Coatings are insoluble in acids, alkalis and alcohol.

**Metco 136CP**
Chemistry: Cr₂O₃ 5SiO₂ 3TiO₂
Particle Size: -90 +16 µm (-170 mesh +16 µm)
Morphology: Clad
Properties & Applications: High wear and corrosion resistance. Tough finish resists mechanical shock better than other ceramics. Good low friction characteristics.

**Metco 136F**
Chemistry: Cr₂O₃ 5SiO₂ 3TiO₂
Particle Size: -88 +11 µm
Morphology: Clad
Properties & Applications: High wear and corrosion resistance. Tough finish resists mechanical shock better than other ceramics. Good low friction characteristics.

**OEM Specifications:**
Williams WIMS 648

**EU AMDRY 6460**
Chemistry: Cr₂O₃ 5SiO₂ 3TiO₂
Particle Size: -22 +5 µm
Morphology: Angular / Blocky, Fused and Crushed
Properties & Applications: Coatings exhibit high wear and corrosion resistance, and are tough with high resistance to mechanical shock compared to other ceramics. Good friction characteristics.

**EU AMDRY 6462**
Chemistry: Cr₂O₃ 5SiO₂ 3TiO₂
Particle Size: -45 +5 µm (-325 mesh +5 µm)
Morphology: Angular / Blocky, Fused and Crushed
Properties & Applications: Coatings exhibit high wear and corrosion resistance, and are tough with high resistance to mechanical shock compared to other ceramics. Good friction characteristics.

**EU Sulzer Metco 6483**
Chemistry: Cr₂O₃ 40TiO₂
Particle Size: -90 +16 µm (-170 mesh +11 µm)
Morphology: Sintered
Properties & Applications: Produces hard coatings with excellent resistance against abrasion, heat and corrosion. Formerly supplied as PEM 111.
Titanium oxide and its alloys produce coatings that are generally tougher, but with lower hardness, than coatings of alumina. Applications for titanium oxide based coatings are sliding wear resistance where lubricity is needed. Coatings should not be used at services temperatures that exceed 540 °C (1000 °F) to avoid potential cracking as a result of phase transformation. Higher concentrations of chromium oxide or alumina will increase the wear resistance of titanium oxide. Air plasma spray produces higher quality, denser coatings that can be ground to smoother finishes than those produced using combustion powder spray.

**Metco 102**
- Chemistry: TiO₂ 99%
- Particle Size: -88 +7.8 µm (-170 mesh + 7.8 µm)
- Morphology: Angular / Blocky, Fused and Crushed
- Properties & Applications: Moderate abrasive wear resistance. Lower hardness than alumina / titania coatings. Soluble in alkalis and sulfuric acid, but resistant to attack in many other environments. Slightly conductive; static electricity does not build up on the coating surface.

**EU AMDRY 6505**
- Chemistry: TiO₂ 99%
- Particle Size: -106 +38 µm (-140 +400 mesh)
- Morphology: Angular / Blocky, Fused and Crushed
- Properties & Applications: Moderate abrasive wear resistance. Lower hardness than alumina / titania coatings. Soluble in alkalis and sulfuric acid, but resistant to attack in many other environments. Slightly conductive; static electricity does not build up on the coating surface.

**EU AMDRY 6510**
- Chemistry: TiO₂ 99%
- Particle Size: -45 +5 µm (-325 mesh +5 µm)
- Morphology: Angular / Blocky, Fused and Crushed
- Properties & Applications: Moderate abrasive wear resistance. Lower hardness than alumina / titania coatings. Soluble in alkalis and sulfuric acid, but resistant to attack in many other environments. Slightly conductive; static electricity does not build up on the coating surface.

**Metco 111**
- Chemistry: TiO₂ 45Cr₂O₃
- Particle Size: -125 +7.8 µm (-120 mesh + 7.8 µm)
- Morphology: Blend
- Properties & Applications: Produces hard coatings with excellent resistance to abrasion, wear, heat and corrosion. Applications: dry cell battery core mandrels and drum doctor blades.
Zirconia based ceramics are used in heat insulation applications as thermal barriers to improve efficiency and service life of components in high temperature service. These materials are generally plasma sprayed over an appropriate bond coat. Stabilizers such as magnesia, ceria, calcia and yttria are alloyed with the zirconia to help minimize phase transformation that can cause volume changes within the coating, which can lead to coating spallation and cracking during service. Key applications are gas turbine hot section components, diesel engine piston crowns and seats.

Metco 201B-NS
Chemistry: ZrO$_2$ 5CaO 0.5Al$_2$O$_3$ 0.4SiO$_2$ 1.1 other oxides
Particle Size: -90 +30 µm (-170 mesh +30 µm)
Morphology: Angular / Blocky, Fused and Crushed

OEM Specifications:
- Canada Pratt Whitney CPW 212
- MTU MTS 1067
- Pratt Whitney PWA 1312
- SNECMA DMR 33.089 (made to order only as Metco 201B-NS-1)
- U. S. Military Naval OS10604

Metco 201NS
Chemistry: ZrO$_2$ 5CaO 0.5Al$_2$O$_3$ 0.4SiO$_2$ 1.1 other oxides
Particle Size: -53 +11 µm (-270 mesh +11 µm)
Morphology: Angular / Blocky, Fused and Crushed

OEM Specifications:
- Honeywell Allied Signal FP 5045 XIV, Table 1
- Rolls-Royce MSRR 9507/18
- Rolls-Royce Allison EMS 56720
- Volvo PM 819-26

Metco 210NS-1
Chemistry: ZrO$_2$ 24MgO
Particle Size: -90 +11 µm (-170 mesh +11 µm)
Morphology: Spheroidal, HOSP™

OEM Specifications:
- Jet Avion JA 1346
- Pratt Whitney PWA 1333
- Rolls-Royce MSRR 9507/21

Metco 210NS-1-G
Chemistry: ZrO$_2$ 24MgO
Particle Size: -75 +11 µm (-200 mesh +11 µm)
Morphology: Spheroidal, HOSP™

OEM Specifications:
- GE A50TF155, Class A
- Jet Avion JA 1333

Metco 210
Chemistry: ZrO$_2$ 24MgO
Particle Size: -53 +11 µm (-270 mesh +11 µm)
Morphology: Angular / Blocky, Fused and Crushed
Air Plasma Spray / Ceramic Powders / Zirconium Oxide (Continued)

**AMDRY 333**
Chemistry: ZrO₂, 24MgO
Particle Size: -53 +11 µm (-270 mesh +11 µm)
Morphology: Angular / Blocky, Fused and Crushed

**OEM Specifications:**
GE A50TF155, Class A
Pratt Whitney PWA 1333
Rolls-Royce MSRR 9507/21

**Metco 205NS**
Chemistry: ZrO₂, 25CeO₂, 2.5Y₂O₃
Particle Size: -90 +16 µm (-170 mesh +16 µm)
Morphology: Spheroidal, HOSP™
Properties & Applications: Ideally suited for severe thermal barrier applications and offers greater high temperature corrosion resistance against sodium, sulfur and chlorine contaminants compared to 8% yttria zirconia coatings.

**OEM Specifications:**
Pratt Whitney PWA 36364
Honeywell Allied Signal 91547-EMS 52564, App. A
Light Helicopter LHM 3314, Type 1
Rolls-Royce MSRR 9507/46
Rolls-Royce Allison EMS 56722
Rolls-Royce Allison EPS 10479
SNECMA DMR 33.098
Volvo PM 819-55
Williams WIMS 652

**Metco 143**
Chemistry: ZrO₂, 18TiO₂, 10Y₂O₃
Particle Size: -75 +5 µm (-200 mesh +5 µm)
Morphology: Spheroidal, Spray Dried
Properties & Applications: Coatings exhibit excellent scuff resistance, high temperature hardness, excellent thermal shock properties and resistance to sulfidation, chlorinization and sodium hot corrosion.

**OEM Specifications:**
Pratt Whitney PWA 36364

**Metco 203NS**
Chemistry: ZrO₂, 8Y₂O₃
Particle Size: -125 +16 µm (-120 mesh +16 µm)
Morphology: Spheroidal, Spray Dried
Properties & Applications: Metco 203NS is a flame stabilized yttria zirconia i.e. the zirconia is not stable until melted during the spray coating process.

**OEM Specifications:**
Pratt Whitney PWA 36364

**Metco 204B-NS**
Chemistry: ZrO₂, 8Y₂O₃
Particle Size: -75 +45 µm (-200 +325 mesh)
Morphology: Spheroidal, HOSP™
Properties & Applications: Powders are spheroidal with excellent flowability, chemical homogeneity, structural stability and high purity. Coatings have excellent thermal shock and insulating features. Primarily used as thermal barrier coatings for turbine combustion liners and airfoils.

**OEM Specifications:**
GE A50TF204, Class B
Honeywell Allied Signal 91547-EMS 52564, App. A
Light Helicopter LHM 3314, Type 1
Rolls-Royce MSRR 9507/46
Rolls-Royce Allison EMS 56722
Rolls-Royce Allison EPS 10479
SNECMA DMR 33.098
Volvo PM 819-55
Williams WIMS 652

**Metco 204C-NS**
Chemistry: ZrO₂, 8Y₂O₃
Particle Size: -125 +45 µm
Morphology: Spheroidal, HOSP™
Properties & Applications: Powders are spheroidal with excellent flowability, chemical homogeneity, structural stability and high purity. Coatings have excellent thermal shock and insulating features. Used primarily on turbine combustion liners and airfoils.

**OEM Specifications:**
GE A50A558, Class C
GE A50TF278, Class A
### Metco 204NS
- **Chemistry:** ZrO$_2$-8Y$_2$O$_3$
- **Particle Size:** -125 +11 µm (-120 mesh +11 µm)
- **Morphology:** Spherical, HOSP™
- **Properties & Applications:**
  - Very high purity product. Powders are spheroidal with excellent flowability, chemical homogeneity, structural stability. Coatings have excellent thermal shock and insulating features. Used primarily on turbine combustion liners and airfoils.

### AMDRY 204NS-1
- **Chemistry:** ZrO$_2$-8Y$_2$O$_3$
- **Particle Size:** -125 +11 µm (-120 mesh +11 µm)
- **Morphology:** Spherical, HOSP™
- **Properties & Applications:**
  - Similar to Metco204NS, with good, rather than exceptional purity. Spheroidal with excellent flowability, chemical homogeneity, structural stability. Coatings have excellent thermal shock and insulating features. Used primarily on turbine combustion liners and airfoils.

### Metco 204NS-G
- **Chemistry:** ZrO$_2$-8Y$_2$O$_3$
- **Particle Size:** -106 +11 µm (-140 mesh +11 µm)
- **Morphology:** Spherical, HOSP™
- **Properties & Applications:**
  - Powders are spheroidal with excellent flowability, chemical homogeneity, structural stability and high purity. Coatings have excellent thermal shock and insulating features. Used primarily on turbine combustion liners and airfoils.

### Sulzer Metco 6600
- **Chemistry:** ZrO$_2$-8Y$_2$O$_3$
- **Particle Size:** -75 +15 µm (-200 mesh +15 µm)
- **Morphology:** Spherical, HOSP™
- **Properties & Applications:**
  - Finer particle size for dense wear resistant applications. Smoother surface textures. Recommended for plasma extension guns, ID and combustion spraying.

### AMDRY 6643
- **Chemistry:** ZrO$_2$-8Y$_2$O$_3$
- **Particle Size:** -45 +11 µm (-325 mesh +11 µm)
- **Morphology:** Angular / Blocky, Fused and Crushed
- **Properties & Applications:**
  - AMDRY 6643 is a stabilized Yttria Zirconia. The Zirconia is not flame stabilized. Coatings can be used at temperatures up to approximately 1350 °C (2460 °F), depending on operating conditions.

### Metco 202NS
- **Chemistry:** ZrO$_2$-20Y$_2$O$_3$
- **Particle Size:** -106 +16 µm (-140 mesh +16 µm)
- **Morphology:** Spherical, Spray Dried
- **Properties & Applications:**
  - Flame stabilized yttria zirconia, designed to produce coatings that are stable at high temperatures. Recommended for resistance to erosion at temperatures above 845°C (1550°F). Applications: thermal barrier coatings in rocket and jet engines.
These alloys contain boron and silicon as temperature suppressants that allow these materials to be fused (remelted) in normal atmospheres after the coating is applied. The fusing procedure coalesces the coating into an essentially pore-free, fully dense surface that is metallurgically bonded to the substrate. Coatings are typically fused by oxy-acetylene touches, furnace or induction. Cobalt based self-fluxing alloys exhibit very high hot hardness having greater impact resistance and better ductility than nickel-based alloys. They are also less prone to cracking during post-fusing cooling.

**Metco 18C**

**Chemistry:** Co 27Ni 18Cr 6Mo 3.5Si 3B 2.5Fe 0.2C  
**Particle Size:** -125 +53 μm (-120 +270 mesh)  
**Morphology:** Spheroidal, Gas Atomized  
**Properties & Applications:** Used for hardfacing substrates of 400 series stainless steel and other low shrink materials. Coatings are hard and resistant to wear by abrasive grains, hard surfaces, fretting, cavitation and particle erosion. High hot hardness.

**OEM Specifications:**  
Rolls-Royce MSRR 9507/39 (made to order only as Metco 18C-NS)  
SMUK DTD900-4950 (made to order only as Metco 18C-NS)
These alloys contain boron and silicon as temperature suppressants that allow these materials to be fused (remelted) in normal atmospheres after the coating is applied. The fusing procedure coalesces the coating into an essentially pore-free, fully dense surface that is metallurgically bonded to the substrate. Coatings are typically fused by oxy-acetylene touches, furnace or induction. Proper (slow) cooling is critical to prevent cracking. The resulting coatings have high impact resistance and generally exhibit high hot hardness, low ductility and high thermal expansion coefficients. Industries commonly using these coatings are agriculture and glass moulding.

**Metco 12C**  
Chemistry: Ni 10Cr 2.5B 2.5Fe 2.5Si 0.15C  
Particle Size: -125 +45 µm (-120 +325 mesh)  
Morphology: Sphero idal, Gas Atomized  
Properties & Applications: Only self-fluxing alloy which produces a machinable fused coating. Recommended for resistance to wear by abrasive grains, hard surfaces, fretting, cavitation, and erosion at both low and high temperatures to 840ºC (1550ºF).

**Metco 14E**  
Chemistry: Ni 14Cr 4Fe 3.3Si 2.8B 0.6C  
Particle Size: -106 +45 µm (-140 +325 mesh)  
Morphology: Sphero idal, Gas Atomized  
Properties & Applications: Produces chip-resistant self-fluxing coatings. Resistant to wear from abrasive particles, contact against hard surfaces, friction, cavitation and erosion at service temperatures up to 540º C (1000º F).

**Metco 15E**  
Chemistry: Ni 17Cr 4Fe 4Si 3.5B 1C  
Particle Size: -106 +45 µm (-140 +325 mesh)  
Morphology: Sphero idal, Gas Atomized  
Properties & Applications: Coatings are very dense and corrosion resistant. Recommended for the most severe service requirements when used on base materials with a fairly high coefficient of thermal expansion.

**Metco 15F**  
Chemistry: Ni 17Cr 4Fe 4Si 3.5B 1C  
Particle Size: -53 +15 µm (-270 mesh +15µm)  
Morphology: Sphero idal, Gas Atomized  
Properties & Applications: Coatings are very dense and corrosion resistant. Recommended for the most severe service requirements when used on base materials with a fairly high coefficient of thermal expansion.

**Metco 16C**  
Chemistry: Ni 16Cr 4Si 4B 3Cu 3Mo 2.5Fe 0.5C  
Particle Size: -125 +45 µm (-120 +325 mesh)  
Morphology: Sphero idal, Gas Atomized  
Properties & Applications: Coatings are resistant to wear by abrasive grains, hard surfaces, particle erosion, fretting and cavitation.
Metco 19E
Chemistry: Ni 16Cr 4Si 4B 4Fe 2.4Cu 2.4Mo 2.4W 0.5C
Particle Size: -106 +4 5 µm (-140 +325 mesh)
Morphology: Spheroidal, Gas Atomized
Properties & Applications: Can be used in the as-sprayed or fused condition. Coatings are dense, hard, essentially oxide free and very dense when fused. Readily coalesces during fusing. Resistant to abrasive grains, hard surfaces, cavitation, particle erosion and fretting. Offers the best corrosion resistance of all the self-fluxing alloys. Applications: cam followers, wear rings and utility exhaust fans.

Metco 36C
Chemistry: Ni 35 (WC 8Ni) 11Cr 2.5B 2.5Fe 2.5Si 0.5C
Particle Size: -150 +4 5 µm (-100 +325 mesh)
Morphology: Blend
Properties & Applications: The most wear resistant of the self-fluxing coatings. The WC particles in this material are large, blocky and unaffected by the heat of fusing. Essentially cobalt free for stain resistance.

Metco 31C-NS
Chemistry: Ni 35 (WC 12Co) 11Cr 2.5Fe 2.5Si 2.5B 0.5C
Particle Size: -125 +45 µm (-120 +325 mesh)
Morphology: Blend
Properties & Applications: Post-fuse coatings are erosion, abrasion and fret resistant. Applications: knives and cutting edges for agriculture.

Metco 32C
Chemistry: (WC 12Co) 14Ni 3.5Cr 0.8B 0.8Fe 0.8Si 0.1C
Particle Size: -125 +45 µm (-120 +325 mesh)
Morphology: Blend
Properties & Applications: Coatings are capable of in service temperatures to 540ºC (1000ºF) and are extremely wear resistant to abrasive grains, hard surfaces, fretting and particle erosion.

Metco 34F
Chemistry: (WC 12Co) 33Ni 9Cr 3.5Fe 2Si 2B 0.5C
Particle Size: -53 +15 µm (-270 mesh +15 µm)
Morphology: Blend
Properties & Applications: Especially developed to produce thin, hard, dense and smooth coatings. Coatings can be used in the unfused state.

Metco 34FP
Chemistry: (WC 12Co) 33Ni 9Cr 3.5Fe 2Si 2B 0.5C
Particle Size: -53 +15 µm (-270 mesh +15 µm)
Morphology: Blend
Properties & Applications: Especially developed to produce thin, hard, dense and smooth coatings. Coatings can be used in the unfused state.