

Nickel Based Powders for PTA

1. Introduction

Sentes-BIR offers ForteCoat range gas atomized, self-fluxing nickel based alloy powders with successful results in various industrial hardfacing and thermal spraying applications.

Sentes-BIR's proprietary gas-atomization process ensures satellite-free, homogeneous and consistent powders. These perfectly spherical particles increase in the flow rate through coating system passages, with fewer disturbances due to satellites.

Plasma transferred arc welding (PTA) process has several well-known advantages such as minimal mixing of base and coating material (5 - 10 %), precise adjustment of the penetration depth, high energy density of the plasma arc, a small heat-affected zone, a high deposition rate (up to 20 kg/h), a true metallurgical bond between the substrate and the coating and the flexible use of alloys.

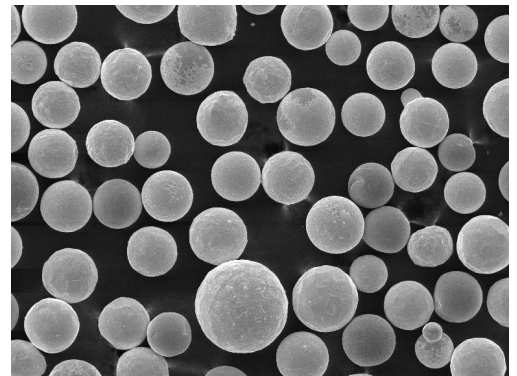
The chemistry and particle size of ForteCoat PTA powders are carefully controlled to insure consistent high quality coating properties. Coating hardness is in the range of HRC 32 – 62, depending on the specific alloy chosen. Existence of Silicon and Boron in the alloy lower melting temperature and produce hard phase to increase wear resistance.

1.1 Uses and Applications

Self-fluxing Nickel alloys powders can be applied with different spraying processes. There are many industrial applications from petrochemical, offshore, agriculture, plastic extrusion, pulp and paper, marine and steel manufacturing where wear and corrosion protection is needed. Special powders are developed for glass industry, please refer our special technical document. Some examples of applications are:

- Baffle plates in sugar industry
- Steam nozzles
- Muller mixer shafts
- Thrust collars
- Armature shafts
- Wash pipes in petroleum drilling)
- Guide plates
- Trimming dies
- Auger flights
- Pistons
- Hydraulic cylinders

Product Characteristics	
Manufacturing Process	Inert gas atomization
Powder Morphology	Spheroidal
Surfacing Process	PTA



typical gas-atomized powder

2. Material Information

2.1 Chemical Compositions

Product Code	%						
	Ni	Cr	B	Si	C	Fe	Others
9062	Balance	15.5	2.9	4.3	0.7	4.2	
9056	Balance	13.5	2.8	4.0	0.55	4.0	
9053	Balance	12.5	2.3	3.3	0.55	3.6	
9030	Balance	6.5	1.2	4.1	0.2	1.2	
9040	Balance	7.7	1.7	4.0	0.36	1.9	
9625	Balance	21.5		0.4	≤0.03	1.4	Mo9 Nb3.8
9276	Balance	15.5		0.5	0.12	3.0	Mo16 W4.5 Mn1.2 V: 0.5

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2.2 Coating Characteristics

Product Code	Hardness
9062	HRC 57-62
9056	HRC 52-58
9053	HRC 47-53
9030	HRC 30-35
9040	HRC 38-42
9625	HV ₃₀ 200
9276	HV ₃₀ 210

* *approximate*

2.3 Particle Size Distribution

Product Code	53-150 µm	63-180 µm	63-210 µm
9062	•	•	•
9056	•	•	•
9053	•	•	•
9030	•	•	•
9040	•	•	•
9625	•	•	•
9276	•	•	•

* *(other particle size distributions are available on request)*

3. Selection Criteria

General selection criteria for self-fluxing nickel based alloy powders are depend coating hardness, if wear or corrosion protection required, desired finish machining requirements.

ForteCoat 9030, 9040, 9053 and 9062 powders are chosen depending on their hardness property

ForteCoat 9056 is specially formulated powder for coating plastic extrusion screws.

ForteCoat 9625 is for restoration of worn components of Inconel 625 or similar materials and has similar in chemical to Inconel 625 Typical service temperature is up to 980 °C. Similarly, ForteCoat 9276 powder has same composition to C276 alloy.