

## **Stelcar™ JK™112**

88% Tungsten Carbide/  
12% Cobalt

## **Technical Note**

DATE: 8/20/93

SUPERSEDES: 9/6/88

NO: C-002

Page: 1 of 5

## **DESCRIPTION**

Stelcar JK112 powder is manufactured by agglomeration and sintering fine particles of tungsten carbide and cobalt. Highly polished surface finishes are possible because of the fine size and homogenous distribution of tungsten carbide particles. JK112 coatings are very resistant to abrasion and other forms of wear. JK112 powder is similar in composition to Praxair D-Gun LW-1N30 coatings. JK112 is recommended when surface finish is a major requirement for the application.

## **APPROXIMATE COMPOSITION, Wt.%**

Carbon	5.5
Cobalt	12.0
Tungsten	Balance

## **MESH SIZE**

270/D

## **APPLICATIONS**

Hardfacing of compressor rods, pump casings, pump impellers, pump plungers, pump sleeves, mechanical seal faces, feed screws, gate valves, thread guides, paper cutting and slitter knives, fan blades, as well as various chemical and petrochemical parts.

JK, JET KOTE and STELCAR are trademarks of  
Stoody Deloro Stellite, Inc.

**COATING CHARACTERISTICS - PROPYLENE FUEL**

	<b><u>SET A</u></b>	<b><u>SET B</u></b>
Bond Strength, PSI (per ASTM 633)	10,000+	10,000+
Microhardness, DPH [300g]	960-1149	1017-1116
Macrohardness, 15N	90.0-90.9	89.2-92.8
Estimated Porosity, As-Sprayed	<1.5%	<1%
Maximum Coating Thickness, Inches As-Sprayed, Flat or Irregular Shapes	.015	.010
Maximum Coating Thickness, Inches As-Sprayed on Cylindrical Shapes	.015	.015
Est. Maximum Service Temperature, °F	1000	1000
Est. Deposit Efficiency, %	58	53
Estimated Coverage, Lb/Ft <sup>2</sup> / .010"	1.7	1.8
Est. Surface Finish, Microinch AA As-Sprayed	185-300	150-250
Est. Surface Finish, Microinch AA Ground and Diamond Lapped	<2	<2
Abrasive Wear Resistance, MM <sup>3</sup> Loss Per ASTM G65-80, 2000 Revolutions	2.99	2.1

The above data in no way constitutes a specification. Parameters and other technical information in this document are for guidance only. Stellite Coatings reserves the right to make changes as additional information becomes available.

**FINISHING**

When finishing JK112 coatings diamond grinding or lapping must be used.

**Light Duty Grinding:**

Wheel Type: 100-240 Mesh Resinoid Bonded Diamond Wheel of  
L, P or R Hardness and Concentration of 50

Cross-Feed Pass: .035" - .050"

Part Surface Speed: 40-50 Feet Per Minute

In-Feed Per Pass: .0005"

**Note:** Diamond wheels must be dressed periodically to achieve proper cutting and to avoid damage to the coating.

**Heavy Duty Grinding:**

Use all of the above but substitute a wheel with 100 mesh, nickel-clad diamonds in a resinoid bonded matrix, and hardness of R. Large surfaces may require a softer wheel.

**NOTE:**

1. Important! Diamonds must be periodically relieved, by dressing the wheel to insure proper grinding.
2. Irreversible damage to the coating can occur when the grinding wheel specifications and/or the grinding technique is incorrect.
3. Coolant must be flooded onto the part and grinding wheel during grinding. The coolant must not contain Amines, which can attack and pit the cobalt matrix!

**Recommended Lapping:**

1. Lapping is best done following a 6-14 microinch AA diamond ground finish of the coating.
2. Diamond paste or slurry is recommended as lapping media. Do not lap coatings dry. Use a lubricant as recommended for the particular media used in each step. Remove debris, wash and dry the coating surface prior to proceeding to the next grain size. Avoid contamination of the lapping surfaces by cleaning prior to application of fresh media.
3. Recommended grain size progression after grinding:

<b><u>Lapping Compound</u></b>	<b><u>Est. Finish, Microinch AA</u></b>
15-30 Micron	3-5
9-15 Micron	2-4
3-9 Micron	1-2

4. Super finishing is possible only if the coating does not have porosity, cracks or pullout caused by improper coating or finishing techniques.

**SET A OPERATING PARAMETERS<sup>(1)</sup>**

Fuel Gas	Propylene (C <sub>3</sub> H <sub>6</sub> )	
Powder Carrier Type	Argon (Ar) or [Nitrogen (N <sub>2</sub> )]	
Nozzle	5/16 x 6	
Injector	#50	
Carbide Insert	.052" or .080"	
<b><u>Console Type</u></b>	<b><u>JKII</u></b>	<b><u>JKIIA</u></b>
<b><u>Manifold Pressures, PSI</u></b>	<b>(2) (7)</b>	<b>(3)</b>
Oxygen	120	100
Main Fuel Gas	80	80
Carrier Gas	100	85
Hydrogen (Pilot)	25	100
<b><u>Console Pressures, PSI</u></b>		
Oxygen	75-86	66-77
Main Fuel	60-66	60-74
Carrier	54-65 (.052")	54-65 (.052")
<b><u>Console Flows(4)</u></b>	<b>43-53 (.080")</b>	<b>43-53 (.080")</b>
Oxygen	980-1020	980-1020
Main Fuel	58-60%	130-137
Carrier	30-35	Ar 56-66
<b><u>Console Settings</u></b>		[N <sub>2</sub> 67-77]
Oxygen		54.4-56.7
Main Fuel		43.3-45.7
Carrier		Ar 40.0-47.1
<b><u>Cooling Water(5)</u></b>		[N <sub>2</sub> 67-77]
°F IN	80-90	80-90
°F OUT	115-120	115-120
Flow, GPM	6.5-8.0	6.5-8.0
<b><u>Powder feed Settings</u></b>		
Dial Set (Approximate)	194-220	194-220
RPM (Approximate)	2.6-3.1	2.6-3.1
Feed Rate (6), grams/Min.	50-60	50-60
<b><u>Spray Distance, Inches</u></b>	<b>7-8</b>	<b>7-8</b>

**NOTES:**

- Pressures shown are running pressures with powder feeding.
- Manifold pressures for JKII system are critical, manifold regulators must be located at factory supplied hose ends.
- Manifold pressure too low will not allow enough flow. If it is too high the controller will pulse upon start up.
- JKII system does not correct flow due to change in gas temperature or pressures at the meters, JKIIA system compensates and flow is displayed as true Standard Cubic Feet per Hour (SCFH): T = 0°C, P = 14.7 PSIA
- A heat exchanger to control the water inlet temperature to the gun is recommended. Adjust water flow to achieve outlet temperature. Water temperatures may affect coating quality and gun performance.
- Powder feed rate must be checked with powder flowing through lit gun. Powder Feed Rate (PFR) = (Powder Weight (g) Initial - Powder Weight Final (g) / Powder Feed Time (min.)). Powder feed time must be greater than 1 min. PFR is linear to RPM of the feeder. To achieve required PFR, change RPM as follows:

$$\text{RPM (NEW)} = \frac{\text{PFR (Required) RPM (Original)}}{\text{PFR (Calculated)}}$$

- JKII flowmeter requires change for specific gas use:  
 H<sub>2</sub> - Part #972915 C<sub>3</sub>H<sub>6</sub> - Part #972763

**SET B OPERATING PARAMETERS <sup>(1)</sup>**

Fuel Gas		Propylene (C <sub>3</sub> H <sub>6</sub> )
Powder Carrier Type		Argon (Ar) or [Nitrogen (N <sub>2</sub> )]
Nozzle		5/16 x 12
Injector		#50
Carbide Insert		052" or .080"
<b><u>Console Type</u></b>	<b><u>JKII</u></b>	<b><u>JKIIA</u></b>
<b><u>Manifold Pressures, PSI</u></b>	<b>(2) (7)</b>	<b>(3)</b>
Oxygen	150	120-130
Main Fuel Gas	110	100-110
Carrier Gas	100	85
Hydrogen (Pilot)	25	100
<b><u>Console Pressures, PSI</u></b>		
Oxygen	115-122	93-102
Main Fuel	90-106	85-92
Carrier	75-85 (.052")	73-83 (.052")
<b><u>Console Flows(4)</u></b>	<b>58-68 (.080")</b>	<b>58-68 (.080")</b>
Oxygen	1200-1220	1260-1300
Main Fuel	74-78%	190-230
Carrier	35	Ar 76-78
<b><u>Console Settings</u></b>		[N <sub>2</sub> 85-90]
Oxygen		70.0-72.2
Main Fuel		63.3-76.7
Carrier		Ar 54.3-55.7
<b><u>Cooling Water(5)</u></b>		[N <sub>2</sub> 85-90]
°F IN	80-90	80-90
°F OUT	115-120	115-120
Flow, GPM	10.0-12.0	10.0-12.0
<b><u>Powder feed Settings</u></b>		
Dial Set (Approximate)	194-220	194-220
RPM (Approximate)	2.6-3.1	2.6-3.1
Feed Rate (6), grams/Min.	50-60	50-60
<b><u>Spray Distance, Inches</u></b>	<b>8-9</b>	<b>8-9</b>

**NOTES:**

- Pressures shown are running pressures with powder feeding.
- Manifold pressures for JKII system are critical, manifold regulators must be located at factory supplied hose ends.
- Manifold pressure too low will not allow enough flow. If it is too high the controller will pulse upon start up.
- JKII system does not correct flow due to change in gas temperature or pressures at the meters, JKIIA system compensates and flow is displayed as true Standard Cubic Feet per Hour (SCFH): T = 0°C, P = 14.7 PSIA
- A heat exchanger to control the water inlet temperature to the gun is recommended. Adjust water flow to achieve outlet temperature. Water temperatures may affect coating quality and gun performance.
- Powder feed rate must be checked with powder flowing through lit gun. Powder Feed Rate (PFR) = (Powder Weight (g) Initial-Powder Weight Final (g)/ Powder Feed Time (min.)). Powder feed time must be greater than 1 min. PFR is linear to RPM of the feeder. To achieve required PFR, change RPM as follows:

$$\text{RPM (NEW)} = \frac{\text{PFR (Required) RPM (Original)}}{\text{PFR (Calculated)}}$$

- JKII flowmeter requires change for specific gas use:

H<sub>2</sub> - Part #972915 C<sub>3</sub>H<sub>6</sub> - Part #972763