

Stelcar® JK® 120P Powder
86 Tungsten Carbide/10 Cobalt/4 Chromium

Technical Note

DATE: 4/14/94
SUPERSEDES: 1/31/92
NO: C-005
PAGE: 1 of 3

DESCRIPTION

JK120P powder, previously called JK120, is a powder that is capable of producing coating properties similar to UCAR LW15 using propylene or propane fuel with the Jet Kote® thermal spray process. Please note JK120H is specified for hydrogen fuel only and JK120P is recommended for **CARBON BASED FUELS** such as propylene.

This particular WC/Co/Cr composition was designed for thick overlay applications or for general use.

This alloy is significantly more corrosion resistant to hydrogen sulfide than coatings containing an unalloyed cobalt matrix, however, JK120P coatings require sealing, if applied to base materials of low corrosion resistance.

APPROXIMATE COMPOSITION, Wt. %

Carbon	5.4
Chromium	4.0
Cobalt	10.0
Iron	1.0 Maximum
Tungsten	Balance

MESH SIZE

270/Down

COATING CHARACTERISTICS

Microhardness, DPH [300g]
Macrohardness, 15N (Rc)
Estimated Porosity, %
Est. Bond Strength, PSI (ASTM 633)
Estimated coverage, Lb/Ft/.010"
Est. Surface Finish, Microinch AA
-As Sprayed
-Ground/Lapped
Maximum Coating Thickness, Inches.
Maximum Service Temperature, °F
Abrasive Wear Resistance, mm ³ loss
30 lb load, 500 revolutions (ASTM G65)

SET A

824-1029
89-91 (57-62)
<3
10,500+
1.6
220-280
<5
.035
1000
Unknown

APPLICATIONS

Hardfacing of compressor rods, pump casings, pump impellers, pump plungers, pump sleeves, paper manufacturing suction rolls, mechanical seal faces, feed screws, gate valves, fan blades, as well as various chemical, oil field and petrochemical parts.

FINISHING

Coatings of JK120P must be finished by WET grinding with DIAMOND media.

Grinding:

Light Duty:

Wheel type: 100-240 mesh resinoid bond diamond (friable) L,P, or R hardness

Cross-feed/Pass: .035" - .050"

Part Surface Speed: 40-50 ft./min.

In-feed/Pass: .0005"

Heavy Duty:

Use above but substitute 100 mesh nickel clad diamonds in a resinoid matrix. The wheel should be a R hardness. For larger surfaces it may be desirable to use a softer wheel.

WARNING:

- 1) DIAMONDS MUST BE PERIODICALLY RELIEVED TO INSURE PROPER CUTTING AND REDUCE PARTICLE PULLOUT. IRREVERSIBLE COATING DAMAGE MAY OCCUR IF THE GRINDING WHEEL IS USED IN DULL CONDITION, OR IF WHEEL SPECIFICATION AND/OR IF GRINDING TECHNIQUE IS NOT CORRECT.
- 2) COOLANT MUST BE FLOODED ONTO PART AND WHEEL DURING GRINDING.

POLISHING AND LAPPING:

Diamond media is recommended. 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 surfaces prior to proceeding to the next grit size. Avoid contamination of the lapping surfaces by cleaning prior to application of fresh media. Recommended grit size progression after grinding:

15 to 45 micron diamond paper, cloth, mylar film, paste or slurry

Superfinishing is best done with diamond media and recommended progression is as follows:

15 or 9 micron - paste or slurry

followed by

6 or 3 micron - paste or slurry

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.

SET A OPERATING PARAMETERS⁽¹⁾

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

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:

H₂ - Part #972915 C₃H₆ - Part #972763