JK® 125 Powder
Stelcar® Tungsten Carbide
Chromium Carbide/Nickel Powder

TECHNICAL NOTE
DATE: 5/2/97
SUPERSEDES: 1/31/92
NO: C-011

DESCRIPTION

Coatings of JK® 125 powder are recommended for wear applications where oxidation or corrosion resistance superior to tungsten carbide/cobalt is required. It may be considered for an application where UCAR LW-5 is recommended, as its composition is similar.

Composition, wt%	
Carbon	5.0
Chromium	20.0
Nickel	6.0
Tungsten	Balance

Mesh Size
270/D

APPLICATIONS

Pump seals, pump bearings, food processing cutters and can forming and sealing dies, also applications where high temperature wear resistant surfaces in corrosive and oxidizing atmospheres is desired. JK®125 coatings contain no cobalt and are suitable for nuclear applications. JK®125 coatings are resistant to mild basic and organic acid solutions.

COATING CHARACTERISTICS	SET A	SET B	SET C
Bond Strength, PSI (per ASTM C-633)	10,000<	Unknown	11,000<
Microhardness, DPH [300g]	877-1000	900-1000	950-1050
Macrohardness, 15N	89-92	89-92	90-91
Estimated Visual Porosity, %	<2	<2	<1
Estimated Visual Oxide Level	moderate	Low	Low
Maximum Coating Thickness Inches As-sprayed on cylindrical shapes	. 025	. 025	Unknown
Maximum Coating Thickness Inches* As-sprayed on flat or irregular shapes	. 015	. 025	Unknown
Est. Maximum Service Temperature, ^{o}F	1200	1200	1200
Estimated Deposit Efficiency, %**	35-45	40-45	40-45
Coverage Estimation Lb/Ft^2/. 010"	1.3-1.6	1.4-1.5	1.4-1.5
As-Sprayed Surface Finish, Microinch AA	Unknown	Unknown	Unknown
Abrasive Wear Resistance, mm^3 Loss	Unknown	Unknown	Unknown

* Thickness limits depend on use of coatings part configuration and composition.
** Part size and configuration may vary values.

CORROSION RESISTANCE

Appears suitable for salt, water and amine environments. Has moderate resistance in sulfuric acid. Not recommended for nitric or hydrochloric acid containing environments. Appears to have suitable oxidation resistance up to 1200°F.

FINISHING

Coatings of JK® 125 must be finished by WET grinding or lapping:

Light Duty Grinding

Wheel type, 100-240 Mesh Resinoid Bond Diamond (Friable Shape)
L, P, or R Hardness
50 Concentration
.035" - .050" Cross-feed/Pass
40-50 Ft./Min. Surface/Speed
.0005" In-feed/Pass

Heavy Duty Grinding:

Use all of the above but substitute a wheel with 100 mesh, nickel clad diamonds in a Resinoid bonded matrix, an R hardness. (Large surfaces may require softer wheel.)

NOTE:

1. Important! Diamonds must be periodically relieved to insure proper grinding; irreversible damage to coating can occur when the grinding wheel dulls (diamonds are not exposed) wheel specifications and/or grinding technique is not correct.

2. Coolant must be flooded onto part and wheel during grinding.

Recommended Lapping Parameters*

Lapping Compound Sequence to achieve <2 Microinch RMS Finish

1. 30 Micron Diamond
2. 15 Micron Diamond
3. 9 Micron Diamond
4. .5 Micron Alumina

* Produced from 6-14 microinch AA diamond grind finish.

NOTE: Super finishes are not possible if coating has cracks or pullout caused by improper coating or finishing techniques.

SET A OPERATING PARAMETERS (1)

Fuel Gas	Propylene (C_2H_6)
Powder Carrier Type	Argon (Ar)
Nozzle	5/16 x 6
Injector	#50

Console Type	JK®II	JK®IIA
Manifold Pressures, PSI	(2) (7)	(3)
Oxygen	120	100
Main Fuel Gas	80	80
Carrier Gas	100	85
Hydrogen (Pilot)	25	
Console Pressures, PSI		
Oxygen	75-85	65-75
Main Fuel	63-68	80-86
Carrier	48-50	48-50
Console Flows(4)		
Oxygen	980-1020	990-1020
Main Fuel	58-62%	130-140
Carrier	30-35	56-70
Console Settings		
Oxygen		54.0-57.2
Main Fuel		43.3-46.7
Carrier		40.0-57.1
Cooling Water (5)		
^oF IN	80-90	80-90
^oF OUT	115-120	115 -120
Powder feed Settings		
Dial Set (Approximate)	160	160
RPM (Approximate)	2.0	2.0
Feed Rate (6), grams/Min.	40-45	40-45
Spray Distance, Inches	6-7	6-7

NOTES:

1. Pressures shown are running pressures with powder feeding.
2. Manifold pressures for JK® II system are critical, manifold regulators must be located at factory supplied hose ends.
3. Manifold pressure too low will not allow enough flow. If it is too high the controller will pulse upon start up.
4. JK® II system does not correct flow due to change in gas temperature or pressures at the meters, JK® IIA system compensates and flow is displayed as true Standard Cubic Feet per Hour (SCFH): T = 0^oC, P = 14.7 PSIA
5. 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 torch performance.
6. 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: RPM (NEW) = (PFR (Required) X RPM (Original))/ PFR (Calculated)
7. JK® II flowmeter requires change for specific gas use: H_2 - Part #972915 C_3H_6 - Part #972763

SET B OPERATING PARAMETERS (1)

Fuel Gas	Hydrogen (H_2)
Powder Carrier Type	Argon (Ar)
Nozzle	1/4 x 6
Injector	#40

Console Type	JK®II	JK®IIA
Manifold Pressures, PSI	(2) (7)	(3)
Oxygen	100	90
Main Fuel Gas	100	90
Carrier Gas	100	85
Hydrogen (Pilot)	25	
Console Pressures, PSI		
Oxygen	55-58	57-69
Main Fuel	80-82	80-86
Carrier	65-74	65-74
Console Flows(4)		
Oxygen	450	460
Main Fuel	1375	1290
Carrier	30-35	57
Console Settings		
Oxygen		25.6
Main Fuel		71.7
Carrier		40.7
Cooling Water (5)		
°F IN	80-90	80-90
°F OUT	115-120	115 -120
Powder feed Settings		
Dial Set (Approximate)	162-187	162-187
RPM (Approximate)	2.0-2.5	2.0-2.5
Feed Rate (6), grams/Min.	50-55	50-55
Spray Distance, Inches	6-7	6-7

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7. JK® II flowmeter requires change for specific gas use: H_2 - Part #972915 C_3H_6 - Part #972763

SET C OPERATING PARAMETERS (1)

Fuel Gas	Hydrogen (H_2)
Powder Carrier Type	Argon (Ar)
Nozzle	1/4 x 9
Injector	#40

Console Type	JK®II	JK®IIA
Manifold Pressures, PSI	(2) (7)	(3)
Oxygen	120	90
Main Fuel Gas	120	90
Carrier Gas	100	85
Hydrogen (Pilot)	25	
Console Pressures, PSI		
Oxygen	63-68	64-68
Main Fuel	75-85	81-86
Carrier	50-57	50-57
Console Flows (4)		
Oxygen	475	480
Main Fuel	1375	1300
Carrier	30-35	57
Console Settings		
Oxygen		26.7
Main Fuel		72.2
Carrier		42.8
Cooling Water(5)		
^oF IN	80-90	80-90
^oF OUT	115-120	115 -120
Powder feed Settings		
Dial Set (Approximate)	162-187	162-187
RPM (Approximate)	2.0-2.5	2.0-2.5
Feed Rate (6), grams/Min.	50-55	50-55
Spray Distance, Inches	6-7	6-7

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