

**JK<sup>TM</sup>558P**  
**Tribaloy<sup>R</sup>T-800 Intermetallic Powder**

**Technical Note**

DATE: 7/15/93

SUPERSEDES: 4/24/91

NO:C-004

PAGE:1 of 4

**DESCRIPTION**

JK558P, Tribaloy T-800 coatings maintain unique surface properties over a wide temperature range. Coatings exhibit outstanding resistance to abrasive and adhesive wear, has good corrosion resistance in a wide range of environments, and are particularly well suited where lubrication is a problem, as in high temperature applications or with low viscosity fluids. In metal-to-metal wear situations JK558 has demonstrated the ability to substantially reduce wear on both members of the mating couples. JK558 is often used where wear and corrosion are present. Further information on the properties of Tribaloy alloys is available in bulletin 461-5005.

JK558P powder has the same chemistry as JK558H, but due to the coarser powder distribution it is suitable for JET KOTE<sup>R</sup> Surfacing Systems using propylene or hydrogen fuels. The coatings produced with JK558P powder do not appear to comply with G.E. Coating Specification F50TF69. Please refer to JK558H technical note C-044 for additional description of this alloy and its uses.

**APPROXIMATE COMPOSITION, Wt.%**

**MESH SIZE**

|               |         |       |
|---------------|---------|-------|
| Carbon        | <.08    | 325/D |
| Cobalt        | Balance |       |
| Chromium      | 17.5    |       |
| Iron + Nickel | 3.0     |       |
| Molybdenum    | 28.5    |       |
| Silicon       | 3.4     |       |

**APPLICATIONS**

Applications for JK558P are:

Restoration or hardfacing of arbors, cams, pump components, bearing seats, plastic extrusion components, mechanical seals, brake components, magnetic tape heads, computer tracking components, various pump components, and automotive and diesel piston rings.

**COATING CHARACTERISTICS**

Approximate properties of JK558P coatings produced by JKII and JKIIA units follow.

|   | <b><u>SET A</u></b> |
|---|---------------------|
| Bond Strength, KPSI (per ASTM 633)  | 8.5+                |
| Microhardness, DPH [300g]   | 455-618             |
| Macrohardness, 15N (Rc Conversion)  | 83.4-88.2 (45-55)   |
| Est. Porosity, As-Sprayed   | 2%                  |
| Unmelted Particles, Per Field of View at 200x                                   | 10+                 |
| Maximum Coating Thickness, Inches As-Sprayed, Flat or Irregular Shapes          | .030                |
| Maximum Coating Thickness, Inches As-Sprayed, Cylindrical Shapes                | Unknown             |
| Est. Maximum Service Temperature, °F  | 1500                |
| Est. Deposit Efficiency, %  | Unknown             |
| Est. Coverage, Lb/Ft <sup>2</sup> /.010"  | .5                  |
| Est. Surface Finish, Microinch AA   | 330-450             |
| Abrasive Wear Resistance, MM <sup>3</sup> Loss Per ASTM G65-80, 500 revolutions | 13.4                |
| Oxide Level, Visual   | High                |
| Est. Thermal Expansion Coefficient Microinches/Inch/°F , 72-1800 °F             | Unknown             |

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.

**CORROSION RESISTANCE**

Corrosion resistance of JK558 coatings are rated as shown for the following environments. These results are based on laboratory tests of the alloy. Because of the porosity in the sprayed coatings, even when as low as 2%, and other operating conditions, the final evaluation of JK558 coatings in corrosive environments should be by field testing.

|  |              |
|--|--------------|
| 50% Acetic Acid @ boiling                              | Excellent    |
| 10% Ferric Chloride @ room temp.                       | Good         |
| 45% Formic Acid @ boiling                              | Excellent    |
| 5% Hydrochloric Acid @ 150°F                           | Excellent    |
| 65% Nitric Acid @ 150°F                                | Satisfactory |
| 85% Phosphoric Acid @ 150°F                            | Excellent    |
| 10% Sodium Chloride +<br>5% Iron Chloride @ room temp. | Good         |
| 10% Sulfuric Acid @ boiling                            | Satisfactory |

Excellent - <2 mils/yr  
Satisfactory - 20-50 mils/yr

Good - <20 mils/yr

## **FINISHING**

Coatings of JK558P must be finished by grinding or lapping:

### **GRINDING OPTION #1 :**

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/Pass : .0005"

**IMPORTANT!** Diamonds must be periodically relieved by dressing the wheel to insure proper grinding.

### **GRINDING OPTION #2 :**

Wheel Type : 220 SiC Vitrified Bond, H Hardness  
Cross-Feed/Pass : .035" - .075"  
Part Surface Speed : 40 - 65 Feet per Minute  
In-Feed/Pass : .0005" - .001"

Substitutions for wheel specification may be required if coarse grinding and increased wheel life is desired.

### **NOTES :**

1. Irreversible damage to the coating can occur when the grinding wheel specifications and/or the grinding technique is incorrect.
2. Coolant must be flooded onto the part and grinding wheel during grinding.

### **Recommended Lapping**

1. Lapping is best done following a 6-14 microinch AA ground finish of the coating.
2. Diamond paste or slurry is recommended as lapping media by following recommendations from JK558H technical note. SiC can be used however starting with 320 then 400 followed by 600 mesh if finish is not critical.
3. 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.
4. Super-finishing is possible only if the coating does not have cracks or pull-out 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              | 5/16-6                                     |
| Injector            | #50  |
| Carbide Insert      | .052" or .080"                             |

|                                       | <b><u>JKII</u></b> | <b><u>JKIIA</u></b>          |
|---------------------------------------|--------------------|------------------------------|
| <b><u>Console Type</u></b>            |                    |                              |
| <b><u>Manifold Pressures, PSI</u></b> | (2) (7)            | (3)                          |
| Oxygen                                | 120                | 100                          |
| Main Fuel Gas                         | 80                 | 80                           |
| Carrier Gas                           | 100                | 85                           |
| Hydrogen (Pilot)                      | 25                 | 100                          |
| <b><u>Console Pressures, PSI</u></b>  |                    |                              |
| Oxygen                                | 76-85              | 68-75                        |
| Main Fuel                             | 60-65              | 58-63                        |
| Carrier                               | 52-57 (.052")      | 52-57 (.052")                |
| <b><u>Console Flows(4)</u></b>        | 43-55 (.080")      | 43-55 (.080")                |
| Oxygen                                | 1000-1020          | 1000-1020                    |
| Main Fuel                             | 56-60%             | 127-137                      |
| Carrier                               | 28-30              | 57 Ar (70 N <sub>2</sub> )   |
| <b><u>Console Settings</u></b>        |                    |                              |
| Oxygen                                |                    | 54.4-56.7                    |
| Main Fuel                             |                    | 42.3-45.7                    |
| Carrier                               |                    | 40.0 Ar (67 N <sub>2</sub> ) |
| <b><u>Cooling Water(5)</u></b>        |                    |                              |
| °F IN                                 | 80-90              | 80-90                        |
| °F OUT                                | 115-120            | 115-120                      |
| <b><u>Powder Feed Settings</u></b>    |                    |                              |
| Dial Set (Approx.)                    | 134-150            | 134-150                      |
| RPM (Approximate)                     | 1.5-2.0            | 1.5-2.0                      |
| Feed Rate (6), grams/Min.             | 30-40              | 30-40                        |
| <b><u>Spray Distance, Inches</u></b>  | 7-8                | 7-8                          |

**NOTES:**

1. Pressures shown are running pressures with powder feeding.
2. Manifold pressures for JKII 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. 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
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 gun 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:  

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

7. JKII flowmeter requires change for specific gas use:

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