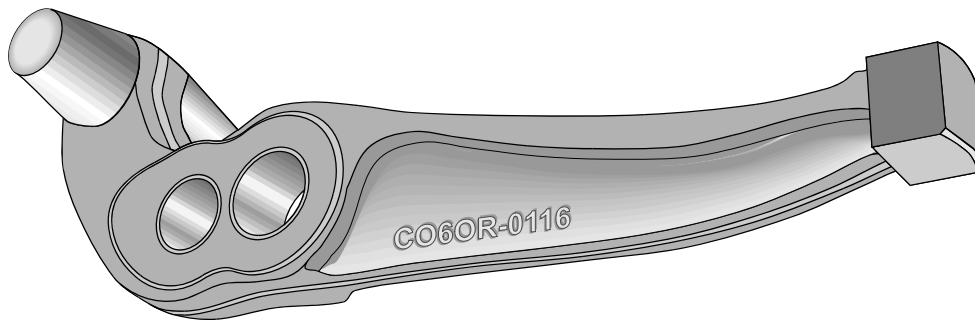


THE RECLAMATION OF CAST STEEL CLUTCH RELEASE LEVERS BY POWDER SPRAYING

Application Data Sheet AU-DR-005



INTRODUCTION

The powder flame spray reclamation of clutch release levers and many other automotive components has now become common practice. By using the flame spraying process, considerable savings may be made over replacement costs.

Savings of up to 50% are common where on large components, savings of up to 90% may be achieved.

It is sometimes advisable to use fused coatings on components that are subjected to higher loads and excessive wear in service, fused coatings being non-porous and having a low friction coefficient makes them ideal for clutch release levers.

EQUIPMENT

Metallisation Mark 74 Powder Spray Pistol

MATERIALS

Metallisation 99325 Nickel-Chrome-Boron Powder

Cleaning

- (a) Steam clean if equipment available
- (b) Degrease by solvent vapour if equipment available

Preliminary Inspection

Check for cracks or faults taking lever below the manufacturers recommended operating tolerances.

Note: Metalsprayed deposits do not impart any strength to the base material

Preparation

- (a) Preliminary Machining
Grinding or finishing may be used to remove any major scoring on level tips, blending in to form a uniform and concentric base.

- (b) Masking
Mask surfaces adjacent to area requiring treatment with a heavy duty masking tape.

Thoroughly inspect for contamination prior to blasting.

Blasting

Thoroughly blast area to be metalsprayed with clean n° 24 Chilled Iron Grit.

Application of Sprayed Coating

Masking

- (a) Apply sprayshield masking fluid using a small brush to all areas adjacent to the area being sprayed. Ensure fluid is not applied to area being metalsprayed. (Small amounts of masking fluid on area to be sprayed can be removed with emery cloth)
- (b) Check thoroughly that area to be sprayed is free from contamination

- (c) **IMPORTANT** Areas to be sprayed should not come into contact with oil, grease, hands or any other form of contamination.

Note: Masking is not always required when spraying clutch release lever tips.

Spraying

Spraying should be as soon as possible after preparation and before any visible sign of deterioration occurs. A multiple of levers should be set in a fixture or laid in line ready for treatment.

Pre-heating

The properly prepared surface should now be pre-heated to between 95° (203°) and 100°C (212°F) before the spraying operation starts.

Bonding

On flat surfaces, especially where coatings are not carried over edges, the tensile stress in the coating is applied directly to the bond as a shear stress.

Bond to the base must be strong enough to withstand these stresses, otherwise the coating separates from the surface and a void exists at the interface allowing oxides to form as heat is applied for fusing.

Spraying

On small components, it is advisable to set them in multiples or produce a fixture allowing rotation during spraying.

The spray head should be at 90° to the surface being coated and traversed by hand at a surface speed of not less than 18 metres/minute (60 feet per minute).

This will give a deposit thickness of between 75µm-100µm (0.003"-0.004") per pass. It is good practice to keep the work temperature below 300°C (572°F) during the coating operation.

Spraying Parameters: MK74

Acetylene 0.83 Bar (12 psi)

Oxygen 2.07 Bar (30 psi)

Air As required

Flowmeter Pointer Setting:

<u>Gas</u>	<u>Oxy</u>
5.0	6.5

Coating Thickness

Self-fluxing alloys are porous as sprayed and will shrink by approximately 20% when fused. The coating thickness should be amount required to bring component back to manufacturers recommended working tolerance, then 300µm-400µm (0.012" - 0.016") finishing allowance plus 20% of total for shrinkage.

FUSING

There are distinct advantages in fusing the coating while the component is still hot from the spraying operation. First, less heat is required, second, it reduces the danger of cracking or lifting of unfused deposit as it cools after spraying.

The fusing may be completed using the spray equipment with powder turned off. Bringing the component up to temperature slowly using a slightly reduced flame at a distance of 100mm to 125mm (4" to 5") moving the flame back and forth over the surface bringing the component up to fusing temperature 970°C-1000°C (1778°F-1832°F)

A rapid rise in temperature may cause the coating to separate from the substrate or crack.

COOLING

Cooling should be as slow as possible to avoid the chance of cracking. The component must cool at the same rate as coating.

FINISHING

The component is now ground back to the original shape using Grinding Wheel Type N° 46 Blue V Grade

✚ REFERENCE TECHNICAL BULLETIN N°S :-

2.9.1 99325 Nickel Chrome Boron Powder

5.2.2 Surface Preparation by Gritblasting

NOTE: - SEE ALSO

AU-DR-001 Reclamation of Clutch Pressure Plate Faces

AU-DR-002 Reclamation Clutch diaphragm springs

AU-DR-003 Reclamation of Pressed Steel Clutch Levers by Flame Spraying