Metallisation
Thermal spray equipment and consumables

The Arcspray Reclamation Of Hydraulic Rams

Application Data Sheet HE-DR-001

Introduction

The hydraulic Industry, like any other Industry, has its share of wear problems. These are generated by the very harsh operational conditions. The 103T arcsprayed coating offers the advantages of low friction and great wear resistance, with the added benefit of being able to repair deeply scored rams with one process.

By using the Metallisation arcspray process, it is possible to apply a coating of 103T onto the worn areas of the hydraulic ram. This brings them back up to the original size at a very small percentage of the replacement cost, enabling the ram to be back in service in a very short period of time.

Equipment

Metallisation 528E, 140 or 340 Arcspray Systems

Materials

Bond Coat

Not always required.

Metallisation 79E Iron Chrome.

Arcspray bonding wire exotherms during spraying, which produces very high bond strength coatings.

Main Deposit

Metallisation 103T Iron Chrome Boron Wire

Coatings are hard and exhibit work hardening properties. Because of its low shrinkage, residual stresses are low and deposits of considerable thickness may be sprayed. The high chromium content provides good corrosion resistance.

Method

Cleaning

a) Degrease by solvent vapour process, if equipment available.

b) Inspect for longitudinal distortion, cracks or faults taking the ram below the manufacturers recommended operating tolerances.

NOTE: Metalsprayed deposits do not impart any strength to base materials.

Pre-Machining

Rough turn or grind areas being reclaimed to enough depth to clean up, typically 0.016" (0.4mm) to 0.040" (1mm), machining their length plus an allowance of 25mm either side of the hydraulic seal and bearing.

Cleaning

a) Degrease by solvent vapour process, if material available.

b) Check all surfaces are free from contamination and debris.

Preparation

a) Mask all machined surfaces adjacent to the area requiring treatment with heavy duty masking tape.

b) Thoroughly inspect for contamination prior to blasting.

c) Thoroughly blast with clean N° 30-36 Grade Aluminium Oxide Grit.

d) Ensure that areas to be treated are thoroughly blasted, paying particular attention to edges of machined areas.

Application Of Sprayed Coating

Masking

a) Apply sprayshield masking fluid using a small paintbrush to all areas adjacent to the area being sprayed (small amounts of masking on areas to be sprayed can be removed with emery cloth).

b) Thoroughly check the areas to be sprayed for contamination.

c) **Important:** The areas to be sprayed should not come into contact with chains, rope slings, hands or any other form of contamination. Delays between blasting and spraying should not exceed 20 minutes.

- Electrical supplies are generally more readily available.
- Potentially flammable and explosive gases are not required.

Bonding

a) The Arcspray Equipment should be set up in accordance with the Metallisation Manual for the spraying of 79E Nickel Aluminium Arc Wire.

b) The areas to be sprayed should be cleaned with a vacuum cleaner or clean, dry air blast to remove any loose particles of grit.

c) Apply 79E bond coat to a depth of 75μm-100μm

d) The hydraulic ram should be rotated to give a minimum surface speed of 18 metres/minute

e) The Arcspray Pistol should be set so that the spray stream is at 90° to the surface being coated and traversed at an even speed, giving a uniform coating.

f) Spraying Parameters Bond Coat

i.	Range:	100mm (4”)
ii.	Nozzle Air Pressure:	3.7 Bar (55 psi)
iii.	Voltage before spraying:	38V
iv.	Voltage during spraying:	34V
v.	Amperage:	200A

Note: Parameters may differ in accordance with type and length of power cables and hoses being used.

Main Deposit 103T (to be applied immediately after bond coat)

a) The arcspray equipment should be set up in accordance with the Metallisation manual for spraying 103T (Iron Chrome Boron) Wire.

b) Apply final deposit to the specified thickness, including grinding allowance, i.e. finished ground dimension plus 0.375mm-0.5mm (0.015”-0.020”).

c) The hydraulic ram should be rotated to give a minimum surface speed of 18 metres/minute.

d) The arcspray pistol should be set so that the spray stream is at 90° to the surface being coated and traversed at an even speed to give a deposit of not more than 0.13mm per pass.

e) Using pre-set callipers, check final sprayed deposit thickness to ensure there are no areas below finished sprayed diameter.

f) Remove loose particles on surface with wire brush or clean air blast.

g) Allow to cool thoroughly, preferably whilst rotating.

h) Spray Parameters Main Deposit 103T

i.	Range:	15cm (6”)

ii.	Nozzle Air:	4.3-4.6 bar (65-70 psi)
iii.	Volts before spraying:	32V
	Volts during spraying:	30V
iv.	Amperage:	150A

Sealing

a) Apply Sprayseal 'M' in accordance with Metallisation Sprayseal 'M' instructions. Keep surface wet by re-application for a period of approximately one hour.

b) Allow to dry thoroughly.

c) Remove all uncured sealer from the surface with clean, disposable cloths or paper towels.

De-Masking

a) Remove all masking tape.

b) Remove all overspray taking care to prevent coating damage.

c) Remove all traces of sprayshield with solvent.

Finish Grind

a) Grinding Wheel Type N° 46 Grit Blue V Grade.

b) Wet Grind to finished diameter, take light cuts using feed and speed in accordance with grinding machine manufacturer's instructions.

Inspection

a) Check dimensions.

b) Check for cracks or defects in sprayed coating, i.e. large pores or protrusions and loose particles.

Finish Clean

a) Clean to remove any traces of grinding abrasive and loose particles.

b) Wash with petroleum spirit/paraffin.

c) Dry the surface with clean, disposable cloths or paper towels.

- Reference Technical Bulletins:

No. 2.1.9 Metallisation Wire 79E IChrome

No. 2.6.8 Metallisation Wire 103T Fe/Cr/B