Road Emulsion Association Limited

Technical Data Sheet No.3

Recommendations for the Cleaning and Maintenance of Spraying Machines for use with Bitumen Emulsion

Revised by the Association's Technical Committee - June 2023

1. Introduction

Bitumen emulsion may be applied by hand, but for larger areas and for those where uniform distribution of the emulsion is required, spraying is recommended. Small areas are often sprayed using a hand-held nozzle (through a hand lance) connected to a machine where pressure is applied to the emulsion indirectly by means of compressed air, or where the emulsion itself is pumped. For larger areas, specially designed large capacity machines are to apply the emulsion [1].

The following is intended as a guide to the cleaning and maintenance of such machines. Where reference is made to solvents, this in general refers to non-volatile high flash point hydrocarbon solvents of the kerosene type. Proprietary bitumen cleaners such as those based on terpenes or fatty acid methyl esters may also be used, but care in their selection should be taken, as some may react with bitumen emulsion and adversely affect its application and end properties. The minimum amount of solvent necessary should be used. Appropriate risk assessment to permit the safe use of any solvent must be made using the suppliers' Material Safety Data Sheet and by checking the site specific working conditions.

2. Cleaning

Internal cleaning of tanks when necessary, should only be carried out by a specialist tank cleaning contractor who may use steam, hot oil, high pressure water, cleaning agent or a combination of these.

3. Bulk Sprayer

It is not necessary to empty the tank at the end of every single day's operation. Sufficient emulsion can be left in the tank to cover heating coils, if present, and the tank subsequently topped up. However, it is good practice to routinely periodically completely clean out the tank contents to avoid the build up of bitumen residue or any alteration of the properties of the emulsion by prolonged heating and pumping. The spray bar should be flushed through with a suitable cleaning agent and drained into a suitable container and disposed of in accordance with regulatory requirements at the end of each day's operation or where there is any prolonged delay in spraying. If no suitable containers are available the spray bar can be flushed directly back into the main tank. This is done by turning off the bitumen to the pump and opening an air valve at the receiving side of the pump which will force air through the bar and back to the main tank of the sprayer. The jets can block if not flushed through with a suitable cleaning agent and the sprayer will require good circulation and a spray test prior to work commencing. Jets may be removed and soaked in cleaning agent overnight if required and **must not** be cleaned by spraying solvent through them to avoid any vapour ignition hazard due to electrostatic discharge. Drainings should not be returned to the tank but disposed of non-hazardous or hazardous waste as appropriate.

4. Hand-Operated Machines

Breaks in spraying should be accompanied by rinsing the end of the lance with solvent to prevent blockage, but it **must not** be cleaned by spraying solvent to avoid any vapour

ignition hazard due to electrostatic discharge. At the end of each day's operation, it is good practice to empty completely the contents of the machine. Jets may be soaked in solvent overnight if required. Drainings should not be returned to the tank but disposed of non-hazardous or hazardous waste as appropriate.

5. Changing from Anionic to Cationic Emulsion and vice versa

Anionic and Cationic emulsions will coagulate if mixed with each other. Even a small amount of one mixed with the other will be sufficient to precipitate bitumen, causing blockages in the working parts of the machine and spray jets. To avoid this, use machines reserved only for one type of emulsion, or if this is not possible, change from one type to the other as infrequently as possible. Prior to changing over, the machine should be drained completely. Internal cleaning of tanks and pipework should then be carried out by a specialist tank cleaning contractor who may use steam, hot oil, high pressure water, a suitable cleaning agent or a combination of these.

6. Inspection and Maintenance

Inspection and maintenance should be carried out according to manufacturers' recommendations. In addition ensure:-

a) All hoses and seals are be manufactured from oil resistant materials and checked regularly for leaks.
b) Leaking glands should be replaced immediately since these considerably reduce the spraying efficiency and accuracy.
c) The plunger rod of small pump operated spraying machines has a tendency to become coated with bitumen, giving rise to excessive friction which breaks the emulsion and jams the machine. This can be avoided by keeping the plunger rod lubricated with solvent.
d) Where a hand lance is used, special attention should be given to ensure that any flexible hose is rated for the pressures and temperatures involved and is securely attached at both ends.

References

[1] BS1707: Road surface dressing, bond coats, seals, preservatives and other spray - Specification for the method of test for binder sprayers for accuracy of spread of binder (spray bar bench test)

For further information on all REA Technical Data sheets please look on the "Technical Datasheets" webpage on www.rea.org.uk