

**SPRAY and NOZZLE CLASSIFICATION SCHEME - MANAGEMENT PROTOCOL****1. INTRODUCTION**

The first scheme for classifying sprays and nozzles was introduced by the British Crop protection Council (BCPC) in 1986 <sup>1</sup>. It has been managed by the BCPC Applications Committee since then. It is expected that a new internationally agreed scheme will be introduced in 1996/7 <sup>2</sup>. There is however a need to re-confirm the protocols for the management, operation and technical aspects of the scheme until the introduction of any new scheme to help those wishing to obtain classification of their nozzles.

This protocol gives guidance on the procedures for collection of data and submission of the data to BCPC for classification of nozzles into the categories of spray quality - Very Fine, Fine, Medium, Coarse and Very Coarse.

Further protocols are available from BCPC for the measurement of droplet spectra using laser operated particle size analysers,

**2. PRINCIPLES**

- 2.1 Classification is accomplished by comparison of the droplet size spectrum between 10 to 90% cumulative volume of test nozzles to those of a set of BCPC Reference Nozzles (see Appendix I) at pressures between 1 to 4 bar.
- 2.2 Test and BCPC Reference nozzles must be analysed using particle size analysers and protocols acceptable to BCPC: at the same time, on the same instrument and at the same settings.
- 2.3 Companies or contracting laboratories wishing to submit data for classification must follow this protocol.
- 2.4 Following classification, the categories may be published by the company in their own literature, acknowledging BCPC as the source.

**3. PROCEDURE**

- 3.1 BCPC Applications Committee (see Appendix) should be contacted before data are collected to ensure the correct procedure and protocol are followed. A member of the Committee will be designated to correspond with the submitter of data.
- 3.2 BCPC will supply a set of Reference nozzles and the protocol for the proposed particle size analyser.

- 3.3 Use clean water plus 0.1% Agral<sup>3</sup> as test fluid.
- 3.4 Measure the output of both test and reference nozzles at 1 to 4 bar pressure in at least 1 bar steps. Check deposit patterns of test nozzles for uniformity to expected patterns.
- 3.5 Obtain droplet spectrum data for the BCPC Reference nozzles at their rated pressures (see Appendix).
- 3.6 Obtain droplet spectrum data for the test nozzles at pressures from 1 to 4 bar in at least 0.5 bar steps.
- 3.7 Repeat measurements for the Reference nozzles.
- 3.8 Plot all droplet spectrum data identically as percent cumulative volume against droplet diameter on suitable axes to give as straight a central section of the graph as possible.
- 3.9 Submit all droplet spectrum data and details of the particle size analyser, its set-up and method of use to BCPC via the Liaison officer who will ensure that the data is in a suitable form for classification.

#### **4. CLASSIFICATION**

- 4.1 A working group of at least four members of the BCPC Applications Committee will analyse the submitted data. A reference chart (see Appendix II) will be constructed from the Reference nozzle data defining the spray quality thresholds:-

Very Fine to Fine	- Reference nozzle 01
Fine to Medium	- Midway between ref. nozzles 02 and 04
Medium to Coarse	- Midway between ref. nozzles 04 and 08
Coarse to V.Coarse	- Equally spaced about the 08 curve.

- 4.2 Test nozzle droplet spectra will be superimposed onto the Reference chart and the category into which they best fit determined. Data which is coincident with a threshold curve or crosses it will be classified as follows:-

Very Fine/Fine threshold	- assigned to Very Fine
Medium/Fine threshold	- assigned to Fine
Medium/Coarse threshold	- assigned to Coarse
Coarse/Very Coarse threshold	- assigned to Very Coarse

- 4.3 Test data which departs radically from the general shapes of the Reference nozzles droplet spectra will not be classified.
- 4.4 Test data which show serious discontinuity in its 'family' of spectra may be referred back for reanalysis.

## **5. PUBLICATION OF RESULTS**

- 5.1 The BCPC Applications Committee will advise the submitting organisation of the classification of the test data and corresponding nozzles in the form of a chart giving spray quality categories for each combination of nozzle size and pressure.
- 5.2 The submitting organisation may publish these categories in their own literature or that of other organisations using their nozzles. BCPC must always be acknowledged as the source of the categories.
- 5.3 BCPC Applications Committee reserve the right to dissociate BCPC from any inappropriate use of the terms Very Fine, Fine, Medium, Coarse and Very Coarse as applied to spray quality, nozzles and other atomizers.

## **6. REFERENCES**

- 1 Doble SJ, Matthews GA, Rutherford I, Southcombe ESE. (1985). A System for Classifying Hydraulic Nozzles and Other Atomizers into Categories of Spray Quality. Proc.BCPC Conference - Weeds, 1125-1133.
- 2 Southcombe ESE. Classification of Sprays and Atomizers - Report of a Workshop, Rotterdam, October 1994. BCPC communication.
- 3 Agral. Non-ionic wetter containing 900 g/l alkyl phenol ethylene oxide. Zeneca Crop protection.

## 7. APPENDIX

### 7.1 BCPC APPLICATIONS COMMITTEE

A Sub-Committee of the Technical Committee of the British Crop Protection Council.

Contact: E S E Southcombe. (Address details deleted)

### 7.2 BCPC REFERENCE NOZZLES

<b>NOZZLE</b>	<b>BCPC CODE</b>	<b>PRESSURE bar</b>	<b>OUTPUT litre/min</b>	<b>DESIGNATION</b>
01	F110/0.4/3.0	4.5	0.45	Fine / Very Fine threshold
02	F110/0.8/3.0	3.5	0.85	Characteristic Fine
04	F110/1.6/3.0	2.5	1.44	Characteristic Medium
08	F110/3.2/3.0	2.0	2.58	Characteristic Coarse

### 7.3 PARTICLE SIZE ANALYSERS

Protocols are available from BCPC for the following laser particle size analysers:-

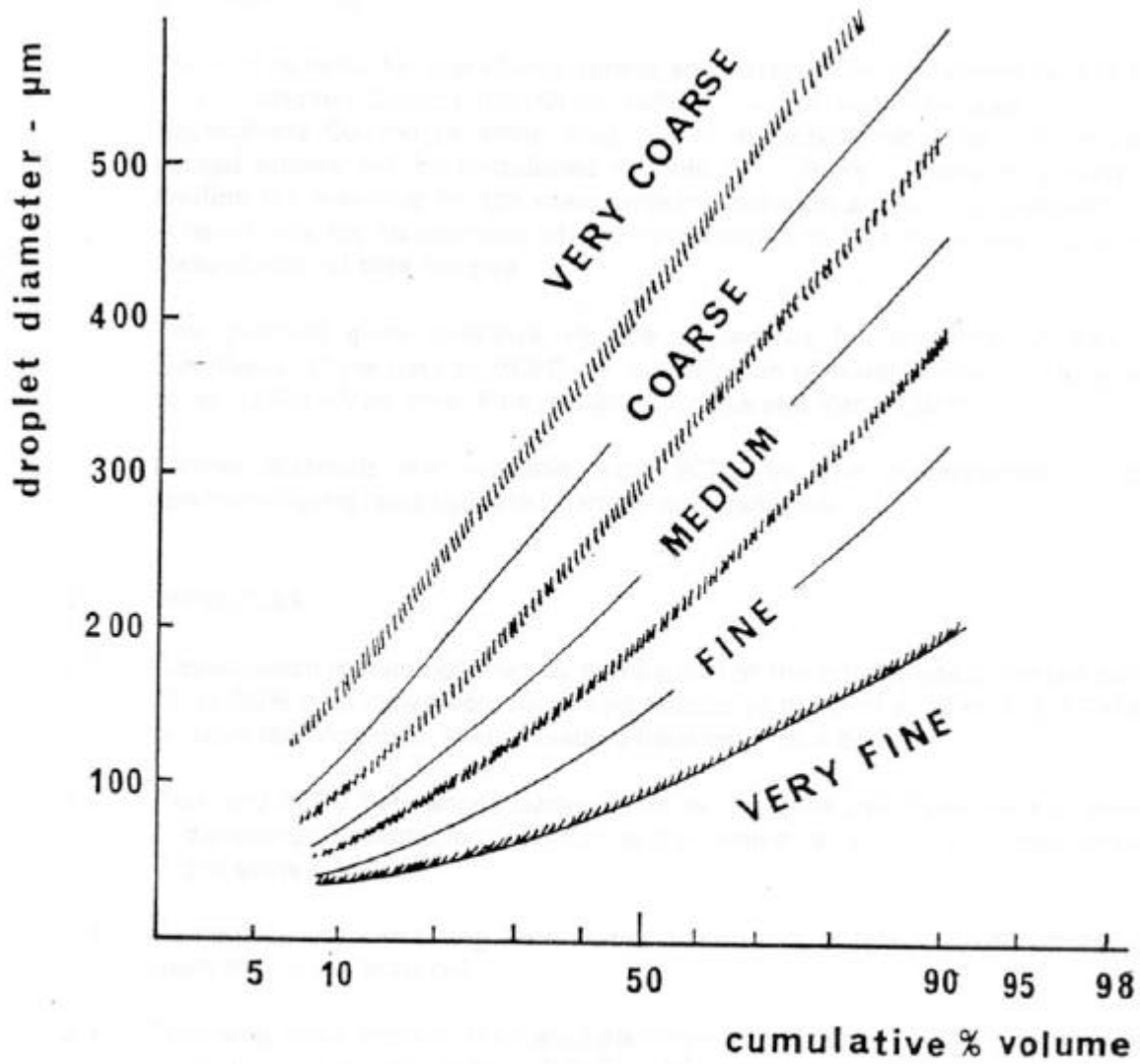
Malvern 2600

Aerometrics

Dantec

PMS

Other droplet sizing equipment and techniques may be agreed by BCPC.



CATEGORY THRESHOLDS