NEW ZEALAND AGRICULTURAL ENGINEERING INSTITUTE

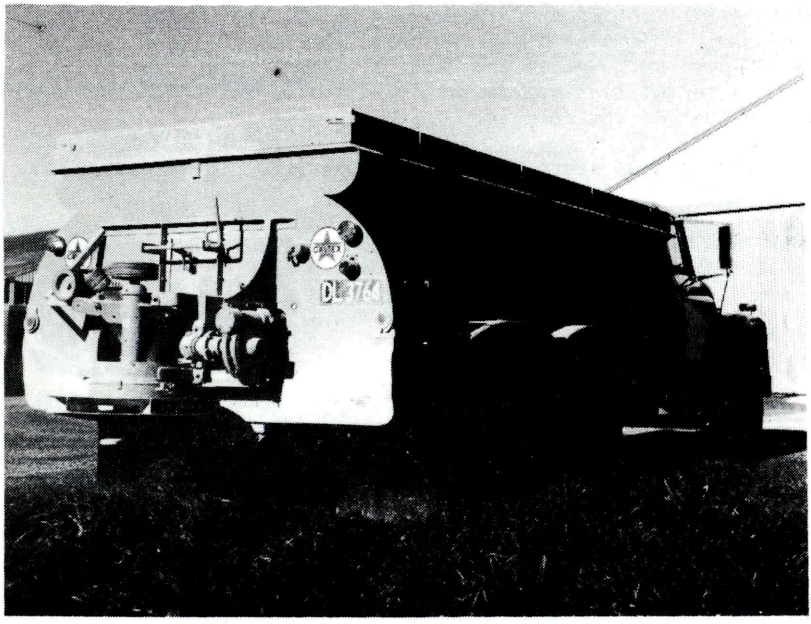
LINCOLN COLLEGE CANTERBURY NEW ZEALAND

Public TEST REPORT NO.T/42

STILL AIR LABORATORY REPORT ON THE DOHERTY BULK FERTILISER DISTRIBUTOR SPREADING AMMONIUM SULPHATE

MANUFACTURER OF MACHINE: Doherty Bros Ltd, Grange Street, WINTON.

TEST ENTRANT: Wilson & Kennard, MILTON.



TEST PROCEDURE:

A full description of the test procedure and equipment is contained in Project Report P/6 to be issued by the New Zealand Agricultural Engineering Institute. In the interim see NZAEI Project Report P/5.

BRIEF DESCRIPTION OF THE MACHINE:

The Doherty Bulk Fertiliser Distributor is a truck mounted spinning disc machine, the spinning disc being driven by auxiliary motor.

The hopper delivery system of the machine tested was of the scraper chain type, driven from the drive shaft of the carrying vehicle via an auxiliary gear box.

The distributor is available in a range of hopper capacities built to suit the carrying vehicle. The machine tested is described as a Doherty 16 ft 6 ton chassis mounted type bin.

The transverse and longitudinal distribution patterns illustrated in this test report were obtained after modification of the scraper chain to spinner feed chutes of the distributor as originally supplied for testing. The modification consisted of increasing the flow of material into the right hand feed chute relative to the left hand chute. The left hand chute was also extended so as to cause the material flowing down it to fall across the spinner on a radial line approximately 2" to the left of a centre line through the rear of the spinner.

The spinner was designed by Dibble Bros, Te Awamutu.

SIEVE ANALYSIS OF THE MATERIAL (AMMONIUM SULPHATE):

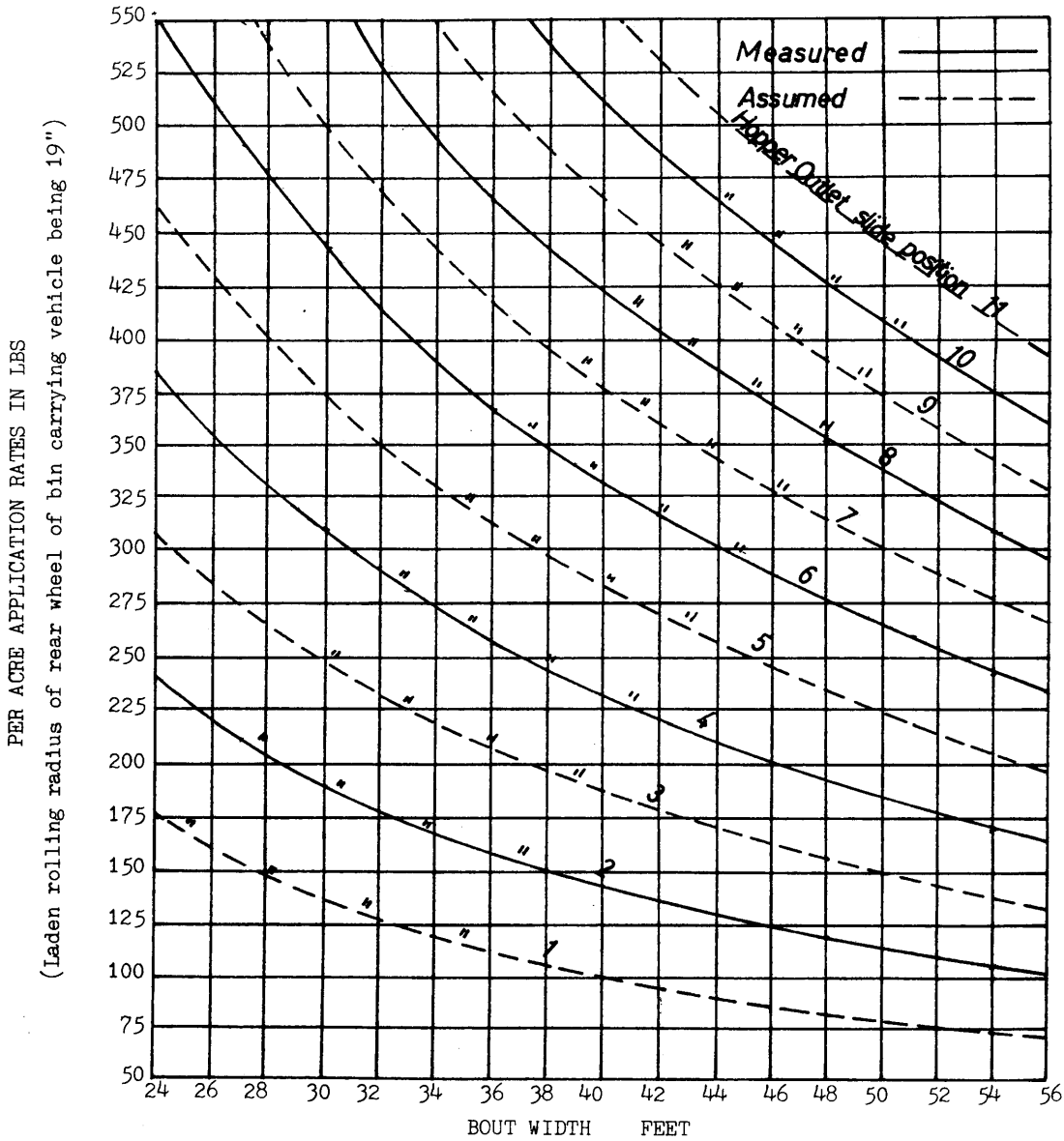
B.S. Sieve No.	% by weight
8	4.7
12	25.6
16	37.3
22	21.2
30	4.2
pan	7.0

BULK DENSITY OF THE MATERIAL (AMMONIUM SULPHATE):

The Bulk Density was 63 lbs 0 oz per cubic foot.

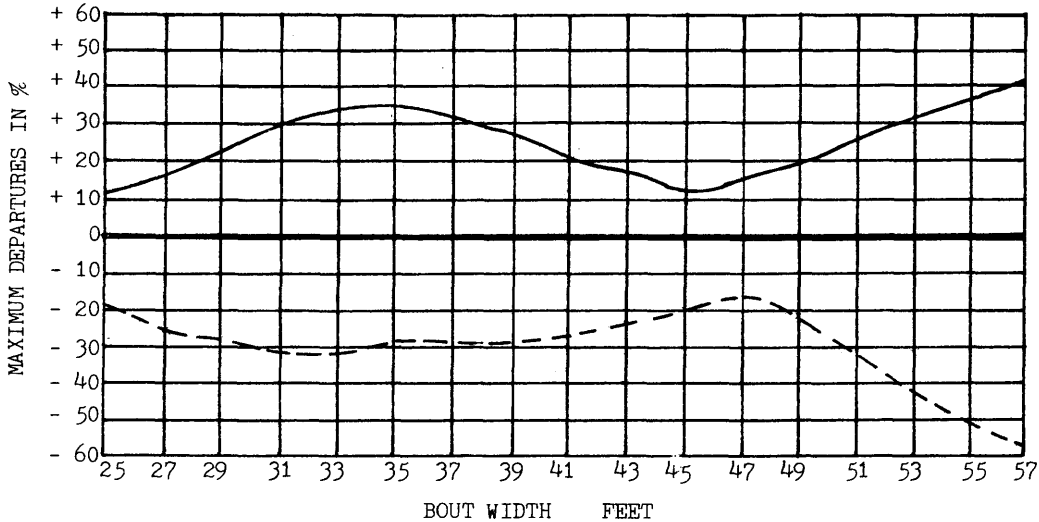
HOPPER OUTPUT OF MACHINE TESTED:

Drive Shaft to Scraper Chain Auxiliary Gear Box set in 2nd Gear.

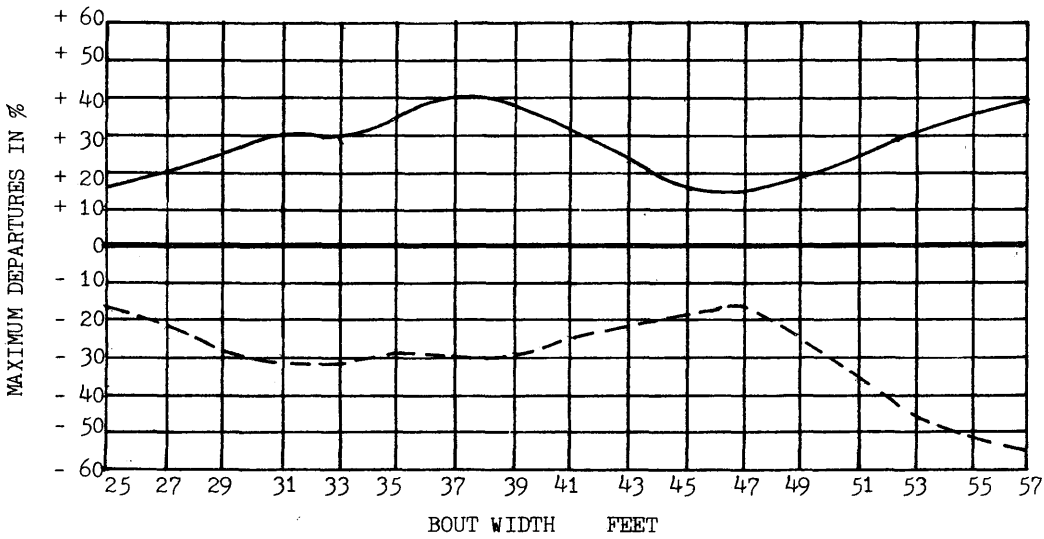


MAXIMUM DEPARTURES FROM THE MEAN APPLICATION RATE
OVER A SELECTED RANGE OF BOUT WIDTHS:

Mode of Travel: Round & Round
Above Mean Rate: ————————
Below Mean Rate: ----------



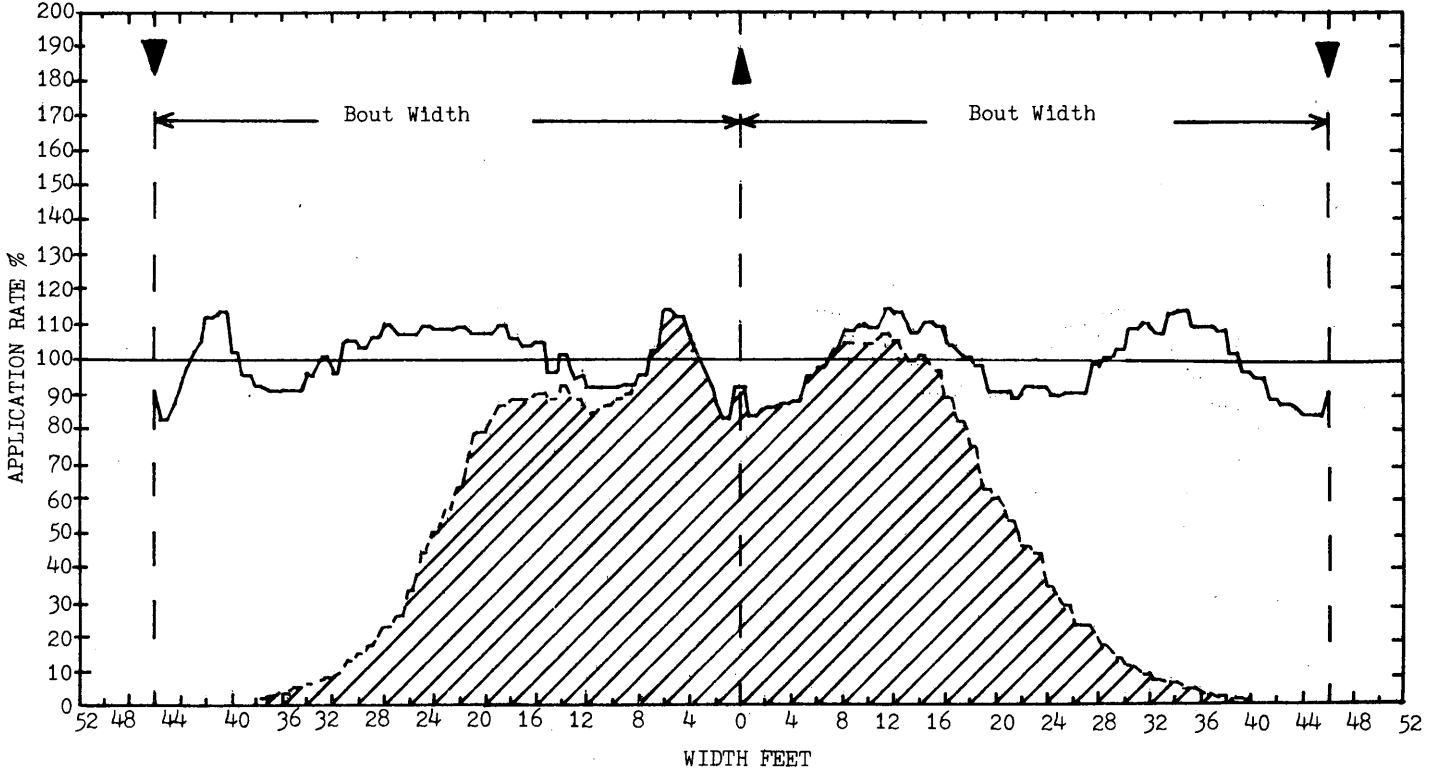
Mode of Travel: To & Fro
Above Mean Rate: ————————
Below Mean Rate: ----------



TRANSVERSE DISTRIBUTION PATTERN:

Name of Machine: Doherty Bin with Dibble Spinner
Disc Speed: 650 R.P.M.
Disc Setting: See modification to feed chutes on page 2
Bout Width: 46 Feet

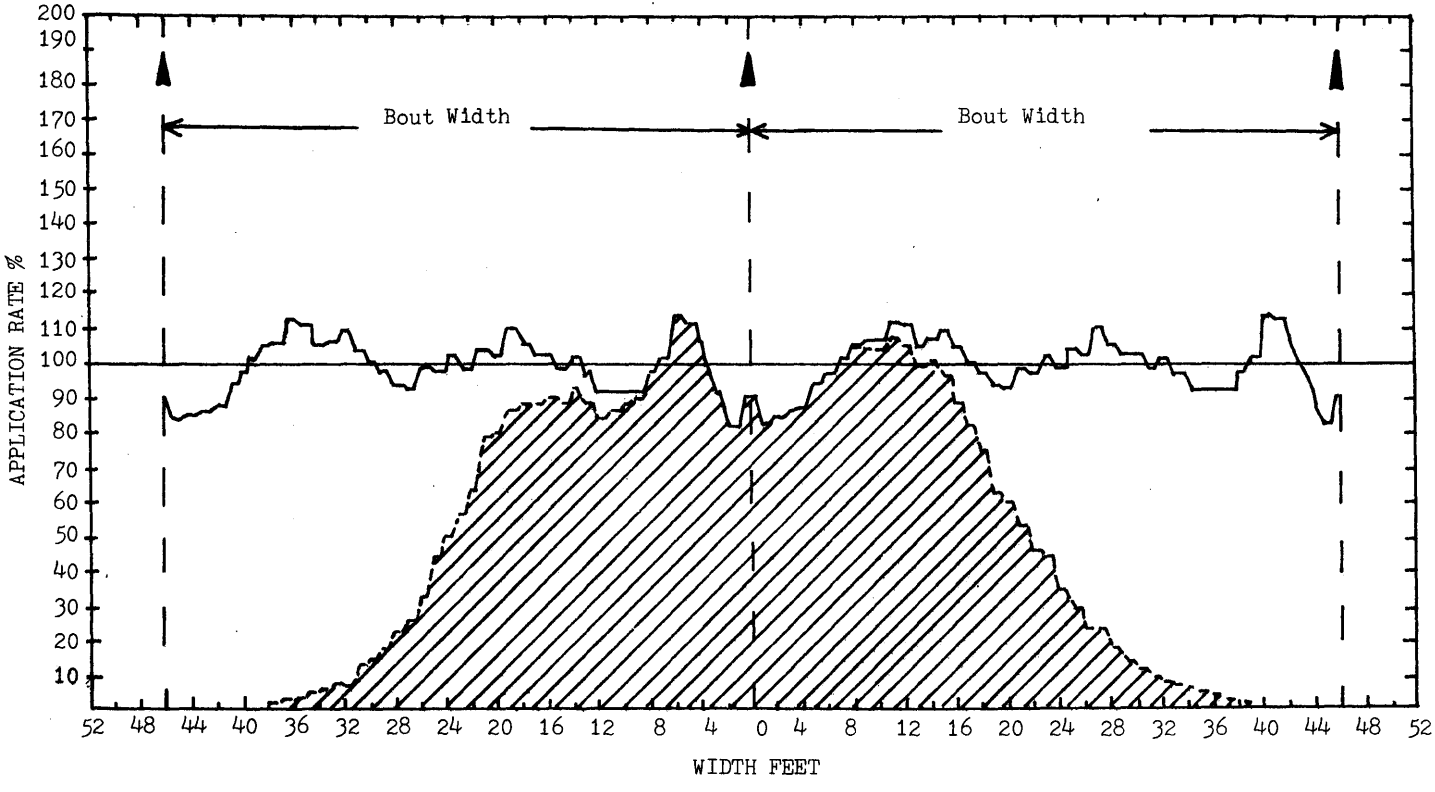
Material: Ammonium Sulphate
Mode of Travel: To & Fro
Hopper Outlet Setting: To simulate a rate of flow of material onto the spinning disc equivalent to an application rate of 2 cwt to the acre at a ground speed of 16 m.p.h.



TRANSVERSE DISTRIBUTION PATTERN:

Name of Machine: Doherty Bin with Dibble Spinner
Disc Speed: 650 R.P.M.
Disc Setting: See modification to feed chutes on page 2
Bout Width: 46 Feet

Material: Ammonium Sulphate
Mode of Travel: Round & Round
Hopper Outlet Setting: To simulate a rate of flow of material onto the spinning disc equivalent to an application rate of 2 cwt to the acre at a ground speed of 16 m.p.h.



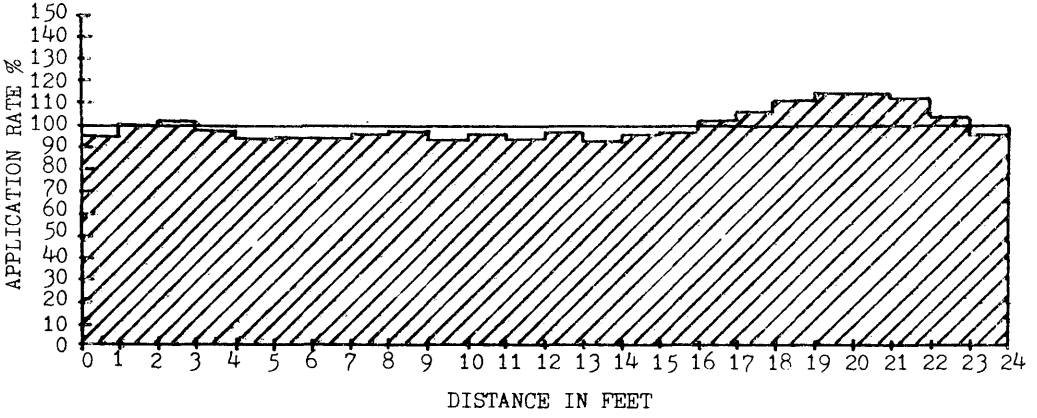
LONGITUDINAL DISTRIBUTION

Name of Machine: Doherty Bin with Dibble Spinner

Material: Ammonium Sulphate

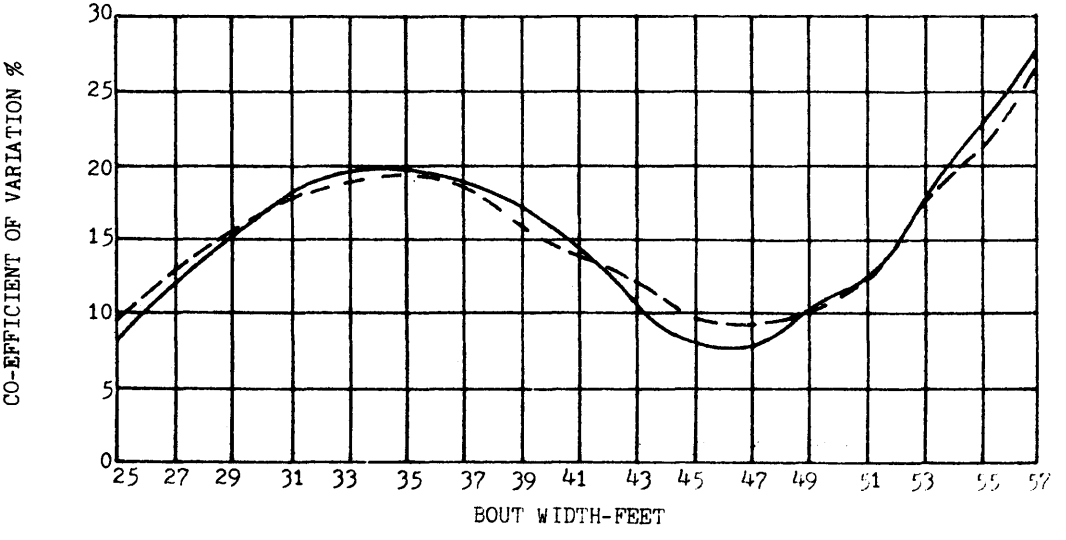
Actual Test Speed: 3 m.p.h.

Disc Speed: 650 R.P.M.



SENSITIVITY TO FLUCTUATIONS IN BOUT WIDTH

Mode of Travel "Round & Round"
Mode of Travel "To & Fro"



COMMENTS ON PERFORMANCE:

The Co-efficients of Variation obtained with Ammonium Sulphate for this machine as originally supplied for testing were:

Mode of Travel	Bout Width	Co-efficient of Variation
Round & Round	46 Feet	47.3%
To & Fro	46 Feet	53.4%

(N.B. The lower the Co-efficient of Variation is the more even will be the distribution, perfect spreading being 0.0%, see N.Z.A.E.I. Project Report P/6).

Because of the very uneven Transverse Distribution obtained from the initial tests, modification to the Spinner Feed system as given on page 2 was carried out. The machine was then re-tested and the following Co-efficients obtained at the illustrated bout widths given in this report.

Mode of Travel	Bout Width	Co-efficient of Variation
Round & Round	46 Feet	7.3%
To & Fro	46 Feet	9.0%

The shape of the curve on the Sensitivity to Fluctuations in Bout Width graph for both Modes of Travel indicates a machine/material combination sensitive to fluctuations in bout width. To achieve the spreading pattern displayed on the Transverse Distribution Pattern graphs for both "Round & Round" and "To & Fro" travel maintenance of the correct bout width involving accurate driving will be required.

MANUFACTURERS COMMENTS:

The manufacturer of the Bin considered that no comment was required on this machine/material combination.

Testing Officer .....

Date .....

DIRECTOR .....