File

DEPARTMENT OF MINES AND RESOURCES

BUREAU OF MINES

CANADA

Ottawa, October 22, 1946.

R E P O R T

of the

ORE DRESSING AND METALLURGICAL LABORATORIES.

Investigation No. 2125.

Metallurgical Examination of a 'Bug Blitzer' Cylinder.

(Copy No. 4.)

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Introduction:

On September 17, 1946, Mr. C. C. Stibbard, Director of Operations, Board of Transport Commissioners for Canada, Ottawa, in a letter (File No. 1717.87.36) addressed to Mr. C. S. Parsons, Chief, Bureau of Mines, requested the assistance of these Laboratories in testing an insecticide cylinder.

Mr. H. C. Johnson, Inspector, B. of T.C., delivered one of the cylinders and also copies of B. of T.C., General Order No. 563, dated April 9, 1946, containing Spec. No. 9 to the requirements of which all such containers must comply. The cylinder submitted for examination was stated to have been purchased on the open market by an employee of the B. of T.C. It was desired to have a complete examination and test

(Introduction, cont'd) -

of the cylinder as laid down in the above specification.

The label on the cylinder described the cylinder as the "Bug Blitzer Reliable Insecticide Dispenser" made by Aerocide Dispensers Limited, 230-232 King Street E., Toronto, Ontario, and besides general directions for use bore a typed or stamped legend "CRC-9, Aug. 8-1946" and a warning to "store below 170° F."

The cylinder received measured 10.3" x 1.8" diameter.

Object of Investigation:

To examine and test the cylinder submitted with a view to determining whether it complies with the requirements of Spec. No. 9 referred to above.

Procedure:

(1) The cylinder was photographed 'as received' to show the label and general shape (Figure 1), and also the reverse side of the label showing the manufacturer's name and address (Figure 2).

(2) The paint was removed by chemical means. It was revealed that the cylinder is made in two halves (Figure 3) from material bearing government markings (Figure 4). The two halves of the main body of the cylinder were joined by what appears to be a silver braze (Figure 5). The cylinder discharge valve was apparently joined to the end of the cylinder by means of a silver braze (Figure 6). No longitudinal seams were used.

(3) No evidence was found of any safety device such as a fusible metal plug as required by Spec. No. 9.

(4) The volume of the cylinder was calculated from

(Procedure, cont'd) -

outside measurements and found to be approximately 26.25 cu. in., well below the specified maximum volume of 86 cu. in.

(5) The cylinder was subjected to pressure tests as follows by the Fuels division of this Department. Tests were made by means of a high-pressure hydraulic pump and a Bourdon gauge using oil. It was necessary to drill the outlet hole of the cylinder to 1/8" diameter to permit entry of the oil.

(a) Pressure brought to 500 pounds per square inch and held for 1 minute. No leak or other defects observed. This test exceeds the specified individual cylinder test of 400 pounds per square inch held for a minimum of 30 seconds.

(b) Pressure brought to 1500 pounds per square inch and held for 1 minute. No leaks or other defects observed. This test exceeds the specified lot test which required freedom from rupture at 1200 pounds per square inch.

(6) The cylinder was subjected to a flattening test between knife edges shaped, 45° angle, rounded to a 3/8" radius. The cylinder was flattened until the two inside walls were in contact (Figure 7). This test was more severe than that specified. After flattening there was no evidence of cracking of the cylinder walls.

(7) A chemical analysis sample was machined from the flattened cylinder. The analysis obtained is shown in the table below, together with the specified analysis for the purpose of comparison:

	Specified Analysis	Analysis Obtained
	- Per Cent -	
Carbon -	0.150 max.	0.10
Phosphorus -	0.045 "	0.006
Sulphur -	0.055 "	0.034
Manganese -		0.29
Silicon		Trace.
Chromium -		Nil.
Nickel -		Nil.
Molybdenum -		Trace.

(Procedure, cont'd) -

(8) Micrometer measurements were made of the wall thickness of the two halves of the cylinder. A large number of readings (approximately 20) showed a range of wall thickness of from 0.044 to 0.043" as compared to the specified minimum wall thickness of 0.040".

(9) Typical cross-sections of the brazed joints were machined, mounted, polished and etched. Figure 8 shows a cross-section of the braze joining the two halves of the cylinder and Figure 9 the braze joining the outlet to the cylinder end. A microscopic examination of similar samples revealed that a good bond had been secured between the component parts. It will be noted that the depth of brazing is considerably greater than the specified minimum of four times the thickness of the shell metal with regard to the braze joining the two halves of the shell.

Discussion and Conclusions:

With regard to the applied tests, such as pressure or flattening, the cylinder complied with the specification requirements. The following shows in detail wherein the cylinder complies with and fails to meet specification requirements:

(a) The cylinder meets requirements with regard to:

(1) No longitudinal brazed seams were used in manufacture.

(2) Depth of brazing on the circumferential seam.

(3) Thickness of wall material.

(4) Pressure tests.

(5) Flattening tests.

(6) Chemical analysis.

(7) The volume of the cylinder is below the specified maximum.

(Continued on next page)

(Discussion and Conclusions, cont'd) -

(b) The cylinder fails to meet requirements with regard to:

(1) The cylinder is not permanently marked with regard to specification number, manufacturer's and owner's symbols.

(2) There is no safety device of any kind incorporated in the cylinder.

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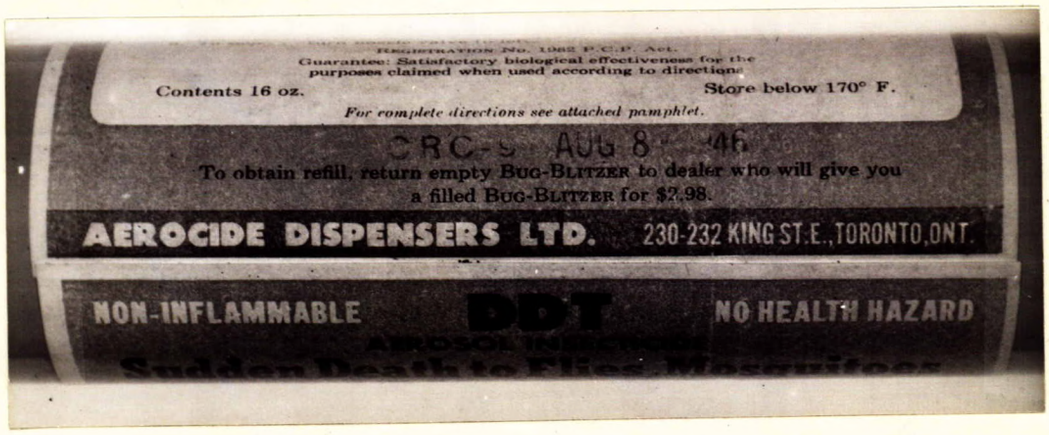
(Figures 1 to 9 follow,
on Pages 6 to 10.)

Figure 1.

PHOTOGRAPH OF CYLINDER 'AS RECEIVED', SHOWING GENERAL SHAPE.

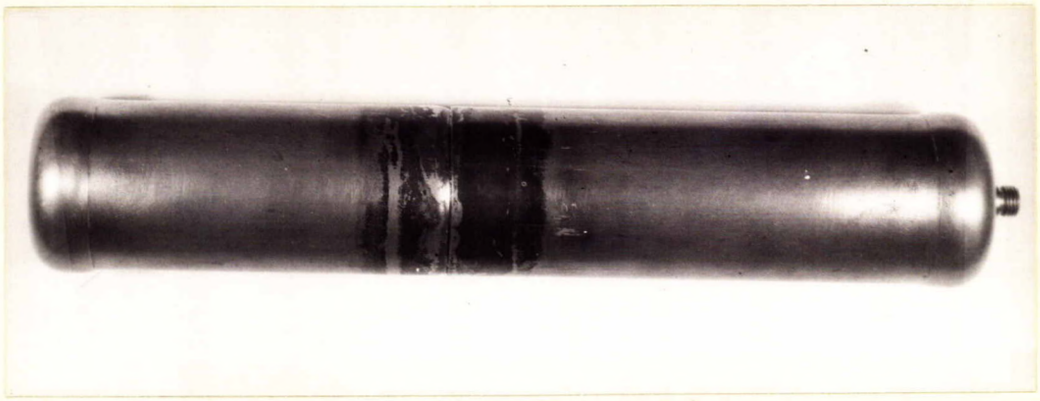
Figure 2.



PHOTOGRAPH OF CYLINDER LABEL 'AS RECEIVED'.

Note typed or stamped legend "CRC-9 Aug. 28, 1946" and warning to 'store below 170° F.'.

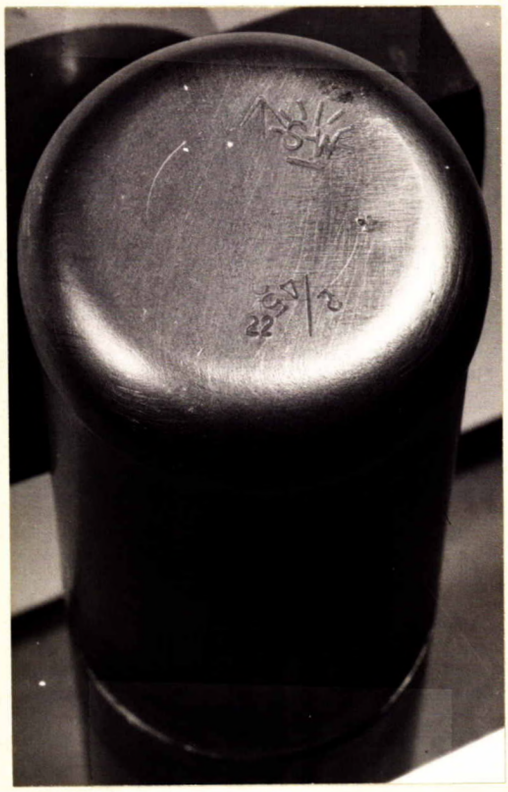
Figure 3.



PHOTOGRAPH OF CYLINDER AFTER CHEMICAL REMOVAL OF PAINT.

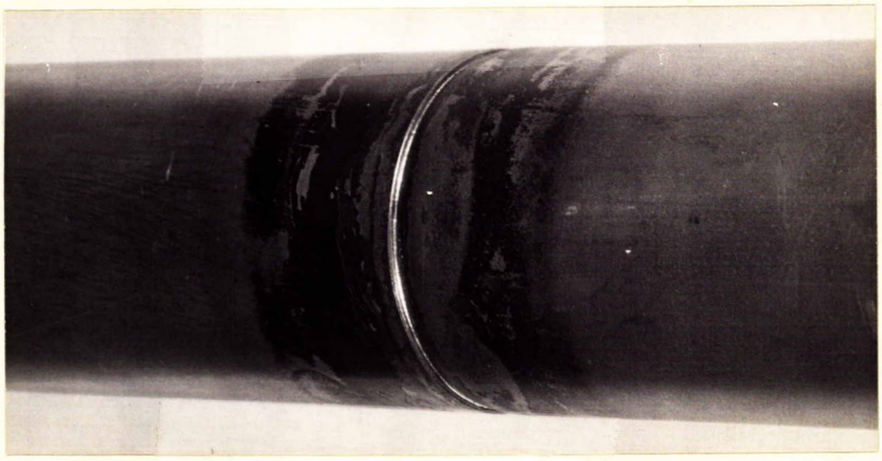
Note joint joining two halves of shell.

Figure 4.



GOVERNMENT MARKINGS ON ENDS OF CYLINDER.

Figure 5.



CLOSE-UP OF JOINT JOINING THE TWO HALVES OF THE SHELL.

Apparently a silver brazed joint.

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Figure 6.

CYLINDER DISCHARGE VALVE JOINED TO STEEL SHELL BY WHAT APPEARS TO BE A SILVER BRAZE.

Note government markings on the end of the shell.

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Figure 7.

APPEARANCE OF CYLINDER AFTER FLATTENING TEST.

No cracks were detected in the cylinder walls at area of greatest deformation.

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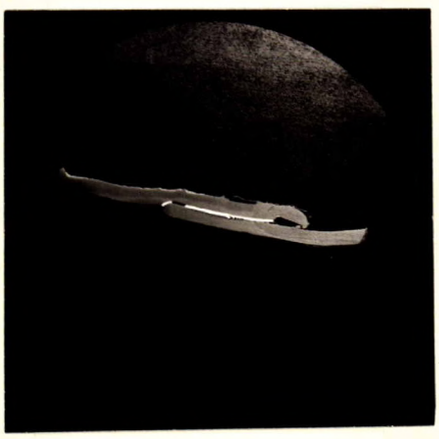
Figure 8.



PHOTOGRAPH OF SILVER BRAZE JOINING TWO HALVES OF THE CYLINDER SHELL.

Note that depth of braze exceeds specified minimum of 4 times the wall thickness.

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Figure 9.

PHOTOGRAPH OF SILVER BRAZE JOINING THE CYLINDER DISCHARGE VALVE TO THE SHELL BODY.

Braze length approximately 3 times wall thickness of shell.

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