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SUITABILITY OF STANDARD CHEMICAL FOAM CHARGES FOR PROPOSED STANDARD 2-GALLON  
EXTINGUISHER.

by

R. J. French, P. L. Hinkley and D. W. Fittes.

Summary

Performance and fire tests have shown that the standard Ministry of Works chemical foam charges are satisfactory for use in the proposed standard fire extinguisher body.

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# SUITABILITY OF STANDARD CHEMICAL FOAM CHARGES FOR PROPOSED STANDARD 2-GALLON EXTINGUISHER

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R. J. French, P. L. Hinkley and D. W. Pittes

## Introduction

A proposal has been made by the Joint Executive Standardisation Committee for the introduction of a standard 2-gallon body to be used for two-solution chemical foam, soda-acid and water-gas types of hand extinguishers. The total capacity of this new body is slightly greater than that of most existing proprietary extinguishers, and this has necessitated examination of the suitability of standard Ministry of Works charges for use with it. A comparative study has been made of the performance of the standard charges in the new body (total capacity 21.2 pt.) and similar charges used in one of the smallest of the existing types (total capacity 17.8 pt.). Both extinguishers have inner containers of 2.5 pt. capacity. The difference in the size of the body results in an increase in ullage from 3.3 pt. to 6.7 pt. when the extinguishers are charged in accordance with the appropriate Ministry of Works specification.

## Method of comparison

To determine the effect of the change in body size, the total quantity of foam produced, the relationship between discharge pressure and time, and the throw of the jet of foam were measured. Ministry of Works charges, made up in accordance with the directions given on the containers, were used in both extinguishers. To give more information about the effect of the increased ullage some tests were carried out with the new body in which the outer charge was made up with an additional  $\frac{1}{2}$  gallon of water and with an additional  $\frac{1}{2}$  gallon of sodium bicarbonate solution. Under these conditions the level of the outer charge was the same as that which would be used for existing soda-acid or water-gas extinguishers.

The throw was measured with the nozzle horizontal and  $\frac{3}{4}$  in. above ground level.

The fire-fighting qualities of the foam produced were also assessed by measuring the time taken to reduce the intensity of radiation from a suitable test fire to a third of its original value (control time <sup>(1)</sup>), using a standard method of application.

For these experiments a 3 ft. 4 in. diameter x 5 in. deep tray was used with a 9 in. high baffle plate against which the foam jet could be directed built up along 24 in. of its periphery. A 2 in. depth of petrol was used. The extinguisher was mounted on pivots on a frame so that when it was upturned the nozzle was 3 ft. from the baffle, 26 in. above the petrol surface and inclined downwards at  $10^{\circ}$ . The extinguisher was operated 30 seconds after the petrol was ignited. Measurements were also made of the times taken for the jet of foam to reach the nearer edge of the tray, to reach the baffle and to fall short of the tray again. In these tests extinction was generally not achieved but in some cases the fire was reduced to a few flickers.

## Test results

The results of the experiments are shown in Tables I and II and Figures 1 and 2. All the figures given are the average of two or three results.

Table 1

Total quantity of foam produced

Extinguisher	Charge	Quantity of foam
Old type	Standard	10.0 gal
Proposed Standard	Standard	12.2 gal
Proposed Standard	Outer charge made up by addition of $\frac{1}{2}$ gal water	14.2 gal

Table 2

Fire tests

Extinguisher	Charge	Time to reach tray s	Time to reach baffle s	Time to fall short of tray s	Control time s	Remarks
Old type	Standard	12	19	75	34	Foam rather stiff. Fire not extinguished.
Proposed Standard	Standard	2	14	56	21	Foam more fluid. Fire reduced to a few flickers.
Proposed Standard	Outer charge increased by $\frac{1}{2}$ gal water	19	43	78	44	Foam rather stiff. Fire not extinguished.
Proposed Standard	Outer charge increased by $\frac{1}{2}$ gal of solution	15	29	77	62	Foam rather stiff. Fire not extinguished.

Conclusions

The standard charge in the new body gave better results than those obtained with the same charge in the old body. Slightly more foam was produced and, presumably because of the greater ullage leading to a more efficient mixing of the two solutions, pressure increased more rapidly in the extinguisher. This point was clearly illustrated by the time for the foam to reach the tray in the fire tests. The effect upon the throw was small. The reduced control time obtained appeared to be due to the foam being more fluid, an effect also presumed to be due to the greater ullage. Increasing the amount of the outer charge by the addition of water or sodium bicarbonate solution worsened the performance of the extinguisher.

Reference

- (1) FRENCH, R. J., HINKLEY, P. L. and FRY, J. F. The Surface application of foam to petrol fires. Department of Scientific and Industrial Research and Fire Offices' Committee Joint Fire Research Organization F.R. Note No. 21/1952, June, 1952.

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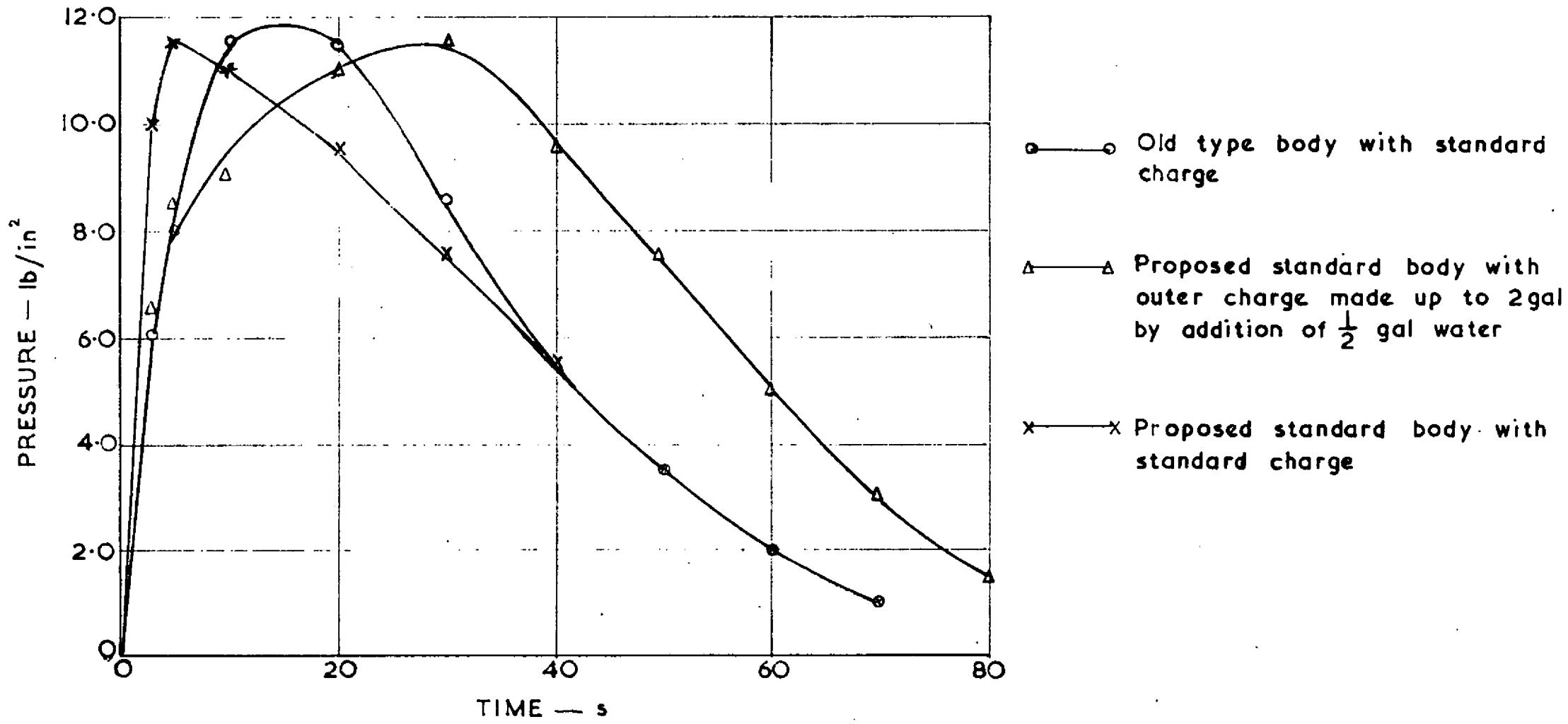


FIG. I. RELATIONSHIP BETWEEN PRESSURE & TIME

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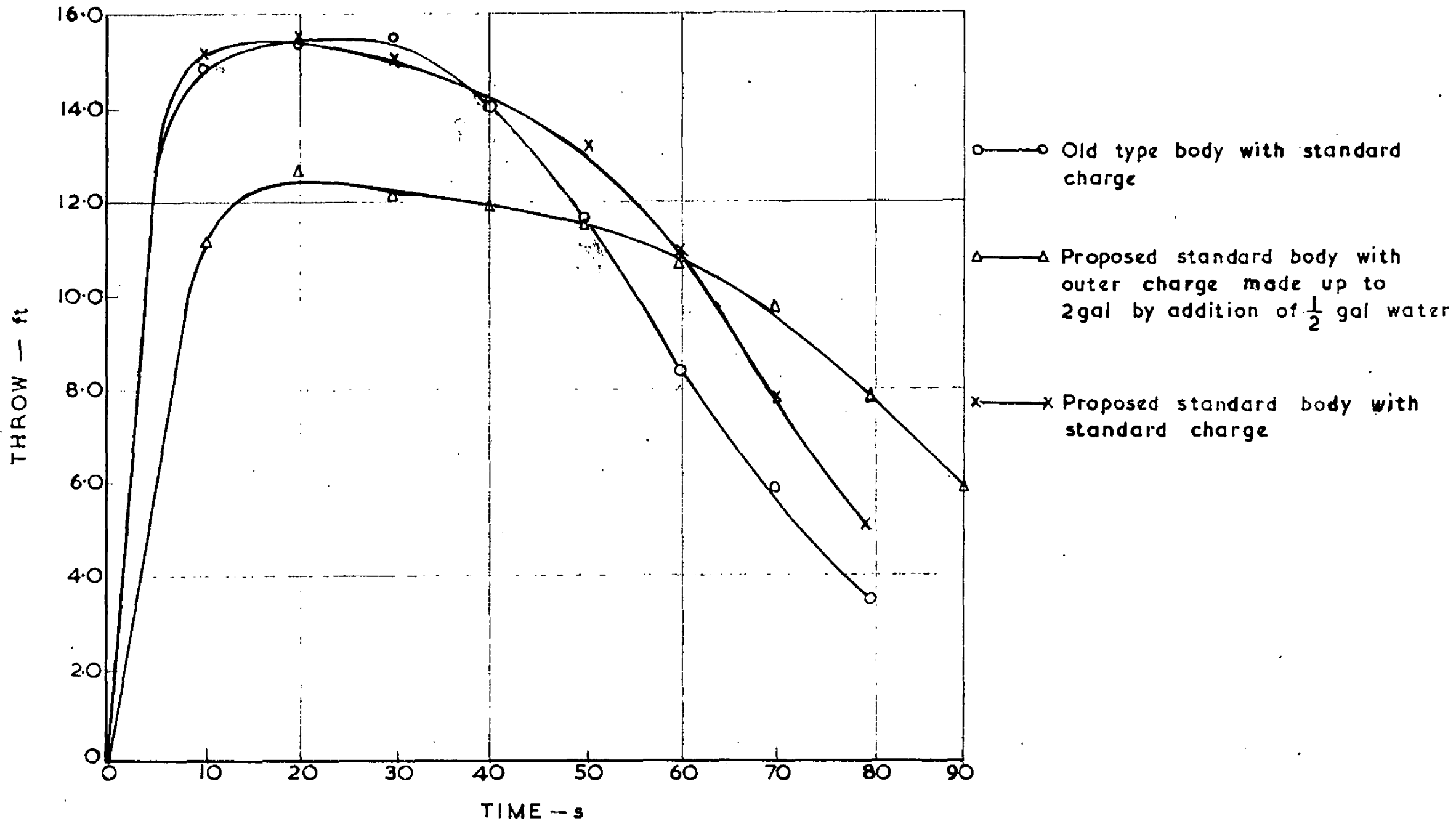


FIG. 2. RELATIONSHIP BETWEEN THROW & TIME