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**EXTINGUISHMENT OF A HEPTANE POOL FIRE USING
THE IFEX 1 L IMPULSE GUN AND 72.5 L HOSE REEL**

BY

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DISCLOSURE NOTICE

(Please read before reading report)

Purpose:

The purpose of this report is to describe a test of the ability of the IFEX 1 l Impulse Gun and 72.5 l Hose Reel using 1% AFFF to extinguish a heptane pool fire in a 2.44 m diameter dish.

Audience:

The information presented herein was carried out for Fire Fighting Technologies, and is intended for use by them.

Assumptions/Qualifications:

These are stated within the appropriate sections in the report.

Further Information:

Nil

External Source Materials:

VU takes no responsibility for source materials used in this report that are not generated by VU.

EXECUTIVE SUMMARY

The tests reported on were requested and funded by Fire Fighting Technologies. The purpose of this report is to describe a test of the ability of the IFEX 1 *l* Impulse Gun and 72.5 *l* Hose Reel using 1% AFFF to extinguish a heptane pool fire in a 2.44 *m* diameter dish.

The IFEX system using a 1% AFFF foam solution extinguished a well developed fire in a 2.44 *m* diameter dish containing heptane in less than one minute and using about 33 *l* of the foam solution. It is notable that a rather small quantity of foam solution was used to achieve extinguishment of a quite vigorous fire.

DISTRIBUTION

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1 INTRODUCTION

The test reported on herein was requested and funded by Fire Fighting Technologies.

This report presents the results of a test to ascertain the ability of the IFEX 1 l Impulse Gun and 72.5 l Hose Reel using 1% AFFF solution to extinguish a heptane pool fire in a 2.44 m diameter dish initially containing 100 l of heptane. The 2.44 m diameter dish is that required for the 'Lastfire' test¹.

The IFEX 1 l Impulse Gun and 72.5 l Hose Reel system is an innovative system of fire fighting that is described in Figure 1 which is derived from the web site firefightingtechnologies.com.au.

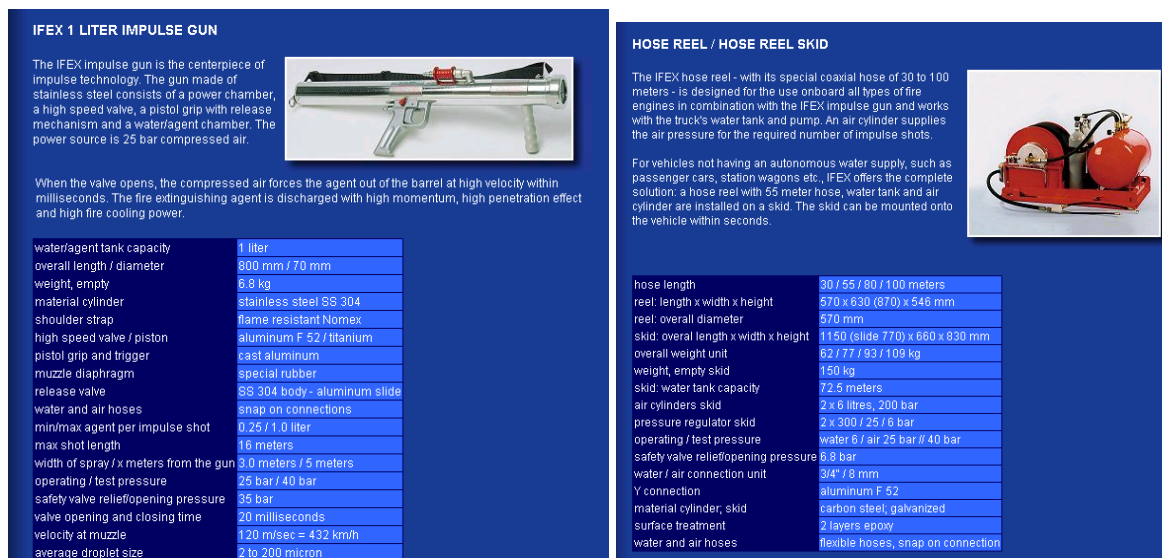


FIGURE 1 DATA ON IFEX EQUIPMENT (OBTAINED FROM WEB SITE FIREFIGHTINGTECHNOLOGIES.COM.AU)

The 'Lastfire' foam test was developed by a consortium of oil companies to ascertain the effectiveness of fire fighting foams for hydrocarbon tank applications. The test reported here was not a standard 'Lastfire' test. Rather it was an initial trial to discover how effective the IFEX system might be in this application. In this test, in comparison with a standard 'Lastfire' test, a reduced quantity of heptane was used, the fire was not allowed to burn for the full period required in the 'Lastfire' test before application of foam commenced, and the post-extinguishment phase of the 'Lastfire' test was not conducted.

2 TEST SET-UP

The tests were conducted in the VU Large Scale Experimental Fire Facility at Fiskville. The test was conducted by placing 100 l of heptane in the 'Lastfire' dish which is a 2.44 m diameter steel dish and the heptane was then ignited. After the fire was well developed and stabilised the use of the IFEX system was commenced.

The IFEX system was prepared for this trial by adding 0.72 l of AFFF foam concentrate manufactured by 3M to the standard 72.5 l water tank and then topping up with water. Thus a 1% foam solution was used in this trial.

As in the standard 'Lastfire' test water was placed in the bottom of the dish and heptane was placed on top of the water. Enough water was added to bring the initial surface of the heptane similar to level used in the 'Lastfire' test.

The IFEX system used consisted of an IFEX 1 l Impulse Gun and 72.5 l Hose Reel unit mounted in the back of a four-wheel drive vehicle.

The test was recorded on video and a copy of the video is available from CESARE or Fire Fighting Technologies.

3 TEST RESULTS

Following ignition of the heptane it was allowed to burn freely for about 84 s at which time it was judged that the fire was well established and was very close to a steady state condition.



(a) Flames just before first attack

(b) Deformation of flames during first shot



(c) Approximately 2 s after first attack

(d) Approximately 7 s after first attack



(e) Approximately 13 s after first attack

(f) Approximately 17 s after first attack

FIGURE 2 VIEWS AT MARKED TIMES OF HEPTANE FIRE EXTINGUISHMENT USING IFEX SYSTEM

Application of the foam solution using the IFEX system was then commenced. The initial 'shot' resulted in a significant distortion of the flames but subsequent shots caused much less disruption to the flames. Additional shots were fired into the flames (Figure 2) over

the next 30 s at which time the flames were substantially extinguished. At this stage several further shots were fired to attain complete extinguishment. After each shot was fired the flames briefly flared as the surface film on the remaining heptane was disturbed. The fire was completely extinguished after about 60 s.



(a) Approximately 21 s after first attack

(b) Approximately 27 s after first attack



(c) Approximately 32 s after first attack

(d) Approximately 36 s after first attack



(e) Approximately 40 s after first attack

(f) Approximately 53 s after first attack

FIGURE 3 VIEWS AT MARKED TIMES OF HEPTANE FIRE EXTINGUISHMENT USING IFEX SYSTEM



(a) Approximately 64 s after first attack (b) Approximately 70 s after first attack



(c) Approximately 110 s after first attack

FIGURE 4 VIEWS AT MARKED TIMES OF HEPTANE FIRE EXTINGUISHMENT USING IFEX SYSTEM

A count was maintained of the number of shots fired using the IFEX system. In all 33 shots were fired and on the basis that each shot uses 1 l of solution this means that about 33 l of the 1% foam solution was used. Not all of the shots were fully effective as there was some foam on the floor outside the dish, so it is possible less solution could be used if the shots were fired with greater care or precision. (It should be recognised that the top of the dish is at a somewhat awkward height for the operator of the IFEX system.) It is notable that a rather small quantity of foam solution was used to achieve extinguishment of a quite vigorous fire.

4 CONCLUSIONS

The IFEX system using a 1% AFFF foam solution extinguished a well developed fire in a 2.44 m diameter dish containing heptane in less than one minute and using about 33 l of the foam solution.

5 REFERENCES

1. Lastfire <http://www.angusfire.co.uk/wnpres152.shtml>


5 SIGNATORY PAGE

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