

Monnex Dry Powder performance test

Monnex BCE Dry Powder

Background note: -

For more than 35 years Monnex has retained a 50% reduction in volume of use over other dry powders such as ABC and standard BC. Monnex dry powder was originally manufactured by ICI in Warrington before being purchased by Croda plc and the manufacturing transferred to the Croda operation at Kirkby, Merseyside in the early 1990's. The current manufacturers of Monnex (Kerr Fire) maintain the following claim:- 'When Monnex is tested in an EN3 rated extinguisher body, it is possible to extinguish a 144B pan fire (4.54m²) with just 1.5kg of powder'.

The request from MAG Airports is for LEIA to undertake an independent fire performance test to determine if the manufacturer's claims are still relevant in 2019.

Test parameters: -

To undertake a fire performance evaluation between Monnex dry Powder and ABC dry powder. The fire test performance should be constructed in such a way that any difference in performance can be determined. Large scale fire testing to an internationally recognised standard can only be undertaken by experienced operators and is therefore by necessity, undertaken with a human interaction to complete the testing. The test parameters must therefore take into account this human interaction within the overall test results. LEIA employed the services of Matthew Cornford to undertake the fire testing and who is recognised in the UK as the leading EN3 fire test operator. His services are utilised by BSI, BRE and many of Europe's leading test authorities.

Test protocol: -

EN3 test protocol has been chosen to determine any fire performance differences between Monnex and ABC 40 dry powders. The fire trays used are EN3 regulation stainless steel trays designated as 144B (4.54m²) and 183B (7.23m²)

8 x 6 kilo ABC 40 extinguisher units were purchased from Smiths Fire in Kettering, Northants. All 8 units are manufactured by Thomas Glover and represent an easily available off the shelf fire safety product which can be sourced in most regions of the UK. Smiths Fire is a local supplier of fire safety products to the LEIA Laboratories and purchased without favour or design.

4 of the 6 kilo units were discharged of ABC dry powder then cleaned and purged by LEIA laboratories to remove all residue of ABC dry powder before being filled with 5 kilos of Monnex dry powder and pressurised to the original extinguisher pressure of 14bar.

Due to the low density of Monnex dry powder (650-800 kg/m³) it was determined that a similar gas ullage space would be required as the ABC dry powder and therefore only 5 kilos

of Monnex would be suitable for this test. All 8 extinguisher units were compacted in accordance with EN3 for 500 cycles and held in the conditioning chamber for 24 hours at the Norwich test facility between 16th and 17th December.

Each of the 4 x ABC 40 extinguishers and 4 x Monnex extinguishers were randomly selected prior to each fire test, marked to identify and weighed before and following the fire test.

Figure 1 indicates the fire test number, EN3 fire test pan, product, fill volume, recorded full weight prior to test, recorded unit weight following the test and the total contents used for the test.

Figure 1:

Test	EN3 Fire Size	Extinguisher type	Identification Ref	Volume (kilo)	Full weight (kilo)	Used weight (kilo)	Contents used (kilo)
1	183B	MONNEX	03	5	8.32	5.16	3.16
2	183B	MONNEX	04	5	8.40	4.64	3.76
3	183B	ABC 40	01	6	9.21	3.26	5.95
4	144B	ABC 40	02	6	8.93	5.96	2.97
5	144B	MONNEX	05	5	8.31	6.81	1.50

The 183B fire test pan was chosen as the 'Pass or Fail' test pan. The ABC 40 extinguisher was rated in EN3 as meeting the requirements for a 144B rating so we wanted to determine if the ABC 40 could out perform its designed rating. It was anticipated that Monnex would achieve this rating based on the manufacturer's claims.

In test 1 and 2 it was clear that Monnex could achieve the 183B rating using an average of 3.46 kilo per test. In test 3, ABC40 was expected to fail the rating and did fail. The total content of the extinguisher was used (5.95 kilo) without achieving extinction.

In test 4, ABC40 was tested in accordance with the claimed rating of 144B and this test fire was extinguished with 2.97 kilo of its contents.

In test 5, Monnex was tested to determine if less or a similar volume of powder would be required to achieve extinction. Clearly the test proved that only 50% volume of Monnex was required to extinguish the same fire, 1.5 kilo Monnex versus 2.97 kilo of ABC40.

Conclusion: -

Given the limited number of tests undertaken and the protocol chosen for the fire performance tests of Monnex and ABC40 dry powder, the claim made by the manufacturer of Monnex as detailed in this reports 'Background Note' is considered to be accurate. The Monnex dry powder fire performance was significantly better than ABC dry powder with the use of 651gms /m² for ABC powder versus 330gms/m² for Monnex which represents a 50% reduction required weight for weight to achieve extinction on the fire tests undertaken by LEIA.

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