UK fire tests

The Soundwave panel has been tested and evaluated according to BS (British Standards) 476 Part 7 and has achieved a class 2 rating.

Two Cone Calorimeter tests were carried out by Warrington Fire Research Ltd in UK in august 2001 in order to:
• Rate the Soundwave panel according BS467
• Investigating the Soundwave panel's fire load contribution

Rating according BS476 Part 2
It was not possible to follow the standard BS 476 part 7 procedure because the Soundwave panel melted, rather than igniting. Hence, The Cone Calorimeter test was regarded the most suitable test procedure in this case. The same classifications are obtained using this method.

The Soundwave panel was exposed to a heat flux of between 12 and 22 kW/m2 and did not ignite which indicates that a Class 2 performance was achieved according BS476 Part 7.

Fire load contribution
Three Soundwave panels were exposed to a heat flux of 50 kW/m2. The following data was collected:

Parameter	Sample 1	Sample 2	Sample 3	Mean
Test ignition time (s)	51	19	52	40,7
Test end time (s)	614	799	545	652,7
Test duration from ignition to end (s)	563	780	493	612,0
Flame out time (s)	494	679	425	532,7
Initial specimen mass (g)	20,9	23,3	21,4	21,9
Final specimen mass (g)	3,8	5,2	6,1	5,0
Specimen mass loss (g)	17,1	18,1	15,3	16,8
Specimen mass loss (kg/m2)	1,94	2,05	1,73	1,90
Total mass pyrolysed (%)	82	78	71	77,0
Mass on ignition (g)	20,9	23,1	21,2	21,7
Ave. mass loss rate/unit area (g/m2/s)	3,4	2,6	3,5	3,2
Heat release rate 180 s (kW/m2)	138,52	135,67	136,50	136,90
Heat release rate 300 s (kW/m2)	95,91	97,82	87,92	93,90
Peak heat release rate (kW/m2)	614,7	505,4	702,9	607,7
Time to peak heat release rate (s)	135	111	135	127,0
Total heat release (MJ/m2)	32,4	35,8	27,9	32,0
EHC at 180 s (MJ/kg)	17,90	16,89	17,06	17,30
SEA at 180 s ((kg/m2)	196,19	121,88	129,70	149,30
Total smoke produced (m2/m2)	2323,9	912,4	936,2	1390,8

Source: Warrington Fire Research Report WARRES no.120840

UK Conclusions
The Soundwave panel has achieved a BS 476 part 7 Class 2 rating.
The test data should be presented to the relevant building control authorities when requested, to support the application for the material's use.

Swedish fire tests

The Soundwave panel is tested according to SS 02 48 21 (NT Fire 002) and evaluated according to "Boverkets riktlinjer för godkännande, Brandskydd, Allmänna råd 1993:2, utgåva 2" and meet the requirements for material difficult to ignite.

The Soundwave panel is tested according to ISO 5659-2 (1994) and gas concentration were evaluated according to IMO FTP Code Resolution MSC. 61 (&/), chapter 1, Annex 1, Part 2. All gas concentrations were below the given criteria.

Ignitability test and gas analysis test were carried out by SP Sveriges Provnings- och Forskningsinstitut, Borås, in august 2001.

Ignitability
Two material samples out of same material as The Soundwave panel were used. The first sample was exposed to a flame during 15 min. The second sample was placed 50 mm from the first sample and 100 mm higher (over the flame). The second sample did not ignite and thus The Soundwave panel was classified as difficult to ignite.

Gas analysis
The Soundwave panel was test under three different conditions:

1. exposed to a heat flux of 25 kW/m2 without pilot flame
2. exposed to a heat flux of 25 kW/m2 with pilot flame
3. exposed to a heat flux of 50 kW/m2 without pilot flame

The following data were collected (in ppm):

Gas species	Test 1	Test 2	Test 3		Limit
CO	790	450	760	max	1450
HCl	<5	<5	<5	max	600
HBr	<10	<10	<10	max	600
HF	<5	<5	<5	max	600
HCN	<2	<2	<2	max	140
NOx	<20	<20	<20	max	350
SO2	<30	<10	<10	max	120

In all tests the gas concentrations were below the limits.

Swedish Conclusions
The Soundwave panel meets the requirements for materials difficult to ignite according to "Boverkets riktlinjer för godkännande, Brandskydd, Allmänna råd 1993:2, utgåva 2".
The Soundwave panel emits gas concentrations below what is acceptable and all gas concentrations are below limits in IMO FTP Code Resolution MSC. 61 (&/), chapter 1, Annex 1, Part 2.

French fire tests

The Soundwave panel was tested and evaluated for radiation according to NF P 92 501 and NF P 92 507 and was given a M3 rating.

The Soundwave panel was tested and evaluated for dripping according to NF P 92 505 and meet the given criteria.

The tests were carried out by LNE Laboratoire National d'Essai, Trappes, in august 2001.

Radiation test and dripping test
The Soundwave panel was exposed to a heat source for 20 minutes. A flame was placed on the other side of the panel in order to ignite emitted gas.

The following data were collected:

Parameter	Sample 1
Time to first ignition on exposed side (s)	33
Max height of flame (cm)	30
Sum of the flames heights (cm)	68
Sum of the duration of the combustions timed (s)	131

Source: LNE Rapport d'Essai – Dossier B070481 – Document CEMAT/1

The evaluation of this data gives The Soundwave panel a M3 rating.
No non-burning material dripped from the sample and thus the Soundwave panel meets the given criteria.

French conclusions
The Soundwave panel has achieved a M3 rating according NF P 92 501 and NF P 92 507.
The Soundwave panel meets the NF P 92 505 criteria for dripping.

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