Solent Composite Solutions

ProTek®

Fire Testing and Terminology Summary

Test Methods

JET FIRE

Large scale jet fire test carried out at the Spadeadam test facility with sonic gas release rate of 3kg / second (equivalent to 10 tonnes gas per hour)
OTI 95634: Medium scale jet fire test with sonic gas release rate of 0.3 kg / second (one tenth the scale of the Spadeadam test) now superseded by ISO 22899.

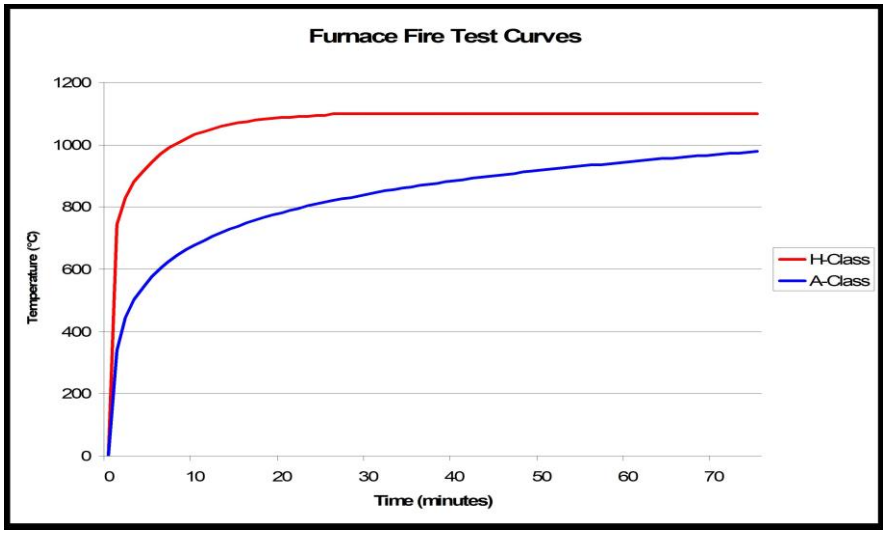
EXPLOSION / BLAST

Blast tests carried out at Spadeadam test facility by controlled ignition of a hydrocarbon gas cloud to create dynamic overpressures up to 1.7 barg (1 barg is equivalent to pressure load of 10 Tonnes / m²)

OTHER FIRE TESTS

BS476 Fire test on building materials and structures
Part 7: Surface spread of flame test
Part 20: General requirements
Part 22: Methods for determination of the fire-resistance of non-load bearing elements of construction
(Equivalent test standards include ISO 834, DIN 4102, IMO A754(18) and pr EN 357)
FRS 14-84: Hydrocarbon fire resistance test for elements of construction for offshore installations
IMO (International Maritime Organisation) Resolution A754(18): Marine fire resistance test incorporating hydrocarbon furnace curve

Airbus Industrie Technical Specification ATS1000.001: Smoke and Toxicity fire test standard for materials used inside Airbus aircraft
NFP 92-501: Epiradiateur test procedure for classification of rigid materials or materials on rigid substrates of all thicknesses and flexible materials over 5mm thick
NFX 10-702: Test for measuring the specific optical density of smoke emitted by the pyrolysis of solid materials
ASTM D2683 – 77: Measuring the minimum oxygen concentration to support candle-like combustion of plastics (Oxygen Index)



A-Class: Used to test most building products reflects the temperature – time profile of burning wood, paper, furniture etc.

H-Class: Used to test products for the oil and gas industry reflects the temperature – time profile from burning oil or gas and is typified by a faster rise to a higher temperature than an A-class fire Also known as the NPD (Norwegian Petroleum Directorate) and DEn (Department of Energy) Hydrocarbon Fire Test Curve

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Jet Fire: Fire caused by high pressure release of hydrocarbon fuel that is ignited to cause a very erosive flame with high temperature and high heat flux

Pool Fire: Fire resulting from burning pool of hydrocarbon fuel with a high flame temperature and heat flux without the erosive nature of a jet fire.

Furnace Fire: Fire caused by burning a combustible fuel within a contained furnace enclosure without erosive effects but gives very controlled temperature rise to match certification testing requirements

Load Carrying Capacity (R) : The length of time that the separating element specimen to is able to carry load without collapes in a normal fire scenario.

Integrity (E): The structural resistance of a separating element specimen to contain a fire without holes, cracks, fissures or sustained flaming on the unexposed (cold) face of the test piece. A-Class tests require 60 minutes integrity and H-Class tests require 120 minutes integrity.

Insulation (I) : The ability of a separating element specimen to limit the temperature rise on the unexposed (cold) face of the test piece to an average of less than 140°C and no more than 180°C in any one location.

Heat Flux: The measure of energy released during combustion often measured in kW / m². Typical values for hydrocarbon fires are within range of 150 to 320 kW / m² with wood fires being considerably lower.

Classifications:

The classification for furnace fire tests are declared by the time in minutes at which insulation failure occurs after the letter describing the fire type as given in the table below.
This table incorporates the current international REI classification of structures for fire resistance properties:

Classification	Fire Type	Load Carrying (R) (minutes)	Integrity (E) (minutes)	Insulation (I) (minutes)
A30	Solid fuel fire	60	60	30
A60	Solid fuel fire	60	60	60
H30	Hydrocarbon Oil / gas fire	120	120	30
H60	Hydrocarbon Oil / gas fire	120	120	60
H120	Hydrocarbon Oil / gas fire	120	120	120

Classifications for hydrocarbon jet fires in accordance with ISO 22899 describe the item being protected, the failure temperature and the duration before the failure temperature is reached.

For example a jet fire performance protecting a structural steel member to limit its temperature to less than 400°C for 60 minutes is classified as:

JF/Structural steel/400/60

More explanation of classifications can be found in the relevant standards and specifications.