

Fire Integrity of Decks and Bulkheads

The following A, B & C class divisions are used when specifying Bulkheads, decks, ceilings, and other internal partitions in offshore accommodations facilities.

“A” Class Division” is defined as a bulkhead or part of a deck which is:

- constructed of steel or other equivalent material.
 - suitably stiffened.
 - so constructed as to be capable of preventing the passage of smoke and flame to the end of the 60-minute standard fire test.
 - so insulated where necessary with suitable non-combustible materials that if the division is exposed to a standard fire test the average temperature on the unexposed side of the division shall not increase more than 139°C above the initial temperature nor shall the temperature at anyone point, including any joint, rise more than 180°C above the initial temperature within the time listed below:
- “A-60” standard, 60 minutes
 - ” A-30” standard, 30 minutes
 - ”A-15” standard, 15 minutes
 - ”A-0” standard, 0 minutes

“B” Class Division” means a bulkhead, part of a deck, ceiling or lining which is:

- So constructed as to be capable of preventing the passage of flame to the end of the first 30 minutes of the standard fire test.
- Constructed as to provide an insulation standard such that, if the division is exposed to a standard fire test, the average temperature on the unexposed side of the division shall not increase more than 139°C above the initial temperature, nor shall the temperature at

anyone point, including any joint, rise more than 225°C above the initial temperature within the time listed below.

- “B-15” standard, 15 minutes
- ”B-0” standard, 0 minutes
- Constructed of suitable non-combustible materials and all materials whose use is necessary for or ancillary to its construction and erection shall be non-combustible.

“C” Class Division” means a bulkhead, ceiling or lining which is constructed of suitable non- combustible materials not being an “A” Class Division or a “B” Class Division.

Application in practice

Plant rooms are typically enclosed by A class divisions, normally A60

Cabins and recreation spaces are typically enclosed by B class divisions, normally B15.

Passive Fire Protection (PFP)

PFP has a vital, and increasingly significant, role in safeguarding people, as well as limiting damage to offshore installations from fire and smoke.

Passive fire protection is normally built into the external cladding of offshore accommodation and with the rating specified by the Technical safety discipline depending on proximity to sources of combustible materials and the fire risk.

Passive fire protection works by:

- Protecting a structure’s critical structural members.
- Protecting equipment within an installation.

- Limiting the spread of fire, heat, and smoke by containing it in a single compartment in its area of origin.
- Protecting escape routes and providing vital escape time for occupants.

Fire rating System

A relatively simple rating system has been developed indicating protection performance of a system against the following types of fire. I.e.

A Cellulosic Fire

H Hydrocarbon Fire

J Jet Fire

A second identifier indicated the minutes that protection will be provided for. I.e. **J60**. This indicates that protection will be provided from a jet for a minimum of 60 minute.

Passive fire protection works in conjunction with active fire prevention, such as sprinkler systems and extinguishers, and emergency response/mustering procedures for offshore installations

The choice between active and passive systems, or a combination of the two, is influenced by the likely size and type of fire, the duration of protection required, the equipment or structure requiring protection, water availability, and the time required for evacuation.

Passive fire protection (PFP) is defined as a coating or cladding arrangement or free-standing system which, in the event of fire, will provide thermal protection to restrict the rate at which heat is transmitted to the object or area being protected. The type and amount of PFP needed depends on the fire type and duration and the failure criteria of the item being protected.

There are three main types of fire to be protected against.

- Cellulosic Fire
- Hydrocarbon Fire
- Jet Fire

Cellulosic Fire

Cellulosic fire is a fire with a fuel source predominantly of cellulose (e.g. plastics, wood, paper, cotton, textiles). A fire involving these materials is relatively slow growing, although its intensity may ultimately reach or exceed that of a hydrocarbon fire. The fire generally remains stable for at least 60 minutes. The standard fire curve of a cellulosic fire reaches 500°C [932°F] within 5 minutes and rises to 945°C [1733°F] over time. Typical radiation value after 5 minutes is 50 kW/m².

Hydrocarbon Fire

Hydrocarbon fire, or pool fire, is a fire fueled by hydrocarbon compounds (oil and gas), having a high flame temperature to 1000°C [1832°F] within 5 minutes, achieved almost instantaneously after ignition. The heat rises to 1100°C [2012°F] shortly thereafter. The fire maintains its stability for at least 120 minutes. A hydrocarbon fire will spread rapidly, burn fiercely and produce a high heat flux. Typical radiation value after 5 minutes is 160 kW/m²

Jet Fire

Jet fires are a particular group of hydrocarbon fueled fires expelled from an orifice, e.g. leak in pipe or vessel, under pressures of 2 bar or greater. They are the most severe fire scenario, considering the effect

of erosion of steel and also the significantly higher rate of burning due to turbulent fuel/air mixing. Typical radiation value after 5 minutes is 320 kW/m².

Note: A download is available in the form of an E book by one of the major suppliers of PFP to offshore installations. This useful book provides more detail on definitions and testing specifications.