A Durable Fibre Cement & Steel

Composite Building Material

DURASTEEL®

PARTITIONS

Intumex®

ASIA PACIFIC

Durasteel

Durasteel® is a composite panel of fibre reinforced cement mechanically bonded to punched steel sheets on both surfaces. It is classified as non-combustible in accordance with many national and international standards and is highly resistant to moisture even when saturated. It will not absorb combustible fluids and its fire resistant qualities are exceptional.

Durasteel® is highly impact and blast resistant, which enables it to withstand prolonged exposure to fire of the cellulosic, hydrocarbon or jet fire types. It can also withstand hose-stream actions and, because of its very low moisture absorption, it can be used externally and is not susceptible to the damage often caused by moisture during the early stages of delivery and installation of the system, or by sprinkler actuation.

Durasteel® is a fit and forget system, which requires virtually no maintenance.

Features/Advantages of Durasteel®

- Strong.
- Impact resistant.
- Moisture resistant.
- Maintenance free.
- Requires no foundations.
- Space saving.
- Engineered for fast track construction.
- Flexible installation.
- Offers up to 6 hours fire protection.
- Lightweight.
- Employs only dry trade installation methods.
- Relocatable and suitable for retro-installation.
- Proven 40-year design life.
- Tested to Hose Stream ASTM E119 to 5-bar pressure.
- Tested to DIN 4102 to 4000J hard body impact after fire test.
- Ducting available in 1, 2, 3 or 4-sided configurations with internal or external flanges, with up to 4 hours fire resistance.
- Non-combustibility with zero spread of flame.
- Non-toxic.
- Man made mineral fibre free.
- Modular or kit form construction.
- Loadbearing and non loadbearing constructions.
- Resistant to the most onerous fire curves, e.g. Hydrocarbon, Jet fire etc.

Typical Applications

Ventilation ducts:

- Smoke extract ducts
- Kitchen extract ducts
- Cable protection ducts
- Service ducts

Ceilings:

- Plenum chambers
- Loadbearing ceilings
- Membrane ceilings
- Suspended ceilings
- Lift or service shaft cappings

Walls:

- Partitions
- Service shafts
- Lift enclosures
- Cavity barriers

Industrials:

- Valve box enclosures
- Switch gear enclosures
- Doors
- Escape tunnels
- Storage systems
- Hatch covers
- Fuel pipe protection

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General Technical Data

THICKNESS TYPE	Durasteel® 6.0mm	Durasteel® 9.5mm
SIZES	2500mm x 1200mm / 2400mm x 1200mm	2500mm x 1200mm / 2400mm x 1200mm
NOMINAL BOARD WEIGHTS AT AMBIENT CONDITIONS	16.8 kg/m²	21.0 kg/m²
THICKNESS TOLERANCE	+1.5 to -0.0 mm	+1.0 to -1.0 mm
LENGTH TOLERANCE	+2.0 to -2.0 mm	+2.0 to -2.0 mm
WIDTH TOLERANCE	+2.0 to -2.0 mm	+2.0 to -2.0 mm
FLEXURAL STRENGTH (BS EN 12467:2000)	109 Mpa	84 Mpa
FLEXURAL MODULUS (BS EN 12467:2000)	55 Gpa	40 Gpa
IMPACT STRENGTH (BS 5669: Part 1 / 1500mm drop)	No failure	No failure
IMPACT RESISTANCE (Projectile)	2793 J	2793 J
EFFECT OF 4000J HARD BODY IMPACT TEST AFTER FIRE TEST DIN 4120: Part 3		Pass
BENDING STRENGTH (BS 5669: Part 1: 1989)	>189.5 N/mm²	>189.5 N/mm²
NATURAL MOISTURE CONTENT BY WEIGHT	6%	6%
MOISTURE ABSORPTION (Weight from NORMAL MOISTURE CONTENT)	6~7%	6~7%
MOISTURE MOVEMENT (35~85% RH) (BS EN 318: 2002)	≤ 0.2%	≤ 0.2%
MOISTURE MOVEMENT (65% RH to saturated) (BS EN 318: 2002)	≤ 0.2%	≤ 0.2%
WATERTIGHTNESS (BS 4624: 1981)	Pass	Pass
FIRE RESISTANCE AFTER 24 HOURS WATER IMMERSION (BS 476:Part 24: 1987)		Satisfactory
THERMAL CONDUCTIVITY AT 20°C (ASTM C518: 1991)		0.129 W/m°K
COEFFICIENT OF THERMAL EXPANSION (BS 1902: 1990)		15 x 10^{-6} K^{-1}
MAXIMUM CONTINUOUS OPERATING TEMPERATURE (BS 7346: Part 2: 1990)	350°C	350°C
RADIANT HEAT REDUCTION THROUGH PANEL	9.30-2.53 (2948.0-802.0 Btu/ft h°F)	9.30-2.53 (2948.0-802.0 Btu/ft h°F)
SOUND REDUCTION INDEX	28.0 dB	29.7 dB
NON COMBUSTIBLE (BS 476: Part 4: 1970)	Yes	Yes
MATERIAL OF LIMITED COMBUSTIBILITY	Yes	Yes
BUILDING REGULATIONS CLASSIFICATION	Class 0	Class 0
SPREAD OF FLAME (BS 476: Part 7: 1987)	Class 1	Class 1
BBA (British Board of Agrément) CERTIFICATION NUMBER	93/2929	93/2929
AIRFLOW	Equivalent to Sheet Metal Ducting.	
SHEET FINISHES	Galvanised mild steel or stainless steel.	
SYSTEMS FINISHES	Galvanised steel or primed steelwork (special finished available upon request).	
DOORS FINISHES	Galvanised steel or primed steelwork (special finished available upon request).	

Durasteel

Introducing Durasteel® Partitions & Walls

Features

- Up to 6-hour fire resistance.
- Impact resistant.
- Unaffected by water.
- Non-combustible.
- No smoke or toxic gas in a fire.
- Slim, space-saving profile.
- Lightweight, no foundations.
- Easily relocatable.
- Hose-stream resistant.
- Mechanical or seismic vibration resistant.
- Suitable for retro-installation.
- Low sound transmission.
- Fast track buildability.

ABOVE: Durasteel® undergoing 3.1Bar high pressure hose stream test, in accordance with ASTM E119 requirements.

General

Intumex Durasteel® walls and partitions can be designed and installed in various layout and framing options to meet a multitude of needs. In today's construction markets the need for systems which can perform multifunction roles, whilst capable of allowing for fast track and cost effective installation are of prime importance.

The Intumex Durasteel® partition and wall system can easily fulfil all of these roles. Durasteel® walls have resistance to extreme impact, both before, during and after exposure to fire. This ensures that under use, they suffer no damage from the ravages of every day exposure within warehouse situations for instance, under fire conditions they protect and maintain compartmentation, after a fire they ensure a building remains secure until remedial work can be undertaken.

As a real example of the effectiveness of the Durasteel® walls, see the above photographs, one the right, before the fire, on the left, after the fire. The Durasteel® wall separating the two sections of this factory performed exactly as designed, the morning following this fire, the bottling plant on the unexposed face of the wall was operating as usual, thus minimising the effects of the fire as much as possible.

Intumex Durasteel® walls are swiftly installed; on most occasions they have no requirement for foundations or other special construction works. Installation is a "dry" trade thus there is no dislocation of other trades working in the same areas, therefore allowing faster project completion.

Durasteel® walls can offer both integrity only or integrity and insulation. Walls can be designed for supreme blast resistance and to meet most of the generally recognised fire curves, Cellulosic, Hydrocarbon, Jet Fire etc.

Intumex Durasteel® walls combine extremely high levels of fire resistance with impact and water resistance to similar high performance levels. They are proven to withstand the most demanding environments, temperature extremes and hostile elements, they resist high thermal shock, such as high pressure firemen's hoses.

Durasteel® walls and partitions can be used in applications such as separation of hazardous areas, shielding for valve actuators, protection of escape routes and tunnels, construction of refuge areas, compartmentation within buildings and storage areas for hazardous goods or protection of equipment.

Introducing Durasteel® Partitions & Walls

Durasteel® wall under-going 4000J impact resistance test following a fire test in accordance with DIN 4102: Part 3 requirements. The top right picture shows a concrete block wall undergoing similar testing.

Overview

The general arrangement of the proposed partition system constructed from Durasteel® is shown on the following pages.

When considering the design of walls, it is essential to consider the section size of the steel framing in conjunction with the wind loading factors, expansion allowance, together with the height and span of the wall, to ensure that under both fire and ambient conditions, the wall will provide the necessary design performance.

The basic framing system comprises of lightweight steel sections, with a nominal 3mm thickness, dependant on the other design factors etc. All framing is either bolted, screwed or welded into position, again this would be dependant on location, performance parameters and design requirements.

Where a cold smoke seal is required, the boards must be bedded on Intumex fire rated silicone or Intumex Acrylic Intumescent mastic. For demountable wall systems, to ensure sealants do not act as adhesives, a cold smoke seal composed of a 2mm thick strip of Intumex PL Intumescent strip can be applied. For the integrity only systems, the Durasteel® walls have been tested with the framework on both the exposed and unexposed faces, to fire, in order to show that the frame can be exposed without detriment to the fire performance of the system.

The framing for the Durasteel® wall systems must be securely fixed back to a substrate that has an equal or better fire performance than the designed wall. All fixings must be non-combustible, and must be those listed in the approval documents e.g. the correct type and grade of Teks screws must be used, not cheaper equivalents. The expansion bolts fixing the framing to substrates should be of all steel fabrication and not of aluminium or plastic.

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Durasteel® Partitions & Walls Types of Application

Low Radiation Fire Wall

Low radiation fire wall for construction where a high degree of stability and integrity are required, where insulation as measured upon the unexposed surface of the wall is not critical, but where heat radiation from exposed to unexposed face could be of importance. Intumex Durasteel® low heat radiation walls offer a reasonably lightweight construction, which is very narrow across its thickness.

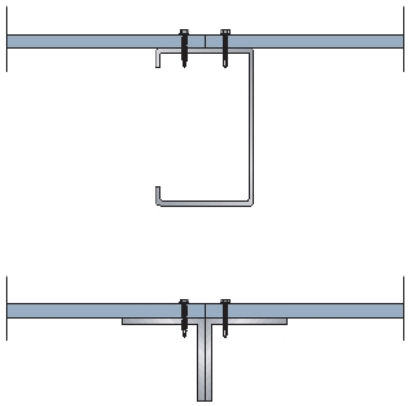
Used in conjunction with the Intumex Durasteel® pallet racking fire barrier system, This wall offers increased warehousing space and allows for racking to be placed practically against the Durasteel® wall itself.

RADIATION CHARACTERISTICS

Period	Furnace temperature	Temperature 100mm from face
1 hour	945°C	115°C
2 hours	1049°C	136°C
3 hours	1110°C	146°C
4 hours	1153°C	147°C

Single layer Durasteel® fire walls can be constructed using framing of either steel channels, Tee sections or back to back angle sections as shown in the two details here.

The type of framing system and the dimensions of the steel sections will depend on the performance requirements of the wall in terms of wind load, fire performance, impact resistance etc. In most instances, Durasteel® walls are of a bespoke design. Please consult Intumex Asia Pacific for specific design details to suit your project.



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Durasteel® Partitions & Walls Types of Application

Insulated Fire Wall

Insulated fire wall for construction where a high degree of stability, integrity and insulation are required during a fire. Durasteel® insulated fire walls are designed to prevent the passage of heat from a fully developed fire on the exposed face. The maximum permitted temperature allowable on the surface of the unexposed face is 140°C as a mean temperature overall the surface, or a maximum temperature of 180°C at any one point overall the surface.

Please note this is different to the above low radiation walls where the temperature is measured 100mm away from the face as detailed on opposite page.

Insulated wall constructions should be used in areas where the following may occur:

- Escaping personnel or fire fighters may have bodily contact with the wall surface.
- If used as a wall lining to any escape route, for instance as an access tunnel within a factory.
- If there are any volatile chemicals or materials stored within the vicinity of the fire wall and which may ignite at low temperatures.
- There is a need to improve compartmentation beyond simple integrity.

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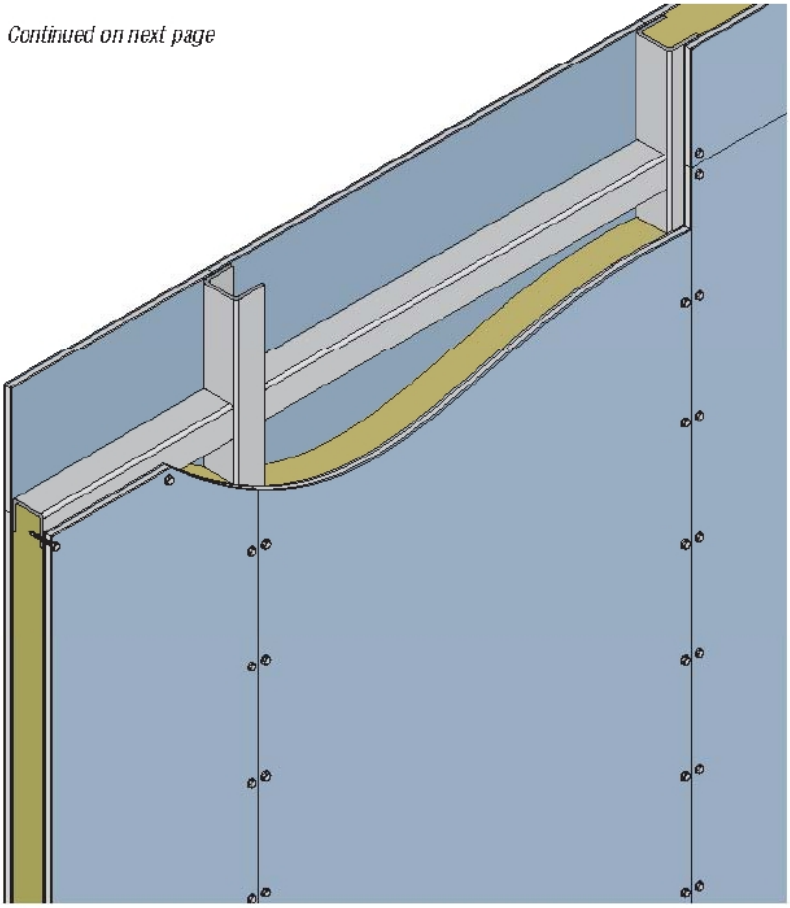

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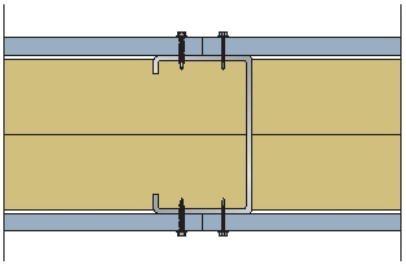
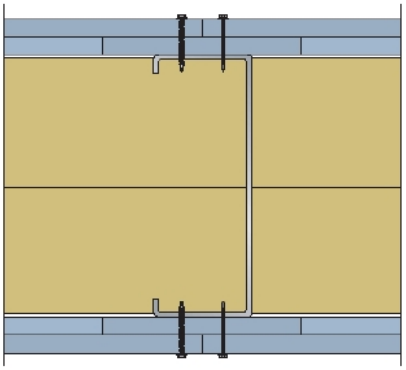
Durasteel® Partitions & Walls Types of Application

Insulated Fire Wall *Continued from previous page*

There are a number of methods of constructing insulated wall systems, three of which are depicted here. The first system consists simply of a steel frame, Durasteel® boards either side and a mineral wool infill. The second is similar but includes the addition of a Durasteel® cover fillet over the steel framing which improves the insulation by reducing heat conduction across the frame. The third on the right using multiple layers of Durasteel®.

Each option has its own benefits. The type of system, thickness of Durasteel®, type, thickness and density of the mineral wool, cover strips or not are all dependent on the fire and physical performance required from the system. Please consult Intumex Asia Pacific for specific details to match your project requirements.





COMPONENTS

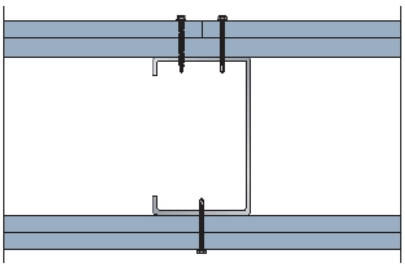
① Steel head and track framing.

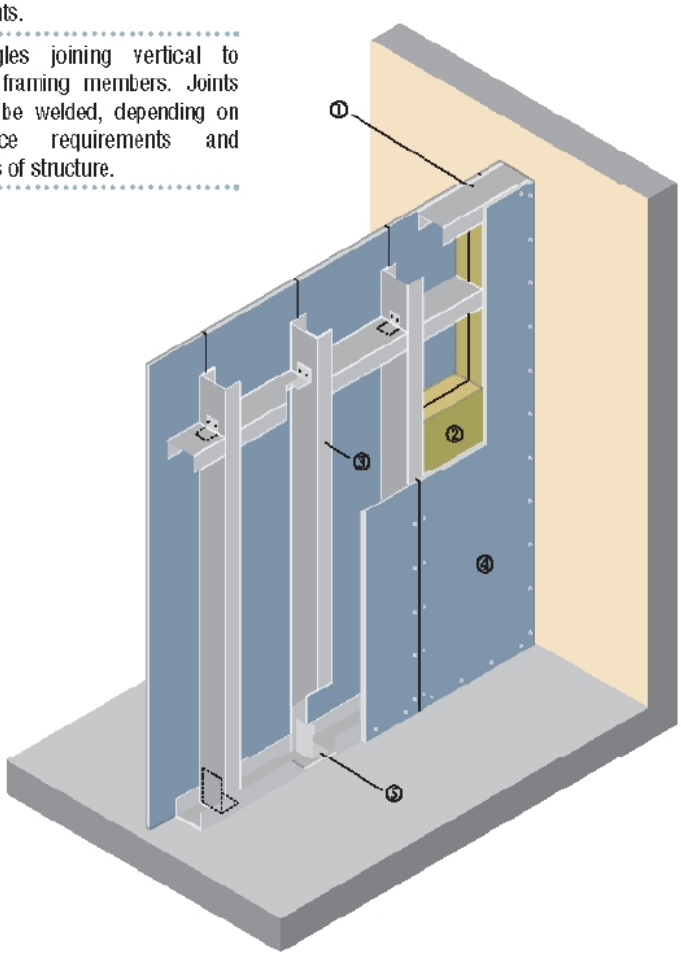
② Mineral wool, thickness, density and layers dependant on fire performance requirements.

③ Vertical steel framing positioned at nominal 1200mm centres. Note that centres and dimensions of framing can alter depending on physical performance requirements.

④ Intumex Durasteel® boards, 6mm or 9.5mm depending on performance requirements.

⑤ Steel angles joining vertical to horizontal framing members. Joints can often be welded, depending on performance requirements and dimensions of structure.





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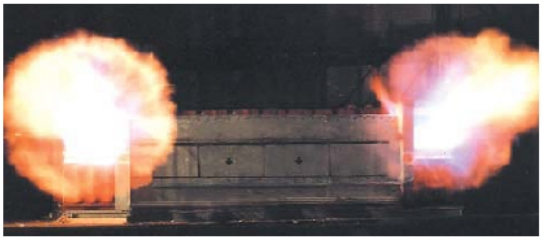
Durasteel® Partitions & Walls Types of Application

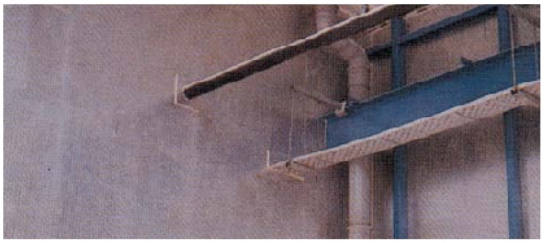
Fireblast™ Wall

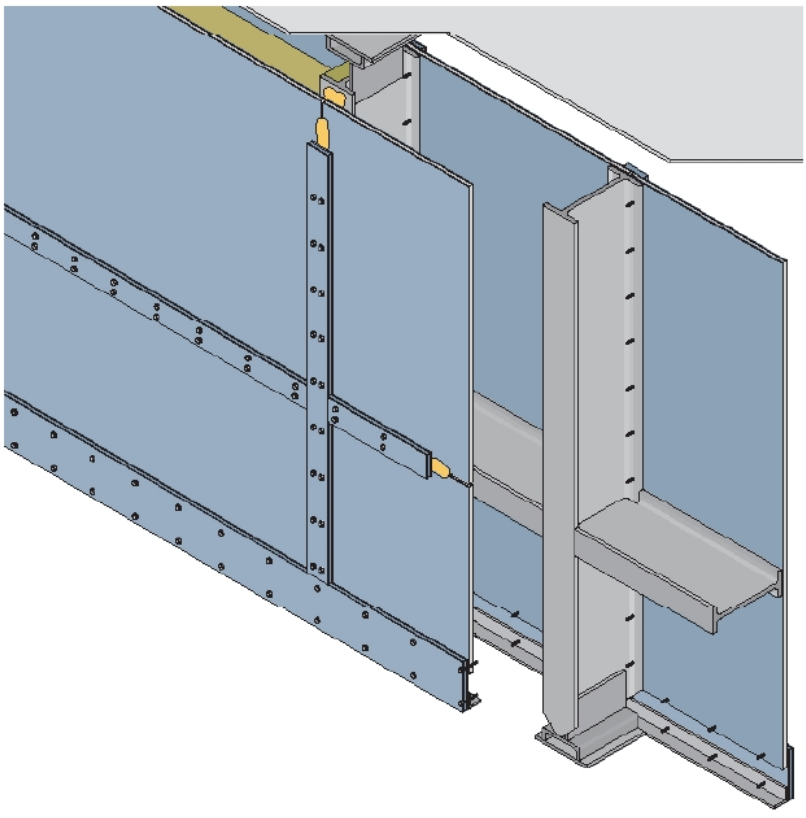
Designed specifically to protect personnel and equipment from the effects of explosion, fire, impact, and the effects of smoke and fumes in hazardous environments, such as offshore platforms, petrochemical installations, chemical plants, military establishments, civil defence works and hazardous process plants.

Additional features of Fireblast™ fire and blast resistant walls:

- Blast resistant, tested from 0.3 to 2 bar pressure.
- Resistant to hydrocarbon fires, tested to H120.
- Impact resistant to 4000J after 180 minute fire test.
- Jet fire resistant (J60).
- High energy absorption.
- Purpose developed software produces individual designs in minutes.
- Hose stream resistant to a 5 Bar high pressure hose. In accordance with DIN 4102 Parts 2 and 3 requirements.







Fireblast is a structure made of rigid steel sub frame with Durasteel® fixed to both sides. One of this systems major advantages is its eminent suitability for retro-installation, especially in confined spaces, making Fireblast™ ideally placed for the improvement of safety on existing structures, as well as on new installations. This Durasteel® system combines light weight with exceptional strength, energy absorption and durability.

Unlike many fire and blast resistant materials, Durasteel® is non combustible and will withstand an explosion followed by a prolonged fire and still be unaffected by hose stream fire fighting. Its integrity remains unimpaired, ensuring continued protection against fire, impact and moisture as well as preventing the escape of smoke and toxic gases.

Durasteel® systems are tested up to H120 fire rating, and the systems can be designed to suit specific project performance requirements.

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Durasteel® Partitions & Walls Types of Application

Fireblast™ Wall *Continued from previous page*

All Fireblast™ walls are individually tailored to suit specific project performance requirements, please consult Intumex Asia Pacific for specification and construction details.

FIRE RATING PERFORMANCE

TYPE	BUILDING & CONSTRUCTION	OFFSHORE CONSTRUCTIONS
Single-skin Constructions	1-hour, 2-hour or 4-hour fire integrity	A0, H0
Double-skin Constructions	1-hour, 1.5 hours, 2-hour, 3-hour, 4-hour or 6-hour fire resistance	A60, A120 - Ratings for standard fire tests. H60 and H120 - Ratings for hydrocarbon fire tests..
Specials	Intumex Durasteel has designed and installed many purpose-built fire walls, which provide performance characteristics beyond fire resistance. All structures can be independently assessed to ensure the required performance is achieved.	

CONSTRUCTION DETAILS

SPECIFIC APPLICATIONS	PRIMARY PERFORMANCE REQUIREMENT	FIRE PERFORMANCE (minutes)	ACOUSTIC PERFORMANCE Rw (dB)
Public and service corridors	Impact resistance	120 (integrity)	30
Warehousing		240 (integrity)	32
Industrial buildings		240/60	42
Mass transit systems		240/120	47
Manufacturing facilities		240/240	52
Other areas subject to abnormally rough use			
Off-shore facilities	Blast resistance	120 minutes hydrocarbon fire	42
Petro-chemical industry		120 minutes hydrocarbon fire	47
Gas processing plant		60 minutes jetfire	52
Other areas subject to projectile or explosion risk			

NOTE: Fire performance figures denote integrity and insulation performance respectively.
Acoustic performance figures established by direct testing or by assessment.

For details of specifications and installation details, please consult your local Durasteel® distributor or your local Intumex Asia Pacific office.