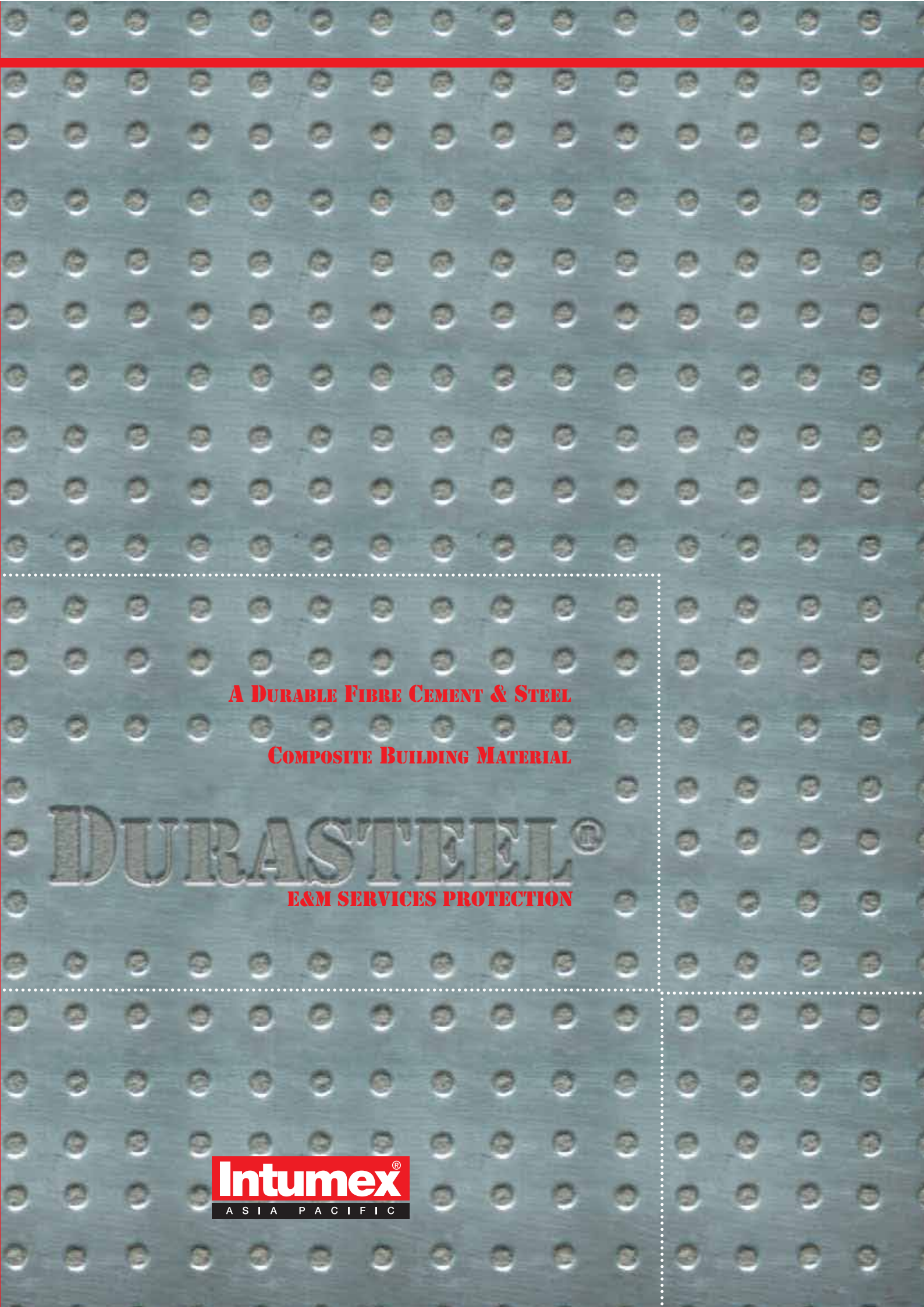
A Durable Fibre Cement & Steel
Composite Building Material
DURASTEEL®
E&M SERVICES PROTECTION
Intumex®
ASIA PACIFIC

Introducing DURASTEEL® E&M Services Protection

General

Essential electric cables and lines require reliable fire protection: firstly to ensure maintenance of cable function and secondly to prevent fire transmission in the event of a cable fire.

The possible increased fire risk from inflammable liquids or gases in pipes in the presence of a building fire can be effectively reduced by means of a fire resisting encasement.

PVC or other combustible drainage and water supply pipe work and flues which pass through separating elements of construction may also need fire resisting encasements to maintain the integrity of the fire resisting element of construction.

Where electrical and mechanical services such as cables and pipes pass through high risk areas, they often require protection against fire attack. Enclosures formed by DURASTEEL® form two functions.

1) They ensure that compartmentation is maintained should there be any risk of degradation of services leading to openings within the structure.

2) They can provide protection to ensure critical services continue to maintain their function under fire conditions.

DURASTEEL® services enclosures offer benefits as follows:

- Easily retro fitted around existing cables and services.
- Sufficiently strong enough to directly support cable trays without risk of cracking or breaking of the boards.
- The DURASTEEL® outer board has inherent EMC shielding capabilities, making it ideal for communication, Power and IT networks.
- Splitters can easily be incorporated to allow separation of high and low voltage power and communication cables, splitters aid maintaining compartmentation.
- Can be installed in phases.
- Easily demountable in sections if so designed.
- Withstands extremes of air pressures.
- Suitable for installation in road and rail tunnels.
- Resistant to vibration.
- Tamper proof designs available making these systems eminently suitable for use in areas prone to vandalism, e.g. prisons etc.
- Suitable for enclosures protecting gas or oil pies.

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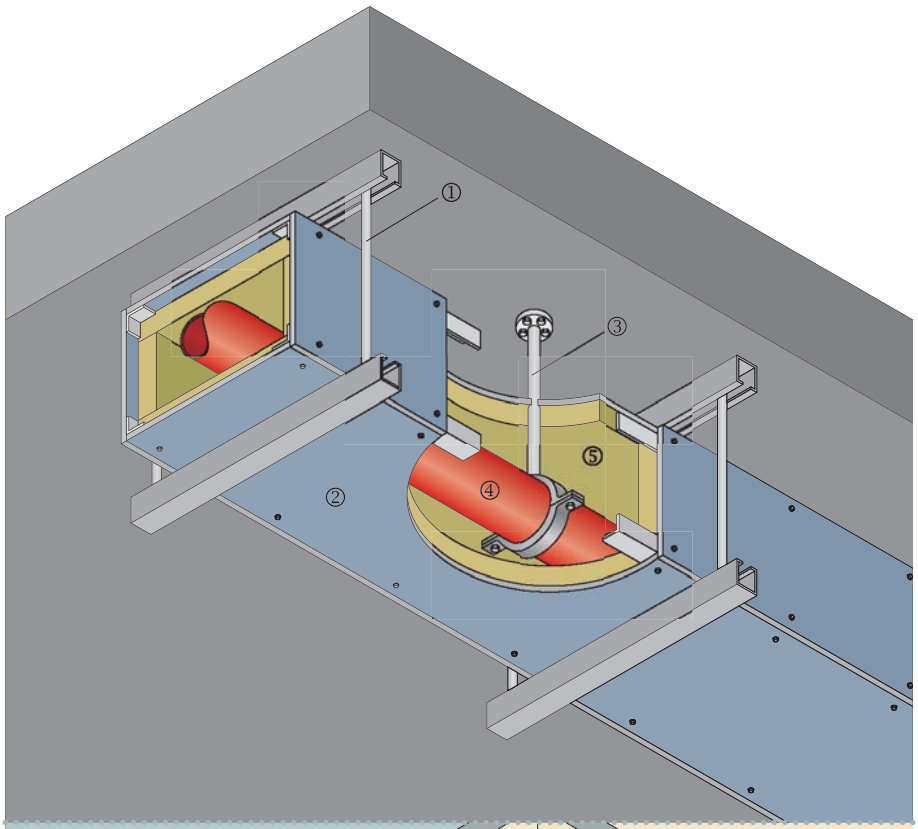
DURASTEEL® E&M Services Protection Types of Application



Vulnerable Services Enclosures

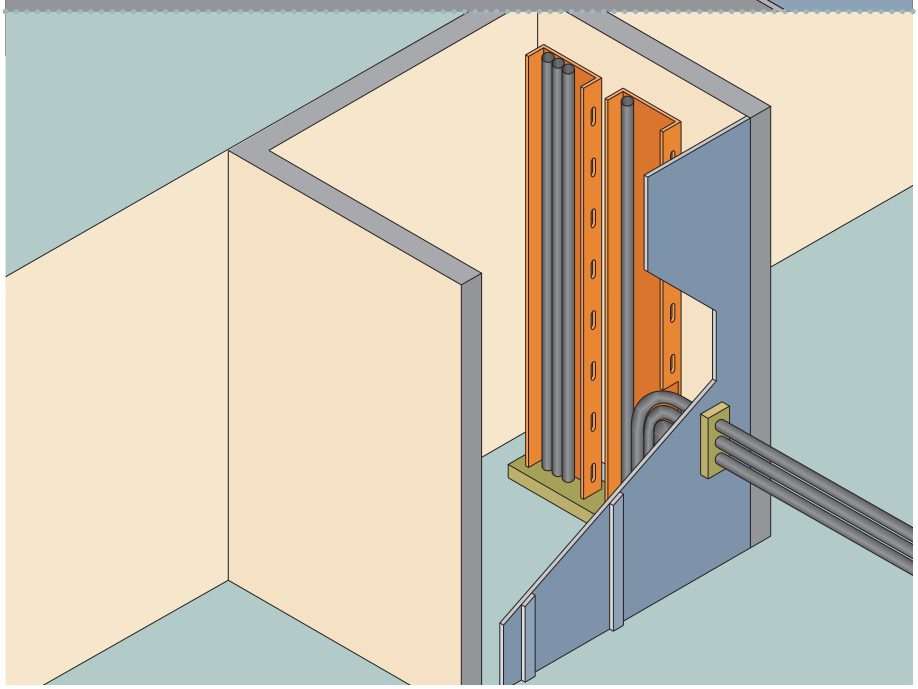
① Independent support system where preferred, this support is not always necessary, the system can be designed such that the enclosure utilises existing support mechanisms. Please consult Intumex Asia Pacific for details.

② DURASTEEL® services enclosure. A number of differing systems and combinations of materials are possible, offering design possibilities to meet almost all eventualities and performance characteristics.

③ Services support system. Not always required. In certain instanced, dependent on the particular service type and the performance requirements, the DURASTEEL® enclosure is sufficiently robust as to be able to support the services within itself.

④ Building services. Steel, plastic, copper piping systems, or other building services systems.

⑤ Mineral wool required only when insulation criteria to be fulfilled. Please consult Intumex Asia Pacific for details.



Horizontal Barrier In Service Shaft

DURASTEEL® systems can be used to create the “forth” wall to enclose services shafts, providing a system of robustness, high performance in both normal and fire conditions.

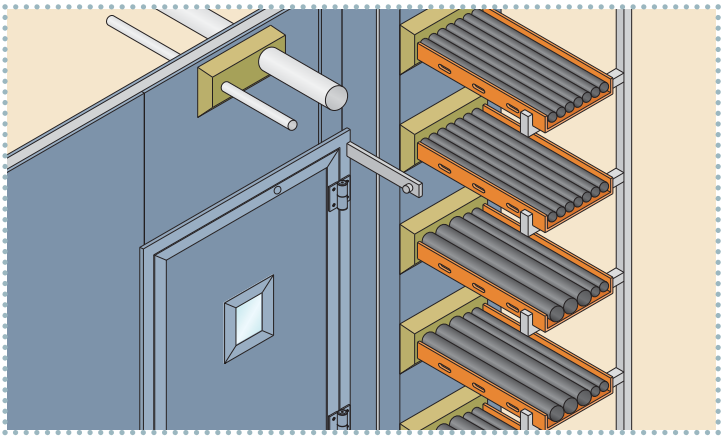
Intumex penetration seal systems can be used to ensure maintenance of compartmentation where services exit the protected shafts.

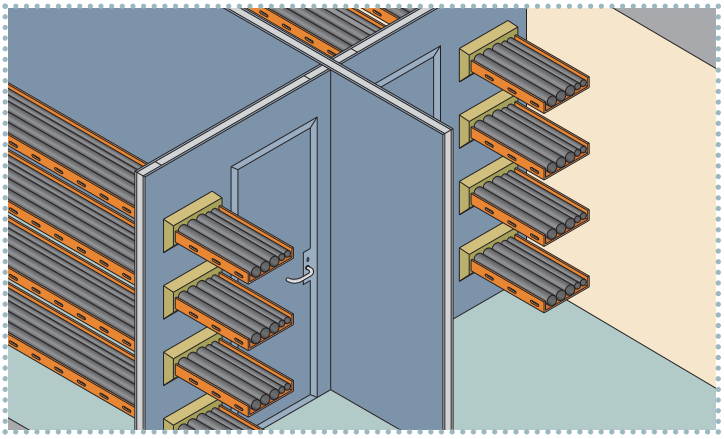
DURASTEEL® E&M Services Protection Types of Application

Cable Tunnel Cross Barrier

DURASTEEL® cable barrier systems can be designed to incorporate hatches and doors, or to be demountable allowing access to the interior.

Intumex Asia Pacific manufacture a full range of penetration seal systems which can be used to ensure maintenance of compartmentation where services pass through barriers.





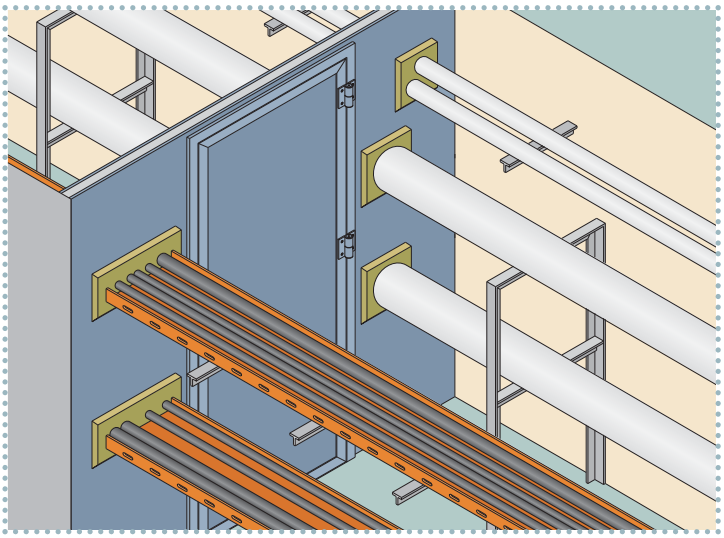
Smoke Extract Ducting System

Within cable transit tunnels, DURASTEEL® systems can be used to provide transverse barriers, inclusive of access doorways and penetration sealing systems, this prevent fire travelling along the cable ways. The DURASTEEL® barriers can also be constructed so as to separate tunnels into two or more distinct compartments, thus further reducing the risk of losing important services to fire.

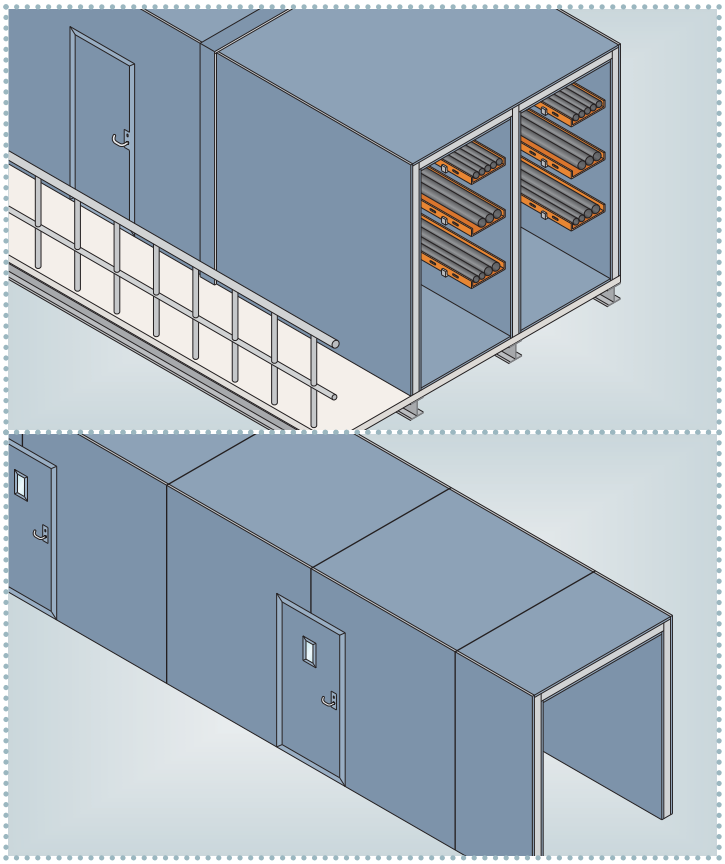
Cross Barrier In Cable Tunnel

As can be seen from the detail opposite, the Intumex DURASTEEL® services protection system, combined with the Intumex Fire Stopping and penetration seal systems, offer the end user a wide range of design possibilities.

No matter what services may need to penetrate the structure or the DURASTEEL® systems, Intumex penetration seal systems are able to provide comprehensive, high performance, cost effective and reliable fire stopping.



DURASTEEL® E&M Services Protection Types of Application



Modular Cable Corridor Including Cross Barriers / Escape Corridor

Intumex DURASTEEL® systems can be designed for use as modular units, as in the example to the left, a cable corridor within a power station complex or a Petro-chemical facility etc.

Similar design characteristics can be utilised for the construction of enclosures for some of the following :

- Spray booths.
- Emergency shut down equipment enclosures.
- Personnel control room enclosures.
- Civil defence blast resistant structures.
- Escape corridors, in offshore installations.

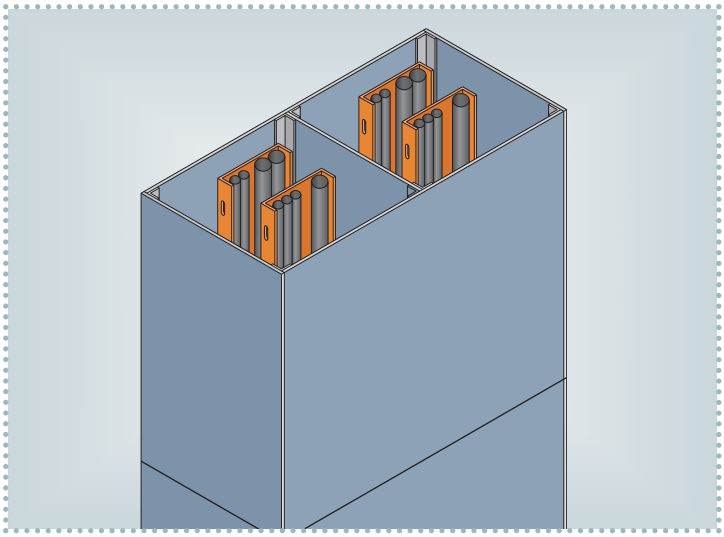
Cable Trunking System Including Splitters & Access Panels

Intumex DURASTEEL® services protection enclosures can be used in either horizontal or vertical orientation.

Vertical systems can be designed to span between floor slabs with little or no requirement for intermediate fixing points or bracing, depending on design and performance requirements. Please consult Intumex Asia Pacific for design details.

All Intumex DURASTEEL® services enclosure system are capable of offering in excess of 240 minutes integrity AND insulation characteristics, in accordance with the relevant criteria of BS 476: Parts 20-24.

DURASTEEL® system have also been widely tested to a multitude of differing national and international standards for a wide range of different performance requirements. If the design has to meet specific requirements, there is no doubt Intumex DURASTEEL® can provide an approved system design to meet almost any performance needs.



DURASTEEL®

Project References

DURASTEEL® fibre cement and steel composite board is well known for its high impact performance and has been extensively used in many noteworthy projects over the countries in Asia Pacific and Europe, such as the following:

PROJECTS	APPLICATIONS	YEAR
K.C.R.C. EastRail extension, HONG KONG	Smoke extraction duct, access doors, plenum ceiling, services enclosure	2004
Wanchai Police Headquarters (phase 3), HONG KONG	LT duct for smoke extraction, plenum ceiling, services enclosure, town gas pipe enclosure, bulkhead for fire shutters, smoke barrier	2004
M.T.R.C. Stations Improvement, HONG KONG	Smoke extraction ducts, fire doors, kiosk fire separation, services enclosure	1997~2004
School Improvement Programme (phase 1, 2, 3 & 4), HONG KONG	Services enclosure, fire barrier, ventilation ducts	1995~2004
Sub-stations for H.K. Electric Company, HONG KONG	Services enclosure, ventilation duct	1992~2004
Government Housing Developments, HONG KONG	Ventilation ducts, services enclosure	1990~2004
Hong Kong University extension, HONG KONG	Loadbearing floor, services enclosure, ventilation ducts	1990~2004
Sub-stations for China Light & Power Ltd., HONG KONG	Cable trench cover, services enclosure	1990~2004
Brisbane bus tunnel	Ducting/shield	2003
H.K. Chinese Women's Club College, HONG KONG	Loadbearing ceiling	2003
K.C.R.C. WestRail stations and tunnels, HONG KONG	Smoke extraction duct, access doors, floor hatches, plenum ceiling, services enclosure, demountable fire barrier	2003
Kwai Chung Cargo Terminals, HONG KONG	Smoke vents, services enclosure, fire doors, fire barrier, bulkhead for fire shutters	1990~2003
Charter House, HONG KONG	Smoke extraction duct, services enclosure, access doors with architectural finishes	2002
M.R.T.C. North East Line, SINGAPORE	Ventilation and smoke extract duct, demountable fire barrier, access floor hatch	2002
M.T.R.C. Tseung Kwan O extension (stations and tunnels), HONG KONG	Smoke extraction duct, access doors and hatches, services enclosure, town gas pipe enclosure	2002
Olympic Station Commercial & Residential Development (phase 1, 2 & 3), HONG KONG	Smoke vents, access hatches, services enclosure, smoke barrier, bulkhead for fire shutters	2000~2002
New World First Depot, HONG KONG	Smoke extraction duct, services enclosure	2000
The University of Science & Technology, HONG KONG	Services enclosure, fire doors, ventilation duct	1992~2000
Harbour Plaza Resort City, HONG KONG	Smoke extraction ducts, smoke vents, services enclosure, plenum ceiling, bulkhead for fire shutters	1999
London Underground: Jubilee Line extension, U.K.	Fire rated and non-fire rated ventilation ductwork	1993~1999
Cheung Kong Center, HONG KONG	Smoke extraction duct, smoke vents, services enclosure, smoke barrier, lift shaft duct	1998
International Finance Centre One, HONG KONG	Smoke extraction, smoke barrier, services enclosure	1998

Intumex® ASIA PACIFIC

DURASTEEL®

Project References

PROJECTS	APPLICATIONS	YEAR
Louis Vuitton at Canton Road, HONG KONG	Loadbearing floor	1998
Lantau Airport Railway (stations and tunnels) HONG KONG	Smoke extraction duct, fire doors, smoke barrier, services enclosure, plenum ceiling	1996~1998
Cathay Pacific Catering Services, HONG KONG	Smoke extraction duct, services enclosure, fire door	1997
Hong Kong International Airport, HONG KONG	Sliding fire door, smoke extraction duct, services enclosure	1997
HSBC Building, HONG KONG	Loadbearing floor, services enclosure	1997
North District Hospital, HONG KONG	Services enclosure, town gas pipe enclosure	1997
Royal Ascot Commercial & Residential Development, HONG KONG	Smoke vents, services enclosure, loadbearing floor	1997
Tuas Bay tunnel, SINGAPORE	Joint cover	1997
Western Harbour crossing, HONG KONG	Smoke extraction duct, movement joints	1997
Labrador sub-station, SINGAPORE	Floor opening	1996~1997
Australia Shopping Centre, AUSTRALIA	Ducting system	1996
Comcentre, SINGAPORE	2 hours plenum ceiling	1996
Hollywood Plaza, HONG KONG	Smoke vents, fire doors	1996
Hunghom Freight extension, HONG KONG	Smoke extraction duct, plenum ceiling	1996
Kwinana Power Station (coal), AUSTRALIA	Smoke barriers, fire doors	1996
Nestle Dairy Farm Factory, HONG KONG	Smoke extraction duct, services enclosure	1996
Sydney harbour tunnel, AUSTRALIA	Expansion joint protection, fire doors	1996
Telepark, SINGAPORE	2 hours plenum ceiling	1996
United Christian Hospital, HONG KONG	Services enclosure, ventilation ducts	1996
Woodlands sub-station, SINGAPORE	Trench cover	1996
Tampines Mall, SINGAPORE	2 hours plenum ceiling	1995~1996
Temasek Polytechnic, SINGAPORE	2 hours enclosure	1995~1996
Republic Plaza, SINGAPORE	2 hours trafficable ceiling	1994~1996
Senoko Power Station, SINGAPORE	Fire barrier	1994~1996
Suntec City (phases 3, 4 & 5), SINGAPORE	2 hours trafficable ceiling	1993~1996
Nethersole Hospital, HONG KONG	Plenum ceiling, services enclosure	1995
AIA Tower, SINGAPORE	2 hours enclosure	1994
AutoPlaza, HONG KONG	Loadbearing floor	1994
New Century Hotel & Plaza, HONG KONG	Smoke extraction duct, smoke vents, smoke barrier, services enclosure, plenum ceiling, fire doors	1994

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Intumex® ASIA PACIFIC

Project References

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PROJECTS	APPLICATIONS	YEAR
Times Square, HONG KONG	Services enclosure, bulkhead for fire shutters	1994
Black Point Power Station, HONG KONG	Ventilation ducts, fire doors, services enclosure	1993
Boy Scout Headquarters, HONG KONG	Smoke vents, services enclosure	1993
Corporation Place, SINGAPORE	4 hours ceiling	1993
International Finance Centre Two, HONG KONG	Smoke barrier, insulated fire doors, ventilation ducts, services enclosure	1993
Lane Crawford Place, SINGAPORE	2 hours pipe enclosure	1993
Tate's Cairn Tunnel, HONG KONG	Cable enclosure, plenum cable	1993
British Rail: Waterloo International Rail Terminal, U.K.	Ductwork	1992
Channel Tunnel, U.K.	Cable enclosure	1992
City Bank Headquarters & Plaza, HONG KONG	Smoke vents, fire doors, services enclosure	1992
London Underground: Bow Road Station, U.K.	Fire doors	1992
Route 5 road tunnel, HONG KONG	Cable trunking enclosure	1992
M.R.T.C., SINGAPORE	Smoke extract duct, plenum ceiling, fire barrier, access floor hatch, fire door	1989~1992
M.T.R., HONG KONG	Cable enclosure, plenum ceiling, duct, fire wall, plant room enclosure	1988~1992
Bank of China, HONG KONG	Services enclosure, ventilation ducts	1991
Dragon Centre, HONG KONG	Smoke extraction duct, smoke vents, fire doors, services enclosure, plenum ceiling	1991
London Underground: New Angel Station, U.K.	Cable enclosures and separation, stairway protection	1991
Miramar Hotel, HONG KONG	Smoke vents, services enclosure	1991
Peninsula Hotel extension, HONG KONG	Smoke extraction duct, smoke vents, fire doors, services enclosure	1991
British Rail: St. Pauls Thames Link, U.K.	Smoke ventilation ductwork	1990
Garwick Airport, U.K.	Ventilation and smoke extract duct	1990
Pacific Place Two, HONG KONG	Smoke vents, smoke barrier, ventilation ducts, services enclosure, bulkhead for fire shutters, drencher bulkhead	1990
Shing Mun Tunnel, HONG KONG	Cable enclosure	1989
Stanstead Airport, U.K.	Smoke extract duct, fire barrier, fire door	1989
Sydney Harbour tunnel, AUSTRALIA	Protection to joints	1989
The 2nd Cross Harbour tunnel, HONG KONG	Fire door, cable protection, service enclosure	1989
HSBC Headquarters, HONG KONG	Smoke extraction duct, services enclosure	1985

Approval of Codes & Standards

DURASTEEL® systems have also been tested to many international standards below and many other national standards:

- **AS 1530: Various parts** ····· AUSTRALIA
- **CAN 4-S114-M80** ····· CANADA
- **China Fire Rules & Regulations 1984** ··· P.R. CHINA
- **Arreté du 30 Juin 1983** ····· FRANCE
- **Arreté du 21 Avril 1983** ····· FRANCE
- **DIN 4102: Various parts** ····· GERMANY
- **DIN 52104** ····· GERMANY
- **PA III 4.596** ····· GERMANY
- **BS 476: Various parts** ····· U.K.
- **ASTM E 119** ····· U.S.A.
- **ASTM E 136** ····· U.S.A.

Approvals for DURASTEEL® systems have been given by the following organisations:

- Hong Kong Fire Services Department ····· HONG KONG
- EdF (Electricité de France) ····· FRANCE
- Det Norske Veritas ····· NORWAY
- Lloyds Register ····· U.K. (Worldwide)
- Building Research Establishment ····· U.K.
- Loss Prevention Council ····· U.K.
- UL (Underwriters Laboratories) ····· U.S.A.
- FM (Factory Mutual) ····· U.S.A.
- ABS (American Bureau of Shipping) ····· U.S.A.

Working With DURASTEEL®

Quality Assurance

Intumex Asia Pacific has always been committed to the highest standards of quality. Our DURASTEEL® board manufacturing and production systems operate under a rigorous quality management system, independently certified as complying with BS EN ISO 9000. This provides specifiers, contractors and end users with an independent assurance of our continuous quality control of production.

On-site Quality Control

Intumex Asia Pacific will provide a full technical back up to the (sub) contractor both on and off site. This will include assistance in the form of providing written confirmation of construction details, together with drawings where required. Please note however that this refers only to specific detail drawings and does not relate to the provision of the shop drawings unless otherwise agreed.

Intumex Asia Pacific will visit site on a frequency to be agreed between ourselves, the (sub) contractor and the main contractor to ensure that installation is proceeding in accordance with our recommendations.

Composition & Manufacture

DURASTEEL® is a composite panel of fibre reinforced cement, mechanically bonded to punched steel sheets on both faces. DURASTEEL® is non combustible and is classified as a Class 0 material.

Continued on next page

Working With DURASTEEL®

Continued from previous page

Health & Safety

No special precautions are necessary in handling or working boards. When using power saws or sanders in a confined space, dust extraction equipment is recommended to control dust levels.

DURASTEEL® will support its own weight and also can be used in load bearing situations; please consult Intumex Asia Pacific Technical Services Department for advice. Installers must ensure that they work from adequate and safe platforms where necessary.

Health and Safety data sheets are available.

Handling & Storage

Carry boards on edge, and do not drop on their corners or on to trestles. All products should be stored under cover on a flat base, clear of the ground. If stored in the open, the stack should be fully protected from the weather. If stored on racks or dunnage, boards should be fully supported across their width at not more than 1m centres.

Maintenance & Cleaning

Boards do not normally require any maintenance in use. DURASTEEL® boards will not crack or deteriorate with normal usage, as it is the most rugged board product available within the passive fire protection market. DURASTEEL® boards can be degreased with a mild solvent should painting or plastering be required (see Decorating).

General

Care should be taken to prevent injury from sharp edges and corners. Do not leave boards lying about on site, on scaffolding or in high traffic areas, where risk of damage or injury is increased, and prevent any misuse which could result in personal injury or damage to boards. In the event of injury, obtain proper treatment. The materials and the packaging used for distribution do not incorporate any substances considered to be hazardous to health.

Working

CUTTING & SAWING

Use a jig saw with a coarse blade. Diamond dusted blades are available in some countries and will assist in prolonging the life of the blades. In general, cutting with a jigsaw is only suitable for small cuts, e.g. scribing around services etc.

For long cuts, a jigsaw blade can be used, but has limitations on its effectiveness, short life span of jigsaw blades is an issue and straightness of cuts. For many long cuts, use a grinder or a guillotine if available. Note that when cutting boards with a grinder, the edges are extremely sharp and thus extra care should be taken to avoid cutting of hands etc. See below for details on dressing of edges.

Always wear suitable eye and hand protection. Ideally, masks should be worn to prevent inhalation of dust.

DRILLING

Use a hand drill or high speed power drill (not the percussion type); bits should have HSS tips and should be suitable for drilling steel and/or fibre cement. Always wear suitable eye and hand protection. Ideally, masks should be worn to prevent inhalation of dust.

EDGE TREATMENT

A file or grinder can be used to remove sharp or burred edges due to cutting of the sheets. Care should be taken not to remove large areas of the galvanised coating as this could possibly lead to corrosion of the steel. When cut, edges do not need to be coated in order to provide additional protection as galvanic reaction will prevent corrosion of edges. However, this does depend on the location of the system and its exposure to inclement conditions. Please consult Intumex Asia Pacific if in any doubt. Always wear suitable eye and hand protection. Ideally, masks should be worn to prevent inhalation of dust.

Decorating

PLASTERING

If a skim finish is desired, it will be necessary to apply a grid of expanded metal lathing to provide a key for plaster or sand and cement render. Please consult Intumex Asia Pacific for specific recommendations.

PAINTING & DECORATING

Any conventional paint can be used. Alkali resistant primers are not necessary. Water based paints (with a watered down first coat) or oil based paints can be applied to all products using proprietary primer/top coat systems as recommended by paint manufacturers. DURASTEEL® should be de-greased with a solvent based cleaning agent. All paints should be compatible with application to:

1) the galvanised steel facing, and
2) the core material has a high alkali content.

At all times the recommendations of the paint manufacturer should be followed.

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