

**A DURABLE FIBRE CEMENT & STEEL  
COMPOSITE BUILDING MATERIAL**

**DURASTEEL®**  
**CEILING & PLENUMS**

**Intumex®**  
ASIA PACIFIC





# Introducing DURASTEEL® Ceilings & Plenums

## Features

- Moisture resistance.
- Impact resistance.
- 'Walk on' strength.
- Fire resistance up to 4 hours including insulation.
- Superior spanning capability.
- Pressure resistance.
- Demountable.
- Loadbearing systems available for up to 15 kN/m<sup>2</sup>.
- Hose stream resistant.



## General

Intumex DURASTEEL® ceilings can be formed to fulfil a multitude of functions. Horizontal constructions can be used not only as traditional suspended and membrane ceiling constructions, but can also be used as plenums, single sided enclosures to cables and services. Intumex DURASTEEL® ceilings can be designed as load bearing structures, and even standard DURASTEEL® ceilings can be used as trafficable constructions.



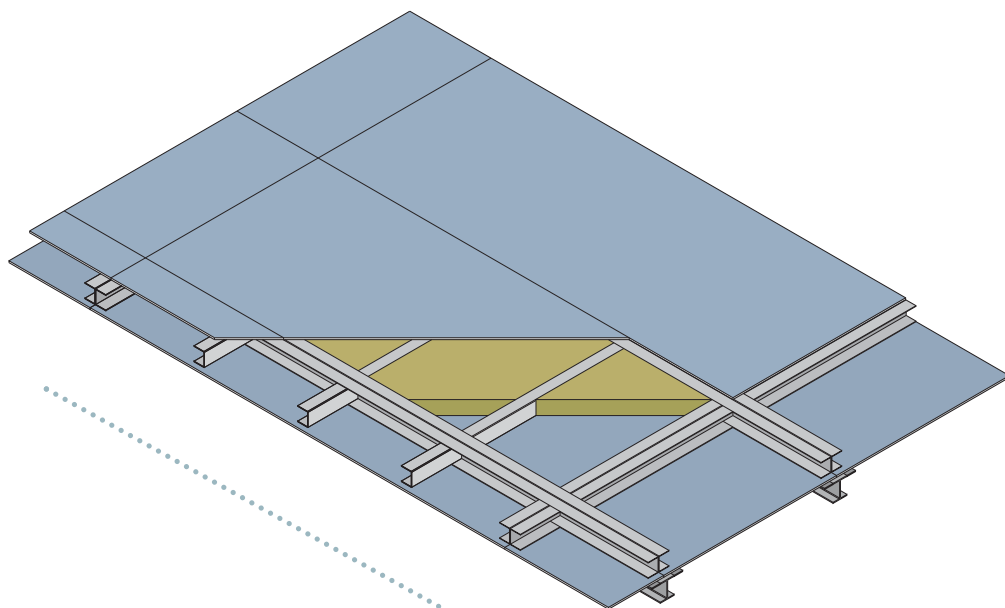
DURASTEEL® horizontal barriers have been fully tested to the requirements of BS 476: Parts 21 and 22: 1987. These barriers can withstand fire exposure from above, below or above AND below, dependent on the design and performance requirements.

The overall system design will depend on the performance characteristics, but typically would consist of DURASTEEL® panels, fixed to one of both sides of a steel supporting framework, with or without the cavity filled with rock wool.

# DURASTEEL® Ceilings & Plenums

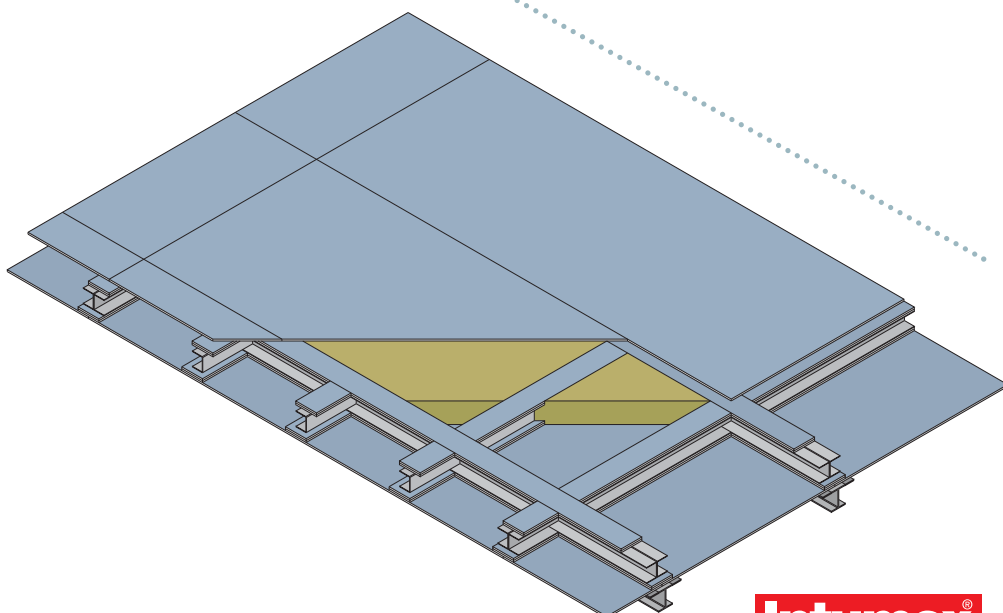
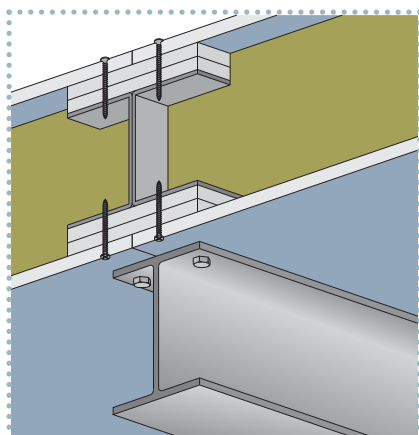
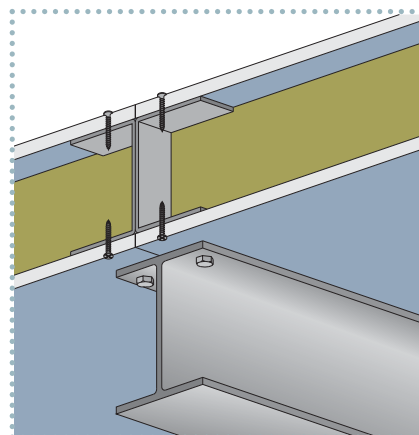
DURASTEEL® loadbearing ceilings can be constructed from simple readily available local materials. The fire performance of such systems can offer includes up to 240 minutes integrity and insulation, as well as loadbearing capacity, regardless of whether fire exposure is from above or below.

Depending on the loadbearing requirement, it may be necessary to include additional, protected, steel support sections beneath the ceiling construction.



Depending on the insulation performance requirements, it may or may not be necessary to include additional cover fillets over the steel sections to retard the conduction of heat through the ceiling construction.

The detail below shows the construction with two cover fillets either side of the support framing. The number and overall thickness of the fillets is dependant on the insulation performance required.



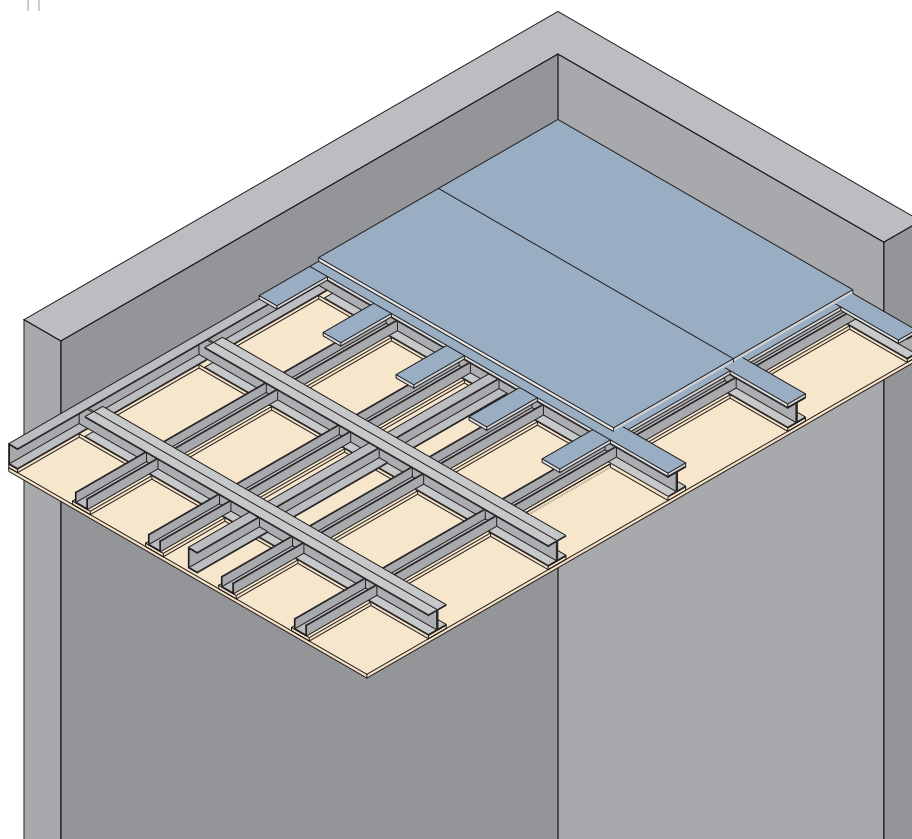
# DURASTEEL® Ceilings & Plenums

## Types of Application

### Self-Supporting Membrane Ceiling With SUPALUX®

Intumex DURASTEEL® can be combined with Intumex SUPALUX® boards to provide a cost effective system, offering the same robustness and trafficable construction as the standard DURASTEEL® construction, but with the one side clad with Supalux® to provide a more aesthetic appearance.

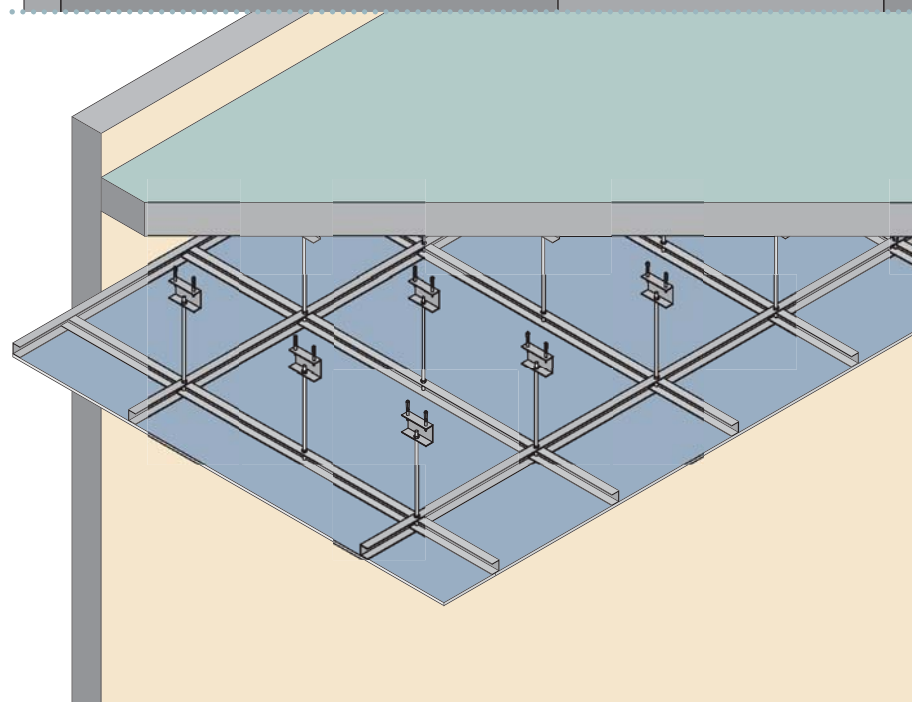
DURASTEEL® membrane ceilings can offer up to 240 minutes integrity and insulation.



### Suspended Plenum Ceiling

DURASTEEL® suspended ceiling constructions can be used to act as Plenum chambers. DURASTEEL® is capable of withstanding very high positive and negative pressures. DURASTEEL® systems fully comply with the air leakage rates of DW144.

DURASTEEL® ceiling systems can cover extremely large spans, especially where internal hanger support systems are incorporated into the design. Please consult Intumex Asia Pacific for further details. Also see [page 60](#).

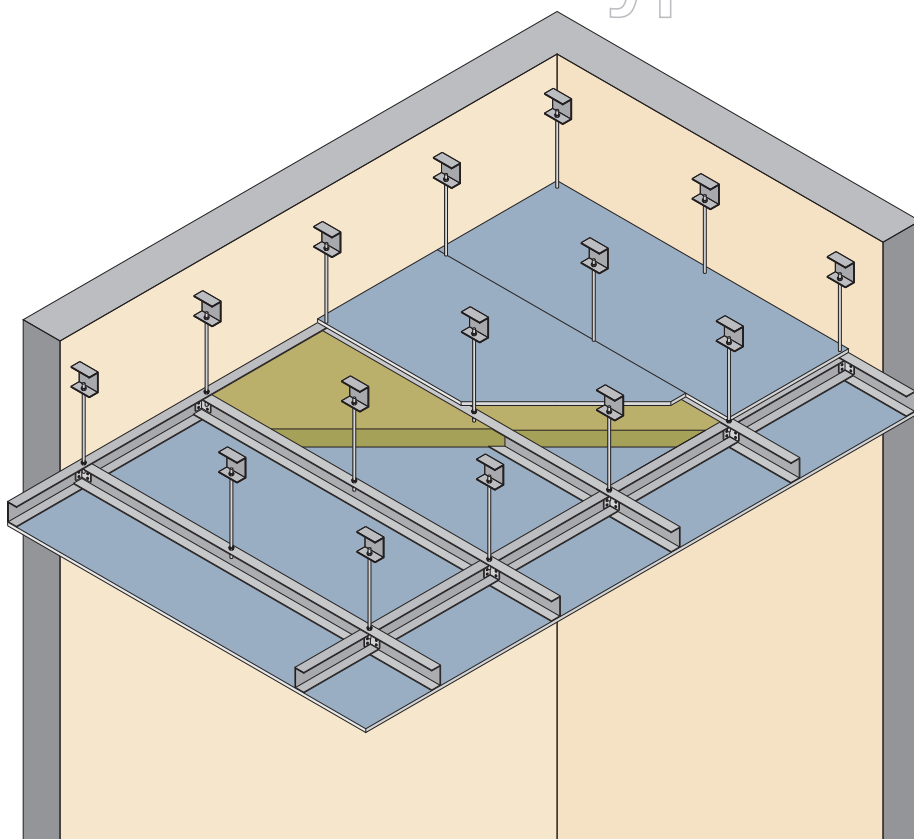




# DURASTEEL® Ceilings & Plenums

## Types of Application

Self-Supporting  
Double Layer  
Membrane Ceiling



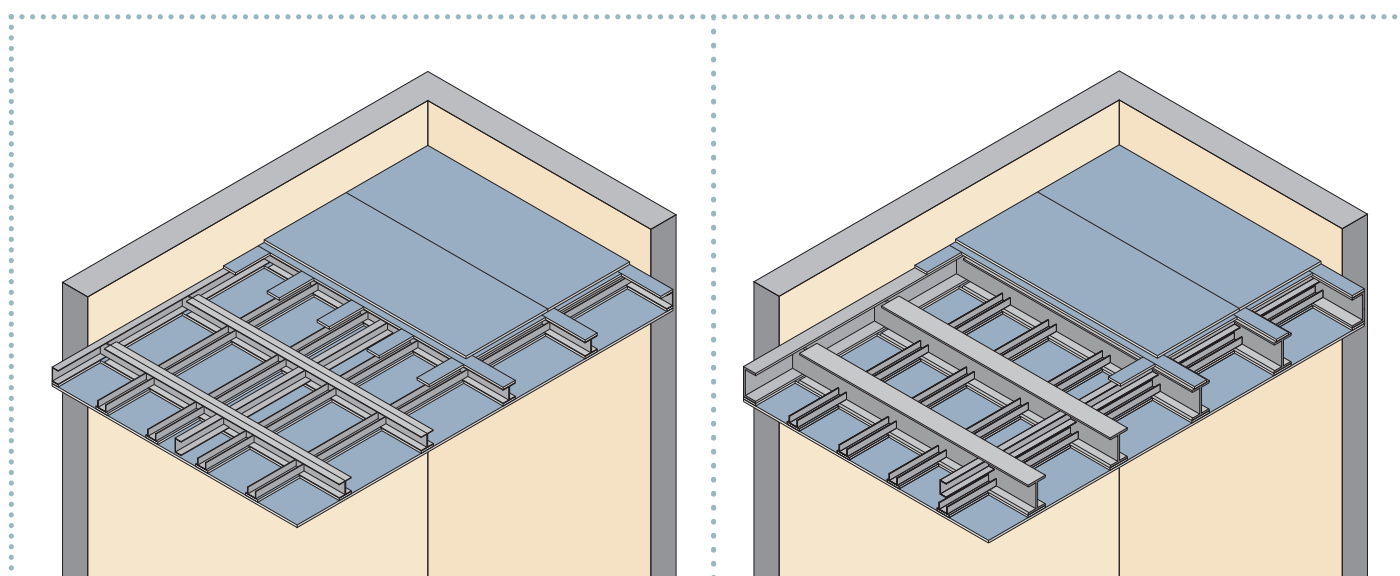
Similarly, double layer membrane ceiling systems can be constructed to cover large expanses with the introduction of additional hanger support systems. Inclusion of these additional supports can often allow a reduction in the dimensions of the support frame members, offering a lighter weight and more cost effective system.



# DURASTEEL® Ceilings & Plenums

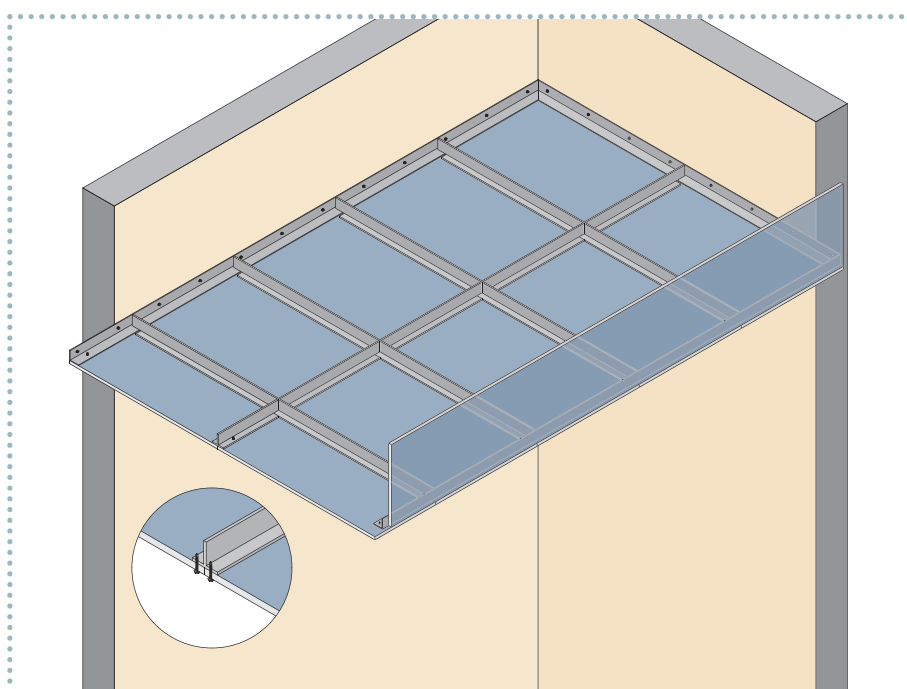
## Types of Application

The below details depict methods of constructing membrane ceiling systems without recourse to additional hanger support members. The section shape, type and dimension of the steel support structure is dependent on the span, the overall weight of the ceiling construction, the required performance in terms of fire and under normal operating conditions. E.g. loadbearing capacity. Please consult Intumex Asia Pacific for details.



DURASTEEL® ceiling constructions can be used to create one, two or three sided enclosures. These can be used as plenums, services enclosures or to provide compartmentation.

Construction details will differ from project to project and are dependant on a number of factors, please consult Intumex Asia Pacific for details. Also see [page 60](#).





# 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

# 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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# Project References

*Continued from previous page*

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.

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# Working With DURASTEEL®

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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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