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Importance and Effective Ways of Fire Compartmentation of Façades

Critical Issues in High-Rise Façade Design
Fire Safety and Tall Building Façades
Critical Issues in High-Rise Façade Design

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CURRENTLY
- Fire Safety
- Interfaces and Compartmentation
- Cladding
- Cavity Barriers
- Curtain Walling Perimeter
- Barriers Protected
- Spandrels Noise Control

PERSPECTIVE
- System Testing
- Specification Compliance
- 35 + year horizon
- Insulation market stakeholder
- All generic types
- UK | EU | UAE | ME | IND | AUS

RESILIENCE
- Context of Fire

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What to Expect Today

Critical Issues in High-Rise Façade Design
Fire Safety and Tall Building Façades

REACTION TO FIRE

RESISTANCE TO FIRE

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Primary criteria is **FIRE RESISTANCE**

- **INSULATION**
  - Conducted heat
  - Ambient plus 180 °C

- **PLUS**

- **INTEGRITY**
  - Flame, smoke and gases
TESTING STANDARDS / APPLICATION
**Acceptable Test Standards and Criteria**

Perimeter Fire Barrier System/Exterior Curtain Wall / Floor Intersection

i. ASTM E 2307

ii. UL 2079

iii. EN 1364-4

iv. EN 1364-3
PERIMETER BARRIER FIRESTOP SYSTEMS FOR CURTAIN WALLS

EN 1364-4 : 2014 / ASTM E 2307

Perimeter Barrier Firestop

- Dynamic condition
- Large scale


Intermediate Scale Multi-story Test Apparatus
Scope of EN 1364-4 – Test dynamic behavior At 20PA
Movement measured

Performance is a function of:
- Specification
- Installation
- Full QMS
- Quantified properties
- Repeatable

Standard
- < +/- 10%

Non-Standard
- According to project
- Design movement stated
- Additional compression
- Reflected in MS
- < +/-20mm
Scope of EN 1364-4 – Test dynamic behavior At 20PA
Movement measured
Classification of Firestop Systems

All perimeter barrier systems shall be listed and approved system assemblies.
PERIMETER BARRIER
FIRESTOP SYSTEMS
FOR CURTAIN WALLS

SINGLE SOURCE - SYSTEMS

Siderise Systems
One Part /QMS

Legal requirements

Testing to specified standards
at approved labs

Certification by approved labs

C.O.C as per system specification

Compliant

Test standard

System assembly

Audited products
Polat Tower, Istanbul 2012
A ventilated system consists of an outer panel, a ventilated cavity, insulation and an inner leaf.
CAVITY BARRIERS FOR VENTILATED FAÇADES

- Allows ingress of air at base & egress of air at top
- Circulates air to expel moisture
- Penetrating water is drained
- Pressure equalisation
- Stack effect aka Chimney Effect
Ventilated façades

Mixed materials
### Ventilated façades

- **Mixed materials**

- **30 different façade types**

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**Images:**
- [Image of facade types]
- [Image of facade types]
Design of cavity barriers

- Traditional full-width cavity barriers prevent ventilation and drainage.
- Cavity barriers in rainscreen presents a conflict.
- How do we overcome this conflict?
The use of intumescent materials:

- Allow a cavity to be maintained under normal circumstances
The use of intumescent materials:

- Allow a cavity to be maintained under normal circumstances
- Seals cavity in the event of a fire
  - Activated at critical temperature
  - ‘Integrity’ re-established
  - Continues to expand to close air gap.
Product selection – Reference to System Tests
Product selection – Reference to System Tests
CAVITY BARRIERS FOR VENTILATED FAÇADES

World of Façades Jakarta Conference

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Product selection – Reference to Site Condition
Product selection – Reference to Site Condition
Product selection – Reference to Site Condition
Reference to System Tests

<table>
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<tr>
<th>Test Date</th>
<th>Test Standard</th>
<th>Test Owner</th>
<th>Cladding Type</th>
<th>Cladding Description</th>
<th>Joint Type</th>
<th>Insulation Type</th>
<th>Horizontal Cavity Barrier</th>
<th>Air Gap (mm)</th>
<th>Vertical Cavity Barrier</th>
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THE APPROACH

Fire safety: A bigger part of the menu
Before: “Would you care for an after-dinner mint?”
Now: “main course”

“The challenges of specifying and detailing for tomorrow”
Thank you