BRITISH COLUMBIA
BUILDING ENVELOPE COUNCIL

Testing and Certification of Building Products

January 27, 2011

Presented by:

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Presentation Agenda

- Intertek Overview
- Testing & Certification
- Product Certification Marks
- Building Products Testing
  - Structural Testing
  - Small Scale Testing
  - Weathering
  - Wind Testing
  - Fenestration Testing
  - Fire Testing
- Questions Period

Intertek – Our Heritage

- As one of Thomas Edison's companies, we began testing light bulbs in 1896
- Over 100 years later, we have built the largest network of product safety laboratories

1896 1896: Edison's Testing Bureau est; later named ETL

1925 1925: SEMKO est

1927: Chas Warnock Co. founded

1955

1965 1961: SEMKO joins CB Scheme: today's largest issuer

1965: WH successfully challenges UL, CSA in Canada: sets precedent

1989 1989: ETL OSHA recognized NRTL

1992: Inchcape issues first ISO 9000 certificate

2004 2004: Entela acquired as entrée into automotive

2007 2006: ETL is the fastest Growing certification Mark in North America

Intertek – Our Industries

Our organisation	Industries we operate in	What we do
Consumer Goods Commercial & Electrical Oil, Chemical & Agri Analytical Services Industrial Services Minerals	Aerospace & Automotive Building Products Chemical Consumer Goods & Retailers Electrical & Electronic Energy Food & Agriculture Government & Institutions IT & Telecom Industrial Medical & Pharmaceutical Petroleum Toys, Games & Hardlines Textile, Apparel & Footwear	Testing Inspection Certification Auditing Outsourcing Advisory Training Quality Assurance

Intertek – Global Network

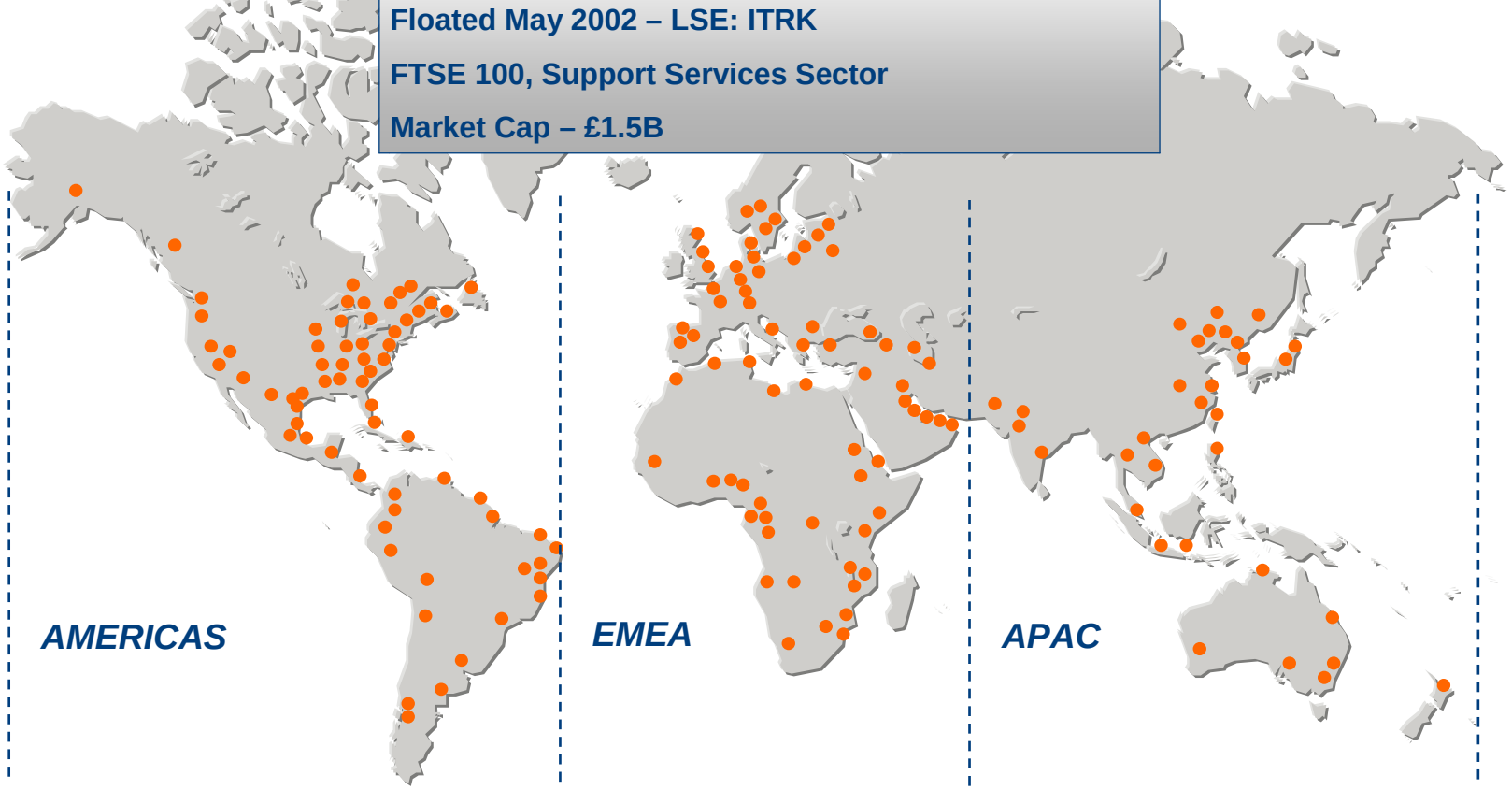
Countries	Locations	Staff
100+	1,000+	26,000+

Headquartered in London England

Floated May 2002 – LSE: ITRK

FTSE 100, Support Services Sector

Market Cap – £1.5B



Intertek – By the Numbers…

- Billions of products globally feature our certification marks
- More than 2,000,000 annual tests, inspections, certifications
- Market access to nearly all 195 countries on 6 of 7 continents
- 89 Product Safety, Performance and EMC laboratories, globally
- More proprietary certification products than any other certifier – from ETL & Energy Efficiency to Quality/Performance & RoHS
- 2nd largest certification org in North America

Intertek Group v. NA Certifiers
2008 Revenue

Intertek Group: $1.8 billion
UL: $814 million
CSA: $183 million

Intertek C&E v. NA Certifiers
2008 Revenue

UL: $814 million
Intertek C&E: $381 million
CSA: $183 million

Conversions from £ to $ at 2008 constant exchange rates

Testing & Certification

Product certification:

- Ongoing process by Independent Third Party to ensure quality, safety, environmental and performance criteria for compliance to local and global regulations
- To protect the consumer

Product testing:

- Follow standardized test methods to verify products to minimum requirements
- Troubleshooting, safety, quality control, R&D, design engineering and evaluation, prototype testing and validation, and product benchmarking

Testing & Certification Cont'd

AHJ's look for testing and certification to be conducted by an Accredited Independent Third Party agency

- Validate manufacturer's claims and in-house test results to standardized methods

Two facets to Intertek's role as Accredited Independent Third Party testing agency:

1. Test building products for compliance to referenced standards in the Building Code
2. Industry relations - consult with manufacturers of innovative products and organizations such as CCMC to develop test plans and evaluate and certify product conformance

Testing & Certification Cont'd

Accreditations:

- Intertek is an ISO 17025 accredited testing agency
- All Intertek labs are accredited by the one or more of the following agencies:

SCC Accredited LAB
LAB Accrédité CCN TM

IAS ACCREDITED

FBC Florida Building Commission

MIAMI - DADE

CRRC COOL ROOF RATING COUNCIL ACCREDITED LABORATORY

- Testing accreditations includes various materials, structural and fire test standards in all five of our Building Products laboratories

Testing & Certification Cont'd

Accredited by all major code bodies to test in accordance with the following standards:

- ASTM
- UL and CAN/ULC
- FM
- ANSI
- CAN/CGSB
- Miami Dade County
- NFPA
- CCMC / ICC ES

Product Certification Marks

Certification Marks applied to certified products

- Confirm products meet safety, quality, and performance requirements
- Provide evidence that a product conforms to applicable standards, and that there is a program of ongoing follow-up services including factory inspections
- In most markets, conformity to local requirements is mandatory before products can be sold. In other instances, it can be a powerful marketing tool that helps build confidence throughout distribution and end-user channels.

Product Certification Marks Cont'd

- Building Products Group tests various components and systems that are used in Buildings (residential and commercial) to various test standards
- Act as a Third Party laboratory that helps clients meet Building Codes in North America and Overseas

Product Certification Marks Cont'd

Environmental Certification:

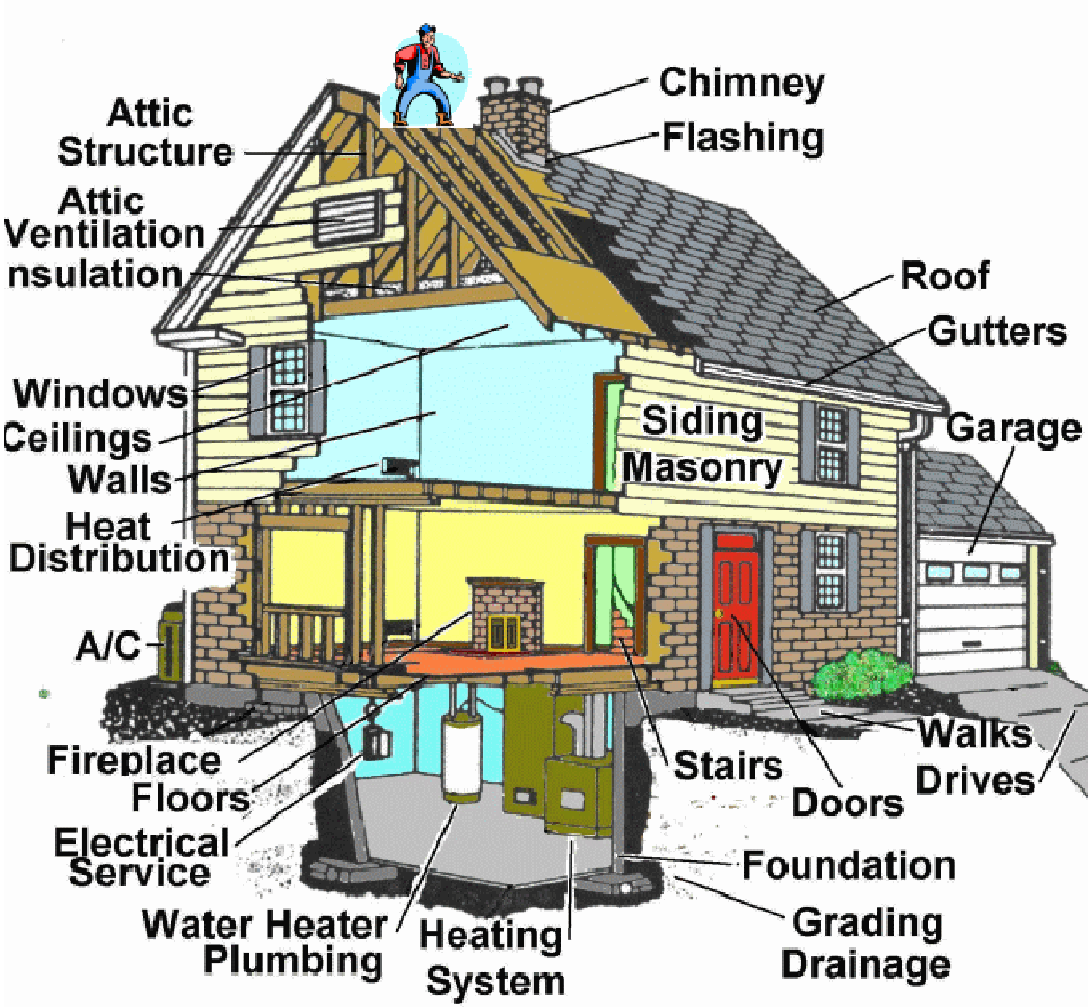
- Environmental product claims coming under scrutiny by regulators and growing source of distrust by consumers
- "Greenwashing" – the disingenuous marketing of environmentally friendly product attributes – advocacy groups and consumers looking for hard proof behind environmental claims
- Validate environmental credentials
- Manufacturers under greater pressure to ensure products meet standards and have accurate test and analysis data to back up their claims
- Ensures products conform to multiple environmental regulations

Building Products Testing

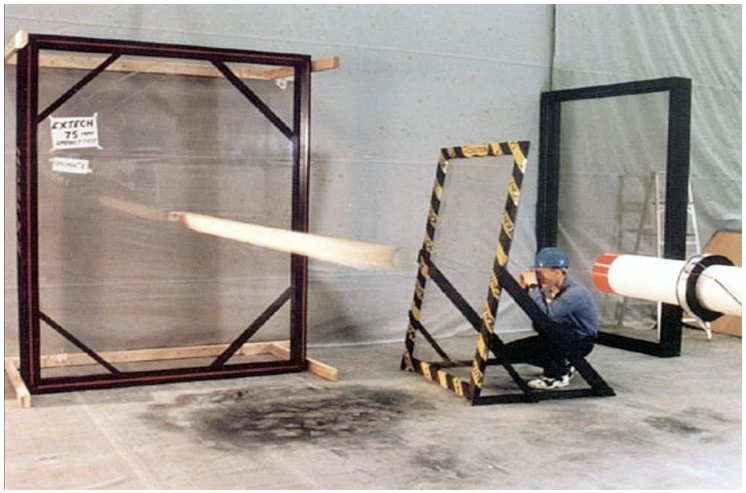
Services include, Code compliance, product evaluations and CCMC / ICC-ES submittals for approval.

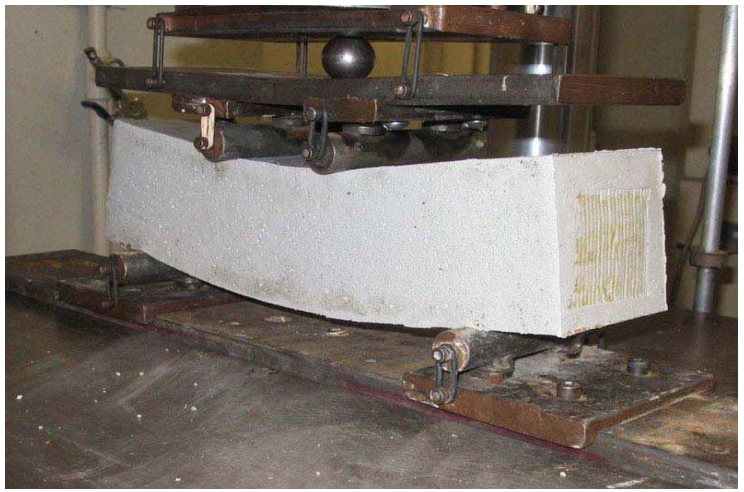
- Construction products and materials testing
- Fire & flammability testing
- Structural testing
- Acoustical testing
- Weathering and environmental testing (incl. Miami-Dade County)
- Doors, hardware and fenestration products
- Hearth and plumbing products
- Field Labelling

Building Products Testing Cont'd



Building Products Testing Cont'd





Building Products Testing Cont'd

Structural Testing

Scope	• Structural testing is a means to investigate the performance of a material and/or assembly • Allows analysis for expected maximum load under static and cyclic conditions, strength of connections, racking characteristics and load distribution
Standard(s)	• ASTM E72 (axial, compressive, transverse and racking) • ASTM E330 (static and dynamic pressure)
Requirement	• Ultimate loads are taken at failures and compared to standard • Incremental loading is based on test standard and/or acceptance criteria
Equipment	• Red Frame 80,000 lbf @ 16 ft, Blue Frame 110,000 lbf @ 16 ft • Hulk 500,000 lbf • Deflection Gauges, Loading Ram, String Gauges, Load Cells

Structural Testing Cont'd

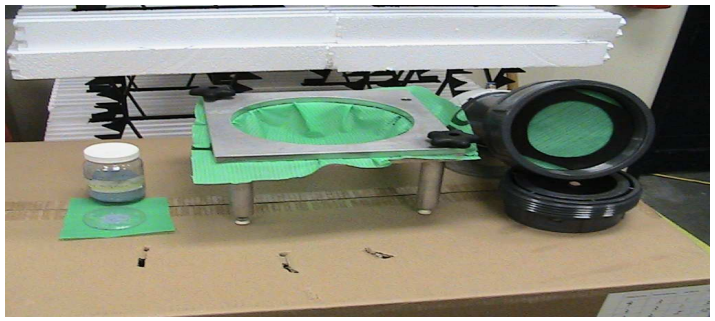
video clip…

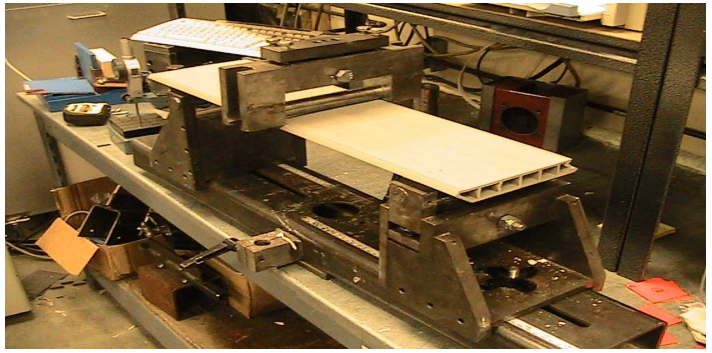
ASTM E72 – Axial

Small Scale Testing

Scope	• Tests are performed to verify material characteristics such as tensile strength, bending strength and chemical composition • Used as a bench mark to evaluate products performance under various environmental conditions
Standard(s)	• Break it: ASTM D828 (tensile), ASTM D6109 (flexural), ASTM D1621 (compression), ASTM D1922 (tear) • Permeability: ASTM E96 (MVTR), ASTM D779 (water resistance), ASTM D570 (water absorption)
Requirement	• Stipulated by test standard or Acceptance Criteria • Baseline results are typically compared to post-weathered samples and can be used as verification tests in the future if modifications are made
Equipment	• Instron Universal Testing Machine (max. 22,000 lbF), Elmendorf Tester, Tinus Olsen (160,000 lbF) • Environmental Chamber, Mock-up Test Apparatus, Scale

Small Scale Testing

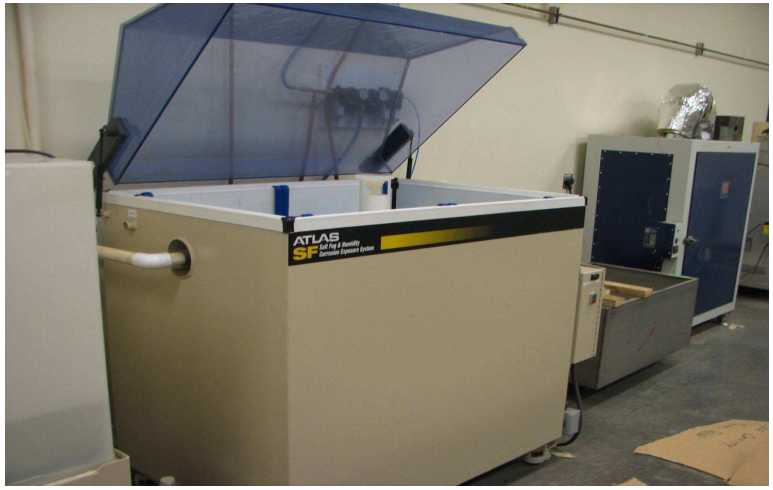




Weathering

Scope	• Weathering is the adverse response of a product to climate, causing premature product failures • 3 main factors of UV weathering are solar radiation (light), temperature and water (moisture) • Other type of weathering includes freeze-thaw, heating/cooling and salt-fog
Standard(s)	• UV Weathering: ASTM G152, ASTM G153, ASTM G154, ASTM G155 • Freeze-thaw: ASTM C67, ASTM C666 • Salt-Fog: ASTM B117
Requirement	• UV Weathering: duration varies (500 – 5000 hrs); testing before and after • Freeze-thaw: weight change, no physical change • Salt-Fog: no corrosion or blistering; visual examination
Equipment	• Xenon Arc Machine, QUV Chamber, Sun tan lamps; Atlas (manufacturer) • Ovens (50 – 130°C); Freezers (-40°C) • Salt Fog Machine; Atlas (manufacturer)

Weathering Cont'd



Wind Testing

Scope	• Wind testing is a means to investigate the performance of a roofing system under either static or dynamic wind conditions • Allows determination of ultimate load and deflection to calculate allowable wind speeds
Standards	• UL 580 (wind resistance), UL 1897 (wind up-lift), FM 4470 (wind uplift) • ASTM D3161 (asphalt shingles), TAS 100 (wind-driven rain)
Requirement	• Ultimate loads are taken at failures and compared to test requirement • Incremental loading is based on test standard and/or acceptance criteria
Equipment	• 10 x 10 foot vertical chamber for TAS 125, UL 580, UL 1897 • 5 x 9 & 12 x 24 foot horizontal chamber for FM 4470 • Wind generator capable of producing 110 mph wind speed

Wind Testing Cont'd

FM 4470 (small scale)

FM 4470 (large scale)

TAS 125 (UL580)

UL 1897

video clip…

ASTM D3161 – 110mph Wind

FEN Testing – Air, Water & Structural

Scope	• Code and/or Architect dictates the requirement of windows used in North America, which must be evaluated for their performance level • Additional requirements involve modeling of the windows for U-value and Energy Ratings
Standard(s)	• NAFS – AAMA/WDMA/CSA 101/I.S.2/A440-08 • Amalgamated standard combining CDN and US requirements into one standard
Requirement	• Airtightness (A1 – A3); Watertightness (B1 – B7); Wind Load (C1 – C5) • Ease of Operation; Resistance to Forced Entry (voluntary) • Condensation Resistance, Screen Strength (voluntary)
Equipment	• White Wall is used to perform the 3 required tests; 20’ x 20 wall • Airtightness (75 Pa); Watertightness (720 Pa); Wind (4800 Pa) • Deflection Gauges

FEN Testing – AWS Cont'd

FEN Testing – Miami Dade Program

Scope	• Florida State in the US has higher test requirements for all types of Building Products, above the IBC and IRC • Windows need to show that they can withstand and be used in High Velocity Hurricane Zones (HVHZ)
Standard(s)	• TAS 201, Impact Methodology • TAS 202, Impact and Air, Water & Structural • TAS 203, Cycling
Requirement	• TAS 202: Airtightness (75 Pa); Watertightness (720 Pa); Wind (4800 Pa) • TAS 202: 3 samples, 2x4 hit @ 50 ft/sec, applied at center, corner & frame • TAS 203: 3 samples, 8 loading sequences at different pressures
Equipment	• White Wall is used to perform the 3 required tests; 20’ x 20 wall • Missile Cannon • Deflection Gauges

FEN Testing – Miami Dade Cont'd

video clip…

TAS 201 – Impact Test

FEN Testing – Curtain Wall

Scope	• Curtain Wall testing is unique to the Vancouver office • Testing is specified by Architect; manufacturer that wins tender must comply with their specs
Standard(s)	• AAMA 501 • Various other ASTM standards are available; specified by Architect
Requirement	• Air, Water, Dynamic Water • Thermal Cycling, Air and Water • Deflection Readings, Seismic, Blow-out, Seismic Overload
Equipment	• Curtain Wall Stand, 30’ wide x 40’ high • Loading Ram, Deflection Gauges, Blowers • Aircraft Engine (DC-6, 2000 hp, 120 mph) • Refrigeration Unit

FEN Testing – Curtain Wall Cont'd

video clip…

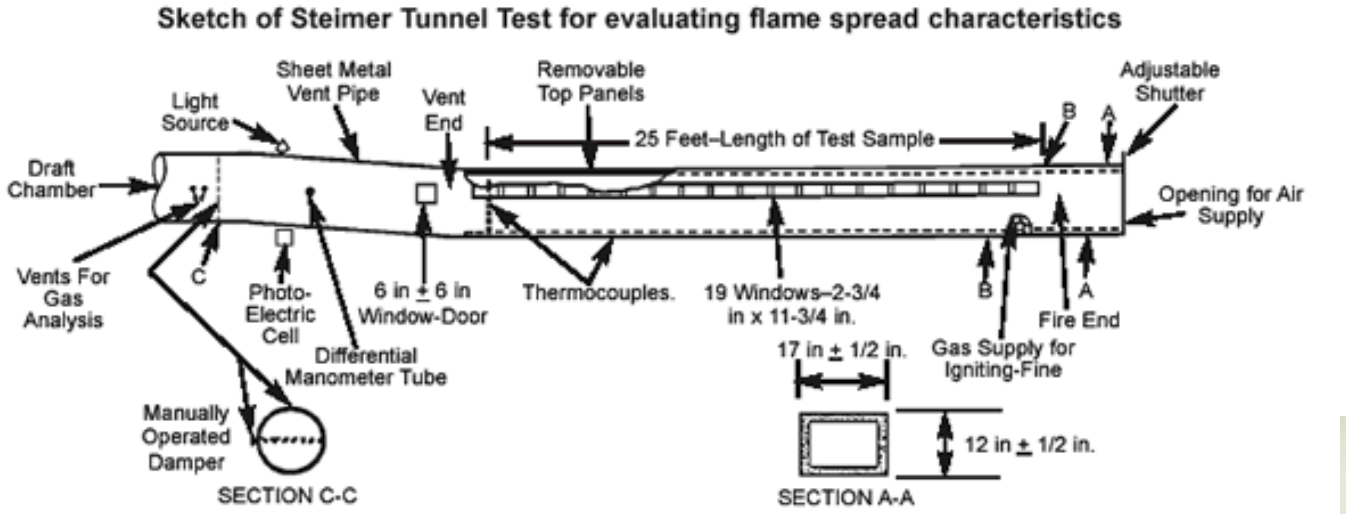
Wind Driven Rain – CCMC Test

(70mph – 110mph)

Fire Testing – Surface Burning

Scope	• Rating assigned to building materials based on data generated from a fire test, which indicate the rate at which flame will spread over the surface • 2 components: flame spread index (FSI) and smoke developed index (SDI)
Standard(s)	• ASTM E84, CAN/ULC S102, CAN/ULC S102.2, UL 723, NFPA 255 • CAN/ULC S102 & CAN/ULC S102.2 require 3 runs
Requirement	• Class A: FSI = 0 – 25 / SDI = 0 – 450 • Class B: FSI = 26 – 75 / SDI = 0 – 450 • Class C: FSI = 76 – 100 / SDI = 0 – 450
Equipment	• Steiner Tunnel, refer to diagram • Sample size is 18 inches wide by 24 feet long

Fire Testing – Surface Burning Cont'd



Fire Testing – Roofing

Scope	• Fire-resistance classifications measure roof assemblies' relative resistances to *external* fire exposures of a roof system • Small scale fire tests determine fire properties of the individual material
Standards	• ASTM E108, UL 790, CAN/ULC S107 (Roof Covering) • ASTM E84 (flame spread), ASTM D635 (burning rate), ASTM D1929 (Spontaneous Ignition)
Requirement	• Assigned by local building officials based on occupancy and the Code • Class A, B and C Roof Coverings • flame spread, burning rate and spontaneous ignition ratings are defined by the Code
Equipment	• ASTM E108 Furnace (Middleton, WI) • Steiner Tunnel (Coquitlam, BC & San Antonio, TX) • Small Scale Fire Lab (Coquitlam, BC, Middleton, WI)

Fire Testing – Roofing Cont'd

ASTM D635

ASTM E108 (SoF)

ASTM E108 (SoF)

ASTM D1929

Fire Testing – Doors

Scope	• A fire door is a door with a fire-resistance rating used as part of a passive fire protection system to reduce the spread of fire or smoke • Intertek has the largest number of Fire Door Certification clients in North America
Standard(s)	• Negative Pressure: CAN/ULC S104, NFPA 252, UL 10(b) • Positive Pressure: UL 10(c) • Installation Standard: NFPA 80
Requirement	• 20 min, 45 min, 60 min, 90 min, 2 hr, 3 hr Fire Ratings • No through penetration, no sustained flaming on un-exposed side • Must withstand fire hose impact test w/o creating an opening • Remain latched and meet deflection & separation requirements
Equipment	• Pilot scale: 48” x 52”, used for R&D to evaluate hardware or options • Mid scale: 4’ x 8’, used for full size single swing door • Full scale: ~ 10’ x 10’, used for pair doors, door frames, windows

Fire Testing – Doors Cont'd

video clip…

UL 10C – Mid-Scale with Hose Stream

(1800 deg F)

Fire Testing – Wall Assemblies

Scope	• "Fire Resistance" designates the ability of an assembly to contain a fire for a specified period of time • Assemblies include partition, floor/ceiling, roof/ceiling, protected beam or column
Standard(s)	• ASTM E119, CAN/ULC S101, NFPA 251, UL 263 • Testing procedures similar with subtle differences in loading and set-up • Need to understand client's market
Requirement	• Assigned by local building officials based on occupancy and the Code • 45 min, 1 hr, 2 hr, 3 hr Fire Resistance Ratings (load and non-load bearing) • Assymetrical walls are tested on both sides • Must pass Hose Stream test
Equipment	• Full scale Furnace, 10' x 10' (100 sq ft) • Horizontal Furnace, 12' x 15' (180 sq ft) • Load bearing frames

Fire Testing – Wall Assemblies Cont'd

Fire Testing – Wall Assemblies Cont'd

video clip…

NFPA 286 – Room Corner Burn

(EPS foam flash-over)

Questions / Open Forum