Codes and Fenestration:
Emerging Thermal Codes Changes

Mike Fischer – WDMA
NWDA January 2008
“Predicting the future is dangerous. Not preparing for it is deadly…”

Chris Mathis
They’re Heeeeeeeere....
State of the Arena

- ICC 2006 Codes Adopted
- Comprehensive Fenestration Standards: Windows, Skylights, and Entry Doors
- Certification and Labeling
- ICC 2009 I-Codes on the way!
Water...
Earthquake...
Other Performance Issues

- Accessibility
- Life Safety
- Security
- Man-Made Disaster
Standards Development

- 101/I.S.2/A440
- NAHB GBS
- NFRC Certification Methods
- Standards & Code Correlation
Compliance Options

- Industry Certification
  - Hallmark Certification
  - FMA Keystone
  - AAMA Gold Label
  - NAMI
- Jurisdictional Product Approvals
- NFRC
- Energy Star
Installation Issues
Codes and Glazing-1

Codes are dynamic – always changing

- By place
  - Locally, regionally, nationwide
- By code
  - Structural, fire, energy, etc.
Codes and Glazing - 2

- Codes are dynamic – always changing
  - By reaction
    - Post-hurricane, post-earthquake, post-wildfire, post-flood, etc.
  - By building type
    - Residential, commercial, high-rise, hotels, etc.
  - By project type
    - New versus remodeling/retrofit
2006 IECC

- Window to Wall Ratio Consideration Removed
- Simplified Climate Zone Map: HDG Removed
- Consistent Requirements for Both New and Replacement Products
- Material Neutral Residential Requirements
<table>
<thead>
<tr>
<th>CLIMATE ZONE</th>
<th>FENESTRATION U-FACTOR</th>
<th>SKYLIGHT U-FACTOR</th>
<th>GLAZED FENESTRATION SHGC</th>
<th>CEILING R-VALUE</th>
<th>WOOD FRAME WALL R-VALUE</th>
<th>MASS WALL R-VALUE</th>
<th>FLOOR R-VALUE</th>
<th>BASEMENT WALL R-VALUE</th>
<th>SLAB R-VALUE &amp; DEPTH</th>
<th>CRAWL SPACE WALL R-VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.20</td>
<td>0.75</td>
<td>0.40</td>
<td>30</td>
<td>13</td>
<td>3</td>
<td>13</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>0.75</td>
<td>0.75</td>
<td>0.40</td>
<td>30</td>
<td>13</td>
<td>4</td>
<td>13</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>0.65</td>
<td>0.65</td>
<td>0.40&lt;sup&gt;g&lt;/sup&gt;</td>
<td>30</td>
<td>13</td>
<td>5</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>5 / 13</td>
</tr>
<tr>
<td>4 except Marine</td>
<td>0.40</td>
<td>0.60</td>
<td>NR</td>
<td>38</td>
<td>13</td>
<td>5</td>
<td>19</td>
<td>10 / 13</td>
<td>10, 2 ft</td>
<td>10 / 13</td>
</tr>
<tr>
<td>5 and Marine 4</td>
<td>0.35</td>
<td>0.60</td>
<td>NR</td>
<td>38</td>
<td>19 or 13+5&lt;sup&gt;g&lt;/sup&gt;</td>
<td>13</td>
<td>30&lt;sup&gt;f&lt;/sup&gt;</td>
<td>10 / 13</td>
<td>10, 2 ft</td>
<td>10 / 13</td>
</tr>
<tr>
<td>6</td>
<td>0.35</td>
<td>0.60</td>
<td>NR</td>
<td>49</td>
<td>19 or 13+5&lt;sup&gt;g&lt;/sup&gt;</td>
<td>15</td>
<td>30&lt;sup&gt;f&lt;/sup&gt;</td>
<td>10 / 13</td>
<td>10, 4 ft</td>
<td>10 / 13</td>
</tr>
<tr>
<td>7 and 8</td>
<td>0.35</td>
<td>0.60</td>
<td>NR</td>
<td>49</td>
<td>21</td>
<td>19</td>
<td>30&lt;sup&gt;f&lt;/sup&gt;</td>
<td>10 / 13</td>
<td>10, 4 ft</td>
<td>10 / 13</td>
</tr>
</tbody>
</table>

For SI: 1 foot = 304.8 mm.

a. R-values are minimums. U-factors and SHGC are maximums. R-19 shall be permitted to be compressed into a 2 × 6 cavity.

b. The fenestration U-factor column excludes skylights. The SHGC column applies to all glazed fenestration.

c. The first R-value applies to continuous insulation, the second to framing cavity insulation; either insulation meets the requirement.

d. R-5 shall be added to the required slab edge R-values for heated slabs.

e. There are no SHGC requirements in the Marine zone.

f. Or insulation sufficient to fill the framing cavity, R-19 minimum.

g. “13+5” means R-13 cavity insulation plus R-5 insulated sheathing. If structural sheathing covers 25 percent or less of the exterior, insulating sheathing is not required where structural sheathing is used. If structural sheathing covers more than 25 percent of exterior, structural sheathing shall be supplemented with insulated sheathing of at least R-2.
Upcoming Issues: 2009 IECC

- Material Neutrality
- Continued Pressure for Trade-Offs
- Increased Stringency
- Additional Envelope Requirements:
  - Moisture Control
  - Cool Roofing (Reflectivity)
“Let’s Look Into The Future…”
Energy Code Influences

- Supply and demand of petroleum products
  - Front page, every day
  - Today’s costs and tomorrow’s projections
- Economic factors
  - Inflation rate, energy escalation rates, cost of money, etc.
- Regulation of petroleum-based products
  - Embodied energy, durability, recyclability, etc.
- Peak power concerns and generation capacity constraints
- “Green” market forces
Other Code Influences

- Improved fire safety
- Improved wind resistance
- Natural disaster reaction
- Increased building remodeling and re-use
  - Urban land availability issues
Regulatory Influences

- Who’s in power (federal, state)
  - i.e. “Current Policy Directions”
- DOE influence on national model codes
  - Translation into influence on state and local codes (Example: Michigan Energy Code)
- Other federal agencies (EPA, HUD, GSA)
- States taking the lead in some action areas
  - Example: California Title 24; Florida
“People” Code Influences

- Aging population issues in building standards and planning
  - Health issues (accessibility, IAQ, energy)
  - Fixed income issues (affordability, durability, etc.)
  - Re-combined families/Aging in place
- Work at home issues
  - Accessibility, daytime power usage, thermal comfort, lighting and glare, etc.
Near Term vs. Long Term

- **Near Term Influences**
  - Water Performance/Installation
  - Structural Performance (+/- pressures)
  - Energy Performance/Thermal Comfort
  - Green Building (embodied energy)

- **Longer Term Influences**
  - Warranty and Durability Standards
  - Product Liability- Construction Defects
  - Recycling/disassembly/reclamation issues
The Crystal Ball

Where’s the money?

What should I do to prepare for these energy-related market forces?
Dangerous Predictions #1

- The days of cheap gas and oil are over
  - Even if the price comes down, the shock to the economy and building industry will be felt for years to come.
  - Utilities will continue to buy natural gas for peak electrical generation
  - Natural gas for heating will get very expensive
  - Electricity, especially peak power for air conditioning, will get even more expensive
Dangerous Predictions #2

- States will be reacting faster than the federal government to respond to these energy pressures
  - Model energy codes will look better and better to states (No significant development costs, just training and enforcement costs)
  - Certification of compliance will become even more important
Dangerous Prediction #3

- The poor will be hurt the most by these energy pressures
  - There will (probably) be increased pressure to dramatically improve the energy performance of HUD housing

- Repeat: The Poor Will Be Hurt The Most.
Dangerous Prediction #4

- The building industry will be slow to respond to these inflationary pressures as well as these energy pressures.

- The public will be looking to the energy code to provide some safety/security against these pressures.
Safe Prediction #1

- The energy code will continue to deliver the "least efficient building allowed by law..."
Safe Prediction #2

- Private, state and federal programs will continue to emerge that seek to differentiate “efficient buildings” from “code compliant ones”
  - Energy Star – the bar will be raised - the Performance Arms Race
  - Building America – the bar will be raised
  - LEED – the bar will be raised
Try predicting your own future:

What am I going to do to be ready for these emerging market forces?”