The Benefits of NFRC Labels for The Energy Code
Hello!

I am Jim Meyers

with the Southwest Energy Efficiency Project
SWEEP is one of 6 Regional Efficiency Organizations

SWEEP promotes greater energy efficiency through the economies of AZ, CO, NM, NV, UT & WY

Founded – 2001

Program support for buildings, transportation, industrial and utilities
How NFRC Ratings Support Energy Codes in the Southwest

Importance of NFRC rating labels
Buildings Energy Use: 40% of U.S. total
Buildings Electricity Use: 75% of U.S. total
U.S. Building Energy Bill: $380 billion per year

Transportation: 27 quads
Commercial: 18 quads
Residential: 21 quads
Industrial: 31 quads
“What are the three most important rules of the chemist?"

"Label clearly. Measure twice. Eat elsewhere."

Patrick Rothfuss, The Name of the Wind
Labels Support the Energy Code and Building Compliance

→ Provide standard for reference
→ Support climatic environment for buildings
→ Respected authority
→ Provides direction to building industry stakeholders
Part of the system
Fuel Economy and Environment

Fuel Economy

27 MPG
Small SUVs cars range from 16 to 31 MPG. The best vehicle rates 119 MPGe.

24 32
combined city/hwy
city highway

3.7 gallons per 100 miles

You save
$1,250
in fuel costs over 5 years compared to the average new vehicle.

Annual fuel cost
$1,950

Fuel Economy & Greenhouse Gas Rating
This vehicle emits 328 grams CO₂ per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also creates emissions; learn more at fueleconomy.gov.

Greenhouse Gas Rating
(10 is best)

7

Smog Rating
(10 is best)

6

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 24 MPG and costs $1,000 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at $3.50 per gallon. MPGe is miles per gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fueleconomy.gov
Calculate personalized estimates and compare vehicles
2018 IECC

NFRC ratings and the code
IECC sections with NFRC

→ R303 Identification
→ NFRC 100, NFRC 200
→ Default tables if no labels
→ R402 Building Thermal Envelope Tables
→ R402 Fenestration Requirements
→ R402.4 Air Leakage Fenestration NFRC 400
→ R402.5 Maximum Fenestration Requirements
→ Air barrier and Fenestration Installation
Changes to the 2018 IECC-Res

→ Lowered the U-factors for fenestration in Climate Zones 3-8
→ Not directly tied to fenestration
  → New air leakage test standard
  → ERI path accounts for renewable generation
  → ICC 400 Standard allowed for log homes

<table>
<thead>
<tr>
<th>CLIMATE ZONE</th>
<th>FENESTRATION U-FACTOR b</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NR</td>
</tr>
<tr>
<td>2</td>
<td>0.40</td>
</tr>
<tr>
<td>3</td>
<td>0.360.32</td>
</tr>
<tr>
<td>4 except Marine</td>
<td>0.360.32</td>
</tr>
<tr>
<td>5 and Marine 4</td>
<td>0.320.30</td>
</tr>
<tr>
<td>6</td>
<td>0.320.30</td>
</tr>
<tr>
<td>7 and 8</td>
<td>0.320.30</td>
</tr>
</tbody>
</table>
Trends

NFRC ratings and the code
Building Trends

→ Carbon Reduction
→ Strategic Electrification
→ Stretch codes
→ Net Zero, ready
→ California
→ EVs
→ ESS
→ Leased components
Building Trends

→ Reductions to carbon
→ Strategic Electrification
→ Stretch codes
→ Drive to zero
Studies and Research

NFRC ratings and the code
Research and Studies
Window U-Factor

The Alabama Residential Energy Field Study
Window SHGC

- Texas
- Pennsylvania
- North Carolina
- Alabama
- Maryland
- Kentucky

Climate Zone
- 2
- 3
- 4
- 5

U.S. Department of Energy
Energy Efficiency & Renewable Energy
Building Trends

Drive to zero
Reductions to carbon
Strategic Electrification
Stretch codes
California
EVs
ESS
Leased components
Coming to 2021 IECC?

Window U-Factor
All Homes

U-.32 or lower: 53%
U-.30 or lower: 31%
U-.28 or lower: 3%

# of Homes
0 500 1000 1500 2000 2500 3000 3500
.22 or lower 0.24 0.26 0.28 0.3 0.32 0.34 0.36 0.38 0.4 .41 or higher

U-Factor

MEEA
RESNET
RESIDENTIAL ENERGY SERVICES NETWORK
20 YEARS OF SUCCESS Setting the Standards for Quality 1996 - 2016
0.33

0.23

2013, 2014, 2015, 2016 (1)

(1) RESNET Registry Data
Line up with the 2018 IECC

2013
U – 0.33
SHGC-0.23

2014
U – 0.33
SHGC-0.23

2018 IECC
U – 0.32
SHGC-0.25/NR

2015
U – 0.33
SHGC-0.23

2016
U – 0.33
SHGC-0.23
State and Local

NFRC how to participate
How you can support local code update efforts

→ Respected authority
→ Research, studies, trends
→ Building industry
→ Code change proposals
→ Committee participation
→ Key contacts
Building codes adopted at State or Local level

- Majority of codes adopted locally
- Level of knowledge
- Who is the Respected Authority
- Who is participating
Building codes adopted at State or Local level

Changes in codes and trends impact local changes

<table>
<thead>
<tr>
<th>CLIMATE ZONE</th>
<th>ENERGY RATING INDEX</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>57</td>
</tr>
<tr>
<td>2</td>
<td>57</td>
</tr>
<tr>
<td>3</td>
<td>57</td>
</tr>
<tr>
<td>4</td>
<td>62</td>
</tr>
<tr>
<td>5</td>
<td>61</td>
</tr>
<tr>
<td>6</td>
<td>61</td>
</tr>
<tr>
<td>7</td>
<td>58</td>
</tr>
<tr>
<td>8</td>
<td>58</td>
</tr>
</tbody>
</table>

a. Where on-site renewable energy is included for compliance using the ERI analysis of Section R406.4, the building shall meet the mandatory requirements of Section R406.2, and the building thermal envelope shall be greater than or equal to the levels of efficiency and SHGC in Table R402.1.2 or Table R402.1.4 of the 2015 International Energy Conservation Code.
2021 IECC Development

NFRC how to participate
### 2018/2019 ICC Code Development Schedule

#### (February 10, 2017)

<table>
<thead>
<tr>
<th>STEP IN CODE DEVELOPMENT CYCLE</th>
<th>2018 EDITION OF I-CODES PUBLISHED</th>
<th>2019 – Group B Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fall/2017 (except 2018 IgC, see Group B Codes on page 2)</td>
<td>Admin, IBC-S, IEBC, IECC-C, IECC-R/IRC-E, IgCC (Ch. 1), IRC-B</td>
</tr>
<tr>
<td>DEADLINE for cdAPCESS ONLINE RECEIPT OF CODE CHANGE PROPOSALS</td>
<td>January 8, 2018</td>
<td>January 7, 2019</td>
</tr>
<tr>
<td>WEB POSTING OF “PROPOSED CHANGES TO THE I-CODES”</td>
<td>February 28, 2018&lt;sup&gt;*&lt;/sup&gt;</td>
<td>March 4, 2019&lt;sup&gt;*&lt;/sup&gt;</td>
</tr>
<tr>
<td>COMMITTEE ACTION HEARING (CAH)</td>
<td>April 15 – 25, 2018&lt;br&gt;Greater Columbus Convention Center&lt;br&gt;Columbus, OH</td>
<td>April 28 – May 8, 2019&lt;br&gt;Albuquerque Convention Center&lt;br&gt;Albuquerque, NM</td>
</tr>
<tr>
<td>ONLINE CALL ASSEMBLY FLOOR</td>
<td>Starts approx. two weeks after last day</td>
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</tr>
</tbody>
</table>
COMPANION ACTION HEARINGS
At the CAH, code development committees approve, approve with modifications or disapprove each code change proposal.

Any participants may challenge the committee actions. ICC members vote on these challenges online. Approved challenges result in an automatic public comment to be considered at the PCH.

PUBLIC COMMENT SUBMISSION AND REVIEW
Anyone can submit public comments via cdpACCESS™ on the results of the CAH.

PUBLIC COMMENT HEARINGS
At the PCH, eligible voters discuss and vote on code change proposals.

Eligible voters work for government agencies protecting the public’s health and safety and have no financial stake in the outcome.
ICC Code Development Process

ONLINE GOVERNMENTAL CONSENSUS VOTE
Following the PCH, eligible voters vote online. The final vote count combines the in-person PCH and online votes. The Validation Committee reviews and the ICC Board confirms the final results.

NEW EDITION PUBLISHED
An updated edition of the International Codes is published every three years.
## Example Code Change Proposal

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>AIR BARRIER AND INSULATION INSTALLATION</th>
<th>INSULATION INSTALLATION CRITERIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>General requirements</td>
<td>A continuous air barrier shall be installed in the building envelope. The exterior thermal envelope contains a continuous air barrier. Breaks or joints in the air barrier shall be sealed.</td>
<td>Air-permeable insulation shall not be used as a sealing material.</td>
</tr>
<tr>
<td>Ceiling/attic</td>
<td>The air barrier in any dropped ceiling/soffit shall be aligned with the insulation and any gaps in the air barrier shall be sealed. Access openings, drop down stair or knee wall doors to unconditioned attic spaces shall be sealed.</td>
<td>The insulation in any dropped ceiling/soffit shall be aligned with the air barrier.</td>
</tr>
<tr>
<td>Walls</td>
<td>The junction of the foundation and sill plate shall be sealed. The junction of the top plate and the top of exterior walls shall be sealed. Knee walls shall be sealed.</td>
<td>Cavities within corners and headers of frame walls shall be insulated by completely filling the cavity with a material having a thermal resistance of R-3 per inch minimum. Exterior thermal envelope insulation for framed walls shall be installed in substantial contact and continuous alignment with the air barrier.</td>
</tr>
<tr>
<td>Windows, skylights and doors</td>
<td>The space between window/door jams and framing, and skylights and framing shall be sealed.</td>
<td></td>
</tr>
<tr>
<td>Rim joists</td>
<td>Rim joists shall include the air barrier.</td>
<td>Rim joists shall be insulated.</td>
</tr>
<tr>
<td>Floors (including above garage and)</td>
<td>The air barrier shall be installed at any exposed edge.</td>
<td>Floor framing cavity insulation shall be installed to maintain permanent contact with the underside of subfloor decking, or floor framing cavity insulation shall be permitted to be in contact with.</td>
</tr>
</tbody>
</table>
Example Code Change Proposal

**RE68-16**

**Table R402.4.1.1 (IRC Table N1102.4.1.1)**

**Proponent:** Shaunna Mozingo, representing Colorado Chapter of ICC Energy Code Development Committee
(smazingo@coloradoode.net)

**2015 International Energy Conservation Code**

Revise as follows:

<table>
<thead>
<tr>
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<td>Air-permeable insulation shall not be used as a sealing material.</td>
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<td></td>
<td></td>
<td>Air-permeable insulation is inside of an air barrier.</td>
</tr>
<tr>
<td>Ceiling/attic</td>
<td>The air barrier in any dropped ceiling/soffit shall be aligned with the insulation and any gaps in the air barrier shall be sealed. Access openings, drop down stairs or knee wall doors.</td>
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Example Code Change Proposal
RE77-16

R402.2.11 (IRC N1102.2.11), Table R402.4.1.1 (IRC Table N1102.4.1.1)

Proponent: Robby Schwarz, representing EnergyLogic, Inc. (roby@nrlogi.com)

2015 International Energy Conservation Code
Delete without substitution:

R402.2.11 (N1102.2.11) Crawl space walls. As an alternative to insulating floors over crawl spaces, crawl space walls shall be permitted to be insulated when the crawl space is not vented to the outside. Crawl space wall insulation shall be permanently fastened to the wall and extend downward from the floor to the finished grade level and then vertically and/or horizontally for at least an additional 24 inches (610 mm). Exposed earth in unvented crawl space foundations shall be covered with a continuous Class I vapor retarder in accordance with the International Building Code or International Residential Code, as applicable. All joints of the vapor retarder shall overlap by 6 inches (153 mm) and be sealed or taped. The edges of the vapor retarder shall extend not less than 6 inches (153 mm) up the stem wall and shall be attached to the stem wall.

Revise as follows:

| TABLE R402.4.1.1 (N1102.4.1.1) |
| AIR BARRIER AND INSULATION INSTALLATION |
cdpACCESS

Online based tool built exclusively for ICC’s code development process. “cdp” is the abbreviation for “Code Development Process”. cdpACCESS was once only remote voting, but it has expanded to be much more than just remote voting.
cdpACCESS

ICC CODE DEVELOPMENT PROCESS
BY THE NUMBERS

2015-2017 CYCLE

3,318  CODE CHANGES
1,552  VOTERS
207,176 VOTES CAST
cdpACCESS Features

- Electronic code submittals
- Online collaboration
- Viewing and printing the monograph and Code Change Agendas
- Online submittal of floor modifications
- Online voting on assembly motions after the CAH
- View and print Report on Committee Action Hearing

- Online collaboration in support of public comment submittal
- Online public comment submittal
- View and print Public Comment Agenda (Final Action Agenda)
- Online vote on proposed code changes following Public Comment Hearings
Access to Free I-Codes

→ https://codes.iccsafe.org/public/
Thanks!

Any questions?

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→ @energymeyers (twitter)
→ 303-974-7243