Construction Institute

State of Connecticut
Office of Education Data Management

UNDERSTANDING RES*Check* / COM*Check*

DESIGN TRADES CONFERENCE

Gengras Center

University of Hartford

Don Vigneau, AIA - Presenter

IECC Compliance - Four Options

Prescriptive R-Value and U-Factor

R-values
Table R402.1.1

U-Factors
Table R402.1.3

"UA" Alternatives RES*Check* software

Total Building UA
R402.1.4

Simulated Performance (software)

Simulated Performance Alternative
R405

Hides the Math: UA=(UcAc)+(UsAs)+(UwAw)+(UgAg)+(UdAd)+(UbAb)+(UsAs)+.....
Ao

RES*CHECK* COM*CHECK*

WHAT CODE DO I USE?

USE THE LATEST VERSION

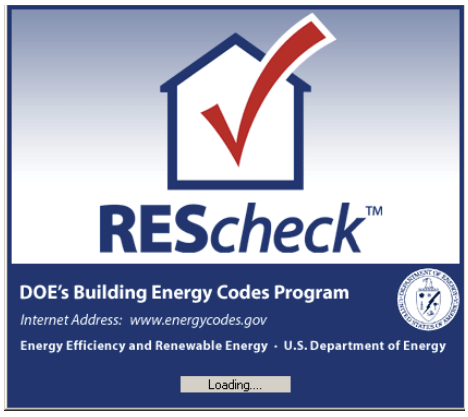
- **Version 4.5.0.5**
  www.energycodes.gov/rescheck
- **Version 3.9.3.2**
  www.energycodes.gov/comcheck

DOE SOFTWARE:
WHAT IS IT?
WHY SHOULD I USE IT?

WHY CONSIDER RES*Check* or COM*Check*?

- HAS ALL THE ESSENTIAL INFORMATION IN IECC
- Ease of use
- Simplifies takeoffs
- Keeps running scorecard
- Menus show alternatives
- ALLOWS TRADEOFFS
- COM*Check* includes ASHRAE 90.1 editions

RESCheck Version 4.5.0.5



www.energycodes.gov/rescheck

RES*Check*: WHAT'S IN IT?

COMPONENTS/SYSTEMS

- Building ceilings/walls/ floors/basements/slabs
- Doors and Glazing
- Skylights/crawl spaces
- HVAC equipment
- Service hot water*
- Inside/outside Lighting*
- Pools & Spas*

USEFUL FEATURES/TOOLS

- Building orientation
- Dropdown menu choices
- Mandatory requirements
- User-created Libraries
- Area calculator tool
- Shape calculator

- *(even without any conditioned spaces)

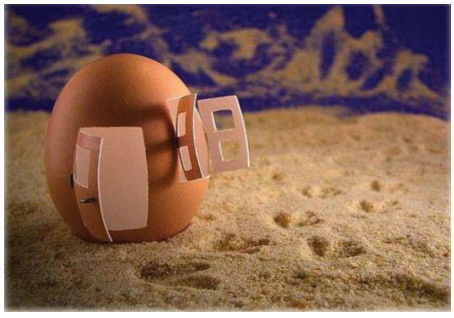
AND WHAT'S NOT…

- Sunrooms/greenhouses
- Farm buildings
- Buildings covered under the COM*Check* program
- Underslab insulation
- Exemptions/exceptions
  - One window/one door
  - Unlimited glazing area
  - Cathedral ceiling < 500sf
  - Floor cavity insulation
- Performance items R405
  - Air exchange rate
  - Distribution systems
  - Multiple thermostats

2012 ENVELOPE IMPROVEMENTS

PRESCRIPTIVE

- Higher insulation values
- Lower glazing/door factors



MANDATORY

- Reduced air leakage
  (& mandated testing)
- U-factor maximums
  - restored in IRC

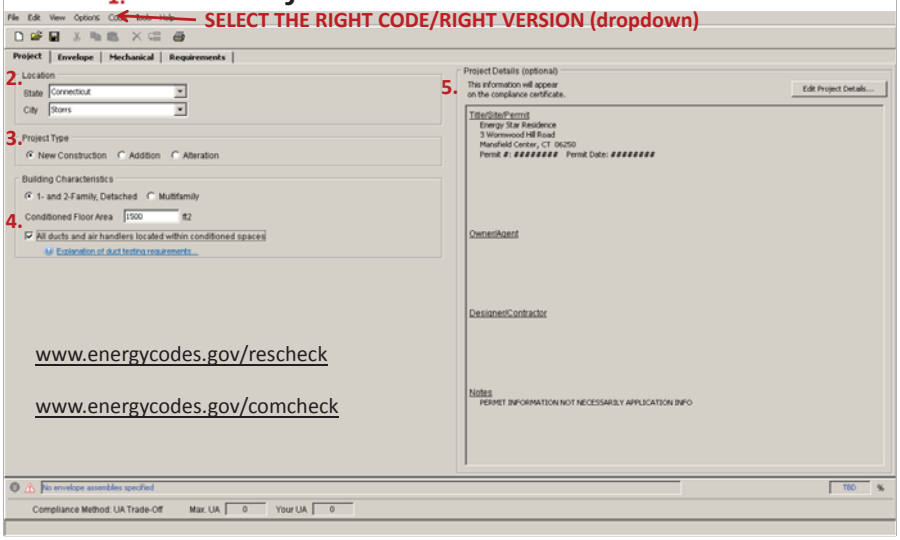
MANDATORY ITEMS

- Air leakage & testing
- Fireplace dampers
- Glazing performance
- HVAC controls/sizing
- Pool heaters/covers

Envelope Improvements Summary

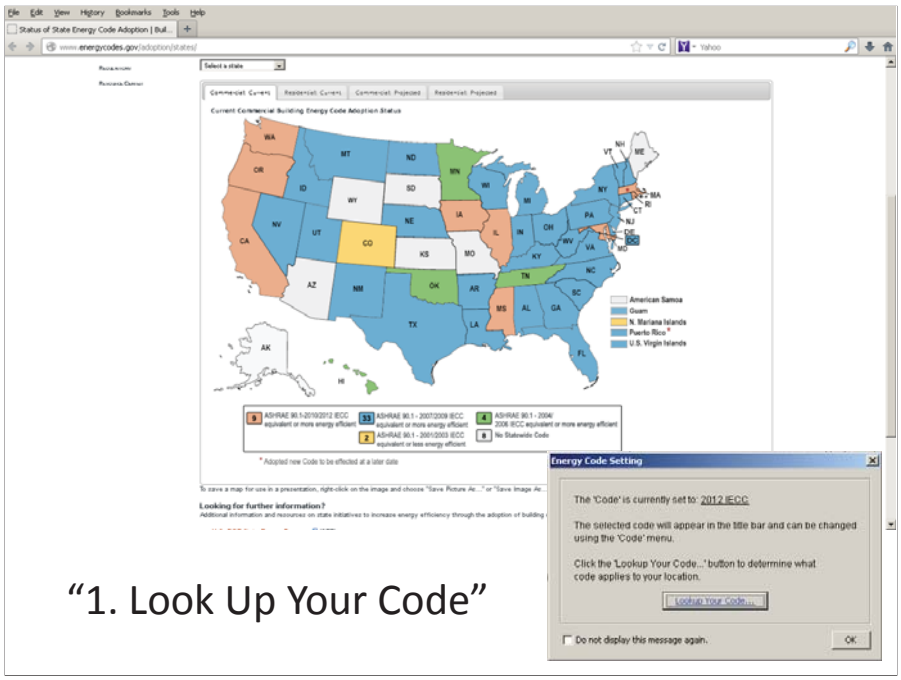
CHANGES	2009	2012	ZONE	COMMENTS
Main Envelope	**Table R402.1.1**		**Zone 5 - CT/MA/RI/Hudson Valley**	
- Glazing	0.35	**0.32**	4,5,6,7	**Table R 402.1.1**
SHGC	N/R	**0.40**	N/R	**“**
- Skylights	0.60	**0.55**	4,**5**,6,7	**“**
- Ceilings	R 38	**R 49**	4,**5**	**CT adds eave baffles R 402.2.3**
- Walls	R 20	R 20	5	**“ 13 + 5 option**
- Basmt/Crawl	R 10/13	**R 15/19**	**5**	**“ outside/inside numbers**
Sunrooms	**Sections R402.2.12/R402.3.5**			**(not in RESCheck)**
- Glazing	0.50	**0.45**	(all)	
- Skylights	0.75	**0.70**	(all)	
- Ceilings	R 24	R 24	5,6,7,8	**“ CT amends to R 19**
- Walls	R 13	R 13	(all)	**“ CT amends to R 11**

WHAT CODE DO I USE?
Project Screen - Details



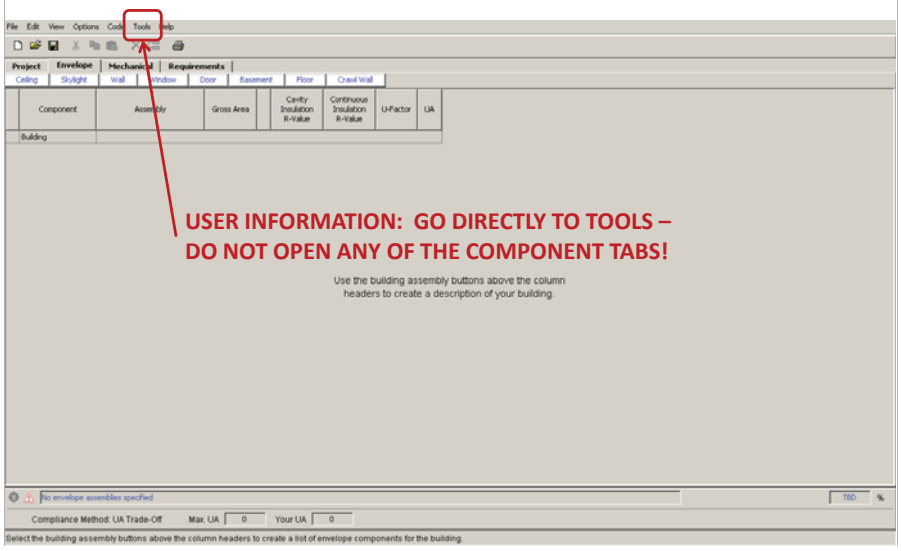
www.energycodes.gov/rescheck

www.energycodes.gov/comcheck

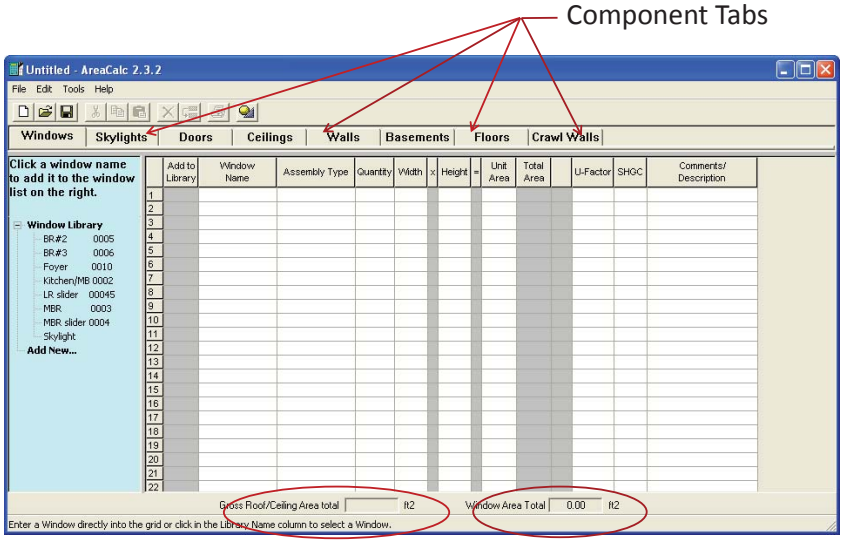


"1. Look Up Your Code"

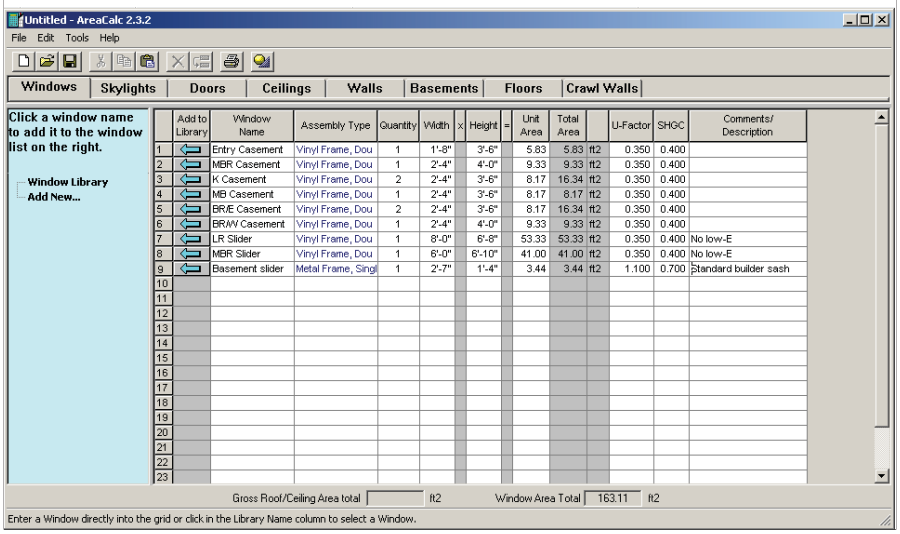
The Envelope Screen - Information



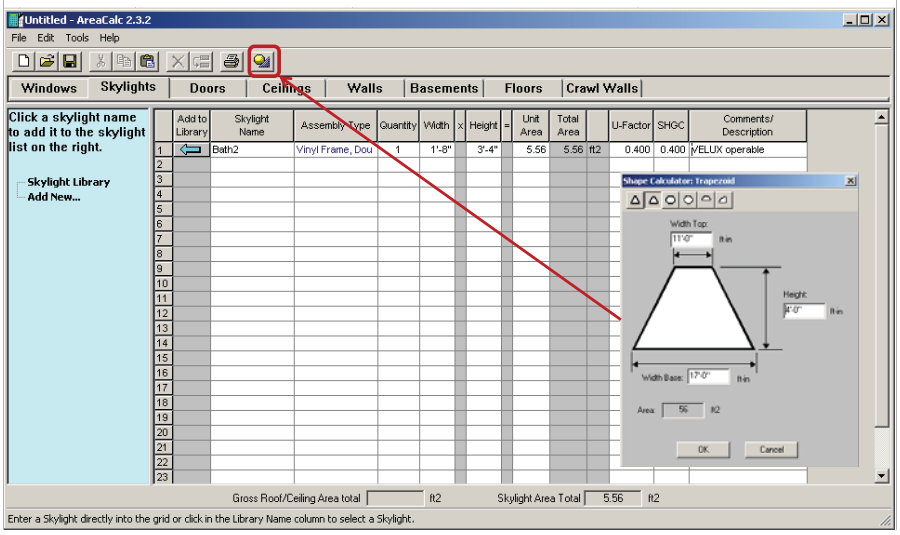
Tool Box: AREA CALC Take-Off



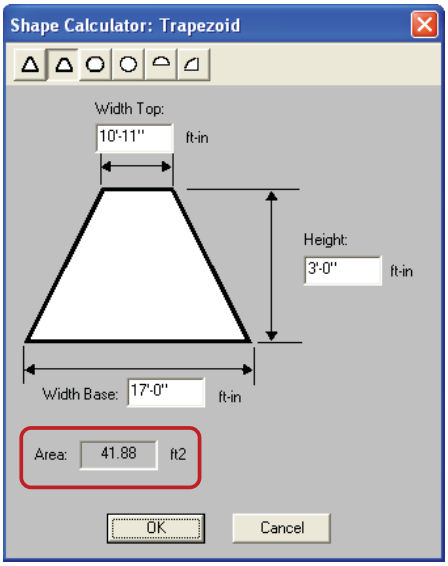
AREA CALC – Window Tab



SKIP THE MATH – Shape Calculator



THE SHAPE CALCULATOR TOOL



Calculates areas for common shapes of walls, fancy windows:

- **Click the cell where you need the info**
- **Enter the dimensions into the boxes**
- **Click OK to transfer to your component data**

AREA CALC - Doors Tab

Untitled - AreaCalc 2.3.2

File Edit Tools Help

Windows | Skylights | **Doors** | Ceilings | Walls | Basements | Floors | Crawl Walls

Click a door name to add it to the door list on the right.

Door Library
Add New...

	Add to Library	Door Name	Assembly Type	Quantity	Width	x	Height	=	Unit Area	Total Area		U-Factor	SHGC	Comments/ Description
1	⇦	Front Entry	Solid	1	3'-0"		6'-8"		20.00	20.00	ft2	0.350		Exterior insulated
2	⇦	Kitchen to Garage	Solid	1	2'-6"		6'-8"		16.67	16.67	ft2	0.350		Exterior insulated
3														
4														
5														
6														
7														
8														
9														
10														
11														
12														
13														
14														
15														
16														
17														
18														
19														
20														
21														
22														
23														

Gross Roof/Ceiling Area total ft2 Door Area Total 36.67 ft2

Enter a Door directly into the grid or click in the Library Name column to select a Door.

Table R402.1.1

TABLE R402.1.1
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT[a]

CLIMATE ZONE	FENESTRATION *U*-FACTOR[b]	SKYLIGHT[b] *U*-FACTOR	GLAZED FENESTRATION SHGC[b, e]	CEILING *R*-VALUE	WOOD FRAME WALL *R*-VALUE	MASS WALL *R*-VALUE[i]	FLOOR *R*-VALUE	BASEMENT[c] WALL *R*-VALUE	SLAB[d] *R*-VALUE & DEPTH	CRAWL SPACE[c] WALL *R*-VALUE
1	NR	0.75	0.25	30	13	3/4	13	0	0	0
2	0.40	0.65	0.25	38	13	4/6	13	0	0	0
3	0.35	0.55	0.25	38	20 or 13+5[h]	8/13	19	5/13[f]	0	5/13
4 except Marine	0.35	0.55	0.40	49	20 or 13+5[h]	8/13	19	10 /13	10, 2 ft	10/13
5 and Marine 4	0.32	0.55	NR	49	20 or 13+5[h]	13/17	30[g]	15/19	10, 2 ft	15/19
6	0.32	0.55	NR	49	20+5 or 13+10[h]	15/20	30[g]	15/19	10, 4 ft	15/19
7 and 8	0.32	0.55	NR	49	20+5 or 13+10[h]	19/21	38[g]	15/19	10, 4 ft	15/19

For SI: 1 foot = 304.8 mm.

a. *R*-values are minimums. *U*-factors and SHGC are maximums. When insulation is installed in a cavity which is less than the label or design thickness of the insulation, the installed *R*-value of the insulation shall not be less than the *R*-value specified in the table.

b. The fenestration *U*-factor column excludes skylights. The SHGC column applies to all glazed fenestration. Exception: Skylights may be excluded from glazed fenestration SHGC requirements in Climate Zones 1 through 3 where the SHGC for such skylights does not exceed 0.30.

c. "15/19" means R-15 continuous insulation on the interior or exterior of the home or R-19 cavity insulation at the interior of the basement wall. "15/19" shall be permitted to be met with R-13 cavity insulation on the interior of the basement wall plus R-5 continuous insulation on the interior or exterior of the home. "10/13" means R-10 continuous insulation on the interior or exterior of the home or R-13 cavity insulation at the interior of the basement wall.

d. R-5 shall be added to the required slab edge *R*-values for heated slabs. Insulation depth shall be the depth of the footing or 2 feet, whichever is less in Climate Zones 1 through 3 for heated slabs.

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

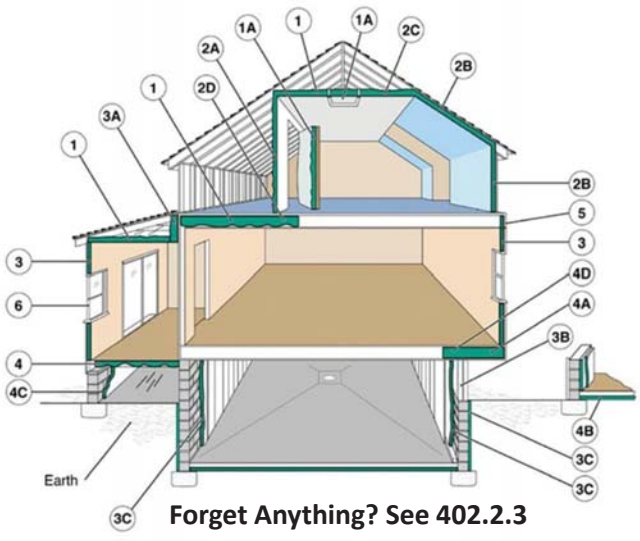
f. Basement wall insulation is not required in warm-humid locations as defined by Figure R301.1 and Table R301.1.

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

h. First value is cavity insulation, second is continuous insulation or insulated siding, so "13+5" means R-13 cavity insulation plus R-5 continuous insulation or insulated siding. If structural sheathing covers 40 percent or less of the exterior, continuous insulation *R*-value shall be permitted to be reduced by no more than R-3 in the locations where structural sheathing is used – to maintain a consistent total sheathing thickness.

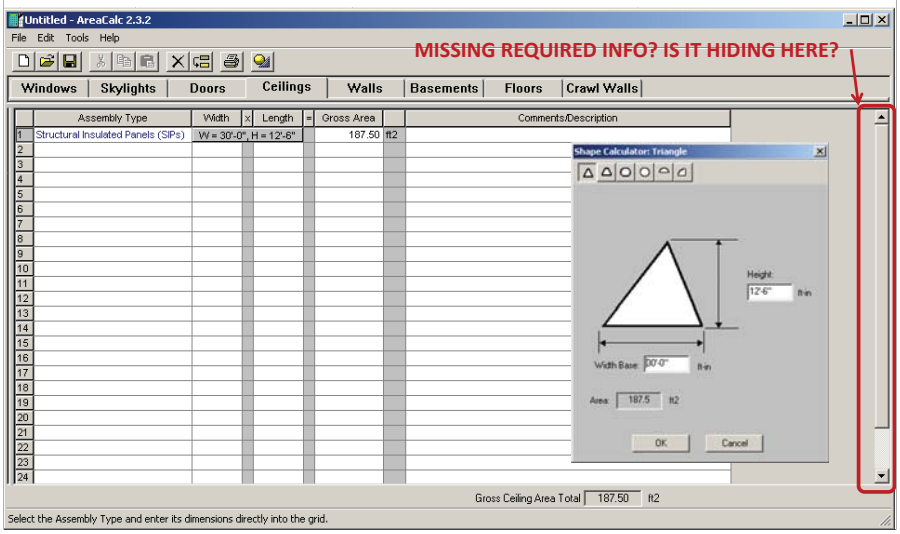
i. The second *R*-value applies when more than half the insulation is on the interior of the mass wall.

INSULATING THE ENVELOPE

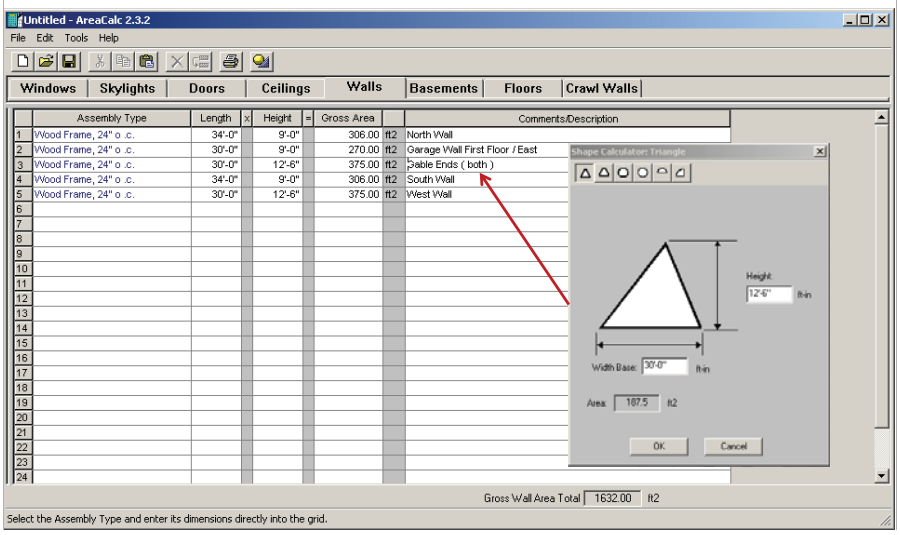


Forget Anything? See 402.2.3

AREA CALC – Ceiling Tab



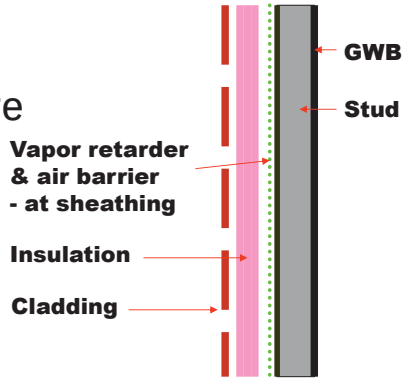
AREA CALC – Walls Tab



WHAT DOES A PERFECT WALL LOOK LIKE?

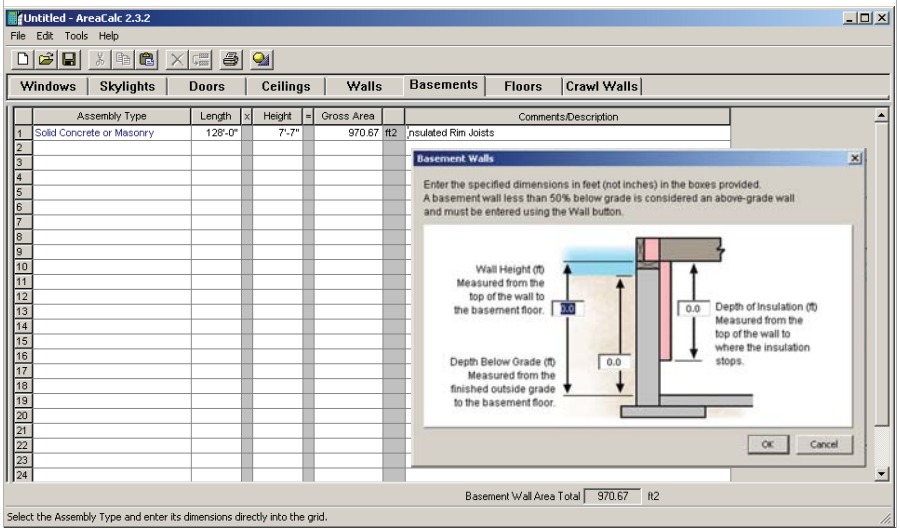
"OUT-SULATION"

- Insulates the structure
- Provides/protects:
  - Drainage plane
  - Air barrier
  - Vapor retarder



www.buildingscience.com

AREA CALC – Basements (Wall)



RES*Check* Doesn't do SUNROOMS

Less stringent insulation
R-value and glazing
U-factor requirements

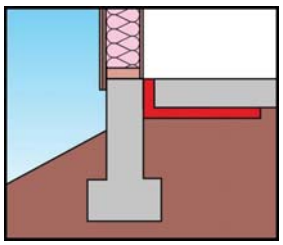
Sunroom definition:

- Glazing area >40% glazing of gross exterior wall and roof area
- Separate heating or cooling system or zone
- Must be thermally isolated (closeable doors or windows to the rest of the house)

THE DEVIL IS IN THE DETAILS

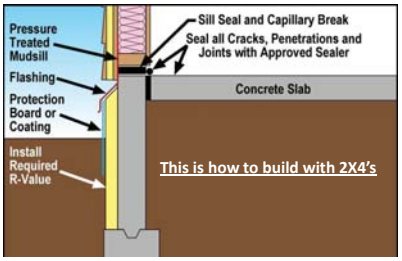
CURRENT METHOD

- requires air sealing & vapor retarder to be located on opposite faces of the wall

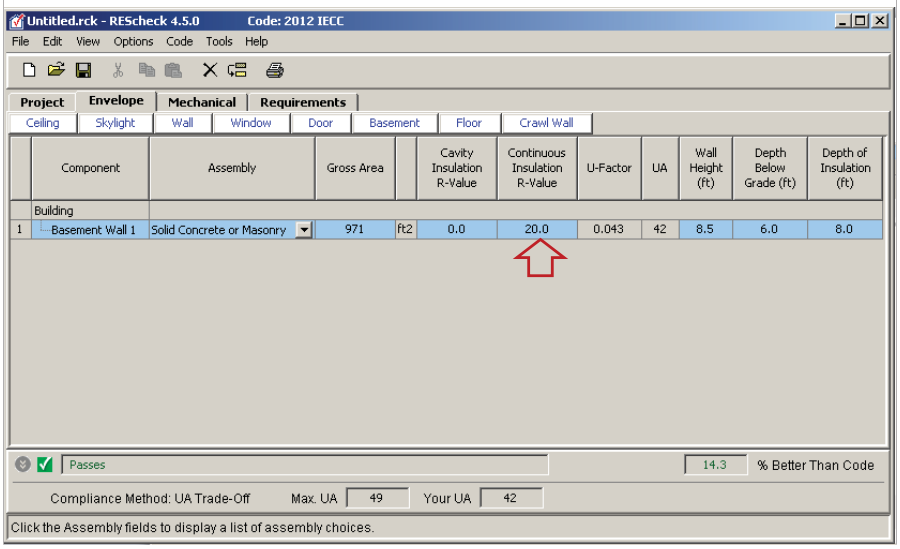


OPTIONAL METHOD

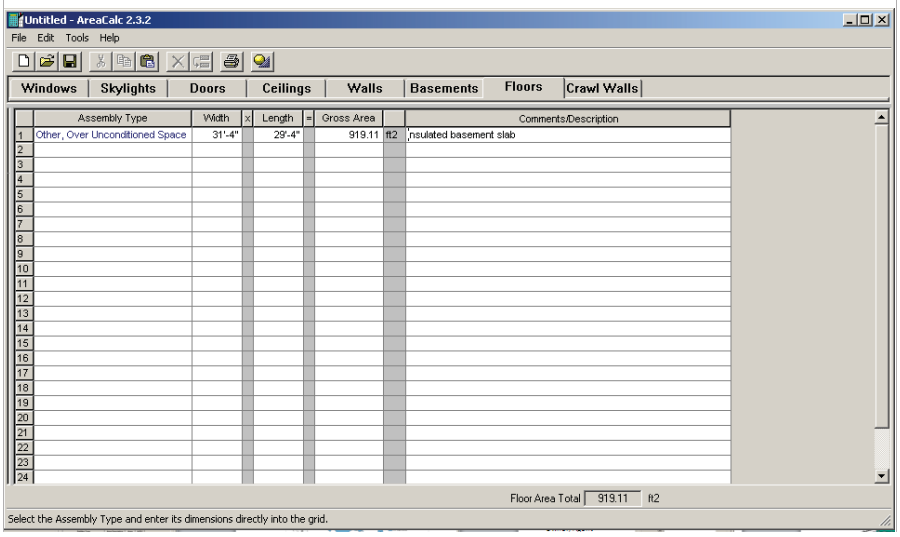
- Places air sealing & vapor retarder both at midpoint of the wall
  - Note: structure is INSIDE conditioned envelope



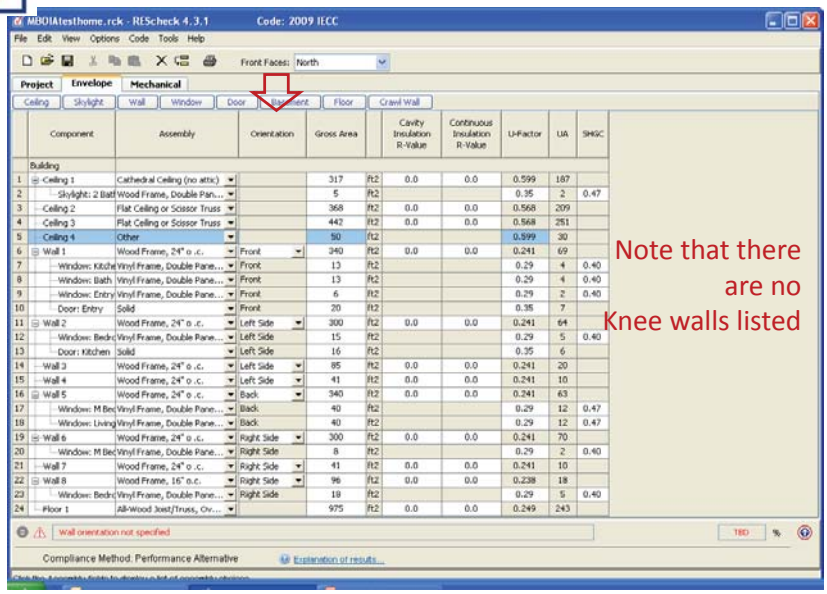
Basement Wall Tab



AREA CALC – Basement Floor



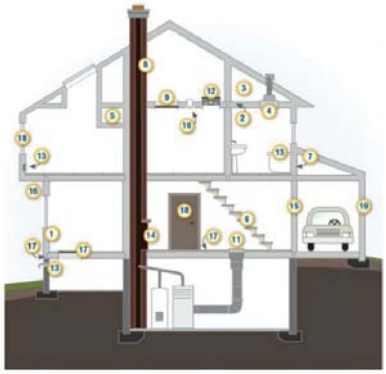
AREA CALC – Transfers to RES*Check*



Note that there are no Knee walls listed

MANDATORY REQUIREMENTS

Mandatory Requirements
AIR SEAL & TEST



VENTED ATTIC

- Conventional construction
- Typical Locations
- Lots of places to seal

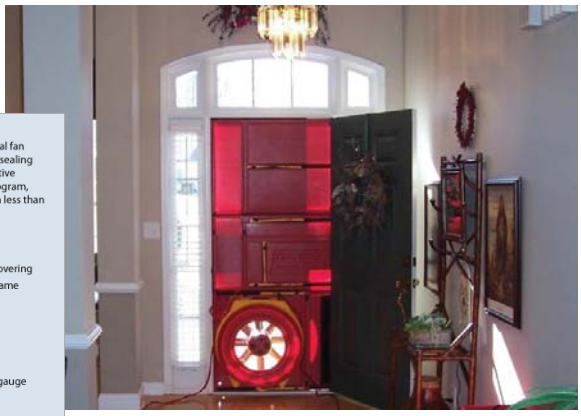
CONDITIONED ATTIC

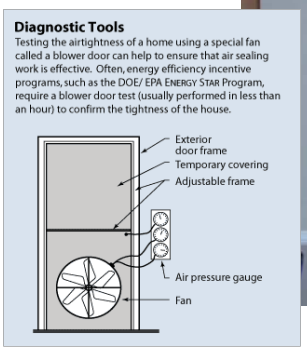
- Unconventional
- Reduce penetrations
- Less places to seal

Mandatory Requirements
WHOLE-HOUSE LEAKAGE TEST

Required:

- Zones 3-8





DESIGN LOADS/EQUIPMENT SIZING
403.6 503.2.1

ACCA Standards

- J - Load Calculations
- S - Equipment Selection
- D - Duct Design

- ASHRAE/ACCA 183

http://www.acca.org/store/product.php?pid=97

INDIVIDUAL LIGHTING OPTIONS

- 75% SOCKETS

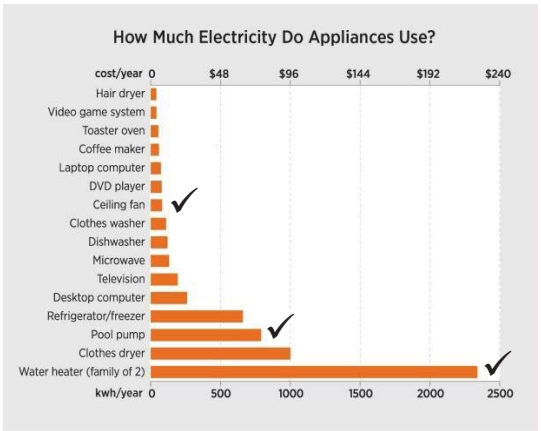
OR

- 75% FIXTURES

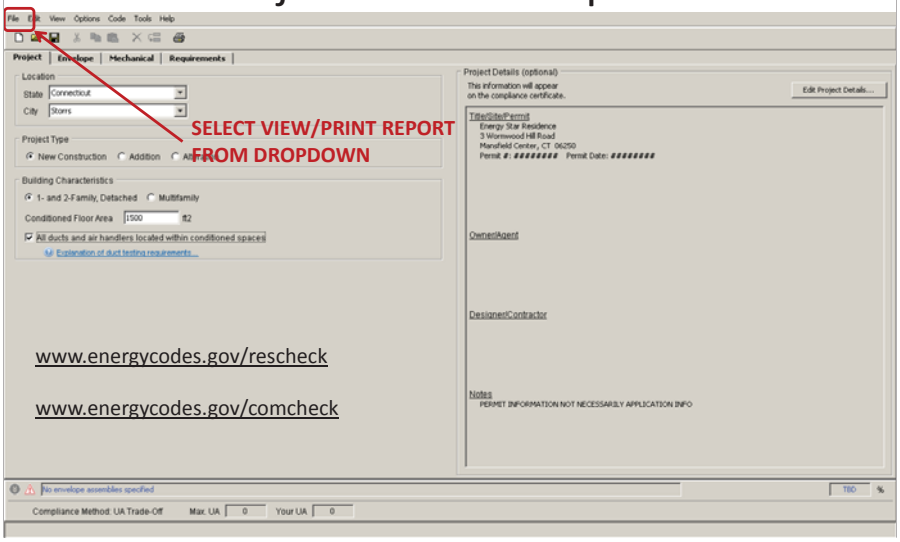
EXCEPTIONS: **Low-voltage lighting; no fuel gas pilots**

WHERE DO I FIND THESE IN RES*CHECK*?

- You don't find plug loads (not in the codes), just these 3
- Plug loads are only allowed in other programs with renewables, HVAC, lighting tradeoffs against envelope



WHAT'S NEXT?
Project Screen - Reports



SELECT VIEW/PRINT REPORT FROM DROPDOWN

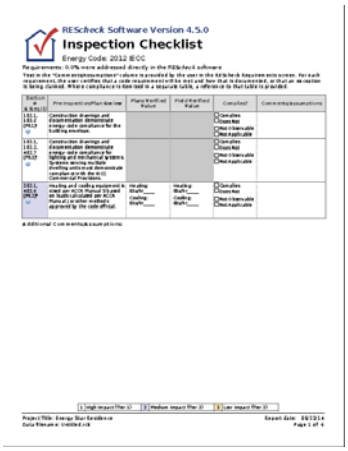
www.energycodes.gov/rescheck

www.energycodes.gov/comcheck

View Report – INSPECTION CHECKLIST

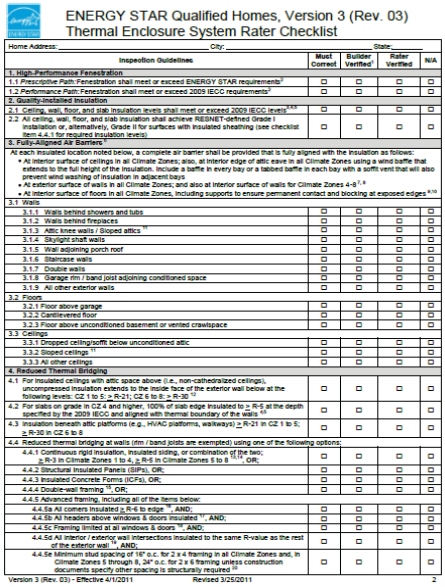
NEW FORMAT:

- Data Entry Selections
  - Entry Fields
- Mandatory Provisions
  - Gray; no info entry
- Checked Compliance
- Priority Scaled
  - High Impact
  - Medium Impact
  - Low Impact


REScheck Software Version 4.5.0
Inspection Checklist
Energy Code: 2012 IECC

TOOLS

- Another example of what's available for project checklists
- Energy Star lists are more detailed and comprehensive than RES*Check* program


ENERGY STAR Qualified Homes, Version 3 (Rev. 03)
Thermal Enclosure System Rater Checklist

Home Address: City: State:

Inspection Guidelines	Must Correct	Builder Verified	Rater Verified	N/A
1. High-Performance Fenestration				
1.1 Prescriptive Path: Fenestration shall meet or exceed ENERGY STAR requirements	☐	☐	☐	☐
1.2 Performance Path: Fenestration shall meet or exceed 2009 IECC requirements	☐	☐	☐	☐
2. Quality-Installed Insulation				
2.1 Ceiling, wall, floor, and slab insulation levels shall meet or exceed 2009 IECC levels	☐	☐	☐	☐
2.2 All ceiling, wall, floor, and slab insulation shall achieve RESNET-certified Grade I installation or, alternatively, Grade II for surfaces with insulated sheathing (see checklist item 4.4.1 for required insulation levels)	☐	☐	☐	☐
3. Fully-Aligned Air Barriers				
At each insulated location noted below, a complete air barrier shall be provided that is fully aligned with the insulation as follows: • At interior surface of ceilings in all Climate Zones; also, at interior edge of attic eave in all Climate Zones using a wind baffle that extends to the full height of the insulation. Include a baffle in every bay or a tabbed baffle in each bay with a soffit vent that will also prevent wind washing of insulation in adjacent bays • At exterior surface of walls in all Climate Zones; and also at interior surface of walls for Climate Zones 4-8 • At interior surface of floors in all Climate Zones, including supports to ensure permanent contact and blocking at exposed edges				
3.1 Walls				
3.1.1 Walls behind showers and tubs	☐	☐	☐	☐
3.1.2 Walls behind fireplaces	☐	☐	☐	☐
3.1.3 Attic knee walls / Sloped attics	☐	☐	☐	☐
3.1.4 Skylight shaft walls	☐	☐	☐	☐
3.1.5 Wall adjoining porch roof	☐	☐	☐	☐
3.1.6 Staircase walls	☐	☐	☐	☐
3.1.7 Double walls	☐	☐	☐	☐
3.1.8 Garage rim / band joist adjoining conditioned space	☐	☐	☐	☐
3.1.9 All other exterior walls	☐	☐	☐	☐
3.2 Floors				
3.2.1 Floor above garage	☐	☐	☐	☐
3.2.2 Cantilevered floor	☐	☐	☐	☐
3.2.3 Floor above unconditioned basement or vented crawlspace	☐	☐	☐	☐
3.3 Ceilings				
3.3.1 Dropped ceilings/soffit below unconditioned attic	☐	☐	☐	☐
3.3.2 Sloped ceilings	☐	☐	☐	☐
3.3.3 All other ceilings	☐	☐	☐	☐
4. Reduced Thermal Bridging				
4.1 For insulated ceilings with attic space above (i.e., non-cathedralized ceilings), uncompressed insulation extends to the inside face of the exterior wall below at the following levels: CZ 1 to 5: ≥ R-21; CZ 6 to 8: ≥ R-30	☐	☐	☐	☐
4.2 For slabs on grade in CZ 4 and higher, 100% of slab edge insulated to ≥ R-5 at the depth specified by the 2009 IECC and aligned with thermal boundary of the walls	☐	☐	☐	☐
4.3 Insulation beneath attic platforms (e.g., HVAC platforms, walkways) ≥ R-21 in CZ 1 to 5; ≥ R-30 in CZ 6 to 8	☐	☐	☐	☐
4.4 Reduced thermal bridging at walls (rim / band joists are exempted) using one of the following options:				
4.4.1 Continuous rigid insulation, insulated siding, or combination of the two; ≥ R-3 in Climate Zones 1 to 4, ≥ R-5 in Climate Zones 5 to 8, OR;	☐	☐	☐	☐
4.4.2 Structural Insulated Panels (SIPs), OR;	☐	☐	☐	☐
4.4.3 Insulated Concrete Forms (ICFs), OR;	☐	☐	☐	☐
4.4.4 Double-wall framing, OR;	☐	☐	☐	☐
4.4.5 Advanced framing, including all of the items below:				
4.4.5a All corners insulated ≥ R-5 to edge, AND;	☐	☐	☐	☐
4.4.5b All headers above windows & doors insulated, AND;	☐	☐	☐	☐
4.4.5c Framing limited at all windows & doors, AND;	☐	☐	☐	☐
4.4.5d All interior / exterior wall intersections insulated to the same R-value as the rest of the exterior wall, AND;	☐	☐	☐	☐
4.4.5e Minimum stud spacing of 16" o.c. for 2 x 4 framing in all Climate Zones and, in Climate Zones 5 through 8, 24" o.c. for 2 x 6 framing unless construction documents specify other spacing is structurally required	☐	☐	☐	☐

Version 3 (Rev. 03) - Effective 4/1/2011 Revised 3/25/2011 2

http://www.energystar.gov/ia/partners/bldrs_lenders_raters/downloads/InspectionChecklists.pdf

THE CERTIFICATE

2012 IECC Energy Efficiency Certificate

Insulation Rating	R-Value	
Wall	0.00	
Floor	20.00	
Ceiling / Roof	0.00	
Ductwork (unconditioned spaces):	____	
Glass & Door Rating	**U-Factor**	**SHGC**
Window		
Door		
Heating & Cooling Equipment	**Efficiency**	
Heating System: _____	____	
Cooling System: _____	____	
Water Heater: _____	____	

Name: _____ Date: _____

Comments

- Insulation values
- Door / window U-factors
- Equipment types/sizes

COMMERCIAL SOFTWARE
COM*Check*

COMCheck Version 3.9.3.2

www.energycodes.gov/comcheck

WHY USE COMCheck?

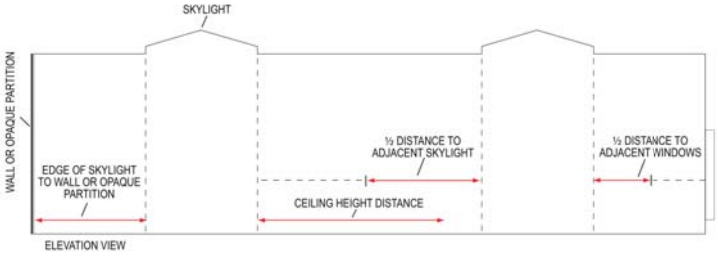
- 80% of commercial construction smaller than 20Ksf
- Small commercial has many similar systems and techniques

2012 COMMERCIAL CHANGES

- Vertical glazing now 30% except w/daylighting
- Sloped glazing 15%>30%
- Lighting Power reduced – many categories
- Revised lighting controls for better daylighting

2012 ENVELOPE CHANGES

- Glazing – 40% → 30%
- Exceptions:
  - Daylighting controls
  - 50% minimum floor area
  - Glazing VT ≥ 1.1 x SHGC
- Skylights ≥ 50% by use where ceiling > 15 ft:
  - 15 specific uses
- Controls under skylights /roof monitors CZ 1-5

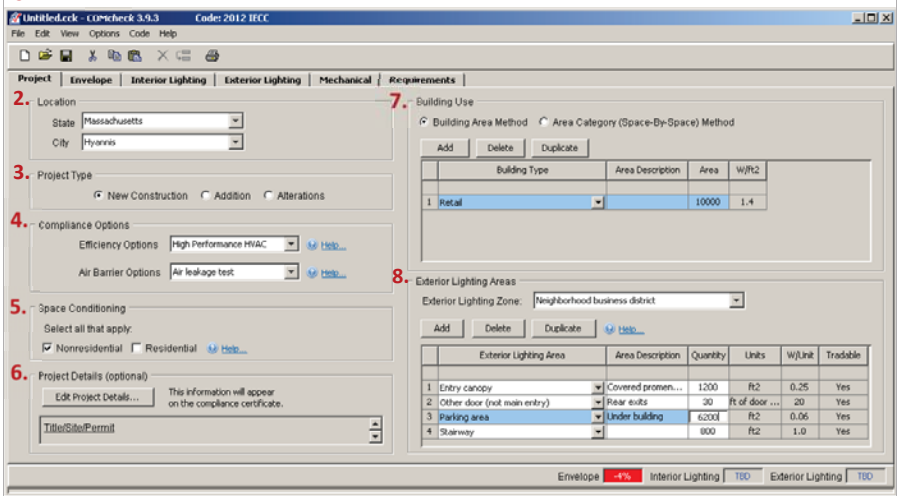


2012 ENVELOPE CHANGES

- Air barrier requirements for Climate Zones 4-8
  - Construction
  - Materials
  - Tested assemblies
  - Penetrations
  - Fenestration testing
  - Other openings
  - Intakes, exhausts, stairs and shafts
- Vestibules in Zones 3-8

The Project Screen - Details

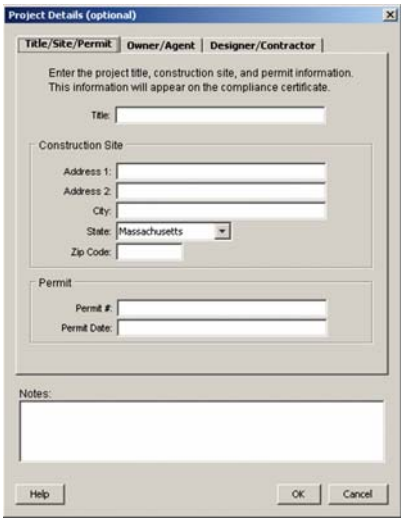
9. **1. GET THE CODE EDITION**



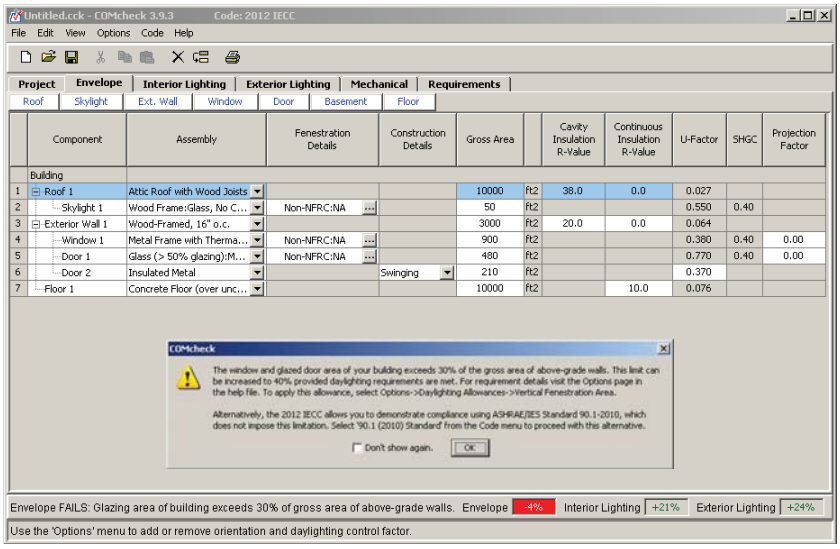
2. Get the Details

<u>User to fill out:</u>

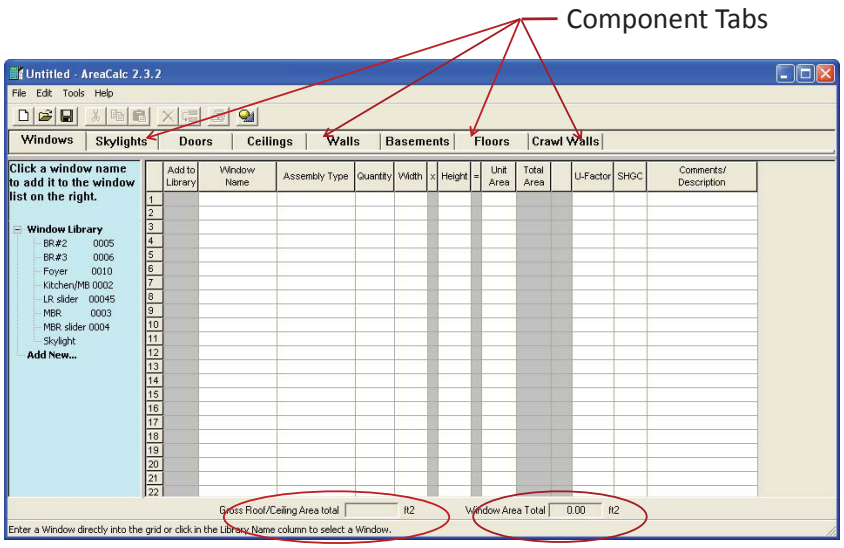
- Project title
- Address
- Owner/Agent
- Designer
- Contractor (if known)
- General description…



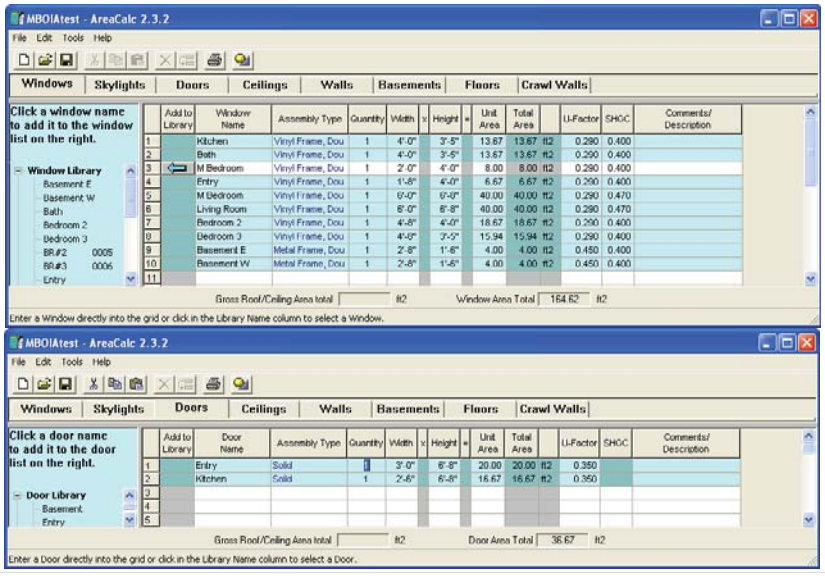
Envelope Compilation



Tool Box: AREA CALC Take-Off



AREA CALC – WINDOWS AND DOORS

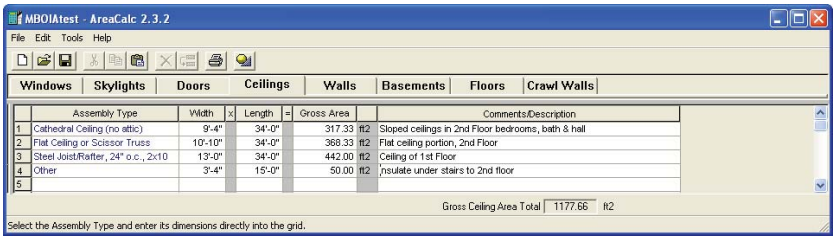


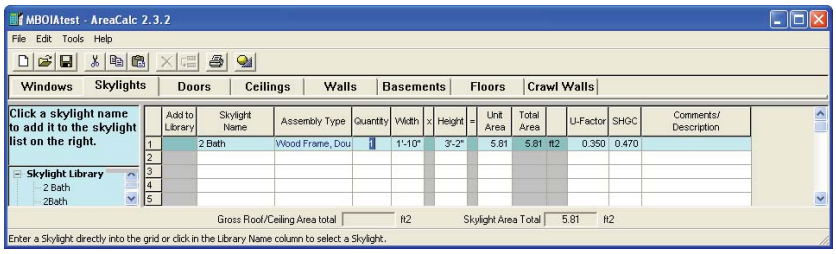
2012 - SIGNS OF CHANGE

NFRC LISTINGS

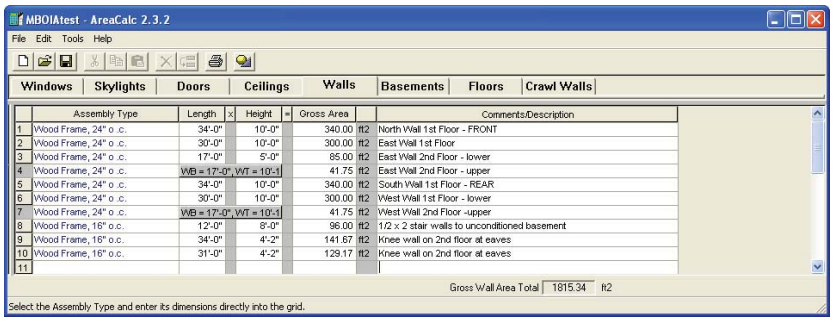
- U-factors
- Solar Heat Gain
  - PF Table C402.3.3.1*
- Visible transmittance*
- Dynamic Glazing

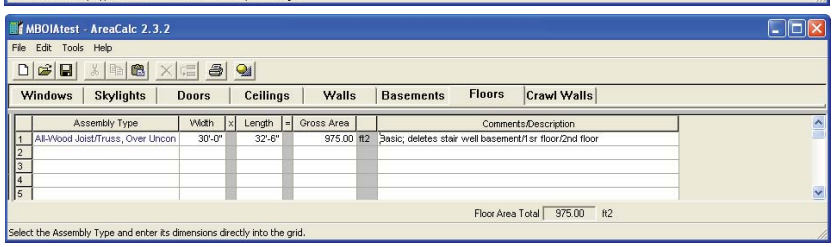
AREA CALC – CEILINGS & SKYLIGHTS





AREA CALC – WALLS AND FLOORS

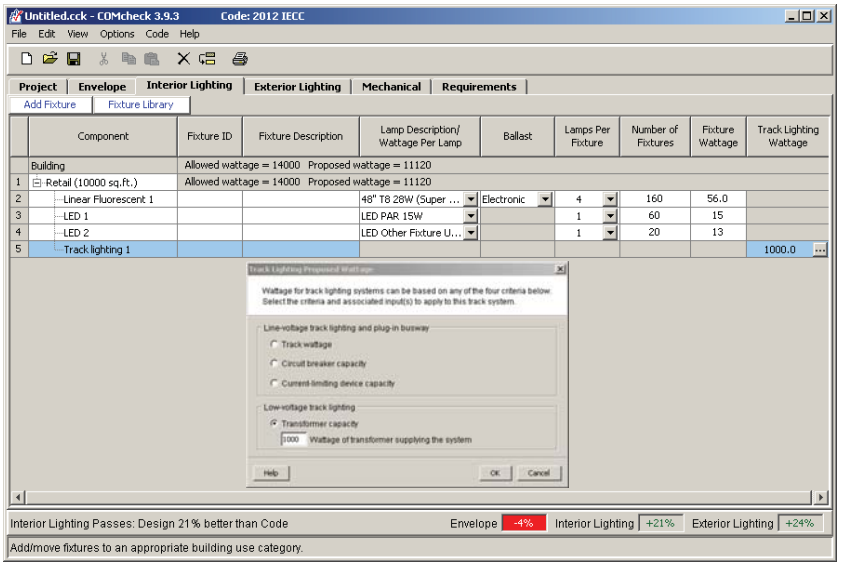




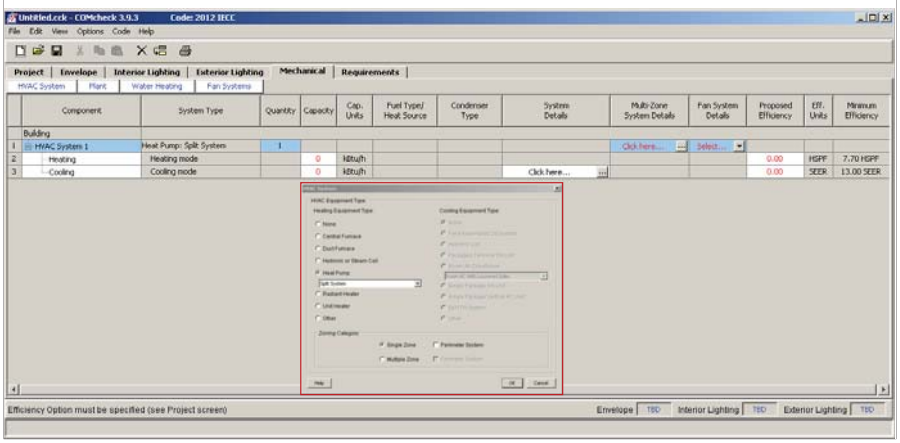
LIGHTING CHANGES
Control Strategies

- Occupancy sensors:
  - ≥ 300sf, plus
  - 8 specific areas
- Daylight zone control limitations/exceptions
- ILPA space-by-space option returns

Lighting Compilation



HVAC –THE MECHANICAL TABS
Multiple System Capabilities



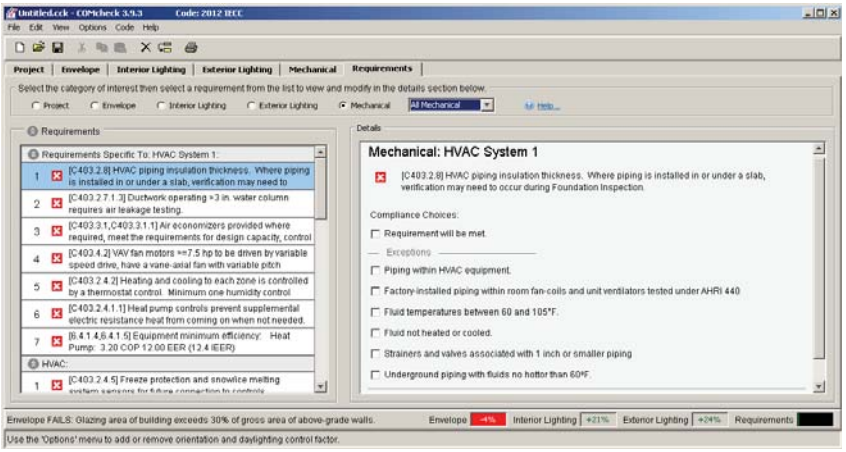
Mandatory Requirements
HVAC CHANGES

- Load calculations must account for ERV systems
- Equipment Sizing per loads
  - New NAECA regional – based minimums
- Chiller NPLV required performance
- Auto-start controls
- DCV for all systems w/ >25 occupants/100sf

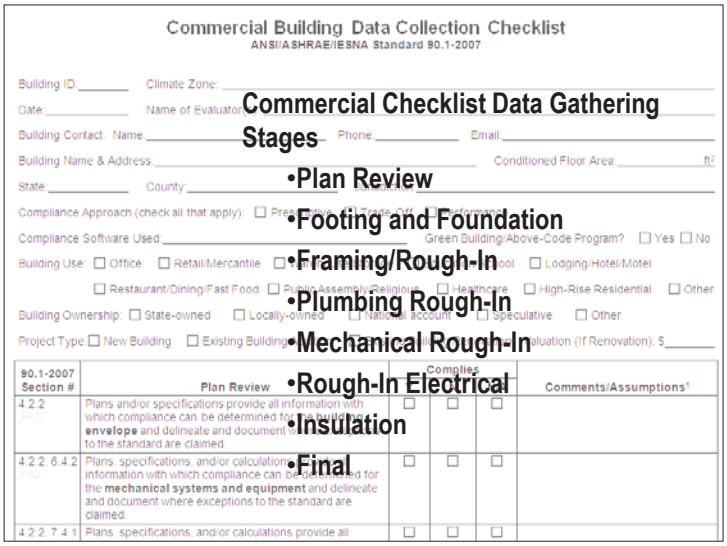
Equipment Sizing*

UNIT	MAXIMUM OVERSIZING PERCENTAGE	MINIMUM EFFICIENCY AND TESTING PROCEDURE
Air Conditioners	15%	Table 503.2.3(1)
Multi-speed Air Source Heat pumps & GSHP	15%	Table 503.2.3(2)
Single-speed GSHP	25%	Tables 503.2.3(2) or (3)
All fuel-fired heating appliances	40%	Tables 503.2.3(4) or (5)

Requirements Reviews



SCORE+STORE CHECKLISTS



Commercial Building Data Collection Checklist
ANSI/ASHRAE/IESNA Standard 90.1-2007

Building ID:_____ Climate Zone:_____
Date:_____ Name of Evaluator:_____
Building Contact: Name:_____ Phone:_____ Email:_____
Building Name & Address:_____ Conditioned Floor Area:_____ ft²
State:_____ County:_____
Compliance Approach (check all that apply): ☐ Prescriptive ☐ Trade-off ☐ Performance
Compliance Software Used:_____ Green Building/Above-Code Program? ☐ Yes ☐ No
Building Use: ☐ Office ☐ Retail/Mercantile ☐ School ☐ Lodging/Hotel/Motel
☐ Restaurant/Dining/Fast Food ☐ Public Assembly/Religious ☐ Healthcare ☐ High-Rise Residential ☐ Other
Building Ownership: ☐ State-owned ☐ Locally-owned ☐ National account ☐ Speculative ☐ Other
Project Type: ☐ New Building ☐ Existing Building ☐ Addition ☐ Alteration (If Renovation): $_____

90.1-2007 Section #	Plan Review	Complies			Comments/Assumptions[1]
4.2.2	Plans and/or specifications provide all information with which compliance can be determined for the building envelope and delineate and document where exceptions to the standard are claimed.	☐	☐	☐	
4.2.2, 6.4.2	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the mechanical systems and equipment and delineate and document where exceptions to the standard are claimed.	☐	☐	☐	
4.2.2, 7.4.1	Plans, specifications, and/or calculations provide all	☐	☐	☐	

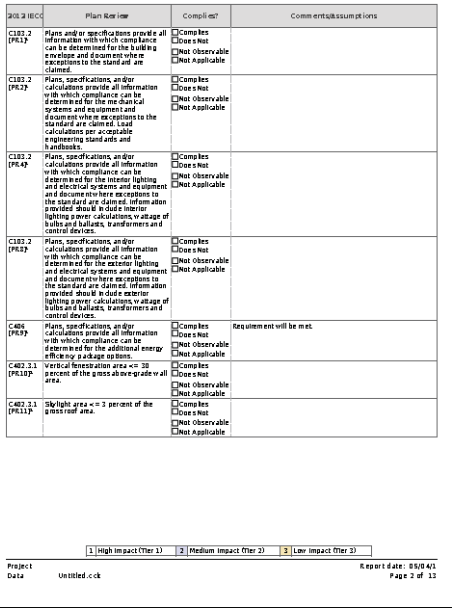
Commercial Checklist Data Gathering Stages

- **Plan Review**
- **Footing and Foundation**
- **Framing/Rough-In**
- **Plumbing Rough-In**
- **Mechanical Rough-In**
- **Rough-In Electrical**
- **Insulation**
- **Final**

Final Report

Checklists:

- Envelope
- Interior Lighting
- Exterior Lighting
- HVAC / SWH
- Add Options

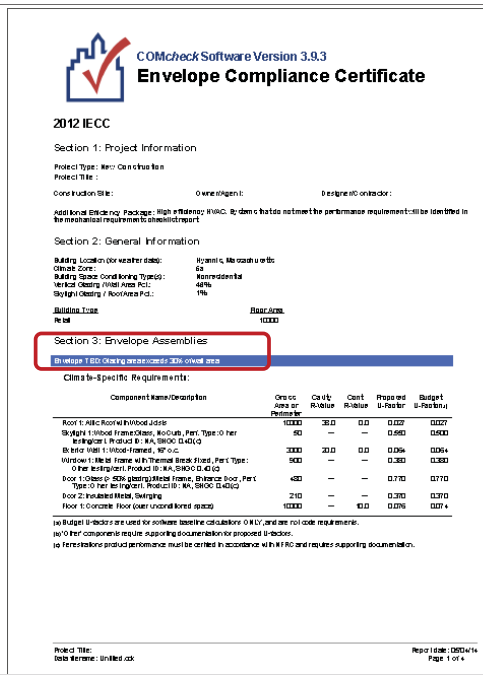


2012 IECC	Plan Review	Complies?	Comments/assumptions
C402.2 (PR1)*	Plans and/or specifications provide all information with which compliance can be determined for the building envelope and document where exceptions to the standard are claimed.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.2 (PR2)*	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the mechanical systems and equipment and document where exceptions to the standard are claimed. Load calculations per acceptable engineering standards and handbooks.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C402.2 (PR3-4)*	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the interior lighting and electrical systems and equipment and document where exceptions to the standard are claimed. Information provided should include interior lighting power calculations, wattage of bulbs and ballasts, transformers and control devices.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C402.2 (PR3)*	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the exterior lighting and electrical systems and equipment and document where exceptions to the standard are claimed. Information provided should include exterior lighting power calculations, wattage of bulbs and ballasts, transformers and control devices.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C406 (PR5)*	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the additional energy efficiency package options.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C402.3.1 (PR10)*	Vertical fenestration area <= 30 percent of the gross above-grade wall area.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C402.3.1 (PR11)*	Skylight area <= 3 percent of the gross roof area.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	

1 High Impact (Tier 1) | 2 Medium Impact (Tier 2) | 3 Low Impact (Tier 3)

Project Data: Untitled.cck — Report date: 05/04/1 — Page 2 of 13

The Certificate



COMcheck Software Version 3.9.3
Envelope Compliance Certificate

2012 IECC

Section 1: Project Information

Project Type: New Construction
Project Title :

Construction Site: Owner/Agent: Designer/Contractor:

Additional Efficiency Packages: High efficiency HVAC. Systems that do not meet the performance requirements will be identified in the mechanical requirements checklist report.

Section 2: General Information

Building Location (for weather data): Hyannis, Massachusetts
Climate Zone: 6a
Building Space Conditioning Type(s): Nonresidential
Vertical Glazing /Wall Area Pct.: 46%
Skylight Glazing / Roof Area Pct.: 1%

Building Type	Floor Area
Retail	10000

Section 3: Envelope Assemblies

Envelope TED: Glazing area exceeds 30% of wall area

Climate-Specific Requirements:

Component Name/Description	Gross Area or Perimeter	Cavity R-Value	Cont R-Value	Proposed U-Factor	Budget U-Factor(a)
Roof 1: Attic Roof w/ Wood Joists	10000	38.0	0.0	0.027	0.027
Skylight 1: Wood Frame Glass, NonOpaq, Pers. Type: 0 Per Testing/Cert. Product ID: NA, SHGC: 0.40 (c)	80	--	--	0.660	0.600
Ext Infor Wall 1: Wood-Framed, 16" o.c.	3000	20.0	0.0	0.064	0.064
Window 1: Metal Frame with Thermal Break Fixed, Pers. Type: 0 Per Testing/Cert. Product ID: NA, SHGC: 0.40 (c)	500	--	--	0.360	0.360
Door 1: Glass > 50% glazing/Metal Frame, Entrance Door, Pers. Type: 0 Per Testing/Cert. Product ID: NA, SHGC: 0.40 (c)	480	--	--	0.770	0.770
Door 2: Insulated Metal, Swinging	210	--	--	0.370	0.370
Floor 1: Concrete Floor (over unconditioned space)	10000	--	10.0	0.076	0.074

(a) Budget U-factors are used for software baseline calculations ONLY, and are not code requirements.
(b) 0 Per components require supporting documentation for proposed U-factors.
(c) Fenestrations product performance must be certified in accordance with NFRC and requires supporting documentation.

Project Title:
Data Filename: Untitled.cck
Report date: 05/04/14
Page 1 of 4

QUESTIONS?

“Energy efficient vehicle
Runs on oats and grass”

CAUTION

DO NOT STEP IN EXHAUST