

Building America



ConSol



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- U.S. DOE EE&RE; managed by NREL
- Reengineering the American home for energy efficiency and affordability
- Goals
 - Minimum: Reduce heating, cooling, water heating, and lighting energy use by 40%
 - Major: Reduce total home energy use by 60%
 - Reduce construction time and cost
 - Encourage system engineering approach
 - Accelerate development new technologies in production homes



Building America Process





Building America

Prescriptive Approach to Achieve 40% Energy Savings



Prescriptive Approach Envelope

- Walls:
 - Min R-13 + external foam-board
- Windows:
 - Low U-factor, low SHGC windows (vinyl-frame, lowE2 glass)
- Ceilings:
 - R-38
- Low air infiltration
 - < 3.5 SLA



Mechanical, Electrical, Plumbing

- Air Conditioner
 - Min 13 SEER
 - TXV

Mechanical layout and design

- ACCA
- Tight ducts
 - <6% leakage
- Water Heater
 - Min 0.62 EF
 - Hot-water pipe insulated to min R-4



Process

Installation protocols for quality construction

- Insulation, air sealing, windows, HVAC
- Examples on ConSol website
- Mechanical design
- 3rd-party inspections and tests
 - All models
 - Minimum 1:7 of build-out
 - sample all plan-types
 - inspect all energy features (insulation, air sealing, window installation, HVAC, water heating)
 - measure duct leakage (duct pressure test)
 - measure air infiltration (blower door)

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Inspections

- Insulation

- R-values and quality
- Depth for cellulose blown-in, depth and density for fiberglass blown-in
- Hot water pipe insulation
- Air-sealing
 - All top-plate penetrations
 - Sole-plate to slab
 - Exterior penetrations
 - Window nailing-fins sealed to framing or flashing



<u>Inspections</u>

• Windows

- Labels: U-Factor and SHGC
- Coatings on correct surface
- Models: size and location

Rough Ducts

- R-value
- Diameters and lengths
- Register termination locations



Inspections at Final

- Ceiling insulation
 - Depth for cellulose blown-in
 - Depth and density for fiberglass blown-in
- A/C SEER and TXV
 - Furnace AFUE
 - Water heater EF





- Duct blaster
- Air flows
- Blower door



Future Issues

- Water heating distribution
- Lighting
- Solar systems