



Instructor Agenda

Retrofit Installer / Shell

Day1

Time	Activities	Media or Props
9:00	Introductions, Housekeeping Agenda	
	Weatherization Introduction 101 (PRQ for all WX Competency Designations)	
9:30	History of the Weatherization Program	<p>"Weatherization Works" Video</p> <p>Basic WX Introduction (Power Point) and Introduction to WX (Power Point)</p>
10:30	Weatherization Introduction 101 (PRQ for all WX Competency Designations)	
	Review of Building Science Info <ul style="list-style-type: none"> • "House As A System" • Building Science Basics • Heat Transfer 	<p>House As A System (Power Point)</p> <p>Building Science Basics (Power Point)</p> <p>"Forms of Heat Transfer" INCAA Video</p>
12:00	Lunch	
1:00	Weatherization Introduction 101 (Continued)	
	Review of Building Science Info (Continued) <ul style="list-style-type: none"> • Alignment of Pressure and Thermal Boundaries • Infiltration Driving Forces 	<p>Identifying and Airsealing the Building Envelope (Power Point)</p> <p>Building Science Basics- "<i>Driving Forces</i>" (Power Point)</p>



Instructor Agenda

Retrofit Installer/Shell Day 1		
Time	Activities	Media or Props
2:00	Review of Building Science Info (Continued) <ul style="list-style-type: none"> • Infiltration Driving Forces 	“Heating Climate Stack Effect and Cost Effective Air Sealing” INCAA Video “Door Closure Pressure Effects” INCAA Video Animation “Exhaust Appliance Pressure Effects” INCAA Video Animation “Duct Leakage Pressure Effects” INCAA Video Animation Radon System Slide Presentation Plexiglass Pressure House Model Prop Demo
3:00	Review Means for Qualifying WX Measures <ul style="list-style-type: none"> • SIR • NEAT / MHEA • Compare Old Approach to New • Take Math Pre-test 	Site-Built Work Order Mobile Home Work Order Math Pre-Test
4:00	End of Day 1	



Instructor Agenda

Retrofit Installer/Shell Day 2		
Time	Activities	Media or Props
	Domain 1 – Maintain Safety	
9:00	Attend training/ training overview Following Work Rules of Jurisdiction Additional Safety Training Requirements <ul style="list-style-type: none"> • OSHA Training Class • Lead Safe Work Practices • Mold Awareness Handle materials/equipment according to manufacturer specifications <ul style="list-style-type: none"> • MSDS Requirements <ul style="list-style-type: none"> • Personal Protective Equipment 	Indiana Policy and Procedure Manual Section 600 (<i>Training</i>) Indiana Energy Conservation Code “Lead Safe Works Practices”- INCAA Video Safe Work Practices (Power Point) PPE Classroom Props
10:30	Domain 1 – Maintain Safety	
	Handle tools according to manufacturer specifications <ul style="list-style-type: none"> • Electrical Safety <ul style="list-style-type: none"> • Ladder and Equipment/Tools Safe Practices 	“Static Shock” Video Clip Retrofit Installer Safety (Power Point) Telescoping Ladder Prop Demo
11:15	Domain 2 – Prepare for the Job	
	Determine Requirements of Work Order Components/ Gather materials and supplies <ul style="list-style-type: none"> • Review work orders • Match tools and materials to work orders • Check for work order errors or oversights 	Indiana Wx Field Guide Site-Built Work Order Mobile Home Work Order
12:00	Lunch	



Instructor Agenda

Retrofit Installer/Shell Day 2		
Time	Activities	Media or Props
	Domain 2 – Prepare for the Job	
1:00	Truck/trailer organization <ul style="list-style-type: none"> • Safe loading and transport of materials • Efficient organization of tools and equipment • Safe transport and anchoring of large machinery (ie. Insulation machines, generators, etc. 	Material, Tools and Equipment (Power Point) North Dakota Truck Set-Up – Slide Show
2:30	Domain 3 – Prepare and Maintain Tools and Materials On-site	
	Safe and Efficient Job Site Set-up/ tools and materials <ul style="list-style-type: none"> • Organization of tools and equipment at the job site • Routine equipment and tool maintenance • Basic power tool and electrical safety 	Pressure Testing Insulation Machine and Hoses (Handout) Assorted Siding Removal Tools, Drill Shroud, Insulation Wall Tubes (Classroom Props) “Insulation Machine Set-up and Maintenance”- INCAA Video
3:15	Domain 4 – Prepare and Maintain Job Site	
	Prepare and Protect the Job Site <ul style="list-style-type: none"> • Protecting the Inside and Outside Environment • Pre-existing conditions • Building deferral conditions • Protective barriers 	“Lead Safe Work Practices”- INCAA Video Material, Tools and Equipment (Power Point)
4:00	End of Day 2	



Instructor Agenda

Retrofit Installer/Shell Day 3		
Time	Activities	Media or Props
	Domain 5 – Implement Work Scope	
9:00	Locate and work areas and verify access Identifying and Air Sealing the Building Envelope <ul style="list-style-type: none"> • Identifying the pressure boundary • Review infiltration driving forces 	Blower Door Basics (Power Point)
10:30	Identifying and Air Sealing the Building Envelope <ul style="list-style-type: none"> • Pressure gauge set-up and use • Gauge hose configuration for DSTO, blower door testing and zonal pressure diagnostics • Basic pressure units of measurement – Pascal and inches of water column 	DG-700 Micro-manometer (Demo) Digital Gauge Set-up (Handout)
11:15	Identifying and Air Sealing the Building Envelope <ul style="list-style-type: none"> • Blower Door set-up • House prep for blower door test 	Setting Up the Blower Door (Power Point)
12:00	Lunch	
1:00	Identifying and Air Sealing the Building Envelope <ul style="list-style-type: none"> • Moisture movement and correct location of moisture barriers • Building air sealing • Air sealing materials • Basic attic air sealing • Various techniques for air sealing bypasses • Safely sealing heat producing elements • Access to difficult spaces to address bypasses • Crawl space/basement air sealing • Safely sealing heat producing elements 	Moisture Movement (Power Point) Air Sealing Materials – Classroom Props Recessed Light Brief (Power Point) WTC Attics (Power Point)



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Retrofit Installer/Shell Day 3		
Time	Activities	Media or Props
	Domain 5 – Implement Work Scope	
3:00	Identifying and Air Sealing the Building Envelope <ul style="list-style-type: none">• Identify mechanical systems • Testing for duct leakage • Sealing duct leaks	Pressure Pan and DG-700 Duct Leakage Issues (Power Point) Old Ducts (Slide Presentation) Mechanical Systems and Improve Duct Systems (Power Point) Duct Sealing Issues (Slide Presentation)
4:00	End of Day 3	

Retrofit Installer/Shell Day 4		
Time	Activities	Media or Props
Domain 5 – Implement Work Scope		
9:00	Installing Loose Fill Insulation & General Insulation Overview <ul style="list-style-type: none"> Types of insulation and appropriate uses (<i>General Discussion</i>) (Attic loose fill; spray-on foam applications; knee-wall net and blow; foundation wall interior vs exterior; attic hatches and pull-down stairs; M.H. bellies, roofs, etc.; radiant barriers) R-values/ U-values (recommendations for climate zones) Conduction vs convection vs radiation Moisture barriers and convective vapor transfer 	Insulation Classroom Props Insulation Article “Estimating Insulation Material” (Handout) Loose Fill Insulation (Power Point)
10:45	Installing Insulation (cont.) <ul style="list-style-type: none"> Determining existing insulation types and R-values Asbestos and vermiculite (do not disturb) Insulation additives and off-gassing Determining insulation coverage <ul style="list-style-type: none"> Attics - variations including framing Sidewall – 2x4; 2x6; framing variations (additional amount required for dense pack) 	Insulation Classroom Props Regal Blue Coverage Chart (Handout)
12:00	Lunch	
1:00	Installing Insulation (cont.)/Begin discussion of high density sidewall insulation <ul style="list-style-type: none"> Determining existing insulation in walls Probing and checking framing (Balloon framing, etc.) Checking interior wall surface integrity and other conditions prior to insulating 	

Retrofit Installer/Shell Day 4		
Time	Activities	Media or Props
	Domain 5 – Implement Work Scope	
1:20	Installing Insulation (cont.)/Insulating Ducts Outside the Thermal Boundary <ul style="list-style-type: none"> • Generally do not add if there is existing insulation • Prioritizing: Primary- un-insulated/ secondary partially insulated Installing Insulation (cont.)/Determining Insulation Approach Below Ground Floor <ul style="list-style-type: none"> • Floors, foundation walls, band joists, etc. • Preferred options • Cost effectiveness, feasibility, durability 	“Crawlspace Solutions” (Handout) Funky Floor Insulation (Slide Presentation) Crawl Wall Insulation (Slide Presentation)
1:45	Installing Insulation (cont.)/ Install or Patch Moisture Barriers <ul style="list-style-type: none"> • Ground vapor barrier (6 mil visqueen minimum) • Install regardless of whether insulating • Overlap and cover up foundation walls Installing Insulation (cont.)/ Continue Attic Loose Fill Insulation Prep. <ul style="list-style-type: none"> • Attic hatches, Whole house fans (rigid “surround”; insulate to R-38; weather strip) • Identify electrical power source for ASHRAE fans • Vent fan ducting • Heat producing element protection • Vent chutes • Electrical junction box covers 	Avoiding Moisture Problems (Handout) Moisture Barriers (Power Point) Attic Prep (Power Point) “Insulating Site Built Homes” (Handout) Attic Prep (Slide Presentation) Mechanical Ventilation Rough-In Guidelines (Power Point) Vent Fan List (Handout)
2:15	Installing Insulation (cont.)/ High Density Sidewall Insulation <ul style="list-style-type: none"> • IR views of problems in insulated walls (B.D creating infiltration; bad foam jobs; loose fill settling; missed slopes and other cavities) • IR views of good high density wall insulation 	IR After Insulation (Slide Presentation)

Retrofit Installer/Shell Day 4		
Time	Activities	Media or Props
Domain 5 – Implement Work Scope		
2:45	Installing Insulation (cont.)/ High Density Sidewall Insulation Basics <ul style="list-style-type: none"> • Sidewall tubing (summer vs winter) • How tubing is used • Probing (tube and side probing) • Siding removal (determining best courses to remove; siding removal tools and techniques) • Cutting off and replacing aluminum siding • Access above windows and doors • Wall drilling bits (plumber rough in and hole saws) • Drilling techniques • Machine set-up (Pressure testing blower- 4 PSI at end of tube) • Controlling the tube (going in and coming out; timing of fill; good packing technique) • Hole closure (fiberglass or foam) • Replacing siding 	Classroom Props Misc. Dense Pack Issues (Power Point) “Sidewall Insulation” INCAA Video
3:30	Installing Insulation (cont.)/ Key Insulation Junctures (How to access, insulate and avoid problems) <ul style="list-style-type: none"> • Pocket doors • Soffits • Plumbing walls • Corners • Firewall edge and inside corners • Bathtubs/ showers • Porch attics • Cantilevers • Wall/ floor junction • Kneewalls; Beneath kneewalls; Kneewall slopes 	Key Junctures (Handout) Key Junctures (Power Point) Front Porch Attics (Power Point) Kneewalls (Power Point)
4:30	End of Day 4	

Retrofit Installer/Shell Day 5		
Time	Activities	Media or Props
Domain 5 – Implement Work Scope		
9:00	Installing Insulation (cont.)/ Crawlspace foundation wall options <ul style="list-style-type: none"> • Identify plumbing installation needs • Exterior blueboard application with stucco coating (thickness of foam; termite considerations; cap over foam if extending beyond siding) • Interior approaches (draping pole building roll fiberglass; 2 part spray foam; blueboard-<i>impractical</i>) • How to close off crawl vents • 2 part spray foam equipment options 	“Crawlspace Air Sealing” Video Basements and Crawlspaces (Power Point) “Crawlspaces-Considering the Options” (Handout) “Closed Crawlspaces Do Double Duty” (Handout) “A Conditioned Crawlspace Checklist” (Handout)
10:30	Door and Window Replacement/ Repair Identify combustion safety hazards: Daily Safety Test Out (DSTO) <ul style="list-style-type: none"> • Worst case house set-up • CAZ pressure gauge set-up • Appliance testing 	Windows and Doors (Power Point) “Daily Safety Test Out” INCAA Video Why We Do DSTO (Slide Presentation) “DSTO Form” (Handout)
12:00	Lunch	
1:00	Installing Insulation (cont.)/ Water Heater Insulation Identify/ Install Roofing and Flashing Installation Needs <ul style="list-style-type: none"> • Minor roof repair • Flashing Insulation Practice Quiz <ul style="list-style-type: none"> • Correct and discuss quiz 	DHW Insulation (Slide Presentation) “Practice Test – Insulation” (Handout)



Instructor Agenda

Retrofit Installer/Shell Day 5		
Time	Activities	Media or Props
	Domain 5 – Implement Work Scope	
1:45	Installing Insulation (cont.)/ Mobile Home Insulation <ul style="list-style-type: none">• Inspecting for good candidates for M.H. cavity insulation• Methods of entry and specialty materials• Bellies; Ceilings;	
2:30	Administer Written Course Exam	Retrofit Installer/ Shell Test
4:30	End of Day 5	



Instructor Agenda

Retrofit Installer/Shell Day 6 (Field Experience)		
Time	Activities	Media or Props
	Domain 1 - Maintain Safety Domain 2 - Prepare for the Job Domain 3 - Prepare and Maintain Tools and Materials On-Site Domain 4 - Prepare and Maintain Job Site Domain 5 - Implement Work Scope Domain 6 - Wrap Up	
9:00	<p>All duties and tasks included in the 6 designated job task domains are covered as applicable in a full day of field work on a site-built home. The houses chosen vary in terms of what measures may be appropriate to apply in each given instance.</p> <p>Any or all of the following measures will be done when possible:</p> <ul style="list-style-type: none"> • Equipment, tool, materials and site set-up • Whole house blower door and duct leakage testing • Air sealing prioritization • Attic air sealing • Misc. major air sealing • Duct sealing • Crawlspace vapor barrier installation • Attic prep and insulating • Dense pack sidewall insulating • Final test out • Site clean up 	<p>Site-built local house</p> <p>Work production truck with full complement of insulation and power equipment, tools and personal protective equipment. A full array of air sealing and insulation materials will be made available.</p>
4:30	End of Day 6	