

Tools, Equipment and technical support for Insulation Installing Crew

The following is a list of equipment recommended for installing thermal boundaries in new and existing buildings and includes dry and wet spray cellulose applications, blown fiberglass, rigid board and fiberglass batt insulation. Some of the listed items are optional, for purposes of quality assurance and diagnostic support.

Insulation blowing machines have various performance features and should be selected based on the anticipated volume of work and type of construction. In single-family home applications and smaller commercial and multi-family installations, many electric powered insulation machines have adequate performance features. For larger buildings requiring several thousand square feet of attic or sidewall insulation, or for buildings where more than 100 feet of hose will be required to reach areas requiring insulation, or if the vertical head of the application is more than 25 feet, consider the more powerful gas engine powered machines, ...or the use of an additional blower, to provide the required power. Gas engines can be an imposition on the neighborhood, unless well insulated for sound, and they also increase the capital equipment cost by about 10,000 dollars. Some of the listed electric machines have the 2nd blower installed.

Training is important to insure crew safety, jobsite organization, and quality installations. Machine or cellulose manufacturers may provide training and technical support on the use of their products. A “hands-on” training with an experienced installer/manufacture’s representative is often available, and can be combined with additional written and video training materials. In addition, the following training recommendations should be considered.

- Respirator training and compliance with OSHA 29CFR – 1910.134. This includes employer responsibilities for staff requiring respirators, medical benchmarking for individual crew members, proper fitting of respirators to individual employees and care and maintenance of personal respirators. Many states have labor departments that provide this training, as a public service.
- Lead Site Supervisor Training and Lead Safe Work Practices – Offered by EPA as a 32 hour course with certification exam, provides regulations and guidance on handling or disturbing materials containing lead based paint.
- Building Science for Home Performance Specialists – Training on the energy, comfort and health/safety aspects of building performance. For insulation installers, this training should include the following, as each of these topics is directly related to the installation of thermal boundaries:
 - Goals and opportunities in building performance enhancements
 - Principles of heat, air and moisture
 - Building systems interactions
 - Performance characteristics of thermal boundaries
 - Natural and mechanical airflow and building airflow requirements
 - Combustion appliance and combustion zone inspection/verification
 - Health and Safety issues, including combustion venting safety, indoor air quality, moisture control/mold prevention, egress and fire safety.
 - Inspections, documentation and reporting

Performance Systems Development has designed a comprehensive training for Home Performance contractors. It can be readily adapted to address your specific needs. Contact Conrad Metcalfe at 607-277-6240 ext.202 for further details.

Setting Up the Insulation Crew

Capital Equipment	Use	Count	Estimated Costs \$\$
Insulation truck – 20 foot box truck with rear overhead door side door near front of box hydraulic lift tail gate	To maintain tools, equipment and materials for on-site installations and to provide ease of loading and unloading materials and equipment	1	20,000
5000 Watt/ hour generator (Optional)	Power for at least 2 circuits of an electric powered cellulose insulation machine. Many older homes can not support the amp draw required to run the blowing machine.	1	800
Tool, equipment and material storage bins	Organize tools and equipment and materials for transportation and worksite organization	1	500
Ladder racks	Securing ladders for storage and transportation	1	200
Insulation blowing machine	Install loose blown and wet spray insulation	1	See specifications
Wet spray applicator	Provide water or adhesive to loose blown cellulose for new construction or rehabs where wall systems are open	1	500

Electric powered Insulation machines Model	Features	Optimum capacity	Comments	Estimated Costs \$\$
Force 2	275 lbs. 100, 220 or 240 Volt 2 20 amp circuits Hopper capacity 50 lbs. 3" hose outlet	Cellulose- 2800 square ft. R-19 per hour	Has only one blower, which may limit the maximum hose length or height of installation. My experience with the Force 2 has been mostly positive, though I did often wish for a little more power	5,500
Force 3	350 lbs. 115 or 220 Vol\ 2 20 amp circuits 2- 3 stage blowers Hopper capacity 75 lbs. 3" hose outlet	Cellulose – 3600 square ft. R-19 per hour	2 3 stage blowers should make this an aggressive machine for large or remote residential work. . I would recommend the Force 3	6,900
Krendl # 590	475 lbs. 2 – 3 stage blowers 2 ½" hose outlet	Cellulose – 1400 lbs./hr.	2 ½" hose capacity can be restrictive for large open blow attics or remote locations	4,900
Krendl # 1090	630 lbs. 2 – 3 stage blowers 3" hose outlet	Cellulose – 1800 lbs./hr	Sounds like a serious machine with lots of capacity. I've never used one of these, but I have some experience with the Model # 800, which was a pleasure. I would recommend the #1090	6,200

Diagnostic Tools	USE	Count	Estimated Costs \$\$
Draft gauge or manometer	Measure vent pressures in combustion appliances, building pressures	1	500
Carbon monoxide detector	Measure combustion appliance outputs and ambient carbon monoxide levels	1	500
Voltage indicator -Electrical wire tester	Determine if electrical wires are carrying electrical current	2	Total 60
Deep signal penetrating moisture meter	For non-destructive testing of building components for characterization of moisture levels and locating moisture problems	1	300
Borescope or fiber optic scope	Viewing interior of wall, floor and ceiling systems	1	300 - 600
Ground impedance tester	Determine that circuits in use are properly grounded	1	200
Clamp on AMP meter	Measure Amp draw of tools, for trouble shooting	1	100
Infrared imager (Optional)	Identify framing members, air leakage sites, insulation voids and quality assurance	1	8,000 – 15,000
Digital camera	Documentation of building and components for QA and training	1	200
Blower door	Augment diagnostics and evaluate installations		1700
Diagnostic smoke	Locating by-passes through building envelope and thermal barriers	1	40

Equipment	Use	Count	Estimated Costs \$\$
½ inch bit power drills (D handle)	Drilling sidewalls, floors, etc...	2	300
Reciprocal saw and blades	Sawing openings for roof and gable end vents	1	200
Circular saw and blades	Constructing trim, siding repairs, attic floor removal, framing, etc...	1	200
Portable drill gun 3/8" bit x 14 volt or greater	Setting and removing screws, setting drywall screws, light construction	1	100
Plumbers drill bits 2 ¼ and 2 ½ inch	Drilling floors and sidewalls for installation of injection hose	4	100
Assorted smaller bits (1/8 to 1 inch dia.)	Drilling small test holes, in building components, combustion vents,	Assorted	30
Metal Screed	Preparing wet spray insulation for drywall	1	50
4 ft. grounding rod and 12 ga. Braided copper wire	Proper grounding of generator	1	30
50 foot extension cords (12 ga.)	Provide power from generator or household circuits to insulation machine	3	100
50 foot extension cords (14 ga.)	Provide power from generator or household circuits to power tools	3	75
Ground fault interrupter	Protect users of electrical circuits from electrical shock	3	100
Urethane foam gun	Installing 1 part urethane foam for air sealing	1	125
25 ft. drop cords	Provide lighting to work areas of the building	2	40
34 ft. extension ladders (fiberglass)	Exterior sidewall and roof access	2	600
Battery operated Flashlights	Investigating remote areas of the building	2	30
HEPA vacuum system With disposable filters	Cleanup of cellulose, drywall dust and paint dust in assorted building zones	1	200 - 300
Lawn rake	Outdoor cleanup of cellulose	1	20
Scoop shovel	Outdoor cleanup of cellulose	1	20
Ladder standoffs	Maintain ladders at a distance from sidewall, to accommodate ladder scaffolding and to prevent damage to siding	2	100
Ladder jacks	Used to suspend scaffold planks from ladders, while insulating sidewalls	2	100
Aluminum scaffold plank	Provide a work platform between 2 ladders or on stationary scaffold, when working off the ground	1	200
Sheet metal sheers	Flashing, insulation baffles, weatherstrips	2	40
50' lengths of 3/8" nylon rope	Transfer insulation hose to 2 nd or 3d story of buildings and assorted uses	2	40
Staple tackers	Stapling insulation and hammer tacking flashing, insulation baffles	3	150
Pry bars – various designs	Thin bars used for siding and floor deck removal. Heavier bars – assorted use	4	Total 80

Personal Safety Equipment and Supplies			
Fitted ½ face respirator	Provide lung protection of installers	1 per crew person	60
Replaceable NIOSH particulate and organic compound filters	Attached to respirator, - filters respirated air. Should be changed as often as needed. Particulates more frequently than activated charcoal filters	Bulk purchase	200
Hard hats	Protect crew members from head injuries	1 per crew person	40
Safety goggles	Provides eye protection for crew members	1 per person	20
Leather gloves	Protect crew members from slivers, metal cuts, etc...	1 pair per person	20
Tyvek coveralls	Protect crew members from dusts and dirt	Case lot	50
Disposable latex gloves	Protect crew members from lead dusts, adhesives and foams	Case lot	20
First aid kit	Provide immediate response to personal injuries	1	100
Lead testing swabs (packs of 5 to 8)	On site analysis for lead paint on building surfaces, as needed	Case lots	200
Fire Extinguisher (2-A:10-B:C)	One for vehicle at all times One for job site	2	100