CertainTeed

OPTIMA®

Installation Instruction Manual

CertainTeed
SAINT-GOBAIN

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OPTIMA® SYSTEM—LOOSE FILL FIBER GLASS INSULATION FOR CLOSED CAVITY APPLICATIONS

This installation manual presents standardized guidelines for using the OPTIMA® System with the expectation of product quality and uniform performance.

OPTIMA is the result of years of research and development that relied a great deal on practical field testing in new construction. A number of contractors, utilizing their own machines and crews, field-tested OPTIMA to help validate the system.

A key point is that while proper product and fabric will go a long way toward ensuring optimum insulation performance, proper installation procedures are essential because they directly influence the physical properties and performance of the installed product.

This manual covers the basics. Of course, we cannot cover all variables that will occur in the field. Therefore, whenever you encounter a situation not covered here, we encourage you to call your local CertainTeed representative for consultation.

Please ensure you are in compliance with applicable OSHA and EPA regulations on all job sites.

SYSTEM DESCRIPTION

OPTIMA refers to the OPTIMA System, which includes both OPTIMA premium loose fill fiber glass insulation and OPTIMA non-woven fabric.

OPTIMA premium loose fill fiber glass insulation is highly engineered to provide outstanding thermal performance and excellent closed cavity application productivity.

OPTIMA non-woven fabric is specially designed to meet air permeability and strength criteria, as well as minimize fibrous dust during application.

OPTIMA premium loose fill fiber glass insulation is approved for use in the Blow-In-Blanket® System (BIBS®).

The OPTIMA System requires that OPTIMA insulation be pneumatically installed behind OPTIMA fabric (or equivalent), using properly maintained and CertainTeed-approved equipment, in full accordance with these installation instructions. Only then can OPTIMA perform consistently and uniformly.

OPTIMA insulation is also acceptable for retrofit closed cavity applications. See OPTIMA Sidewall Reinsulation Specification Sheet (30-24-225) for more information.

IMPORTANT: OPTIMA insulation is not suitable for attic open blow applications. The OPTIMA System should always be covered with a building material (such as drywall) suitable to meet building code.

FABRIC INSTALLATION

The OPTIMA System requires the use of OPTIMA non-woven fabric or an equivalent having the following properties:

- Frazier air permeability = 420 cfm ft^2 at 0.5" H_2O
- Coulter average maximum pore size: 200 micrometers
- Grab tensile strength, lb./inch, average: MD: 22, CD: 22

Steps—Wood Framing

1. Select proper OPTIMA fabric size for the construction type (8-foot, 9-foot or 10-foot walls).
2. Cut a section of fabric from the roll that extends approximately 1 foot beyond each side of the wall to be covered. With experience the installer may be able to work with the roll of fabric without cutting individual pieces for each wall.
3. Staple tack the corners on one side (top and bottom), making sure the fabric is stretched taut.
4. Staple tack the opposite corners, pulling the fabric tightly to prevent any sagging. On long wall sections staple tack along the top plate periodically while stretching the fabric until the opposite corners are reached.
5. Staple every 1 to 1-1/2 inches starting from one side along each stud face. Using your free hand, press on the fabric covering the next cavity space while stapling the fabric on the next stud face. Staple along the top and bottom plates as you go.
6. Verify that the fabric is evenly stretched over the entire wall section.
7. Cut away, using a utility knife, fabric that is covering any openings (i.e., doors or windows) that require access before the installation is completed. Also, trim away any excess fabric.

Steps—Steel Framing

1. Select proper OPTIMA fabric size for the construction type (8-foot, 9-foot or 10-foot walls).
2. Purchase proper construction grade adhesive for bonding of the fabric to steel framing. CertainTeed has tested many adhesives. Three suggested contruction grade adhesives are shown below:
   - OSI® Formula #38™ (F-38) Metal Framing and Drywall Adhesive
   - Loctite® PL® 400® Sub-Floor and Deck Adhesive
   - Liquid Nails® Drywall Construction Adhesive

   NOTE: These adhesives are flammable and give off dangerous/hazardous fumes. Observe all precautions mandated by OSHA and other safety-oriented agencies that exercise regulatory authority at the job site. Also, read and observe any safety precautions printed on the adhesive packaging. At the very least, keep the work area well ventilated and be sure that no open flame, intense heat source or smoking is permitted **during adhesive application and curing.**
3. Wipe down steel framing facing where adhesive will be applied with a rag or cloth. An oily film from the manufacturing process may be left on the steel framing. This film has the potential to interfere with an adhesive's ability to bond to the steel.
4. Apply 6-inch strips of double-sided carpet tape (a fast drying spray adhesive can be used instead, if preferred) to the left and right ends of the top and bottom plates. Place additional strips of tape every 3 to 4 feet along the length of the top and bottom plates. The tape strips should be parallel to the floor. The carpet tape is used to hold the fabric in place while the adhesive is applied and curing. The tape may remain in place after the adhesive is applied.
5. Cut a section of fabric from the roll that extends approximately 1 cavity width beyond the sides of the wall at corners.
6. Press the top corner of the fabric onto the first piece of tape at one end of the wall while your assistant stays 4 to 5 feet away, keeping the fabric positioned straight and fairly tight.
7. Apply a bead of adhesive, while your assistant holds the fabric out of the way, across the top plate between the first two studs, then down the face of those studs. Do not put adhesive along the bottom plate at this time.
8. Stretch the fabric over the adhesive, keeping it straight and tight. Press the fabric thoroughly into the bead of adhesive using a tool such as a putty knife or wallpaper roller.
9. Repeat steps 7 and 8 to the other end of the wall.
10. Apply a bead of adhesive along the bottom plate to secure the bottom of the fabric. After the adhesive is cured, the OPTIMA insulation can be blown into the cavities.
11. Cut away, using a utility knife, fabric that is covering any openings (i.e., doors or windows) that require access before the installation is completed. Also, trim away any excess fabric.

FABRIC INSTALLATION (cont'd.)

Notes

- Staples applied at a 45° angle hold better than when vertical or horizontal.
- Fabric is printed with vertical dashed lines to help you align it with studs.
- To ensure the required performance, pull fabric tight across studs as you staple or apply adhesive. If you leave slack, the insulation will bulge out, and drywall may not lay flush to the studs.

See our Right Way video *"Insulating with the OPTIMA System"* for more information.

With the OPTIMA fabric in place, you are ready to fill the cavities with OPTIMA insulation. Some practice may be necessary to repeatably achieve the correct installed density.

INSULATION INSTALLATION

Steps

1. Make a small (approximately 4-inch) vertical incision in the fabric at waist height. On an 8-foot cavity, one hole may suffice; however, on a 9-foot or greater cavity, a second hole may be necessary. Another method is to use the tip of the nozzle to poke a hole in the fabric.
2. Insert the hose or nozzle into the hole and down the cavity to approximately 18 inches from the bottom or below wiring and fill from the bottom up, working the hose side to side as you go and slowly pulling the hose back as you fill in 10- to 12-inch increments. For cavities with two holes, begin with the lower hole.
3. Upon reaching the access hole, turn the hose or nozzle 180° and push it up to approximately 18 inches from the top of the cavity. Fill from the top down while continuing to move the hose or nozzle.
4. Perform density check every 3 to 4 stud cavities in the beginning until proper density is achieved, then every 1,000 square feet. Proper density is critical in achieving optimum R-Value. An average blowing rate of 15 pounds per minute should be targeted.
5. How to check insulation density (density = weight/volume): A one-cubic-foot test must weigh no less than 1.8 pounds for standard density OPTIMA — do not take sample from where the nozzle was inserted.
   - **2x4** – 16 inches on center – remove 34 inches of insulation (sample will be 3.5 inches x 14.5 inches x 34 inches = 1 cubic foot) — sample should weigh 1.8 pounds.
   - **2x6** – 16 inches on center – remove 21.6 inches of insulation (sample will be 5.5 inches x 14.5 inches x 21.6 inches = 1 cubic foot) — sample should weigh 1.8 pounds.
   - **2x6** – 24 inches on center – remove 14 inches of insulation (sample will be 5.5 inches x 23.5 inches x 14 inches = 1 cubic foot)
6. If you have achieved target density as specified on the bag, proceed to step 7. If density is off, adjust your technique and/or machine settings until you repeatedly achieve proper density.
7. Cover density check areas with a piece of fabric and re-blow them.
8. SPECIAL NOTE: Density higher than approximately 2.5 pounds does not increase R-Value, wastes material, reduces profits and can create drywall installation problems.
9. Once proper density is achieved, continue filling all cavities, checking density every 1,000 square feet. If you discover any voids, pierce fabric and fill void directly.
10. Properly installed fabric and product will have a slight bulge (3/8 inch); do not smooth, insulation should make contact with drywall for optimum R-Value.

See our Right Way video *"Insulating with the OPTIMA System"* for more information.

EQUIPMENT

Blowing Machines

While there are many pneumatic insulation machines available today, only certain ones are recommended for use with the OPTIMA System. Recommended initial machine settings for these machines appear below.

In order to apply OPTIMA properly, the machine you use must meet CertainTeed performance criteria of:

- Proper fiber conditioning
- Uniform material flow
- Proper air volume

To meet these criteria, pneumatic equipment normally requires:

- An adequate shredding system comprising one or more relatively high RPM fingered shafts
- A gasketed and vaned rotary airlock feeder section
- A positive displacment type blower capable of providing at least 2 psi air pressure
- A slide gate to control feed into and out of the shredder section
- Internally corrugated plastic blowing hose

With any recommended equipment, there are two ways of controlling application density: adjusting machine settings and modifying application technique. The latter method tends to be the most important.

Blowing Hose

Use internally corrugated hose of a minimum length of 200 feet. Use 150 feet of 3-inch hose and 50 feet of 2-1/2-inch hose when installing OPTIMA.

Nozzle

The use of a nozzle for the installation of OPTIMA is optional. However, the use of garage vacuum accessories or thin wall aluminum as rigid hose extension is recommended. A diameter of 2 to 2-1/2 inches and a length of 4 to 6 feet with one end cut at a 60° angle is recommended for longer cavities, and a 2-foot extension is suitable for standard cavities.

Machine Settings

CertainTeed has tested and evaluated a number of blowing machines to determine the appropriate machine settings for OPTIMA fiber glass insulation. Settings may vary depending on machine condition, climatic factors and application techniques.

These machine settings were developed using machines in good working order and application techniques considered to be acceptable in normal field operations.

In some cases, it may be necessary to adjust initial settings in order to fine tune the performance of your blowing equipment as well as to achieve target density.

Make it a habit to experiment and adjust accordingly to achieve the best results. With the OPTIMA System and its recommended equipment, application technique is the most important factor.

Blowing Machine, Hose and Equipment Settings — OPTIMA

MANUFACTURER MODEL	UNISUL VOLU-MATIC®	CERTAINTEED MACHINE WORKS COMFORTCREW™	GENERAL MACHINE SETTINGS
RPM	Set in accordance with manufacturers' recommendations		
Gear	2nd	N/A	2nd (if applicable)
Gate Opening	1/2	Sidewall	1/3 to 2/3
Air Pressure	Sufficient for minimum 6-foot throw out end of hose		
Blowing Hose Diameter x Length	3 inches x 150 feet + 2-1/2 inches x 50 feet		
Nozzle	Approximately 3-foot section of thin-walled plastic piping cut to 60° angle on one end		

INSTALLATION SAFETY

Working at a construction site always offers the potential for accidents. During any OPTIMA installation, you should be fully aware of all OSHA regulations and practice safe work habits not only at the site, but while proceeding to and from each location.

In particular, working with blowing machines requires taking basic safety precautions. Here is a brief summary of the key points to remember. Of course, if your company has established safety regulations, you should be familiar with and follow them as well.

1. Take care when loading bags of OPTIMA insulation and rolls of OPTIMA fabric onto the truck. Handle only one bag or roll at a time, being sure to always use proper lifting techniques.
2. When loading the hopper, lift only one bag at a time. To open each bag, always cut away from yourself.
3. Never overfill the hopper: usually, three bags is maximum. This will vary by machine.
4. Never put your hands, brooms or other foreign objects into the hopper for any reason while the machine is in operation.
5. If you drop something into the hopper, always turn the machine completely off before trying to retrieve the object.
6. Never adjust the machine with its engine running. Turn it completely off first.
7. Make sure the engine is vented to the outside of the truck.
8. Always wear a disposable dust respirator and ear plugs when feeding the machine, or even when standing nearby.
9. Always follow CertainTeed's recommended safety procedures, such as wearing a NIOSH-certified disposable or reusable particulate respirator with an efficiency rating of N95 or higher, when installing OPTIMA. Please read the WARNING section on the bag for details.
10. Clean up periodically during installation so that you don't trip over the materials you've laid out for the job. Also, when installation is complete, be sure to take all leftover materials and accessories.

COVERAGE CHARTS — U.S.

Sidewall, Cathedral and Other Closed Cavities — Standard Density

Coverages are based on 28-lb. nominal bag weight.

THICKNESS INCHES	R-VALUE	DENSITY LBS. PER CU. FT.	MINIMUM WEIGHT LBS. PER SQ. FT.	BAGS PER 1,000 SQ. FT.	MAXIMUM SQ. FT. COVERAGE PER BAG
3.5 (2x4)	15	1.8	0.525	18.8	53.3
5.5 (2x6)	23	1.8	0.825	29.5	33.9
7.25 (2x8)	30	1.8	1.088	38.8	25.7
9.25 (2x10)	39	1.8	1.388	49.6	20.2
11.25 (2x12)	47	1.8	1.688	60.3	16.6
13.25 (2x14)	56	1.8	1.988	71.0	14.1

Floored Attics, Closed Cavities — Optional Densities

THICKNESS INCHES	R-VALUE	DENSITY LBS. PER CU. FT.	MINIMUM WEIGHT LBS. PER SQ. FT.	BAGS PER 1,000 SQ. FT.	MAXIMUM SQ. FT. COVERAGE PER BAG
3.5 (2x4)	12	1.0	0.292	10.4	96.0
3.5 (2x4)	13	1.2	0.350	12.5	80.0
3.5 (2x4)	14	1.4	0.408	14.6	68.6
3.5 (2x4)	14	1.6	0.467	16.7	60.0
5.5 (2x6)	19	1.0	0.458	16.4	61.1
5.5 (2x6)	21	1.2	0.550	19.6	50.9
5.5 (2x6)	22	1.4	0.642	22.9	43.6
5.5 (2x6)	22	1.6	0.733	26.2	38.2
7.25 (2x8)	26	1.0	0.604	21.6	46.3
7.25 (2x8)	27	1.2	0.725	25.9	38.6
7.25 (2x8)	29	1.4	0.846	30.2	33.1
7.25 (2x8)	30	1.6	0.967	34.5	29.0
9.25 (2x10)	33	1.0	0.771	27.5	36.3
9.25 (2x10)	35	1.2	0.925	33.0	30.3
9.25 (2x10)	36	1.4	1.079	38.5	25.9
9.25 (2x10)	38	1.6	1.233	44.0	22.7

COVERAGE CHART — CANADA

The OPTIMA System is CCMC (13272-R) approved for use in Canada.

When installed with pneumatic equipment, OPTIMA will achieve the thermal performances at the thickness, density and coverage specified in the coverage chart below, based on a nominal 28-lb. (12.7-kg) bag (see chart).

Sidewall, Cathedral and Other Closed Cavities — Standard Density

Coverages are based on 28-lb. nominal bag weight.

THERMAL RESISTANCE		CAVITY DEPTH		MAXIMUM COVERAGE PER BAG		MINIMUM NUMBER OF BAGS		MINIMUM WEIGHT PER UNIT	
R	RSI	in.	mm	sq. ft.	sq. m	1,000 sq. ft.	100 sq. m	lb./ sq. ft.	kg/ sq. m
14	2.5	3.5	89	53.3	5.0	18.8	20.2	0.53	2.56
22	3.9	5.5	140	33.9	3.2	29.5	31.7	0.83	4.03
28	4.9	7.25	184	25.7	2.4	38.8	41.8	1.09	5.31
36	6.3	9.25	235	20.2	1.9	49.6	53.3	1.39	6.77

Design Density = 1.8 lb./cubic ft. (28.8 kg/cubic m)

DENSE PACKING WITH OPTIMA — U.S.

OPTIMA premium loose fill fiber glass insulation can be used for dense pack applications where air permeance* reduction is needed—typically, in the weatherization of existing homes. Historically, cellulose has been promoted as the only choice; however, loose fill fiber glass insulation can deliver a number of significant benefits: fewer packages needed — less labor, handling and jobsite trash; higher R-Value per inch — higher wall R-Values; EPA and BPI approved for weatherization programs and retrofit applications; GREENGUARD® Children and Schools Certified for indoor air quality; high recycled glass content — exceeds EPA's Recovered Materials Advisory Notice; won't absorb moisture or support mold growth; naturally non-combustible; no fire-retardant chemicals added; doesn't settle; and less dust.

CERTAINTEED OPTIMA DENSE PACK COVERAGE CHART					
OPTIMA®					
Framing	**Cavity Depth** (inches)	**R-Value**	**Coverage** (max. ft^2/pkg.)	**Weight** (min. lbs/ft^2)	**Packages** (min./1,000 ft^2)
2 x 4	3 1/2	15	38.4	0.729	26.0
2 x 4	3 5/8	15	37.1	0.755	27.0
2 x 4	4	17	33.6	0.833	29.8
2 x 6	5 1/2	23	24.4	1.146	40.9
2 x 8	7 1/4	30	18.5	1.510	53.9
2 x 10	9 1/4	39	14.5	1.927	68.8
Package Net Weight: 28 lbs. / Min. Density: 2.5 lbs./cubic ft.					

Blowing Machine: Required — Fiber agitation and conditioning with air pressure control

1. Machine speed — per manufacturer's recommendation
2. Slide gate — start with 1/3 to 1/2 open
3. Air pressure — 2.0 to 2.4 psi (55" to 66" of H_2O) (machine back pressure end of insert tube)
4. Transmission (if applicable) — 2nd gear

Blowing Hose:

1. Internally corrugated hose required (except for wall insert tube)
2. Smooth transition reducers
3. 10' cavity insert tube:
   a. 1¼" ID w/ 1/8" wall thickness clear vinyl/plastic tube
   b. 1½" ID w/ 1/8" wall thickness for larger cavities (2 x 6 or larger)
   c. 1½" or 2" blow hose inserted into floor/ceiling cavities or large sidewall cavities from the attic

BLOWING HOSE ASSEMBLY									
Machine Outlet Dia.	**1st Section**	**Reduce to**	**2nd Section**	**Reduce to**	**3rd Section**	**Reduce to**	**4th Section**	**Reduce to**	**5th Section**
4"	4" x 0 - 25' then reduce to 3" follow 3" machine outlet set up								
3 1/2"	3 1/2" x 0 - 25' then reduce to 3" follow 3" machine outlet set up								
3"	3" x 50' min.	2 1/2"	2 1/2" x 50'	2"	2" x 50'	1 1/2"	1 1/2" x 10 - 25'	Insert Tube	10'
2 1/2"	2 1/2" x 100' min.	2"	2" x 50'	1 1/2"	1 1/2" x 10 - 25'	Insert Tube	10'		

Techniques:

1. Preferred — 1 hole w/ tube inserted upwards
2. Alternative — 1 hole w/ tube inserted downwards or 2 holes with insert tube

NOTE: Please ensure you are in compliance with applicable OSHA and EPA regulations on all job sites.

* BPI-102, "Standard for Air Resistance of Thermal Insulation Used in Retrofit Cavity Applications — Material Specification," is BPI's approved technical standard for insulation used in air sealing, and requires that such products limit maximum air permeance to 3.5 cfm/ft^2 (as measured using ASTM C522). OPTIMA achieves this permeance rating at a density of 2.5 lbs/ft^3. This compares to 3.5 lbs/ft^3 for cellulose.

GLOSSARY

Adhesive
Bonding material used to adhere the OPTIMA fabric to the surface of steel framing.

Agitator Arms
The arms that rotate inside the hopper, serving to break up material before it enters the shredder.

Air Pressure
The measurement of air provided to the blowing machine by the blower. Usually measured in pounds per square inch (psi).

Air Relief/Bypass Valve
A device in line with the positive air pressure side of a blower that is used to regulate the air volume in use. Capped and weighted or levered ball valves are typical.

Bag Count
The specified number of bags required to insulate a given area. This is a critical factor in assuring the thermal performance of a blowing insulation by installing the proper weight per square foot.

BIBS®
Blow-In-Blanket System for the pneumatic installation of fibrous glass loose fill behind netting (damp application with water-based adhesive) or non-woven fabric (dry application with no adhesive).

Blow Back
Air pressure that escapes from the feeder back into the hopper and prevents the smooth flow of material into the shredder. This condition results from worn feeder seals.

Blower
The blower provides the air pressure necessary to move the blowing material from feeder through blowing hose. Its air relief cap uses either weights or an air bypass valve to regulate the amount of air pressure into the feeder.

Blowing Hose
Flexible plastic conduit to transport conditioned material from the blowing machine to the application site (attic or cavity). Internally corrugated hose is critical to provide additional fiber conditioning for premium, non-bindered fibrous glass loose fill products.

Blowing Machine
Pneumatic equipment designed to condition and install blowing insulation.

Density
The weight per cubic foot of blowing material, expressed in pounds per cubic foot (pcf).

Drive (Jack) Shaft
The mechanism that transfers mechanical power from the machine's engine to its other components.

Feed Rate
The rate at which blowing insulation passes through the blowing machine and hose, usually expressed in pounds per minute or minutes per bag.

Feeder (Airlock)
A series of rotating vanes inside a cylinder at the point where air is introduced to material to yield a desired material-air ratio. When well-maintained, the seals on these vanes prevent air leakage in each chamber.

Hopper
The box or holding tank located above the blowing machine's working components that holds material being fed into the machine. Most large blowing machines have hoppers designed to hold several bags of material, and work most efficiently when their hoppers are loaded near capacity.

Product Conditioning
The process of opening and sizing the blowing material, essential to achieving the specified thermal performance.

R-Value
The measure of an insulating material's ability to resist the flow of heat. The higher the R-Value, the greater the insulating power. CertainTeed's blowing insulation installed at the proper weight per square foot, at or above the minimum thickness, achieves the R-Value specified.

Shredder
The shredder conditions the material into a smaller, more uniform size, while also moving material to the feeder section at a constant rate.

Slide Gate
An adjustable gate that directly affects the feed rate of blowing material by controlling the amount of material entering/exiting the shredder. Located before or after the shredder, it is an important factor in proper material conditioning.

Weight
The pounds per square foot necessary to achieve the desired R-Value as listed on the bag label.

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