The image shows a room under construction. The walls and ceiling are framed with wooden studs. A thick, white, textured spray foam insulation has been applied to the interior surfaces of the studs, filling the cavities. On the left, there is an arched opening, possibly for a window or door, which is currently covered with a white plastic sheet. The floor is a plain, light-colored concrete. The overall scene is a typical residential construction site during the insulation phase.

RESIDENTIAL SPRAY FOAM GUIDE

SWD





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WHAT IS SPRAY FOAM INSULATION?

Spray foam insulation is a two part system composed of an “ISO - A Side” and “Resin - B Side.” The two parts are mixed together in the application process and applied to walls for a seamless insulation solution.

Spray Foam Insulation or Spray Polyurethane Foam (SPF) was introduced by a German scientist, Dr. Otto Bayer, in 1937. Dr. Bayer received the patent for a chemical reaction that lead to the spray foam industry.

It was the aviation and refrigeration industries that first embraced Dr. Bayer’s discovery. However, it took more than 20 years for spray foam to become commercially available.

Spray foam was first introduced to the construction industry in the 1960s, and installation equipment advances soon followed, enhancing the overall application of spray foam. Then, during the energy crisis of the 1970’s, the spray foam industry boomed. Spray foams are now commonly used for insulation, roofing, and building envelope systems.



ISO and Resin Components



Isocyanate - “A” Side

The “A” side is commonly a mixture of methylene diphenyl diisocyanate (MDI) and polymeric methylene diphenyl diisocyanate (pMDI). MDI is widely used in the production of rigid polyurethane foams for home or refrigerator insulation.



Resin Blend - “B” Side

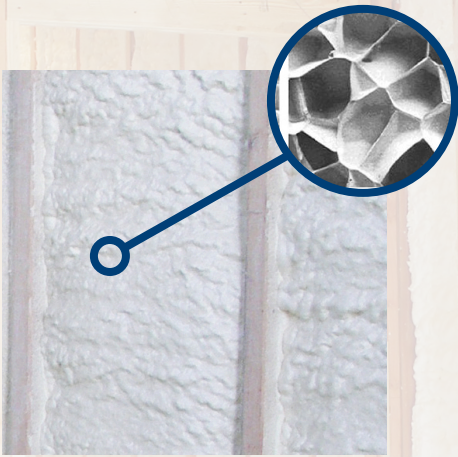
The Resin Blend is called a “blend” because it is a mixture of five components.

1. Polyols
2. Catalysts
3. Surfactants
4. Flame retardants
5. Blowing agents (for closed-cell foam)

SPRAY FOAM INSULATION TYPES

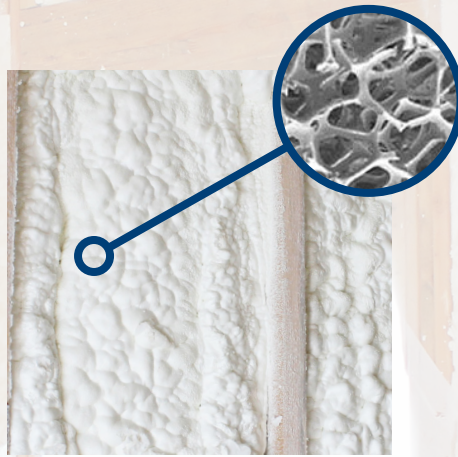
There are two common categories used to identify spray foam insulation: closed-cell and open-cell. As spray foam is a versatile material, closed-cell and open-cell insulation cover all desired application requirements. Spray foam contractors are able to recommend what insulation material is best according to location and application needs. Below are the main features for each category.

CLOSED-CELL¹



Medium-High Density
Air Barrier at 1"
Class 2 Vapor Retarder
Increases Structural Strength
R-value = 6.6 per inch
Interior/Exterior Applications

OPEN-CELL¹



Lower Density
Air Barrier at 3.5"
Sound Attenuation
Greater Economic Yield
R-value = 3.7 per inch
Strictly Interior Applications

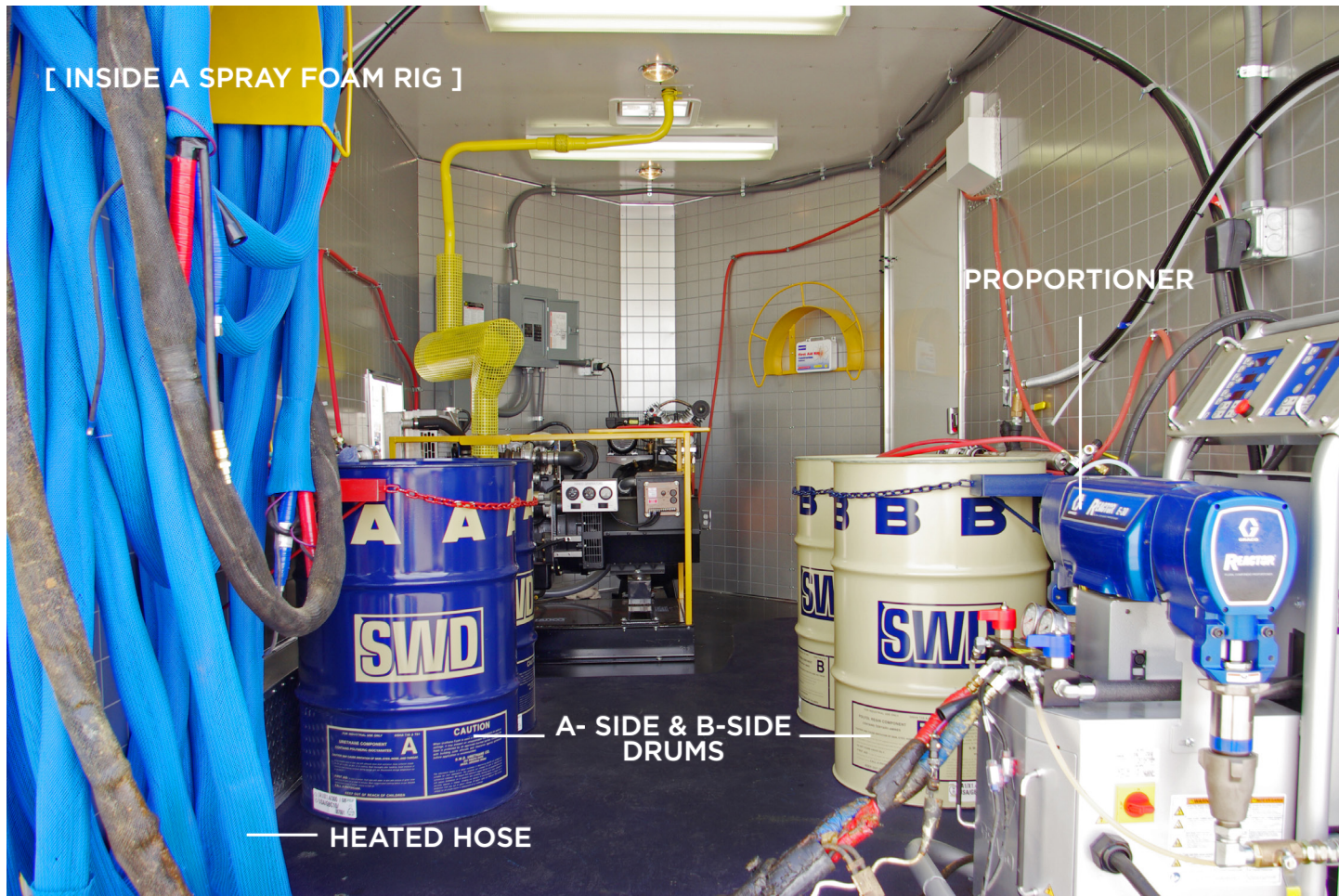
1. Intertek Code Compliance Research Report: CCRR-1011, CCRR-1050, CCRR-1051.

SWD Urethane's line of closed-cell and open-cell products are under the QUIK-SHIELD® brand.

APPLICATION PROCESS



The application process starts in the spray foam rig. Spray foam rigs have the necessary equipment that combine the liquid “ISO - A Side” and “Resin - B Side” together, resulting in expanding foam that cures in place.



The ISO and Resin sides are supplied by the manufacturer, typically in 55-gallon drums. Some materials require mixing, in these cases an agitator is used to prepare the liquid.

1



2

Liquid components are pumped from the drums to the proportioner. The proportioner heats and pressurizes the ISO and Resin for optimal performance before transferring them to the gun.



3

The ISO and Resin sides are combined in the gun and sprayed to the substrate.

4



The ISO and Resin separately travel through the heated hose to the spray gun.



5

Typical open-cell used in residential walls have fast reactivity. The foam rises and seals within seconds providing seamless insulation.

SPRAY FOAM **MYTHS** VS **FACTS**

MYTH: SPRAY FOAM IS AN UNTESTED TECHNOLOGY

FACT: Polyurethane foam was invented in the 1930's, with widespread building applications occurring since the 1960's. Because it is used in construction, spray foam is required to meet building codes, including the International Residential Codes (IRC) and International Building Codes (IBC). All QUIK-SHIELD® spray foam insulation products meet today's code requirements.

MYTH: SPRAY FOAM IS NOT AS HEALTHY AS FIBERGLASS

FACT: Unlike fiberglass insulation, spray foam is an air barrier material that reduces indoor air pollution and limits chemical exposure. Spray foam, as a component in an air barrier assembly, contributes to creating an improved indoor environment that is more equipped to mimic hypoallergenic conditions. Poor indoor air quality can be a factor for serious and sometimes life-threatening health effects. The Environmental Protection Agency and the American Lung Association have determined that air barriers, like QUIK-SHIELD® spray foam, help give homes a healthier indoor living environment.

QUIK-SHIELD® insulation products have low VOC emissions and contain no formaldehyde. These features have also qualified them to be GREENGUARD® GOLD certified.

MYTH: BUGS AND PESTS CONSUME SPRAY FOAM AND CAN LIVE IN IT

FACT: Spray foam is not a food source. As a seamless air barrier, it helps eliminate the risk of dangerous mold growth and reduces infiltration of dust, pollen, insects, and pests. Traditional loose-fill insulation such as fiberglass or cellulose can encourage pests to live and breed in homes.

MYTH: SPRAY FOAM CREATES A SERIOUS FIRE HAZARD

FACT: Spray foam is not a serious fire risk when building code requirements, IBC and IRC, specific to foamed plastics are followed.

QUIK-SHIELD® insulation products have been tested by third party laboratories to ensure all products are safe and in compliance with all applicable codes.



INCREASE HOME COMFORT WITH SPRAY FOAM



High performance materials, like spray foam insulation, increase a home's comfort through improved indoor air quality, consistent temperature control, and overall home durability. Air leakage is directly associated with energy efficiency. Spray foam insulation, applied to the entire building envelope, insulates and air seals the assembly and has been proven to reduce energy consumption significantly versus a leaky building envelope.

INDOOR AIR QUALITY

Pollutants such as smoke, dust, germs, mold, and pollen are factors for poor indoor air quality. These can cause serious or life-threatening health effects, such as asthma, respiratory infections, and lung cancer. Spray foam insulation, as a component in an air barrier assembly, seals a home from harmful outdoor pollutants, crucial for maintaining a comfortable and healthy living environment.

The American Lung Association (ALA) recommends using building materials that are low-VOC and contain no formaldehyde chemicals to keep indoor air quality safe¹. QUIK-SHIELD® spray foam insulation products meet ALA recommendations and also meet the highest GREENGUARD® standard: Gold Certification.

TEMPERATURE CONTROL

Both closed-cell and open-cell spray foams are air impermeable at a minimum specified thickness. This qualifies them as air barrier materials as defined in building codes.

In conjunction with the components of the building envelope, spray foam provides a quick path to a tight building envelope, which is key to building energy efficiency. This feature allows for longer lasting heating/cooling conditions by

maintaining thermostat settings. Reduced air leakage increase occupant comfort and lower heating and cooling loads.

Addressing uncontrolled air leakage through sealing the building envelope can provide significant cost savings. Homeowners living in a fully sealed home save an average of 40% on heating and cooling bills². In most cases, the pay-back time from installing spray foam insulation in a home is instantaneous.

Although traditional insulations such as fiberglass, cellulose, rockwool etc. can easily meet the code prescribed R-values, their air permeable properties and typical installation methods do not translate to the same energy performance as spray foam. A home is significantly compromised with traditional insulation methods in comparison to a home with a sealed building envelope, regardless of how much R-value is used.

INFINITE COMFORT

Spray foam insulation will last for the life of the building. Retouches or replacement of the foam is not necessary after the home is completed. In other words, the excellent performance properties of spray foam will provide infinite comfort to residents.

1. "New Construction and Remodeling Tips", - American Lung Association, 2019
2. Energy saving verified in numerous climate zones using residential energy modeling software.

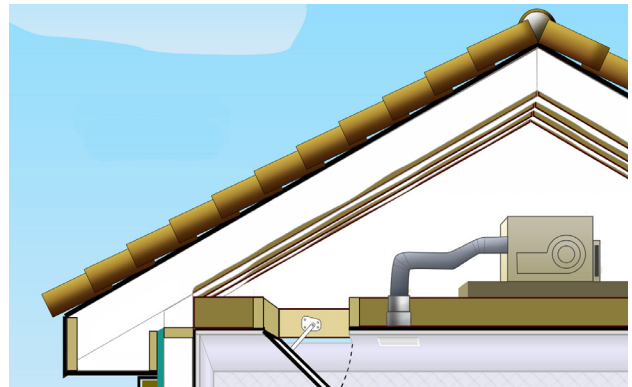


R-20 SPRAY FOAM OUTPERFORMS R-38 FIBERGLASS

R-value alone is not a direct reflection of energy performance on a building. Energy modelling proves that a side-by-side comparison of a code prescribed, installed, air permeable insulation, R-38 fiberglass, versus a reduced prescribed requirement, R-20 SPF, significantly reduces the energy consumption of the code-approved, air permeable insulation. This clearly shows that the largest contributor to energy performance is air leakage and not R-value.

R-20 Spray Foam Unvented Attic

In an unvented attic, spray foam insulation is applied under the roof deck as a seamless air barrier that completely seals the roof. This makes the attic part of an energy-efficient semi-conditioned space and allows HVAC units to work in a much better ambient environment, allowing them to perform closer to design parameters.

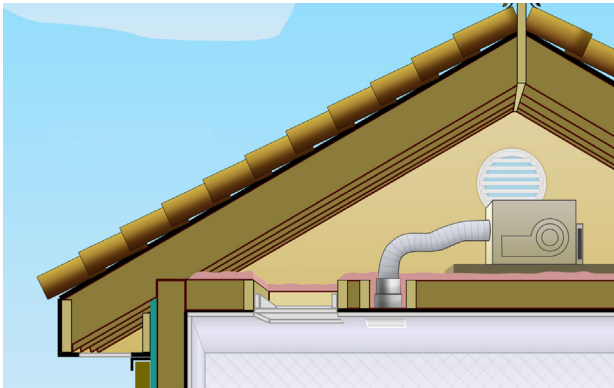


No Escaping Heat

Minimal to no snow is melting on the roof of the home as a result of spray foam's seamless insulation that does not let conditioned air escape.



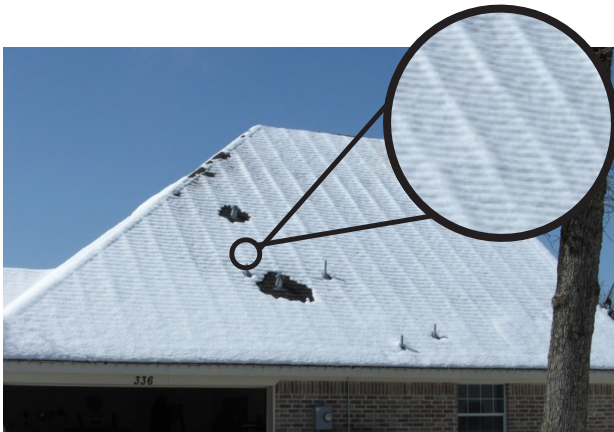
R-38 FIBERGLASS Vented Attic



Typical vented attic systems have traditional air permeable insulation installed on the floor of the attic. The venting system uses combination of soffit, ridge, and gable vents to allow air to move through the attic. With this system, conditioned air from the home can escape through the air permeable insulation between the living space and the attic. Unconditioned air entering the attic through ventilation openings can easily pass to the occupied space through the air permeable insulation, adding heating/cooling loads in the conditioned space. Additionally, it is typical to have mechanical equipment/ducts in the attic space subject to extreme temperatures such as hot in the summer and cold in the winter which dramatically reduce the efficiency of these systems.

Escaping Heat

An outline of the roof trusses can be seen due to heat escaping from the living space through the attic and melting the snow.



Photos from Dallas Texas metro area of two homes across the street from one another. To get a fair comparison and factor out snow melt from the Sun, both roof photos were taken with the snow exposure facing North.

QUIK-SHIELD® GREENGUARD® Gold Certification

SWD Urethane's QUIK-SHIELD® spray foam insulation products have received certification from the UL Environment GREENGUARD® Environmental Institute. The GREENGUARD® certification is given to products that promote a healthy and safe indoor environment

QUIK-SHIELD® open-cell and closed-cell products have met the highest GREENGUARD® standard: GOLD Certification. Products meeting this strict standard for indoor air quality are certified safe and healthy for indoor environments where the occupants may be particularly sensitive to indoor air quality, such as schools, daycares, and retirement homes.



BONUS ROOMS

SPRAY FOAM APPLICATION AREAS



Vented Attics

Insulation is applied to the floor of the attic to create a boundary between conditioned space and ambient conditions. Installing spray foam in vented attics increases energy efficiency in homes.



Unvented Attics

In an unvented attic, the roof deck is insulated with spray foam, completely sealing the building envelope. This eliminates the need for attic ventilation, makes a better thermal environment for mechanical equipment/ductwork, and allows equipment to work more efficiently.



Interior Acoustical Walls

The purpose of insulating any interior wall is for noise reduction. Open-cell foam forms a good air barrier and sound dampener.¹



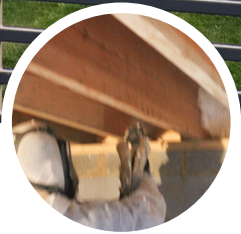
Exterior Walls

Large surface areas are subject to high air-leakage potential and temperature extremes. Spray foam provides an impermeable air-barrier¹ with a high R-value for long-term durability and energy-efficiency.



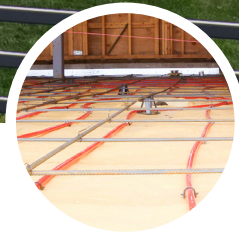
Bonus Rooms

Bonus rooms are typically built over a garage. It is recommended to insulate the ceiling of the garage/floor of the bonus room with spray foam to maintain the energy efficiency of the building.



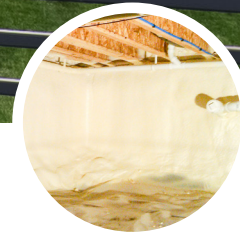
Rim Joists

Rim joist areas have a high air leak potential which is why it is critical to air-seal these with spray foam to optimize energy efficiency.



Under Slab

Closed-cell spray foam is superior to conventional ways of insulating foundation slabs. Spray foam is not damaged during the construction phase, unlike the way board stock products can be.



Unvented Crawl Spaces

The walls are insulated and ventilation is eliminated. This puts the mechanical equipment/ductwork into a more favorable environment that is closer to the temperature and relative humidity of the directly conditioned space above.



Vented Crawl Spaces

The top of the crawlspace is insulated at the boundary of directly conditioned space and ambient conditions. Spray foam allows the home to have warm floors during the heating season, and its air barrier properties promotes superior energy-efficiency.

1. QUIK-SHIELD open-cell spray foam has been tested to ASTM C-423 for sound and ASTM E-283 for air barrier properties.

COST OF SPRAY FOAM VS FIBERGLASS

On the surface, traditional insulation seems cheaper, but there are hidden costs to fiberglass and money-saving benefits to spray foam.

HOME BUYER INITIAL COST OF INSTALLATION

	Spray Foam	Fiberglass
Cost of Insulation	\$4,785	\$1,715
Attic Ventilation	\$0	\$400
Radiant Barrier	\$0	\$300
Duct Insulation	\$0	\$200
Air Sealing Recessed Lighting	\$0	\$100
Larger Heating & Cooling Equipment	\$0	\$1,000
Total Installation Cost	\$4,785	\$3,715

HOMEOWNER ENERGY COSTS

Average Monthly Heating/Cooling Bills	\$54	\$107
Monthly Savings Over Fiberglass	\$53	

HOME BUYER COST ON MORTGAGE

Monthly Cost on a 30 Year Mortgage (at 4.5%)	\$24	\$18
Spray Foam Monthly Difference	\$6	

\$53	-	\$6	=	\$47
Spray Foam Monthly Energy Savings Over Fiberglass		Spray Foam Additional Monthly Cost on a 30 Year Mortgage		Homeowner's Net Savings Over Fiberglass per Month

2,000 sq. ft. home in the Dallas, TX area using 5.5" of open-cell foam in the attic and 3.5" in the walls. Compared to R-30 blown fiberglass in the attic and R-13 in the walls. Prices vary by region. Fiberglass homes without an air barrier may not pass local code inspection for air tightness.

Homeowners' Experience Living In A Home With Spray Foam

SWD Urethane spoke with homeowners living in a home with spray foam insulation to understand their experience. Below are some of the results gathered regarding their home's overall comfort level and energy savings.

86%

of homeowners noticed lower energy bills

90%

of homeowners feel their home has less dust

82%

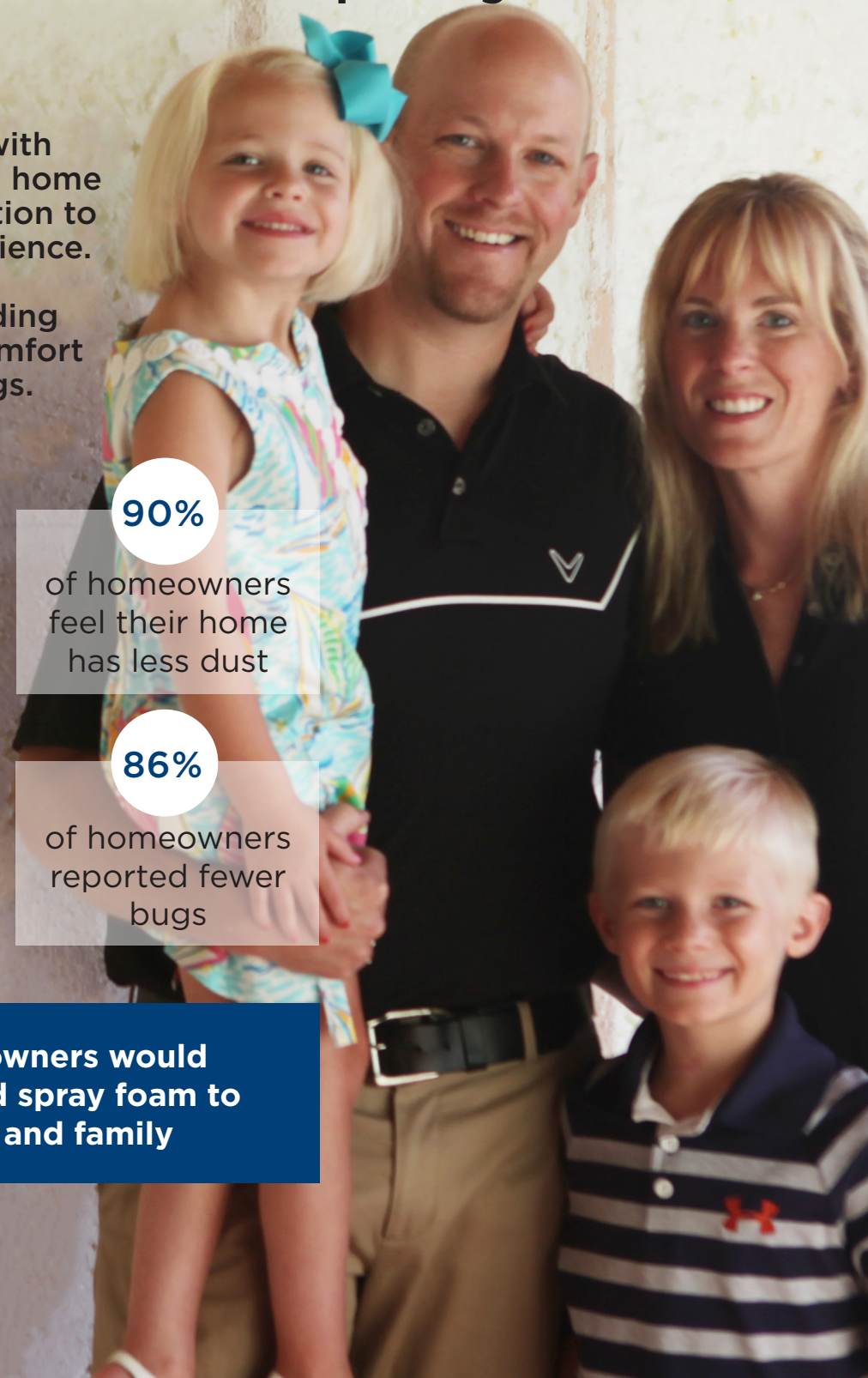
of homeowners experience less outside noise

86%

of homeowners reported fewer bugs

92%

of homeowners would recommend spray foam to friends and family



SPRAY FOAM OVERALL VALUE

Spray foam insulation has been proven to:

- Increase Energy Efficiency
- Improve Indoor Air Quality
- Eliminate the Risk of Mold Growth
- Control Pollutants
- Prevent Insect Entry Through Walls
- Provide Wall-to-Wall Temperature Comfort
- Reduce Noise Pollution
- Increase Structural Durability
- Resist Flood Damage
- Boost Home Resale Value
- Promote Sustainable Living
- Reduce Waste





At SWD Urethane we invest heavily in state-of-the-art Research and Development, enabling us to produce industry leading products that exceed our partners' expectations. SWD has specialists that can provide professional assistance on building science, product recommendations, or contact information for certified spray foam contractors across the nation.

**Contact us at
800-828-1394
swdurethane.com**

for more information on our QUIK-SHIELD® spray foam insulation products.

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