

Spray Polyurethane Foam.
Separating fact from fiction.



Owens Corning® Insulation Solutions



An investment you can trust.

For more than 70 years, Owens Corning has been committed to providing quality building solutions that meet the needs of the contractors and builders who work with our products, as well as the expectations of the homeowners who live with them day in and day out. We believe in performance that provides greater energy efficiency and comfort without sacrificing safety, sustainability and cost. As the building materials industry advances, it's important to thoroughly test materials and installation procedures.

Spray Polyurethane Foam (SPF) is a manufactured-on-site form of building insulation that has gained some acceptance in recent years. SPF is typically composed of two chemical components that, when combined in prescribed ratios by a properly trained and protected installer, can be an effective insulator. SPF is also available in two varieties — open cell and closed cell — each with specific installation requirements and/or performance attributes that make them more or less suitable for home applications. Due to its lower price point, open cell Spray Polyurethane Foam is used much more frequently than closed cell, although installed prices for both variants are typically higher than that of fiberglass insulation.

In this brochure, we will examine the characteristics of Owens Corning® PINK® FIBERGLAS™ insulation and open and closed cell Spray Polyurethane Foam insulation in five critical areas that impact quality of life and the value of a home over time: Safety, Performance, Installation, Environmental Impact and Accountability. PINK® FIBERGLAS™ blanket and loosefill insulation offers superior performance over both types of Spray Polyurethane Foam. It's also a better investment.

Take a look for yourself as we separate fact from fiction. Citations are found at the bottom of each page and on www.insulatewithintegrity.com, where there is additional information on this topic.

STOP!
Before you
consider SPF,
consider the facts.



- **SPF is manufactured on site and its performance is highly dependent on properly trained installers.**
- **SPF creates the potential for moisture buildup, a common cause of wood-based building failures.**
- **SPF cannot provide a complete air-sealing solution and does not seal the top or bottom plate.**
- **SPF lengthens the build cycle by stopping all other construction activity for up to 72 hours.**
- **SPF costs more to install with no performance increase over other air-sealing and insulation systems.**

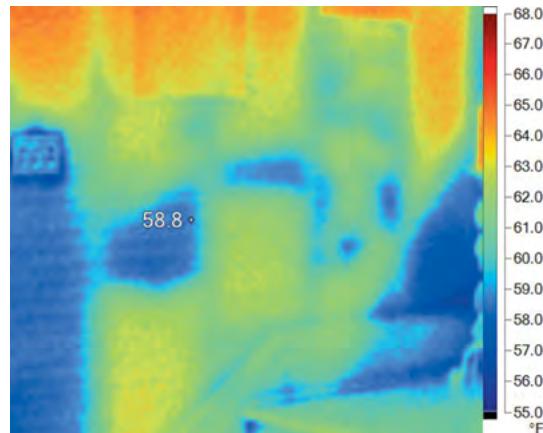
PERFORMANCE

Spray Polyurethane Foam entered the residential building industry as both an insulator and an early air-sealing solution. However, recent advancements in building science, along with Owens Corning's groundbreaking air-sealing study, give us a better understanding of the impact air leakage has on a home's performance. We now know that most air leakage occurs where components are joined, not in framing cavities where most insulation is installed. Extensive research shows that once a building is sealed, R-value, not insulation type, is all that matters for thermal performance.¹ Owens Corning understands that insulating and air sealing are two separate concerns that require dedicated solutions. SPF is only a partial solution that adds cost.

▼ Owens Corning® PINK® Insulation solutions allow installers to meet and field-verify specific R-value performance targets.



▼ SPF, when improperly installed or left to untrained installers, will often not perform to expectations. Blue areas in this thermographic image indicate underinsulation. [Photo credit: thermal-inspection.net]



PERFORMANCE categories	Fiberglass insulation solutions	SPF
Thermal Performance	<p>Product quality is managed by Owens Corning during manufacture in a controlled environment with frequent quality control checks.</p> <p>Fiberglass insulation is easily inspected to ensure performance.</p>	<p>Installed in a properly sealed building, SPF can deliver intended R-value and thermal performance.¹</p> <p>However...</p> <p>Shrinkage occurs when SPF has been incorrectly manufactured at the job site and/or installed while framing lumber is wet, a real-world condition in the new home construction process. This shrinkage creates gaps in the building envelope, compromising thermal performance and increasing the potential for thermal convection looping and moisture damage.²</p> <p>SPF advocates often claim credit for air sealing as a way to offset insulating to the full R-value. However, building science does not support these claims.¹</p>
Moisture Control	<p>Experiments and analysis continually provide data confirming that PINK® FIBERGLAS™ outperforms SPF in similar conditions.</p> <p>Historical data shows that buildings insulated with fiberglass are resistant to moisture issues.</p>	<p>Building failures have occurred in wall system experiments. Moisture management is an emerging problem tied to the use of SPF that has been known to contribute to structural damage. Guidance for proper use of SPF is not available for all climate zones.³</p> <p>OSB and plywood manufacturers, as well as the Engineered Wood Association, are beginning to provide recommendations to avoid the use of SPF under roof decks or adopt moisture management construction methods that are expensive and challenging to build.⁴</p>
Air Sealing	<p>EcoTouch® Insulation paired with EnergyComplete® Sealant meets R-value targets while sealing the most critical air leakage points in a home.⁵</p> <p>The most important leaks are best sealed with a gasketing material. EnergyComplete® Sealant is an air-sealing solution that creates a gasket to reduce both air leakage and noise penetration.</p>	<p>While SPF is often marketed as a dual solution that can provide air sealing and insulation, it leaves many sources of air leaks unsealed and therefore is not a complete air-sealing solution.¹</p> <p>SPF does not form a gasket.</p>

1. Source: http://www.buildingscience.com/documents/special/content/thermal-metric/BSCThermalMetricSummaryReport_20131021.pdf

2. Source: Spray Polyurethane Foam Uses in Modern Building Construction Applications and Limitations: The perspective of a system failure investigator. *Build Boston*, 2010. Ned Lyon, Simpson Gumpertz & Heger

3. Source: http://web.ornl.gov/sci/buildings/2010/B11%20papers/129_Yuan.pdf

4. Source: http://products.roymartin.com/sites/default/files/productdocs/disclaimer_for_undersheathing_spray-foam_application.pdf
Wood Moisture Content and the Importance of Drying in Wood Building Structures (TT-111A). (2011). APA.

5. Source: <http://ocenergycomplete.com/docs/literature/EnergyComplete%20White%20Paper%20Brochure.pdf>

INSTALLATION

Owens Corning understands the building industry and the importance of maintaining a production schedule. For us, simplicity matters because it matters to contractors and builders. Our PINK® FIBERGLAS™ Insulation products come to the job site ready to install, with no mixing or complicated equipment required.



► Owens Corning® EcoTouch® Insulation installs safely and easily without the need for extensive safety equipment. Other trades can continue to work during installation.

▼ NIOSH recommends that SPF installers wear extensive personal protective equipment including full-face supplied-air respirators and chemical protective clothing during installation.¹ The home must be quarantined for up to 72 hrs.³



INSTALLATION categories	Fiberglass insulation solutions	SPF
Worksite Management	No risk of chemical exposure. Minimal off-shelf protective gear is needed.	The National Institute for Occupational Safety and Health (NIOSH), Occupational Safety and Health Administration (OSHA) and the Environmental Protection Agency (EPA) recommend that SPF installers wear extensive personal protective equipment, including full-face supplied-air respirators and chemical protective clothing, during installation. ¹
Application Training	Owens Corning provides training materials to our network of installers and the industry to ensure product performance and the highest level — Grade 1 — installations.	OSHA strongly recommends that SPF installers be trained due to the potential exposure to hazardous chemicals and the associated risks. ² Initial training lasts from 5 to 7 days and can be quite costly.
Build-cycle Management	No one is required to leave or stay away from the job site when installing Owens Corning® products. Drywall can be installed immediately with no wait time.	The health risks associated with Spray Polyurethane Foam chemical exposure require that other trades vacate the job site during installation and for up to 72 hours after. ³ Drywall installers often must spend additional time removing overspray from framing prior to drywall installation.

1. Source: http://www.epa.gov/dfe/spf_presentation_2009_epa_osa_niosh_cpse.pdf
http://www.epa.gov/dfe/pubs/projects/spf/health_concerns_associated_with_chemicals_in_spray_polyurethane_foam_products.html
<http://www.sprayfoam.org/files/docs/2011/Agency%20Report%20-%20NIOSH.pdf>
http://www.epa.gov/dfe/pubs/projects/spf/exposure_potential.html

2. Source: <http://www.sprayfoam.org/files/docs/2011/Agency%20Report%20-%20NIOSH.pdf>

3. Source: http://www.epa.gov/dfe/pubs/projects/spf/when_is_it_safe_to_re-enter_after_spf_installation.html
<http://www.sprayfoam.org/files/docs/2011/Agency%20Report%20-%20NIOSH.pdf>

SAFETY

Owens Corning takes safety seriously. We believe that further research is needed to define the safe use of Spray Polyurethane Foam chemicals. The job-site manufacturing process of SPF includes many variables. Like any science experiment, if those variables are altered, outcomes can be affected. OSHA, NIOSH and the EPA have voiced concerns about worker and job-site safety, as well as concerns about the health effects of SPF.¹ We believe safety must come first.

► (left) Owens Corning® EcoTouch® Insulation is soft to the touch and has only a slight potential for minor skin irritation.

► (far right) SPF installers must wear extensive personal protective equipment.



SAFETY categories	Fiberglass insulation solutions	SPF
Manufacturing Process	Owens Corning controls the manufacturing process — and quality control — of its PINK® FIBERGLAS™ insulation.	Job-site manufacturing puts an extreme burden on the SPF installer to avoid increased emissions and exposure to Volatile Organic Compounds (VOCs). ² Installers must wear extensive personal protective equipment, including full-face supplied-air respirators and chemical protective clothing, to protect against emissions. ³
Fire/Combustibility	Owens Corning® products are easy to install and do not cause health concerns for installers, other on-site workers or homeowners. There is no emission risk and fiberglass is not combustible.	Firefighting organizations are expressing concerns about the ignition and fire-spread hazards associated with SPF. ⁴ Because closed cell SPF cures via exothermic reaction, it must be built up in a series of less than 2" thick layers that must fully cure before the next layer is applied. Rushing this process traps heat generated during the curing process and has resulted in charring and self-ignition within the framing cavity. ⁵ The Smoke Development Index (SDI) of unfaced Owens Corning® EcoTouch® Insulation is zero, as compared to Spray Polyurethane Foam with a typical SDI rating of less than 450.
Off-gassing/Indoor Air Quality	Fiberglass poses no risk of harmful off-gassing.	Articles found on sprayfoamsafety.com recognize the need for further investigation into off-gassing. "The potential for off-gassing of volatile chemicals from Spray Polyurethane Foam is not fully understood and is an area where more research is needed." ⁶

Colors represent Owens Corning's assessments of the facts presented.

1 Source: https://www.osha.gov/dep/greenjobs/spf_chemical.html
<http://www.sprayfoam.org/files/docs/2011/Agency%20Report%20-%20NIOSH.pdf>
http://www.epa.gov/dfe/pubs/projects/spf/spray_polyurethane_foam.html
http://www.epa.gov/dfe/spf_presentation_2009_epa_osa_niosh_cpsc.pdf

2 Source: http://www.epa.gov/dfe/pubs/projects/spf/exposure_potential.html
<http://www.sprayfoam.org/files/docs/2011/Agency%20Report%20-%20NIOSH.pdf>
http://www.epa.gov/dfe/pubs/projects/spf/health_concerns_associated_with_chemicals_in_spray_polyurethane_foam_products.html

3 Source: http://www.epa.gov/dfe/pubs/projects/spf/steps_to_control_exposure.html#contractors
<http://www.sprayfoam.org/files/docs/2011/Agency%20Report%20-%20NIOSH.pdf>
https://www.osha.gov/dep/greenjobs/weather_ppe.html
http://www.epa.gov/dfe/spf_presentation_2009_epa_osa_niosh_cpsc.pdf

4 Source: <http://www.firemarshals.org/greenbuilding/bridgingthegap.html>

5 Source: <http://www.greenbuildercollege.com/studyguides/BaySystemsSprayInsulation.pdf>
<http://www.volatilfree.com/pdfs/product-data/VFI-714.pdf>

6 Source: http://www.epa.gov/dfe/pubs/projects/spf/exposure_potential.html#potentialoffgassing

ENVIRONMENTAL IMPACT

Our commitment to environmental sustainability, in our operations and our products, is aggressive and among the best in the industry. We are committed to meeting the needs of our industry to achieve higher performing homes that are energy efficient, comfortable, durable and sustainable. We call this "Green Without Compromise."

- Approximately one-fifth of the material used in a typical open cell SPF job is waste that goes to a landfill.²



ENVIRONMENTAL categories	Fiberglass insulation solutions	SPF
Product Composition	EcoTouch® is a new class of high-performance insulation made with 99% natural materials and a minimum of 58% total recycled content (36% post-consumer recycled content). It is GreenGuard Gold Certified and formaldehyde-free.	The majority of SPF products are synthetic chemical-based.
Product Impact	Life Cycle Assessment (LCA) and Environmental Product Declarations (EPD) verified data show that Owens Corning® EcoTouch® Insulation has a lower embodied primary energy and global warming potential than SPF formulations. They also show PINK® FIBERGLAS™ batts and loosefill insulation consistently perform better than SPF in acidification, smog and ozone depletion measurements.	Open cell SPF embodied energy is 3 times higher than Owens Corning® EcoTouch® unfaced Insulation, and its Global Warming Potential is 2 times higher. ¹ The Embodied Energy of closed cell SPF is 14 times higher than Owens Corning® EcoTouch® Insulation, and its Global Warming Potential is 55 times higher. ¹ Approximately one-fifth of the material used in a typical open cell SPF job is waste that goes to a landfill. ²
Life Cycle	The details and environmental impact of Owens Corning® processes and product makeup are well-documented in Life Cycle Assessment and Environmental Product Declarations (EPDs). ³ EPDs are on file and online. Results have been peer-reviewed and verified by ULEnvironment. Owens Corning published the North American fiberglass insulation industry's first EPD in 2012.	A generic SPF industry Life Cycle Assessment is on file and online. Results have been third-party verified and peer-reviewed. ⁴ To date, individual manufacturer Environmental Product Declarations are not available.

THIRD-PARTY VALIDATION					
EcoTouch® PINK® FIBERGLAS™ insulation solutions					



For the fourth year in a row, Owens Corning has earned placement in the Dow Jones Sustainability World Index in recognition of its sustainability initiatives. This year, Owens Corning was named the Industry Leader for the DJSI World Building Products component.

1. Source: http://productguide.ulenvironment.com/productDocuments/1807/15/SPFA_101.1_TS_SPFIInsulationClosedCellMediumDensity_10October2013.pdf
http://productguide.ulenvironment.com/productDocuments/1807/15/SPFA_101.1_TS_SPFIInsulationOpenCellLowDensity_10October2013.pdf

2. Source: <http://www.masonknowles.com>

3. Source: <http://www.ocbuildingspec.com/learncenter.aspx?id=178422&sessionid=3-1F703F69-3255-4585-B7DD-72588EC8038C&page=11#product>

4. Source: http://productguide.ulenvironment.com/productDocuments/1807/15/SPFA_101.1_TS_SPFIInsulationClosedCellMediumDensity_10October2013.pdf
http://productguide.ulenvironment.com/productDocuments/1807/15/SPFA_101.1_TS_SPFIInsulationOpenCellLowDensity_10October2013.pdf

ACCOUNTABILITY

Owens Corning controls the quality and performance of our products from design through manufacturing, and we maintain a close relationship with builders, contractors and consumers. We proudly stand behind every product we manufacture and sell and fully support the people who install them.

► OSB and plywood manufacturers, as well as the Engineered Wood Association, are beginning to provide recommendations to avoid the use of SPF under roof decks due to rot. (Photo credit: The Florida Roofing, Sheet Metal, and Air Conditioning Contractors Association)



ACCOUNTABILITY categories	Fiberglass insulation solutions	SPF
Product Stewardship	Fiberglass wool is among the most studied materials, and the International Agency for Research on Cancer, the National Toxicology Program and California Prop 65 do not consider that fiberglass wool causes cancer in humans.	Organizations such as OSHA, NIOSH and the EPA have expressed concerns about worker and job-site safety, as well as health effects. ¹
Install Standards	Owens Corning is committed to quality from manufacture through installation. Our PINK® FIBERGLAS™ products minimize field failure issues.	SPF must be manufactured at the job site, typically using a truck-mounted rig with several pieces of equipment. Failures related to improper field manufacturing are well-documented. Surface conditions, equipment, operator skill and weather all tend to alter product performance. ²
Product Liability	None.	Leading environmental, safety, health and building product manufacturer organizations have raised concerns over the use of Spray Polyurethane Foam in the built environment.

1. Source: https://www.osha.gov/dep/greenjobs/spf_chemical.html
<http://www.sprayfoam.org/files/docs/2011/Agency%20Report%20-%20NIOSH.pdf>
http://www.epa.gov/dfe/pubs/projects/spf/spray_polyurethane_foam.html
http://www.epa.gov/dfe/spf_presentation_2009_epa_osa_niosh_cpsc.pdf

2. Source: <http://www.greenbuildercollege.com/studyguides/BaySystemsSprayInsulation.pdf>
<http://www.volatilfree.com/pdfs/product-data/VFI-714.pdf>
Spray Polyurethane Foam Uses in Modern Building Construction Applications and Limitations: The perspective of a system failure investigator. Build Boston, 2010. Ned Lyon, Simpson Gumpertz & Heger



Choose performance over perception.

In the end, there's one simple reason that we at Owens Corning recommend PINK® FIBERGLAS™ solutions over Spray Polyurethane Foam: It works. We've built our reputation on knowing how it works, where it works best and what's important to builders, contractors, businesses and homeowners. And we're just as concerned about performance as we are about safety, reliability and sustainability. We are often asked, "Why isn't Owens Corning in the SPF business?" Now you know. To stay informed, go to www.insulatewithintegrity.com.



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