



# The Wide Range of Millennium Bonding Adhesives for Membrane Roofing



H.B. Fuller | Construction Adhesives



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## INSULATION ADHESIVES

# Millennium PG-1 EF ECO

### DESCRIPTION

Millennium PG-1 EF ECO is a two component, low rise, solvent-free, polyurethane foamable adhesive that contains no high Global Warming Potential (GWP) propellants. Application is quick & easy and adhesive sets in minutes resulting in significant labor savings for the contractor. Millennium PG-1 EF ECO is packaged in dual pressurized canisters and dispensed utilizing a disposable adhesive applicator assembly and twenty-five-foot hoses. Millennium PG-1 EF ECO does not contain HFC-134a or other high Global Warming Potential (GWP) propellants. This product is approved for use in all US and Canadian markets that regulate ozone-depleting substances.

### BASIC USE

Millennium PG-1 EF ECO is designed for use as an adhesive for bonding approved roof insulations to a building's structural roof deck, base sheets, other insulation board stock, and smooth or gravel built-up asphaltic roof surfaces. Millennium PG-1 EF ECO is also designed for fleeceback membrane attachment in ribbon or spatter applications. It is dispensed in 1" – 1.5" (2.5cm – 3.8cm) wide beads or in a spatter application using our proprietary dual-purpose static mixer. Our unique design allows both ribbon and spatter applications from a single static mixer. Millennium PG-1 EF ECO expands and rises to fill minor surface irregularities.

### APPROVED INSULATIONS AND SUBSTRATES

- Polyisocyanurate (PolyISO)
- Expanded Polystyrene (EPS)
- Extruded Polystyrene (XPS)
- Mineral wool
- Gypsum cover board
- Asphaltic cover boards
- Cementitious wood fiber
- HD wood fiber
- HD Polyiso Cover Board
- Concrete
- Gypsum roof deck
- Wood or steel
- Lightweight insulating concrete
- Modified bitumen membranes and base sheets (sanded or granule surfaced)
- Approved insulations (multi-layer applications)
- Smooth or gravel surface asphaltic built-up roof (re-roof applications)

For a complete list of approved substrates and insulation types, or for additional information, contact our Technical Department.

### SAFETY

Prior to working with Millennium PG-1 EF ECO or any adhesive product consult product label and Safety Data Sheet (SDS) for necessary health and safety precautions.



### FEATURES

Contains no CFC or HCFC, high global warming potential propellants

Proprietary spray nozzle allows for multiple applications through a single static mixer

VOC content <50 g/L

No extra equipment required

Faster and easier application than using mechanical fasteners

Solvent free formula

Eliminates Thermal Bridging

### BENEFITS

Using no high GWP propellants ensure PG-1 EF ECO meets all current national and state regulations.

Millennium PG-1 EF ECO can be used for spatter or ribbon application depending on the need, increasing productivity and limiting products needed on the job.

Ultra low VOC content formula is approved for use in all OTC and SCAQMD regulated regions.

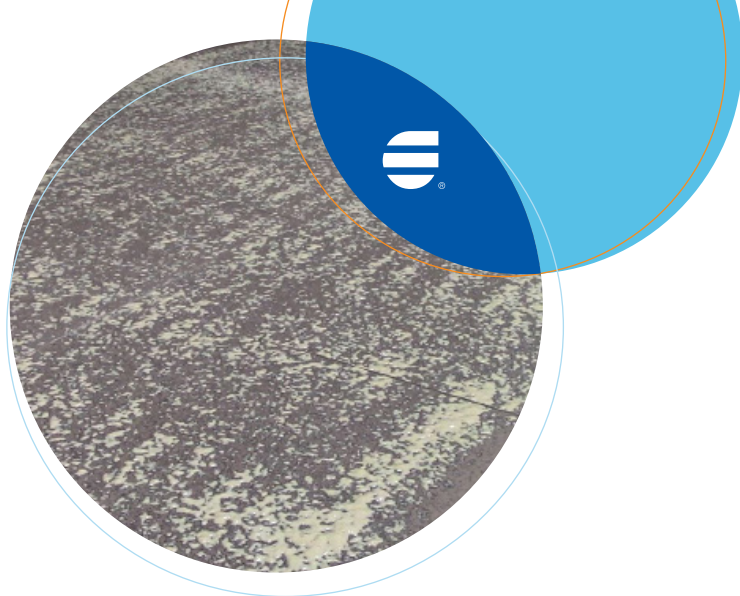
Applicator, hose, and all accessories needed are included with each canister set, ensuring there is no extra equipment or additional steps needed.

Millennium PG-1 EF ECO eliminates potential for roof deck corrosion and disruption of building occupants due to fastening.

Millennium PG-1 EF ECO contains no solvents, making it suitable for use with EPS and XPS insulation in addition to PolyISO.

Using Millennium PG-1 EF ECO in lieu of mechanical fasteners eliminates thermal bridging and ensures maximum R-Value.





## SURFACE PREPARATION

All work surfaces should be clean, dry, and free of dirt, dust, debris, oils, loose and/or embedded gravel, un-adhered coatings, deteriorated membrane and other contaminants that may result in a surface that is not sound or is uneven. For re-cover applications over gravel surfaced BUR apply Millennium Universal Primer prior to the application of Millennium PG-1 EF ECO. For applications over fresh and/or non-oxidized asphalt, coal tar or plastic film membranes, Millennium Surface Treatment may be required prior to the application of Millennium PG-1 EF ECO.

## STORAGE

Keep temperature of contents between 60°F to 90°F (16°C to 32°C). Bring temperature of material to approximately 70°F (21°C) for approximately 24 hours before use. Do not store in direct sunlight or above 95°F (35°C). Store canisters valve side up. KEEP FROM FREEZING! Millennium PG-1 EF ECO has a shelf life of 12 months when stored properly.

## COLOR

Part 1 - Amber  
Part 2 - Clear

Foamed Adhesive will appear as a homogeneous light amber color with no streaking or marbling.

## PACKAGING

Millennium PG-1 EF ECO is available in the following packages:

Package Size	Part #	Canisters/Pallet
Part 1, 49# Canister	PG-SPECO-A01	36
Part 2, 43# Canister	PG-SPECO-B01	36

Part 1 and Part 2 canister and packaged in individual labeled boxes. The Part 1 box will contain one applicator, hoses, four dual-purpose static mixers, a wrench, petroleum jelly and a set of gloves.

## LIMITATIONS

- Do not apply to wet surface.
- Not recommended for use with insulation boards larger than 4'x4' (1.2m x 1.2m).
- Do not use warped or curled insulation boards. All insulation boards must lay flat upon the roof surface.
- **Do not apply when temperatures are below 40°F (4°C).**

PROPERTY	VALUE
Skin Time*	5-8 Minutes
VOC Content	<50 g/L
Coverage Rate (Ribbon Application)	Up to 35 squares per set**
Coverage Rate (Spatter Application)	Up to 24 squares per set**
Shelf Life	12 months

\*Note conditions - i.e. Standard Temperature/Humidity Conditions (~70F / 50% RH)

\*\*Coverage rate estimates indicate total square feet of insulation attachment per kit. Rates are based on an application pattern of 4 (four) 1" – 1.5" (2.5cm – 3.8cm) ribbons spaced 12" (30cm) o.c. per 4' x 4' (1.2m x 1.2m) insulation board. Coverage rates may be lower when used over irregular surfaces.

## APPROVALS



For more information about our company, visit [www.hbfuller.com/roofing](http://www.hbfuller.com/roofing).



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MEMBRANE ADHESIVES

# Millennium PG-1 Pump Grade Adhesive

## Fleeceback Membrane Adhesive

### DESCRIPTION

Millennium PG-1 Pump Grade Adhesive is a two component, essentially VOC free, all purpose, low rise, polyurethane foamable adhesive that contains no solvents and sets in minutes. It is approved for use in VOC regulated markets such as California and other OTC States.

Application is quick and easy resulting in significant labor savings for the contractor. Millennium PG-1 Pump Grade Adhesive is dispensed through any of the application tools designed for 2-part urethane including the Patented Multi-Bead\* and Multi-Bead Plus\*\* applicators, the Patented Millennium Cyclone pump cart\* (by Garlock), or an approved low pressure pump cart which equally mixes Part 1 and Part 2 of the adhesive.

### BASIC USE

Millennium PG-1 Pump Grade Adhesive is designed for use as an adhesive for bonding approved fleece backed single ply membranes (TPO, PVC, EPDM) to a building's structural roof deck, base sheets, insulation boards, and smooth surfaced built-up and modified bitumen roof surfaces. It is dispensed in 3/4" to 1" (1.9cm - 2.5cm) wide liquid beads that will quickly spread to a width of 2-3 inches. The adhesive will expand and rise to fill minor surface irregularities.

### APPROVED INSULATIONS AND SUBSTRATES

- HD wood fiber
- Polyisocyanurate
- Polystyrene (XPS & EPS)
- Gypsum cover board
- Asphaltic cover boards
- Concrete
- Gypsum roof deck
- Cementitious wood fiber
- Wood or steel
- Mineral wool
- Lightweight insulating concrete
- Modified bitumen membranes and base sheets (sanded or granule surfaced)
- Approved insulations (multi-layer applications)
- Smooth built-up roof (re-roof applications)

### SAFETY

Prior to working with this or any adhesive product consult product label and Safety Data Sheet (SDS) for necessary health and safety precautions.

### LIMITATIONS

- Do not apply to wet or damp surfaces.
- Not recommended for use with insulation boards larger than 4' x 4' (1.2m x 1.2m).
- Do not use warped or curled insulation boards. All insulation boards must lay flat upon the roof surface.
- Do not apply when temperatures are below 25°F (-4°C).

### EQUIPMENT

- Patented Multi-Bead Plus\*\*
- Patented Multi-Bead\*
- Battery Powered Single Bead
- Pneumatic Single Bead
- Ultra Drive Manual Applicator
- Heavy Duty Manual Applicator
- Patented Millennium Cyclone+ (by Garlock)
- Graco Predator E-10 Reactor
- Graco Predator
- Adhesives Systems Technology GMP-075
- Adhesives Systems Technology PCH GMP-500

### FEATURES

### BENEFITS

Universal formula	Approved for both insulation and membrane attachment
Replaces fasteners	Minimizes penetrations, deck corrosion, and thermal bridging
Low rise foam	Accommodates minor surface irregularities
Solvent free	Essentially VOC free, approved for use in VOC regulated markets

\*US 7,506,556 B2; US D501,855 S; CA 2,493,739 C

\*\*US 9,381,536 B2

+US 9,573,150 B2; US 9,566,594 B2

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## APPLICATION

Note: Millennium PG-1 Pump Grade Adhesive can be applied when both ambient and substrate surface temperatures are at 25°F (-4°C) and rising provided the adhesives are properly stored. Millennium PG-1 Pump Grade Adhesive should be stored at approximately 70°F + (21°C+) for a minimum of 48 hours prior to use and remain in a warm storage area until ready for use on the rooftop. Storing the adhesive below the recommended application temperature range prior to use can have a negative effect on product performance which may include reducing the expected coverage rates of the adhesive, delayed or extended reaction and set up times and in some cases can alter the mix of the two components.

In the event the adhesive is exposed to cooler temperatures for an extended period of time, it must be brought back up to the recommended application temperature prior to use. The adhesive should never be allowed to freeze. Material stored and utilized at cold temperatures will be prone to crystallization of Part 1.

1. Place the cartridge into the appropriate One Step™ applicator. When using the Millennium Cyclone low pressure pump cart, connect the black Part 1 fitting to the black feed hose fitting. Connect the gray Part 2 fitting to the gray feed hose fitting. Operate the pump according to Manufacturer's instructions (see Cyclone Operator's Manual).
2. Utilize the empty cardboard container to capture adhesive pre-dispense or recycle empty cardboard containers.
3. Apply Millennium PG-1 Pump Grade Adhesive directly to the substrate, using the roof membrane manufacturer's recommended ribbon pattern to achieve proper coverage rates for membrane attachment. As adhesive is applied, allow to begin rising then place insulation board/membrane into wet adhesive and roll membrane with a weighted roller to ensure positive contact between membrane, adhesive and substrate. Do not allow the adhesive to skin over. Eliminate uneven surfaces to ensure positive contact between the insulation board and substrate.
4. Unused material can be applied at a later date by simply plugging the cartridges (with provided plugs) and using a new One Step™ mixing nozzle. When using the bladder packaging properly clean and grease dispensing wand and pump unit according to the pump manufacturer's recommendation.
5. Plastic bladders are designed for easy visibility to ensure adhesive maintains a 1:1 ratio. If material is not consumed at a 1:1 ratio stop application and check for blockage in hose or dispensing manifold.
6. Millennium PG-1 Pump Grade Adhesive provided in 50 gallon drum sets can be used with approved pump systems. The adhesives should be placed on a drum roller or agitated prior to use.

## COLOR

Foamed adhesive will appear off white to light amber.

## PACKAGING AND COVERAGE

Millennium PG-1 Pump Grade Adhesive is available in the following package:

Cartridge Size	Part #	Cartridges/Case
1.5 Liter	PG-FA15-04	4

Covers 600 sq ft (56m<sup>2</sup>) per case. Coverage estimates indicate total square feet of insulation/membrane attachment per case.

Size	Part #	Sets/Pallet
5 gal (18.9L) box, Part 1 (A)	PG-IA5B-A01	18
5 gal (18.9L) box, Part 2 (B)	PG-IA5B-B01	
15 gal (58L) drum, Part 1 (A)	PG-15DR-A01	4
15 gal (58L) drum, Part 2 (B)	PG-15DR-B01	
50 gal (189L) drum, Part 1 (A)	PG-IADR-A01	2
50 gal (189L) drum, Part 2 (B)	PG-IADR-B01	

Part 1 and Part 2 mixed through an approved low pressure pump cart will produce the following coverage rates:

5 gallon (18.9L) Kit: 2,000-2,500 sq ft (186m<sup>2</sup>-232m<sup>2</sup>)  
 15 gallon (58L) Kit: 6,000-7,500 sq ft (558m<sup>2</sup>-696m<sup>2</sup>)  
 50 gallon (189L) Kit: 20,000- 25,000 sq ft (1,860m<sup>2</sup>- 2322m<sup>2</sup>)

Coverage estimates indicate total square feet of membrane attachment per kit. Rates are based on a 3/4" to 1" (1.9cm - 2.5cm) applied adhesive ribbon spaced 12" (30cm) o.c. per 4' x 4' (1.2m x 1.2m) insulation board.

NOTE: A 3/4" - 1" (1.9cm - 2.5cm) wide uncured adhesive ribbon will produce a 3" - 4" (7.6cm - 10.2cm) wide cured adhesive bead that will rise approximately 3/4" - 1" (1.9cm - 2.5cm) above the substrate. Coverage rates may be lower when used over irregular surfaces and will vary depending on roughness.

## STORAGE

Keep temperature of contents between 45°F to 95°F (7°C to 35°C). Bring temperature of material to approximately 70°F (21°C) before use. Do not store in direct sunlight or above 95°F (35°C). Store boxes valve side up. **KEEP FROM FREEZING!**



\*Subject to the conditions of Approval when installed as described in the current edition of the FM Approval Guide.

\*US 7,506,556 B2; US D501,855 S; CA 2,493,739 C

\*\*US 9,381,536 B2

+US 9,573,150 B2; US 9,566,594 B2

++US 9,174,234 B2; CA 2,806,690 C



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MEMBRANE RESTORATION -  
SINGLE-PLY

# Millennium Sprayable Single-Ply Bonding Adhesive



## DESCRIPTION

Millennium Sprayable Single-Ply Bonding Adhesive is a fast drying, sprayable bonding adhesive for adhering Fleeceback and standard EPDM and TPO membranes to horizontal and vertical roof surfaces. The adhesive formula offers excellent adhesion and quick drying over a wide range of temperatures. Millennium Sprayable Single-Ply Bonding Adhesive is approved for use in all environmentally regulated regions per current requirements.

## BASIC USE

The adhesive is applied in a variable web spray pattern via a self-contained spray system. Product is applied full coverage to adhere Fleeceback and standard EPDM and TPO membranes to approved insulation, cover board, OSB etc. The adhesive must be applied to both the membrane and substrate to which it will be mated. Once dry the membrane can be mated to the substrate and brushed in.

## APPROVED SUBSTRATES

Acceptable substrates include: Polyiso, Polyiso HD, DensDeck® Prime, SECUROCK®, OSB, plywood, metal, residual asphalt, and clean concrete block.

Applying an initial coat of adhesive reduces the potential for asphalt bleed-through on vertical surfaces. The initial coat serves to seal the surface of residual asphalt and improves adhesion. Once the initial coat has flashed off properly, apply a second coating of Millennium Sprayable Single-Ply Bonding Adhesive to the vertical surface.

## APPROVED MEMBRANES

Fleeceback and standard EPDM and TPO membranes.

## COLOR

Pale green

## SURFACE PREPARATION

All work surfaces should be clean, dry, and free of dirt, dust, debris, oils, unadhered coatings, deteriorated membrane or other contaminants that may result in a surface that is not sound or is uneven.

## SAFETY

Millennium Sprayable Single-Ply Bonding Adhesive contains a flammable liquid propellant and vapor. Vapors from applied adhesive are heavier than air and may travel along the ground or through ventilation and ignited by pilot lights, other flames, sparks, heaters, smoking, electrical motors, static discharge, or other ignition sources. Residual vapors may ignite even though adhesive is not being applied. **Keep away from open flame.** Use in well ventilated areas. Avoid inhalation of spray mist or vapors. Appropriate PPE, gloves and goggles must be worn when using this product. Never aim spray gun at people. Read label and safety data sheet prior to use for complete safety, precaution and warning information.

## LIMITATIONS

Not for use on PVC or KEE membranes.

## EQUIPMENT

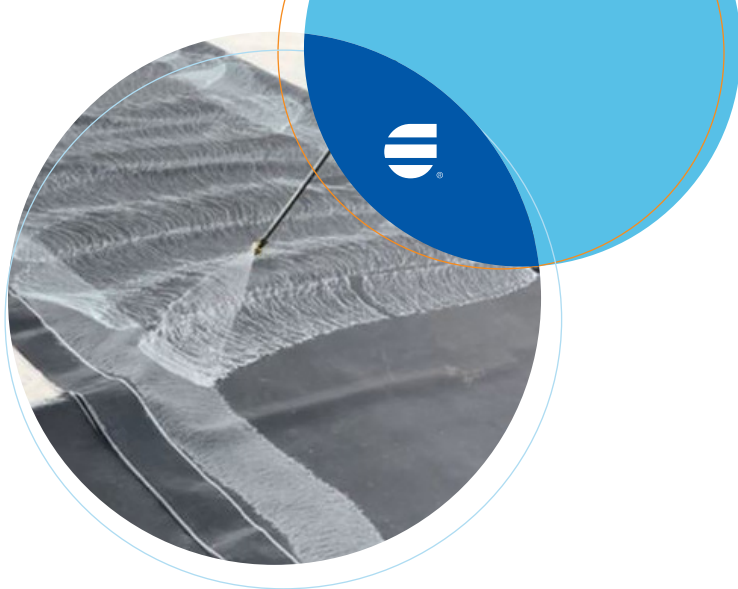
Hose and spray gun must be purchased separately.

## FEATURES

## BENEFITS

VOC <250 g/l	Approved for use in all regulated areas
Quick and easy application	Reduce labor cost, and minimal clean up
Good adhesion to EPDM, TPO & Fleeceback membrane	Tenacious bonding performance
Fast drying, <7 minutes in most conditions	Allows for faster membrane lay-in
Can be applied at low temperature (25°F)	Extended roofing season
Extended open time, up to 30 min at 160°F	Provides flexibility to installation time

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## CLEANUP

Solvent or mineral spirits can be used to clean tools and surfaces. If the spray gun valve becomes stuck, attach hose and spray gun to container of Citrus Cleaner, MEK, Acetone, Toluene, etc and trigger spray gun repeatedly until operation is smooth. If the spray gun is clogged, soak fittings in MEK, Acetone, Toluene, etc to loosen adhesive. Observe all manufacturer's safety precautions and use recommendations when using solvents.

To prevent material from hardening in spray gun and hose, do not evacuate hose and spray gun unless connecting to a new canister. Use mineral spirits to clean adhesive residue from spray gun and spray tips.

Dispose canister when all adhesive in the canister has been used, close canister valve and evacuate hose and spray gun before disconnecting hose from canister. Dispose of contents/ adhesive canister in accordance with local/ regional/national/international regulations.

## STORAGE AND SHELF LIFE

Store canister in a safe, conditioned space with temperature maintained above 70°F. Do not store canister in areas where temperatures reach 110°F or higher. Contents are flammable. Store in accordance with local, state, and federal regulations.

With the hose and applicator attached, keep canister valve open to maintain pressure in the hose and spray gun. Periodically spray in a safe manner to help prevent possible clogging. Keep spray applicator trigger locked when not in use.

Shelf life is 12 months in unopened packaging and stored at temperatures of 40°F to 100°F.

## PACKAGING AND COVERAGE

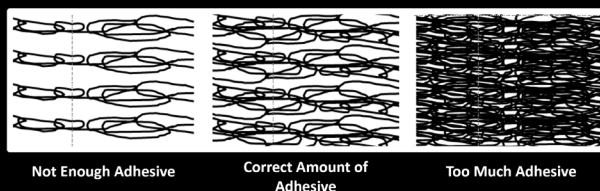
Item	Part #
#38 canister	15268-CST31A
Spray Gun	30004-004
6' Hose	30002-004
12' Hose	30001-004
18' Hose	30003-004
Extended Applicator	30005-004
Canister Flush	15413-CST8
LVOC Canister Flush	15414-CST8
Applicator Tips	30006-004

- Coverage rate is 1000ft<sup>2</sup>/canister for finished two sided application when laminating smooth field membrane to board stock/substrate. Coverage rates may vary with fleece membrane
- Coverage rate is 750ft<sup>2</sup>/canister for two sided vertical wall application when laminating smooth field membrane to wall substrate. Coverage rate for this application is decreased due to increased overlap of spray pattern for the vertical application.
- Coverage rates may be lower when used over irregular surfaces and will vary depending on roughness of membrane/substrate surfaces.

## APPLICATION

1. Shake adhesive canister for 30 seconds prior to use.
2. Attach spray gun to hose and then attach hose to adhesive canister. Open valve on canister and check connecting fittings for leaks. Once valve has been turned on, do not turn the valve off until the adhesive canister is completely empty or proper cleaning (see instructions below) is performed.
3. Millennium Sprayable Single-Ply Bonding Adhesive can be applied at ambient temperature of 25°F and above. Adhesive canister temperature must be at least 70°F prior to use for the product to spray properly. Utilize a H.B. Fuller PowerBlanket and hot boxes when necessary. Substrate must be clean, dry, and free of debris and contaminants.
4. Adjust the spray pattern/fan by slowly adjusting trigger lock to the desired pattern and locking when not in use.
5. Visually target the "Correct Amount of Adhesive" coverage pattern detailed in the image below. Typically spray with the trigger fully open, at a height of ~12 inches, and a rate ~1ft/sec to obtain "Correct Amount of Adhesive" spray pattern. Apply adhesive with proper overlap to ensure adequate adhesive coverage.

### Adhesive Spray Patterns



6. Apply Millennium Sprayable Single-Ply Bonding Adhesive in an even coat to deck substrate and membrane, keeping the spray tip approximately 12" (30.5 cm) away and perpendicular to the surface during spray. Avoid high thickness buildup.
7. For applications taking place in ambient temperature below 70°F, store adhesive canister in heated space and move to project area during application. Adhesive canisters must be kept warm on the jobsite. Dispense product from canister while it is still warm. Adhesive will begin to spit rather than spray when the adhesive in the canister is too cold. If this occurs, swap cold canister for warmer one and return cold canister to heated area. Before changing canister, close the valve on the canister and depressurize the hose. Remove the hose and attach to the new canister. Open valve and do a test spray.
8. Allow Millennium Sprayable Single-Ply Bonding Adhesive to flash-off until it does not transfer to finger when touched. Limit application to surfaces that will be covered with membrane the same day.
9. Follow OEM membrane manufacturer's guidelines when laying membrane into adhesive.



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MEMBRANE RESTORATION

# Millennium Single-Ply Bonding Adhesive EPDM/TPO



## DESCRIPTION

Millennium Single-Ply Bonding Adhesive is a solvent based contact adhesive formulated to adhere EPDM and TPO.

## BASIC USE

Adheres EPDM and TPO roofing membranes to wood, metal flashings, brick or block masonry, rooftop flashings, insulation, recover, barrier boards, and other acceptable substrates.

## APPROVED SUBSTRATES

- Wood
- Metal flashings
- Brick or block masonry
- Rooftop flashings
- Insulation
- Recover
- Barrier boards

## APPROVED MEMBRANES

EPDM and TPO.

## COLOR

Yellow

## SURFACE PREPARATION

All surfaces to be adhered should be thoroughly dry, clean, and free of dust and loose debris. Membranes and substrates should be free of oil, grease, and other contaminants.

## SAFETY

Do not use in a confined space or around heat, flame or sparks. Prevent fumes from entering building via air ventilation ducts. Avoid breathing adhesive vapors. Wear safety glasses or goggles to prevent contact with eyes. Wear gloves that meet ANSI/ISEA 105-2005 to protect when applying adhesive. Keep out of the reach of children. Read Safety Data Sheet for complete safety information before use. Do not smoke when applying this product.

## LIMITATIONS

- Not for use on PVC or KEE membranes.
- Do not apply to wet or damp surfaces. This includes primers. Allow solvent based primers to completely dry before using the adhesive.
- Do not apply when surface temperatures are below 40°F (4°C).

## EQUIPMENT

- Solvent resistant paint roller
- Spray rigs designed to apply adhesives
- Commercially available adhesive dispensers

## FEATURES

## BENEFITS

High-strength adhesive

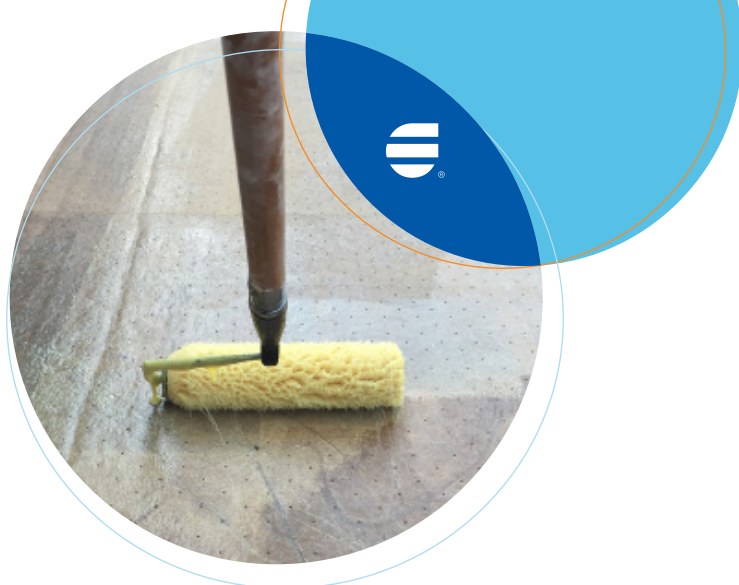
Maintains integrity of installed membrane for years

Excellent adhesive performance

Compatible with a wide range of substrates

Fast application

Labor savings for contractor



## APPLICATION

1. Thoroughly stir the adhesive before and during use. Do not use electric drills to mix the adhesive. Do not thin adhesive. Thinning will affect adhesive performance. The color should be consistent with no solids remaining on the bottom.
2. Millennium Single-Ply Bonding Adhesive is a contact adhesive that needs to fully “flash-off” before the membrane and substrate surface are joined together. To ensure the adhesive flash-off time is approximately the same, apply the Bonding Adhesive to both surfaces in one application. Bonding Adhesive can be applied using a solvent resistant paint roller, spray rigs designed to apply adhesives or commercially available adhesive dispensers. If the adhesive is spray applied, it is recommended to roll the adhesive with a solvent resistant roller.
3. Position the membrane into place and allow adequate time for the membrane to relax.
4. “Barn Door” fold the membrane onto itself exposing the substrate and bottom of the membrane. Apply the adhesive in a uniform and consistent coat; avoiding globs and puddles and light areas. Make sure not to apply bonding adhesive over areas which will be used to create field or flashing seams.
5. Allow the adhesive to fully flash-off and become tacky. Using the finger-push method, check the adhesive by applying pressure with a finger to the adhesive while pushing across the adhesive.
6. After adequate flash-off time, roll the membrane onto the adhesive coated substrate and immediately brush the membrane with a stiff bristle broom to ensure maximum contact.

## STORAGE

1. Store in original unopened containers at temperatures between 60°F and 80°F.
2. When stored in cooler temperatures, allow material to warm to room temperature before using.
3. Do not allow material to be stored in direct sunlight.
4. Rotate stock. Do not use product past 12 month shelf life.

## SHELF LIFE

1. When stored in original unopened containers at temperatures between 60°F (15.6°C) and 80°F (26.7°C), a shelf life of 12 months can be expected.
2. The expected shelf life can be shortened if product is stored in temperatures exceeding recommended storage levels.

## PACKAGING AND COVERAGE

Millennium Single-Ply Bonding Adhesive is available in the following package:

<u>Pails Size</u>	<u>Part #</u>	<u>Pails/Pallet</u>
5 Gallon (18.9L)	SB12982-902	45
5 Gallon (18.9L)	SB12982-903 (EU)	45

A coverage rate of 45 to 60 sq. ft. (4.18 to 5.57 m<sup>2</sup>) of finished roof, per gallon, should be expected. Coverage rates will vary depending upon the type of substrate and substrate surface. Some substrates are more porous and will absorb more adhesive resulting in a lower coverage rate. Other substrates have smooth dense facers resulting in a higher coverage rate. Coverage rates are based on applications using a 3/8 inch solvent based paint roller cover.



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MEMBRANE RESTORATION -  
SINGLE-PLY

# Millennium Sprayable PVC Single-Ply Bonding Adhesive



## DESCRIPTION

Millennium Sprayable PVC Single-Ply Bonding Adhesive is a fast drying, sprayable bonding adhesive for adhering PVC and Fleece membranes to horizontal and vertical roof surfaces. The adhesive formula offers excellent adhesion and quick drying over a wide range of temperatures. Millennium Sprayable PVC Single-Ply Bonding Adhesive is approved for use in all VOC regulated regions per current requirements.

## BASIC USE

The adhesive is applied in a variable web spray pattern via a self-contained spray system. Product is applied full coverage to adhere PVC and Fleece membranes to approved insulation, cover board, OSB etc. The adhesive must be applied to both the membrane and substrate to which it will be mated. Once dry the membrane can be mated to the substrate and brushed in.

## APPROVED SUBSTRATES

Acceptable substrates include: Polyiso, Polyiso HD, DensDeck® Prime, SECUROCK®, OSB, plywood, metal, residual asphalt, masonry, and most gypsum based cover boards.

## APPROVED MEMBRANES

PVC and PVC fleeceback membranes.

## COLOR

Neutral

## SURFACE PREPARATION

All work surfaces should be clean, dry, and free of dirt, dust, debris, oils, un-adhered coatings, deteriorated membrane or other contaminants that may result in a surface that is not sound or is uneven.

## SAFETY

Millennium Sprayable PVC Single-Ply Bonding Adhesive contains a flammable liquid propellant and vapor. Vapors from applied adhesive are heavier than air and may travel along the ground or through ventilation and may be ignited by pilot lights, other flames, sparks, heaters, smoking, electrical motors, static discharge, or other ignition sources. Residual vapors may ignite even though adhesive is not being actively applied. **Keep away from open flame.** Use in well ventilated areas. Avoid inhalation of spray mist or vapors. Appropriate PPE, gloves and goggles must be worn when using this product. Never aim spray gun at people. Read label and safety data sheet prior to use for complete safety, precaution and warning information.

## LIMITATIONS

Not for use on EPDM, TPO, or KEE membranes.

## EQUIPMENT

Hose, applicator tip, and spray applicator must be purchased separately.

## FEATURES

## BENEFITS

VOC <200 g/l	Approved for use in all regulated areas
Quick and easy application	Reduce labor cost and minimal clean up
Excellent adhesion to PVC & Fleeceback membrane	Superior long term uplift performance
Fast drying, <7 minutes in most conditions	Allows for faster membrane application
Open Time 1-20 minutes @ 68°F (20°C)	Provides flexibility for proper installation

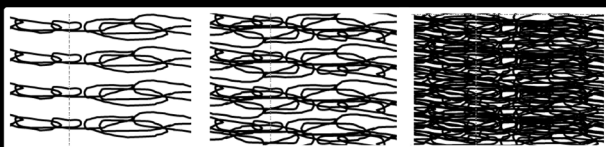




## APPLICATION

1. Shake adhesive canister for 30 seconds prior to use.
2. Connect spray applicator to hose and connect hose to adhesive canister. NOTE: Must use a stainless steel braided metal hose - contact H.B. Fuller for details. Open valve on canister to check fittings for leaks. Keep adhesive canister valve open to maintain pressure in the hose/spray applicator when not in use. Once valve has been turned on, do not turn the valve off until the adhesive canister is completely empty or proper cleaning is performed. Refer to guidelines on canister label for cleaning.
3. Millennium Sprayable PVC Single-Ply Bonding Adhesive can be applied at ambient temperature of 40°F and above. Adhesive canister temperature must be at least 70°F prior to use and for the product to spray properly. Utilize H.B. Fuller Warming Blanket, and hot boxes when necessary. Substrate must be clean, dry, and free of debris and contaminants.
4. Adjust the spray pattern/fan by slowly adjusting trigger lock to the desired pattern. Lock trigger when not in use.
5. Visually target the "Correct Amount of Adhesive" coverage pattern detailed in the image below to both membrane and substrate. Apply adhesive with proper overlap to ensure adequate adhesive coverage. For vertical surfaces apply adhesive in a heavier application.

### Adhesive Spray Patterns



6. For applications taking place in ambient temperature below 70°F, store adhesive canister in heated space and move to project area during application. Adhesive canisters must be kept warm on the jobsite. Dispense product from canister while it is still warm. When product in canister becomes too cold, it will begin to spit rather than spray. If this occurs, swap cold canister for warmer one and return cold canister to heated area. When changing canister, close the valve on the canister and depressurize the hose completely. Remove the hose and attach to the new canister. Open valve and perform a test spray.
7. Allow Millennium Sprayable PVC Single-Ply Bonding Adhesive to flash-off until it does not transfer to finger when touched. Limit application to surfaces that will be covered with membrane the same day.
8. Follow OEM membrane manufacturer's guidelines when laying membrane into adhesive.
9. Read Product Information Sheet and Safety Data Sheet before use.

## PACKAGING AND COVERAGE

Item	Part #
#38 canister	15436-CST18
Spray Gun	30004-004
12' Hose	380018
Extended Applicator	30005-004
Applicator Tips	380017

- Coverage rate is 1,000ft<sup>2</sup>/canister for finished two sided application when laminating smooth field membrane to board stock/substrate. Coverage rates may vary with fleece membrane.
- Coverage rate is 750ft<sup>2</sup>/canister for two sided vertical wall application when laminating smooth field membrane to wall substrate. Coverage rate for this application is decreased due to increased overlap of spray pattern for the vertical application.
- Coverage rates may be lower when used over irregular surfaces and will vary depending on roughness of membrane/substrate surfaces.

## CLEANUP

### Short Term Storage:

1. Leave valve on adhesive canister open and lock applicator so trigger cannot be engaged.
2. Make sure to clean spray tip in a well ventilated area using appropriate PPE.
3. Remove spray tip by removing retaining nut. Clean spray tip and retaining nut by soaking in appropriate solvent (ketone, aromatic, etc).
  - a. Spray tip may require manual cleaning with appropriate sized probe (small wire or pipe cleaner) to help remove build up.
  - b. An aerosol solvent based cleaner may also be used to help remove build up.
    - i. Recommend H.B. Fuller's EternaClean or equivalent.
4. Clean applicator tip and threads with appropriate solvent.

### Long Term Storage:

1. Make sure to clean applicator/hose assembly in a well ventilated area using appropriate PPE.
2. Close valve on canister and engage trigger to completely relieve pressure on applicator/hose.
3. Disconnect the hose from the canister outlet.
4. Remove spray tip by removing retaining nut. Clean spray tip and retaining nut by soaking in appropriate solvent following instructions detailed in "Short Term Storage Cleaning".
5. Connect hose to outlet of Millennium Canister Flush Solution; tighten with a wrench using caution not to over tighten.
6. Open canister valve fully on flush cylinder and squeeze handle of spray applicator to allow flow of flush solvent through hose.
  - a. Flush an adequate amount of solvent through the hose into an appropriate collection container.
7. Once flushed, close the flush canister valve, and engage trigger to relieve pressure on applicator/hose.
  - a. Make sure to collect all flush solution into an appropriate container.
8. Disconnect the hose from the canister outlet and drain any residual flush solvent into an appropriate collection container.
9. Clean applicator tip and threads with appropriate solvent.
10. Read Product Information Sheet and Safety Data Sheet before use.

### STORAGE AND SHELF LIFE

Store canister in a safe, conditioned space with temperature maintained above 70°F. Do not store canister in areas where temperatures reach 90°F or higher. Contents are flammable. Store in accordance with local, state, and federal regulations.

With the hose and applicator attached, keep canister valve open to maintain pressure in the hose and spray gun. Periodically spray in a safe manner to help prevent possible clogging. Keep spray applicator trigger locked when not in use.

Shelf life is 12 months in unopened packaging and stored at temperatures of 40°F to 90°F.



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## SINGLE-PLY RESTORATION

# Millennium KEE/PVC Single-Ply Bonding Adhesive



### DESCRIPTION

Millennium KEE/PVC Single-Ply Bonding Adhesive is a solvent based contact adhesive formulated to adhere KEE and PVC Single-ply commercial waterproofing membranes.

### BASIC USE

Millennium KEE/PVC Single-Ply Bonding Adhesive is designed for adhering KEE and PVC roofing membranes to wood, metal flashings, brick or block masonry, insulation, coverboards and barrier boards, and other acceptable substrates.

### APPROVED SUBSTRATES

- Wood
- Metal flashings
- Brick or block masonry
- Insulation
- Coverboards
- Other approved substrates

### APPROVED MEMBRANES

KEE and PVC.

### COLOR

Tan

### SURFACE PREPARATION

All surfaces to be adhered should be thoroughly dry, clean, and free of dust and loose debris. Membranes and substrates should be free of oil, grease, and other contaminants.

### SAFETY

Do not use in a confined space or around heat, flame or sparks. Prevent fumes from entering building via air ventilation ducts. Avoid breathing adhesive vapors. Wear safety glasses or goggles to prevent contact with eyes. Wear gloves that meet ANSI/ISEA 105-2005 to protect when applying adhesive. Keep out of the reach of children. Read Safety Data Sheet for complete safety information before use.

### LIMITATIONS

- Not for use on EPDM or TPO membranes.
- Not to be applied direct to expanded or extruded polystyrene insulation.
- Do not apply to wet or damp surfaces.
- Do not apply when surface temperatures are below 25°F (3.8°C).

### EQUIPMENT

- Solvent resistant paint roller
- Spray rigs designed to apply adhesives
- Commercially available adhesive dispensers

### FEATURES

### BENEFITS

High-strength adhesive	Excellent long-term uplift performance
Approved for use down to 25°F	Extends the Roofing Season in cold climate regions
VOC content 200 g/l	Single formula approved for use in all VOC regulated markets
Excellent low temperature Spreadability	Easy to apply, saves labor
Tough green strength	Improved workability on vertical surfaces

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## APPLICATION

1. Thoroughly stir the adhesive before and during use. Do not use electric drills to mix the adhesive. Do not thin adhesive. Thinning will affect adhesive performance. The color should be consistent with no solids remaining on the bottom.
2. Millennium KEE/PVC Single-Ply Bonding Adhesive is a contact adhesive that needs to fully “flash-off” before the membrane and substrate surface are joined together. To ensure the adhesive flash-off time is approximately the same, apply the Bonding Adhesive to both surfaces in one application. Bonding Adhesive can be applied using a solvent resistant paint roller, spray rigs designed to apply adhesives or commercially available adhesive dispensers. If the adhesive is spray applied, it is recommended to roll the adhesive with a solvent resistant roller.
3. Position the membrane into place and allow adequate time for the membrane to relax.
4. “Barn Door” fold the membrane onto itself exposing the substrate and bottom of the membrane. Apply the adhesive in a uniform and consistent coat to both the substrate and the underside of the waterproofing membrane, avoiding puddles and light areas. Make sure not to apply bonding adhesive over areas which will be used to create field or flashing seams.
5. Allow the adhesive to fully flash-off and become tacky. Using the finger-push method, check the adhesive by applying pressure with a finger to the adhesive while pushing across the adhesive.  
**Note:** the adhesive must be completely dry before mating the membrane with the substrate. Covering wet adhesive and trapping solvent between the membrane and substrate may result in blistering and other surface defects.
6. After adequate flash-off time, roll the membrane onto the adhesive coated substrate and immediately brush the membrane with a stiff bristle broom to ensure maximum contact.

## STORAGE

1. Store in original unopened containers at temperatures between 60°F and 80°F.
2. When stored in cooler temperatures, allow material to warm to room temperature before using.
3. Do not allow material to be stored in direct sunlight.
4. Rotate stock. Do not use product past 12 month shelf life.

## SHELF LIFE

1. When stored in original unopened containers at temperatures between 60°F (15.6°C) and 80°F (26.7°C), a shelf life of 12 months can be expected.
2. The expected shelf life can be shortened if product is stored in temperatures exceeding recommended storage levels.

## PACKAGING AND COVERAGE

Millennium KEE/PVC Single-Ply Bonding Adhesive is available in the following package:

Pails Size	Part #	Pails/Pallet
5 Gallon (18.9L)	15271-P35A	45

A coverage rate of 45 to 60 sq. ft. of finished roof, per gallon, should be expected. Coverage rates will vary depending upon the type of substrate and substrate surface. Some substrates are more porous and will absorb more adhesive resulting in a lower coverage rate. Other substrates have smooth dense facers resulting in a higher coverage rate. Coverage rates are based on applications using a 3/8 inch solvent based paint roller cover.

Physical Properties	DC15271 TDS Specifications
Color	Tan
Viscosity	500 – 2,000 cps (#2 @ 20)
Solid Weight	24% +/- 3%
Coverage	45 – 60 ft <sup>2</sup> /Gal (1.2 m <sup>2</sup> ) of bonded surface
V.O.C.	<200 g/L
Application	Spray, Brush, Roller
Open Time	10 – 30 min.
Shelf Life	12 months
Storage	Closed container/between 60°F and 80°F
Weight / Gallon	7.1 (0.85) lbs. shipped in 5 gal. pails
Working Temp. Range	25°F and rising/up to 90°F



MEMBRANE ADHESIVE

# Millennium Hurricane Force® Membrane Adhesive HS



## SBS Membrane Adhesive - Pedastal Adhesive

### DESCRIPTION

Millennium Hurricane Force® Membrane Adhesive HS is a two-component, fast setting, essentially VOC free, polyurethane membrane adhesive that becomes waterproof within minutes of application and is designed for use with our One Step™ application process.

Our contractor preferred One Step™ patented application process\* is efficient and always dependable. Application is quick and easy, resulting in significant labor savings for the contractor; 100 square feet of roof membrane can be installed in less than 2 minutes.

The VOC content of this adhesive is less than 20 g/L. Millennium Hurricane Force® Membrane Adhesive HS is approved for use in VOC regulated markets such as California and the OTC States. This product is ideal for use on projects sensitive to building disruption concerns such as re-roofing schools and hospitals.

### BASIC USE

Millennium Hurricane Force® Membrane Adhesive HS is designed for use as an adhesive for bonding approved base sheets, vapor retarders and roof membranes to approved substrates. Millennium Hurricane Force® Membrane Adhesive HS is ideal for applications where hot asphalt or solvent based cold process adhesives cannot be used. Millennium Hurricane Force® Membrane Adhesive HS can also be used to adhere roof pedestals to SBS roof membrane.

### APPROVED SUBSTRATES

- Structural Concrete
- Base sheets (sanded or smooth surfaced)
- Smooth built-up roof surfaces (re-roof applications)
- Modified Bitumen (sanded or granule surfaced only)
- Metal panels
- Lightweight insulating concrete (LWIC)
- Wood
- Fiber Glass
- Polyisocyanurate insulation
- Polystyrene (XPS, EPS)
- Perlite insulation
- Wood fiber insulation
- Gypsum cover board
- High density ISO cover board

### APPROVED MEMBRANES

- SBS modified bitumen base sheets
- SBS modified bitumen mineral surfaced cap sheets

For a complete list of approved substrates, or for additional information, contact our Technical Department.

### SAFETY

Prior to working with this or any adhesive product consult product label and Safety Data Sheet (SDS) for necessary health and safety precautions.

### FEATURES

### BENEFITS

Ready to use	Requires no pre-mixing, reduces labor costs
No temperature restrictions	Suitable for all climates
Essentially VOC free	Suitable for use in VOC regulated markets
Solvent free	Essentially VOC free, no odors
Elastomeric	Remains flexible, absorbs stresses
Excellent bond	Substitute for hot asphalt or solvent based adhesives
Ribbon applied	Eliminates blistering common in asphalt adhered roof membrane
Fast setting	Completely set within minutes of application
Cold applied	Won't burn, no exposure to oxidized asphalt fumes

### WARNING!

This product can expose you to Diisodecyl phthalate (DIDP) which is known to the State of California to cause reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

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## APPLICATION

1. With a utility knife, remove the molded tips at the groove from the One Step™ mixing head.
2. Attach a One Step™ mixing nozzle to the threaded mixing head.
3. Place the cartridge into the appropriate One Step™ applicator.
4. Dispense an initial amount of Millennium Hurricane Force® Membrane Adhesive HS into a waste container to ensure a proper mix, then discard.
5. Apply Millennium Hurricane Force® Membrane Adhesive HS directly to the substrate using a ribbon pattern. Space 1/2" - 3/4" (1.3 cm - 1.9 cm) wide beads either 12" (30cm), 9" (23 cm), 6" (15 cm), or 3" o.c. (7 cm) depending on project specifications and wind uplift requirements.
6. Immediately set membrane into wet adhesive. Do not allow the adhesive to skin over. Eliminate uneven surfaces to ensure positive contact between the membrane and substrate.
7. Roll membrane with a weighted roller to ensure positive contact between adhesive, membrane, and substrate.
8. Complete side laps and head laps with Millennium Hurricane Force® Lap and Flashing Adhesive.
9. Unused adhesive can be applied at a later date by simply plugging the cartridges (with provided half moon plugs) and using a new One Step™ mixing nozzle.

## SURFACE PREPARATION

All work surfaces should be clean, dry, and free of dirt, dust, debris, oils, unadhered coatings, deteriorated membrane or other contaminants that may result in a surface that is not sound or is uneven.

For re-cover applications over weathered asphalt BUR or smooth surfaced SBS modified bitumen, apply Millennium Universal Primer prior to the application of Millennium Hurricane Force® Membrane Adhesive HS. For applications over fresh and/or non-oxidized asphalt, apply Millennium Surface Treatment prior to the application of Millennium Hurricane Force® Membrane Adhesive HS.



## LIMITATIONS

- Do not apply to wet or damp surfaces.
- Not intended for insulation attachment.
- Not to be used with torch down membranes or membranes with plastic films.

## EQUIPMENT

The fast and dependable One Step™ applicators make applying Millennium Hurricane Force® Membrane Adhesive HS simple:

- Patented Multi-Bead and Multi-Bead Plus\*
- Millennium One Step™ Battery Powered Applicator
- Millennium One Step™ Pneumatic Single Bead Applicator

## STORAGE

Keep temperature of contents between 65°F-85°F (18°C-29°C) 24 hours prior to use. Do not store in direct sunlight or temperatures higher than 90°F (32°C).

## COLOR

Black

## PACKAGING AND COVERAGE

Millennium Hurricane Force® Membrane Adhesive HS is available in the following package:

Cartridge Size	Part #	Cartridges/Case
1.5 Liter	HF-MH15-04	4

Each cartridge will produce approximately 100 - 125 lineal feet (30m - 38m) of 1/2" - 3/4" (1.3cm - 1.9cm) wide adhesive beads. A four cartridge case will produce approximately 400 - 500 lineal feet (122m - 152m) of 1/2" - 3/4" (1.3cm - 1.9cm) wide adhesive beads.

Coverage rates may vary when used over irregular surfaces.



\*US 9,381,536 B2; US 7,056,556 B2; US D501,855 S; CA 2,493,739 C

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## MEMBRANE ADHESIVES

# Millennium Hurricane Force® Lap and Flashing Adhesive



## DESCRIPTION

Millennium Hurricane Force® Lap and Flashing Adhesive is a two-component, fast setting, essentially VOC free, polyurethane adhesive that forms a strong bond between roof membrane and substrate within minutes of application.

The high viscosity, high solids formulation of Millennium Hurricane Force® Lap and Flashing Adhesive makes it ideal for installing flashing membrane on vertical substrates and quickly sealing membrane side and head laps.

## BASIC USE

Millennium Hurricane Force® Lap and Flashing Adhesive is designed for bonding flashing as well as side laps and head laps in approved membranes. Millennium Hurricane Force® Lap and Flashing Adhesive is ideal for applications where hot asphalt or solvent based cold process adhesives cannot be used.

## APPROVED SUBSTRATES

- Concrete
- Cinder and masonry block
- Base sheets (sanded or granule surfaced)
- Plywood
- Metal
- Fiberglass insulation
- Polyisocyanurate insulation
- Perlite insulation
- Wood fiber insulation
- Polystyrene (XPS, EPS)
- Gypsum Cover board
- High density polyisocyanurate cover board

## APPROVED MEMBRANES

- SBS modified bitumen base sheets
- SBS modified bitumen mineral surfaced cap sheets

For a complete list of approved membranes, substrates and insulation types, or for additional information, contact our Technical Department.

## SAFETY

Prior to working with this or any adhesive product consult product label and Safety Data Sheet (SDS) for necessary health and safety precautions.

## LIMITATIONS

- Do not apply to wet or damp surfaces.
- Not intended for insulation attachment.
- Not to be used with torch down membranes or membranes with plastic films.

## FEATURES

## BENEFITS

Ready to use	Requires no pre-mixing, reduces labor costs
No temperature restrictions	Suitable for all climates
One Step™ technology	Easy to apply
Solvent free	Essentially VOC free, no odors
Elastomeric	Remains flexible, absorbs stresses
High build formulation	Suitable for vertical applications
Excellent bond	Substitute for hot asphalt or solvent based adhesives
Fast setting	Completely set within minutes of application



## WARNING!

This product can expose you to Diisodecyl phthalate (DIDP) which is known to the State of California to cause reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).



## APPLICATION

1. With a utility knife, remove the molded tips at the groove from the One Step™ mixing head.
2. Attach a One Step™ mixing nozzle to the threaded mixing head.
3. Place the cartridge into the appropriate One Step™ applicator.
4. Dispense an initial amount of Millennium Hurricane Force® Lap and Flashing Adhesive into a waste container to ensure a proper mix, then discard.
5. For lap adhesive installation apply Millennium Hurricane Force® Lap and Flashing Adhesive in one continuous 3/4" - 1" (1.9 cm - 2.5 cm) wide bead down the center of the membrane's selvage edge. As adhesive is applied immediately set membrane into wet adhesive.
6. For flashing installation apply the adhesive to the back side of the membrane or directly to the substrate in a ribbon pattern. Spread adhesive with a 1/4" (0.6 cm) notched or serrated trowel for full coverage applications. Immediately set flashing membrane in place.
7. For laps immediately roll with weighted roller to ensure positive contact between adhesive and membrane. For flashing immediately roll with a suitable hand roller.
8. Unused adhesive can be applied at a later date by simply plugging the cartridges (with provided half moon plugs) and using a new One Step™ mixing nozzle.

## SURFACE PREPARATION

All work surfaces should be clean, dry, and free of dirt, dust, debris, oils, unadhered coatings, deteriorated membrane or other contaminants that may result in a surface that is not sound or is uneven.

## EQUIPMENT

The fast and dependable One Step™ applicators make applying Millennium Hurricane Force® Lap and Flashing Adhesive simple:

- Millennium One Step™ Battery Powered Applicator
- Millennium One Step™ Pneumatic Applicator

## STORAGE

Keep temperature of contents between 65°F to 85°F (18°C to 29°C) 24 hours prior to use. Do not store in direct sunlight or temperatures higher than 90°F (32°C).

## COLOR

Black

## PACKAGING AND COVERAGE

Millennium Hurricane Force® Lap and Flashing Adhesive is available in the following package:

<u>Cartridge Size</u>	<u>Part #</u>	<u>Cartridges/Case</u>
1.5 Liter	HF-LF15-04	4

Each cartridge will produce approximately of 50 - 75 lineal feet (15m - 23m) of 3/4" - 1" (1.9cm - 2.5cm) wide adhesive beads. Coverage rates may vary when used over irregular surfaces.



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## MEMBRANE ADHESIVES

# Millennium Hurricane Force® 1-Part Membrane Adhesive



### DESCRIPTION

Millennium Hurricane Force® 1-Part Membrane Adhesive is a highly elastomeric, one-part asphalt modified urethane adhesive that is solvent free and does not require mixing.

The VOC content of the adhesive is less than 250 g/L. Millennium Hurricane Force® 1-Part Flashing Adhesive is approved for use in VOC regulated markets such as California and the OTC States.

### BASIC USE

Millennium Hurricane Force® 1-Part Membrane Adhesive is designed for use as an adhesive for bonding approved base sheets, vapor retarders, and membranes to approved substrates.

Millennium Hurricane Force® 1-Part Membrane Adhesive forms a strong bond to most substrates, does not soften or damage the membrane, and provides outstanding wind uplift protection.

### APPROVED SUBSTRATES

- Lightweight Concrete
- Base sheets (sanded or smooth surfaced)
- Smooth built-up roof surfaces (re-roof applications)
- Modified Bitumen (sanded or granule surfaced only)
- Metal panels
- Wood
- Fiber Glass
- Polyisocyanurate insulation
- Polystyrene (XPS, EPS)
- Perlite insulation
- Wood fiber insulation
- Gypsum cover board
- High density ISO cover board

### APPROVED MEMBRANES

- SBS modified bitumen base sheets
- SBS modified bitumen mineral surfaced cap sheets

For a complete list of approved substrates, or for additional information, contact our Technical Department.

### SAFETY

Prior to working with this or any adhesive product consult product label and Safety Data Sheet (SDS) for necessary health and safety precautions.

### LIMITATIONS

- Do not apply to wet or damp surfaces. This includes primers. Allow solvent based primers to completely dry before using the adhesive.
- Do not apply when surface temperatures are below 40°F (4°C).

### EQUIPMENT

- 1/4" (0.6 cm) notched or serrated squeegee.
- Better Spreader adhesive applicator.

### FEATURES

### BENEFITS

Single component	Requires no mixing
Solvent free	No odors
Elastomeric	Remains flexible, absorbs stresses
VOC content less than 250 g/L	Suitable for use in VOC regulated markets
Cold applied	No flame, no exposure to oxidized asphalt fumes

### ⚠ WARNING!

This product can expose you to Asphalt which is known to the State of California to cause reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

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## STORAGE

Store material in original unopened packaging at temperatures between 40°F-100°F (4°C-38°C). For best results store material at temperatures between 60°F-80°F (15°C-27°C) just prior to use.

Shelf life is 12 months when stored as recommended.

## COLOR

Black

## PACKAGING AND COVERAGE

Millennium Hurricane Force® 1-Part Membrane Adhesive is available in the following package:

<u>Pails Size</u>	<u>Part #</u>	<u>Pails/Case</u>
5 Gallon (18.9L)	HF-MA5P-01	36

Coverage rate is approximately 12-15 sq. ft. (1.1-1.4 m<sup>2</sup>) per gallon when applied with a 1/4" notched trowel which results in an approximately 1/8" (0.3 cm) thick layer of adhesive.

Coverage rates may vary when used over irregular surfaces.

Coverage rate using a Better Spreader type adhesive applicator at 6" o.c. is 40-50 ft<sup>2</sup>/gal.

## APPLICATION

1. Ensure that the substrate is suitable for bonding and is clean, dry, and free of defects. For dusty surfaces prime the substrate using Millennium Universal Primer at a rate of 150 -250 sq.ft. (14 m<sup>2</sup>-23m<sup>2</sup>) per gallon. Allow primer to dry.
2. Apply Millennium Hurricane Force® 1-Part Membrane Adhesive in full coverage with a 1/4" (0.6 cm) notched or serrated squeegee directly to the substrate. Application rate shall be 1.5 to 2 gallons per 100 sq. ft. (9 m<sup>2</sup>). Coverage rates may vary over irregular surfaces.
3. Follow roof membrane manufacturers recommendations for installing the membrane into the adhesive. For modified bitumen membranes, unroll the sheet and allow to relax prior to setting into the adhesive.
4. Immediately place the roofing membrane into the freshly applied Millennium Hurricane Force® 1-Part Membrane Adhesive. Do not allow the adhesive to skin over. Broom or roll the membrane surface to ensure full contact.
5. If using adhesive to seal laps, a continuous bleed-out of adhesive should be present along all membrane side laps and head laps. Alternatively, heat weld side and head laps.
6. For multi-ply applications remove loose sand from the base ply surface and repeat steps 2-5.
7. When applying adhesive with a Better Spreader type of adhesive applicator refer to membrane/substrate manufacture's application instructions.

## SURFACE PREPARATION

All work surfaces should be clean, dry, and free of dirt, dust, debris, oils, unadhered coatings, deteriorated membrane or other contaminants that may result in a surface that is not sound or is uneven.

For re-cover applications over weathered asphalt BUR or smooth surfaced SBS modified bitumen, apply Millennium Universal Primer prior to the application of Millennium Hurricane Force® 1-Part Membrane Adhesive. For applications over fresh and/or non-oxidized asphalt or plastic film membranes, apply Millennium Surface Treatment prior to the application of Millennium Hurricane



"Subject to the conditions of Approval when installed as described in the current edition of the FM Approval Guide."



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MEMBRANE ADHESIVES

# Millennium Hurricane Force® 1-Part Flashing Adhesive



## DESCRIPTION

Millennium Hurricane Force® 1-Part Flashing Adhesive is a highly elastomeric, one-part asphalt modified urethane adhesive that is solvent free and does not require mixing.

The VOC content of the adhesive is less than 250 g/L. Millennium Hurricane Force® 1-Part Flashing Adhesive is approved for use in VOC regulated markets such as California and the OTC States.

## BASIC USE

Millennium Hurricane Force® 1-Part Flashing Adhesive is specially formulated for use as a vertical grade flashing adhesive for bonding approved base sheets, vapor retarders and membranes for low slope roof applications. Millennium Hurricane Force® 1-Part Flashing Adhesive can also be used to seal head laps in modified bitumen roof membranes.

Millennium Hurricane Force® 1-Part Flashing Adhesive forms a strong bond to most substrates and does not soften or damage the membrane.

## APPROVED SUBSTRATES

- Concrete
- Cinder and masonry block
- Base sheets (sanded or granule surfaced)
- Plywood
- Metal
- Fiberglass insulation
- Polyisocyanurate insulation
- Perlite insulation
- Wood fiber insulation
- Polystyrene (XPS, EPS)
- Gypsum Cover board
- High density polyisocyanurate cover board

## APPROVED MEMBRANES

- SBS modified bitumen base sheets
- SBS modified bitumen mineral surfaced cap sheets

For a complete list of approved substrates, or for additional information, contact our Technical Department.

## SAFETY

Prior to working with this or any adhesive product consult product label and Safety Data Sheet (SDS) for necessary health and safety precautions.

## LIMITATIONS

- Do not apply to wet or damp surfaces. This includes primers. Allow solvent based primers to completely dry before using the adhesive.
- Do not apply when surface temperatures are below 40°F (4°C).

## FEATURES

## BENEFITS

Single component	Requires no mixing
Solvent free	No odors
Elastomeric	Remains flexible, absorbs stresses
VOC content less than 250 g/L	Suitable for use in VOC regulated markets
Cold applied	Won't burn, no exposure to oxidized asphalt fumes





## APPLICATION

1. Ensure that the substrate is suitable for bonding and is clean, dry, and free of defects.
2. Apply Hurricane Force® 1-Part Flashing Adhesive with a 1/4" (0.6 cm) notched trowel directly to the backside of the flashing membrane (as shown) or to the bonding substrate.
3. Embed the flashing membrane into the freshly applied adhesive. Do not allow the adhesive to skin over. Apply pressure across the entire membrane surface to ensure full contact with the adhesive removing all wrinkles and air pockets.
4. A continuous bleed-out of adhesive should be present along all membrane side laps and tie-ins.
5. For multi-layer flashing applications repeat steps 2-4.

## SURFACE PREPARATION

All work surfaces should be clean, dry, and free of dirt, dust, debris, oils, un-adhered coatings, deteriorated membrane or other contaminants that may result in a surface that is not sound or is uneven.

## STORAGE

Store material in original unopened packaging at temperatures between 40°F-100°F (4°C-38°C). For best results store material at temperatures between 60°F-80°F (15°C-27°C) just prior to use.

Shelf life is 9 months when stored as recommended.

## COLOR

Black

## PACKAGING AND COVERAGE

Millennium Hurricane Force® 1-Part Flashing Adhesive is available in the following package:

<u>Pails Size</u>	<u>Part #</u>	<u>Pails/Case</u>
5 Gallon (18.9L)	HF-FA5P-01	36

Coverage rate is approximately 12-15 sq. ft. (1.1-1.4 m<sup>2</sup>) per gallon when applied with a 1/4" notched trowel which results in an approximately 1/8" (0.3 cm) thick layer of adhesive.

Coverage rates may vary when used over irregular surfaces.



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APPLICATION EQUIPMENT

# Patented One Step™ Multi-Bead & Multi-Bead Plus



## DESCRIPTION

The patented One Step™ Multi-Bead\* (MBA) and Multi-Bead Plus\*\* (MBA Plus) are battery powered adhesive applicators designed to be used with Millennium One Step™ adhesives. The One Step™ MBA applicator is a four cartridge port adhesive applicator designed for One Step Foamable Adhesive® cartridges. The One Step™ MBA Plus applicator is a 13 cartridge port adhesive applicator designed for One Step™ Insulation and Hurricane Force® Membrane Adhesive cartridges.

## START UP

1. Make sure batteries are fully charged. If battery is not fully charged, charge until display confirms that it is fully charged. Plug charger into electrical outlet. Connect the battery to the charger (for MBA: black connector to black connector, red connector to red connector; for MBA Plus: gray connecting terminal from charger to gray terminal on battery). Make sure 2/6/10 button is depressed to activate the charging process. The indicator lights on the charger will display the status of the battery.
2. Install fully charged battery into battery compartment and connect the terminals.
3. Test the MBA by depressing the trigger switch. Make sure all plungers are functional. To activate the return, pull firmly on the return handle. To test the MBA Plus turn the "Dispense/Retract" dial to the "dispense" position and depress the trigger switch. Make sure all plungers are functional. To activate the return, turn "Dispense/Retract" dial to "Retract" position; the plungers will retract automatically.
4. Prepare Millennium One Step™ adhesive cartridges by removing the molded tips from the threaded mixing head, and attach the provided One Step™ mixing nozzle.
5. Load cartridges, and ensure that each cartridge is firmly in place.
6. Position applicator where adhesive is to be dispensed and the insulation or membrane is to be installed.
7. Begin dispensing adhesive by depressing trigger switch, and pull applicator at a rate which will put down adhesive beads 1/4" to 1/2" (0.6cm to 1.3cm) wide.
8. When finished dispensing cartridges in their entirety, pull return handle until plungers have completely retracted. On the MBA Plus set the "Dispense/ Retract" dial to "retract" position. Remove empty cartridges.

## SAFETY

Protective equipment such as safety glasses and protective gloves must be worn when operating or servicing the MBA and MBA Plus applicators.

Under no circumstances should any acid or corrosive chemicals be used in the machines. The electrical circuitry is not of explosion proof design and should not be used in any environment requiring such a design.

The MBA and MBA Plus applicator should never be actuated when the outlet tip of the adhesive cartridge(s) is blocked or restricted by cured adhesive, any object or some part of the body.

Prior to working with this or any product consult product label and Safety Data Sheet (SDS) for necessary health and safety precautions.

## FEATURES

## BENEFITS

MBA applies 4 beads of adhesive simultaneously	Install up to 6 squares in less than 2 minutes
MBA Plus has 13 cartridge capacity	Install adhesive from 12" o.c. up to full coverage
Battery powered	No cords or generators required
Low maintenance	No work delays due to equipment failure
Fastest method of installing rigid insulation	Lower installed cost

\*US 7,056,556 B2; US D501,855 S; CA 2,493,739 C

\*\*US 9,381,536 B2

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## PACKAGING

Patented One Step™ Multi-Bead and Multi-Bead Plus applicators include:

### North America

#### Description

Multi-Bead  
Multi-Bead Plus

#### Part #

EQ-MBA  
EQ-MBAP

### Europe, CIS, and Middle East

#### Description

Multi-Bead  
Multi-Bead Plus

#### Part #

EQ-MBAEU  
EQ-MBAPEU

2 rechargeable batteries  
1 battery charger

## AVAILABLE ACCESSORIES / PARTS

Patented One Step™ Multi-Bead:

- 7 AH replacement battery
- 12 AH replacement battery
- Replacement battery holder for larger 12 AH battery
- AC to DC power converter
- Front replacement wheels
- Rear replacement wheels
- Replacement trigger switch

Patented One Step™ Multi-Bead Plus:

- 40 AH replacement battery
- Front replacement wheels
- Rear replacement wheels
- Replacement trigger switch

## SHUT DOWN AND EXTENDED BREAKS

1. If dispensing needs to be interrupted, release the trigger switch and briefly pull back the return mechanism on the MBA, or turn the "Dispense/ Retract" dial on the MBA Plus to relieve pressure from the cartridges.
2. If dispensing is interrupted for more than a few minutes, the static mixing nozzles will need to be replaced with new nozzles.
3. If battery's charge is used up during dispensing, simply replace with alternate battery and begin charging spent battery.
4. At the end of each day, recharge both batteries for use the following day.

## MAINTENANCE INSTRUCTIONS

- Keep all moving parts free of adhesive or debris.
- Do not allow adhesive to build up on the plungers or plunger rods.
- Always maintain a clean surface where the cartridges are placed. Debris can cause the cartridges to tilt and malfunction.
- Wheels should remain free of adhesive to provide smooth travel. Wheels can be covered with a layer of tape to ensure quick removal of adhesive buildup.
- The battery should be completely charged prior to use.
- For faster charge times, do not allow battery to fully discharge. A partially discharged battery will charge more quickly than a fully discharged battery.
- Slow charging at 2 amps overnight will promote longer battery life than rapid charging at 10 amps. Batteries carry a 90-day warranty.
- The electric actuator is not serviceable by the user. Do not attempt to open the actuator case. Opening the actuator case will void all warranties.
- Always use four cartridges in the MBA applicator. Uneven pressure can damage the applicator. If fewer than four beads of adhesive are required, use the Millennium One Step™ Battery Powered Applicator.
- Always use a minimum of four equally filled and spaced cartridges in the One Step™ MBA Plus applicator. Failure to dispense less than four equally spaced cartridges can cause uneven pressure on the push rods and can lead to damage to the machine. If fewer than four beads of adhesive are required, use a single bead applicator.
- For the MBA Plus applicator, place prepared cartridges in proper slots for desired bead spacing. Ensure each cartridge is set firmly in place with dark side (part B) placed in the up position.

\*US 7,056,556 B2; US D501,855 S; CA 2,493,739 C

\*\*US 9,381,536 B2



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## APPLICATION EQUIPMENT

# Millennium One Step™ Battery Powered Applicator



### DESCRIPTION

Millennium One Step™ Battery Powered Applicator is specifically designed to be used with the Millennium One Step™ family of adhesives and sealants. The unique carriage design is extremely durable and allows the user to install adhesive in an upright position eliminating back strain. The tool is powered by a Li-ion 20 volt rechargeable battery. The motor is designed to run on lower amps than conventional cordless tools which extends overall battery life and reduces charging time.

### USER INSTRUCTIONS

1. Assemble carriage handle using the provided (4) screws and lock nuts with the wrench and allen key (also included).
2. Open the clutch lever to allow movement of the racks. Retract the rack by pulling the rack handle away from the tool.
3. Prepare adhesive cartridge by removing caps or plugs and installing static mixing nozzle. Note: Follow adhesive manufacturers complete instructions for cartridge preparation.
4. Insert cartridge into the carriage. Line up the cartridge and the cartridge nozzle opening for correct positioning.
5. Push the rack handle forward, lining up pistons with the openings on the cartridge. Close the clutch lever to engage clutch.
6. Slide the battery onto the handle until it is fully engaged.
7. Adjust speed control knob to desired flow. Full speed is designated on the knob by the largest "bubble" symbol. Slower speeds; smaller bubbles. Note: Most applications will require the tool to be operated at full speed.
8. Hold trigger to begin dispensing adhesive. Note: Trigger must be depressed 2 times before tool operates when it has remained idle. This is a power saving feature built into the tool.
9. When finished dispensing, or when end of cartridge is reached, release trigger, open clutch, then retract rack. Remove cartridge.

### SAFETY

Protective equipment such as safety glasses and protective gloves must be worn when operating or servicing the Millennium One Step™ Battery Powered Applicator.

The Millennium One Step™ Battery Powered Applicator should never be pointed at or near people. The applicator should never be actuated when the outlet tip of the adhesive cartridge is blocked or restricted by cured adhesive, any object, or some part of the body.

Prior to working with this applicator thoroughly review the Instruction Manual provided with the tool.

### FEATURES

### BENEFITS

Battery powered	Portable, no cords or hoses
Quick and easy use	Saves time and labor
Trigger delay	Saves battery charge
Durable construction	Withstands everyday use
Strong motor	Can dispense higher viscosity adhesives





## MAINTENANCE INSTRUCTIONS

- Keep handles clean, dry and free of oil or grease.
- Clean with mild soap and damp cloth. Do not use solvents or cleaning agents that can damage the tools plastic parts.
- Follow cleaning and maintenance instructions in battery charger manual and battery pack leaflet.
- Remove adhesive residue from rack and pistons regularly if present. Apply light coating of light machine oil to lubricate rack as needed.
- For internal lubrication and all other maintenance, except external cleaning and battery pack recharging, and for all repairs, return to service center, distributor, or manufacturer.
- If the tool is not running at full capacity, check to be sure that the battery pack is fully charged and that the contacts on the battery pack and tool are both clean. If they need maintenance, use caution and clean with an eraser.

## SERVICE

Tool service must be performed only by qualified repair personnel. Service or maintenance performed by unqualified personnel may result in risk of an injury. Do not disassemble tool or battery pack. At the conclusion of it's useful life, remove battery pack from tool. Without further disassembly, return battery pack intact for recycling and/or discard tool intact. Information on battery pack recycling can be found in the Instruction Manual provided with the tool. Disassembly and reassembly may create an unsafe condition.

When servicing a tool, use only identical replacement parts. Use of unauthorized parts or failure to follow maintenance instructions may create a risk of electrical shock or injury.

## PACKAGING

Millennium One Step™ Battery Applicator:

### North America

DESCRIPTION	PART #
Complete Applicator with 20 V Li-ion Battery NA	EQ-7075-KIT-LINA
20 V Li-ion Charger with NA Cord Set	EQ-7075-CGR-LINA
Cord Set NA Charger	EQ-7075-CORD-NA
Replacement 20 V Li-ion Battery	EQ-7075-BAT-LI

### Europe, CIS, and Middle East

DESCRIPTION	PART #
Complete Applicator with 20 V Li-ion Battery EU	EQ-7075-KIT-LIEU
20 V Li-ion Charger with EU Cord Set	EQ-7075-CGR-LIEU
Cord Set EU Charger	EQ-7075-CORD-EU
Replacement 20 V Li-ion Battery	EQ-7075-BAT-LI

ADDITIONAL ACCESSORY	PART #
Applicator Carrying Case (Special Order)	EQ-7075-CASE

The One Step™ Battery Powered Applicator includes 2 rechargeable Li-ion batteries, 1 battery charger, and 1 detachable carriage handle.

\*Refer to the Millennium One Step™ Battery Powered Applicator Instruction Manual for complete use and safety information.



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**H.B. Fuller**

**Construction Adhesives**

ADHESIVE APPLICATION  
EQUIPMENT

# Millennium Cyclone 5/15 VS PLUS By Garlock

An adhesive delivery system for controlled low-pressure spray and continuous bead application

## DESCRIPTION

The Patented Millennium Cyclone 5/15\* VS PLUS low-pressure adhesive pump cart is an innovative adhesive applicator designed with the roofing contractor in mind. The pump cart comes from a tradition of field-proven adhesive applicators invented by H.B. Fuller Company. With this pump cart, an operator can quickly and easily switch from adhesive bead application for adhering board stock to a controlled low-pressure spray application designed to adhere single-ply fleeceback membrane. The switch is made by simply activating a switch, connecting an air line and snapping on a low pressure spray nozzle. This makes the Millennium Cyclone 5/15\* VS PLUS the most versatile and productive adhesive applicator on the market today. Whether installing insulation board stock or single-ply fleeceback membrane, the Millennium Cyclone 5/15\* VS PLUS will provide an economical advantage over disposable packaged adhesives and applicator guns.

A key design feature of the Cyclone 5/15 VS Plus that drives the productivity is the Check-Valve Manifold System. This system incorporates the Check-Valve Static Mix Tip virtually eliminating adhesive clogs in the adhesive manifold. Other features include a custom designed and fabricated adhesive tray that accommodates both five-gallon and fifteen-gallon containers of adhesive. The ergonomic EZ-Load Drum System reduces the risk of injury by eliminating the need to lift the fifteen-gallon drums of adhesive during the loading process. The heavy-duty motor is controlled by an easy access control panel with hi/lo dispense settings and delivers power to the dual adhesive pumps which delivers adhesive through 50 feet of hose.

The patented features, proven performance and reliability of the Millennium Cyclone 5/15 VS PLUS Pump Cart makes this the perfect solution for applying adhesives on large commercial roofing projects. The system allows contractors to install both insulation and fleeceback membrane with significant savings on adhesive & labor cost, and installation time, resulting in increased productivity and profitability.



## FEATURES

**Dual Speed Control Panel and Check-Valve Manifold**

**Check-Valve Static Mix Tip**

**Ergonomic EZ Load Drum System**

**Custom designed and fabricated adhesive tray**

**Quick connect fittings**

**Dual pump system**

**Heavy-duty solid core tires**

## BENEFITS

**Allows both low-pressure spray and continuous bead applications**

**Eliminates adhesive clogs in the manifold**

**Reduces risk of injury, eliminates lifting drums of adhesive when loading machine**

**Accommodates both five - and fifteen - gallon containers of adhesive**

**Facilitates quick adhesive container change-outs**

**Reduces risk of catastrophic pump failure/lowers maintenance cost**

**Provides increased mobility**

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## INSTRUCTIONS FOR LOADING FIFTEEN-GALLON ADHESIVE DRUM SETS:

- Make sure the manifold valves are in the OFF mode and motor is turned off.
- Remove covers from both the top and bottom of the desiccant filter.  
Note: The desiccant filter sensor will turn purple indicating the filter needs to be replaced. Photo 1.
- Insert desiccant filter into rubber holder as shown and tighten clamp. A light lubricant is advised when inserting the filter. Do not block or cover holes with lubricant or grease. Photo 2.
- Remove drum bung caps from adhesive Part 1(A) side using the drum bung wrench supplied. Install desiccant filter assembly and black quick connect as shown in the pictures. Photos 3 & 4.
- Remove drum bung caps from adhesive Part 2(B) side using the drum bung wrench supplied. Install plastic vent assembly and gray quick connect assembly as shown in the pictures. Photos 5 & 6.
- Lock pump cart wheels and carefully load adhesive drums onto drum rack. Desiccant filter and vent should be placed at the highest point. Secure drums to drum rack with the ratcheting tie downs provided.
- Place a small amount of grease on both the male and female sides of the Part 1 black quick connect fitting and connect the drum and inlet hoses together. Repeat process for Part 2 gray quick connect side.
- Once adhesive drums are loaded onto pump cart, follow instructions for applying adhesive in low-pressure spray or bead application.



## INSTRUCTIONS FOR LOADING FIVE-GALLON ADHESIVE BLADDERS SETS:

- Make sure the manifold valves are in the OFF mode and motor is turned off.
- Remove adhesive bladders from over packed boxes. Photos 7 & 11.
- Insert adhesive bladder labeled Part 1 into the tray labeled Part 1. Apply small amount of non-lithium grease to female end of quick connect coupling. Attach quick connect fitting on bladder to the Part 1 pump inlet hose. Photos 8, 9, & 10.
- Insert adhesive bladder labeled Part 2 into the tray labeled Part 2. Apply small amount of non-lithium grease to female end of quick connect coupling. Attach quick connect fitting on bladder to the Part 2 pump inlet hose. Photos 12, 13 & 14.
- Once adhesive bladders are loaded onto pump cart follow instructions for applying adhesive in low-pressure spray or bead application.



## ADHESIVE LOW-PRESSURE SPRAY APPLICATION

### ONCE ADHESIVE IS LOADED INTO PUMP CART CONTINUE AS FOLLOWS:

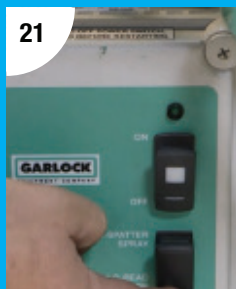
- Select Hi – Spatter Spray on Control Panel – pump cart will run HIGH speed for low-pressure spray application. With the manifold in the OFF mode, flip power switch to “on”. Photos 15 & 16.
- Slowly open manifold valves, motor will start automatically. Let a small amount of material flow out into a waste container to ensure that an equal amount of material is coming out of each manifold port. Photo 17. Shut off manifold valves, motor will stop automatically when shut-off pressure is reached.
- Wipe end of manifold clean with rag, apply non-lithium grease or silicone-type spray to end of manifold prior to attaching check-valve static mix tip.
- Connect air compressor feed line to airline connection on 50’ hose assembly. Air compressor capable of 5 cfm at 90 psi is required. (not provided)
- Attach check-valve static mix tip to applicator manifold. Ensure keyed mixer is mated into the manifold in the correct orientation. Attach bayonet ring and twist quarter turn. Ensure that it is completely seated prior to applying adhesive. Photo 18.
- Carefully snap low-pressure spray nozzle onto the static mix tip. Photo 19.
- Attach supplied air line from air regulator on applicator assembly to low-pressure spray nozzle. Photo 20.
- Open air line and adjust air pressure accordingly, typical pressure is 8-16 psi at the low-pressure spray nozzle. Photo 20a.
- Slowly open manifold valves, apply adhesive directly to substrate in a sweeping motion, left to right.
- Adjust air pressure as needed to optimize application pattern – Atomization should be avoided.
- Use caution when applying adhesive near seaming or flashing areas to avoid contamination.
- Consult your waterproofing membrane manufacturer’s guidelines for recommendations regarding membrane placement and mating/rolling requirements.



## ADHESIVE BEAD APPLICATION

### ONCE ADHESIVE IS LOADED INTO PUMP CART CONTINUE AS FOLLOWS:

- Select Lo-Bead Application on Control Panel – pump cart will run LOW speed for adhesive bead application. With the manifold in the OFF mode, flip power switch to “on”. Photos 21 & 22.
- Slowly open manifold valves, motor will start automatically. Let a small amount of material flow out into a waste container to ensure that an equal amount of material is coming out of each manifold port. Photo 23.
- Shut off manifold valves, motor will stop automatically when shut-off pressure is reached.
- Wipe end of manifold clean with rag, apply non-lithium grease or silicone-type spray to end of manifold prior to attaching static mixer.
- Attach check-valve static mix tip to applicator manifold. Ensure keyed mixer is mated into the manifold in the correct orientation. Attach bayonet ring and twist quarter turn. Ensure that it is completely seated prior to applying adhesive. Photo 24.
- Slowly open manifold valves and apply adhesive directly to the substrate as recommended by the product manufacturer for bead application.





## SAFETY

Protective equipment such as safety glasses and protective gloves must be worn when operating or servicing the Millennium Cyclone 5/15 pump cart. Additional PPE, such as a respirator may be required when applying low-pressure spray adhesives.

The Patented Millennium Cyclone 5/15 VS PLUS pump cart operates on 110-volt 60Hz AC current. Use a grounded power cord that is in good condition, rated for outdoor use, and a minimum of 14-gauge construction. Servicing electrical components should only be done by trained personnel and only after disconnecting power to the equipment. CAUTION: The electrical circuitry is not of explosion proof design and should not be used in any environment requiring such a design. When operating equipment for low-pressure spray application, an air compressor capable of 5 cfm at 90 psi is required. (not provided) The Patented Millennium Cyclone 5/15 VS PLUS pump cart operates with pressure. The applicator should never be pointed toward people. The applicator should never be actuated when the outlet tip is blocked or restricted by cured adhesive or any object. Consult adhesive product label and Safety Data Sheet (SDS) for necessary safety precautions.

## PROCEDURE TO EXTEND CHECK-VALVE STATIC MIX TIP LIFE DURING USE:

During adhesive application, there can be short delays experienced with starting and stopping when applying adhesive materials. During the stops the adhesive continues to foam and react within the static mixer. Under normal conditions, you typically have 4-8 minutes depending on temperature before the mixer and / or manifold becomes clogged and unusable. With our Check-Valve Manifold System, the check valves prevent back flow into the manifold. To extend the life of the mixer during use, a short ½ second purge of polyol only (Part 2) can be dispensed by quickly opening and closing the Part 2 ball valve. The polyol will push the mixed material out and extend the open time of the product within the static mixer. Care must be taken not to over purge the polyol component. Over purging can cause damage to the hoses and / or equipment. Only a ½ second purge is needed. The Part 1 ball valve should be in the closed position for this procedure.

## SHUT DOWN AND EXTENDED BREAKS

1. Close manifold valves. Turn off power.
2. Relieve any pressure in hoses by opening and closing applicator valves.
3. Leave check-valve static mix tip attached. Static mix tip can remain attached to the manifold assembly during shut down periods. Replace static mixer prior to resuming work. Greasing fittings is not necessary during short-term storage.
4. For long-term storage (7+ days) or If equipment is stored without static mixer attached - Pump a non-lithium grease into both grease fittings on the gun manifold until it flows out of the tip. Install grease into the part 1 (A) grease fitting first.
5. For added protection, insert F style manifold plug into manifold outlet and secure with nut ring.

## MACHINE STORAGE

Long term storage (30 days +) will require that the pump system and hoses are flushed with Millennium Cyclone System Solution. (Refer to Millennium Cyclone System Solution Product Information Sheet and Technical Bulletin for detailed instructions). After extended storage the gravity feed supply lines and quick connects may need to be replaced.

\*US 9,573,150 B2; US 9,566,594 B2

\*\*US 9,174,234 B2; CA 2,806,690 C



For more information about our company, visit [www.hbfuller.com/roofing](http://www.hbfuller.com/roofing).

Material can be allowed to stand in the machine for short periods of time, however, it is very important that Part 1 not be exposed to air or moisture to prevent crystallization.

Material should be run through the pump and hoses every three to four weeks when the pump is not in use. Cyclone System Solution can be run through the pump for this purpose.

## ADHESIVE MATERIAL PACKAGING AND COVERAGE

Refer to the Millennium PG-1 Pump Grade Adhesive Product Information Sheets for complete product specifications and instructions for use.

Product Information Sheets available:

- Millennium PG-1 Pump grade Adhesive – Low Viscosity Insulation Adhesive
- Millennium PG-1 Pump grade Adhesive – Fleeceback Membrane Adhesive

Millennium PG-1 Pump Grade Adhesive is available in the following packages:

Size	Part #	Sets/Pallet
5 gal (18.9L) box, Part 1 (A)	PG-IA5B-A01	18
5 gal (18.9L) box, Part 2 (B)	PG-IA5B-B01	
15 gal (58L) drum, Part 1 (A)	PG-15DR-A01	4
15 gal (58L) drum, Part 2 (B)	PG-15DR-B01	

Part 1 and Part 2 mixed through Patented Millennium Cyclone 5/15 Low Pressure Pump Cart will produce the following coverage rates:

Ribbon Application

- 5 Gallon (18.9L) Kit: 2,500-3,000 sq. ft. (232m<sup>2</sup>-279m<sup>2</sup>)
- 15 Gallon (56.7L) Kit: 7,500-9,000 sq. ft. (697m<sup>2</sup>-836m<sup>2</sup>)

Controlled Low-Pressure Spray Application

- 5 Gallon (18.9L) Kit: 1,300-1,800 sq. ft. (232m<sup>2</sup>-279m<sup>2</sup>)
- 15 Gallon (56.7L) Kit: 3,900-5,400 sq. ft. (697m<sup>2</sup>-836m<sup>2</sup>)

Coverage estimates indicate total square feet of insulation/membrane attachment per kit. Rates are based on an application pattern of 4 (four) 1/2" - 3/4" (1.3cm - 1.9cm) beads spaced 12" (30cm) o.c. per 4' x 4' (1.2m x 1.2m) insulation board. NOTE: A 1/2" - 3/4" (1.3cm - 1.9cm) wide uncured adhesive bead will produce a 2" - 3" (5.1cm - 7.6cm) wide cured adhesive bead that will rise approximately 3/4" - 1" (1.9cm - 2.5cm) above the substrate. Coverage rates may be lower when used over irregular surfaces and will vary depending on roughness.

The Patented Millennium Cyclone 5/15 VS Plus can be used with any brand of 2-part urethane roofing adhesives and Cubitainer® packaging.

## Cyclone 515 VS Plus Part Numbers

Part	Part Number
Cyclone 515 VS Plus – 2 speed Cyclone	EQ-CYC-VSPGK
Check Valve Static Mix Tip w/Bayonet Ring (25/PK)	EQ-TIP-CV25
Check Valve Manifold (1/PK)	EQ-CYC-732869
Ultra-Low-Pressure Spray Nozzle (10/PK)	EQ-CYC-SN10
Quick Release Spray Nozzle Hose (1/PK)	
Check Valve Manifold plug (5/PK)	
Pneumatic regulator (1/PK)	
Pneumatic ball valve (1/SET)	



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APPLICATION EQUIPMENT

# Patented Millennium Cyclone

## Low Pressure Pump Cart (by Garlock)

### DESCRIPTION

Patented Millennium Cyclone\* low pressure adhesive pump cart is a bulk delivery system specifically designed to dispense two component 1 : 1 ratio low viscosity polyurethane adhesives. These adhesives are widely used to adhere rigid insulation and cover boards to structural roof decks as well as to adhere fleecebacked single-ply membranes in both new roofing and recover applications. The Cyclone includes 1 applicator nozzle and 50 feet of hose.

### START UP

Make sure the manifold valves are in the OFF mode and motor is turned off.

1. Insert adhesive bladder labeled Part 1 into the tray labeled Part 1. Apply small amount of non-lithium grease to female end of quick connect coupling. Attach quick connect fitting on bladder to the Part 1 pump inlet hose.\*\*
2. Insert adhesive bladder labeled Part 2 into the tray labeled Part 2. Apply small amount of non-lithium grease to female end of quick connect coupling. Attach quick connect fitting on bladder to the Part 2 pump inlet hose.
3. With the manifold in the OFF mode, flip power switch to "on".
4. Slowly open manifold valves, motor will start automatically. Let a small amount of material flow out into a waste container to ensure that an equal amount of material is coming out of each manifold port.
5. Shut off manifold valves, motor will stop automatically when shut-off pressure is reached.
6. Wipe threaded portion of manifold clean with rag, apply non-lithium grease to threaded portion of manifold.
7. Attach static mixing nozzle to applicator manifold using retaining nut or one piece mixing nozzle. Ensure that it is completely seated and then begin applying adhesive.
8. Apply adhesive directly to the substrate as recommended by the product manufacturer.

\*US 9,573,150 B2; US 9,566,594 B2

\*\*US 9,174,234 B2; CA 2,806,690 C

### SAFETY

Protective equipment such as safety glasses and protective gloves must be worn when operating or servicing the Millennium Cyclone pump cart.

The Patented Millennium Cyclone pump cart runs on 110 volt 60Hz AC current. Use a grounded power cord that is in good condition, rated for outdoor use, and a minimum of 14- gauge construction. Servicing electrical components should only be done by trained personnel and only after disconnecting power to the equipment. CAUTION: The electrical circuitry is not of explosion proof design and should not be used in any environment requiring such a design.

The Patented Millennium Cyclone pump cart operates with pressure. The applicator should never be pointed toward people. The applicator should never be actuated when the outlet tip is blocked or restricted by cured adhesive or any object.

Consult product label and Safety Data Sheet (SDS) for necessary safety precautions.

FEATURES	BENEFITS
Lightweight / Portable	Easy to maneuver
Clean, contained delivery system	Applicator and hoses stay clean and free flowing, low maintenance
Quick and easy application	Perfect for large congested rooftops
Solid core tires	Prevents flat tires
Adjustable gun assembly	Ergonomic design
Dual pump system	Reduces risk of catastrophic pump failure / lowers maintenance cost
Single aperture	Easy connections

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## SHUT DOWN AND EXTENDED BREAKS

1. Close manifold valves.
2. Turn off power.
3. Remove static mixing tip and retaining nut (if needed) and discard.
4. Relieve any pressure in hoses by opening and closing applicator valves.
5. Pump a non-lithium grease into both grease fittings on the gun manifold until it flows out of the tip. Install grease into the part 1 (A) grease fitting first.

**CAUTION:** Remove static mixing nozzle during any pause in application or operation. Do not allow pressure to build up in the static mixing nozzle. If static mixing nozzle remains on applicator manifold, material can react and harden in the manifold and possibly the ends of the hoses. During removal and attachment of static mixing nozzles, a wrench may be necessary for removal. Clean manifold threads and re-grease frequently.

## LIMITATIONS

- Do not apply to wet or damp surfaces.
- Not recommended for use with insulation boards larger than 4' x 4' (1.2m x 1.2m).
- Do not use warped or curled insulation boards. All insulation boards must lay flat upon the roof surface.
- Pump grade adhesives are designed for application temperatures of 40°F and above.

## SURFACE PREPARATION

All work surfaces should be clean, dry, and free of dirt, dust, debris, oils, loose and/or embedded gravel, un-adhered coatings, deteriorated membrane and other contaminants that may result in a surface that is not sound or is uneven. In recover applications Millennium Surface Treatment or Millennium Universal Primer may be required. Contact H.B. Fuller's Technical Service Department for more information.



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## MACHINE STORAGE

Long term storage (30 days +) will require that the pump system and hoses are flushed with Millennium Cyclone System Solution. (Refer to Millennium Cyclone System Solution Product Information Sheet and Technical Bulletin for detailed instructions). After extended storage the gravity feed supply lines and quick connects may need to be replaced.

Material can be allowed to stand in the machine for short periods of time, however, it is very important that Part 1 not be exposed to air or moisture to prevent crystallization.

Material should be run through the pump and hoses every three to four weeks when the pump is not in use. Cyclone System Solution can be run through the pump for this purpose.

## MATERIAL PACKAGING AND COVERAGE

Millennium PG-1 Fleeceback Membrane Adhesive and Low Viscosity Insulation Adhesive kit:

Part 1 (A) - 5 gallon (18.9L) Box : PG-IA5B-A01

Part 2 (B) - 5 gallon (18.9L) Box : PG-IA5B-B01

Part 1 (A) and Part 2 (B) (complete kit) mixed through the Patented Millennium Cyclone low pressure pump cart will produce approximately 2,000 to 2,500 sq. ft. (186m<sup>2</sup> - 232m<sup>2</sup>) when properly mixed and applied over a semi-smooth substrate. Coverage estimates indicate total square feet of insulation attachment per 10 gallon kit. Larger beads may be required for rough surfaces or fleeceback membrane adhesive applications. For fleeceback applications consult your waterproofing membrane manufacturer's guidelines. Rates are based on an application pattern of 4 ribbons, 1/2" - 3/4" (1.3cm- 1.9cm) wide, 12" (30cm) o.c. per 4' x 4' (1.2m x 1.2m) insulation board.

Patented Millennium Cyclone can be used with any brand of 2-part urethane roofing adhesives and Cubitainer® packaging. Utilizing the easy-to-install conversion kit, the Cyclone can be converted to handle 15 gallon drum sets.

\*US 9,573,150 B2; US 9,566,594 B2



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## About H.B. Fuller's Commercial Roofing Products

Skyrocketing insurance costs, increasing wind uplift requirements, and the growing complexity of today's regulatory environment are changing the way we roof. H.B. Fuller has a myriad of solutions designed to help commercial roofing contractors comply with demanding developers, building owners, and municipal building codes.

From insulation attachment to repair products, H.B. Fuller's durable solutions adhere and seal commercial low-slope roofing systems. Our patented tape technologies have been applied to seam, flash, and cover more than a billion square feet of rooftop. The patented One Step™ insulation adhesive delivery system has revolutionized roofing: providing the fastest, most efficient method of insulation installation while minimizing roof deck penetrations and eliminating thermal bridging from mechanical fasteners.

H.B. Fuller's Hurricane Force® Membrane Adhesive Systems and Penetration Sealing Systems are cold applied, quick setting, all-weather, essentially VOC-free adhesives & sealants. H.B. Fuller is committed to developing products that improve jobsite safety, eliminate fire hazards, and reduce building disruption.

H.B. Fuller is an ISO 9001, TS 16949 and ISO 14001 certified company. Today, H.B. Fuller remains committed to the innovative spirit that has made our company successful employing over one hundred chemists and technicians to develop novel solutions for the most demanding bonding and sealing applications.

