PRODUCT APPLICATION GUIDE

Additional product information can be found on the Demilec website at www.Demilec.ca. Refer to the following documents plus this Product Application Guide to establish processing parameters for varying substrate and climatic conditions:

- Demilec Good Safety Practices Guide
- Airmétic Soya/Heatlok Soya/Polarfoam Soya Technical Data Sheet & MSDS
- CCMC # 13244-L Evaluation Report
- CAN/ULC-S705.2 Standard for thermal insulation – Spray applied rigid polyurethane foam, medium density - Application

GENERAL PROCESSING GUIDELINE

Airmétic Soya/Heatlok Soya/Polarfoam Soya requires heat from the proportioner to complete the chemical reactions necessary to create foam meeting the specifications on the Technical Data Sheet. Fully functional primary heaters and hose heat are needed to process Airmétic Soya/Heatlok Soya/Polarfoam Soya. Please consult the Demilec Technical Service Department for further assistance.

CHEMICAL CONDITIONING

The chemical drums should be stored and maintained between 59°F (15°C) and 77°F (25°C) before processing at the job site. If the drums are bulged due to excessive heat, do not open the drums. Cool down the drums between 59°F (15°C) and 77°F (25°C) for approximately 24 – 48 hours to allow the physical blowing agent, 245fa, to return to a liquid state. Please contact the Demilec Technical Service Department for more information.

SUBSTRATE PREPARATION

All surfaces to be sprayed must be free of oil, grease, waxes, rust scale, loose dirt and water. In addition, the substrate must be structurally sound. The moisture content of wood substrates must not exceed 19% before foam is applied. Some metal surfaces may require sandblasting and priming prior to foam spraying to ensure adequate adhesion. Consult a Demilec Technical Service Representative for additional information on surface preparation. When in doubt about the potential for adhesion to a substrate, build a mock-up and spray the foam under similar conditions to that expected in the field, then test for adhesion and cohesion.

Applying foam insulation to concrete:

- Concrete and masonry must be fully cured and “bone-dry.”
- Efflorescence must be brushed
- Muriatic acid can be an effective cleaning agent for preparing concrete substrates prior to spraying foam. Follow the label instructions for dilution and application.

Applying foam insulation to galvanized steel:

- Do not use hydrocarbon solvents like mineral spirits to clean galvanized metal.
- Prime using a DTM (direct to metal) bonding primer suitable for galvanized metal recommended by Demilec.

Applying foam over previously painted surface:

- Glossy surfaces – sand, abrade surfaces or prime.

Applying foam over bare steel/metal:

- Rust scales – wire brushing or scrubbing with a stiff brush or abrasive pad.
- Corrosion – clean then prime with suitable bonding primer.
- Glossy or very smooth surfaces – sand, abrade surfaces or prime.

Applying foam over stainless steel:

- Oils – wash with minerals spirits and/or prime with a suitable primer. Brush blasting, sanding or abrading may be necessary as foam requires a mechanical bond.

Applying foam over aluminum:

- Oils, Hydrated Alumina – clean with solvent, never use a caustic solution, and/or prime with a high adhesion bonding primer suitable for aluminum recommended by Demilec.

Applying foam over glass:

- Oils – wash with detergent
- Glossy or very smooth surfaces – sand or abrade surfaces.
- UV degradation – prime glass surface with suitable primer.

Asphalt and Tar:

- Solvents – allow to cure and for solvent to evaporate, prime with suitable primer.

Rigid Polyurethane Foam:

- UV degradation – remove surface of foam with wire brush or wire grinding wheel.

Polypropylene, polyethylene, some silicones and some ceramic surfaces:

- Airmétic Soya/Heatlok Soya/Polarfoam Soya may not adhere without a mechanical attachment to these substrates.

APPLICATION PARAMETERS

EQUIPMENT – Follow the spray equipment manufacturer's safe operation guidelines. Every spray unit is slightly different and you will need to adjust your primary heater and hose temperatures accordingly for each polyurethane foam system. Adjust your processing pressures and application technique to have an appropriate spray pattern.

PROPORTIONER – Use only fixed ratio (one-to-one), volumetric positive displacement pumps connected to a common drive.

TRANSFER PUMPS – Use 2:1 or 1:1 double acting transfer pumps assuring equal pressure is delivered from both sides to the proportioner. Diaphragm pumps, wall mounted or drum mounted pumps should not be used to process closed cell foams containing the blowing agent 245fa. Contact the Demilec Technical Service Department for recommendations.

PRIMARY HEATERS – The primary heaters should be resistance controlled, direct contact heating rods, either submersible, mass block and tube style or combination of direct heating contact rods and mass block (hybrid heater). The primary heaters should be controlled through independent controllers, separated from the hose heat to ensure an accurate setpoint temperature. Airmétic Soya/Heatlok Soya/Polarfoam Soya may not be consistently sprayed in conformance with the written specification if the combination of the proportioner's pumping capacity, the primary heat capability and spray gun discharge rate (mixing chamber size) is out of balance. Contact the Demilec Technical Service Department for further guidance.

HEATED HOSE – Demilec recommends the use of heated spray hoses rated at ≥ 2000 psi. Use moisture resistant hoses specifically designed for isocyanate. The heated spray hose should be able to maintain temperatures up to 190°F (88°C) and should be heated using an electrical element with an independent temperature sensor. The heated hose should also be adjusted and monitored separately from the A and B primary heaters, and should be capable of maintaining the temperature from the A and B primary heaters all the way to the spray gun.

FLUSHING/CHANGING FROM ANOTHER CHEMICAL TO AIRMÉTIC SOYA/HEATLOK SOYA/POLARFOAM SOYA

Follow the published flushing procedure on the Demilec website. Never flush water through the A-side (iso side). Failure to properly flush will result in off-spec foam and does not comply with the CCMC evaluation Listing and does not qualify for the Demilec Limited Lifetime Warranty.

FOAM APPLICATION

In preparation for spraying, an off-target test spray should be performed to verify the processing pressure, primary heater and hose temperature settings. The "initial setpoint temperatures" listed below and on the Technical Data Sheet are suggested general starting parameters; it's important to observe the foam and the reaction time of the reacting mass and make additional adjustments throughout the day as needed to maintain proper cell structure, adhesion, cohesion and general foam quality.

RECOMMENDED PROCESSING CONDITIONS*		
Initial Primary Heater Setpoint Temperature	95°F @ 115°F	35°C @ 46°C
Initial Hose Heat Setpoint Temperature	95°F @ 115°F	35°C @ 46°C
Minimum Processing Dynamic Pressure	800 psi	5516 kPa
Substrate & Ambient Temperature Summer Winter Super Winter	 41°F @ 86°F 41°F @ 14°F 14°F @ -4°F	 5°C @ 30°C 5°C @ -10°C -10°C @ -20°C

*Foam application temperatures and pressures can vary widely depending on temperature, humidity, elevation, substrate, equipment and other factors. While processing, the applicator must continuously observe the characteristics of the sprayed foam and adjust processing temperatures and pressures to maintain proper cell structure, adhesion, cohesion and general foam quality. It is the sole responsibility of the applicator to process and apply Airmétic Soya/Heatlok Soya/Polarfoam Soya within specification.

One proven method of applying Airmétic Soya/Heatlok Soya/Polarfoam Soya product is to spray perpendicular (90 degree angle) to the substrate, holding the gun 18 – 24" away from the substrate. This technique also helps minimize over spray. Airmétic Soya/Heatlok Soya/Polarfoam Soya should be applied by spraying vertically or horizontally to the substrate while overlapping the passes 60 – 90%. Apply by spraying into the gelling material (wet line) as it is rising. If the processing parameters are set too high, the pattern may be uncontrollable, the mixing chamber may clog often, the wet line will not be as pronounced and the surface characteristics will be rough. When the parameters are too low the foam may spray in a direct stream, no fine atomized droplets open spray pattern acheived and mixed chemicals may remain partially reacted.

Always spray perpendicular to the surface. Maximum thickness per lift is 2" (50mm). Spraying sections too thick, too fast may result in charring of the foam, or in extreme conditions a fire may result. Thin foam layers often result in poor physical properties, reduced coverage and poor chemical reaction due to low exothermic heat generated from the chemical reaction, which is needed to create proper closed cell formation.

When multiple passes are needed to achieve total thickness greater than 4", allow the first 4" of foam to cool down before proceeding with the following passes. It is recommended to use a 0 – 220°F pocket sized, self-penetrating thermometer to ensure that the foam has cooled before additional layers can be applied. Wait until the core of each pass has cooled to 100°F (38°C) or below before successive foam lifts are applied. When multiple layers are necessary to achieve the proper R-value, cross-hatching should be done. This technique aids in proper cohesion of passes.

The temperature of the substrate has a major effect on the foam density and adhesion. Certain compromises are necessary to spray in cold weather. The "COLD WEATHER PROCESSING" section offers more information on this topic. If in doubt about the substrate or the ambient conditions, a trial

application should be done to check foam quality and spray performance. Water on the substrate from rain, fog, condensation, etc. will react chemically with the isocyanate, adversely affecting the physical properties, performance and adhesion of the foam. Airmétic Soya/Heatlok Soya/Polarfoam Soya should never be applied when the relative humidity is above 80%, as high relative humidity can adversely affect the physical properties of the foam.

EXTERIOR FOAM APPLICATION

Climatic conditions are an important factor that should be considered when preparing to apply foam to the exterior of a structure. Ambient and substrate temperatures should be monitored. Foam should only be applied when ambient and substrate temperatures are inside the range for the foam system version being used. Foam should only be applied to substrates with less than 19% moisture content. It is best to apply foam when the humidity is less than 80% and the wind is less than 10 mph to maintain proper adhesion and yield. Pay close attention to the temperature of the substrate when applying foam to the exterior of a structure.

Use windscreens downwind, the foam can travel long distances because the particles may separate when airborne. Windscreens can also be configured around scaffolding and man-lifts. It may also be necessary to enclose and preheat the area to the acceptable temperature range for the foam system being used. In preparation for spraying, a test spray should be performed to ensure that the proper processing temperatures and pressures are set. The specified settings per the TDS are general starting parameters, it is important to observe the foam and the reaction time of the reacting mass and make additional adjustments as needed.

When applying foam to a cold substrate, each pass should not be less than 1" in thickness because of the possibility of reduced foaming. Each lift pass should not exceed 2" thick to avoid elongated cell formation and to avoid shrinkage. When multiple passes are needed to achieve the prescribed thickness, allow the foam to cool before proceeding with the next pass. It is recommended to use a 0 – 220°F pocket sized, self-penetrating thermometer to ensure that the foam has cooled before additional layers can be applied. Wait until the core of each pass has cooled to 100°F (38°C) or below before successive foam lifts are applied. Successive passes should overlap 60 – 90% to ensure a smooth surface free of ridges. The thickness of the insulation should be measured with a depth gauge.

COLD STORAGE APPLICATIONS

Cold storage facilities require vapor barriers. Vapor barriers are typically applied to the warm side of the insulation system. Airmétic Soya/Heatlok Soya/Polarfoam Soya applied at a thickness of or greater than 1.25" is classed as a vapor barrier. Freezers require 2 lb foam, using lower density foam or an over catalyzed foam can also lead to severe cracking. Proper surface preparation may be necessary prior to the application of Airmétic Soya/Heatlok Soya/Polarfoam Soya in cold storage applications. Contact the Demilec Technical Service Department for more information about cold storage applications.

Materials used to construct refrigerated rooms are affected by temperature changes, like all common building materials. Gradual lowering of the temperature is designed to eliminate problems stemming from these temperature changes while at the same time withdrawing construction moisture, and testing the vapor barrier and mechanical system.

COLD STORAGE FACILITY COOL DOWN SCHEDULE

TIME PERIOD	MAX. TEMP. REDUCTION	MIN. ROOM TEMP.
First 24 hours	–	75°F (24°C)
Second 24 hours	15°F (-9°C)	60°F (16°C)
Third 24 hours	15°F (-9°C)	45°F (7°C)
Fourth 24 hours	10°F (-12°C)	35°F (2°C)
Until room is dry (watch moisture on coils as an indicator)	0°F (-18°C)	35°F (2°C)

TEMPERATURE REDUCTION AFTER ATTAINING DRY STATE

TIME PERIOD	MAX. TEMP. REDUCTION	MIN. ROOM TEMP.
First 24 hours	5°F (-15°C)	30°F (-1°C)
Second 24 hours	10°F (-12°C)	20°F (-7°C)
Third 24 hours	10°F (-12°C)	10°F (-12°C)
Fourth 24 hours	10°F (-12°C)	0°F (-18°C)
Fifth 24 hours	10°F (-12°C)	-10°F (-23°C)

HOW TO AVOID OVER SPRAY

Over spray with closed cell foams occurs for a variety of reasons such as spraying the product too hot, applying the product with a gun too far from the substrate, not spraying perpendicular to the surface, or spraying in high wind conditions. Excessive over spray may lead to blisters or delaminating of additional passes of foam or coating. Over spray can travel long distances and may adhere to objects left unprotected such as windows, buildings and automobiles. Protect anything that should not get foamed.

LIMITATIONS OF USE

Airmétic Soya/Heatlok Soya/Polarfoam Soya is a combustible material with a maximum continuous service temperature of 180°F (82°C). Airmétic Soya/Heatlok Soya/Polarfoam Soya should not be used in direct contact with chimneys, flues, steam pipes, recessed lighting or heat emitting devices. Consult the listing or label of such materials for clearance to combustibles. A minimum clearance of 3" should be maintained when applying around recessed lighting and it's important to avoid spraying inside electric outlets or junction boxes. Properly prepare and secure any material or surface that should not get insulated. If in doubt about the substrate temperature or surface conditions, a trial application should be conducted to check foam quality and spray performance. Water on the surface from rain, fog, condensation, etc. will react chemically with the isocyanate, adversely affecting the foam and physical properties, particularly adhesion during application.

COLD WEATHER PROCESSING

The minimum substrate and ambient temperature for Airmétic Soya/Heatlok Soya/Polarfoam Soya is 32°F (5°C) for summer version, 14°F (-10°C) for winter version and -4°F (-20°C) for super winter version. Please use the right version of chemicals depending on climatic conditions and temperatures.

Low temperatures affect the foaming process in two ways.

1. Chemical reactions can be slowed due to reduced exothermic energy within the expanding mass, which could lead to poor adhesion, dripping, creeping and voids formation at substrate/foam interface.
2. This reduced temperature often leads to reduced yield by producing thicker skin formation.

The temperature and type of substrate has a greater influence on the quality of the foam than the temperature of the air because the rate of heat transfer from liquid to air is much slower than the rate from liquid to substrate. If the substrate temperature is too low, or it is a highly conductive material such as metal or concrete, the heat produced by the chemical reaction may be drawn into the substrate so rapidly that plastic formation and cell generation becomes very slow. It is not a good practice to use the heated chemicals to warm the surface (flash coat). Instead, if the substrate to be sprayed is too cold to produce proper foam, the substrate should be heated using an indirect-fired heater or the foam should be sprayed on a warmer substrate on a warmer day or on a substrate exposed to the sun or change the chemical version for the appropriate one. No open flame or direct heating is permitted during the spraying process.

THERMAL AND UV PROTECTION

Like all foam plastics, Airmétic Soya/Heatlok Soya/Polarfoam Soya must be separated from the living space by a 10 minute thermal barrier in accordance with applicable codes. This product must not be used when the continuous service temperature of the substrate or foam is below -76°F (-60°C) or above 180°F (80°C). Airmétic Soya/Heatlok Soya/Polarfoam Soya must be protected from direct exposure to sunlight; incidental exposure during construction may cause surface discoloration but will not degrade the performance of the foam.

VENTILATION

Ventilate during spray foam application and for a minimum of 24 hours following the application or until no objectionable odor remains. If not adequately ventilated during and shortly after application, the odors can be absorbed in adjacent materials such as fibrous insulation, wood framing and household or stored items.

CHEMICAL STORAGE

Airmétic Soya/Heatlok Soya/Polarfoam Soya B-side resin is packaged in totes or in closed-head metal drums. A100 or A100-4 PMDI is packaged in totes or in closed-head metal drums. Store the B-side resin at temperatures between 59°F (15°C) and 77°F (25°C). Store the A-side isocyanate at temperatures between 59°F (15°C) and 100°F (38°C). Keep away from direct sunlight. Remove the transfer pump and tightly close the bungs of the A-PMDI and B-side drum after use. Airmétic Soya/Heatlok Soya/Polarfoam Soya B-side resin has a 6 month shelf life when stored within the acceptable storage temperatures and the drum is in its original condition with the bungs having never been removed. See Airmétic Soya/Heatlok Soya/Polarfoam Soya B-side SDS for additional product information.

FOR MORE INFORMATION

Visit www.Demilec.ca or call 1-866-437-0223 for more information on health, safety and environmental protection with respect to polyurethane chemicals.

Disclaimer: The information herein is to assist customers in determining whether our products are suitable for their applications. We request that customers inspect and test our products before use and satisfy themselves as to contents and suitability. Nothing herein shall constitute a warranty, expressed or implied, including any warranty of merchantability or fitness, nor is protection from any law or patent inferred. All patent rights are reserved. The foam product is combustible and must be protected in accordance with applicable codes. Protect from direct flame and spark contact, around hot work for example. The exclusive remedy for all proven claims is replacement of our materials.