PATRIOT 500

OPEN CELL SPRAY FOAM • UES ER-1046

Patriot 500 is a two-component, water-blown (zero ozone depleting chemical) light-density, open-cell spray polyurethane foam (SPF) system that is designed to improve the performance of the building envelope for interior commercial, residential and industrial applications.

PHYSICAL PROPERTIES

Core Density	ASTM D1622	0.5 pcf ± 0.05	**Tensile Strength**	ASTM D1623	3 psi
R-Value @ 1”	ASTM C518	4.1	**Air Permeance @ 3.5”**	ASTM E2178	0.002 cfm/ft² @ 75 PA
Water Vapor Permeance	ASTM E96	9.3 Perms @ 2”	**Dimensional Stability**	ASTM D2126	-4% @ 158°F
Re-occupancy	ASTM D8445	2 hours	**Re-entry**	ASTM D8445	2 hours

LIQUID PROPERTIES

PROPERTY	A SIDE: PMDI ISOCYANATE	B SIDE: PATRIOT 500 RESIN
Color	Brown	Amber
Viscosity (Brookfield cps) @ 77°F	200 ± 30	200 ± 50
Specific Gravity	1.24	1.15
Mixing Ratio (volume)	1:1	1:1

FIRE TEST RESULTS

Flammability	ASTM E84 @ 4”	<25 Flame Spread; <450 Smoke Development
Large Scale Fire: Ignition Barrier	AC 377 Appendix X	PASS: 4 Wet Mils DC 315
Large Scale Fire: Thermal Barrier	NFPA 286*	PASS: 18 Wet Mils DC 315; 14 Wet Mils No-Burn
Alternative Unvented Attic Assembly*	IBC 1202.3 / IRC R806.5	Approved for certain attics without prescriptive ignition barrier or intumescent coating
NFPA 285	PASS	IAPMO UES ER-1046

PROCESSING PARAMETERS

PRESSURE (DYNAMIC)
1000–1500 psi while spraying

MACHINE TEMPERATURE
A Side: 125°F–135°F (52°C–57°C)
B Side: 125°F–135°F (52°C–57°C)

SUBSTRATE TEMPERATURE
PATRIOT 500: 32°F–120°F (4°C–49°C)

DRUM TEMPERATURE
A Side: 68°F–86°F (20°C–30°C)
B Side: 68°F–86°F (20°C–30°C)

HOSE HEAT TEMPERATURE
125°F–135°F (52°C–57°C)

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PROCESSING INSTRUCTIONS

AGITATION
AGITATION REQUIRED AT HIGH SPEED FOR 20-30 MINUTES PRIOR TO SPRAYING. AGITATION DURING APPLICATION AT MEDIUM SPEED. RECOMMENDED AGITATOR: GRACO COLLAPSING BLADE AGITATOR #26C818 OR #26C150.

DRUM TEMPERATURES & RECIRCULATION
RECIRCULATE AS NEEDED TO ACHIEVE CHEMICAL TEMPERATURES IN THE DRUMS OF 75°F-95°F FOR BOTH A SIDE & B SIDE DRUMS (THIS IS NECESSARY TO BRING VISCOSITIES OF A SIDE & B SIDE IN ALIGNMENT TO PREVENT OFF-RATIO FOAM AND INCREASE YIELD). WHEN RECIRCULATING, SET THE PRIMARY HEATER FOR A SIDE TO 100°F AND B SIDE TO 130°F. USE LASER THERMOMETER OR INLET TEMPERATURE GAUGE TO MEASURE DRUM TEMPERATURE (A SIDE DRUM SHOULD NEVER BE WARMER THAN B SIDE DRUM).

SUBSTRATE CONDITION
SUBSTRATE MUST BE CLEAN, DRY, AND MOISTURE CONTENT <19%. SUBSTRATE TEMPERATURE SHOULD BE >5°F ABOVE DEW POINT. WHEN SUBSTRATE TEMPERATURE IS BELOW 45°F, PRE-HEAT BUILDING. WHEN HEATING CONCRETE OR METAL SUBSTRATE WITH PORTABLE HEATERS, ONLY HEAT TO 50°F, OTHERWISE CONDENSATION MAY FORM. NEVER USE PORTABLE PROPANE HEATERS.

SPRAY TECHNIQUE
SPRAY SIDE-TO-SIDE APPROXIMATELY 18" FROM SURFACE. THE FARTHER AWAY YOU SPRAY, THE COLDER THE CHEMICAL WILL BE WHEN REACHING SUBSTRATE, INCREASING THE POTENTIAL FOR VOIDS. REVERSE PICTURE FRAME TECHNIQUE IS ALSO SUGGESTED IF DESIRED.

HIGH HUMIDITY
WHEN THE DEW POINT IS GREATER THAN 65°F, REDUCE THE A SIDE TEMPERATURE BY 5°F +/- TO REDUCE ISO REACTIVITY/BLOW BACKS.

CONTAMINATION
B SIDE IS SENSITIVE TO CONTAMINATION FROM OTHER PRODUCTS. NEVER COMBINE THIS PRODUCT WITH ANY OTHER PRODUCT AND NEVER COMBINE OPEN CELL WITH CLOSED CELL PRODUCTS. TRANSFER PUMPS MUST BE PROPERLY CLEANED BETWEEN PRODUCT. RECIRCULATING LINES MUST BE PROPERLY FLUSHED BEFORE RECIRCULATING.

MAX / MIN PASS THICKNESS
MAX PRACTICAL PASS THICKNESS IS 6-8" BEFORE RESULTING IN SPLASH-BACK. MIN RECOMMENDED PASS THICKNESS IS 3", EXCEPT WHEN A FLASH-COAT IS REQUIRED.

PROPER TEMPERATURE SETTINGS
AS A GENERAL RULE OF THUMB, THE HOSE TEMPERATURE IS THE MOST IMPORTANT SETTING AND SHOULD BE SET FIRST. THE A SIDE IS SET 2°F-5°F HIGHER THAN THE HOSE. THE B SIDE IS SET 3°F-10°F HIGHER THAN THE A SIDE DEPENDING ON HUMIDITY LEVELS. IF AMBIENT CONDITIONS ARE HOT AND DRY, ALL TEMPERATURES MAY BE SET THE SAME.

HIGH ALTITUDE
AT HIGHER ELEVATIONS, A SIDE & B SIDE TEMPERATURES MAY HAVE TO BE SET THE SAME AS THE HOSE.

HEATED HOSE
THE HOSE TEMPERATURE IS THE MOST IMPORTANT SETTING AND SHOULD BE SET FIRST TO DESIRED FINAL CHEMICAL TEMPERATURE AT GUN. HOSE TEMPERATURE SHOULD RARELY BE ADJUSTED. PRIMARY HEATERS SHOULD BE INCREASED IF CHEMICAL IS TOO COLD. A POORLY INSULATED HOSE MAY COMPROMISE ADEQUATE HEATING AND DRASTICALLY CHANGE REQUIRED TEMPERATURE SETTINGS. NEVER INCREASE HOSE TEMPERATURE ABOVE 145°F - YOU CAN BURN THE HOSE.

MAXIMIZING YIELD / DIALING-IN TEMPS
DOZENS OF FACTORS AFFECT YIELD, BUT PROPERLY DIALING IN TEMPERATURES HAS THE BIGGEST IMPACT. FOR OPEN CELL, START TEMPERATURES HOT ENOUGH THAT THE FOAM SHRINKS SLIGHTLY FROM THE STUDS, THEN LOWER TEMPERATURES 3°F AT A TIME UNTIL SHRINKAGE STOPS; THIS IS THE YIELD SWEET SPOT.

PRESSURE SETTINGS
HIGHER FLUID PRESSURE SETTINGS CREATE MORE MIST AND REQUIRE GREATER DISTANCE FROM THE CAVITY, RESULTING IN MORE OVERSPRAY. HIGHER PRESSURE WILL GENERALLY LOWER YIELD. AS A RULE OF THUMB, YOU SHOULD PRACTICE SPRAYING AS CLOSE TO 1000 PSI AS PRACTICAL.

CAUTIONS & RECOMMENDATIONS

PATRIOT 500 IS DESIGNED FOR INSTALLATION IN MOST STANDARD CONSTRUCTION CONFIGURATIONS USING COMMON MATERIALS SUCH AS CONCRETE, METAL, AND WOOD PRODUCTS. FOAM PLASTIC INSTALLED IN WALLS OR CEILINGS MAY PRESENT A FIRE HAZARD UNLESS PROTECTED BY AN APPROVED, FIRE-RESISTANT THERMAL BARRIER WITH A FINISH RATING OF NOT LESS THAN 15 MINUTES AS REQUIRED BY BUILDING CODES. RIM JOISTS/HEADER AREAS IN ACCORDANCE WITH THE IRC® AND IBC® MAY NOT REQUIRE ADDITIONAL PROTECTION. FOAM PLASTIC MUST ALSO BE PROTECTED AGAINST IGNITION BY CODE-APPROVED MATERIALS IN ATTICS AND CRAWL SPACES, OR AS CODE APPROVED ALTERNATIVES APPLY. AS WITH ALL SPF SYSTEMS, IMPROPER APPLICATION TECHNIQUES SHOULD BE AVOIDED AND ANY DEFECTIVE PRODUCT REPLACED WITH PROPERLY INSTALLED MATERIALS. EXAMPLES OF IMPROPER APPLICATION TECHNIQUES INCLUDE, BUT ARE NOT LIMITED TO: EXCESSIVE APPLICATION THICKNESS, OFF-RATIO MATERIAL AND SPRAYING INTO OR UNDER RISING LIQUID FOAM. ADDITIONALLY, OFF-RATIO MATERIALS CAN RESULT IN OFFENSIVE ODORS THAT MAY NOT DISSIPATE.

JOBSITE WARNINGS

APPLICATORS SHOULD ENSURE THE SAFETY OF THE JOBSITE AND CONSTRUCTION PERSONNEL. SPF INSTALLATION IS COMBUSTIBLE AND APPROPRIATE SIGNS SHALL BE POSTED WARNING THAT ALL "HOT WORK" SUCH AS WELDING, SOLDERING, AND CUTTING WITH TORCHES SHOULD NOT TAKE PLACE UNTIL A THERMAL BARRIER OR APPROVED EQUIVALENT IS INSTALLED OVER ANY EXPOSED POLYURETHANE FOAM. CONTRACTORS SHOULD COMMUNICATE WITH OTHER TRADES WORKING IN PROXIMITY TO THE SPRAY APPLICATION AREA. APPROPRIATE WARNING SIGNS SHOULD BE POSTED AT EACH ENTRYWAY, CLEARLY INDICATING THAT SPRAY FOAM ACTIVITY IS IN PROGRESS AND PROPER RESPIRATORY PROTECTION IS REQUIRED TO ENTER. NON-SPF PERSONNEL AND OCCUPANTS SHOULD BE VACATED FROM THE BUILDING DURING THE APPLICATION OF SPF. PROPER VENTILATION DURING SPRAYING AND AFTERWARDS AT MINIMUM 10 AIR CHANGES PER HOUR. RE-ENTRY: VENTILATE FOR 2 HOURS BEFORE PERSONAL PROTECTIVE EQUIPMENT IS NO LONGER REQUIRED FOR TRADES AND INSPECTORS. RE-OCCUPANCY: AFTER 2 HOURS OF CONTINUOUS VENTILATION, BUILDING MAY BE RE-OCCUPIED.

TROUBLESHOOTING GUIDE

POOR ADHESION BETWEEN LAYERS OR "FISH EYE" CELLS
IF THE FOAM DOES NOT ADHERE TO ITSELF AND/OR CONTAINS LARGE RANDOM CELLS THAT APPEAR LIKE "FISH EYES," THE CAUSE MAY BE TRAPPED STEAM BETWEEN LAYERS. ALLOW THE FIRST LAYER TO COOL BEFORE APPLYING SECOND LAYER.

PULLS AWAY FROM STUDS OR DEFLATES
IF FOAM PULLS AWAY OR "SHRINKS" FROM STUDS WITHIN A FEW SECONDS, THEN IT IS TOO HOT. LOWER PRIMARY HEATERS AND HOSE TEMPERATURES BY 3°F. SPRAY OUT CHEMICAL IN HOSE (APPROXIMATELY 2-3 GALLONS) UNTIL REDUCED TEMPERATURE IS ACHIEVED. IF PROBLEM DOES NOT RESOLVE, LOWER TEMPERATURE BY ANOTHER 3°F, AND REPEAT PROCESS UNTIL RESOLVED. IF FOAM PULLS AWAY FROM STUDS SEVERAL MINUTES AFTER APPLICATION, THEN CHEMICAL MAY BE CONTAMINATED.

VOIDS BEHIND FOAM OR DELAMINATION
IF FOAM SHOWS VOIDS BEHIND IT OR DELAMINATES, THERE ARE FOUR POSSIBLE CAUSES: (1) IF STRINGY FIBERS ("COCONUT HAIRS") APPEAR BETWEEN THE SUBSTRATE AND FOAM, THE FOAM MAY BE TOO COLD. INCREASE ALL HEATERS BY 5°F AND SPRAY OUT CHEMICAL IN HOSE UNTIL NEW INCREASED TEMPERATURES ARE ACHIEVED. REPEAT PROCESS UNTIL PROBLEM IS RESOLVED; (2) IF THE FOAM IS NOT STRINGY BUT HAS A CRUSTY SKIN, IT MAY BE TOO HOT. DECREASE TEMPERATURES BY 5°F; (3) SUBSTRATE MOISTURE CONTENT MAY BE TOO HIGH. TRY LOWERING A SIDE BY 5°F AND CALL TECH SUPPORT; (4) SUBSTRATE MAY BE TOO COLD - TRY A ⅛ – ¼" INITIAL FLASH COAT.

VOIDS & SHRINKING
IF FOAM CREATES VOIDS AND SHRINKS FROM STUDS AT THE SAME TIME, THEN INCREASE B SIDE DRUM TEMPERATURE ONLY TO 100°F. MACHINE ΔT MAY BE TOO LOW.

BEEHIVE CELL STRUCTURE
IF THE FOAM HAS CONSISTENTLY LARGE CELL STRUCTURE RESEMBLING A BEEHIVE, IT MAY BE TOO COLD. INCREASE ALL HEATERS BY AT LEAST 10°F–15°F. IF PROBLEM PERSISTS, CHEMICAL MAY BE CONTAMINATED.

COLOR
IF THE FOAM APPEARS YELLOWISH OR SHOWS MARBLING, IT IS LIKELY TOO COLD. PRIMARY HEATERS SHOULD BE INCREASED 3°F–5°F. FOAM SHOULD APPEAR WHITE.

CRUNCHY OR GUMMY
IF FOAM IS CRUNCHY AND AMBER IN COLOR, THEN FOAM MAY BE ISO RICH AND OFF-RATIO. IF "GUMMY" CONSISTENCY, THEN FOAM MAY BE RESIN RICH. CHECK EQUIPMENT.

POOR YIELD
MANY FACTORS AFFECT YIELD, INCLUDING LOW SUBSTRATE TEMPERATURE, METAL OR CONCRETE SUBSTRATES, THIN LAYERS, MULTIPLE LAYERS, LARGER MIXING CHAMBER SIZES, HIGHER PRESSURE SETTINGS, AND OFF-RATIO FOAM. IF TEMPERATURES ARE DIALED-IN TOO COLD, THEN LACK OF HEAT WILL GENERATE POOR CHEMICAL REACTIVITY & POOR YIELD (SEE DRUM TEMPERATURES & MAXIMIZING YIELD UNDER PROCESSING INSTRUCTIONS). B SIDE MAY NOT BE THOROUGHLY MIXED AND MAY REQUIRE AGITATION. CHECK CHEMICAL EXPIRATION.

IMPORTANT
REGARDLESS OF PROPORTIONER HEATING CAPACITY, NEVER SPRAY FROM COLD DRUM CHEMICAL. POWERFUL PRIMARY HEATERS MAY SCORCH B SIDE RESIN. FOLLOW DRUM TEMPERATURES & RECIRCULATION PROCEDURES UNDER PROCESSING INSTRUCTIONS.

HEALTH & SAFETY INFORMATION

BEFORE WORKING WITH THIS PRODUCT, YOU MUST READ AND BECOME FAMILIAR WITH AVAILABLE INFORMATION, INCLUDING THE SAFETY DATA SHEET (SDS), REGARDING THE RISKS, PROPER USE AND SAFE HANDLING. ALL CONTRACTORS AND APPLICATORS MUST USE APPROPRIATE RESPIRATORY, SKIN AND EYE PERSONAL PROTECTIVE EQUIPMENT (PPE) WHEN HANDLING AND PROCESSING SPRAY FOAM SYSTEMS. REFER TO THE CENTER FOR THE POLYURETHANES INDUSTRIES (CPI): GUIDANCE FOR DEVELOPING A WRITTEN RESPIRATORY PROTECTION PROGRAM, GUIDANCE ON BEST PRACTICES FOR THE INSTALLATION OF SPRAY POLYURETHANE FOAM, AND SPRAY FOAM PRODUCT STEWARDSHIP GUIDANCE, AVAILABLE AT WWW.SPRAYPOLYURETHANE.ORG AND WWW.PATRIOTFOAM.COM.

SHELF LIFE & STORAGE

PATRIOT 500 HAS A SHELF LIFE OF APPROXIMATELY SIX MONTHS FROM THE DATE OF MANUFACTURE WHEN STORED IN ORIGINAL, UNOPENED CONTAINERS AT 50°F-90°F. THIS MATERIAL SHOULD BE STORED IN A SECURE LOCATION AND NEVER IN DIRECT SUNLIGHT. STORAGE TEMPERATURES ABOVE THE RECOMMENDED RANGE WILL SHORTEN SHELF LIFE.

VAPOR RETARDER

PATRIOT 500 IS INTENDED FOR INDOOR APPLICATIONS AND IS A CLASS III VAPOR RETARDER. IT IS VAPOR SEMI-PERMEABLE AND WILL ALLOW FOR SOME DIFFUSION OF MOISTURE THROUGH THE INSULATION. THE FOLLOWING CONSIDERATIONS ARE NEEDED: (1) AN ADDITIONAL VAPOR RETARDER MAY BE NEEDED IN CERTAIN BUILDING ENVELOPES IN CLIMATE ZONES 5 AND HIGHER WHEN NOT MEETING THE CONDITIONS OF IRC TABLE 402.5.1. REFER TO LOCAL BUILDING CODES. (2) A VAPOR RETARDER ALSO NEEDS TO BE CONSIDERED WHERE HIGH INTERIOR HUMIDITY CONDITIONS EXIST.

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