UPC 2.0 HFO

LOW GWP
CLOSED CELL SPRAY FOAM

TECHNICAL DATA SHEET & SPRAY GUIDELINES

UPC 2.0 HFO Closed Cell Spray Foam

UPC 2.0 HFO is a two-component, medium density, one to one by volume spray applied polyurethane foam system. UPC 2.0 HFO system consists of an "A" component (ISO) and a blended "B" component (RESIN) in separate drums. UPC 2.0 HFO contains no ozone-depleting chemicals and is based on hydrofluoroolefin (HFO) technology.

Physical Properties					
Core Density	ASTM D1622	2.03 pcf ± 0.10	**Tensile Strength**	ASTM D1623	50 psi
R-Value @ 1"	ASTM C518	6.5	**Air Permeance @ 1"**	ASTM E2178 @ 75 PA	< 0.031 L/sm²
Water Vapor Permeance	ASTM C355	0.96 @ 1.5 inch	**Dimensional Stability**	ASTM D2126	-20°F: N/C | 158°F @ 100%RH: <0.5%
Water Resistance	AATCC TM 127-2014	Pass			
Closed Cell Content	ASTM D1940	93%	**Compressive Strength**	ASTM E1621	35 psi
Shear Strength	ASTM C273	45 psi	**Shelf Life**	6 months when stored between 50°F - 75°F	
Intertek Certified Clean Air Gold: Conforms to California Department of Public Health (CDPH) Standard Method v1.2: Private Office and School Classroom				CDPH 01350 v1.2: PO, SC, R for VOC emissions and formaldehyde	

Liquid Properties	A-PMDI Isocyanate	UPC 2.0 HFO RESIN
Color	Brown	Light Amber
Viscosity (Brookfield cps) @ 77°F	200 ± 30	650 ± 50
Specific Gravity	1.24	1.22
Mixing Ratio (volume)	1:1	1:1

Fire Test Results		
Flammability : Class A (Class 1)	ASTM E84 @ 4"	25 Flame Spread | 200 Smoke Development
Large Scale Fire Testing: Ignition Barrier	AC 377 Appendix X*	PASS: NO COATING
Large Scale Fire Testing: Thermal Barrier	NFPA 286*	PASS: 16 Wet Mils DC 315

UPC 2.0 HFO meets or exceeds the IBC requirements for exterior walls in type I, II, III, IV and V construction. This includes NFPA 285 and NFPA 259 testing with Intertek Listings (GWL/FIP 30-02, GWL/FIP 30-03).

Reactivity Profile							
Cream Time	0-1 seconds	**Gel Time**	2 seconds	**Tack Free**	3-4 seconds	**End of Rise**	4-6 seconds

* See Intertek CCRR-0375 for additional instructions or consult with UPC's Technical Department for details: 203-760-0025

SPRAY PARAMETERS

This chart is a **starting guide** to set temperatures based on environment, mixing chamber size. Adjustments should be made to account for substrate temp/type, hose insulation condition, speed of sprayer, wind factor, etc. A smaller mixing chamber, like a 4242, will give you the best quality foam at optimal speed-to-yield ratio.

Select Mixing Chamber:	4242 | -01			5252 | -02			6060 | -03		
Select Ambient Temp and Match to Mix Chamber	Temperature Set ±			Temperature Set ±			Temperature Set ±		
	Hose†	A	B	Hose†	A	B	Hose†	A	B
Substrate Temperature for standard wood (Starting Drum Temperature Must be Minimum of 55°F)									
> 90°F	108°F	111°F	114°F	110°F	113°F	116°F	112°F	115°F	118°F
CAUTION: Switch to (S) Summer formula above 80°F. (R) Regular formula may froth & cause pressure imbalance in hot weather.									
80°F	113°F	116°F	119°F	115°F	118°F	121°F	117°F	120°F	123°F
70°F	115°F	118°F	121°F	117°F	120°F	123°F	119°F	122°F	125°F
60°F	116°F	119°F	122°F	118°F	121°F	124°F	120°F	123°F	126°F
50°F	117°F	120°F	123°F	119°F	122°F	125°F	121°F	124°F	128°F
40°F	118°F	121°F	124°F	120°F	123°F	126°F	*Not Recommended*		
30°F	120°F	123°F	126°F	*Not Recommended*					
CAUTION: Switch to (W) Winter formula below 30°F, (R) Regular formula may crack. 1/2" priming coat may be needed to improve adhesion.									
20°F	120°F	123°F	126°F	*Not Recommended*			*Not Recommended*		
10°F	121°F	125°F	127°F						
< 0°F	*Not Recommended*								
Pressure Setting**	1200 +/- psi			1200-1400 +/- psi			1200-1300 +/- psi		

Important notice regarding yield and density: Many factors affect yield, including substrate temperature, substrate type, and pass thickness. Multiple passes will significantly reduce yield. Larger mixing chamber sizes and higher pressure settings will also reduce yield. Off-ratio foam will affect yield.

PROCESSING INSTRUCTIONS - *Read Carefully*

Agitation	DO NOT agitate.
Drum Temperatures & Recirculation	DO NOT RECIRCULATE. Starting chemical temperatures in the drums should be between 55°F-75°F for both the A & B-drums. Use laser thermometer or inlet temp gauge to measure drum temp (A-Drum should NEVER be warmer than B-Drum). If drum is below 55°F, then slowly raise temp with warming blanket or heated storage. NEVER super-heat with portable heater. If drum is too hot then blowing agent will boil-off.
Substrate Condition	Substrate must be clean, dry, and moisture content <19%. Substrate temp should be >5°F above dew point. When substrate temperature is below 45°F, pre-heat building. When heating with portable heaters, if concrete or metal substrate only heat to 50°F, otherwise condensation may form. Never use portable propane heaters. When substrates temps are above 80°F and below 30°F, switch to summer or winter blends accordingly.
Contamination	B-Side is sensitive to contamination from other products. Never combine different products. Transfer pumps must be properly cleaned between product.
Spray Technique	Spray up-and-down approx 18" from surface. The further away you spray, the colder the chemical will be when reaching substrate. Layering will reduce yield, but make smoother. When substrate temp is below 35°F, may need 1/2" priming layer to improve adhesion.
Metal | Concrete Applications	When applying on metal or concrete you may need a 1/2" priming layer. Increase temperatures by 2-5°F to account for heat loss from these surfaces.

PROCESSING INSTRUCTIONS *(continued)*

Max | Min Pass Thickness	Max pass thickness is 3". If the foam is applied too hot or too thick, will overheat foam and cause burnt/"fishy" odor, result in future shrinkage, or possibly lead to fire hazard (including spontaneous combustion). 2nd layer may be applied after 1st layer is hard to the touch.
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 2-5°F higher than the hose. The B-Side is set 2-5°F higher than the A-Side. IMPORTANT: Core temp should never exceed 250°F. If ambient conditions are hot and dry, all temps may be set the same.
High Altitude	At higher elevations, A & B temps may have to be set the same as the hose.
† Heated Hose	A poorly insulated hose may not be able to maintain adequate hose heat and drastically change required temp settings on primary heaters. Never Increase hose temp above 145°F - you can burn the hose.
Maximizing Yield | Dialing-In Temps	Dozens of factors affect yield, but properly dialing in temps and # of layers is critical. Ideal core temp should be 240-260°F, this is the yield sweet spot (use a digital meat thermometer to test the core temp). DO NOT exceed 270°F. For experienced sprayers, start temperatures cold enough that the rising foam sags slightly, then increase temps 5°F at a time until sagging stops. Many thin layers will reduce yield significantly.
****Pressure Settings**	Air pressure settings to the Gun for 01 mix chamber should be @ 100psi, for 02 @ 125psi. 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 1000psi as practical.

TROUBLESHOOTING GUIDE

Delamination	If foam delaminates from substrate, it may be from cold substrate. Apply an initial 1/2" priming layer to improve adhesion. Another cause may be excess moisture in substrate; try reducing A-side temps by 5-7°F to reduce Iso reactivity. Spraying over uncured foam may also cause delamination.
Blistering	If foam creates voids and blisters behind foam, it may be from too much moisture in substrate. Apply a sacrificial mist layer to the substrate, then apply regular pass as normal. IF spraying on metal and blisters form, try increasing thickness of initial pass (no less than 1/2").
Elongated Cell Structure	If the foam has stretched or elongated cells, then it is likely too hot. Try reducing all temps by 5°F.
Large Cell Structure	If the foam has consistently large cell structure,then the B-side resin may be contaminated with open-cell resin.
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. Cured foam should be snappy in consistency when broken apart.
Chalky | Brittle	Too hot. Lower all heaters by 5-7°F. If problem does not resolve, lower temperature by another 5°F, and repeat.
Curing Too Fast	If the closed-cell is curing too fast then it is too hot and could result in future cracking. Lower temperatures by 3°F or as needed.
Curing Too Slow	If the closed-cell is curing too slow then it is too cold and you may see a narrow spray pattern. Raise temperatures by 5-7°F or as needed.
Gun is Clogging Often	If the mixing chamber needs constant cleaning, then foam may be too hot. Lower temperatures by 3-5°F or as needed. Also check gun air settings.
Poor Yield	Many factors affect yield, including low substrate temp, 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, may need agitating. Check chemical expiration.
Pulls Away From Studs	If pulls away or "shrinks" from studs over time, then foam was applied too hot, too thick, or second layer applied over hot foam.
Important	Minimum drum temperature of 55°F is necessary to bring viscosities of A&B in alignment to prevent off-ratio foam and increase yield; setting chemical temperatures above recommendations may result in B side frothing. If the B-drum is over 85°F, then the blowing agent may boil and cause imbalance pressure in proportioner.
Frothing	UPC 2.0 contains a dissolved blowing agent. If the B-side drum is overheated or excessively agitated, the chemical may froth out. Using regular formula in summer temps may also contribute to frothing or imbalance pressure in proportioner.

Cautions and Recommendations:

UPC 2.0 HFO is designed for installation in most standard construction configurations using common materials such as, concrete, metal, and wood products. The foam should not be used when the continous service temp of the subtrate is >180°F. 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. It is the responsibility of the applicator to understand how their equipment works.

Job-site Warnings:

Applicators should ensure the safety of the job-site and construction personnel. SPF Insulation 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 at each entryway must be posted that clearly indicates that spray foam activity is taking place 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 24 hours of continuous ventilation, building my be re-occupied.

Health and Safety Information:

Before working with this product, you must read and become familiar with available information (e.g., Safety Data Sheet (SDS)) on its 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 Polyurethane Foam Product Stewardship Guidance". Available at www.spraypolyurethane.org and www.UPCFoam.com

Shelf Life and Storage:

UPC 2.0 HFO has a shelf life of approximately 4 months from the date of manufacture when stored in original, unopened containers at 50-75°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:

When installed at a minimum of 1.5-inch UPC 2.0 HFO is considered a Class II vapor retarder. Consult with local code officials for specific requirements Climate zone tables are available in current IBC® and IRC® publications.