MAXIMIZING PROFITS WITH UPC 500 MAX & 1.7

ULTRA-HIGH YIELD OPEN-CELL & CLOSED-CELL SPRAY FOAM

Universal Polymers Corp.

Maximize Yield, Maximize Profit, Maximize Quality

UPC 500 Max and 1.7 Can Significantly Increase Your Bottom Line and Make You More Competitive

FOR TECHNICAL SUPPORT CALL **682-503-8069**

UPC 500 MAX OPEN-CELL			
R-value @ 1":	3.8	**Core Density:**	0.45+/- lb/ft³
Low Odor:	Clean Air Gold Certified	**Yield:**	Up to 23,000 Board feet
Superior Formulation:	Solution based ultra-high yield open-cell, aggressive agitation not required. Realistic, attainable high-yield results.		
SAVINGS *Nearly 25% More Yield Than Typical Open-Cell Foam*			
How Many Board ft do you Spray a Month?	200,000 board ft	400,000 board ft	600,000 board ft
Sets Needed with Typical Open-Cell Foam	11.1	22.2	33.3
Sets Needed with UPC 500 Max	8.7	17.4	26.1
How Many Sets You Can Save in a Year	29.0	58.0	87.0
Annual Savings* a Year	**$57,971**	**$115,942**	**$173,913**
***$2,000 per set assumption**			

UPC 1.7 CLOSED-CELL			
R-value @ 1":	6.6	**Core Density:**	1.70+/- lb/ft³
Low Odor:	Clean Air Gold Certified	**Yield:**	Up to 6,000 Board feet
Superior Formulation:	More 245fa blowing agent to lower density, not water. More expensive formulation, dimensionally stable, attainable high-yields.		
SAVINGS *Nearly 20% More Yield Than Typical Closed-Cell Foam*			
How Many Board ft do you Spray a Month?	50,000 board ft	100,000 board ft	150,000 board ft
Sets Needed with Typical Closed-Cell Foam	11.1	22.2	33.3
Sets Needed with UPC 1.7	8.3	16.7	25.0
How Many Sets You Can Save in a Year	33.3	66.7	100.0
Annual Savings* a Year	**$66,667**	**$133,333**	**$200,000**
***$2,000 per set assumption**			

"The UPC 500 Max is a remarkable ultra-high yield open-cell foam. A solution based formula that does not require aggressive agitation, is no fuss, and cuts smoothly."

~ Roy, R&R Spray Foam

"The 1.7 has been a real game changer. It has allowed my business to become much more competitive and dramatically improve our closed-cell margins. We saw a 10-15% reduction in material costs when we switched!"

~ J. Klein, Compass Insulation

SAVINGS EFFECT OF MAXIMIZING YIELD *Small Adjustments in Yield Can Have Major Financial Impact*				
	Open-Cell Yields Achieved:			
	15,000 board ft	**18,000 board ft**	**20,000 board ft**	**22,000 board ft**
	If 200,000 board ft sprayed per month:			
Sets Used	13.3	11.1	10.0	9.1
Cost For Material*	$26,667	$22,222	$20,000	$18,182
Yearly Cost for Material	$320,000	$266,667	$240,000	$218,182
	If 600,000 board ft sprayed per month:			
Sets Used	40.0	33.3	30.0	27.3
Cost For Material*	$80,000	$66,667	$60,000	$54,545
Yearly Cost for Material	$960,000	$800,000	$720,000	$654,545
***Assuming $2,000 per set cost**	*Maximizing Yield Can Add Hundreds of Thousands of Dollars to the Bottom Line Each Year*			

Paying close attention to yield can dramatically impact the bottom line of your business. Small adjustments in the processing and application of the foam can mean huge increases in profitability.

Maximizing Yield Means Maximizing Profit and Maximizing Quality!
Make More Money While Doing the Right Thing for Your Customers

FOR TECHNICAL SUPPORT CALL **682-503-8069**

UNDERSTANDING THE CONDITIONS THAT AFFECT YIELD

There is no standardized test for "yield", we interpret yield through density. "Density" is the weight of one cubic foot (1/ft³) of the foam. Through density, we can extrapolate the theoretical yield from a set liquid chemical. For example, if stated core density of a half-pound foam is 0.5/ft³, then a set of chemical weighing 1,000lbs should produce 2,000/ft³ of foam. Since there are 12 board feet in a cubic foot, theoretically a half-pound foam should achieve 24,000 board feet! In reality we can never achieve that yield, so where does it all go? If we examine where the yield disappears to, then we can have a better understanding of expected yields and how to calculate the yield.

Conditions Affecting Yield	Loss in Yield	Explanation	Recommendations
Substrate Contact Layer & Surface Skin	5-10%	A denser layer of the foam forms where it contacts the substrate and dense skin forms on the surface. Some formulas form thinner skins. You will find this on the UPC 500 Max and 1.7. This helps reduce overall density and improve yield.	• Heating the substrate helps improve the density of the initial contact layer. A cold substrate cools the chemical reaction and reduces the reactivity, thereby limiting its expansion. • Heating the ambient temperature improves the density of the skin formation. Heat the ambient temperature and substrate as close to 70°F as possible. You should use an infrared thermometer to gauge the substrate temperature.
Substrate Temperature	0-30%	The substrate temperature greatly impacts the chemical reaction and growth of the foam. Even on a cold winter day, properly pre-heating a building can dramatically increase yields. As the substrate temperatures drop below 70°F, yields will begin to fall; as they fall below 50°F they will decline exponentially more.	• Heat the building using diesel/electric heaters (avoid propane). If a large structure, concentrate heat in sections being sprayed. Try and achieve at least 50°F substrate if possible. The closer to 70°F the better (except never heat metal substrate above 50°F or may condensate). • If possible, follow the direction of the sun as it warms the substrate.
Substrate Type	0-10%	Concrete and metal will reduce yield. These materials have greater conductivity and suck the heat out of the chemical, thereby lowering reactivity and creating a thicker contact skin.	• Pre-heat substrate as close to 70°F as possible for concrete, but no more than 50°F for metal. • **500 Max & 1.7:** For concrete and metal, use a sacrificial flash coat of ¼" to create a thermal break between these substrate types and the subsequent full pass layer.
Spray Mist	3-5%	A fine mist of chemical particulate is emitted from the gun that never makes contact with the substrate. This mist is lost chemical.	• Lower pressures to reduce mist. • Use an 01 mixing chamber between 1,000-1200psi to reduce mist and improve yield.
Mixing Chamber	0-10%	The larger the mixing chamber the more mist that is generated, the poorer the atomization (mix of resin and iso), and the colder the temperature of chemical coming out of the gun. Large mixing chambers increase flow of GPM, thereby reducing the ability of the chemical to heat up properly in the proportioner.	• Many applicators report 5-10% greater yield when switching from an 02 to an 01 tip. • Make sure mixing chamber size can handle the delta T of the proportioner. • If chemical is cold, an 01 mixing chamber will allow the chemical more time to pass over the block heaters.
Starting Drum Chemical	0-10%	You **CAN NOT** start with cold chemical in the drum, even with powerful block heaters to rapidly-heat the chemical. The viscosities of A&B chemicals are out of alignment when cold. If it transfers into the proportioner and pressurizes cold, then as the chemical heats up volume changes - the result is off-ratio chemical and reduced yield. *Caution: Using powerful block heaters to rapidly heat cold chemical may scorch catalysts and reduce the reactivity and growth of the foam. The warmer the starting chemical, the more aligned the viscosities will be.*	• **500 Max**: Use blanket heaters to warm drums to 75°F. • **1.7 CC:** Use blanket heaters to warm drum temperatures to minimum of 55°F, but no more than 70°F (The 1.7 is susceptible to frothing if drum is too warm). • **1.7 CC**: If drum temperature is too low (<55°F), then the blowing agent in the 1.7 will expand when heated by the block heaters and throw the pressures between A&B out of alignment. The 1.7 is particularly sensitive due to excess blowing agent. • *Band heaters or torpedo heaters NOT recommended, they do not heat evenly and can scorch the polyols and blowing agent.*
Lift/Pass Thickness	0-30%	Thinner lifts do not generate enough exothermic reaction necessary to fully expand the foam. Applications that call for thin thickness will experience significantly less yield - bid the job accordingly.	• **500 Max**: Thicker lifts result in greater yield. More exothermic reaction is generated to fully expand the foam. • **1.7 CC**: The regular 1.7 formula is fine-tuned to spray at 2" lifts. Spray as close to 2" as possible to maximize yield. Be careful, spraying more than 2" and you risk excess exothermic reaction that will affect the physical properties and dimensional stability. Use High-Lift formulas only where more than 2" lifts will be applied.
Number of Lifts/Passes	0-20%	Each pass will produce another layer of dense skin and increase overall density. Each additional pass will reduce yield by 3-6%. It is common to see in-place density of 3lb/ft³ for a 2lb/ft³ CC foam when numerous thin passes have been applied.	• **500 Max**: Try and spray as close to the full thickness required as possible. This takes practice. • **1.7 CC**: Spray as close to 2" in single lift for regular version, and 3-4" for high-lift version.
Uniformity	1-10%	Technique and skill will dictate how flat the sprayer can apply the foam. If the thickness of application is uniform, then less overall foam will have to be applied to achieve minimum required thickness.	• **1.7 CC**: Spraying using up-and-down technique will provide more uniform and flatter application. • **500 Max**: Spray side-to-side. If a thick application requires more than one pass, then second pass should be up-and-down.
Off-Ratio	0-30%	Foam can be off-ratio for a variety of reasons - cavitation, clogged Y-strainers, clogged check-valve screens, mixing chamber clogged, cold chemical, worn pump seals, etc...	• Maintain equipment. Check Y-strainers weekly, check valve screens daily, clean mixing chamber daily, rebuild pump seals every 2 years, rebuild wet portion of stick pumps every 2 years, and rebuild dry portion of stick pumps yearly. • New generation of Graco and PMC equipment utilizes flow meters to monitor the ratio of A&B and provide assurance and documentation.
Dialing in the Correct Temp. Settings	0-30%	This is a major factor. If your temperatures are dialed-in too cold, then lack of heat will generate poor chemical reactivity and poor yield. • Hose Temp: Start with the desired temp you want the foam coming out at the gun, set your hose to that temperature. The hose heating element is not meant to be a primary heat source, only to maintain the heat. • A-Side: Set 2-5°F higher than the Hose. • B-Side: Set 2-5°F higher than the A-Side. • Note: The A&B are set higher than the hose as we expect to lose a few degrees as it travels to the gun. The B-side should always be set higher than the A-side, the B-side has a lower viscosity. We want to bring the viscosities in alignment.	**500 Max**: Start temperatures high enough that the foam shrinks slightly from the studs, then lower temps 3°F at a time until shrinkage stops - this is the yield sweet spot. **1.7 CC**: Better to start temperatures lower. You have to establish the "wet line." The "wet line" is the dark, unreacted chemical. This line should last for 1-2 seconds for maximum yield. If the "wet line" lasts more than 2 seconds or liquid is drippy, then chemical is too cold. If "wet line" is not visible, then it is curing too quickly and foam is too hot and will burn.

UPC 500 Max In-Field Yield Simulation

These are two hypothetical Scenarios for the 500 Max. In Scenario A, the 500 Max is sprayed in near perfect conditions with an experienced sprayer. In Scenario B, the 500 Max is sprayed in less than optimal winter time conditions with a novice sprayer. As you can see, Scenario B has nearly half of the yield of Scenario A. This is an example of how large the disparity in yield can be from the same exact product.

Core Density in Laboratory:	0.45/ft³
Theoretical Laboratory Yield:	26,666 board ft

Scenario A: 85°F Summer Day, 01 Mix Chamber, 1200psi, E30, 8" Single Pass in Roof Deck, OSB Substrate @80°F , 75°F Starting Drum Temp, Sprayer with 7 Years of Experience.

Scenario B: 25°F Winter Day, 02 Mix Chamber, 1400psi, E30, Two 4" Passes in Roof Deck, OSB Substrate @30°F, 55°F Starting Drum Temp, Sprayer with 18 Months of Experience

Condition	Scenario A Loss in Yield	Scenario B Loss in Yield
Contact Layer & Surface skin	5%	7%
Spray Mist	3%	5%
Substrate Temperature	0%	10%
Mixing Chamber Size	0%	3%
Starting Chemical Temp	0%	5%
Substrate Type	0%	0%
Lift Thickness	3%	7%
No. of Passes	0%	5%
Uniformity	1%	3%
Off ratio	0%	2%
Temperature at Gun	0%	2%
In-Field Yield	**23,466 board ft**	**13,333 board ft**
In-Place Density	0.51 lbs/ft³	0.89 lbs/ft

SPRAY PARAMETERS

These charts are a **starting guide** to set temperatures and pressures. Adjustments should be made to account for the myriad of variables that will affect foam development. Use stated densities below as a gauge when comparing with your density checks. A tolerance of +/-10% is reasonable. Refer to the UPC TDS for Application Instructions.

UPC 500 MAX DYNAMIC SPRAY PARAMETERS

Select Mixing Chamber:	4242 | -01			5252 | -02			6060 | -03		
Select Ambient Temp and Match to Mix Chamber	Temperature Set			Temperature Set			Temperature Set		
Substrate Temperature for standard wood (Starting Drum Temperature Must be Minimum of 75 °F)	Hose†	A	B	Hose†	A	B	Hose†	A	B
> 90°F	*113°F*	*116°F*	*119°F*	*114°F*	*117°F*	*120°F*	*115°F*	*118°F*	*121°F*
80°F	*115°F*	*118°F*	*121°F*	*116°F*	*119°F*	*122°F*	*117°F*	*120°F*	*123°F*
70°F	*118°F*	*121°F*	*124°F*	*119°F*	*122°F*	*125°F*	*120°F*	*123°F*	*126°F*
60°F	*122°F*	*125°F*	*128°F*	*123°F*	*126°F*	*129°F*	*124°F*	*127°F*	*130°F*
50°F	*126°F*	*129°F*	*132°F*	*127°F*	*130°F*	*133°F*	*128°F*	*131°F*	*134°F*
40°F	*130°F*	*133°F*	*136°F*	*131°F*	*134°F*	*137°F*	*Not Recommended*		
	CAUTION: Below 35°F a 1/8"-1/4" initial flashing layer may be applied to substrate to eliminate voids in cold weather.								
30°F	*134°F*	*137°F*	*140°F*	*Not Recommended*			*Not Recommended*		
20°F	*138°F*	*141°F*	*144°F*						
15°F	*140°F*	*143°F*	*146°F*						
10°F	*142°F*	*145°F*	*148°F*						
< 0°F	*Not Recommended*								
Pressure Setting	1200 +/- psi			1200-1400 +/- psi			1300-1400 +/- psi		

UPC 1.7 DYNAMIC SPRAY PARAMETERS

Select Mixing Chamber:	4242 | -01			5252 | -02			6060 | -03		
Select Ambient Temp and Match to Mix Chamber	Temperature Set			Temperature Set			Temperature Set		
Substrate Temperature for standard wood (Starting Drum Temperature Must be Minimum of 55°F)	Hose†	A	B	Hose†	A	B	Hose†	A	B
> 90°F	*107°F*	*110°F*	*113°F*	*108°F*	*111°F*	*114°F*	*109°F*	*112°F*	*115°F*
	CAUTION: Switch to (S) Summer formula above 80°F. (R) Regular formula may froth & cause pressure imbalance in hot weather.								
80°F	*108°F*	*111°F*	*114°F*	*109°F*	*112°F*	*115°F*	*110°F*	*113°F*	*116°F*
70°F	*110°F*	*113°F*	*116°F*	*111°F*	*114°F*	*117°F*	*112°F*	*115°F*	*118°F*
60°F	*111°F*	*114°F*	*117°F*	*112°F*	*115°F*	*118°F*	*113°F*	*116°F*	*119°F*
50°F	*112°F*	*115°F*	*118°F*	*113°F*	*116°F*	*119°F*	*114°F*	*117°F*	*120°F*
40°F	*113°F*	*116°F*	*119°F*	*114°F*	*117°F*	*120°F*	*Not Recommended*		
30°F	*115°F*	*118°F*	*121°F*	*Not Recommended*					
	CAUTION: Switch to (W) Winter formula below 30°F. (R) Regular formula may crack in temperatures below 30°F.								
20°F	*115°F*	*118°F*	*121°F*	*Not Recommended*			*Not Recommended*		
15°F	*116°F*	*119°F*	*122°F*						
10°F	*117°F*	*120°F*	*123°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. UPC does not warrant, guarantee nor endorse the guidelines

FOR MORE INFORMATION, CONTACT UPC AT 682-503-8069