

## SUBJECTIVE BONDING STUDY

### PRODUCTS TESTED

#### Armcell Products

1800 CLOSED-CELL PVC/NBR FOAM; SKIN and SKIVED  
 2001 CLOSED-CELL NEOPRENE BASED FOAM; SKIVED  
 2002 CLOSED-CELL NEOPRENE BASED FOAM; SKIVED  
 4053 CLOSED-CELL ECH (EPICHLOROYDRIN) FOAM; SKIVED  
 5021 CLOSED-CELL EPDM/CR/SBR FOAM; SKIVED  
 6031 CLOSED-CELL PVC/NBR FOAM; SKIVED  
 8001 CLOSED-CELL 100% EPDM; SKIVED  
 8092 LED GRADE 100% EPDM FOAM; SKIVED

IG1 CLOSED-CELL PVC/NBR/CR FOAM; SKIN and SKIVED  
 IR41 CLOSED-CELL PVC/NBR/CR FOAM; SKIN and SKIVED  
 MLO CLOSED-CELL PVC/NBR FOAM  
 CKJN 200 00NA 2# PE FOAM (CHEMICALLY CROSSLINKED); SKIN  
 CKJN 400 4# PE FOAM (CHEMICALLY CROSSLINKED); SKIN  
 CKJN 1600 BLK 16# PE FOAM (CHEMICALLY CROSSLINKED); SKIN  
 CKJN 2000 O1BJ 20# PE FOAM (CHEMICALLY CROSSLINKED); SKIN

### SETUP AND TESTING

Adhesive systems (see charts below) were backed with 1 mil PET film (liner-side for double-coated products) and trimmed to 1 inch width. 2 sample sets were laminated to customer-supplied materials. One set laminated at Room Temperature and one set using 135°F Heat Assist. Sample were conditioned as follows and subjectively evaluated:

5D @ RT = Samples conditioned at room temperature for 5 days and evaluated.

140°F = Samples conditioned for 7 days at room temperature followed by 72 hours at 140°F and 50% Relative Humidity, followed by 7 days at room temperature.

### SUBJECTIVE RATING SYSTEM

- EXCELLENT:** Completely destructive bond and/or substantial force required to remove adhesive from material.
- VERY GOOD:** Substantial Destruction to surface of material and/or significant force required to remove adhesive from material.
- GOOD:** Partially destructive bond and/or moderate force required to remove adhesive from material.
- FAIR:** Non-destructive bond to material but moderate force required to remove adhesive

### SYMBOLS

HEAT ASSIST NECESSARY	Δ Bond demonstrated improvement after accelerated aging noted (time and temp)
HEAT ASSIST BENEFICIAL	D Discoloration of adhesive noted after accelerated aging noted
S Indicates Product Series	OG Outgassing
LAM Lamination Temperature	L- Minor Legging      L Moderate Legging      L+ Major Legging
RT Room Temperature	

Foam Bonding evaluations are affected by foam thickness and integrity. Adhesion to foam and rubber products are affected by factors including material thickness and density, lamination speed, temperature, and compression. Bond strength observed immediately after lamination is often not a reliable indicator of long term adhesion or compatibility. Results being provided as a guide to product selection; products should be thoroughly tested to application materials applied using intended production equipment and practices and evaluated in conditions reflecting intended use.

Data presented are typical properties taken from a limited number of production runs, and should not be used for specification purposes. Berry Global, Inc. makes no warranty expressed or implied, and specifically disclaims and disavows any implied warranty or merchantability and of fitness for a particular purpose. Berry also is not responsible for formulation changes in products that could impact the bonding ability of the Berry materials tested. Accordingly, all Berry products are sold with the understanding that purchasers will be solely responsible for determining the suitability of the materials for any purpose.



**Results:**

LAM:	1800 SKIN-SIDE	1800 SKIVE-SIDE	2001	2002	4053	5021	6031	8001	8092
	CLOSED-CELL PVC/NBR FOAM	CLOSED-CELL PVC/NBR FOAM	CLOSED-CELL NEOPRENE BASED FOAM	CLOSED-CELL NEOPRENE BASED FOAM	CLOSED-CELL ECH (EPICHLOROY DRIN) FOAM	CLOSED-CELL EPDM/CR/SBR FOAM	CLOSED-CELL PVC/NBR FOAM	CLOSED-CELL 100% EPDM	LED GRADE 100% EPDM FOAM
EXCELLENT	2016M 2237M 3175M 4787M 5000M 5008B 5944M 700's 7744 4628 488 650's 7744		2016M 353M 5944M 650's 7744	353M 4628 650's	254M 256M 7744		2016M 5944M 7744	650's 7744	
VERY GOOD	254M 256M 7334 7511 7854 353M 7834	5008B 3175M 4628 4787M 5000M 5944M 650's 7854	254M 256M 4377M 700's 7332 7334 488M 668 6849	2016M 7834	2016M	2016M 5944M	650's	5944M 730's	
GOOD	7332 668 6849 7603 7603 7832	700's 7511 7744 2016M 2237M	4628 7603 7854 3175M 5000M 5944M	2237M 256M 5944M 700's 7300's 7511 7603 7832	250's 4628 488M 653 L 700's	650's L 7300's 7800's 353M	250's 353M 4300M'S 4628 488M 688M 700's 7330's 7830's 7511 7603 7854	2016M 2237M 250's 5000M	5944M <sup>OG</sup> 650's
FAIR	4377M	256M 353M 488M	4787M	254M	4787M L+ 4787M L+ 5000M L 5008B L 688M 7603	256M 5000M 700's	6849	4628 668M 6849	5000M



LAM:	IG1 SKIVE	IG1 SKIN	IR41 SKIVE	IR41 SKIN	MLO	CKJN 1600 BLK	CKJN 200 00NA	CKJN 2000 01BJ	CKJN 400
	CLOSED-CELL PVC/NBR/CR FOAM	CLOSED-CELL PVC/NBR/CR FOAM	CLOSED-CELL PVC/NBR/CR FOAM	CLOSED-CELL PVC/NBR/CR FOAM	CLOSED-CELL PVC/NBR FOAM	16# PE FOAM (CHEMICALLY X-LINKED)	2# PE FOAM (CHEMICALLY X-LINKED)	20# PE FOAM (CHEMICALLY X-LINKED)	4# PE FOAM (CHEMICALLY X-LINKED)
EXCELLENT			2016M 250M's 353M 4300M's 4628 4787M 5008B 650's 7511 7603 7744 7800's	2016M 488M 5008B 650's	2016M 2237M 250M's 353M 4300M's 4628 4787M 488M 5000M 5008B 5944M 650's 700's 7511 7603 7744 7800's 7854		2016M 655M 7744		
VERY GOOD	5000M L+ 5944M L+	2016M 2237M 250M's 353M 4787M 5000M 650's 700's 7330's 7744 7854	2237M 488M 5000M 5944M 700's 7854	2237M 250M's 353M 4300M's 4628 4787M 5000M 5944M 700's 7511 7744 7800's	6849		4787M 5008B 7854		
GOOD	2016M 250M's 5008B 5944M 7744	4377M 4628 4787M 5008B 730 7511 7830's	688M 6849 7330's	688M 7603 7854	688M	4787M 655	5000M 5944M	4787M 5008B 7744 7854	4787M 7744
FAIR	650's 700's	7603		6849		2016M 2237M 7744 7854	2237M	2016M 2237M 5944M 655	655 7854