

Weather Resistive Barriers (WRB) and Self Adhesive Membranes (SAM)

A Trade Study By Ted Barnes, P. Eng.

February 2015

Wade Engineering Ltd.

Trade Study Criteria

- **Cost & Availability**
- **Durability – does it stand up to construction conditions**
- **WRB Permeability – Water & Air**
 - **H₂O: WVTR (*liquid*) & MVTR measured in Perms**
 - Perm (ng/Pa-s-m²) or (inch-pound) where 1 ng = 1x10⁻⁹ g
 - **Optimum WRB Perm for cold climates is 10 or higher**
 - Data shows greater perm ratings dry faster in cold climates
 - Concern in warm climates is reverse moisture drive at higher perm ratings
 - Leaks overwhelm moisture intrusion therefore maximize drying (>perm)
 - **Air: Liters/sec/metre sq. (l/s/m²)**
 - <.004 L/s/m² provides good air leakage resistance
 - Reduces wind washing effect

WRB Trade Data



TEST	Grade D 30 min UUB-790a	Typar MetroWrap	TYPAR House Wrap	TYVEK HomeWrap	TYVEK Commercial Wrap	GuardWrap HP NXT	HomeGuard HP PLUS
Construction		film coated fiber	film coated fiber	Spun-bonded	Spun-bonded		
Cost \$ per 900 sq ft.	2 layers - \$82	\$110	\$123	\$112	\$165	\$105	\$130
Basis Weight (ASTM D-5261)	5.9 oz/yd ²	3.5oz/yd ²	2.8oz/yd ²	1.8oz/yd ²	2.7oz/yd ²	2.1oz/yd ²	2.1oz/yd ²
Thickness (ASTM D-1777)		12.1mils	12.9mils	N/A	N/A	5mils	N/A
Bursting Strength (ASTM D-3786)		N/A	66 Psi	N/A	N/A	N/A	N/A
Breaking Strength (ASTM D5034/5033)		93lbs/95lbs	80lbs/87lbs	N/A	83lbs/89lbs	53lbs/44lbs	N/A
Tensile Strength (MD/CD)(ASTM D882)		N/A	N/A	30lbs/30lbs	38lbs/35lbs	N/A	30lbs/30lbs
Trapezoidal Strength (MD/CD)		60lbs/67lbs	30lbs/33lbs	8lbs/6lbs	12lbs/10lbs	N/A	10lbs/16lbs
Hydrostatic Pressure Resistance (cm)		980	865	250	280	N/A	250
Air Penetration Resistance Gurley Hill Porosity (sec/100cc)		>4800/100cc	>2500/100cc	1200/100cc	>1500/100cc	N/A	>1000/100cc
Water Vapour Transmission - (ASTME-96-95, Procedure A)	5-60 Perms	10 Perms	11.7 Perms	56 Perms	23 Perms	7.35 Perms	42 Perms
Water Vapour Transmission - (ASTME-96-95, Procedure B)		N/A	N/A	54 Perms	28 Perms	N/A	56 Perms
Moisture Vapour Transmission - (ASTME-96- 95, Procedure A)		10 Perms	11.7 Perms	N/A	N/A	60 Perms	N/A
UV Exposure Resistance		12 months	6 months	4 months	9 months	9 months	4 months
Airs Ins - Air leakage Test	<0.175 L/s/m ²	N/A	<0.0032 L/s/m ²	<0.004 L/s/m ²	<0.001 L/s/m ²	<0.01 L/s/m ²	<0.001 L/s/m ²
Air Pemeance		N/A	N/A	N/A	N/A	12-15 Perms	N/A
Water Resistance Test (Boat Test)		N/A	Pass	N/A	N/A	N/A	N/A
Water Ponding Test		N/A	Pass	N/A	N/A	N/A	N/A
Flame Spread Index		Class A	Class A	Class A	Class A	Class A	Class A
Smoke Developed Index		Pass	Pass	Class A	Class A	Class A	N/A
MD - Machine Direction		CertainTeed similar					
CD - Cross Direction							
Optimal Moisture Vapour Transmission Rate Range: >10 Perms							

WRB Comments

- **Cost**
 - **Grade D building paper is lowest cost material but more labor intensive and less durable.**
 - **Some text recommends two layers of any WRB making paper much cheaper.**
 - **Tyvek Commercial Wrap does not appear to be worth the extra price**
- **Durability - Measured by different means**
 - **Typar: perforated polypropylene film has greater tear strength**
 - **The film can get damaged during construction and reduce protection**
 - **Tyvek: spun-bonded polyethylene fibers**
 - **Claims to be more abrasion resistant during construction**

WRB Comments cont.

- **Vapour and Air Permeability**
 - In cold climates, greater vapour permeability is better to allow drying.
 - The rationale for limiting vapour permeability is based on inward vapour drive in hot climates.
 - Lower air permeability is better as it reduces wind washing at corners.

Self Adhesive Membrane (SAM) Trade Data

Product Name	Adhesive	Membrane / Thickness OA	Primer	Application Temp. Min.	UV Exposure - days	Cost/ 100 sq. ft.	Incompatible
AQUABARRIER Tape - 25 9" x 75' = 56.25 ft2	SBS Rubberized Asphalt	Polyethylene laminate / 25 mil	IKO S.A.M. Adhesive (Solvent-Based)			\$67.55	Note 1 below
BLUESKIN - WB25 9" x 75'	SBS Rubberized Asphalt	"Blue Film" / 25 mil	cold weather - blueskin spray	-4C	42	\$124.44	Note 1 below
BLUESKIN - WB 9" x 75'	SBS Rubberized Asphalt	"Blue Film" / 35 mil	cold weather - blueskin spray	-12C	42		Note 1 below
BLUESKIN BUTYL FLASH	Synthetic butyl	polypropylene / 14 mil	req'd on concrete & masonry	-4C	150		Uncured Solvent based sealants
DUPONT - StraightFlash 4" x 150' or 9" x 125'	Butyl rubber	Spunbond Polyethylene / 30 mil	NR	-4C	120		
DUPONT - FlexWrap NF 6" or 9" x 125'	Butyl rubber	Polyethylene laminate / 64 mil	NR	-4C	120		
DUPONT - Flashing Tape 4", 6", or 9" x 75'	Butyl rubber	Polyethylene laminate / 20 mil	NR	-4C	120		
PROTECTO WRAP PW100/40 4" - 36" x 75'	Recycled butyl hybrid	Polyethylene laminate / 40 mil	#100 Primer	5C	120		Plasticized PVC Vinyl, Pitch
PROTECTO FLASH BT25-XL 6" x 50'	Recycled butyl hybrid	Polyethylene laminate / 25 mil	Protecto Tak	5C	120	\$35	Plasticized PVC Vinyl, Pitch
PROTECTO SUPER STICK BUILDING TAPE 3-12" x 75'	"PSA" no VOC	?	N/R	-20C	365		AAMA 700 pass
PROTECTO FLEX FLASHING 4, 6, 8 & 9" x 50'	SBS Rubberized Asphalt	Polyethylene laminate / 40 mil	below 7C	5C	120	\$35	Note 1 below
PROTECTO SAFSEAL PWC 6634	Synthetic butyl	Polyethylene laminate / 40 mil	WBP Primer	unk	unk		
TYPAR Flashing AT 4, 6 & 9" x 75'	Butyl rubber	Polyethylene laminate / 15 mil	N/R	0C	180	Not Available	
TYPAR Flashing RA 4, 6, 8, 12" x 75'	SBS Rubberized Asphalt	polyolefin film	3M super seal	unk	180 (or 90)	Not Available	Note 1 below
TYPAR Flashing Flex 6 & 9" x 75'	Butyl rubber (Butyl Asphalt?)	Polyolefin film 60 mil	N/R	unk	180	Not Available	
SOPREMA SOPRASEAL STICK 1100 T 4, 6, 9, 12, 18" x 75'	SBS Modified bitumen	Polyethylene tri-laminate / 40 mil	Elastocol Stick	-10C	u/k		
Optimal Moisture Vapour Transmission Rate Range: ? Perms							
Note 1: *Plasticized PVC Vinyl, polyurethane and silicone caulks							