POLYON BARKAI INDUSTRIES (1993) LTD.

Polynum Sound™ – Properties and Performances

Polynum Sound™ was designed to answer thermal and acoustic needs, yet using thin and safe product.

At its basic configuration Polynum Sound™ delivers minimum sound transmission loss (STC) 16, and heat reduction of R17.

To compare to equivalent insulation in the market, we need to understand the density concept for sound and effective R value for heat.

A. Density determination:

Reduction of airborne noise (STC) is function of mass and weight. Some of the existing insulation using product density per m3 (cubic meter) and some per m2 (square meter).

For example, Mineral Wool (Rockwool) at 80kg density (80kg/m3) will weight only 800 gram per 10mm (1 cm) of thickness. Another example, 25mm (1") of glass wool (fiberglass) at 48kg/m3 will weight only 1.2 kg/m2.

This means that we can easily compare and define alternative products to various acoustic and heat requirements.

Polynum Sound™ at 1kg/m2 (basic configuration) is identical to 10mm (1cm) of rockwool (mineral wool) at 100kg/m3 and to 22mm (2.2cm) of 48kg/m3 of glass wool.

B. R-value (heat coefficient)

Polynum Sound™ heat resistance value is similar to Polynum Big. Double sided of pure aluminum with 5% Emissivity promising a robust R-Value. In fact, Polynum Sound™ R value is equal to 150mm of typical conventional insulation such as glass wool or mineral\rock wool!

C. Certifications:

As a accredited manufacture our products tested according to international standards. The enclosed data sheet is corresponding with these testing and certificates.

A. Polynum Sound 1 kg/m2 – datasheet

Sound 10.00mm

Property	Units	Dir	POLYNUM SOUND
Layer Description	High Resistance Aluminum Foil/Close cells acoustic 8.00mm Bubbles /High Resistance Aluminum Foil		
Nominal thickness	mm		+/- 10.00
Emissivity (ASTM C 1371) Only if closing layers are aluminum			0.03
Reflectivity (ASTM E 408) Only if closing layers are aluminum			0.97
Heat resistance (Max R) (ASTM C 236) Only if closing layers are aluminum	$m^2 \cdot ºC/W$		3.08
Heat resistance (Max R) (ASTM C 236) Only if closing layers are aluminum	$Btu*in/(hr*ft^2*°F)$		17.50
Acoustic value (effective airborne noise reduction)	DB (A)		14
Acoustic Value (Absorption coefficient)	NRC		0.70
Scratch Resistance			Both Sides
Surface Flame Spread (ASTM E-84)			Class A
Flame spread classification and smoke density developed according to: UL 723, NFPA No. 255, UBC No. 8-1			Class A
Surface Flame Spread French standard	SNPE		M1
Surface Flame Spread German DIN Standard	DIN 4102		B1
Linear dimensional Changes (ASTM C 1136-92)	110°C		< 0.2
Water Vapor Transmission (ASTM-E-96)	$g / ft^2 \cdot hr$		0.0018
Linear Shrinkage (24 hrs in water)			0%
Evaluation of Fungi and Bacteria growth (ASTM C 1338-00)	Does not promote growth		
Operating Temperature	°C		-45 to +110
Anti corrosion treatment			Yes
Yield (nominal)	g/m^2		+/-1,000
Standard Roll Size	m X m		1.20m X 15m
Standard Roll Weight (Gross)	kg		± 18.00 kg

B. Polynum Sound™ Comparison to 80kg/m3 mineral wool

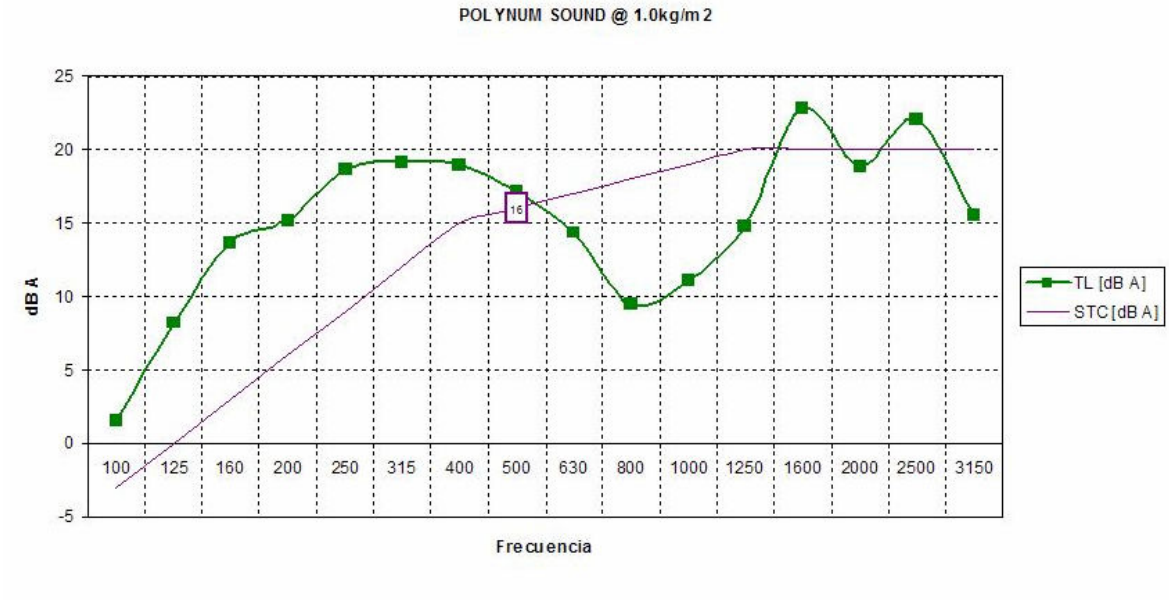
Properties	Mineral\Rock wool at 80kg/m2 at 10mm thickness 10mm 80kg/m3	Polynum Sound (1kg/m2) double sided + Aluminum finish 9.00-10.00mm
Heat Resistance parameters:		
Published R value	0.75	3.08
Published U value	1.33	0.32
Effective R value*	0.49	3.08
Effective U value*	**2.05**	**0.32**
R Value testing temperature	24 °C	32 °C
R Value testing Moisture	RH = 0	RH = 70%
Moisture effect	Up to 35% of published rate	No
Emissivity (glass wool)	0.88	0.03
Reflectivity (glass wool)	0.12	0.97
Overlapping seal	No	Yes
Heat Conduction rate via roof sheets	**High**	Next to zero
Allow convection heat to escape from building (increase in building heat)	Will not allow heat to escape from the building, hence will increase heat in the building	Due to light weight air cell structure, convection heat can easily move up!
Heat lags (Heat Storage Medium)	Yes - up to 4 hours	No - will cool down with the roof trend
Aluminum thickness (if in use)	N/A	8 or 18 micron
Product durability and stability:		
Water Proof	No	Yes
Fungi resistance	No	Yes
Nesting of insects	Yes	No
Delaminating	Yes (the paper foil)	No
Operation temp	High	High
Average life time	5 to 10yrs	25 yrs +
Warranty	Not sure	15 yrs
Health matters:		
Irritation material	**Yes**	No
Asthmatic material	**Yes**	No
Allergenic product	**Yes**	No
Toxication possibility	**Yes**	No
Cancer present agent	**Yes**	No

Noise reduction matters:		
NRC (noise absorption)	75%	75%
Anti Dumping	Yes	Yes
Echo effect	Low	Low
Noise Reflection	12dB(A)	14dB(A)
STC according to ISO 717-1	N/A	16
Safety matters:		
Fire classification	Not Sure	Class 0&1
Smoke classification	Not Sure	Class A (60)
Installation and logistic matters:		
Installation delays	Possible (due to rain)	No
Steel\wire mesh	Yes	No need
Protective Plastic sheet	Yes	No Need
Storage requirements	High	Low
Transportation space	High	Low
Installation method	Slow	Fast
Use mask during installation	Yes	No
Dust accumulation due to wire mesh	Yes	No
Problems to adjust roof sheets*	Yes	No
Possible leakage from roof area**	High	Low
Green Point:		
Approved by Singapore Green Program	NO	Yes

* Due to 4" thickness

** Due to blanket structure no overlap sealant

C. Polynum Sound STC Results



Polynum™ Sound was designed to cut airborne noise (noise transmission), and providing superior thermal insulation.

polynum Sound
Pat. Pend.

Technical Data Sheet

Thermal and Acoustic Reflective insulation made of two pure aluminum foil layers covering a single or double core layer of large bubble film specially formulated for increased acoustic attenuation.

Property	Units	Dir	Value	
			1 kg/m²	2 kg/m²
Emmisivity (ASTM C 1371)			0.05	
Reflectivity (ASTM C 1371)			0.95	
Nominal thickness	mm		9	17
Heat resistance (R)–under roof	m^2·°C/W	Down	3.06	3.16
Heat resistance (R)–wall caviey	m^2·°C/W	Horiz.	1.69	1.81
Sound Transmission Class	ISO 717-1	dB	-14	-20
Surface Flame Spread † (BS 476 :Part 7)			Class 1	
Water Vapor Transmission (ASTM E-96)	g /ft²·hr		0.018 (method A)	
Fungal Resistance Test (ASTM C 1338)			No fungal growth	
Yield (nominal)	g/m²		1000	2000
Standard Roll / Sheet Size	m X m		1.2m X 15m	1.2m X 2.5m
Standard Roll Weight (Gross)	kg		±18 kg	6.0 kg

Polynum™ products are designed and manufactured under control of a Quality Management System, which meets the requirements of ISO 9001:2000 as certified by: EVQ

†Tested by Warrington Fire Research Centre Ltd. U.K. (Test Report No.121611)

Date: December 6th, 2005

To: Whom it may concern

From: Polyon Barkai Industries (Bangkok) Ltd.
Thailand

Manufacture Certificate

Material: Polynum Sound™ Insulation

Heat Insulation Performances: Following Low E reflective Products facing air cavities

Polynum Sound™ heat reduction performances under typical metal (GI) sheet roof will deliver similar heat reduction performances to 150mm to 200mm of typical conventional insulation such as glass wool or rock wool.

Hanan Rotenberg
Polyon Barkai Industries (Bangkok) Ltd.
(Electronic Signature)

Date: December 6th, 2005

To: Whom it may concern

From: Polyon Barkai Industries (Bangkok) Ltd.
Thailand

Manufacture Certificate

Material: Polynum Sound™ Insulation

Sound Insulation Performances: Following Sound Transmission Coefficient Test

Polynum Sound™ noise reduction performances under typical metal (GI) sheet roof will deliver similar noise reduction performances to 10mm of 80kg/m3 of mineral/rock wool.

Hanan Rotenberg
Polyon Barkai Industries (Bangkok) Ltd.
(Electronic Signature)