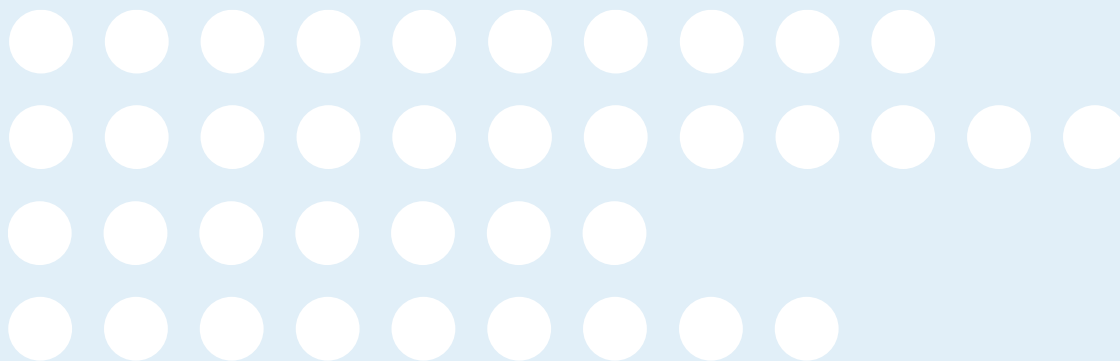


# ***DUNLOP FOAMS***

**A C O U S T I C S O L U T I O N S**

***SPECIALTY ACOUSTIC PRODUCTS BULLETIN  
COST-EFFECTIVE SOLUTIONS BACKED BY TECHNICAL SUPPORT***



REVISED OF AUGUST 2005

### A RANGE OF FOAMS FOR ACOUSTIC APPLICATIONS

Dunlop Foams offers a range of polyurethane foams with excellent sound absorption properties. The range includes flexible ether and ester foams for use in recording studios, and flame retarded flexible ether and ester foams for commercial and industrial applications.

### SOUND WAVES AND SOUND ENERGY

Sound waves are a form of energy. When sound waves impinge on a surface, some of them are reflected back towards the source, some may be absorbed and the balance is transmitted. Sound absorbing materials lower or attenuate the noise level by absorbing part of the sound energy. Typical sound waves may consist of a mixture of low, medium and high frequency components.

### SOURCES OF NOISE MAY INCLUDE

- ▶ **TYPICAL LOW TO MEDIUM FREQUENCY NOISE OR RUMBLE – 0 TO 500 HZ:** COMPRESSORS, GRINDERS, CRUSHERS, ENGINES, PRESSES AND EXHAUST FANS
- ▶ **MID-RANGE HUM OR CHATTER – 250 TO 2,000 Hz:** OFFICE MACHINERY, CIRCULAR SAWS, HUMAN VOICE
- ▶ **HIGH FREQUENCY SQUEAL – 1,000 TO 4,000 Hz AND ABOVE:** ULTRASONIC WELDERS, HYDRAULIC PUMPS, FAST SMALL ENGINES, SOME INDUSTRIAL CUTTING AND POLISHING PROCESSES

Dunlop Acoustic Foams are good absorbers of medium and high frequency sounds. When foam sheets or shapes are used at the appropriate thickness and configuration, they are capable of lowering the noise levels of machinery, instruments, computers, machine rooms, offices, sound studios, insides of tractor and earthmoving equipment cabins, vehicle interiors etc. as surrounds, panelling or cladding.

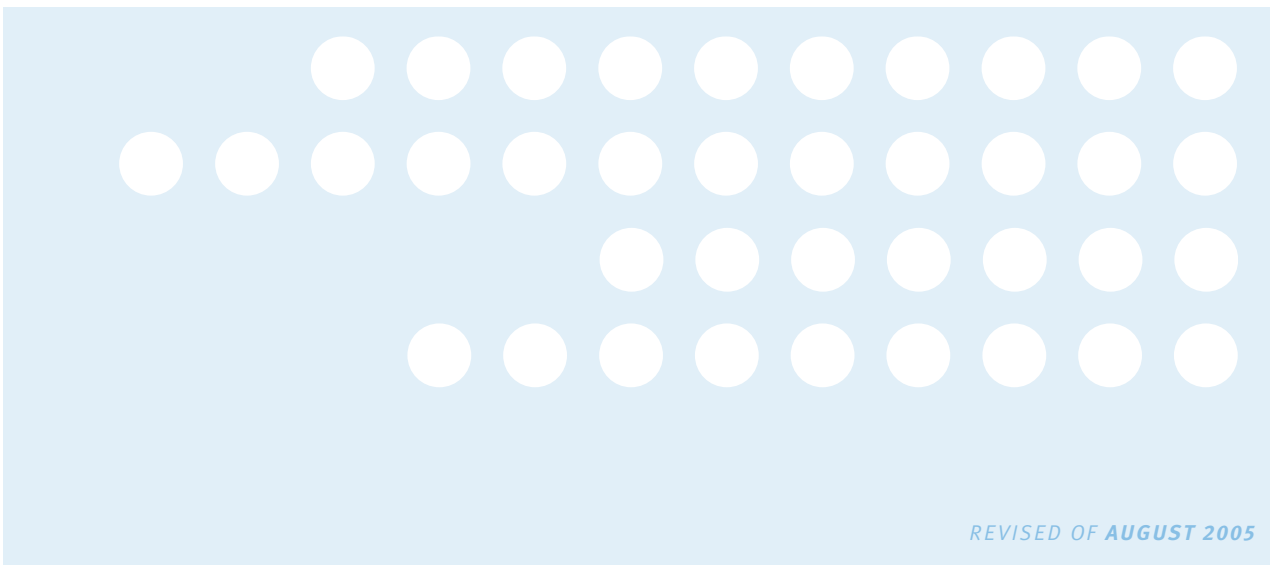
They can be used to adjust reverberation characteristics of lecture rooms, theatres, recording studios, concert halls, gymnasiums, public halls and restaurants.

Suitable textile fabric, flocking or vinyl sheeting will enhance the visual appeal of acoustic foams. In some cases the foam is laminated to metal sheeting. Such assembly acts as a barrier to sound waves, supplementing the sound absorption properties of the foam.

Flexible ester foams (polyester polyol based polyurethanes) are used in acoustic panels and inside hi-fi speaker boxes as they have good absorption characteristics at medium frequencies and are excellent absorbers of high frequency sounds. In hi-fi speaker boxes, reticulated foams are the favoured materials of front grills on account of their transparency to sound.

### NOISE REDUCTION APPLICATIONS AND APPROPRIATE DUNLOP ACOUSTIC FOAM GRADES

APPLICATION	SUITABLE GRADES	COMMENT
Recording studio sound panels (private/home studios)	AA21-300 AA29-400	
Flame retarded sound absorption panels, suitable for office partitions or sound deadening in buildings in general General industrial noise reduction for medium to high frequency noises (250 to 4,000 Hz)	ES28-170 FR	Suitable for flame lamination to fabric or foil. Can be used in environments where oils and solvents may be present
Flame retarded sound absorption panels Inside speaker boxes	ST35-200	Not suitable for flame lamination Can be used in environments where moisture may be present
Improved flame retarded sound absorption panels	EN38-200	Not suitable for flame lamination



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### DUNLOP FOAM GRADES, TYPES AND COLOURS

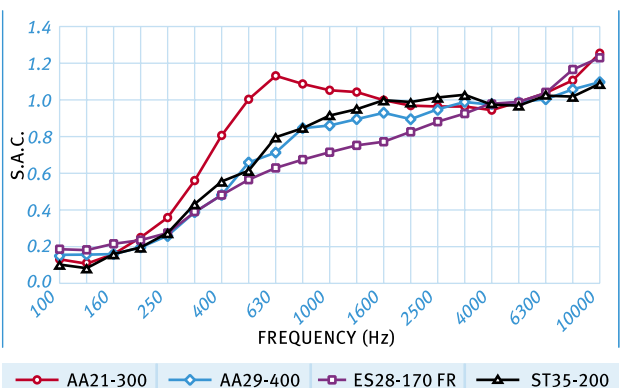
FOAM GRADE	PU FOAM TYPE	COLOUR
AA21-300	Ether	Charcoal
AA29-400	Ether	Charcoal
ES28-170FR	Flame Retarded Ester	Dark Grey
ST35-200	Flame Retarded Ether	Grey
EN38-200	Flame Retarded Ether	Deep Gold

### SOUND ABSORPTION TEST DATA FOR DUNLOP ACOUSTIC FOAMS

Typical Sound Absorption Coefficients across a range of frequencies are presented below for various grades of Dunlop Acoustic Foams in 25mm sheet and for 75/50 egg carton profile convoluted sheet (50mm thick).

Note: Test data for flat foam sheets presented in this bulletin (12mm, 25mm, 50mm sheets) is derived from samples tested by Dunlop Foams using techniques based on the impedance tube method described in AS/NZS 1935.1:1988.

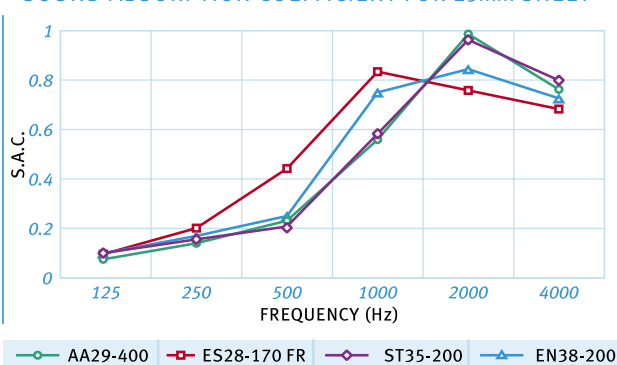
### SOUND ABSORPTION COEFFICIENT FOR 75/50 CONVOLUTED SHEETS



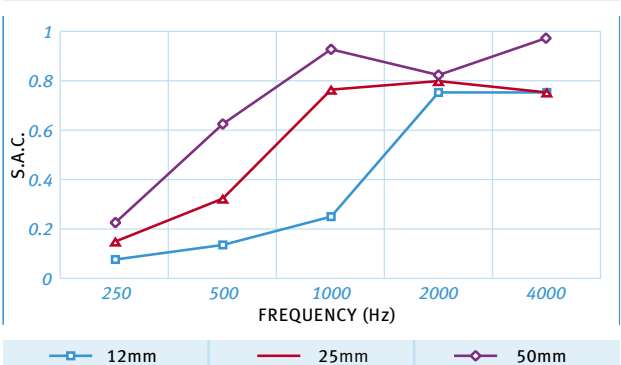
Note: Test data for 75/50 convoluted sheet is derived from samples tested using the reverberation room method described in AS 1045-1988.

Sound absorption increases for increased foam thickness as indicated on the chart below for ES28-170FR.

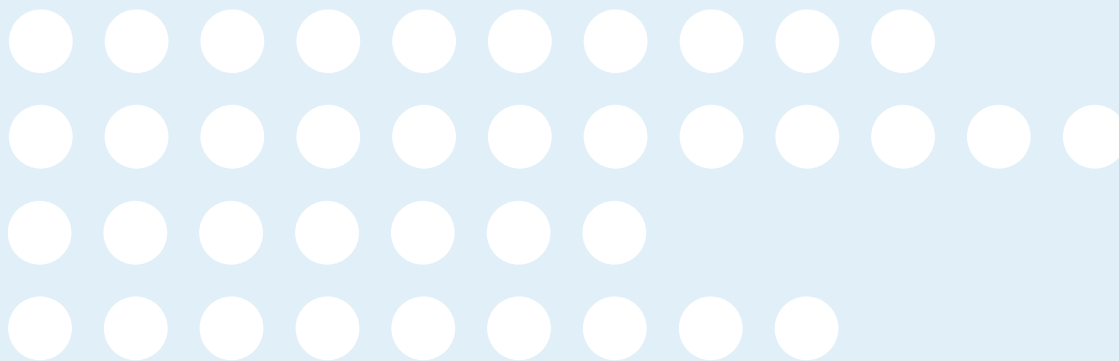
### SOUND ABSORPTION COEFFICIENT FOR 25mm SHEET



### SOUND ABSORPTION COEFFICIENT FOR ES28-170FR



All data presented in this product information bulletin i.e Sound Absorption Coefficient (SAC) and Noise Reduction Coefficient (NRC), is typical data only, and derives from tests carried out by Dunlop Foams. This data should only be used for comparison and initial design purposes.



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The effect of increased foam thickness on improved sound absorption properties is also reflected in the higher Noise Reduction Coefficient (NRC) across the range of Dunlop foams as indicated in the table below:

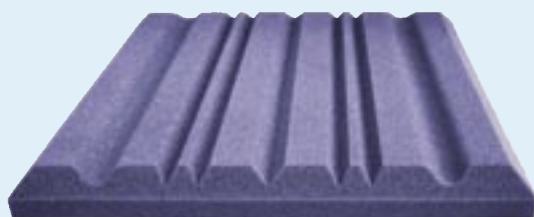
GRADE	12mm SHEET	25mm SHEET	50mm SHEET
AA29-400	–	0.47	–
ES28-170FR	0.33	0.56	0.64
ST35-200	0.22	0.47	0.49
EN38-200	–	0.50	–

(Typical results; should only be used for comparison purposes)

Note: Noise Reduction Coefficient (NRC) is the average of the Sound Absorption Coefficients measured at 250, 500, 1000 and 2000Hz.

#### DUNLOP FOAM ACOUSTIC TILES

Dunlop Foams can also supply profile-cut acoustic tiles of the type shown below in standard size 500mm x 500mm x 50mm.



#### SOME SELECTED DUNLOP ACOUSTIC FOAMS CONTAIN ADDITIVES DESIGNED TO ENHANCE RESISTANCE TO IGNITABILITY AND SPREAD OF SMOKE OR FLAME.

GRADE	PU FOAM TYPE	FR PROPERTIES
AA21-300	ETHER	No
AA29-400	ETHER	No
ES28-170FR	ESTER	YES
ST35-200	ETHER	YES
EN38-200	ETHER	YES

Please contact our Sales or Technical department for further information regarding the physical properties or the FR properties of selected Dunlop Acoustic foams.

Note: Dunlop foams test results alone do not assess the fire hazard of the material or the product made from this material under actual fire conditions.

Foam materials should be kept away from sparks, smokers' materials open flame and from excessive heat. Smoking should be forbidden in areas where foam materials are stored or processed. Foam may burn rapidly with high heat and evolution of black smoke.

#### COST-EFFECTIVE SOLUTIONS BACKED BY TECHNICAL SUPPORT ARE JUST A PHONE CALL AWAY.

Dunlop offers a wide range of foams specially designed for use in acoustics applications. Our products are backed with expert technical support and we can design and supply acoustics foam grades and products from all of our ISO9000 accredited branches.

*All references to the properties of the products listed are typical property values and not specifications. The information is given in good faith and to the best of our knowledge. No warranty of whatever nature is given or implied.*

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