



Introduction of Melamine Foam

◆ Brief Introduction

Melamine resin foam plastic (called Melamine Foam) made from melamine resin. It is a kind of open-cell (over 99% open rate) thermosetting and eco-friendly foam.

◆ Properties

✓ Sound Absorption Property

Melamine foam has three-dimensional grid structure and high opening rate (the opening rate of melamine foam with density of 4-12kg/m³ is 99%). Sound wave, therefore, can go into the innermost of foam conveniently and effectively and transformed to vibration of grid, thereby being consumed and absorbed and eliminating reflected wave effectively as well. It has good sound absorption property in a wide audio range, especially Middle-High frequency noise.

✓ Flame Retardancy

Melamine foam can meet the requirements of the following standards without any flame retardant or additive:

- ★ DIN4102, Class B1 low flammable material standard
- ★ UL94-V0 high flame retardant material standard
- ★ Fireproofing authentication of BS 6853, NF F16-101 and DIN5510
- ★ GB/T8624-2006, Class B (non-flammable) retardant flammable material standard

Excellent flame retardancy property is shown as below:

★Prompt carbonization: When coming into contact with open flame, no flame is formed, no drips, the surface of melamine foam carbonizes immediately, oxygen is isolated and reaction speed slows down.

★Stop burning immediately once open flame leaving: Once open flame leaves melamine foam stops burning straight away, no spark.

★Low density of smoke: Smoke is the main cause of human injury in fire disaster. Tests show that the density of smoke of melamine foam is below 15, which is far lower than foam material of same kind, e.g. the density of smoke of flame retardant PU foam is below 75 (GB/T8627-2007 Test Method for Density of Smoke from Burning or Decomposition of Building Materials)

✓ Heat Insulating and Thermal Insulation Property

Three-dimensional grid structure of melamine foam effectively inhibits the convection and heat transfer of air, which results in excellent heat insulating and thermal insulation. Meanwhile, good heat stability of melamine foam ensures heat insulating and thermal insulation.

✓ Heat-resistant Stability

Melamine foam belongs to thermosetting foam and has dense netlike cross-linking structure. It has good heat-resistant stability and aging-resistance compared with PE, PP and PU. It can work stably within $-150^{\circ}\text{C}\sim 200^{\circ}\text{C}$ for a long time and can bear 240°C for a short time.

✓ Low Density

Melamine foam has $4\text{-}12\text{kg}/\text{m}^3$ of bulk density. It is one of the lightest foam plastics on the market. It can be tailored upon customer's request.

✓ Sanitation

Melamine foam is non-toxic, odorless, no fiber or powder diffusion and has unique chemical stability due to its stable chemical structure and cross-linking structure, hence meeting the requirements of food sanitation class. It can be extensively used in daily-use commodity chemical industry, food industry, electronic industry, indoor decoration, transportation meals, etc. It is the optimum choice.

✓ Post-Processing

Melamine foam can be any required shape by machining such as cutting, scraping and revolving, and hot pressing. In the meanwhile, melamine foam can be combined with many

materials to form sound absorption, thermal insulation and heat insulating materials to meet the requirements of different occasions and working conditions.

◆ APPLICATION FIELD OF MELAMINE FOAM

✓ Acoustic Field

Melamine foam has two key functions in acoustic field, one is noise removing and the other is sound quality beautifying. Although the competitive materials have the corresponding functions, hidden danger to safety and health is existing due to the imperfect comprehensive properties. Melamine foam has high flame retardancy, stability, sanitation, processing and dyeing. It is all-round sound absorption material.

✓ Industrial Noise Reduction

Melamine foam is extensively used in heavy industrial noise environment such as compressor house, air compressor station, punching machine workshop, printing workshop, operating room etc. which effectively ensures physical and mental health of employees and enhances working efficiency and quality.

✓ Sound Absorption in Buildings

Melamine foam is extensively used in theatre, cinema, library, hotel, church, meeting room, stadium, station of all kinds of track transportation, airport, etc. Sound absorption of house comes into vogue and becomes the developing direction.

✓ Professional Acoustics

Melamine foam can be made to all kinds of imaginable sound absorbers and compound materials. It is extensively used in auditorium, studio, television studio, broadcasting studio, KTV, piano room, HIFI audio-visual room, etc. It combines the audio and visual effects successfully and shapes frozen music, thereby raising the level of acoustic environment.

✓ Transportation Field

China is the most developing country of automobile in the world in recent years. High-speed rail and metro are spreading nationwide. The transportation field has huge demand and high requirement for sound absorption material. Melamine foam has good adaptability as a new material of high efficiency, environmental protection and sound absorption. It can create beautiful, comfortable and safe environment for transportation means. It definitely will come into vogue and become the highlight.

✓ Automobile Industry

Noise is mainly from the vibration of motor, the friction between wheels and the ground, whistling sound of air, resonance of automobile body, etc. To eliminate noise, sound absorption material is used to separate and absorb noise as main measure except design. New energy automobile will be favored more and more. Melamine foam is the best material of comprehensive property. It can provide important support to noise reducing, comfort increasing and level rising.

✓ Track Vehicle

Melamine foam can be made the most in sound deadening, sound absorption and thermal insulation of track vehicle to enhance the comfort, environmental protection, energy-saving and safety. Especially in high-speed rail and narrow-gage train, the comprehensive properties such as lightness, flame retardancy and environmental protection, etc. can be exerted even more sufficiently.

✓ National Defense Technology

The advantages of comprehensive properties of melamine foam enable it to be used in aviation, military industry, etc. to play the roles in safety, energy-saving, sound pressure reducing, audio frequency receiving and screening. Melamine foam can be used as seat or filling to reduce the self-weight of vehicle, increase performance and reduce energy consumption.

✓ Comprehensive Filed

✧ Cleaning Supplies

Melamine foam has strong soft abrasivity and adsorption of obstinate stain and dust. Meanwhile, it has hydrophilicity and lipophilicity. Obstinate stain can be removed by melamine foam with water rather than any detergent without damaging the surface. Melamine foam adhered stain will become clean again after washing by water. Using melamine foam as cleaner is convenient and easy, toxic side effect of chemical detergent is avoided. Melamine foam is natural enemy of obstinate stain. It is a good assistant of family, restaurant and hotel.

✧ Thermal Insulation Material

Melamine foam can be used in thermal insulation for piping of industry and household,

thermal insulation and noise reduction for air-conditioning and ventilation system. It can be made to soft wall board and wall-insulation board, etc. Melamine foam overcomes the disadvantage of other products such as flammability and powering. Melamine foam is our severe safety guard of our work and living.

❖ Comprehensive Utilization

Melamine foam can be used as core material of interior decoration, filler of fire-proof material, toy and sofa, base of hydroponics plant growing, raw material of flame retardant board, etc.

Table 1 Main Physical Properties of Melamine Foam

Items	SCC
Apparent Density (Kg/M3)	6~12
Rebounding Ratio (%) \geq	50
Tensile Strength (Kpa)	50
Elongation ratio (%) \geq	10
Conductivity Factor (W/M.K) \leq	0.035
NRC	0.9
Horizontal Burning	HF-1
Radionuclide limit	0
Oxygen (%) \geq	32.3
Smoke Density \leq	30
Firefighting codes (GB/T)	Class B
Formaldehyde releasing (mg/L)	0.2
Operating Temperature (°C)	-180°C~200°C
Dimension (mm)	2000×1100×450

Table 2 Chemical Resistance of Melamine Foam in Different Medium

Classification	Medium and Concentration	Stability
Acid	HCL, 10%	-
	Phosphorous acid, 50%	-
	Sulphuric acid, 10%	-
	Nitric acid, 10%	-
	Acetic acid, 90%	+
Alkali	Ammonia water, 25%	-
	Sodium hydroxide solution, 50%	+
Alcohol	Methanol	+
	Ethanol	+
	Isopropyl alcohol	+
	Butyl alcohol	+
	Glycerol	+
Hydrocarbon	Gasoline	+
	Liquid paraffin	+
	Methylene chloride	+
	Styrene	+
Others	Distilled water	+
	Salt water 3.6%	+
	Butyl Acetate	+
Remarks: "+" means stable "-" means unstable		