YDNFoam | SINOYQX *Pioneering Performance; Empowering Industry, Since 2002*

Lightweight & Efficient Acoustic and Thermal Insulation Solution for Engine Compartments

— Lightweight Upgrade Based on SINOYQX YQX-TG Thermoset Melamine Foam

1. Industry Background:

Material Innovation Amidst Multiple Challenges

With the rapid advancement of vehicle lightweighting, electrification, and environmental regulations, the engine compartment—being the primary source of heat and noise in a vehicle—is facing increased material performance demands, such as:

- Long-term high-temperature operation (≥150°C)
- Limited space with complex structural fit requirements
- Need for overall vehicle weight reduction and energy efficiency improvement
- Compliance with increasingly stringent flame retardant and environmental standards (RoHS, REACH, UL94, EN45545, etc.)

2. Limitations of Traditional Materials

Material Type	Common Issues
Glass Wool	Moisture absorption, fiber shedding, dust pollution, skin irritation, poor environmental compliance
Polyurethane Foam (PU)	Poor aging resistance, difficult flame retardance, high VOC emissions, limited temperature range (-40~+120°C)
EVA/PE Foam	Good toughness but poor sound/thermal insulation, low heat resistance, not suitable for engine environments

Conclusion: A new material is urgently needed—one that is simultaneously lightweight, thermally insulating, sound-absorbing, flame-retardant, and environmentally friendly.

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3. Material Solution: YQX-TG (7065) Thermoset Melamine Foam

- Brand: SINOYQX (by YDNFoam™)
- Product Model: YQX-TG

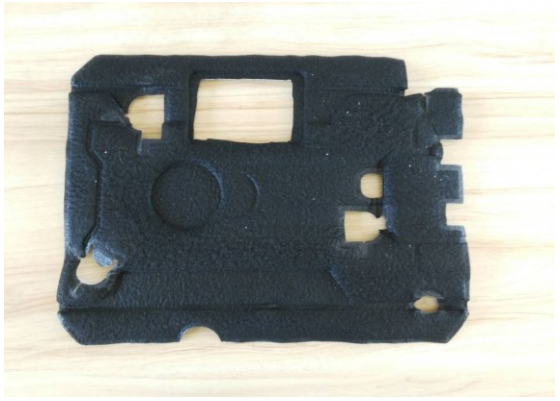
Key Features:

- Ultra-low density: 8–8.5 kg/m³
- Low thermal conductivity: ⩽ 0.032 W/m·K
- High acoustic performance: NRC ⩾ 0.85
- Wide temperature tolerance: -180°C to +240°C

- Fire safety: UL94 V-0, EN45545 HL3
- Dust-free, formaldehyde-free, low VOC, recyclable

Available Composite Structures:

- ◆ Dual-sided flame-retardant non-woven fabric (general type)
- ◆ One side flame-retardant fabric + one side aluminum foil (high-temperature reflective type)



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4. Core Performance Comparison Table

Property / Material Type	YQX-TG (Melamine Foam)	Glass Wool	PU Foam
Density (kg/m³)	8–8.5	20–30	25–40
Thermal Conductivity	≤ 0.032 W/m·K	0.035–0.045	0.032–0.035
NRC (25mm)	≥ 0.85	0.75	0.6–0.7
Temperature Range (°C)	-180 ~ +240	≤ 250	-10 ~ +120
Flame Retardancy	UL94 V-0 / HL3	Grade B	Difficult to comply

Property / Material Type	YQX-TG (Melamine Foam)	Glass Wool	PU Foam
Environmental Safety	Dust-free, low VOC, recyclable	Dust pollution, non-degradable	High VOC emission
Structural Stability	Thermoset, stable	Easily compressed/deformed	Prone to aging and disintegration

✅ **Conclusion:** YQX-TG outperforms traditional solutions in performance, safety, and environmental compliance.

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5. Typical Application Scenarios

Application Area	Function	Recommended Structure
Engine Hood Liner	Heat barrier + mechanical noise absorption	Aluminum foil + foam + non-woven fabric
Dash Inner Insulation Layer	Blocks engine noise from entering cabin	Dual-sided flame-retardant fabric
Mid-Exhaust Heat Shield	Withstands thermal radiation	Aluminum-enhanced type
EV Power Electronics Module	Heat and noise absorption around inverters	Ultra-thin thermoformed foam parts

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6. Processing & Lamination Capabilities

Recommended Process Flow:

➡ Cutting → Hot-press thermoforming (180~200°C) → Surface lamination (flame-retardant non-woven or aluminum foil) → Edge sealing

Notes:

- Thermoforming: YQX-TG's thermoset and crosslinked nature makes it ideal for precision molding and complex automotive geometry.
- Surface Lamination: Lamination with aluminum or flame-retardant fabric improves resistance to oil, water, and heat.
- Edge Finishing: Supports hot-melt sealing, laser cutting, etc., to ensure durability in application.

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7. Third-Party Testing & Regulatory Compliance

Test Item	Standard	Result
Thermal Conductivity	ASTM C518	⩽ 0.032 W/m·K
Acoustic Performance	ASTM C423	NRC ⩾ 0.85 (25mm)
Flame Retardancy	UL94 / EN45545-2	UL94 V-0 / HL3 (R1, R2)
Temperature Resistance	GB/T 2423	No cracks, deformation, or collapse
VOC Emissions	GB/T 27630	Automotive grade compliant, < 50% of limit
Environmental Standards	RoHS / REACH	Fully compliant

8. Solution Value Summary

- ✅ Lightweight: 1/3 the weight of glass wool—reduces overall vehicle load
- ✅ Integrated Performance: Combines sound absorption, thermal insulation, and flame retardancy—eliminating multilayer needs
- ✅ High Adaptability: Thermoforming allows seamless fit to complex curves—improves assembly efficiency
- ✅ Eco-Friendly: Zero dust, low VOC, recyclable—compliant with global green regulations
- ✅ Full Process Support: Compatible with cutting, lamination, thermoforming, and module integration—ideal for OEM/ODM projects

9. Global Reference Customers (Partial List)

CATL 宁德时代 中国中车 CRRC ACOUSTAFOAM THE SOUND OF SILENCE 上汽大众 SAIC VOLKSWAGEN megasorber® ...

10. Application Case Studies

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YDN SINOYQX (Pinghu) Technology LLC

🏭 Pinghu Factory Address:

No. 2088, Jiuliting Avenue, Caoqiao Street, Pinghu City, Zhejiang Province, China, 314214

🏢 Chengdu Marketing Center:

Room 2908, Unit 3, Building 3, No.388, Xishun Street, Huazhaobi, Jinniu District, Chengdu, Sichuan Province, China, 610036

📧 Email:

sales@ydnfoam.com | sales@sinoyqx.com

📞 Phone / WeChat:

+86-135-4070-2776 | +86-135-8634-6868

🌐 Websites:

www.ydnfoam.com | www.sinoyqx.com | www.xnanom.com

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