Polyurethane Boosts Green Buildings

China Polyurethane Industry Association

September 2017

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Trend of green buildings

- More than 50% of the materials obtained by humans from the nature is used to construct various types of buildings and their affiliated equipment. These buildings consume about 50 % of the global energy during their construction and utilization; the air pollution, light pollution and electromagnetic pollution related to the buildings account for 34 % of the total environmental pollution; the construction waste accounts for 40 % of the total waste generated by human activities.

- Green buildings refer to the buildings which can save resources (energy saving, land saving, water saving, material saving), protect the environment and reduce pollution to the maximum degree during the whole life cycle of the buildings, and thus provide people with healthy, suitable and efficient use space and harmonious coexistence with the nature. Green buildings are the results of introducing the concept of sustainable development into the field of architecture, and will become the leading trend of future buildings.

- The development of green buildings is a significant and urgent task in China.

Trend of green buildings

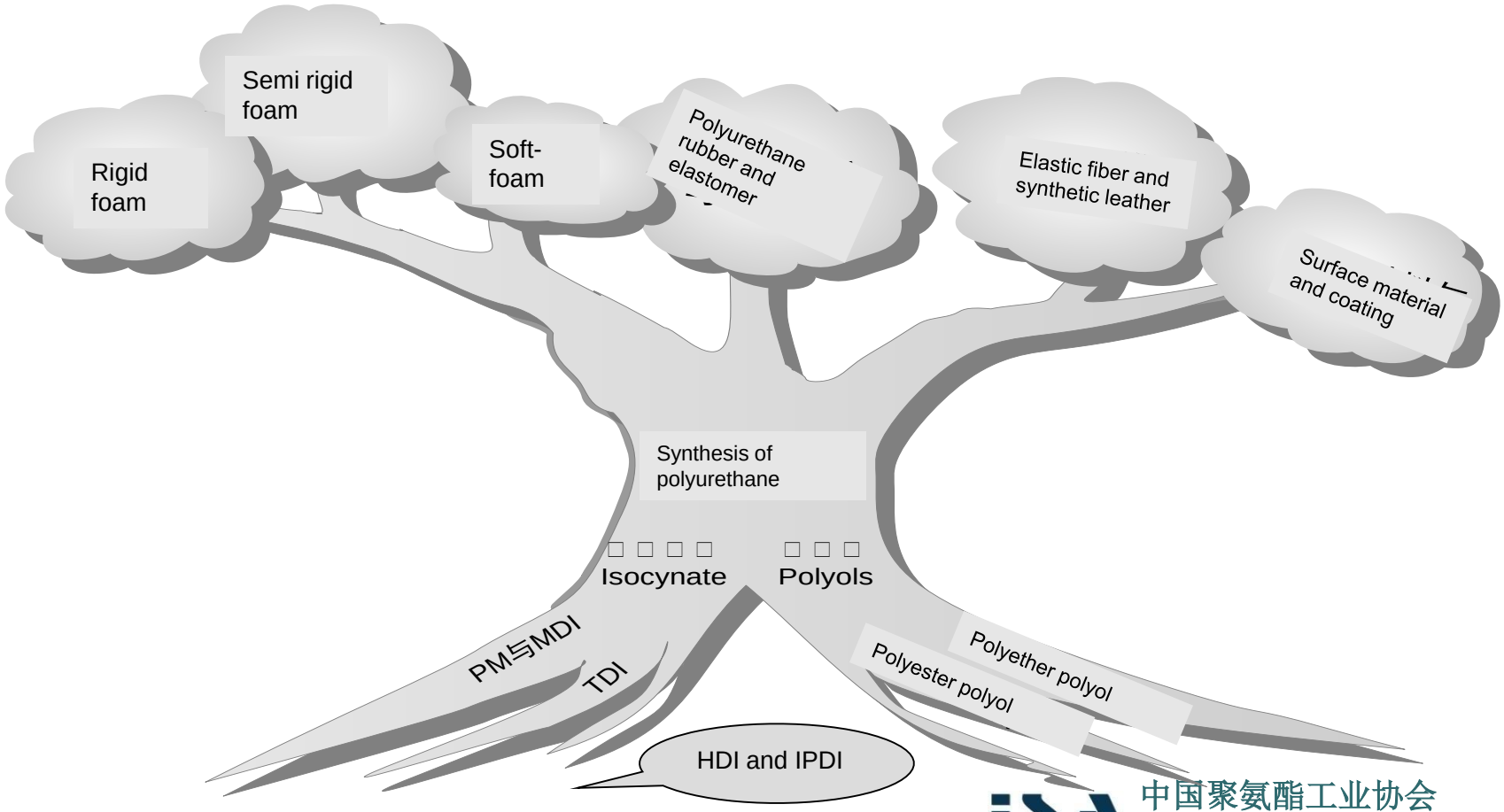
Column 2 Main Development Indicators of Energy Conservation of Building and Green Building during the 13th Five-year Plan

Indicator	2015	2020	Average annual growth rate [cumulative]	Property
Energy efficiency improvement for urban new buildings (%)	--	--	【20】	Constraint
The proportion of urban green buildings in new buildings (%)	20	50	【30】	Constraint
Application proportion of green building materials in urban new buildings	--	--	【40】	Expectation
Implementation of energy saving renovation for existing residential buildings (100,000,000 m^2)	--	--	【5】	Constraint
Energy-saving renovation area of public buildings (100,000,000 m^2)	--	--	【1】	Constraint
Decline proportion of average heating energy consumption intensity for the northern urban residential buildings per unit area (%)	--	--	【-15】	Expectation
Decline proportion of energy consumption for urban public buildings is decreased (%)	--	--	【-5】	Expectation
Renewable energy substitution rate in urban buildings (%)	4	6▲	【2】	Expectation
Proportion of energy-saving buildings in urban residential buildings (%)	40	60▲	【20】	Expectation
Proportion of energy saving measures adopted by the rural residential buildings in developed areas and key regions for development (%)	-	10▲	【10】	Expectation

Note: ① The blackened index is the index proposed in the comprehensive work plan on energy saving and emission reduction of the State Council, the national plan for the development of new urbanization (2014-2020) and the central city working conference. ② Those with ▲ are the forecast value. ③ Those in【】are the accumulative value in 5 years.

Polyurethane material boosts green building development

- **Polyurethane materials with extensive use**



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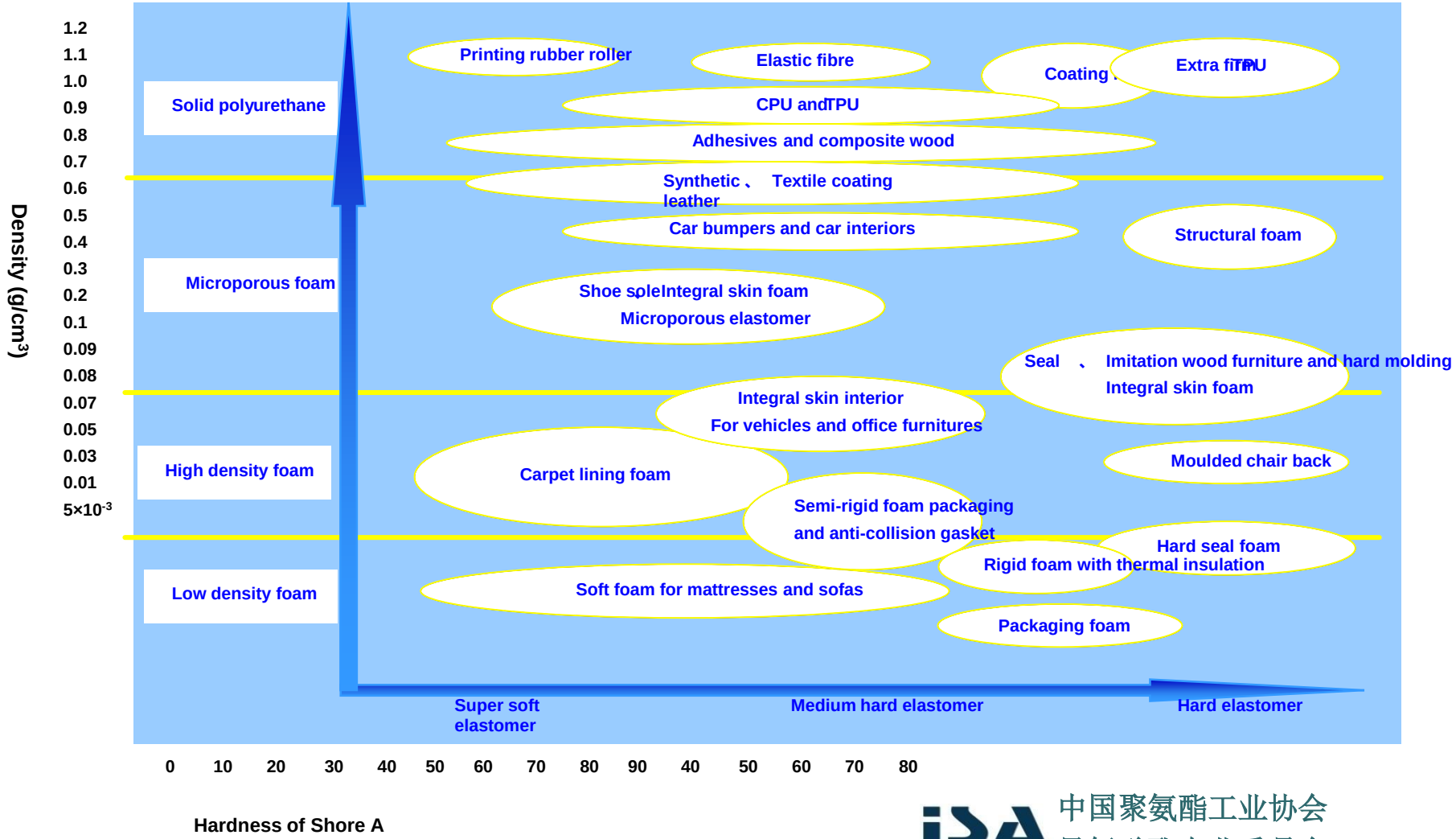

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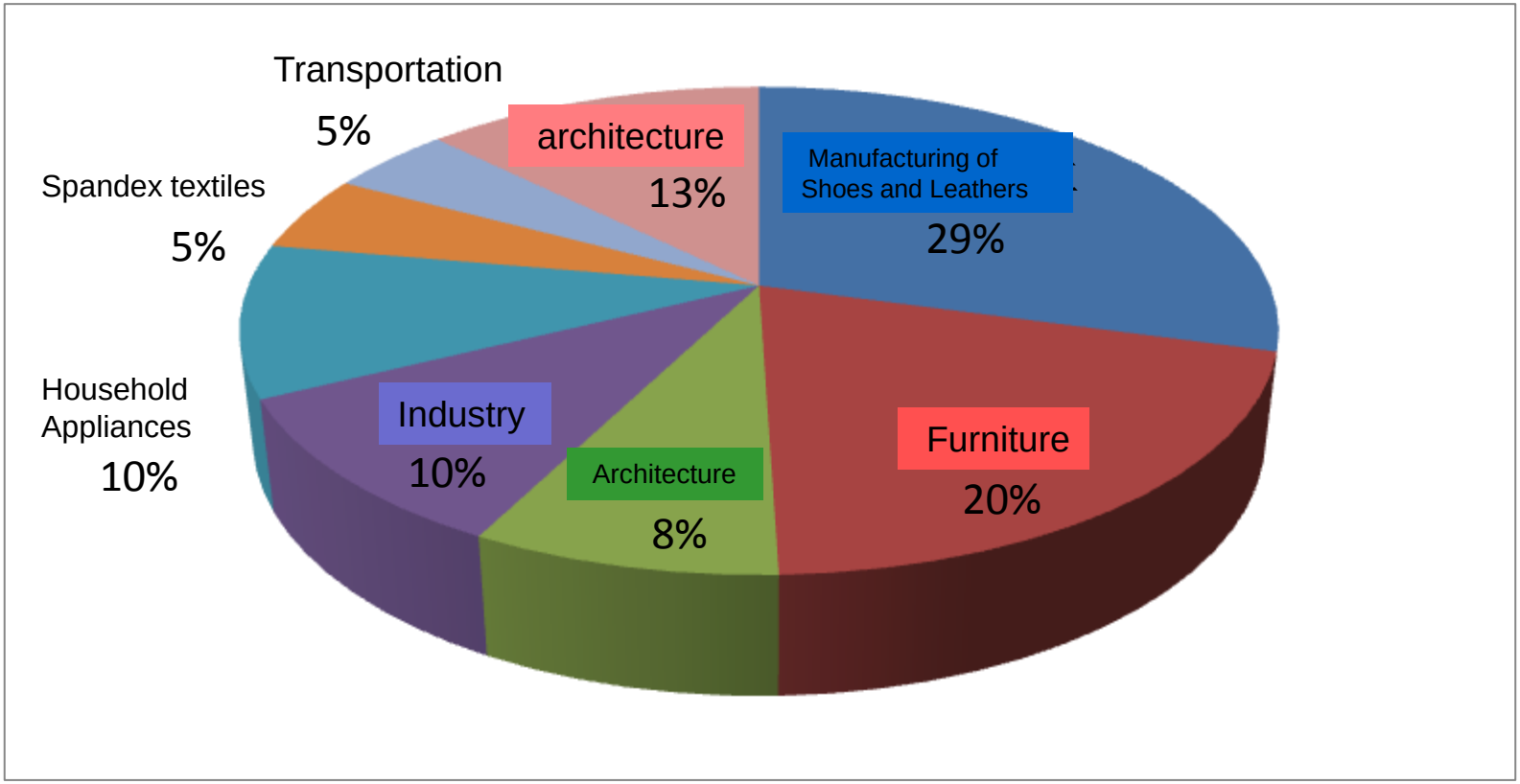

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Polyurethane material boosts green building development

Polyurethane leather
6 billion m^2, accounting for
more than 70% of the global total

Spandex
400, 000 tons, accounting for more than **70%** of the global total

5 billion pairs of shoes, accounting for more than 65% of the global total
About 25 % are made of polyurethane

Refrigerator freezer
120 million sets
No. 1 globally

Automobile
More than 22 million
No. 1 globally

In the energy conservation of building and the application of artificial board in the future
Bright prospect

Polyurethane material boosts green building development

- **Excellent comprehensive performance, suitable for use as green building materials**
  - Heat preservation and insulation
  - Low moisture absorption, excellent waterproof performance
  - High-Strength
  - Self adhesion
  - Wide range of service temperatures
  - In case of fire or heat, no molting drop, for its good structure stability
  - The processing is flexible and diverse, suitable for large-scale production,
  - Clean and hygienic, with no corrosion and biological parasitism

Polyurethane material boosts green building development

- **Application of polyurethane material in construction field**

Categories	Application field	Functions of green buildings
Polyurethane foam	Insulation of building envelope	Energy saving, land saving, material saving, environmental protection and pollution reduction
	Heating pipes & air-condition pipes	Energy saving, material saving, environmental protection and pollution reduction
	Seal the building doors and windows by foam glue	Energy saving environmental protection and pollution reduction
	Furniture and decoration	Healthy, comfortable and material saving
Polyurethane coatings	Wall paint, roof waterproof, floor paint, furniture coating	Environmental protection (water-based, solvent-free)
Polyurethane adhesive	Structural adhesive for buildings and wood-based panel adhesive	Healthy and environment-friendly (water-based, solvent-free, formaldehyde-free)

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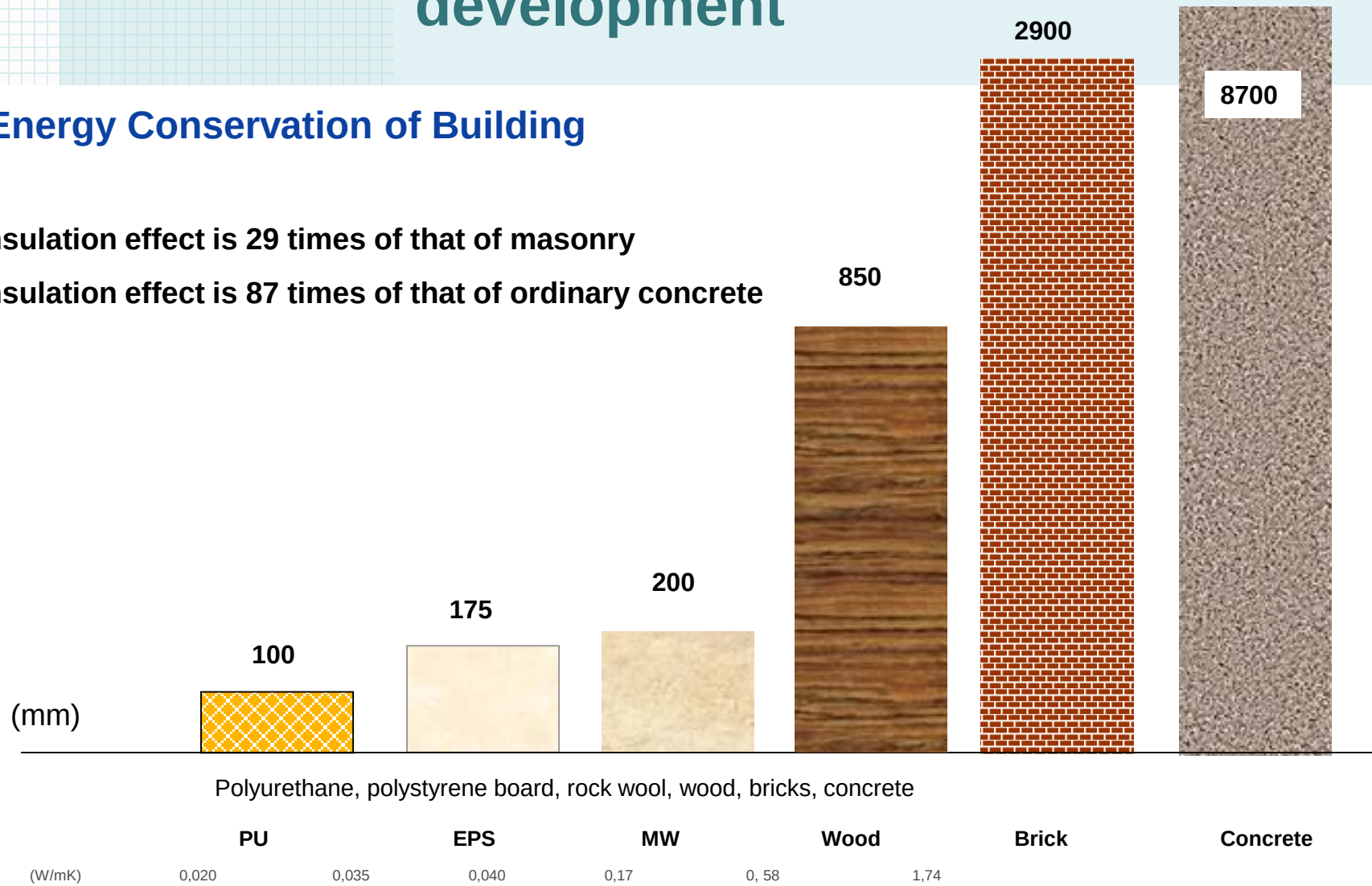
- **Energy Conservation of Building**

The insulation effect is 29 times of that of masonry

The insulation effect is 87 times of that of ordinary concrete



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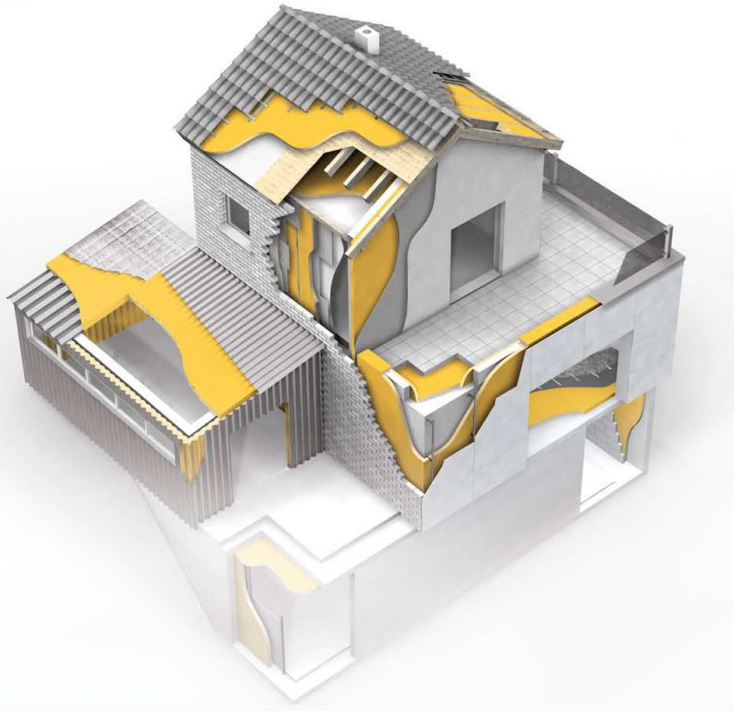

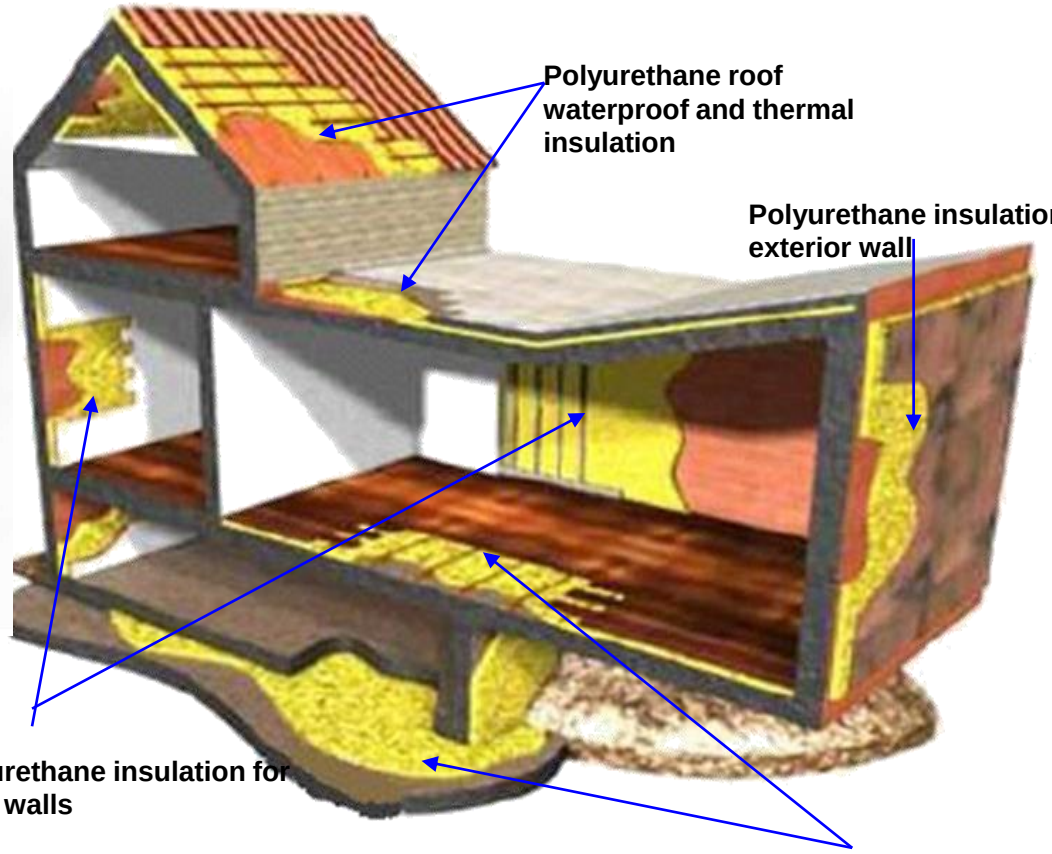

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◆Integration of roof insulation and waterproofing

Rigid polyurethane foam can be used on the slope roof and the flat roof, with thermal insulation and waterproof integration

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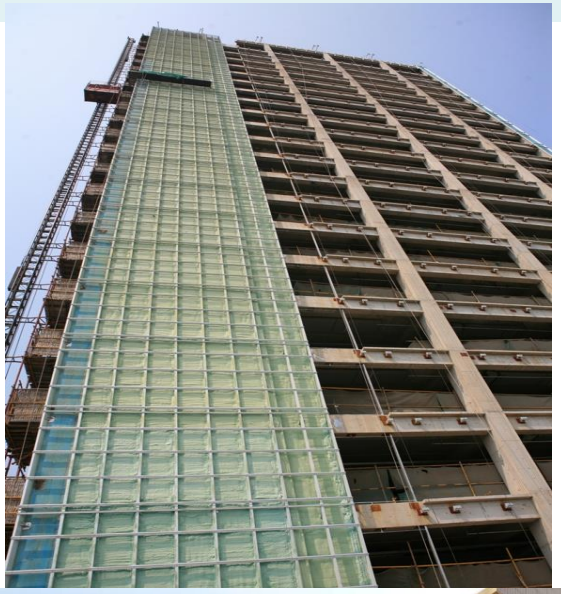
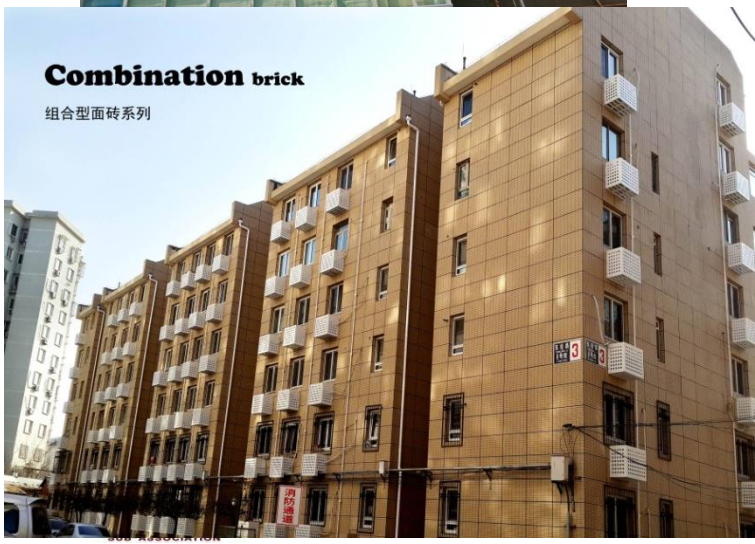
◆Wall Insulation

Building #7 of the Ministry of Housing and Urban-Rural Development



Shanghai Expo Village



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◆Floor heating insulation

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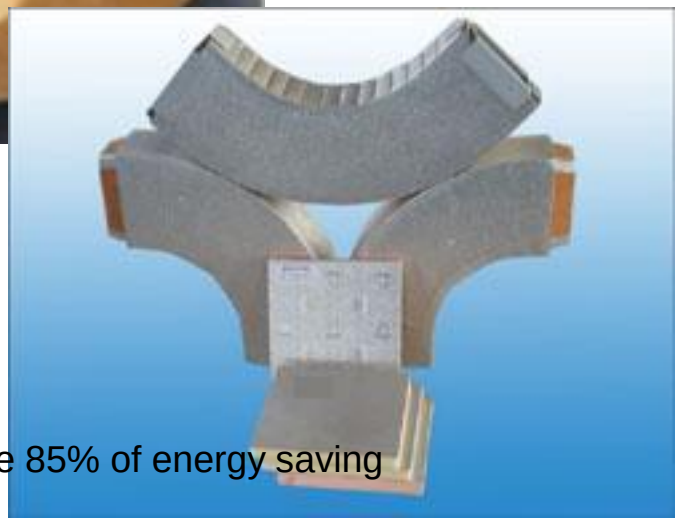
- Heat-supply pipes, air-condition pipes

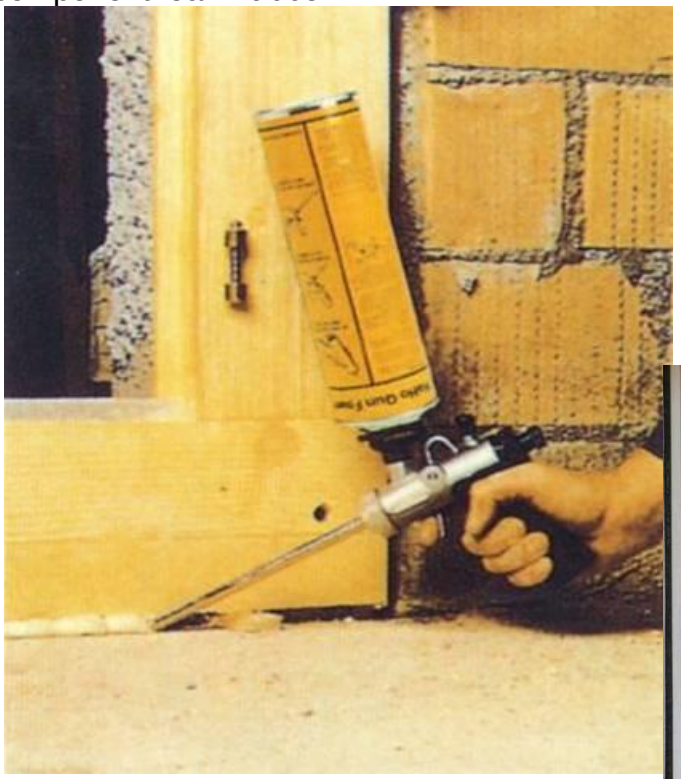


Use polyurethane foam air-condition pipes to achieve 85% of energy saving for central air conditioning

Polyurethane material boosts green building development

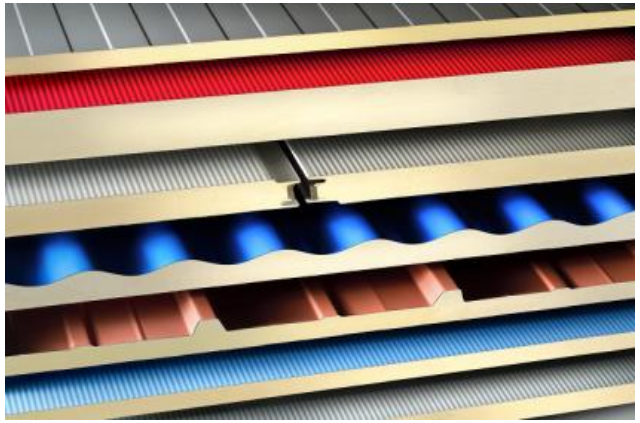
◆Joint sealing of building doors and windows-one-component foam rubber

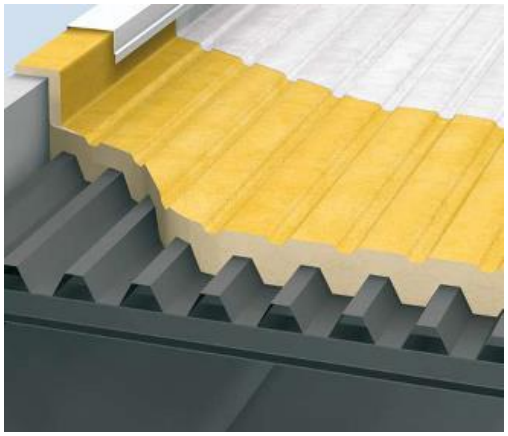
One-component foam polyurethane is a self-expanding, self-adhesive, water vapor-curing polyurethane system, mainly used to fill in various joints, such as: door joints, window joints, etc.

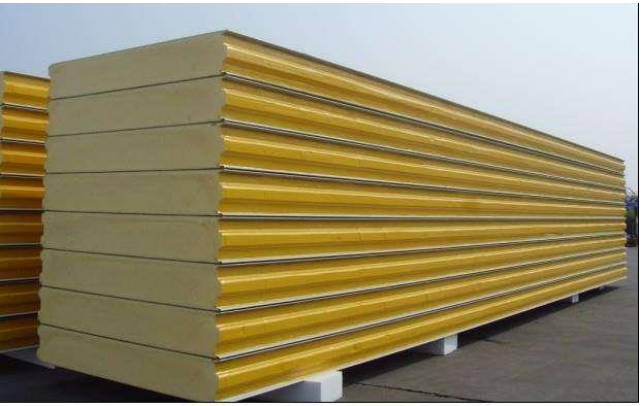


Polyurethane material boosts green building development

- **Prefabricated building**







Polyurethane material boosts green building development

- **Green building materials**

  - Water-based, solvent-free polyurethane coating and adhesive for building use are important green building materials for green buildings
  - The wood-based panel made of polyurethane adhesive is free of formaldehyde or aldehyde and has become a new direction for the development of wood-based panel.

Plate species	Relative corporations shall
MDF	Hanhong, Baoyuan, Ningfeng, Jilin Sengong, Lvzhou, Huqian, Daya, Fenglin, Jianfeng, Zhenghe, Sanwei, Weilibang, etc.
PB	Wanhua Ecoboard, Huafangzhou, Hongwei, Gaofeng, etc.
OSB	Baoyuan, Kangxin, Luli, Yuanfang, Novofibre, etc.

Manufacturers with aldehyde-free products launched

Manufacturers with aldehyde-free products planned to be launched

HOLiKE 好莱客衣柜 · 诗尼曼衣柜 相知 相伴 诗尼曼 · yadan 亚丹衣柜 · PATERSON 百得胜衣柜 · KEFAN科凡 全屋定制 · 卡诺亞 · 索菲亞衣柜 定制衣柜,就是索菲亚 · ROCO劳卡 · 德维尔 全屋定制 · Der德尔 · 尚品宅配 全屋家具 定制专家 · OPPEIN欧派 整体衣柜 · IKEA · ……

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Incoming Issue

- The public objective understanding of green chemical building materials
- Costs
- Optimization of formulation technology
- The improvement of national policies and standards
  - Technical standard
  - Safety and environmental standards, such as fire protection standards

Thank You

CPUIA ISOCYANATE SUB-ASSOCIATION

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