



# 新一代MDI大块泡棉技术

## A New Generation of MDI Slabfoam Technology

MDI为大块泡棉提供更有价值的解决方案

MDI as a valuable solution for Slabfoams

# MDI可以做高回弹和慢回弹大块海绵吗？

Can MDI make HR or VE slabstock?

## 是否经济可行呢？

Is it economic?

## 性能如何？

Performance?

# 亨斯迈MDI大块泡棉在软泡领域的应用

Huntsman MDI for Flexible SlabFoam

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## ■ 已开发并成熟的技术有：

In-house developed system

### ■ 全MDI的高回弹系统

all MDI high resilience system

### ■ 全MDI的慢回弹系统

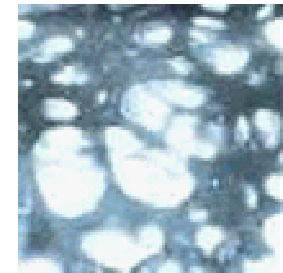
all MDI visco-elastic system

### ■ 特殊系统，如超柔软和仿乳胶系统

special system – supersoft, Latex like foam

## ■ 完全基于独特的改性MDI，并结合特有的添加剂和商品化的高回弹聚醚开发而成

Entirely based on MDI variants from unique assets, in-house designed additive package and commercially available HR polyols



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# 为何使用 MDI生产大块泡棉？

Why MDI Slabstock?

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## 使用MDI生产高回弹和慢回弹泡棉可带来三方面的好处：

Benefits of MDI Slabfoam

### 1. 泡棉性能

Product performances

### 2. 生产工艺

Processing benefits

### 3. 运输、使用

using and transport

# MDI泡棉的性能 MDI Foam Properties

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## 1. MDI泡棉的性能 MDI foam properties

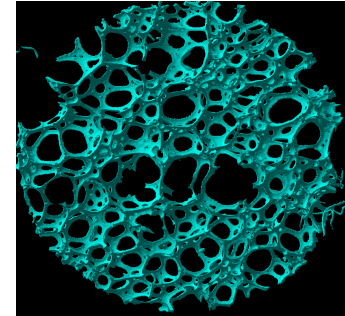
### 1.1 良好的透气性 breath-ability

- 不规则和大而开孔的泡孔

due to irregular and large open cell

- 开孔的结构保证空气的流通和防止热量集聚，从而提供良好、舒适的睡眠环境

The open cell structure allows good air circulation, and prevents heat build-up and helps to maintain a perfect temperature balance and a pleasant environment for sleeping



### 1.2 舒适性 comfort

- 舒适因子高，从而获得舒适的感觉（在低承载时）和好的支撑性（在高承载时）

The higher "Sag factor" provides a better feel (low load) and gives better support (high load)

### 1.3 耐用性 durability

- 耐湿热性能好

good wet compression set

- 有足够的拉力、撕裂和延伸性能

MDI foam exhibit enough tensile, tear and elongation property



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# MDI高回弹泡棉的性能

MDI based HR Slabstock foam

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## Physical Properties:

Foam grade	HR36100	HR38140	HR38160	HR50120	HR50150
Density (kg/m <sup>3</sup> )	35	36	35	48.1	47.0
ILD 40% (N)	110	150	155	128	159
SAG-factor	3.0	3.0	3.0	2.9	2.8
C.S. humid 70% (%)	9.7	8.3	7.3	4.6	4.1
CLD 40% (kPa)	2.7	3.7	4.0	3.0	3.8
Hysteresis loss (%)	25	26	29	19.7	20.6
Tear strength (N/m)	180	140	150	150	150
Tensile strength (kPa)	85	105	90	85	85
Elongation (%)	110	90	90	120	95
Resilience (%)	64	60	58	63	65
C.S. dry 75% (%)	4.1	4.0	3.0	2.7	2.3
C.S. dry 90% (%)	4.6	4.1	3.9	2.6	2.1
Dynamic fatigue ISO 3385					
Thickness loss after 10' (%)	2.0	1.9	2.07	1.4	1.4
Hardness loss ILD 40% after 10' (N)	23.6	32.1	39.8	21	25
Hardness loss ILD 40% after 10' (%)	21.7	21.6	25.6	16.4	15.7

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# MDI慢回弹泡棉的性能

MDI Visco-Elastic Foam Technology

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## Physical Properties:

Physical Property	V50050	V50080	V65060 CM	V65060	V80080
Density (kg/m <sup>3</sup> )	47,6	48,4	60,9	67,7	77,6
C.S. Dry 75 % at 70° C (%)	1,6	1,9	1,4	1,1	1
C.S. Dry 90 % at 70° C (%)	2,3	2,2	3,2	1,5	1,4
C.S. Hum. 70 % at 50° C (%)	-0,4	-0,1	-0,8	-	-1,3
Hardness CLD 25 % (kPa)	1,1	1,9	1,0	1,2	1,5
Hardness CLD 40 % (kPa)	1,3	2,4	1,4	1,5	1,9
Hardness CLD 65 % (kPa)	3,0	5,4	4,1	3,6	4,3
Hysteresis (%)	41,3	39,9	51,0	40,9	35,5
Hardness CLD 40 % ; Peak (kPa)	2.13	3.52	2.36	2.06	2.43
Hardness CLD 40 % ; 3` (kPa)	1.23	2.14	1.20	1.28	1.68
Relaxation (%)	42.5	39.4	49.1	37.8	31.0
Hardness ILD 25 %	36	63	31	40	52
Hardness ILD 40 %	49	83	47	54	70
Hardness ILD 65 %	96	163	109	110	140
SAG-factor	2,7	2,6	3,5	2,8	2,7
Tear strength (N/m)	197	233	157	158	157
Tensile strength (kPa)	86	97	59	46	55
Elongation (%)	217	194	199	264	238
Rebound (%)	9	12	7,5	4	4

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# 有关床垫产品出口的安全性

Product Safety Issues related to Mattresses for export

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- **高标准的防火要求(BS 5852 Crib5, Cal 117)**, 而无添加含卤防火剂  
strictest fire code(BS5852 Crib5, Cal 117) without halogenated compounds
- **不希望有的化学品从床垫中跑出来**（如有机锡、邻苯二甲酸酯、卤素化合物等）  
Unwanted chemicals that may eventually come out of the mattress (e.g. organic tins, phthalates, halogenated compounds...)
- **室内空气质量** Indoor air quality (Volatile Organic Compounds)

这些在欧盟地区被持续关注，表现在

These are continuously being addressed in the European Union, resulting in

- **更严格的管制** more stringent regulations
  - Registration, Evaluation, Authorisation of Chemicals
  - Full Risk Assessments for the use of chemicals
- **鼓励生态环保** reward for better ecological performance
  - **床垫的(Eco)-标签**  
(Eco)-labels for mattress
    - **制造过程中减少对水和空气的污染**  
Less water and air pollution during manufacturing
    - **将有害物质减至最低**  
Minimizing use of hazardous substances
    - **提高品质和产品的耐用性**  
Increased quality control and **product durability**



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# MDI泡棉可符合环保要求 MDI Foam can satisfy environment criteria

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## 1.4 更干净 more clean

- 无需使用锡催化剂  
no Tin catalyst required
- 低挥发性（低VOC）  
lower VOC
  - 可不用接枝聚醚  
no polymer polyol required
  - 少用或不用硅油  
less or no silicone required
  - 无需使用含卤化合物就达到防火要求  
no halogenated additives
  - 使用反应型催化剂  
using reactive catalyst



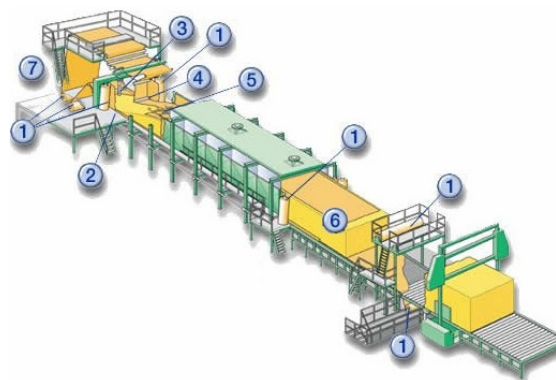
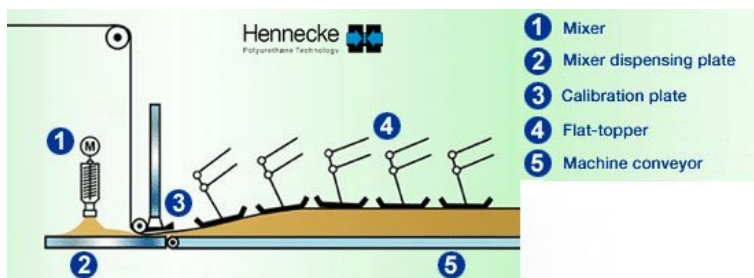
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## 2. 生产工艺 Processing benefits

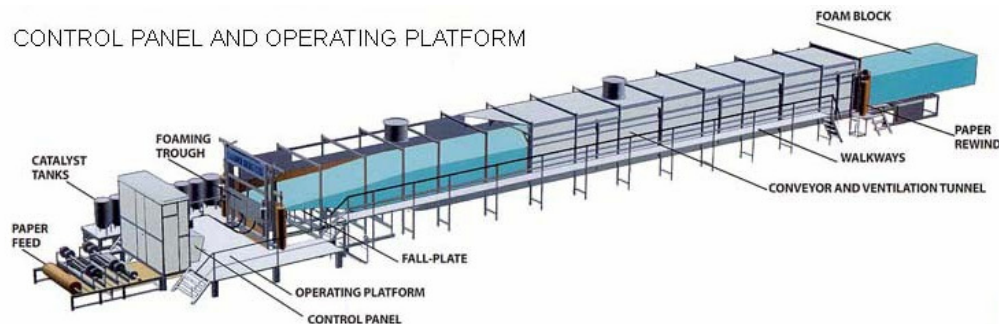
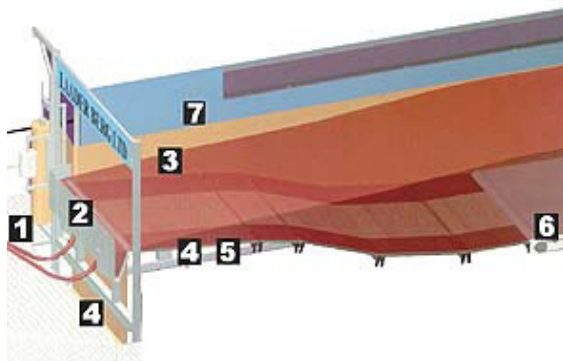
### 2.1 亨斯迈的MDI大块泡棉技术可适用于多种生产设备

All Standard Processes with commercial production

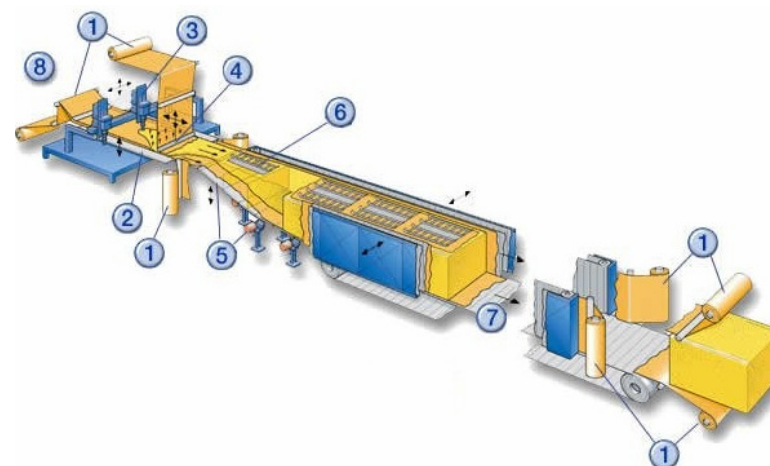
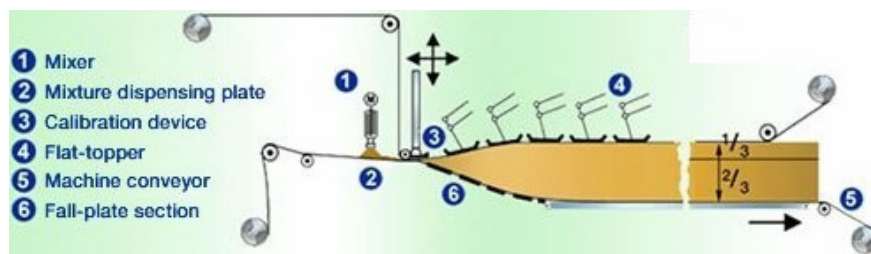
- UBT或传统发泡法（边膜提升法和平衡压板法）  
UBT or conventional processing



## ■ 用喷淋头的溢流槽法 Maxfoam Plus Traversing Head



## ■ QFM工艺

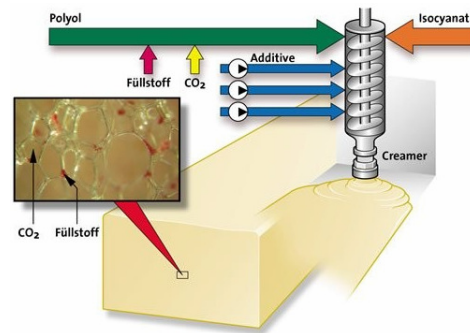


# 适用的生产设备 standard processes

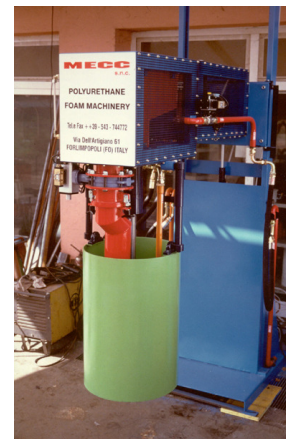
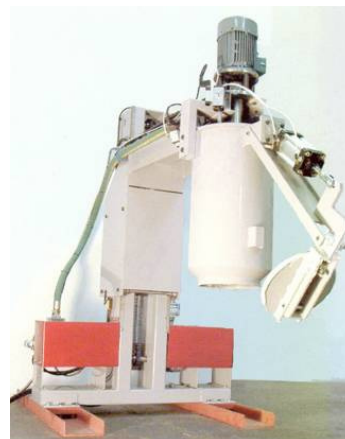
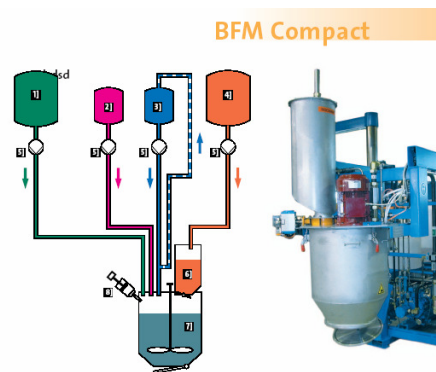
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- 二氧化碳发泡法或变压发泡法 CO<sub>2</sub> blown or VPF process



- 箱泡法 Batchblock Process



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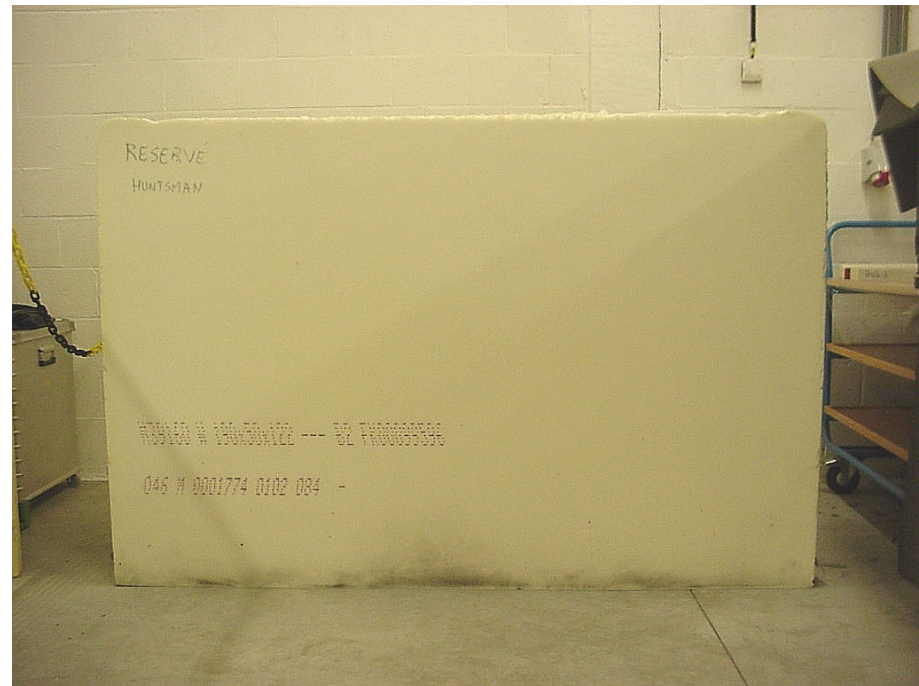
## 2.2 更高的产能和收益率，减少裁切损耗

increase production capacity, better block yield, reduce trim loss

- 改善泡体的形状 improve bun shape
- 泡体的发泡高度更高 increase bun height

商业化的泡棉产品

- QFM
- 39160 规格
- 宽度: 205 cm
- 高度: 140 cm

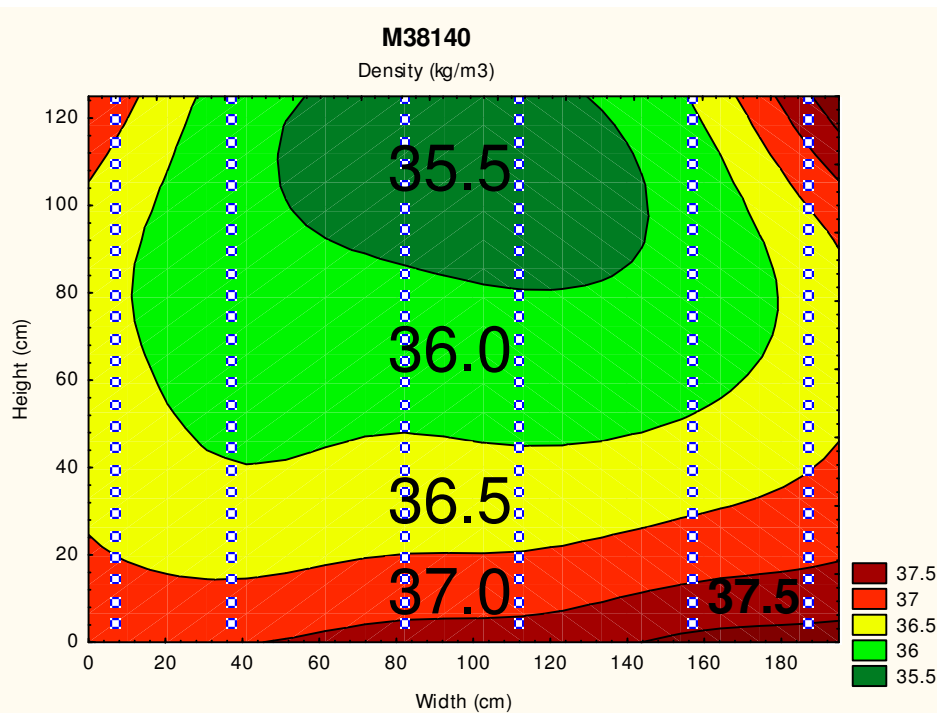


## 2.3 改善密度和硬度在泡体里的分布均匀性

improve density and hardness distribution across the foam bun

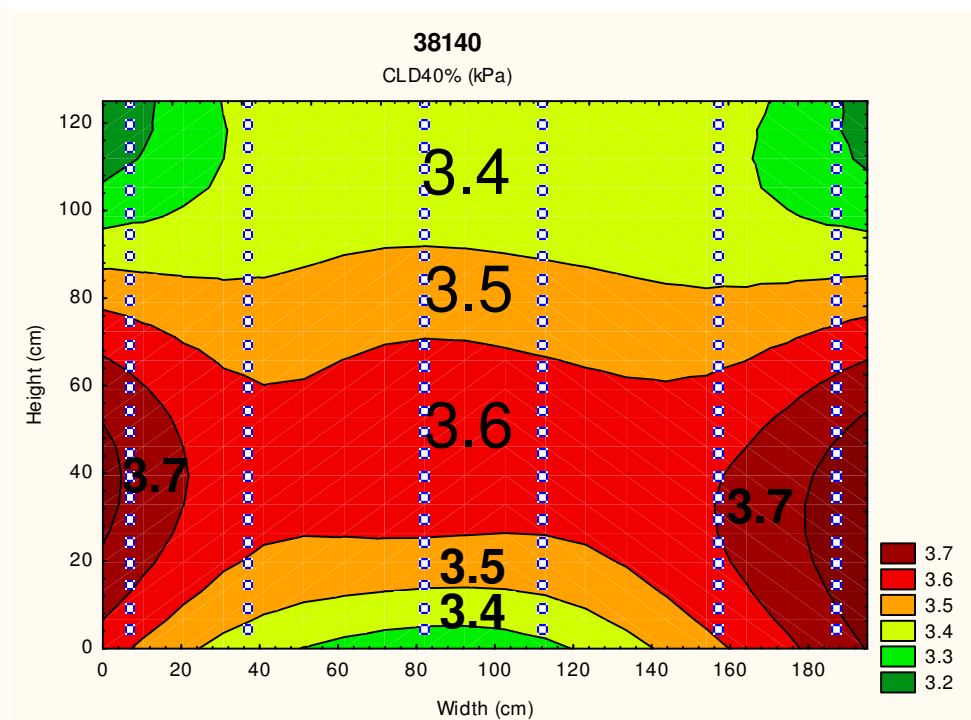
### ■ 密度的分布

Distribution of density



### ■ 硬度的分布

Distribution of hardness



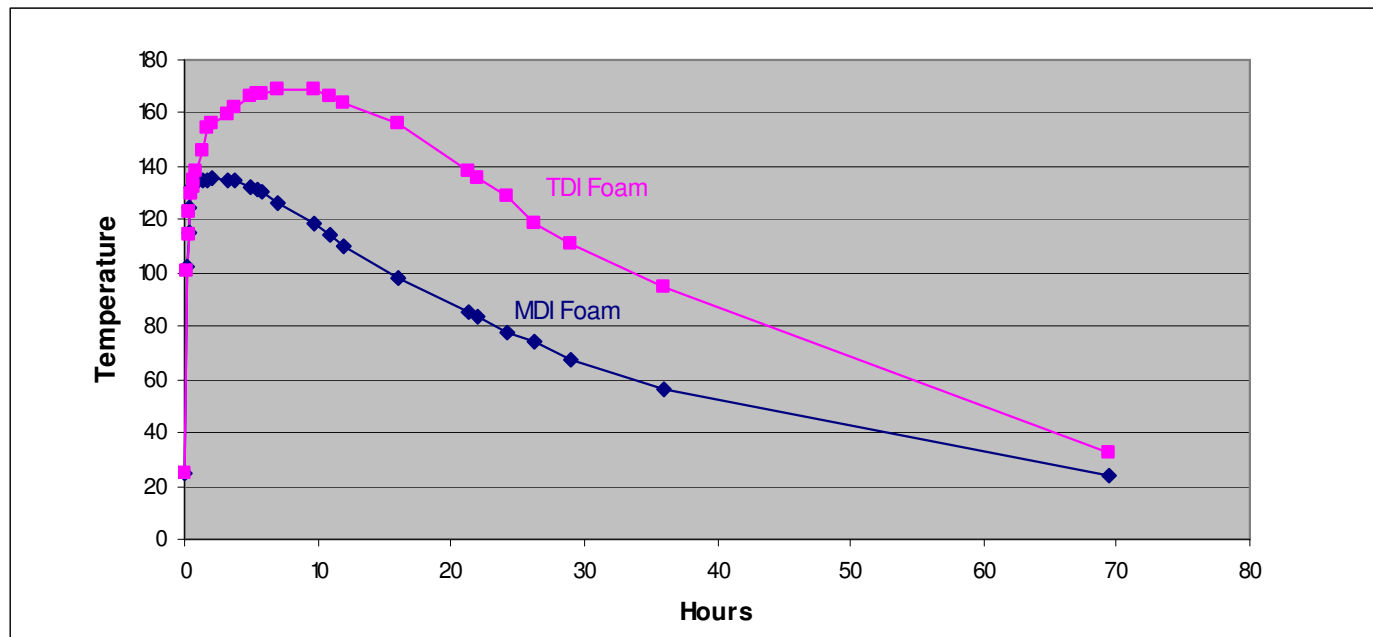
## 2.4 快速熟化

fast cure

- 可无需过夜熟化，生产由后熟化转为冷却  
No overnight cure, start of foam conversion defined by cooling rather than curing time.
- 熟化过程对环境的敏感性低  
Low sensitivity to atmospheric conditions during cure (temperature, humidity, pressure)

### Block Temperature

2 x 2.05 x 0.95m block



## 2.5 生产的宽容性提高

robustness

- 无需使用锡催化剂，无锡催化剂活性衰减问题

No Tin catalyst required, no Tin catalyst deactivation problem

- 反应活性高，从而提高了体系的稳定性，降低环境条件变化的影响，进一步稳定了生产的重现性

High reactivity, increase stability against atmospheric condition variations (humidity, temperature and pressure)

- 配方的组分少，且可覆盖较宽范围的密度和硬度规格

Based on a limited number of components, can cover a wide density and hardness range

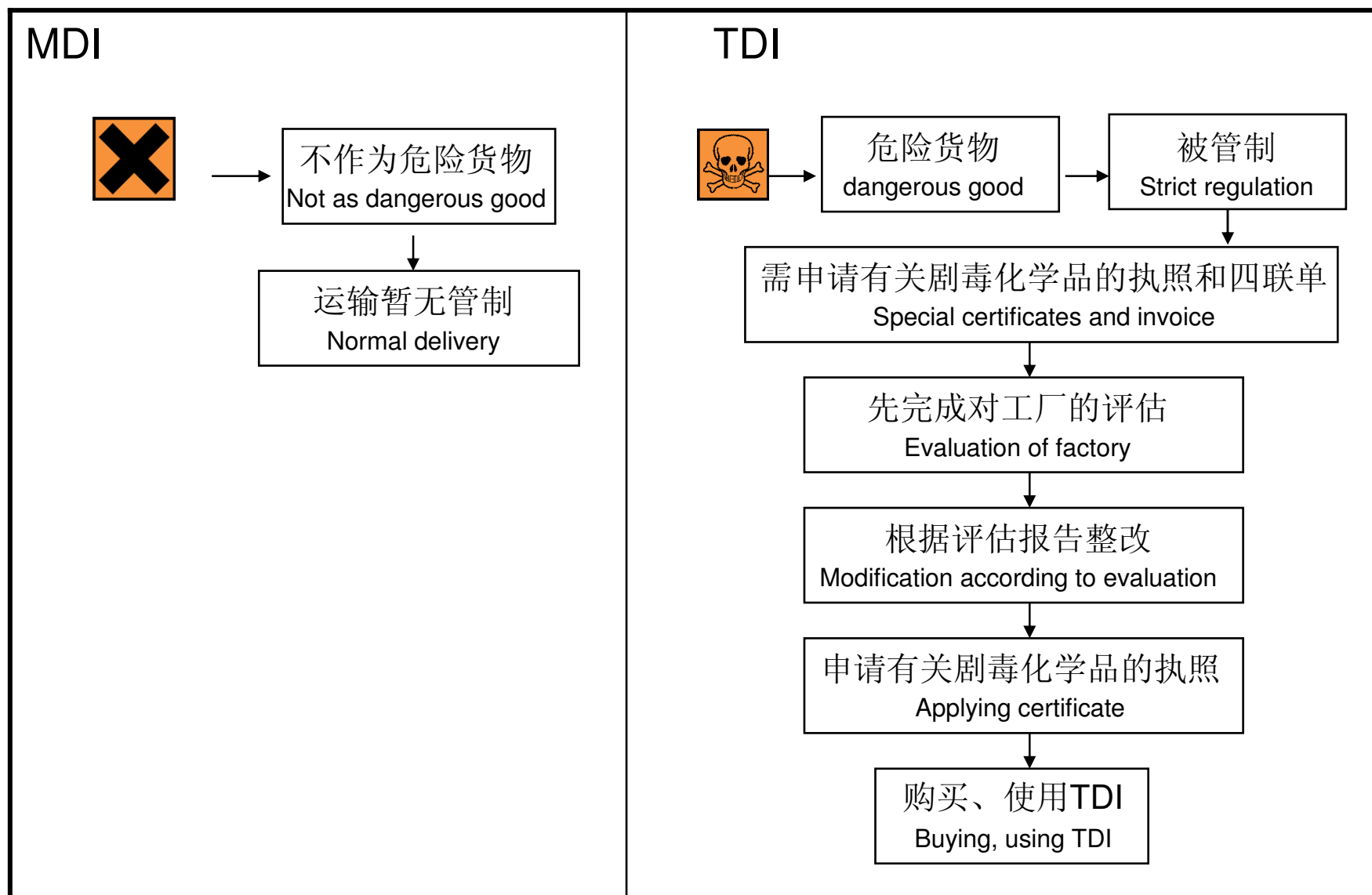
- 泡棉为开孔结构

open foam

### 3. 运输与使用 using and transport

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# 运输与使用 using and transport

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## 购买TDI的四联单

剧毒化学品购买凭证回执(第一联)

剧毒化学品购买凭证回执(第二联)

根据《危险化学品安全管理条例》第二十四条规定，按照下列规定办理：

剧毒化学品购买凭证回执(第一联)

剧毒化学品购买凭证回执(第二联)

中华人民共和国公安部监制

- TDI因管制而产生的运输、储存、使用和购买的额外负担

**extra effort** for transport, storing, using and buying due to regulation

- MDI为非危险货物，因而额外负担少

**simpler effort** for transport

- 采用全MDI生产泡棉，可在生产的每个阶段减少化学品的挥发，从而降低危害水平，**更方便使用**

Reduced hazard risk, low system chemical emissions (at every stage of production), reduce risk to chemical exposure at work and simpler handling

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# 亨斯迈的能力

## Huntsman's Unique Capability

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- 拥有**20年**开发**MDI**大块海棉和配方设计的经验和技術

**20 years development expertise in MDI slabstock, polyol additive design, and formulating technology**

- 全球富有經驗的團隊

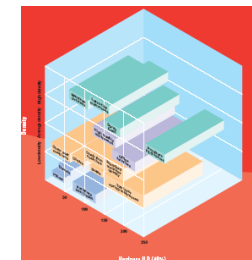
**Experienced team globally**

- 強大的改性**MDI**和特殊聚醚開發能力和技術

**Asset footprint for MDI variants, specialty polyols**

- 亞洲一流的研發中心和歐洲研發中心的支持

**Asia Development Center base at Shanghai, European Development Centre supporting Asia**



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# MDI大块泡棉的总结

## Summary of MDI Slabstock

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### ■ MDI高回弹、慢回弹大块泡棉是经济、可行的。

Possible and economic of MDI HR and VE foam

- 适用于多种生产设备和采用通用原料all standard process and using general materials
- 生产品质一致，可生产规格宽，宽容性更好，并可获得更低的裁切损耗，且密度与硬度分布均匀。

Consistency quality, Wide density and hardness range achievable, more robust, and less trim loss, better density and hardness distribution.

- 运输和使用上便利convenient for transporting and using

### ■ MDI大块泡棉性能独特，且环境友好

unique performance and environment friendly

- 手感好，更舒适，更透气，更耐用Better hand-feel, more permeability, more comfort and more durable.
- VOC低，环境友好，无需液态防火剂即可达到防火要求Lower VOC, and environment friendly, can meet anti-fire property without halogen compounds.

谢谢！

*Thanks for your attention !*