

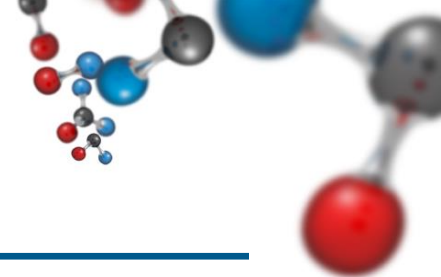
# Wanhua-BorsodChem

## Solutions for Sandwich Panels

*Moscow – March 1<sup>st</sup>, 2017*

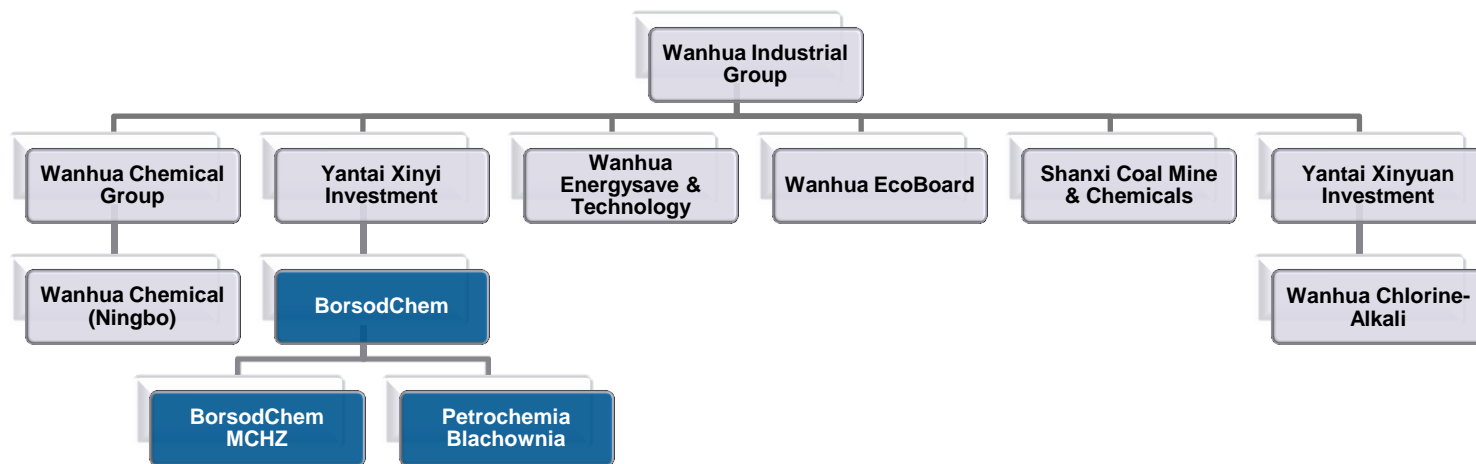
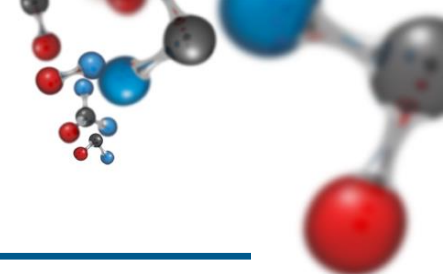
# Agenda

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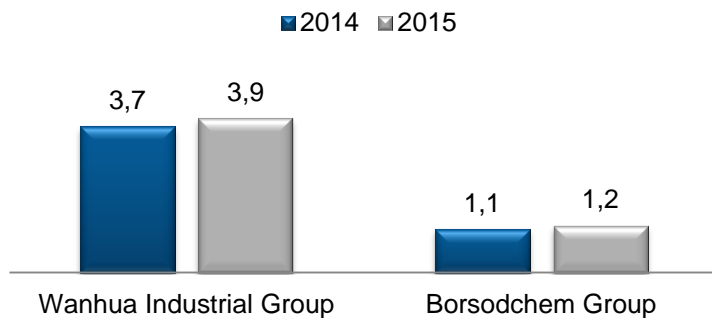


- **Company introduction**
- **Self-Formulation, general aspects**
- **Wanhua and BorsodChem technical support**
- **Raw materials by Wanhua-BorsodChem for self-formulation**
- **Formulated Polyols**
- **Conclusion**

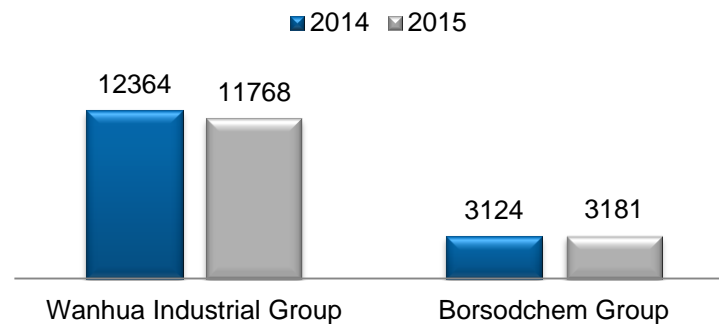
# Facts and figures



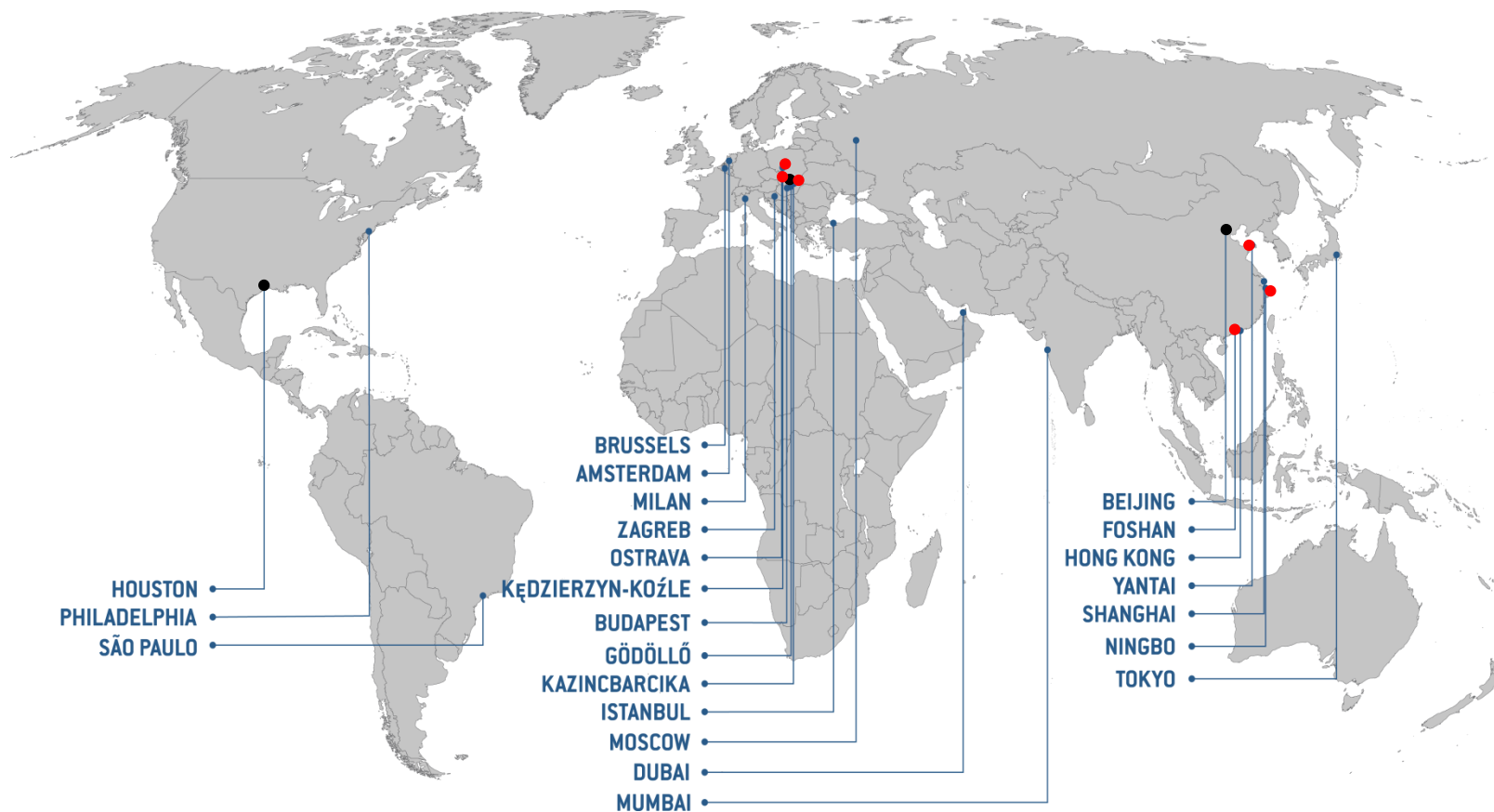
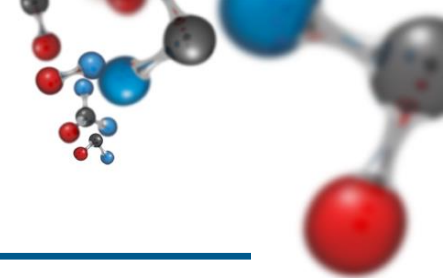
Revenue b (EUR)



Number of Employees



# Wanhua and BorsodChem Worldwide



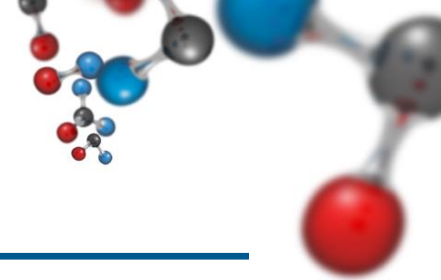
Production sites: 6

Technical centres: 3

Offices and subsidiaries: 14



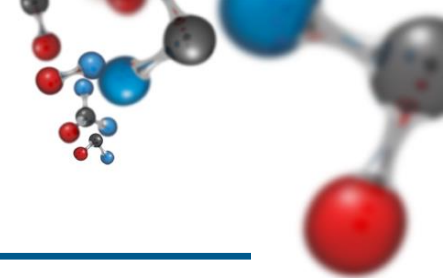
# Wanhua Yantai Industrial Park



- Located in Yantai Economical and Technological Development Zone, with an area of 5.3 square kilometers and investment of 30 billion RMB for the first-phase project.
- Wanhua Yantai industrial park construction was started in 2011, mainly including two core projects, which were MDI integrated and PO/AE integrated.
- New 600kt/a MDI plant was put on stream on Nov. 7<sup>th</sup>,2014.
- New 750kt/a PHD plant, 240kt/a PO plant, 760kt/a MTBE plant, 300kt/a AA plant were commissioned on August 2015.
- New 270kt/a polyol plant, 50kt/a system polyol plant was commissioned in 2016.



# Our Achievements



## Wanhua

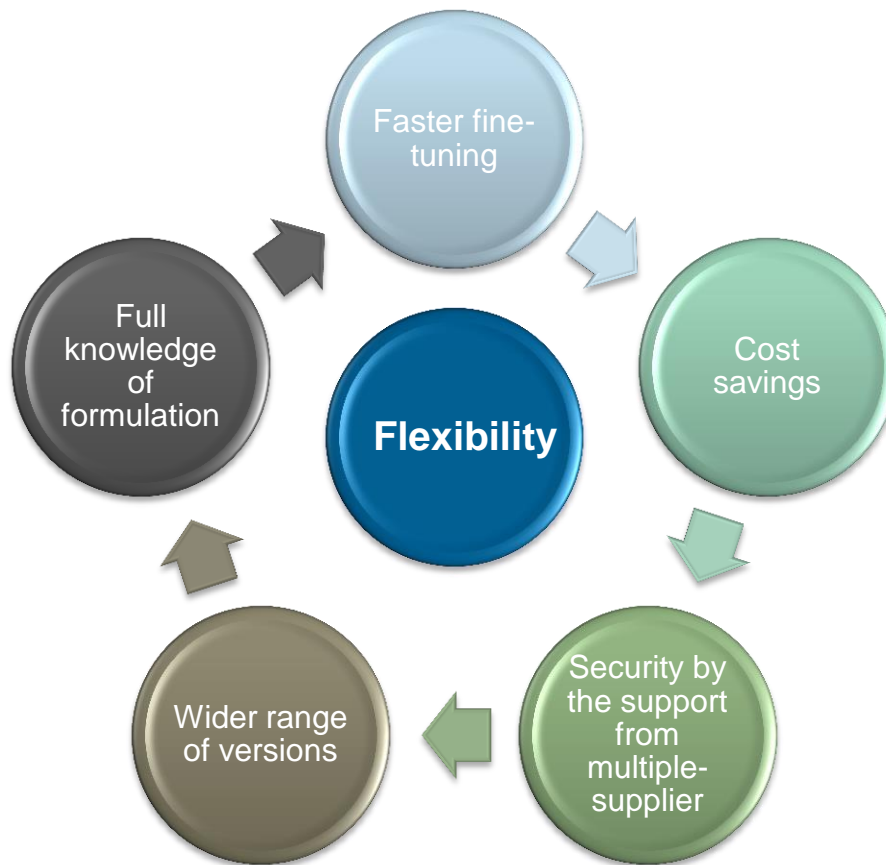
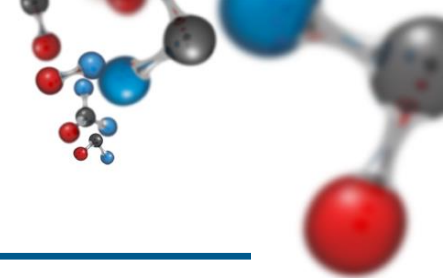
- Nr. 1 MDI producer in the world (1800 ktpa)
- Cost-effective MDI production facilities in China
- World's two largest single-train isocyanate lines (totally 1.200 ktpa) in Ningbo, China
- Large-scale investments in R&D

## BorsodChem

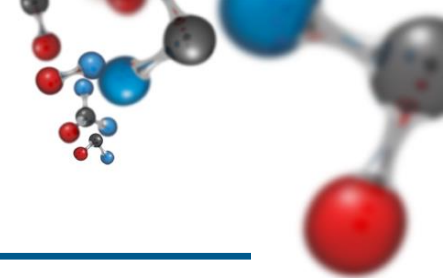
- Leading TDI producer in EMEA (250 ktpa)
- Sole isocyanate producer in CEE
- Expanded MDI and TDI capacity (300 and 250 ktpa respectively in 2015)
- IPPC licensed technologies

Product (KT in 2015)	Wanhua	BorsodChem	Total
MDI	1.800	300	2.100
TDI	0	250	250
Polyol	300	0	300
Aliphatics	35	0	35

# Self-Formulation - Advantages

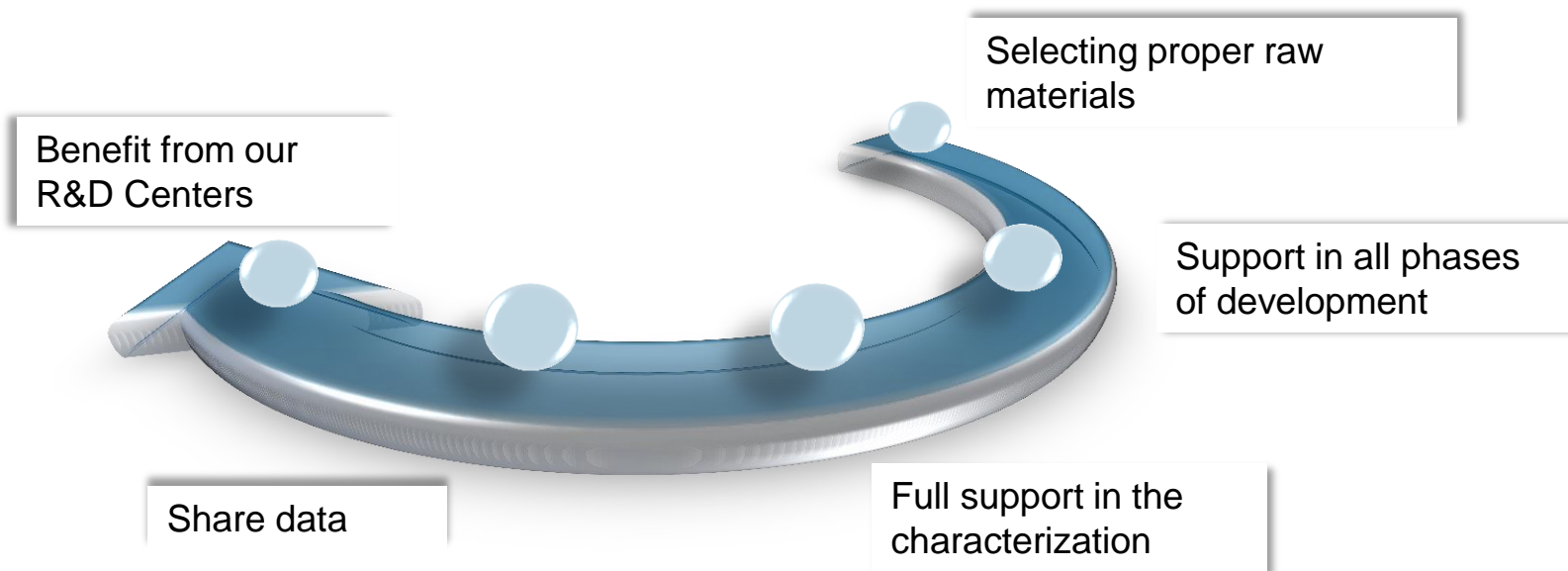
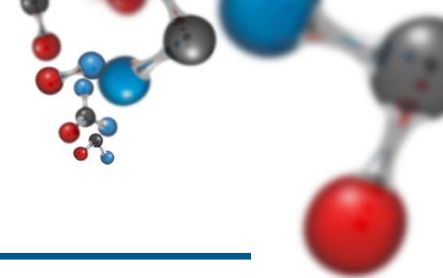


# Self-Formulation – Considerations

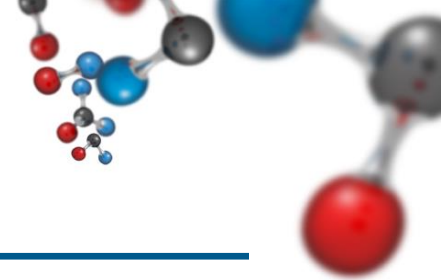




# Self-Formulation - Support



# Wanhua R&D Capabilities



- Over 5% of annual sales revenue invest into R&D
- Over 80 dedicated researchers on polyols and rigid application
- Leading technology in polyols production

HPM



GC



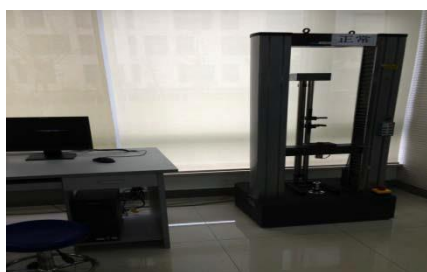
Combustion Analyzer



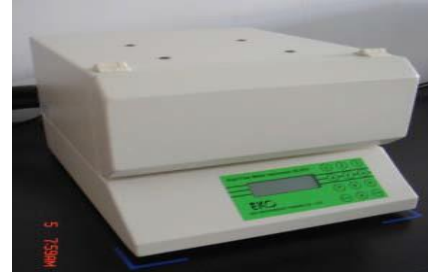
Hydroxyl Value Test



Universal Test Machine



EKO Heat Flow Meter



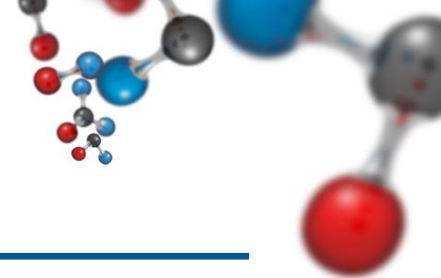
Lab Scale Reactor



Pilot Scale Reactor



# BorsodChem R&D and TS Center



**Development programs** of new specialty (high added-value) products

**Strong cooperation with MDI plant** for the manufacture of new specialty products

**Technical service activity** for commodity and downstream products

**Demonstration centre** for customers



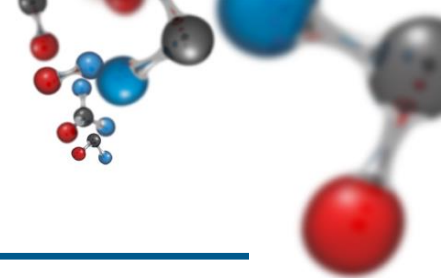
## Equipment

- Advanced laboratory equipment
- Product characterisation
- High pressure machine
- Panel press
- Moulds

## Physical testing

- Product performance
- Aging
- Application

# Knowledge on processing

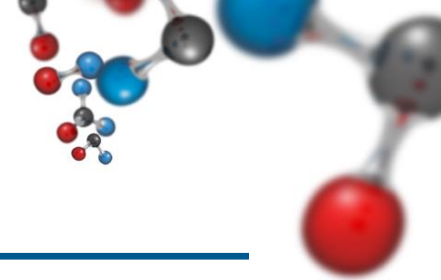


- Impact from surface temperature on adhesion
- Curing & reactivity optimisation – catalyst package
- Laydown technology
- Trimer content profiling: impact from surface temperature & catalyst



# Technical Service

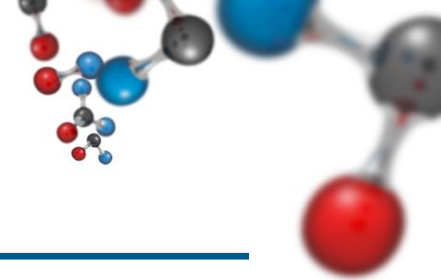
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- **Support Sel-Formulation**
- **Regular Technical visits**
- **Physical testing**
- **Trainings**
- **Customized products**

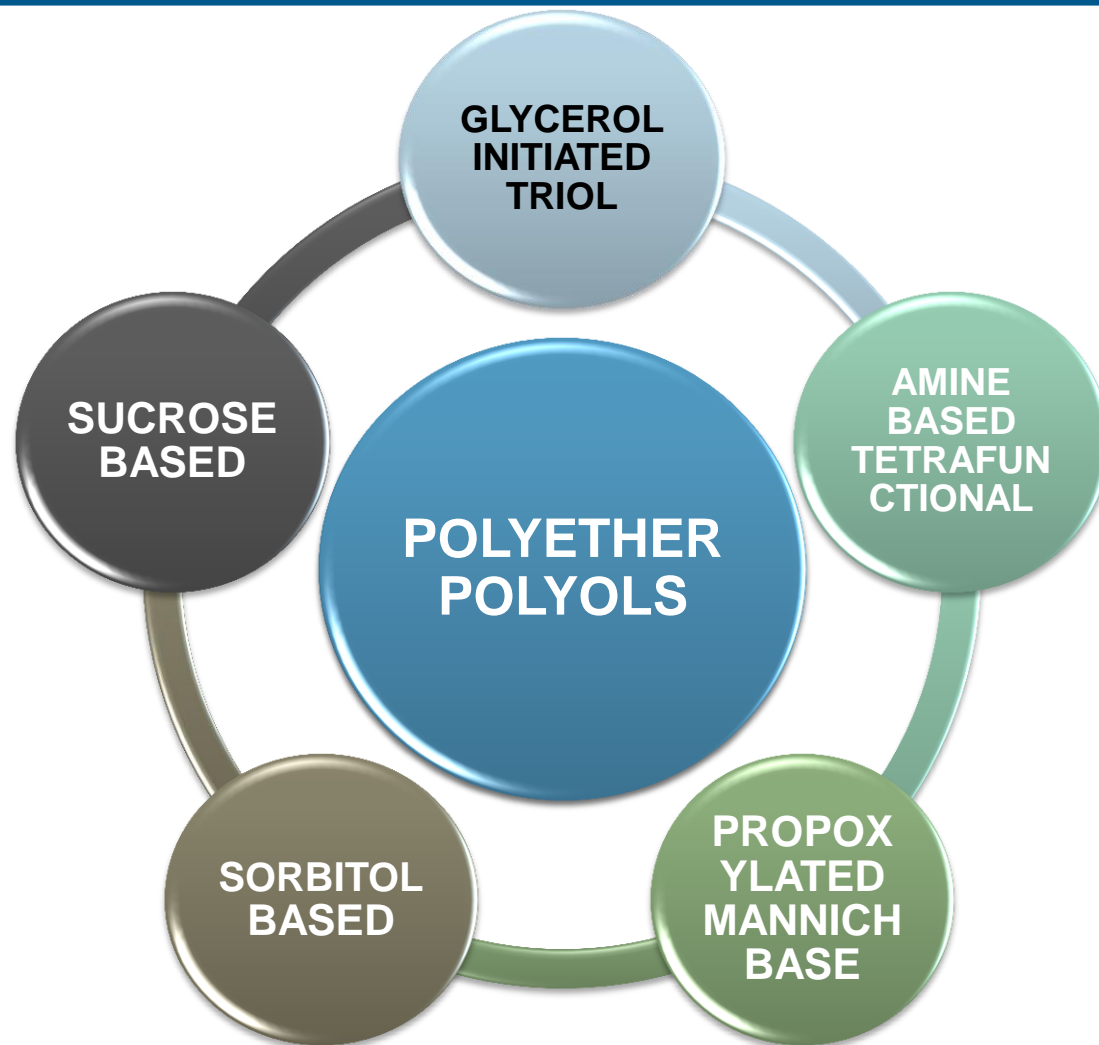
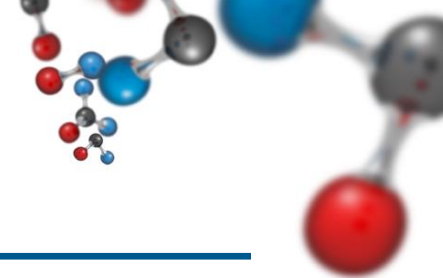


# Wanhua Base Polyols

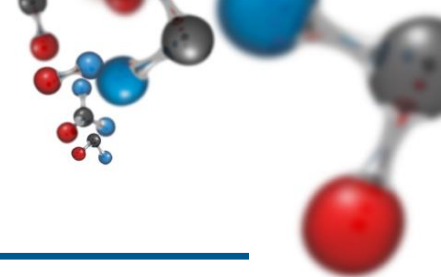


- **Wanhua Chemical set up Polyol SBU in March 2015**
- **Rigid Polyols, CASE, Blended Polyols**
- **3 Plants: Foshan, Ningbo, Yantai**
- **Total capacity: 300 kT/y base polyols**

# WH Base Polyols



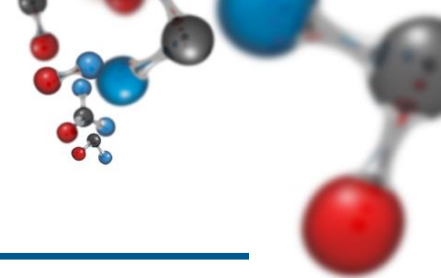
# WH Base Polyethers



Product	WANOL R6245
Appearance	Light yellow or yellow
Specific Gravity	1.10 ± 0.10
Viscosity (25°C mPa·s)	22000 ~ 30000
Water content (%)	< 0.20
PH Value	4.5 ~ 8
OHV (mgKOH/g)	450 ± 15

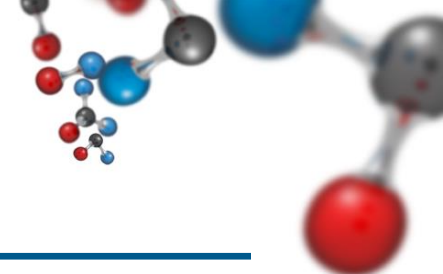


# Polymeric MDI - Basic grades

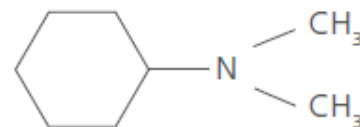


PRODUCT NAME	NCO% /wt%	Viscosity @25°C /mPa.s	Acidity /ppm max	Functionality	Description
ONGRONAT® 2100	31.0	200	300	2.7	Basic grade, SF polymeric MDI
ONGRONAT® 2300	31	400	300	2.8	Basic grade, MF polymeric MDI
ONGRONAT® 2510	30.5	600	300	2.9	Basic grade , HF polymeric MDI
ONGRONAT® 2700	30.5	1800	200	3.0	High viscosity pMDI

# PU Catalysts – ONGROCAT 6901



- Chemical formula:  $C_8H_{17}N$
- CAS No.: 98-94-2
- HS No.: 2921 3010
- Appearance: N,N-Dimethylcyclohexylamine is colourless liquid, with characteristic odour and good miscibility with most organic solvents. It has vigorous reaction with organic acids.



Specification		
Parameter	Unit	Requirements
N,N-Dimethylcyclohexylamine	wt. % min.	99.0
Water	wt. % max.	0.2

## Application

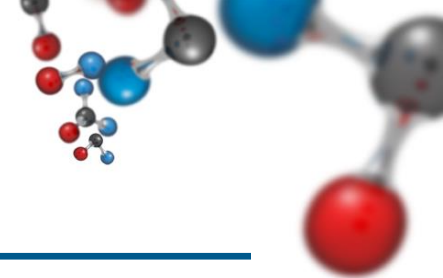
**PUR Catalyst** - Used primarily to promote the urethane (polyol - isocyanate) reaction in a wide range of rigid foam applications.

**Coatings** - wooden floors coatings  
Fuel Oil Additives

Packaging
truck tanks
steel barrels 175 kg
IBC 800 kg
ISO

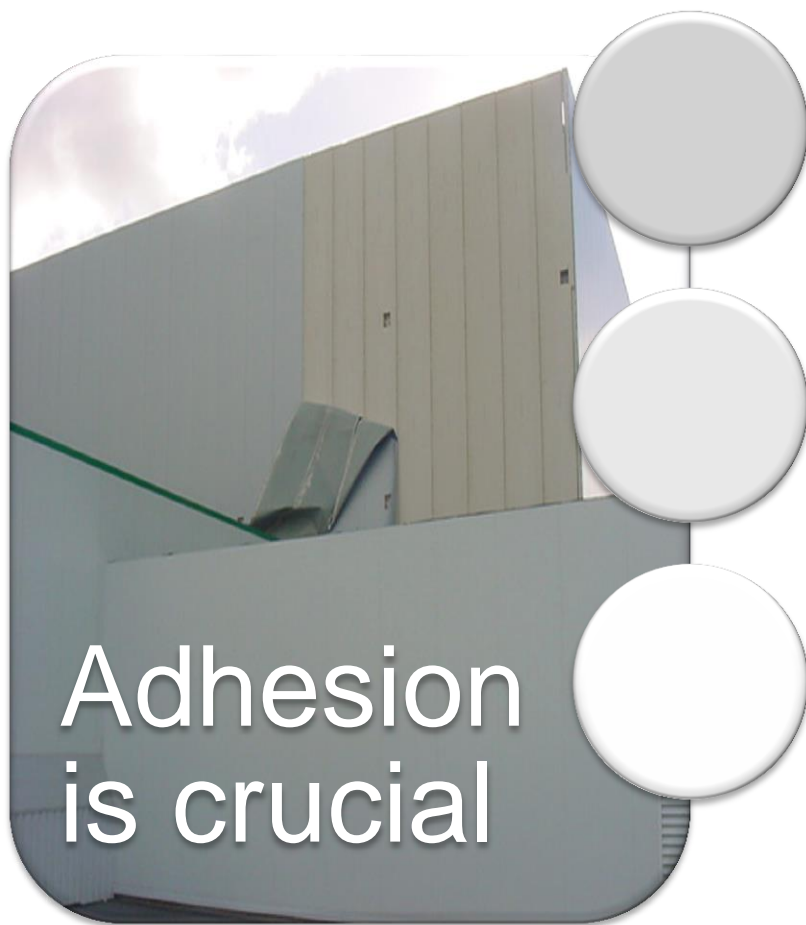
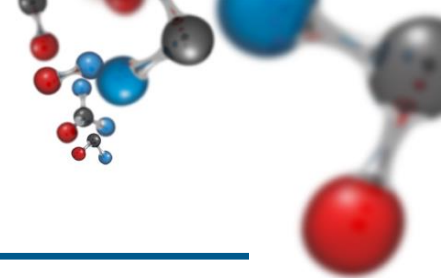


# PU Catalysts – New developments



Catalyst	Blow	Balance	Gel	Low Odor	Trimerisation	Product Description, Potential applications and Typical Benefits	Remark In cooperation with Wanhua
D303	★			★		Strong blow catalyst, lower odor than PMDETA	Planning
D306		★	★	★		Strong gelling catalyst with low odor, replace equivalent A33 directly. Greatly improved storage stability of polyol system	Planning
D304				★	★	Trimerisation catalyst for post-curing, improved surface cure and adhesion strength, low odor, suitable for non-tin system	Planning
D405		★		★		Substitution of DMCHA, low odor	Planning
C8R		★		★		Substitution of DMCHA, low odor	Planning
CP12					★	Trimerisation catalyst, smoother and balanced foaming rise profile for PIR and PUR system	Planning

# PIR – Adhesion Promoter

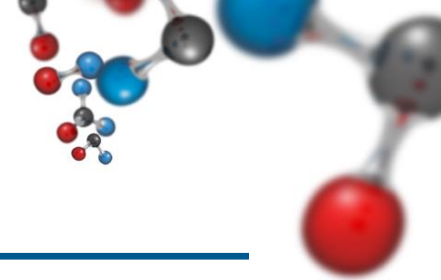


Ad. Promoter necessary

Proper Equipment is required

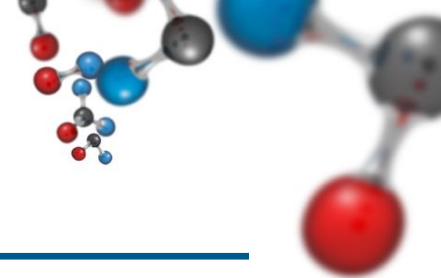
Wanhua-BorsodChem Solutions

# Formulated Polyols – Wanhua portfolio



Product Series	Normal Pentane Blowing system	
	<b>WANEFOAM® RNP2</b>	
Product Series Specification	Core Density: 33-43 kg/m <sup>3</sup>	
	Dimensional stability (-30°C, 48h): ≤ 1%	
	Dimensional stability (+80°C, 48h): ≤ 1.5%	
	Compressive Strength: ≥ 150 kPa	
Typical formula	RNP2000-A (4 components, Low Flame-Retardant System)	RNP2000-B (4 components, High Flame-Retardant System)

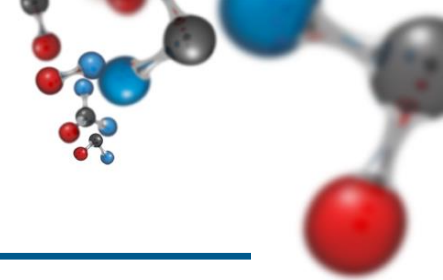
# Formulated Polyols – ONGROPUR® KT 6011



<b>Product Series</b>	<b>Normal Pentane Blowing system ONGROPUR® KT 6011</b>
<b>Product Series Specification</b>	Liquid Density: 37-40 kg/m <sup>3</sup>
	Viscosity (25°C): 700 – 1200 mPa
	Hydroxyl Value: 330 – 380 mgKOH/g
	Density (25°C): ≥ 1.06 – 1.01 g/cm <sup>3</sup>
<b>Typical formula</b>	Ongropur® KT 6011 Ongrocat 6901 N-Penatne Ongronat® 2510

# Conclusion

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## Self-Formulation

- **Flexibility**
- **Full Responsibility**
- **Support on formulating**
- **Benefit from Wanhua-BorsodChem product portfolio**



**Thank you for your attention!**



**Please Visit Our Websites:**  
[www.borsodchem-group.com](http://www.borsodchem-group.com)  
[www.whchem.com](http://www.whchem.com)

