



# PEP SET Technology

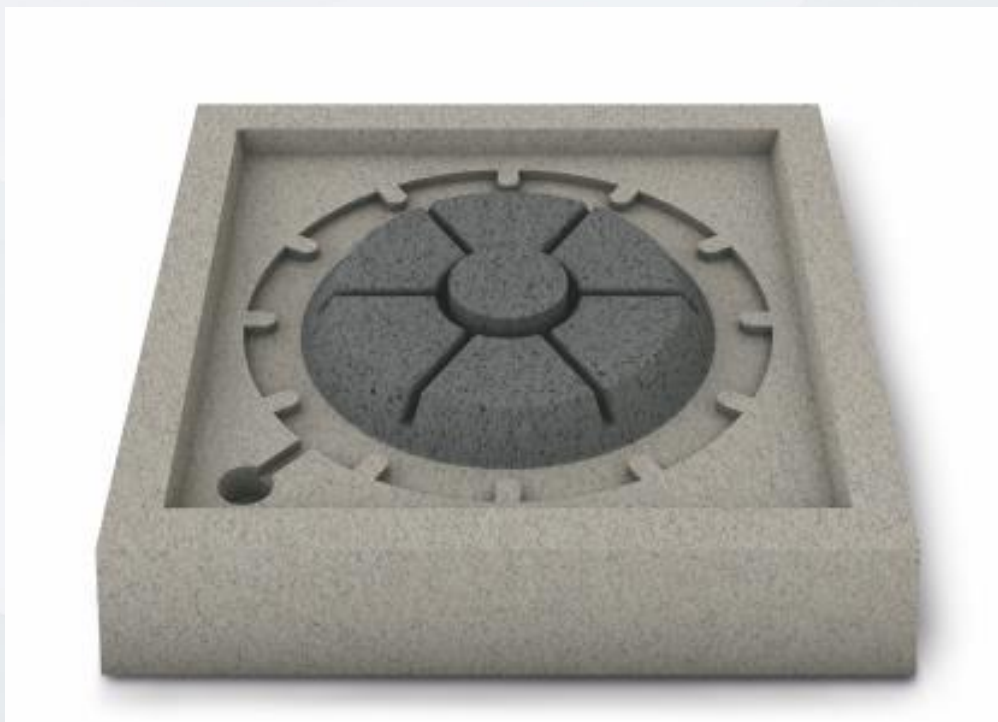
**Ecofriendly - PU NB Binder System**

PEP SET Silver

PEP SET Blue



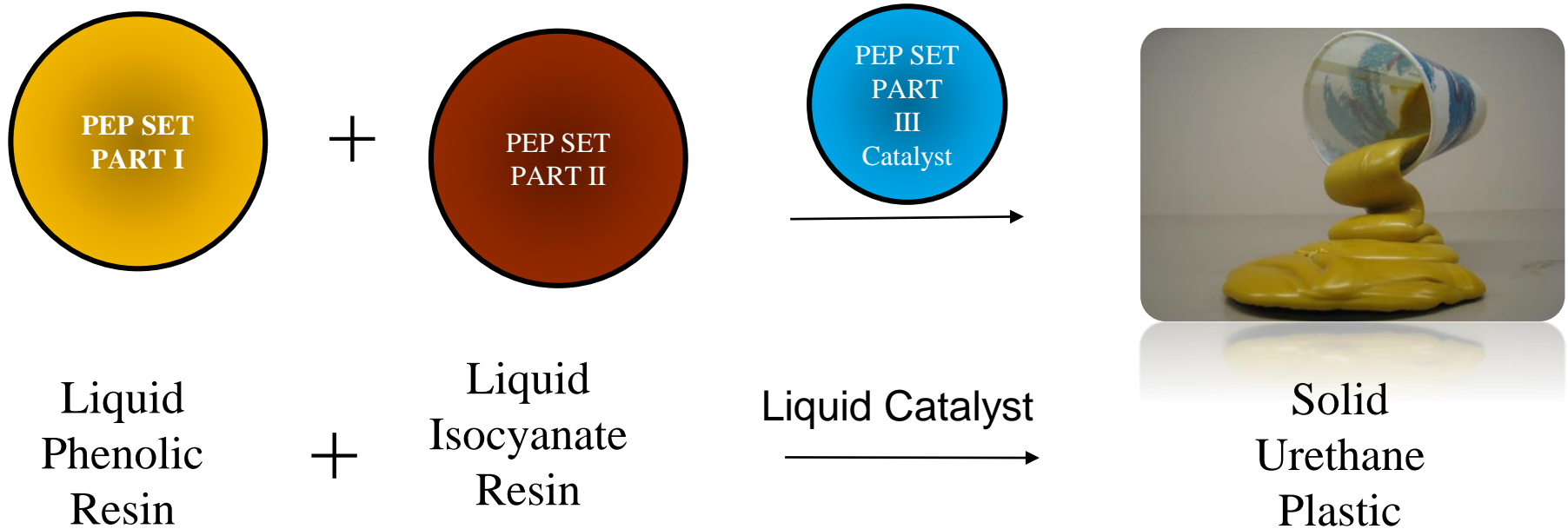
# 50 years ago Ashland invented the Polyurethane Binder Technology



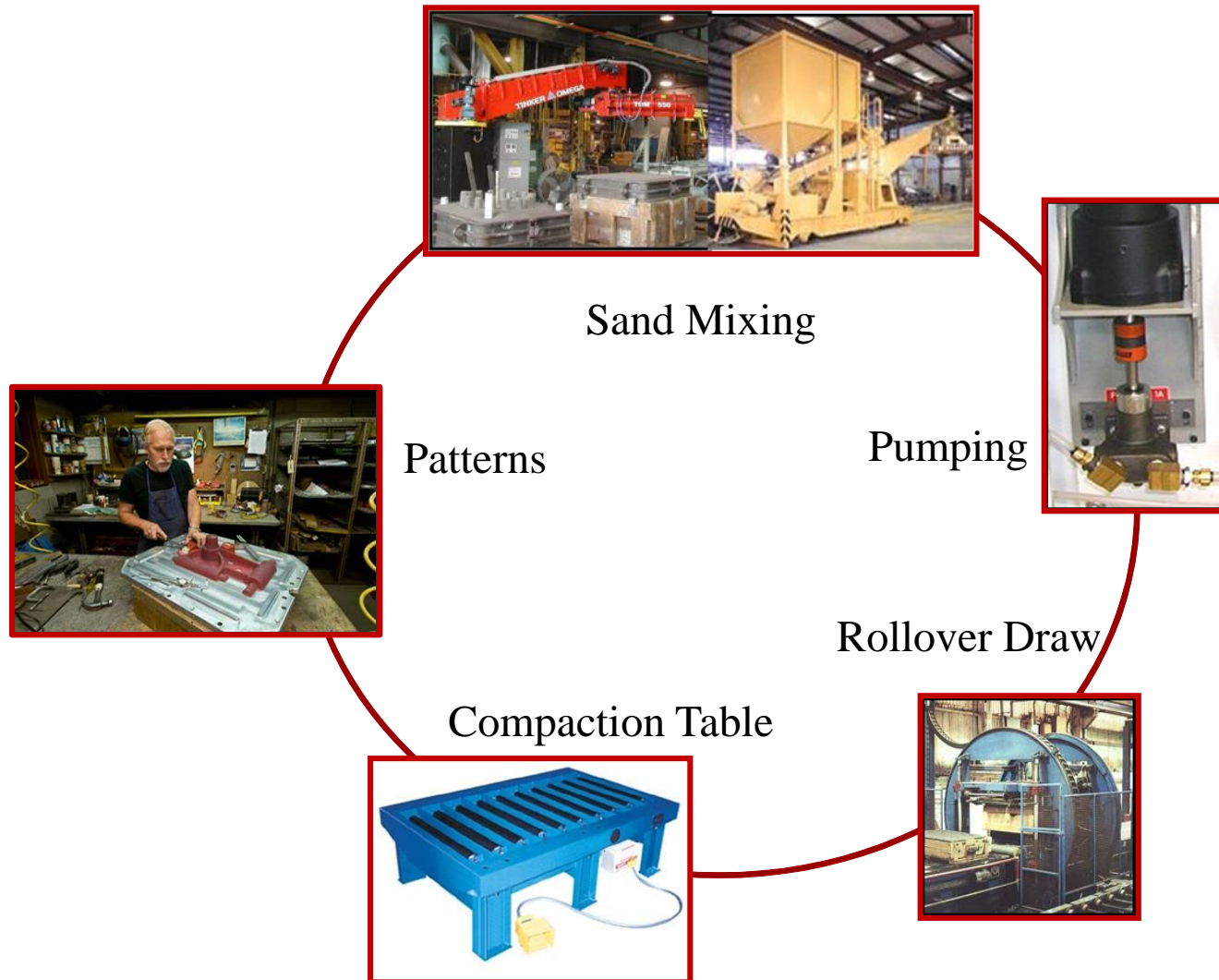
# PEP SET TECHNOLOGY



# BINDER COMPONENTS - CHEMICAL REACTION



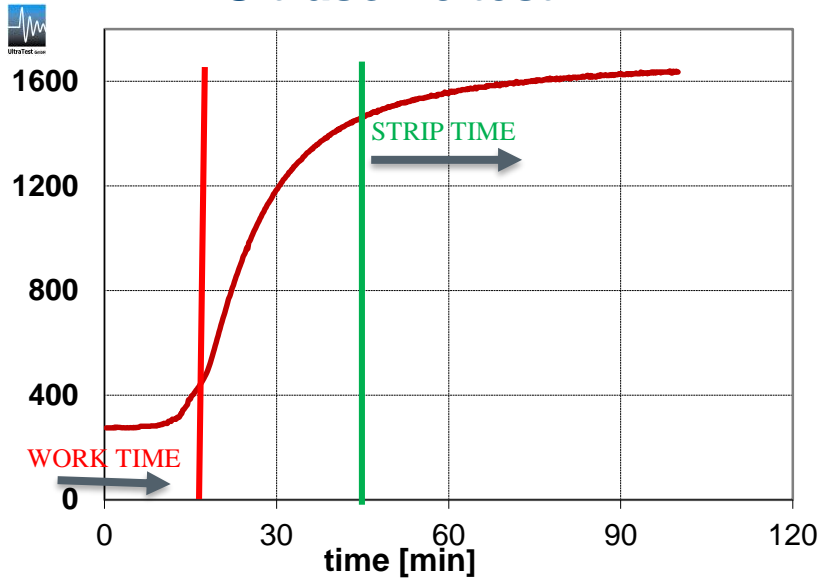
# PEP SET PROCESS - EQUIPMENT



# PEP SET PRODUCTIVITY BENEFITS

## WORK TIME – STRIP TIME CHART

### Ultrasonic test

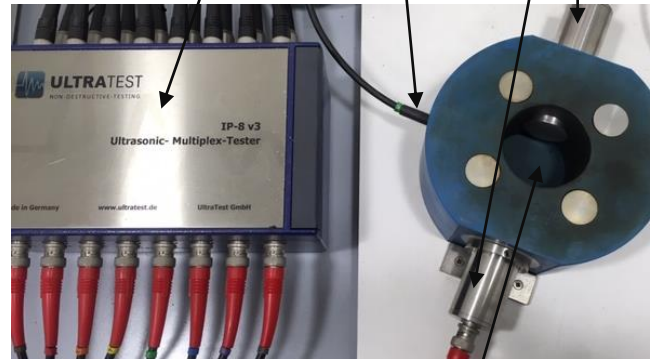
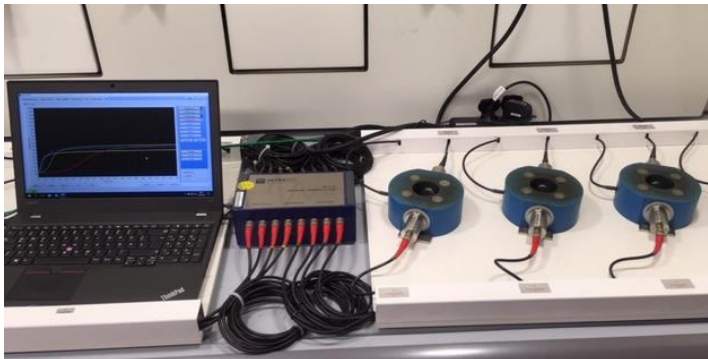


### WORK TIME:

The time period after the mixed sand leaves the mixer up until it starts to develop “body”. The curing reaction remains latent during work time. Chemical bonds begin to form after the sand begins to develop body. All worker related activities (filling, tucking, ramming, rebar, hooks, etc.) should occur during work time.

### STRIP TIME:

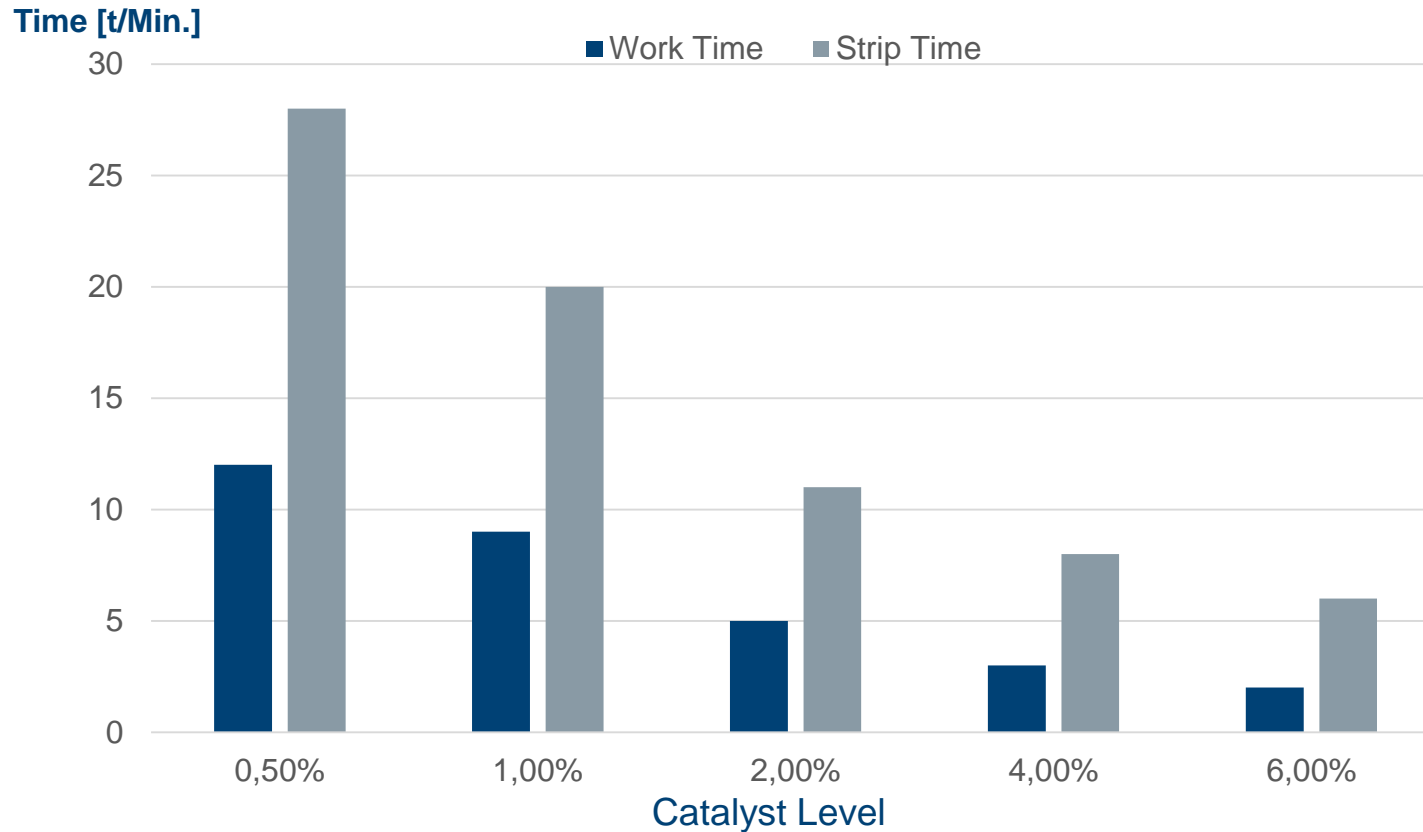
The time period after the sand begins to develop body up until the mold or core is sufficiently cured such that it can be removed from the pattern. The rapid PEP SET curing reaction takes place during strip time. 95% of the chemical bonds have been formed at strip time. The mold or core still remains slightly pliable / flexible at the end of strip time and can be easily removed from the pattern.



Measurement chamber



# PEP SET PRODUCTIVITY BENEFITS ADJUSTMENT DER REACTIVITY

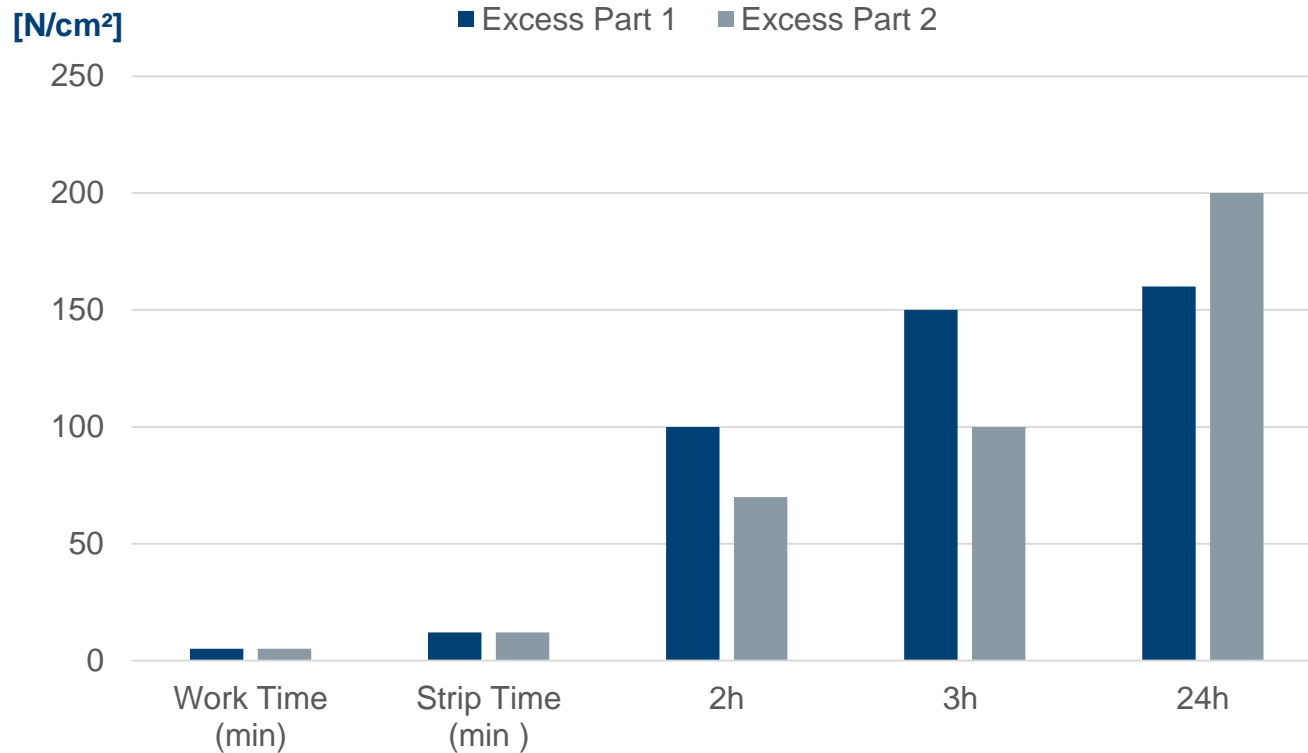


1. Simple adjustment in catalyst levels changes speed
  - a) Account for sand temperature, mold size, etc.
2. Slope is not always linear
  - a) Dependent on speed of cure, catalyst type, etc.





# PEP SET PRODUCTIVITY BENEFITS RATIO PART1 - PART 2

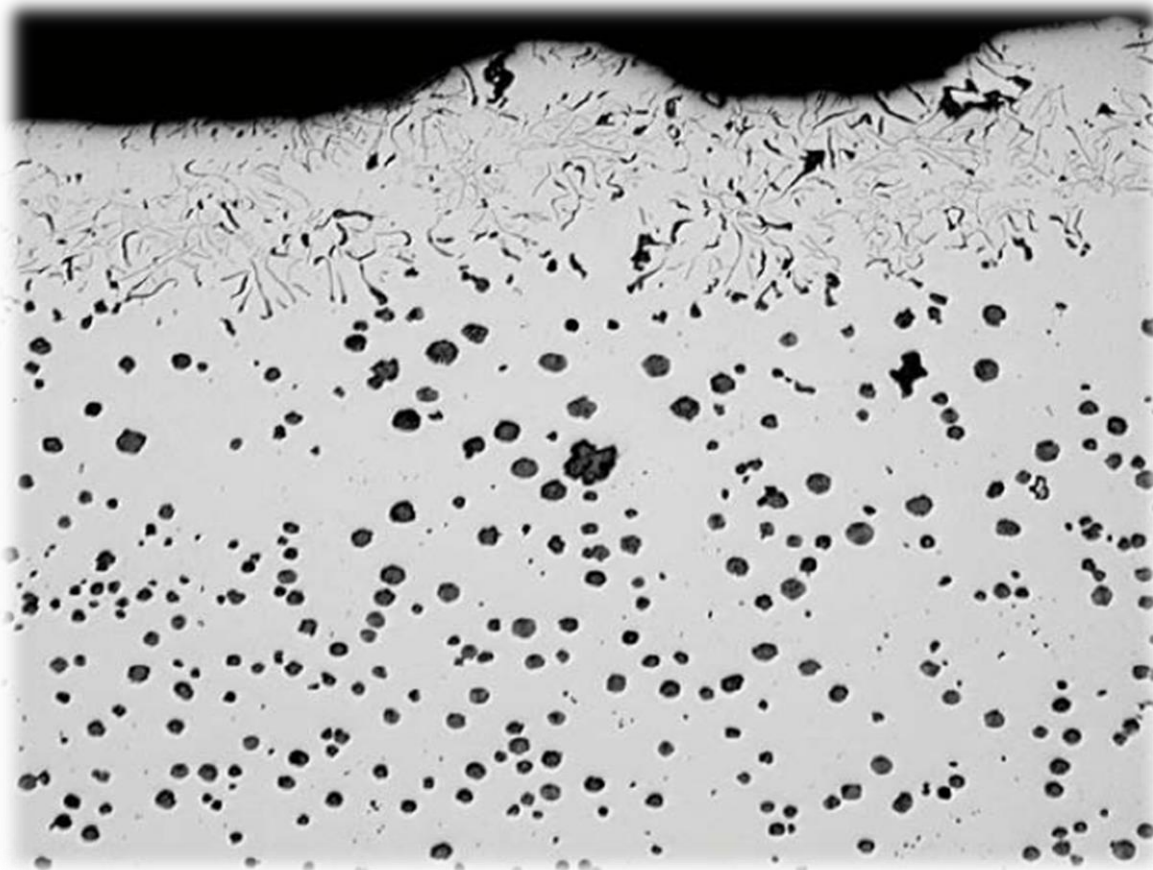


1. Ratio Part 1 to Part 2 can impact core & mold properties
  - a) Strength
  - b) Plasticity





# PEP SET CASTING BENEFITS SULFUR ELIMINATION



1. Acid Cured Furan @ 1.00% Binder Level
  - a) 30% of a Typical 65% TSA Catalyst
  - b) 0.03 – 0.04% Sulfur @ Mold / Metal Interface
  - c) Much More with Reclaimed Sand
2. PEP SET = 0% Sulfur



## PEP SET CASTING BENEFITS CASTING SURFACE



Furan resin



PEP SET binder



## SHORT SUMMARY

1. Good casting surface
2. Good shake-out properties
3. High strength
4. Very good flow ability of the mixed sand
5. Curing speed is largely unaffected by temperature
6. Use of mechanically reclaimed sand possible
7. Compatible with other processes



# PEP SET PORTFOLIO



# PEP SET PRODUCTIVITY BENEFITS PORTFOLIO



Strength

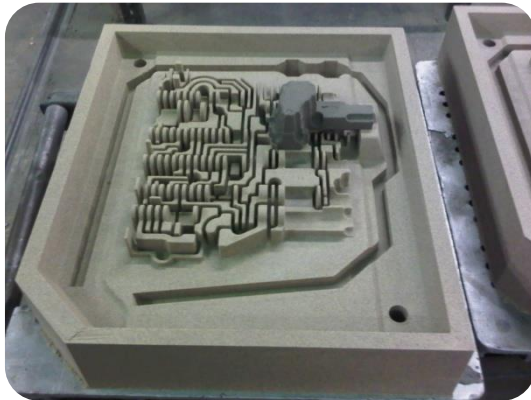
PEP SET  
Standard

PEP SET  
QUANTUM

PEP SET  
Silver

PEP SET  
Blue

PEP SET  
5000 Series  
Light Metal  
Shakeout



Flowability



Shakeout



# PEP SET BENEFITS

## Pep Set Standard

- ✓ Good casting surface
- ✓ Good shake-out properties
- ✓ High strength
- ✓ Very good flow ability of the mixed sand
- ✓ Curing speed is largely unaffected by temperature
- ✓ Use of mechanically reclaimed sand possible
- ✓ Compatible with other processes

## Pep Set Quantum (additional)

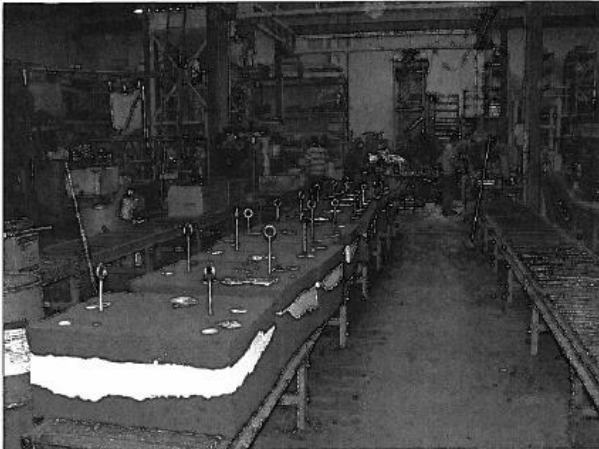
- ✓ Low Emissions (odor and smoke)





# PEP SET QUANTUM LOW SMOKE & ODOR

## PRODUCT INNOVATIONS



Morel Industries began using the Pep Set Quantum low-odor no-bake binder series in October 2008.

### Low Odor Binder System Improves Neighbor Relations

It wasn't long after Morel Industries, Seattle, moved into its new facility in 2008 that complaints about odor began filtering in from nearby residents. After the metal-caster switched to ASK Chemical's low-odor no-bake binder system Pep Set Quantum 4140/6140, the same residents congratulated the company for being a good neighbor.

When owners Steve and Mark Morel first heard the complaints, they contacted local environmental and business agencies to find ways to reduce or eliminate the odor.

"We took every complaint seriously," Steve Morel said. "We shut all our doors and put in a dilution fan."

While the fan helped to a degree,

the neighbors reported they could still smell the odor.

"It really came to a head in mid-September of 2008," Morel said. "We had to do something."

The company's binder supplier representative told the Morel brothers about ASK's new Quantum series of binders, which is designed to have a low odor at mixing and pouring, as well as low smoke generation during pouring while maintaining the tensile strength of traditional Pep Set binders. According to ASK, the system provides the lowest generation of hazardous air pollutants of any current Pep Set binder system, has undetectable free formaldehyde and is a low free phenol system.

Morel Industries poured its first trial molds with the Quantum binder on Oct. 1, 2008, side by side with molds produced with the Pep Set binder it had been using for eight years. Representatives from Puget Sound Clean Air Agency also were present to witness the results. "We noticed a significant difference in odor and smoke right away," Morel said. "It was night and day."

According to Morel, while the new binder greatly affected the working environment, production was nearly unchanged.

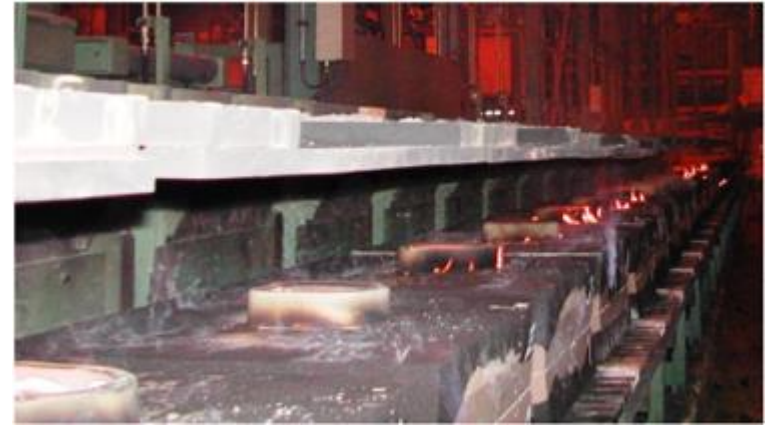
"Since 2008, (ASK) has reformulated the binder," he said. "And it has reduced odor and smoke generation even further."

Visit [www.ask-chemicals.com](http://www.ask-chemicals.com) for more information.

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## PEP SET QUANTUM

Developed by  
ASK Chemicals.



PEP SET Quantum



Competitive product

**ASKCHEMICALS**  
We advance your casting



# PEP SET SILVER

## ENVIROMENT-FRIENDLY PEP SET BINDER



# THE USUAL COMPONENTS OF A PEP SET FORMULATION

## PEP SET SILVER



### Ingredients:

- Base: Formaldehyde-Phenol-Resin / MDI
- Solvents with low EHS impact
- Aromatic Solvents
- Additives
- **Monomers (phenol/formaldehyde)**

### DANGER PICTOGRAMS



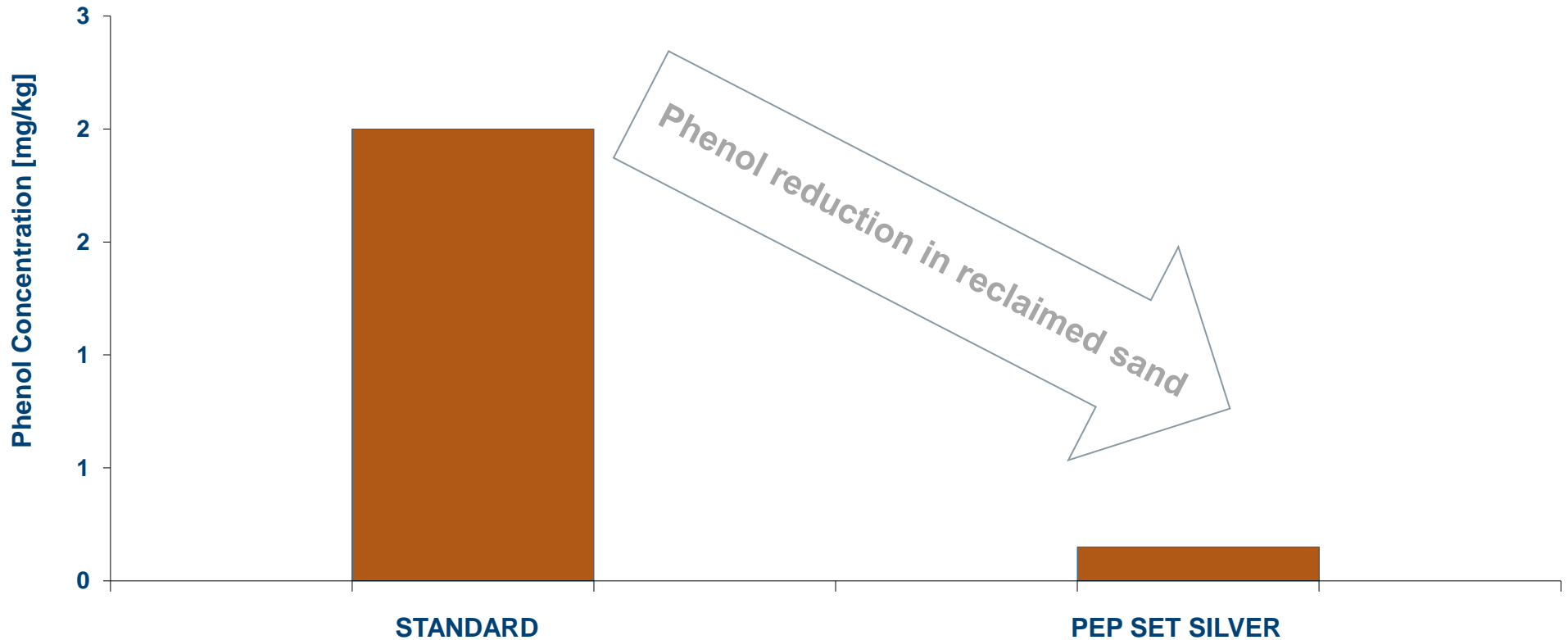
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- Additives

### DANGER PICTOGRAMS



# PEP SET SILVER – PHENOL CONTENT IN RECLAIMED SAND



# PEP SET SILVER – ADVANTAGES AT GLANCE

Benefits	Features	Application
<ul style="list-style-type: none"> <li>• Significant reduction of smoke</li> <li>• Reduction of hazardous air pollution</li> <li>• Reduction of <b>free phenol</b> in reclaimed sand</li> <li>• Improved community relations and worker environment</li> </ul>	<ul style="list-style-type: none"> <li>• Low odor / low smoke / <b>low free phenol</b> system</li> <li>• Reduced of <b>phenol level pollution</b></li> <li>• Fast strip time and good through-cure</li> <li>• Good strength on new and mechanically reclaimed sand</li> </ul>	<ul style="list-style-type: none"> <li>• Aluminum, iron and steel casting</li> <li>• High productivity / high productivity PU NB SYSTEM</li> <li>• Small and medium castings</li> </ul>



# PEP SET BLUE

## LOW EMISSION PEP SET BINDER





# THE USUAL COMPONENTS OF A PEP SET FORMULATION

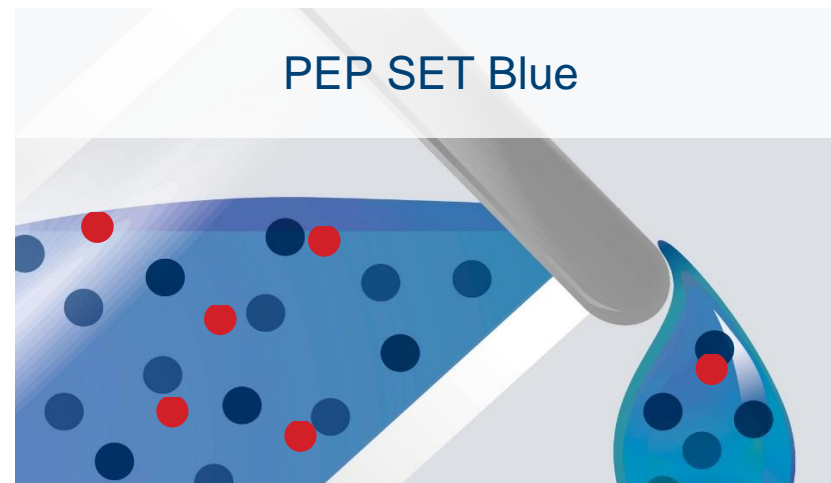
## PEP SET BLUE



### Ingredients:

- Base: Formaldehyde-Phenol-Resin / MDI
- Solvents with low EHS impact
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- Additives
- **Monomers (phenol/formaldehyde)**

### DANGER PICTOGRAMS



### Ingredients:

- Base: Formaldehyde-Phenol-Resin / MDI
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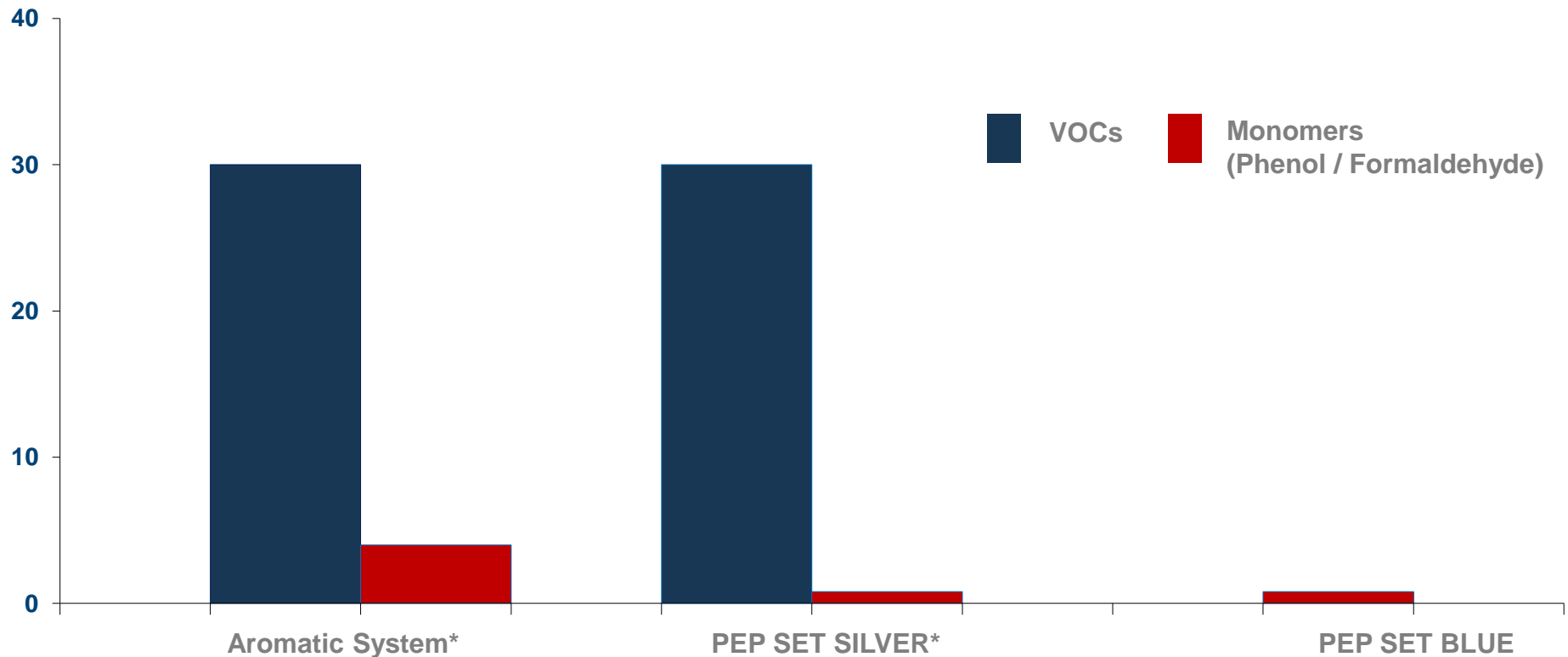
### DANGER PICTOGRAMS

#### Part 1: NO PICTOGRAMS



# PEP SET – EVAPORATION OF VOLATILE COMPOUNDS

## TYPICAL FORMULATIONS



\*) Formulation; contains 30% of aromatic solvent (part 1/part 2)



## PEP SET BLUE – ADVANTAGES AT GLANCE

### Benefits

- Reduction of hazardous air pollution as BTX
- Reduction of **free phenol** in reclaimed sand
- Improved community relations and worker environment

### Features

- Low odor / **low free phenol / low Formaldehyde / free aromatic** system
- Reduced level of **pollution**
- Good strength

### Application

- Aluminum, iron and steel casting
- Small and medium castings



# ECOFRIENDLY PEP SET TECHNOLOGY

## PEP SET QUANTUM



### Advantages :

- Free Phenol <5%
- Free Formaldehyde <0,1%
- Low Smoke/low smell
- High sand performances

### Drawbacks :

- Labelling similar to serial



### Advantages :

- Free Phenol <1%
- Free Formaldehyde <0,1%
- No Heath Hazard labelling
- Low Smoke/low smell
- High sand performances

### Possible Drawbacks :

- VOC's (aromatics)



Part 1: **NO** pictograms

### Advantages :

- Free Phenol <1%
- Free Formaldehyde <0,1%
- No Labelling **Part 1**
- Low smell

### Possible Drawbacks :

- Smoke





**THANK YOU!**