HA International

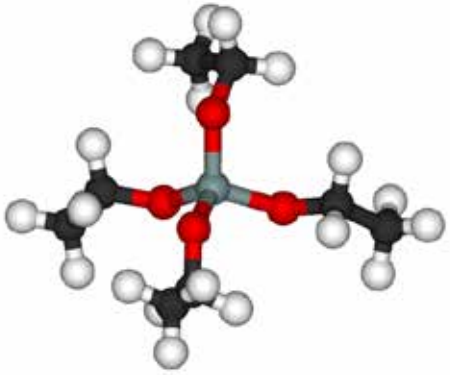
BioSet T

BioSet T8000/T8500 PUNB binder system was developed specifically to improve the foundry environment by:

ü Reducing smoke and odor during pouring, cooling and shakeout

ü Reducing Hazardous Air Pollutant (HAP) emissions

BioSet T8000/T8500 accomplishes this by using a new, non-hazardous, patented silica-based solvent in combination with bio-based methyl ester solvents.



Phenolic Urethane Targeted Strategy (Good, Better, Best)

System	Emissions
BioSet T8000Pt1/T8500 Pt2	**Best** Greatest environmental benefit with lowered resin levels, 35% reduction in HAPs and lowest smoke and odor at PCS
Hybrid BioSet T8000 Pt1/Techniset 6435 Pt2	**Better** Reduced resin usage with 15% reduction in HAPs and lower smoke and odor at PCS
Conventional System Techniset F6000 Pt1/6435 Pt2	**Good** Typical PUNB Performance and Emissions

Advantages over conventional PUNB systems:

- ü Lower odor and smoke during pouring, cooling and shakeout
- ü Very low HAPs, low free formaldehyde
- ü Faster and higher strength development
- ü Similar work time/strip time as conventional systems

Benefits of using the Bioset T System:

- ü Reduction in smoke and odor
- ü Reduced emissions
- ü Faster handling of cores and molds due to fast strength development
- ü Possible reductions in binder level up to 15%**

will vary and depend greatly on individual foundry's sand makeup.

Online Value and Environmental Impact Calculator for BioSet T

Customer can enter their resin and pricing

Calculates cost savings and HAP reductions

Calculate the Impact of using BioSetT
Enter Your Information in the Yellow Boxes

Current System

Current System	Annual Sand Usage (ton)	75,000	Part 2 Resin Type	Low Solids
	Current Total Binder Content (%)	1.80%	Part 1 Ratio	60%
	Current Part 1 Binder Cost/lb	$1.55	Part 2 ratio	40%
	Current Part 2 Binder Cost/lb	$1.45	% Catalyst (based on Pt1)	8%
	Current Catalyst Cost/lb	$2.73		
	Total Binder Reduction For BioSet Systems	3%	Your New Binder Level	1.75%
Hybrid System	BioSet T8000 Pt 1 Quoted Price/lb	$1.65	Part 1 Ratio	60%
	Hybrid 6435 Pt 2 Quoted Price/lb	$1.45	Part 2 ratio	40%
	Catalyst Quoted Price/lb	$2.73	% Catalyst (based on Pt1)	6%
BioSet T	BioSet T8000 Pt 1 Quoted Price/lb	$1.65	Part 1 Ratio	60%
	BioSet T8500 Pt 2 Quoted Price/lb	$1.55	Part 2 ratio	40%
	Catalyst Quoted Price/lb	$2.73	% Catalyst	6%

	System	Price Difference per Ton Mixed Sand	Your Annual Emitted HAPs (Pounds)	Your Annualized Difference in Price
Current System	Conventional System Techniset F6000Pt1/Low Solids Pt2		163,134	
Hybrid System	Hybrid System BioSet T8000 Pt1/Techniset 6435 Pt2 Reduction in HAPs by 22.2%	-$0.82	126,864	-$61,583
BioSet T	BioSet T8000 Pt1/T8500 Pt2 Reduction in HAPs by 33.5%	$0.58	108,427	$43,177

*This calculator provides an estimated comparison of HAP reduction vs.costs. Although the information represented here is based on laboratory and field trial data, actual HAP and binder reduction will vary.

Print Ad Example

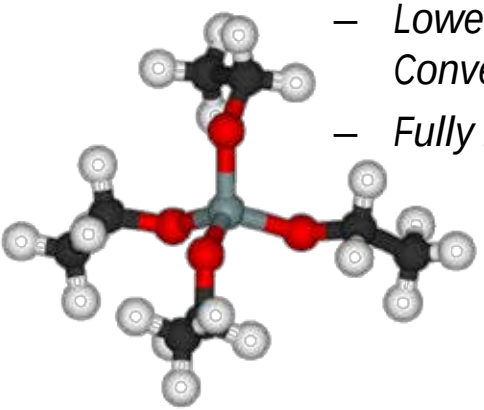
TEOS Solvent Application

- In North America, TEOS has recently been introduced in no-bake applications
- Already in widespread use in Europe for nearly ten (10) years
  - *10-15% of all UCB systems sold in Germany*

Its primary benefit and advantage is smoke & odor reduction at pouring, cooling and shakeout

TEOS-based UNB's

- Key product characteristics:
  - *Replaces aromatic solvents in Part 1 & 2 with TEOS*
  - *Provides excellent strength development and reactivity*
  - *Uses existing Activators/Catalysts*
  - *Performs on a variety of different sands, including new and reclaimed*
  - *Very low smoke and odor at pouring*
  - *Lower HAP generation than Conventional UNB*
  - *Fully mechanical reclaimable*



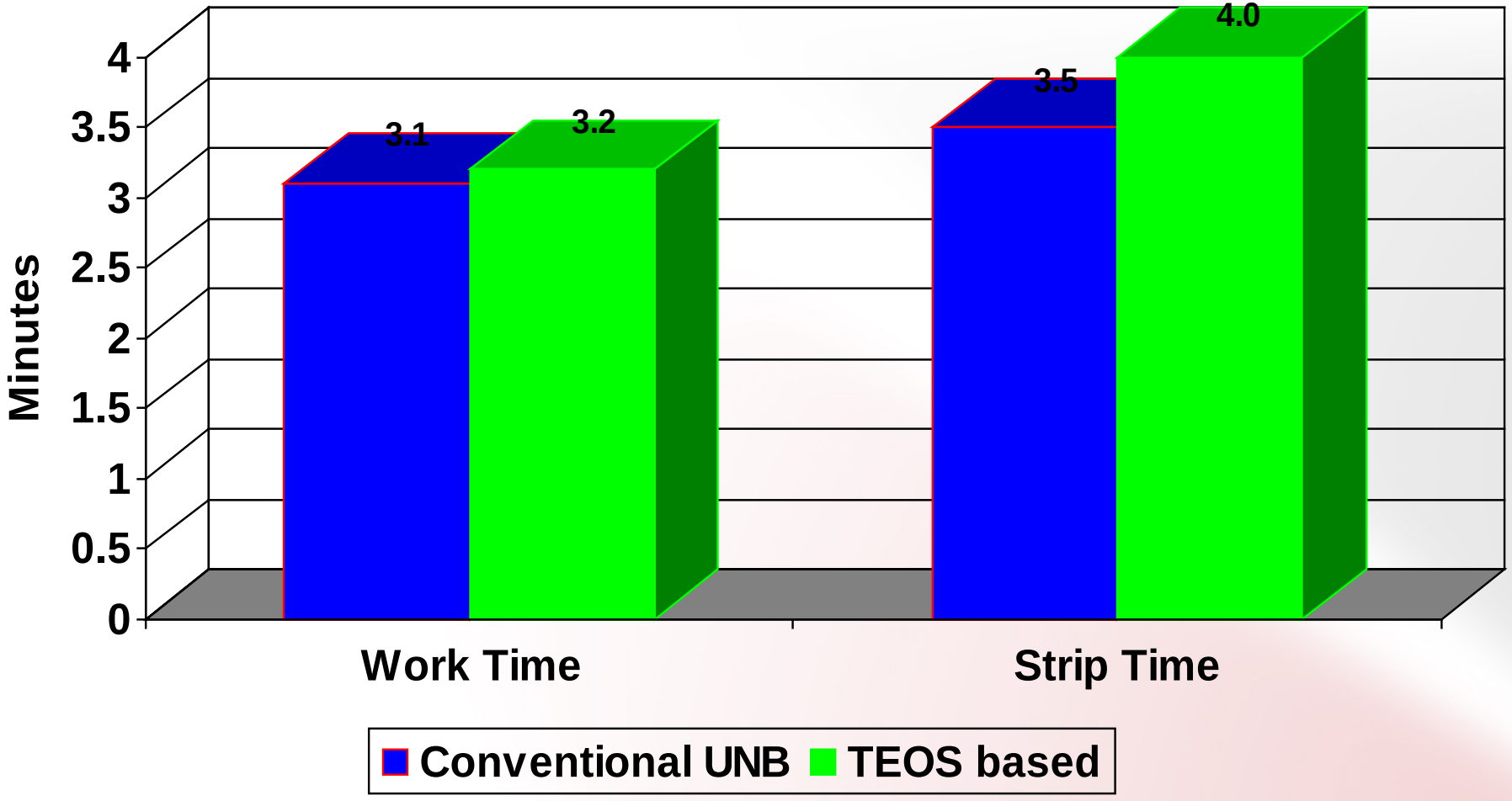
Conventional UNB

TEOS UNB

Work and Strip Time

Conventional vs. TEOS based UNB

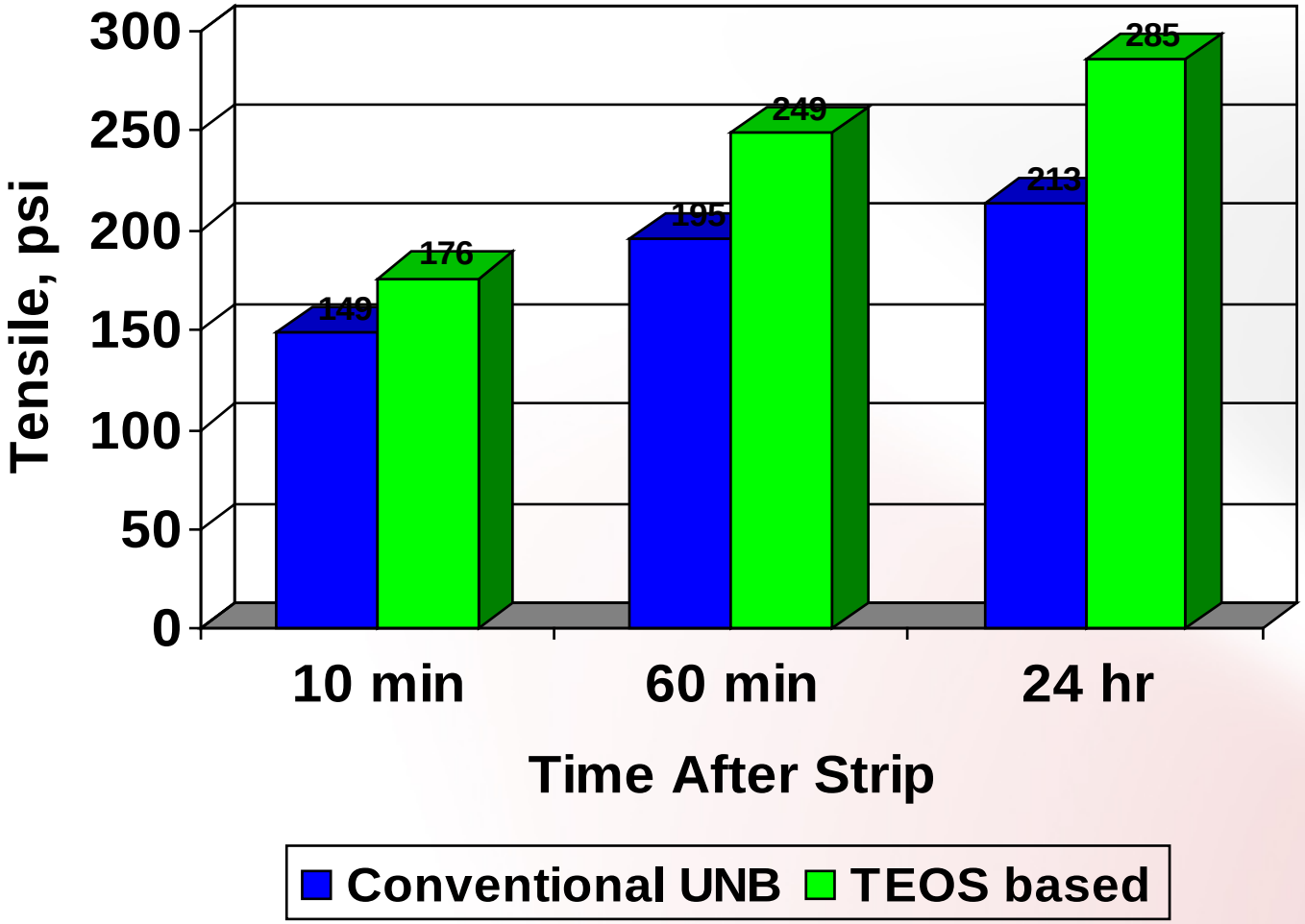
New Silica, 1% Resin – 55/45 Pt1:Pt2



Strength Performance - New Sand

Conventional vs. TEOS based UNB

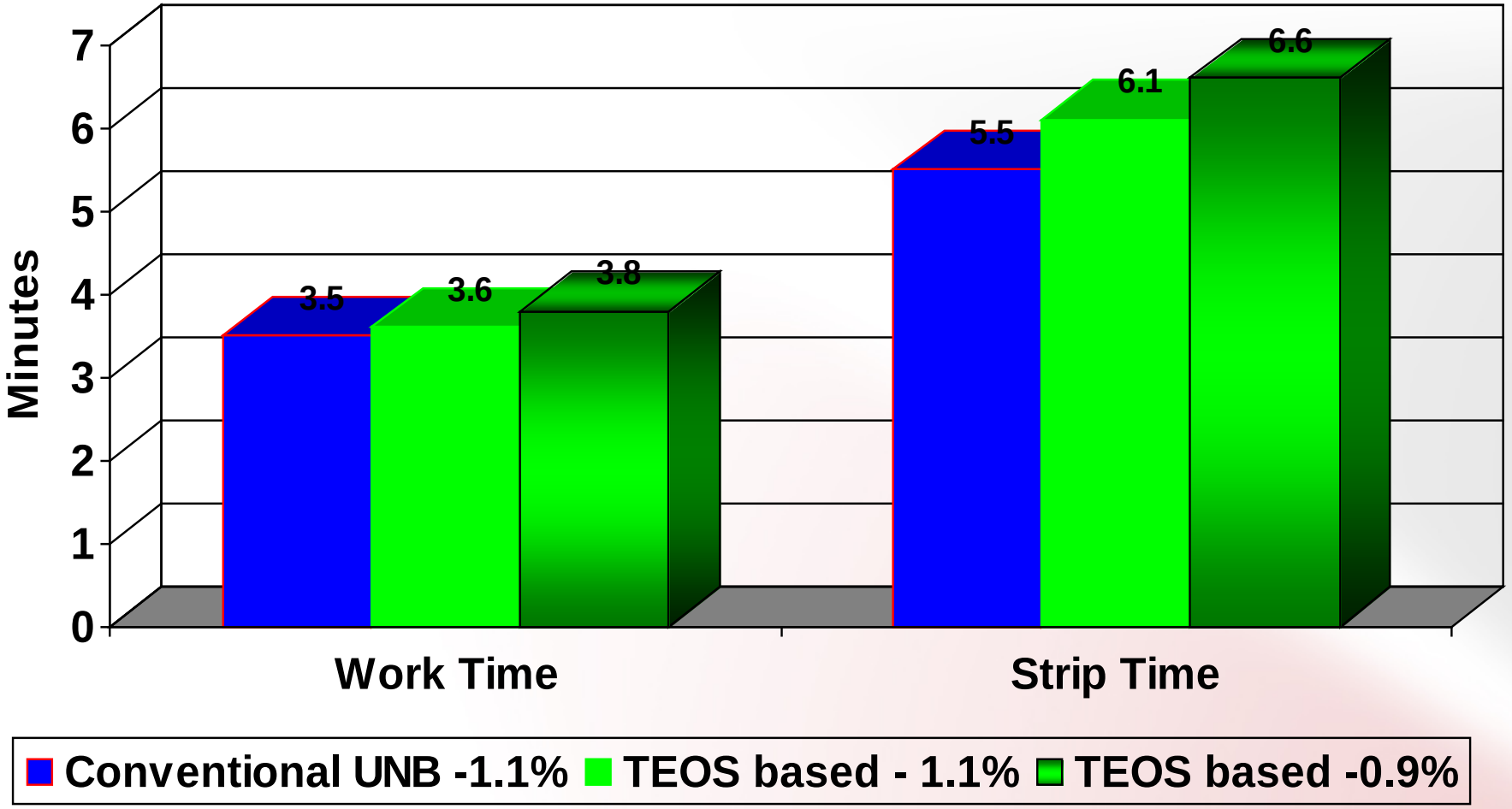
New Silica, 1% Resin – 55/45 Pt1:Pt2



Work and Strip Time - Mechanically Reclaimed

Conventional vs. TEOS based UNB

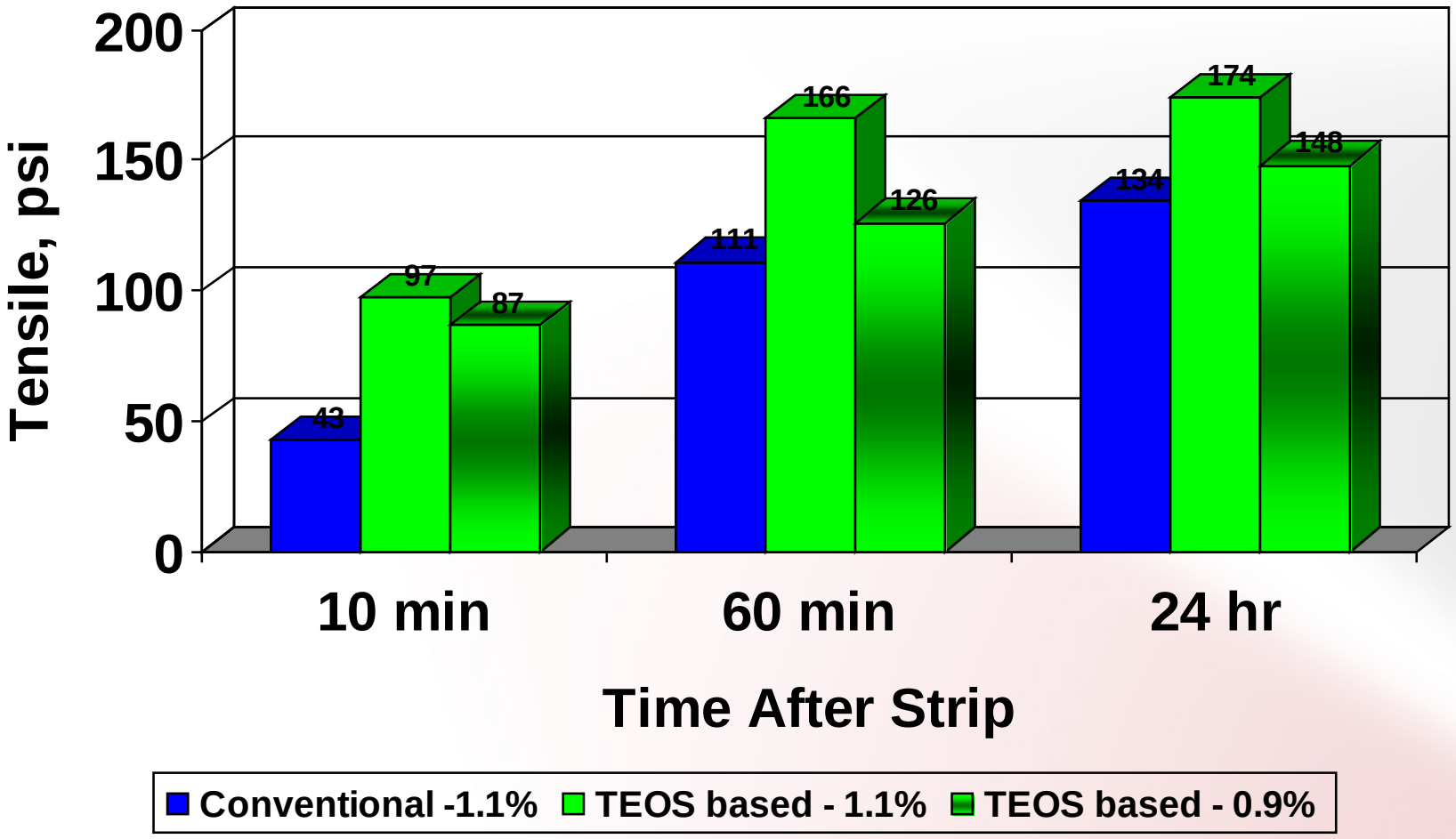
Resin level - varies, 60/40 Pt1:Pt2



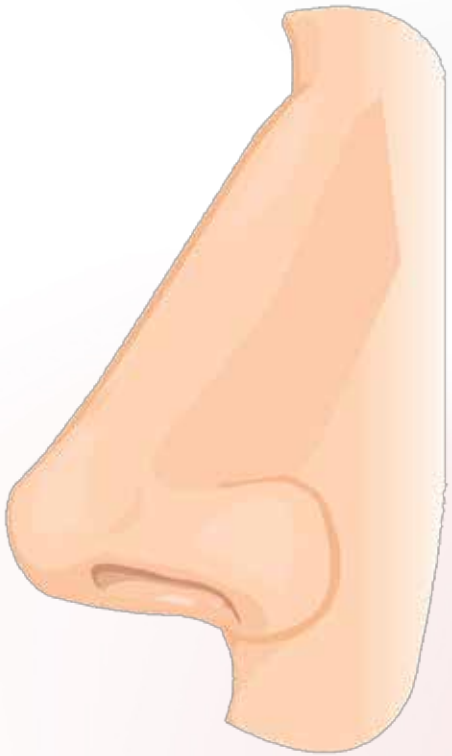
Performance - Mechanically Reclaimed

Conventional vs. TEOS based UNB

Resin level - varies, 60/40 Pt1:Pt2



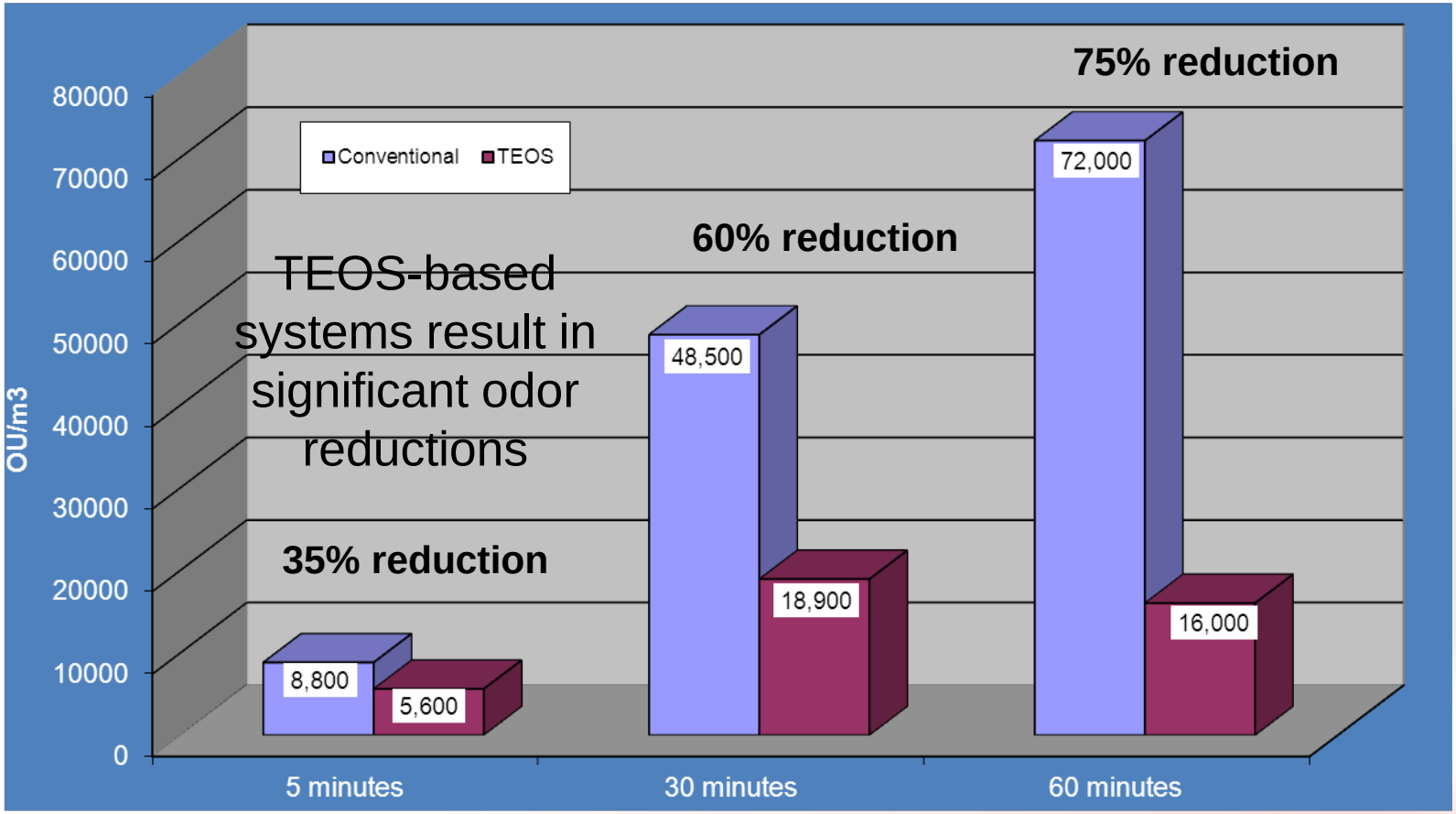
The Nose Knows



Overview of Odor Measurements

Odor measurements (olfactometry) using a close-to-practice test sample at the Institute for Foundry Technology (IFG)

Odor Comparison
Conventional vs. TEOS UCB Systems

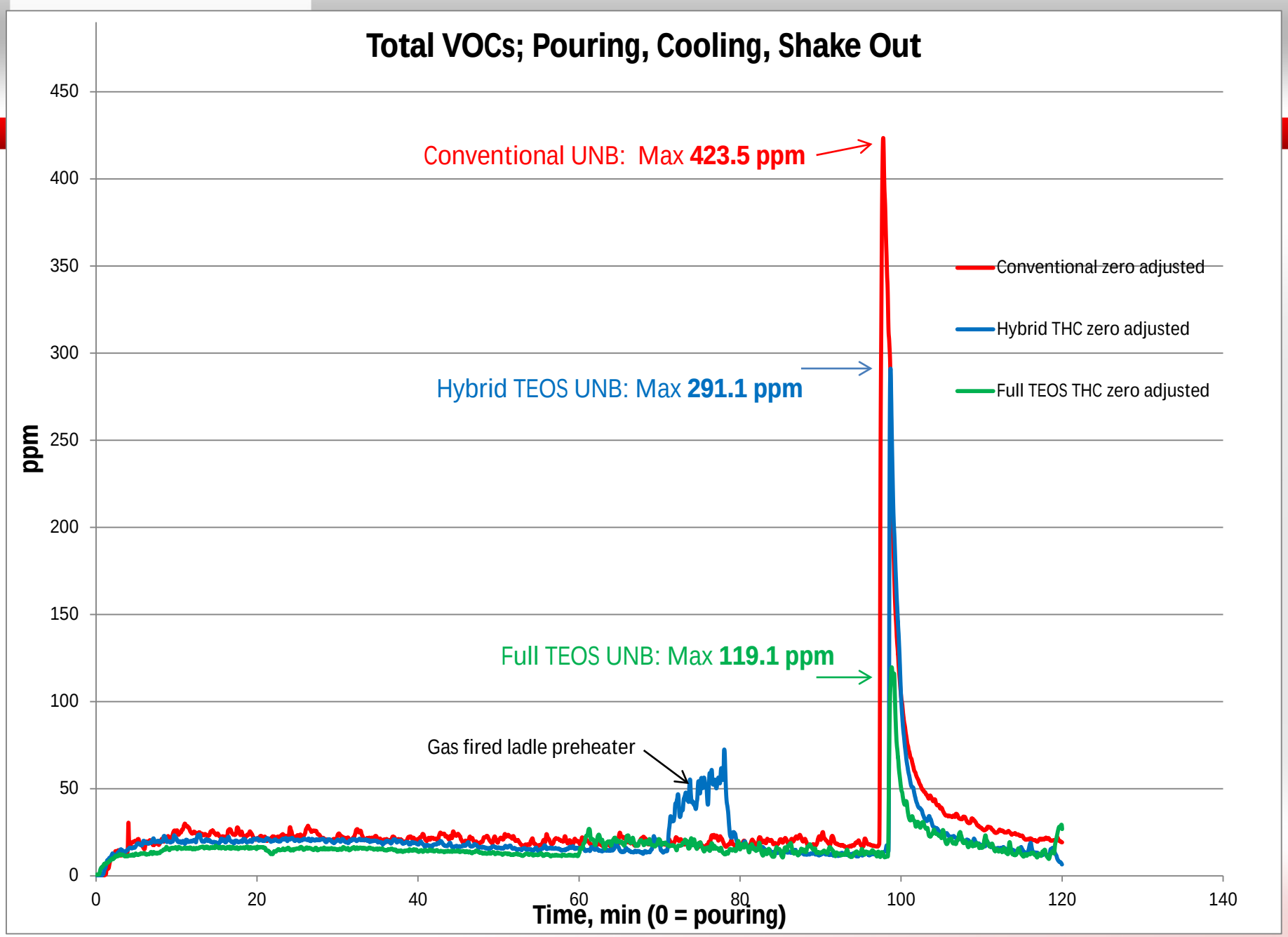


Emissions Testing

- Emissions at PC&S were measured at UNI Metal Casting Center
- Used improved methodology
- Three systems compared:
  - *Conventional UNB*
  - *Hybrid TEOS Part 1 / Conventional Part 2*
  - *Full TEOS UNB*

Pouring, Cooling & Shakeout

- Real Time VOC Measurement
  - Hybrid TEOS Part 1 / Conventional Part 2
    - *27% reduction in Total Hydrocarbons (THCs)*
  - Full TEOS UNB
    - *42% reduction in THCs*


Total VOCs; Pouring, Cooling, Shake Out
Conventional UNB: Max 423.5 ppm
Hybrid TEOS UNB: Max 291.1 ppm
Full TEOS UNB: Max 119.1 ppm
Gas fired ladle preheater
Conventional zero adjusted
Hybrid THC zero adjusted
Full TEOS THC zero adjusted
ppm
Time, min (0 = pouring)
0
50
100
150
200
250
300
350
400
450
0
20
40
60
80
100
120
140

Frequently Asked Questions

Will we really see reduced binder levels?
- Reduction in binder level will vary depending on each foundry's sand makeup. Tests have shown that if the sand conditions are good, lower binders up to 15% percent are possible. High levels of fines in the sand will require greater resin levels in general due to greater surface area and therefore will limit the amount of reduction possible. HAI can test your sand in our laboratory and give an estimate of the overall benefits of using BioSet T.

Does this system work with sand reclamation?
- Our field trials have shown that the BioSet T system is similar to conventional with regards to reclamation.

How does BioSet T perform compared to conventional systems.
- Work time and strip time are similar, and the BioSet T develops tensile strength faster and to a greater level than a conventional PUNB system.

Frequently Asked Questions

Does the system smoke?

- Dramatic reduction in smoke
- Small amount of white smoke observed after pouring; dissipates quickly

Is the system odorless?

- Dramatic reduction in odor at pouring
- Different, less persistent odor during coring and molding

Effect of lower flash point compared to conventional UNB‘s – does it make a difference, if yes how?

- No issues in practice with flash point

Summary

- Key product characteristics:
  - *Very low smoke and odor at pouring*
  - *Lower HAP generation than Conventional UNB*
  - *Provides excellent strength development and reactivity*
    - *Resin level reduction*
  - *Uses existing Activators/Catalysts*
  - *Fully mechanically reclaimable*