



# Jiangsu Yoke Technology



## **PhireGuard ELF-800 / 808** *Marketing Presentation*

# PhireGuard ELF-800 Characteristics

- Oligomeric Chlorinated Diphosphate Esters
- low Fogging and VOC's
- Compatible with Polyether and Polyester-based Urethane technologies
- Miscible in polyol blends
- Enhanced fire properties over wide range of foam density
- Offer durable Fire Protection (no Migration)

# PhireGuard ELF-800 Key Properties

- Appearance: Clear Liquid
- Viscosity: # 4000 mPa.s
- Phosphorus Content = 9.7 wt%
- Chlorine Content > 33.3 wt%
- Acidity: < 0.1 mgKOH/g
- Water Content: < 0.1 wt%
- Colour APHA: < 400
- OH value (Water and Acid excluded): 0 mgKOH/g
- Non Reactive

# PhireGuard ELF-808 Key Properties

## Low Viscosity version of ELF-800

- Appearance: Clear Liquid
- Viscosity: # 2000 mPa.s
- Phosphorus Content = 9.5 wt%
- Chlorine Content = 31 wt%
- Acidity: < 0.1 mgKOH/g
- Water Content: < 0.1 wt%
- Colour APHA: < 400
- OH value (Water and Acid excluded): 0 mgKOH/g
- Non Reactive

# PhireGuard ELF-800 Value Proposition

- New FR Technology
- By Product TCPP, i.e. < 1%
- Enhanced Emission (VOC's, Fogging) performance
- Compatible with most Fire Safety Standards:
  - BS 5852 Crib 5
  - Cal TB 117
  - UL-94
  - FMVSS
- High molecular weight, non “fugitive” FR, meaning that ELF-800 provide the flexible PU foam with durable fire protection

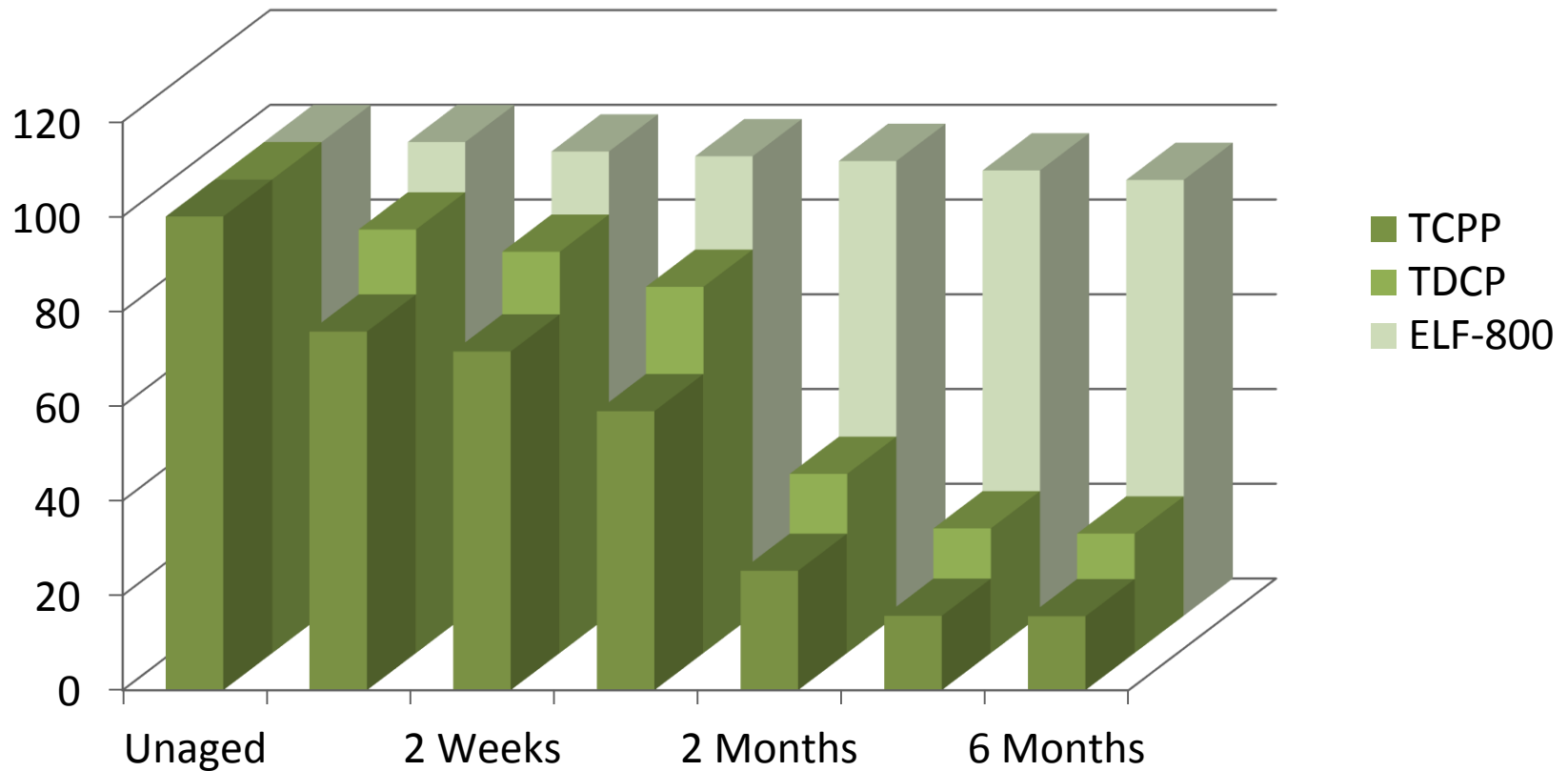


# Typical formulations based on PhireGuard ELF-808

<i>Foam density</i>	25 kg/m <sup>3</sup>	30 kg/m <sup>3</sup>	35 kg/m <sup>3</sup>
FMVSS 302, SE rating	8-9 php	5-6 php	4-5 php
Cal TB 117 A	14 php	10-11 php	8-9 php
BS 5852 Crib 5	15 php + 30 php Mel	12 php + 24 php Mel	9 php + 18 php Mel

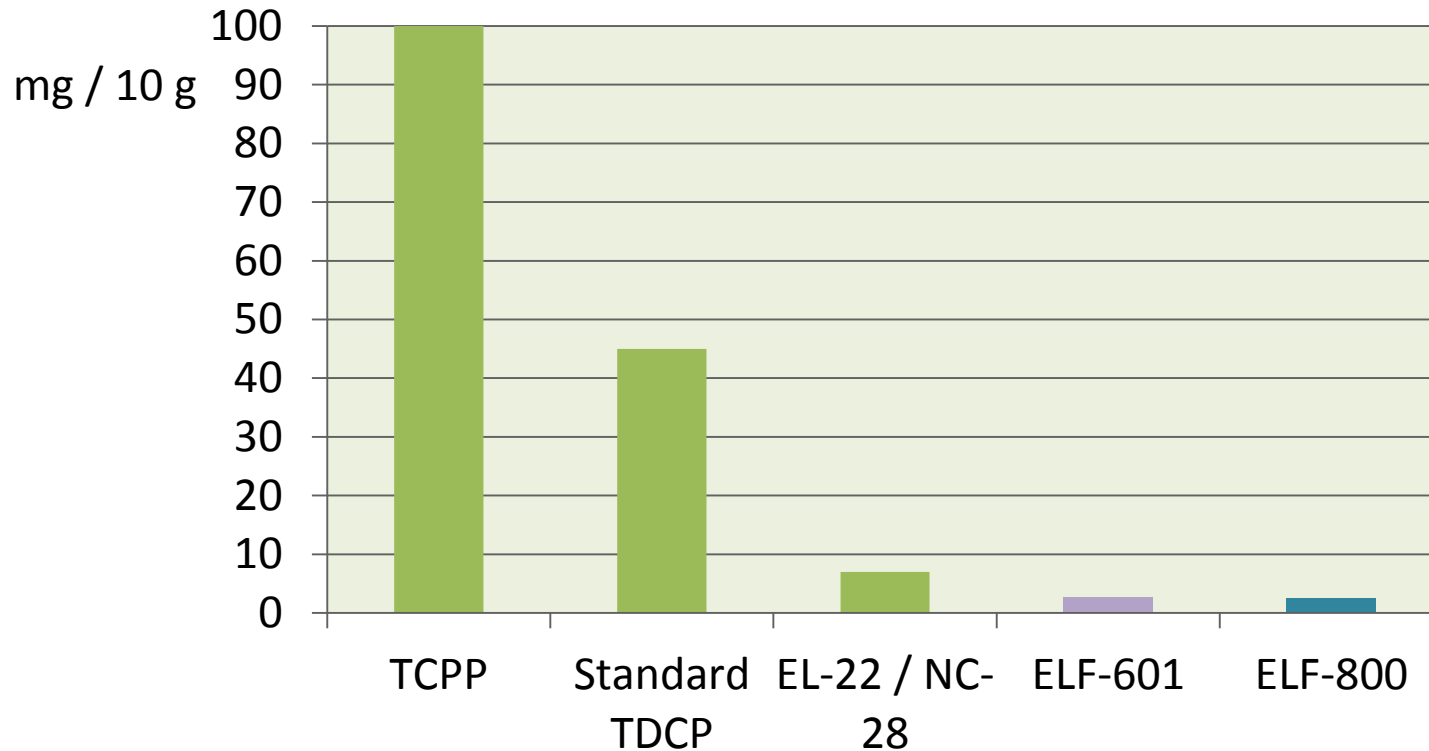
# PhireGuard ELF's are non fugitive

*% Phosphorous retention at 70 deg C, measured by P -NMR.*



# PhireGuard ELF-800 Fogging Performance

DIN B-75201, 120 deg C, 24 hours





# PhireGuard ELF-800 vs Ageing

- 35 kg/m<sup>3</sup>: Polyether foam, 4 pph
  - Comparison with competitive Hal-free
  - FMVSS 302: SE
  - Heat ageing: ELF-800 > Comp FR
  - Humid Aging: ELF-800 > Comp FR
- 35 kg/m<sup>3</sup>: Polyester foam, 5 pph
  - Comparison with competitive Hal-free (different from above)
  - FMVSS 302: SE
  - Heat ageing: ELF-800 > Comp FR
  - VW Humid Aging : ELF-800 > Comp FR



# PhireGuard 800 Summary



Chlorinated  
DiPhosphate  
Ester

Processability, for  
both Polyether  
and Polyester  
foams

Superior FR  
Performance

Best Emission  
(VOC's, Fogging  
Performance).

The  
"TDCP" Replacement?



# One more thing...

- PhireGuard ELF-800 belongs to the new class of Flame Retardants that the Jiangsu Yoke Technology Corporation is launching on the market.
- Reach-Registered
- The PhireGuard tradename is associated with Innovation, Quality Consistency and Cost in Use Efficiency

