



# Jiangsu Yoke Technology



## **PhireGuard EL-22 & NC-28**

***Marketing Presentation***

# PhireGuard EL-22 / NC-28

## Characteristics

- Extension of the TDCP technology
- High purity, superior emission performance
- No impact on reaction profile and processability
- Compatible for polyether and polyester foams
- Enhanced fire properties over wide range of foam density
- Low Odor

# PhireGuard EL-22 Key Properties

- Appearance: Clear Liquid
- Viscosity: # 1500 mPa.s
- Phosphorus Content: 7.2 wt%
- Chlorine Content: 49 wt%
- Acidity: < 0.1 mgKOH/g
- Water Content: < 0.1 wt%
- Colour APHA: < 60
- OH value (Water and Acid excluded): 0 mgKOH/g
- Non Reactive

# PhireGuard NC-28 Key Properties

- Appearance: Clear Liquid
- Viscosity: # 1000 mPa.s
- Phosphorus Content: 7.3 wt%
- Chlorine Content: 46 wt%
- Acidity: < 0.1 mgKOH/g
- Water Content: < 0.1 wt%
- Colour APHA: < 60
- OH value (Water and Acid excluded): 0 mgKOH/g
- Non Reactive

# Difference between EL-22 and NC-28



PhireGuard EL-22: Extrapure “TDCP”



PhireGuard NC-28: EL-22 + Additive to prevent Crystallization at low Temperatures

Both EL-22 and NC-28 have same FR performance

# Applications where EL-22 / NC-28 find Interests



Polyether Foam



Polyester Foam

PhireGuard EL-22  
PhireGuard NC-28



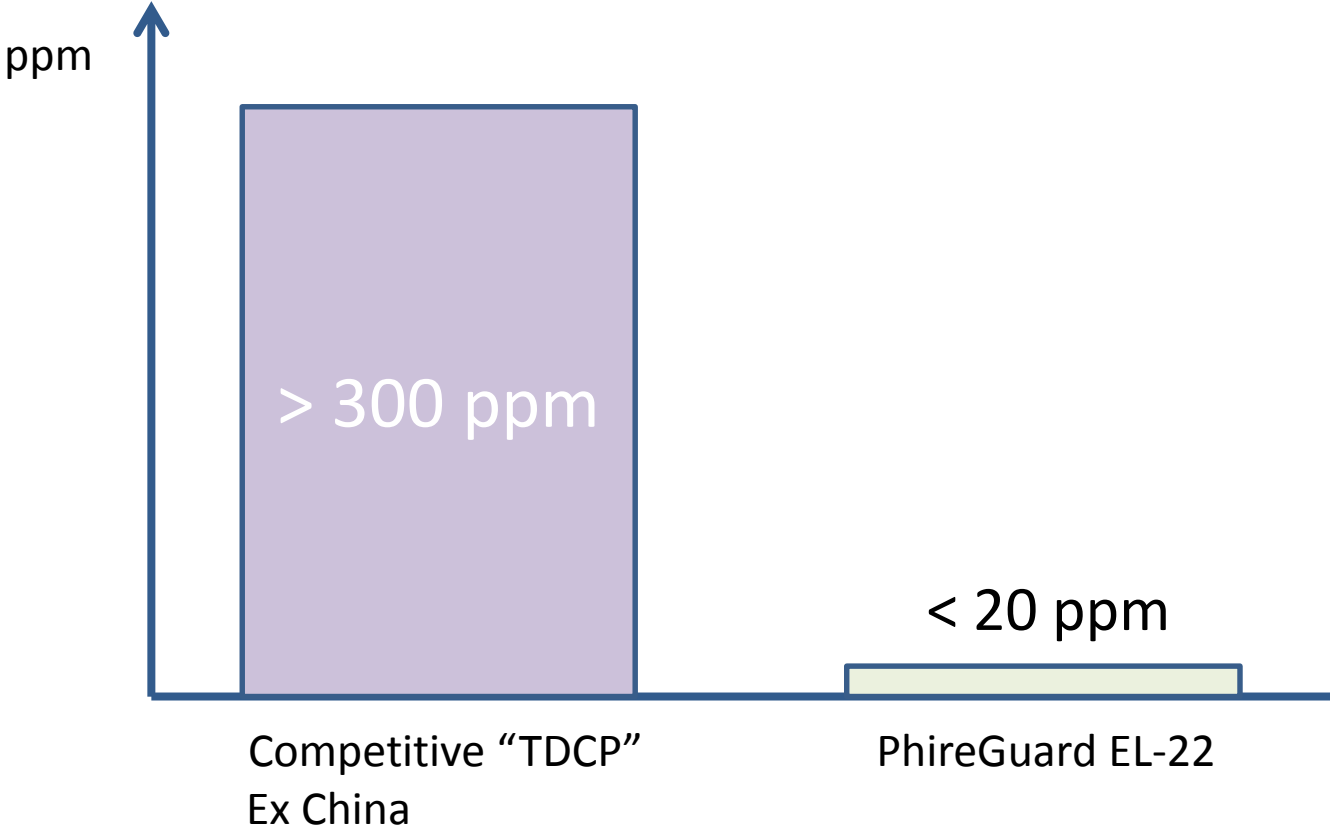
Furnitures



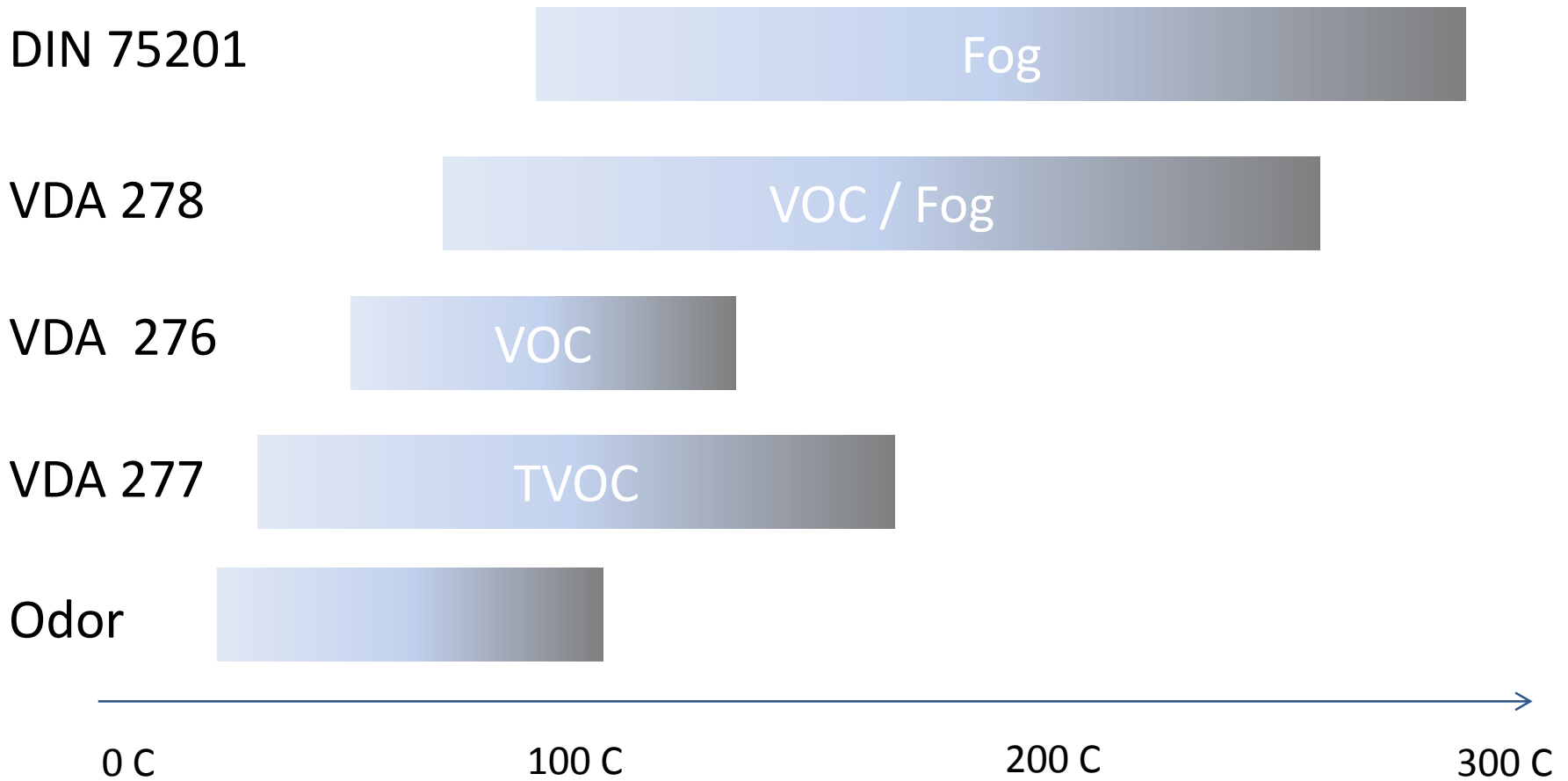
Automotive

# EL-22 is an emission-lean FR

*Yoke method that analyses by GC all substances having a Boiling Point < 120 deg C.*



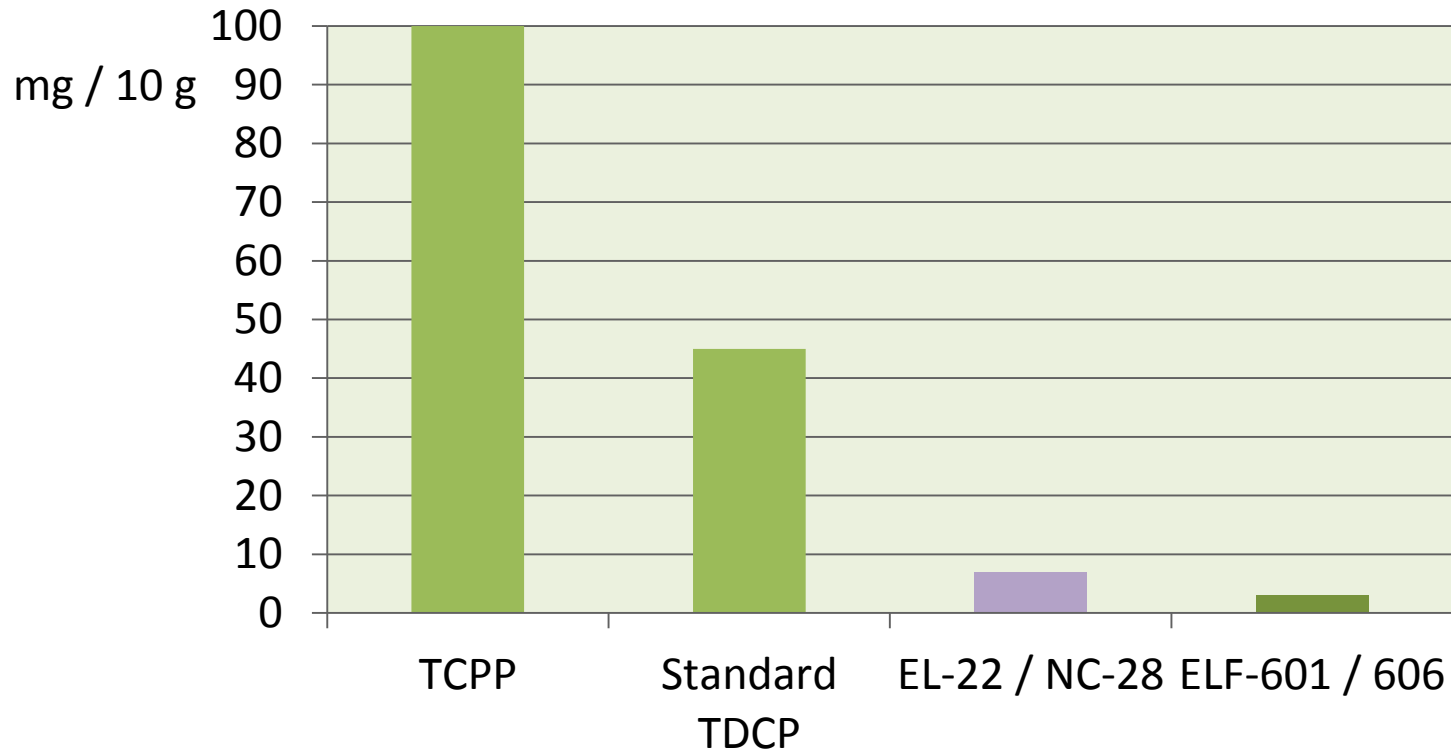
# Acquisition Range of various Emissions Tests





# EL-22 / NC-28 Din Fogging Test

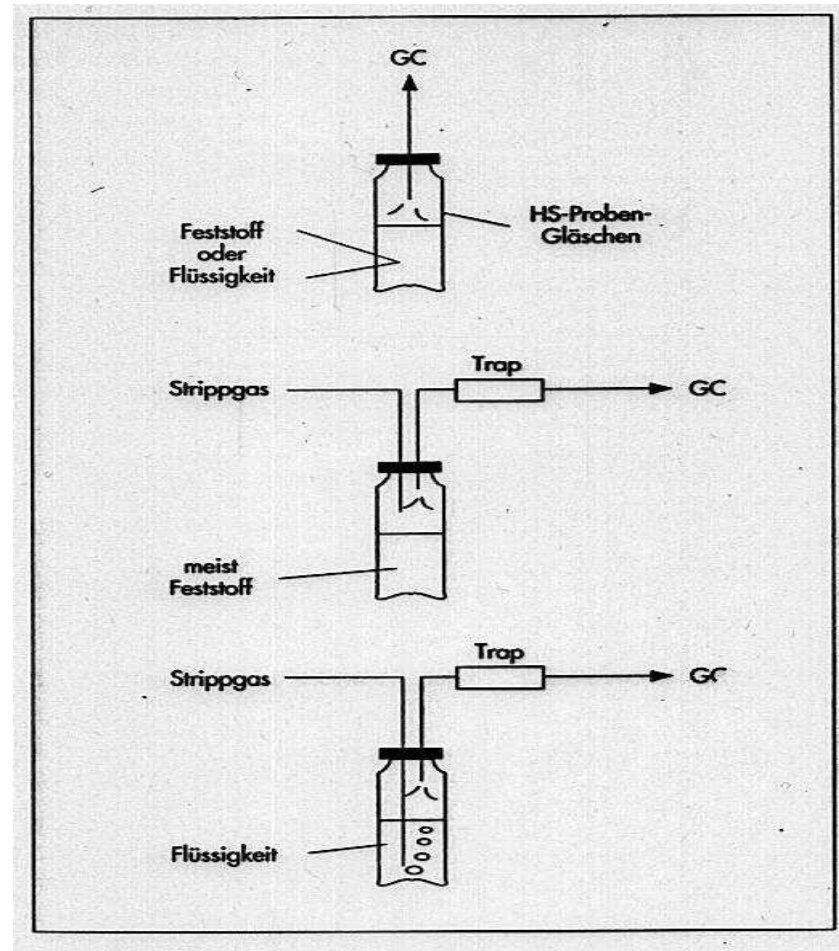
DIN B-75201, 120 deg C, 24 hours



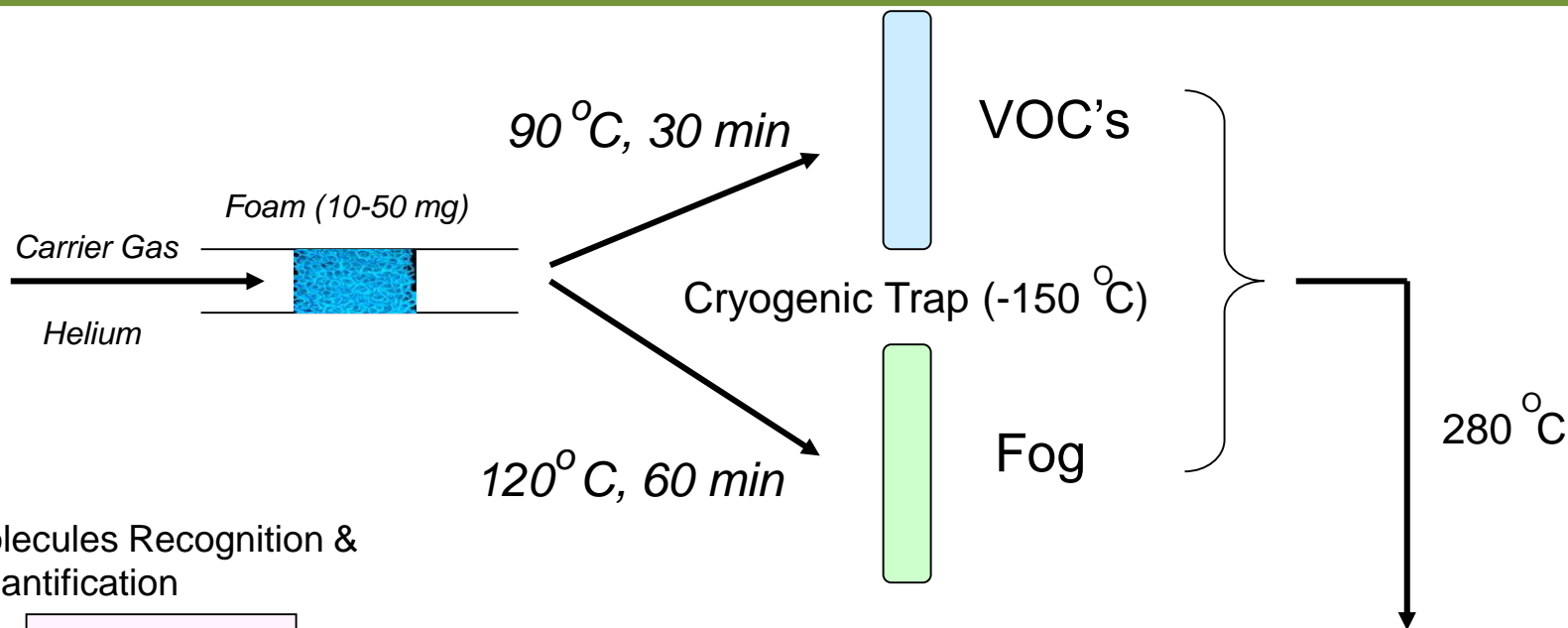
# Automotive Emission Tests VDA 277 and VDA 278

- VDA 277:
  - Static Headspace-GC,
  - 5 Hours 120 C
  - Measure the TVOC
  - “Efficient” for low boiling substances (40 – 120 C)
  - Volkswagen, # Toyota
  
- VDA 278 (VWL 709 DC test)
  - Dynamic Headspace – GC-MS
  - VOC: 30' @ 90 C
  - Fog: 60' @ 120 C
  - “Efficient” for high boiling substances (60 – 270 C)
  - Daimler Chrysler, BMW, Audi...

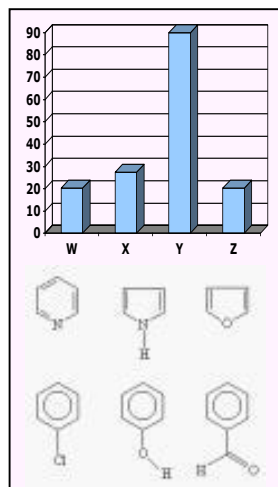
# VDA 277 TVOC's Test



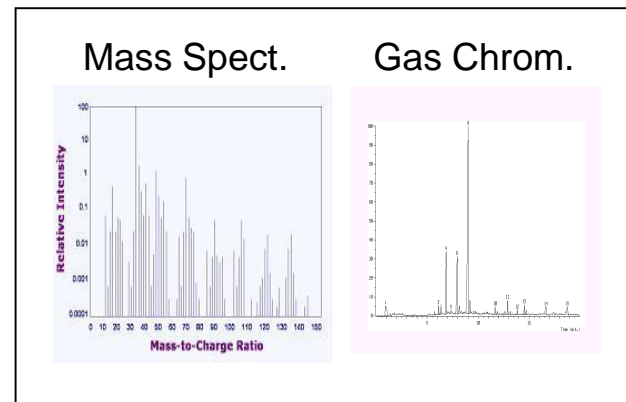
# VDA 278 VOC's / Fog Test



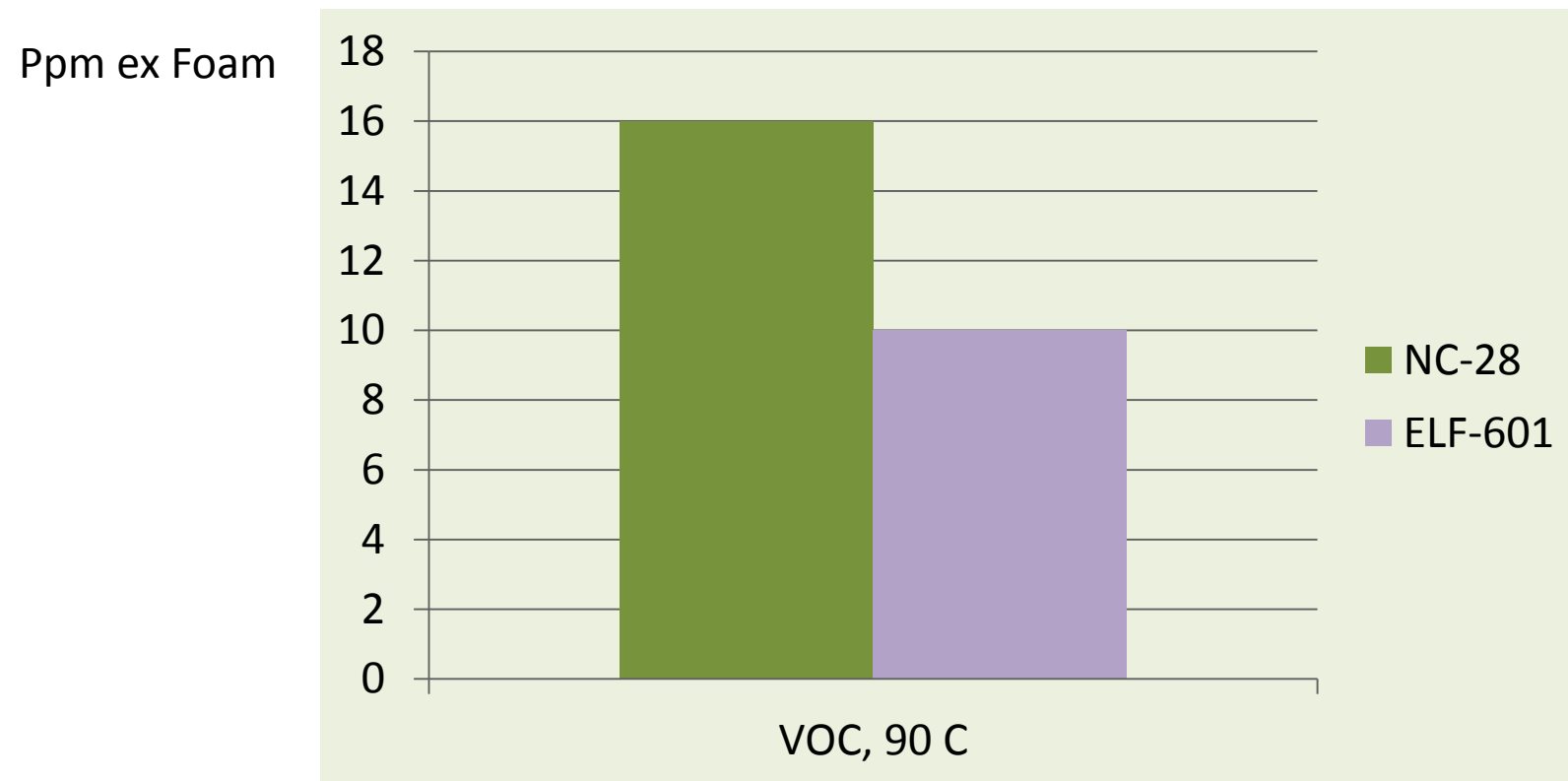
Molecules Recognition & Quantification



Data Analysis

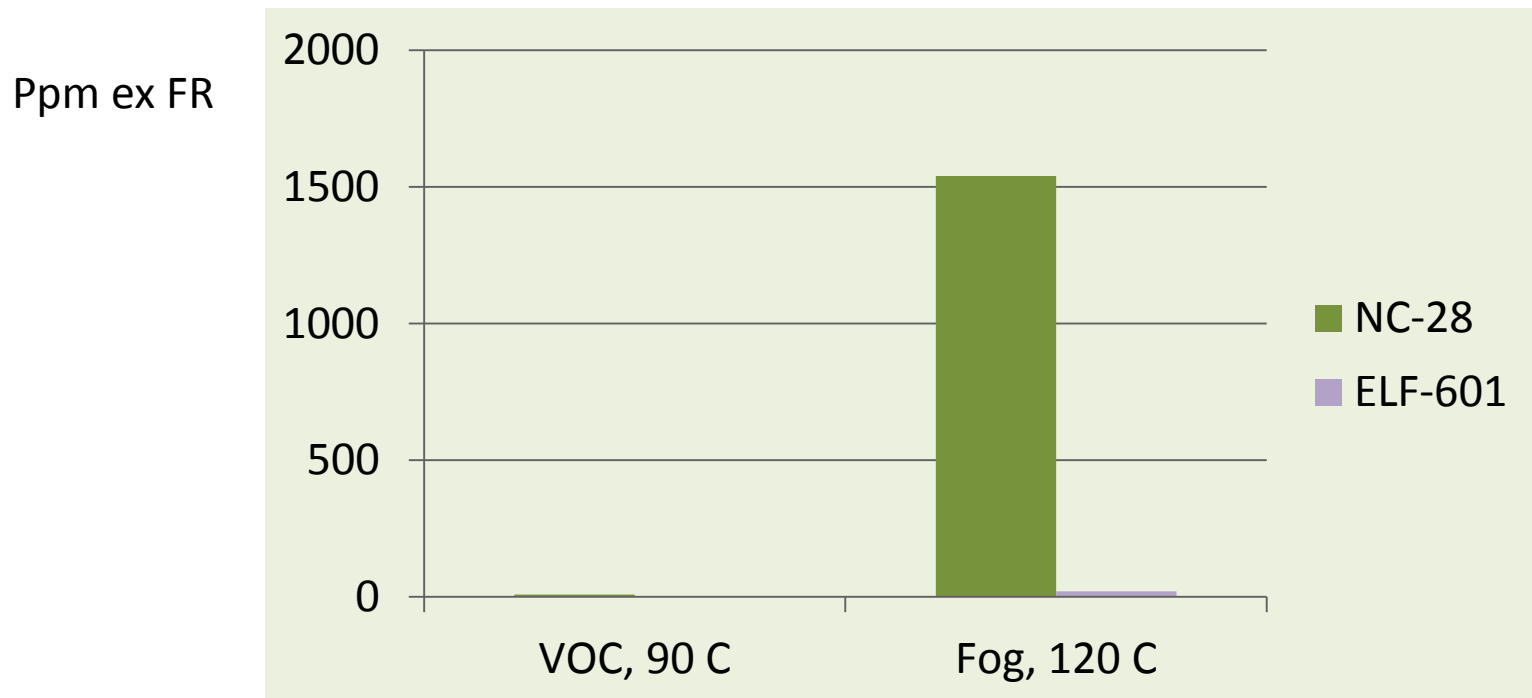


# NC-28 VDA 277 Performance



- Results are expressed in ppm emission measured on the foam
- Both NC-28 and ELF-601 can be used to pass the VDA 277 emission test (< 20 ppm)

# NC-28 VDA 278 Performance



- Max Foam Foam VOC = 100 ppm, Fog = 250 ppm
- Due to poor Fogging Performance, NC-28 not suitable for VDA 278 as it gives by it self more than 1500 ppm Fogging
- ELF-601 is in this case the FR of choice

# Typical EL-22 and NC-28 Loadings

<i>Foam density</i>	25 kg/m <sup>3</sup>	30 kg/m <sup>3</sup>	35 kg/m <sup>3</sup>
<b>FMVSS 302, SE rating</b>	10 php	8 php	7 php
<b>Cal TB 117 A</b>	13 hph	11 php	10 php
<b>BS 5852 Crib 5</b>	15 php + 25 php Melamine	12 php + 24 php Melamine	10 php + 20 php Melamine

*Note that the these loadings are indicative as foam fire performance Depends on other chemicals used (i.e. Polyols, Silicones...)*

# PhireGuard EL-22 / NC-28 Summary



The best of  
"TDCP"  
Technology

For polyether  
and polyester PU  
foam

Superior FR  
Performance

Low Odor

Enhanced  
Emission  
Performance





# One more thing...

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- PhireGuard EL-22 and NC-28 belong to the new class of Flame Retardants that the Jiangsu Yoke Technology Corporation has recently launched on the market.
- The PhireGuard tradename is associated with Innovation, Quality Consistency and Cost in Use Efficiency

