

# TAR SAMPLING & ANALYSIS ACCORDING CEN/TS 15.439 CENER EXPERIENCE IMPROVING SAMPLING & QUANTIFICATION

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## CEN/TS 15.439

Biomass Gasification- Tar and particles in product gases. Sampling and analysis. May 2006

•Details information about

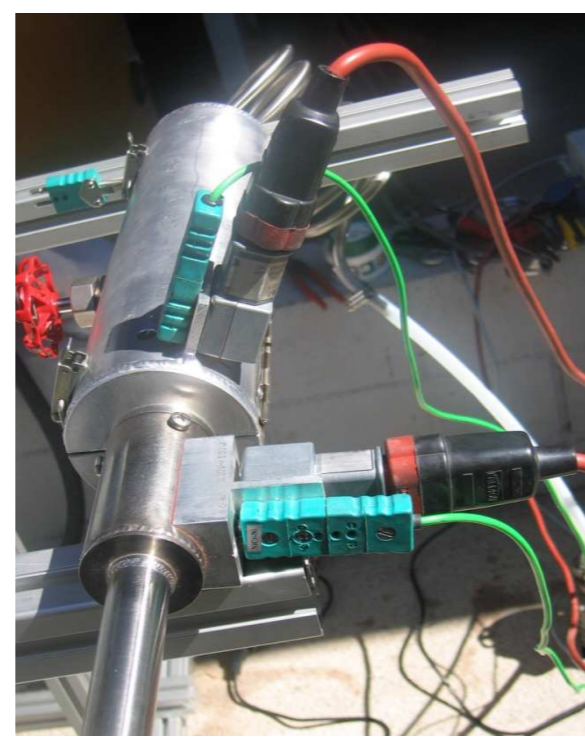
- Gas isokinetic sampling
- Gravimetric particle determination
- GC Quantification “open” Method



## SAMPLING EQUIPMENT

✓Isokinetic Probes

Interchangeable nozzles  
Internally heated and externally cooled  
**Gas T:** from ambient to **1050°C**

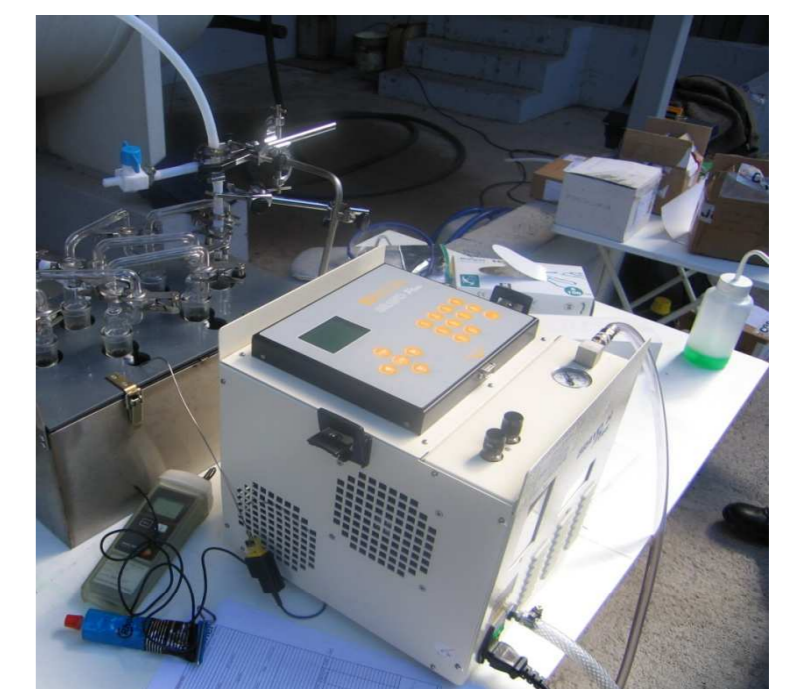


✓Particle Filter

Up to 30 g/Nm<sup>3</sup>  
Heated (300-350°C)

✓Criogenyc Bath

Tar Absorption  
2nd Stage controlled at -15/-20°C



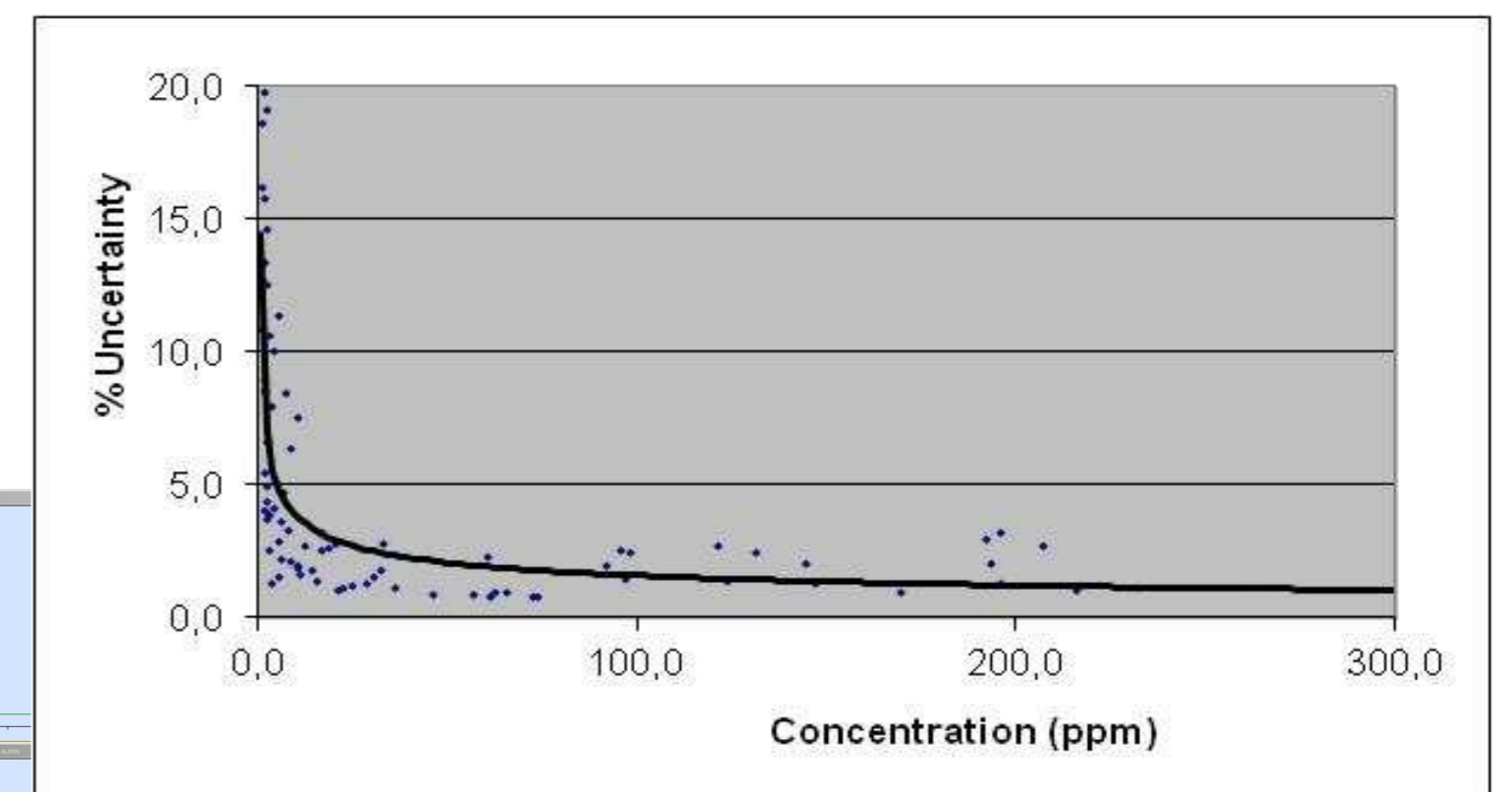
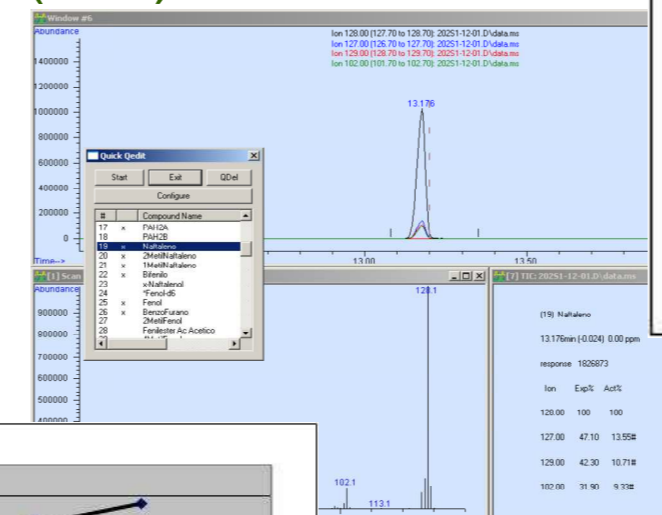
✓Gas Sampler

Flow regulation (1-40 ml/min)  
Flow measurement

## SAMPLING ANALYSIS

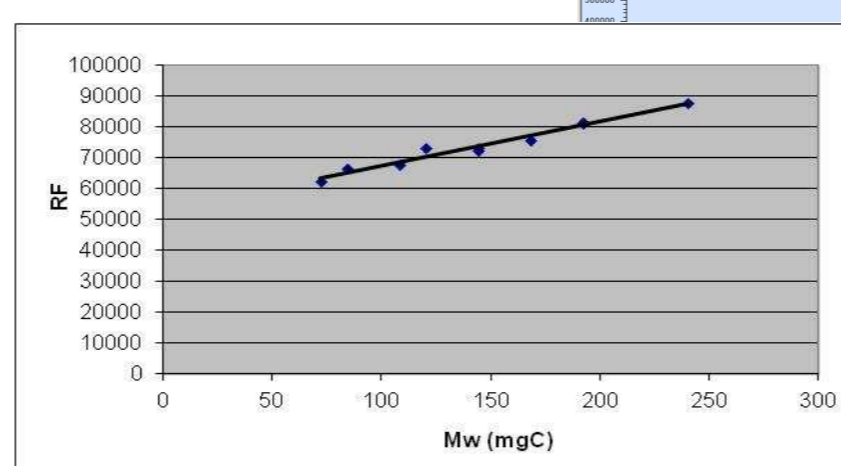
✓GC/MS Identification

>80 identified TARs list available  
1-6 Aromatic Rings  
72-276 g/mol (Mw)



✓GC/FID quantification

Specific tar quantification per compound  
(not “only” as Naphthalene)  
Lower limit up to 0.3 ppm  
Calibration Uncertainty (>400 cal points)



TAR ANALYSIS



✓Particle filter extraction  
✓Gravimetric Particle Determination  
Lower limit <20 mg/Nm<sup>3</sup>



✓Sample preparation for TAR analysis

## CENER BACKGROUND

- Experience in 5 different Gasification Technologies
  - ✓Down-Draft
  - ✓Up-Draft
  - ✓BFB
- Sampling Conditions
  - ✓Air Gasification
  - ✓Steam –Oxigen Gasification
- Sampling Points
  - ✓Gasifier Exit
  - ✓Hot and cold gas cleaning
  - ✓Engine inlet

## CENER'S BFB 2MWt GASIFICATION UNIT



•2012 (Week 42) 60 hours of continuous operation test at stationary conditions

