



Energy research Centre of the Netherlands

Tar dew point; past, present and future

Bram van der Drift

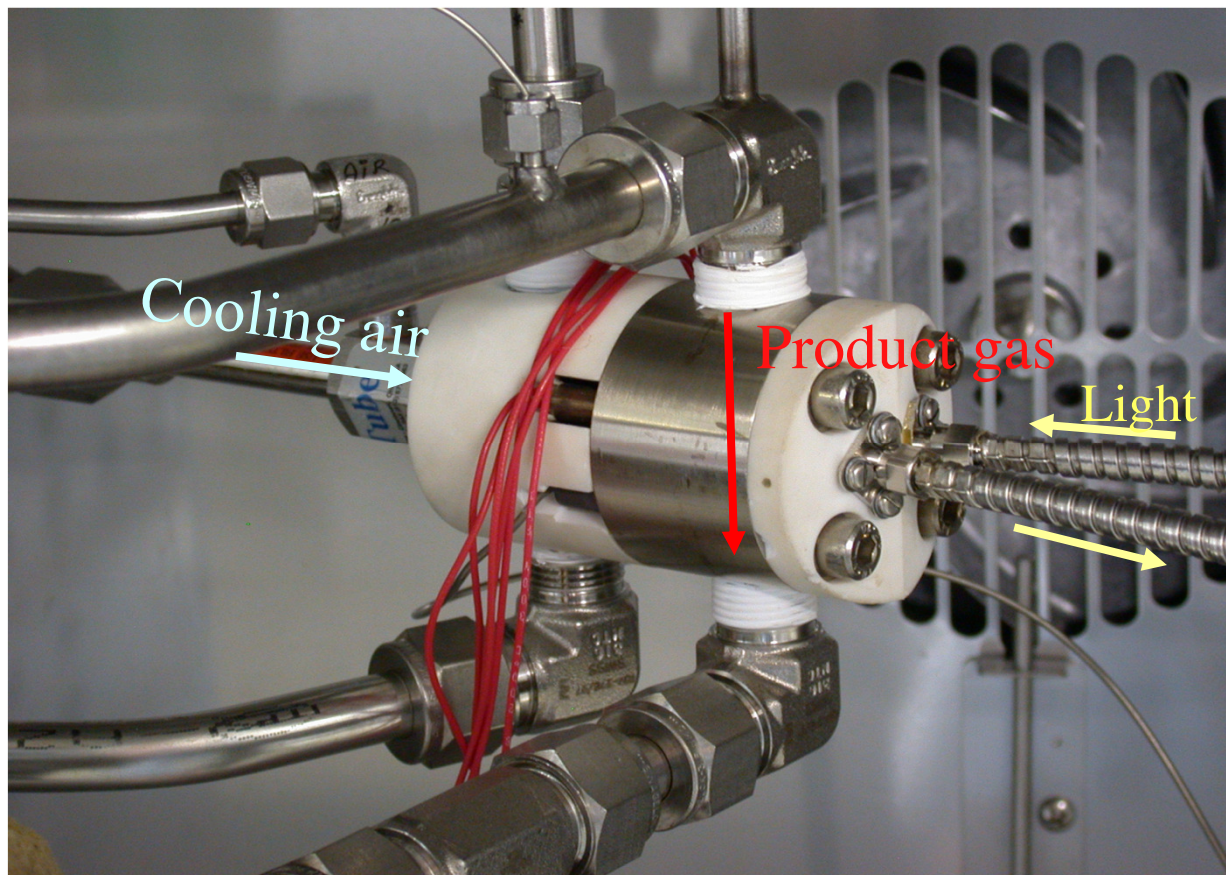


TAR DEW POINT

some considerations

- Tar generally only becomes a problem if condensed
- OLGA tar removal is based on dew points:
 - gas cooling to temperature well above tar dew point
 - tar removal by condensation above water dew point, followed by
 - tar removal by absorption to tar dew points below water dew point
 - enabling water scrubbing without tar contamination
- TDA: Tar Dew point Analyser
- Based on optic changes upon condensation

THE HEART of the TDA



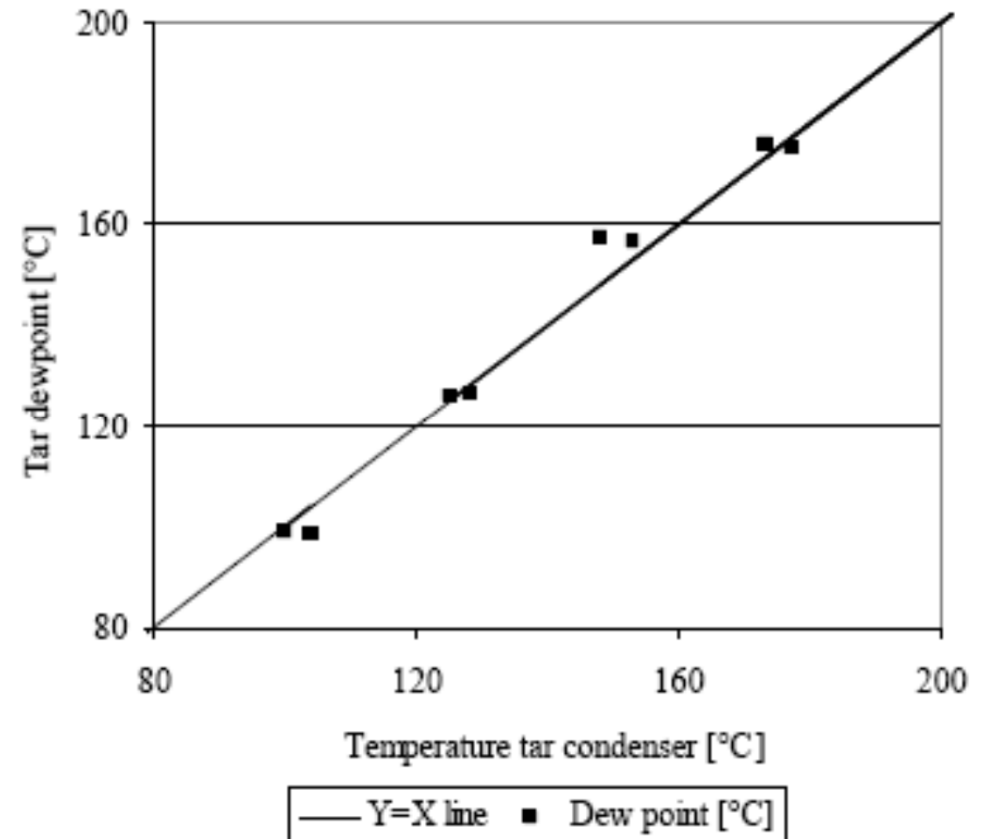
- 40 °C above tar dew point
- 3 °C/min
- 15 min measurement
- 15 min regeneration
- Set point mode
- Cycle mode

Past results

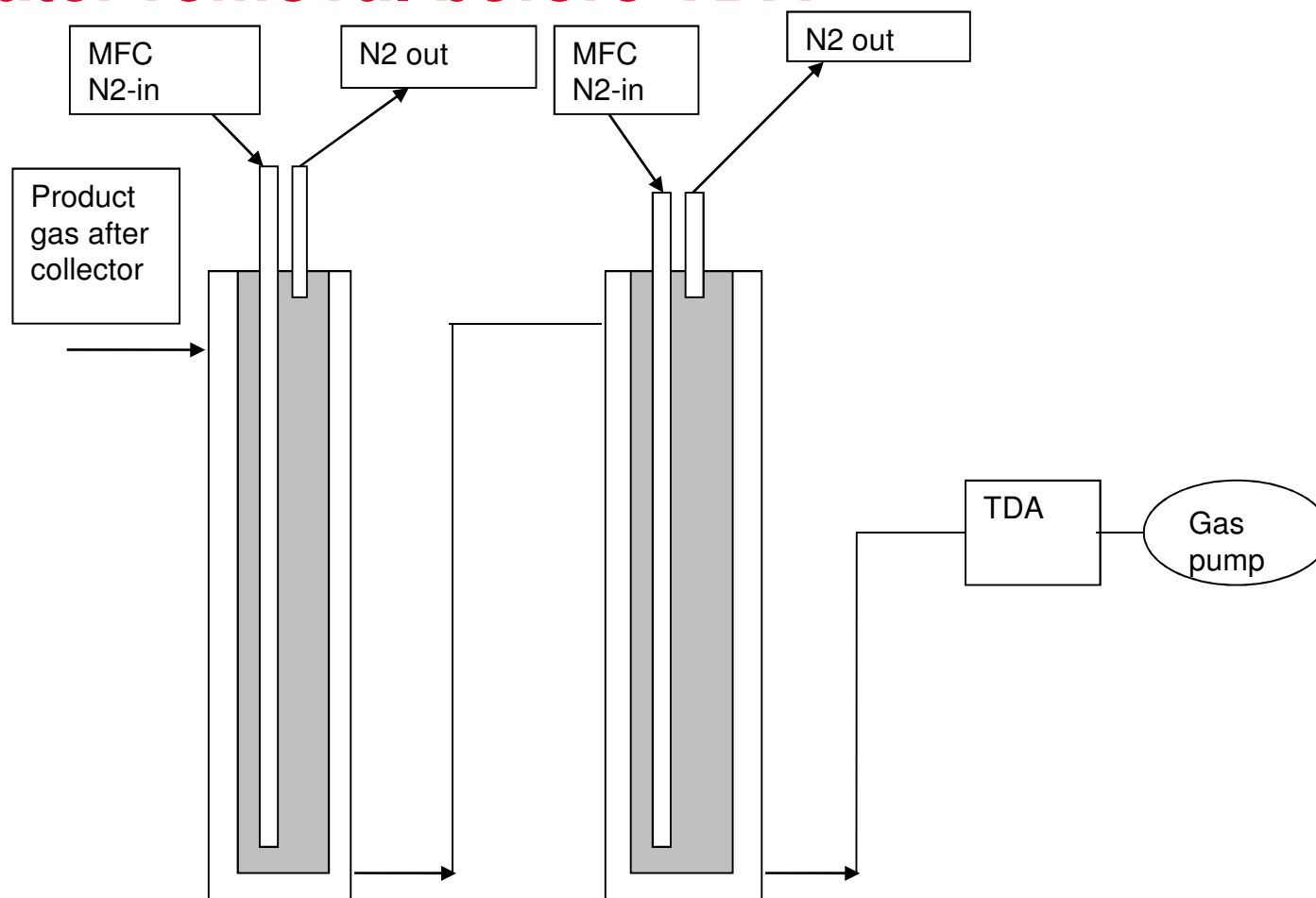
- Development started in 2004 with Michell Instruments
- Operating range is -20 – 200 °C up to 20 bar
- Validated using ECN in-house gasifiers with fixed tar dew points
- Results also validated with in-house tar dew point calculator model

Validation – Using a tar condenser

- BFB gasification creates a gas containing tar
- A tar condenser was used to create an artificial tar dew point
- TDA is used to measure the artificial tar dew point
- Deviations is $<3^{\circ}\text{C}$



Water removal before TDA



Result for water removal using membranes

- One membrane resulted in >90% water removal
- Water dew point reduced with 40°C over one membrane
- Second membrane removes most water but also an increased slip of fuel gas
- Second module has a water dew point of <5°C

Principle of water removal in a tar laden gas was proven, further R&D was halted

FUTURE

- Wanted:
 - Cheap and simple method for on-line use
 - Aiming at protection of compressor, cooler, ...

MORE INFORMATION

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publications: www.ecn.nl/publications

fuel composition database: www.phyllis.nl

tar dew point calculator: www.thersites.nl

IEA bioenergy/gasification: www.ieatask33.org

Milena indirect gasifier: www.milenatechnology.com

OLGA tar removal: www.olgatechnology.com

SNG: www.bioSNG.com and www.bioCNG.com