

HYDROCARBON DEWPOINT PROJECT – SYNTHETIC NATURAL GAS MIXTURES

SUPPORTING INFORMATION

Introduction

Phase One of the project studied five synthetic natural gas Primary Reference Gas Mixtures prepared at NPL. The composition of the mixtures was tailored to represent three different rates of hydrocarbon condensation (see plot on p.2):

- High condensation rate (one mixture: 'High')
- Medium condensation rate (two mixtures: 'Mid 1' & 'Mid 2')
- Low condensation rate (two mixtures: 'Low 1' & 'Low 2')

These hydrocarbon condensation rates are characteristic of gases found in the gas fields of the British Isles, including those of the most extreme compositions. The mixtures contained all *n*-isomers from C₁ up to C₈, C₉ or C₁₀; benzene; toluene and cyclohexane.

Analysis methods

The mixtures were analysed using the following methods:

1. Lab GC 1

- N₂, CO₂, and C₁ to C₅ hydrocarbons measured using a Danalyser model 500 instrument with TCD detector.
- C₅ to C₁₂ hydrocarbons measured using an HP 4890 GC with an FID detector.

2. Automatic chilled mirror

- Measurements carried out using a Michell Condumax II instrument.
- Operated at the default sensitivity setting of 275mV.

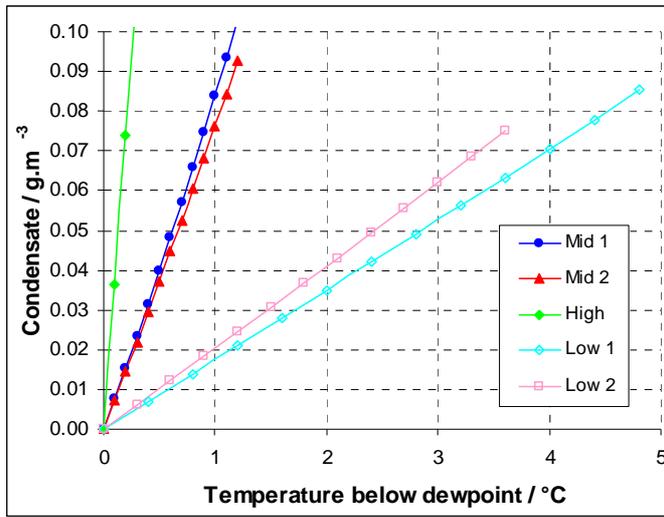
Calculations

All hydrocarbon dewcurves were calculated using the RKS equation of state

Continued...

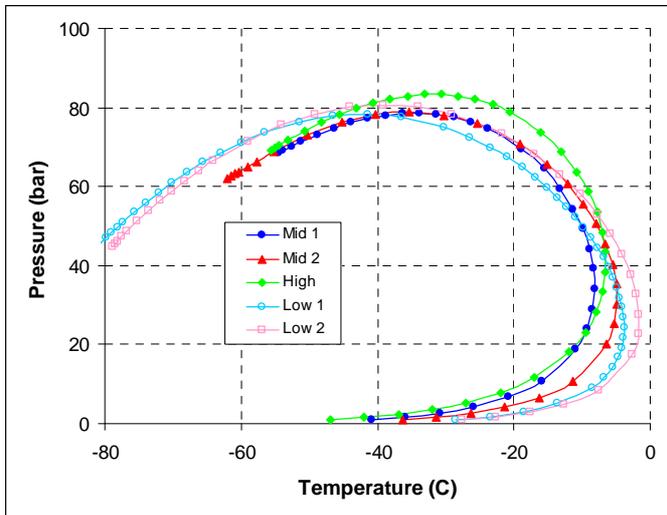
Hydrocarbon condensation rates

Plot of potential liquid hydrocarbon content against temperature below dewpoint:



[Calculated using gravimetric composition data]

Hydrocarbon dewpoint curves



[Calculated using gravimetric composition data]