

# Natural Gas Analyser

## ES140



- Robust and cost-effective
- High precision calorific value reporting
- Optional fourth analysis channel
- GPA 2286/2186 and ISO 6974-6.

*Get ready for tomorrow's analytics*

# Natural Gas Analyser

The GAS ES140 Natural Gas Analyser complies with several international standards, including GPA 2286/2186 and ISO 6974-6.

## Principle of operation

The GAS ES140 Natural Gas Analyser (Figure 1) measures all components of interest, including hydrocarbons  $C_1$ - $C_6$  in only 7 minutes. Heavier hydrocarbons (up to  $C_{20}$ ) can also be analysed but require a longer analysis time. Three independent channels are used for the analysis of (1) permanent gases, (2) hydrocarbons, and (3) hydrogen. Micropacked columns offer low carrier gas consumption and are mounted in the valve oven for isothermal operation, while capillary columns are used in the temperature-programmed oven for fast and detailed hydrocarbon analysis. Sulfinert tubing ensures optimal analysis of sulphur components. Diaphragm valves and InstantConnect detector technology result in a robust and flexible instrument with >99% uptime. The instrument offers high precision and repeatability for accurate calorific value reporting (Figure 4). The analyser can be expanded by a fourth channel, using FPD or PFPD for low level sulphur components.

## Instrument specification

- Thermo GC1600 with two InstantConnect TCDs, FID, XXL external valve oven, 5 diaphragm valves (rotary valves optional), 5 packed columns and 1 capillary column
- Optional NGA calculation pack for calorific value calculation
- Runtime 7 minutes (up to  $C_6$ )
- Minimum detectability < 0.01 %

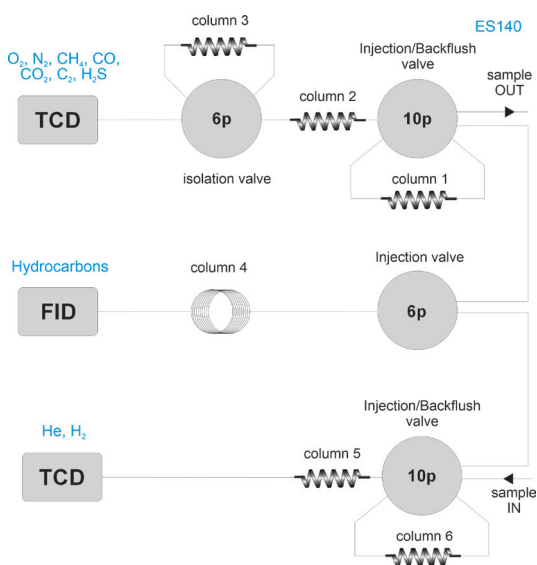


Figure 1 Diagram ES140 analyser

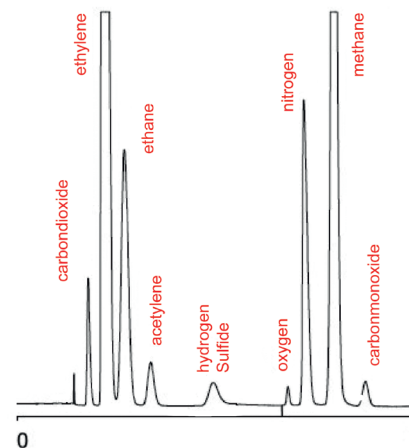


Figure 2 Chromatogram upper channel (TCD, permanent gases)

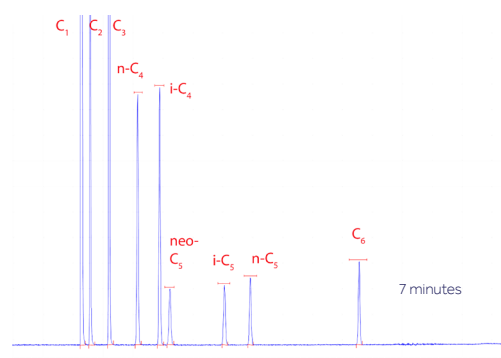


Figure 3 Chromatogram middle channel (FID,  $C_1$ - $C_6$  hydrocarbons)

| Natural gas calculations                                                            |                          |                 |                            |                             |                         |                             |  |  |  |
|-------------------------------------------------------------------------------------|--------------------------|-----------------|----------------------------|-----------------------------|-------------------------|-----------------------------|--|--|--|
| Instrument                                                                          | Trace1300 NGA            | Sequence name   | Data G.A.S. NGA pack       |                             |                         |                             |  |  |  |
| Instrument Method                                                                   | Initial gas injection    | Data Vault      | ChromelonLocal             |                             |                         |                             |  |  |  |
| Processing Method                                                                   | New Processing Method    | Report Template | G.A.S. NGA Report Template |                             |                         |                             |  |  |  |
| Data File                                                                           | NGA mix repro TCDs       | Seq. Line       | 10                         |                             |                         |                             |  |  |  |
| Injection Date                                                                      | 08/jul/2014              | Peaks           | 9                          |                             |                         |                             |  |  |  |
| Injection Time                                                                      | 13:21                    |                 |                            |                             |                         |                             |  |  |  |
| Calculation Type                                                                    | Total                    |                 |                            |                             |                         |                             |  |  |  |
| Physical property report for the dry gas - combustion at 15°C according to ISO 6976 |                          |                 |                            |                             |                         |                             |  |  |  |
| Metering at 0°C and 101.325kPa                                                      |                          |                 |                            |                             |                         |                             |  |  |  |
|                                                                                     | Moilar basis             | Mass basis      | Volumetric basis           | Calories                    | Wobbe Index             | BTU                         |  |  |  |
| Sup. Calorific Value                                                                | 897.41 kJ/mol            | 49.60 MJ/kg     | 40.15 MJ/m <sup>3</sup>    | 9581.52 kcal/m <sup>3</sup> | 50.74 MJ/m <sup>3</sup> | 1077.55 BTU/ft <sup>3</sup> |  |  |  |
| Inf. Calorific Value                                                                | 809.73 kJ/mol            | 44.75 MJ/kg     | 36.23 MJ/m <sup>3</sup>    | 8650.79 kcal/m <sup>3</sup> | 45.78 MJ/m <sup>3</sup> | 972.27 BTU/ft <sup>3</sup>  |  |  |  |
| Mean mol weight                                                                     | 18.093 g/mol             |                 |                            |                             |                         |                             |  |  |  |
| Compression factor                                                                  | 0.9972                   |                 |                            |                             |                         |                             |  |  |  |
| Relative Density                                                                    | 0.6261                   |                 |                            |                             |                         |                             |  |  |  |
| Density                                                                             | 0.8094 kg/m <sup>3</sup> |                 |                            |                             |                         |                             |  |  |  |
| Metering at 15°C and 101.325kPa                                                     |                          |                 |                            |                             |                         |                             |  |  |  |
|                                                                                     | Moilar basis             | Mass basis      | Volumetric basis           | Calories                    | Wobbe Index             | BTU                         |  |  |  |
| Sup. Calorific Value                                                                | 897.41 kJ/mol            | 49.60 MJ/kg     | 38.04 MJ/m <sup>3</sup>    | 9048.12 kcal/m <sup>3</sup> | 48.09 MJ/m <sup>3</sup> | 1020.97 BTU/ft <sup>3</sup> |  |  |  |
| Inf. Calorific Value                                                                | 809.73 kJ/mol            | 44.75 MJ/kg     | 34.32 MJ/m <sup>3</sup>    | 8196.57 kcal/m <sup>3</sup> | 43.39 MJ/m <sup>3</sup> | 921.22 BTU/ft <sup>3</sup>  |  |  |  |
| Mean mol weight                                                                     | 18.093 g/mol             |                 |                            |                             |                         |                             |  |  |  |
| Compression factor                                                                  | 0.9972                   |                 |                            |                             |                         |                             |  |  |  |
| Relative Density                                                                    | 0.6258                   |                 |                            |                             |                         |                             |  |  |  |
| Density                                                                             | 0.7669 kg/m <sup>3</sup> |                 |                            |                             |                         |                             |  |  |  |
| Metering at 20°C and 101.325kPa                                                     |                          |                 |                            |                             |                         |                             |  |  |  |
|                                                                                     | Moilar basis             | Mass basis      | Volumetric basis           | Calories                    | Wobbe Index             | BTU                         |  |  |  |
| Sup. Calorific Value                                                                | 897.41 kJ/mol            | 49.60 MJ/kg     | 37.39 MJ/m <sup>3</sup>    | 8938.14 kcal/m <sup>3</sup> | 47.27 MJ/m <sup>3</sup> | 1003.44 BTU/ft <sup>3</sup> |  |  |  |
| Inf. Calorific Value                                                                | 809.73 kJ/mol            | 44.75 MJ/kg     | 33.73 MJ/m <sup>3</sup>    | 8055.83 kcal/m <sup>3</sup> | 42.65 MJ/m <sup>3</sup> | 905.40 BTU/ft <sup>3</sup>  |  |  |  |
| Mean mol weight                                                                     | 18.093 g/mol             |                 |                            |                             |                         |                             |  |  |  |
| Compression factor                                                                  | 0.9978                   |                 |                            |                             |                         |                             |  |  |  |
| Relative Density                                                                    | 0.6257                   |                 |                            |                             |                         |                             |  |  |  |

Figure 4 NGA Calorific value report

## Ordering information ES140X - ABCDE

| code X          | 0          | 1          | 2          | 3          |
|-----------------|------------|------------|------------|------------|
| GC model, power | 1600, 230V | 1610, 230V | 1600, 115V | 1610, 115V |

For the selection of options ABCDE (e.g. valve type and passivation, pump and vacuum sampling, rotameter and sample connections, pressure and moisture sensors, hydrogen sensor for safety shut-off, power plug type and more), [see the options table in the order guide.](#)

## About GAS

Global Analyser Solutions provides GC & GC-MS solutions for Energy, Refinery, Chemical and Environmental markets. Our analysers address a broad spectrum of measuring requirements with high precision and reliability. Please reach out for more information on our website. [www.gassite.com](http://www.gassite.com)