

## Power and Flexibility from Protea's latest Process and Emission Monitoring Installation

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Protea has recently installed and commissioned a powerful process and emissions monitoring system for Blue Star Fibres Ltd, a UK producer of both oxidised and carbon fibre. The system, located at the Company's Grimsby site, is based on Protea's flexible model 204 FTIR product customised for the application.

Carbon Fibre is an increasingly important material for the manufacturing industry. From sports goods to vehicle manufacture and wind turbines, the output of carbon fibre is being increased to meet demand.

The fibre is produced from a precursor polymer (Polyacrylonitrile, PAN) that is spun into filaments, which are decomposed in ovens of up to 2000°C in the process known as carbonisation. The carbonisation process and therefore product characteristics are varied by changing the speed the filament passes through the ovens, the oven temperature, the oxygen content and other process adjustments. During the carbonisation process, off-gases are produced as the PAN fibres are heated. The most critical off gas is Hydrogen Cyanide (HCN), along with Ammonia (NH<sub>3</sub>), Formaldehyde (HCHO), Methanol (CH<sub>3</sub>OH) and other organic compounds in low levels. These off-gas concentrations change as the carbonisation process conditions are changed.

Blue Star Fibres required a system design to measure sequentially up to 8 different emission vents within a fixed monitoring system,

with the additional ability for the FTIR instrument to be demounted and deployed as a mobile unit around various parts of the production when required. For example measurement of acrylonitrile from the PAN production unit is required occasionally. Protea's system satisfied these requirements fully and exceeded the company's expectations.

For Blue Star's fixed emission requirements, Protea supplied a switchable 8-point fully heated sample handling system with the capacity to be expanded in the future. Each sample point consisted of a heated sample probe, heated sample line and heated sample valve all controlled at 180°C. A separate, detachable heated sample line then connected the main sampling system to Protea's ProtIR 204M MCERTS-certified Transportable Continuous Emission Monitoring analyser.

The compact design of the ProtIR 204M Transportable CEM gas analyser is particularly well suited to the requirements of carbon fibre plants. When deployed as a CEM unit, it enables vent emission measurements to be continuously taken in compliance with the UK's Environment Agency requirements. For other applications such as monitoring vents not connected to the system or in remote plants, the 204M can be easily disconnected from the main system and quickly moved as a separate unit to the required measurement point. The 204M remains fully and easily configurable for a wide range of different monitoring tasks.



James England, Carbon Fibre Technical Manager at Blue Star Fibres said; "We were delighted with the solution that Protea provided for us. The installation of such a complex system was efficiently completed and the FTIR system has worked perfectly since commissioning. The ProtIR 204M has already provided us with some extremely useful data and I am more than happy to recommend Protea and Protea solutions to any other potential customers."

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