

# LIV<sup>®</sup> IQ product development



Linde

## Medical device development of a digital and connected display for medical gas cylinders

Concept feasibility, IP creation, formative usability, detailed design, prototyping, transfer to manufacture and verification.

A medical gas display providing gas contents, flow rate, therapy time remaining and patient safety alarms, easing the burden on users who previously had to estimate therapy time themselves. BLE connectivity providing remote monitoring of cylinder status.

### Expertise and domain knowledge

- Connectivity
- Bluetooth low energy
- Digital pressure gauge
- Medical device development
- Hospital care
- Product design
- Human factors
- Hardware engineering
- Software engineering





## Our client asked:

How to replace the conventional analogue pressure display on medical gas cylinders with a digital and connected system.

## The project story:

Sagentia Innovation undertook concept design and feasibility, before being selected for the full product development of the digital display unit and handling device.

The system was designed with an electronic pressure gauge to replace the traditional analogue gauge on cylinders holding oxygen. By sensing the set flow rate, the onboard processor calculates the remaining therapy time and this time is clearly displayed on the device's digital display, removing the need for users to estimate it by making the calculation themselves. The system was also designed with patient safety alarms, including low gas contents, low and high flow.

The product provides wireless communication of data stored and collected on the device, allowing remote monitoring of device status, and it was designed to operate for multiple years without changing or recharging the battery, through careful design to a power budget.

Product development was conducted under ISO13485, with Sagentia Innovation holding the Design History File. The project progressed through system and detailed design, prototyping, transfer to manufacture and verification, before design transfer to Linde and the contract manufacturing partner selected with Sagentia Innovation's assistance.

## Contact us

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## Results: deliverables and outcomes

LIV® IQ was launched in 2015 in Europe and USA

The product benefits include:

- peace of mind from a display showing remaining time to the exact minute.
- enhanced patient safety through audible and visible alerts.
- efficient, cost-effective use of cylinder contents.
- A patent was gained from Sagentia Innovation's work and the rights assigned to Linde.