Span Gases

What are "Span gases"?
Span gases are special gas mixtures used for testing gas detection equipment, which requires regular checking and calibration (bump testing). Calibration is an important issue for all testing instruments and is done by means of exposing the sensor to a known concentration of a contaminant. The gases are used as a reference point to ensure correct readings after calibration. The gases supplied by Wilhelmsen Ships Service are suitable for calibration and testing of almost any type of gas detection equipment presently used on board vessels.

The span gases supplied by Wilhelmsen Ships Service are subjected to strict quality controls. The composition of each cylinder is tested and certified, usually for 3 years, which reflects the guarantied stability of the gas.

We supply span gases in 3 different cylinder types: a 10 litre refillable cylinder and two disposable cylinders called a Scotty cylinder and Minimix cylinder. The 10 litre is recommended for gases that are used often while the disposable cylinders are perfect for less frequently used gas types or when working in difficult locations on board.

Wilhelmsen Ships Service supplies around 60 different mixtures and pure gases to the marine market, split into the following main groups:
Hydrocarbons & Air mixtures – so called LEL mixtures
Hydrocarbons & Nitrogen mixtures – mainly LEL mixtures
Carbon monoxide or Hydrogen sulfide mixtures
Oxygen & Nitrogen mixtures
Pure gases such as Nitrogen, Propane and Methane

How are the gases produced?
The gas mixtures are produced by two basic methods; gravimetric and volumetric. Wilhelmsen Ships Service span gases are in most cases mixed using the gravimetric process which ensures precise gas mixtures.

The gravimetric method is based on using finely calibrated scales to weigh the amount of gas put into the cylinder. By adding components and subsequent weighing, the composition can be set very accurately. The accuracy of the mix and the quality of the filling are of vital importance as impurities can result in incorrect calibration.

A prerequisite for a stable mixture is a perfectly clean cylinder. The span gas cylinders are cleaned by purging with high purity nitrogen followed by vacuuming. The strength of the vacuum and the holding time of the vacuum are two factors determining the level of cleanliness. For critical mixtures (i.e. ppm mixtures), the vacuuming is performed while the cylinders are slightly heated to ensure that any product adhering to the inner surface is removed.

After filling, the gas mixture must be thoroughly mixed to ensure that all components are evenly distributed throughout the cylinder contents. Gases have a tendency not to mix as easy as people might think, and when not properly mixed, the composition can vary along the length of the cylinder. The commonest way of mixing gases is to place the cylinders on horizontal rollers and rolling them for 2-4 hours.

After the mixing the gas cylinder content is ready to be certified. This means a sample of the gas cylinder content is analysed to ensure the stated composition is actually inside the cylinder. Wilhelmsen Ships Service uses an accuracy of 5% of the nominal composition.
For example: 2.5% Methane in nitrogen is the nominal composition. The certified composition will then be 2.5% ±5% relative = 2.5% ± 0.125%. This is standard for calibration and bump testing of gas detection equipment.

How long can I use the same gas cylinder?
Fairly small volumes of gas are used for span testing, which means that, in theory, cylinders could be used for a long time. However, in practice this is not the case. Most gases have a shelf life of 3 years after the actual filling and certifying, but in some cases the shelf-life can be as low as 6-12 months, as is the case for mixtures containing hydrogen sulphide.

Information on the shelf-life and filling date can always be found on the certificate of analysis that comes with each refillable cylinder or on the label of disposable cylinders.

How much gas is there in a cylinder?

- Refillable 10 litre 150/200 bar cylinder:
  Most mixtures based on flammable gases are filled to around 100 bars. Higher pressures are not possible because of the required stability of the mixture. The total amount of gas is therefore approx 1000 litres. Using a flow rate of 1.5 litre min (the maximum recommended for most sensors) this will give approximately 660 minutes of usage.
- Disposable MINIMIX cylinder:
  Usually contain 16 litres of gas, giving approximately 10 minutes of gas flow.
- Disposable Scotty IV cylinder:
  Usually contain 50 litres of gas giving approximately 30 minutes of gas flow.
- Disposable Scotty 28 cylinder used for a 4-component mixture:
  Usually contain 27 litres of gas giving approximately 18 minutes of gas flow.

Not only from an economical point of view but also from an environmental point of view, it is preferable, where possible, to use the refillable cylinders over the disposable ones. In some cases where there may be corrosive reactions in the cylinder wall, only disposable cylinders are available.

Storage and safety
As span gases are supplied in pressurized containers there are certain rules and precautions one must observe when handling and storing the cylinders. The cylinders must always be handled with great care and stored vertically and secured to the bulkhead to prevent tipping over or accidental damage. They must be placed in a separate room which must be well ventilated and clearly marked with “gas under pressure” signs. The disposable cylinders, when empty, must be disposed properly and with care to both the crew and the environment.

Availability
As mentioned above, strict cylinder cleaning and filling procedures are vital for the quality of the end product. This limits the number of filling stations capable of delivering span gases in the quality we require. The other consideration when stocking the span gases is the shelf life of the gas. In view of these limitations, Wilhelmsen Ships Service ensures global coverage using major ports such as Singapore, Rotterdam or Houston. For other ports all span gases can be made available given sufficient lead time in order to produce or mix the gas or transport it from the major hubs.

In addition, a limited selection of span gases can be found in several smaller ports to meet customer demand.

Wilhelmsen Ships Service has a broad understanding of customers’ needs with regards to the application and use of span gases. The range of gases covers most applications on board and is guaranteed both in terms of quality of filling and the cylinder itself. In addition to the span gas range Wilhelmsen Ships Service offers a wide range of peripheral equipment such as regulators, flow meters and brackets in order to supply the vessel with a complete solution and satisfy the customer needs and demands.

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Wilhelmsen Ships Service has the world’s largest maritime services network, with 4,600 marine professionals servicing 2 200 ports in 125 countries. Wilhelmsen Ships Service supplies regulatory products and services, Unitor marine products, Nalfleet marine chemicals, maritime logistics and ships agency to the maritime industry. Last year the company made 214 000 product deliveries to 23 000 vessels and handled 54 000 port calls.

For more information, see www.wilhelmsen.com/shipsservice or contact wss.marketing@wilhelmsen.com