

APPLICATION

The TFS-series is the result of intensive development efforts and is used either in laser marking or in laser engraving applications but also in other applications with medium / high dust content. The systems are characterized by their large filter surface and its intelligent system design.



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AREAS OF APPLICATION:

- Laser machining with 30-150W CO₂ lasers and 10-50W solid-state lasers (fibre lasers and crystal lasers) respectively with a working surface of 1500 x 1000 mm
- Work processes with sticky/dampish dust
- Work processes with vapours/gases

THE SYSTEM INCLUDES A LARGE VARIETY OF FEATURES:

- Simple filter replacement
- Special filter concept increasing the service life of the system
- High-performance extraction
- Individual filter monitoring for optimized maintenance
- Powerful electronics

FUNCTIONAL PRINCIPLE

The process air is drawn from the place of origin into the system – e.g. by means of a suction hose. Once it is inside the system, it passes the intake socket to reach the SafeLine prefilter developed specifically for the TFS-series. This allows optimum inflow across the whole filter surface thus reducing losses within the filter. In addition, the filter was optimized for low-contamination filter replacement. Once it passed the prefilter, the air then reaches the particle filter (H14 in accordance with DIN EN 1822). It separates smallest particles from the process air thus allowing circulating the air back to the work area later on. Once the harmful particles have been separated, the air is led to the activated-carbon/BAC filter separating gaseous substances and collecting odours. In order to optimize the separation performance and to increase the service life, the whole activated-carbon unit has been completely reworked thus optimizing it significantly. After passing this last step of the filtration process, the air is returned to the work area by means of the high-performance blower and passing the acoustic insulation of the system's exhaust vent.

PRODUCT FEATURES

SIMPLE FILTER REPLACEMENT

Filter replacement is done easily by the front door of the system. The SafeLine filter on fig. 1(1) and the particle filter on fig. 1(2) are two separate filters braced into the TFS-series by a common tensioning system. Nevertheless, they can be replaced separately. No tools are required for the filter replacement. The process thus doesn't take much time either. The activated-carbon/BAC filter on fig. 1(3) is located above both of the two saturation filters and can be replaced separately if required.

SPECIAL FILTER CONCEPT

INCREASING THE SERVICE LIFE OF THE SYSTEM

Specifically for the application in TFS-series, the filters used were optimized regarding both handling and the system's service life. For this purpose, the SafeLine filters are mounted into a closed filter housing which can easily be closed during the filter replacement (fig. 2) thus effectively protecting the operator against the filtered matters they contain. The special design allows heavy particles to settle at the bottom of the filter without clogging the filter surface. Ultimately, the combination of the huge filter surface and optimum inflow into the filter packages ensures the long service life.

In order to meet the constantly growing safety requirements of our customers, particularly in the area of laser welding, the TFS-series is equipped with an H14 particle filter (99,995% in accordance with DIN EN 1822). This filter even facilitates the separation of ultra-fine particles and enables the recirculation of the cleaned air to the work area. At the activated-carbon/BAC step of filtration, gaseous substances are separated from the air previously cleaned from particles. For an increased service life, the complete airflow inside the filter was now modified thus reducing the flow rates and optimizing the contact time of air and granulate. As a result, the service life of the filter was increased significantly.

HIGH-PERFORMANCE EXTRACTION

TFS 1000 was developed specifically for 30-150W CO₂ lasers and 10-50W solid-state lasers (fibre lasers and crystal lasers) with a working surface of 1 500 x 1 000 mm as well as for other applications with a high demand of air volume (e.g. multi-site extraction). In addition to this, the TFS 500 is equipped with a high-power turbine, which enables effective extraction even with small hose cross-sections.



Fig. 1



Fig. 2:
Back of a SafeLine filter

INDIVIDUAL FILTER MONITORING FOR OPTIMIZED MAINTENANCE

Using the electronic control system **INSPIRE**, TFS-series includes separate filter monitoring for SafeLine and particle filters; see fig. 3(5,6). Easing the maintenance planning, this also optimizes the maintenance costs for the customer.

POWERFUL ELECTRONICS

TFS-series is equipped with the electronic control system **INSPIRE**. In comparison with other systems known on the market, it stands out particularly for its colour display, its ease of use without complicated menu navigation and its wide performance range.

- Manual adjustment of the rotation speed
- Switching between run/standby
- Individual filter monitoring of SafeLine and particle filters with status indicator
- Filter-saturation indicator of the extraction system
- Optical and acoustic filter-saturation indicator
- Display & notification of malfunctions

INTERFACE:

- Individual filter monitoring of prefilter and main filter with status indicator
- Adaption to specific customer applications is possible by means of parameterisation
- Error memory improves the coordination between the customer and the TBH service
- Comprehensive interface functions



OPERATING ELEMENTS:

A) Switching between run/standby

B) Manual adjustment of the rotation speed

1) Filter-saturation indicator

2) System status indicator

3) Performance-setting indicator/
operating-hours meter

4) Temperature and turbine-malfunction
indicator

5) Prefilter status indicator

6) Main-filter status indicator

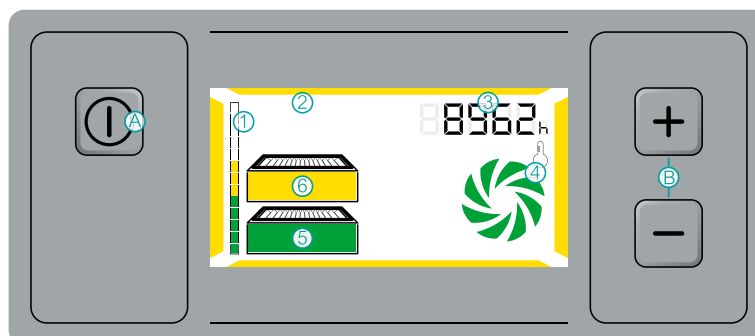
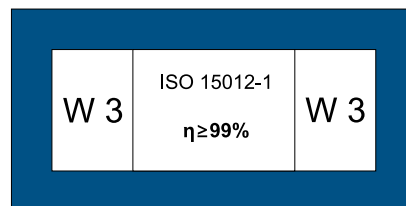


Fig. 3

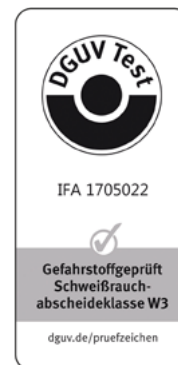
INDUSTRIAL SAFETY AND HEALTH PROTECTION

In order to meet our customers' safety requirements even better, TBH has complemented its product range by different extraction and filter systems specifically tested by the German Institut für Arbeitsschutz (IFA) [Institute for Occupational Safety and Health] in accordance with DIN ISO 15012-1 (2013).



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ADSORPTION OF GASEOUS SUBSTANCES

Two complimentary filter materials are used for the adsorption of gaseous substances. The activated carbon facilitates the physical adsorption process while the BAC granules facilitate a chemical adsorption process. Neutralisation of specific gaseous substances is achieved through chemical binding with the reaction substance that is deposited on the carrier material. Because the physical and chemical adsorption processes are complementary, an extremely wide range of gases and odours can be collected.

Activated carbon



BAC granules



Activated carbon/BAC

