

# Compressed air energy efficiency audit GFAA-AA

**FESTO**



## Key features

### Compressed air energy efficiency audit

#### Is this situation familiar to you?

You need to design your production to be climate-neutral. You therefore want to use compressed air more efficiently to reduce CO<sub>2</sub> emissions. However, you don't know the best place to start as you are not aware of the weak points in your compressed air system and do not know precisely which measures are the most cost-effective.

#### Service package:

During the compressed air energy efficiency audit, our auditors analyse your entire compressed air system, from the compressor room to the pneumatic application. They identify inefficient use of compressed air, locate leaks and recommend optimisations.

They examine the compressed air generation and utilisation of the compressor as well as the air preparation, air quality and the compressed air network. In addition, they carry out a representative leakage detection test on selected pneumatic systems, check the pneumatic efficiency and evaluate the potential savings. To complete the audit package, the experts draw up a concept for a monitoring system.

At the end, you will receive a detailed report which accurately documents all the data and recommends actions, in order of priority, for optimising compressed air efficiency and potential savings. The final report with all the measurement results can be used for energy management in accordance with ISO 50001. The documentation furthermore provides the CO<sub>2</sub> emission values of the compressed air system, which you can use in your sustainability report, in accordance with GRI or GHG for example, and in your climate strategy.

#### The benefits to you:

- Analysis of the current condition of complete compressed air systems, from the compressor to the pneumatic application
- Recommendations for actions simplify the decision-making process for where to begin with measures for increasing efficiency
- TÜV-certified in accordance with ISO 11011
- Compliance with ISO 50001
- Energy savings of up to 60% possible in pneumatic systems
- Improved productivity and process reliability

### Services

The service package includes:

	Additional information
	→ page
• Analysis of compressed air generation: power consumption/delivery capacity/pressure/utilisation	3
• Measurement and analysis of air preparation at the point of generation: sizing/drying capacity/compressed air quality (water and residual oil content)	4
• Analysis of the compressed air distribution: pressure measurement directly downstream of compressed air generation and at least two consumer points for calculation of the pressure drop	5
• Analysis of pneumatic applications: visual inspection of the production plant with leakage detection and detailed energy efficiency analysis of the pneumatic applications on selected machine cells	6
• Concept for a compressed air monitoring system	8
• Detailed analysis of energy saving potential and recommended measures to increase energy efficiency	
• Documenting the results in accordance with DIN EN ISO 11011 in the web-based Festo Energy Saving Services Portal	

Ordering data			
Description	Work involved on site	Part no.	Type
Compressed air energy efficiency audit, up to 3 compressors	2 days	8159956	GFAA-AA-1
Compressed air energy efficiency audit, 4 to 6 compressors	2.5 days	8159957	GFAA-AA-2
Compressed air energy efficiency audit, more than 6 compressors	3 days	8159958	GFAA-AA-3

### Additional support

On request, our service technicians will support you with the implementation of specific improvement measures for increasing energy efficiency and reducing CO<sub>2</sub> emissions.

## Key features

### 1. - Analysis of compressed air generation

#### Scope of services

- Analysis of the compressor output
- Analysis of utilisation (availability)
- Calculating the leakage level of the production plant
- Calculating the annual electricity and compressed air costs as well as savings by eliminating leakages
- Analysis of possible savings on compressed air, CO<sub>2</sub> emissions and costs by switching off the compressed air supply at unproductive times

#### The benefits to you

- Manufacturer-independent analysis
- Analysis during operation
- Transparent energy consumption of the entire system
- Awareness of the compressor's output reserves

#### Details

##### Objective:

Energy-efficient compressed air production

Optimising the sizing and compressor running times requires a clear, resilient consumption profile in line with operating times



##### What's the process?

1. Documentation and calculation of:
  - Type and size of the system
  - Energy consumption
  - Compressed air requirement
  - Consumption fluctuation
2. Analysis and report about:
  - Compressor output (specific output)
  - Utilisation (availability)
  - The load/unload cycles per hour
  - Consumption of air and compressed air (max, min, Ø)
  - Total cost of the compressed air generation (kWh and m<sup>3</sup> and per year)
  - CO<sub>2</sub> emissions
  - Maximum potential savings for compressed air per year
  - Performance reserves
  - Suggested improvements, if necessary

## Key features

### 2. Analysis of compressed air preparation

#### Scope of services

- Analysis of compressed air preparation (air dryer, air filter and air buffer)
- Measurement of compressed air quality
- Suggested improvements where necessary

#### The benefits to you

- Assurance of optimum compressed air quality
- Increased service life of pneumatic components
- Minimisation of unexpected production downtimes
- Necessary adaptation of compressed air preparation



#### Details

##### Objective:

Increased service life of pneumatic components and preventing machine failures

Targeted sizing of compressed air preparation for optimum compressed air quality



##### What's the process?

1. Analysis of centralised and decentralised compressed air preparation through visual inspection
2. Measurement of:
  - Residual oil content up to DIN ISO 8573 Class 2
  - Water content and pressure dew point up to DIN ISO 8573 Class 2
  - Compressed air temperature at the measurement point
  - Absolute air pressure at the measuring point
3. Analysis and report about:
  - Evaluating the results
  - Suggested improvements if necessary

## Key features

### 3. Analysis of compressed air distribution

#### Scope of services

- Pressure drop measurement
- Documentation of the compressed air reservoirs
- Calculating the total storage capacity (compressed air reservoirs and compressed air network)
- Analysis of possible savings on compressed air, CO<sub>2</sub> emissions and costs by cutting pressure losses and reducing the pressure level

#### The benefits to you

- Reliable processes thanks to constant pressure level
- Identification of unnecessary overpressure
- Reduction in pressure and pressure fluctuations
- Cost saving by using lower pressure level

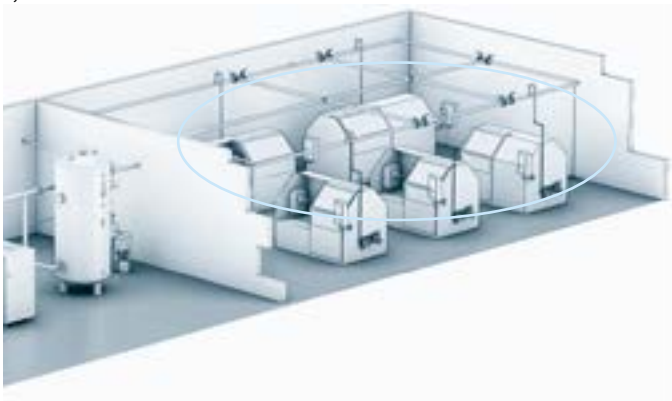


#### Details

##### Objective:

Avoiding losses caused by excessively high pressure drops in the network

The compressed air network can be a bottleneck for production if it is not sized adequately for the required compressed air demand of the installed machines/ systems



##### What's the process?

1. Pressure drop measurement
  - Measuring the compressed air directly downstream of the compressed air generation and at least two consumer points on the compressed air network
2. Determining the pressure level to be generated
  - Verifying the actual pressure at the consumer points
  - Determining the setpoint pressure at the consumer points
3. Analysis and report about:
  - Existing compressed air reservoirs
  - Geometry and cross section of the compressed air network
  - Calculating the compressed air drop in the compressed air network
  - Calculating the total storage capacity (compressed air reservoirs and compressed air network)
  - Investigating the causes of the compressed air drop
  - Calculating the possible savings potential
  - Detailing necessary maintenance measures
  - List of spare parts required

## Key features

### 4. Analysis of pneumatic applications

#### Scope of services

- Energy efficiency analysis of pneumatic applications
- Leakage detection and documentation
- Analysis of possible savings on compressed air, CO<sub>2</sub> emissions and costs by eliminating leaks and optimising compressed air consumption

#### The benefits to you

- Transparency of losses in energy and costs and of CO<sub>2</sub> emissions caused by leaks
- Detailed list of required maintenance measures, including recommended spare parts



### Details – Energy efficiency analysis

#### Objective:

Optimising the application to reduce energy consumption, stabilise processes and reduce costs

#### Analysis of compressed air application in relation to energy saving potential



#### What's the process?

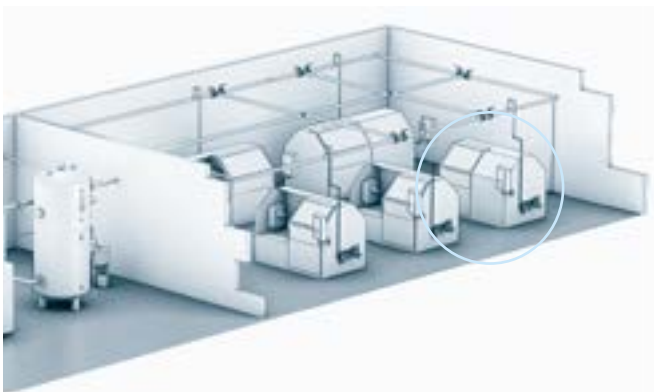
1. Measurement (if required) of:
  - Pressure level
  - Compressed air consumption
2. Evaluation of:
  - Sizing of drives, valves and tubes
  - Optimising blowing and vacuum applications
  - Reducing pressure drops and operating pressure
  - Optimising installation and control concepts
3. Analysis and report about:
  - Inefficient use of compressed air
  - Energy saving potential
  - Improvement options
  - Estimation of annual savings in costs and CO<sub>2</sub> emissions and predicted depreciation of possible optimisation measures

### Details – Leakage detection

#### Objective:

Detection and documentation of leaks as the most important efficiency measure

A leaking compressed air system is a pure waste of energy and money, and jeopardises process reliability



#### What's the process?

1. Leakage detection at selected machines/systems
  - Detecting leakages during operation with highly sensitive ultrasonic detectors
  - Identifying and classifying leakages according to priority (three categories with respect to size and costs)
  - Photographic documentation (location, amount in l/min)
2. Analysis and report about:
  - Calculating losses in energy and costs and of CO<sub>2</sub> emissions
  - Detailing necessary maintenance measures
  - List of spare parts required
  - Estimated repair time
  - General optimisation options
  - Online access to the data provided via the Festo Energy Saving Services Portal for follow-up

## Key features

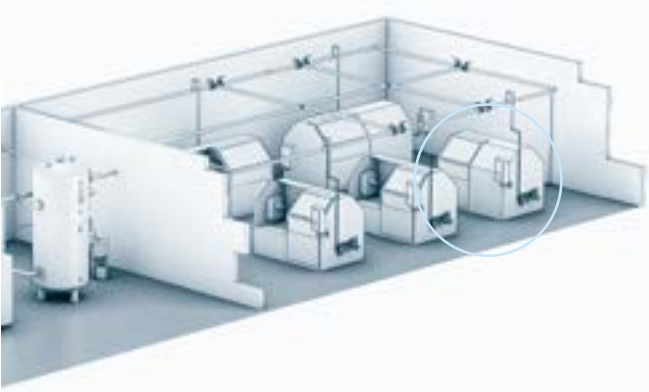
### 4. Analysis of pneumatic applications

Details – Repair of leakages (on request)

Objective:

Elimination of leaks as the most important efficiency measure

A leaking compressed air system is a pure waste of energy and money, and jeopardises process reliability



What's the process?

1. Replacement of faulty parts
  - Tubing
  - Fittings
  - Drives
  - Valves
2. Sealing or replacement of seals
3. Documentation and follow-up of remedied leaks in the Festo Energy Saving Services portal

The benefits to you

- Improved compressed-air energy efficiency
- Up to 60% savings possible in pneumatic systems
- Compliance with ISO 50001
- Improved productivity or process reliability

## Key features

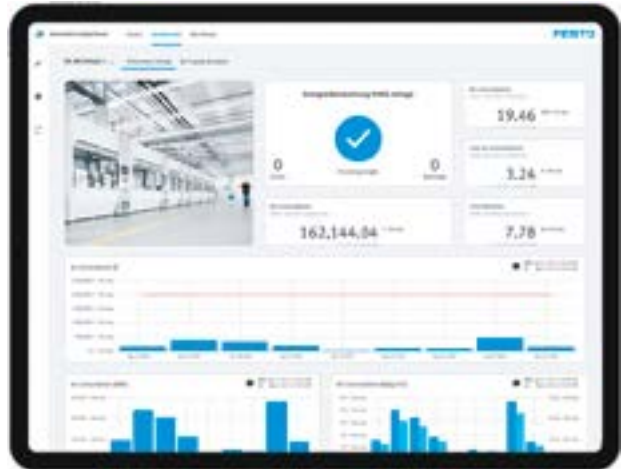
### 5. Concept for a compressed air monitoring system

#### Scope of services

Concept for status monitoring of overall compressed air system and individual subsections where recommended

#### The benefits to you

- Transparency of flow rate, pressure and air humidity – the basis for energy efficiency
- Evaluation of power consumption
- Real-time monitoring of parameters and messaging in the event of irregularities
- Assessment of energy efficiency measures
- Improvement in Overall Equipment Effectiveness (OEE)
- Maintenance based on energy efficiency
- Contribution for audits and certifications (e.g. ISO 50001)



#### Details

##### Objective:

Assurance of overall equipment effectiveness, energy efficiency and profitability of systems

#### Possible monitoring parameters

##### Volumetric flow rate and consumption:

- Analysis of compressed air consumption of the entire system, production areas, machine groups/machines
- Transparency of compressed air consumption, costs and CO<sub>2</sub> emissions
- Detection of non-conformities (e.g. caused by leakages)

##### Pressure:

- Analysis of pressure level in various system sections
- Avoidance of inefficient high pressure level
- Detection and elimination of pressure drops before they cause machine shutdown

##### Pressure dew point:

- Humidity analysis of compressed air
- Ensuring the recommended compressed air quality for specific manufacturing processes, e.g. in the food and pharmaceuticals industries
- Ensuring the recommended compressed air quality for pneumatic components
- Detection of non-conformities

The compressed air monitoring system provides actual data and historical data, enables comparisons with the previous year and monitoring of specific KPIs. Warnings can be triggered on reaching set threshold values so that countermeasures can be initiated immediately.



## Key features

### Festo Energy Saving Services portal

Online portal for results documentation and tracking repairs

- Web-based portal with linked mobile app
- Structured documentation of the audit results
- Option for service enquiries with preparation of quotation
- The Festo auditors use the mobile app to collect data on site; the web-based portal synchronises the collected data, processes it and creates a report on energy and CO<sub>2</sub> savings that can be viewed online and printed
- Access to all functions of the "Leakage detection and documentation" module is available by purchasing a licence or a subscription
- General features:
  - Real-time access to all data
  - Worldwide data availability
  - User-defined access rights

