



BluePlus

Measures to increase energy efficiency





Global energy requirements are constantly increasing. In order to counteract the rapid increase in energy and climate change, the available energy must be used more efficiently and effectively. Energy efficiency is also becoming an important topic in machine tools.

Like all other companies in the UNITED GRINDING GROUP, STUDER has qualified for the BLUECOMPETENCE label, making it a forerunner in the industry.

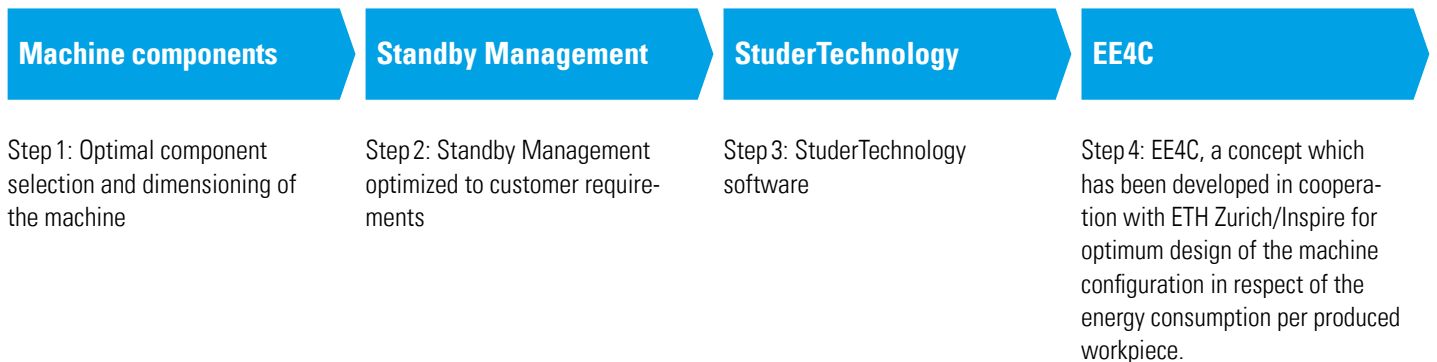
Fritz Studer AG has been certified to ISO 14001 since September 2014.

The international environmental management standard ISO 14001 defines globally recognized requirements on an environmental management system and is part of a family of standards. ISO 14001 focuses on a continuous improvement process as a means of achieving the objectives defined in relation to the environmental performance of an organization.

Fritz Studer AG has defined the following principles in relation to its products:

- Resource-conserving machine design combined with an engineering approach that takes account of the entire life cycle.
- Specific methods and simulation processes, which enable optimization of the machine structure and machine dynamics.
- Development and application of technologies and methods to save energy and costs.
- Energy-efficient manufacturing and production concepts.
- Fluid and thermal concepts with reduced use of fluids.
- Support of the machine operator in optimizing the energy consumption of his process.

The STUDER concept of the «4 BlueSteps» is used to implement these principles.



STUDER's BluePlus label

shows that Fritz Studer AG also has more to offer the customer than its competitors in the area of sustainability and energy efficiency.



1. BlueStep – Machine Components



- EXTRACTION SYSTEMS
- COOLING LUBRICANT SYSTEMS
- AXIS DRIVES
- MACHINE BED
- HYDRAULIC SYSTEM
- PNEUMATIC
- GRINDING SPINDLES
- 24 VOLT TECHNOLOGY
- TEMPERATURE CONTROL
- SOFTWARE

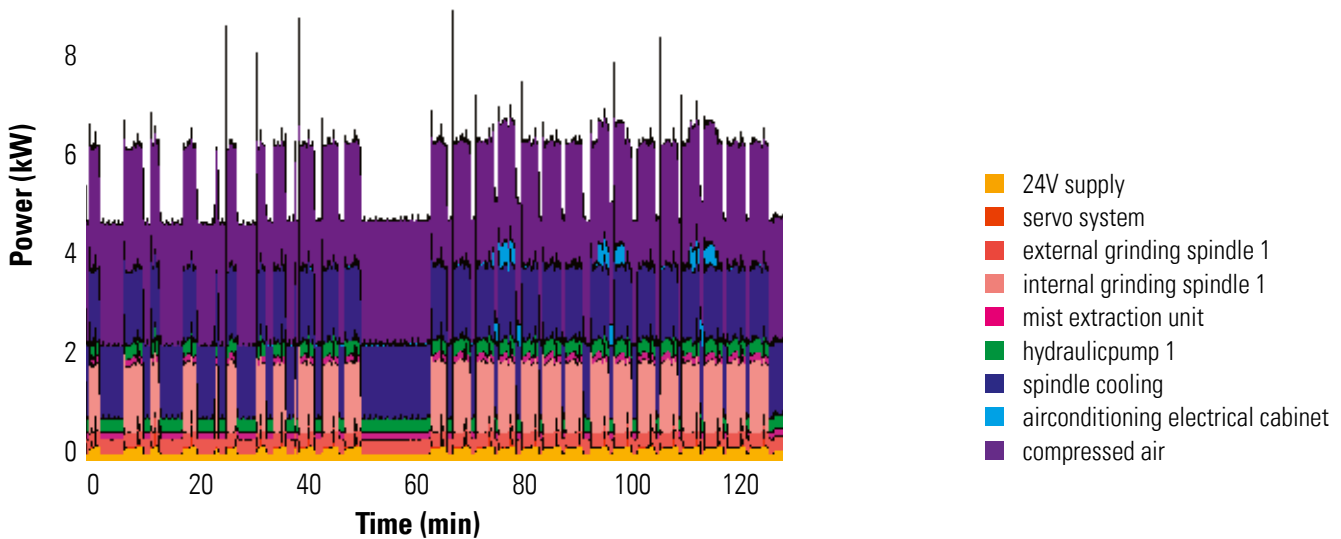
All of these consumers and components are of a certain technological standard. This is continuously and systematically improved by always using the most technologically advanced and energy-efficient components. We also adhere to these principles when selecting and defining the technical concepts.

- **Extraction systems** are equipped with frequency converters.
- **Cooling lubricant systems** are equipped with frequency converters.
- **Axis drives** are optimized to the application.
- **The machine bed** is made of Granitan.
- **The hydraulic system** is equipped with storage technology and frequency-controlled pumps.
- **The pneumatic system** has been improved by measures to the piping, cross-sectional transitions and processing.
- **Grinding spindles** are only operated in the optimum performance range.
- **The 24 volt technology** has been optimized.
- We have also developed a method for quicker temperature control of the machine. The time saving is approx. 60%, and the energy consumption in the temperature control phase is reduced accordingly.
- **Software:** The StuderTechnology software makes an essential contribution to increasing energy efficiency

2. BlueStep – Standby Management

Power Area Chart

2014-11-26 - PR - K01 - K01 - 100



This measuring device has been developed in cooperation with ETH Zurich / Inspire. Up to 16 electrical channels and one air pressure channel can be evaluated. Recording is automatic and results in a diagram like the one shown above.

The measured values are also processed in a software tool in such a way that the temporal profile and energy consumption of the respective consumers in relation to the other consumers is visible. We have used this analysis to implement BlueStep 1, the targeted use of components with a reduced energy requirement.

In practice all consumers are switched on in the morning and switched off again in the evening. These power-on/power-off phases can also be determined by our measuring device. Improvements are achieved by only switching consumers on when in use. Software adjustments are made in both the STUDER operating software and in the software individually programmed by customers, the grinding cycles. We support the customers here with our experience.

Summary

BLUE PLUS

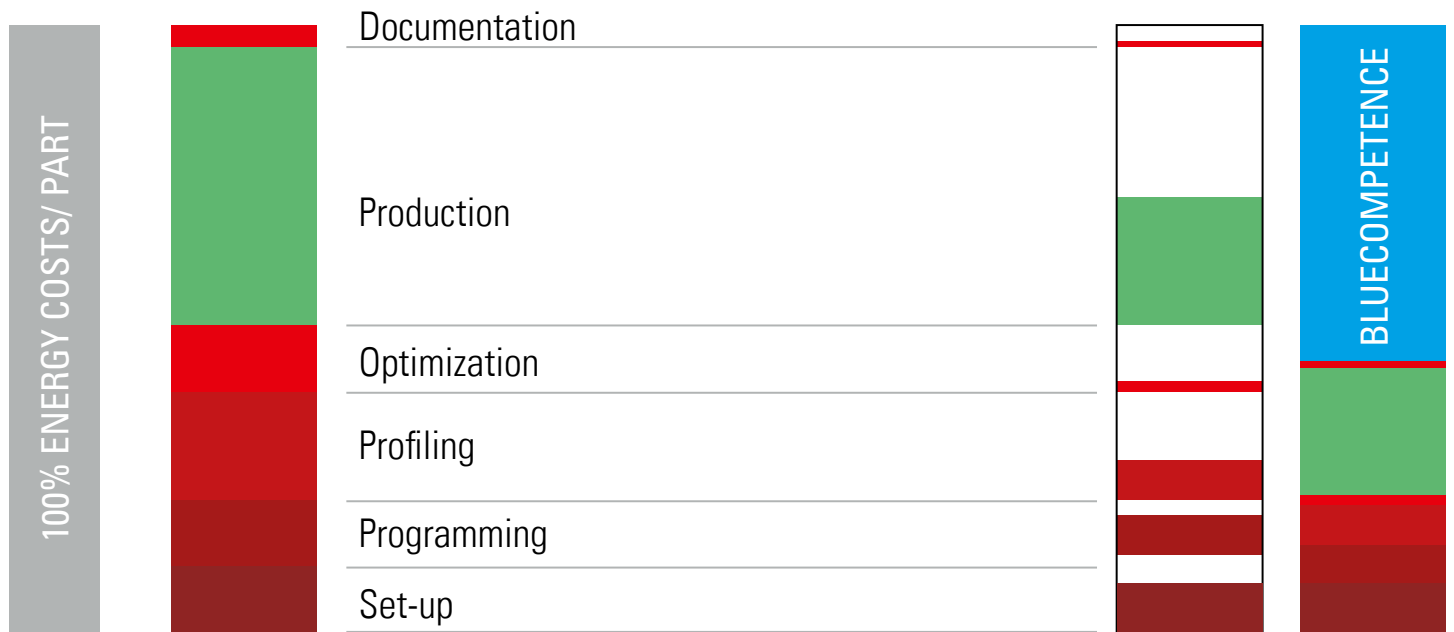
STUDER's own BluePlus label stands for:

- Resource-conserving machine design
- Detailed measurement down to component level taking account of all forms of energy
- Methods and simulation processes lead to optimum machine configuration for the customer's process
- Energy-efficient manufacturing and production concepts
- Fluid and thermal concepts with reduced use of fluids
- Support of the machine operator in optimizing the energy consumption of the process
- Targeted optimization leads to increase in the machine's value with the retrofit option

Quality is when we as a company also care for the environment. *Environmental group*



3. BlueStep – StuderTechnology



The StuderTechnology software makes an essential contribution to increasing energy efficiency. The column on the left represents the energy costs per produced workpiece with traditional usage behavior by the user. These energy costs can essentially be assigned to the activities of using a cylindrical grinding machine. With computer assistance the user can be provided with incentives to significantly improve the use of the machine. The individual times are drastically reduced. Grinding times alone can generally be reduced by 25 – 50%. I.e. the energy expended per part is substantially reduced.

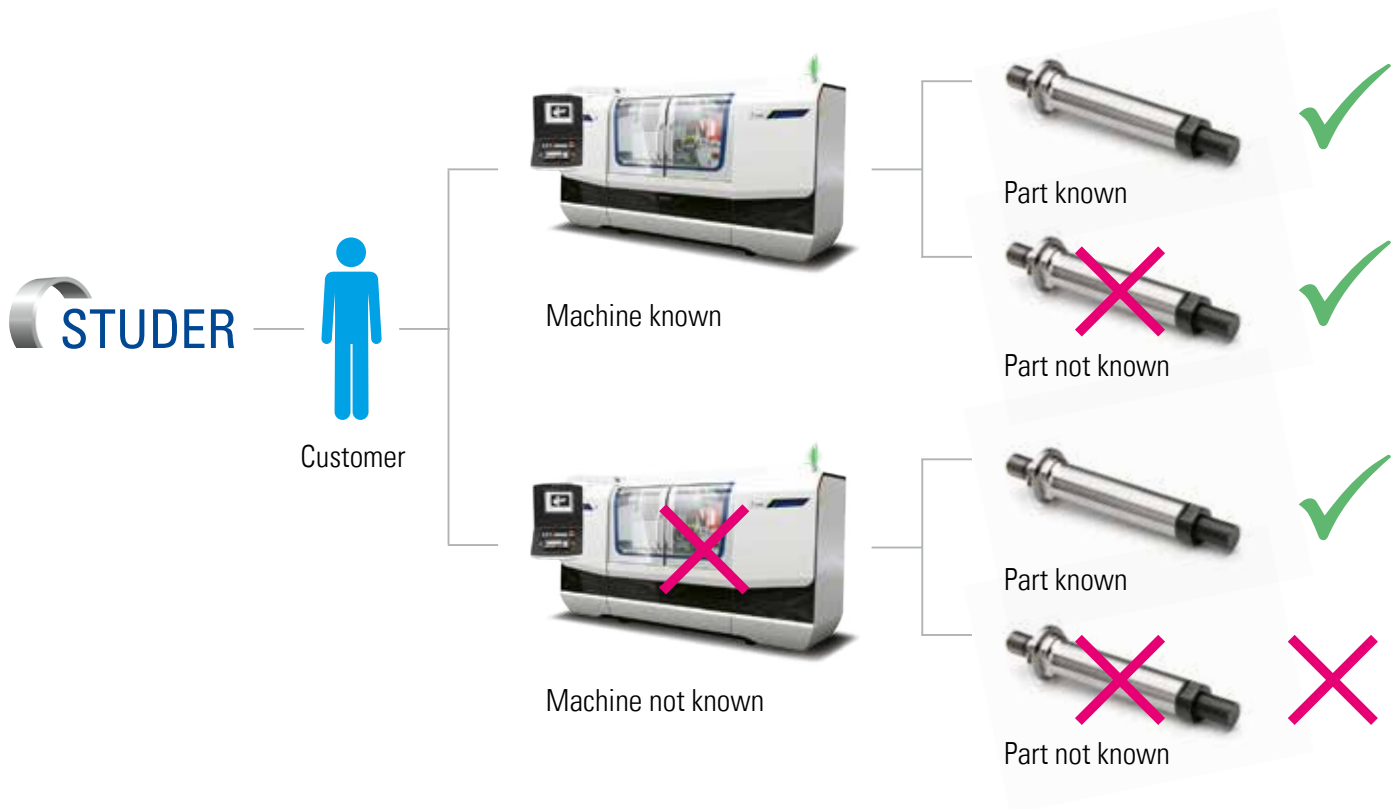
The advantages are:

- The machine operator no longer has to perform difficult calculations and is closer to an optimized grinding process straight away.
- There is practically no further optimization expenditure.
- Increased productivity, often 50% or more, and lower personnel costs per workpiece.
- Shorter grinding times and, simultaneously, better machine utilization.
- Lower energy costs per workpiece.
- High quality irrespective of the user.

Some features of StuderTechnology:

- Automatic suggestions for setting values for almost all grinding tasks.
- Monitoring and modification of setting values on the basis of material / abrasive combination, coolant etc.
- Inclusion of influencing variables such as spindle power, clamping devices, bending etc..
- Indication and warning system if settings values selected are unfavorable.

4. BlueStep – EE4C



EE4C – Energy evaluation for customer quotation

EE4C is a system which enables the customer to obtain the exact energy value for the production of his workpiece. This is in comparison to different machines with different technical equipment.

This requirement will be made increasingly by the industry in future. Proof of the energy costs per workpiece are already required in the quotation phase.

Early, detailed and reliable statements on calculation of the Total Cost of Ownership (TCO) are already possible in the quotation phase.

1. Detailed measurement down to component level (multi-channel) taking account of all forms of energy (electricity, compressed air).
2. New machines: Adapted machine configuration on the basis of customer or reference process is possible.
3. Retrofit: Detailed and targeted optimization of components and increase in machine's value through retrofit option.
4. Detailed forecast and monitoring / verification of TCO and resource costs down to component level are possible.



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