

Waveform Technology

Cristófoli Reduces Machining Time with Edgecam Waveform Technology



The need for sterilizing items such as clamps and scalpels occur in many industries. Hospitals, clinics, laboratories, and even tattoo parlors sterilize its equipment through the use of an autoclave. The autoclave sterilizes the equipment through a heat-damp pressure that is generated inside the autoclave.

With more than 150,000 autoclaves manufactured, Cristófoli Biosafety Equipment offer models that combine the technology and design best suited for dentists, doctors, laboratory technicians, and researchers.

In Campo Mourao, Parana, where Cristófoli autoclaves are designed and produced, the tooling department is responsible for machining production components used in autoclaves.

Rafael Aranha, Tooling Manager, Cristófoli says, "Agility is fundamental in the machining process. Edgecam provided many improvements in our roughing operation."

Prior to the implementation of Edgecam, the production of an adjustable rod took 14 minutes and seven seconds. That operation now takes less than three minutes - a reduction of 81%, according to Aranha.

During the roughing process, Waveform allows the toolpath to maintain constant cutting in all regions of the model, even during changes of direction. Gentle vibrations and cutting efforts are greatly reduced by generating a consistent cut. As a result, increasing feed rate and cutting depth helps improve the utilization of the machine and cutting tool.

About The Company:

Name: Cristófoli Biosafety Equipment

Business: Lab Safety Equipment

Web: www.cristofoli.com

Benefits Achieved:

- Reduced production times by as much as 81%
- Maintaining constant cutting improves the utilization of the machine and cutting tools
- Increased tool life by stabilizing cutting processes

Comments:

"Edgecam's Waveform has helped us improve our cycle times while improving our time-to-market, ensuring that we maintain our high levels of quality and service, which will always be our number one priority."

Rafael Aranha
Tooling Manager

	With Waveform	Before
Stepover	14%	70%
Feedrate	6,500mm/min	3,500mm/min
Cutting Depth	20mm	2mm
Cycle Time	2min 43sec	14min 07sec

Table 1: Machining aluminum adjustable rod held in a Romi Discovery 1000 machine with a Siemens 810 D control.

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“We are really excited about these early processes and understand that the more we master this technology, the more benefits we will see. By combining depth of cut and feed rate, we will have seen a significant reduction in cycle time without any additional investment,” Aranha says.

This drop is also significant in mold cavity machining (or milling) where the company realized a significant improvement in cycle time: Three and a half hours to 50 minutes - which means 76% reduction in production time.

Looking at the cutting tool data, it is possible to notice that the use of high feed tools allows us to operate at a higher feedrate, however this is done using smaller cutting increments. With the use of Waveform, it is possible to use much of the cutting area of the tool without causing damage. Analyzing this process allowed us to change our cutting depth from 0.6mm to 10.0mm, according to Aranha.

In addition to using more of the cutting area, Waveform increases tool life. Despite cutting parameters considerably larger than what is available in the conventional process, Waveform’s soft cutting direction change ensures stability for the cutting process, therefore preserving the tool. This subjects the cutting edge to fewer cracks and less wear.

“Edgecam’s Waveform has helped us improve our cycle times while improving our time-to-market, ensuring that we maintain our high levels of quality and service, which will always be our number one priority,” concludes Rafael.



“We were able to reduce the machine cycle time without investing in additional machinery,” says Rafael.



“The adjustable stem, which previously took 14 minutes and seven seconds to complete, the roughing process now takes less than three minutes - a reduction of 81%.” says Rafael.

	With Waveform	Before
Stepover	10%	50%
Feedrate	6,000mm/min	7,000mm/min
Cutting Depth	10mm	0.6mm
Cycle Time	50min	3hr 30min
Speed	8,000rpm	1,500rpm

Table 2: Machining a carbon steel cavity held in a Romi Discovery 1000 machine with a Siemens 810 D control.

