Velocity 5™

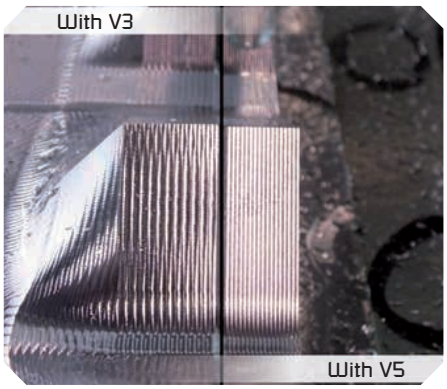
Application cases

FIDIA

High speed machining

High speed and accuracy of complex surfaces machining are the most known and appreciated features of Fidia CNC Numerical Controls.
Years of rigorous and close collaboration with top End Users and Machine Tools Builder has allowed Fidia to be on the leading edge in CNC's technology of complex surface milling.
Velocity 5™ is a further significant step in speed and quality improvement.
It is available on the full current range of Fidia numerical controls and can be installed as retrofitting on many of those already operating.

Velocity 5™



Velocity 5™: How to improve surface quality reducing milling time

Velocity 5™: smooth and uniform axis movements resulting from new speed and acceleration algorithms

Fidia introduces Velocity 5™, a new technique for axes control, that significantly improves the performances of the machine, in 3 axes as well as in 5 axes machining.

With Velocity 5™ the tool path processing is based on new algorithms, that enhance the dynamic behaviour of the machine and ensure a better finishing and smoother surfaces, even when the tool path is slightly uneven.

Whatever the operation is, roughing, semi-finishing or finishing, the benefits are substantial:

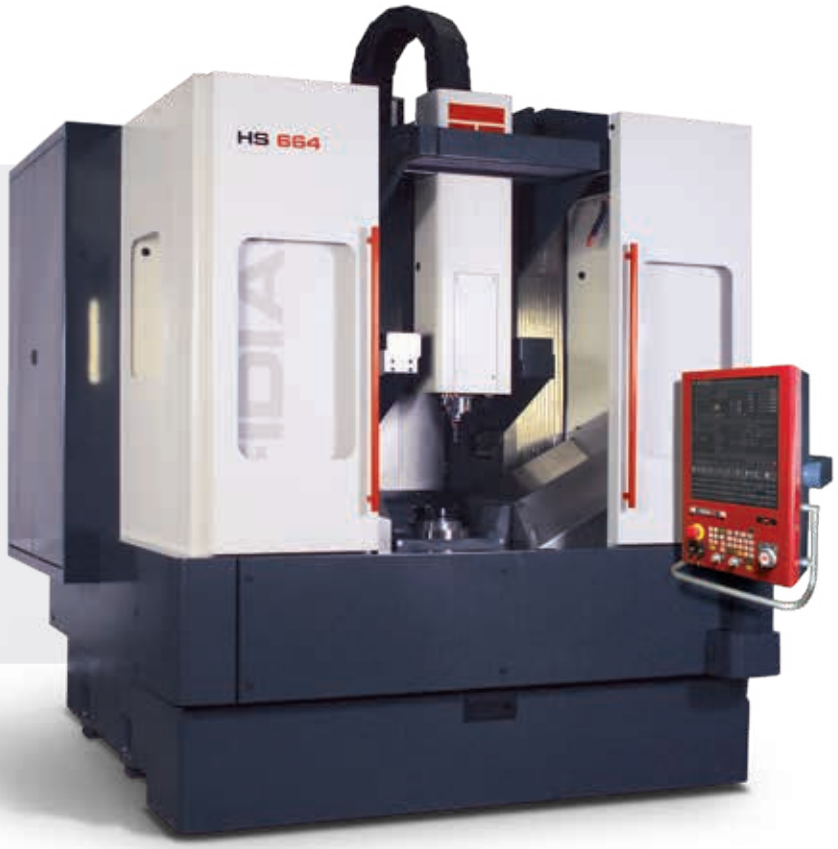
- reduction of milling time execution on 3D profiles (average saving is 15-20 %, up to 30-40%)
- improvement of the machined surface quality
- faster execution of areas with small radii
- uniform behaviour of the machine in both milling directions
- smooth movements of the machine axes thanks to new acceleration control techniques
- simple use, as with one single parameter (DYNA) the operator can choose a higher accuracy or a faster feed rate

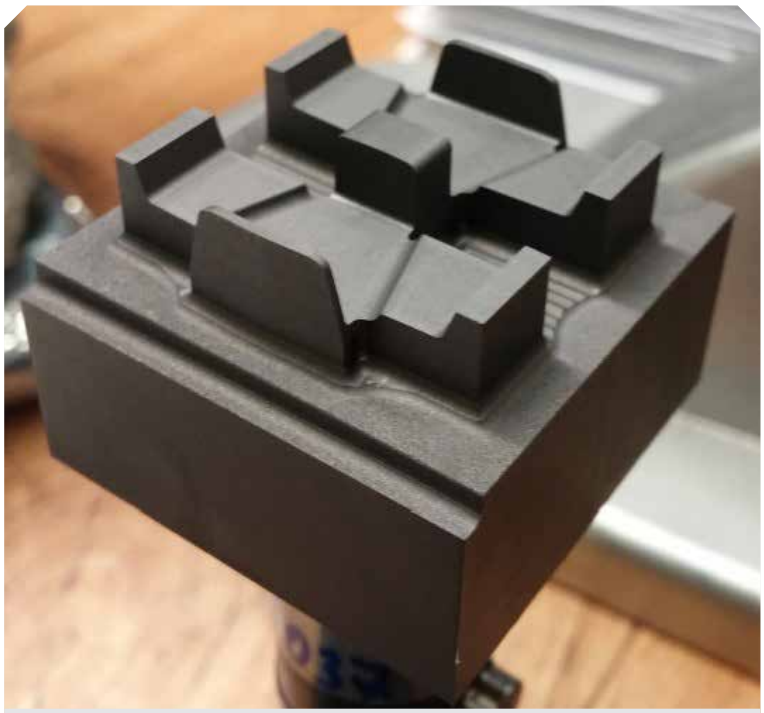
The improved fluidity of axis movements is immediately perceived: critical areas with a large number of points are covered at constant feederate and changes of direction are rapid and completed with no hesitation. The intended trajectory is executed with precision at the highest feederate. The final result is an excellent finishing quality and unmatched execution time.

Besides, the Velocity 5™ installation allows the reduction of mechanical stress of the machine tool and of the tool wear, leading to higher profitability of the equipment.

Velocity 5™ on FIDIA HS664

FIDIA
HS664





Application

3 axes machining of a graphite electrode

Results from compared test

Type of milling	Lead time		[%]
	With V3	With Velocity 5™	
EL-CELO	0:00:51	0:00:46	-9,80%
KONTURA_HR	0:02:02	0:01:53	-7,38%
J6309	0:01:49	0:01:34	-13,76%
J6310	0:16:20	0:11:48	-27,76%
J6311	0:03:31	0:02:06	-40,28%
J6312	0:22:13	0:14:27	-34,96%
J6313	0:22:24	0:13:03	-41,74%
KONTURA_CISTO	0:01:32	0:01:20	-13,04%
Total time	**1:10:42**	**0:46:57**	**-33,59%**
Total time saved [%]		**-33,59%**	

Conclusions

Finally, the test achieved a wonderful result in saving 33,5% of production time.

Velocity 5™ on FIDIA K199

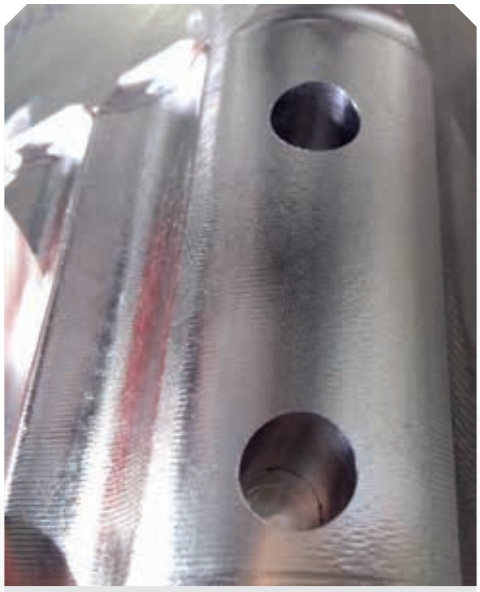
FIDIA
K199

Application

5 axes machining of an aluminium test part

Results from compared test

Type of milling	Lead time		[%]
	With V3	With Velocity 5™	
001P001 (Roughing)	0:28:52	0:22:56	-20,55%
001P002 (Roughing)	0:07:12	0:05:04	-29,63%
001P003A (Finishing)	0:14:08	0:10:38	-24,76%
001P004 (Finishing)	0:06:29	0:04:15	-34,45%
001P005 (Finishing/drilling)	0:11:31	0:03:04	-73,37%
Total time	**1:08:12**	**0:45:57**	**-32,62%**
Total time saved [%]		**-32,62%**	



Surface quality with V3

Surface quality with Velocity 5™

Conclusions

Finally the test achieved an improved surface quality of the part with wonderful results in saving 32,62% of production time.

Velocity 5™ on Droop und Rein FOGS 1840

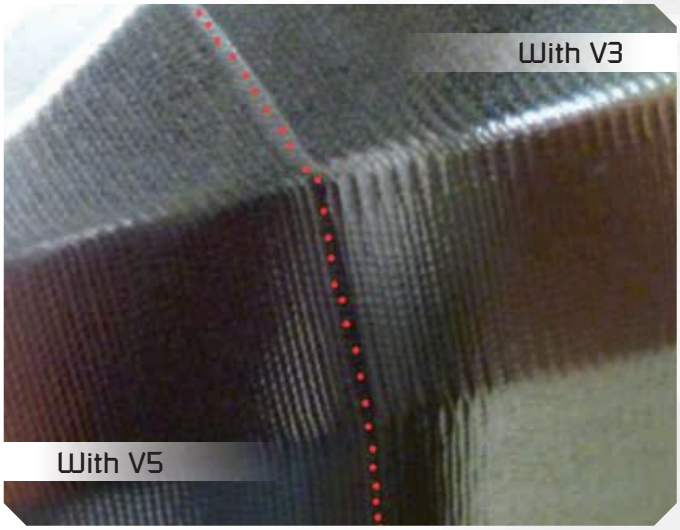
DS Technologie FOGS 1840

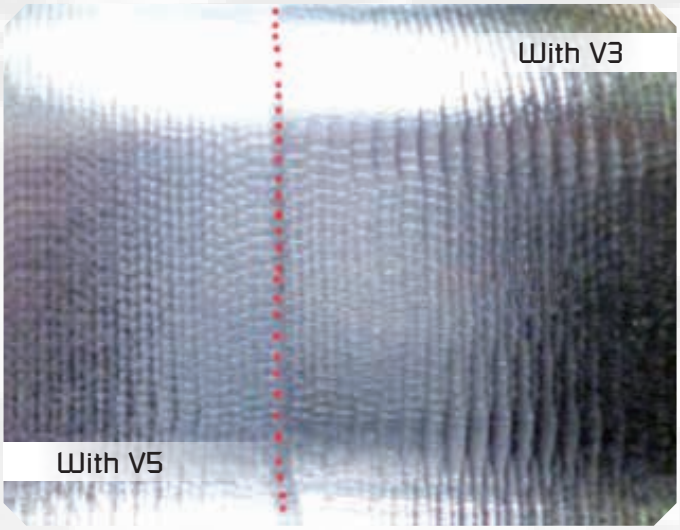
Application

5 axes machining of steel test parts

Results from compared test

Type of milling	Lead Time		[%]
	With V3	With Velocity 5™	
LP9670.tr1 - Part1	0:30:23	0:27:19	-10,09%
LP9670.tr1 - Part2	0:16:16	0:10:06	-37,91%
LP9670.tr1 - Part3	1:00:27	0:57:34	-4,77%
Total time	**1:47:06**	**1:34:59**	**-11,31%**
Best time saving perf. [%]		**-11,31%**	



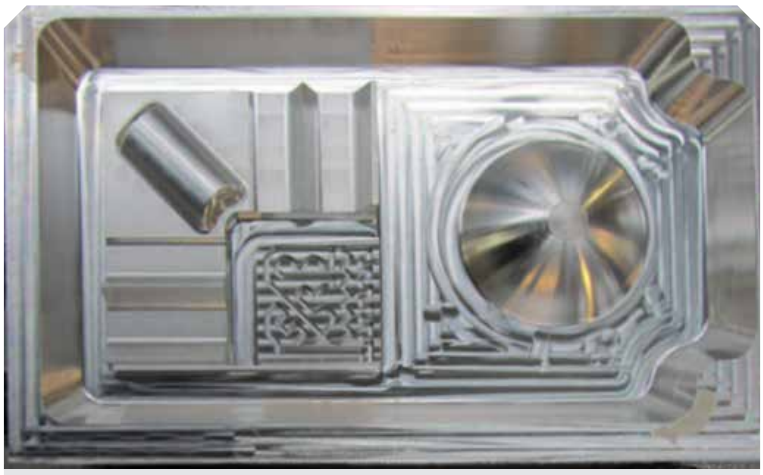


Conclusions

The specific critical characteristics of the selected applications gave evidence of an improved surface quality with a slightly progress in time performance (6 to 7% exploiting DYNA parameter potential). Nevertheless, the innovation brought by Velocity 5™ at a global CNC performance level allows to work with higher machining parameters (Feed=8000 and Spindle=7500), achieving time savings in the order of 37% as shown for Part 2 program execution, which can be extended to the entire machining program.

Velocity 5™ on Henri Line Bridge Machine

Henri Line Bridge

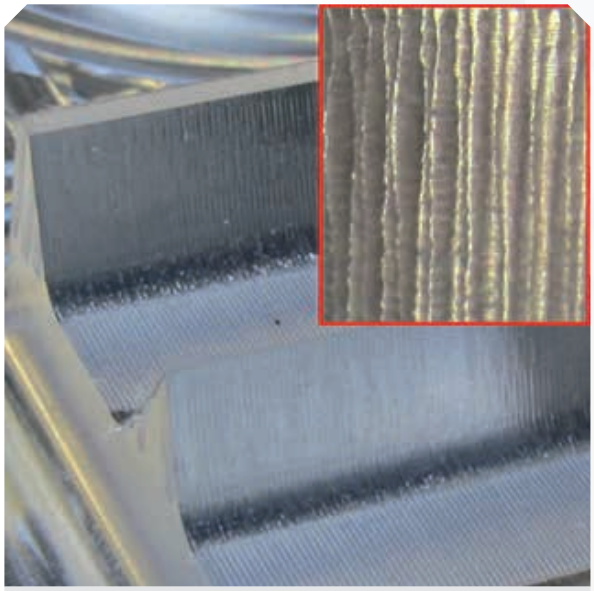


Application

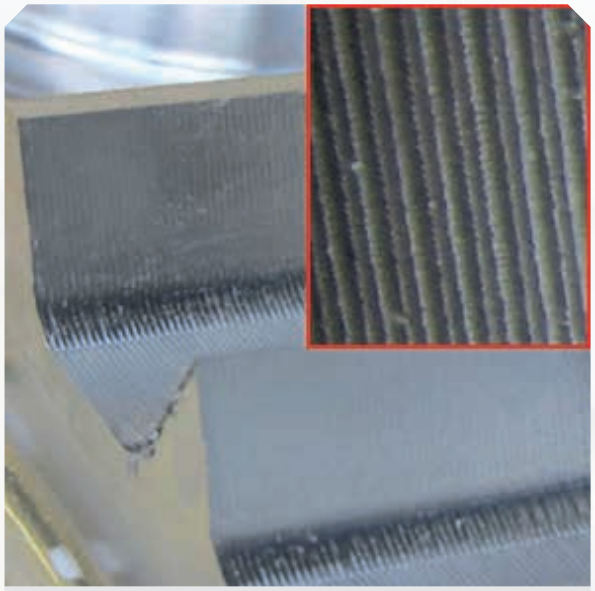
5 axes machining of aluminium test part

Results from compared test

Type of milling	Lead Time		[%]
	With V3	With Velocity 5™	
NC 001 (Roughing)	0:51:00	0:42:00	-17,65%
NC 002 (Roughing)	0:09:00	0:08:00	-11,11%
NC 003 (Roughing)	0:34:00	0:25:00	-26,47%
NC 004 (Finishing)	0:01:12	0:01:00	-16,67%
NC 005 (Finishing)	0:06:00	0:04:00	-33,33%
NC 006 (Finishing)	1:02:00	0:40:00	-35,48%
Total time	**2:43:12**	**2:00:00**	**-26,47%**
Total time saved [%]		**-26,47%**	



Surface quality with V3



Surface quality with Velocity 5™

Conclusions

Performances and results achieved with Velocity 5™ are astonishing both under the time saving (-26,47%) and the surface quality point of view, as highlighted by the images comparison above.

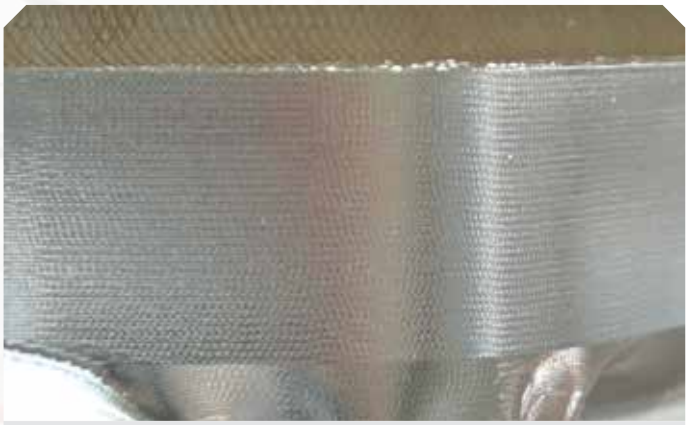
Velocity 5™ on FPT Pragma

FPT Pragma

Results from compared tests

Type of milling	Lead Time		[%]
	With V3	With Velocity 5™	
Mercedes test	00:31:46	00:24:53	**-22,75%**

Surface quality with V3



Surface quality with Velocity 5™

Conclusions

Thanks to the implementation of the Velocity 5™ algorithms, it has been possible to use higher cutting parameters. Even increasing Feed by 100%, surface quality remains almost unchanged.

Velocity 5™ on MECOF CS500

MECOF
CS500

Application

Machining of steel test part.
Velocity 5™ has been compared against V3 on a MECOF CS500 machine tool on a steel test part.

Results from compared test

Type of milling	Lead Time		[%]
	With V3	With Velocity 5™	
General roughing	00:36:00	00:23:15	-35,71%
Finishing Z-constant	01:30:00	00:42:46	-54,54%
Finishing Z-constant	00:05:00	00:03:30	-35,47%
Finishing 3D	01:50:00	01:20:16	-28,74%
Finishing 3D	00:23:00	00:15:31	-36,96%
Total time	**04:24:00**	**02:45:18**	**-39,29%**

Conclusions

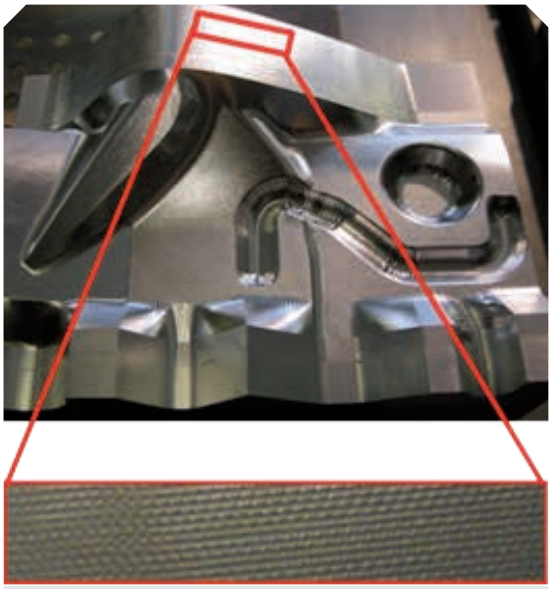
Velocity 5™ resulted to be over 39% faster, resulting in a brilliant 01:43 h time saving.

Velocity 5™ on Parpas LHS

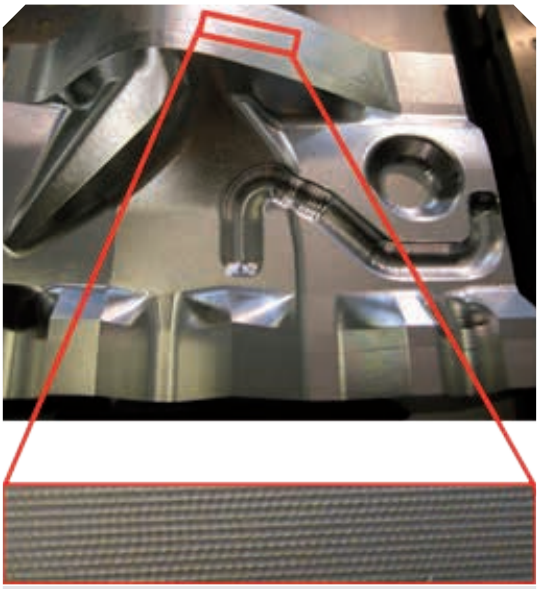
Parpas LHS

Results from compared tests

Type of milling	Lead Time		[%]
	With V3	With Velocity 5™	
Mercedes test	00:29:00	00:19:00	**-34,4%**



With V3



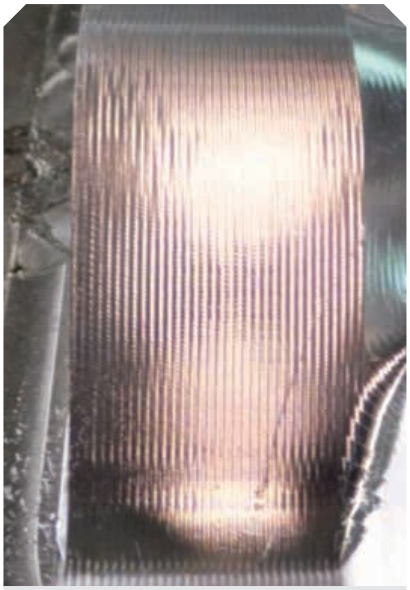
With Velocity 5™

Velocity 5™ on MECOF Air One

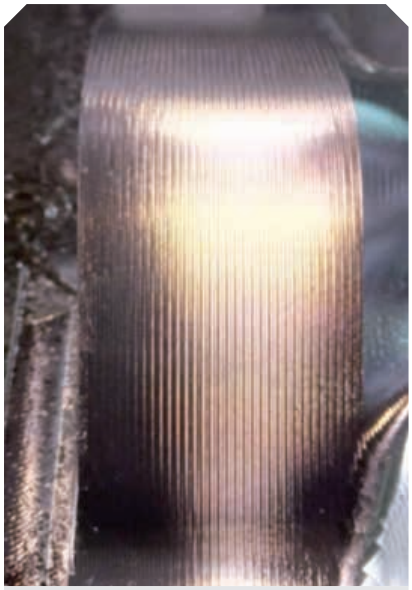
MECOF
Air One

Results from compared tests

Type of milling	Lead Time		[%]
	With V3	With Velocity 5™	
Mercedes test	00:21:00	00:13:00	**-38,1%**



With V3



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