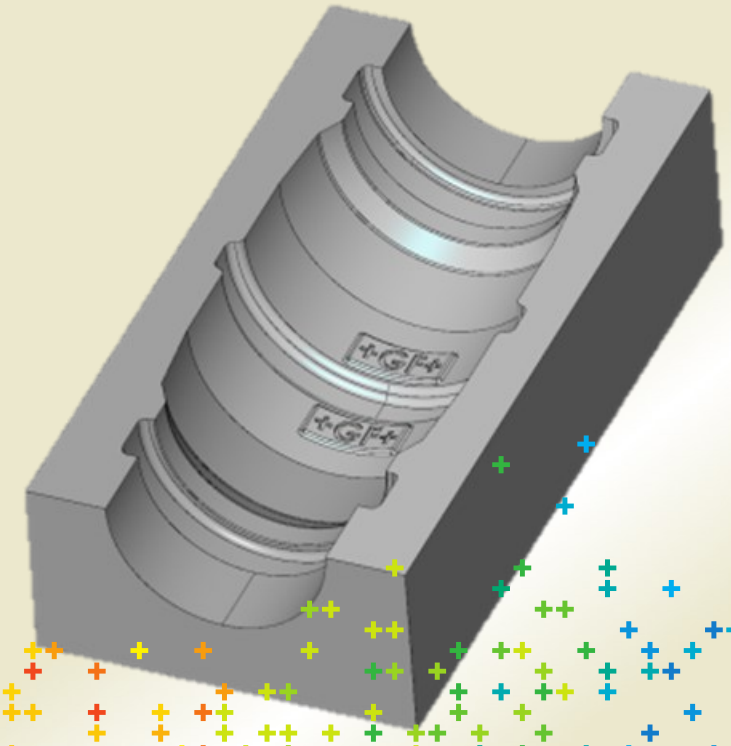
GF Machining Solutions

Application Note 08/ 2016

Insert



The requirements for the quality in mold making are higher than ever. It is demanded not just only a piece in high accuracy and surface quality. The customer expects to produce it's mold segments with highest process security and a optimized processing time.
The insert demo shows to what our machines like the Mikron HSM 200U LP are capable to produce in highest quality in a production-oriented environment.

Requirements

- Accuracy: +/- 5 µm
- Surface quality: Ra <0.2 µm

Work piece

- Dimension: 17x28x55
- Material: 1.2343
- Hardness: 52 - 54 HRC

Machine

- Type: Mikron HSM 200U LP
- Spindle: HSK E32 (50'000 rpm)

Success factors


Rigid polymer machine body


High quality motor spindle


Smooth move-ments due to linear drives

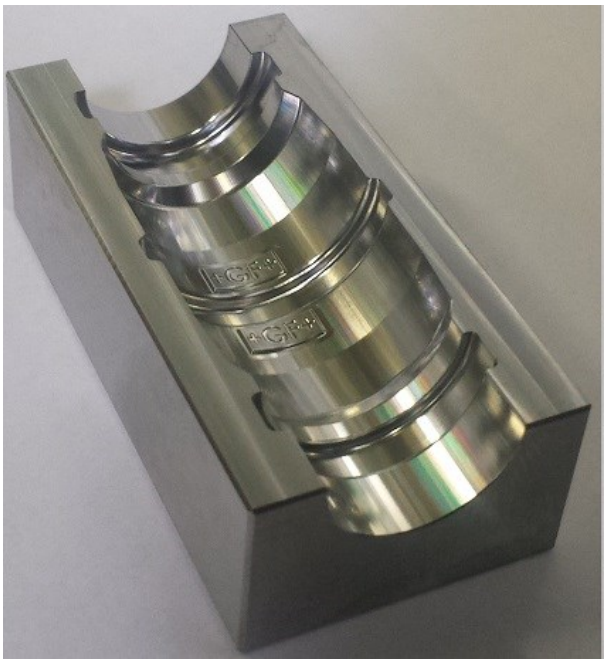

OSS

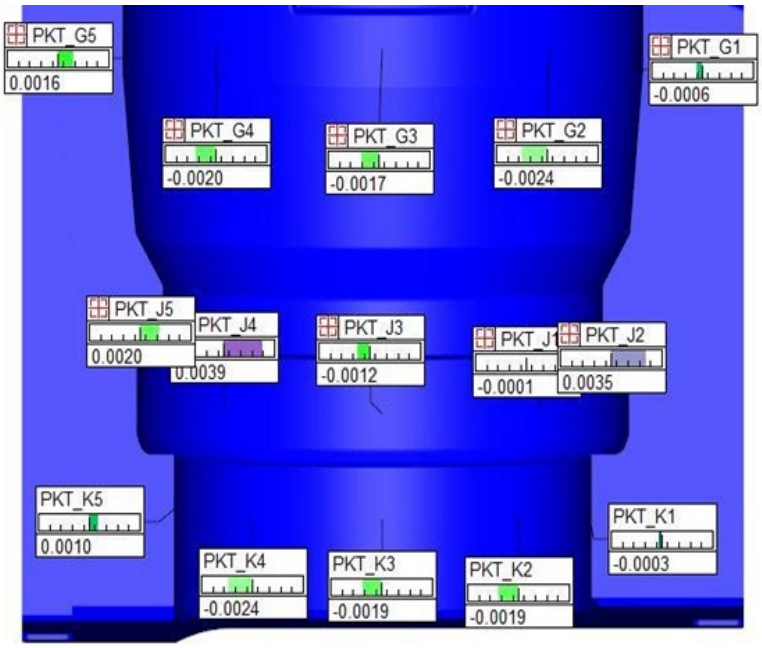

ITC


High quality tooling

Machining sequences

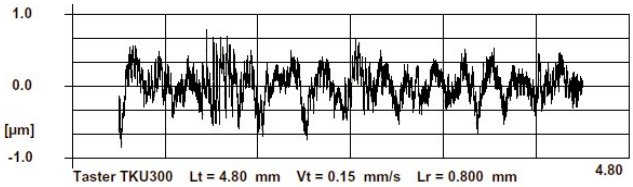
Operation	Tool	[mm]	[mm]	-	[U/min]	[mm/min]	[mm]	[mm]	[h:mm:ss]
Roughing (rough grading)	toric end mill	4	0.5	4	7'960	720	0.200	4.000	**00:31:00**
Roughing (fine grading)	toric end mill	2	0.2	2	14'300	800	0.200	0.200	**00:19:28**
Prefinishing (major surfaces)	ball end mill	2	1	2	14'884	600	0.200	0.200	**00:17:27**
Prefinishing (groove)	ball end mill	1	0.5	2	25'515	635	0.100	0.100	**00:10:10**
Finishing (surface Z-level 0)	end mill	6	0	6	5'300	600	3.000	0.100	**00:00:31**
Finishing (major surfaces)	ball end mill	1	0.5	2	25'515	800	0.030	0.030	**00:20:25**
Finishing (groove)	ball end mill	2	1	2	14'884	800	0.030	0.030	**01:33:55**
Finishing (rest material)	ball end mill	0.4	0.2	2	38'000	600	0.025	0.025	**00:03:43**
Engraving	ball end mill	1	0.5	2	25'515	800	0.020	0.020	**00:02:37**
total machining time									**03:19:16**





Surface quality Ra 0.15 Rz 1

To achieve this shiny surface quality a smooth tool path combined with a small theoretical rough-ness has to be applied. Together with the highly precise motion control of the Mikron HSM 200U LP and the smart module OSS, highest surface qualities are achievable in a production oriented environment.



Part accuracy ± 0.005 mm

To be able to reach highest accuracy is essential in today's mold making. A tolerance of ±0.005 mm is a common goal for mold inserts such as the sample shown. This requires a system which allows to reproduce this quality in a production oriented environment. Therefor a reliable machine tool such as the Mikron HSM 200U LP is the right choice. It's thermal stability and the offered automation is the right configuration for a production orientated mold shop.

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