Date of Request	2016-05-24	Finishing Date	2016-06-15		
Product/Project Name	Forging Gear Camshaft – CAT	Drawing number Product / Project Number	492219 492219	REV	02 02
Requested by	S. Dries	Customer / Department	SQA		
Executed by	R. Schoenaers				
CC	P. Appeltants – K. Becx – M. Miguet				
Problem Definition / Delivery Condition Product Description	**Incoming inspection** Hardness, microstructure and forging lines investigation.				

Sample nr(s): 636
Humidity Lab: 62 %
Temperature Lab: 22 °C

Forging Gear Camshaft – 492219

CONCLUSION

- The hardness is according the drawing specification (MIC 492219_01).
- The microstructure is acceptable according the drawing specification Quenched & Temper microstructure.

HARDNESS (HB 10/3000)

Drawing specification: Hardness ball diameter 3.5 – 3.7
MIC 492219_01: at diameter 230 mm in the core → 3.5 – 3.7 BR (≈ 269 – 302 HB 10/3000)

Verification: verification plate 305 HB 10/3000 → 304/306/306 → $\bar{x}$ = 305 HB 10/3000

Place of measurement: diameter 230 mm, after removing forging skin

MEASUREMENTS					
1	*2*	*3*	*4*	5	$\bar{x}$
296	295	295	302	297	297 HB ≈ Ball diameter 3.52 mm

FORGING LINES

Place of measurement: longitudinal section

Forging lines pattern

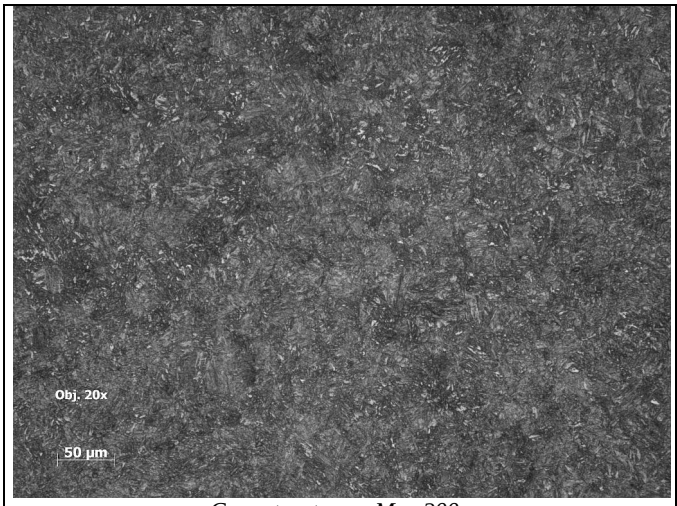
MICROSTRUCTURE

Drawing specification (MIC 492219_01):

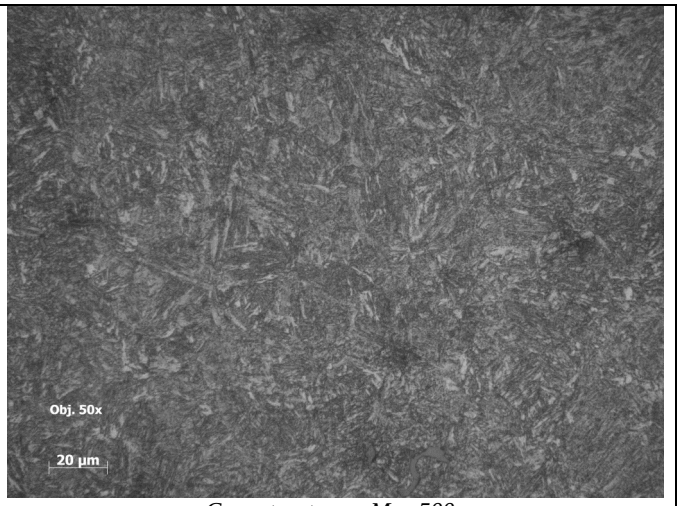
- Direct hardening 1E106A, tempered at 560°C
- Homogeneous tempered martensite
- Grain size 5 or finer acc. ASTM E 112 (grain refined with Aluminium)

Place of measurement: surface and core, longitudinal direction

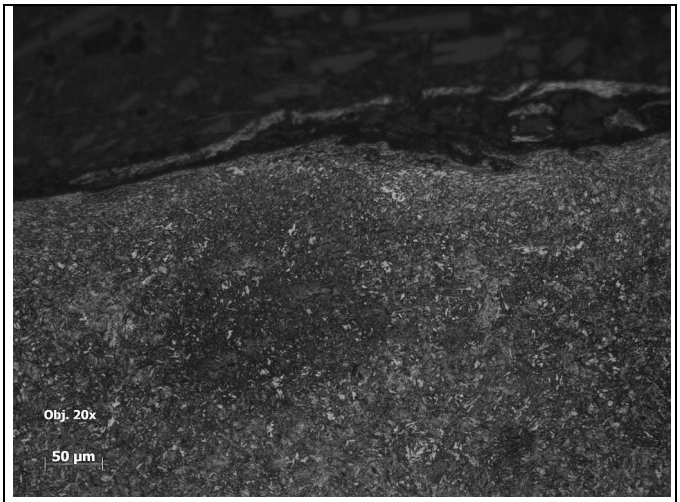
The microstructure is quenched and tempered . The surface is free from decarburization.



Core structure – M = 200x



Core structure – M = 500x



Structure at the surface – M = 200x