

313061

LABORATORY REPORT
GETRAG S.p.A. - B/WLQ 2



REPORT 14/128

Date: 03/07/2014
Author: Raffaele Padolecchia

Reason for analysis: PPAP + Full Layout dimensional

Requester: WLQ1 - Auditor Bari

Part Name: SPEED GEAR REV
P/N: 250.1.3648.05
State of parts: Finished

Material: GCG_805000_Part 2
Customer: Ford

Result: OK

Distribution List:
WLQ1 - Auditor Bari
WLQ1 - G. Montenegro
GPS1 - G. Russo
GPS1 - R. Malerba

Notes: Charge 32715 - furnace #1
Material batch: D
Production lot 14737840, rack #15/15

Surface Hardness Verification

Scale	Position	Values [mm]	Range	Component
HRC	M1	61,2	-	Gear
HRA	M1	81,5	80.5 + 2.5	Gear

Core Hardness Verification

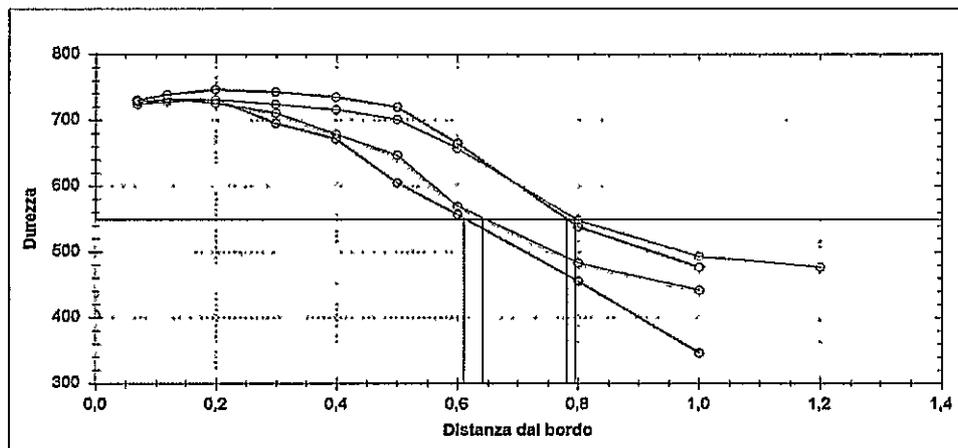
Sample	Scale	Position	Value	Range	Component
2102/14	HV10	M5	438	≥ 300	Gear

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CHD Verification

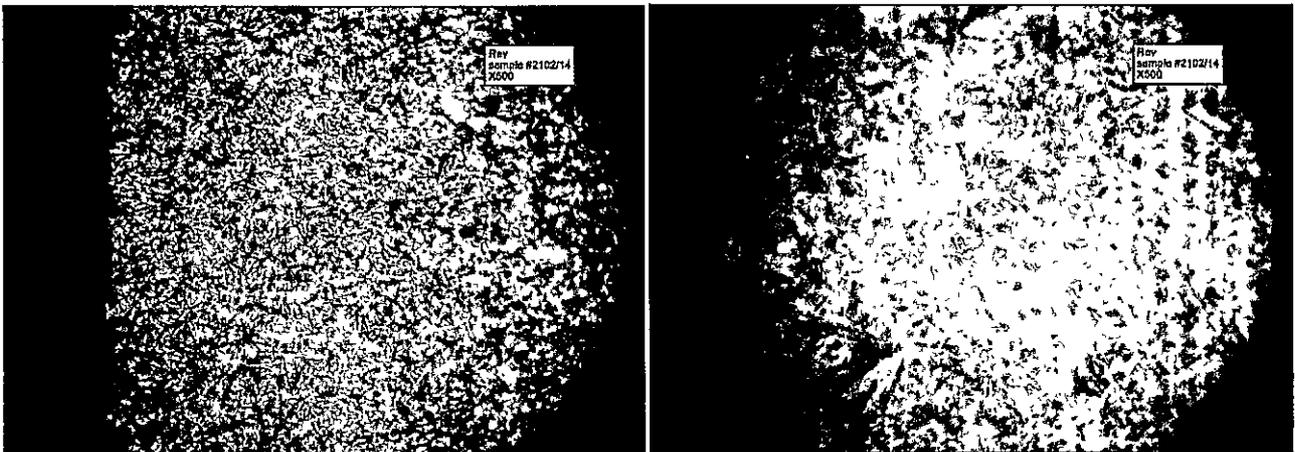
Sample	Scale	Position	Values [mm]	Range	Component
2102/14	CHD 550 HV1	M2	0,80	0.5 + 0.4 mm	Gear
2102/14	CHD 550 HV1	M2	0,78	0.5 + 0.4 mm	Engagement ring
2102/14	CHD 550 HV1	M3	0,61	min. 0,3 mm	Gear
2102/14	CHD 550 HV2	M4	0,64	0.4 + 0.4 mm	Gear



Picture 1: gear - hardness profiles

Metallographic Analysis

Sample #	2102/14
Gear - Tooth flank surface structure:	Martensite + 5% retained austenite (OK)
Gear - Tooth base core structure:	Martensite + bainite (OK)



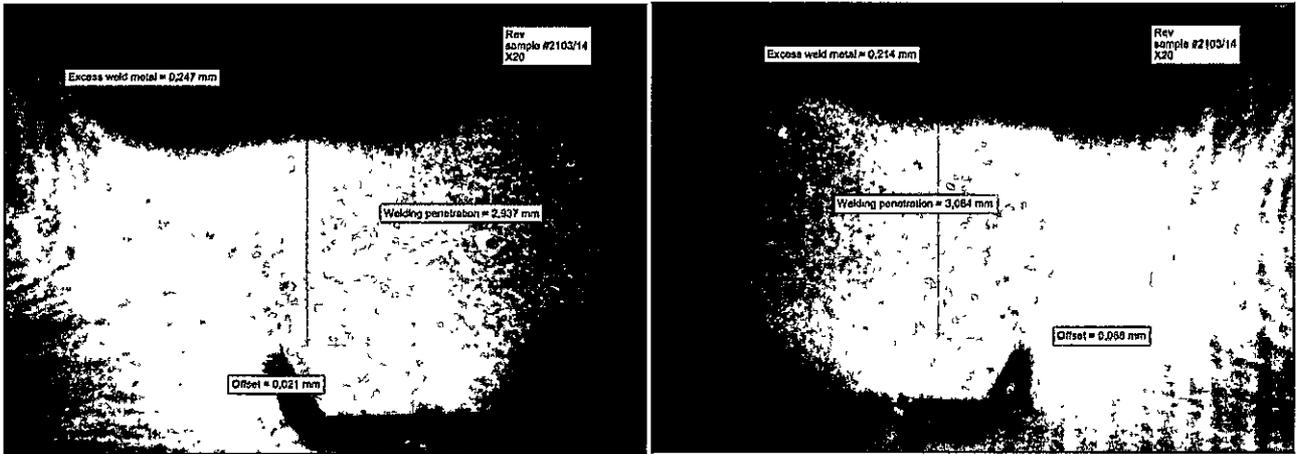
Picture 3: Gear - Surface microstructure at tooth flank (left) and at tooth root (right)

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Weld Seam Analysis

Sample #	Position	Welding penetration [mm]	Offset [mm]	Excess weld metal [mm]
2103/14	Gear-Clutch ring	2,94	0,02	0,25
2103/14	Gear-Clutch ring	3,08	0,09	0,21
Range		min. 2,5	max ± 0,1	max 0,5
Magnetic particles insp.	No defective indication			



Picture 4: macro of the joint.