

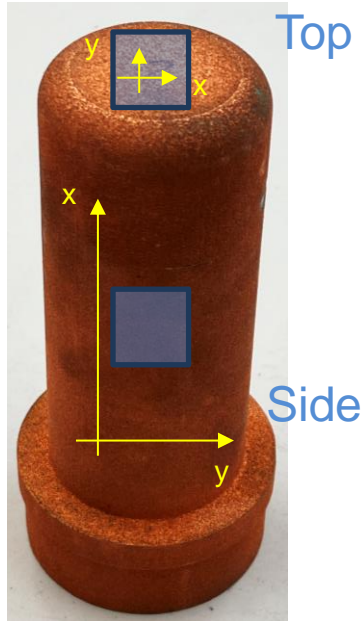
# AM Copper inner conductors

Surface finishing test

Mass Finishing

Shot Blasting

AM Solutions



Contact Profilometer: Fromtracer Avant, Mitutoyo (ref. standard: ISO 4287).

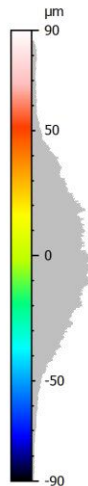
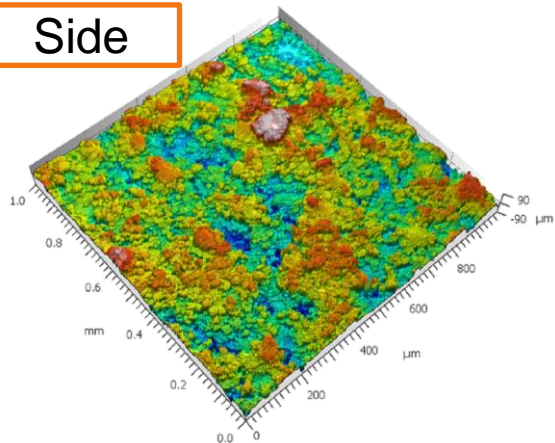
Parameters: cut-off  $\lambda = 0,8 \text{ mm}$  (or  $\lambda = 2,5 \text{ mm?}$ ); sampling length  $L = 4,8 \text{ mm}$ ; scan speed  $0,5 \text{ mm/s}$

Optical Profilometer: NPS, Hirox (ref. standard: ISO 25178)

Parameters: cut-off  $\lambda = 0,8 \text{ mm}$ ; sampling area  $1,0 \text{ mm}^2$ ; scan speed  $1 \text{ mm/s}$

# SAMPLE 2

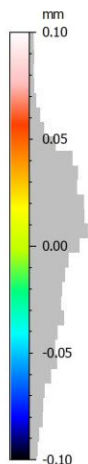
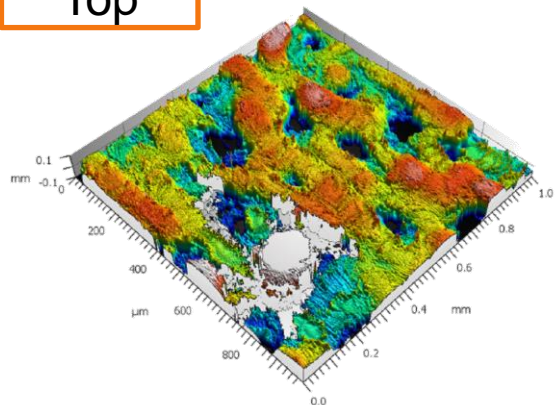
Side



$\lambda = 0,8$   
mm

	Side X		Side Y		Top X		Top Y	
	average	$\sigma$	average	$\sigma$	average	$\sigma$	average	$\sigma$
<b>Ra</b>	14,37	0,77	12,27	1,25	20,05	3,91	19,48	3,43
<b>Rq</b>	17,50	0,85	15,05	1,27	25,00	4,39	23,82	4,14
<b>Rp</b>	35,24	1,75	29,71	3,82	40,41	8,56	39,58	7,71
<b>Rv</b>	40,73	3,20	35,83	4,49	60,88	7,79	56,62	8,23
<b>Rz</b>	75,97	1,44	65,53	3,59	101,30	15,54	96,20	15,67
<b>Rt</b>	97,49	6,19	82,08	2,33	137,26	12,82	133,93	24,34

Top

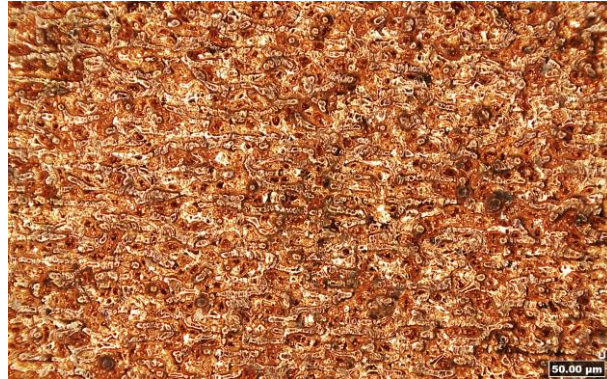


$\lambda = 2,5$   
mm

	Side X	
	average	$\sigma$
<b>Ra</b>	15,86	1,20
<b>Rq</b>	19,71	1,44
<b>Rp</b>	44,21	4,84
<b>Rv</b>	56,15	2,60
<b>Rz</b>	100,36	6,31
<b>Rt</b>	126,96	12,15

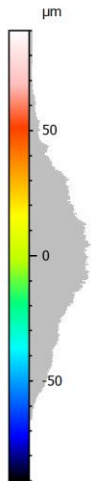
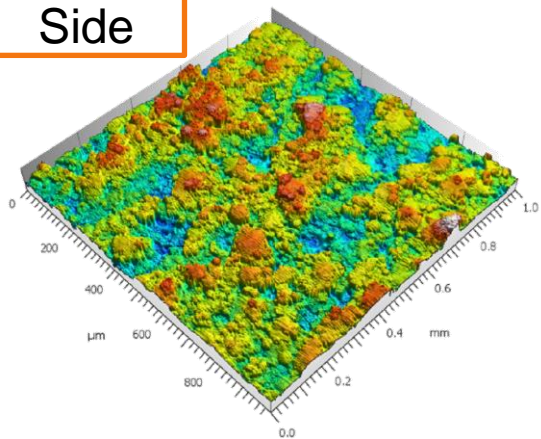
Surface 3D reconstruction		
$\lambda = 0,8$ mm	Side	Top
<b>Sa</b>	19,98	33,26
<b>Sq</b>	24,76	43,90
<b>Sp</b>	70,50	187,3
<b>Sv</b>	85,75	209,1
<b>Sz</b>	161,3	396,4

# SAMPLE 2



# SAMPLE 3

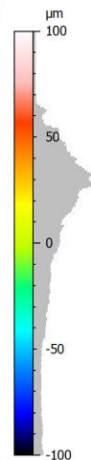
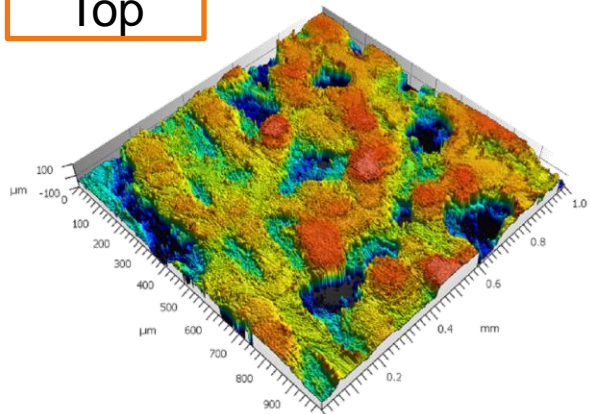
Side



$\lambda = 0,8$   
mm

	Side X		Side Y		Top X		Top Y	
	average	$\sigma$	average	$\sigma$	average	$\sigma$	average	$\sigma$
<b>Ra</b>	12,76	1,53	12,28	1,35	18,59	0,92	18,18	1,58
<b>Rq</b>	15,67	1,68	14,92	1,17	22,36	1,04	22,19	2,11
<b>Rp</b>	30,54	1,87	28,65	1,06	32,38	2,32	35,94	3,07
<b>Rv</b>	38,17	4,41	36,41	4,34	57,95	6,16	54,25	6,31
<b>Rz</b>	68,70	6,28	65,06	3,39	90,32	4,20	90,19	8,54
<b>Rt</b>	88,46	8,92	79,25	5,05	126,05	19,68	113,31	15,23

Top

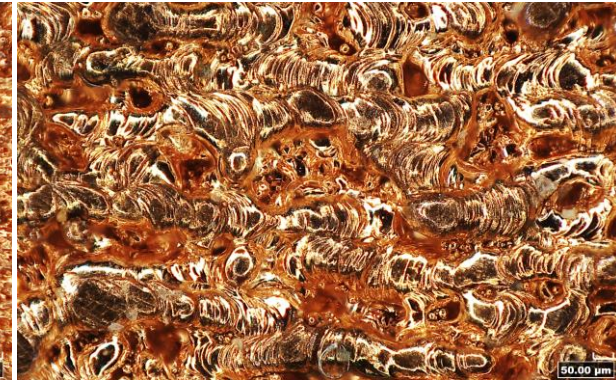


$\lambda = 2,5$   
mm

	Side X	
	average	$\sigma$
<b>Ra</b>	14,49	0,66
<b>Rq</b>	18,08	1,15
<b>Rp</b>	38,58	2,72
<b>Rv</b>	54,02	4,25
<b>Rz</b>	92,59	5,50
<b>Rt</b>	114,00	8,33

Surface 3D reconstruction		
$\lambda = 0,8$ mm	Side	Top
<b>Sa</b>	19,31	31,48
<b>Sq</b>	23,82	42,70
<b>Sp</b>	82,67	108,8
<b>Sv</b>	75,39	239,8
<b>Sz</b>	158,1	348,6

# SAMPLE 3



# SURFACE TREATMENT

## Step 1: 1h CMP

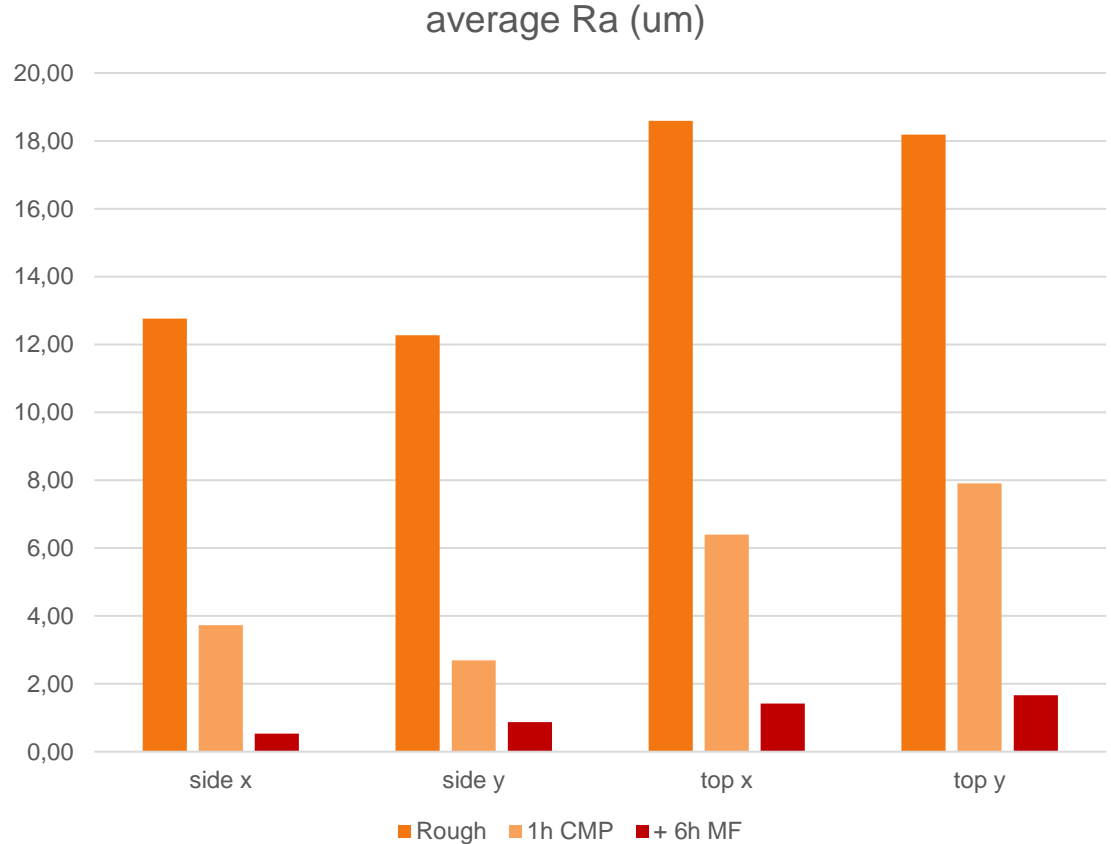
Media: R. Ecoshape

Compound: CMP 03/21 L 50%

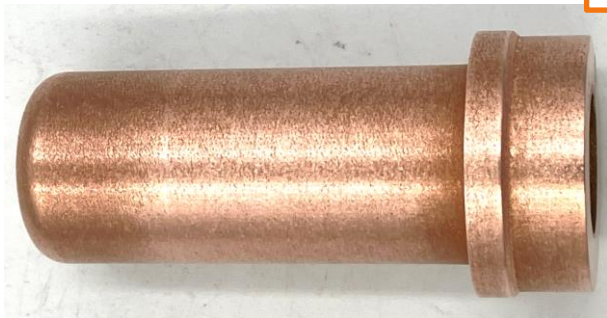
## Step 2: 6h MF

Media: R. Ecoshape

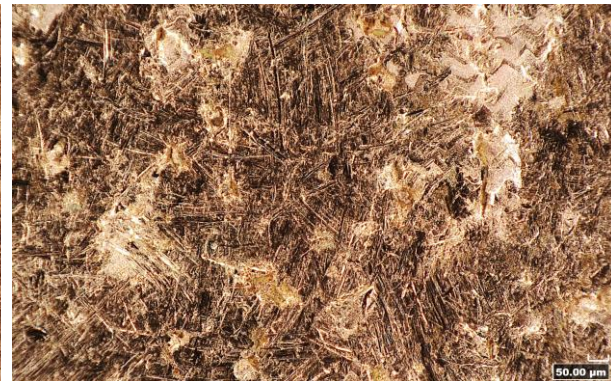
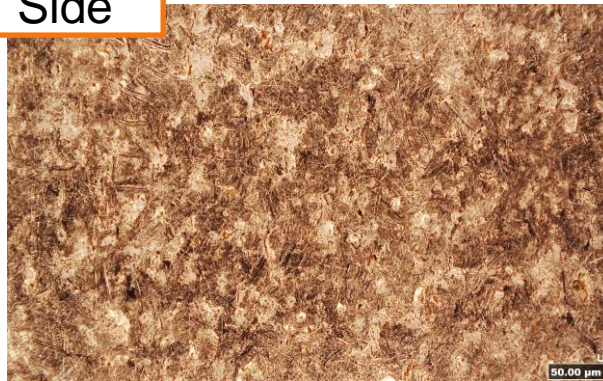
Compound: ZF 322 1%



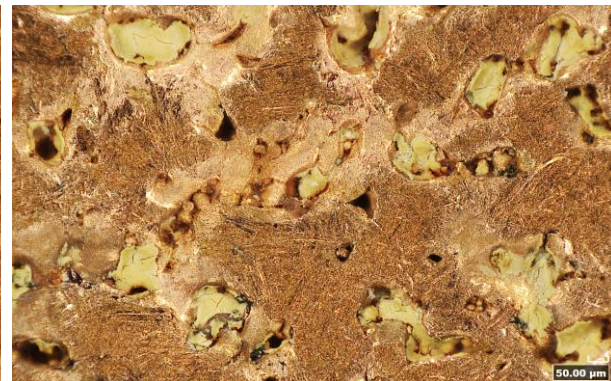
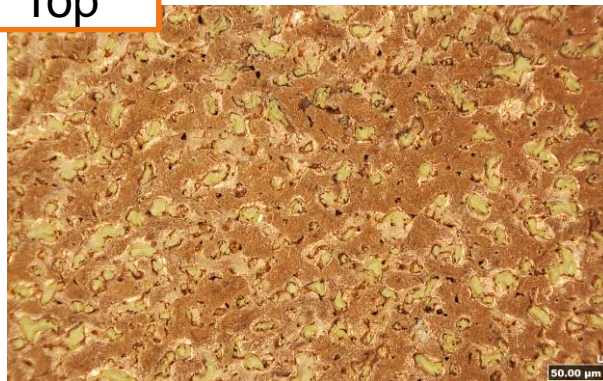
# SAMPLE 3 – 1H CHEMICALLY-ASSISTED MASS FINISHING



Side

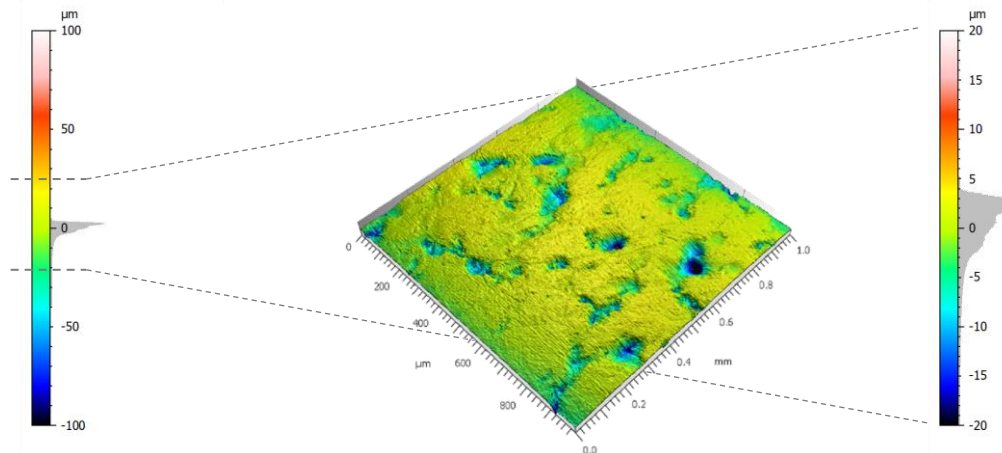
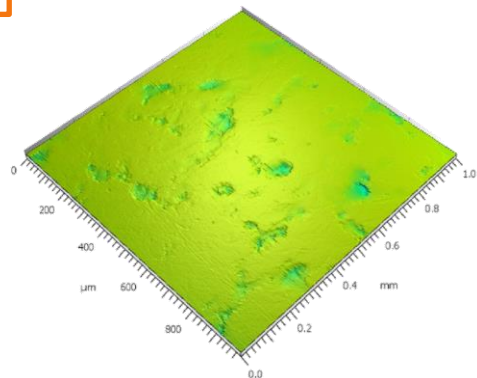


Top

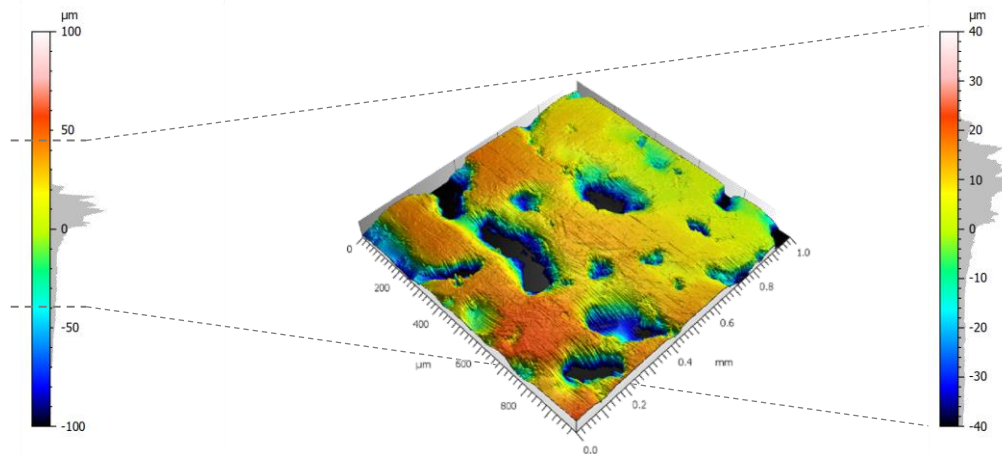
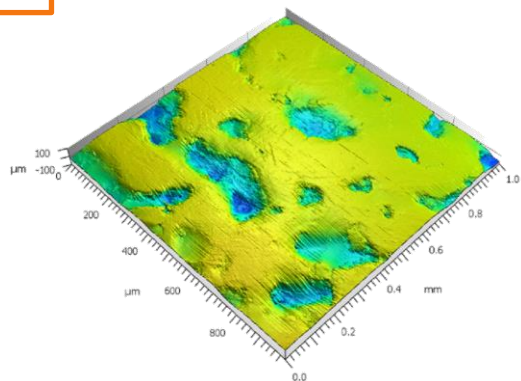


# SAMPLE 3 – 1H CHEMICALLY-ASSISTED MASS FINISHING

Side



Top



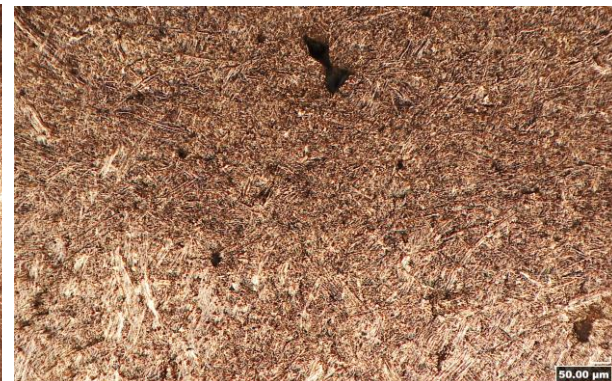
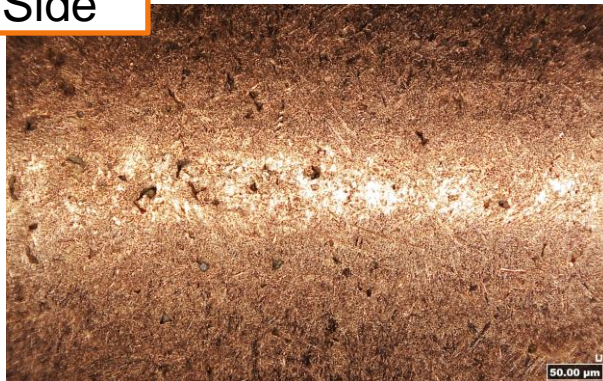
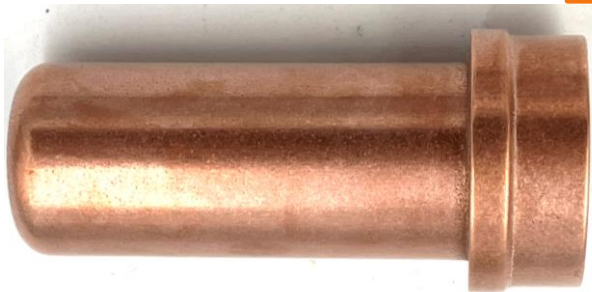
# SAMPLE 3 – 1H CHEMICALLY-ASSISTED MASS FINISHING

$\lambda = 0,8$ mm	Side X		Side Y		Top X		Top Y		$\lambda = 2,5$ mm	Side X	
	average	$\sigma$	average	$\sigma$	average	$\sigma$	average	$\sigma$		average	$\sigma$
<b>Ra</b>	3,73	1,26	2,69	0,55	6,39	1,60	7,90	1,98	<b>Ra</b>	4,15	1,14
<b>Rq</b>	5,40	1,76	3,50	0,85	9,90	2,47	10,11	2,53	<b>Rq</b>	5,93	1,83
<b>Rp</b>	6,03	2,08	4,57	0,84	10,37	2,59	10,91	2,73	<b>Rp</b>	6,75	2,09
<b>Rv</b>	21,74	5,63	12,94	3,05	37,62	9,40	29,05	7,26	<b>Rv</b>	27,35	8,93
<b>Rz</b>	27,77	7,68	17,51	3,86	47,99	11,99	39,97	9,99	<b>Rz</b>	34,10	10,99
<b>Rt</b>	41,57	11,39	27,56	10,60	70,05	17,50	59,33	14,83	<b>Rt</b>	53,10	21,40

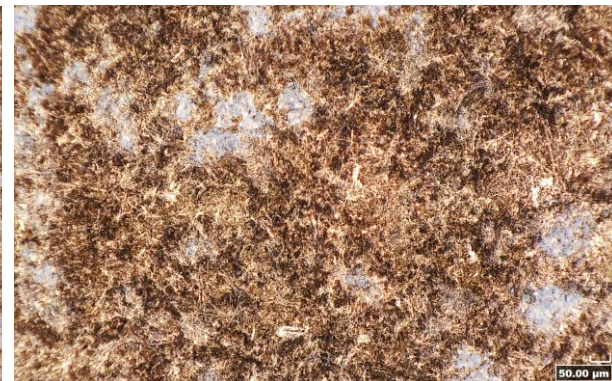
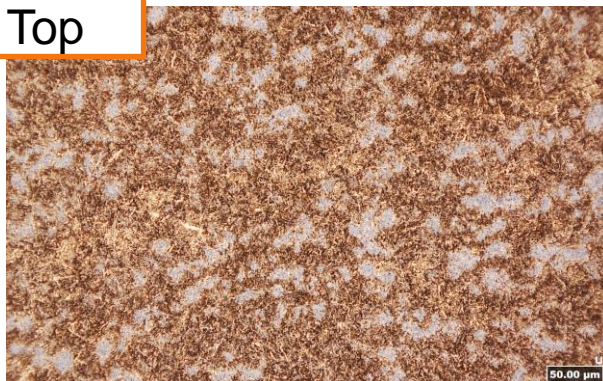
Surface 3D reconstruction		
$\lambda = 0,8$ mm	Side	Top
<b>Sa</b>	1,99	11,98
<b>Sq</b>	2,96	16,28
<b>Sp</b>	4,51	22,71
<b>Sv</b>	39,06	68,53
<b>Sz</b>	43,57	91,25

# SAMPLE 3 – 6H MASS FINISHING

Side

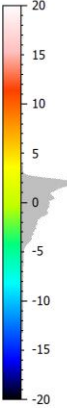
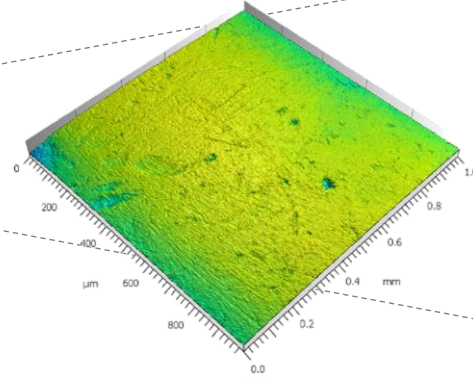
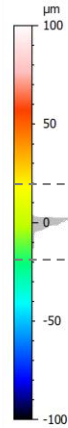
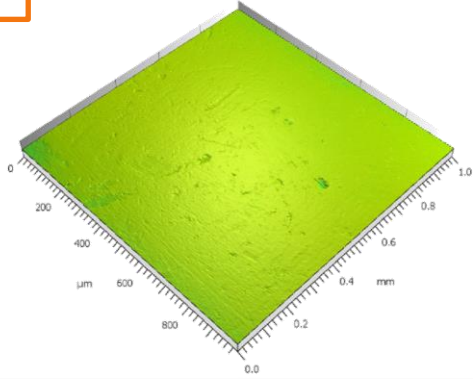


Top

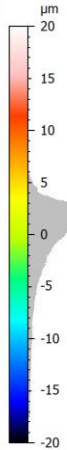
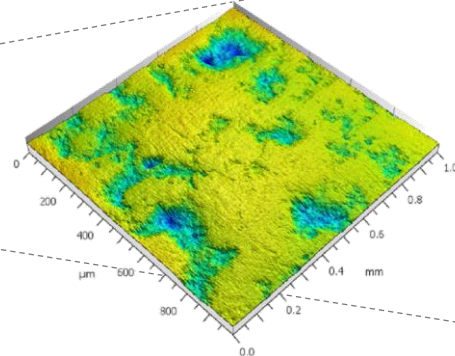
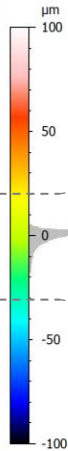
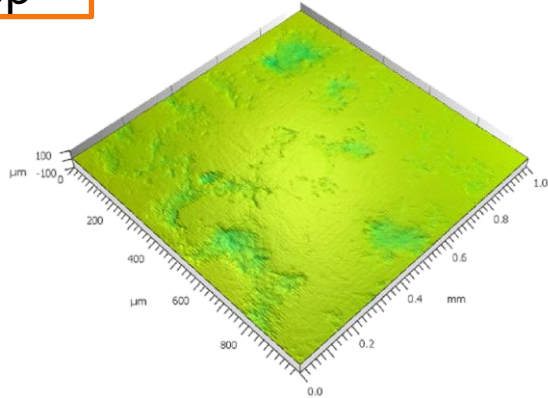


# SAMPLE 3 – 1H CHEMICALLY-ASSISTED MASS FINISHING

Side



Top



# SAMPLE 3 – 6H MASS FINISHING

$\lambda = 0,8$ mm	Side X		Side Y		Top X		Top Y		$\lambda = 2,5$ mm	Side X	
	average	$\sigma$	average	$\sigma$	average	$\sigma$	average	$\sigma$		average	$\sigma$
<b>Ra</b>	0,53	0,25	0,87	0,09	1,42	0,46	1,66	0,21	<b>Ra</b>	0,59	0,19
<b>Rq</b>	1,02	0,59	1,01	0,17	2,12	1,00	2,17	0,21	<b>Rq</b>	1,02	0,47
<b>Rp</b>	1,23	0,42	1,78	0,10	3,07	1,76	2,66	0,40	<b>Rp</b>	1,33	0,52
<b>Rv</b>	6,64	4,04	2,63	1,67	6,63	1,43	7,29	0,65	<b>Rv</b>	7,03	3,48
<b>Rz</b>	7,88	4,38	4,41	1,72	9,69	3,15	9,95	1,02	<b>Rz</b>	8,37	4,00
<b>Rt</b>	19,06	13,16	7,23	4,14	13,51	4,17	14,69	1,86	<b>Rt</b>	14,95	12,33

Surface 3D reconstruction		
$\lambda = 0,8$ mm	Side	Top
<b>Sa</b>	0,76	2,22
<b>Sq</b>	1,08	2,97
<b>Sp</b>	2,61	6,61
<b>Sv</b>	14,09	16,53
<b>Sz</b>	16,70	23,14

*MASS FINISHING*

*SHOT BLASTING*

*AM SOLUTIONS*

**www.rosler.com**

**Matteo Pozzi**

R&D Engineer

Rösler Italiana s.r.l.

Tel.: +39 039 611521

E-Mail: [m.pozzi@rosler.com](mailto:m.pozzi@rosler.com)