

# Biofilm Detection by a Fiber-Tip Ball Resonator Optical Fiber Sensor

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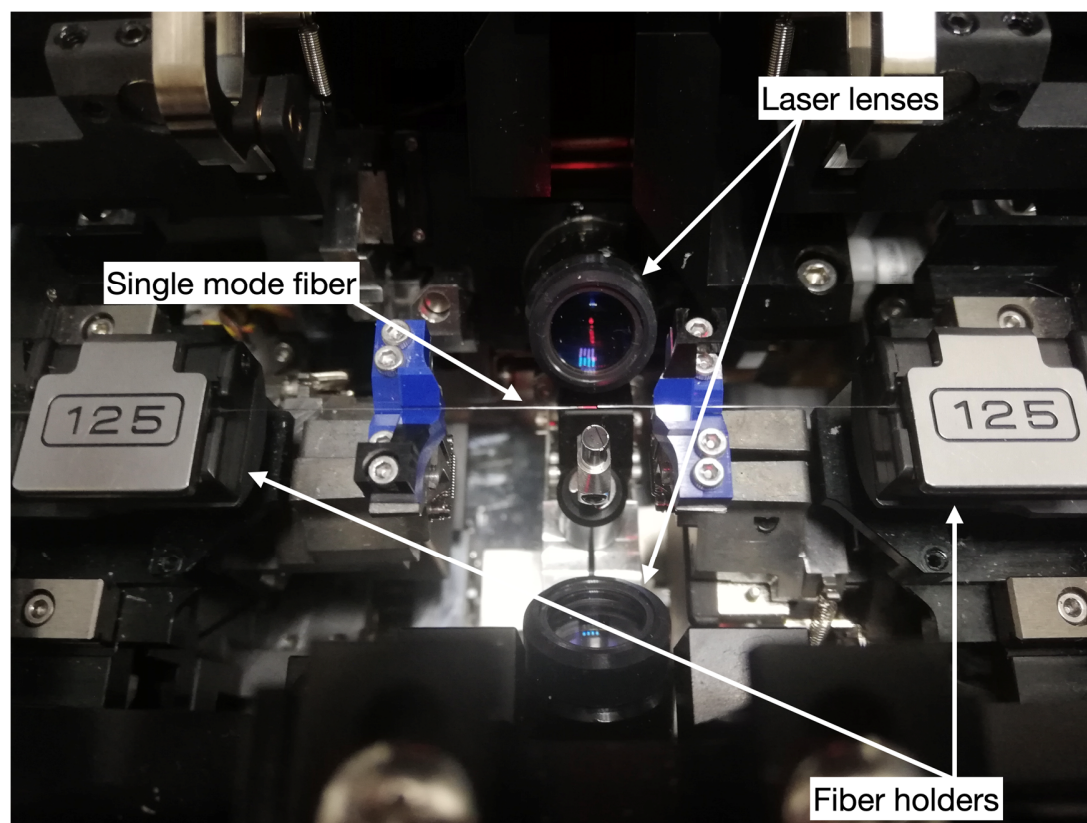
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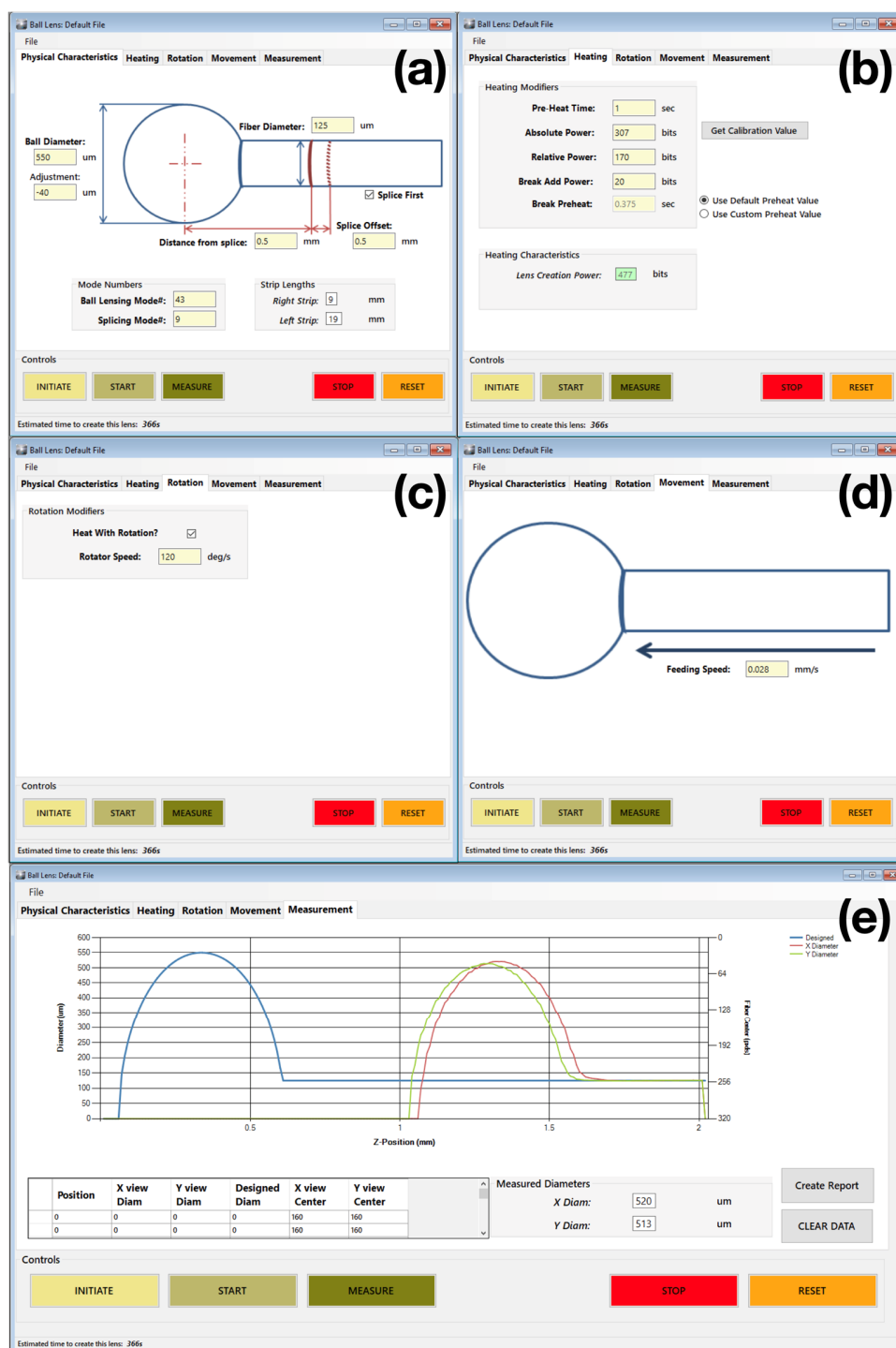
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## Supplementary Materials



**Figure S1.** Ball resonator fabrication by CO<sub>2</sub> laser.



**Figure S2.** Settings of ball resonators manufacture: (a) Physical characteristics settings; (b) Heating settings; (c) Rotation settings; (d) Movement settings; (e) Measurements of fabricated ball resonators.

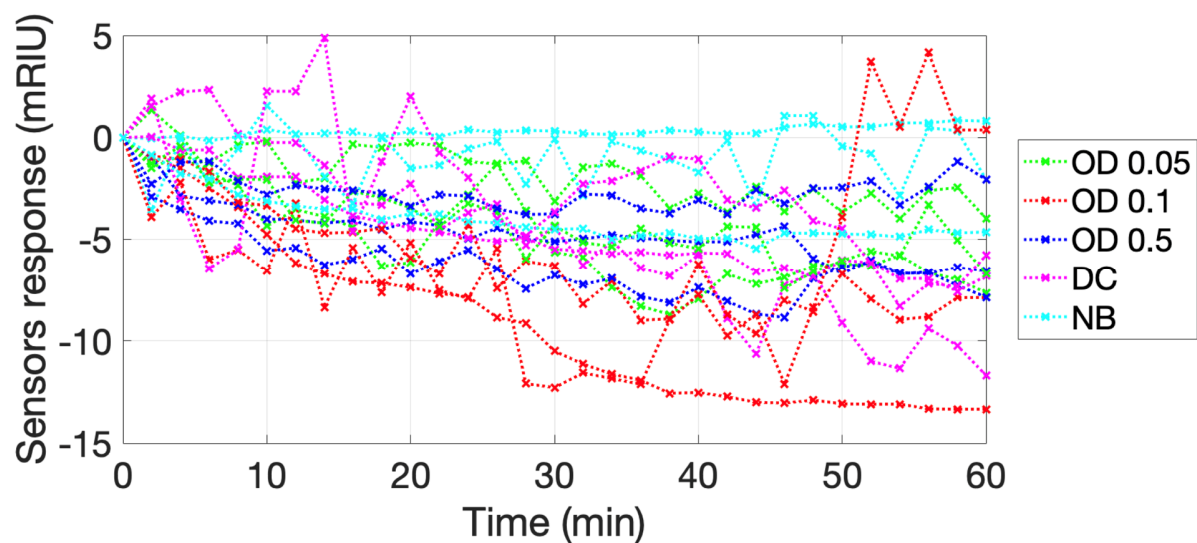


Figure S3. View of all response of all experiments over time.

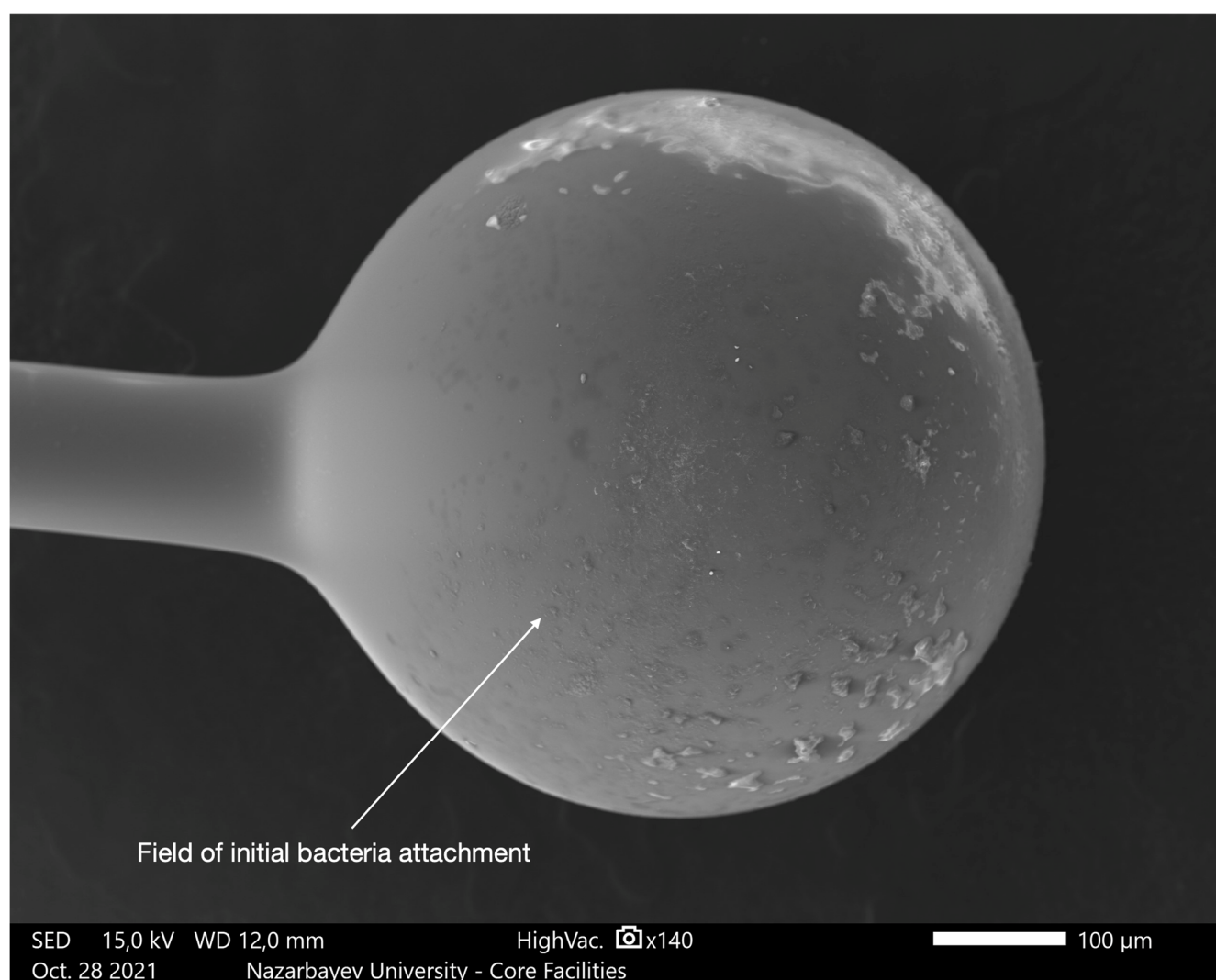
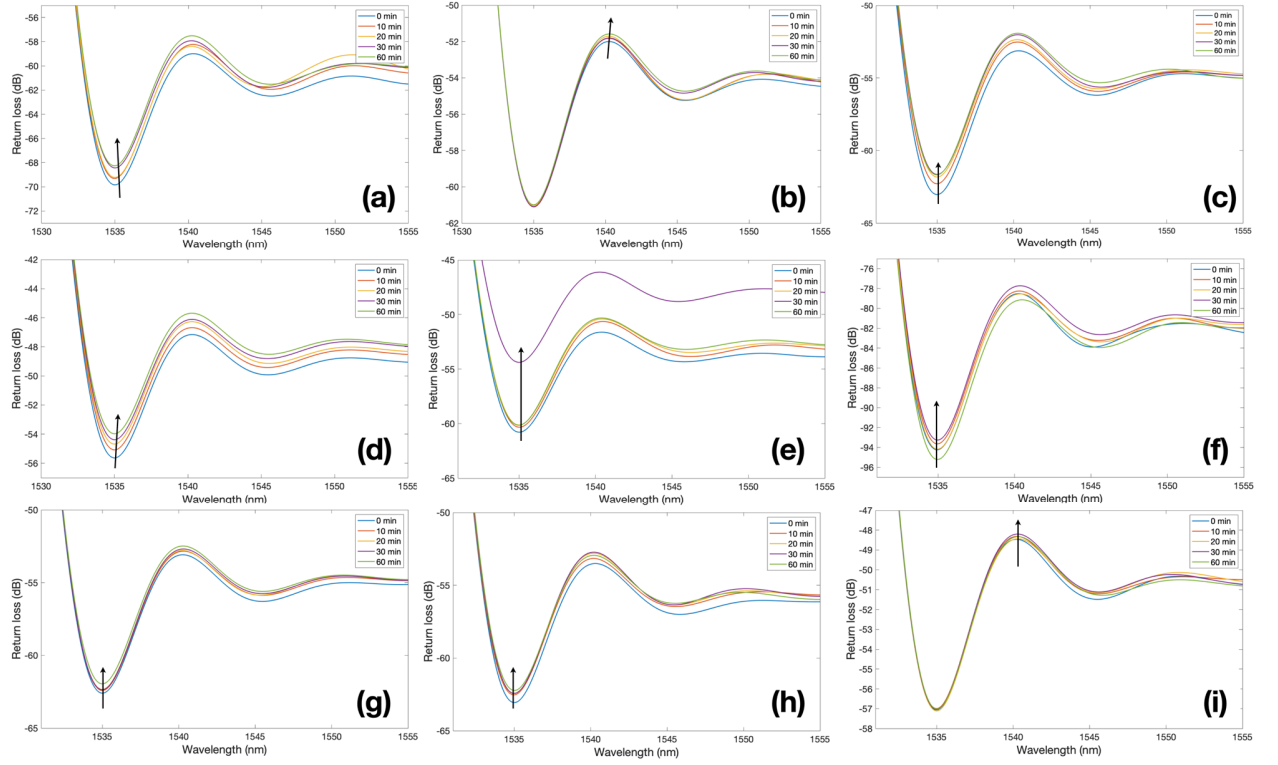
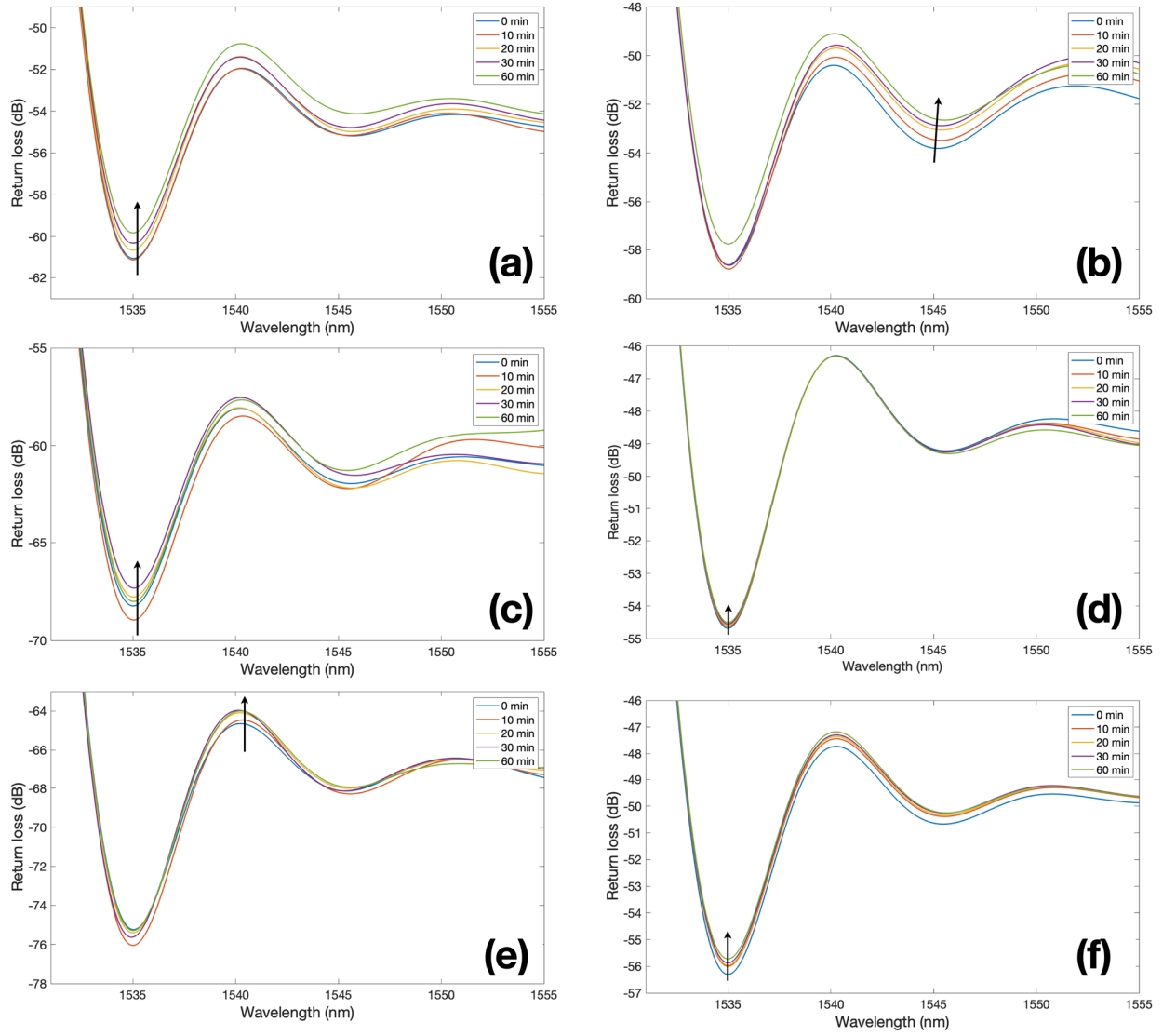


Figure S4. Scanning electron microscopy of OD=0.5 sample. The fealds of bacteria initial attachments are seen.



**Figure S5.** Spectra of ball resonators: (a)-(c) ball resonators used for OD=0.05 experiment with diameters 535-541  $\mu\text{m}$ , 541-534  $\mu\text{m}$ , 526-521  $\mu\text{m}$  respectively; (d)-(f) ball resonators used for OD=0.1 experiment with diameters 569-561  $\mu\text{m}$ , 544-538  $\mu\text{m}$ , 543-539  $\mu\text{m}$  respectively; (g)-(i) ball resonators used for OD=0.05 experiment with diameters 532-523  $\mu\text{m}$ , 523-521  $\mu\text{m}$ , 520-513  $\mu\text{m}$  respectively.



**Figure S6. Spectra of ball resonators used for controls:** (a)-(c) ball resonators used for control DC with diameters 565-559  $\mu\text{m}$ , 567-564  $\mu\text{m}$ , 571-564  $\mu\text{m}$  respectively; (d)-(f) ball resonators used for control NB with diameters 568-561  $\mu\text{m}$ , 569-563  $\mu\text{m}$ , 570-564  $\mu\text{m}$  respectively.

**Table S1.** Size and sensitivity of all BRs used in experiments (NB – nutrient broth, DC – dead cells, bacteria OD=0.5, OD=0.1, OD=0.05).

#	Diametr (um)	Analyte	Sensitivity (dB/RIU)	R2	At the wavelength (nm)	Corresponding to the index	Experiment
1	573-565	NB	-90,59	1,00	1 552,83	9 364,55	NB
2	568-561	NB	-108,38	1,00	1 552,75	9 321,82	NB
3	569-563	NB	-92,26	0,95	1 573,42	21 463,19	NB
4	532-523	0,5	-104,46	0,97	1 552,98	9 453,06	DC
5	523-521	0,5	-96,41	0,98	1 571,60	20 407,15	DC
6	520-513	0,5	-98,66	0,95	1 553,14	9 553,78	DC
7	535-541	0,05	-127,52	0,98	1 552,85	9 379,81	OD=0.05
8	541-534	0,05	-128,37	0,98	1 552,55	9 202,78	OD=0.05
9	526-521	0,05	-122,32	0,97	1 580,55	25 577,46	OD=0.05
10	569-561	0,1	-106,03	0,99	1 552,88	9 398,12	OD=0.1
11	544-538	0,1	-144,28	0,99	1 565,42	16 799,54	OD=0.1
12	543-539	0,1	-101,64	0,95	1 570,99	20 050,05	OD=0.1
13	565-559(1)	DC	-90,71	1,00	1 552,91	9 413,38	OD=0.5
14	567-564	DC	-170,43	0,95	1 551,64	8 656,45	OD=0.5
15	571-564	DC	-115,24	0,99	1 582,89	26 923,45	OD=0.5