

Mellékletek jegyzéke

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1. sz. melléklet: Kísérleti és mérési jegyzőkönyv

1.1. Kutatás célja

AI/UD-CFRP szendvicsszerkezet rétegekőzi sorjaképződés vizsgálata.

1.2. Kísérleti környezet

1.2.1. Felhasznált gépek, szerszámok, műszerek és eszközök

- Nilfisk GB733 ipari porszívó
- Kondia B640 háromtengelyes CNC marógép
- TIVOLY POLARIS 150 Xtreme Ø10 csigafúró
- Kistler 9257B erőmérő
- Jelerősítő 5070
- Jelátalakító: National instrument USB-4431
- Labview program
- F1 fúrókészülék
- UD-CFRP 5mm vastag vinilészter mátrix (Zoltek-től Farkas Balázson keresztül)
- Alumínium ötvözet 5mm vastag EN AW 6082

1.2.2. Rögzített paraméterek és körülmények

- száraz megmunkálás
- forgács elszívás

1.2.3. Faktorok

Megnevezés	Jelölés	Mértékegység	Értelmezési tartomány		Szintek száma	Vizsgált szintek
			Legalsó szint	Legfelső szint		
Előtolás	f	mm/ford	0,05	0,15	3	0,05, 0,065, 0,1, 0,135, 0,15
Forgácsolási sebesség	v_c	m/min	100	175	3	100 (S=3183), 110,98 (S=3533), 137,5 (S=4377), 164,02 (S=5221), 175 (S=5570)
Rétegsorrend	S	-	A	B	2	A, B

Kutatási alapadatok

Környezet

Dátum: 2023. szeptember. 15.

Helyszín: BME „G” épület

Hőmérséklet:

Nyomás:

Személyzet

Kísérletvezető: Markó Balázs (jegyzőkönyv)

Laboráns 1: Dr. Geier Norbert (gépkezelő)



1.3. Kísérlettervezési mátrix

Ssz.	Furatpozíció F1 fúrókészülék ben	Próbatest azonosító	Faktorok			Megjegyzés
			f (mm/ford)	v_c (m/min)	S (-)	
1	1	AL1 CFRP1	0,100	137,50	A	
2	2	AL1 CFRP1	0,100	175,00	A	
3	3	AL1 CFRP1	0,150	137,50	A	
4	4	AL1 CFRP1	0,100	137,50	A	
5	5	AL1 CFRP1	0,100	137,50	A	
6	6	AL1 CFRP1	0,100	137,50	A	
7	7	AL1 CFRP1	0,100	100,00	A	
8	8	AL1 CFRP1	0,065	110,98	A	
9	9	AL1 CFRP1	0,135	110,98	A	
10	10	AL1 CFRP1	0,065	164,02	A	
11	11	AL1 CFRP1	0,050	137,50	A	
12	12	AL1 CFRP1	0,100	137,50	A	
13	13	AL1 CFRP1	0,135	164,02	A	
14	1	AL2 CFRP2	0,100	137,50	B	
15	2	AL2 CFRP2	0,100	175,00	B	
16	3	AL2 CFRP2	0,150	137,50	B	
17	4	AL2 CFRP2	0,100	137,50	B	
18	5	AL2 CFRP2	0,100	137,50	B	
19	6	AL2 CFRP2	0,100	137,50	B	
20	7	AL2 CFRP2	0,100	100,00	B	
21	8	AL2 CFRP2	0,065	110,98	B	
22	9	AL2 CFRP2	0,135	110,98	B	
23	10	AL2 CFRP2	0,065	164,02	B	
24	11	AL2 CFRP2	0,050	137,50	B	
25	12	AL2 CFRP2	0,100	137,50	B	
26	13	AL2 CFRP2	0,135	164,02	B	



A: Al ötvözet felül, CFRP alul

B: CFRP felül, Al ötvözet alul

További megjegyzések:

- Töltéserősítő mérés határ 1000N
- Erősítési tényező 100 N/V
- Mérési frekvencia: $f = N_{max}/60 \cdot (360/5) = 6684 \text{ Hz} \approx 7000 \text{ Hz}$
- Ø10 csigafúrónak kilógása 65 mm (szerszámbefogó homloklapfelületétől)
- Ø10 csigafúró T9-es szerszámtárhelybe lett elhelyezve
- Fúrókészülék kiórázva rövidebbik oldala mentén: $\pm 0,02 \text{ mm}$
- G54-es munkadarab nullpont
- Alumínium lemezen „x” jelölés tetején a bal alsó sarokban
- Patronos szerszámbefogó
- Program indításkor potméter 100%-on van
- Egymás után vannak a furatok
- Potméter 100%
- Szerszám kopottsági állapot szemrevételezésre került és szignifikánsan nem változott
- Az NC program futtatva volt: D/NCprograms/geier/20230915_markobalazs mappából



1.4. Záradék

Kísérletek vége: 2023 (év) 09 (hónap) 15 (nap) 13 (óra) 00 (perc)

A kísérleti adatok lementve és a mérési környezet eredeti állapotba visszarendezve. Amortizálódott eszközök lejelentve.

A kísérleti adatokat és a kísérleti jegyzőkönyv szkennelt változatát eljuttatom Dr. Geier Norbert-nek (geier.norbert@gpk.bme.hu).

Markó Balázs

Kísérletvezető



1.5. Mérési jegyzőkönyv

Mérés ideje: 2023. szeptember. 18. 9:00-10:00

Helyszín: BME „J” épület

Mérőeszköz: Keyence VR-5000 profilométer

Mérést végezték: Markó Balázs, Dr. Geier Norbert

Mérési sorrend:

Mérési sorszám	Próbatest azonosító	Furat kísérleti sorszáma	Nagyítás	Megjegyzés
1	AL1 CFRP1	1, 2, 3, 4	38x	
2	AL1 CFRP1	5	38x	Lemaradt az első mérésről ezért külön került felvételre
3	AL1 CFRP1	6, 7, 8, 9, 10	38x	
4	AL1 CFRP1	11	38x	
5	AL1 CFRP1	12, 13	38x	
6	AL2 CFRP2	1, 2, 3, 4, 5	38x	
7	AL2 CFRP2	6, 7, 8, 9, 10	38x	
8	AL2 CFRP2	11	38x	
9	AL2 CFRP2	12, 13	38x	

Megjegyzések:

- Minden mérés esetén a lemezen vettük fel a referenciasíkokat

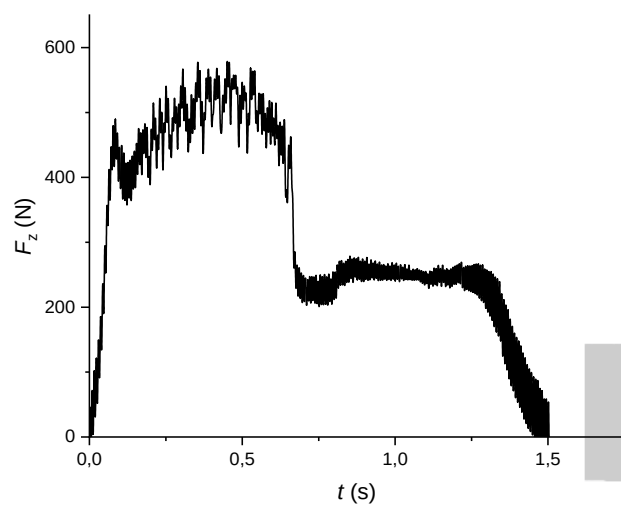


2. sz. melléklet: Erőmérés eredménye

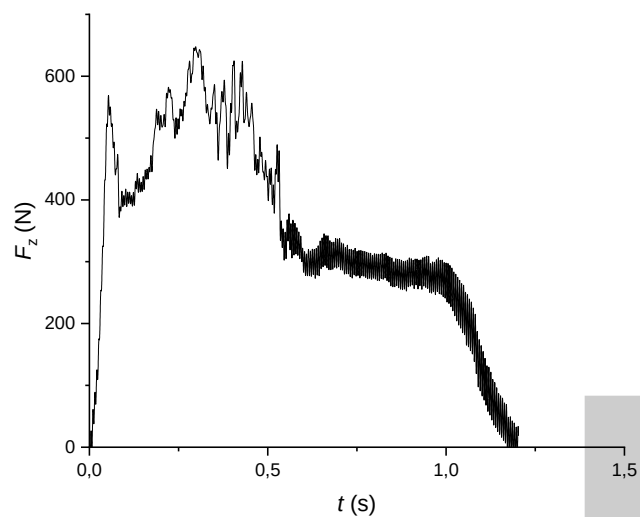
Mivel jellegre megegyeztek a két módszerrel a kapott diagramok, ezért csak az FFT szűréssel kapott diagramok szerepelnek itt.

2.2. Első lemezen lévő furatoknál kapott erő diagramok

- 1. furat

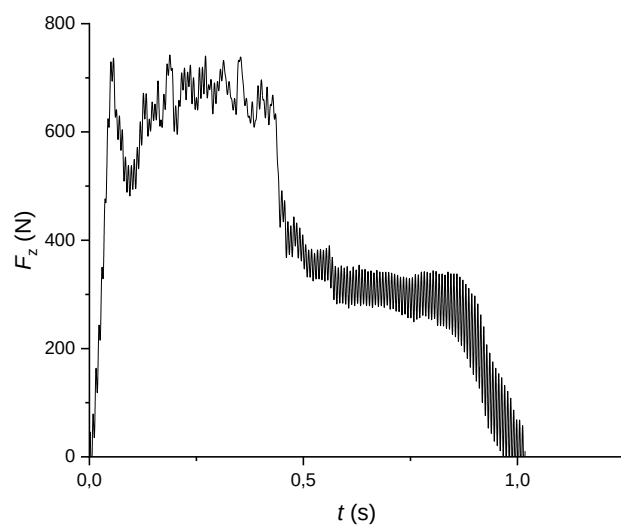


- 2. furat

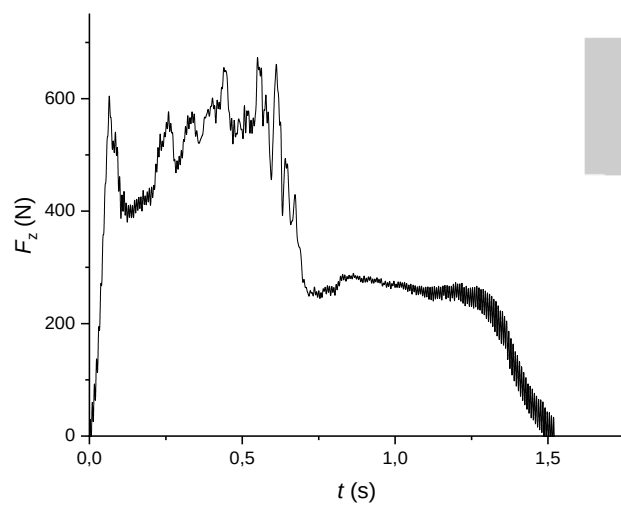




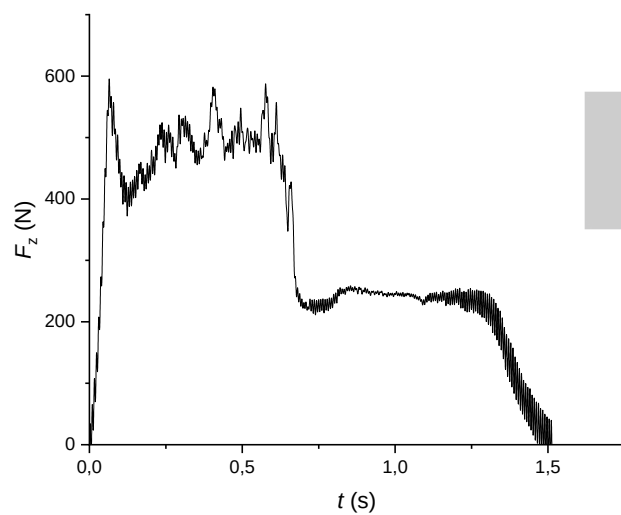
2. furat



- 4. furat

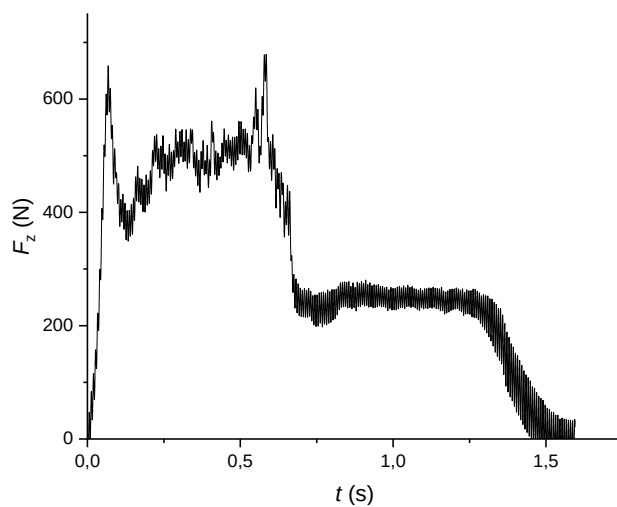


- 5. furat

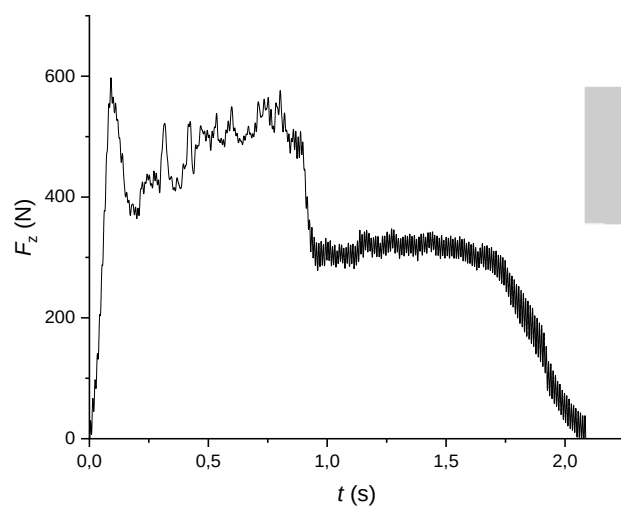




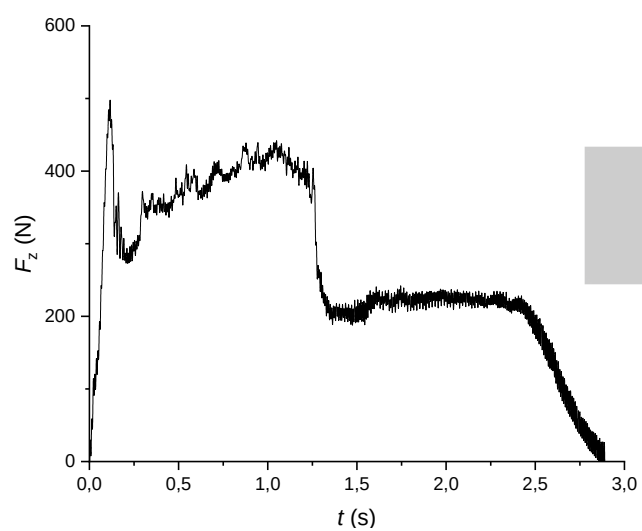
- 6. furat



- 7. furat

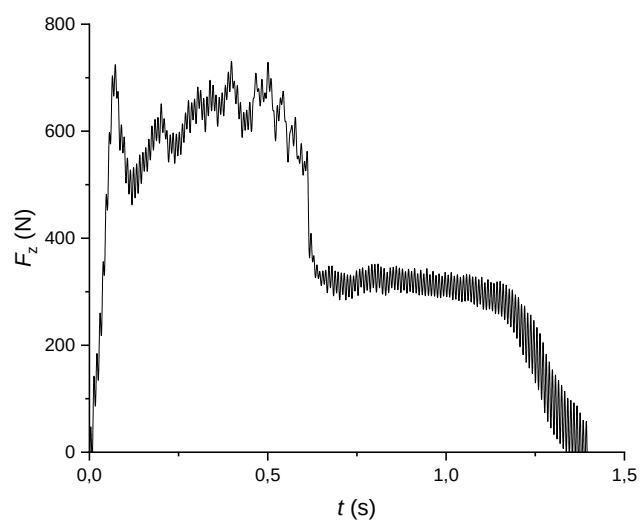


- 8. furat

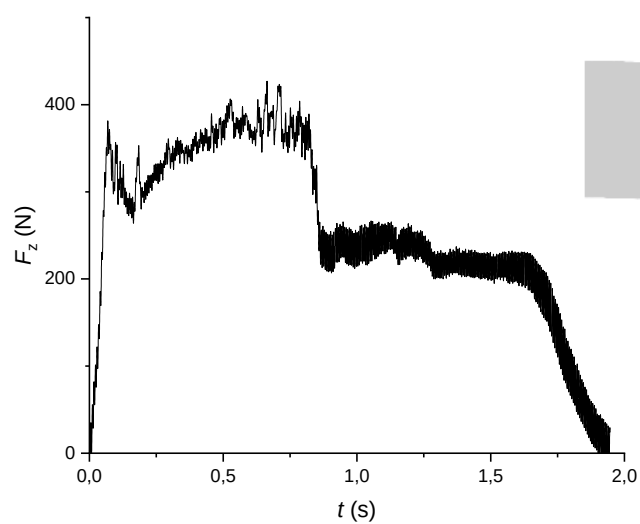




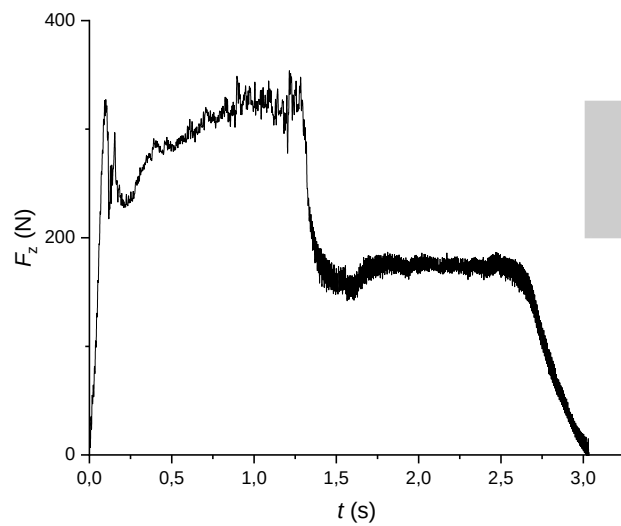
- 9. furat



- 10. furat

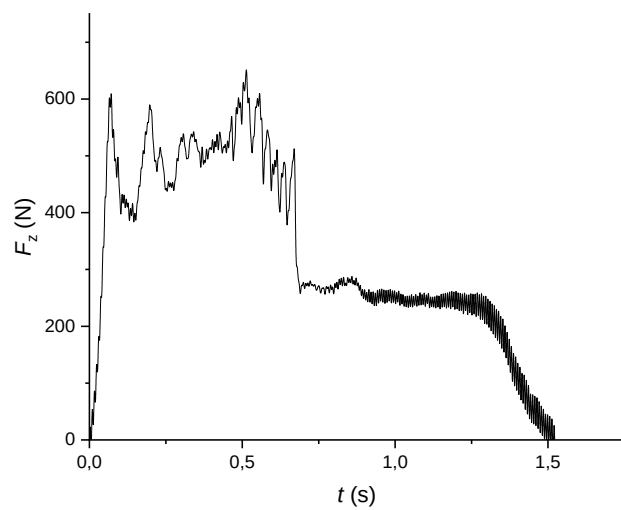


- 11. furat

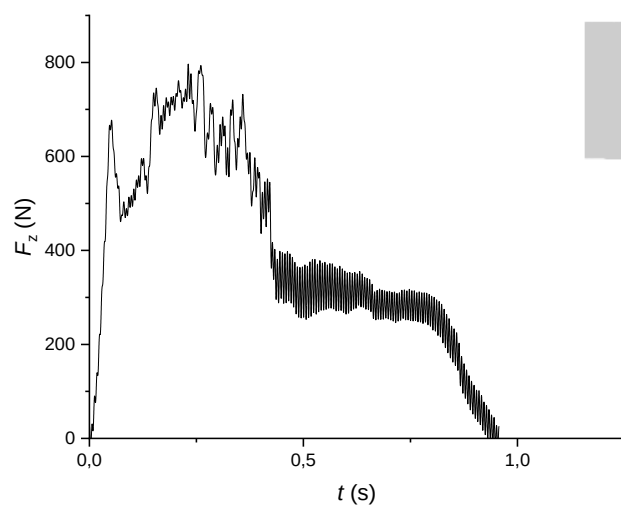




- 12. furat



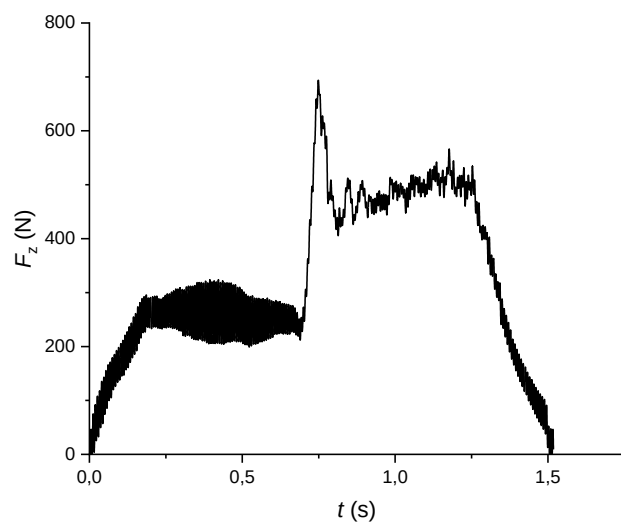
- 13. furat



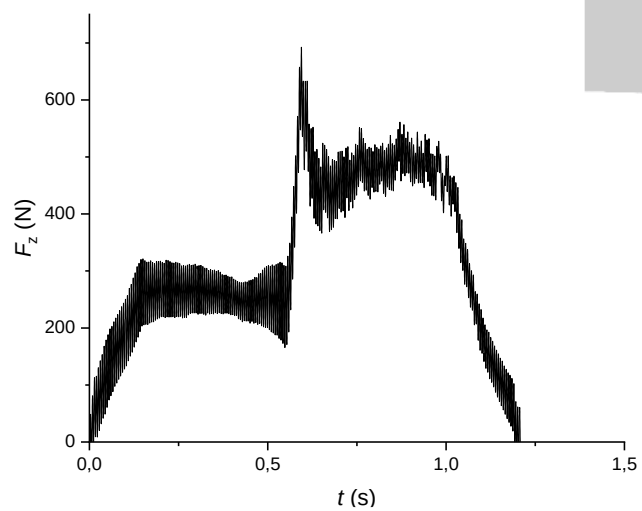


2.2. Második lemezen lévő furatoknál kapott erő diagramok

- 1. furat

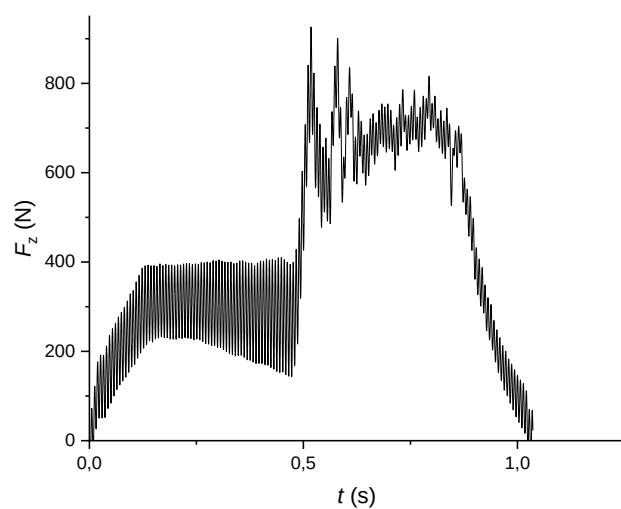


- 2. furat

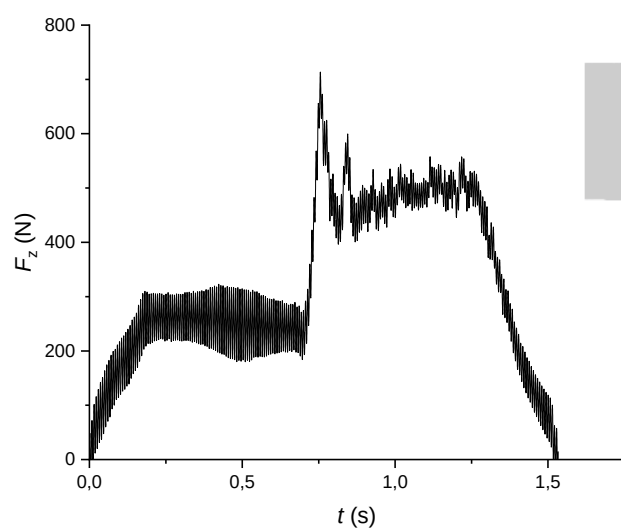




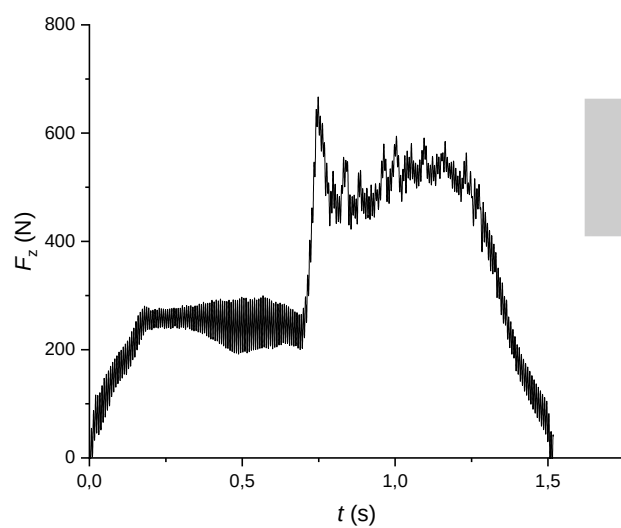
- 3. furat



- 4. furat

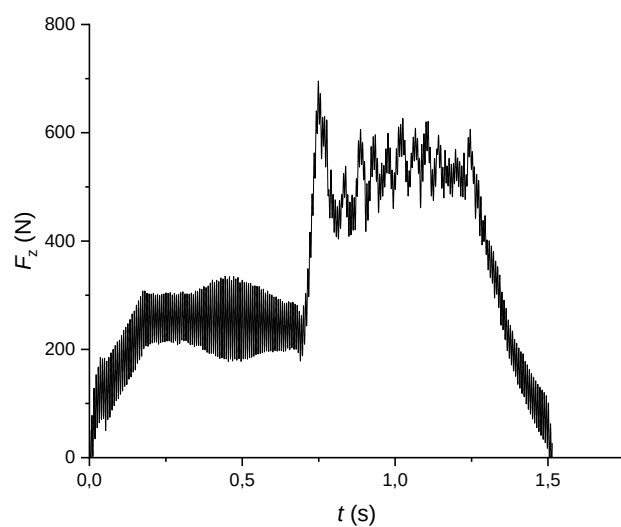


- 5. furat

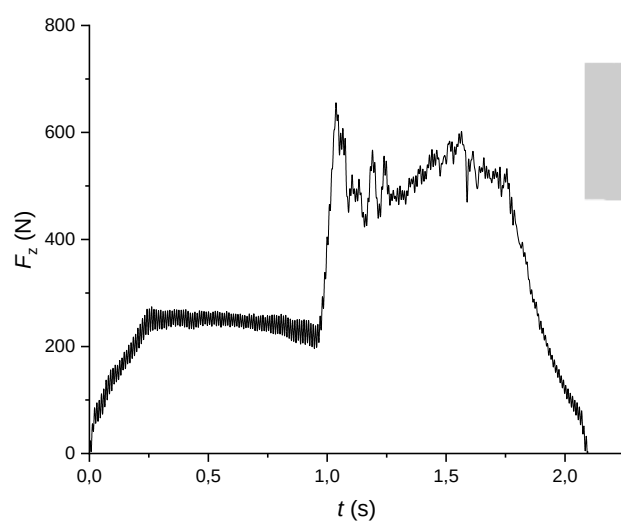




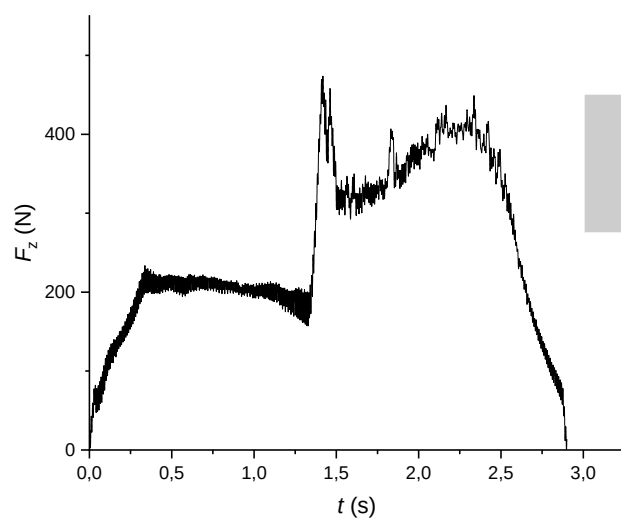
- 6. furat



- 7. furat

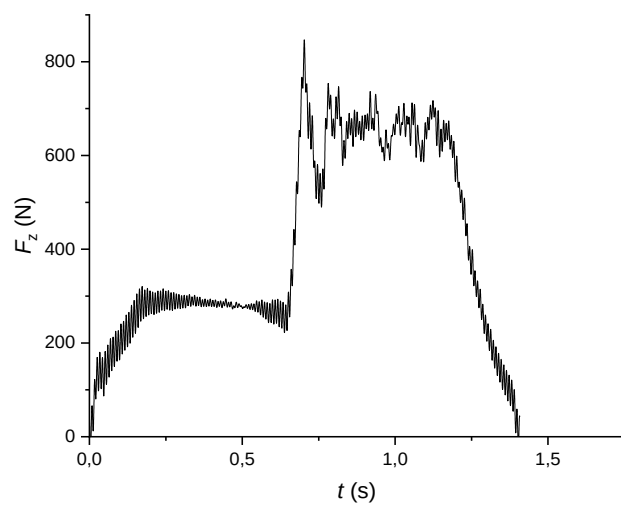


- 8. furat

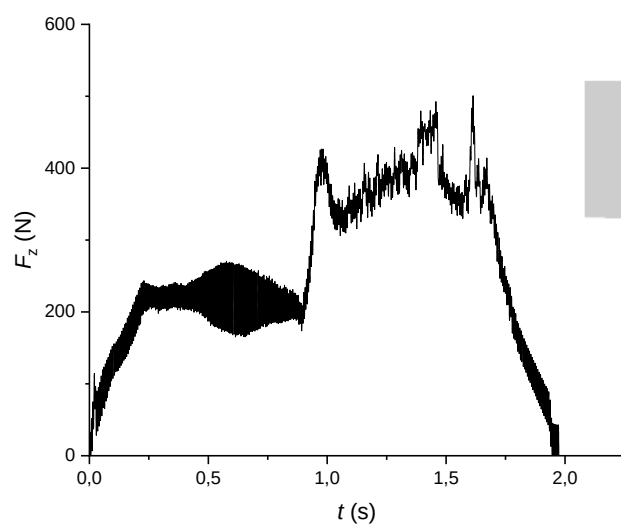




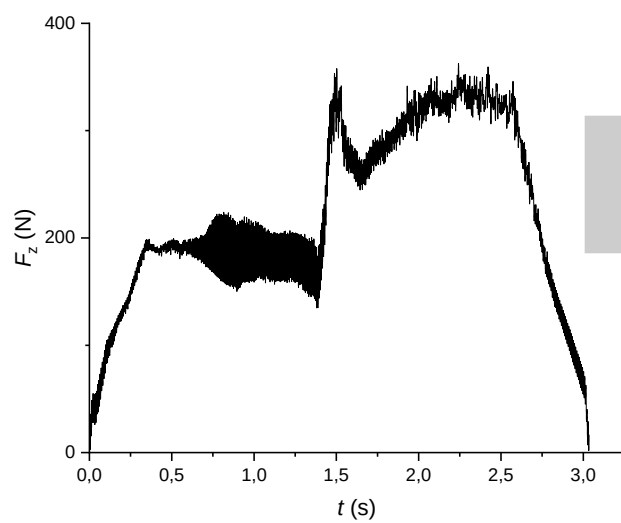
- 9. furat



- 10. furat

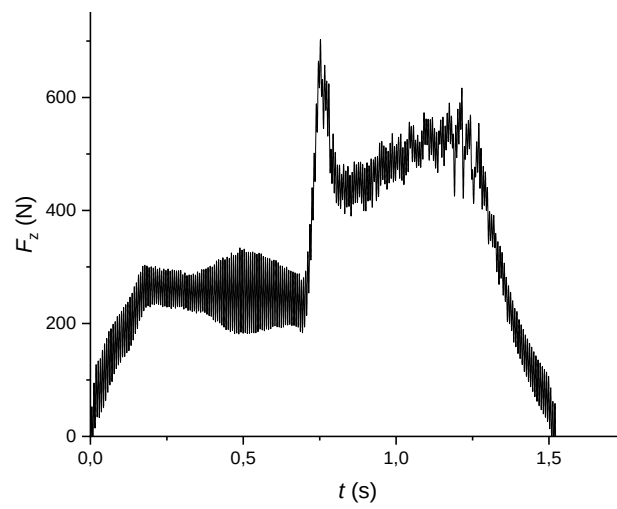


- 11. furat

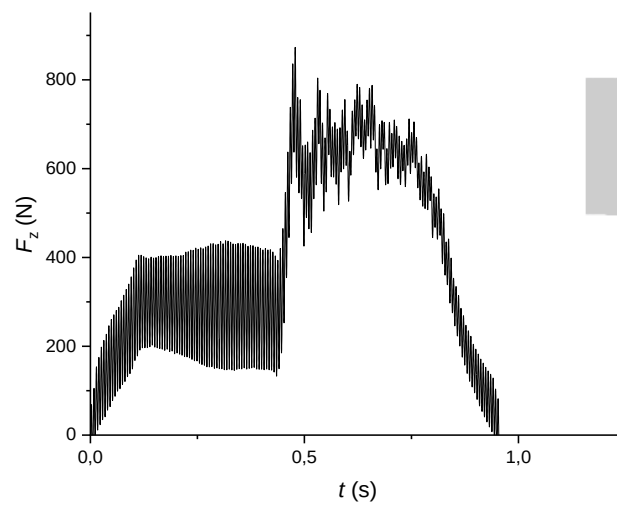




- 12. furat



- 13. furat



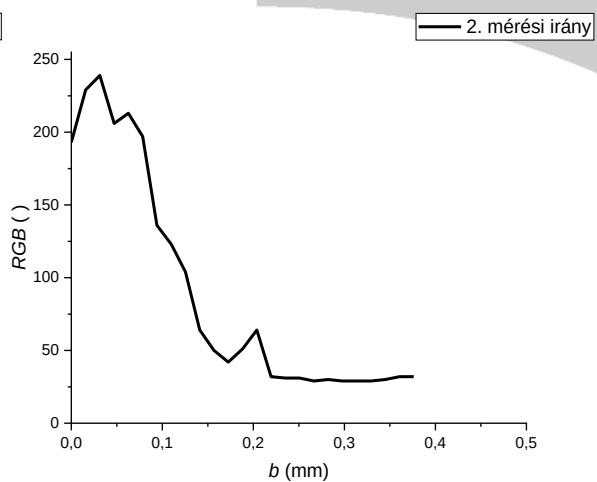
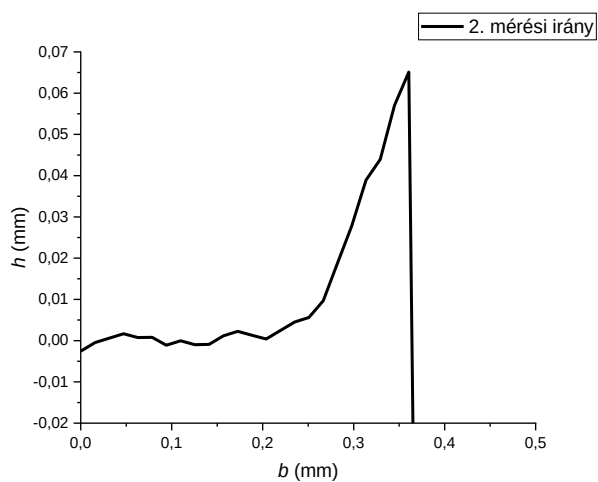
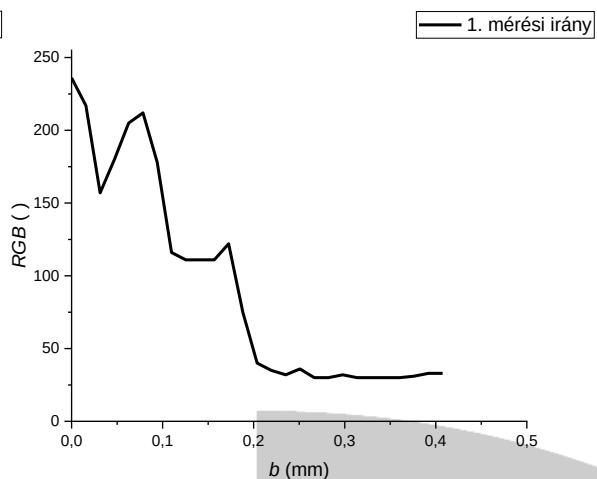
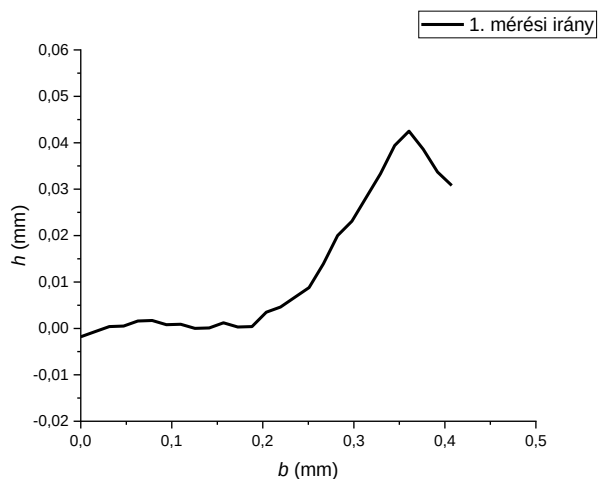


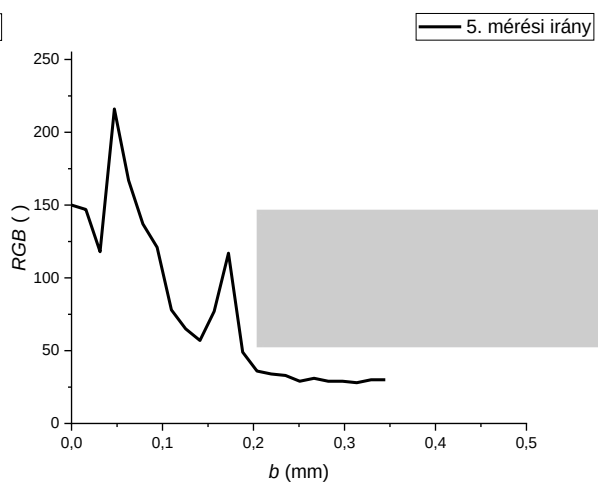
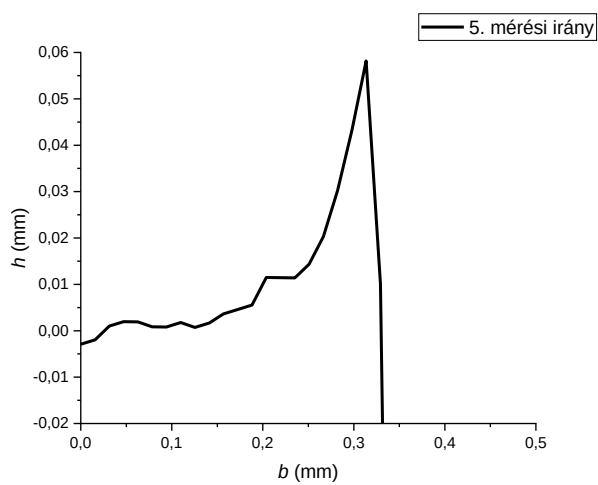
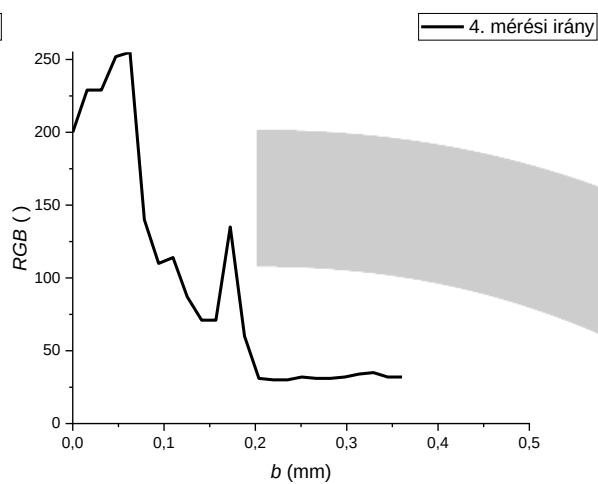
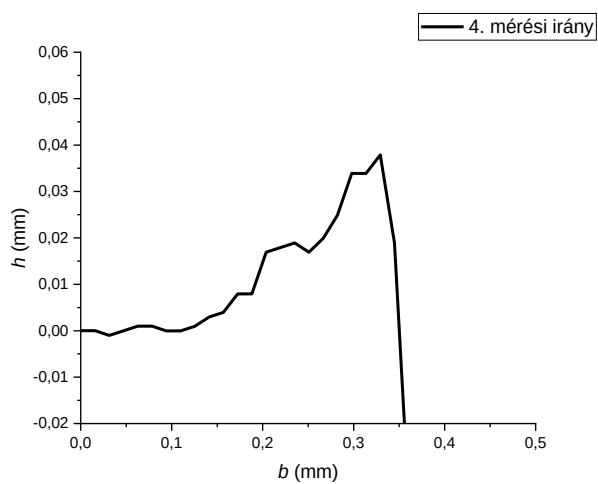
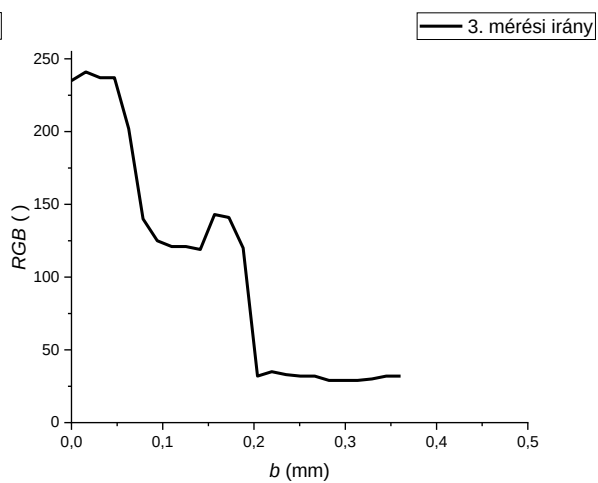
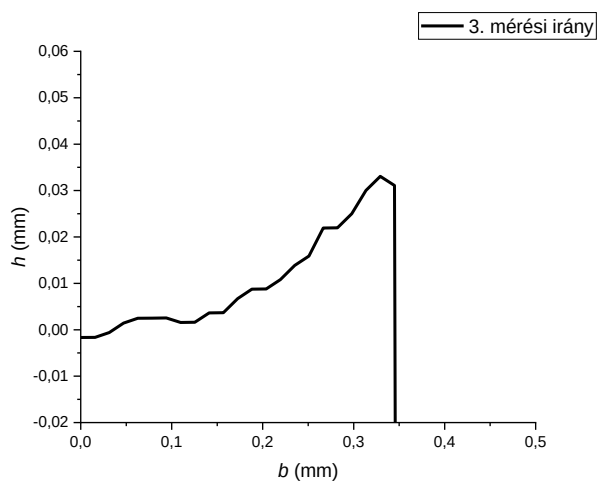
3. sz. melléklet: Mért furatokhoz tartozó h - b és RGB - b diagramok

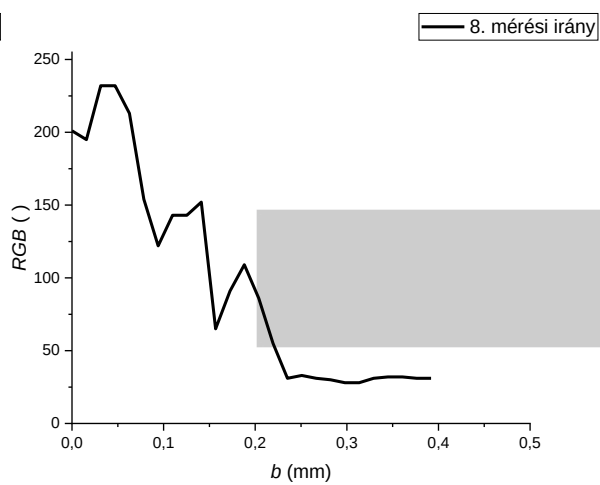
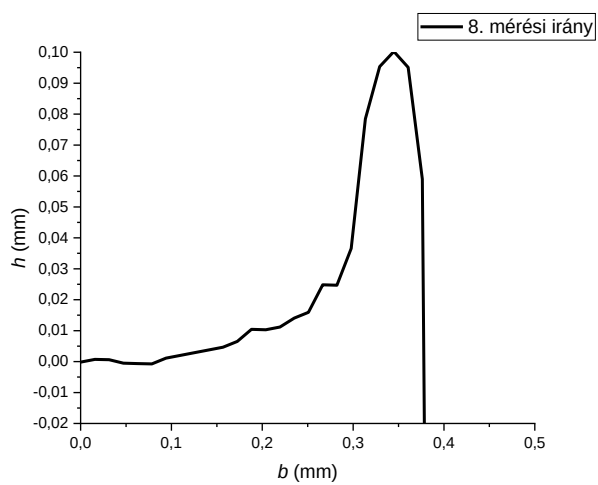
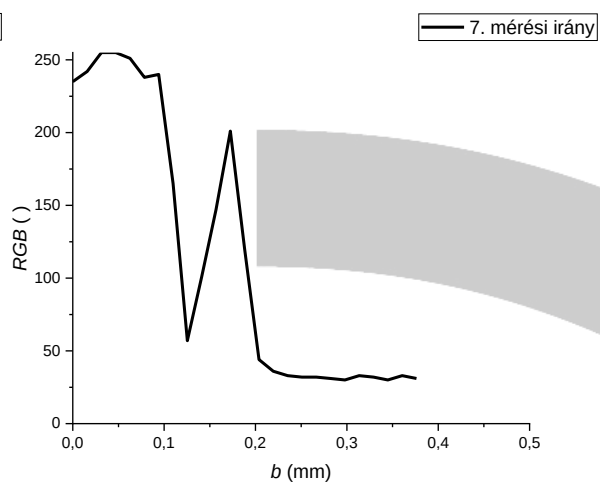
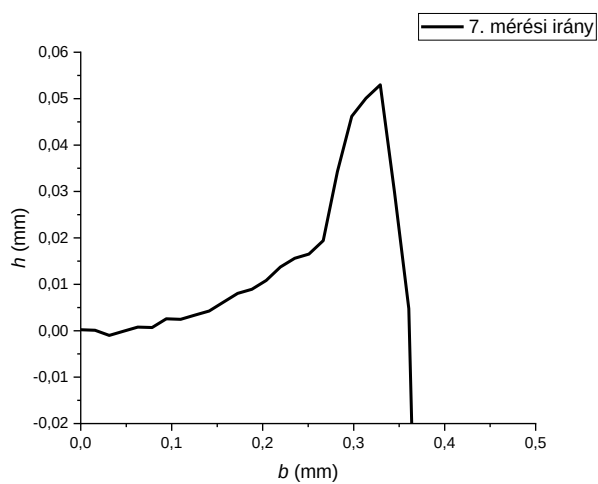
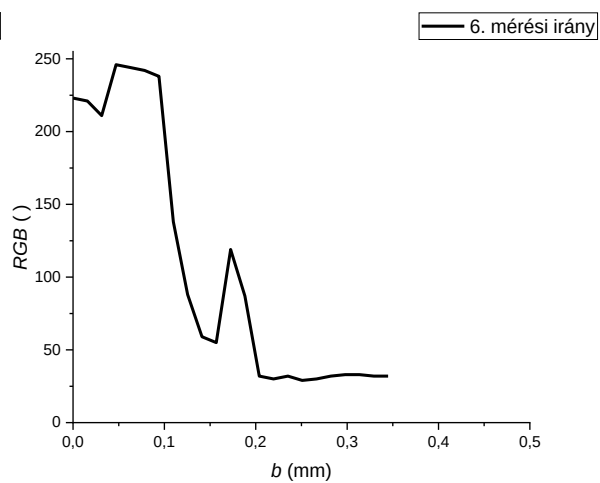
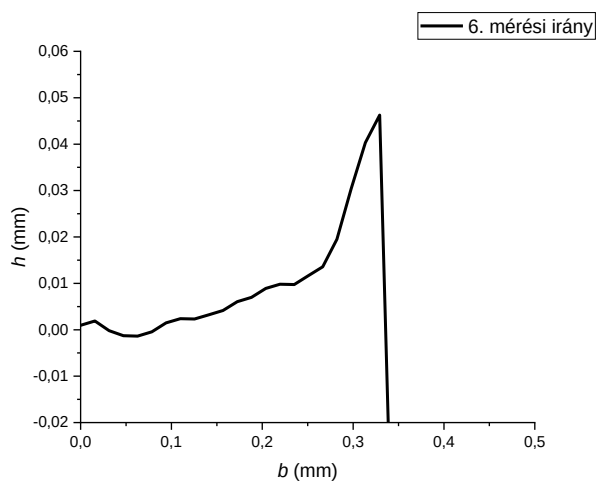
3.1. Első lemezhez tartozó furatok

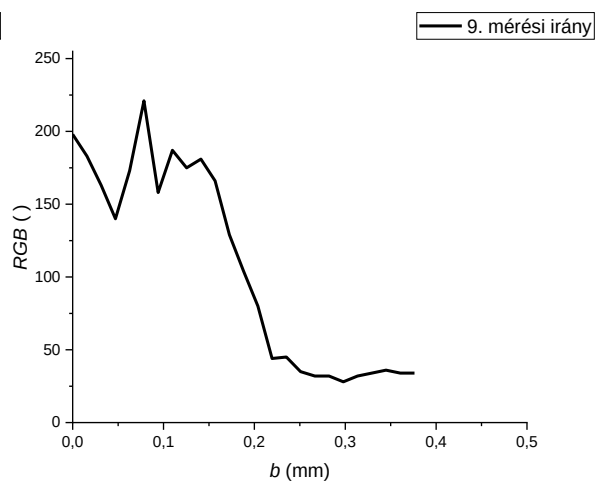
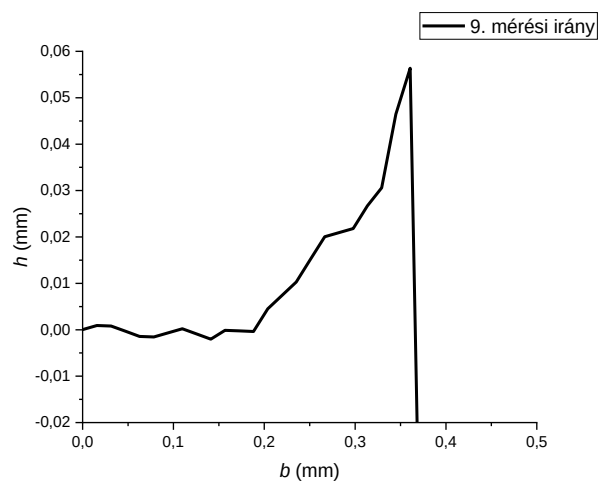
3.1.1. Első lemezsorrend

- 1. furat



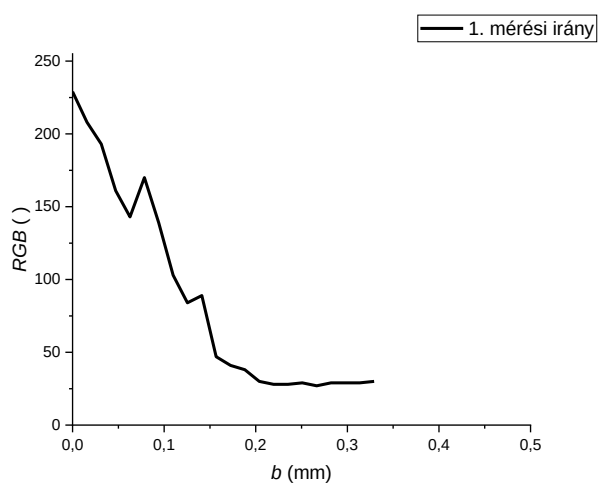
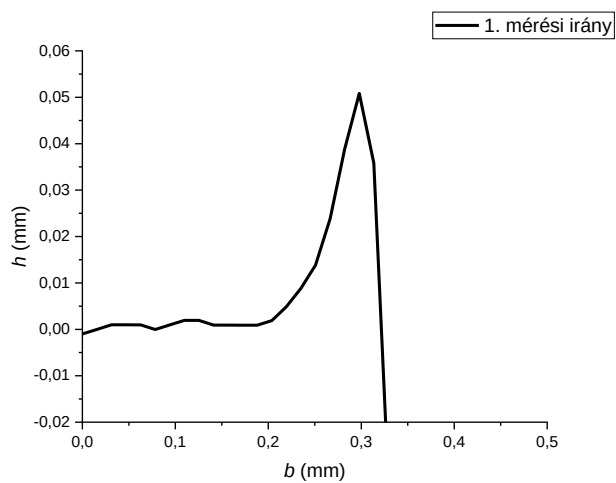


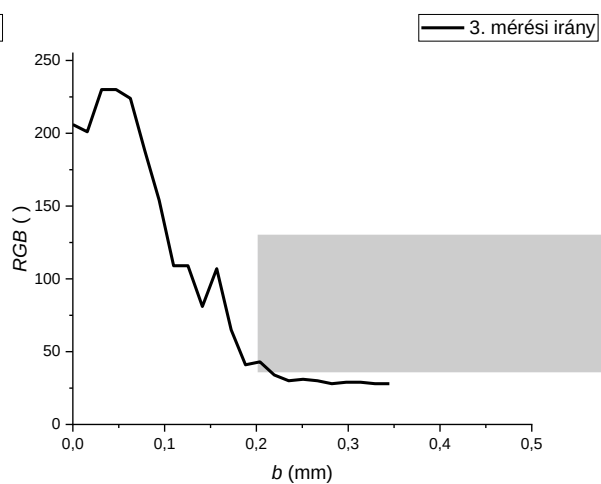
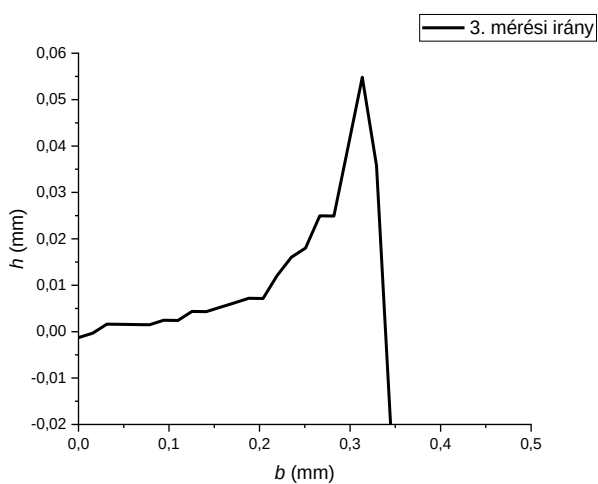
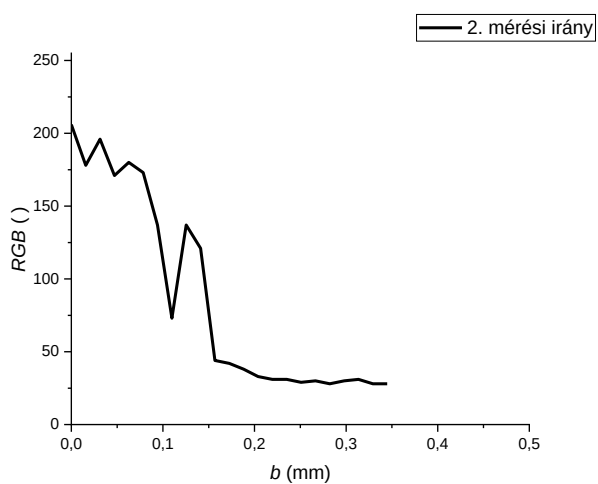
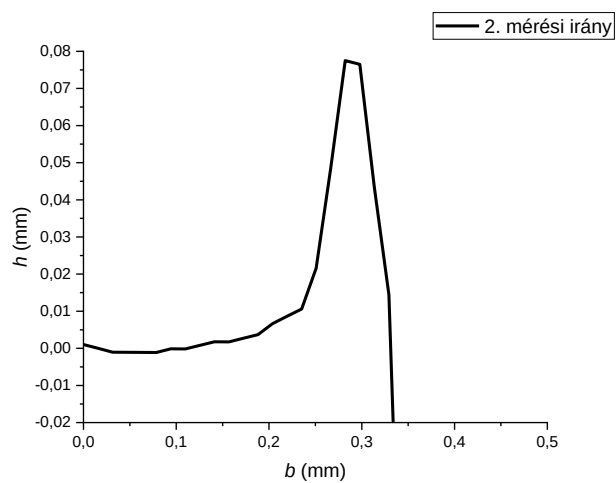


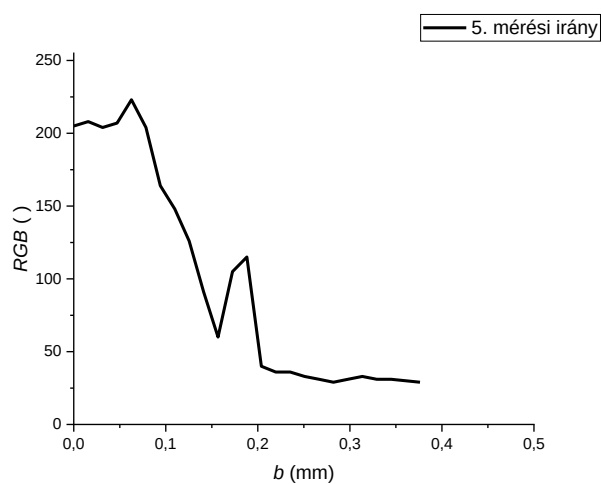
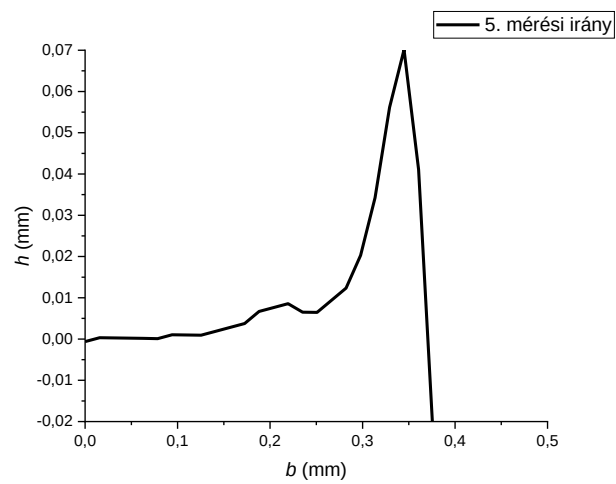
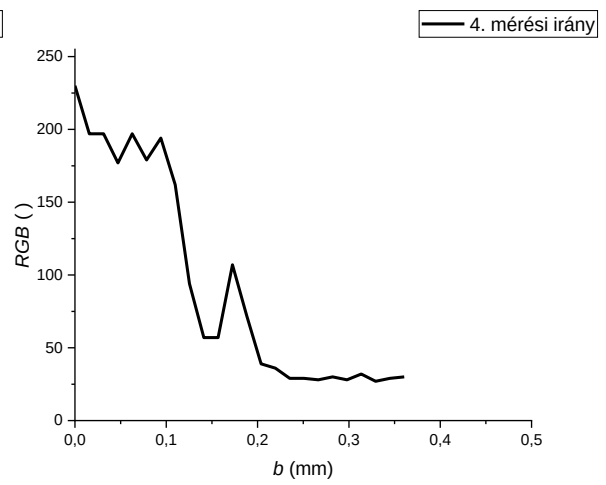
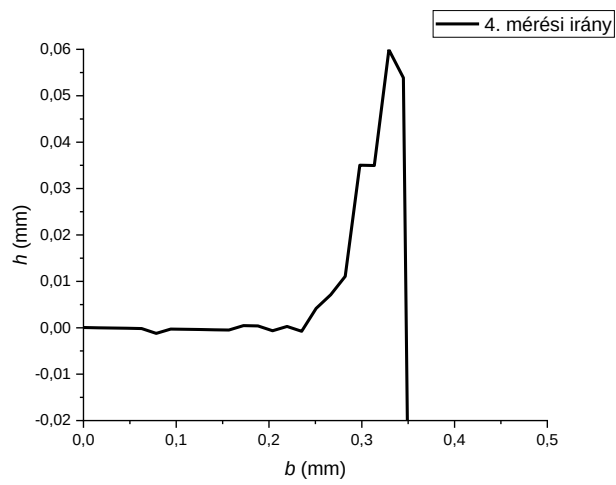


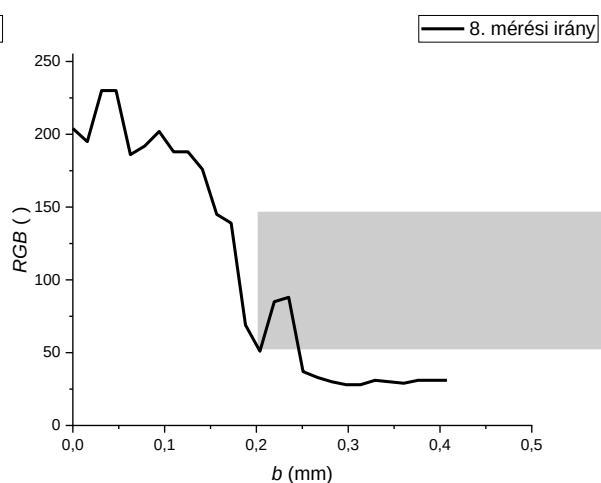
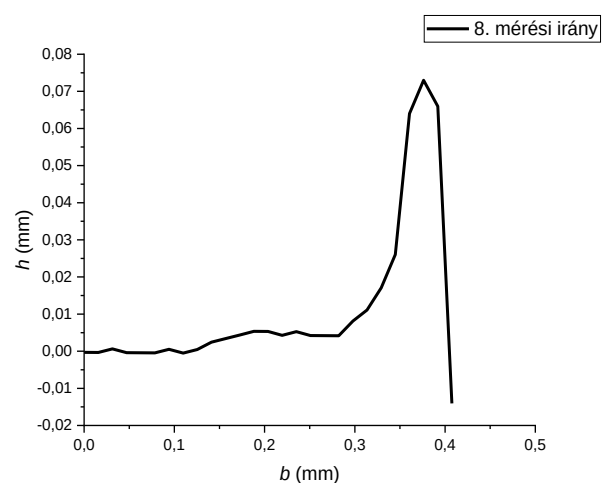
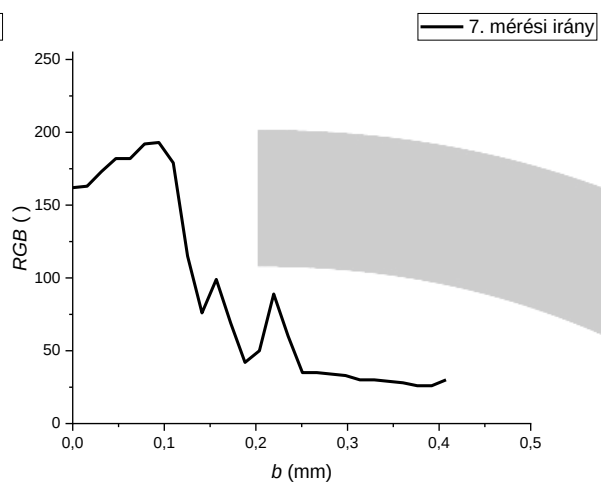
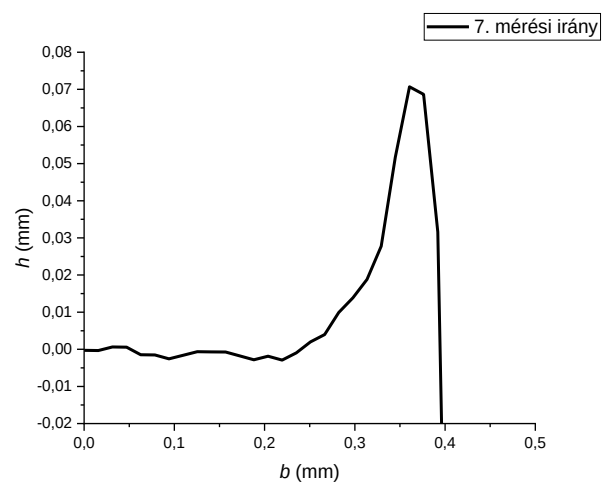
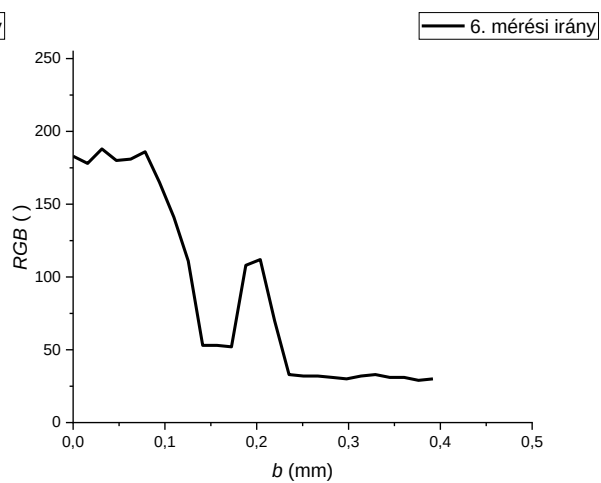
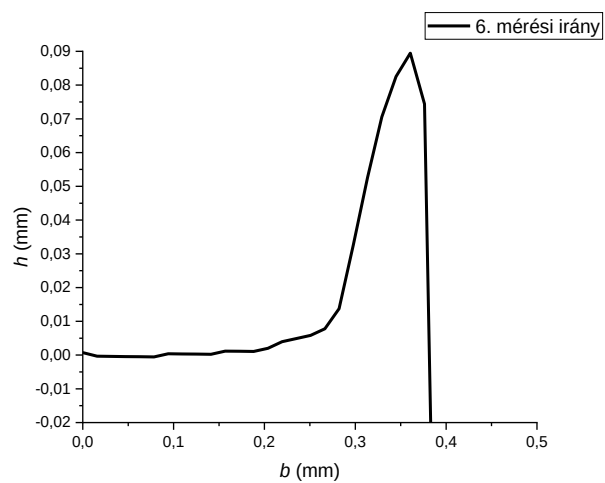


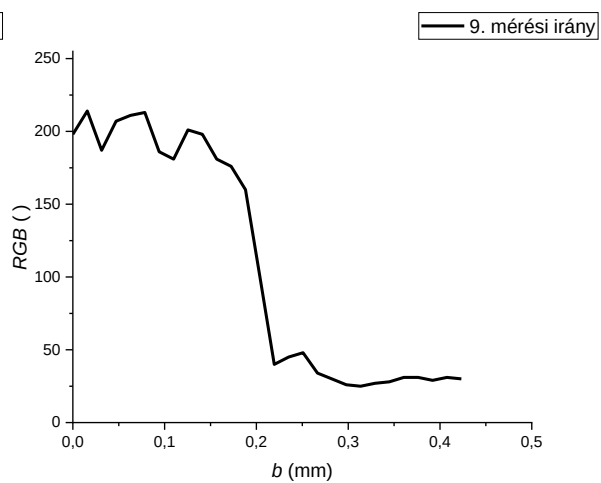
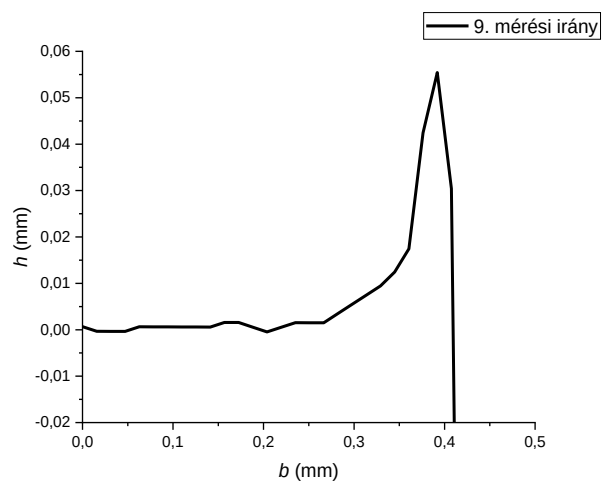
- 2. furat





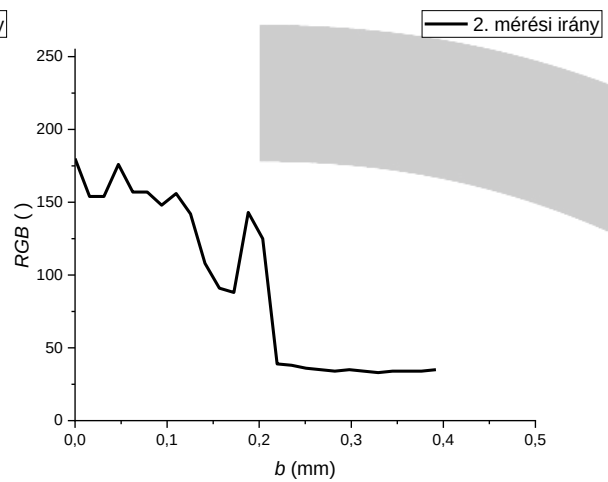
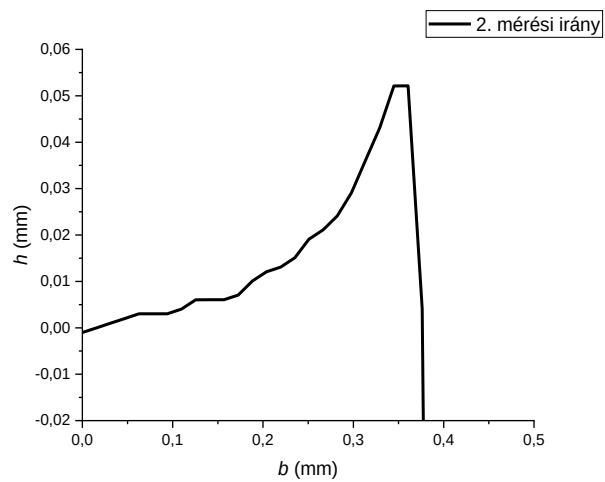
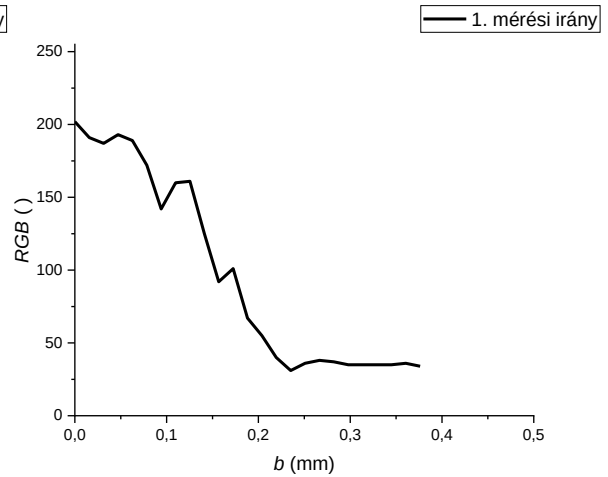
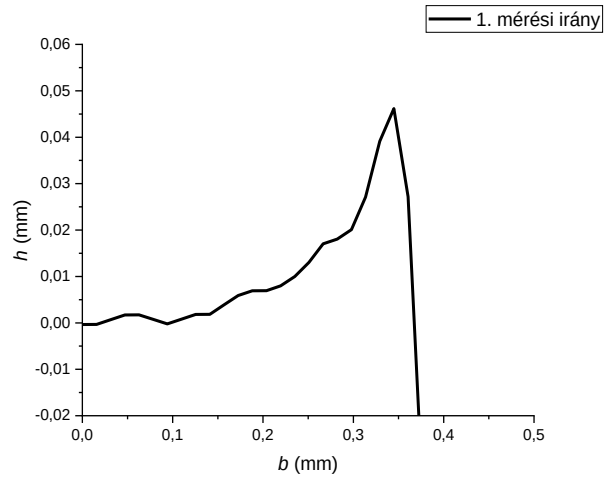


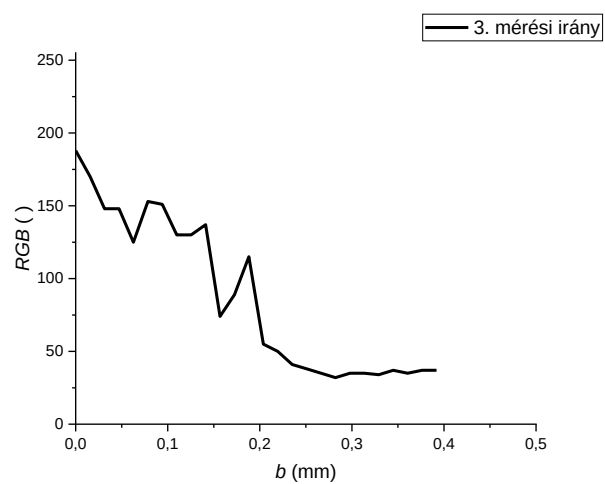
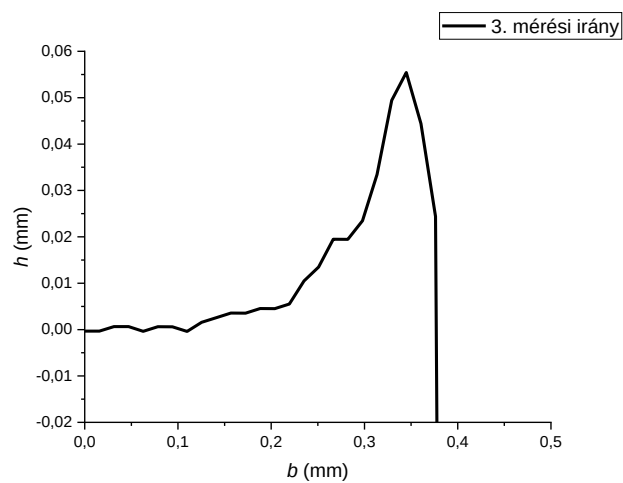


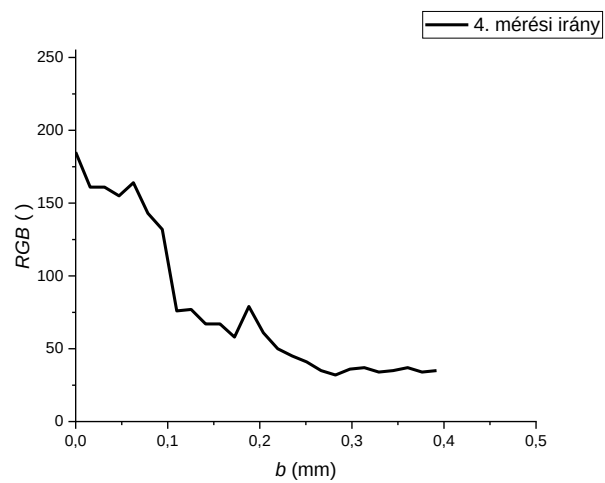
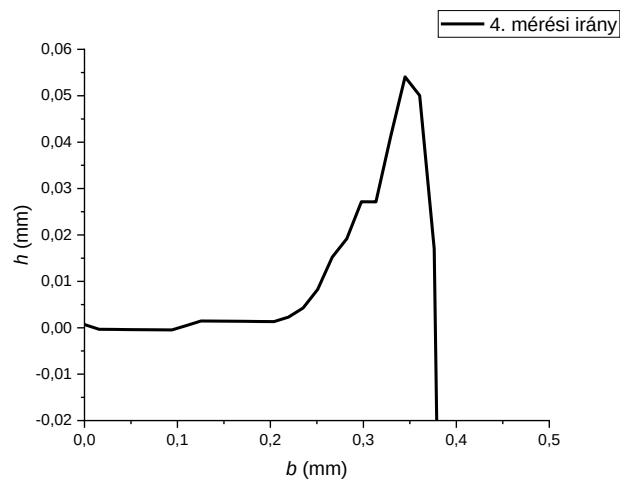


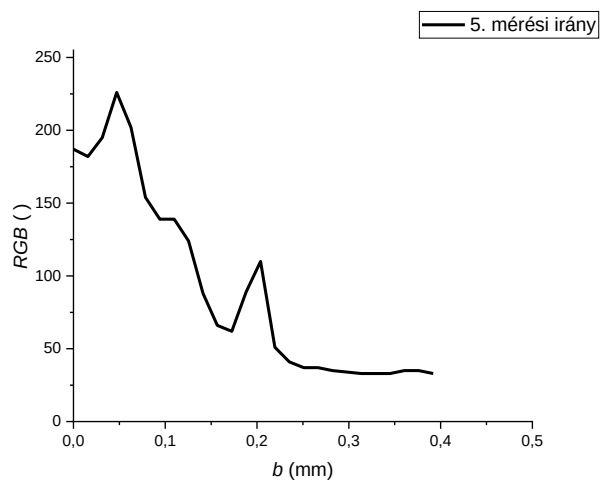
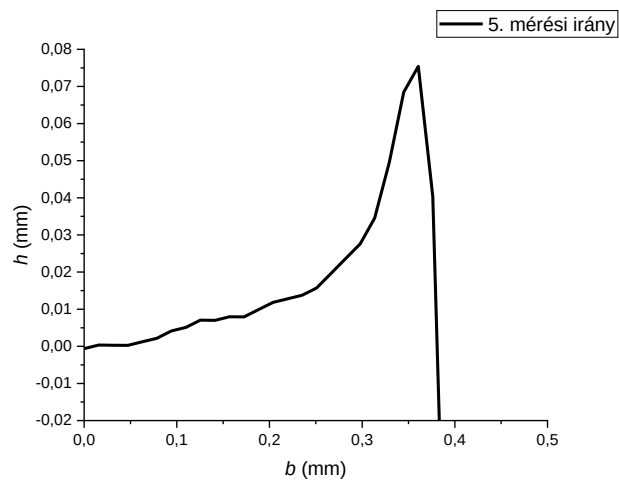


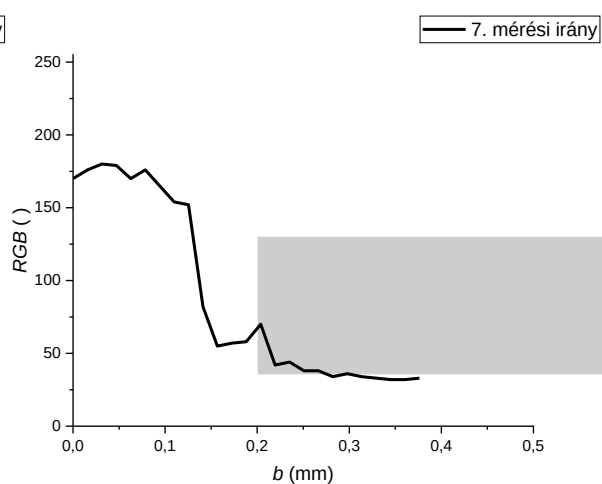
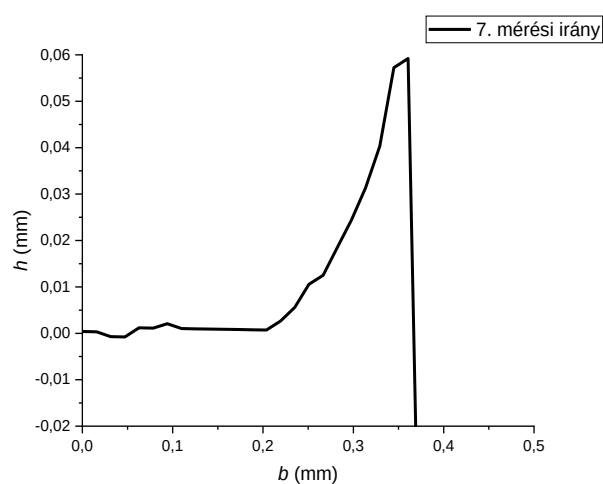
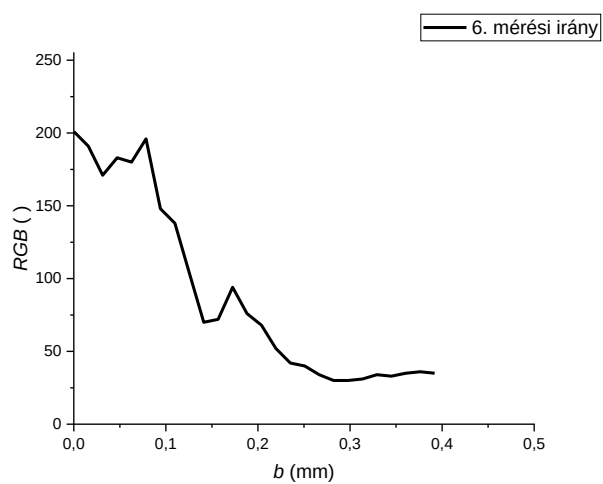
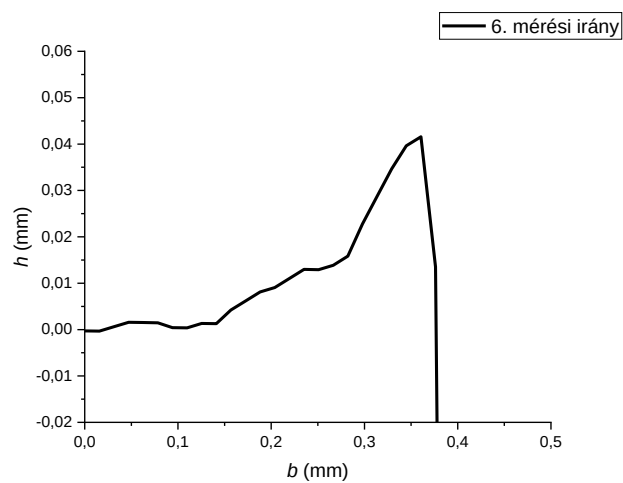
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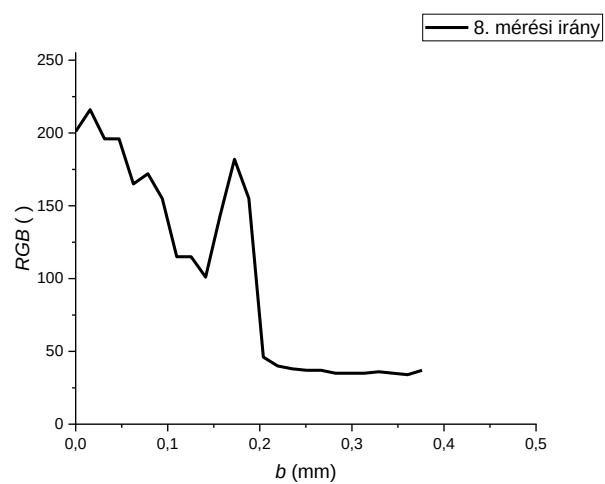
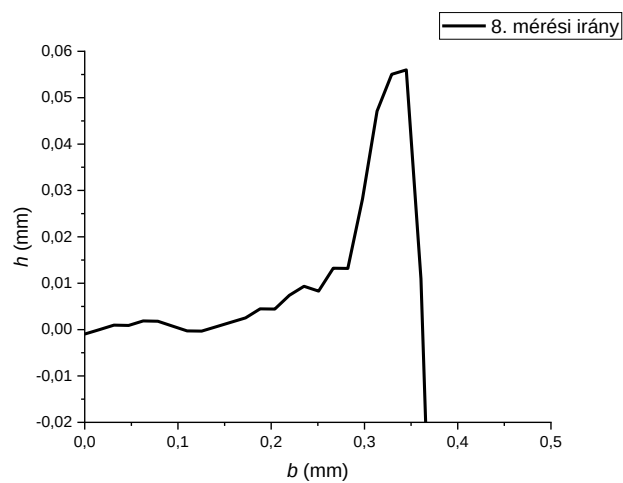


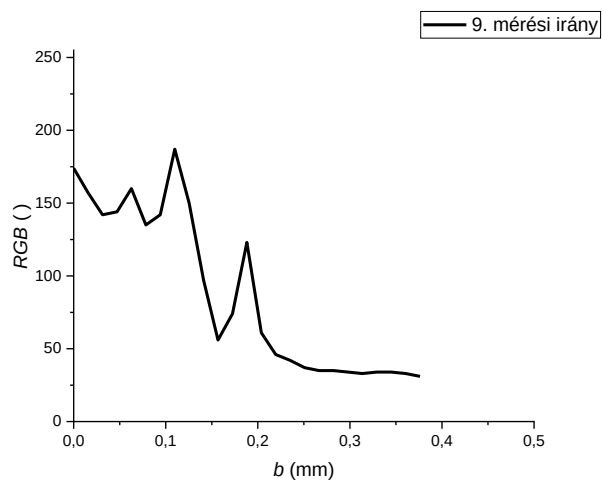
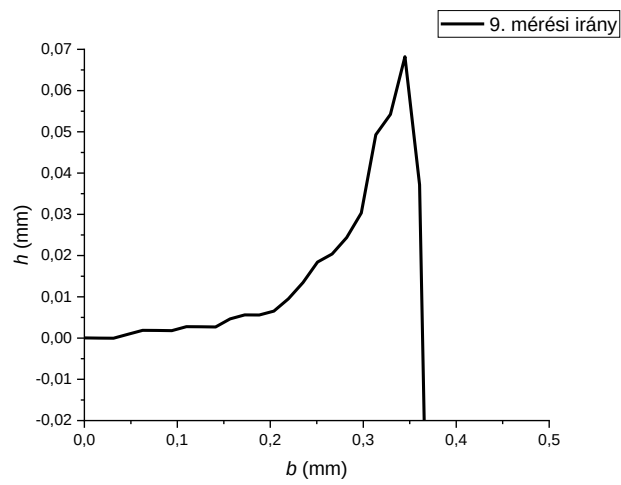






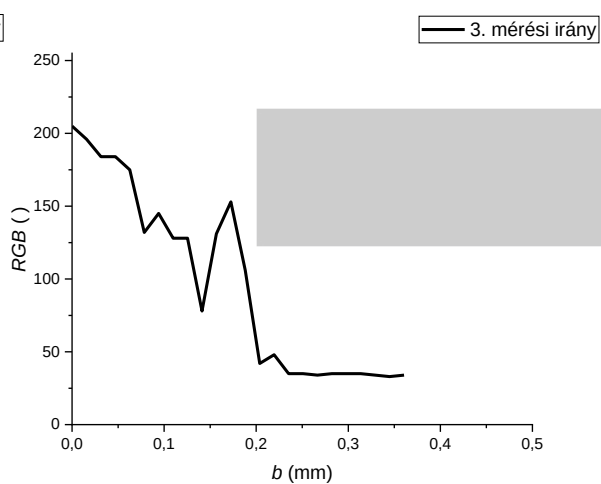
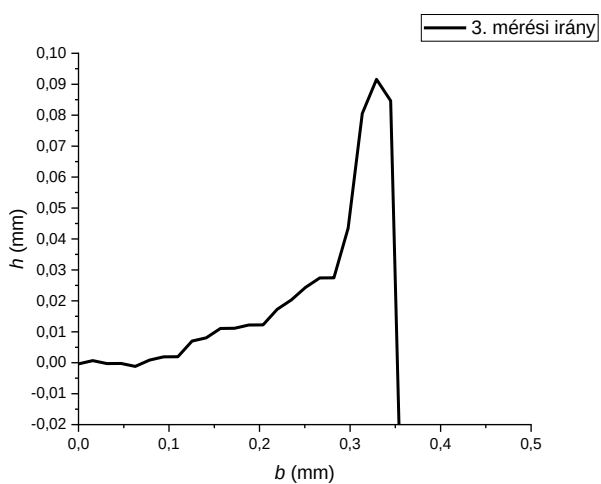
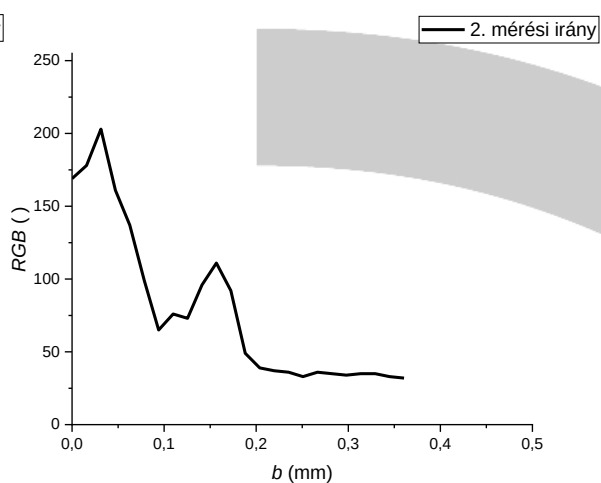
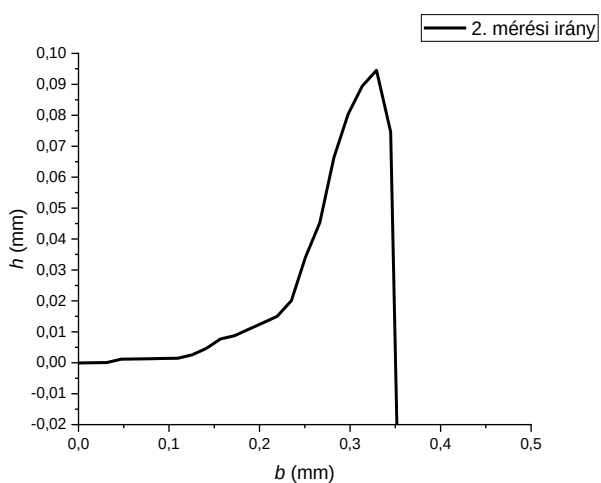
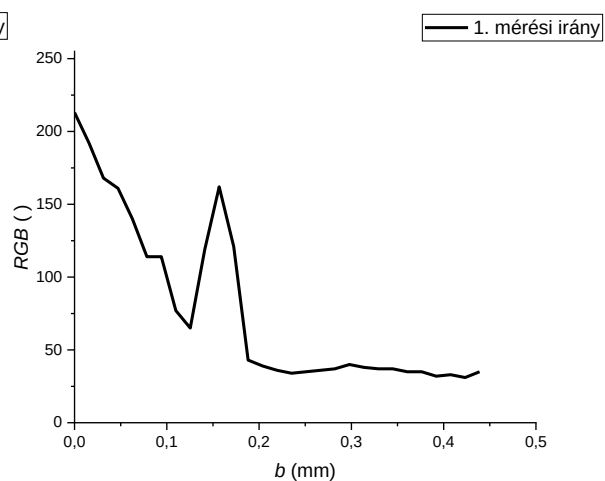
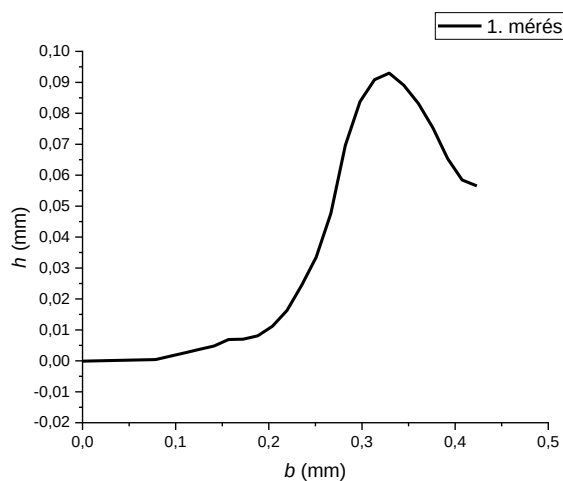


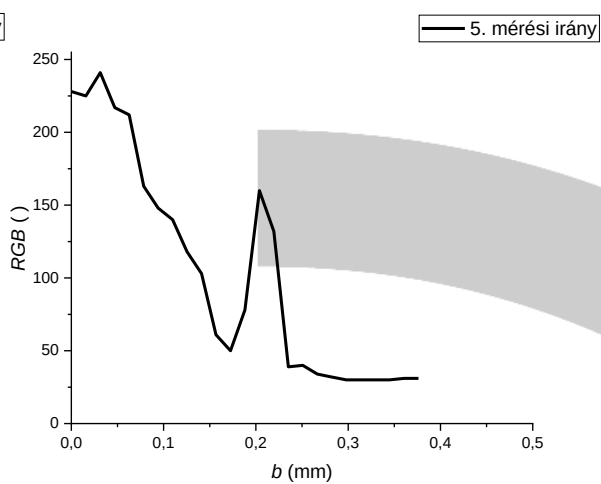
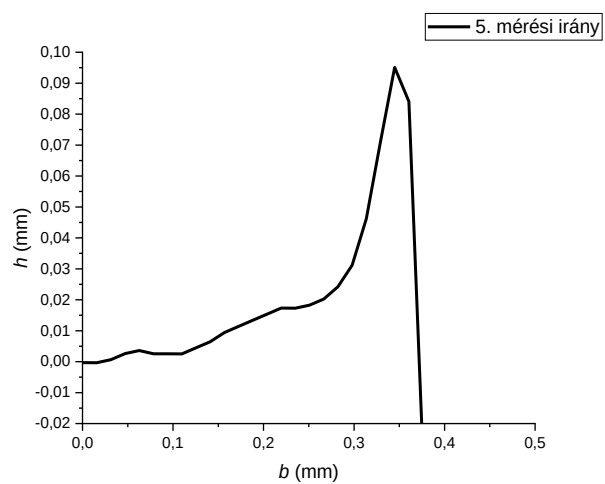
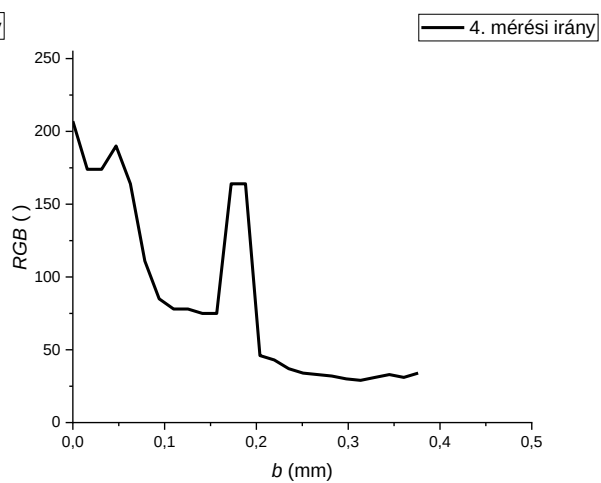
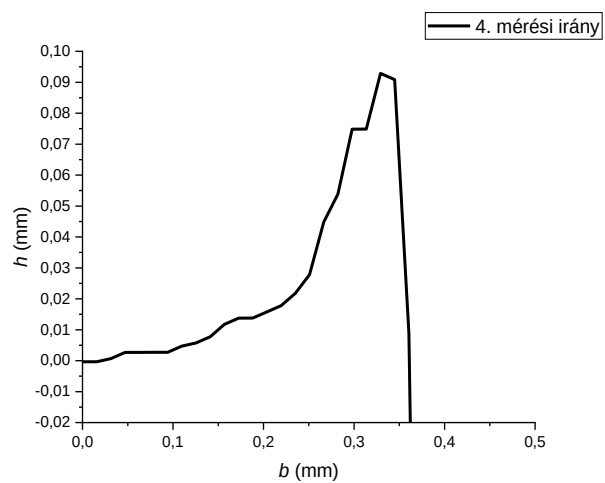


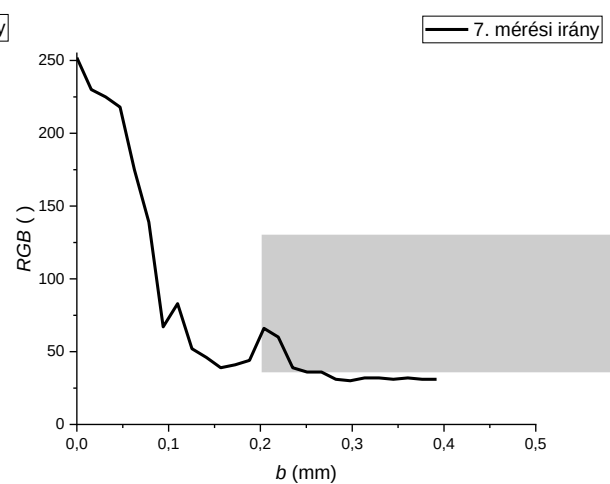
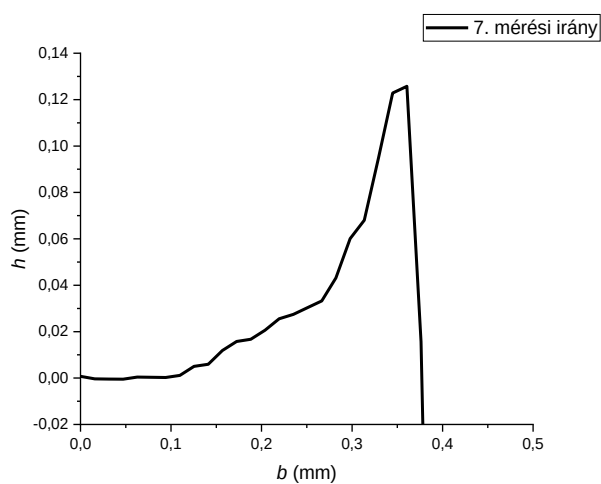
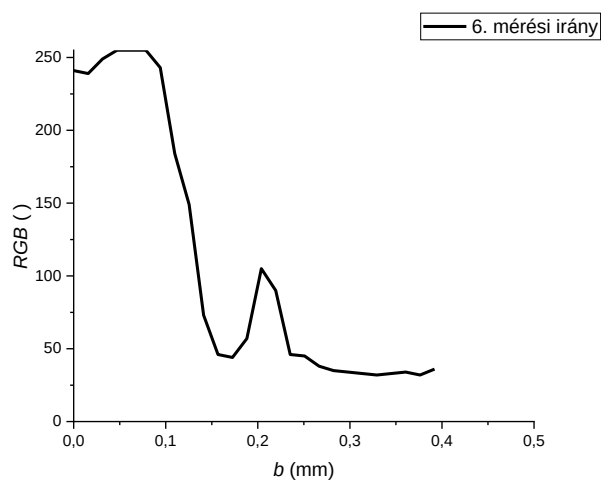
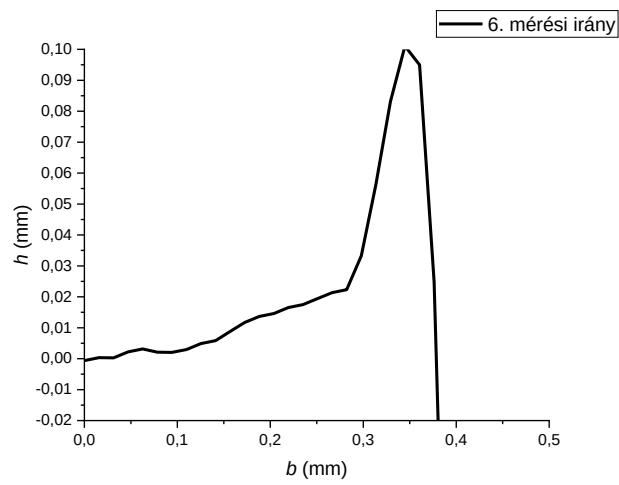


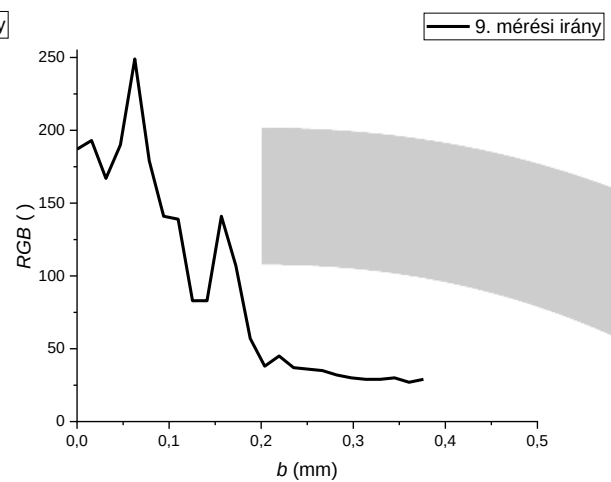
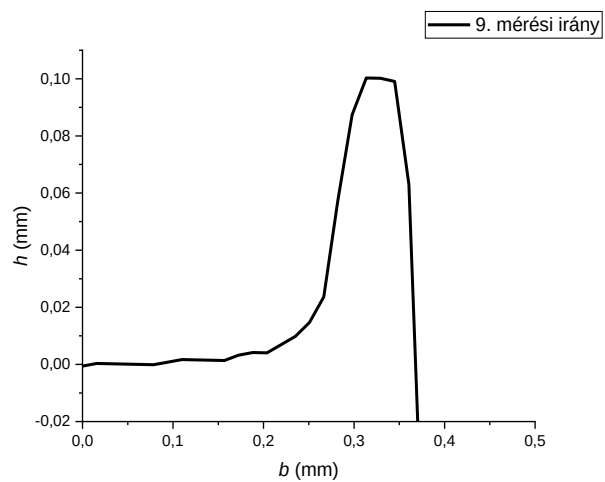
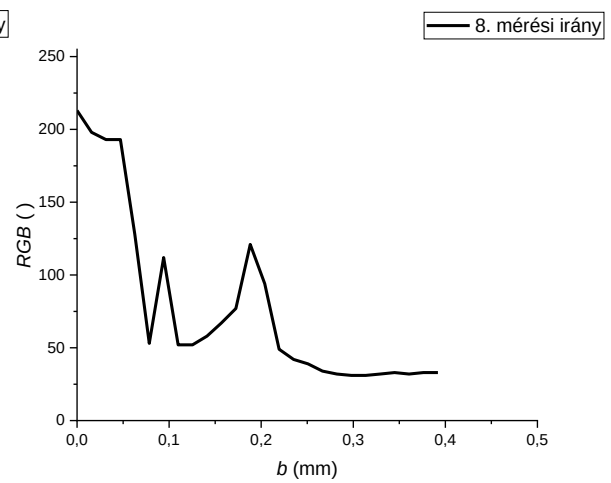
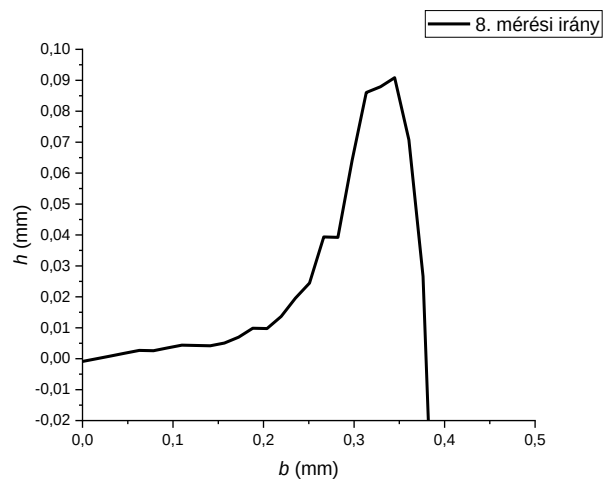


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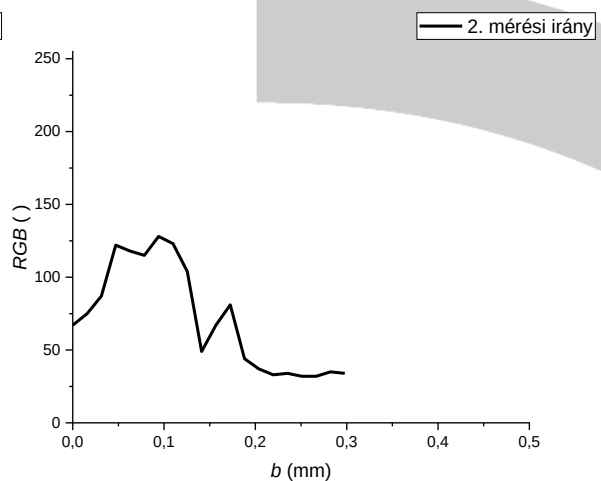
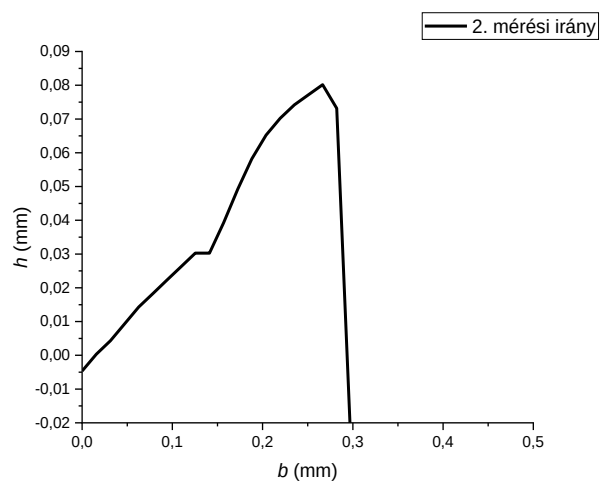
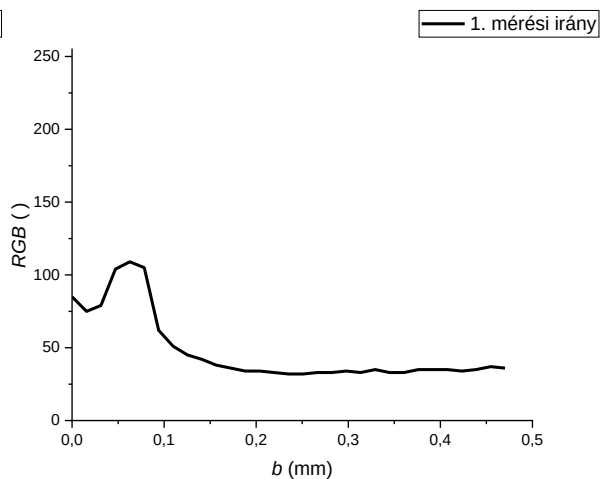
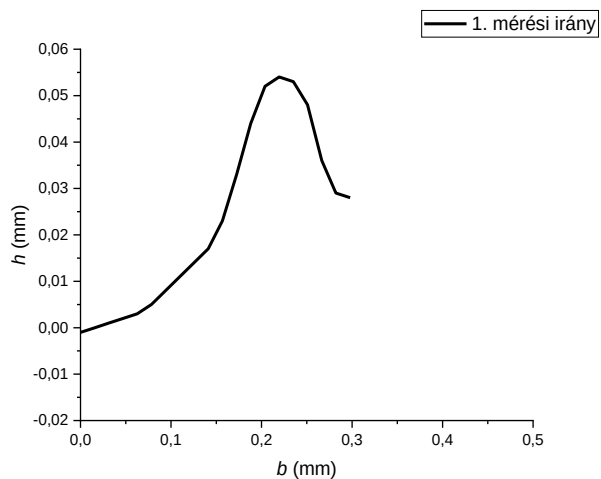


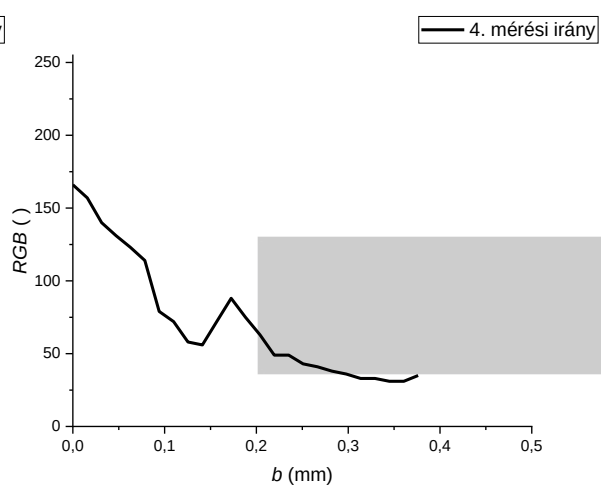
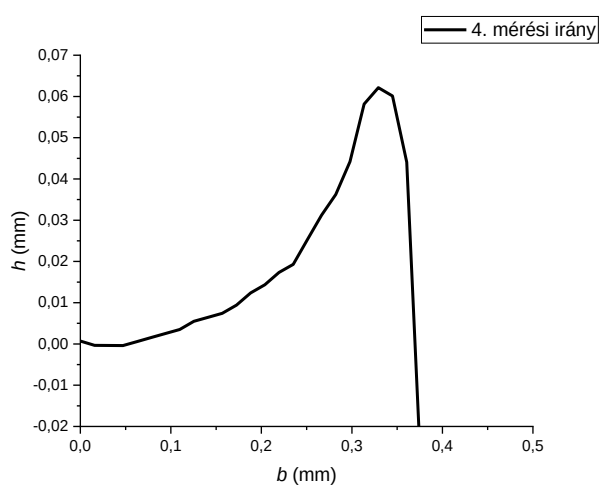
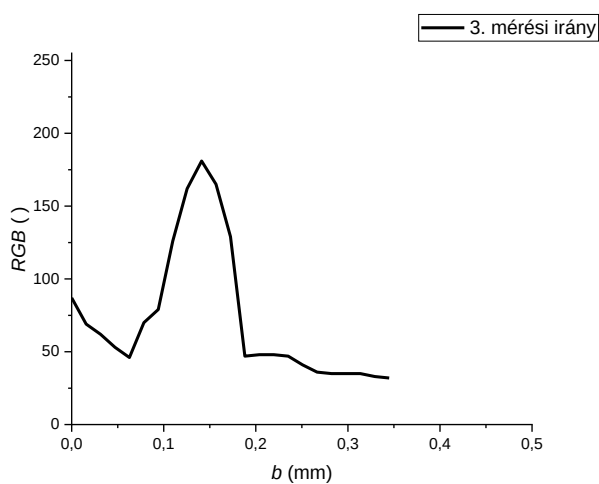
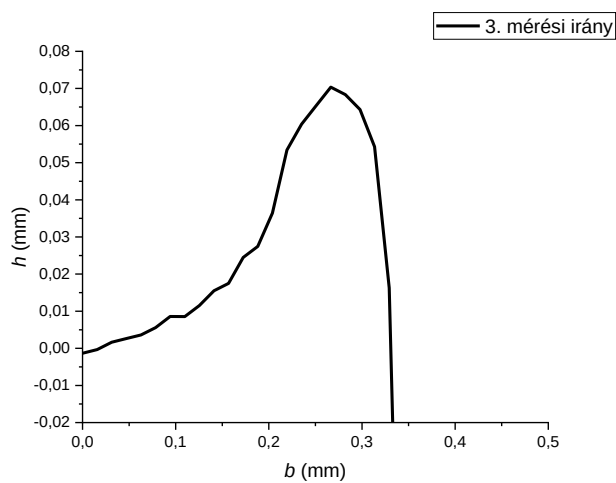


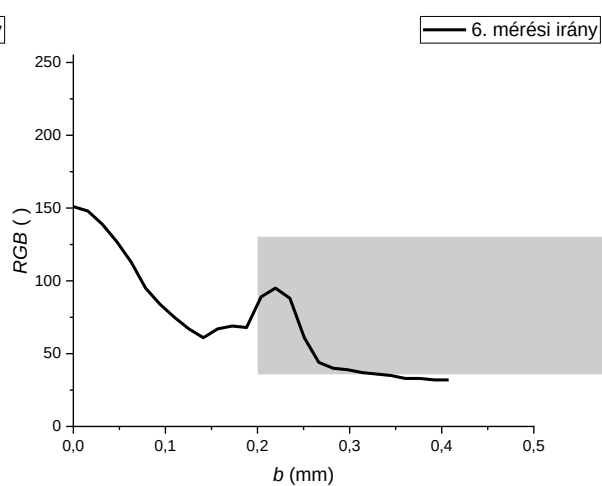
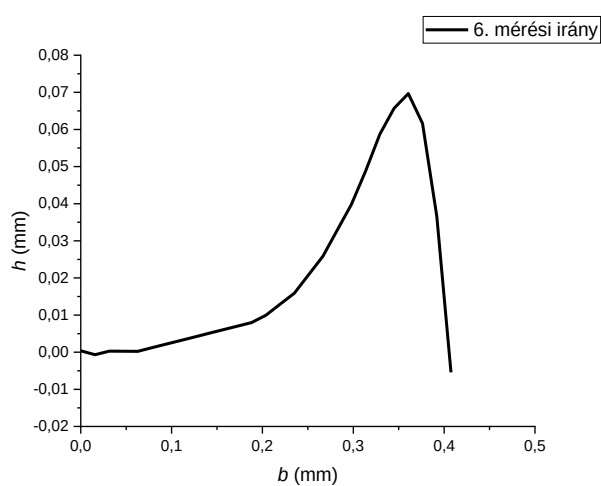
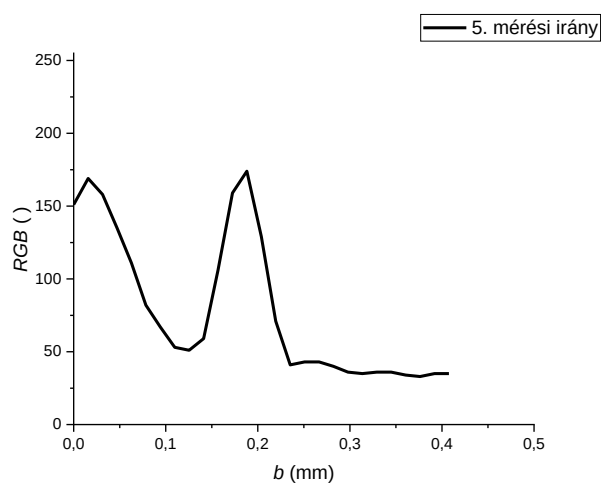
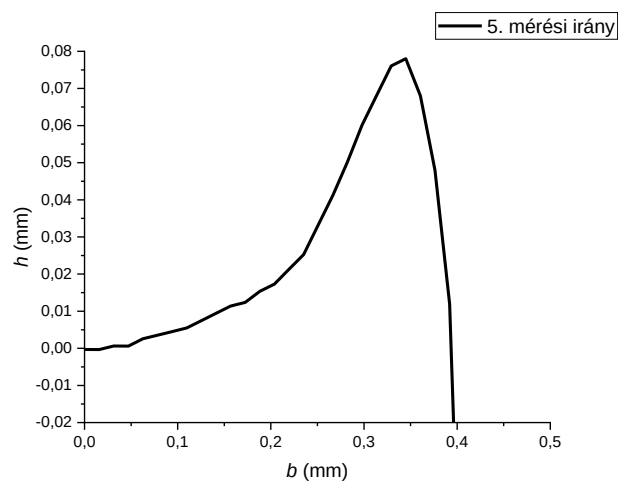


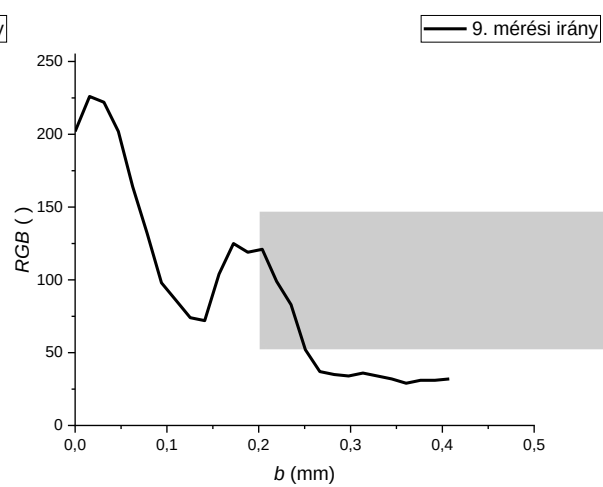
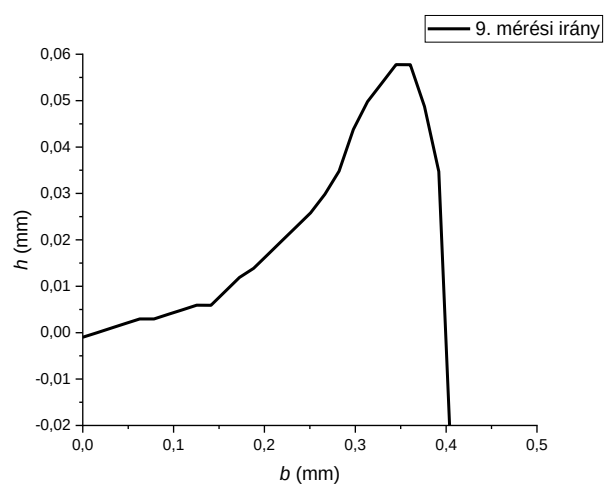
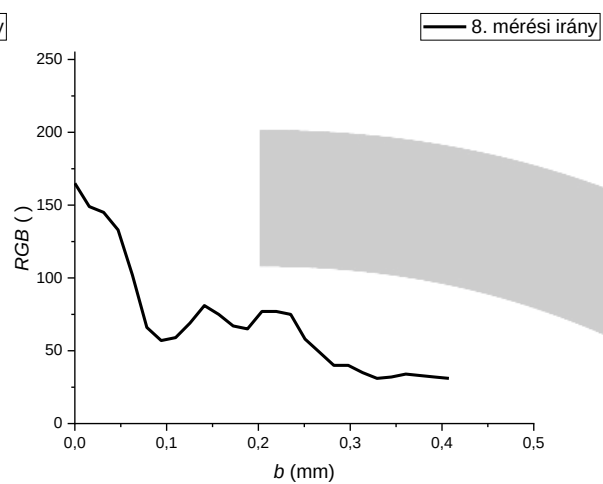
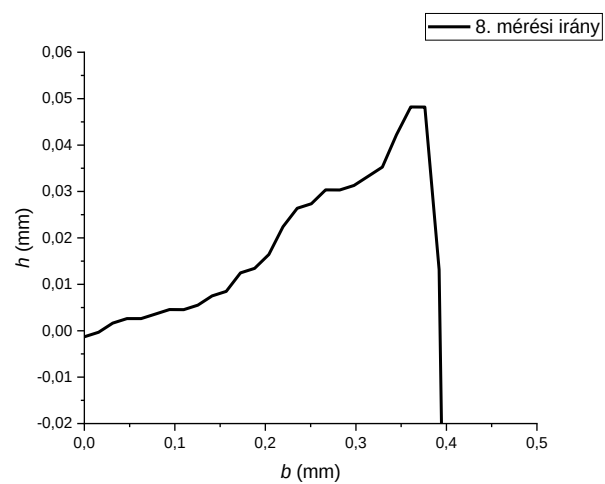
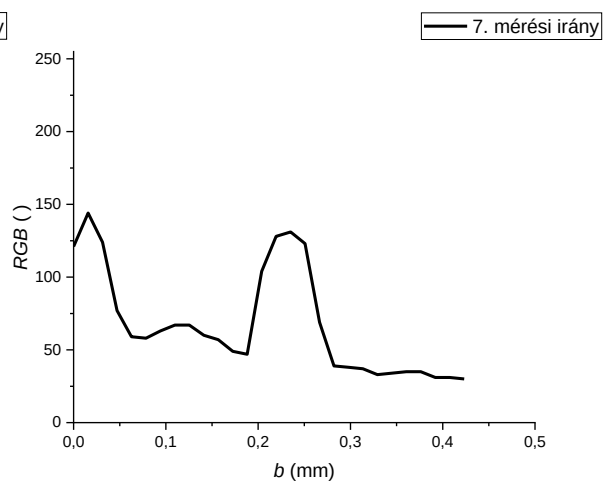
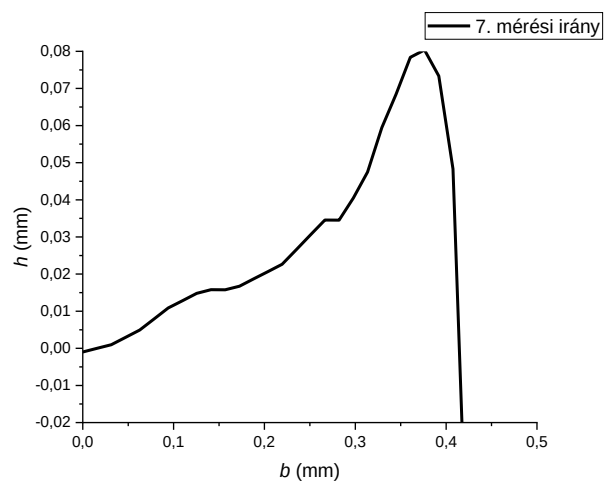
- 5. furat

Ennél a furatnál eltérnek a diagrammok a nem megfelelő szűrés miatt.



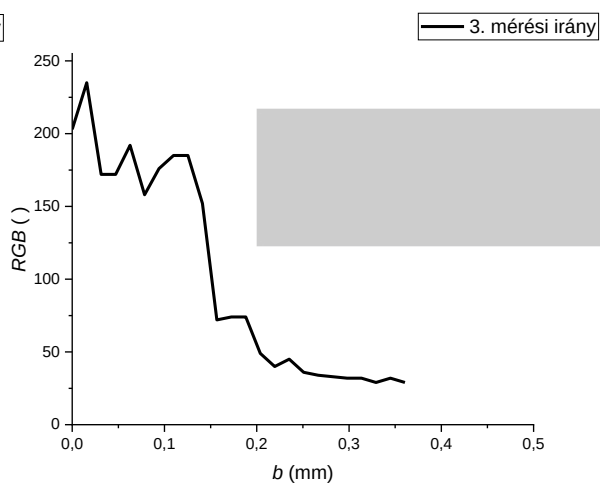
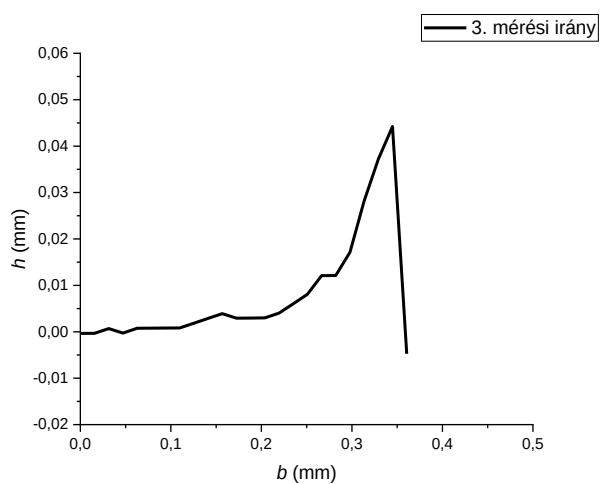
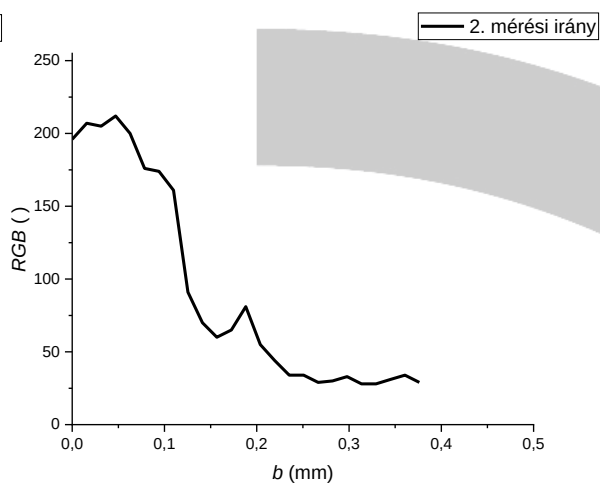
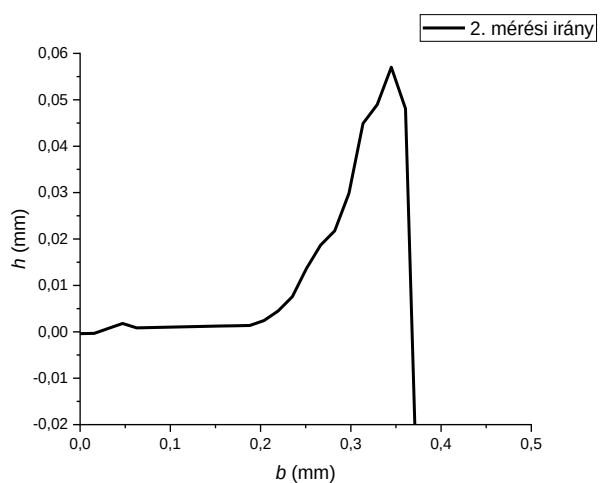
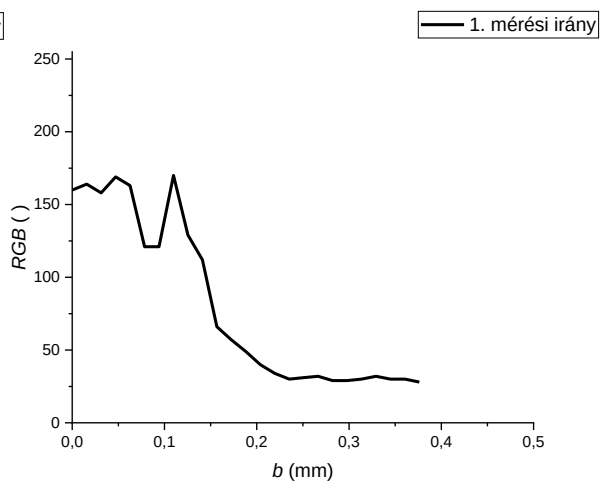
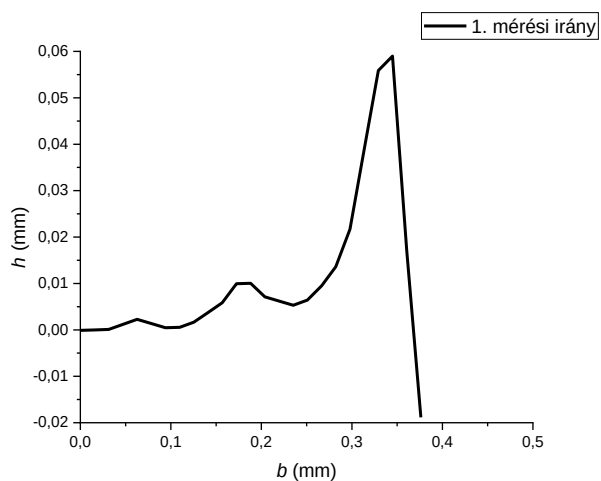


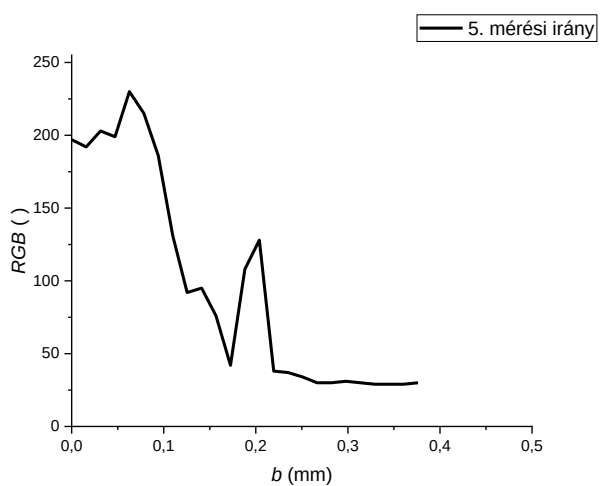
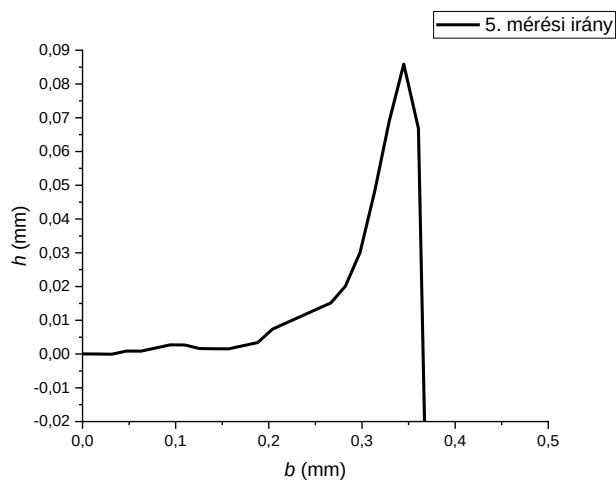
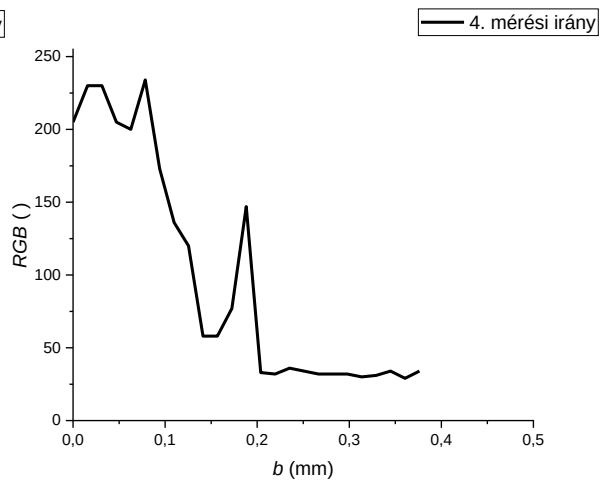
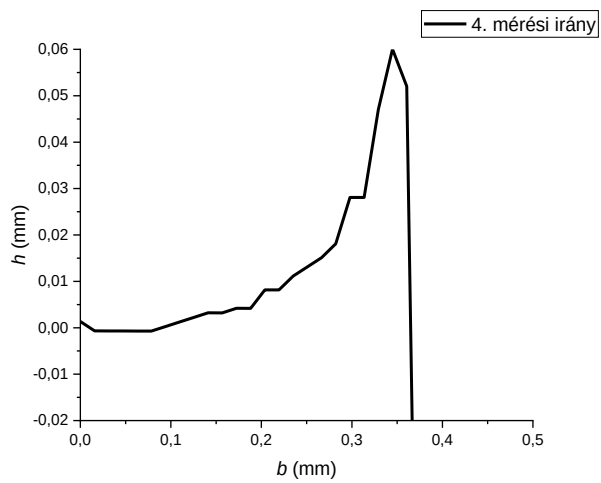


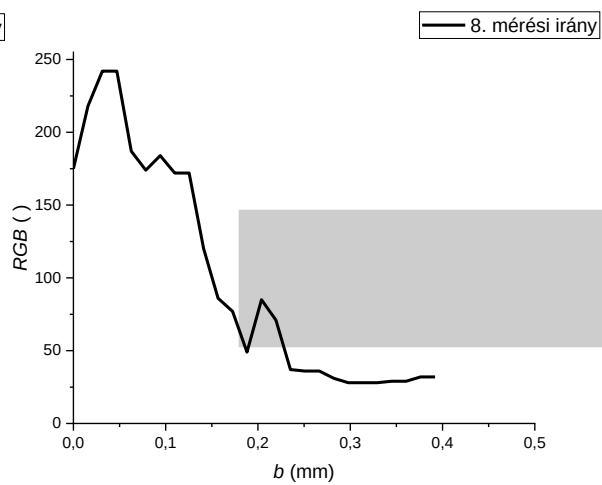
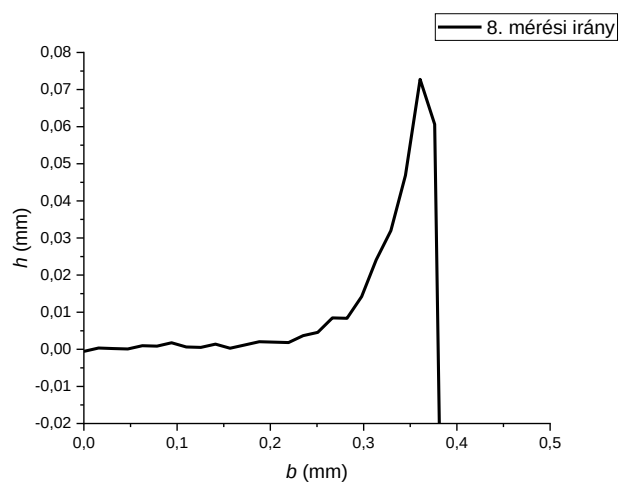
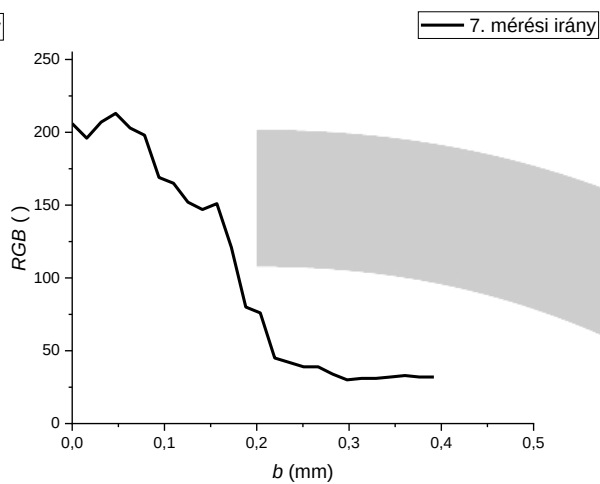
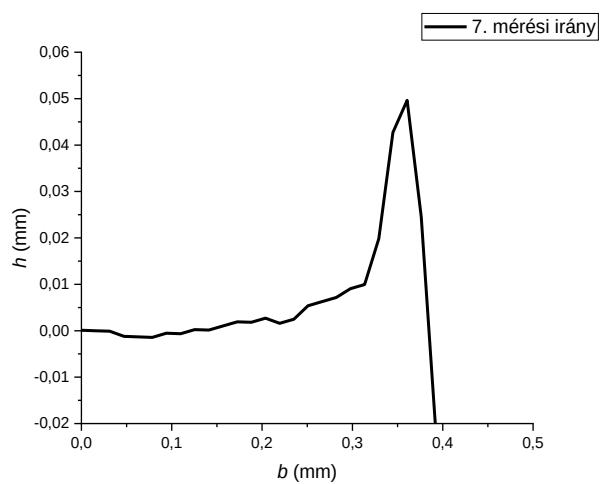
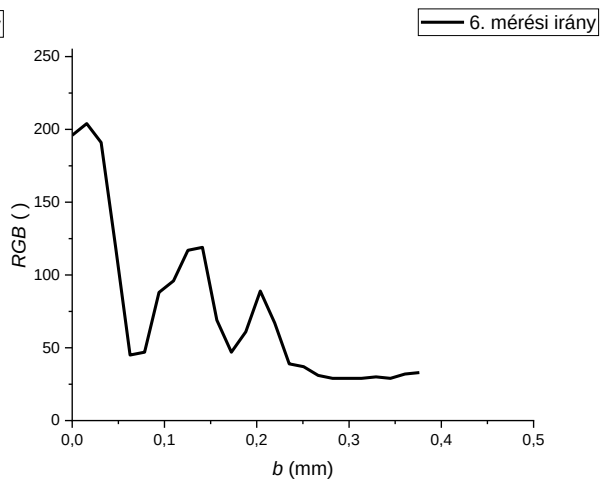
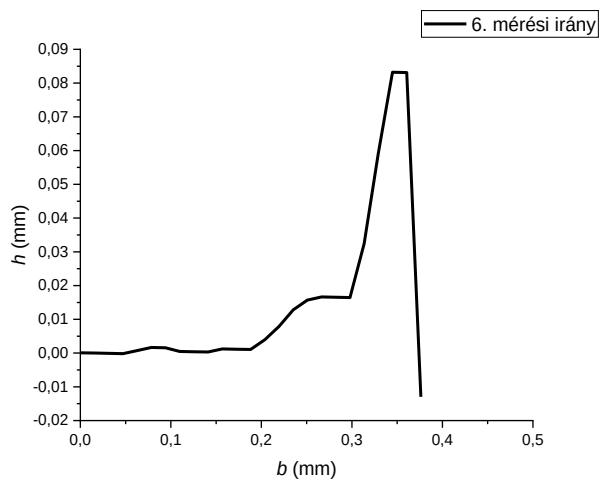


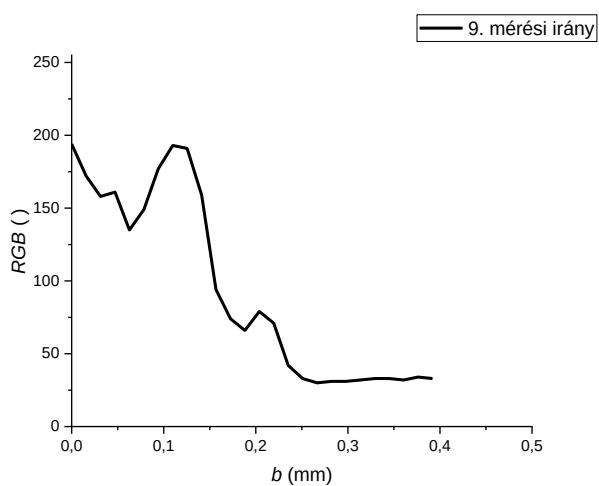
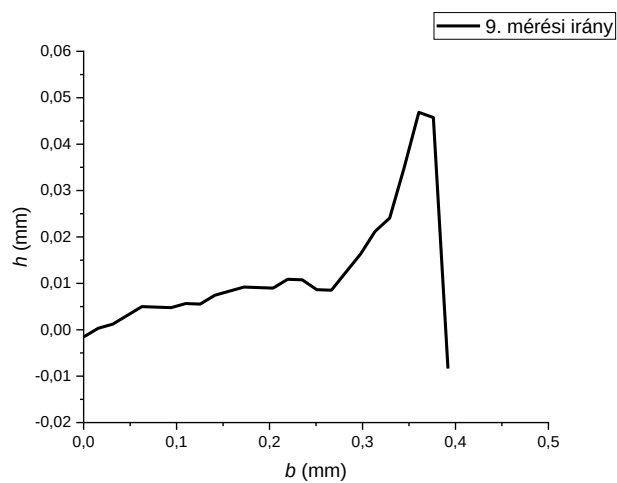


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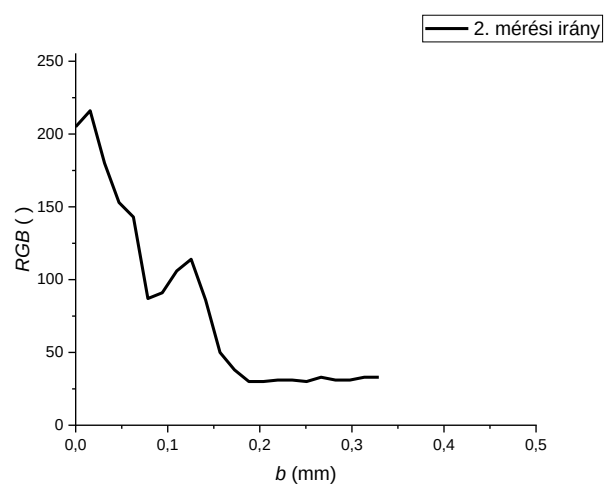
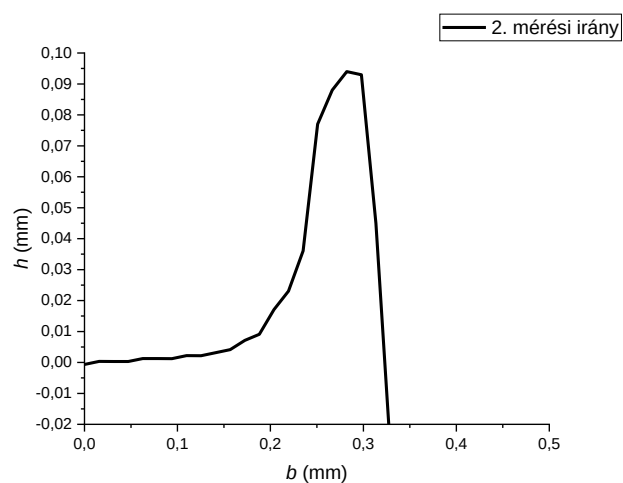
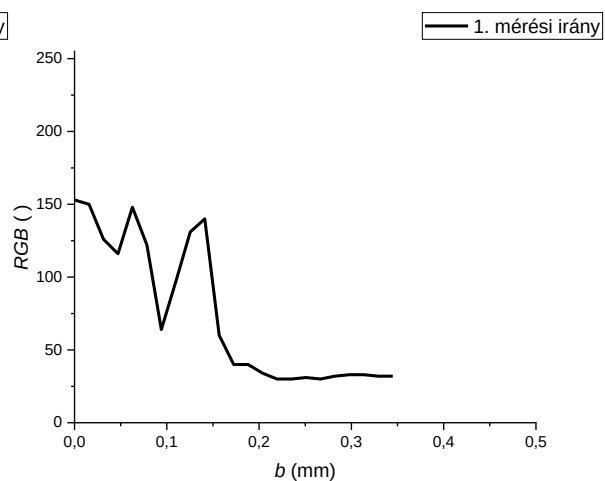
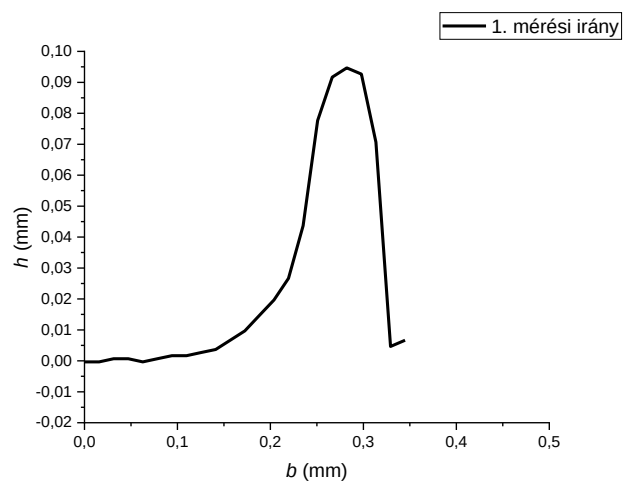


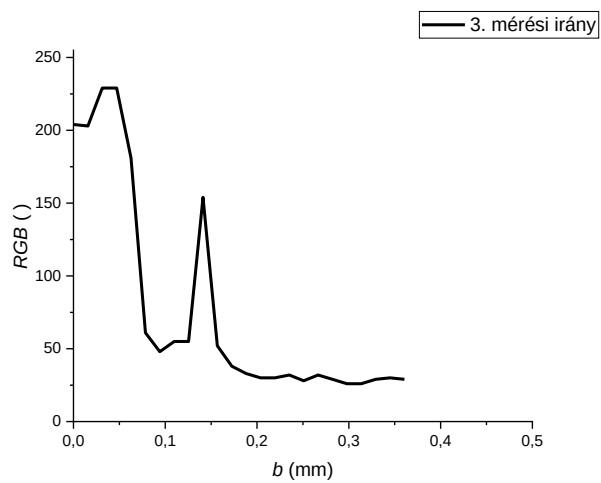
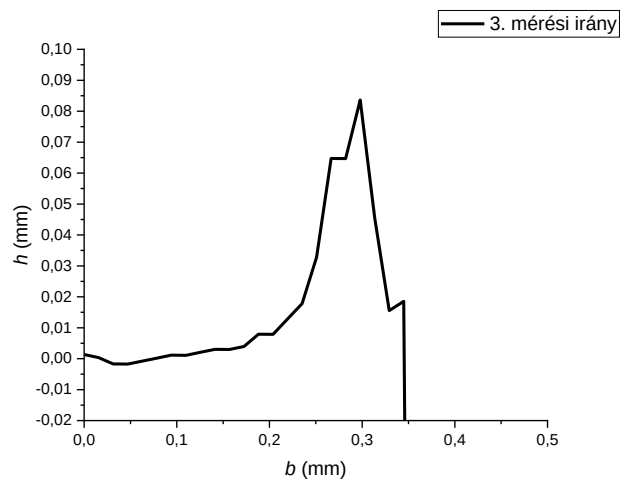


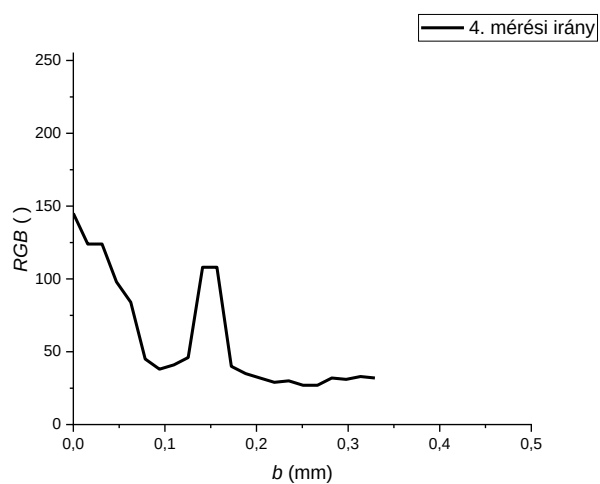
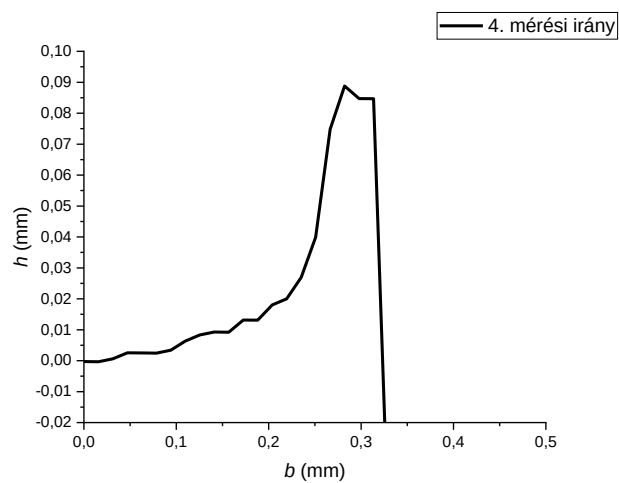


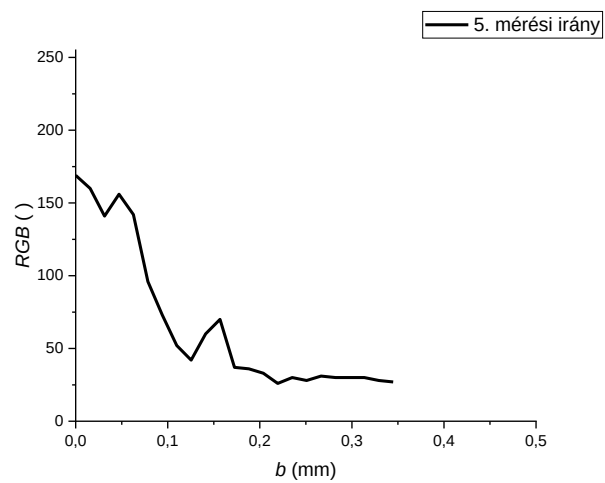
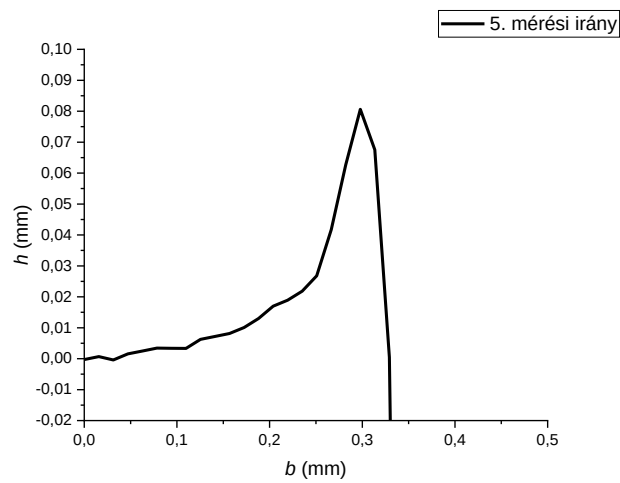


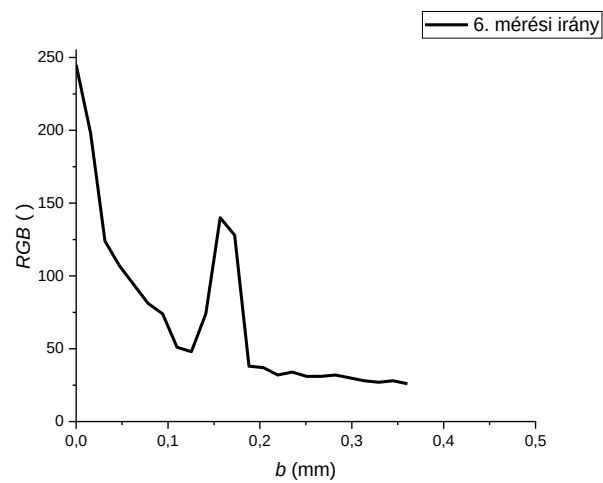
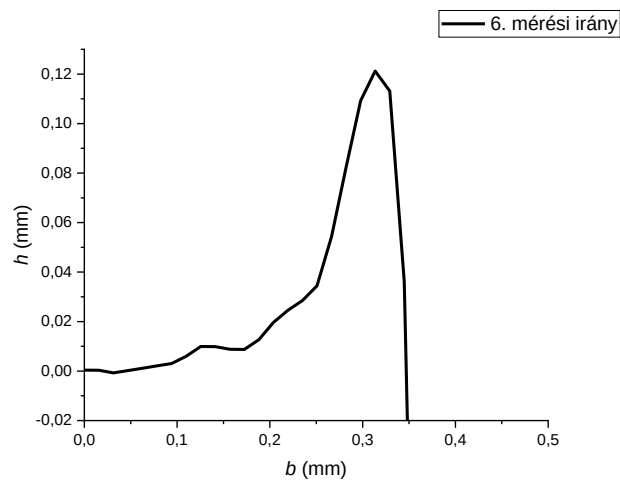
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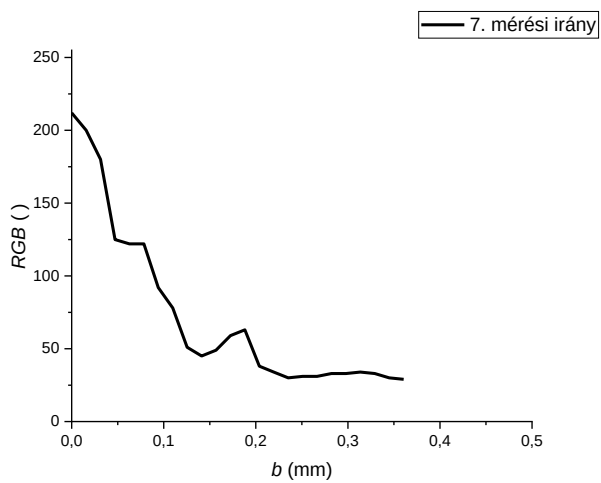
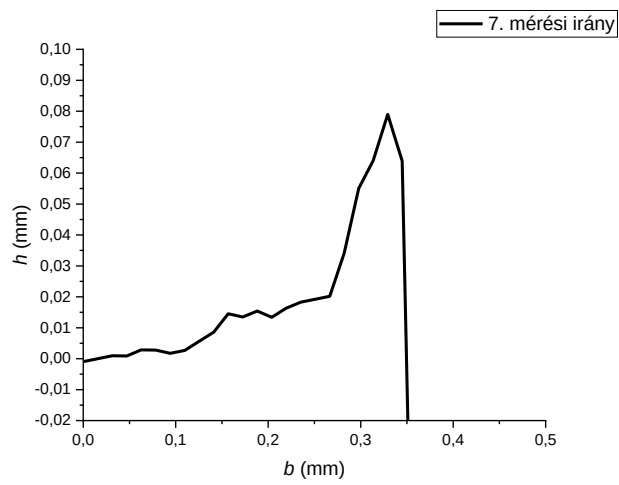


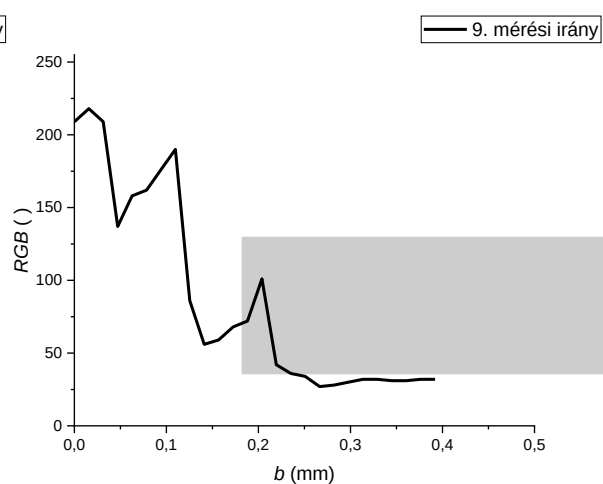
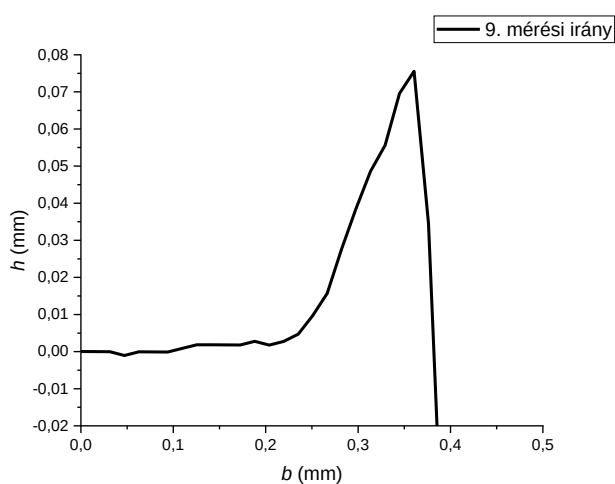
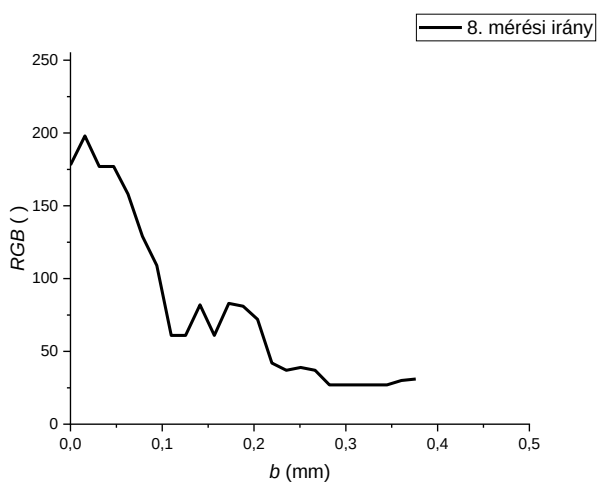
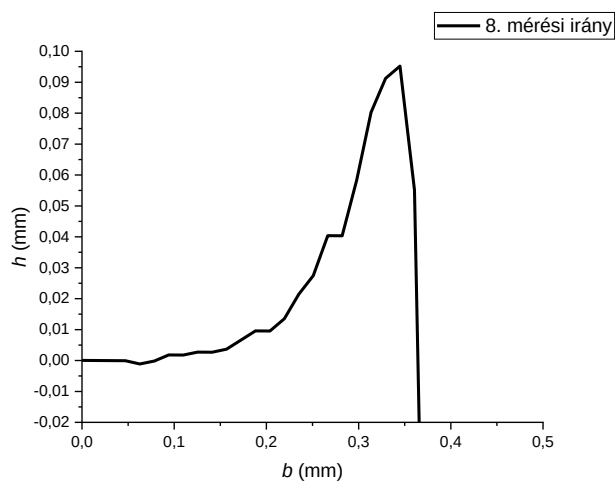






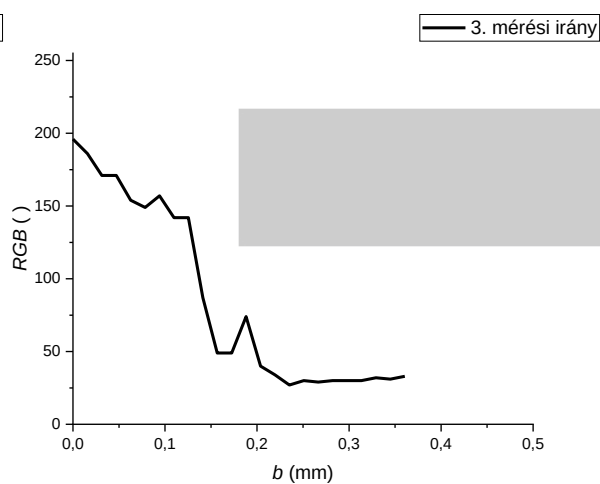
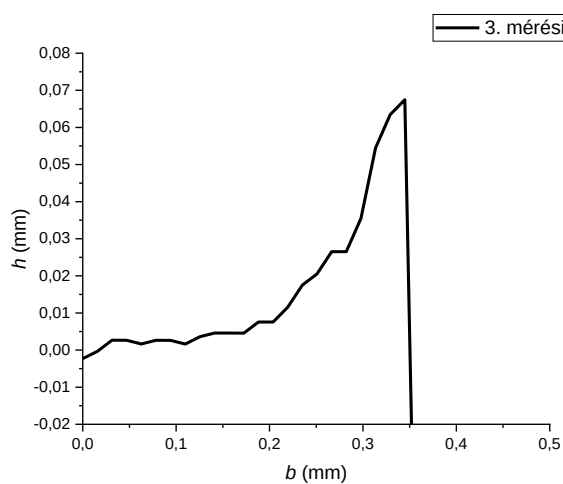
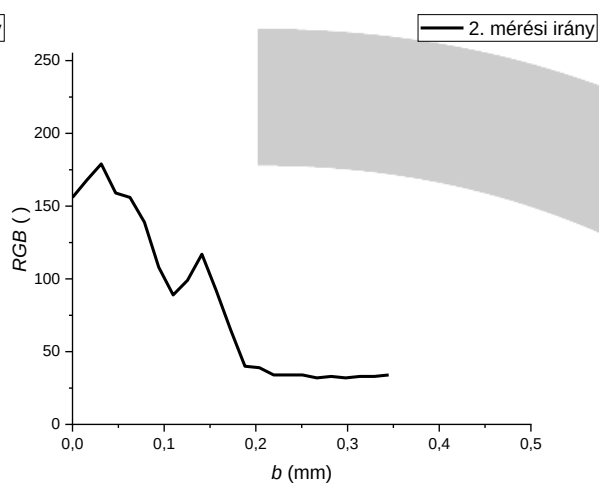
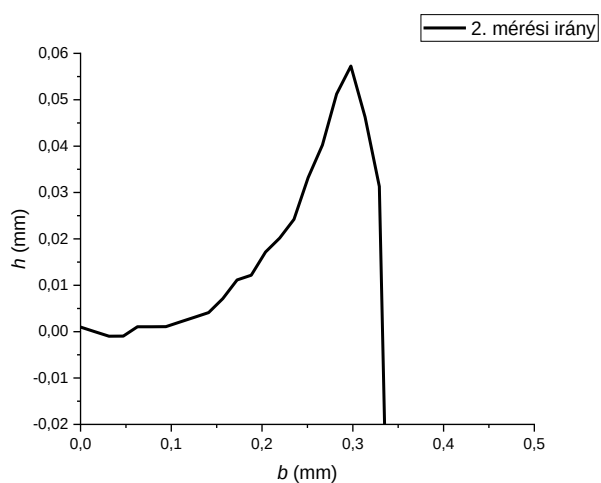
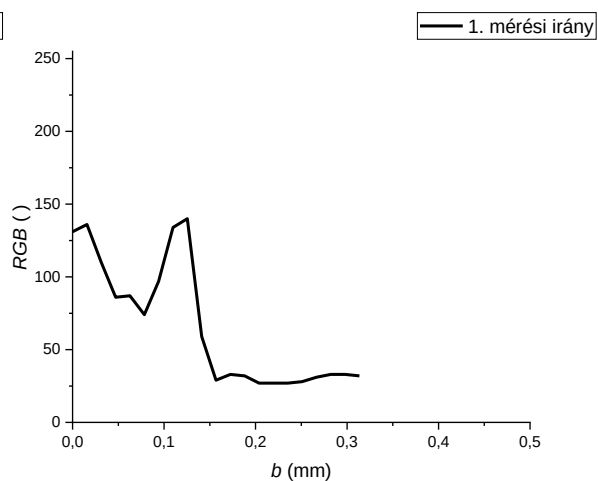
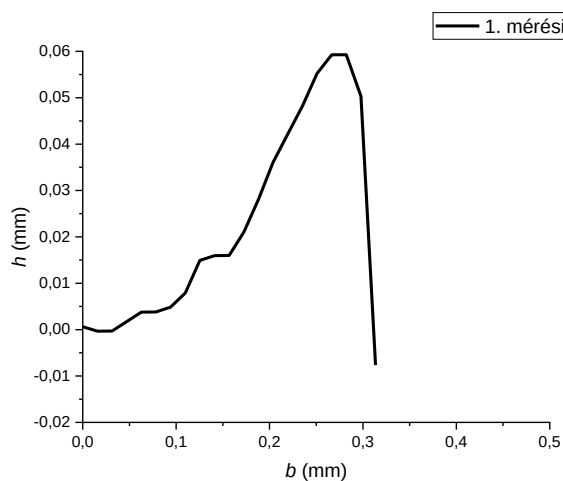


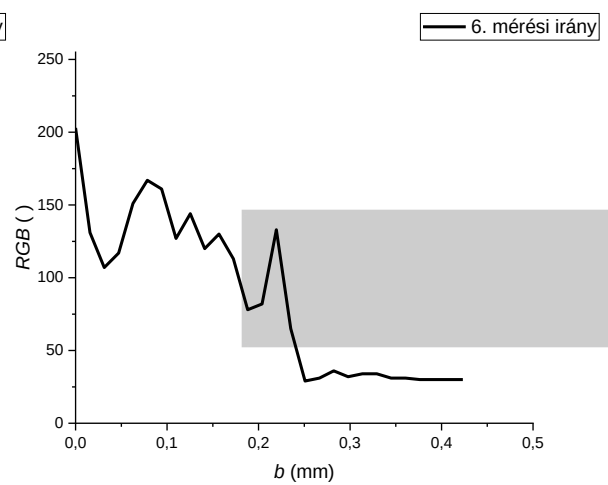
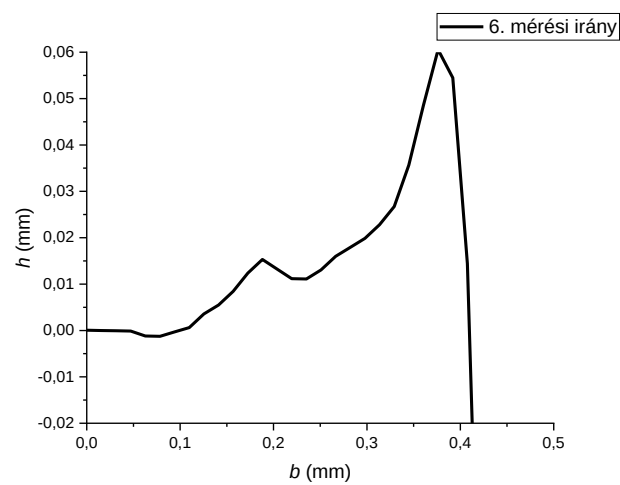
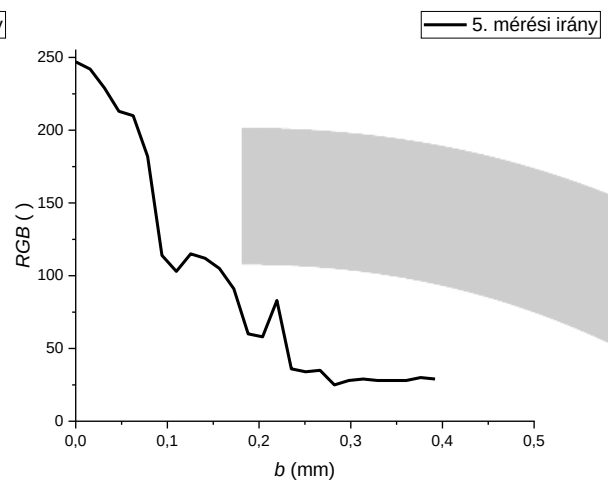
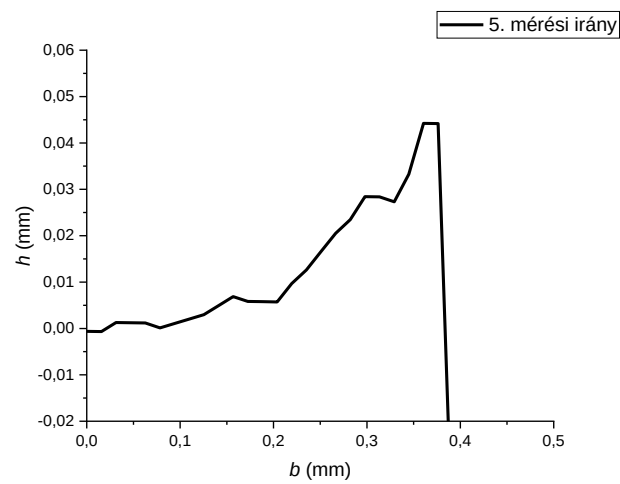
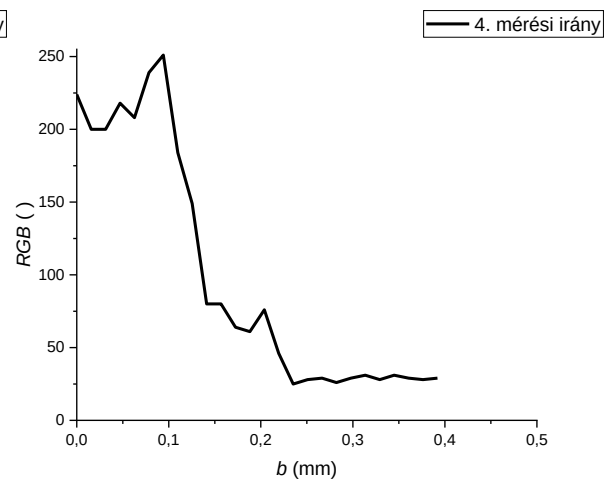
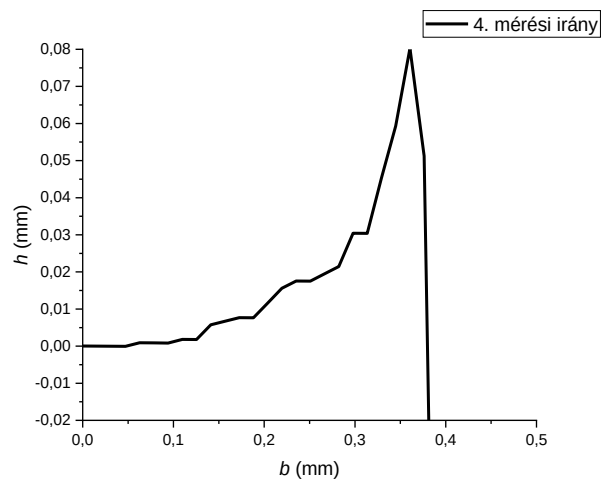


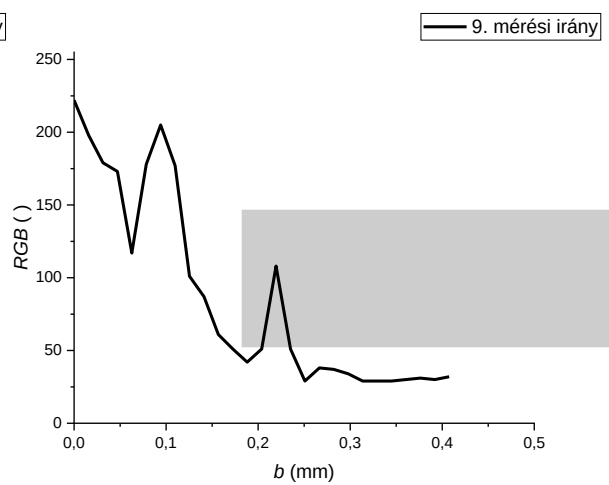
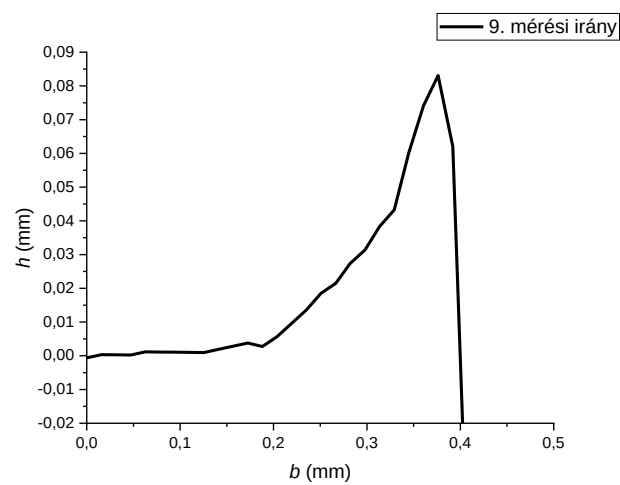
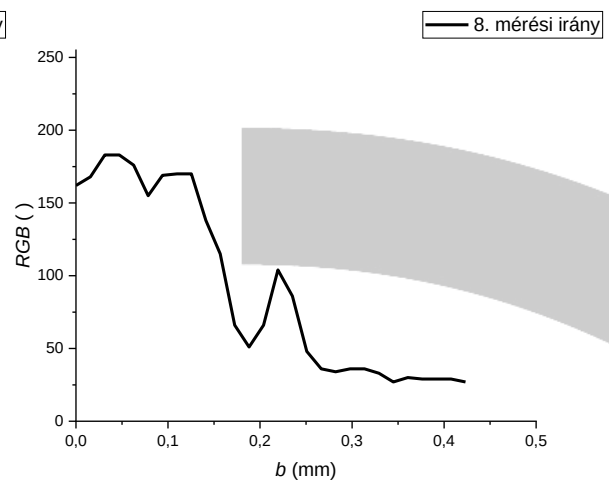
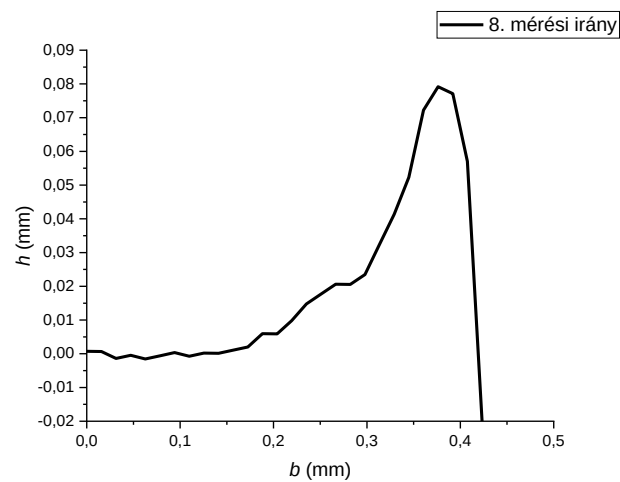
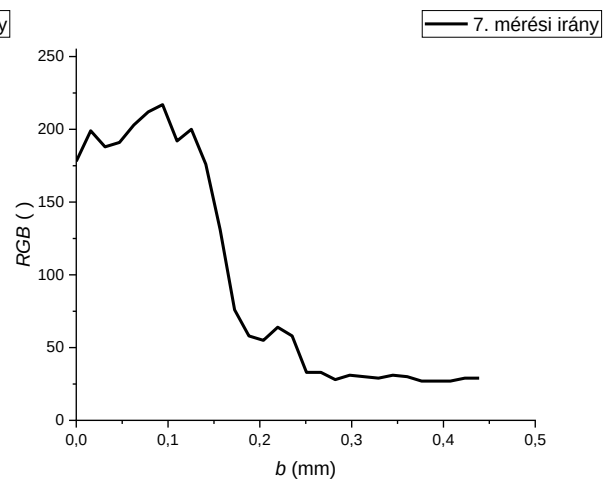
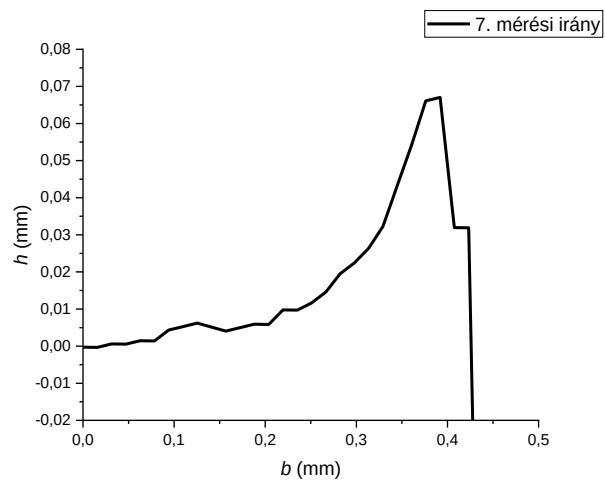




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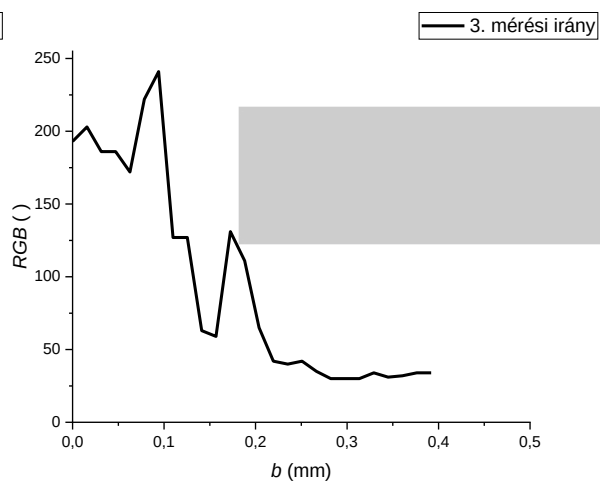
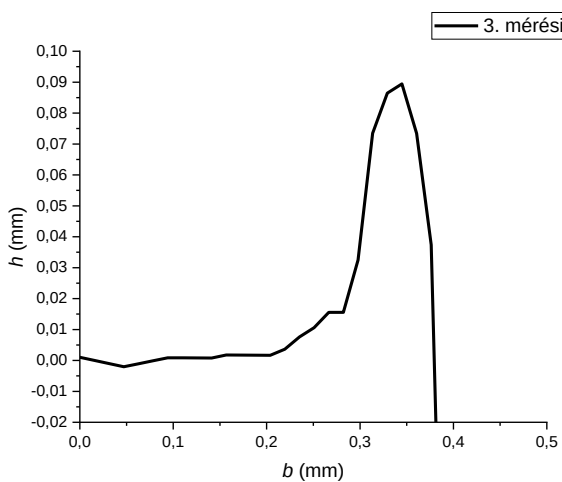
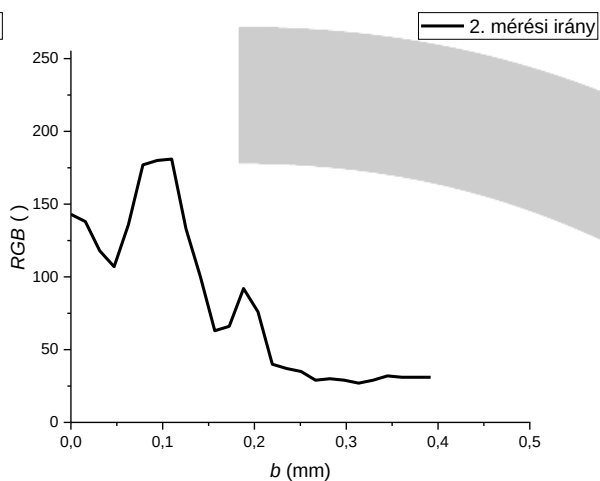
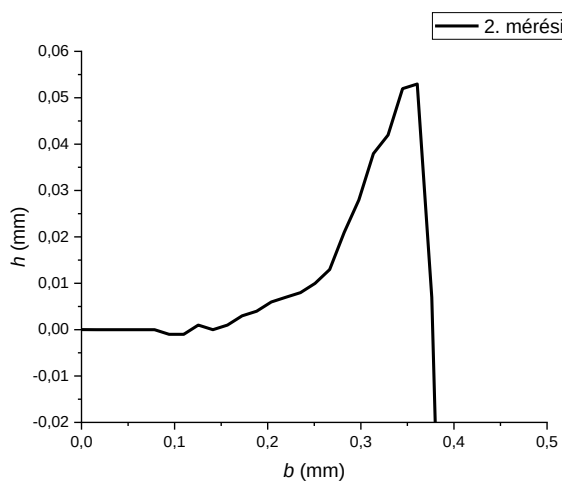
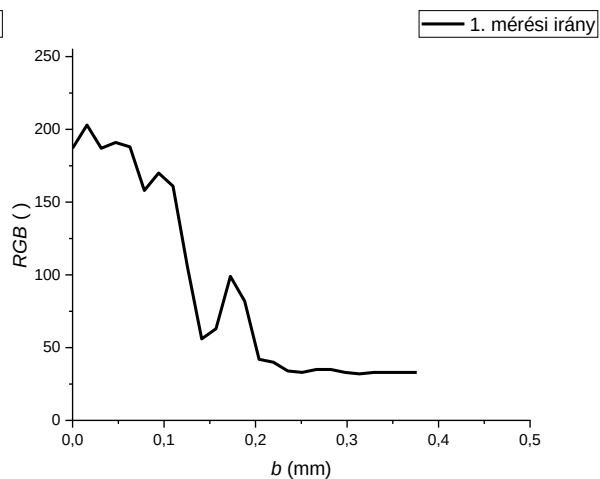
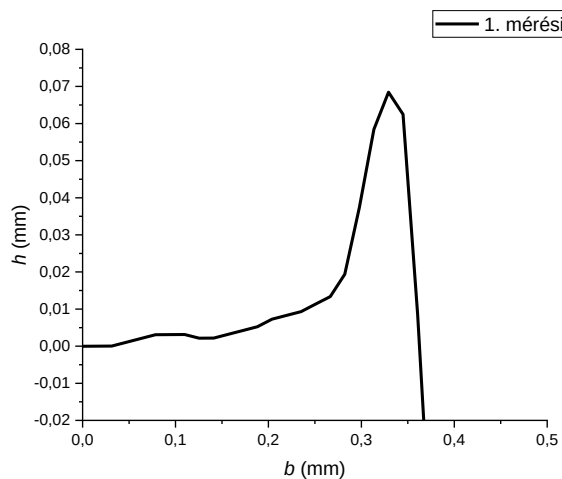


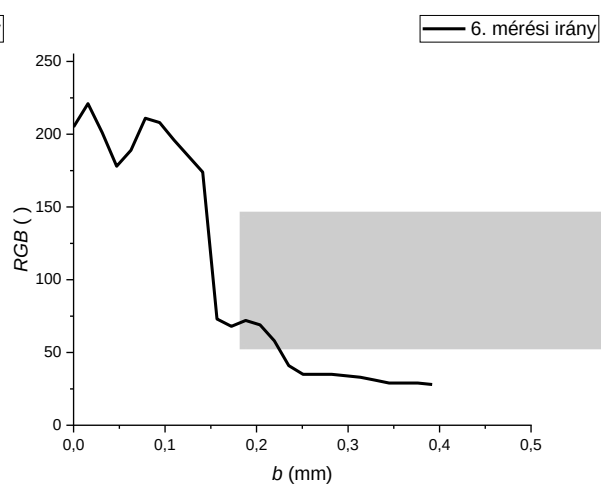
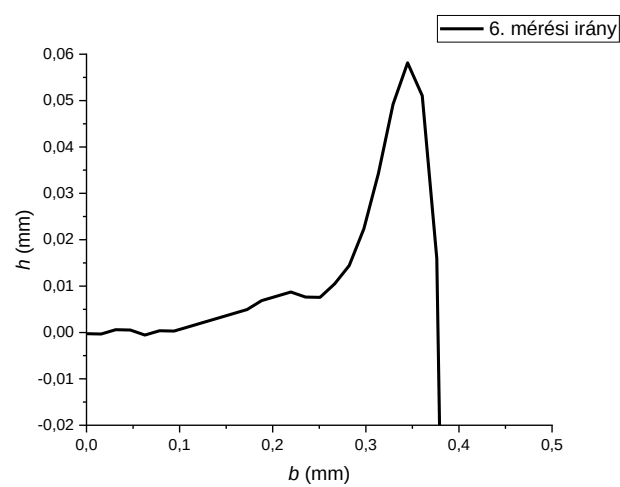
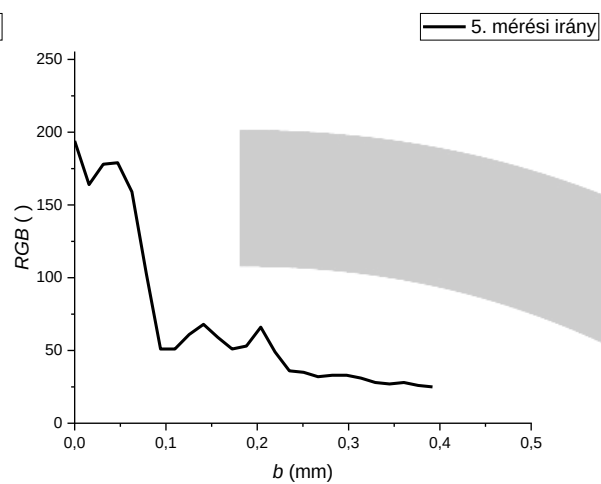
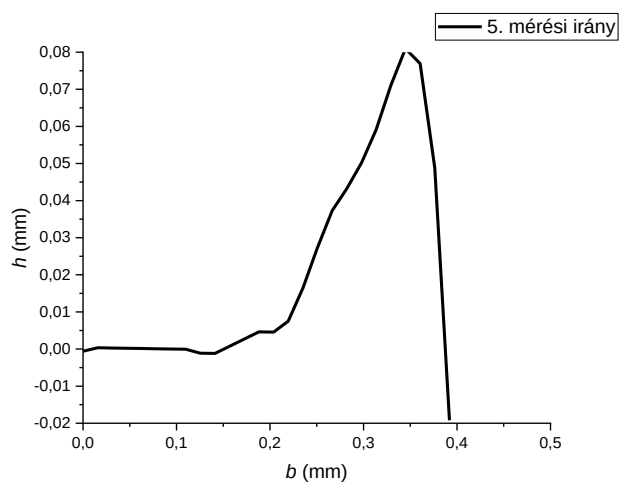
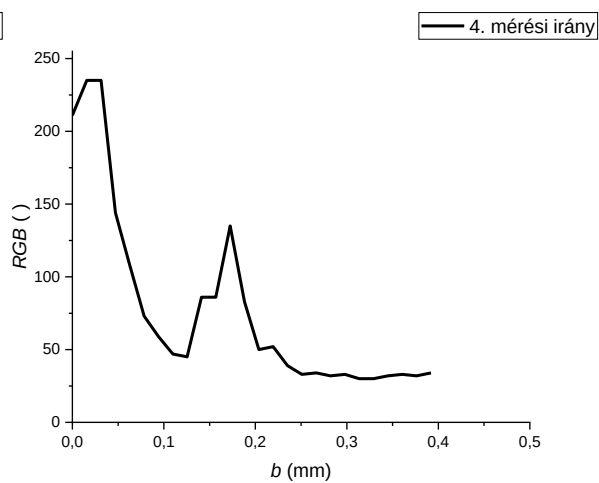
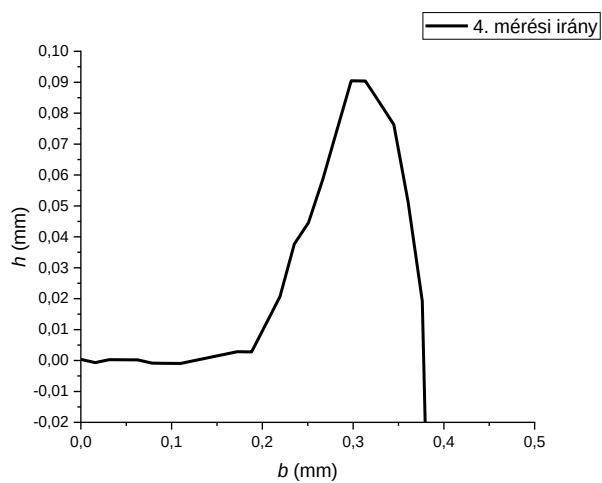


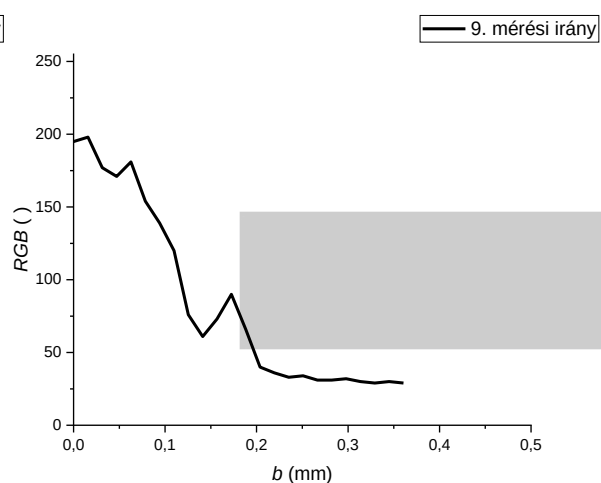
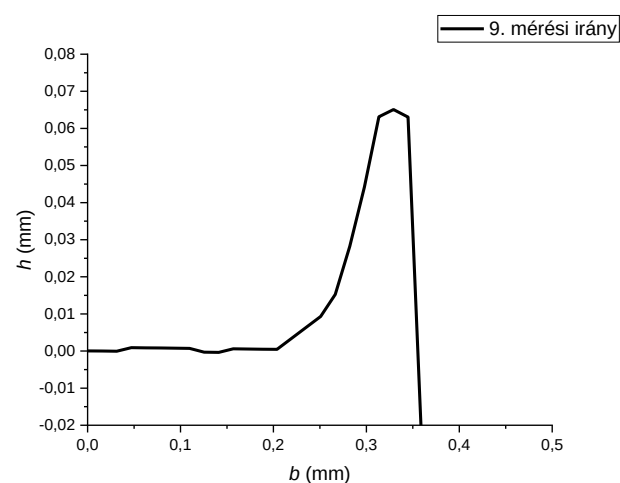
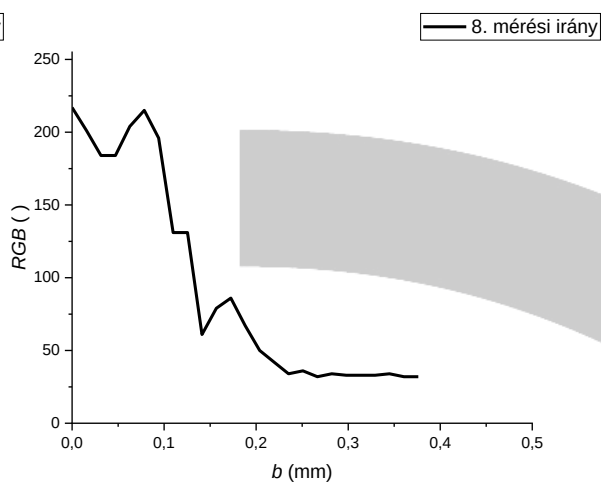
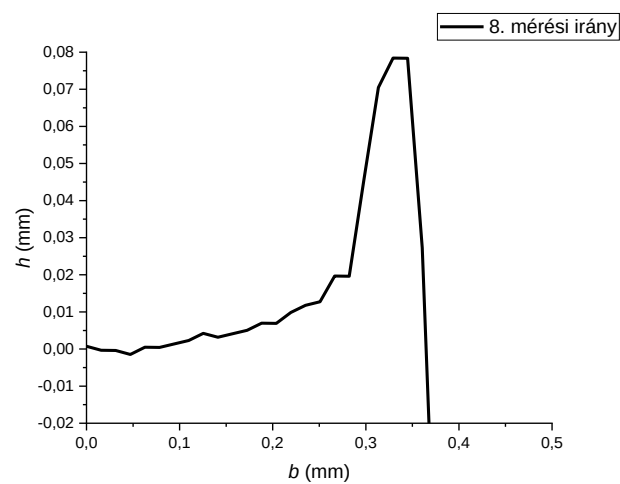
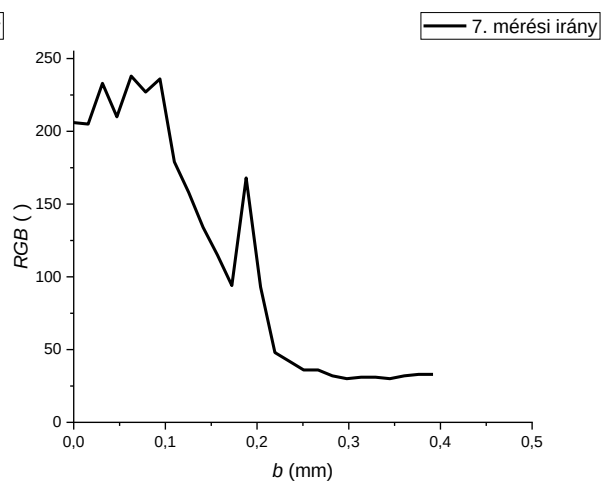
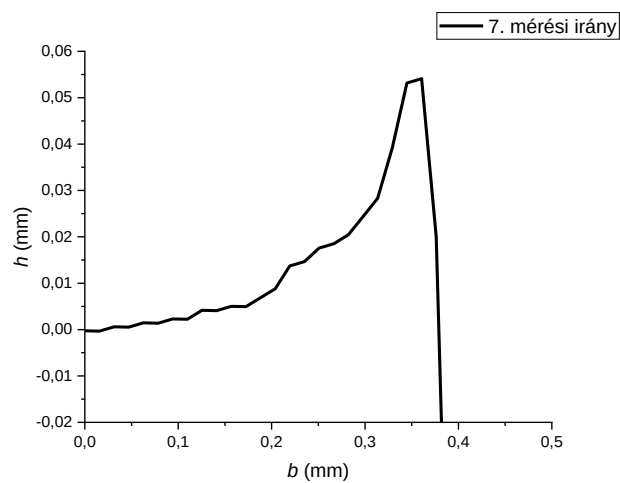




- 9. furat

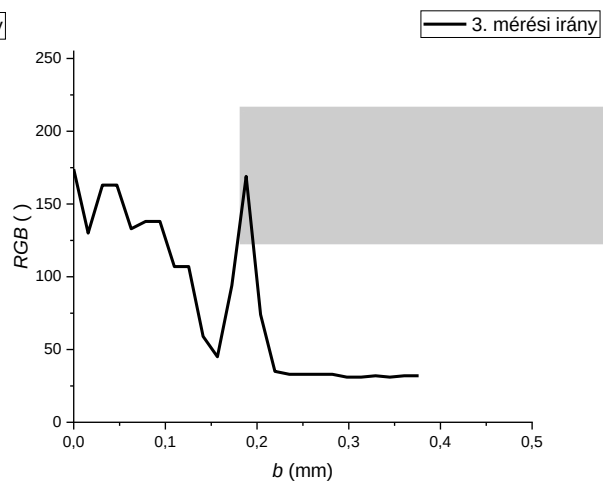
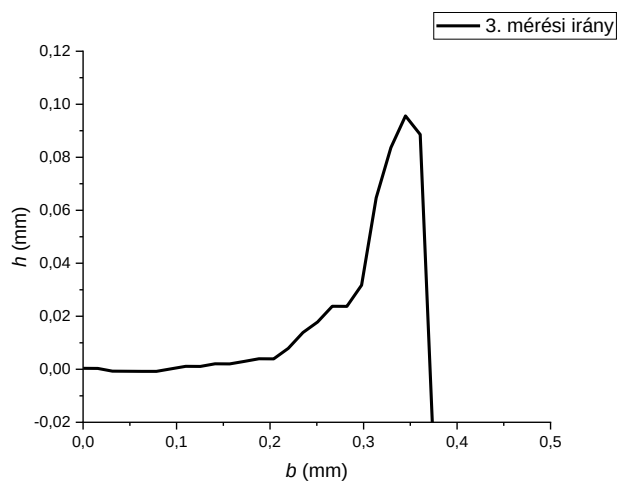
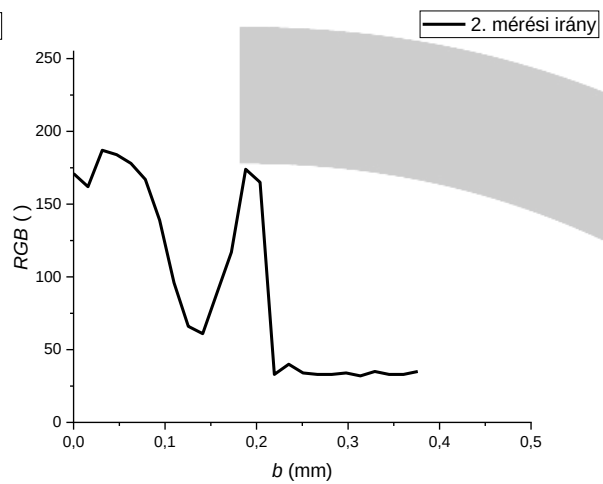
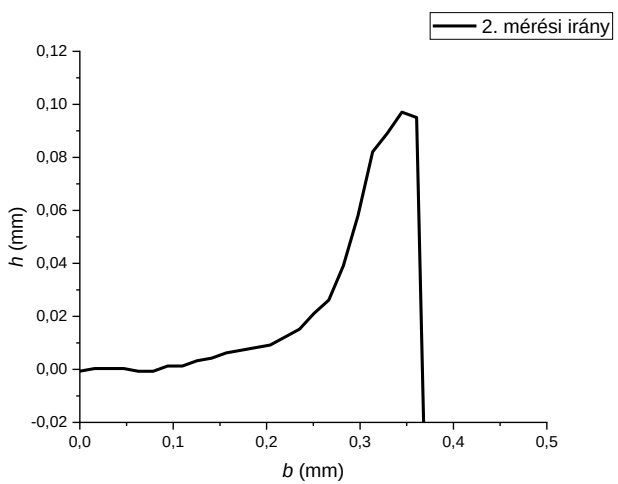
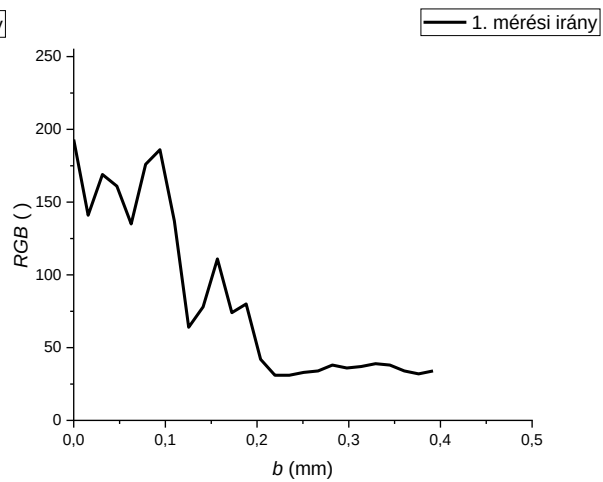
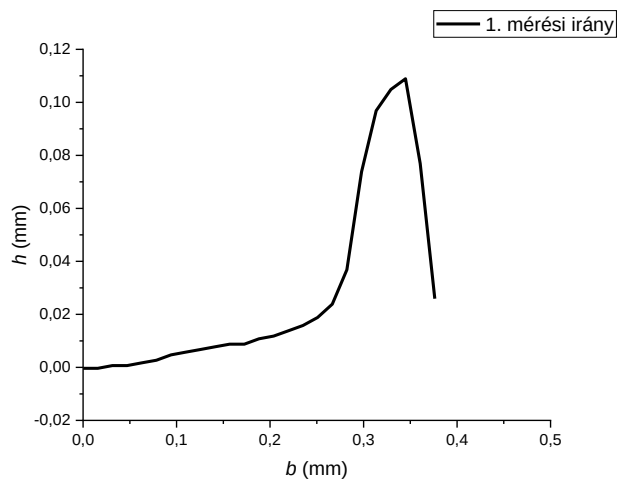


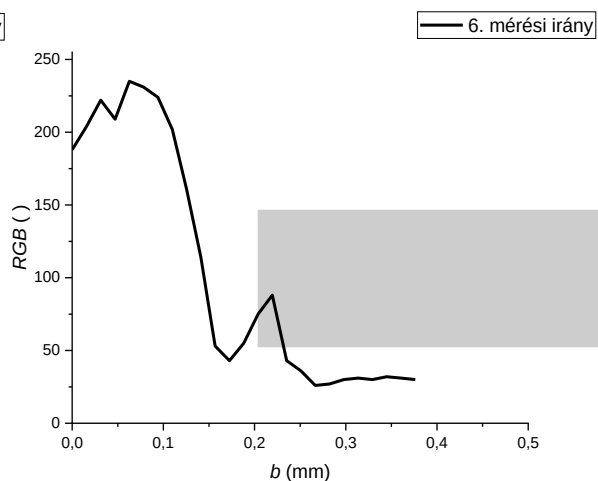
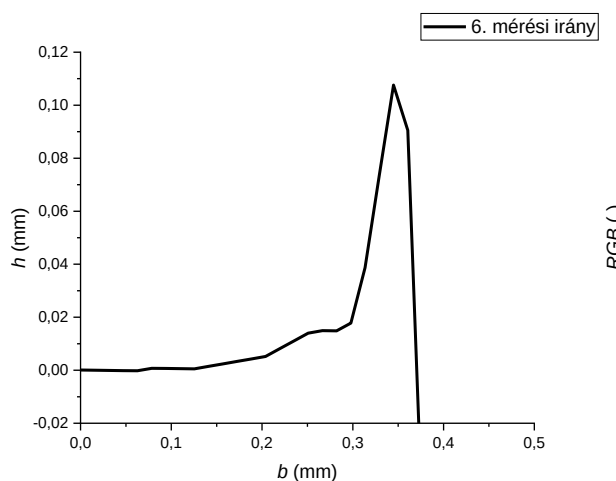
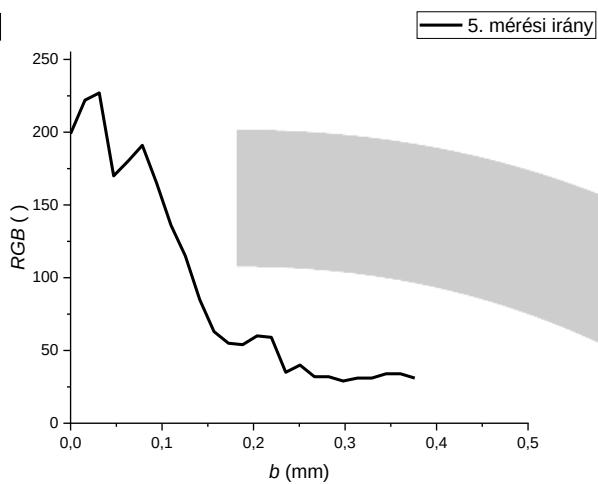
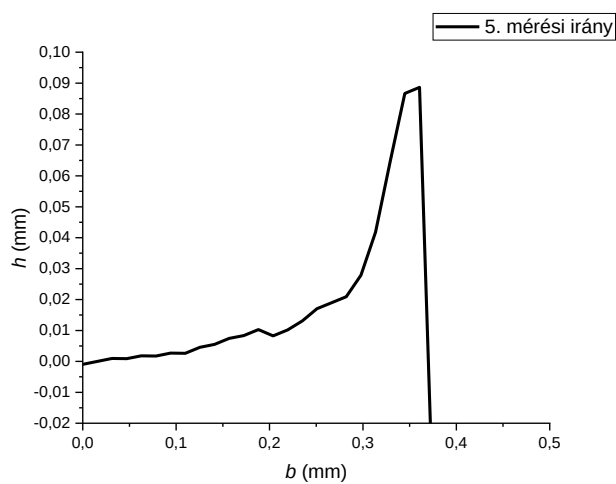
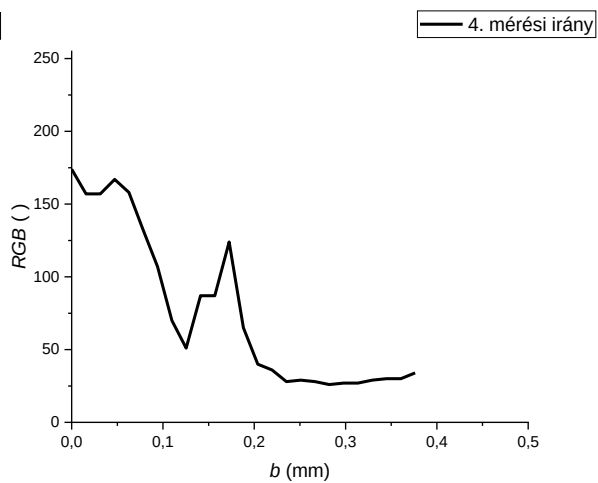
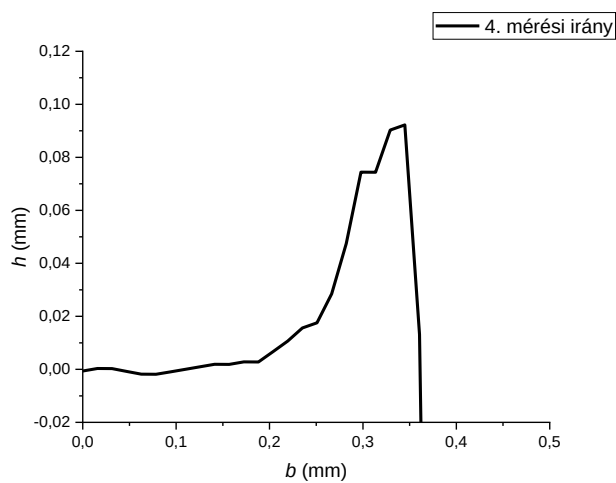


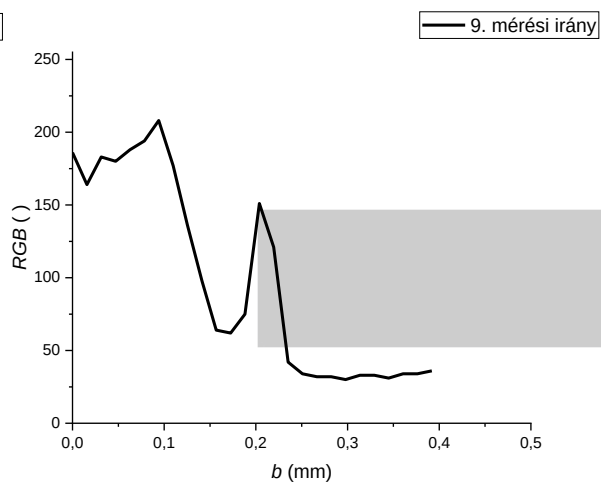
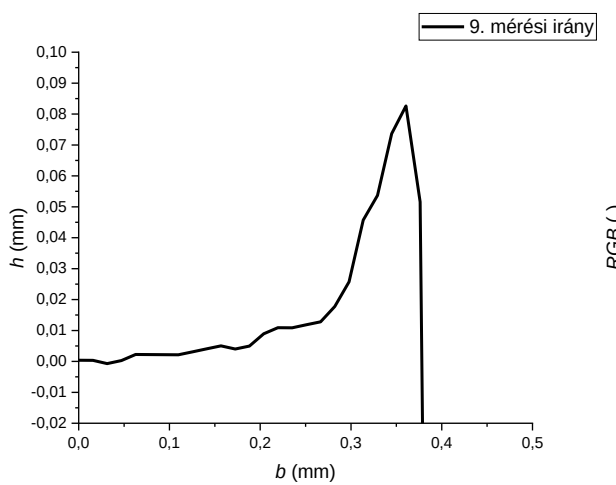
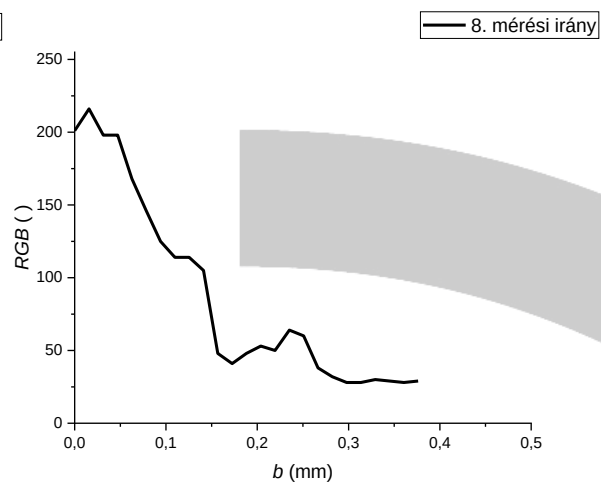
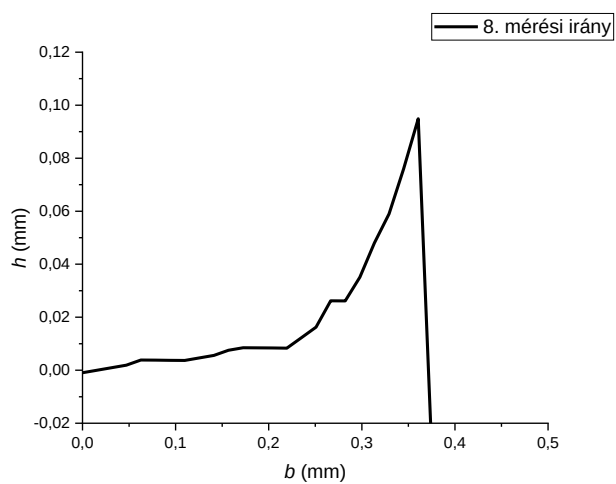
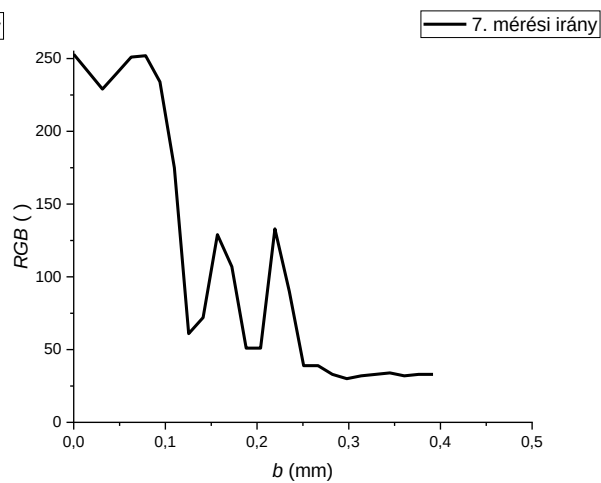
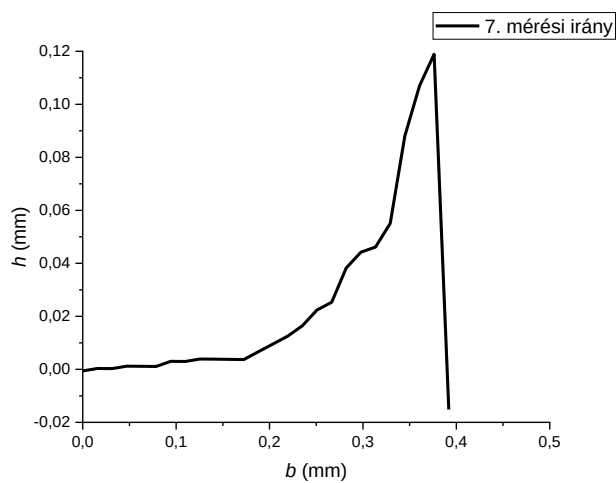




- 10. furat





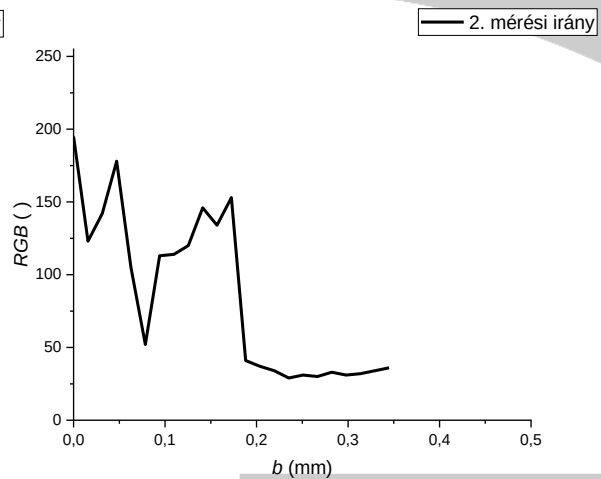
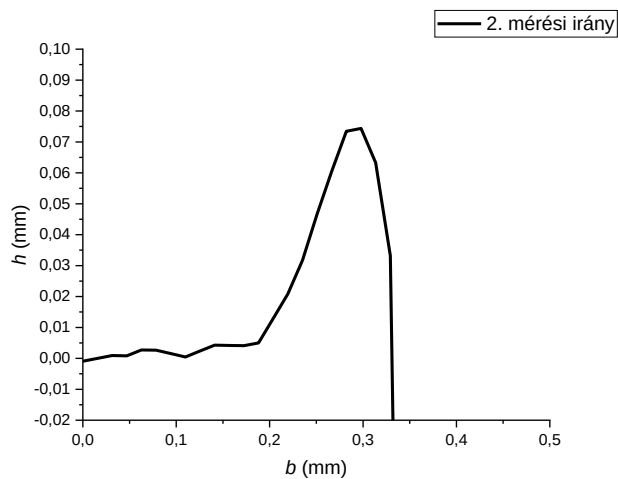
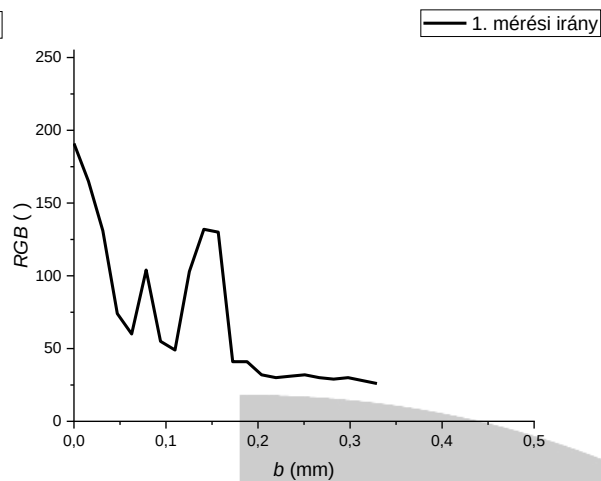
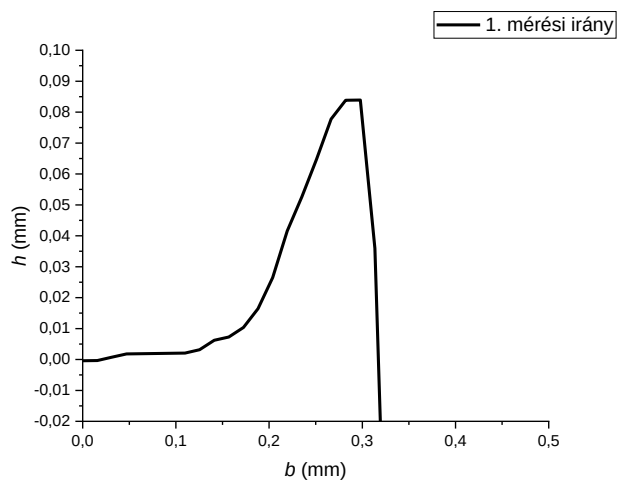


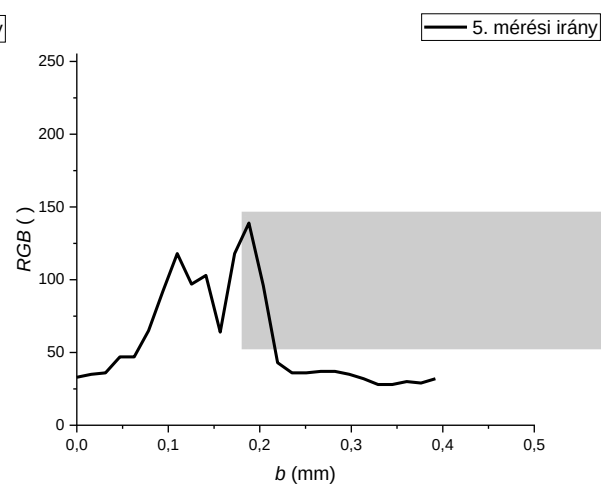
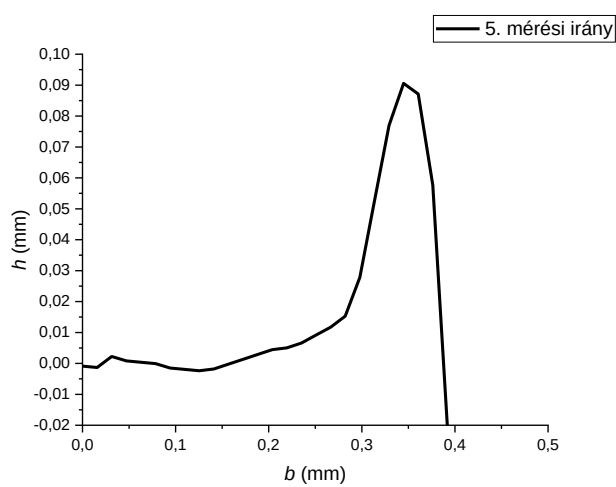
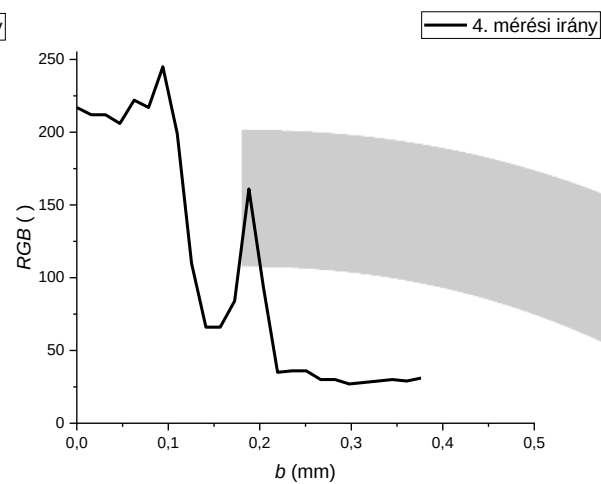
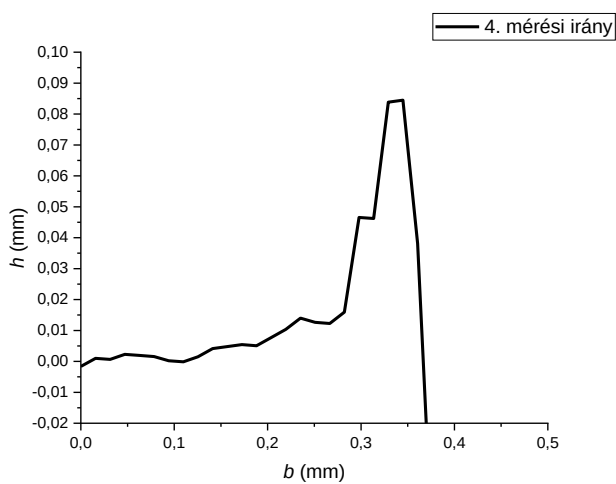
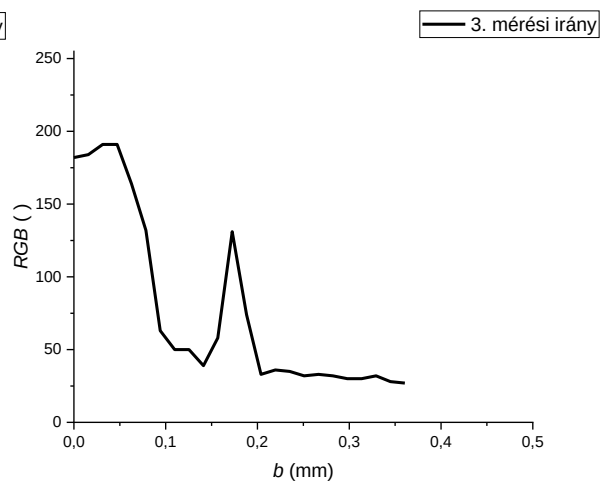
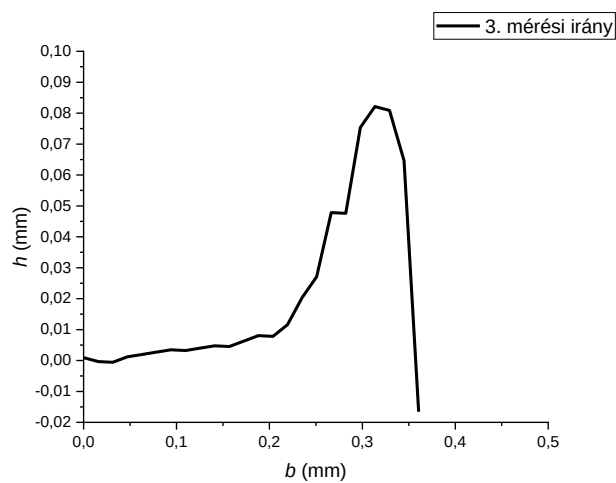


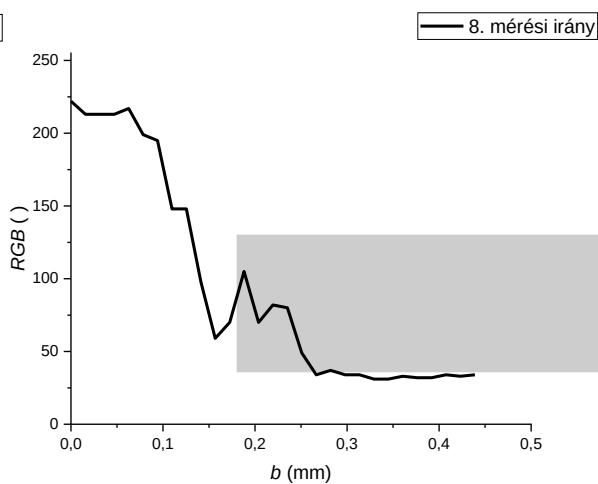
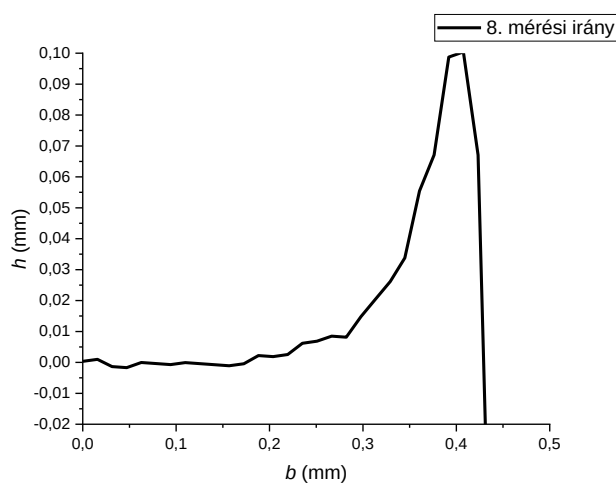
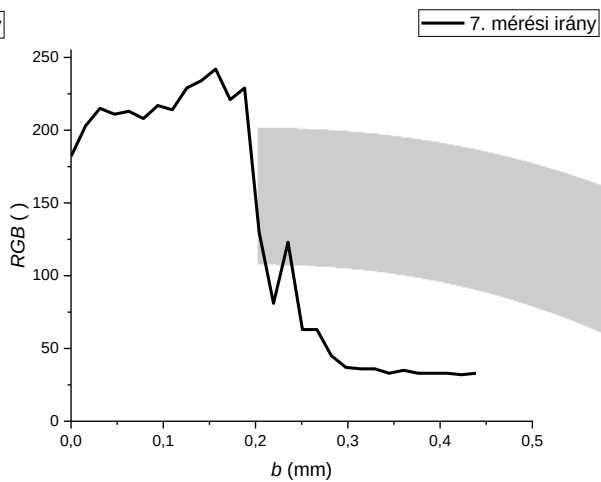
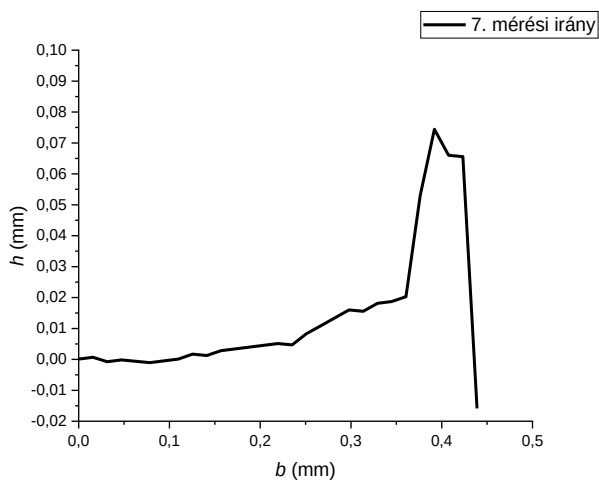
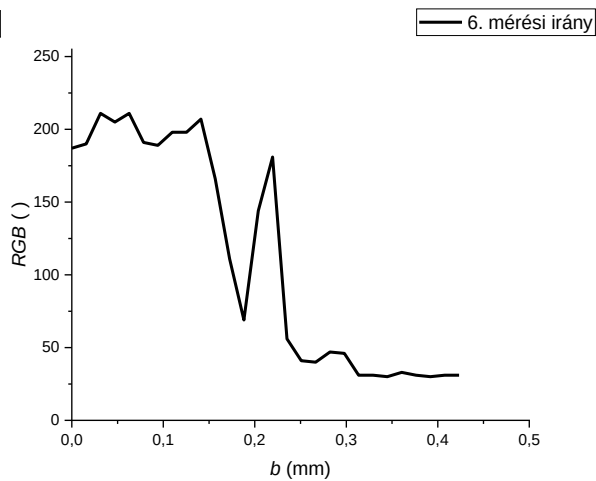
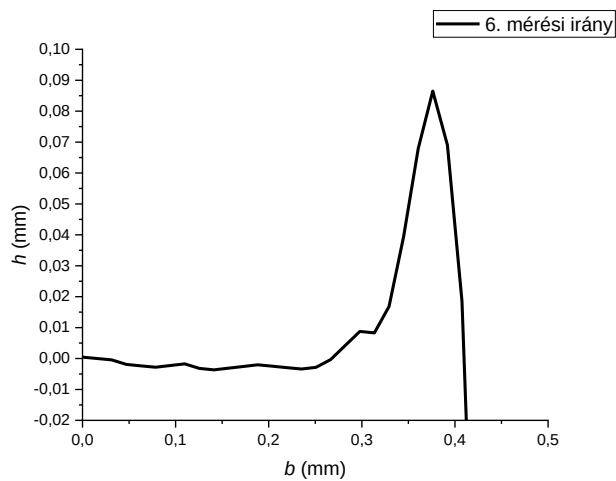
- 11. furat

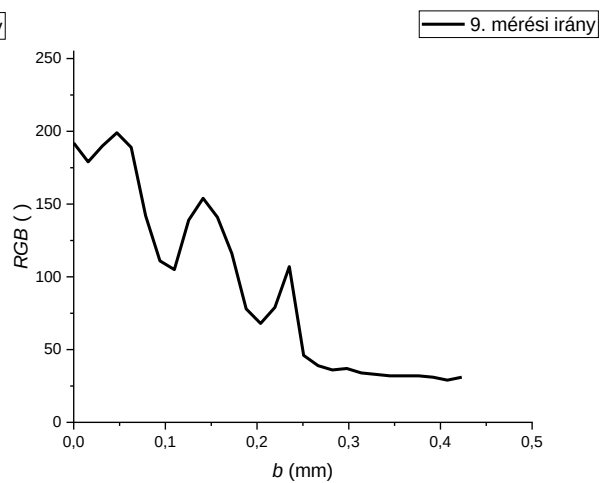
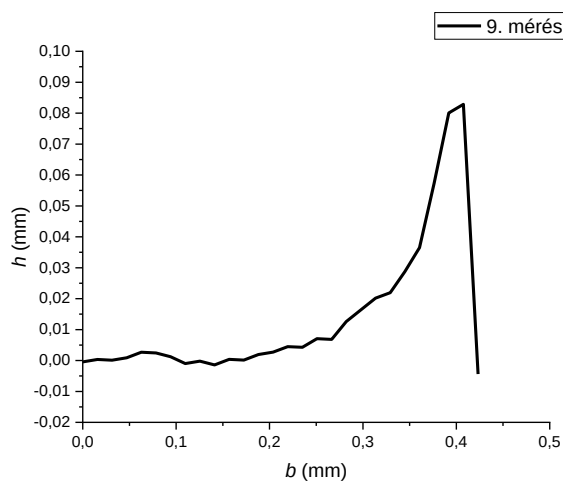
Ennél a furatnál mérési és szűrési hibák is adódtak. Ezért nem tartalmazza a melléklet az itt kapott eredményeket.

- 12. furat



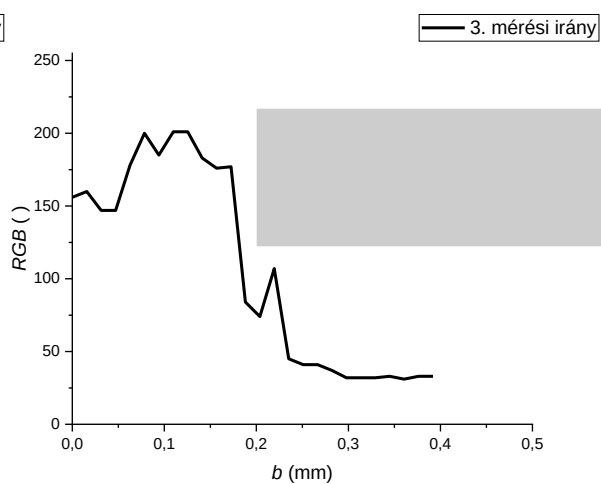
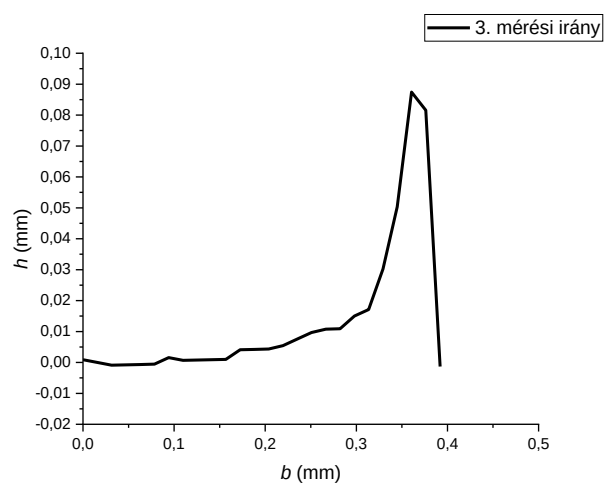
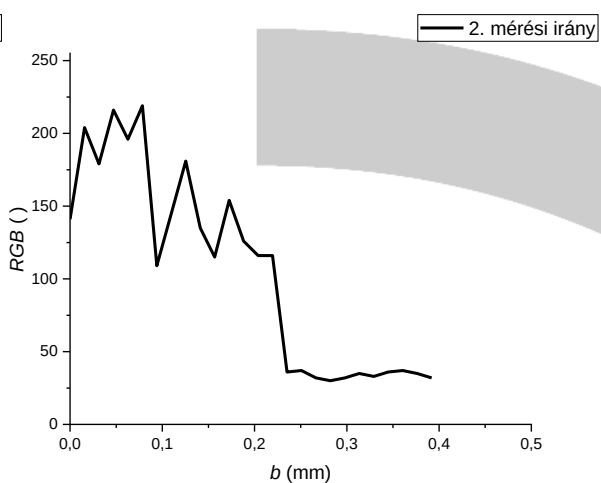
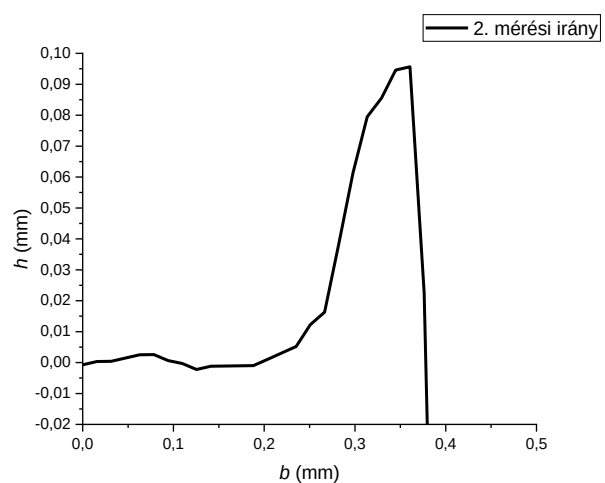
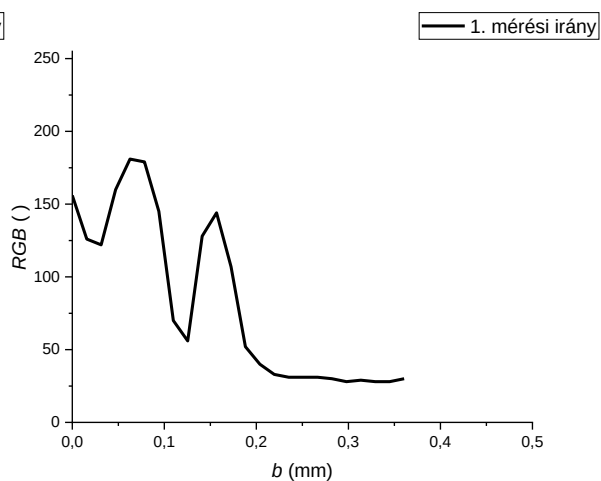
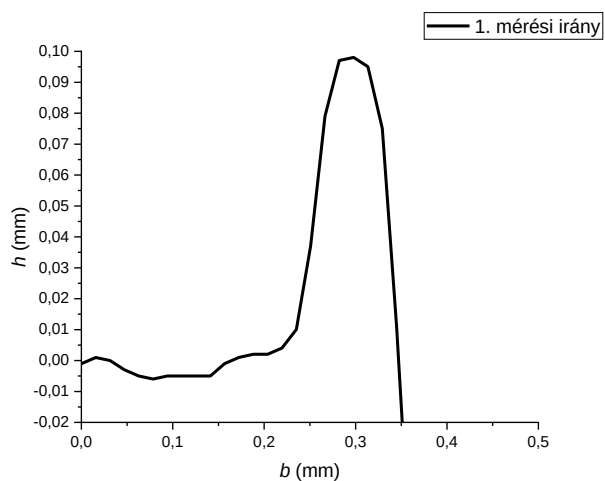


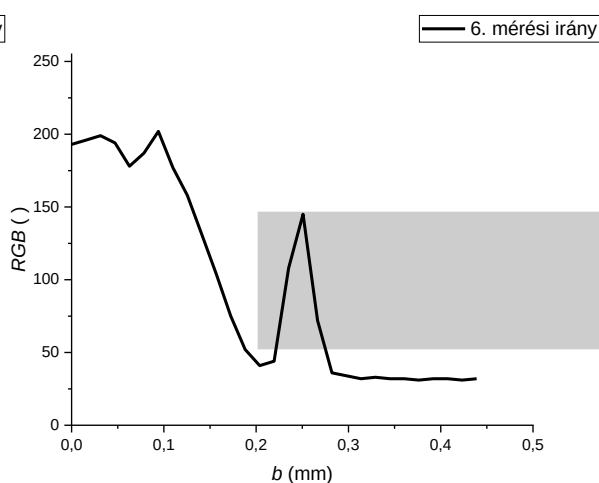
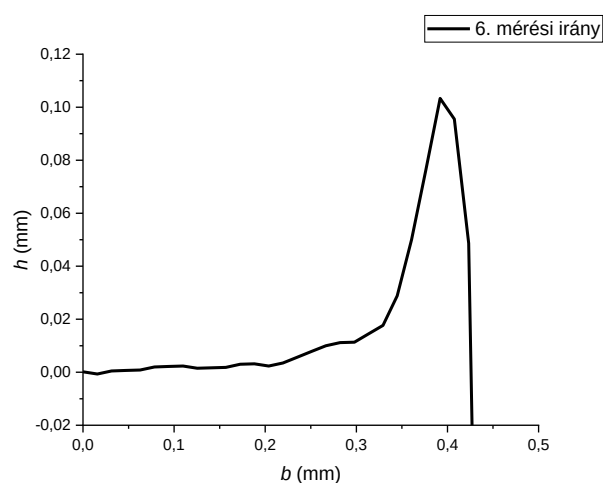
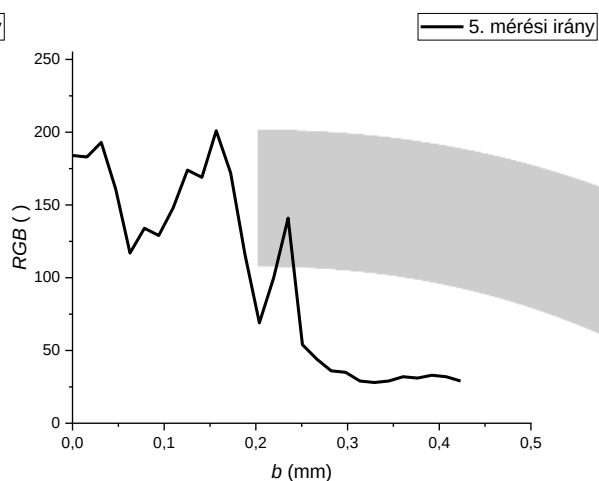
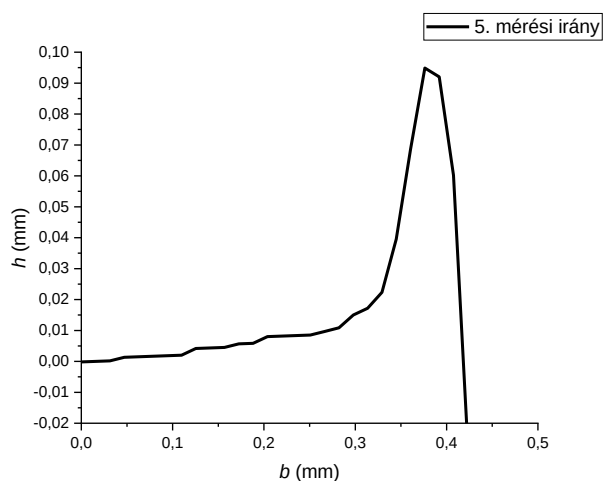
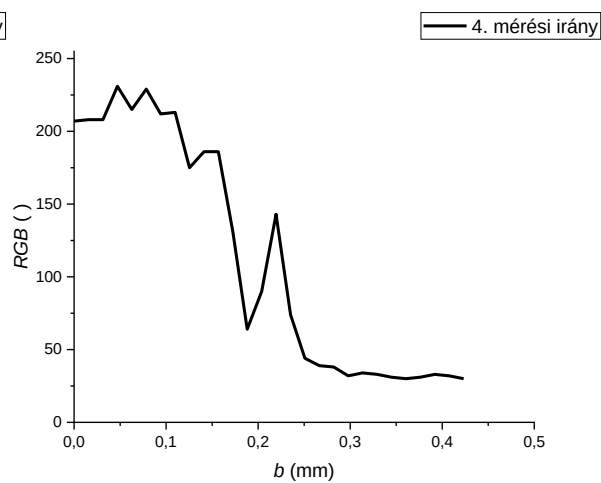
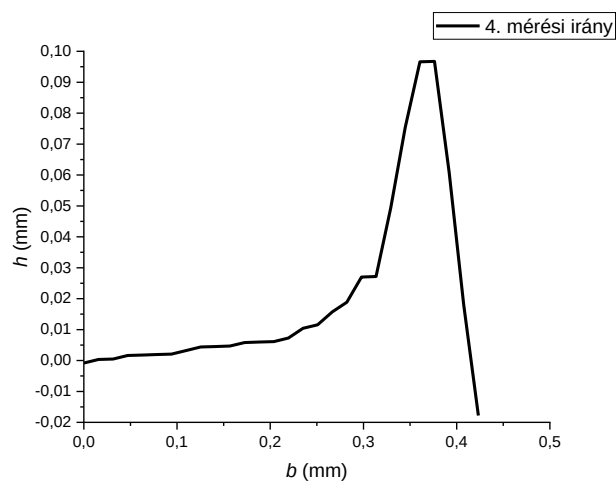


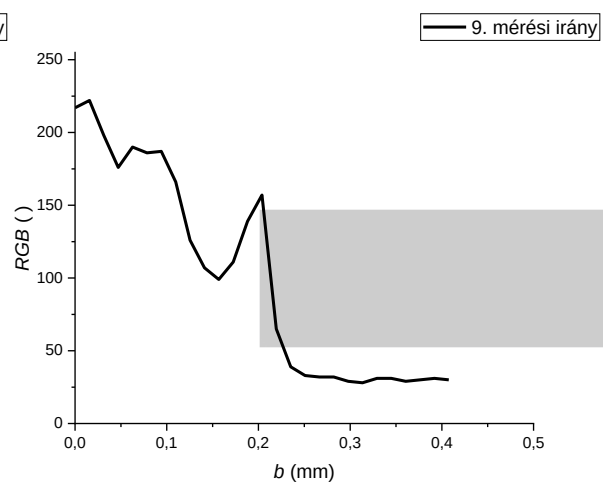
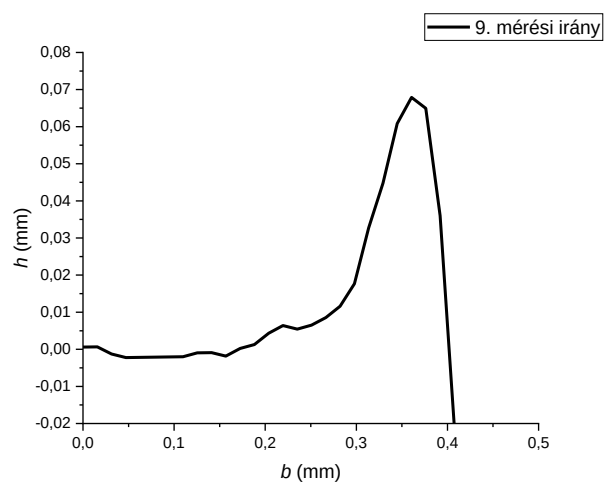
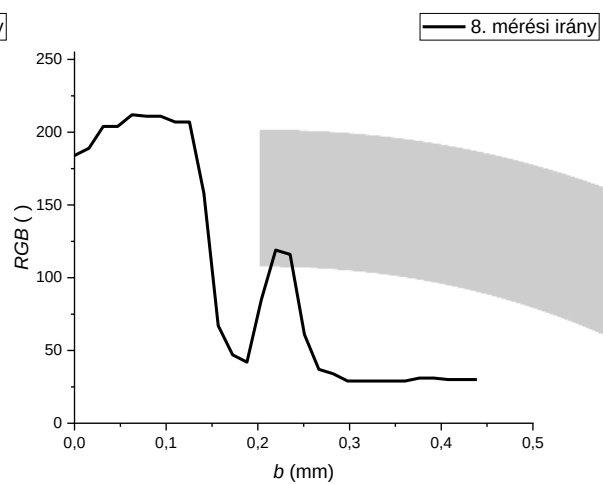
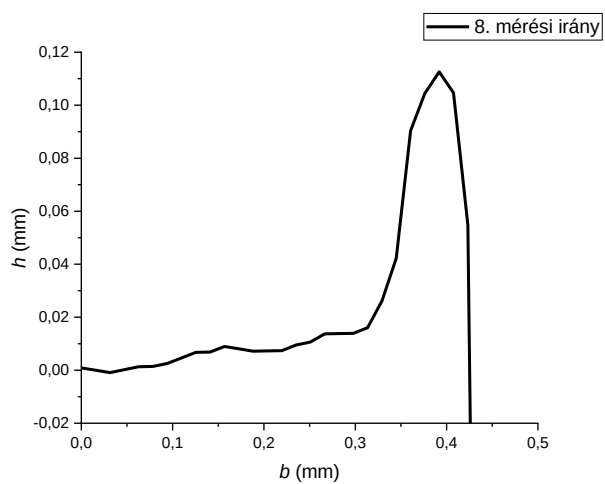
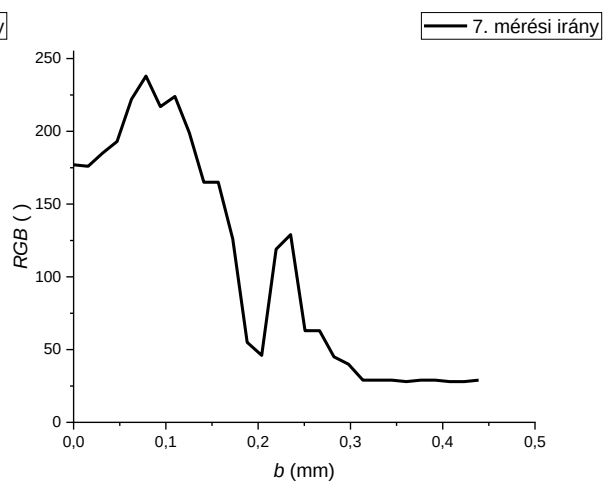
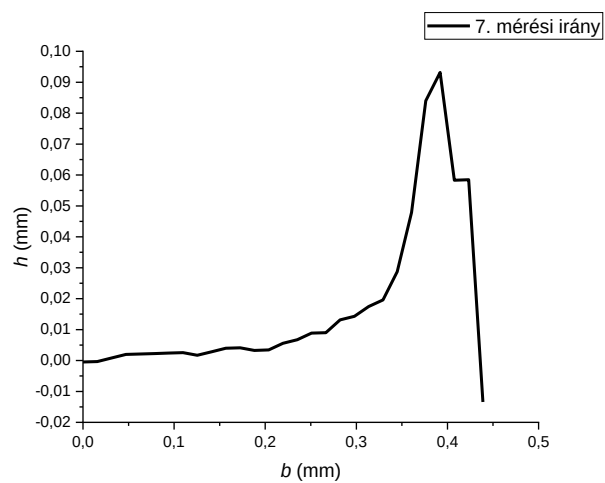




- 13. furat



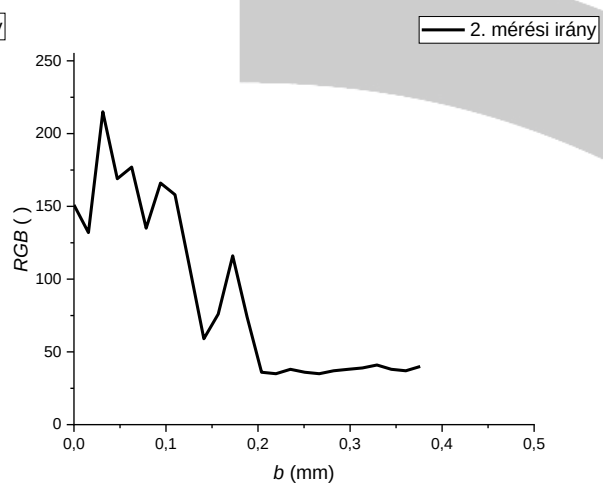
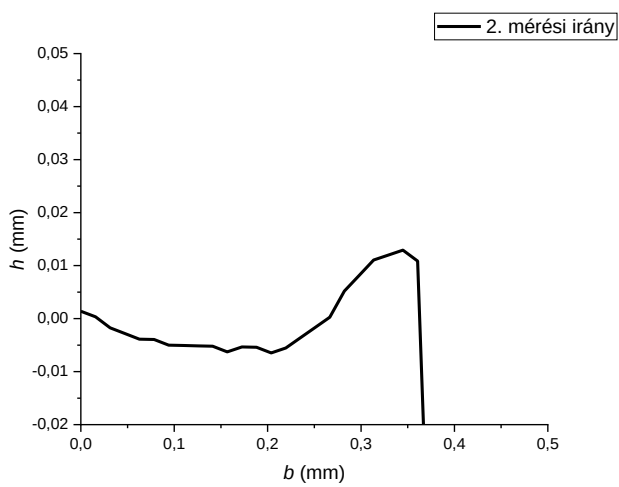
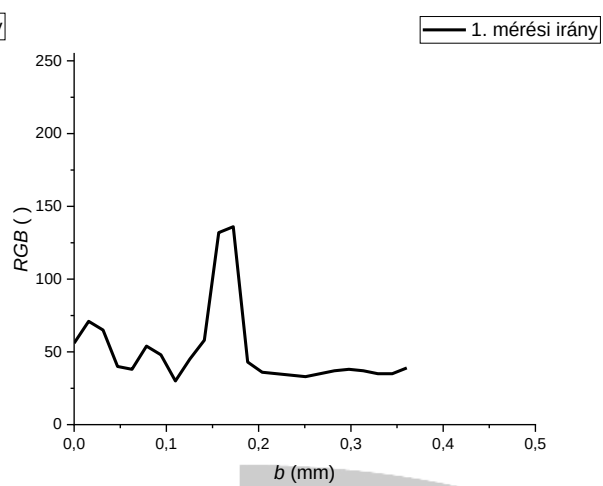
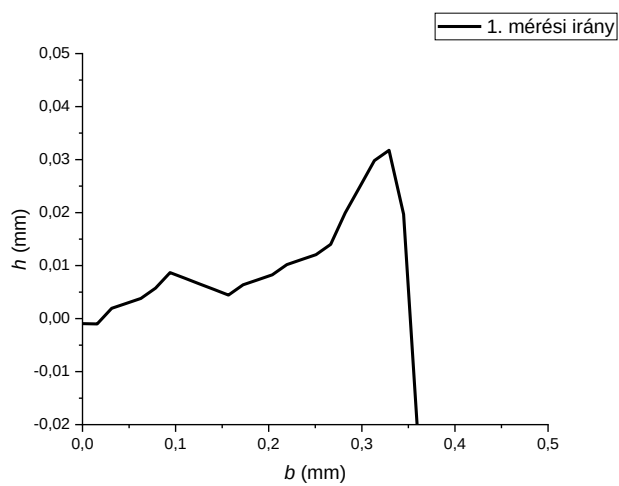


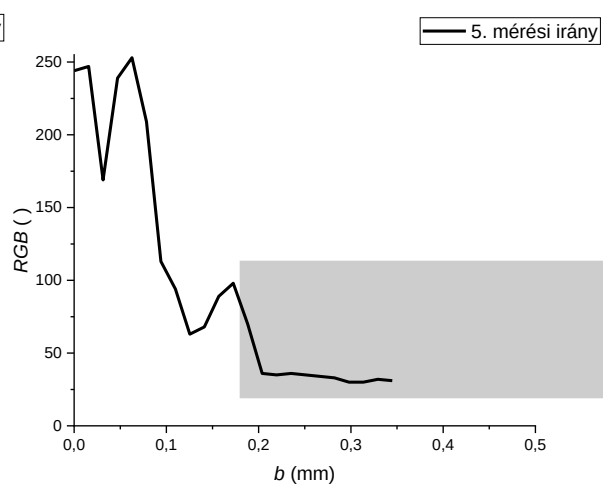
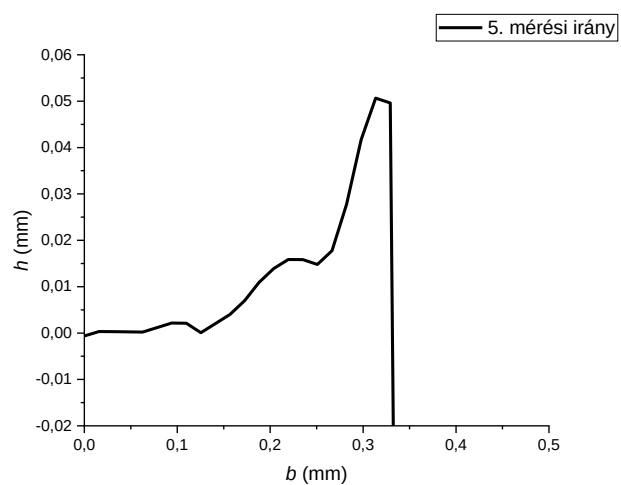
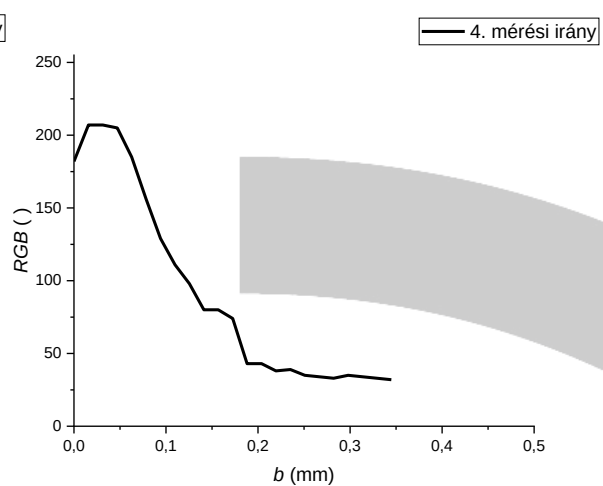
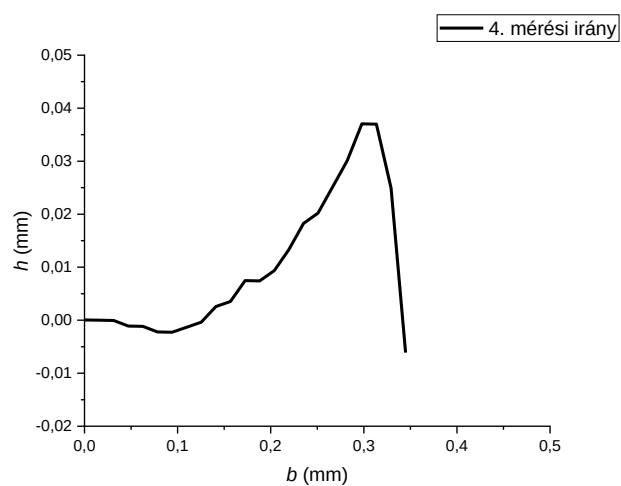
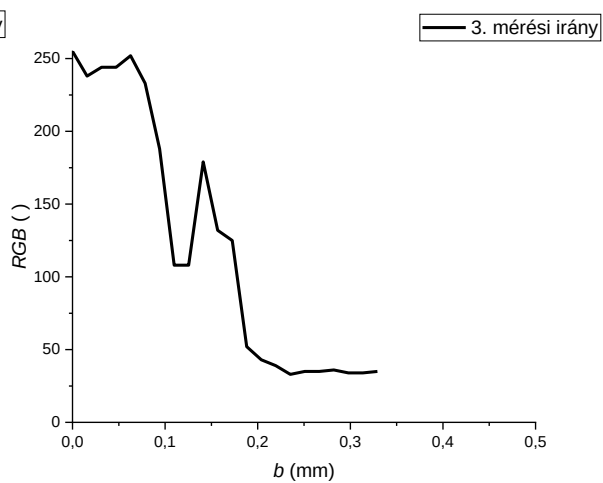
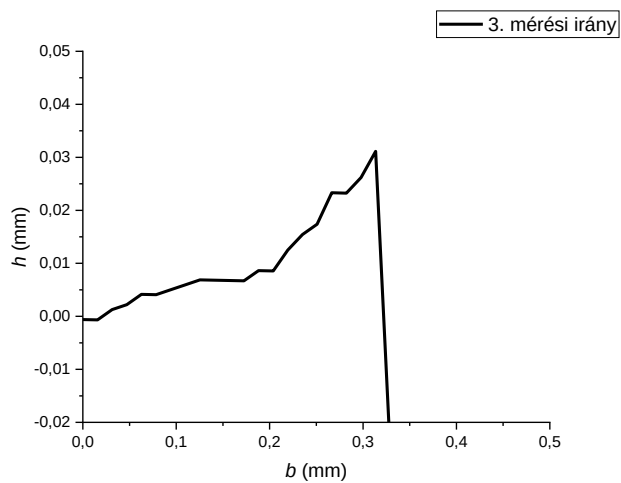


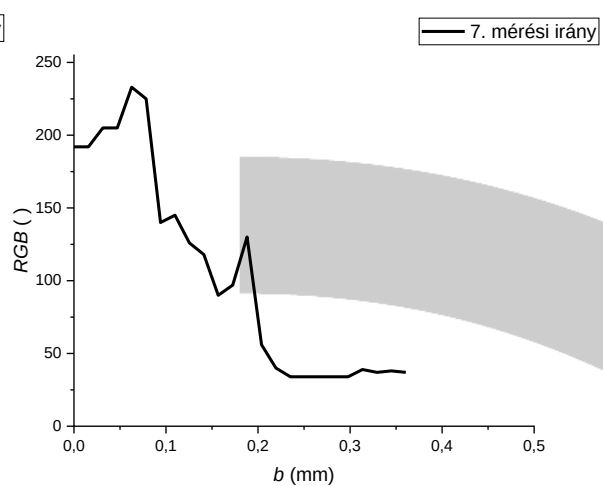
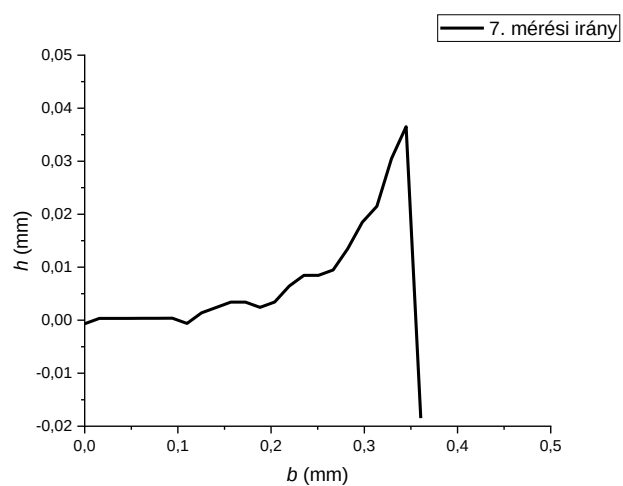
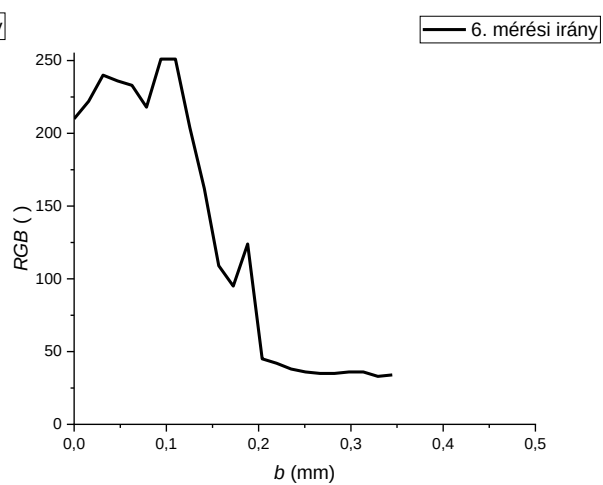
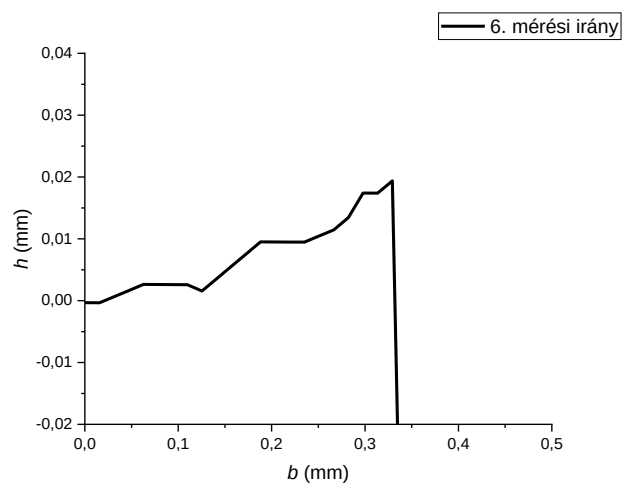


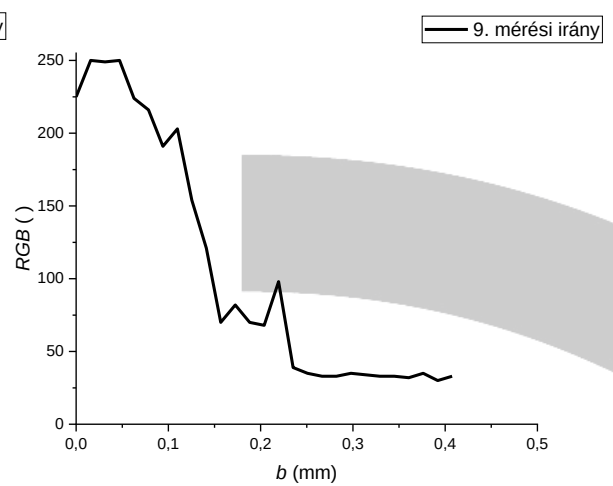
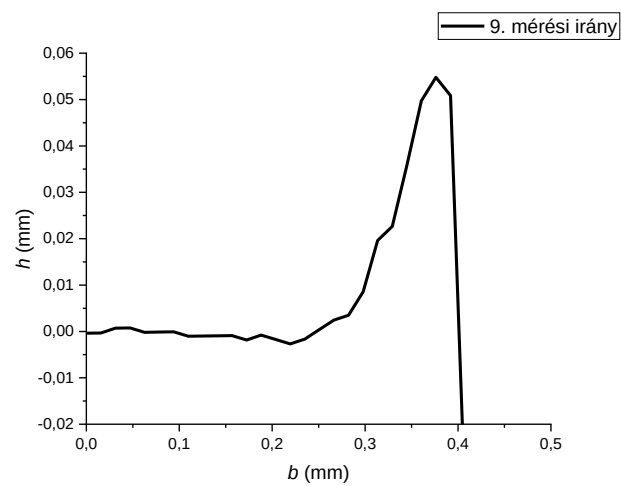
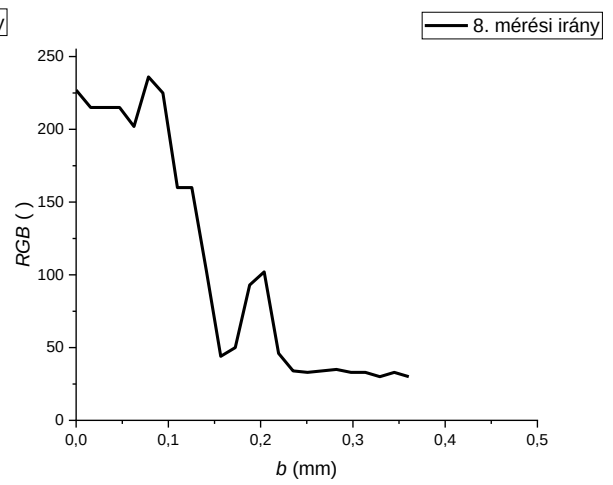
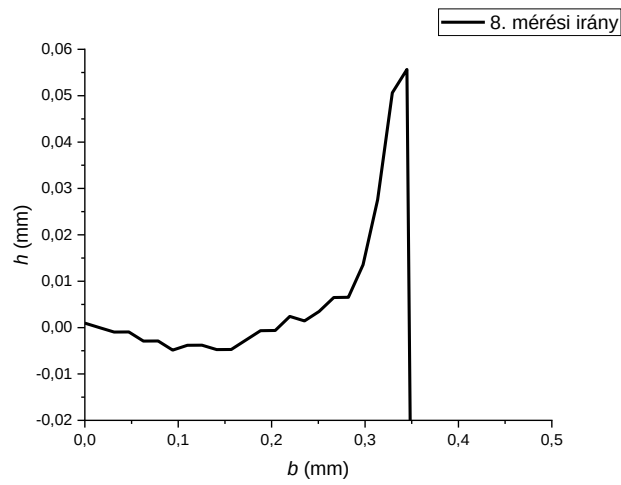
3.1.1. Második lemezsorrend

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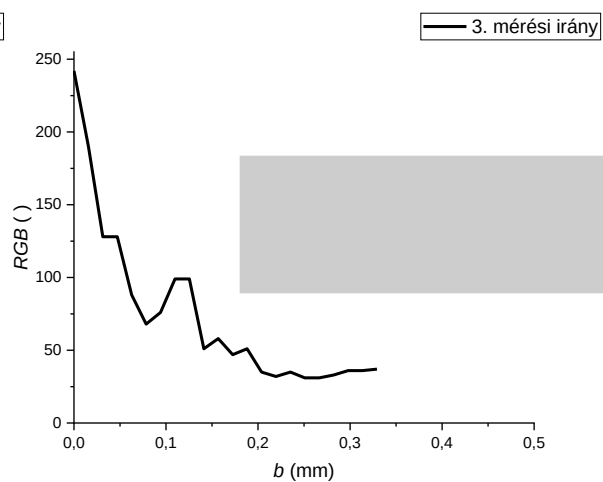
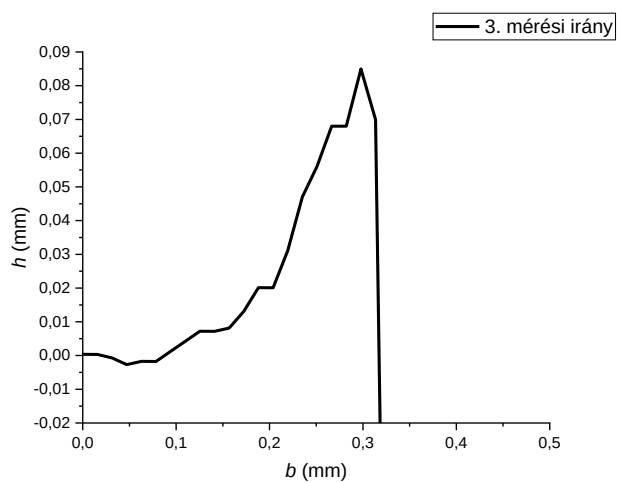
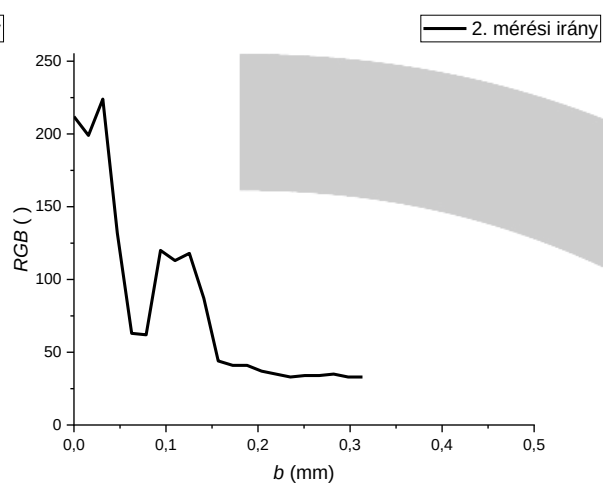
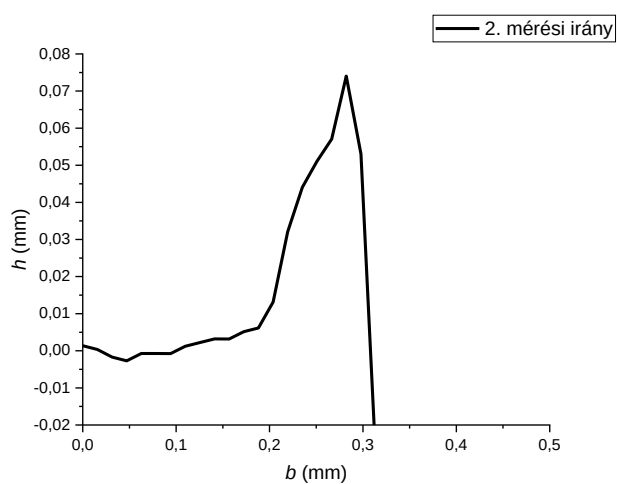
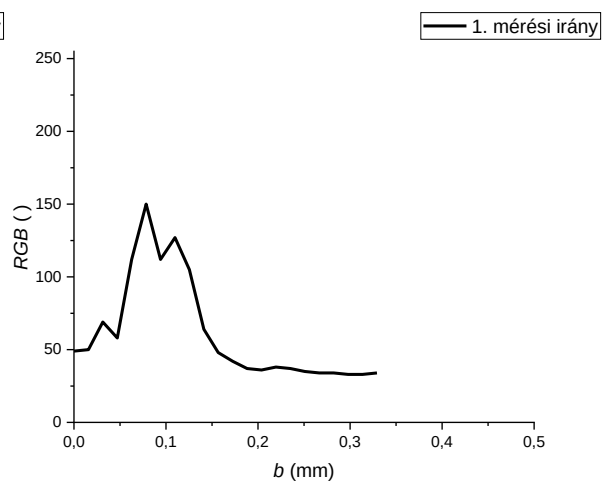
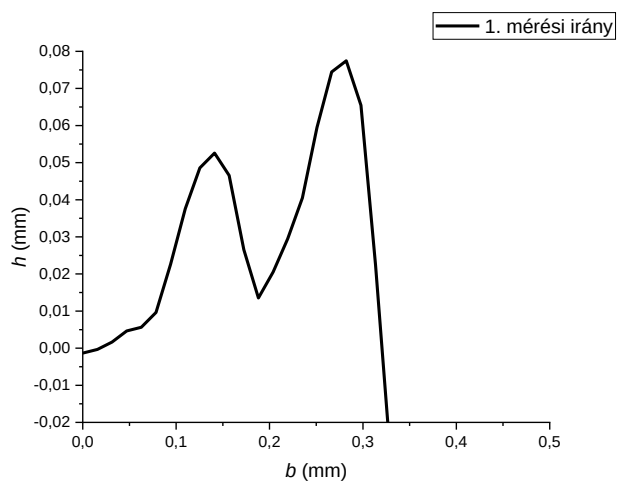


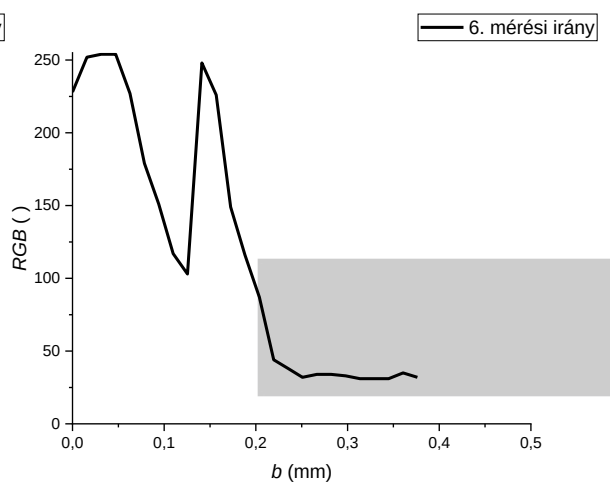
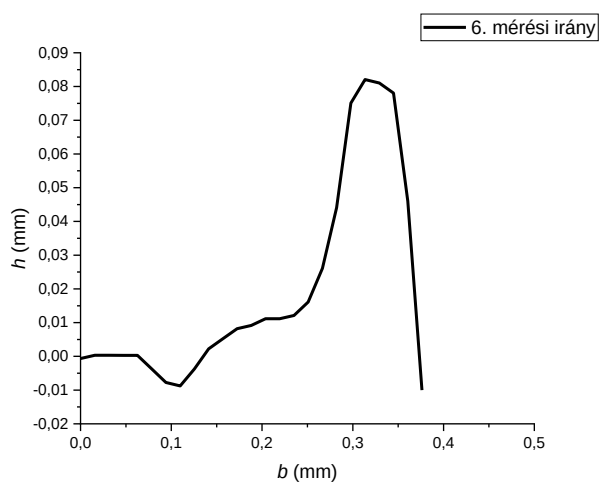
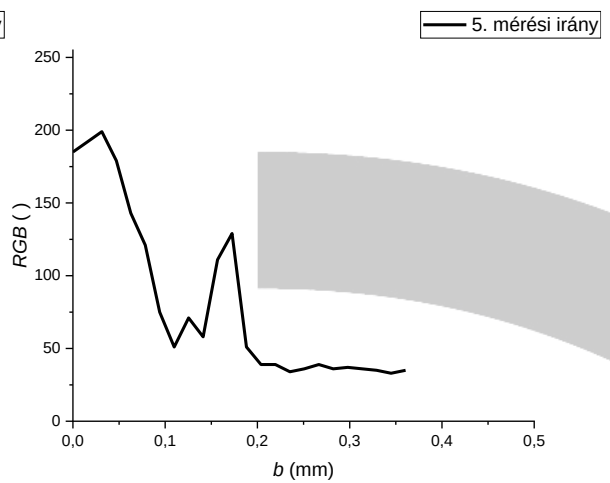
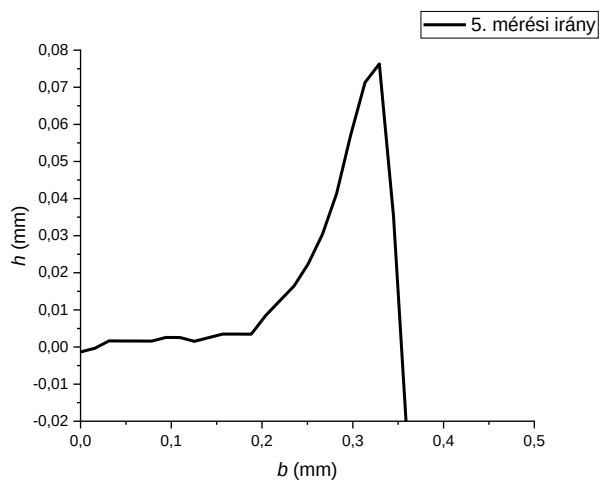
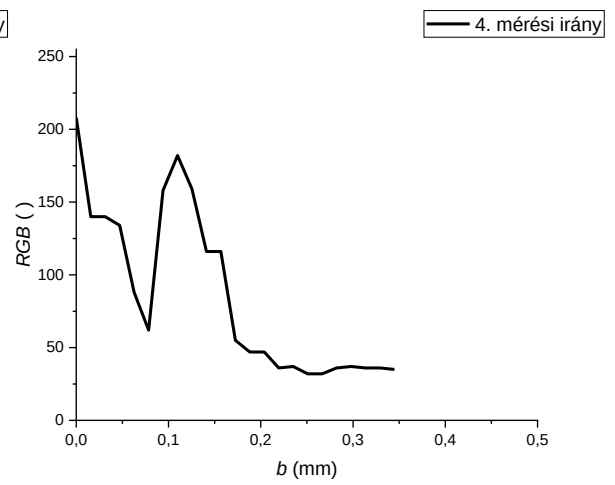
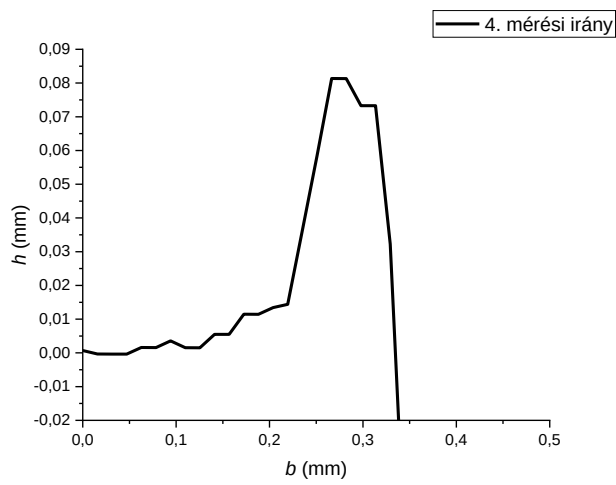


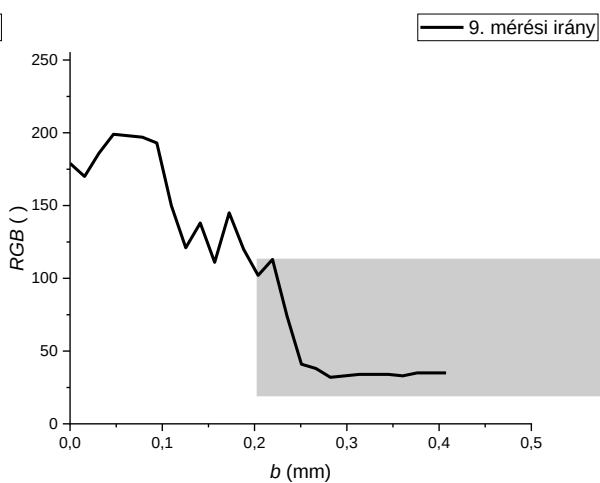
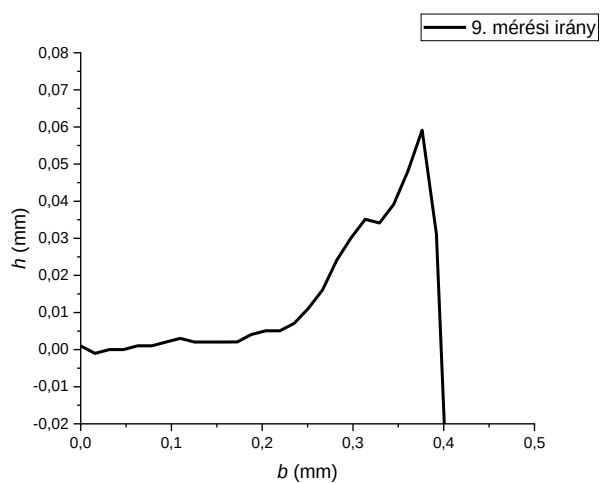
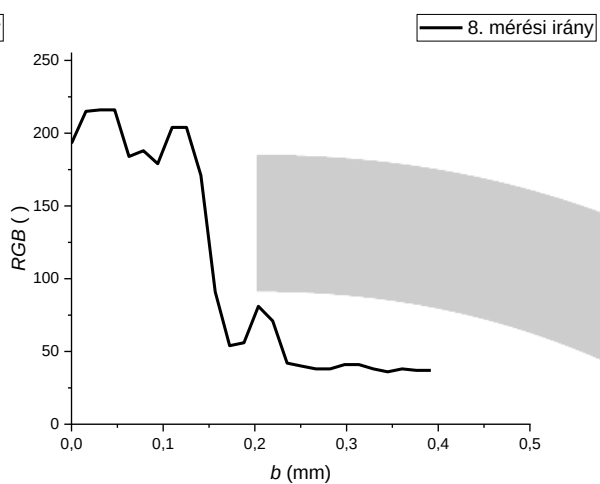
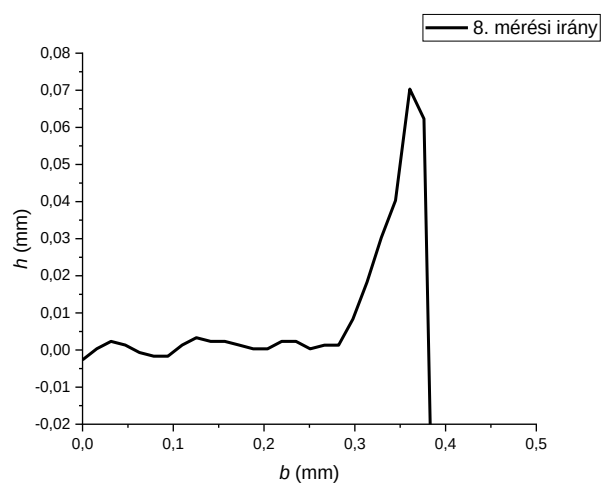
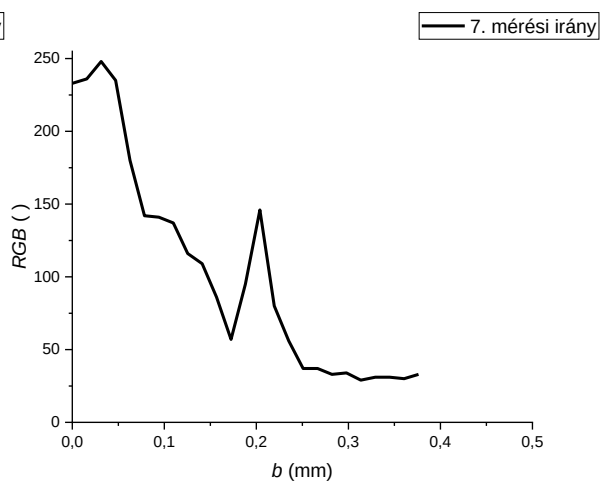
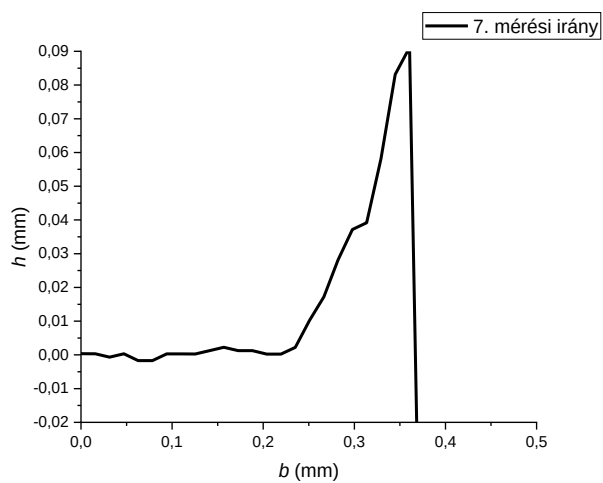




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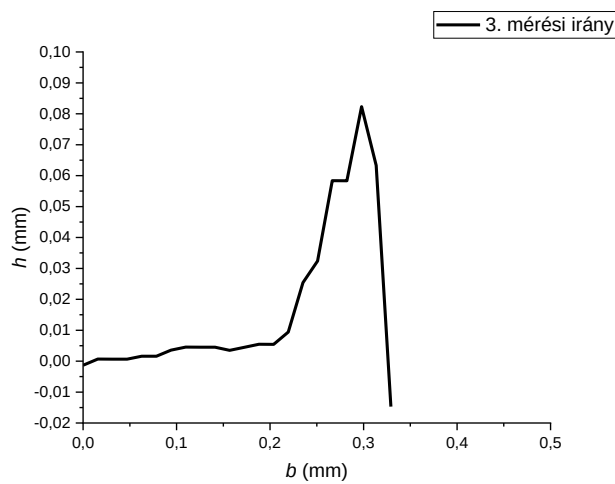
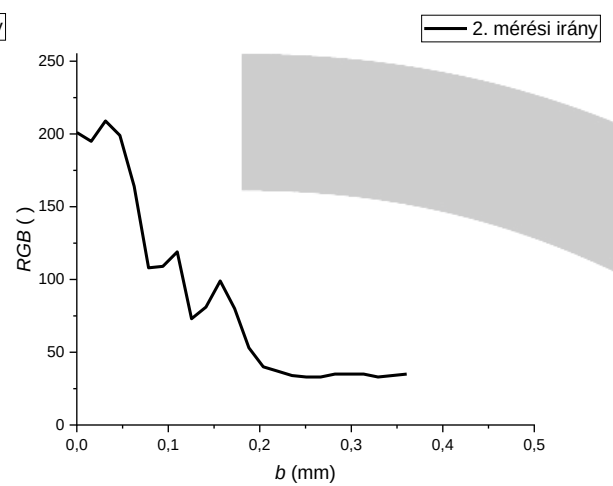
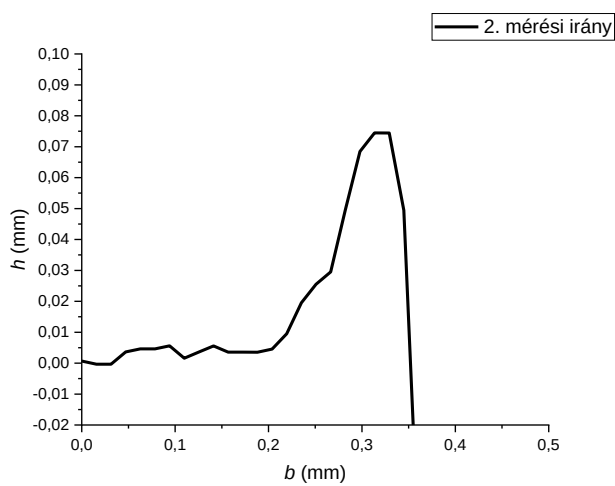
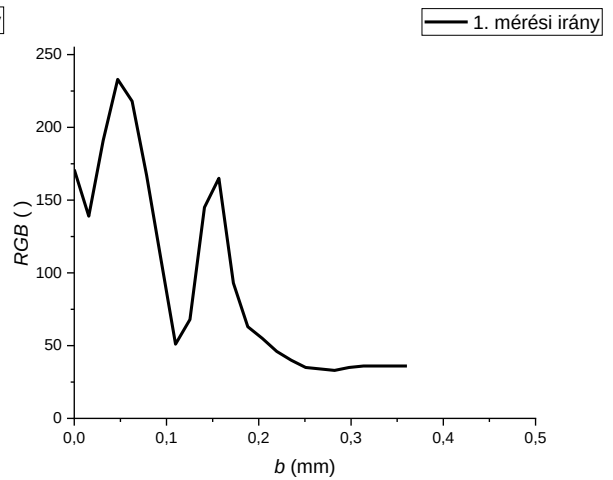
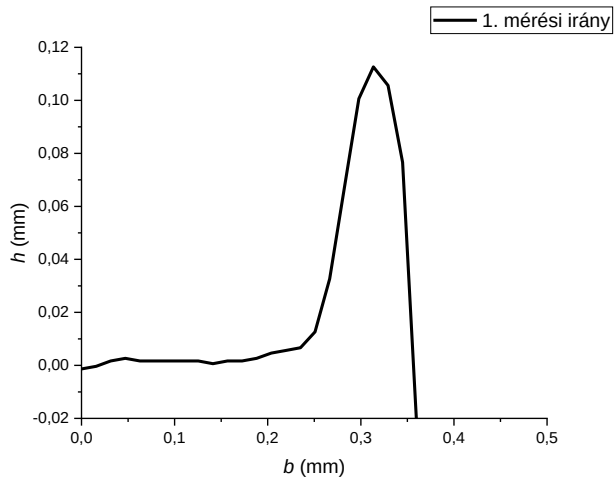


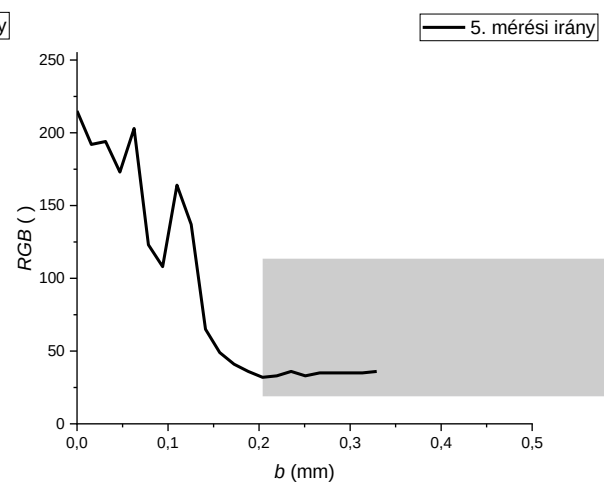
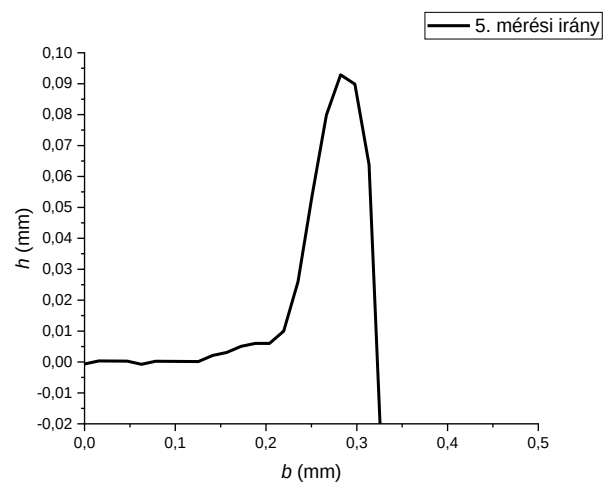
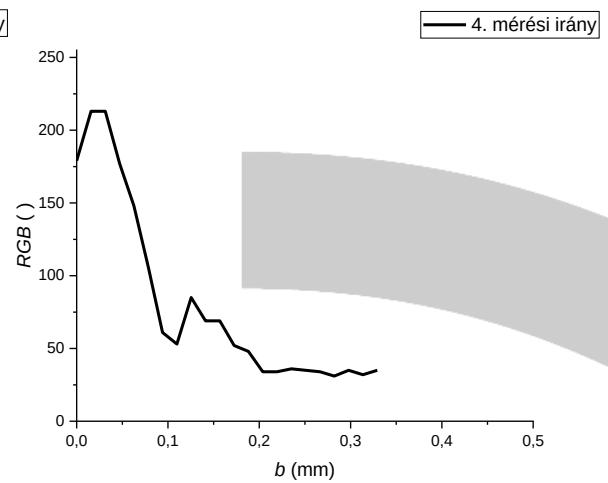
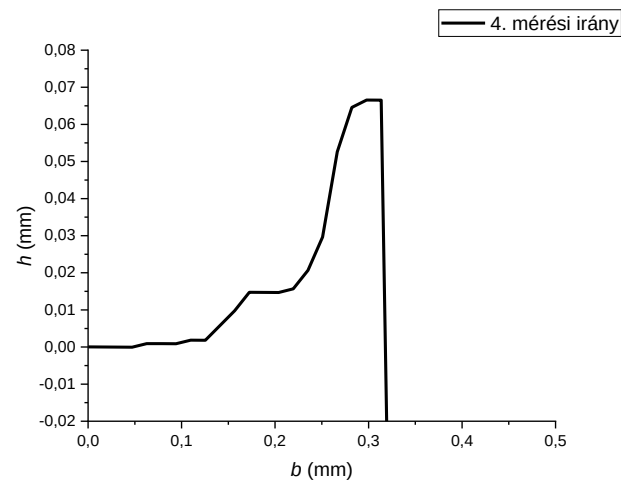
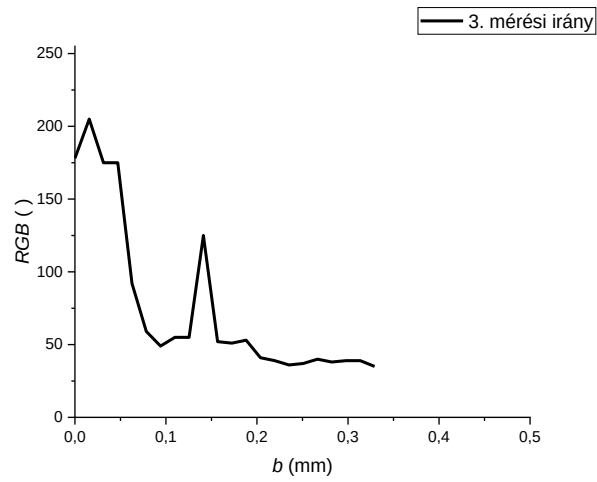


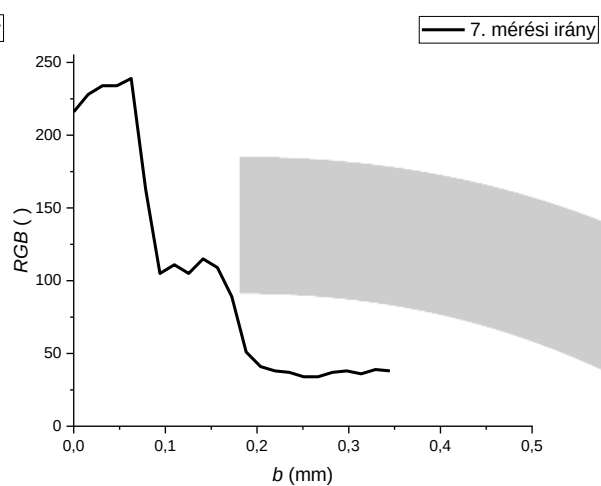
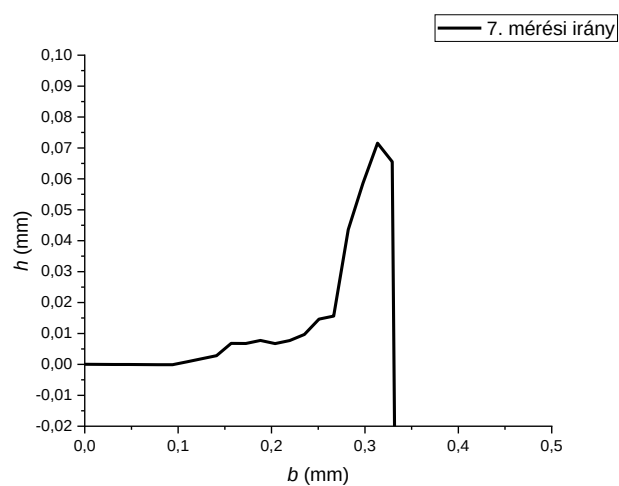
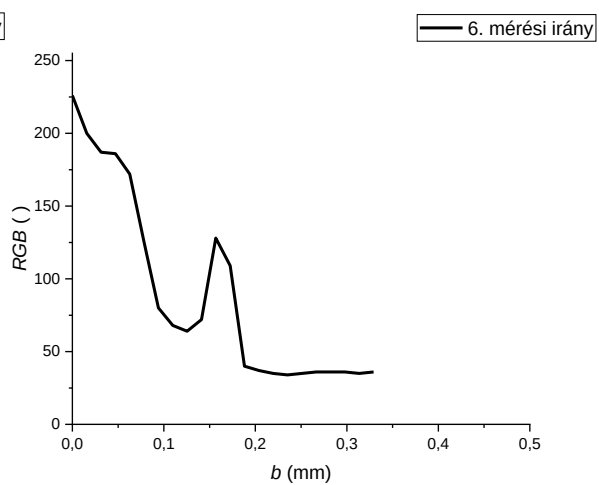
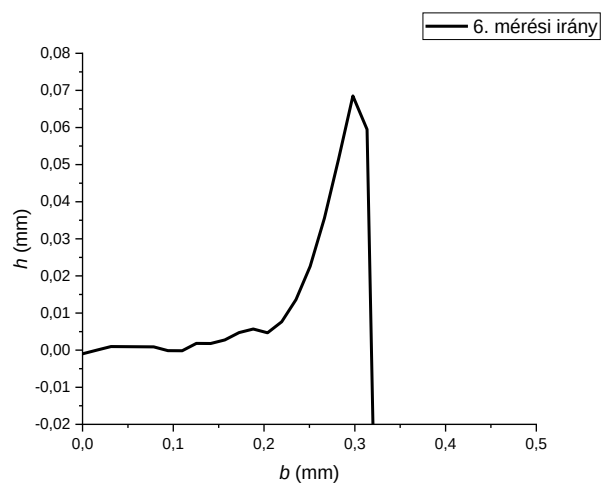


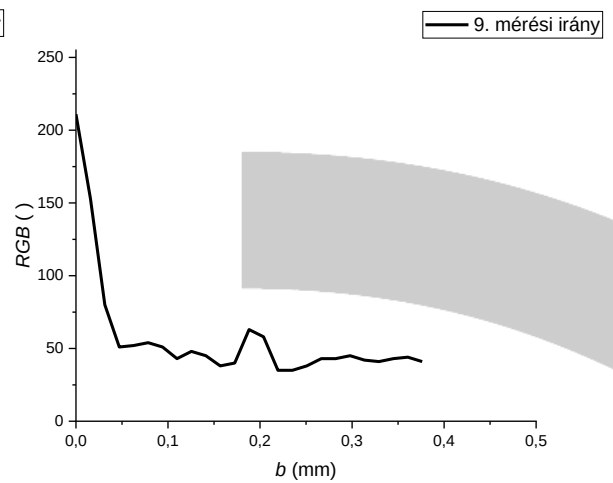
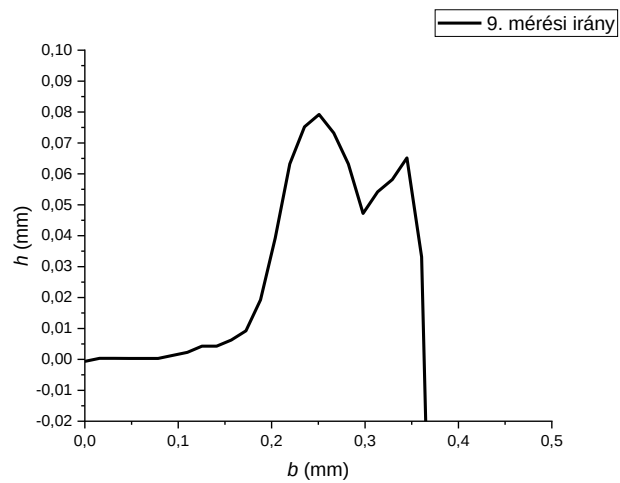
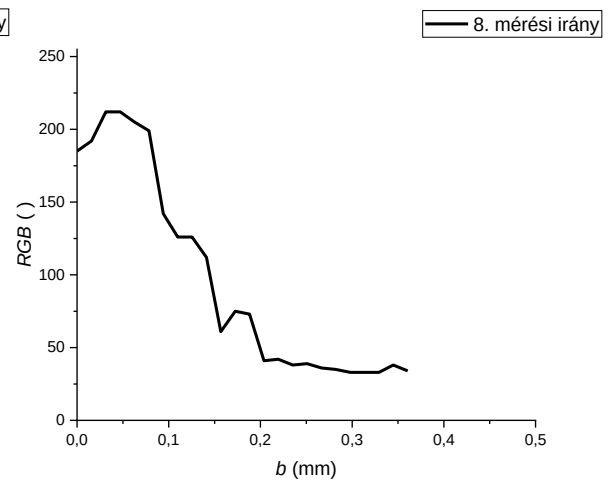
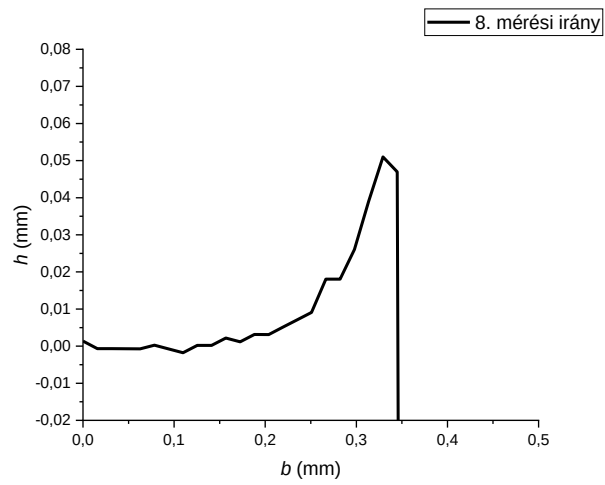


- 3. furat



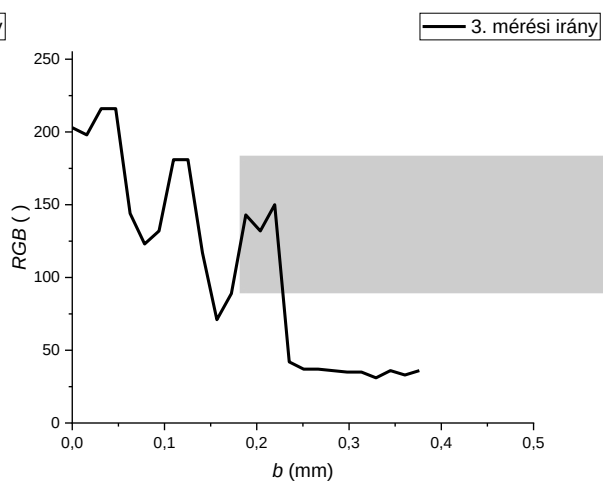
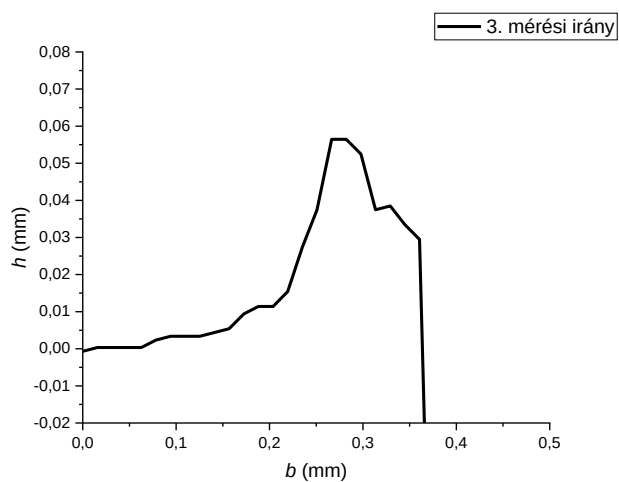
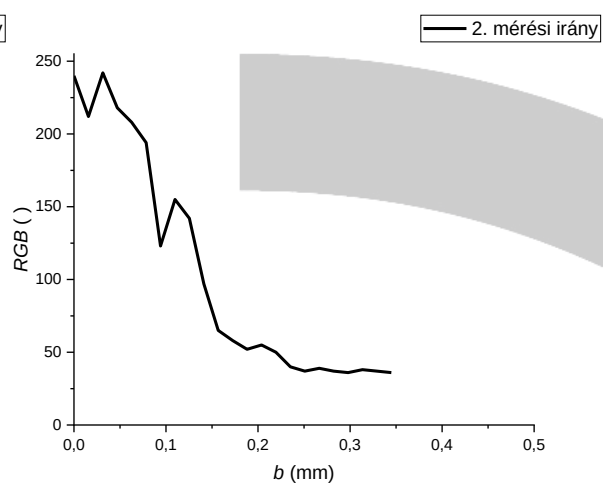
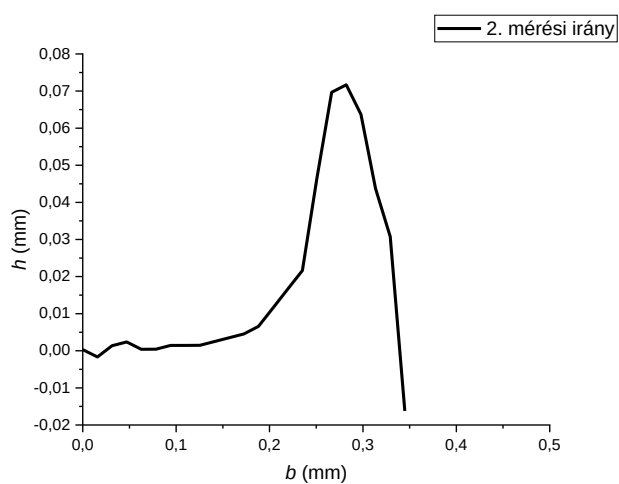
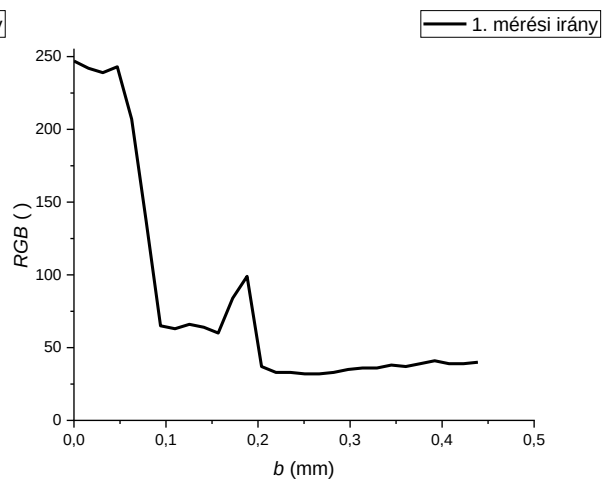
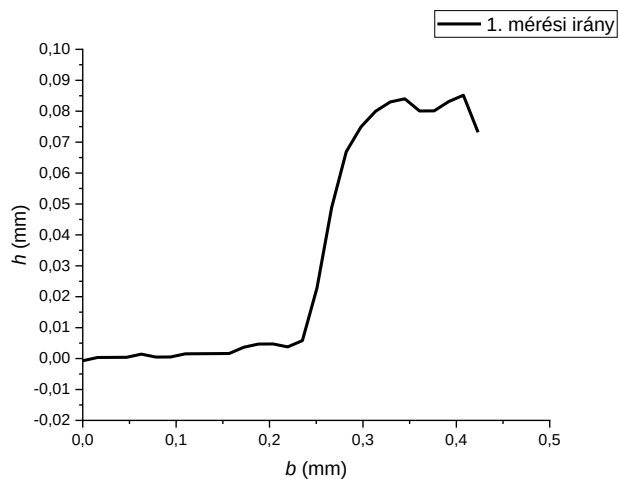


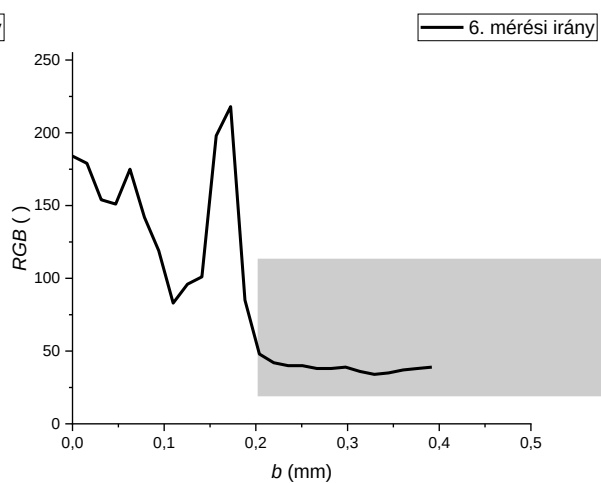
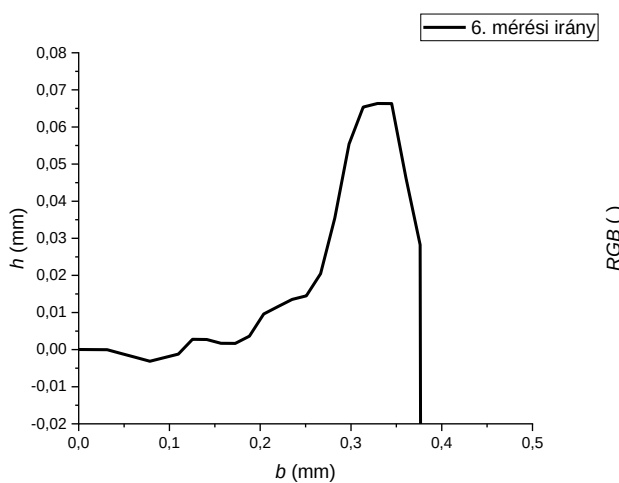
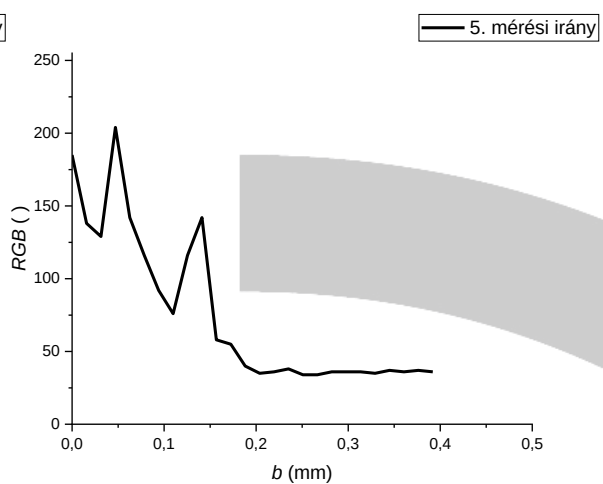
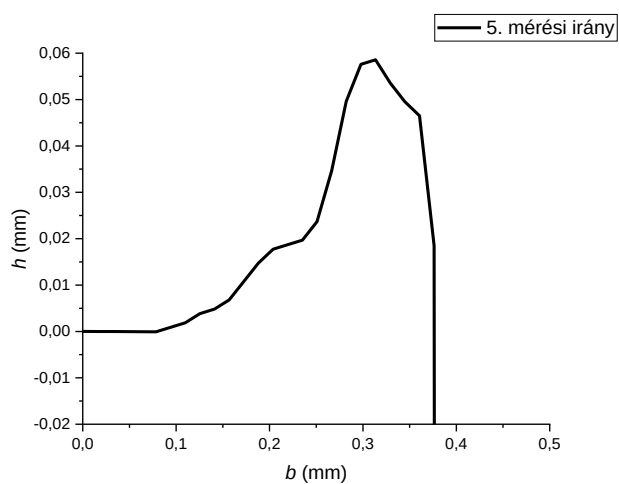
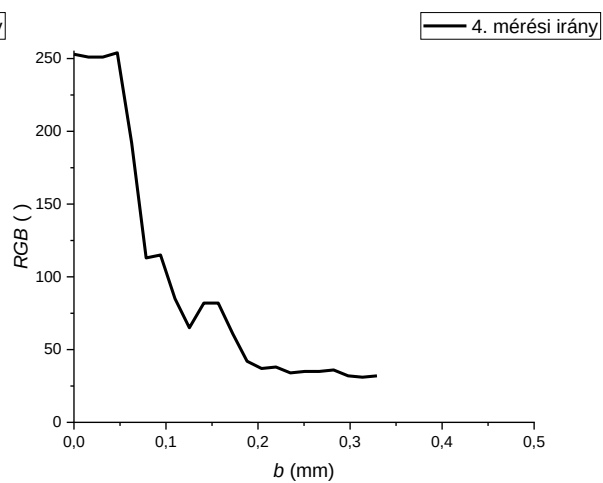
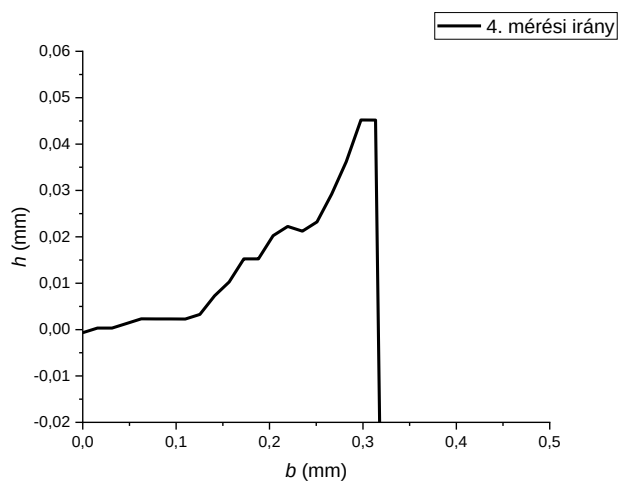


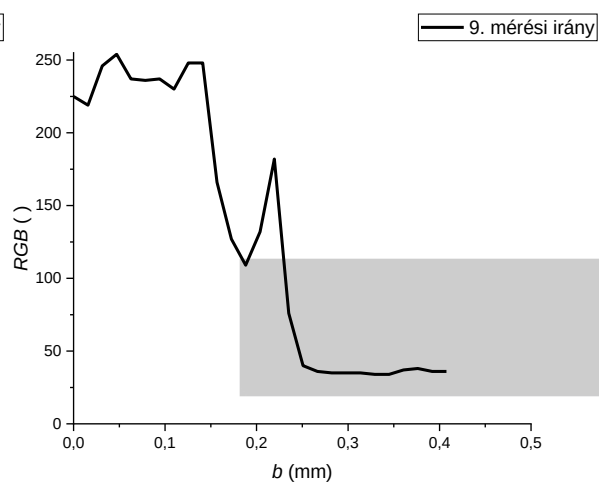
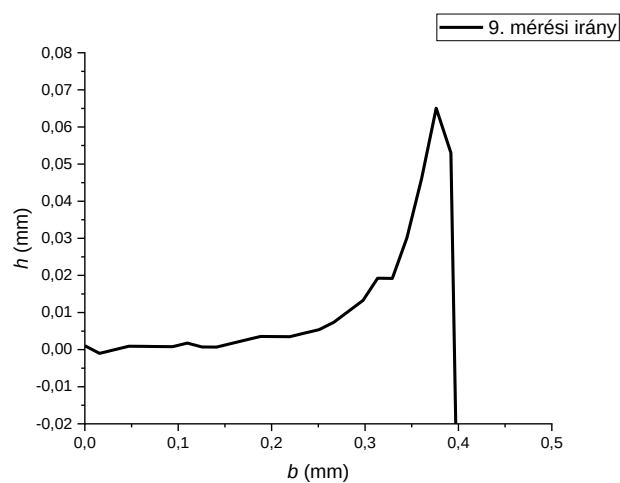
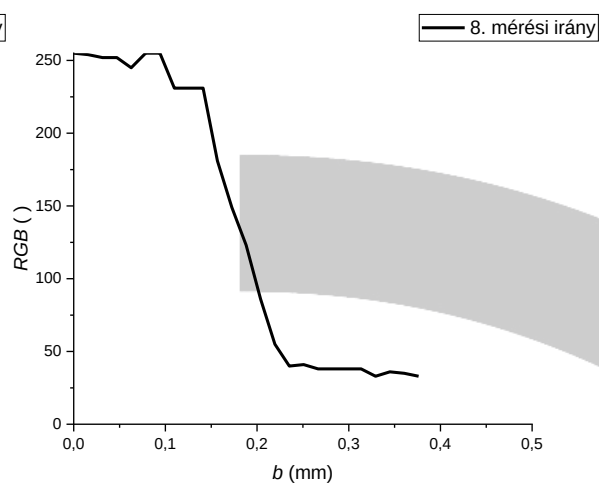
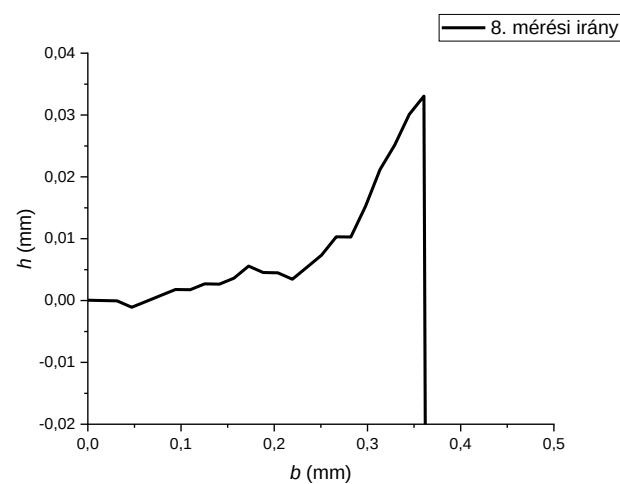
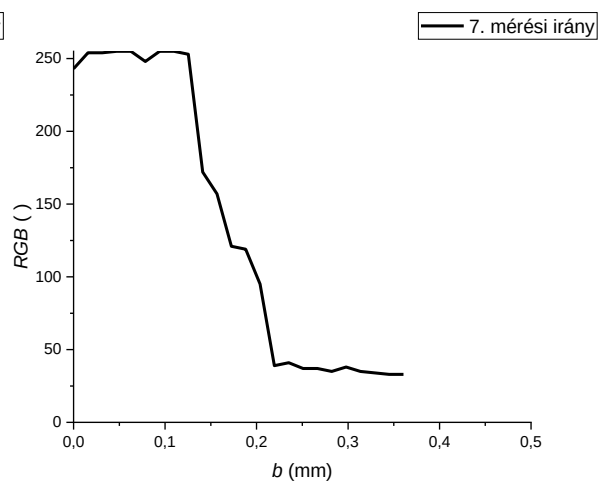
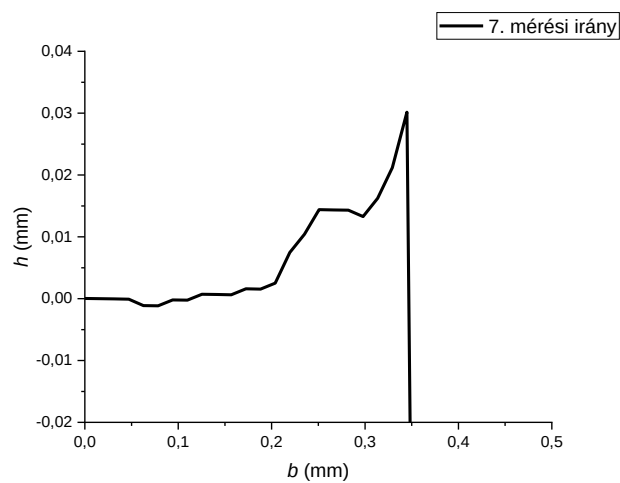




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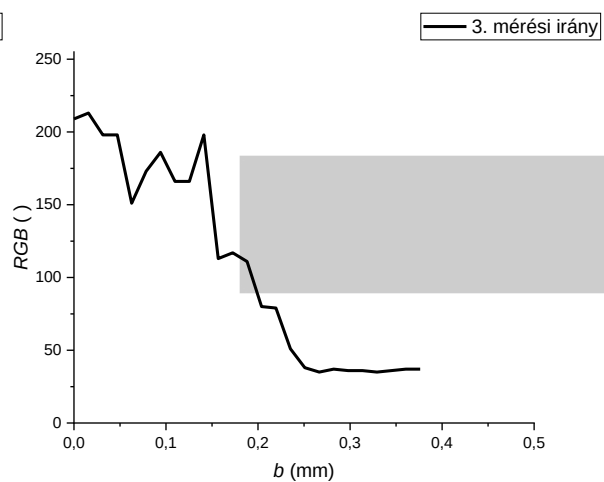
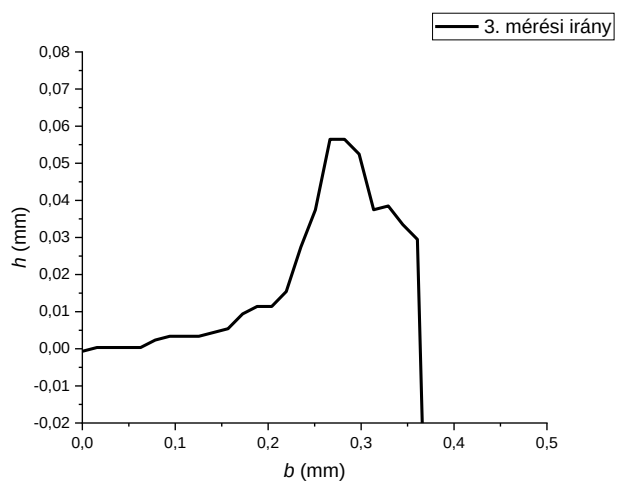
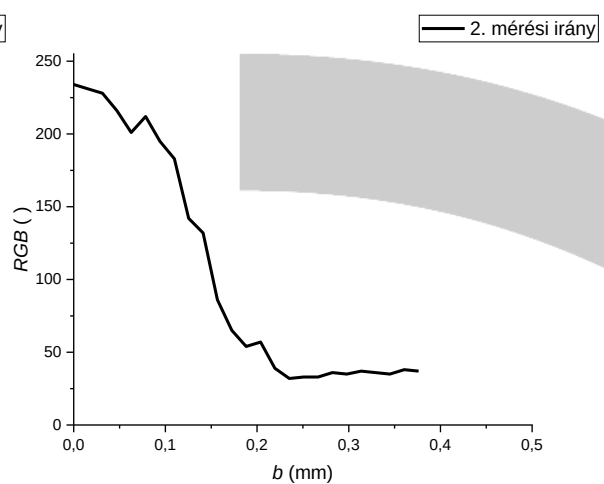
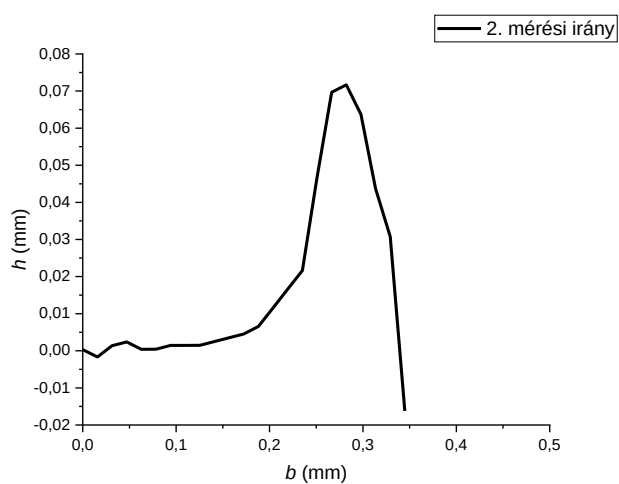
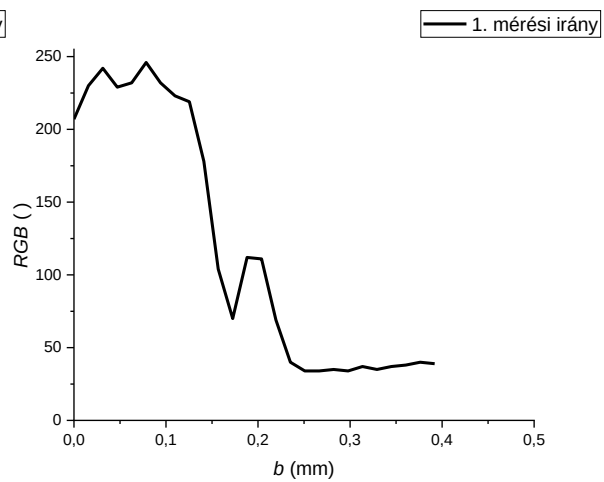
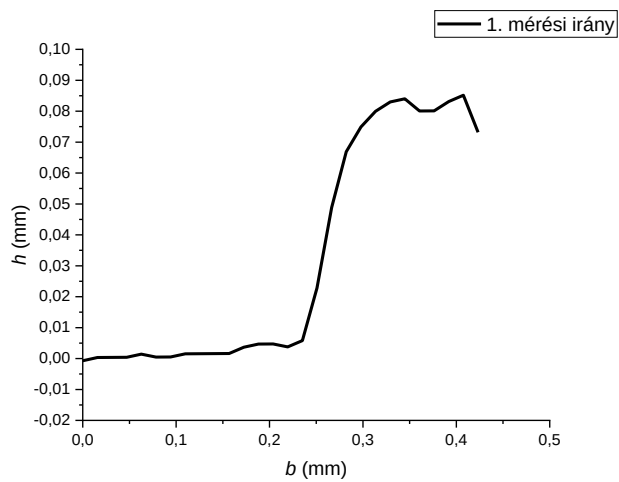


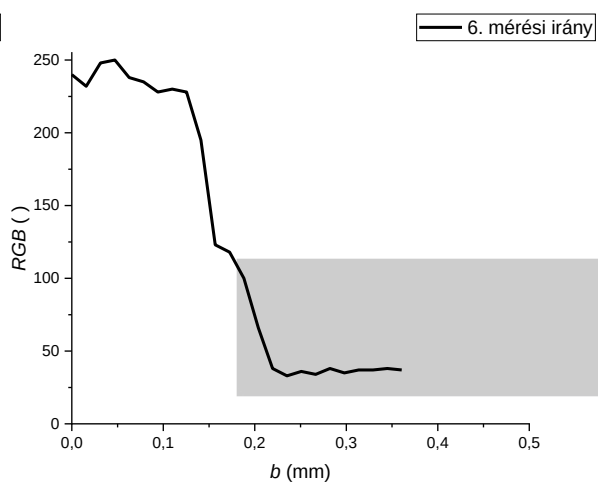
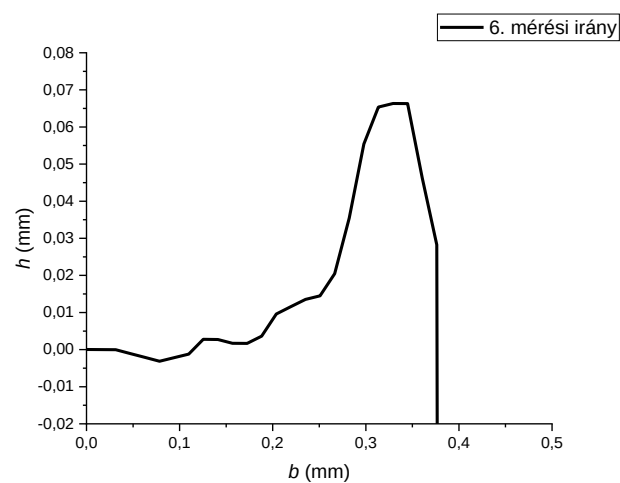
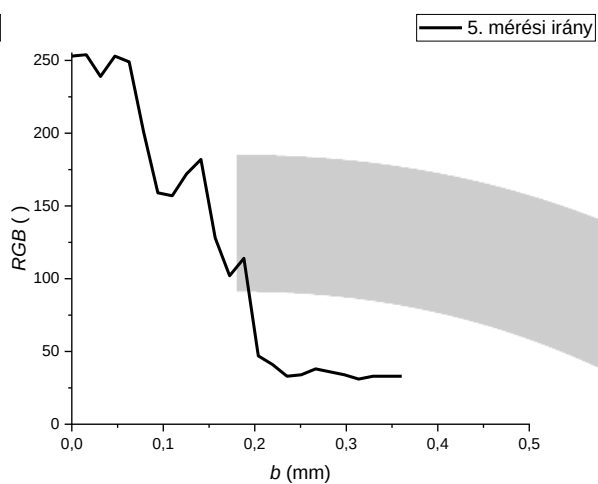
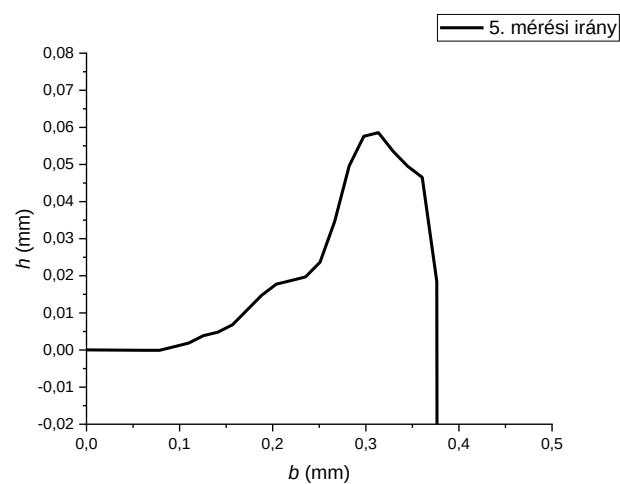
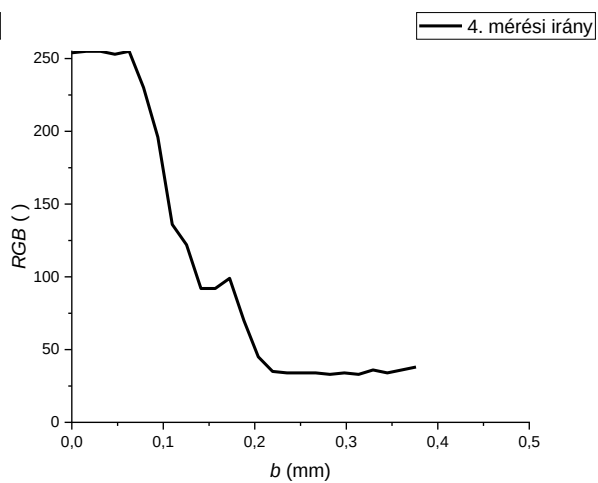
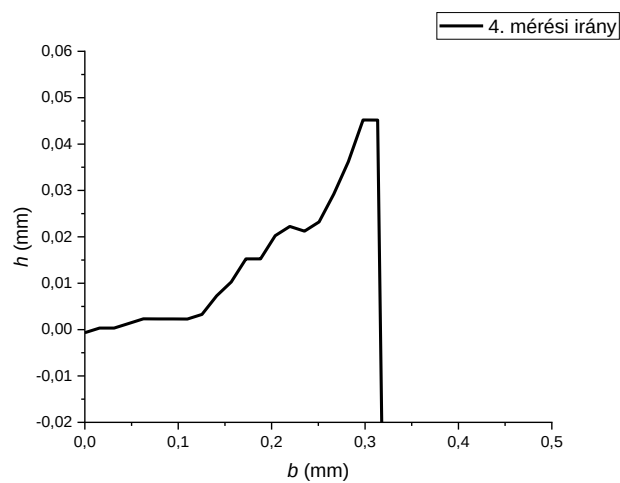


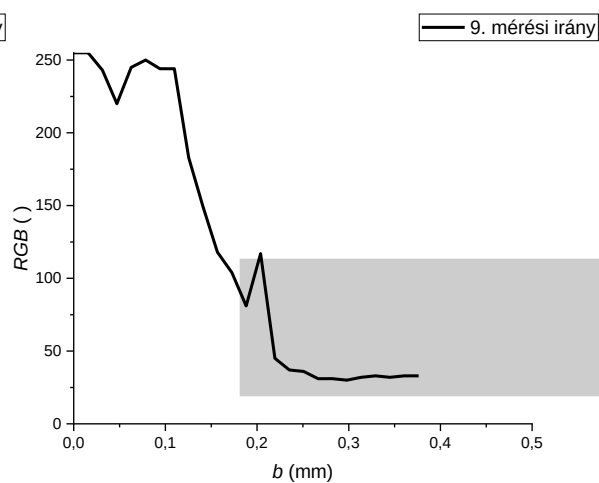
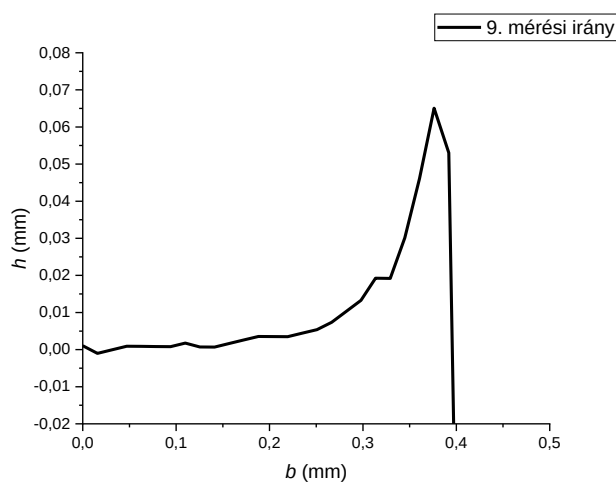
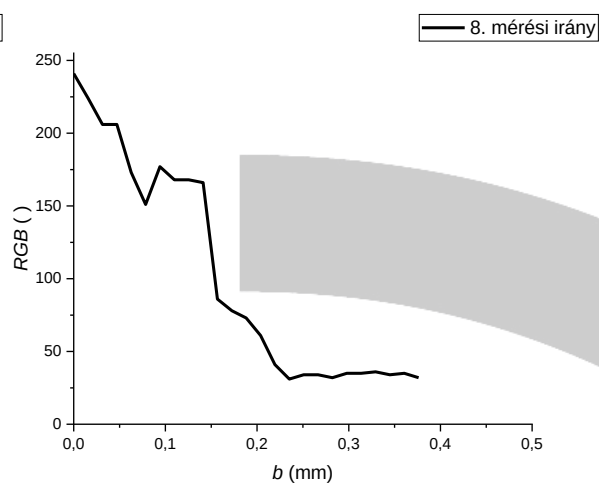
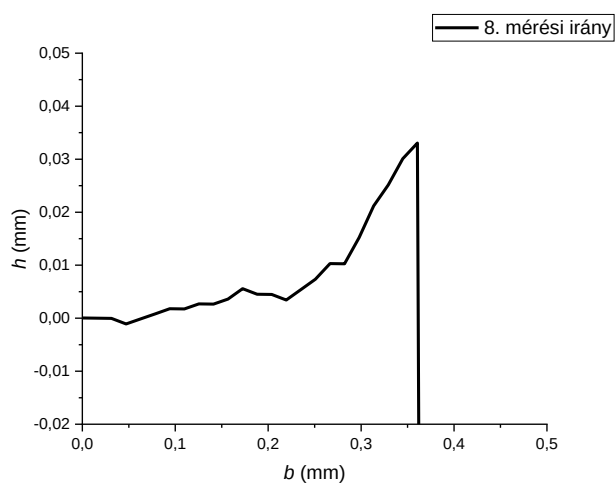
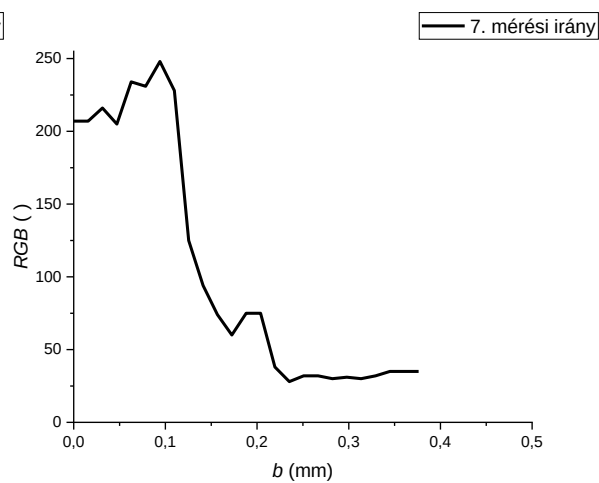
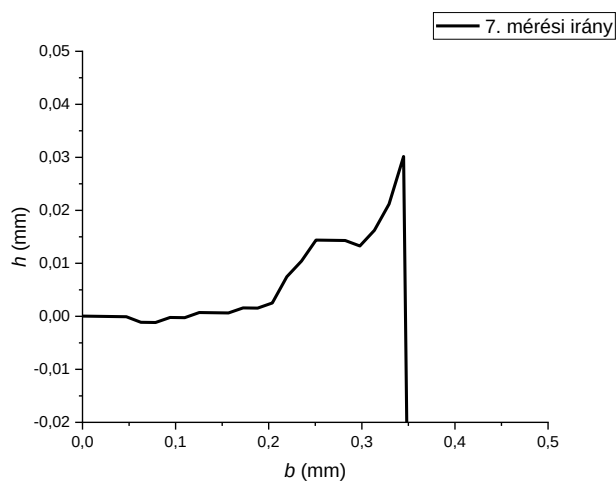




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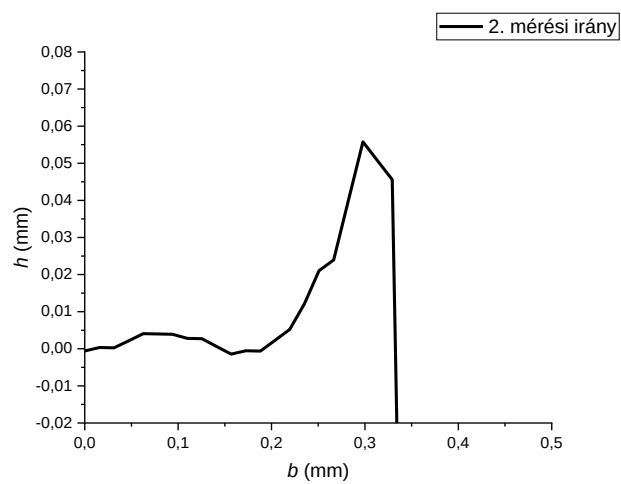
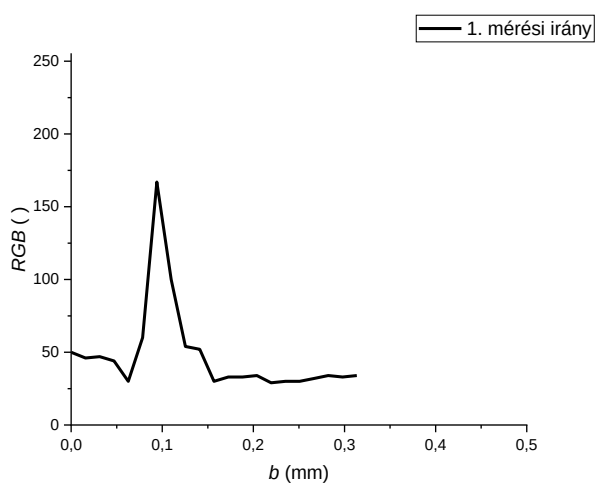
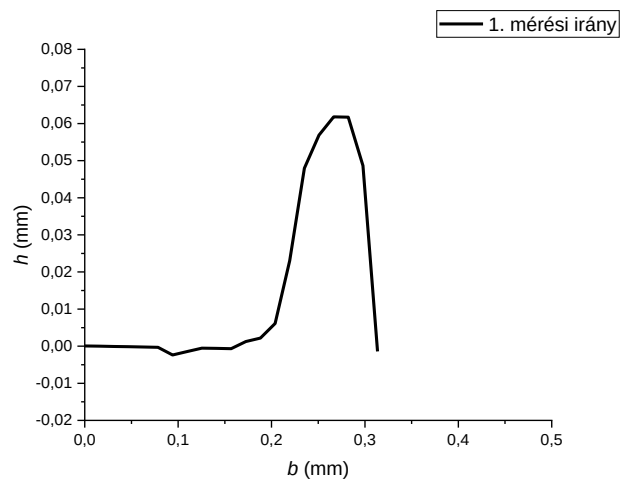


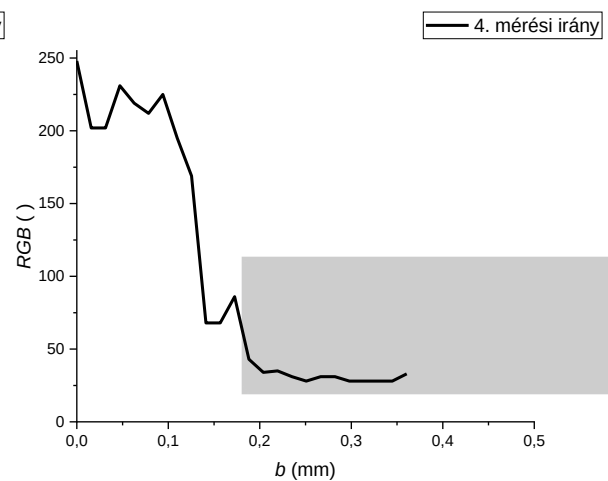
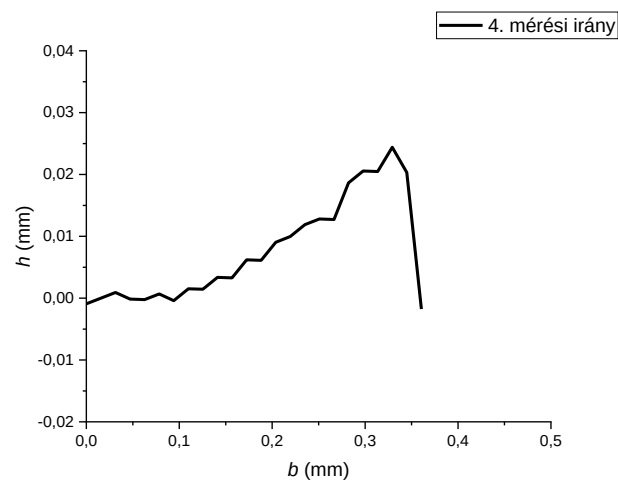
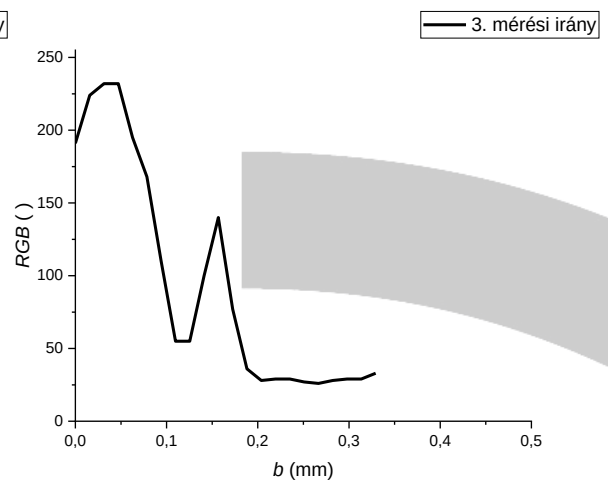
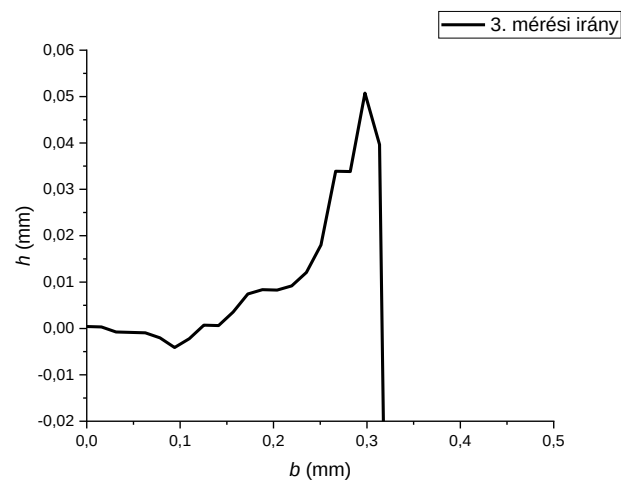
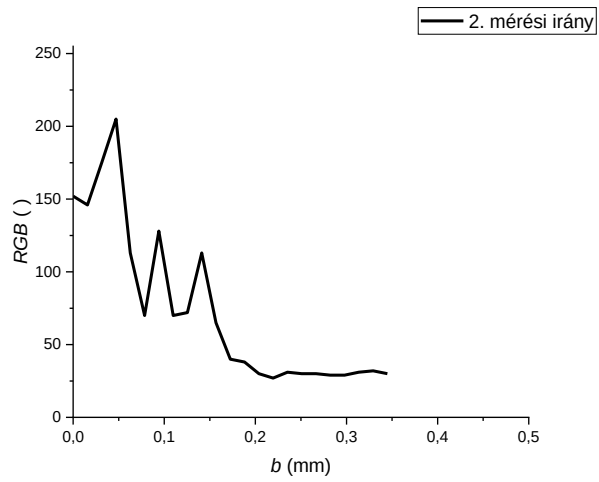


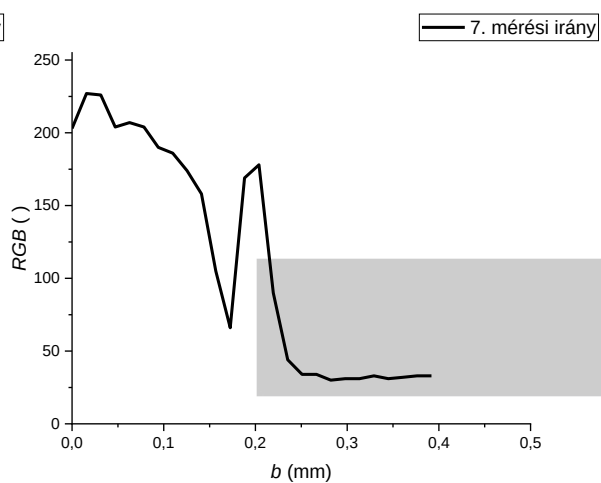
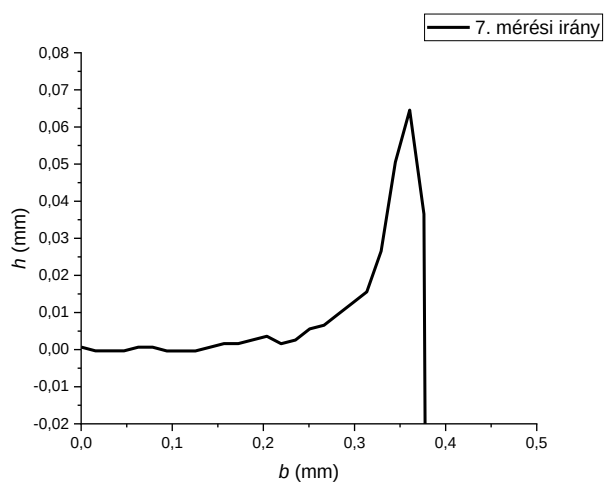
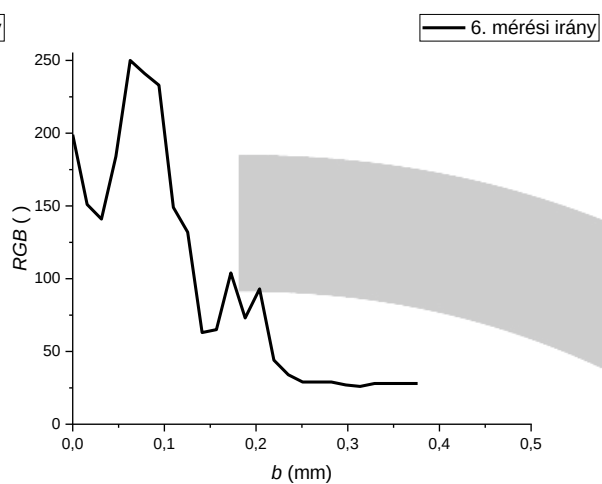
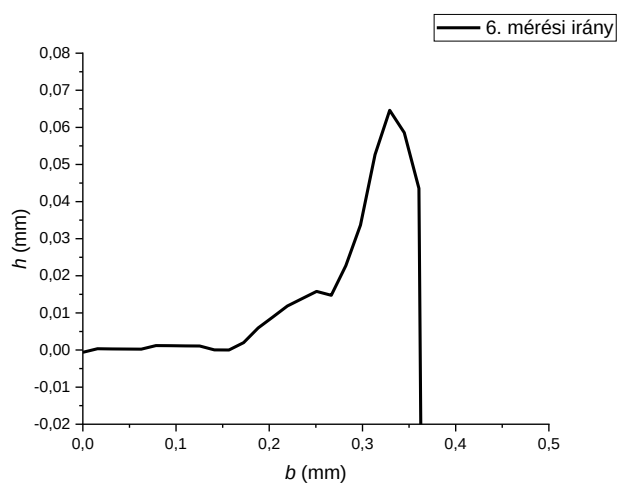
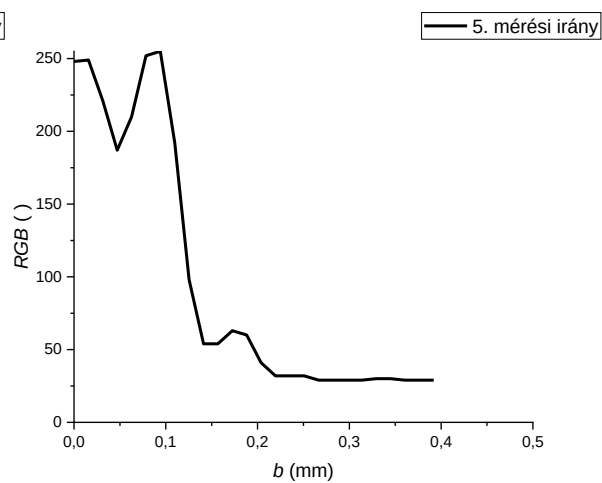
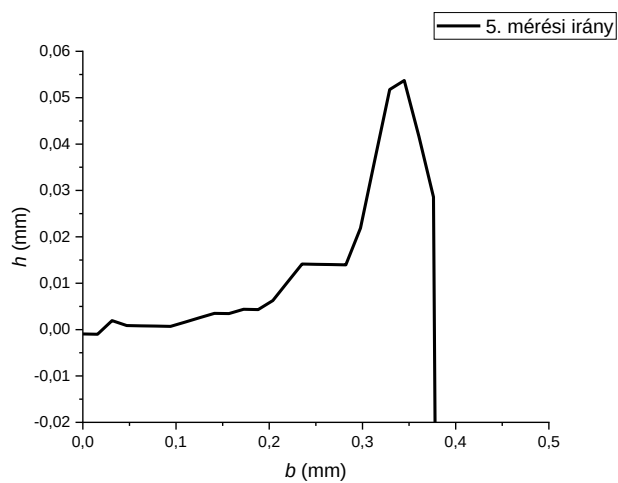


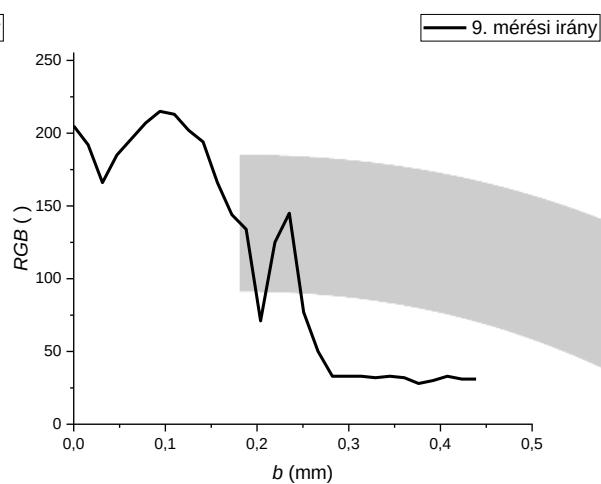
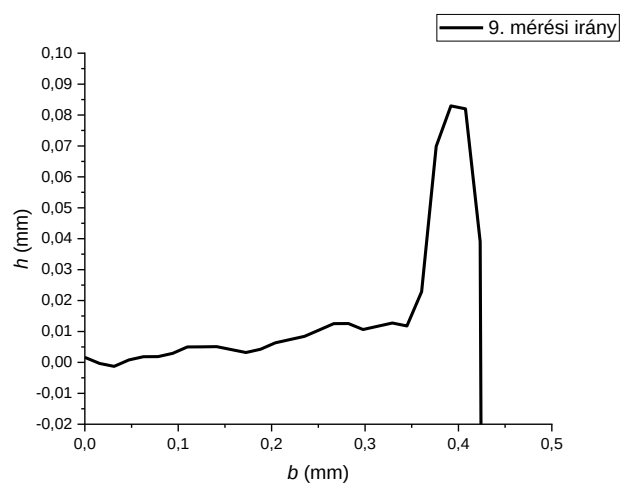
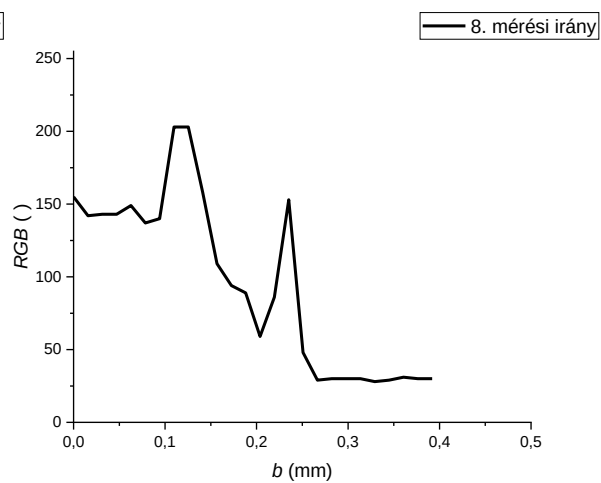
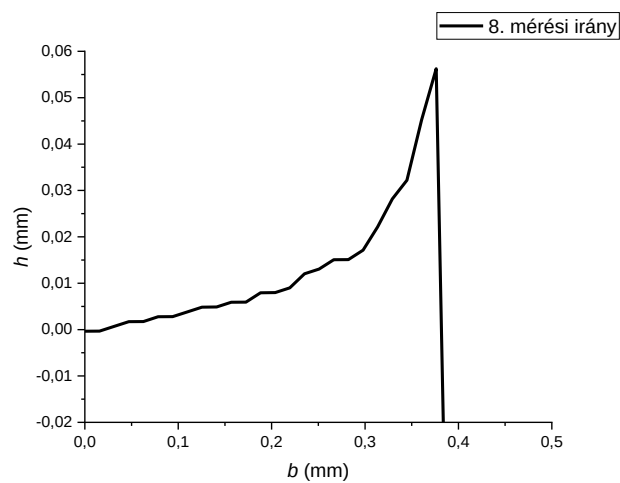


- 6. furat



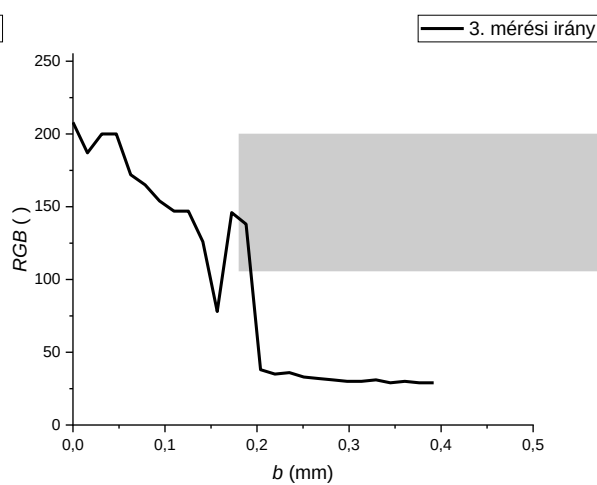
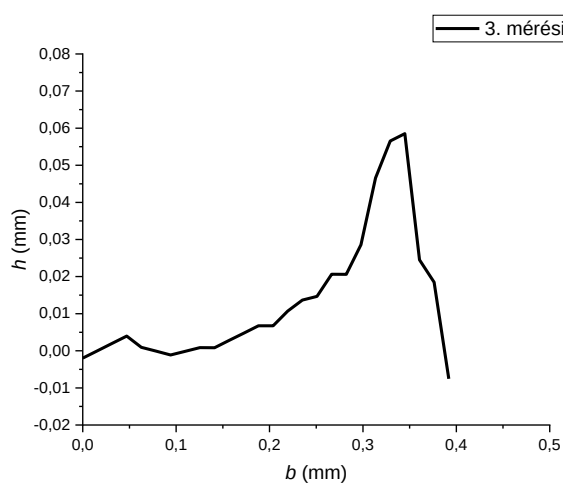
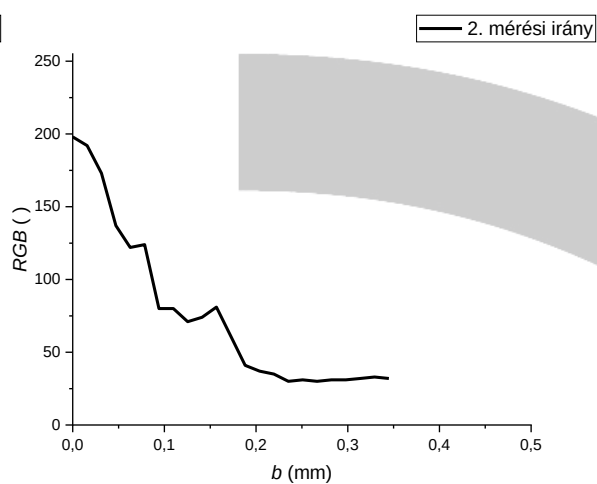
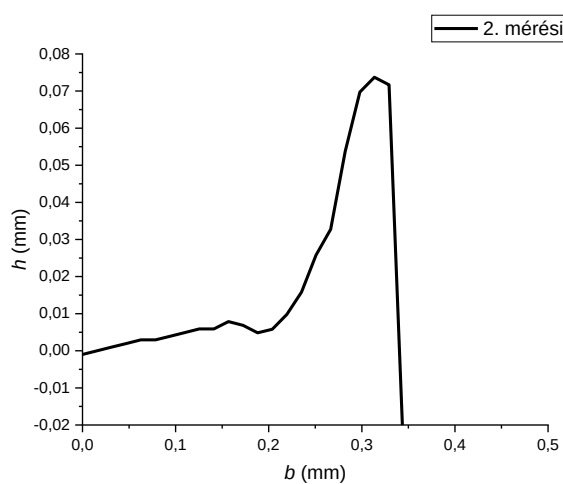
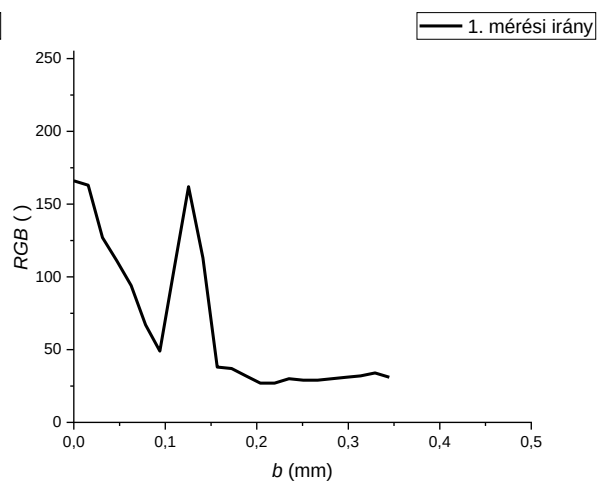
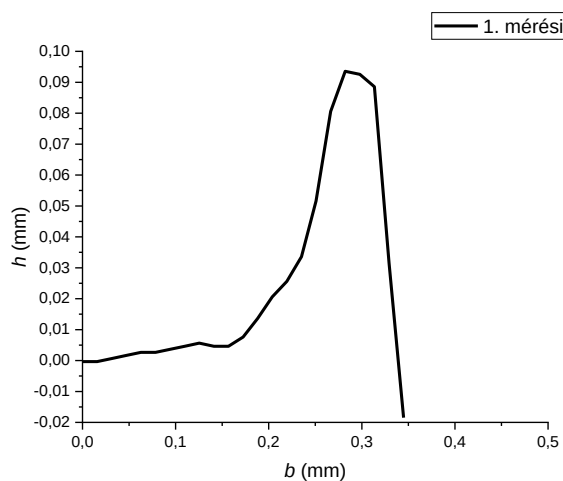


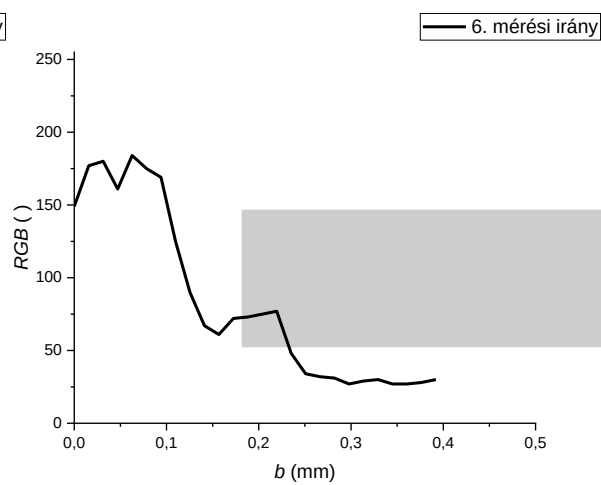
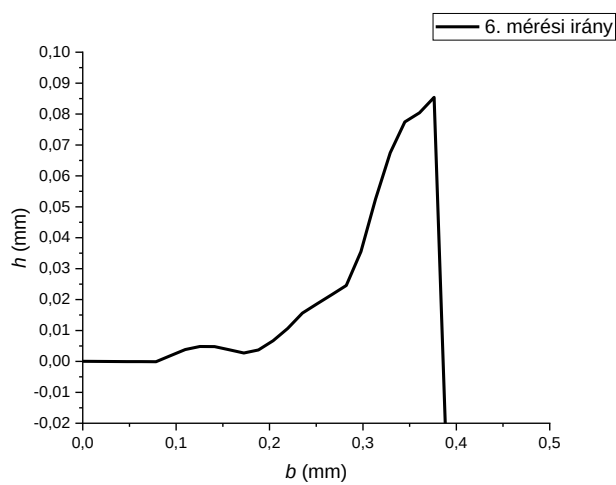
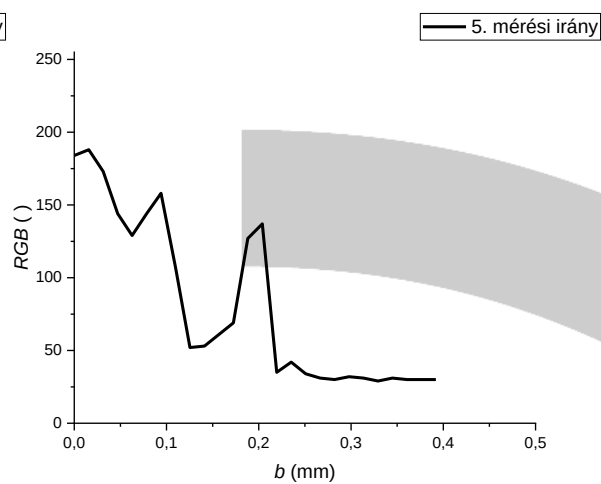
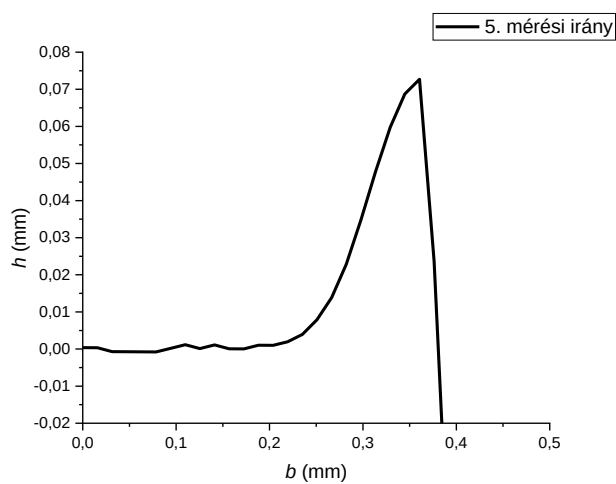
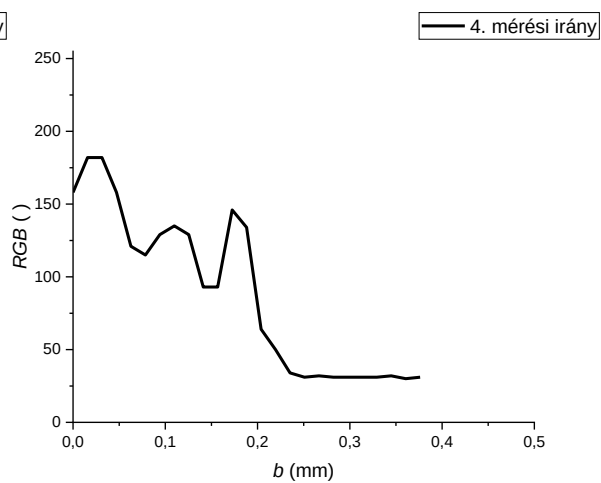
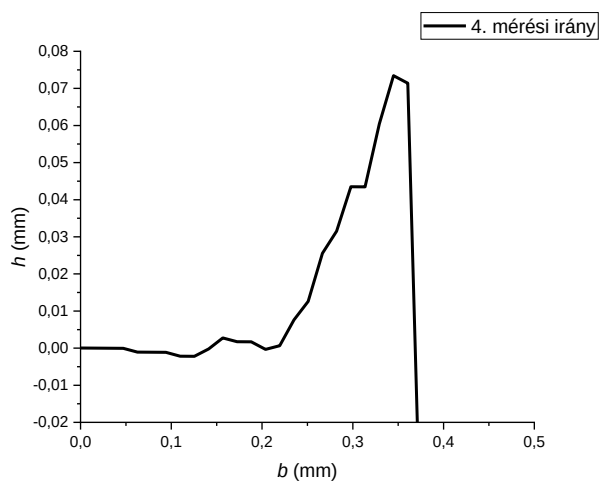


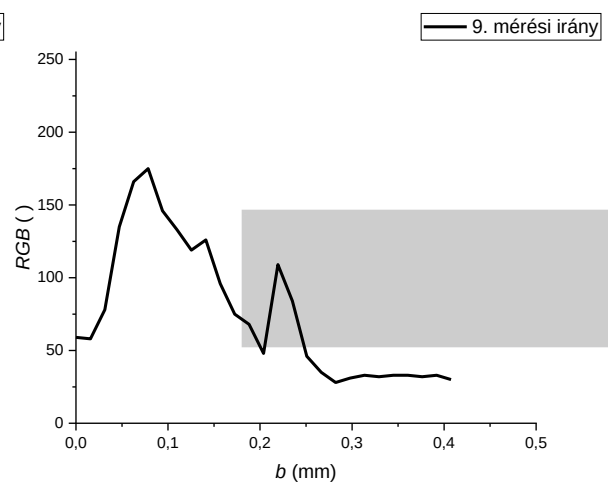
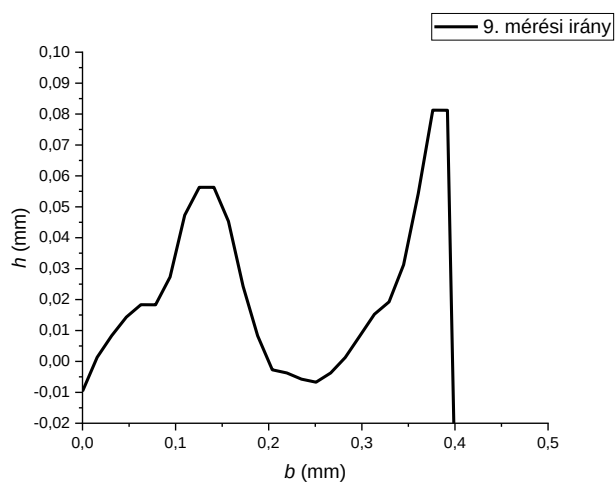
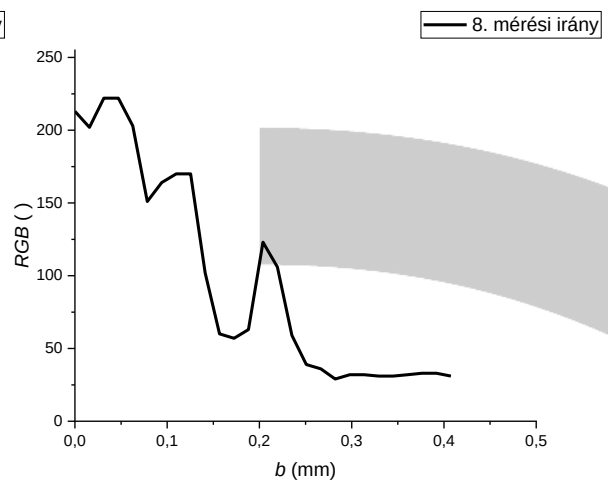
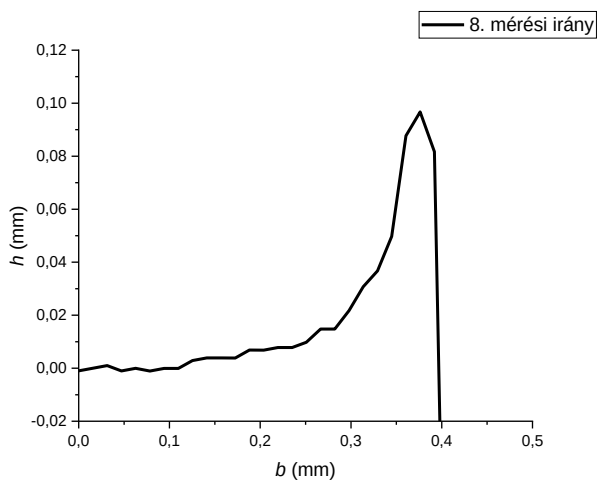
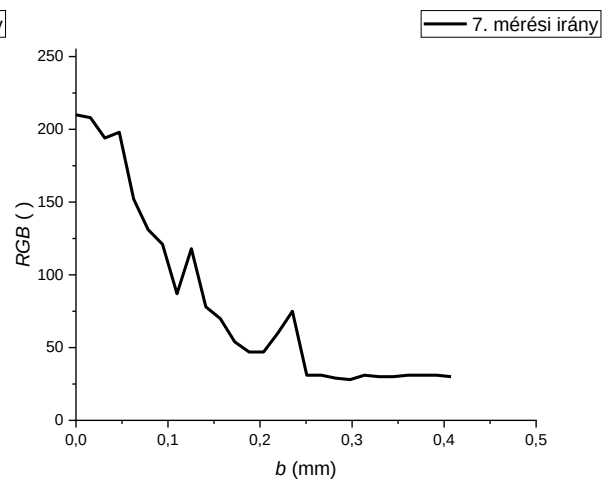
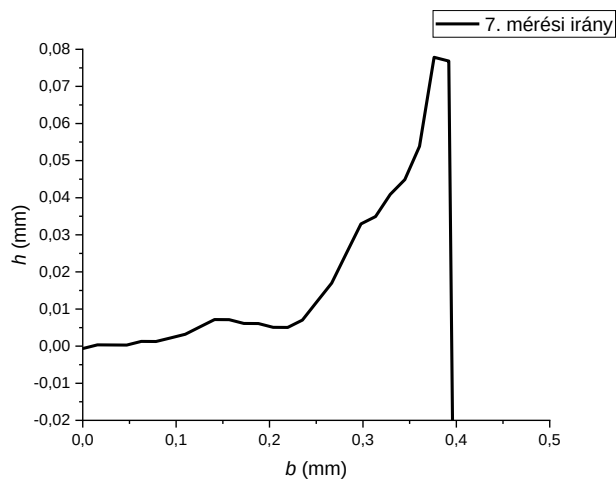




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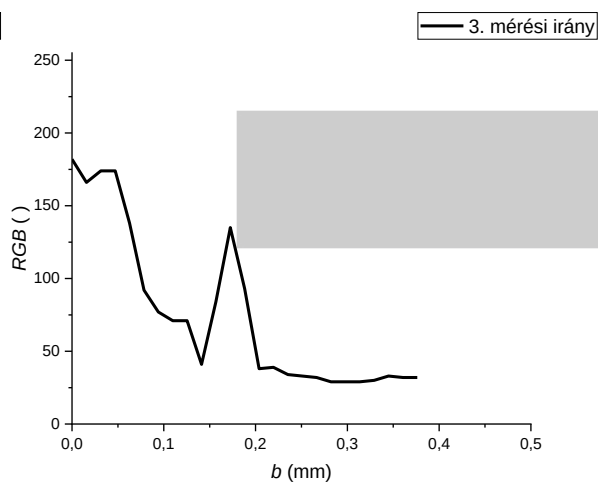
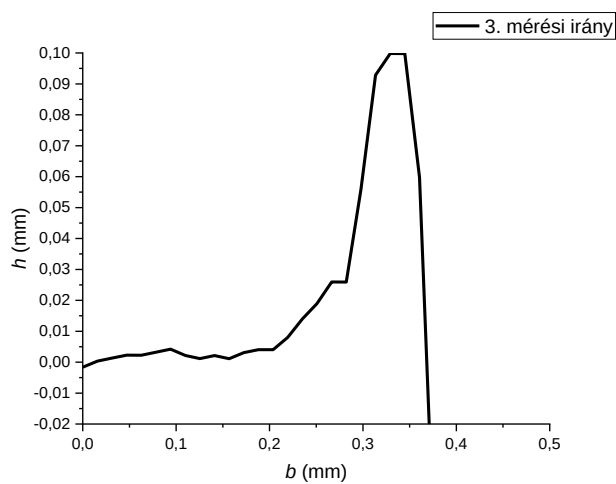
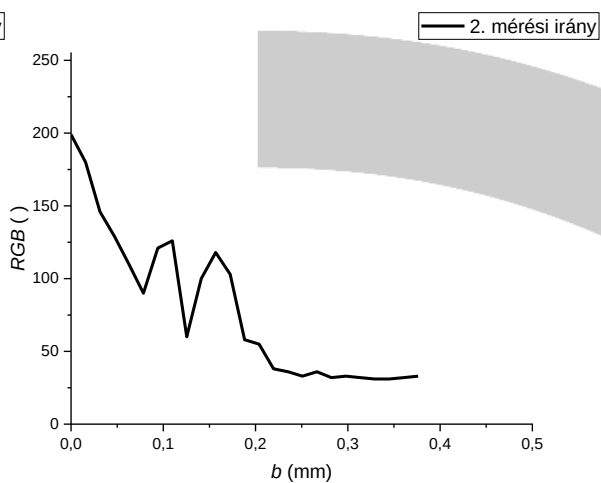
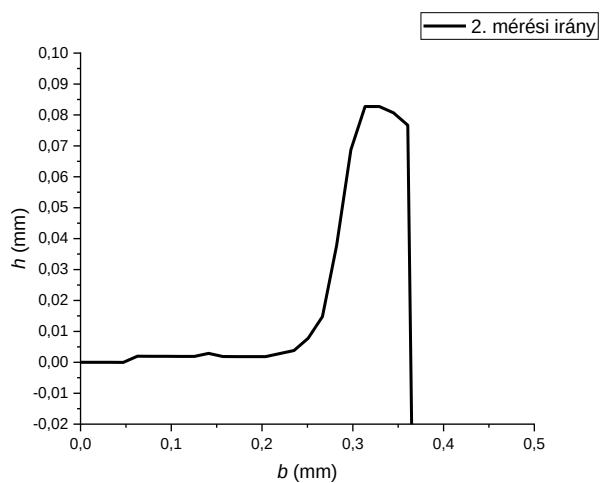
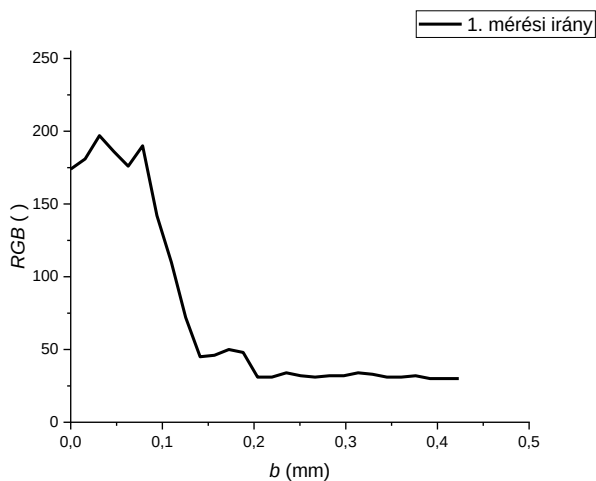
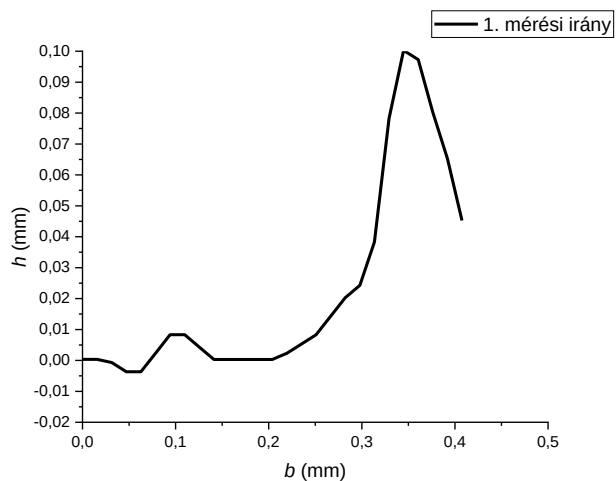


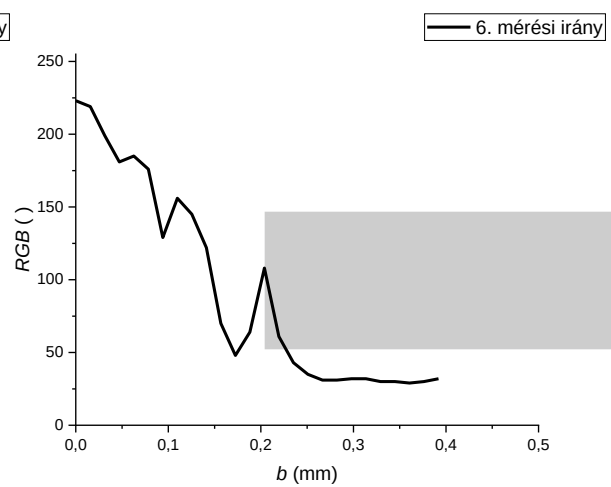
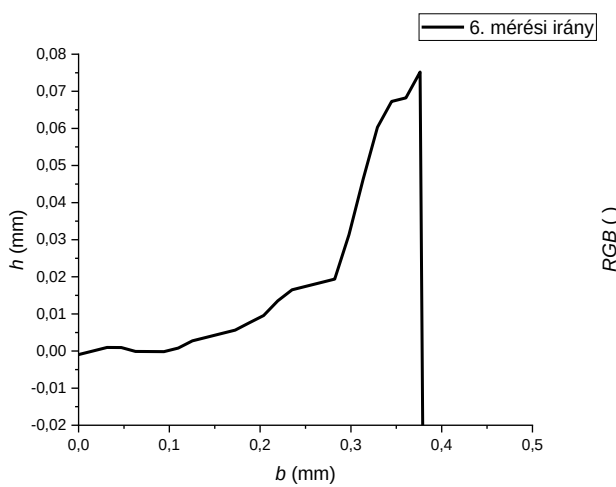
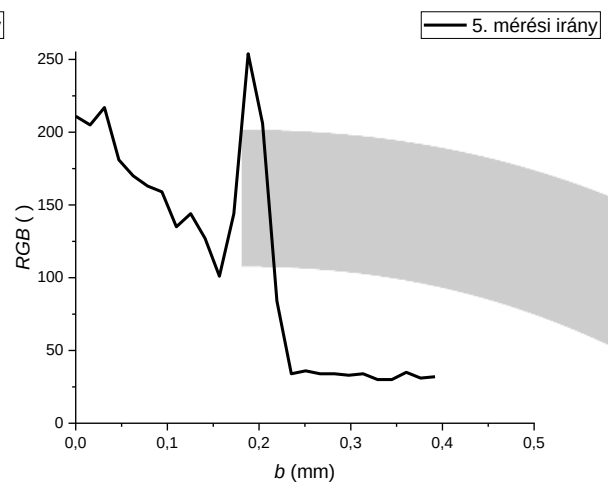
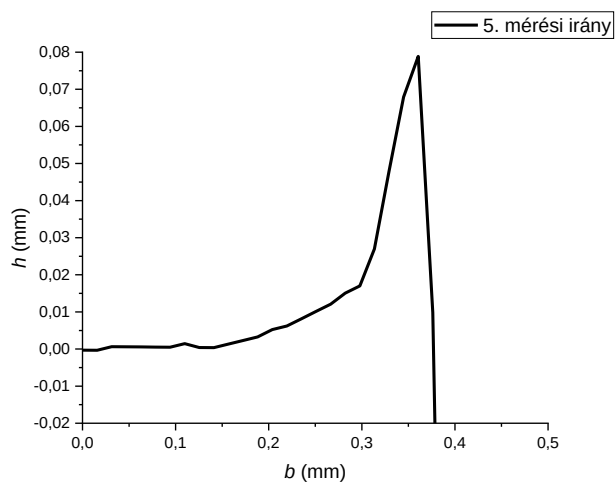
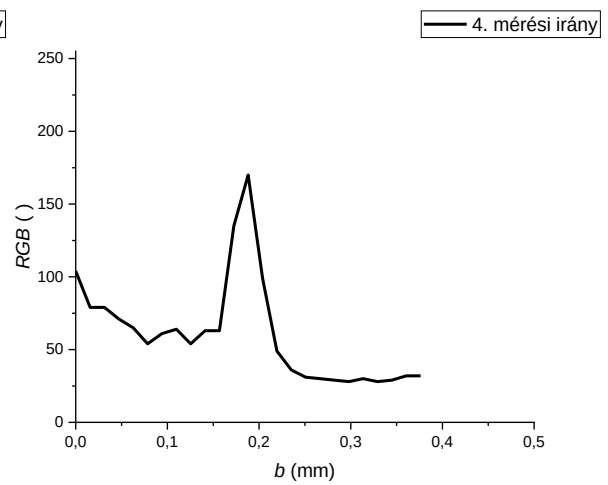
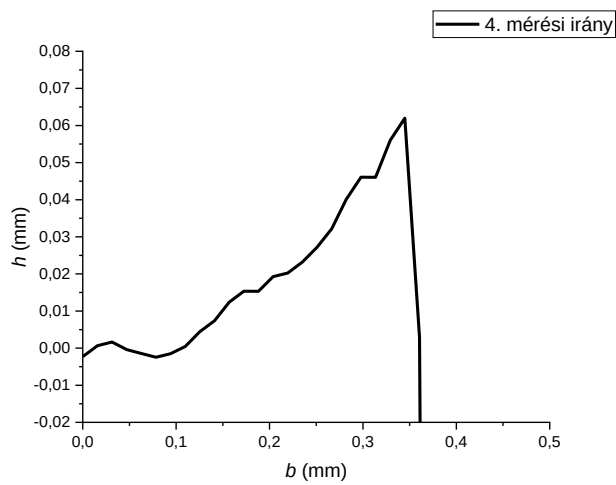


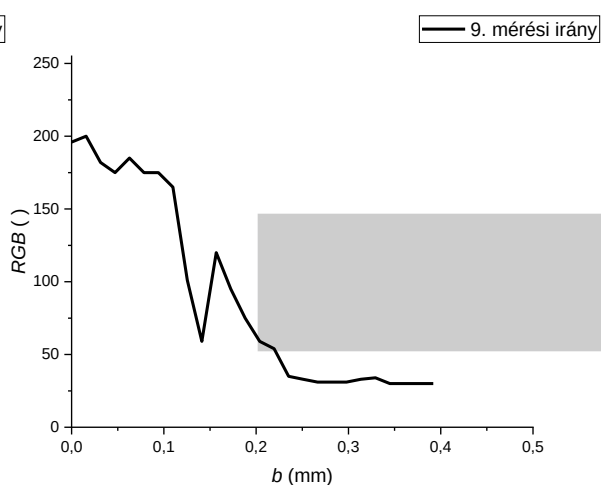
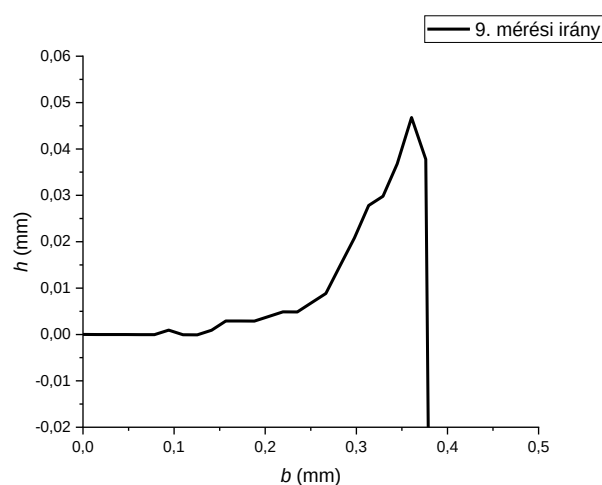
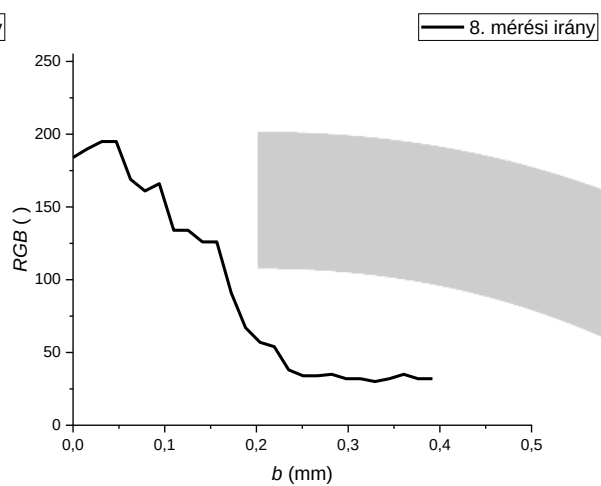
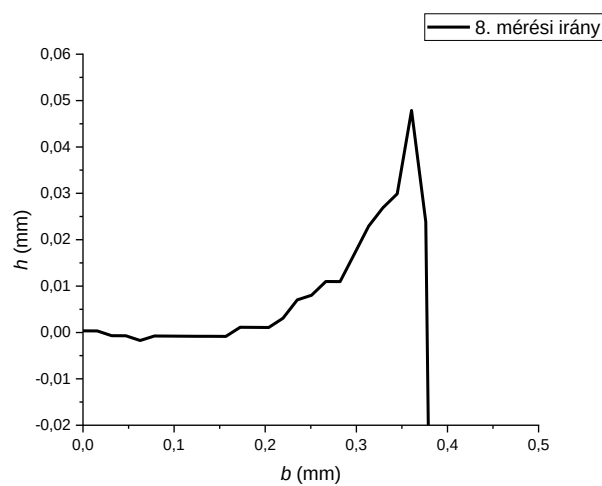
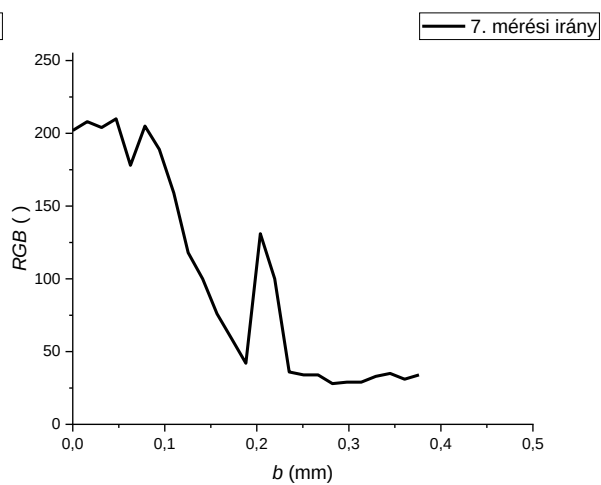
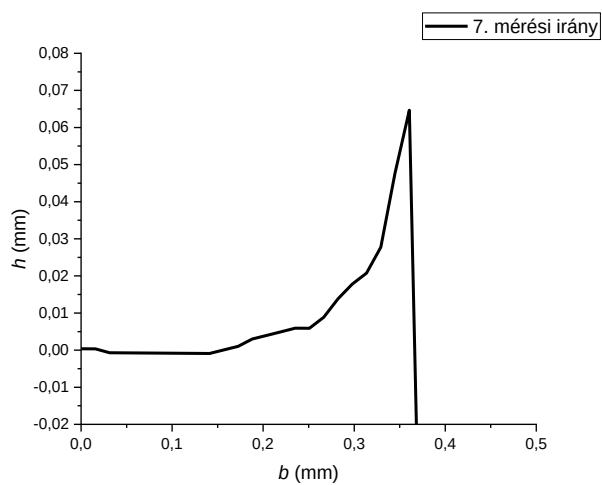




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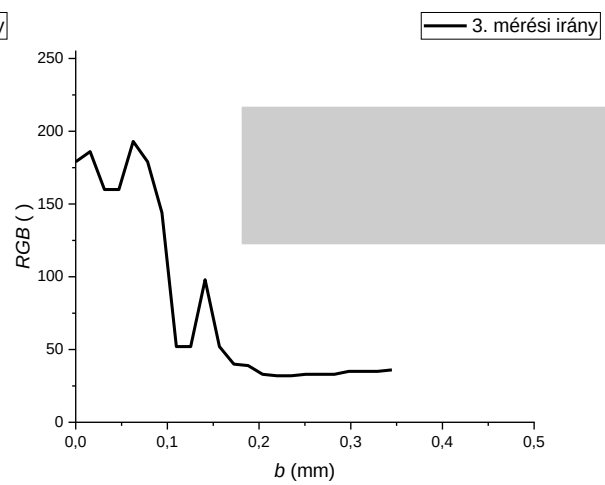
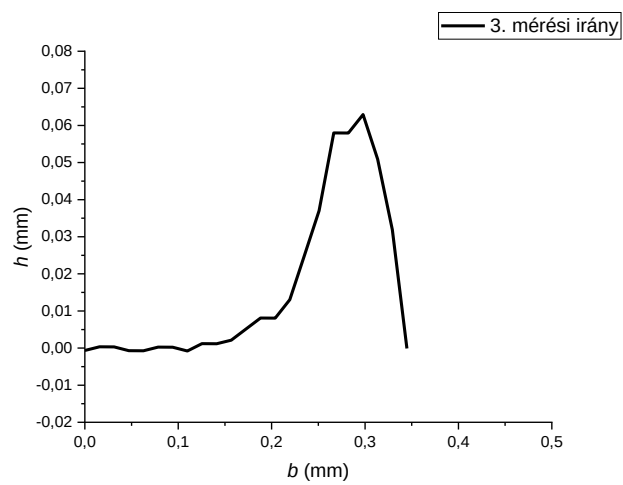
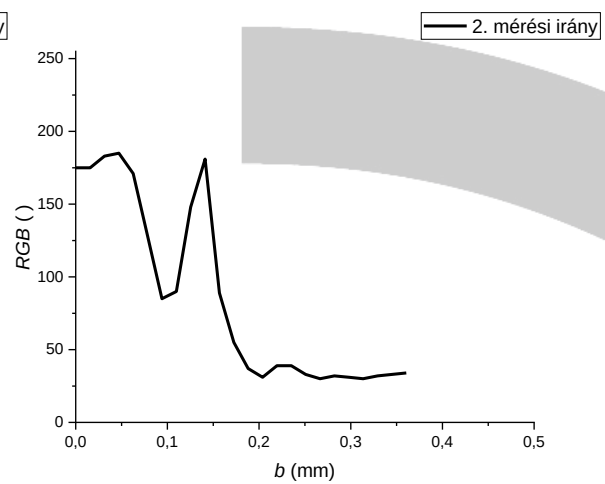
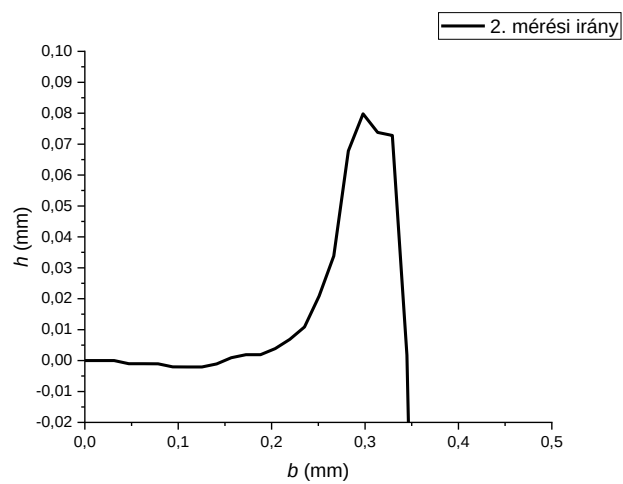
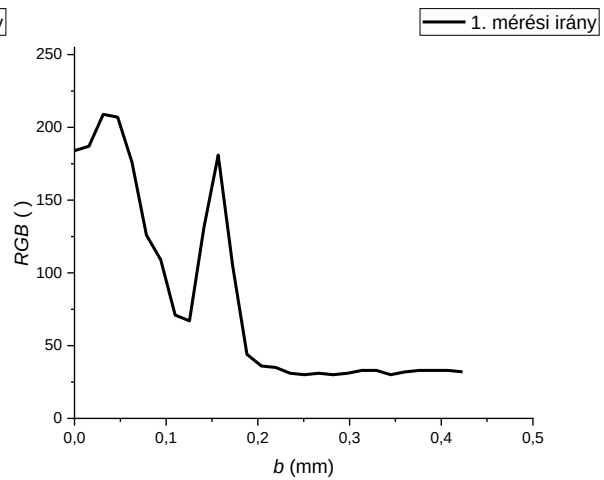
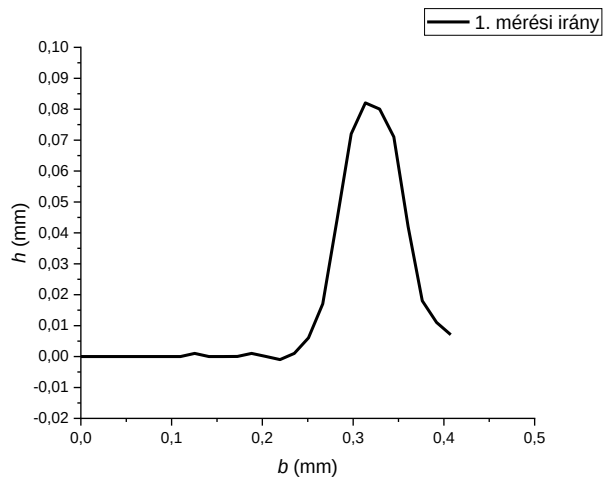


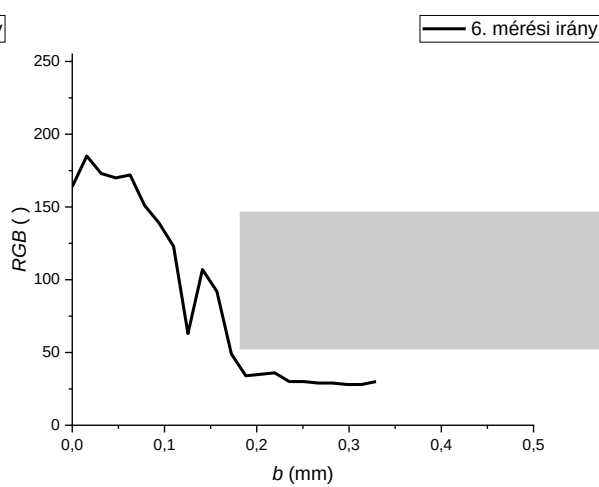
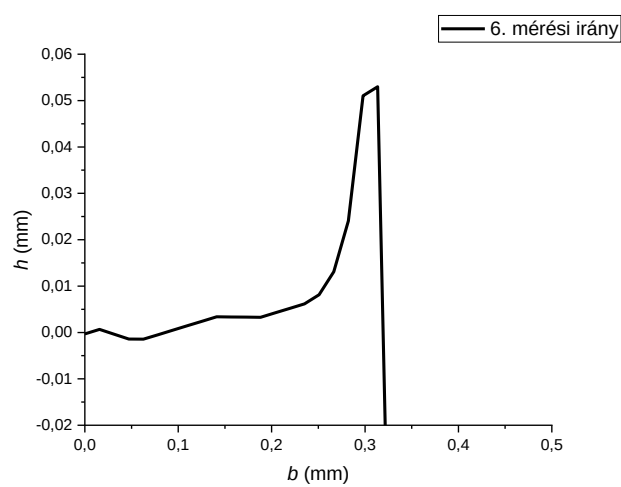
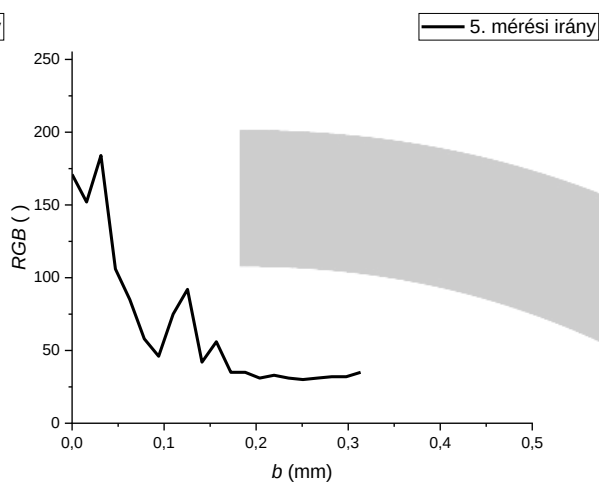
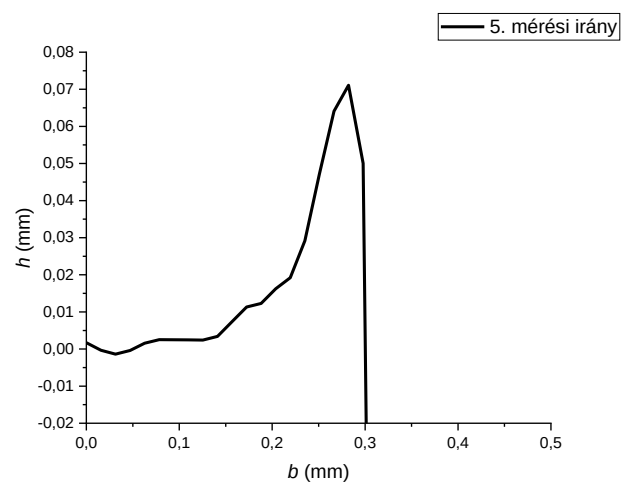
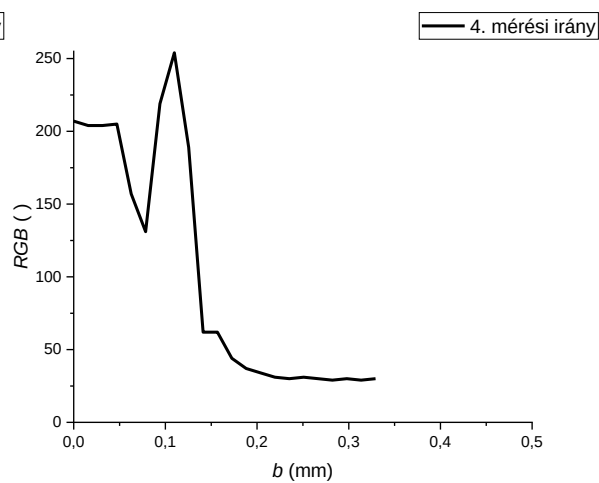
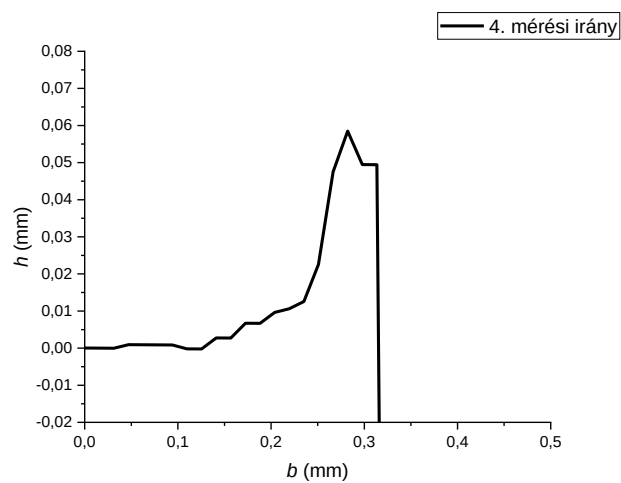


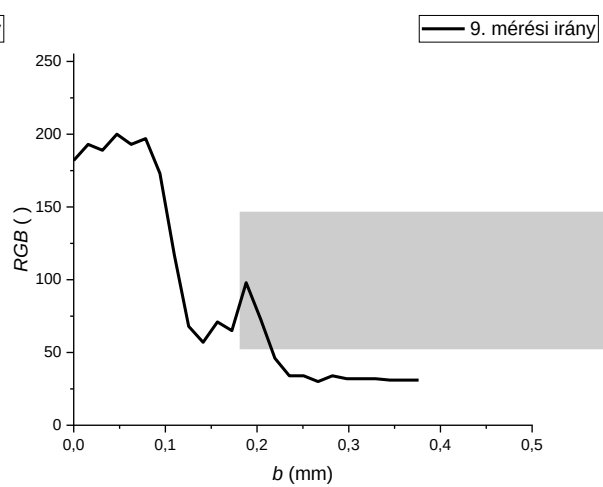
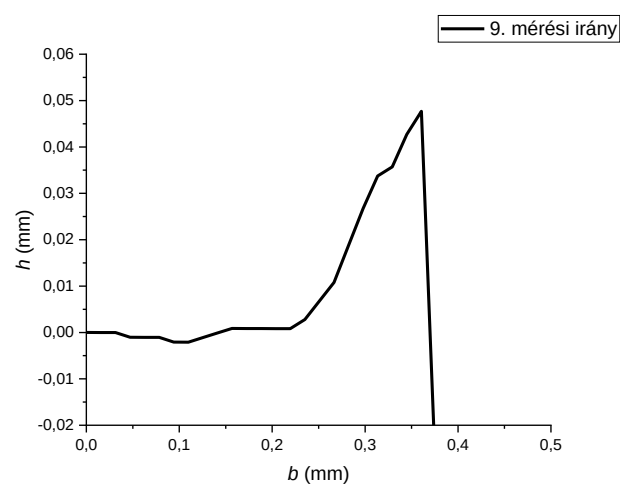
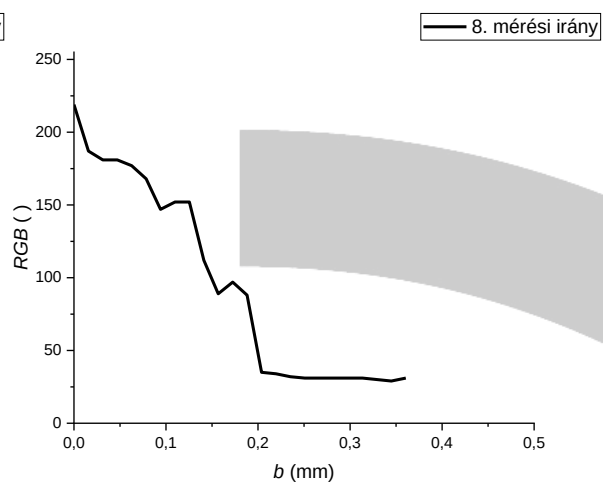
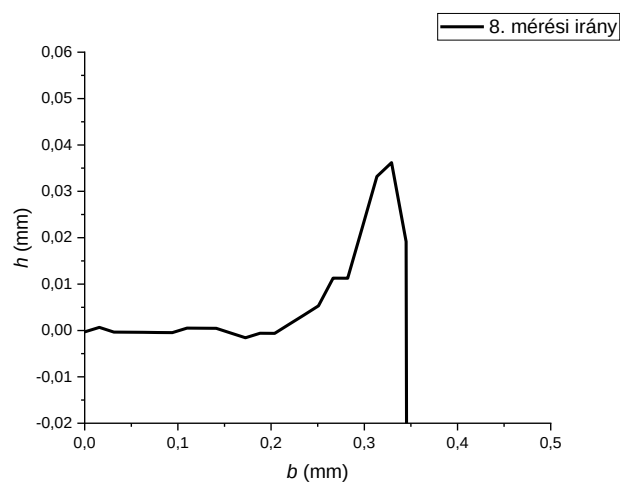
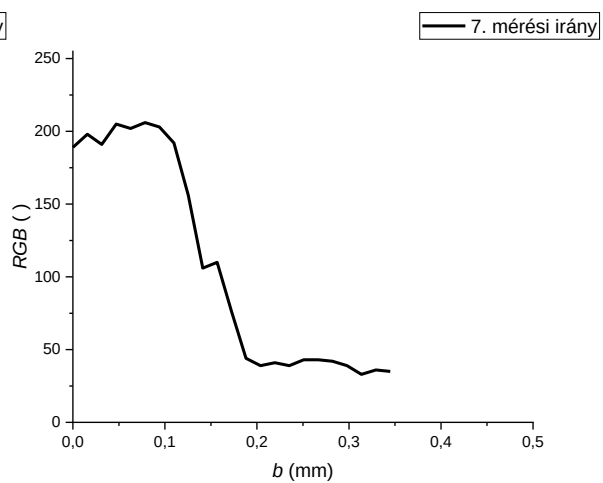
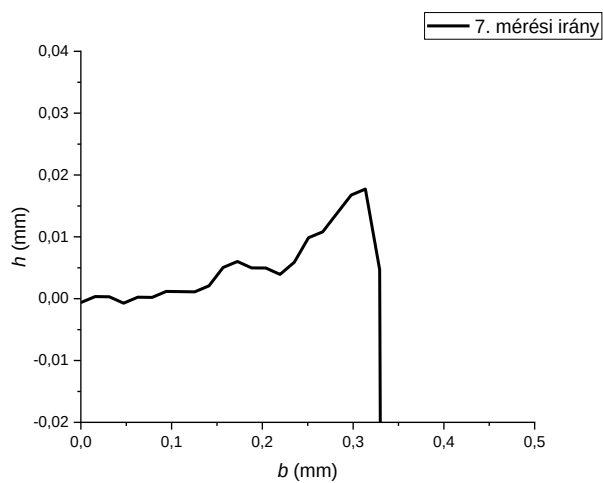




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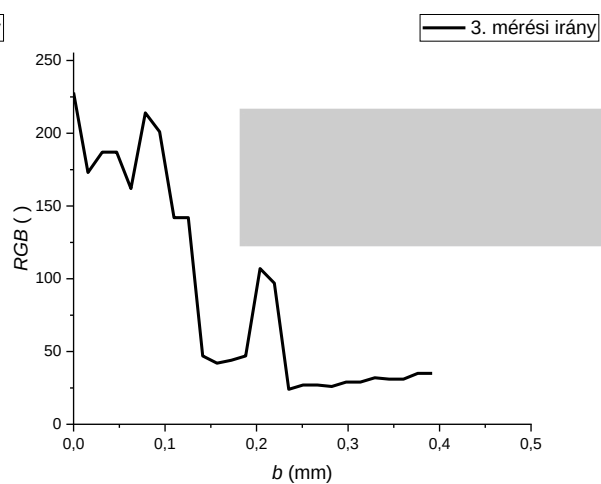
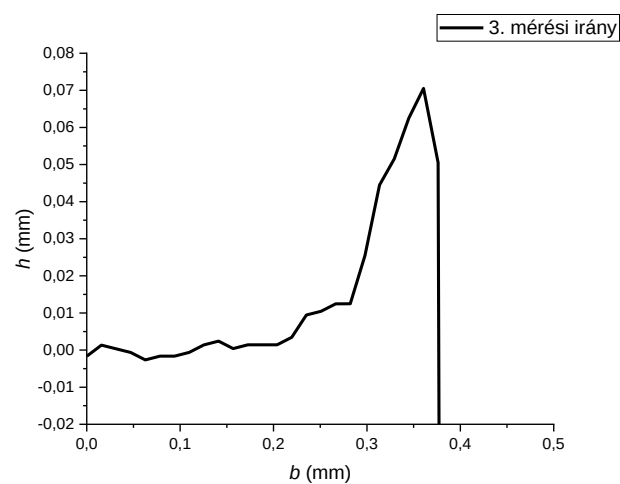
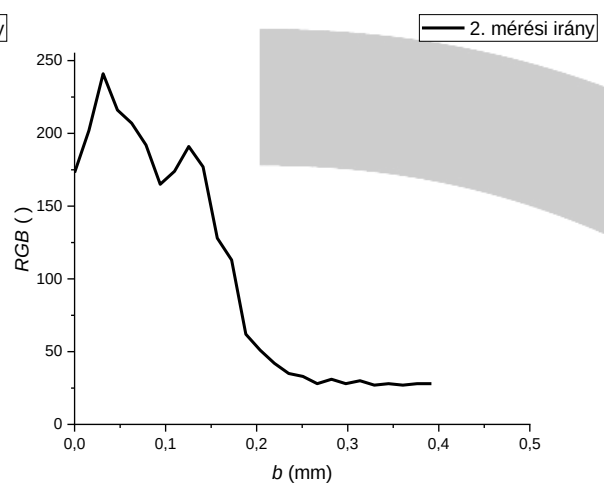
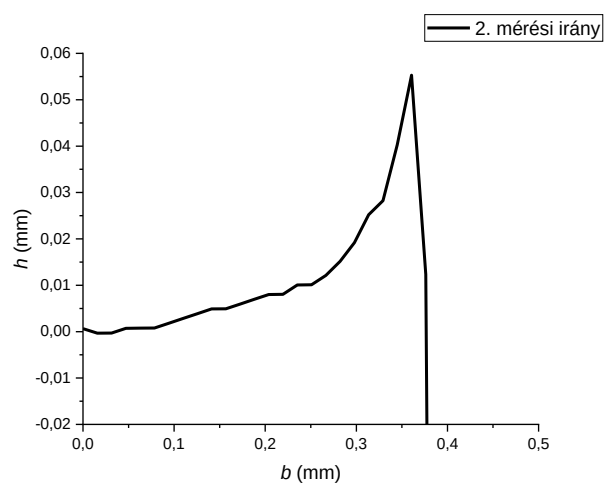
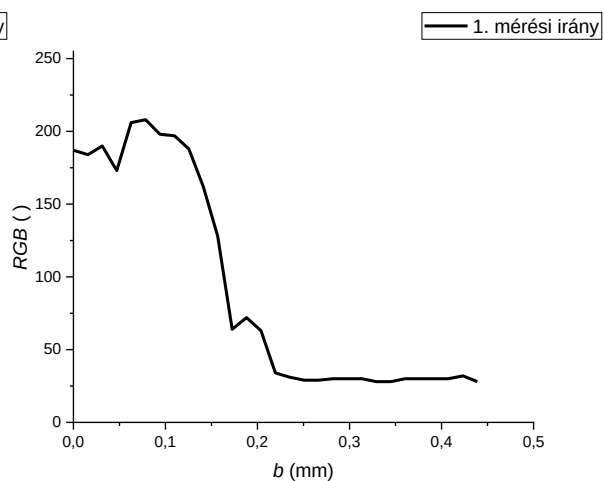
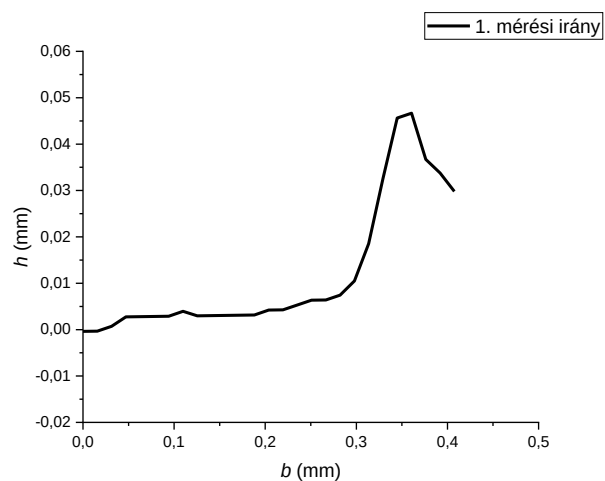


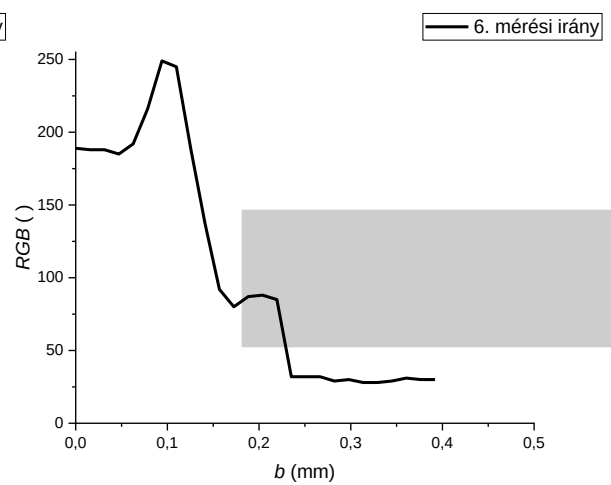
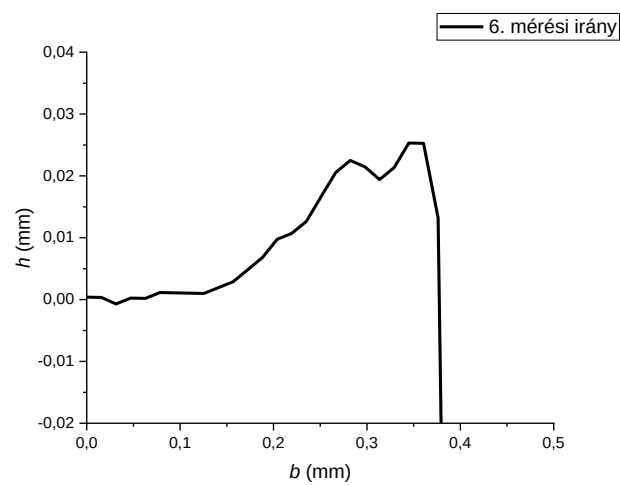
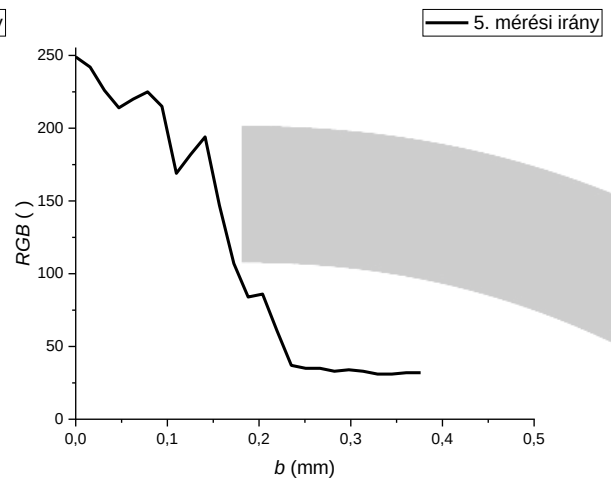
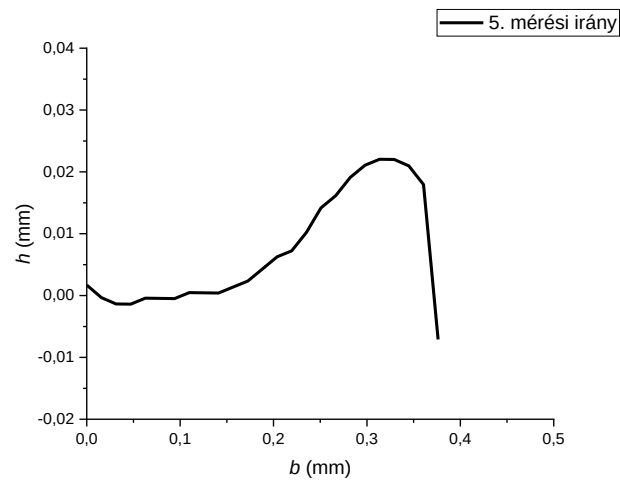
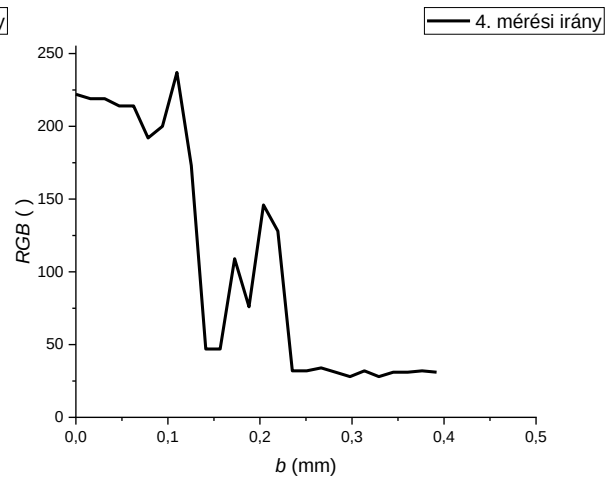
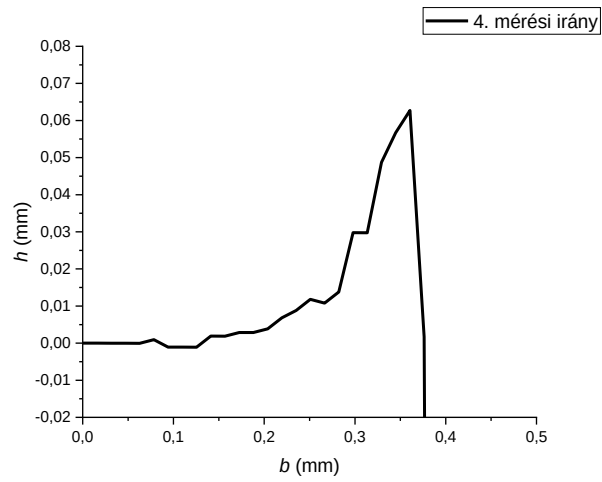


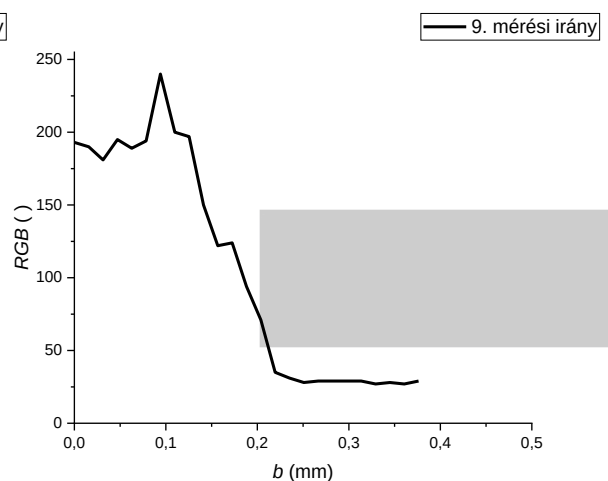
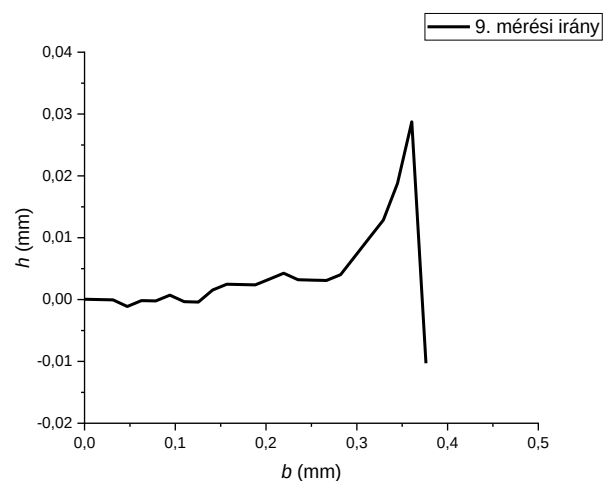
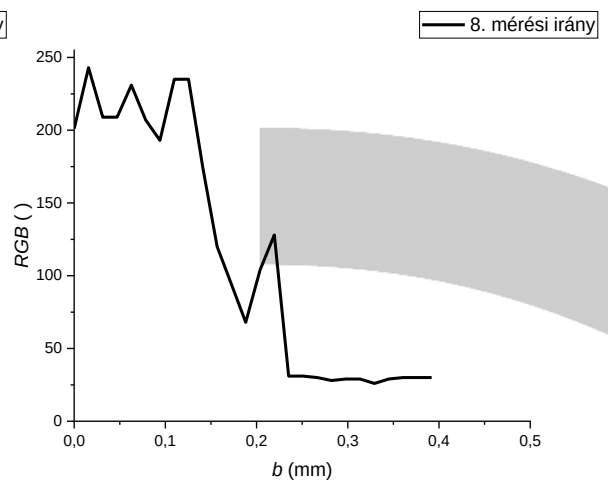
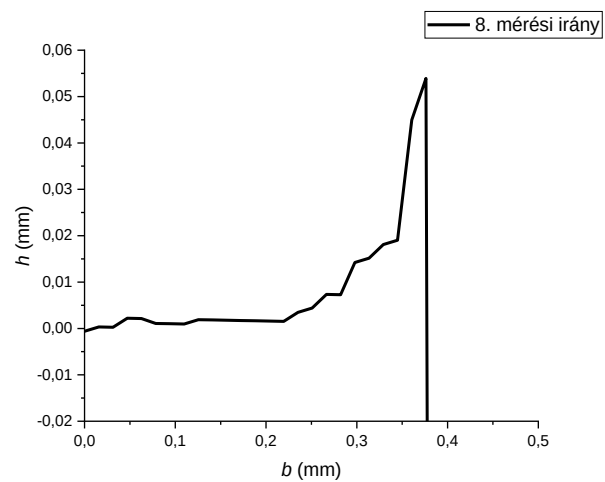
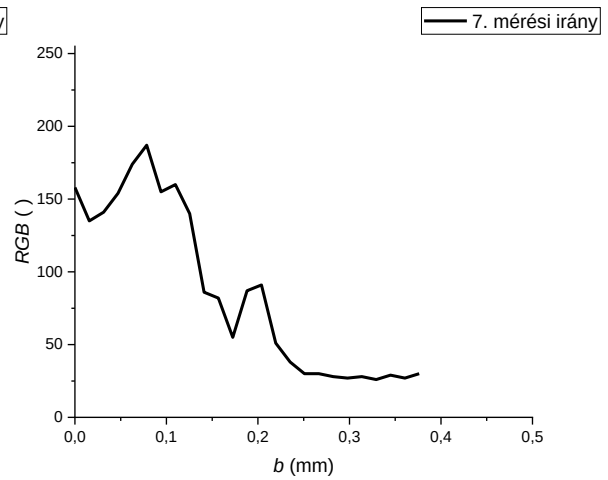
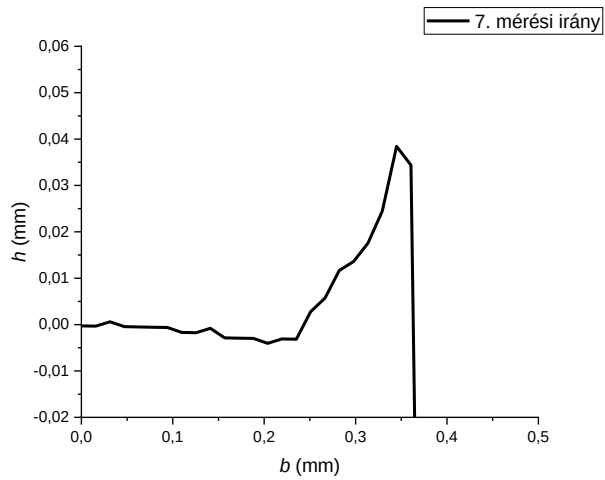




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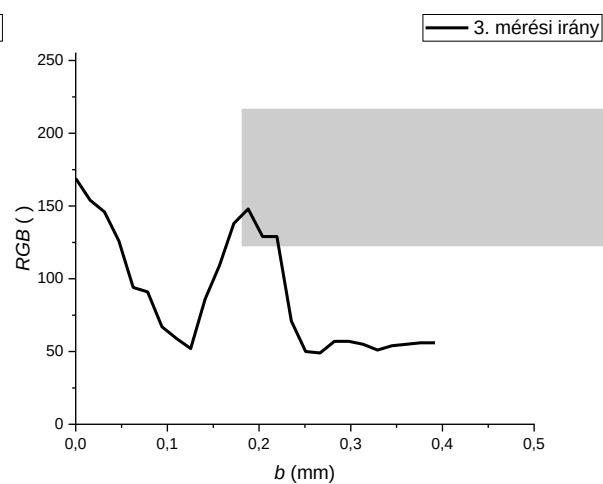
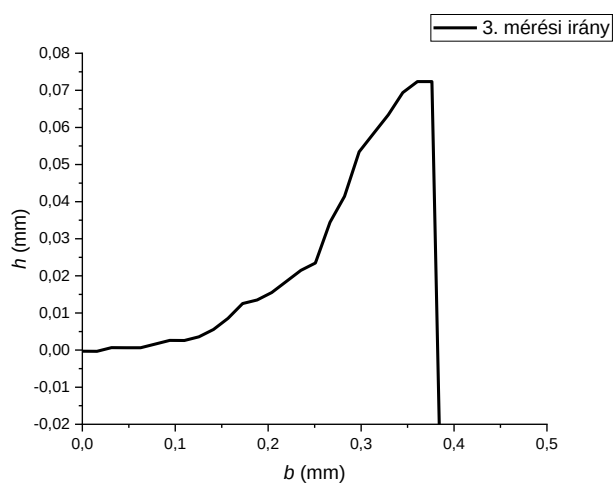
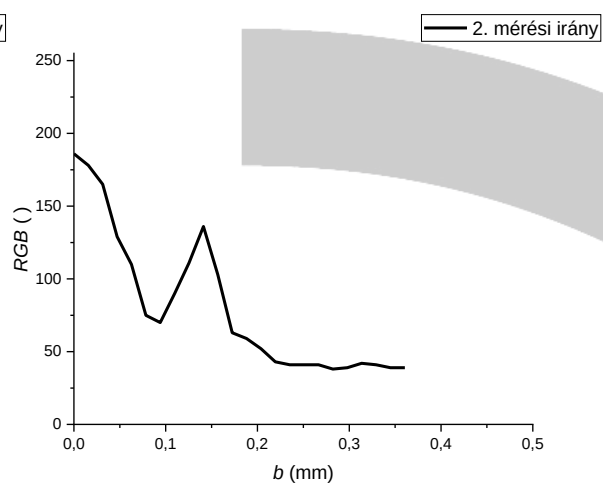
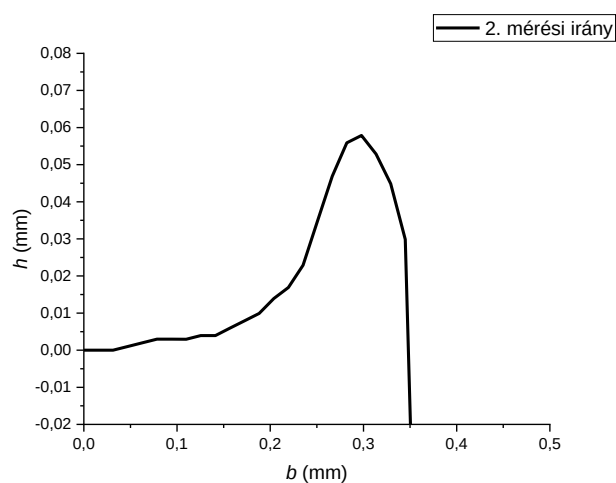
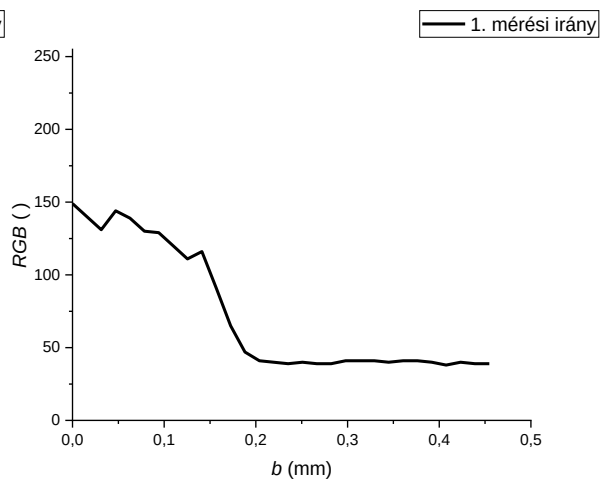
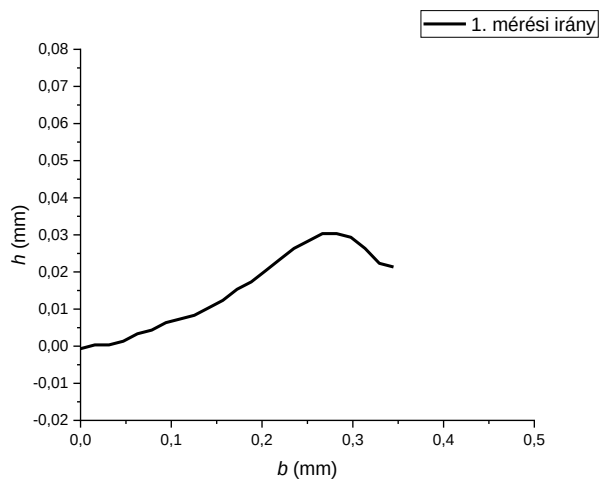


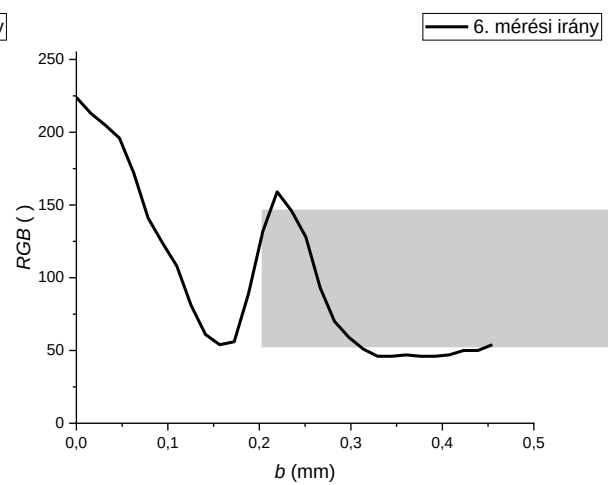
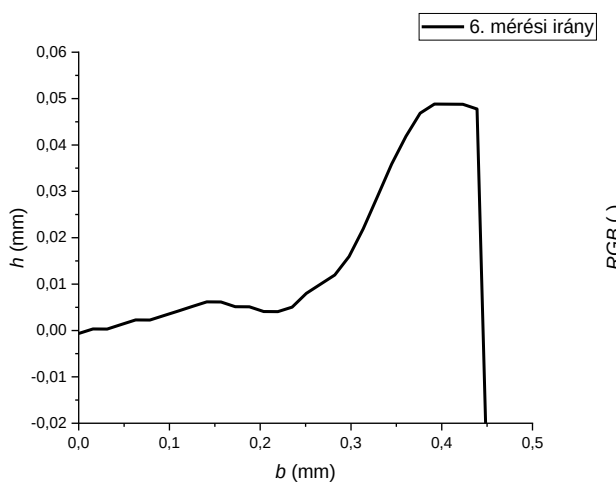
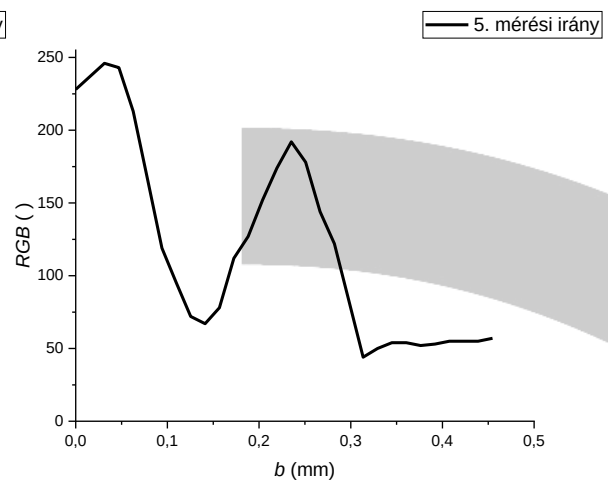
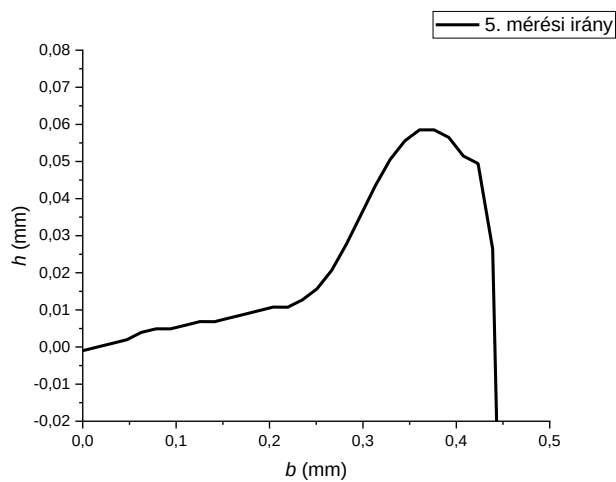
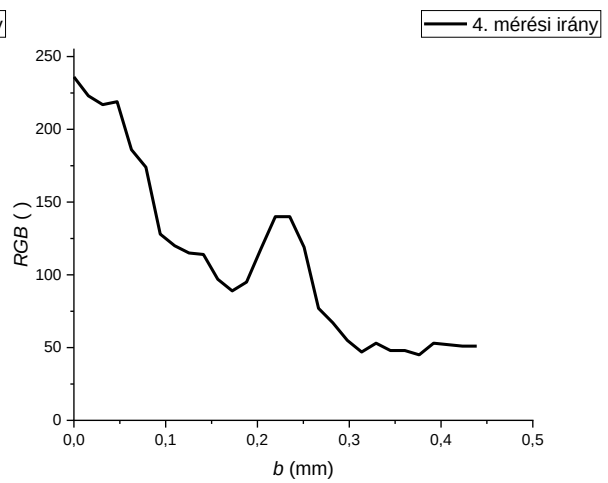
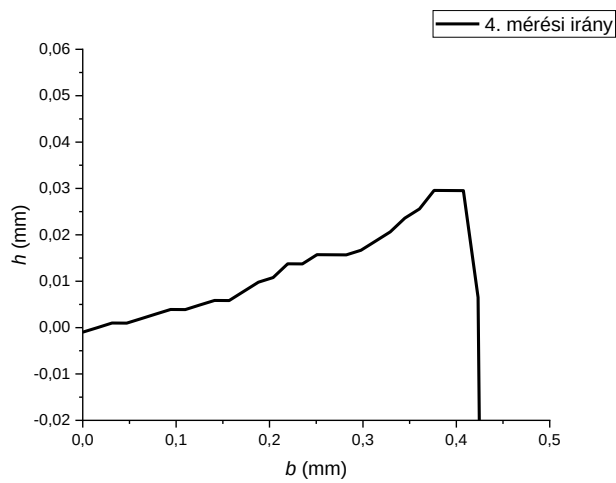


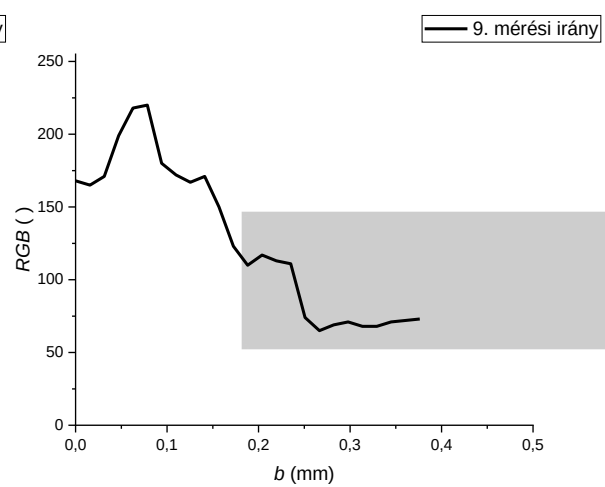
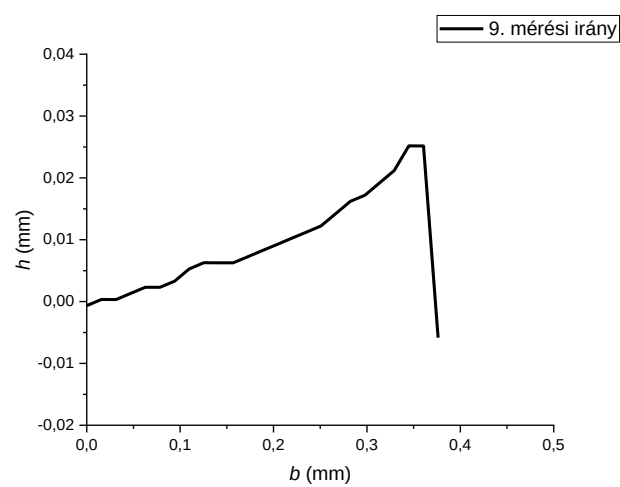
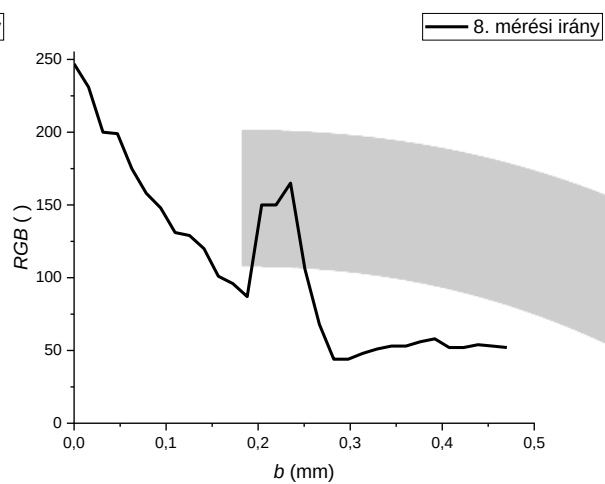
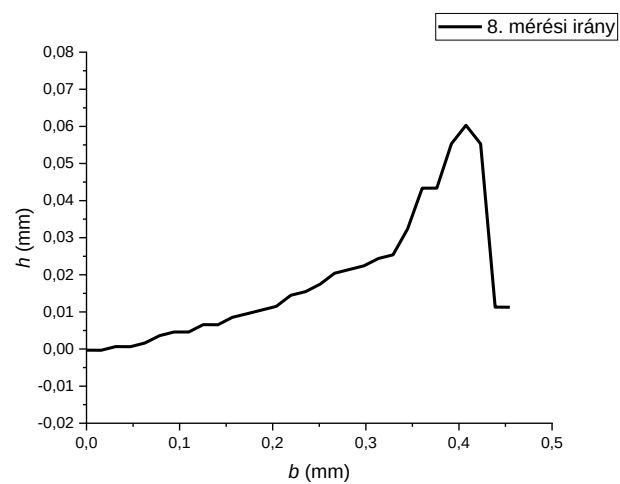
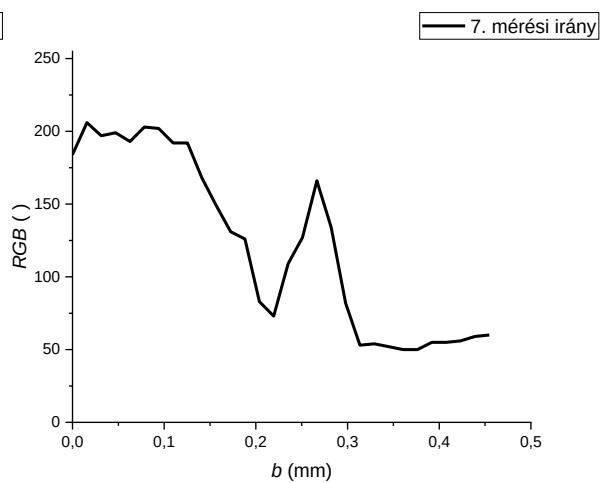
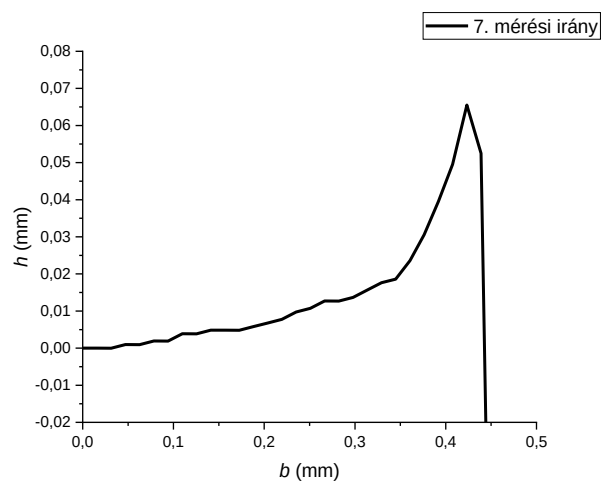




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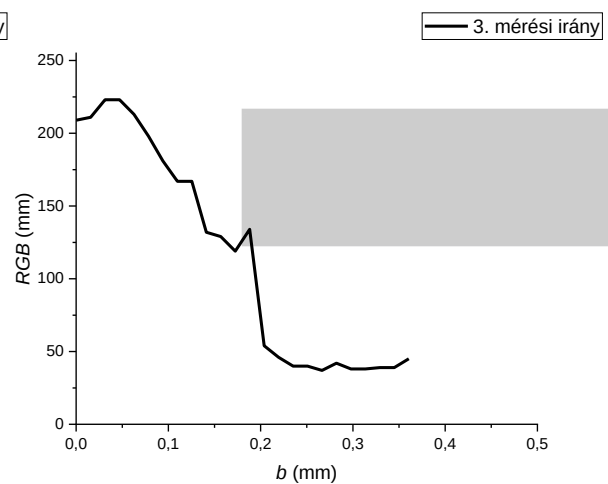
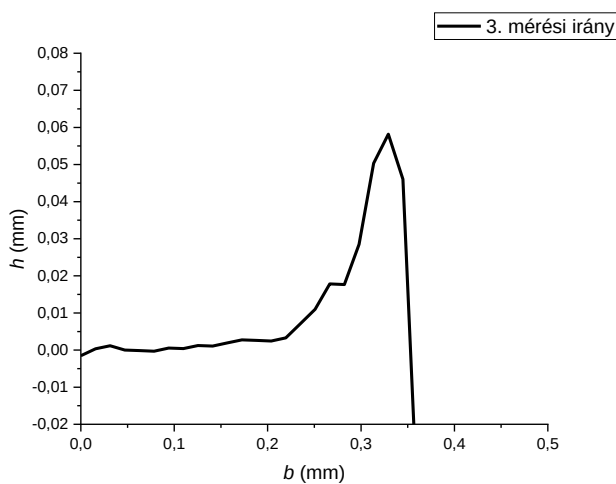
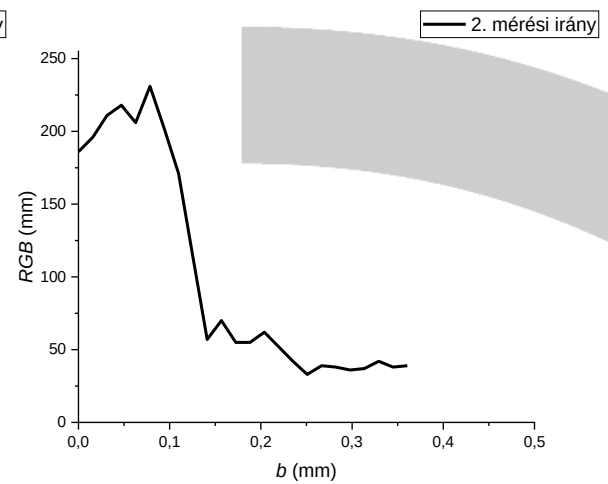
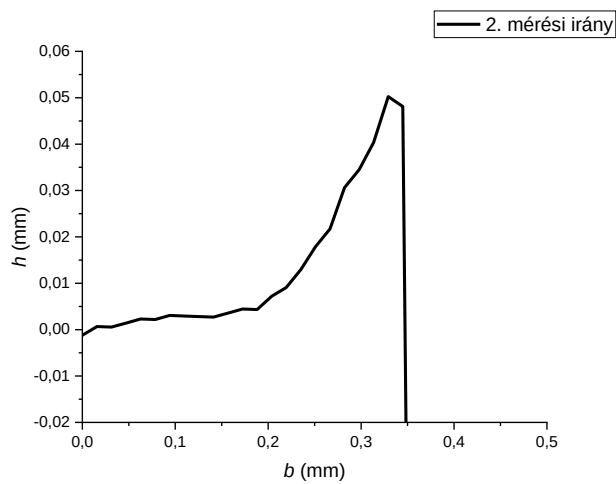
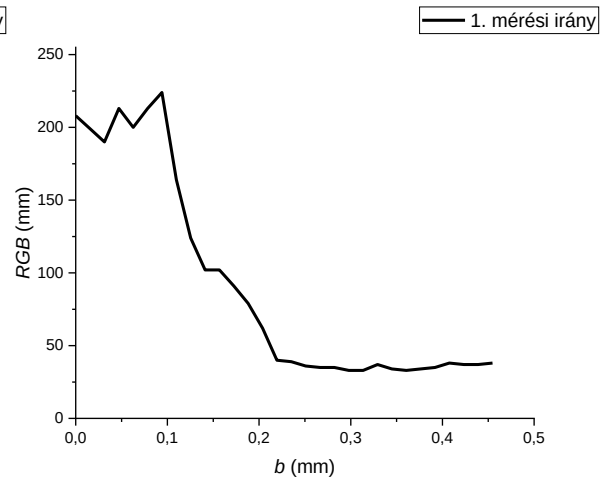
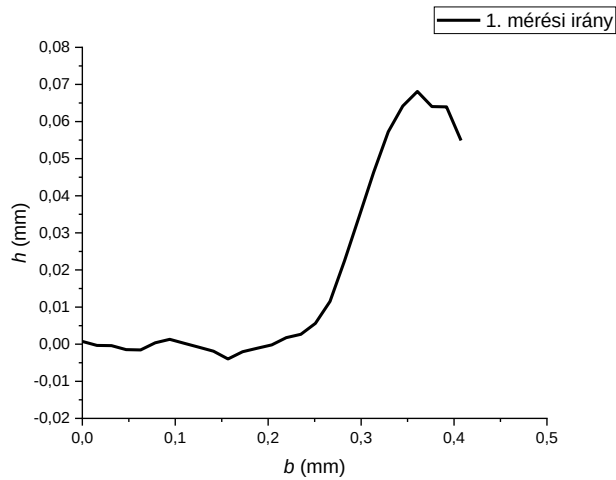


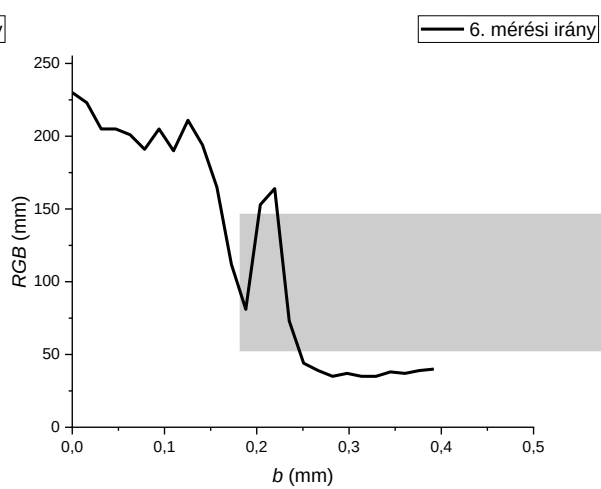
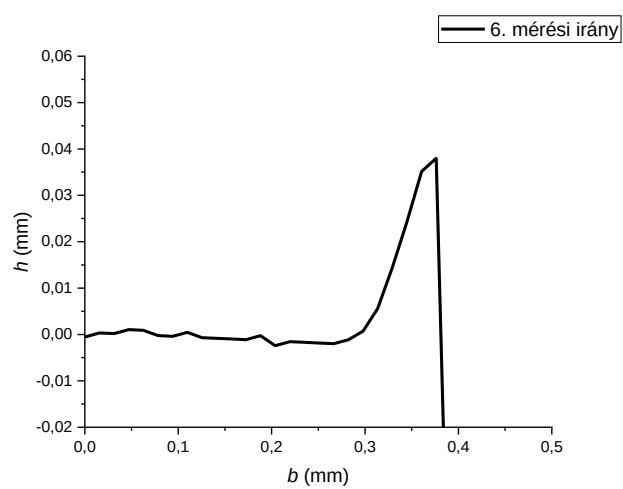
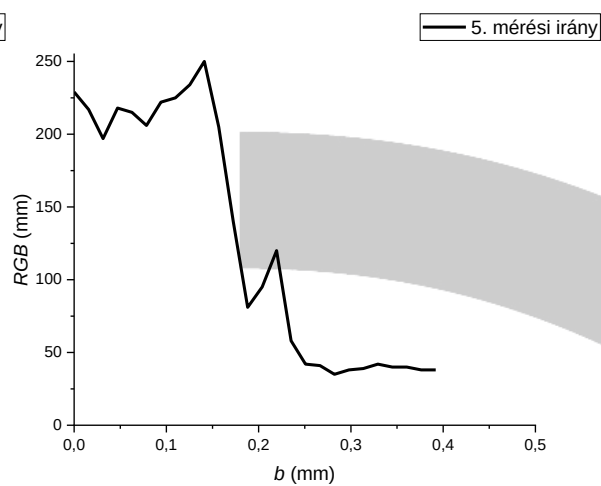
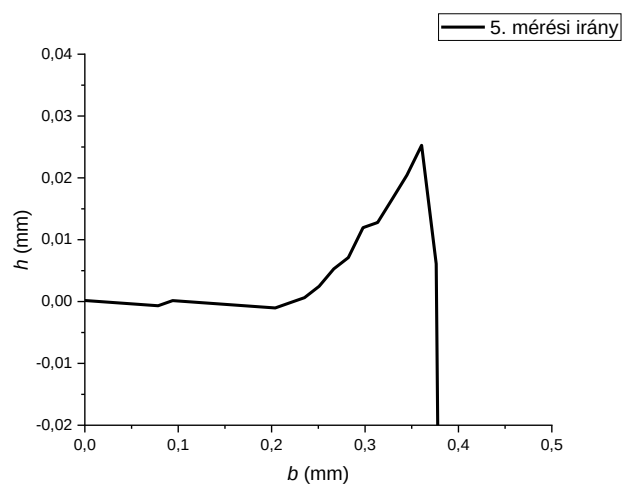
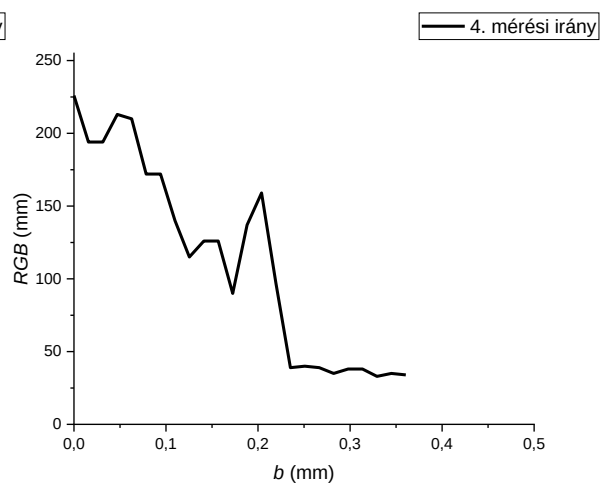
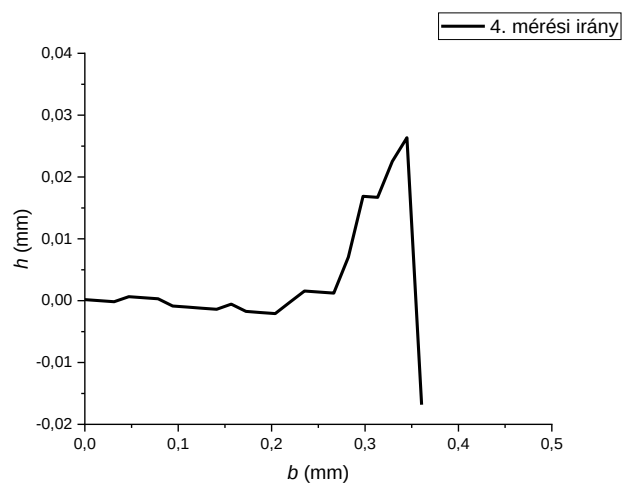


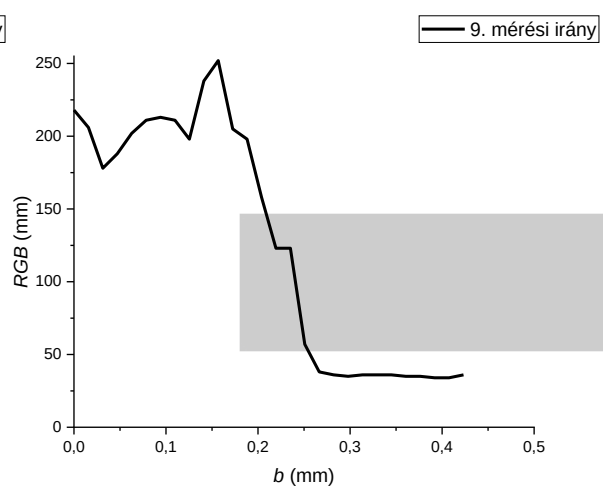
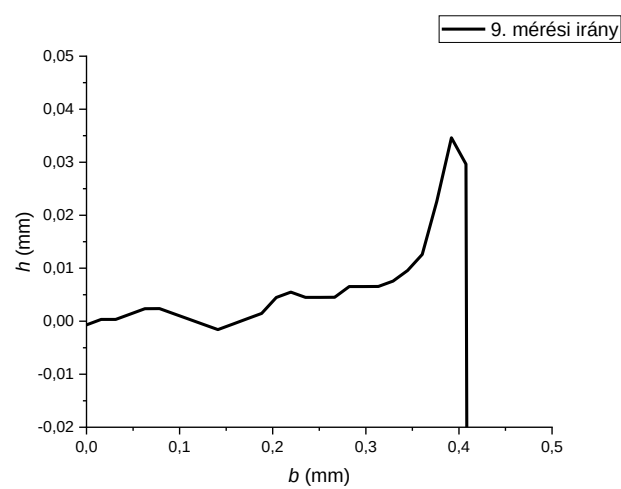
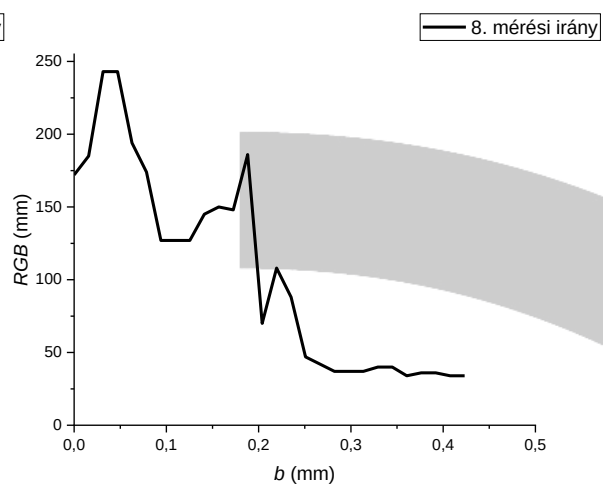
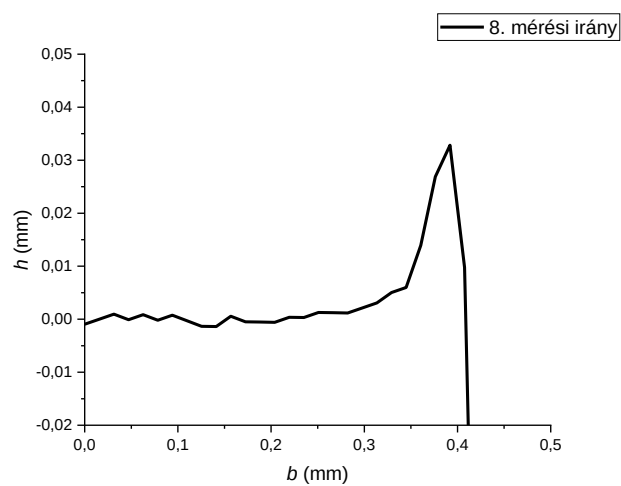
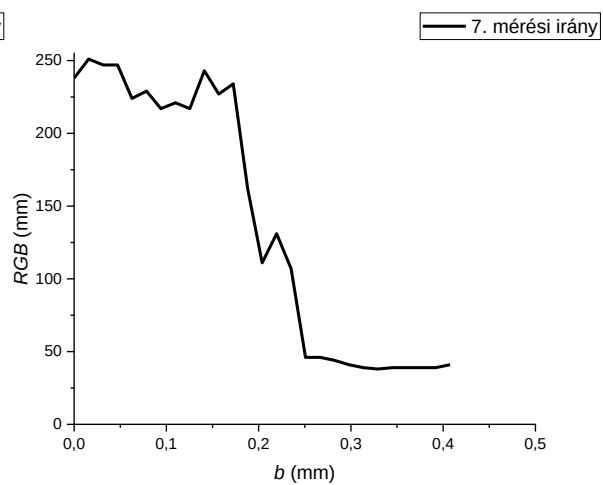
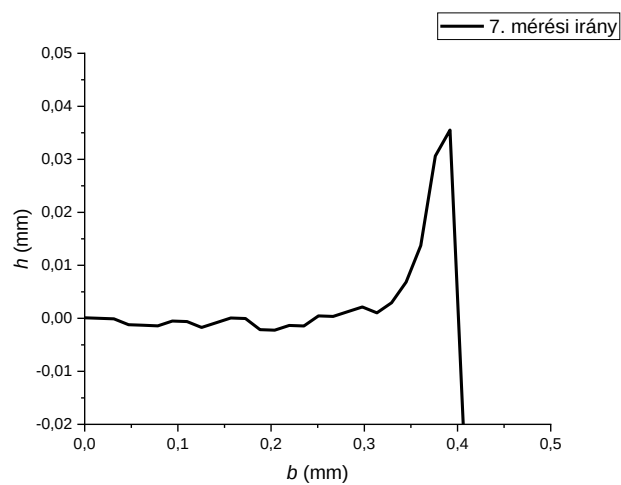




- 12. furat

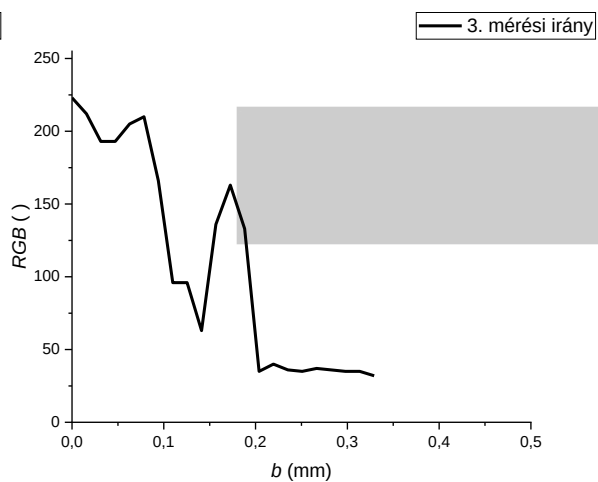
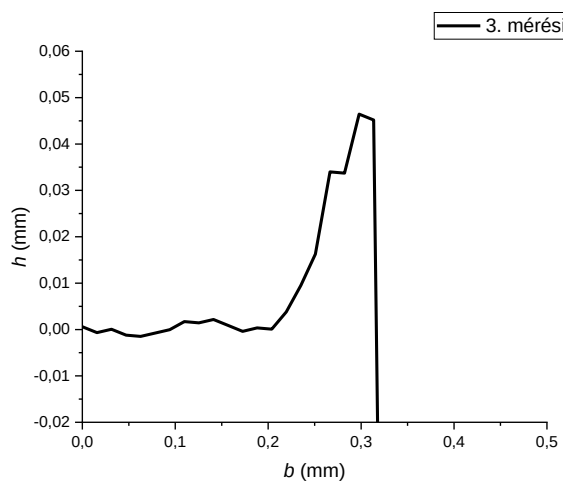
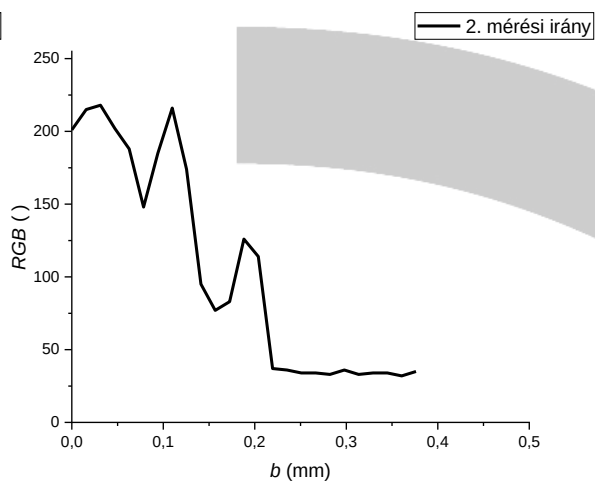
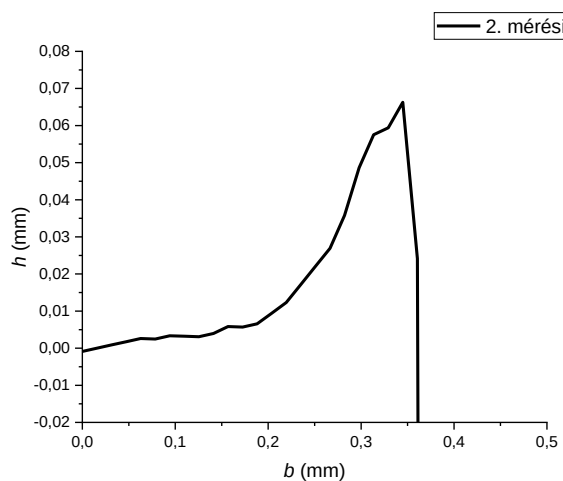
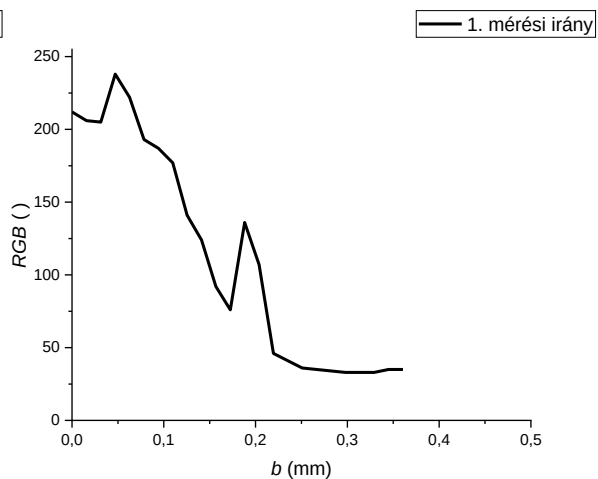
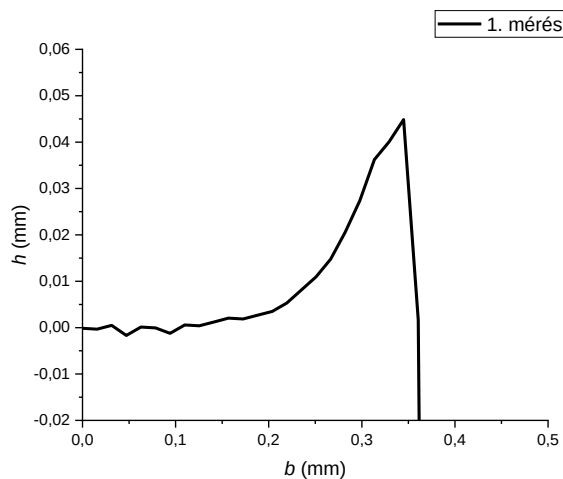


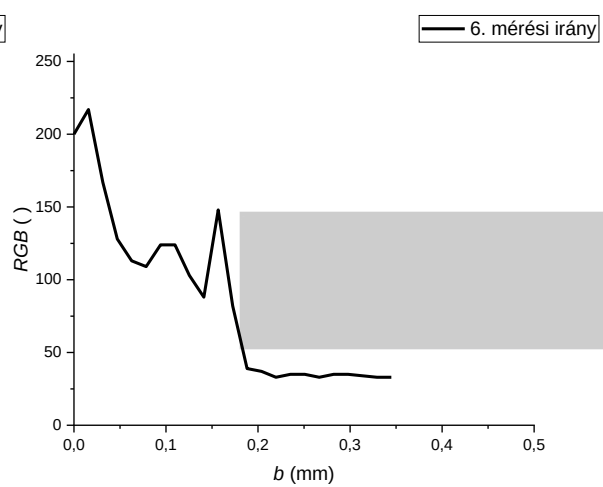
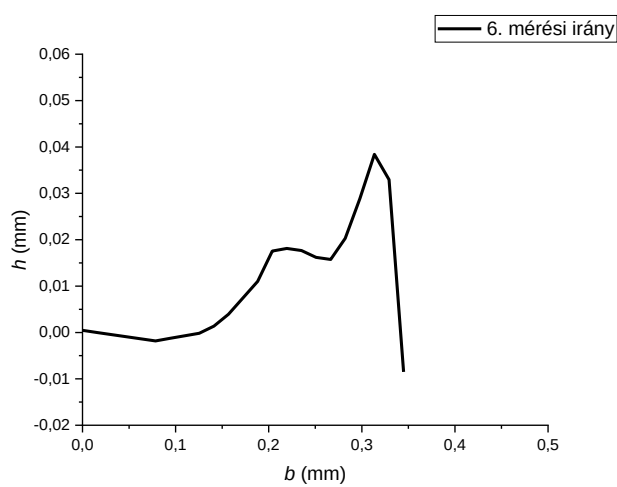
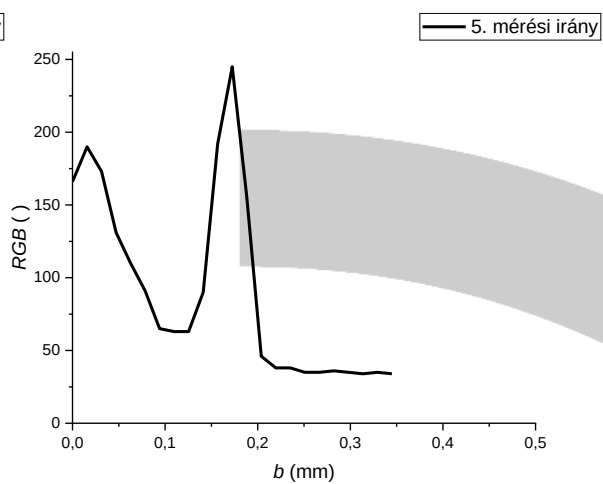
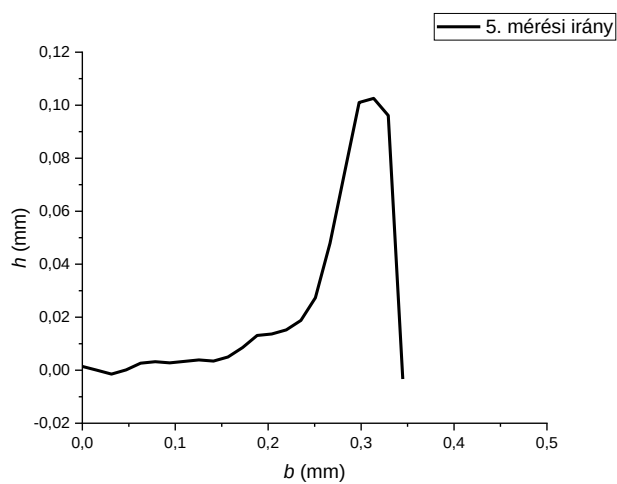
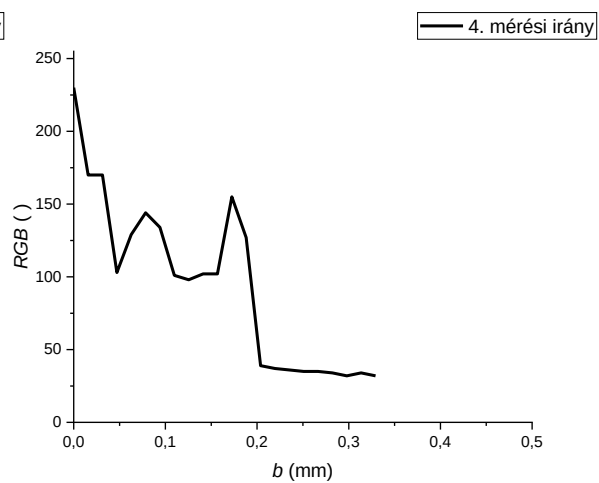
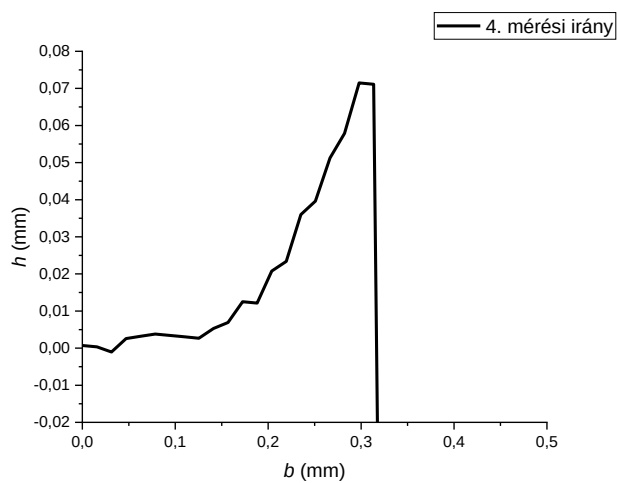


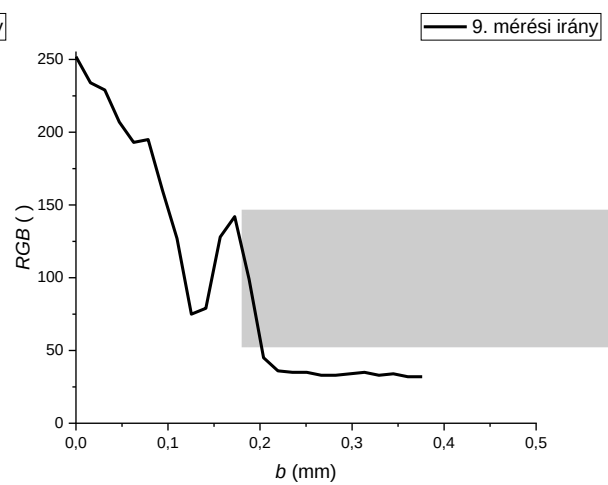
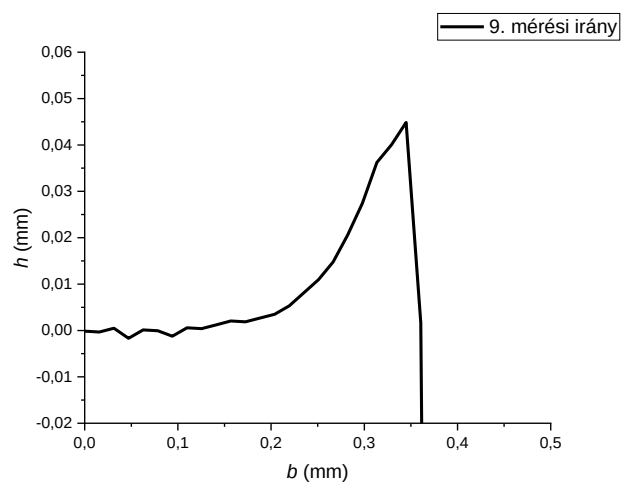
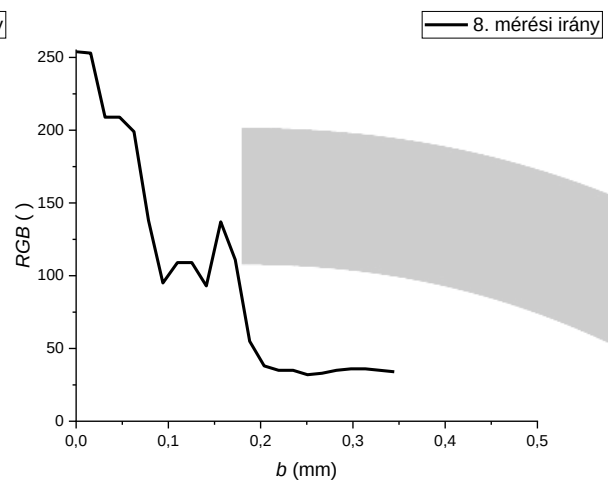
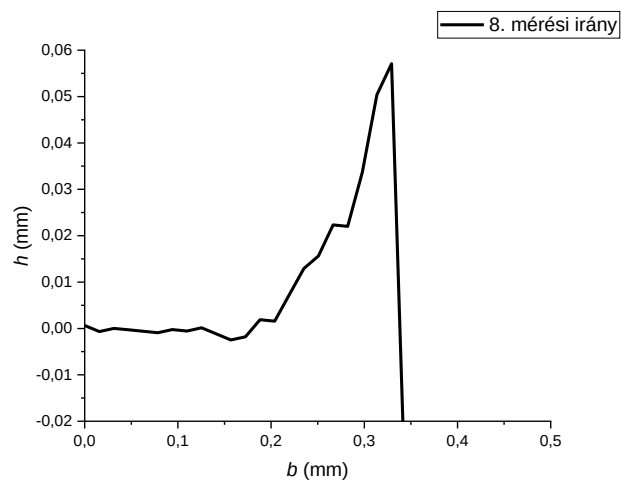
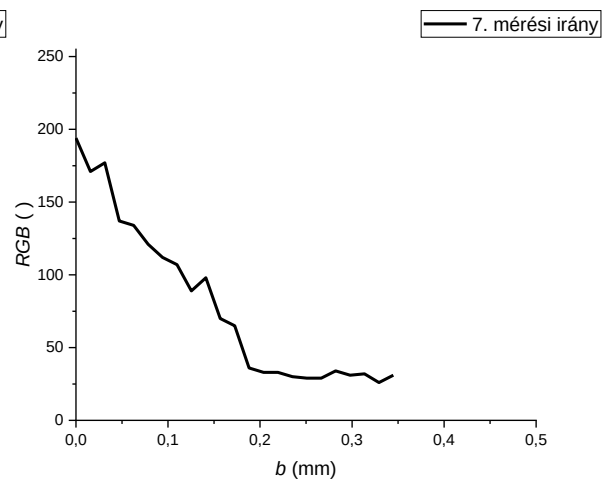
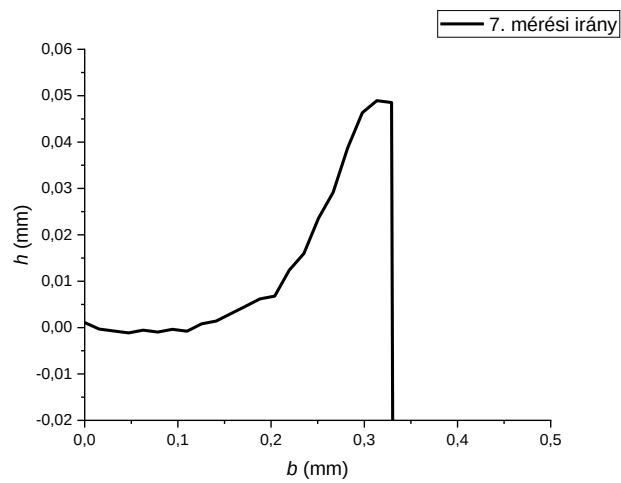




• 13. furat





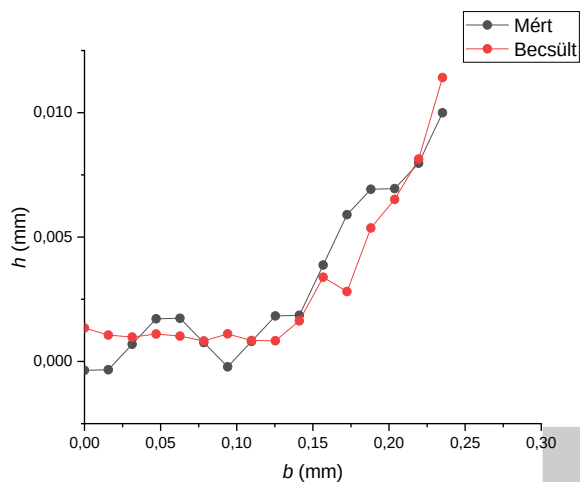




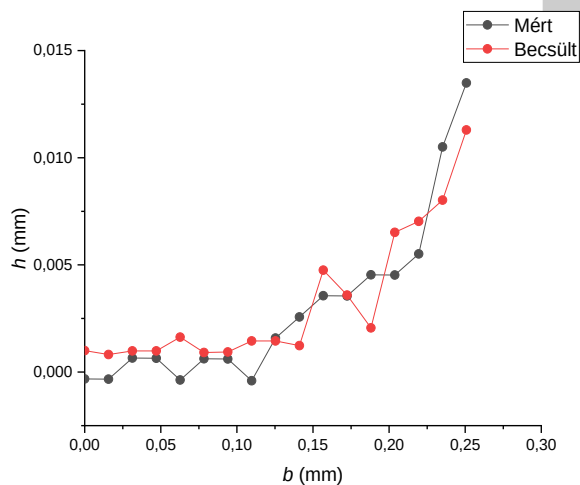
4. sz. melléklet: Mért és 2D-s mikroszkópi kép alapján becsült értékek összehasonlítása

Ebben a mellékletben a mért és a becsült adatok láthatók azon szakaszon, ahol alkalmazható a 2D-s alapú sorjabecslő módszer.

- 1. furat

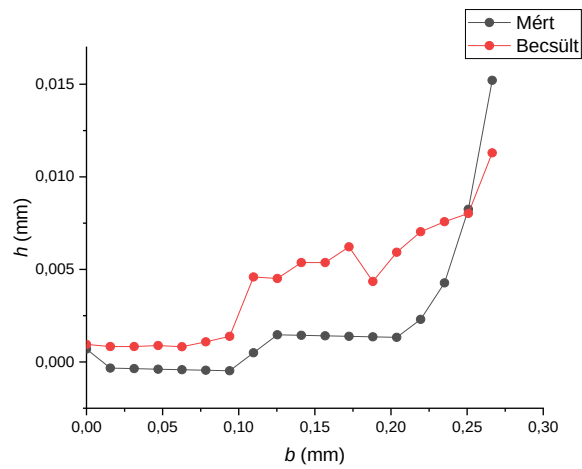


- 3. furat

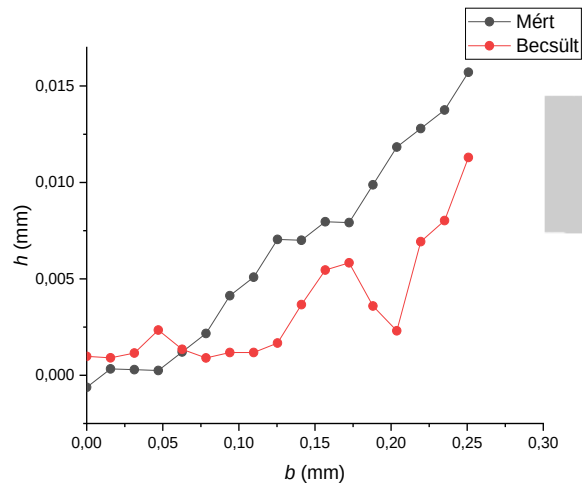




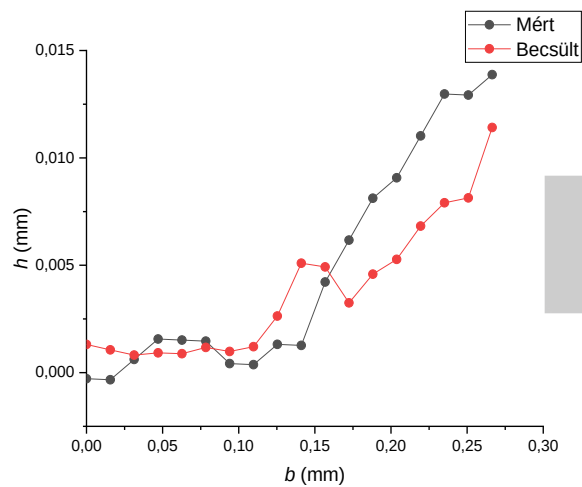
- 4. furat



- 5. furat

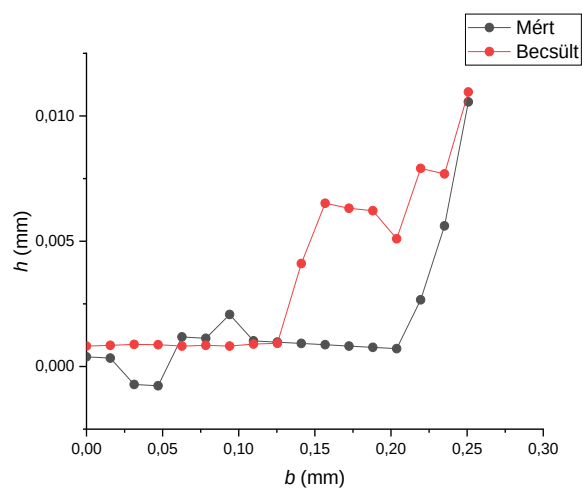


- 6. furat

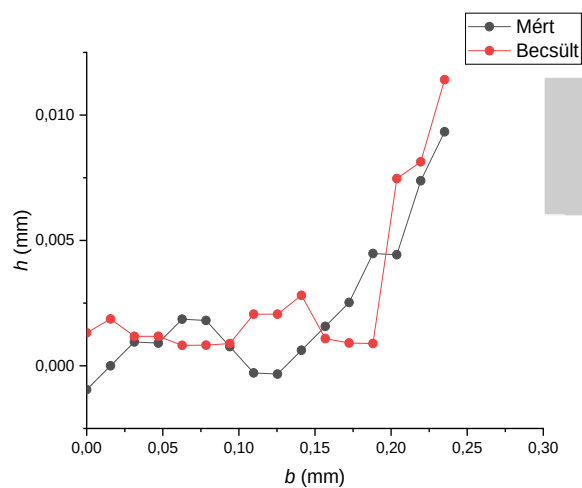




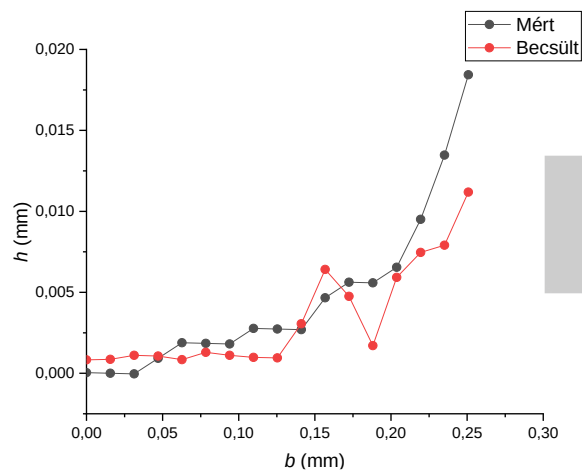
- 7. furat



- 8. furat



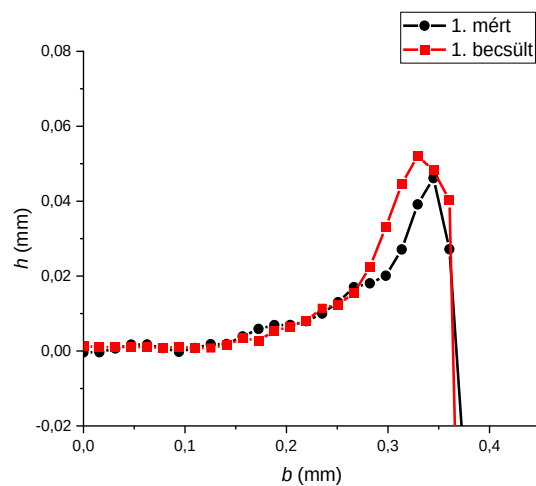
- 9. furat



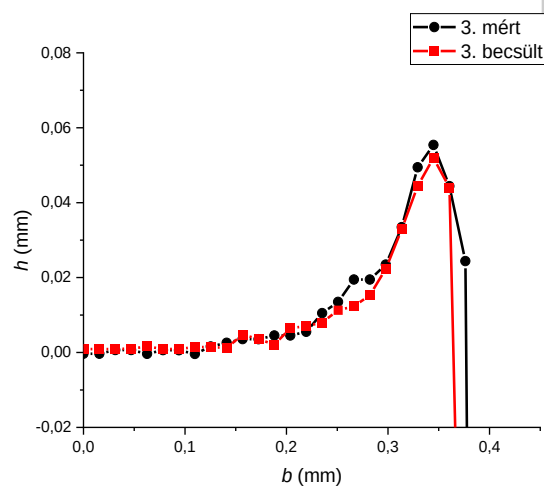
5. sz. melléklet: Eredményként adódó mért és becsült értékek összehasonlítása

Ebben a mellékletben a teljes h - b diagramok összehasonlításra kerülnek.

- 1. furat

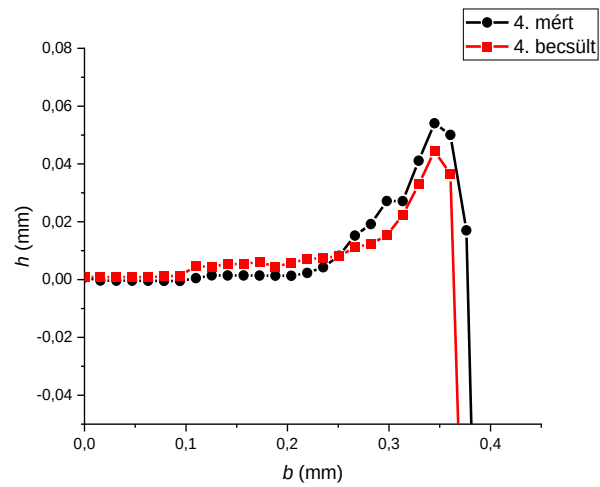


- 3. furat

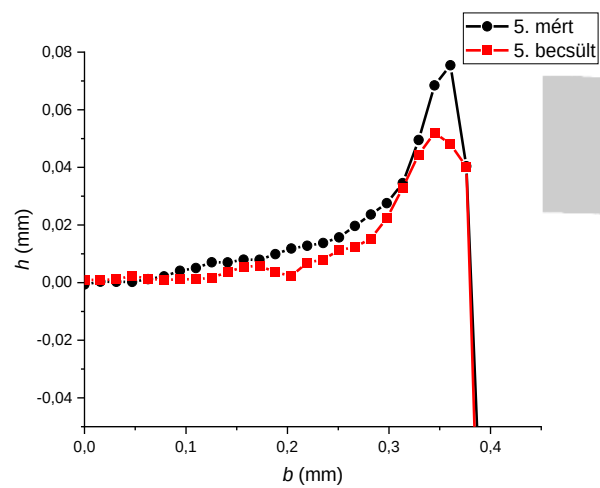




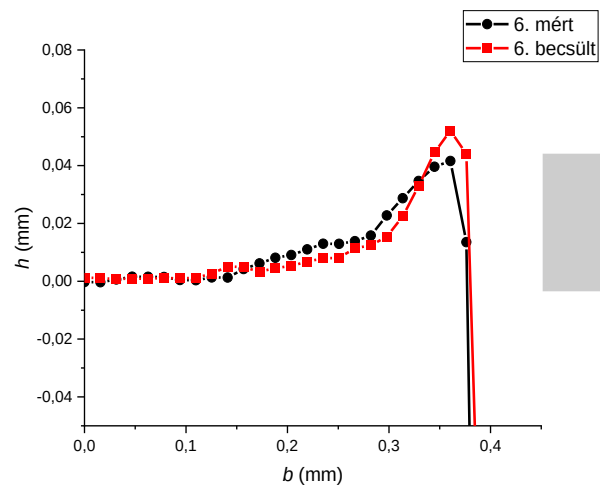
- 4. furat



- 5. furat

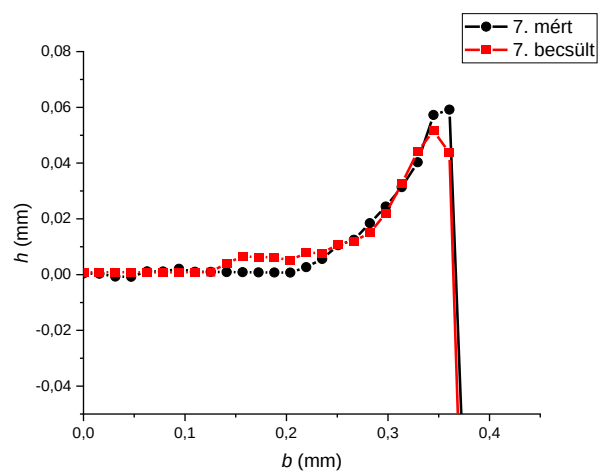


- 6. furat

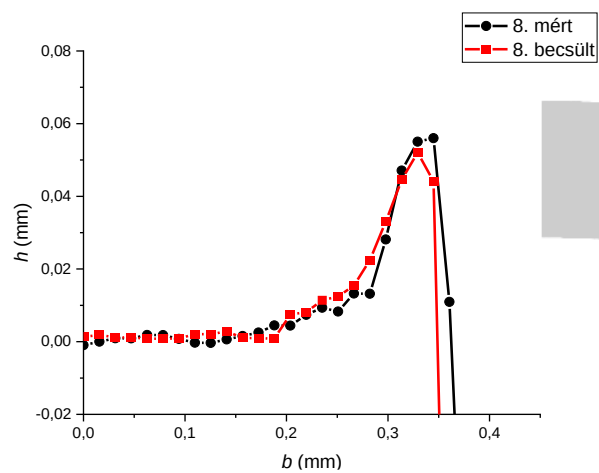




7. furat



- 8. furat



- 9. furat

