

Table S1 Measurements accuracy validation by standard gas with different dilution ratios

Dilution ratio		1	5/6	2/3	1/2	1/3	1/6	1/20	0	**R ²
CO ₂ concentrat ion/%	Theoretical	5.9	4.9	3.9	2.9	1.9	0.9	0.3	0	0.9965
	QuinTron	5.7	4.8	3.8	2.9	2.1	1.0	0.3	0	
	Fast GC	5.9	4.9	4.0	2.8	1.9	0.9	0.4	0	
	*Error	0.2	0.1	0.2	0.1	0.2	0.1	0.1	0	
H ₂ concentrat ion/ppm	Theoretical	149	124	99	75	50	25	8	0	0.9978
	QuinTron	148	122	97	70	48	21	7	1	
	Fast GC	146	126	101	75	51	23	7	0	
	*Error	2	4	4	5	3	2	0	1	
CH ₄ concentrat ion/ppm	Theoretical	75	63	50	38	25	13	4	0	0.9967
	QuinTron	75	62	50	37	27	14	3	2	
	Fast GC	70	62	50	35	26	13	2	0	
	*Error	5	0	0	2	1	1	1	2	

*Error is equal to the absolute value of the difference between the CO₂/H₂/CH₄ concentration detected by QuinTron BreathTracker and Fast GC system

**R² is the correlation coefficient between the CO₂/H₂/CH₄ concentration detected by QuinTron BreathTracker and Fast GC system

Table S2 Measurements accuracy validation of CO₂ concentration by actual samples

Sample No.	CO ₂ concentration/%			Sample No.	CO ₂ concentration/%		
	QuinTron	Fast GC	*Error		QuinTron	Fast GC	*Error
1	0	0	0	31	2.6	2.5	0.1
2	0.2	0.1	0.1	32	2.6	2.5	0.1
3	0.4	0.3	0.1	33	2.7	2.5	0.2
4	0.7	0.5	0.2	34	2.8	2.8	0.0
5	0.8	0.7	0.1	35	2.8	2.7	0.1
6	0.8	0.7	0.1	36	3.0	2.9	0.1
7	0.8	0.7	0.1	37	3.1	2.9	0.2
8	0.9	0.7	0.2	38	3.3	3.3	0.0
9	1.0	0.8	0.2	39	3.3	3.2	0.1
10	1.0	0.8	0.2	40	3.3	3.1	0.2
11	1.1	0.9	0.2	41	3.5	3.6	0.1
12	1.1	0.9	0.2	42	3.5	3.4	0.1
13	1.4	1.3	0.1	43	3.6	3.4	0.2
14	1.5	1.3	0.2	44	3.7	3.7	0.0
15	1.7	1.6	0.1	45	3.7	3.8	0.1
16	1.7	1.5	0.2	46	3.7	3.6	0.1
17	1.8	1.7	0.1	47	3.9	3.8	0.1
18	1.8	1.6	0.2	48	3.9	3.9	0.0
19	2.1	2.0	0.1	49	3.9	3.7	0.2
20	2.1	2.0	0.1	50	4.3	4.3	0.0
21	2.2	2.1	0.1	51	4.3	4.3	0.0
22	2.2	2.1	0.1	52	4.3	4.2	0.1
23	2.2	2.1	0.1	53	4.3	4.2	0.1
24	2.3	2.2	0.1	54	4.7	4.7	0.0
25	2.4	2.2	0.2	55	4.7	4.5	0.2
26	2.4	2.3	0.1	56	4.8	4.6	0.2
27	2.5	2.6	0.1	57	4.9	4.8	0.1
28	2.5	2.4	0.1	58	5.0	4.9	0.1
29	2.6	2.6	0.0	59	5.2	5.0	0.2
30	2.6	2.5	0.1		**R ²		0.9966

*Error is equal to the absolute value of the difference between the CO₂ concentration detected by QuinTron BreathTracker and Fast GC system

**R² is the correlation coefficient between the CO₂ concentration detected by QuinTron BreathTracker and Fast GC system

Table S3 Measurements accuracy validation of H₂ concentration by actual samples

Sample No.	H ₂ concentration/ppm			Sample No.	H ₂ concentration/ppm		
	QuinTron	Fast GC	*Error		QuinTron	Fast GC	*Error
1	2	2	0	31	7	7	0
2	2	0	2	32	7	7	0
3	2	1	1	33	7	6	1
4	2	0	2	34	8	11	3
5	2	0	2	35	8	9	1
6	3	1	2	36	8	9	1
7	3	1	2	37	9	8	1
8	3	0	3	38	10	10	0
9	3	3	0	39	10	9	1
10	3	3	0	40	11	13	2
11	3	2	1	41	11	11	0
12	3	2	1	42	12	15	3
13	3	1	2	43	12	14	2
14	3	1	2	44	12	13	1
15	3	1	2	45	13	15	2
16	3	2	1	46	15	19	4
17	4	3	1	47	16	17	1
18	4	3	1	48	17	18	1
19	4	3	1	49	17	19	2
20	4	4	0	50	19	20	1
21	4	3	1	51	21	22	1
22	4	4	0	52	22	23	1
23	5	5	0	53	24	24	0
24	5	5	0	54	26	25	1
25	5	4	1	55	35	32	3
26	5	4	1	56	36	35	1
27	5	5	0	57	68	69	1
28	6	7	1	58	73	75	2
29	6	7	1	59	99	97	2
30	6	6	0		**R ²		0.9931

*Error is equal to the absolute value of the difference between the H₂ concentration detected by QuinTron BreathTracker and Fast GC system

**R² is the correlation coefficient between the H₂ concentration detected by QuinTron BreathTracker and Fast GC system

Table S4 Measurements accuracy validation of CH₄ concentration by actual samples

Sample No.	CH ₄ concentration/ppm			Sample No.	CH ₄ concentration/ppm		
	QuinTron	Fast GC	*Error		QuinTron	Fast GC	*Error
1	0	0	0	31	1	0	1
2	0	0	0	32	1	1	0
3	0	0	0	33	2	3	1
4	0	0	0	34	2	3	1
5	0	1	1	35	2	3	1
6	0	0	0	36	2	3	1
7	0	2	2	37	2	3	1
8	0	0	0	38	2	3	1
9	0	0	0	39	2	3	1
10	0	0	0	40	2	4	2
11	1	2	1	41	2	0	2
12	1	2	1	42	2	3	1
13	1	0	1	43	2	1	1
14	1	1	0	44	2	4	2
15	1	1	0	45	2	2	0
16	1	0	1	46	4	6	2
17	1	0	1	47	5	4	1
18	1	1	0	48	5	4	1
19	1	2	1	49	6	6	0
20	1	2	1	50	6	8	2
21	1	0	1	51	6	6	0
22	1	0	1	52	6	5	1
23	1	1	0	53	8	11	3
24	1	2	1	54	8	8	0
25	1	2	1	55	8	9	1
26	1	0	1	56	8	7	1
27	1	1	0	57	9	11	2
28	1	2	1	58	12	14	2
29	1	0	1	59	14	16	2
30	1	0	1		**R ²		0.9177

*Error is equal to the absolute value of the difference between the CH₄ concentration detected by QuinTron BreathTracker and Fast GC system

**R² is the correlation coefficient between the CH₄ concentration detected by QuinTron BreathTracker and Fast GC system