

Round Robin Statistical results

CEN/TC264/WG17

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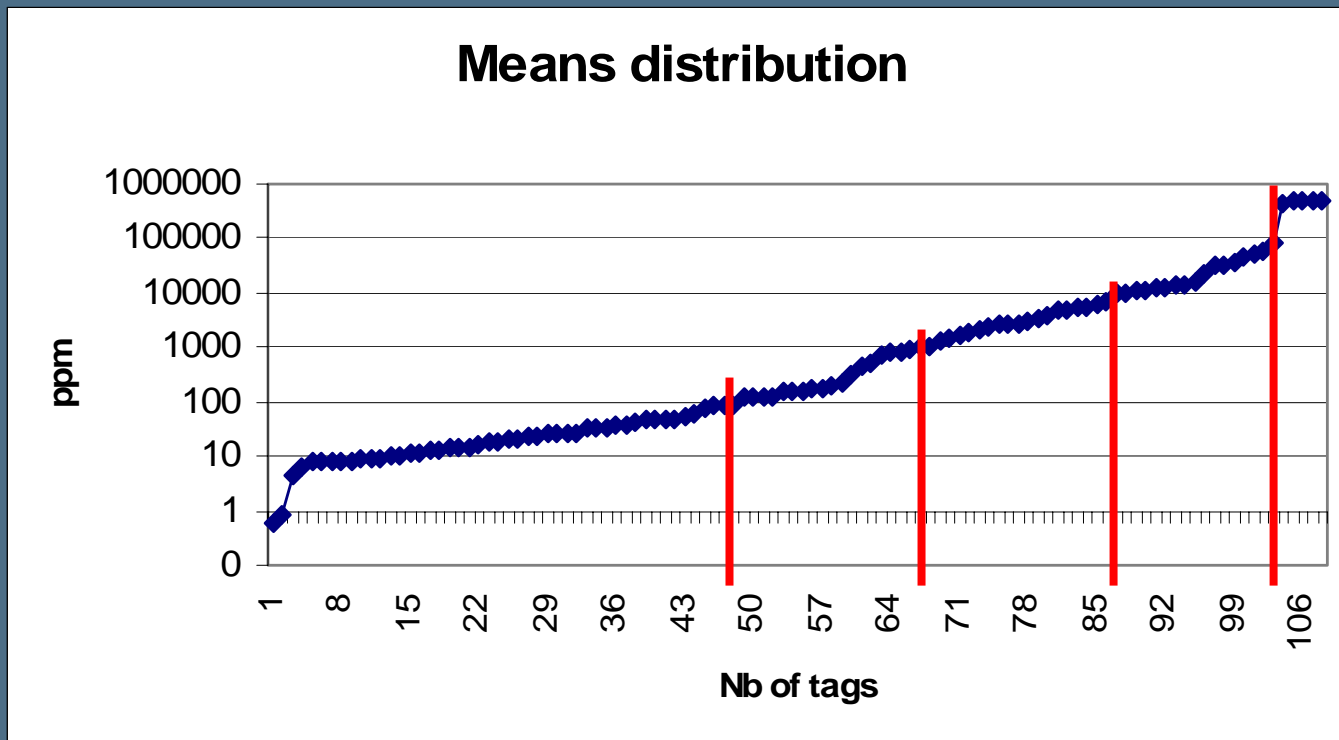
TOTAL/RM/STD/RECH/CRES/CMA

- **108 measured tags**
 - 23% of tags measured by 5 labs (25 tags)
 - 38% of tags measured by 4 labs (41 tags)
 - 26% of tags measured by 3 labs (28 tags)
 - 13% of tags measured by 2 labs (14 tags)

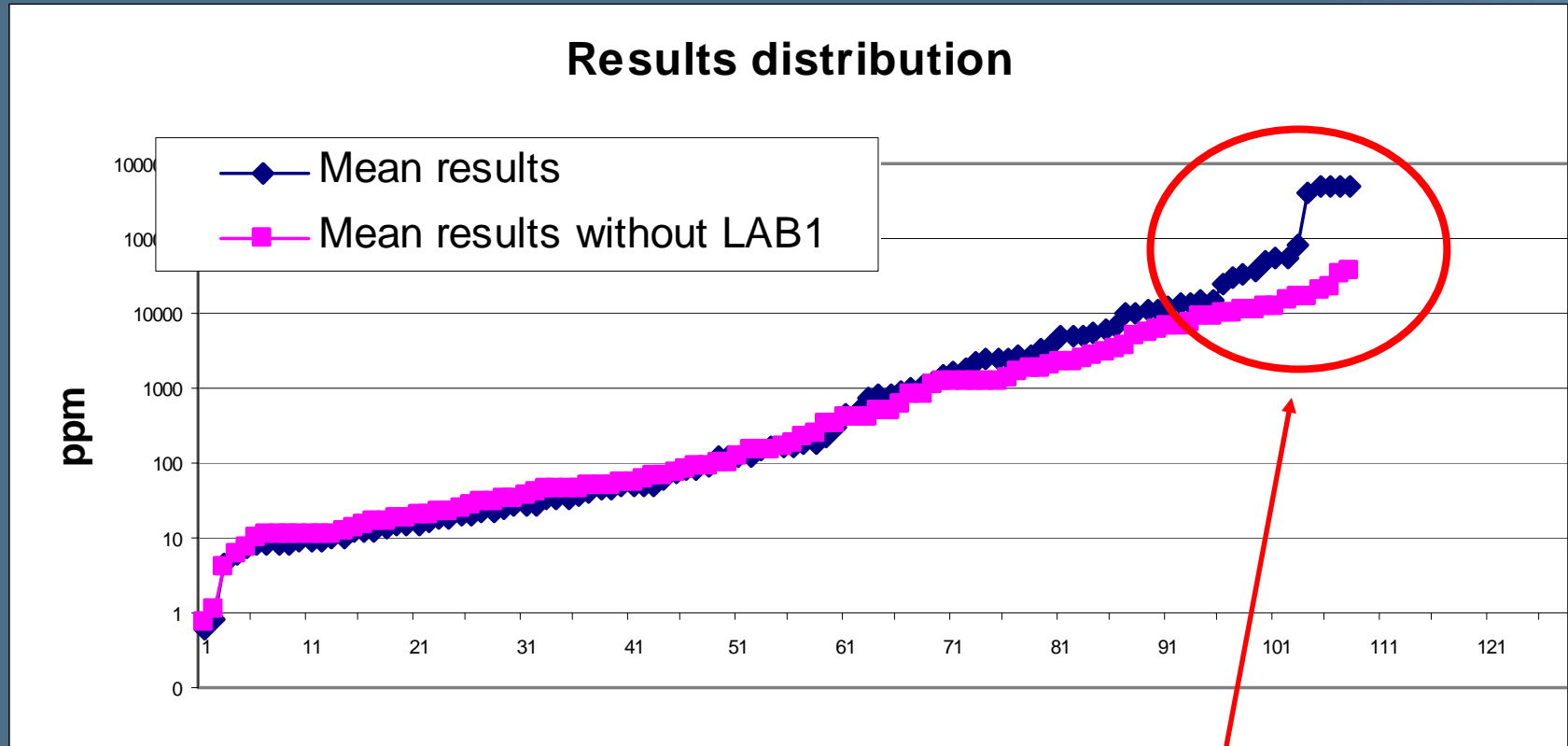
Mean results



Mean (ppm)	<100	100< <1000	1000< <10000	>10000
nb of tags	48	18	21	20
% of tags	42.8	16.8	19.6	18.7



Mean results : with and without LAB1



- Main difference on highest values

- Repeatability calculated by tags
- **Results expressed by : I_r = Repeatability uncertainty (%)**
 - The confidence interval of a single result obtained by one lab has an uncertainty of $\pm I_r$.
 - If the result is repeated by the same lab, there are more than 95% of chance to be included in this interval.

Mean of I_r = 98 %

Min of I_r = 0 %

Max of I_r = 413 %

Repeatabilities



Ir (%)	< 10%	10% < < 50 %	50 % < < 100 %	> 100 %
nb of Ir	3	31	37	37
%	2.8	28.7	34.3	34.3
% cumulated		31.5	65.7	100.0

66 % of tags have a repeatability uncertainty lower than 100%

Repeatabilities by lab



	Lab1	Lab2	Lab3	Lab4	Lab5
Ir (%)	141	117	54	69	84
Nb of tags	108	93	61	42	97

- Lab 1 has the highest repeatability.
- Lab 4 has repeated measures in succession.
- Lab 2, 3 and 4 have 40% of their results < 10ppm.
- Lab 5 has no measurements < 10ppm.

- Reproducibilities calculated by tags
- Results expressed by :

IR=Reproducibility uncertainty (%)

- The confidence interval of one result is +/- IR whatever the lab that has measured it.

Mean of IR = **257 %**

Min of IR = 18 %

Max of IR = 462 %

Reproducibilities



IR (%)	< 50 %	50 % < < 100 %	100 % < < 200 %	> 200 %
nb of tags	2	5	27	74
% of tags	1.9	4.6	25.0	68.5
% cumulated		6.5	31.5	100.0

6.5% of tags have a reproducibility uncertainty lower than 100%

31.5% of tags have a reproducibility uncertainty lower than 200%

Repeatabilities without LAB1



- Repeatability calculated by tags

Mean of Ir = 68 %

Min of Ir = 0 %

Max of Ir = 275 %

Ir (%)	<10	10< <50	50< <100	>100
nb of Ir	6	45	33	24
%	6	42	31	22
%cumulated		47	78	100

Reproducibilities without LAB1



- Reproducibilities calculated by tags

Mean of IR = 93 %

Min of IR = 6 %

Max of IR = 372 %

Ir (%)	<50	50< <100	100< <200	>200
nb of Ir	39	20	26	7
%	42	22	28	8
%cumulated		64	92	100

Repeatability and reproducibility by area



TOTAL

	Ir (%)	IR (%)	Ir (%) without Lab1	IR (%) without Lab1
All	98	257	69	93
A	59	235	41	45
B	196	240	174	205
C	65	255	58	68
D	185	389	141	188
E	129	223	89	108
F	88	200	63	106
G	85	204	39	45
H	65	282	39	33
I	59	233	40	56
J	74	297	52	75

Repeatability and reproducibility by level



	Ir(%)	IR(%)
<100 ppm	76	96
100 ppm < - < 1000ppm	53	68
1000 ppm < - < 10000ppm	51	67
10000 ppm <	109	218

Repeatability by area and by lab



Ir (%)	Lab1	Lab2	Lab3	Lab4	Lab5
All	141	117	54	69	84
A	99	90	13	7	19
B	147	63	16.2	36	204
C	3	1	0	0	1
D	126	140	74		105
E	142	65	24	29	104
F	111	104	17	107	
G	170	145	104		44
H	74	114			82
I	133	83			62
J	98	148		118	40

R and r calculated on screening values



	Ir (%)	IR (%)	Ir (%) without Lab1	IR (%) without Lab1
All	79	264	61	82
A	60	231	54	60
B	64	214	57	58
C	85	295	76	94
D	150	336	119	151
E	45	233	39	45
F	87	258	72	124
G	67	256	45	64
H	63	256	40	36
I	59	233	40	56
J	74	297	52	75

- All labs :
 - Ir = 98 % - IR = 257 %
- Without lab1 :
 - Ir = 69 % - IR = 93 %
- Difference between Screening and corrected values
 - No significant influence of reponse factors.

ANNEXES

Means by lab and by tag

Results by area



TOTAL

Tag	Component	LAB1	LAB2	LAB3	LAB4	LAB5	Ir (%)	Irepro (%)
1	SEAL	0	26	42	0	35	98	203
2	GATE VALVE	666	435	358	315	500	77	81
3	PUMP	375	173	208	0	30	34	194
4	PUMP	0	62	114	0	48	92	223
5	GATE VALVE	7825	408	1475	3077	45	12	247
6	GATE VALVE	0	3	0	0	42	41	409
7	GATE VALVE	0	5	0	0	39	37	384
8	RBV	97	55	236	302	128	58	132
9	RBV	3402	1635	1905	5365	4360	98	118
10	RBV	0	5	0	0	25	40	360
Tag	Component	LAB1	LAB2	LAB3	LAB4	LAB5	Ir (%)	Irepro (%)
11	GATE VALVE	12	8249	4050	15031	21320	218	234
12	GATE VALVE	150	6279	1102	8407	18649	266	285
13	GATE VALVE	90	5330	3968	9154	6908	139	166
14	GATE VALVE	138	1450	2243	7188	16216	293	318
15	GATE VALVE	30	765	819	2678	794	48	197
16	GATE VALVE	888		5033	17825	26437	212	240
Tag	Component	LAB1	LAB2	LAB3	LAB4	LAB5	Ir (%)	Irepro (%)
17	GATE VALVE	12	181	56	0	367	110	262
18	PUMP	12	62		0	218	102	284
19	GATE VALVE	94	1539	779	8060	351	28	309
20	GATE VALVE	18	428	50	0	107	102	302
21	PUMP	30	51	1720	1767	704	30	201
22	GATE VALVE	18	1896	1138	3406	885	20	174

Results by area



TOTAL

Tag	Component	LAB1	LAB2	LAB3	LAB4	LAB5	Ir (%)	Irepro (%)
23	GATE VALVE	0	2	4		60	152	372
24	GATE VALVE	0	4	0		56	155	379
25	GATE VALVE	0	3	0		30	150	365
26	GATE VALVE	42	6804	1193		36293	317	381
27	GATE VALVE	0	1	0		206	165	414
28	GATE VALVE	589	1	0		133	413	425
29	GATE VALVE	0	1	0		136	165	413
30	GATE VALVE	6	1	1		63	154	361
31	GATE VALVE	0	1	0		34	162	403
32	GATE VALVE	0	0	0		41	164	412
33	GATE VALVE	0	2	0		31	156	383
34	GATE VALVE	0	0	0		32	164	411
35	GATE VALVE	0	4	0		27	146	353
36	GATE VALVE	0	4	0		30	148	358
37	GATE VALVE	0	2	0		46	160	397
Tag	Component	LAB1	LAB2	LAB3	LAB4	LAB5	Ir (%)	Irepro (%)
38	GATE VALVE	39983	2126	25500	37990	61202	105	150
39	PUMP	1244	1510	6750		43103	183	332
40	GATE VALVE	10866	9911	1353	3142	719	225	245
41	PUMP	0	149	421	152	234	67	168
42	GATE VALVE	0	2	68	464	92	107	319
43	GATE VALVE	451	358	330	397	964	86	122

Results by area



Tag	Component	LAB1	LAB2	LAB3	LAB4	LAB5	Ir (%)	Irepro (%)
44	GATE VALVE	685	627	551	2441		86	180
45	CONTROL VALV	0	13	32	4		76	244
46	GATE VALVE	3447	2958	1780	2277		97	89
47	GATE VALVE	3014	2133	1645	3082		98	89
48	GLOBE VALVE	0	2	0	0		84	404
49	GATE VALVE	0	3	0	0		327	462
50	GATE VALVE	25223		22500			10	18
51	GATE VALVE	0	8	11	0		98	248
52	GATE VALVE	6791	10235	28500			57	159
53	GATE VALVE	18109		9600			16	88
54	GATE VALVE	0	3	56	48		13	222

Results by area



TOTAL

Tag	Component	LAB1	LAB2	LAB3	LAB4	LAB5	Ir (%)	Irepro (%)
55	GATE VALVE	0	29	36		36	87	149
56	GATE VALVE	26	0	0		12	341	351
57	GATE VALVE	5627	4217	1425		170	95	187
58	GATE VALVE	6144	1955	1898		77	45	206
59	CONTROL VALV	1106	897	1188		1754	86	85
60	GATE VALVE	0	0	8		45	29	329
61	GATE VALVE	13	19	4		23	122	142
62	GATE VALVE	65	19	164		104	95	155
63	GATE VALVE	7	28			84	30	205
64	GATE VALVE	9766	5938			16527	93	119
65	BLIND	46	1			137	96	238
66	GATE VALVE	20	10			52	94	175
67	GATE VALVE	33825				37491	61	45
68	GATE VALVE	485	450			1189	37	121
69	GATE VALVE	530	1708			8902	28	245
70	GATE VALVE	0	462			206	111	222
71	GATE VALVE	1494	997			188	117	169
72	GATE VALVE	0	23			80	85	247
73	GATE VALVE	0	0			53	25	345
74	GATE VALVE	0	0			61	25	347

Results by area



TOTAL

Tag	Component	LAB1	LAB2	LAB3	LAB4	LAB5	Ir (%)	Irepro (%)
75	RCV 531	1028520				8833	84	284
76	RCV 532	1028520				6723	84	285
77	RCV 536	336	17			155	81	197
78	RCV 535	0	10			136	48	315
79	RCV 534	954495				3145	84	287
80	RCV 533	954495				317	84	289
81	RCV 537	12183	1311			1190	30	259
82	RCV 538	0	1			80	26	341

Results by area



Tag	Component	LAB1	LAB2	LAB3	LAB4	LAB5	Ir (%)	Irepro (%)
89	RCV 517	24	226			221	84	158
90	RCV 518	80	16			147	125	184
91	RCV 513	6	12			81	44	253
92	RCV 514	59	3			85	26	172
93	RCV 521	836500				11331	36	276
94	RCV 522	20255	9672			318	104	211
95	RCV 526	87	644			188	32	195
96	RCV 525	0	10			60	84	284
97	RCV 524	96567				386	13	281
98	RCV 523	14571	1649			1763	175	277
99	RCV 527	3979	1324			350	44	202
100	RCV 528	0	2			255	26	343
101	RCV 511	43	3			22	33	179
102	RCV 512	146934				12224	8	239
103	RCV 516	52629				9668	22	196
104	RCV 515	0	6			33	83	281
Tag	Component	LAB1	LAB2	LAB3	LAB4	LAB5	Ir (%)	Irepro (%)
105	GATE VALVE	0	5		0	171	65	389
106	GATE VALVE	0	2		0	58	64	389
107	GATE VALVE	0	18		28	426	60	352
108	GATE VALVE	0	2		0	143	65	394
109	GATE VALVE	774	102		151	5274	56	318
110	CONTROL VALV	1809	232		295	1011	164	211
111	GATE VALVE	102600				7089	13	246
112	GATE VALVE	108000				1222	0	277
113	CONTROL VALV	54	24		42	78	166	149
114	GATE VALVE	27000				2386	85	244