FLUXANA®
XRF Application Solutions

FLX-142 – Recycling material from used catalysts Proficiency Test Sample

FLX-142	Al2O3[1]	CaO	Cr2O3	Cu	Fe[1]	K2O	MgO	Mn
Unit	%	%	%	%	%	%	%	%
No. of laboratories	14	13	13	13	14	11	14	14
Mean m	27,256	7,445	2,662	0,933	7,469	0,287	0,869	0,979
Reproducibility standard deviation s_R	1,915	0,483	0,214	0,251	1,211	0,028	0,127	0,120
Repeatability standard deviation s_r	0,269	0,093	0,039	0,036	0,121	0,009	0,034	0,040
Robust standard deviation s*	1,918	0,377	0,200	0,226	1,269	0,028	0,140	0,106
Uncertainty U (s*)	1,282	0,262	0,138	0,157	0,848	0,021	0,094	0,071
Uncertainty U (s_R)	1,280	0,335	0,148	0,174	0,809	0,021	0,085	0,080
Mean - 2*s_R	23,426	6,479	2,233	0,431	5,048	0,232	0,615	0,739
Mean + 2*s_R	31,085	8,410	3,090	1,434	9,890	0,343	1,123	1,219

	Na2O	Ni[1]	P2O5	SiO2	TiO2[2]	V2O5[2]	Zn
Unit	%	%	%	%	%	%	%
No. of laboratories	12	13	14	14	9	8	14
Mean m	0,831	21,006	0,470	7,516	0,068	0,021	0,108
Reproducibility standard deviation s_R	0,181	2,428	0,058	1,036	0,010	0,019	0,025
Repeatability standard deviation s_r	0,034	0,179	0,018	0,091	0,004	0,003	0,004
Robust standard deviation s*	0,199	2,210	0,058	1,016	0,004	0,016	0,025
Uncertainty U (s*)	0,143	1,533	0,039	0,679	0,004	0,014	0,017
Uncertainty U (s_R)	0,131	1,684	0,039	0,692	0,008	0,017	0,017
Mean - 2*s_R	0,469	16,150	0,353	5,443	0,048	0,017	0,058
Mean + 2*s_R	1,194	25,861	0,586	9,589	0,088	0,059	0,159

Mean	calculated from laboratory means using traceable methods only
s_R	Reproducibility standard deviation
s_r	Repeatability standard deviation
s*	Robust standard deviation
U (s*)	uncertainty calculated for a confidence interval of P= 95% (k=2)
U (s_R)	uncertainty calculated for a confidence interval of P= 95% (k=2)
Range of tolerance	Mean ± 2 x s_R ; all labs within this range show satisfactory

All values are in mass % and are based on annealed sample material.

The complete Proficiency Test Report can be found here:

[1] Heterogeneities in the material cause extended tolerance ranges

[2] <10 laboratories in evaluation