

Mass Echelon III Calibration Certificate

**Indiana State Dept of Health
Weights and Measures Metrology Laboratory
2525 N Shadeland Ave Bldg 30 Ent 12
Indianapolis IN 46219**

Calibration No.: 17-138

Date Received: June 5, 2017

Calibration Date: June 8, 2017

Client Name: Koenig Scale Co Inc

Point of Contact (POC): Kevin Koenig

Address: 4779 E Margaret Dr

POC Phone No.: (812) 877-6121

City/State/Zip: Terre Haute IN 47803

Condition of Artifact: Fair; Light Rust or damage

Specification: NIST HB 105-1 (1990)

Manufacturer	S/N	Denomination	Class	Correct	Adjusted	Condemned	Confiscated	Total
Unknown		1000 lb	F	21	5	0	0	21
Unknown		500 lb	F	15	0	0	0	15
Unknown		250 kg*	F	6	0	0	0	6
Miscellaneous		50 lb	F	113	8	0	0	113
Miscellaneous		25 lb	F	45	1	0	0	45
Miscellaneous	1 through 40	25 kg	F	40	0	0	0	40
Unknown	1LRK	20 kg	F	1	0	0	0	1
Unknown	1-7-11	10 kg	F	1	1	0	0	1
Grand Total				242	15	0	0	242

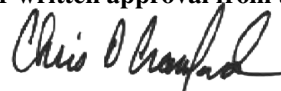
*250 kg meets tolerances specified in NIST HB 105-1 (1990). No uncertainties have been given; lab uncertainties do not meet guidelines set forth by the National Institute of Standards and Technology (NIST).

Note 1
Koenig Scale Co

Lab# 17-138LM

Mfg	Denom	id #	As Found Conv Mass Error in lb	As Adjusted Conv Mass Error in lb	Uncertainty in lb
Unknown	1000 lb	3	-0.05975		0.02205
Unknown	1000 lb	7	-0.09502	-0.00375	0.02205
Unknown	1000 lb	14	-0.05313		0.02205
Unknown	1000 lb	4	-0.06636		0.02205
Unknown	1000 lb	10	-0.02557		0.02205
Unknown	1000 lb	9	-0.07518	-0.00507	0.02205
Unknown	1000 lb	8	-0.06305		0.02205
Unknown	1000 lb	6	-0.03638		0.02205
Unknown	1000 lb	18	-0.03682		0.02205
Unknown	1000 lb	17	-0.06834		0.02205
Unknown	1000 lb	11	-0.08047	0.00066	0.02205
Unknown	1000 lb	12	-0.03527		0.02205
Unknown	1000 lb	13	-0.09132	-0.00375	0.02205
Unknown	1000 lb	1	-0.02844		0.02205
Unknown	1000 lb	2	-0.11442	-0.00220	0.02205
Unknown	1000 lb	16	-0.07055		0.02205
Unknown	1000 lb	15	-0.03594		0.02205
Unknown	1000 lb	19	0.03682		0.02205
Unknown	1000 lb	G692	0.06041		0.02205
Unknown	1000 lb	20	-0.03175		0.02205
Unknown	500 lb	653L	-0.015		0.011
Unknown	500 lb	655L	-0.025		0.011
Unknown	500 lb	GL1	0.018		0.011
Unknown	500 lb	662L	0.021		0.011
Unknown	500 lb	660L	0.001		0.011

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Unknown	500 lb	652L	-0.025	0.011
Unknown	500 lb	654L	-0.023	0.011
Unknown	500 lb	657L	0.027	0.011
Unknown	500 lb	656L	-0.033	0.011
Unknown	500 lb	651L	0.008	0.011
Unknown	500 lb	658L	0.000	0.011
Unknown	500 lb	663L	0.001	0.011
Unknown	500 lb	659L	-0.021	0.011
Unknown	500 lb	661L	-0.021	0.011
Unknown	500 lb	650L	-0.036	0.011
Unknown	500 lb	GL2	0.006	0.011

Temp °C	RH %	BP (mm Hg)
22.3	47	738.1

The uncertainty is taken as the root sum square of the Type A and the Type B uncertainties multiplied by a coverage factor of 2.025 - 2.23 (k= 2.025 - 2.23) providing a confidence level of approximately 95%.
As found values above may include weights that have been altered prior to testing (painting, scraping, sanding, etc.). "As Found" values listed above are "As Delivered" and should not be considered when calculating in or out of tolerance condition at last time of use prior to calibration.
 Unless noted otherwise above readings are "As Found" and "As Calibrated".
The addition of any material such as tape, labels, wire, string and/or tags to the Test Weight voids this Report of Calibration.



Note 2*
 Koenig Scale Co

Lab# 17-138

Mfg	Denom	Wt #	As Found Conv Mass Error in g	As Adjusted Conv Mass Error in g
Unknown	250 kg	83	0.0	
Unknown	250 kg	81	0.0	
Unknown	250 kg	82	0.0	
Unknown	250 kg	86	0.0	
Unknown	250 kg	84	0.0	
Unknown	250 kg	85	0.0	

Temp °C	RH%	BP (mm Hg)
22.1	40	739.6

*No Uncertainties given; uncertainties do not meet the guidelines specified by NIST. Meet tolerances specified in NIST HB 105-1 for NIST Class F Cast Iron Weights.

The uncertainty is taken as the root sum square of the Type A and the Type B uncertainties multiplied by a coverage factor of two (k=2) providing a confidence level of approximately 95%.
As found values can not be furnished on weights which have been altered prior to testing (painting, scraping, sanding, etc.).
 Unless noted otherwise above readings are "As Found" and "As Calibrated".
The addition of any material such as tape, labels, wire, string and/or tags to the Test Weights voids this Report of Calibration.

The pound equivalent for fractional and decimal weights listed above have been rounded.
 The laboratory uses 453.59237 grams per pound for all conversions.

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Note 3
Koenig Scale Co

Lab# 17-138

Mfg	Denom	id #	As Found Conv Mass Error in lb	As Adjusted Conv Mass Error in lb	Uncertainty in lb
Unknown	50 lb	711	0.00271		0.00064
Toledo	50 lb	1011	-0.00037		0.00064
Unknown	50 lb	604	0.00313		0.00064
Troemner	50 lb	1024	0.00353		0.00064
Troemner	50 lb	1027	0.00487	0.00218	0.00064
Troemner	50 lb	1029	0.00134		0.00064
Unknown	50 lb	606	-0.00082		0.00064
Unknown	50 lb	602	-0.00154		0.00064
Toledo	50 lb	1000	0.00511	0.00346	0.00064
Unknown	50 lb	207	-0.00218		0.00064
Troemner	50 lb	1037	0.00115		0.00064
Unknown	50 lb	203	0.00295		0.00064
Toledo	50 lb	810	-0.00159		0.00064
Unknown	50 lb	709	-0.00132		0.00064
Toledo	50 lb	610	0.00123		0.00064
Toledo	50 lb	614	0.00101		0.00064
Toledo	50 lb	806	0.00234		0.00064
Toledo	50 lb	807	0.00179		0.00064
Unknown	50 lb	706	0.00179		0.00064
Unknown	50 lb	401	0.00170		0.00064
Unknown	50 lb	710	0.00337		0.00064
Unknown	50 lb	405	0.00115		0.00064
Toledo	50 lb	611	0.00269		0.00064
Unknown	50 lb	607	0.00097		0.00064
Unknown	50 lb	403	0.00262		0.00064
Toledo	50 lb	1017	-0.00154		0.00064
Toledo	50 lb	1010	0.00302		0.00064
Unknown	50 lb	409	0.00203		0.00064
Unknown	50 lb	407	0.00192		0.00064
Unknown	50 lb	1020	0.00234		0.00064
Unknown	50 lb	402	0.00203		0.00064
Unknown	50 lb	602	0.00170		0.00064
Toledo	50 lb	617	0.00522	0.00000	0.00064
Unknown	50 lb	406	-0.00141		0.00064
Troemner	50 lb	1019	0.00143		0.00064
Unknown	50 lb	410	-0.00002		0.00064
Unknown	50 lb	716	0.00317		0.00064
Unknown	50 lb	714	0.00066		0.00064
Unknown	50 lb	408	0.00154		0.00064
Unknown	50 lb	404	0.00315		0.00064
Toledo	50 lb	618	-0.00095		0.00064
Unknown	50 lb	204	0.00084		0.00064
Troemner	50 lb	1032	0.00403		0.00064
Unknown	50 lb	206	-0.00090		0.00064
Toledo	50 lb	1012	0.00463	0.00251	0.00064
Unknown	50 lb	603	0.00212		0.00064
Toledo	50 lb	609	0.00082		0.00064
Unknown	50 lb	608	0.00020		0.00064

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Unknown	50 lb	601	0.00119	0.00064
Toledo	50 lb	615	-0.00108	0.00064
Toledo	50 lb	1022	0.00130	0.00064
Toledo	50 lb	1018	0.00229	0.00064
Unknown	50 lb	701	0.00024	0.00064
Troemner	50 lb	1033	0.00106	0.00064
Toledo	50 lb	612	-0.00106	0.00064
Unknown	50 lb	202	0.00042	0.00064
Toledo	50 lb	613	-0.00132	0.00064
Troemner	50 lb	1028	0.00009	0.00064
Unknown	50 lb	201	0.00106	0.00064
Unknown	50 lb	209	-0.00040	0.00064
Fairbanks	50 lb	1023	-0.00024	0.00064
Troemner	50 lb	1035	0.00505	-0.00057
Unknown	50 lb	1036	0.00060	0.00064
Troemner	50 lb	1031	0.00234	0.00064
Troemner	50 lb	1025	0.00176	0.00064
Toledo	50 lb	1015	0.00152	0.00064
Toledo	50 lb	1016	-0.00112	0.00064
Troemner	50 lb	1030	0.00194	0.00064
Troemner	50 lb	1034	0.00276	0.00064
Toledo	50 lb	1013	0.00273	0.00064
Unknown	50 lb	715	-0.00057	0.00064
Toledo	50 lb	619	-0.00002	0.00064
Unknown	50 lb	208	-0.00146	0.00064
Unknown	50 lb	719	0.00143	0.00064
Unknown	50 lb	210	0.00254	0.00064
Toledo	50 lb	809	0.00331	0.00064
Toledo	50 lb	801	0.00262	0.00064
Toledo	50 lb	808	0.00093	0.00064
Toledo	50 lb	803	0.00201	0.00064
Unknown	50 lb	702	-0.00278	0.00064
Toledo	50 lb	805	0.00223	0.00064
Toledo	50 lb	616	0.00170	0.00064
Unknown	50 lb	704	-0.00150	0.00064
Unknown	50 lb	705	0.00004	0.00064
Unknown	50 lb	712	-0.00011	0.00064
Unknown	50 lb	205	-0.00220	0.00064
Unknown	50 lb	700	0.00271	0.00064
Unknown	50 lb	605	0.00240	0.00064
Unknown	50 lb	1009	-0.00029	0.00064
Toledo	50 lb	804	0.00132	0.00064
Toledo	50 lb	907	0.00278	0.00064
Toledo	50 lb	910	0.00412	0.00064
Toledo	50 lb	908	0.00331	0.00064
Toledo	50 lb	1007	0.00106	0.00064
Toledo	50 lb	906	-0.00097	0.00064
Toledo	50 lb	1002	0.00355	0.00064
Toledo	50 lb	904	0.00362	0.00064
Toledo	50 lb	903	0.00284	0.00064
Toledo	50 lb	901	0.00306	0.00064
Toledo	50 lb	909	0.00309	0.00064
Toledo	50 lb	1014	0.00123	0.00064
Toledo	50 lb	1008	0.00066	0.00064

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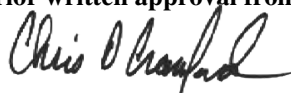
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Toledo	50 lb	620	-0.00037	0.00064
Toledo	50 lb	1006	-0.00126	0.00064
Unknown	50 lb	713	0.00161	0.00064
Toledo	50 lb	1004	-0.00013	0.00064
Troemner	50 lb	1026	-0.00009	0.00064
Toledo	50 lb	1003	-0.00066	0.00064
Toledo	50 lb	1005	-0.00026	0.00064
Toledo	50 lb	902	-0.00132	0.00064
Rice Lake	50 lb	1010	-0.00046	0.00064
Toledo	50 lb	1001	-0.00013	0.00064
Toledo	50 lb	905	-0.00278	0.00064
Unknown	25 lb	2526	0.00166	0.00040
Unknown	25 lb	2518	0.00060	0.00040
Unknown	25 lb	2523	0.00137	0.00040
Unknown	25 lb	2509	0.00188	0.00040
Unknown	25 lb	2525	0.00148	0.00040
Unknown	25 lb	2522	-0.00028	0.00040
Unknown	25 lb	2536	-0.00103	0.00040
Unknown	25 lb	2516	0.00135	0.00040
Unknown	25 lb	2532	0.00119	0.00040
Unknown	25 lb	2506	-0.00282	0.00062
Unknown	25 lb	2507	-0.00143	0.00040
Unknown	25 lb	2505	-0.00042	0.00040
Unknown	25 lb	2515	-0.00068	0.00040
Unknown	25 lb	2521	0.00064	0.00040
Unknown	25 lb	2539	0.00161	0.00040
Unknown	25 lb	2524	0.00157	0.00040
Unknown	25 lb	211	-0.00112	0.00040
Unknown	25 lb	2533	0.00042	0.00040
Unknown	25 lb	2514	0.00194	0.00040
Unknown	25 lb	2508	0.00163	0.00040
Unknown	25 lb	2534	-0.00046	0.00040
Unknown	25 lb	2529	0.00033	0.00040
Unknown	25 lb	2527	0.00082	0.00040
Unknown	25 lb	2535	-0.00068	0.00040
Unknown	25 lb	2510	-0.00112	0.00040
Toledo	25 lb	911	0.00082	0.00040
Toledo	25 lb	811	0.00124	0.00040
Unknown	25 lb	2520	0.00205	0.00040
Unknown	25 lb	2519	-0.00092	0.00040
Unknown	25 lb	411	-0.00106	0.00040
Unknown	25 lb	2538	-0.00075	0.00040
Unknown	25 lb	2537	0.00005	0.00040
Unknown	25 lb	111	-0.00050	0.00040
Unknown	25 lb	2512	-0.00031	0.00040
Unknown	25 lb	2540	-0.00198	0.00040
Unknown	25 lb	2501	-0.00106	0.00040
Unknown	25 lb	2504	0.00115	0.00040
Unknown	25 lb	2513	0.00124	0.00040
Unknown	25 lb	2502	-0.00123	0.00040
Unknown	25 lb	2511	-0.00189	0.00040
Unknown	25 lb	2528	-0.00134	0.00040
Unknown	25 lb	2503	-0.00121	0.00040

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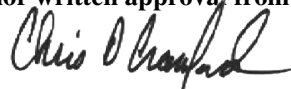
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Unknown	25 lb	2530	0.00113	0.00040
Unknown	25 lb	2517	0.00040	0.00040
Unknown	25 lb	2531	-0.00046	0.00040

			As Found Conv Mass Error in mg	As Adjusted Conv Mass Error in mg	Uncertainty in mg
Unknown	25 kg	3	-891		320
Unknown	25 kg	7	-291		320
Unknown	25 kg	33	-681		320
Unknown	25 kg	8	-1451		320
Unknown	25 kg	5	269		320
Unknown	25 kg	6	269		320
Unknown	25 kg	23	769		320
Unknown	25 kg	40	559		320
Unknown	25 kg	29	249		320
Unknown	25 kg	31	-1291		320
Unknown	25 kg	34	-71		320
Unknown	25 kg	12	-101		320
Unknown	25 kg	14	199		320
Unknown	25 kg	27	-641		320
Unknown	25 kg	36	59		320
Unknown	25 kg	20	-401		320
Unknown	25 kg	28	-501		320
Unknown	25 kg	15	-691		320
Unknown	25 kg	10	-221		320
Unknown	25 kg	30	619		320
Unknown	25 kg	18	-1371		320
Unknown	25 kg	19	-981		320
Unknown	25 kg	39	159		320
Unknown	25 kg	38	909		320
Unknown	25 kg	13	89		320
Unknown	25 kg	17	-1561		320
Unknown	25 kg	35	169		320
Unknown	25 kg	16	-411		320
Unknown	25 kg	1	99		320
Unknown	25 kg	26	-831		320
Unknown	25 kg	24	359		320
Unknown	25 kg	9	349		320
Unknown	25 kg	11	499		320
Unknown	25 kg	22	-1311		320
Unknown	25 kg	4	-291		320
Unknown	25 kg	32	-1761		320
Unknown	25 kg	2	569		320
Unknown	25 kg	21	-1291		320
Unknown	25 kg	37	-1921		320
Unknown	25 kg	25	389		320
Unknown	20 kg	1LRK	-1562		280
Unknown	10 kg	1-7-11	-1131	-11.00000	150

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	Temp °C	RH %	BP (mm Hg)
06/06/17	22.1	40	738.1
06/08/17	22.4	39	738.3

The uncertainty is taken as the root sum square of the Type A and the Type B uncertainties multiplied by a coverage factor of 2 to 2.11 (k= 2 to 2.14) providing a confidence level of approximately 95%.

As found values above may include weights that have been altered prior to testing (painting, scraping, sanding, etc.). "As Found" values listed above are "As Delivered" and should not be considered when calculating in or out of tolerance condition at last time of use prior to calibration. Unless noted otherwise above readings are "As Found" and "As Adjusted".

The addition of any material such as tape, labels, wire, string and/or tags to the Test Weight voids this Report of Calibration.

Traceability Statement:

The Echelon III Mass Standards of the State of Indiana are traceable to the SI and NIST through approved accredited laboratories. The calibration number (Calibration No.) identified above is the unique traceability number to be used in referencing measurement traceability for artifacts identified in this report only.

Uncertainty Statement:

The combined standard uncertainty includes uncertainties reported for the standard, uncertainties associated with the measurement process, uncertainties for any observed deviations from reference values which are less than surveillance limits (previous similar determinations have demonstrated that the maximum permissible errors are sufficiently large that buoyancy corrections are not usually significant [i.e., corrections & their uncertainty will not change the last decimal place of the reported value or uncertainty (with uncertainty reported to 2 significant digits)]. The combined standard uncertainty is multiplied by a coverage factor, k, to give the expanded uncertainty, which defines an interval with a 95.45 % level of confidence. The expanded uncertainty presented in this report is consistent with NIST Technical Note 1297. Surface Roughness and Density testing have not been performed, therefore, there are no components for the effects of such testing in the uncertainty budget.

Equipment, Standards, and Procedures Used:

Comparator(s) Used: MT KC500, Sartorius CCE60K2

Comparators are "Used for Comparisons Only – No Calibration Required."

Standard(s) Used: Echelon III Working Standards 1000 lb #1, 500 lb #3, 50 lb "B", 25 lb "LRW", 1 lb "23", 0.1 lb "23", 0.05 lb "23", 0.01 lb "23", 0.001 lb "23", 20 kg "V", 10 kg "27B7", 5 kg "W"

Procedure (SOP) Used: SOP 8, Option B

The laboratory uses procedures developed by the National Institute of Standards and Technology (NIST).

Joshua A. Reagin
Joshua A. Reagin

Technical Manager, Metrologist

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Chris D Bradford