Member State of OIML
Japan

National Institute of
Advanced Industrial Science
and Technology
AIST

OIML Certificate No.
R60/2000-JP1-12.05

OIML CERTIFICATE OF CONFORMITY

Issuing authority

Name:	National Metrology Institute of Japan / National Institute of Advanced Industrial Science and Technology (NMIJ / AIST)
Address:	AIST Tsukuba Central 3-9, Tsukuba Ibaraki 305-8563, Japan
Person responsible:	Dr. Tamotsu Nomakuchi, President of AIST

Applicant

Name:	A&D Company, Limited
Address:	3-23-14, Higashi-Ikebukuro, Toshima-ku, Tokyo 170-0013, Japan

Manufacturer of the certified pattern

Name:	A&D Company, Limited
Address:	3-23-14, Higashi-Ikebukuro, Toshima-ku, Tokyo 170-0013, Japan

Identification of the certified pattern:

Beam (shear) load cell

Type:	LCM17K500E , LCM17T001E , LCM17T002E
Fraction:	Pi=0.7
Temperature range	-10 ℃ / 40 ℃

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OIML Certificate No.
R60/2000-JP1-12.05

Characteristics:

Model designation			LCM17K500E	LCM17T001E	LCM17T002E
Accuracy class	Class	-	C		
Maximum number of load cell verification intervals	n_{max}	-	3000		
Humidity symbol			CH		
Minimum dead load	E_{min}	kg	0		
Maximum capacity	E_{max}	kg	500	1000	2000
Safe load limit	E_{lim}	kg	$1.5*E_{max}$		
Minimum verification interval	v_{min}	kg	E_{max} /5000		
Apportionment factor	p_{LC}		0.7		
Ratio of minimum LC Verification interval $Y=E\max / v\min$	Y	-	5000		
Ratio of minimum dead load output return $Z=E\max/(2*DR)$	Z	-	3000		
Rated output		mV/V	0.98		
Maximum excitation voltage		V AC/DC	15		
Input impedance	R_{LC}	Ω	390		
Cable detail		-	5m 5wire		

This certificate attests the conformity of the above-mentioned pattern (represented by the samples identified in the associated test report(s) with the requirements of the following Recommendation of the International Organization of Legal Metrology - OIML):

R60, edition 2000 (E)
For accuracy class C

This certificate relates only to the metrological and technical characteristics of the pattern of the instrument concerned, as covered by the relevant OIML International Recommendation.
This certificate does not bestow any form of legal international approval.
The conformity was established by tests described in the associated test report no. 12-11/R60:2000, that includes 19 pages.

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OIML Certificate No.
R60/2000-JP1-12.05

The Issuing Authority
NMIJ/AIST

Dr. T. Nomakuchi
President of AIST
2012-07-20

The CIML member

Dr. Y. Miki

2012-07-20

Important note: Apart from the mention of certificate's reference number and the name of the OIML Member State in which the certificate is issued, partial quotation of the certificate and of the associated Test Report is not permitted, although either may be reproduced in full.

National Institute of Advanced Industrial Science and Technology
AIST

NMIJ

OIML MUTUAL ACCEPTANCE ARRANGEMENT

Evaluation Report

Load cells

Issuing Authority

Name : National Metrology Institute of Japan /National Institute of Advanced Industrial Science and Technology (NMIJ/AIST)

Address : AIST Tsukuba Central 3, Tsukuba Ibaraki 305-8563, Japan

Applicant : A&D Company, Limited

Manufacturer : A&D Company, Limited

Applied Type : LCM17K500E , LCM17T001E , LCM17T002E

Evaluation Report Number : 24-006

This report ensures the conformity of the applied type with the requirements of the OIML R60 (edition 2000), on the basis of evaluation of the attached test report (N° 12-11/R60:2000).

Evaluator :
Wataru Kaminaga
Legal Metrology Division
NMIJ/AIST
Signature :
W. Kaminaga
Date: 2012. 7. 13

Supervisor :
Shigeki Yamaguchi
Head of Legal Metrology Division
NMIJ/AIST
Signature :
Shigeki Yamaguchi
Date: 2012. 7. 13

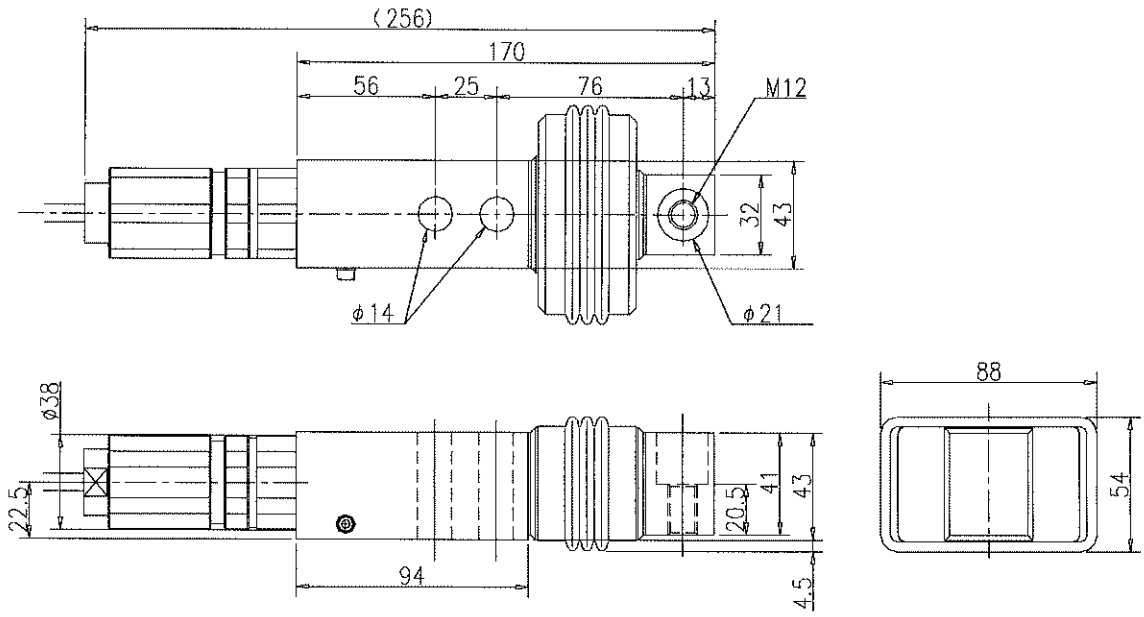
Description

Technical data

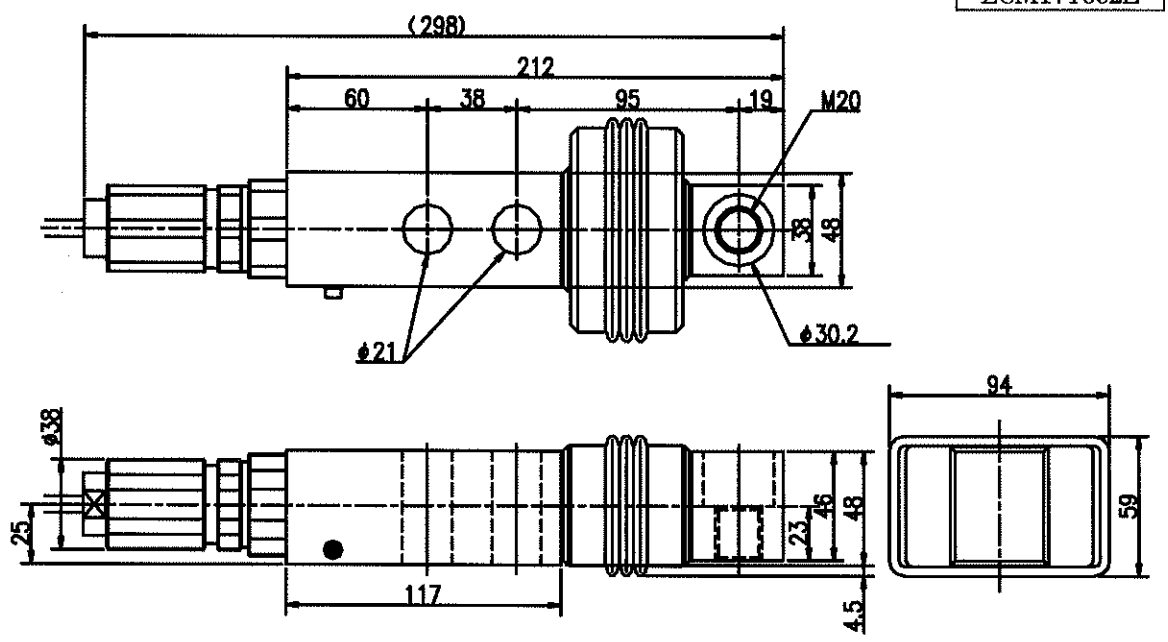
Model designation			LCM17K500E	LCM17T001E	LCM17T002E
Accuracy class	Class	-	C		
Maximum number of load cell verification intervals	n_{max}	-	3000		
Humidity symbol			CH		
Minimum dead load	E_{min}	kg	0		
Maximum capacity	E_{max}	kg	500	1000	2000
Safe load limit	E_{lim}	kg	$1.5*E_{max}$		
Minimum verification interval	v_{min}	kg	E_{max} /5000		
Apportionment factor	p_{LC}		0.7		
Ratio of minimum LC Verification interval $Y=E\max / v\min$	Y	-	5000		
Ratio of minimum dead load output return $Z=E\max/(2*DR)$	Z	-	3000		
Rated output		mV/V	0.98		
Maximum excitation voltage		V AC/DC	15		
Input impedance	R_{LC}	Ω	390		
Cable detail		-	5m 5wire		

LCM17　Dimension

Model
LCM17K500E
LCM17T001E

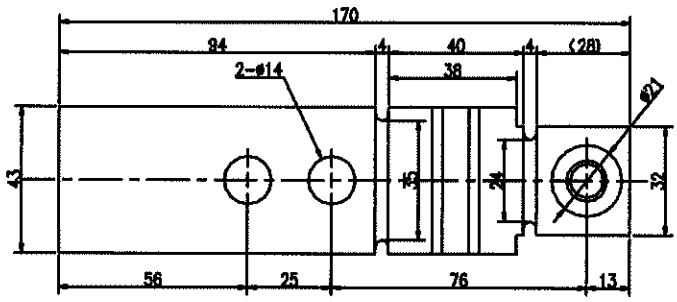


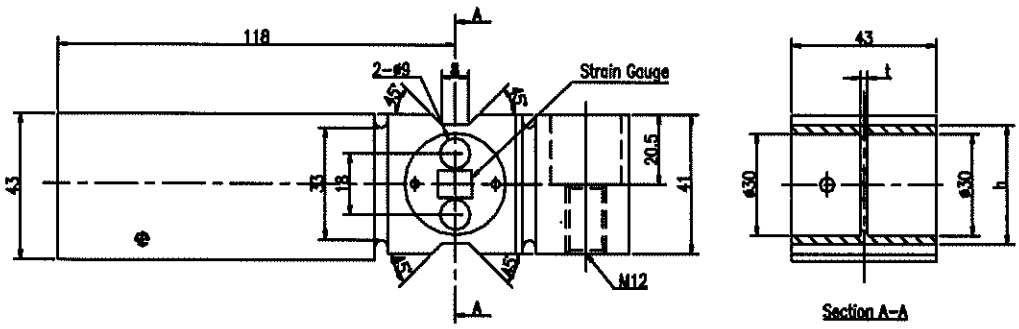
model
LCM17T002E



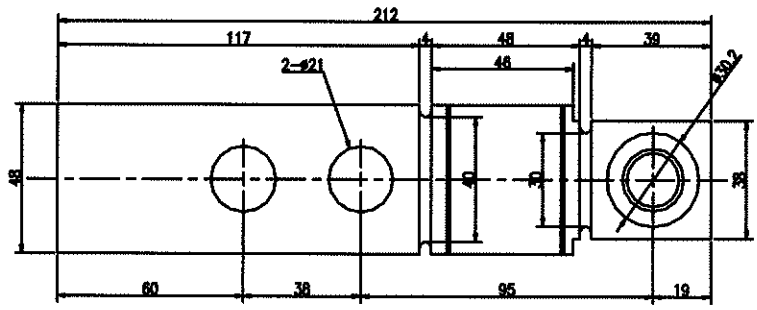
LCM17　Spring element Dimension

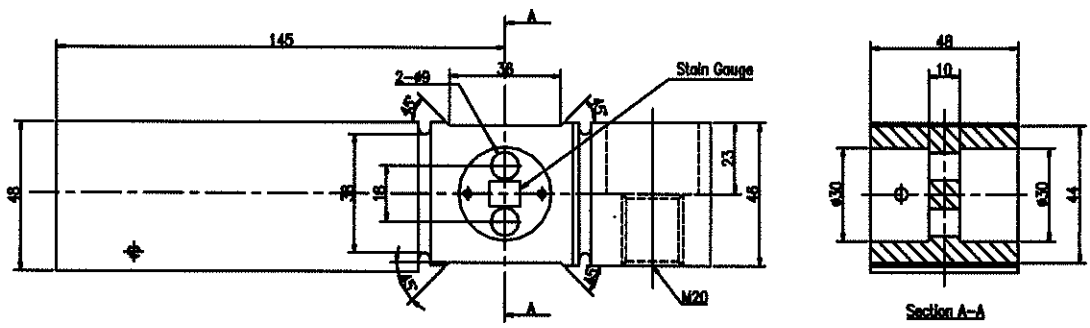
Model	t (mm)	h (mm)
LCM17K500E	2.0	35
LCM17T001E	5.0	39



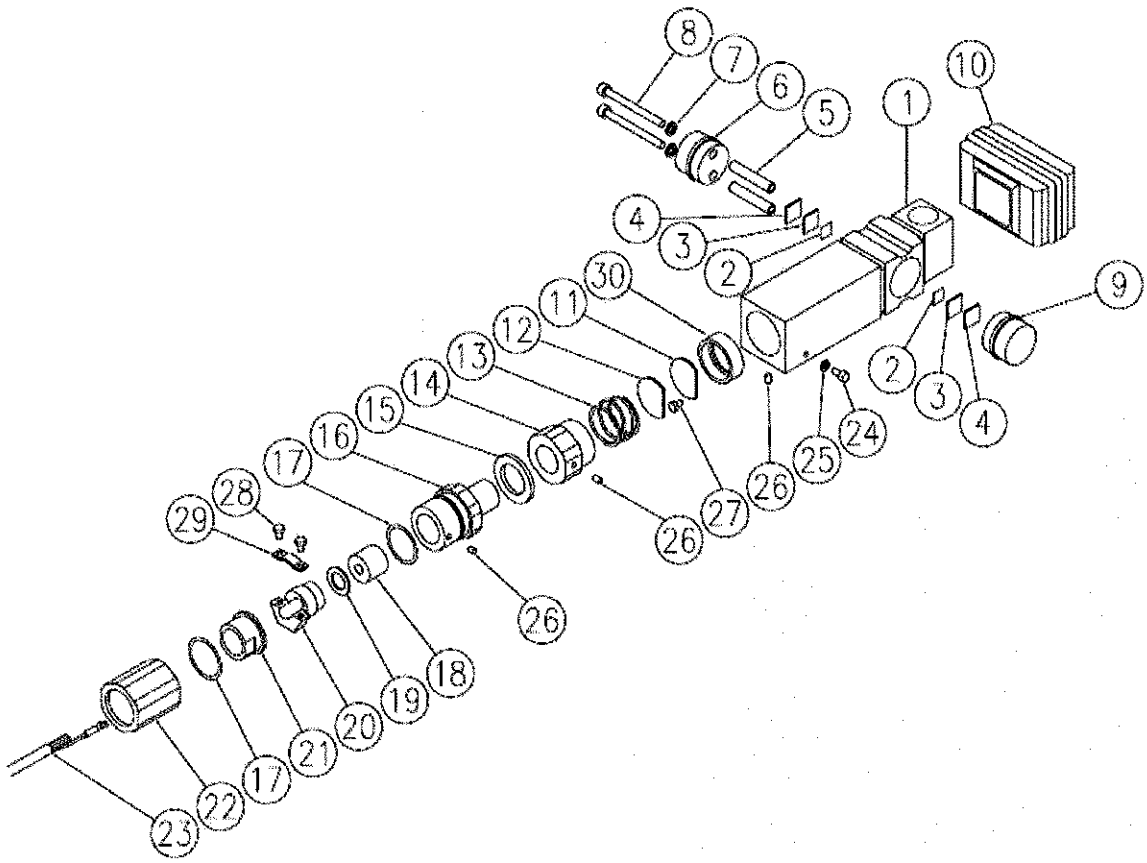


Model
LCM17T002E





LCM17　Structural chart

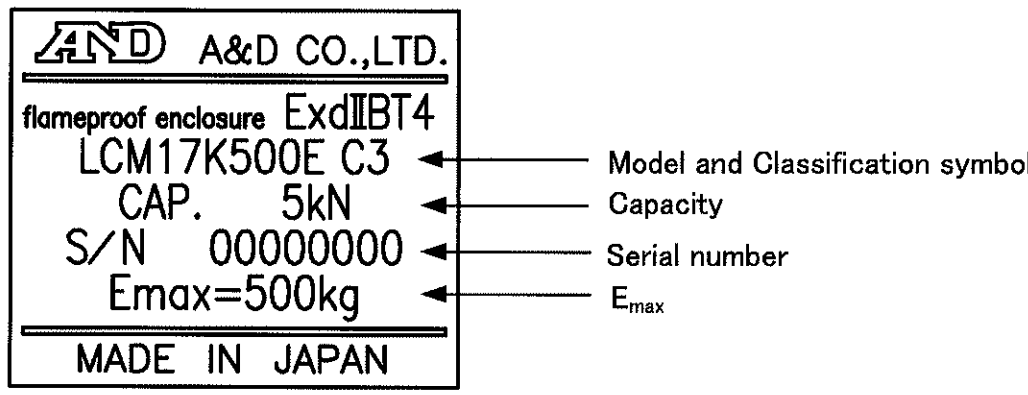


LCM17　Structural chart

Number	Part name	Quantity	Material
1	Spring Element	1	Stainless Steel
2	Strain gauge	2	Polyimide、etc
3	Covering agent	2	Butyl compound
4	Protective agent	2	Silicone
5	Spacer	2	Stainless Steel
6	Cover	1	Stainless Steel
7	Spring washer M5	2	Stainless Steel
8	Cap bolt M5	2	Stainless Steel
9	Cover	1	Stainless Steel
10	Dust cover	1	Rubber
11	Print Circuit Board	1	Glass epoxy board
12	Protective agent	1	Silicone
13	Spring	1	Stainless Steel
14	Nipple adapter	1	Brass
15	Gasket	1	Non asbestos joint sheet
16	Cable nipple	1	Brass
17	O-ring	2	Rubber
18	Clamp	1	Rubber
19	Gland washer	1	Steel
20	Gland nut	1	Brass
21	Ring	1	Brass
22	Nut	1	Brass
23	Cable	1	PVC、etc
24	Cap bolt M4	1	Stainless Steel
25	Spring washer M4	1	Stainless Steel
26	Set screw	3	Steel
27	Screw M4	1	Stainless Steel
28	Clamping plate	1	Steel
29	Screw	2	Steel
30	Spacer	1	Stainless Steel

※　No 30 Spacer is for "LCM17T002E" only.

LCM17 Load cell markings



Model	Classification symbol	Capacity	E_{max}
LCM17K500	C3	5kN	500kg
LCM17T001	C3	10kN	1t
LCM17T002	C3	20kN	2t

National Metrology Institute of Japan

Metrological regulation for load cells : Test report

Project number	:	LC-OIML-12-011
Test report number	:	12-11 / R60:2000
Issuing authority	:	National Metrology Institute of Japan /National Institute of Advanced Industrial Science and Technology (NMIJ/AIST)
		AIST Tsukuba Central 3 Tsukuba Ibaraki 305-8563, Japan
Applicant	:	A&D Company, Limited
Manufacturer	:	A&D Company, Limited
Date of application	:	2012.6.18
End of evaluation	:	2012.7.6
Date of issue	:	2012. 7. 9
Signature	:	Y. Koyano

Yasuhiro Koyano

Chief of Legal Weighing Metrology Section
Mechanical Metrology Division

OIML R60
Edition 2000(E)

Testing authority

Name: National Metrology Institute of Japan
Address: Central 3-1, 1-1-1 Umezono, Tsukuba, Ibaraki, 305-8563, Japan
Contact information: Telephone: +81 29 861 4389 Fax:+81 29 861 4341

Applicant/Manufacturer information

Application no.: 24-006
Application date: 2012.6.18
Model designation: LCM17***E

Manufacturer: A&D Company, Limited
Address: 3-23-14 Higashi-Ikebukuro,Toshima-ku,Tokyo 170-0013 Japan

Applicant: A&D Company, Limited
Address: 3-23-14 Higashi-Ikebukuro,Toshima-ku,Tokyo 170-0013 Japan

Representative: Youichi Sansho
(name, telephone) +81 48 593 1127

Instrument category: Load cell: strain gauge Documentation no.:

Information concerning the pattern

Accuracy class: [ ] A [ ] B [×] C [ ] D

Maximum number of load cell verification intervals (n_{max}): 3000

Direction of loading: (for load cell characterization, see 4.6.3)
[ ] Tension [×] Beam (shear) [ ] Compression
[ ] Universal [ ] Beam (bending)

Safe load limit (Lim): 150% of Emax Apportionment factor, p_{LC} (see *Note*) 0.7

Limits of working temperature: (only if other than -10°C to +40°C, see 5.5.1.1)
Upper: ____ °C Lower: ____ °C

Power voltage: V_{min} ____ V V_{max} 15 V

or V: 5 ~12 V [×] AC [×] DC Recommended: [ ] AC [×] DC

Humidity evaluation symbol:

NH	[ ] Yes	[×] No
SH	[ ] Yes	[×] No
CH or no markings	[×] Yes	[ ] No

Electronic load cell: [ ] Yes [×] No

Note: This value of p_{LC} is assumed to be 0.7 unless otherwise declared by the manufacturer.

Information concerning the pattern (continued)

Application No: 24-006

Specify other conditions that must be observed to obtain the specified performance (for example, electrical characteristics of the load cell):

Various designs within model range:

Maximum capacity E_{max} (kg)	Minimum load cell verification interval v_{min} (kg)	Minimum dead load E_{min} (kg)	Maximum number of load cell intervals n_{max}	Minimum dead load output return DR (kg)
500	0.1	0	3000	
1000	0.2	0	3000	
2000	0.4	0	3000	

All values in this table are taken from documentation pages _____.

DR information required only when applicable.

Load cell(s) submitted:

Model designation	Serial number	E_{max}(kg)
LCM17K500E	1	500

Secondary equipment (specify load adapters, etc.):

Remarks:

General information concerning test conditions

Ref.:A3

Application no.: 24-006

Load cell model: LCM17K500E Serial no.: 1 E_{max}: 500 kg

n_{max}: 3000 v_{min}: 0.1 kg DR (if applicable): -

Force-generating system - description: Load cell performance testing device
(see *Note*)

Minimum test load: 4.7 kg

Indicating instrument - description: HBM DMP40

Environmental equipment - description: Air Supply Epuipment ASE-210

Temperature: 20.4 ℃

Relative humidity: 47.2 ~ 47.4 %RH

Barometric pressure: 100.55 ~ 100.82 kPa

Test location: Room 023

Acceleration of gravity at test location: 9.79949 m/sec^2

Evaluator: Fukuda

Note: Include information concerning accuracy (for example, accredited laboratory).

Summary of the test

Application no.: 24-006
Load cell model: LCM17K500E
Serial no.: 1
E_{max}: 500 kg n_{max}: 3000
v_{min}: 0.1 kg DR: -
Force-generating system: Load cell performance testing device p_{LC}: 0.7
Indicating instrument: HBM DMP40
Evaluator: Fukuda

No.	Test description	Passed	Failed	Report page	Remarks
D.2	Load cell errors (E_L)	×		10	
D.3	Repeatability errors (E_R)	×		11	
D.4	Temperature effects on MDLO (C_M)	×		12	
D.5	Creep (C_C)	×		13-16	
D.5	DR(C_{DR})	×		13-16	(see *Note 2*) DR= 0.02 kg
D.6	Barometric pressure effects (C_p)	×		17	
D.7	Humidity effects (CH or no mark) (C_{Hmin})	×		18	
D.7	Humidity effects (CH or no mark) (C_{Hmax})	×		18	
D.8	Humidity effects (SH)				
D.9	Marking requirements	See Page ***19***, Check that marked values are correct.			
D.10	Load cells equipped with electronics				
D.11	Warm-up time				
D.12	Power voltage variations				
D.13	Short time power reductions				
D.14	Bursts (electrical fast transients)				
D.15	Electrostatic discharge				
D.16	Electromagnetic susceptibility				
D.17	Span stability				

The following table checks the required calculations as per the General notes provisions of C.4:

Paragraph No.	Description	n_{max}		n_{max}-500		n_{max}-1000	
		Pass	Fail	Pass	Fail	Pass	Fail
C.4.2, C.4.3, C.4.5	Check all calculations using values of n at n_{max} and at lower than n_{max}	×		×		×	
C.4.4	Check that $v_{mir} \leq \frac{D_{max}-D_{min}}{n_{max}}$	Pass		Fail			
		×					

Worst case figure for minimum dead load output return error (in mass units) = DR = 0.02 kg see *Note 3*

Notes: *1* Enter "NA" for "the test is not applicable".
2 Record error to accomodate OIML R76.
3 This DR value is used in association with OIML R 76.

Form D.1 (3 runs) Load test data (E_L)

Ref.: A.4.1.1 to A.4.1.11. Complete one sheet for each test temperature, one for each humidity (SH) test in A.4.6, and when applicable, one for each electronics power voltage in A.4.7.3.

Application no.: 24-006
Load cell model: LCM17K500E
Serial no.: 1
E_{max}: 500 kg
n_{max}: 3000
v_{min}: 0.1 kg
p_{LC}: 0.7 DR: -
Force-generating system: Load cell performance testing device
Indicating instrument: HBM DMP40
Evaluator: Fukuda

	At start	At end	
Date:	2012/6/18	2012/6/18	
Temperature:	20.4	20.4	°C
Relative humidity:	47.2	47.1	%
Barometric pressure:	100.82	100.80	kPa
Indicator temperature:	21.8	22.2	°C

Electronics power voltage (when applicable): _____ V

Table D.1 (3 runs)

Test load (kg)	Run no. 1		Run no. 2		Run no. 3		Average indication (mV/V)	Repeatability error (mV/V)
	Indication (mV/V)	Time	Indication (mV/V)	Time	Indication (mV/V)	Time		
0	0.056644	7:22:51						
450	1.065195	7:23:20						
0	0.056642	7:23:50						
450	1.065187	7:24:19						
0	0.056642	7:24:49						
450	1.065184	7:25:18						
0	0.056643	7:25:48						
0	0.056640	7:30:58	0.056648	7:39:06	0.056652	7:47:12	0.056647 *	0.000012
50	0.167309	7:31:19	0.167316	7:39:27	0.167319	7:47:33	0.167315	0.000010
100	0.277985	7:31:40	0.277990	7:39:47	0.277993	7:47:53	0.277989	0.000008
150	0.388682	7:32:00	0.388683	7:40:08	0.388688	7:48:14	0.388684	0.000006
200	0.499376	7:32:21	0.499378	7:40:28	0.499381	7:48:34	0.499378	0.000005
250	0.610055	7:32:42	0.610057	7:40:49	0.610060	7:48:55	0.610057	0.000005
300	0.720760	7:33:03	0.720760	7:41:09	0.720763	7:49:15	0.720761	0.000003
350	0.831468	7:33:23	0.831469	7:41:30	0.831471	7:49:36	0.831469	0.000003
400	0.942198	7:33:44	0.942199	7:41:50	0.942203	7:49:56	0.942200	0.000005
450	1.052881	7:34:05	1.052880	7:42:11	1.052882	7:50:17	1.052881	0.000002
500	1.163598	7:34:25	1.163593	7:42:32	1.163593	7:50:38	1.163595	0.000005
450	1.052935	7:34:46	1.052933	7:42:53	1.052934	7:50:59	1.052934	0.000002
400	0.942260	7:35:07	0.942259	7:43:14	0.942260	7:51:19	0.942260	0.000001
350	0.831576	7:35:28	0.831573	7:43:35	0.831575	7:51:40	0.831575	0.000003
300	0.720886	7:35:49	0.720884	7:43:56	0.720885	7:52:01	0.720885	0.000002
250	0.610187	7:36:10	0.610184	7:44:17	0.610187	7:52:22	0.610186	0.000003
200	0.499481	7:36:31	0.499482	7:44:38	0.499484	7:52:43	0.499482	0.000003
150	0.388773	7:36:52	0.388779	7:44:59	0.388776	7:53:04	0.388776	0.000006
100	0.278058	7:37:13	0.278060	7:45:20	0.278062	7:53:26	0.278060	0.000004
50	0.167348	7:37:34	0.167350	7:45:41	0.167352	7:53:47	0.167350	0.000004
0	0.056651	7:37:56	0.056654	7:46:02	0.056656	7:54:08	0.056654	0.000005

Notes: *1* * = Average initial minimum test load indication.
2 Absolute (not relative) time shall be recorded.

Form D.1 (3 runs) Load test data (E_L)

Ref.: A.4.1.1 to A.4.1.11. Complete one sheet for each test temperature, one for each humidity (SH) test in A.4.6, and when applicable, one for each electronics power voltage in A.4.7.3.

Application no.: 24-006
Load cell model: LCM17K500E
Serial no.: 1
E_{max}: 500 kg
n_{max}: 3000
v_{min}: 0.1 kg
p_{LC}: 0.7 DR: -
Force-generating system: Load cell performance testing device
Indicating instrument: HBM DMP40
Evaluator: Fukuda

	At start	At end	
Date:	2012/6/19	2012/6/19	
Temperature:	40.2	40.2	°C
Relative humidity:	34.7	34.8	%
Barometric pressure:	100.89	100.90	kPa
Indicator temperature:	21.9	21.8	°C

Electronics power voltage (when applicable): _____ V

Table D.1 (3 runs)

Test load (kg)	Run no. 1		Run no. 2		Run no. 3		Average indication (mV/V)	Repeatability error (mV/V)
	Indication (mV/V)	Time	Indication (mV/V)	Time	Indication (mV/V)	Time		
0	0.056457	7:14:45						
450	1.064931	7:15:15						
0	0.056409	7:15:44						
450	1.064931	7:16:14						
0	0.056401	7:16:43						
450	1.064965	7:17:13						
0	0.056397	7:17:42						
0	0.056396	7:22:52	0.056385	7:30:57	0.056378	7:39:02	0.056386 *	0.000018
50	0.167067	7:23:13	0.167058	7:31:18	0.167047	7:39:23	0.167057	0.000020
100	0.277731	7:23:33	0.277720	7:31:38	0.277712	7:39:43	0.277721	0.000019
150	0.388422	7:23:54	0.388409	7:31:59	0.388401	7:40:04	0.388411	0.000021
200	0.499109	7:24:15	0.499095	7:32:19	0.499087	7:40:24	0.499097	0.000022
250	0.609773	7:24:35	0.609768	7:32:40	0.609760	7:40:45	0.609767	0.000013
300	0.720479	7:24:56	0.720463	7:33:00	0.720454	7:41:05	0.720465	0.000025
350	0.831181	7:25:16	0.831164	7:33:21	0.831156	7:41:26	0.831167	0.000025
400	0.941898	7:25:37	0.941882	7:33:41	0.941874	7:41:46	0.941885	0.000024
450	1.052563	7:25:58	1.052554	7:34:02	1.052544	7:42:07	1.052554	0.000019
500	1.163262	7:26:18	1.163248	7:34:22	1.163242	7:42:27	1.163251	0.000020
450	1.052601	7:26:39	1.052590	7:34:43	1.052583	7:42:48	1.052591	0.000018
400	0.941932	7:27:00	0.941920	7:35:04	0.941913	7:43:09	0.941922	0.000019
350	0.831254	7:27:20	0.831243	7:35:25	0.831238	7:43:30	0.831245	0.000016
300	0.720565	7:27:41	0.720556	7:35:46	0.720551	7:43:51	0.720557	0.000014
250	0.609874	7:28:02	0.609865	7:36:06	0.609859	7:44:11	0.609866	0.000015
200	0.499175	7:28:23	0.499167	7:36:27	0.499162	7:44:32	0.499168	0.000013
150	0.388474	7:28:44	0.388467	7:36:48	0.388462	7:44:53	0.388468	0.000012
100	0.277769	7:29:05	0.277763	7:37:09	0.277758	7:45:14	0.277763	0.000011
50	0.167075	7:29:26	0.167065	7:37:30	0.167059	7:45:35	0.167066	0.000016
0	0.056386	7:29:47	0.056379	7:37:51	0.056374	7:45:56	0.056380	0.000012

Notes: *1* * = Average initial minimum test load indication.
2 Absolute (not relative) time shall be recorded.

Form D.1 (3 runs) Load test data (E_L)

Ref.: A.4.1.1 to A.4.1.11. Complete one sheet for each test temperature, one for each humidity (SH) test in A.4.6, and when applicable, one for each electronics power voltage in A.4.7.3.

Application no.: 24-006
Load cell model: LCM17K500E
Serial no.: 1
E_{max}: 500 kg
n_{max}: 3000
v_{min}: 0.1 kg
p_{LC}: 0.7 DR: -
Force-generating system: Load cell performance testing device
Indicating instrument: HBM DMP40
Evaluator: Fukuda

	At start	At end	
Date:	2012/6/20	2012/6/20	
Temperature:	-9.7	-9.7	°C
Relative humidity:	34.5	33.2	%
Barometric pressure:	99.41	99.44	kPa
Indicator temperature:	22.5	21.7	°C

Electronics power voltage (when applicable): _____ V

Table D.1 (3 runs)

Test load (kg)	Run no. 1		Run no. 2		Run no. 3		Average indication (mV/V)	Repeatability error (mV/V)
	Indication (mV/V)	Time	Indication (mV/V)	Time	Indication (mV/V)	Time		
0	0.056008	7:07:26						
450	1.064803	7:07:55						
0	0.055992	7:08:25						
450	1.064786	7:08:54						
0	0.055981	7:09:24						
450	1.064775	7:09:54						
0	0.055974	7:10:23						
0	0.055963	7:15:33	0.055955	7:23:41	0.055949	7:31:47	0.055956 *	0.000014
50	0.166666	7:15:54	0.166659	7:24:02	0.166652	7:32:08	0.166659	0.000014
100	0.277362	7:16:15	0.277357	7:24:22	0.277349	7:32:28	0.277356	0.000013
150	0.388083	7:16:35	0.388074	7:24:43	0.388067	7:32:49	0.388075	0.000016
200	0.498806	7:16:56	0.498796	7:25:03	0.498790	7:33:09	0.498797	0.000016
250	0.609514	7:17:17	0.609503	7:25:24	0.609498	7:33:30	0.609505	0.000016
300	0.720251	7:17:38	0.720237	7:25:44	0.720229	7:33:50	0.720239	0.000022
350	0.830988	7:17:58	0.830975	7:26:05	0.830967	7:34:11	0.830977	0.000021
400	0.941752	7:18:19	0.941739	7:26:25	0.941730	7:34:32	0.941740	0.000022
450	1.052464	7:18:40	1.052451	7:26:46	1.052441	7:34:52	1.052452	0.000023
500	1.163205	7:19:00	1.163194	7:27:07	1.163183	7:35:13	1.163194	0.000022
450	1.052513	7:19:21	1.052502	7:27:28	1.052492	7:35:34	1.052502	0.000021
400	0.941808	7:19:42	0.941798	7:27:49	0.941788	7:35:55	0.941798	0.000020
350	0.831091	7:20:03	0.831080	7:28:09	0.831073	7:36:16	0.831081	0.000018
300	0.720365	7:20:24	0.720356	7:28:30	0.720348	7:36:37	0.720356	0.000017
250	0.609635	7:20:45	0.609627	7:28:51	0.609620	7:36:58	0.609627	0.000015
200	0.498900	7:21:06	0.498889	7:29:12	0.498888	7:37:19	0.498892	0.000012
150	0.388163	7:21:27	0.388159	7:29:33	0.388150	7:37:40	0.388157	0.000013
100	0.277426	7:21:48	0.277423	7:29:55	0.277413	7:38:01	0.277421	0.000013
50	0.166695	7:22:09	0.166689	7:30:16	0.166683	7:38:22	0.166689	0.000012
0	0.055960	7:22:31	0.055953	7:30:37	0.055949	7:38:43	0.055954	0.000011

Notes: *1* * = Average initial minimum test load indication.
2 Absolute (not relative) time shall be recorded.

Form D.1 (3 runs) Load test data (E_L)

Ref.: A.4.1.1 to A.4.1.11. Complete one sheet for each test temperature, one for each humidity (SH) test in A.4.6, and when applicable, one for each electronics power voltage in A.4.7.3.

Application no.: 24-006
Load cell model: LCM17K500E
Serial no.: 1
E_{max}: 500 kg
n_{max}: 3000
v_{min}: 0.1 kg
p_{LC}: 0.7 DR: -
Force-generating system: Load cell performance testing device
Indicating instrument: HBM DMP40
Evaluator: Fukuda

	At start	At end	
Date:	2012/6/21	2012/6/21	
Temperature:	20.4	20.4	°C
Relative humidity:	47.3	47.4	%
Barometric pressure:	100.54	100.55	kPa
Indicator temperature:	22.1	22.2	°C

Electronics power voltage (when applicable): _____ V

Table D.1 (3 runs)

Test load (kg)	Run no. 1		Run no. 2		Run no. 3		Average indication (mV/V)	Repeatability error (mV/V)
	Indication (mV/V)	Time	Indication (mV/V)	Time	Indication (mV/V)	Time		
0	0.056299	7:24:09						
450	1.064815	7:24:39						
0	0.056305	7:25:09						
450	1.064813	7:25:38						
0	0.056308	7:26:08						
450	1.064812	7:26:37						
0	0.056311	7:27:07						
0	0.056308	7:32:17	0.056316	7:40:23	0.056320	7:48:28	0.056315 *	0.000012
50	0.166982	7:32:38	0.166990	7:40:44	0.166993	7:48:49	0.166988	0.000011
100	0.277649	7:32:58	0.277656	7:41:04	0.277660	7:49:09	0.277655	0.000011
150	0.388341	7:33:19	0.388348	7:41:25	0.388351	7:49:30	0.388347	0.000010
200	0.499032	7:33:40	0.499037	7:41:45	0.499040	7:49:50	0.499036	0.000008
250	0.609709	7:34:00	0.609713	7:42:06	0.609716	7:50:11	0.609713	0.000007
300	0.720407	7:34:21	0.720411	7:42:26	0.720414	7:50:31	0.720411	0.000007
350	0.831111	7:34:41	0.831116	7:42:47	0.831117	7:50:52	0.831115	0.000006
400	0.941834	7:35:02	0.941838	7:43:07	0.941840	7:51:12	0.941837	0.000006
450	1.052514	7:35:23	1.052515	7:43:28	1.052517	7:51:33	1.052515	0.000003
500	1.163217	7:35:43	1.163223	7:43:48	1.163224	7:51:53	1.163221	0.000007
450	1.052557	7:36:04	1.052561	7:44:09	1.052563	7:52:14	1.052560	0.000006
400	0.941883	7:36:25	0.941886	7:44:30	0.941890	7:52:35	0.941886	0.000007
350	0.831200	7:36:45	0.831204	7:44:51	0.831209	7:52:56	0.831204	0.000009
300	0.720508	7:37:07	0.720512	7:45:12	0.720516	7:53:17	0.720512	0.000008
250	0.609812	7:37:27	0.609816	7:45:33	0.609822	7:53:38	0.609817	0.000010
200	0.499110	7:37:48	0.499116	7:45:53	0.499119	7:53:58	0.499115	0.000009
150	0.388407	7:38:09	0.388412	7:46:14	0.388417	7:54:19	0.388412	0.000010
100	0.277702	7:38:30	0.277708	7:46:36	0.277712	7:54:40	0.277707	0.000010
50	0.167016	7:38:51	0.167012	7:46:57	0.167015	7:55:01	0.167014	0.000004
0	0.056317	7:39:12	0.056322	7:47:18	0.056325	7:55:23	0.056321	0.000008

Notes: *1* * = Average initial minimum test load indication.
2 Absolute (not relative) time shall be recorded.

Form D.2 Load cell errors (E_L)calculation

Ref.: 5.1.1; A.4.1.12 to A.4.1.14; C.2.2.

Application no.: 24-006
Load cell model: LCM17K500E
Serial no.: 1
E_{max}: 500 kg
n_{max}: 3000
v_{min}: 0.1 kg
p_{LC}: 0.7 DR: -
Force-generating system: Load cell performance testing device
Indicating instrument: HBM DMP40
Evaluator: Fukuda

	At start	At end	
Date:	2012/6/18	2012/6/21	
Test temperature:	20.4	20.4	℃
Relative humidity:	47.2	47.4	%
Barometric pressure:	100.82	100.55	kPa
Indicator temperature:	21.8	22.2	℃

Conversion factor, f: 0.000369
75% test load (g, kg or t): 375 kg
Reference indication at 75% test load: 0.830188

Table D.2

Test load	Reference indication	20.4 ℃ (20℃)		40.2 ℃(40℃)		-9.7 ℃(-10℃)		20.4 ℃(20℃)		mpe
		Indication	Error(E_L)	Indication	Error(E_L)	Indication	Error(E_L)	Indication	Error(E_L)	
(kg)	(mV/V)	(mV/V)	(V)	(mV/V)	(V)	(mV/V)	(V)	(mV/V)	(V)	(V)
0	0.000000	0.000000	0.00	0.000000	0.00	0.000000	0.00	0.000000	0.00	0.35
50	0.110692	0.110668	-0.06	0.110671	-0.06	0.110703	0.03	0.110674	-0.05	0.35
100	0.221383	0.221343	-0.11	0.221335	-0.13	0.221400	0.05	0.221340	-0.12	0.70
150	0.332075	0.332038	-0.10	0.332024	-0.14	0.332119	0.12	0.332032	-0.12	0.70
200	0.442767	0.442732	-0.10	0.442711	-0.15	0.442842	0.20	0.442722	-0.12	0.70
250	0.553459	0.553411	-0.13	0.553381	-0.21	0.553549	0.25	0.553398	-0.16	0.70
300	0.664150	0.664114	-0.10	0.664079	-0.19	0.664283	0.36	0.664096	-0.15	0.70
350	0.774842	0.774823	-0.05	0.774781	-0.17	0.775021	0.48	0.774800	-0.11	1.05
400	0.885534	0.885553	0.05	0.885498	-0.10	0.885785	0.68	0.885523	-0.03	1.05
450	0.996226	0.996234	0.02	0.996167	-0.16	0.996496	0.73	0.996201	-0.07	1.05
500	1.106917	1.106948	0.08	1.106864	-0.14	1.107238	0.87	1.106907	-0.03	1.05
450	0.996226	0.996287	0.17	0.996205	-0.06	0.996547	0.87	0.996246	0.05	1.05
400	0.885534	0.885613	0.21	0.885535	0.00	0.885842	0.84	0.885572	0.10	1.05
350	0.774842	0.774928	0.23	0.774859	0.04	0.775126	0.77	0.774890	0.13	1.05
300	0.664150	0.664238	0.24	0.664171	0.06	0.664401	0.68	0.664197	0.13	0.70
250	0.553459	0.553539	0.22	0.553480	0.06	0.553672	0.58	0.553502	0.12	0.70
200	0.442767	0.442836	0.19	0.442782	0.04	0.442937	0.46	0.442800	0.09	0.70
150	0.332075	0.332129	0.15	0.332081	0.02	0.332202	0.34	0.332097	0.06	0.70
100	0.221383	0.221413	0.08	0.221377	-0.02	0.221465	0.22	0.221393	0.02	0.70
50	0.110692	0.110703	0.03	0.110680	-0.03	0.110733	0.11	0.110700	0.02	0.35
0	0.000000	0.000007	0.02	-0.000007	-0.02	-0.000002	0.00	0.000007	0.02	0.35

Minimum test load, D_{min}: 4.7 kg PASS: × FAIL:

Notes:

1 Load/reference indications: if a 75% load point was not obtained, a straight line interpolation between the adjacent higher and lower load point indications is used (see 5.2.2 and calculation procedures in C.2.2).
2 Error, E_L: the difference between the test indication and the reference indication divided by the conversion factor, f.
3 Test load values are values above minimum test load, D_{min}.

Form D.3 Repeatability errors (E_R) calculation

Ref.: 5.4; A.4.1.13; C.2.3.

Application no.: 24-006
Load cell model: LCM17K500E
Serial no.: 1
E_{max}: 500 kg
n_{max}: 3000
v_{min}: 0.1 kg
p_{LC}: 0.7 DR: -
Force-generating system: Load cell performance testing device
Indicating instrument: HBM DMP40
Evaluator: Fukuda

Conversion factor, f: 0.000369

Table D.3

Test load	20.4 °C (20°C)		40.2 °C(40°C)		-9.7 °C(-10°C)		20.4 °C(20°C)		mpe
	Repeatability error	Repeatability error	Repeatability error	Repeatability error	Repeatability error	Repeatability error	Repeatability error	Repeatability error	
(kg)	(mV/V)	(V)	(mV/V)	(V)	(mV/V)	(V)	(mV/V)	(V)	(V)
0	0.000012	0.03	0.000018	0.05	0.000014	0.04	0.000012	0.03	0.35
50	0.000010	0.03	0.000020	0.05	0.000014	0.04	0.000011	0.03	0.35
100	0.000008	0.02	0.000019	0.05	0.000013	0.04	0.000011	0.03	0.70
150	0.000006	0.02	0.000021	0.06	0.000016	0.04	0.000010	0.03	0.70
200	0.000005	0.01	0.000022	0.06	0.000016	0.04	0.000008	0.02	0.70
250	0.000005	0.01	0.000013	0.04	0.000016	0.04	0.000007	0.02	0.70
300	0.000003	0.01	0.000025	0.07	0.000022	0.06	0.000007	0.02	0.70
350	0.000003	0.01	0.000025	0.07	0.000021	0.06	0.000006	0.02	1.05
400	0.000005	0.01	0.000024	0.07	0.000022	0.06	0.000006	0.02	1.05
450	0.000002	0.01	0.000019	0.05	0.000023	0.06	0.000003	0.01	1.05
500	0.000005	0.01	0.000020	0.05	0.000022	0.06	0.000007	0.02	1.05
450	0.000002	0.01	0.000018	0.05	0.000021	0.06	0.000006	0.02	1.05
400	0.000001	0.00	0.000019	0.05	0.000020	0.05	0.000007	0.02	1.05
350	0.000003	0.01	0.000016	0.04	0.000018	0.05	0.000009	0.02	1.05
300	0.000002	0.01	0.000014	0.04	0.000017	0.05	0.000008	0.02	0.70
250	0.000003	0.01	0.000015	0.04	0.000015	0.04	0.000010	0.03	0.70
200	0.000003	0.01	0.000013	0.04	0.000012	0.03	0.000009	0.02	0.70
150	0.000006	0.02	0.000012	0.03	0.000013	0.04	0.000010	0.03	0.70
100	0.000004	0.01	0.000011	0.03	0.000013	0.04	0.000010	0.03	0.70
50	0.000004	0.01	0.000016	0.04	0.000012	0.03	0.000004	0.01	0.35
0	0.000005	0.01	0.000012	0.03	0.000011	0.03	0.000008	0.02	0.35

PASS: x FAIL:

Note: Error, E_R: the maximum difference between the three test indications divided by the conversion factor, f (classes C and D) or the maximum difference between the five test indications divided by the conversion factor, f (classes A and B).

D.4 Temperature effects on MDLO (C_M) calculation

Ref.: 5.5.1.3; A.4.1.14; C.2.4.

Application no.: 24-006
Load cell model: LCM17K500E
Serial no.: 1
E_{max}: 500 kg
n_{max}: 3000
v_{min}: 0.1 kg
p_{LC}: 0.7 DR: -
Force-generating system: Load cell performance testing device Conversion factor, f: 0.000369
Indicating instrument: HBM DMP40
Evaluator: Fukuda

Table D.4

Temperature °C	Indication (mV/V)	Change (C_M) (V)	Change (v_{min}/5 °C)	mpc (v_{min}/5 °C)
20.4	0.056647			
40.2	0.056386	-0.71	-0.30	0.70
-9.7	0.055956	-1.17	0.19	0.70
20.4	0.056315	0.97	0.27	0.70

PASS: × FAIL:

Notes:

1 MDLO: minimum dead load output.

2 Indication: the average initial minimum test load indication obtained from Table D.1.

3 The maximum permissible change(mpc) allowed is: (v_{min}/5°C) for classesB, C, and D; (v_{min}/2°C) for class A.

4 Change, C_M(v): the difference between the observed indications, and the indications at the prior temperature, divided by the conversion factor, f.

Form D.5 Creep (Cc) and DR (CDR)

Ref.: 5.3.1, 5.3.2; A.4.2, A.4.3 Complete one sheet for each test temperature.

Application no.: 24-006
Load cell model: LCM17K500E
Serial no.: 1
E_{max}: 500 kg
n_{max}: 3000
v_{min}: 0.1 kg
p_{LC}: 0.7 DR: -
Force generating system: Load cell performance testing device
Indicating instrument: HBM DMP40
Evaluator: Fukuda

	At start	At end	
Date:	2012/6/18	2012/6/18	
Temperature:	20.4	20.4	°C
Relative humidity:	46.6	46.6	%
Barometric pressure:	100.80	100.80	kPa
Indicator temperature:	21.8	22.0	°C

Conversion factor, f: 0.000336

Table D.5

	Test load (kg)	Indication (mV/V)	Barometric pressure (kPa)	Time	Change (v)	mpc (v)	
Exercise cells	0						
These rows may be omitted for a load sequence as shown in Figure A.1	0						
	0						
	0						
(*) →	0	0.056634	100.81	8:54:26			←initial "no load" indication
Fill in time →	Record time of initial loading →			8:54:26			
(**) →	450	1.065181	100.81	8:54:56	0.00	0.735	←initial "load" indication
	450	1.065183	100.81	8:55:55	0.01	0.735	
	450	1.065186	100.81	8:56:54	0.01	0.735	
	450	1.065189	100.81	8:57:53	0.02	0.735	
	450	1.065192	100.81	8:58:52	0.03	0.735	
Constant maximum test load, Dmax	450	1.065193	100.81	8:59:51	0.04	0.735	
	450	1.065195	100.80	9:00:50	0.04	0.735	
	450	1.065197	100.81	9:01:49	0.05	0.735	
	450	1.065198	100.81	9:02:48	0.05	0.735	
	450	1.065198	100.80	9:03:48	0.05	0.735	
	450	1.065201	100.80	9:04:47	0.06	0.735	
	450	1.065205	100.80	9:09:46	0.07	0.735	
	450	1.065208	100.80	9:14:45	0.08	0.735	
	450	1.065210	100.79	9:19:44	0.09	0.735	
	450	1.065213	100.80	9:24:43	0.10	0.735	
Fill in time →	Record time of initial unloading →			9:24:43			
(***) →	0	0.056669	100.80	9:25:13	0.10	0.500	←initial indication
These rows are for reference purposes only	0	0.056669	100.80	9:25:32	0.10	0.500	
	0	0.056669	100.80	9:25:51	0.10	0.500	
	0	0.056671	100.80	9:26:10	0.11	0.500	
	0	0.056669	100.80	9:26:29	0.10	0.500	
	0	0.056669	100.80	9:26:48	0.10	0.500	
	30-20 minute creep difference in units:				0.01	0.1575	

DR (v):	0.10	30 minute creep:	PASS:	×	FAIL:
actual time (s):	30	30-20 minute creep diffence:	PASS:	×	FAIL:
specified time (s):	30	DR ≤ 0.5v:	PASS:	×	FAIL:
mpc for DR (v):	0.50	DR within manufacturer specified DRrequirements:	PASS:		FAIL:

Notes:
1 Change (v) for creep: the observed indication minus the initial "load" indication (**) devided by the conversion factor, f.
2 Determine the difference between the reading obtained at 20 minutes and the reading obtained at 30 minutes (see 5.3.1).
3 Change (v) for DR: the initial indication (***) minus the initial "no load" indication (*) divided by the conversion factor, f.
4 Absolute (not relative) time shall be recorded.

Form D.5 Creep (Cc) and DR (CDR)

Ref.: 5.3.1, 5.3.2; A.4.2, A.4.3 Complete one sheet for each test temperature.

Application no.: 24-006
Load cell model: LCM17K500E
Serial no.: 1
E_{max}: 500 kg
n_{max}: 3000
v_{min}: 0.1 kg
p_{LC}: 0.7 DR: -
Force generating system: Load cell performance testing device
Indicating instrument: HBM DMP40
Evaluator: Fukuda

	At start	At end	
Date:	2012/6/19	2012/6/19	
Temperature:	40.2	40.2	°C
Relative humidity:	34.6	35.0	%
Barometric pressure:	100.90	100.89	kPa
Indicator temperature:	21.6	22.8	°C

Conversion factor, f: 0.000336

Table D.5

	Test load (kg)	Indication (mV/V)	Barometric pressure (kPa)	Time	Change (v)	mpc (v)	
Exercise cells	0						
These rows may be omitted for a load sequence as shown in Figure A.1	0						
	0						
	0						
(*) →	0	0.056354	100.85	8:46:15			←initial "no load" indication
Fill in time →	Record time of initial loading →			8:46:15			
(**) →	450	1.064836	100.85	8:46:45	0.00	0.735	←initial "load" indication
	450	1.064830	100.85	8:47:45	-0.02	0.735	
	450	1.064831	100.85	8:48:44	-0.01	0.735	
	450	1.064832	100.85	8:49:43	-0.01	0.735	
	450	1.064832	100.85	8:50:42	-0.01	0.735	
Constant maximum test load, Dmax	450	1.064833	100.85	8:51:41	-0.01	0.735	
	450	1.064833	100.85	8:52:41	-0.01	0.735	
	450	1.064835	100.85	8:53:40	0.00	0.735	
	450	1.064835	100.85	8:54:39	0.00	0.735	
	450	1.064835	100.85	8:55:38	0.00	0.735	
	450	1.064836	100.85	8:56:37	0.00	0.735	
	450	1.064836	100.85	9:01:36	0.00	0.735	
	450	1.064837	100.84	9:06:35	0.00	0.735	
	450	1.064837	100.84	9:11:34	0.00	0.735	
	450	1.064837	100.83	9:16:33	0.00	0.735	
Fill in time →	Record time of initial unloading →			9:16:33			
(***) →	0	0.056364	100.83	9:17:03	0.03	0.500	←initial indication
These rows are for reference purposes only	0	0.056364	100.83	9:17:22	0.03	0.500	
	0	0.056367	100.83	9:17:41	0.04	0.500	
	0	0.056367	100.83	9:18:00	0.04	0.500	
	0	0.056367	100.83	9:18:19	0.04	0.500	
	0	0.056366	100.83	9:18:38	0.04	0.500	
	30-20 minute creep difference in units:				0.00	0.1575	

DR (v):	0.03	30 minute creep:	PASS:	×	FAIL:	
actual time (s):	30	30-20 minute creep diffence:	PASS:	×	FAIL:	
specified time (s):	30	DR ≤ 0.5v:	PASS:	×	FAIL:	
mpc for DR (v):	0.50	DR within manufacturer specified DRrequirements:	PASS:		FAIL:	

Notes:
1 Change (v) for creep: the observed indication minus the initial "load" indication (**) devided by the conversion factor, f.
2 Determine the difference between the reading obtained at 20 minutes and the reading obtained at 30 minutes (see 5.3.1).
3 Change (v) for DR: the initial indication (***) minus the initial "no load" indication (*) divided by the conversion factor, f.
4 Absolute (not relative) time shall be recorded.

Form D.5 Creep (C_C) and DR (C_{DR})

Ref.: 5.3.1, 5.3.2; A.4.2, A.4.3 Complete one sheet for each test temperature.

Application no.: 24-006
Load cell model: LCM17K500E
Serial no.: 1
E_{max}: 500 kg
n_{max}: 3000
v_{min}: 0.1 kg
p_{LC}: 0.7 DR: -
Force generating system: Load cell performance testing device
Indicating instrument: HBM DMP40
Evaluator: Fukuda

	At start	At end	
Date:	2012/6/20	2012/6/20	
Temperature:	-9.7	-9.7	℃
Relative humidity:	34.5	33.2	%
Barometric pressure:	99.41	99.44	kPa
Indicator temperature:	22.5	21.7	℃

Conversion factor, f: 0.000336

Table D.5

	Test load (kg)	Indication (mV/V)	Barometric pressure (kPa)	Time	Change (v)	mpc (v)	
Exercise cells	0						
These rows may be omitted for a load sequence as shown in Figure A.1	0						
	0						
	0						
(*) →	0	0.055932	99.49	8:39:02			←initial "no load" indication
Fill in time →	Record time of initial loading →			8:39:02			
(**) →	450	1.064741	99.48	8:39:32	0.00	0.735	←initial "load" indication
	450	1.064744	99.48	8:40:32	0.01	0.735	
	450	1.064748	99.49	8:41:31	0.02	0.735	
	450	1.064750	99.50	8:42:30	0.03	0.735	
	450	1.064753	99.49	8:43:29	0.04	0.735	
Constant maximum test load, Dmax	450	1.064755	99.50	8:44:29	0.04	0.735	
	450	1.064756	99.49	8:45:28	0.04	0.735	
	450	1.064758	99.49	8:46:27	0.05	0.735	
	450	1.064759	99.49	8:47:26	0.05	0.735	
	450	1.064760	99.49	8:48:25	0.06	0.735	
	450	1.064761	99.48	8:49:24	0.06	0.735	
	450	1.064764	99.50	8:54:23	0.07	0.735	
	450	1.064766	99.50	8:59:22	0.07	0.735	
	450	1.064767	99.50	9:04:21	0.08	0.735	
	450	1.064771	99.50	9:09:20	0.09	0.735	
Fill in time →	Record time of initial unloading →			9:09:20			
(***) →	0	0.055963	99.50	9:09:50	0.09	0.500	←initial indication
These rows are for reference purposes only	0	0.055959	99.50	9:10:09	0.08	0.500	
	0	0.055958	99.50	9:10:28	0.08	0.500	
	0	0.055957	99.50	9:10:47	0.07	0.500	
	0	0.055956	99.50	9:11:06	0.07	0.500	
	0	0.055954	99.49	9:11:25	0.07	0.500	
	30-20 minute creep difference in units:				0.01	0.1575	

DR (v):	0.09	30 minute creep:	PASS:	×	FAIL:
actual time (s):	30	30-20 minute creep diffence:	PASS:	×	FAIL:
specified time (s):	30	DR ≤ 0.5v:	PASS:	×	FAIL:
mpc for DR (v):	0.50	DR within manufacturer specified DRrequirements:	PASS:		FAIL:

Notes:
1 Change (v) for creep: the observed indication minus the initial "load" indication (**) devided by the conversion factor, f.
2 Determine the difference between the reading obtained at 20 minutes and the reading obtained at 30 minutes (see 5.3.1).
3 Change (v) for DR: the initial indication (***) minus the initial "no load" indication (*) divided by the conversion factor, f.
4 Absolute (not relative) time shall be recorded.

Form D.5 Creep (Cc) and DR (CDR)

Ref.: 5.3.1, 5.3.2; A.4.2, A.4.3 Complete one sheet for each test temperature.

Application no.: 24-006
Load cell model: LCM17K500E
Serial no.: 1
E_{max}: 500 kg
n_{max}: 3000
v_{min}: 0.1 kg
p_{LC}: 0.7 DR: -
Force generating system: Load cell performance testing device
Indicating instrument: HBM DMP40
Evaluator: Fukuda

	At start	At end	
Date:	2012/6/21	2012/6/21	
Temperature:	20.4	20.4	°C
Relative humidity:	47.3	47.1	%
Barometric pressure:	100.55	100.53	kPa
Indicator temperature:	22.1	22.1	°C

Conversion factor, f: 0.000336

Table D.5

	Test load (kg)	Indication (mV/V)	Barometric pressure (kPa)	Time	Change (v)	mpc (v)	
Exercise cells	0						
These rows may be omitted for a load sequence as shown in Figure A.1	0						
	0						
	0						
(*) →	0	0.056308	100.50	8:55:41			←initial "no load" indication
Fill in time →	Record time of initial loading →			8:55:41			
(**) →	450	1.064822	100.50	8:56:11	0.00	0.735	←initial "load" indication
	450	1.064818	100.50	8:57:10	-0.01	0.735	
	450	1.064820	100.50	8:58:09	-0.01	0.735	
	450	1.064823	100.50	8:59:08	0.00	0.735	
	450	1.064824	100.50	9:00:07	0.01	0.735	
Constant maximum test load, Dmax	450	1.064827	100.50	9:01:06	0.01	0.735	
	450	1.064829	100.49	9:02:05	0.02	0.735	
	450	1.064829	100.49	9:03:05	0.02	0.735	
	450	1.064832	100.50	9:04:04	0.03	0.735	
	450	1.064831	100.50	9:05:03	0.03	0.735	
	450	1.064834	100.50	9:06:02	0.04	0.735	
	450	1.064837	100.49	9:11:01	0.04	0.735	
	450	1.064841	100.48	9:16:00	0.06	0.735	
	450	1.064843	100.48	9:20:59	0.06	0.735	
	450	1.064845	100.48	9:25:58	0.07	0.735	
Fill in time →	Record time of initial unloading →			9:25:58			
(***) →	0	0.056343	100.48	9:26:28	0.10	0.500	←initial indication
These rows are for reference purposes only	0	0.056343	100.48	9:26:47	0.10	0.500	
	0	0.056344	100.48	9:27:06	0.11	0.500	
	0	0.056344	100.48	9:27:25	0.11	0.500	
	0	0.056344	100.48	9:27:44	0.11	0.500	
	0	0.056343	100.48	9:28:03	0.10	0.500	
	30-20 minute creep difference in units:				0.01	0.1575	

DR (v):	0.10	30 minute creep:	PASS:	×	FAIL:
actual time (s):	30	30-20 minute creep diffence:	PASS:	×	FAIL:
specified time (s):	30	DR ≤ 0.5v:	PASS:	×	FAIL:
mpc for DR (v):	0.50	DR within manufacturer specified DRrequirements:	PASS:		FAIL:

Notes:
1 Change (v) for creep: the observed indication minus the initial "load" indication (**) devided by the conversion factor, f.
2 Determine the difference between the reading obtained at 20 minutes and the reading obtained at 30 minutes (see 5.3.1).
3 Change (v) for DR: the initial indication (***) minus the initial "no load" indication (*) divided by the conversion factor, f.
4 Absolute (not relative) time shall be recorded.

Form D.6 Barometric pressure effects (Cp)

Ref.: 5.5.2; A.4.4.

Application no.: 24-006
Load cell model: LCM17K500E
Serial no.: 1
E_{max}: 500 kg
n_{max}: 3000
v_{min}: 0.1 kg
p_{LC}: 0.7 DR: -
Force-generating system: –
Indicating instrument: HBM DMP40
Evaluator: Fukuda

	At start	At end	
Date:	2012/6/22	2012/6/22	
Test temperature:	23.8	23.8	°C
Relative humidity:	53.7	53.2	%
Barometric pressure:	100.43	100.43	kPa
Indicator temperature:	23.6	23.7	°C

Conversion factor, f: 0.000369

Table D.6

Pressure (kPa)	Indication (mV/V)	Time	Change (V)	Change (v_{min}/kPa)	mpc (v_{min}/kPa)
100.43	0.044446	13:30	0.00	0.00	0
101.43	0.044439	13:31	-0.02	-0.03	1
100.43	0.044446	13:31	0.02	-0.03	1
99.43	0.044450	13:32	0.01	-0.02	1
100.43	0.044443	13:32	-0.02	-0.03	1

PASS: × FAIL:

Remarks:

Notes: *1* Change (v): the difference between the observed indication and the initial indication divided by the conversion factor, f.

2 Although A.4.4 specifies a change of only 1 kPa for this test, additional measurements may be taken.

3 Absolute (not relative) time shall be recorded.

Form D.7 Humidity effects (CH or no mark)

Ref.: 5.5.3.1;A.4.5.

Application no.: 24-006
Load cell model: LCM17K500E
Serial no.: 1
E_{max}: 500 kg
n_{max}: 3000
v_{min}: 0.1 kg
p_{LC}: 0.7 DR: -
Force generating system: Load cell performance testing device
Indicating instrument: HBM DMP40
Evaluator: Fukuda

	At start	At end	
Date:	2012/6/22	2012/7/5	
Temperature:	20.5	20.4	℃
Relative humidity:	46.8	47.3	%
Barometric pressure:	100.20	100.23	kPa
Indicator temperature:	22.7	23.0	℃

Conversion factor, f: 0.000336

Conditions during damp heat cyclc test:
Chamber temp.(high): 40.1 ℃ Relative humidity: 95.5 %
Chamber temp.(low): 25.3 ℃ Relative humidity: 96.4 %

Table D.7

	Test load (kg)	Before humidity test: Indication (mV/V)	Before humidity test: Time	After humidity test: Indication (mV/V)	After humidity test: Time	Change (v)	mpc (v)	
	0	0.056336	10:08:34	0.057328	15:24:03			
	450	1.064868	10:09:04	1.065646	15:24:32			
	0	0.056338	10:09:33	0.057326	15:25:02			
	450	1.064867	10:10:03	1.065637	15:25:31			
	0	0.056338	10:10:32	0.057322	15:26:01			
	450	1.064868	10:11:02	1.065634	15:26:30			
	0	0.056340	10:11:31	0.057320	15:27:00			
¤	0	0.056336	10:16:48	0.057323	15:32:17			
‡	450	1.064871	10:17:18	1.065637	15:32:47			
¤	0	0.056337	10:17:47	0.057319	15:33:17			
‡	450	1.064869	10:18:17	1.065631	15:33:46			
¤	0	0.056338	10:18:47	0.057316	15:34:16			
‡	450	1.064868	10:19:16	1.065630	15:34:45			
¤	0	0.056339	10:19:46	0.057315	15:35:15			
	Average(¤)	0.056338		0.057318		2.92	120	←≦4%n_{max}
	Average(‡)	1.064869		1.065633				
	Averages difference(*)	1.008532		1.008314		-0.65	1.0v	

(¤) Indications at minimum test load — Change (¤), CHmin: PASS: × FAIL:
(‡) Indications at maximum test load (see Note — Change (*), CHmax: PASS: × FAIL:
(*) Average, see 5.5.3.1 and C.2.7

Notes:
1 This test is not necessary if the load cell is marked NH or SH.
2 Change(v): the difference between the after indication and the before indication divided by the conversion factor, f.
3 Use five test runs for classes A and B; use three test runs for classes C and D.
4 Absolute (not relative) time shall be recorded.

Form D.9 Marking requirements

Ref.: 4.6, 4.7.

Application no.: 24-006
Load cell model: LCM17K500E
Serial no.: 1
E_{max}: 500 kg
n_{max}: 3000
v_{min}: 0.1 kg
p_{LC}: 0.7 DR: -
Force-generating system: Load cell performance testing device
Indicating instrument: HBM DMP40
Evaluator: Fukuda

Table D.9.1

R 60 reference	Mandatory information	On load cell	In document
4.6.1	Accuracy class designation	+	+
4.6.2	Maximum number of load cell verification intervals, n_{max}	+	+
4.6.3	Loading designation (if necessary)	-	-
4.6.4	Working temperature designation	-	-
4.6.5.1	Humidity symbol "NH"	/	/
4.6.5.3	Humidity symbol "SH"	/	/
4.6.6.1, 4.7.1	Name or trademark of manufacturer (see *Note 1*)	+	+
4.6.6.1, 4.7.1	Manufacturer's own designation or load cell model (see *Note 1*)	+	+
4.6.6.1, 4.7.1	Serial number (see *Note 1*)	+	+
4.6.6.1	Year of manufacture	-	+
4.6.6.1	Minimum dead load, E_{min}	-	+
4.6.6.1, 4.7.1	Maximum capacity, E_{max} (see *Note 1*)	+	+
4.6.6.1	Safe load limit, E_{lim}	-	+
4.6.6.1	Minimum load cell verification interval (v_{min})	+	+
4.6.6.1	Other pertinent conditions	-	-
4.6.6.1	Apportionment factor, p_{LC} (if not equal to 0.7)	/	/
4.6.7	Standard classification	-	-
4.6.8	Multiple classifications	-	-

Table D.9.2

R 60 reference	Non-mandatory additional information	On load cell	In document
4.6.5.2	Humidity symbol "CH"	-	+
4.6.6.2	Relative v_{min}, Y	-	-
4.6.6.2	Relative DR, Z	-	-

Include references to the following:
Documents supplied with load cells:
Diagrams showing markings on load cells:

Notes:
1 Required both on load cell and in document.
2 Indicate that the marking is present with a "+".
3 Indicate that the marking is not present with a "-".
4 Indicate that the marking is not applicable with a "/".