



Member State of OIML  
Japan



OIML Certificate No.  
R60/2000-JP1-13.01

## 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: MINEBEA CO., LTD.  
Address: 1-1-1, Katase, Fujisawa-shi, Kanagawa-ken, 251-8531, Japan

### Manufacturer of the certified pattern

Name: MINEBEA CO., LTD.  
Address: 1-1-1, Katase, Fujisawa-shi, Kanagawa-ken, 251-8531, Japan

### Identification of the certified pattern:

Universal (Tension/Compression) load cell  
Type: U2S1-200K-C3, U2S1-250K-C3, U2S1-500K-C3, U2S1-1T-C3,  
U2S1-2T-C3  
Fraction:  $\pi=0.7$   
Temperature range:  $-10\text{ }^{\circ}\text{C} / 40\text{ }^{\circ}\text{C}$



Member State of OIML  
Japan



OIML Certificate No.  
R60/2000-JP1-13.01

Characteristics:

Model designation			U2S1-xx K-C3, where xx equivalent to the $E_{max}$	U2S1-xx T-C3, Where xx equivalent to the $E_{max}/1000$
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	200,250,500	1000,2000
Safe load limit	$E_{lim}$	kg	$1.5 * E_{max}$	
Minimum verification interval	$v_{min}$	kg	$E_{max}/10000$	
Apportionment factor	$p_{LC}$		0.7	
Ratio of minimum LC Verification interval $Y = E_{max} / v_{min}$	$Y$	-	10000	
Ratio of minimum dead load output return $Z = E_{max} / (2 * DR)$	$Z$	-	3000	
Rated output		mV/V	2.0	
excitation voltage		V DC	5~15	
Input impedance	$R_{LC}$	$\Omega$	$420 \pm 40$	
Cable detail		-	6m 4wire	

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. 13-01/R60:2000, that includes 59 pages.



Member State of OIML  
Japan



OIML Certificate No.  
R60/2000-JP1-13.01

The Issuing Authority  
NMIJ/AIST



Dr. T. Nomakuchi  
President of AIST  
2013-03-26

The OIML member

Dr. Y. Miki  
2013-03-26

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.



## 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 : MINEBEA CO., LTD.

Manufacturer : MINEBEA CO., LTD.

Applied Type : U2S1-200K-C3, U2S1-250K-C3, U2S1-500K-C3, U2S1-1T-C3,  
U2S1-2T-C3

Evaluation Report Number: 24-012

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° 13-01/R60:2000).

Evaluator :

Wataru Kaminaga  
Legal Metrology Division  
NMIJ/AIST

Signature :

*W. Kaminaga*

Date: 2013. 3. 15

Supervisor :

Shigeki Yamaguchi  
Head of Legal Metrology Division  
NMIJ/AIST

Signature :

*Shigeki Yamaguchi*

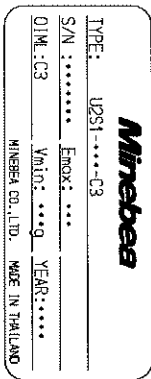
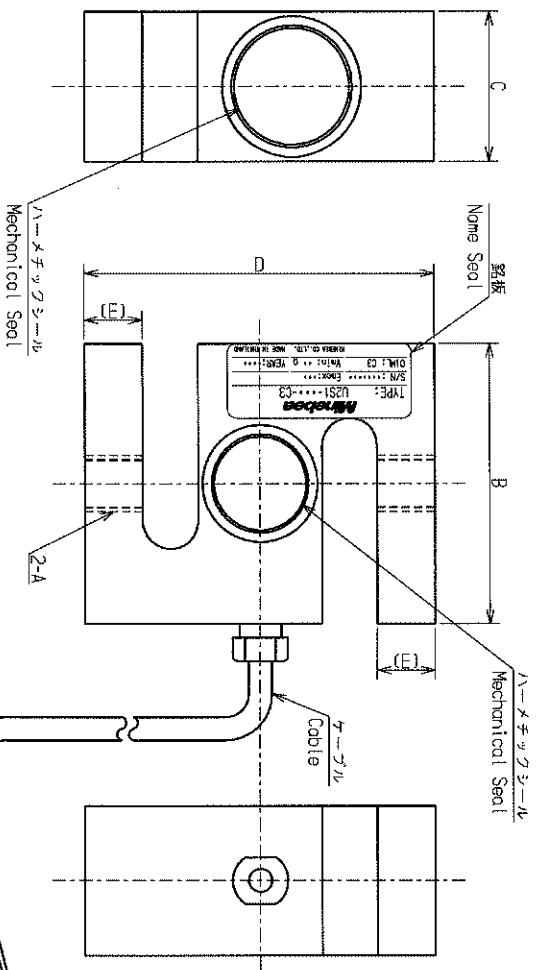
Date: 2013. 3. 15

## Description

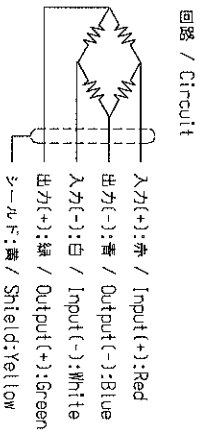
### Technical data

Model designation			U2S1-xx K-C3, where xx equivalent to the $E_{max}$	U2S1-xx T-C3, Where xx equivalent to the $E_{max}/1000$
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	200,250,500	1000,2000
Safe load limit	$E_{lim}$	kg	$1.5 * E_{max}$	
Minimum verification interval	$v_{min}$	kg	$E_{max}/10000$	
Apportionment factor	$p_{LC}$		0.7	
Ratio of minimum LC Verification interval $Y = E_{max} / v_{min}$	Y	-	10000	
Ratio of minimum dead load output return $Z = E_{max} / (2 * DR)$	Z	-	3000	
Rated output		mV/V	2.0	
excitation voltage		V DC	5~15	
Input impedance	$R_{LC}$	$\Omega$	$420 \pm 40$	
Cable detail		-	6m 4wire	

1  
2  
3  
4  
5  
6  
7



ラベル表示  
Indication of Name seal



回路 / Circuit

《外形寸法/OUTLINE》

型式/TYPE	A	B	C	D	E
U2S1-200K-C3					15
U2S1-250K-C3	M2 × 1.75	60	32	76	15
U2S1-500K-C3					14
U2S1-1T-C3					13
U2S1-2T-C3	M24 × 2	80	38	108	25

UNIT:mm

Y型圧着端子  
Y-shape terminal

6000 ±200

公布
K
S
I
F

依頼試験申請用  
作成日 DATE 2013.1.15

品名 DESCRIPTION  
外觀図(OUTLINE)

品番 PART NO.(MODEL NO.) 番番 SHEET  
U2S1-200K-2T-C3

図番 DRAWING NO.  
KT53508-2

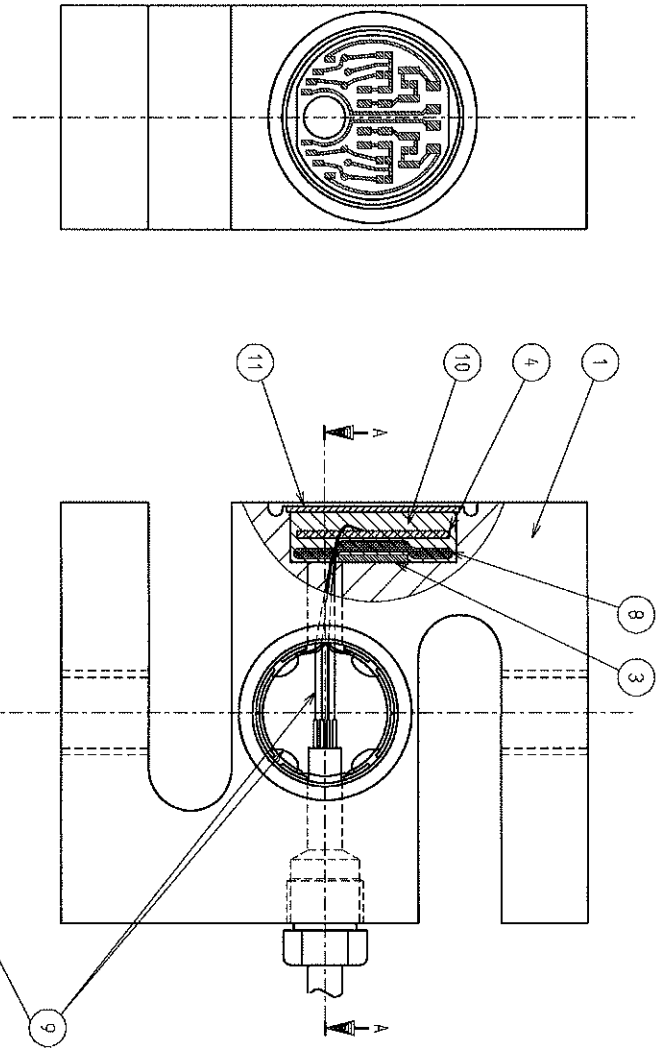
改訂 REV. 1

承認事項 REASON / ENO. NO. ENGINEER APPROVED

検査者 S. UCHIBORI  
承認者 K. SHIBASAKI

項目	公差	公差	公差
寸法 L	±0.1	±0.1	±0.2
寸法 W	±0.1	±0.2	±0.3
寸法 H	±0.1	±0.2	±0.3
寸法 D	±0.1	±0.2	±0.3
寸法 E	±0.1	±0.2	±0.3
寸法 F	±0.1	±0.2	±0.3
寸法 G	±0.1	±0.2	±0.3
寸法 H	±0.1	±0.2	±0.3
寸法 I	±0.1	±0.2	±0.3
寸法 J	±0.1	±0.2	±0.3
寸法 K	±0.1	±0.2	±0.3
寸法 L	±0.1	±0.2	±0.3
寸法 M	±0.1	±0.2	±0.3
寸法 N	±0.1	±0.2	±0.3
寸法 O	±0.1	±0.2	±0.3
寸法 P	±0.1	±0.2	±0.3
寸法 Q	±0.1	±0.2	±0.3
寸法 R	±0.1	±0.2	±0.3
寸法 S	±0.1	±0.2	±0.3
寸法 T	±0.1	±0.2	±0.3
寸法 U	±0.1	±0.2	±0.3
寸法 V	±0.1	±0.2	±0.3
寸法 W	±0.1	±0.2	±0.3
寸法 X	±0.1	±0.2	±0.3
寸法 Y	±0.1	±0.2	±0.3
寸法 Z	±0.1	±0.2	±0.3

1 2 3 4 5 6 7



部品表

No.	部品名	数量	材質
1	エレメント	1	15-5PH
2	ひずみゲージ	4	
3	温度補償ゲージ	2	ガラスエポキシ
4	P.C.B.	1	
5	ケーブル	1	SUS304
6	フラットチャット	1	SUS304
7	フラットシール	1	ネオプレンゴム
8	シーリング材		
9	引き出し線		
10	充填材		
11	ハーメチックシール	1	SUS304
12	ハーメチックキャップ	2	SUS316L

断面 A-A

公布
K
S
T
F

行号 MARK	日付 DATE	変更理由 REASON	承認 ECON NO.	担当 ENGINEER	承認 APPROVED	F. I.D.E	CHECKED	DRAWN	検 公 差	単位 UNIT	材質 MATERIAL	作成日 DATE	品名 DESCRIPTION	番番 PART NO. (MODEL NO.)	製図 SHEET
						S. UCHIBORI		K. SHIBASAKI	±0.05 ±0.02 ±0.1 ±0.2 ±0.3 ±0.5 ±0.8 ±0.3	mm	表面処理 SURF. TREAT. 表面磨き	2013.1.15	構造詳細図	U2S1-200K-2T-C3	1/1
									公差 TOL	表面仕上げ SURF. FINISH			図番 DRAWING NO.		改訂 REV.
									公差 TOL				K101918-2		

依頼試験申請用



National Metrology Institute of Japan

Metrological regulation for load cells :  
Test report

Project number : LC-OIML-13-001

Test report number : 13-01 / 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 : MINEBEA CO.,LTD.

Manufacturer : MINEBEA CO.,LTD.

Date of application : 2013.2.4

End of evaluation : 2013.3.8

Date of issue : 2013.3.12

Signature : *H. Nemoto*

Hajime Nemoto

Chief of Legal Weighing Metrology Section  
Mechanical Metrology Division



**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.: 24-012  
 Application date: 2013.2.4  
 Model designation: U2S1-\*\*\*

Manufacturer: MINEBEA CO.,LTD.  
 Address: 1-1-1, Katase Fujisawa-shi Kanagawa-ken 251-8531, Japan

Applicant: MINEBEA CO.,LTD.  
 Address: 1-1-1, Katase Fujisawa-shi Kanagawa-ken 251-8531, Japan

Representative: Akira Murohashi  
 (name, telephone) +81 466 22 7152

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  $E_{max}$  Apportionment factor,  $p_{LC}$  (see Note) 0.7

Limits of working temperature: (only if other than  $-10^{\circ}\text{C}$  to  $+40^{\circ}\text{C}$ , see 5.5.1.1)

Upper: \_\_\_\_\_  $^{\circ}\text{C}$  Lower: \_\_\_\_\_  $^{\circ}\text{C}$

Power voltage:  $V_{min}$  5 V  $V_{max}$  15 V

or V: 10 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: 24-012

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)
200	0.02	0	3000	
250	0.025	0	3000	
500	0.05	0	3000	
1000	0.1	0	3000	
2000	0.2	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)
U2S1-200K	K9Y0009	200
U2S1-1T	K9Y0035	1000

Secondary equipment (specify load adapters, etc.):

Remarks:

**General information concerning test conditions**

Ref.:A3

Application no.: 24-012Load cell model: U2S1-200K Serial no.: K9Y0009  $E_{\max}$ : 200 kg $n_{\max}$ : 3000  $v_{\min}$ : 0.02 kg DR (if applicable):           Force-generating system - description: Load cell performance testing device  
(see Note)Minimum test load: 4.7 kgIndicating instrument - description: HBM DMP40Environmental equipment - description: Air Supply Equipment ASE-210Temperature: 20.3~20.4 °CRelative humidity: 46.4 ~ 47.4 %RHBarometric pressure: 101.06 ~ 101.84 kPaTest location: Room 023Acceleration of gravity at test location: 9.79949 m/sec<sup>2</sup>Evaluator: Fukuda*Note*: Include information concerning accuracy (for example, accredited laboratory).

**Summary of the test**

Application no.: 24-012  
 Load cell model: U2S1-200K  
 Serial no.: K9Y0009  
 $E_{max}$ : 200 kg  $n_{max}$ : 3000  
 $v_{min}$ : 0.02 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	Compression
D.3	Repeatability errors ( $E_R$ )	×		11	Compression
D.4	Temperature effects on MDLO ( $C_M$ )	×		12	
D.5	Creep ( $C_C$ )	×		13-16	Compression
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	Compression
D.7	Humidity effects (CH or no mark) ( $C_{Hmax}$ )	×		18	Compression
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 $v_{min} \leq \frac{D_{max}-D_{min}}{n_{max}}$	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 accommodate OIML R76.
  - 3 This DR value is used in association with OIML R 76.

**Form D.1 (3 runs) Load test data (E<sub>L</sub>)**

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.: 24-012  
 Load cell model: U2S1-200K  
 Serial no.: K9Y0009  
 E<sub>max</sub>: 200 kg  
 n<sub>max</sub>: 3000  
 V<sub>min</sub>: 0.02 kg  
 P.L.C.: 0.7 DR: \_\_\_\_\_  
 Force-generating system: Load cell performance testing device  
 Indicating instrument: HBM DMP40  
 Evaluator: Fukuda

	At start	At end	
Date:	2013/2/18	2013/2/18	
Temperature:	20.4	20.4	°C
Relative humidity:	46.4	46.8	%
Barometric pressure:	101.12	101.06	kPa
Indicator temperature:	25.1	25.1	°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	0.048638	10:47:41						
200	2.043174	10:48:11						
0	0.048673	10:48:40						
200	2.043176	10:49:10						
0	0.048677	10:49:39						
200	2.043181	10:50:09						
0	0.048679	10:50:39						
0	0.048639	10:55:49	0.048651	11:03:55	0.048650	11:11:59	0.048647 *	0.000012
20	0.246041	10:56:10	0.246050	11:04:16	0.246049	11:12:20	0.246047	0.000009
40	0.443454	10:56:31	0.443465	11:04:36	0.443456	11:12:41	0.443458	0.000011
60	0.640901	10:56:51	0.640906	11:04:57	0.640904	11:13:01	0.640904	0.000005
80	0.838339	10:57:12	0.838347	11:05:18	0.838342	11:13:22	0.838343	0.000008
100	1.035817	10:57:33	1.035826	11:05:38	1.035811	11:13:42	1.035818	0.000015
120	1.233306	10:57:53	1.233310	11:05:59	1.233310	11:14:03	1.233309	0.000004
140	1.430814	10:58:14	1.430818	11:06:19	1.430815	11:14:23	1.430816	0.000004
160	1.628341	10:58:35	1.628341	11:06:40	1.628341	11:14:44	1.628341	0.000000
180	1.825884	10:58:55	1.825880	11:07:01	1.825875	11:15:05	1.825880	0.000009
200	2.023425	10:59:16	2.023425	11:07:21	2.023424	11:15:26	2.023425	0.000001
180	1.825977	10:59:37	1.825975	11:07:42	1.825974	11:15:46	1.825975	0.000003
160	1.628512	10:59:58	1.628510	11:08:03	1.628505	11:16:07	1.628509	0.000007
140	1.431041	11:00:18	1.431040	11:08:24	1.431039	11:16:28	1.431040	0.000002
120	1.233574	11:00:39	1.233571	11:08:44	1.233569	11:16:49	1.233571	0.000005
100	1.036092	11:01:00	1.036092	11:09:05	1.036088	11:17:10	1.036091	0.000004
80	0.838614	11:01:21	0.838613	11:09:26	0.838607	11:17:30	0.838611	0.000007
60	0.641136	11:01:42	0.641135	11:09:47	0.641131	11:17:51	0.641134	0.000005
40	0.443649	11:02:03	0.443649	11:10:08	0.443642	11:18:12	0.443647	0.000007
20	0.246167	11:02:23	0.246165	11:10:29	0.246159	11:18:33	0.246164	0.000008
0	0.048676	11:02:44	0.048675	11:10:49	0.048670	11:18:53	0.048674	0.000006

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<sub>L</sub>)**

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.: 24-012  
 Load cell model: U2S1-200K  
 Serial no.: K9Y0009  
 E<sub>max</sub>: 200 kg  
 η<sub>max</sub>: 3000  
 V<sub>min</sub>: 0.02 kg  
 PLC: 0.7 DR: \_\_\_\_\_  
 Force-generating system: Load cell performance testing device  
 Indicating instrument: HBM DMP40  
 Evaluator: Fukuda

	At start	At end	
Date:	2013/2/19	2013/2/19	
Temperature:	40.2	40.2	°C
Relative humidity:	35.0	35.0	%
Barometric pressure:	100.82	100.81	kPa
Indicator temperature:	24.5	24.6	°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	0.048901	7:33:46						
200	2.043479	7:34:16						
0	0.048948	7:34:46						
200	2.043488	7:35:15						
0	0.048958	7:35:45						
200	2.043491	7:36:14						
0	0.048963	7:36:44						
0	0.048937	7:41:54	0.048933	7:49:59	0.048932	7:58:04	0.048934 *	0.000005
20	0.246340	7:42:15	0.246334	7:50:20	0.246332	7:58:25	0.246335	0.000008
40	0.443757	7:42:36	0.443742	7:50:41	0.443743	7:58:46	0.443747	0.000015
60	0.641200	7:42:56	0.641189	7:51:01	0.641187	7:59:06	0.641192	0.000013
80	0.838640	7:43:17	0.838627	7:51:22	0.838629	7:59:27	0.838632	0.000013
100	1.036113	7:43:38	1.036094	7:51:42	1.036089	7:59:47	1.036099	0.000024
120	1.233604	7:43:58	1.233596	7:52:03	1.233590	8:00:08	1.233597	0.000014
140	1.431115	7:44:19	1.431108	7:52:23	1.431100	8:00:28	1.431108	0.000015
160	1.628642	7:44:40	1.628631	7:52:44	1.628625	8:00:49	1.628633	0.000017
180	1.826194	7:45:01	1.826186	7:53:05	1.826175	8:01:10	1.826185	0.000019
200	2.023738	7:45:21	2.023725	7:53:26	2.023717	8:01:31	2.023727	0.000021
180	1.826281	7:45:42	1.826267	7:53:46	1.826261	8:01:51	1.826270	0.000020
160	1.628805	7:46:03	1.628794	7:54:07	1.628790	8:02:12	1.628796	0.000015
140	1.431334	7:46:23	1.431323	7:54:28	1.431320	8:02:33	1.431326	0.000014
120	1.233860	7:46:44	1.233846	7:54:49	1.233848	8:02:54	1.233851	0.000014
100	1.036380	7:47:05	1.036366	7:55:10	1.036367	8:03:15	1.036371	0.000014
80	0.838905	7:47:26	0.838894	7:55:30	0.838888	8:03:35	0.838896	0.000017
60	0.641417	7:47:47	0.641411	7:55:51	0.641408	8:03:56	0.641412	0.000009
40	0.443934	7:48:08	0.443927	7:56:12	0.443921	8:04:17	0.443927	0.000013
20	0.246450	7:48:28	0.246441	7:56:33	0.246436	8:04:38	0.246442	0.000014
0	0.048952	7:48:49	0.048948	7:56:53	0.048942	8:04:59	0.048947	0.000010

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<sub>L</sub>)**

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.: 24-012  
 Load cell model: U2S1-200K  
 Serial no.: K9Y0009  
 E<sub>max</sub>: 200 kg  
 n<sub>max</sub>: 3000  
 V<sub>min</sub>: 0.02 kg  
 PLC: 0.7 DR:  
 Force-generating system: Load cell performance testing device  
 Indicating instrument: HBM DMP40  
 Evaluator: Fukuda

	At start	At end	
Date:	2013/2/20	2013/2/20	
Temperature:	-9.8	-9.8	°C
Relative humidity:	31.9	32.3	%
Barometric pressure:	101.45	101.47	kPa
Indicator temperature:	24.3	24.0	°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	0.048639	7:14:13						
200	2.043327	7:14:43						
0	0.048690	7:15:13						
200	2.043342	7:15:42						
0	0.048707	7:16:12						
200	2.043346	7:16:41						
0	0.048715	7:17:11						
0	0.048666	7:22:21	0.048697	7:30:29	0.048704	7:38:36	0.048689 *	0.000038
20	0.246081	7:22:42	0.246106	7:30:50	0.246115	7:38:57	0.246101	0.000034
40	0.443507	7:23:03	0.443531	7:31:11	0.443537	7:39:18	0.443525	0.000030
60	0.640962	7:23:24	0.640987	7:31:31	0.640997	7:39:38	0.640982	0.000035
80	0.838415	7:23:44	0.838434	7:31:52	0.838442	7:39:59	0.838430	0.000027
100	1.035893	7:24:05	1.035922	7:32:12	1.035932	7:40:20	1.035916	0.000039
120	1.233405	7:24:26	1.233425	7:32:33	1.233434	7:40:40	1.233421	0.000029
140	1.430928	7:24:47	1.430945	7:32:54	1.430953	7:41:01	1.430942	0.000025
160	1.628469	7:25:08	1.628485	7:33:14	1.628495	7:41:21	1.628483	0.000026
180	1.826010	7:25:29	1.826051	7:33:35	1.826045	7:41:42	1.826035	0.000041
200	2.023605	7:25:50	2.023618	7:33:56	2.023623	7:42:03	2.023615	0.000018
180	1.826133	7:26:10	1.826146	7:34:17	1.826153	7:42:24	1.826144	0.000020
160	1.628646	7:26:31	1.628659	7:34:38	1.628668	7:42:45	1.628658	0.000022
140	1.431159	7:26:52	1.431173	7:34:59	1.431181	7:43:06	1.431171	0.000022
120	1.233673	7:27:13	1.233689	7:35:20	1.233699	7:43:27	1.233687	0.000026
100	1.036184	7:27:34	1.036196	7:35:41	1.036206	7:43:48	1.036195	0.000022
80	0.838698	7:27:55	0.838710	7:36:02	0.838719	7:44:09	0.838709	0.000021
60	0.641211	7:28:16	0.641220	7:36:23	0.641230	7:44:30	0.641220	0.000019
40	0.443712	7:28:37	0.443723	7:36:44	0.443731	7:44:51	0.443722	0.000019
20	0.246221	7:28:58	0.246231	7:37:05	0.246237	7:45:12	0.246230	0.000016
0	0.048722	7:29:19	0.048730	7:37:25	0.048737	7:45:32	0.048730	0.000015

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<sub>L</sub>)**

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.: 24-012  
 Load cell model: U2S1-200K  
 Serial no.: K9Y0009  
 E<sub>max</sub>: 200 kg  
 n<sub>max</sub>: 3000  
 V<sub>min</sub>: 0.02 kg  
 PLC: 0.7 DR:  
 Force-generating system: Load cell performance testing device  
 Indicating instrument: HBM DMP40  
 Evaluator: Fukuda

	At start	At end	
Date:	2013/2/21	2013/2/21	
Temperature:	20.3	20.3	°C
Relative humidity:	47.4	47.2	%
Barometric pressure:	101.82	101.84	kPa
Indicator temperature:	25.0	25.0	°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	0.048869	7:18:13						
200	2.043416	7:18:42						
0	0.048905	7:19:12						
200	2.043422	7:19:41						
0	0.048912	7:20:11						
200	2.043425	7:20:40						
0	0.048913	7:21:10						
0	0.048866	7:26:20	0.048879	7:34:28	0.048879	7:42:35	0.048875 *	0.000013
20	0.246271	7:26:41	0.246279	7:34:49	0.246278	7:42:56	0.246276	0.000008
40	0.443688	7:27:02	0.443695	7:35:10	0.443690	7:43:17	0.443691	0.000007
60	0.641134	7:27:23	0.641141	7:35:30	0.641141	7:43:37	0.641139	0.000007
80	0.838584	7:27:43	0.838596	7:35:51	0.838599	7:43:58	0.838593	0.000015
100	1.036054	7:28:04	1.036058	7:36:11	1.036055	7:44:18	1.036056	0.000004
120	1.233547	7:28:25	1.233546	7:36:32	1.233547	7:44:39	1.233547	0.000001
140	1.431056	7:28:46	1.431057	7:36:53	1.431058	7:45:00	1.431057	0.000002
160	1.628579	7:29:07	1.628577	7:37:13	1.628579	7:45:20	1.628578	0.000002
180	1.826135	7:29:28	1.826132	7:37:34	1.826130	7:45:41	1.826132	0.000005
200	2.023679	7:29:48	2.023679	7:37:55	2.023672	7:46:02	2.023677	0.000007
180	1.826221	7:30:09	1.826222	7:38:16	1.826216	7:46:23	1.826220	0.000006
160	1.628752	7:30:30	1.628747	7:38:37	1.628743	7:46:44	1.628747	0.000009
140	1.431283	7:30:51	1.431281	7:38:58	1.431275	7:47:05	1.431280	0.000008
120	1.233811	7:31:12	1.233809	7:39:19	1.233804	7:47:26	1.233808	0.000007
100	1.036328	7:31:33	1.036330	7:39:40	1.036322	7:47:47	1.036327	0.000008
80	0.838849	7:31:54	0.838854	7:40:01	0.838847	7:48:07	0.838850	0.000007
60	0.641364	7:32:15	0.641368	7:40:22	0.641363	7:48:28	0.641365	0.000005
40	0.443880	7:32:36	0.443882	7:40:42	0.443877	7:48:49	0.443880	0.000005
20	0.246395	7:32:57	0.246397	7:41:03	0.246394	7:49:10	0.246395	0.000003
0	0.048903	7:33:18	0.048907	7:41:24	0.048902	7:49:31	0.048904	0.000005

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



**Form D.2 Load cell errors (EL) calculation**

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

Application no.:	24-012	At start	At end
Load cell model:	U2S1-200K	Date: 2013/2/18	2013/2/21
Serial no.:	K9Y0009	Test temperature:	20.4      20.3 °C
E <sub>max</sub> :	200 kg	Relative humidity:	46.4      47.2 %
n <sub>max</sub> :	3000	Barometric pressure:	101.12    101.84 kPa
V <sub>min</sub> :	0.02 kg	Indicator temperature:	25.1      25.0 °C
Plc:	0.7	DR:	
Force-generating system:	Load cell performance testing device	Conversion factor, f:	0.000658
Indicating instrument:	HBM DMP40	75% test load (g, kg or t):	150 kg
Evaluator:	Fukuda	Reference indication at 75% test load:	1.480932

**Table D.2**

Test load (kg)	Reference indication ( mV/V )	20.4 °C (20°C)		40.2 °C (40°C)		-9.8 °C (-10°C)		20.4 °C (20°C)		mpe (V)
		Indication ( mV/V )	Error(E <sub>L</sub> ) (V)	Indication ( mV/V )	Error(E <sub>L</sub> ) (V)	Indication ( mV/V )	Error(E <sub>L</sub> ) (V)	Indication ( mV/V )	Error(E <sub>L</sub> ) (V)	
0	0.000000	0.000000	0.00	0.000000	0.00	0.000000	0.00	0.000000	0.00	0.35
20	0.197458	0.197400	-0.09	0.197401	-0.09	0.197412	-0.07	0.197401	-0.09	0.35
40	0.394915	0.394812	-0.16	0.394813	-0.15	0.394836	-0.12	0.394816	-0.15	0.70
60	0.592373	0.592257	-0.18	0.592258	-0.17	0.592293	-0.12	0.592264	-0.17	0.70
80	0.789830	0.789696	-0.20	0.789698	-0.20	0.789741	-0.14	0.789718	-0.17	0.70
100	0.987288	0.987171	-0.18	0.987165	-0.19	0.987227	-0.09	0.987181	-0.16	0.70
120	1.184745	1.184662	-0.13	1.184663	-0.13	1.184732	-0.02	1.184672	-0.11	0.70
140	1.382203	1.382169	-0.05	1.382174	-0.04	1.382253	0.08	1.382182	-0.03	1.05
160	1.579660	1.579694	0.05	1.579699	0.06	1.579794	0.20	1.579704	0.07	1.05
180	1.777118	1.777233	0.17	1.777251	0.20	1.777346	0.35	1.777258	0.21	1.05
200	1.974576	1.974778	0.31	1.974793	0.33	1.974926	0.53	1.974802	0.34	1.05
180	1.777118	1.777329	0.32	1.777336	0.33	1.777455	0.51	1.777345	0.34	1.05
160	1.579660	1.579862	0.31	1.579862	0.31	1.579969	0.47	1.579873	0.32	1.05
140	1.382203	1.382393	0.29	1.382392	0.29	1.382482	0.42	1.382405	0.31	1.05
120	1.184745	1.184925	0.27	1.184917	0.26	1.184998	0.38	1.184933	0.29	0.70
100	0.987288	0.987444	0.24	0.987437	0.23	0.987506	0.33	0.987452	0.25	0.70
80	0.789830	0.789965	0.20	0.789962	0.20	0.790020	0.29	0.789975	0.22	0.70
60	0.592373	0.592487	0.17	0.592478	0.16	0.592531	0.24	0.592490	0.18	0.70
40	0.394915	0.395000	0.13	0.394993	0.12	0.395033	0.18	0.395005	0.14	0.70
20	0.197458	0.197517	0.09	0.197508	0.08	0.197541	0.13	0.197521	0.10	0.35
0	0.000000	0.000027	0.04	0.000013	0.02	0.000041	0.06	0.000029	0.04	0.35

Minimum test load, D<sub>min</sub>: 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<sub>L</sub>: 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<sub>min</sub>.

**Form D.3 Repeatability errors ( $E_R$ ) calculation**

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

Application no.: 24-012  
 Load cell model: U2S1-200K  
 Serial no.: K9Y0009  
 $E_{max}$ : 200 kg  
 $n_{max}$ : 3000  
 $V_{min}$ : 0.02 kg  
 PLc: 0.7 DR: \_\_\_\_\_  
 Force-generating system: Load cell performance testing device Conversion factor, f: 0.000658  
 Indicating instrument: HBM DMP40  
 Evaluator: Fukuda

**Table D.3**

Test load (kg)	20.4 °C (20°C)		40.2 °C (40°C)		-9.8 °C (-10°C)		20.4 °C (20°C)		mpe (V)
	Repeatability error (mV/V)	Repeatability error (V)	Repeatability error (mV/V)	Repeatability error (V)	Repeatability error (mV/V)	Repeatability error (V)	Repeatability error (mV/V)	Repeatability error (V)	
0	0.000012	0.02	0.000005	0.01	0.000038	0.06	0.000013	0.02	0.35
20	0.000009	0.01	0.000008	0.01	0.000034	0.05	0.000008	0.01	0.35
40	0.000011	0.02	0.000015	0.02	0.000030	0.05	0.000007	0.01	0.70
60	0.000005	0.01	0.000013	0.02	0.000035	0.05	0.000007	0.01	0.70
80	0.000008	0.01	0.000013	0.02	0.000027	0.04	0.000015	0.02	0.70
100	0.000015	0.02	0.000024	0.04	0.000039	0.06	0.000004	0.01	0.70
120	0.000004	0.01	0.000014	0.02	0.000029	0.04	0.000001	0.00	0.70
140	0.000004	0.01	0.000015	0.02	0.000025	0.04	0.000002	0.00	1.05
160	0.000000	0.00	0.000017	0.03	0.000026	0.04	0.000002	0.00	1.05
180	0.000009	0.01	0.000019	0.03	0.000041	0.06	0.000005	0.01	1.05
200	0.000001	0.00	0.000021	0.03	0.000018	0.03	0.000007	0.01	1.05
180	0.000003	0.00	0.000020	0.03	0.000020	0.03	0.000006	0.01	1.05
160	0.000007	0.01	0.000015	0.02	0.000022	0.03	0.000009	0.01	1.05
140	0.000002	0.00	0.000014	0.02	0.000022	0.03	0.000008	0.01	1.05
120	0.000005	0.01	0.000014	0.02	0.000026	0.04	0.000007	0.01	0.70
100	0.000004	0.01	0.000014	0.02	0.000022	0.03	0.000008	0.01	0.70
80	0.000007	0.01	0.000017	0.03	0.000021	0.03	0.000007	0.01	0.70
60	0.000005	0.01	0.000009	0.01	0.000019	0.03	0.000005	0.01	0.70
40	0.000007	0.01	0.000013	0.02	0.000019	0.03	0.000005	0.01	0.70
20	0.000008	0.01	0.000014	0.02	0.000016	0.02	0.000003	0.00	0.35
0	0.000006	0.01	0.000010	0.02	0.000015	0.02	0.000005	0.01	0.35

PASS:  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<sub>M</sub>) calculation**

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

Application no.: 24-012  
 Load cell model: U2S1-200K  
 Serial no.: K9Y0009  
 E<sub>max</sub>: 200 kg  
 n<sub>max</sub>: 3000  
 V<sub>min</sub>: 0.02 kg  
 p<sub>Lc</sub>: 0.7 DR: \_\_\_\_\_  
 Force-generating system: Load cell performance testing device Conversion factor, f: 0.000658  
 Indicating instrument: HBM DMP40  
 Evaluator: Fukuda

**Table D.4**

Temperature °C	Indication (mV/V)	Change (C <sub>M</sub> ) (V)	Change (v <sub>min</sub> /5 °C)	mpc (v <sub>min</sub> /5 °C)
20.4	0.048647			
40.2	0.048934	0.44	0.37	0.70
-9.8	0.048689	-0.37	0.12	0.70
20.4	0.048875	0.28	0.16	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<sub>min</sub>/5°C) for classesB, C, and D; (v<sub>min</sub>/2°C) for class A.
  - 4 Change, C<sub>M</sub>(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.: 24-012  
 Load cell model: U2S1-200K  
 Serial no.: K9Y0009  
 $E_{max}$ : 200 kg  
 $\eta_{max}$ : 3000  
 $V_{min}$ : 0.02 kg  
 $P_{LC}$ : 0.7 DR: \_\_\_\_\_

	At start	At end	
Date:	2013/2/18	2013/2/18	
Temperature:	20.4	20.4	°C
Relative humidity:	46.5	46.8	%
Barometric pressure:	101.06	101.03	kPa
Indicator temperature:	25.0	25.0	°C

Force generating system: Load cell performance testing device Conversion factor, f: 0.000626  
 Indicating instrument: HBM DMP40  
 Evaluator: Fukuda

**Table D.5**

Test load (kg)	Indication (mV/V)	Barometric pressure (kPa)	Time	Change (v)	mpc (v)	
0						
0						
0						
0						
(*) →	0	0.048598	12:19:12			←initial "no load" indication
Fill in time →	Record time of initial loading →		12:19:12			
(**) →	180	1.926393	12:19:42	0.00	0.735	←initial "load" indication
Constant maximum test load, Dmax	180	1.926412	12:20:41	0.03	0.735	
	180	1.926425	12:21:41	0.05	0.735	
	180	1.926430	12:22:40	0.06	0.735	
	180	1.926420	12:23:39	0.04	0.735	
	180	1.926420	12:24:38	0.04	0.735	
	180	1.926427	12:25:37	0.05	0.735	
	180	1.926425	12:26:36	0.05	0.735	
	180	1.926429	12:27:36	0.06	0.735	
	180	1.926431	12:28:35	0.06	0.735	
	180	1.926434	12:29:34	0.07	0.735	
	180	1.926426	12:34:33	0.05	0.735	
	180	1.926418	12:39:32	0.04	0.735	
	180	1.926411	12:44:31	0.03	0.735	
	180	1.926421	12:49:30	0.04	0.735	
Fill in time →	Record time of initial unloading →		12:49:30			
(***) →	0	0.048643	12:50:00	0.07	0.500	←initial indication
These rows are for reference purposes only	0	0.048640	12:50:19	0.07	0.500	
	0	0.048620	12:50:38	0.04	0.500	
	0	0.048620	12:50:57	0.04	0.500	
	0	0.048622	12:51:16	0.04	0.500	
	0	0.048610	12:51:35	0.02	0.500	
30-20 minute creep difference in units:				0.00	0.1575	

DR (v):	0.07	30 minute creep:	PASS:	x	FAIL:	
actual time (s):	30	30-20 minute creep diffence:	PASS:	x	FAIL:	
specified time (s):	30	DR ≤ 0.5v:	PASS:	x	FAIL:	
mpc for DR (v):	0.50	DR within manufacturer specified DR requirements:	PASS:		FAIL:	

Notes: 1 Change (v) for creep: the observed indication minus the initial "load" indication (\*\*) divided 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.: 24-012  
 Load cell model: U2S1-200K  
 Serial no.: K9Y0009  
 E<sub>max</sub>: 200 kg  
 n<sub>max</sub>: 3000  
 V<sub>min</sub>: 0.02 kg  
 PLC: 0.7 DR: \_\_\_\_\_

	At start	At end	
Date:	2013/2/19	2013/2/19	
Temperature:	40.2	40.2	°C
Relative humidity:	35.1	35.0	%
Barometric pressure:	100.81	100.81	kPa
Indicator temperature:	24.8	24.7	°C

Force generating system: Load cell performance testing device Conversion factor, f: 0.000626  
 Indicating instrument: HBM DMP40  
 Evaluator: Fukuda

**Table D.5**

Test load (kg)	Indication (mV/V)	Barometric pressure (kPa)	Time	Change (v)	mpc (v)	
0						
0						
0						
0						
(*) → 0	0.048920	100.88	9:05:16			←initial "no load" indication
Fill in time →	Record time of initial loading →		9:05:16			
(**) → 180	1.926727	100.88	9:05:46	0.00	0.735	←initial "load" indication
Constant maximum test load, D <sub>max</sub>	180	1.926740	9:06:45	0.02	0.735	
	180	1.926737	9:07:44	0.02	0.735	
	180	1.926731	9:08:43	0.01	0.735	
	180	1.926728	9:09:43	0.00	0.735	
	180	1.926723	9:10:42	-0.01	0.735	
	180	1.926724	9:11:41	0.00	0.735	
	180	1.926717	9:12:40	-0.02	0.735	
	180	1.926708	9:13:39	-0.03	0.735	
	180	1.926705	9:14:38	-0.04	0.735	
	180	1.926707	9:15:38	-0.03	0.735	
	180	1.926693	9:20:37	-0.05	0.735	
	180	1.926685	9:25:36	-0.07	0.735	
	180	1.926676	9:30:35	-0.08	0.735	
	180	1.926670	9:35:34	-0.09	0.735	
Fill in time →	Record time of initial unloading →		9:35:34			
(***) → 0	0.048870	100.87	9:36:04	-0.08	0.500	←initial indication
These rows are for reference purposes only	0	0.048863	9:36:23	-0.09	0.500	
	0	0.048865	9:36:42	-0.09	0.500	
	0	0.048864	9:37:01	-0.09	0.500	
	0	0.048865	9:37:20	-0.09	0.500	
	0	0.048864	9:37:39	-0.09	0.500	
30-20 minute creep difference in units:				-0.02	0.1575	

DR (v):	-0.08	30 minute creep:	PASS:	x	FAIL:	
actual time (s):	30	30-20 minute creep difference:	PASS:	x	FAIL:	
specified time (s):	30	DR ≤ 0.5v:	PASS:	x	FAIL:	
mpc for DR (v):	0.50	DR within manufacturer specified DR requirements:	PASS:		FAIL:	

- Notes:
- 1 Change (v) for creep: the observed indication minus the initial "load" indication (\*\*) divided 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.: 24-012  
 Load cell model: U2S1-200K  
 Serial no.: K9Y0009  
 $E_{max}$ : 200 kg  
 $n_{max}$ : 3000  
 $V_{min}$ : 0.02 kg  
 $P_{LC}$ : 0.7 DR: \_\_\_\_\_

	At start	At end	
Date:	2013/2/20	2013/2/20	
Temperature:	-9.8	-9.8	°C
Relative humidity:	31.9	32.3	%
Barometric pressure:	101.45	101.47	kPa
Indicator temperature:	24.3	24.0	°C

Force generating system: Load cell performance testing device Conversion factor, f: 0.000626  
 Indicating instrument: HBM DMP40  
 Evaluator: Fukuda

**Table D.5**

Test load (kg)	Indication (mV/V)	Barometric pressure (kPa)	Time	Change (v)	mpc (v)	
0						
0						
0						
0						
(*) →	0	0.048651	101.47	8:45:51		←initial "no load" indication
Fill in time →	Record time of initial loading →			8:45:51		
(**) →	180	1.926555	101.47	8:46:21	0.00	←initial "load" indication
	180	1.926593	101.47	8:47:21	0.06	
	180	1.926606	101.47	8:48:20	0.08	
	180	1.926616	101.48	8:49:19	0.10	
	180	1.926626	101.48	8:50:18	0.11	
	180	1.926636	101.47	8:51:17	0.13	
	180	1.926638	101.47	8:52:16	0.13	
	180	1.926641	101.47	8:53:16	0.14	
	180	1.926641	101.46	8:54:15	0.14	
	180	1.926648	101.46	8:55:14	0.15	
	180	1.926653	101.46	8:56:13	0.16	
	180	1.926670	101.46	9:01:12	0.18	
	180	1.926678	101.45	9:06:11	0.20	
	180	1.926688	101.45	9:11:10	0.21	
	180	1.926696	101.44	9:16:09	0.23	
Fill in time →	Record time of initial unloading →			9:16:09		
(***) →	0	0.048795	101.44	9:16:39	0.23	←initial indication
	0	0.048780	101.44	9:16:58	0.21	
	0	0.048772	101.44	9:17:17	0.19	
	0	0.048764	101.44	9:17:36	0.18	
	0	0.048760	101.44	9:17:55	0.17	
	0	0.048757	101.44	9:18:14	0.17	
30-20 minute creep difference in units:					0.03	0.1575

DR (v):	0.23	30 minute creep:	PASS:	x	FAIL:	
actual time (s):	30	30-20 minute creep difference:	PASS:	x	FAIL:	
specified time (s):	30	DR ≤ 0.5v:	PASS:	x	FAIL:	
mpc for DR (v):	0.50	DR within manufacturer specified DR requirements:	PASS:		FAIL:	

- Notes:
- 1 Change (v) for creep: the observed indication minus the initial "load" indication (\*\*) divided 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.: 24-012  
 Load cell model: U2S1-200K  
 Serial no.: K9Y0009  
 $E_{max}$ : 200 kg  
 $n_{max}$ : 3000  
 $v_{min}$ : 0.02 kg  
 PLC: 0.7 DR: \_\_\_\_\_

	At start	At end	
Date:	2013/2/21	2013/2/21	
Temperature:	20.3	20.3	°C
Relative humidity:	46.9	47.1	%
Barometric pressure:	101.84	101.83	kPa
Indicator temperature:	25.2	24.7	°C

Force generating system: Load cell performance testing device Conversion factor, f: 0.000626  
 Indicating instrument: HBM DMP40  
 Evaluator: Fukuda

**Table D.5**

Test load (kg)	Indication (mV/V)	Barometric pressure (kPa)	Time	Change (v)	mpc (v)	
0						
0						
0						
0						
(*) →	0	0.048838	101.85	8:49:49		←initial "no load" indication
Fill in time →	Record time of initial loading →			8:49:49		
(**) →	180	1.926626	101.85	8:50:19	0.00	0.735 ←initial "load" indication
Constant maximum test load, Dmax	180	1.926656	101.85	8:51:20	0.05	0.735
	180	1.926660	101.85	8:52:19	0.05	0.735
	180	1.926664	101.85	8:53:18	0.06	0.735
	180	1.926665	101.85	8:54:17	0.06	0.735
	180	1.926667	101.85	8:55:17	0.07	0.735
	180	1.926667	101.85	8:56:16	0.07	0.735
	180	1.926671	101.85	8:57:15	0.07	0.735
	180	1.926668	101.86	8:58:14	0.07	0.735
	180	1.926670	101.85	8:59:13	0.07	0.735
	180	1.926676	101.85	9:00:12	0.08	0.735
	180	1.926671	101.85	9:05:11	0.07	0.735
	180	1.926687	101.85	9:10:10	0.10	0.735
	180	1.926685	101.84	9:15:09	0.09	0.735
	180	1.926684	101.84	9:20:08	0.09	0.735
Fill in time →	Record time of initial unloading →			9:20:08		
(***) →	0	0.048894	101.84	9:20:38	0.09	0.500 ←initial indication
These rows are for reference purposes only	0	0.048879	101.85	9:20:57	0.07	0.500
	0	0.048873	101.84	9:21:16	0.06	0.500
	0	0.048869	101.84	9:21:35	0.05	0.500
	0	0.048865	101.84	9:21:54	0.04	0.500
	0	0.048862	101.84	9:22:13	0.04	0.500
	30-20 minute creep difference in units:				0.00	0.1575

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

- Notes:
- 1 Change (v) for creep: the observed indication minus the initial "load" indication (\*\*) divided 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.: 24-012

Load cell model: U2S1-200K

Serial no.: K9Y0009

E<sub>max</sub>: 200 kg

n<sub>max</sub>: 3000

V<sub>min</sub>: 0.02 kg

P<sub>LC</sub>: 0.7

DR: \_\_\_\_\_

Force-generating system: —

Conversion factor, f: 0.000658

Indicating instrument: HBM DMP40

Evaluator: Fukuda

	At start	At end	
Date:	2013/3/6	2013/3/6	
Test temperature:	24.0	24.1	°C
Relative humidity:	38.8	38.9	%
Barometric pressure:	101.70	101.71	kPa
Indicator temperature:	24.2	24.0	°C

**Table D.6**

Pressure (kPa)	Indication (mV/V)	Time	Change (V)	Change (v <sub>min</sub> /kPa)	mpc (v <sub>min</sub> /kPa)
101.70	0.003523	11:21	0.00	0.00	0
102.70	0.003525	11:22	0.00	0.01	1
101.70	0.003523	11:23	0.00	0.01	1
100.70	0.003521	11:24	0.00	0.01	1
101.71	0.003525	11:25	0.01	0.02	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.: 24-012  
 Load cell model: U2S1-200K  
 Serial no.: K9Y0009  
 E<sub>max</sub>: 200 kg  
 n<sub>max</sub>: 3000  
 V<sub>min</sub>: 0.02 kg  
 P<sub>LC</sub>: 0.7 DR: —  
 Force generating system: Load cell performance testing device  
 Indicating instrument: HBM DMP40  
 Evaluator: Fukuda

	At start	At end	
Date:	2013/2/21	2013/3/6	
Temperature:	20.3	20.3	°C
Relative humidity:	47.4	47.7	%
Barometric pressure:	101.82	101.48	kPa
Indicator temperature:	24.4	24.7	°C
Conversion factor, f:	0.000626		
Conditions during damp heat cyclic test:			
Chamber temp.(high):	40.2 °C	Relative humidity:	94.4 %
Chamber temp.(low):	25.1 °C	Relative humidity:	96.2 %

**Table D.7**

Test load (kg)	Before humidity test		After humidity test		Change (v)	mpc (v)
	Indication (mV/V)	Time	Indication (mV/V)	Time		
0	0.048845	9:40:40	0.048856	10:37:51		
180	1.926622	9:41:09	1.927049	10:38:21		
0	0.048898	9:41:39	0.048909	10:38:51		
180	1.926629	9:42:09	1.927047	10:39:20		
0	0.048902	9:42:38	0.048907	10:39:50		
180	1.926628	9:43:08	1.927042	10:40:19		
0	0.048901	9:43:38	0.048906	10:40:49		
0	0.048862	9:48:55	0.048874	10:46:06		
180	1.926625	9:49:25	1.927049	10:46:36		
0	0.048900	9:49:55	0.048907	10:47:06		
180	1.926623	9:50:24	1.927043	10:47:35		
0	0.048901	9:50:54	0.048904	10:48:05		
180	1.926629	9:51:23	1.927047	10:48:34		
0	0.048902	9:51:53	0.048905	10:49:04		
Average(□)	0.048891		0.048898		0.01	120 ← ≤ 4% n <sub>max</sub>
Average(‡)	1.926626		1.927046			
Averages difference(*)	1.877734		1.878149		0.66	1.0

(□) Indications at minimum test load      Change (□), CHmin:    PASS:       FAIL:   
 (‡) Indications at maximum test load (see Note 3)      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.: 24-012  
 Load cell model: U2S1-200K  
 Serial no.: K9Y0009  
 $E_{max}$ : 200 kg  
 $n_{max}$ : 3000  
 $v_{min}$ : 0.02 kg  
 $p_{LC}$ : 0.7 DR: \_\_\_\_\_  
 Force-generating system: -  
 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 "/".

**General information concerning test conditions**

Ref.:A3

Application no.: 24-012

Load cell model: U2S1-200K Serial no.: K9Y0009  $E_{\max}$ : 200 kg $n_{\max}$ : 3000  $v_{\min}$ : 0.02 kg DR (if applicable):Force-generating system - description: Load cell performance testing device  
(see Note)

Minimum test load: 1.3 kg

Indicating instrument - description: HBM DMP40

Environmental equipment - description: Air Supply Equipment ASE-210

Temperature: 20.3~20.4 °C

Relative humidity: 46.4 ~ 47.4 %RH

Barometric pressure: 100.95 ~ 101.44 kPa

Test location: Room 023

Acceleration of gravity at test location: 9.79949 m/sec<sup>2</sup>

Evaluator: Fukuda

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

**Summary of the test**

Application no.: 24-012  
 Load cell model: U2S1-200K  
 Serial no.: K9Y0009  
 $E_{max}$ : 200 kg  $n_{max}$ : 3000  
 $v_{min}$ : 0.02 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 ( $E_L$ )	x		26	Tension
D.3	Repeatability errors ( $E_R$ )	x		27	Tension
D.4	Temperature effects on MDLO ( $C_M$ )	x		28	
D.5	Creep ( $C_C$ )	x		29-32	Tension
D.5	DR( $C_{DR}$ )	x		29-32	(see Note 2) DR: 0.02 kg
D.6	Barometric pressure effects ( $C_p$ )				
D.7	Humidity effects (CH or no mark) ( $C_{Hmin}$ )				
D.7	Humidity effects (CH or no mark) ( $C_{Hmax}$ )				
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 $n_{max}$	x		x		x	
C.4.4	Check that $v_{min} \leq \frac{D_{max}-D_{min}}{n_{max}}$	Pass		Fail			
		x					

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 accommodate OIML R76.
  - 3 This DR value is used in association with OIML R 76.

**Form D.1 (3 runs) Load test data (E<sub>L</sub>)**

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.: 24-012  
 Load cell model: U2S1-200K  
 Serial no.: K9Y0009  
 E<sub>max</sub>: 200 kg  
 n<sub>max</sub>: 3000  
 V<sub>min</sub>: 0.02 kg  
 P<sub>LC</sub>: 0.7 DR: \_\_\_\_\_  
 Force-generating system: Load cell performance testing device  
 Indicating instrument: HBM DMP40  
 Evaluator: Fukuda

	At start	At end	
Date:	2013/2/4	2013/2/4	
Temperature:	20.3	20.4	°C
Relative humidity:	46.9	46.4	%
Barometric pressure:	101.43	101.44	kPa
Indicator temperature:	24.1	24.5	°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	-0.018877	8:04:26						
200	-2.013031	8:04:56						
0	-0.018909	8:05:25						
200	-2.013029	8:05:55						
0	-0.018909	8:06:25						
200	-2.013027	8:06:54						
0	-0.018911	8:07:24						
0	-0.018870	8:12:34	-0.018885	8:20:42	-0.018885	8:28:50	-0.018880 *	0.000015
20	-0.216270	8:12:55	-0.216291	8:21:03	-0.216283	8:29:11	-0.216281	0.000021
40	-0.413691	8:13:16	-0.413709	8:21:24	-0.413703	8:29:32	-0.413701	0.000018
60	-0.611120	8:13:37	-0.611137	8:21:44	-0.611136	8:29:52	-0.611131	0.000017
80	-0.808560	8:13:57	-0.808575	8:22:05	-0.808576	8:30:13	-0.808570	0.000016
100	-1.005984	8:14:18	-1.005997	8:22:26	-1.005987	8:30:33	-1.005989	0.000013
120	-1.203427	8:14:39	-1.203439	8:22:46	-1.203435	8:30:54	-1.203434	0.000012
140	-1.400875	8:15:00	-1.400883	8:23:07	-1.400885	8:31:15	-1.400881	0.000010
160	-1.598341	8:15:21	-1.598351	8:23:28	-1.598359	8:31:35	-1.598350	0.000018
180	-1.795825	8:15:42	-1.795823	8:23:48	-1.795826	8:31:56	-1.795825	0.000003
200	-1.993278	8:16:03	-1.993310	8:24:09	-1.993302	8:32:17	-1.993297	0.000032
180	-1.795923	8:16:23	-1.795930	8:24:30	-1.795925	8:32:38	-1.795926	0.000007
160	-1.598526	8:16:44	-1.598530	8:24:51	-1.598529	8:32:59	-1.598528	0.000004
140	-1.401116	8:17:05	-1.401121	8:25:12	-1.401119	8:33:20	-1.401119	0.000005
120	-1.203692	8:17:26	-1.203698	8:25:33	-1.203695	8:33:41	-1.203695	0.000006
100	-1.006267	8:17:47	-1.006271	8:25:54	-1.006268	8:34:02	-1.006269	0.000004
80	-0.808829	8:18:08	-0.808833	8:26:15	-0.808828	8:34:23	-0.808830	0.000005
60	-0.611367	8:18:29	-0.611371	8:26:36	-0.611367	8:34:44	-0.611368	0.000004
40	-0.413895	8:18:50	-0.413895	8:26:57	-0.413892	8:35:04	-0.413894	0.000003
20	-0.216399	8:19:11	-0.216400	8:27:17	-0.216396	8:35:25	-0.216398	0.000004
0	-0.018904	8:19:32	-0.018907	8:27:38	-0.018903	8:35:46	-0.018905	0.000004

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<sub>L</sub>)**

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.: 24-012  
 Load cell model: U2S1-200K  
 Serial no.: K9Y0009  
 E<sub>max</sub>: 200 kg  
 n<sub>max</sub>: 3000  
 V<sub>min</sub>: 0.02 kg  
 PLC: 0.7 DR:  
 Force-generating system: Load cell performance testing device  
 Indicating instrument: HBM DMP40  
 Evaluator: Fukuda

	At start	At end	
Date:	2013/2/5	2013/2/5	
Temperature:	40.2	40.2	°C
Relative humidity:	34.9	35.0	%
Barometric pressure:	101.72	101.74	kPa
Indicator temperature:	23.9	24.3	°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	-0.018673	9:36:09						
200	-2.013016	9:36:38						
0	-0.018696	9:37:08						
200	-2.013015	9:37:37						
0	-0.018696	9:38:07						
200	-2.013015	9:38:37						
0	-0.018695	9:39:06						
0	-0.018681	9:44:16	-0.018680	9:52:24	-0.018677	10:00:31	-0.018679 *	0.000004
20	-0.216101	9:44:37	-0.216100	9:52:45	-0.216097	10:00:52	-0.216099	0.000004
40	-0.413531	9:44:58	-0.413531	9:53:06	-0.413524	10:01:13	-0.413529	0.000007
60	-0.610972	9:45:19	-0.610971	9:53:26	-0.610970	10:01:33	-0.610971	0.000002
80	-0.808415	9:45:39	-0.808412	9:54:47	-0.808409	10:01:54	-0.808412	0.000006
100	-1.005873	9:46:00	-1.005861	9:54:08	-1.005860	10:02:14	-1.005865	0.000013
120	-1.203337	9:46:21	-1.203336	9:54:28	-1.203334	10:02:35	-1.203336	0.000003
140	-1.400805	9:46:42	-1.400800	9:54:49	-1.400799	10:02:56	-1.400801	0.000006
160	-1.598293	9:47:03	-1.598288	9:55:10	-1.598293	10:03:16	-1.598291	0.000005
180	-1.795791	9:47:24	-1.795784	9:55:30	-1.795778	10:03:37	-1.795784	0.000013
200	-1.993278	9:47:45	-1.993272	9:55:51	-1.993266	10:03:58	-1.993272	0.000012
180	-1.795875	9:48:06	-1.795876	9:56:12	-1.795868	10:04:19	-1.795873	0.000008
160	-1.598463	9:48:26	-1.598455	9:56:33	-1.598449	10:04:40	-1.598456	0.000014
140	-1.401032	9:48:47	-1.401028	9:56:54	-1.401024	10:05:01	-1.401028	0.000008
120	-1.203586	9:49:09	-1.203583	9:57:15	-1.203578	10:05:22	-1.203582	0.000008
100	-1.006136	9:49:30	-1.006130	9:57:36	-1.006127	10:05:43	-1.006131	0.000009
80	-0.808675	9:49:50	-0.808669	9:57:57	-0.808663	10:06:04	-0.808669	0.000012
60	-0.611193	9:50:11	-0.611190	9:58:18	-0.611184	10:06:25	-0.611189	0.000009
40	-0.413706	9:50:32	-0.413703	9:58:39	-0.413701	10:06:46	-0.413703	0.000005
20	-0.216206	9:50:53	-0.216202	9:59:00	-0.216197	10:07:07	-0.216202	0.000009
0	-0.018692	9:51:14	-0.018693	9:59:21	-0.018686	10:07:28	-0.018690	0.000007

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<sub>L</sub>)**

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.: 24-012  
 Load cell model: U2S1-200K  
 Serial no.: K9Y0009  
 E<sub>max</sub>: 200 kg  
 F<sub>max</sub>: 3000  
 V<sub>min</sub>: 0.02 kg  
 PLC: 0.7 DR: \_\_\_\_\_  
 Force-generating system: Load cell performance testing device  
 Indicating instrument: HBM DMP40  
 Evaluator: Fukuda

	At start	At end	
Date:	2013/2/6	2013/2/6	
Temperature:	-9.8	-9.8	°C
Relative humidity:	34.6	34.6	%
Barometric pressure:	101.11	101.12	kPa
Indicator temperature:	24.7	23.9	°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	-0.018986	7:03:30						
200	-2.013511	7:03:59						
0	-0.019262	7:04:29						
200	-2.013558	7:04:59						
0	-0.019283	7:05:28						
200	-2.013564	7:05:58						
0	-0.019294	7:06:28						
0	-0.019246	7:11:38	-0.019279	7:19:47	-0.019290	7:27:54	-0.019272 *	0.000044
20	-0.216653	7:11:59	-0.216686	7:20:08	-0.216694	7:28:15	-0.216678	0.000041
40	-0.414080	7:12:20	-0.414112	7:20:29	-0.414124	7:28:36	-0.414105	0.000044
60	-0.611518	7:12:41	-0.611553	7:20:49	-0.611560	7:28:56	-0.611544	0.000042
80	-0.808955	7:13:02	-0.809001	7:21:10	-0.808996	7:29:17	-0.808984	0.000046
100	-1.006403	7:13:22	-1.006435	7:21:31	-1.006452	7:29:38	-1.006430	0.000049
120	-1.203869	7:13:43	-1.203902	7:21:51	-1.203908	7:29:58	-1.203893	0.000039
140	-1.401338	7:14:04	-1.401369	7:22:12	-1.401373	7:30:19	-1.401360	0.000035
160	-1.598828	7:14:25	-1.598857	7:22:33	-1.598863	7:30:40	-1.598849	0.000035
180	-1.796292	7:14:46	-1.796270	7:22:53	-1.796284	7:31:00	-1.796282	0.000022
200	-1.993814	7:15:07	-1.993839	7:23:14	-1.993838	7:31:21	-1.993830	0.000025
180	-1.796428	7:15:28	-1.796416	7:23:35	-1.796416	7:31:42	-1.796420	0.000012
160	-1.599010	7:15:49	-1.599033	7:23:56	-1.599033	7:32:03	-1.599025	0.000023
140	-1.401589	7:16:10	-1.401610	7:24:17	-1.401613	7:32:24	-1.401604	0.000024
120	-1.204151	7:16:31	-1.204170	7:24:38	-1.204172	7:32:45	-1.204164	0.000021
100	-1.006706	7:16:52	-1.006725	7:24:59	-1.006727	7:33:06	-1.006719	0.000021
80	-0.809247	7:17:13	-0.809234	7:25:20	-0.809267	7:33:27	-0.809249	0.000033
60	-0.611780	7:17:34	-0.611792	7:25:41	-0.611799	7:33:48	-0.611790	0.000019
40	-0.414303	7:17:55	-0.414312	7:26:02	-0.414320	7:34:09	-0.414312	0.000017
20	-0.216803	7:18:16	-0.216812	7:26:23	-0.216820	7:34:30	-0.216812	0.000017
0	-0.019307	7:18:36	-0.019315	7:26:44	-0.019323	7:34:51	-0.019315	0.000016

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<sub>L</sub>)**

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.: 24-012  
 Load cell model: U2S1-200K  
 Serial no.: K9Y0009  
 E<sub>max</sub>: 200 kg  
 η<sub>max</sub>: 3000  
 V<sub>min</sub>: 0.02 kg  
 P<sub>LC</sub>: 0.7 DR: \_\_\_\_\_  
 Force-generating system: Load cell performance testing device  
 Indicating instrument: HBM DMP40  
 Evaluator: Fukuda

Date:	At start	At end	
Temperature:	2013/2/7	2013/2/7	°C
Relative humidity:	20.3	20.3	%
Barometric pressure:	47.4	47.1	kPa
Indicator temperature:	100.97	100.95	°C
	25.0	24.5	

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	-0.018976	7:41:28						
200	-2.013073	7:41:57						
0	-0.019005	7:42:27						
200	-2.013088	7:42:56						
0	-0.019009	7:43:26						
200	-2.013101	7:43:56						
0	-0.019010	7:44:25						
0	-0.018968	7:49:35	-0.018982	7:57:44	-0.018979	8:05:51	-0.018976 *	0.000014
20	-0.216370	7:49:56	-0.216385	7:58:05	-0.216382	8:06:12	-0.216379	0.000015
40	-0.413794	7:50:17	-0.413807	7:58:26	-0.413808	8:06:33	-0.413803	0.000014
60	-0.611221	7:50:38	-0.611238	7:58:46	-0.611238	8:06:53	-0.611232	0.000017
80	-0.808648	7:50:58	-0.808677	7:59:07	-0.808680	8:07:14	-0.808668	0.000032
100	-1.006077	7:51:19	-1.006094	7:59:27	-1.006098	8:07:34	-1.006090	0.000021
120	-1.203513	7:51:40	-1.203529	7:59:48	-1.203533	8:07:55	-1.203525	0.000020
140	-1.400956	7:52:01	-1.400975	8:00:09	-1.400978	8:08:16	-1.400970	0.000022
160	-1.598419	7:52:22	-1.598435	8:00:29	-1.598451	8:08:36	-1.598435	0.000032
180	-1.795897	7:52:43	-1.795903	8:00:50	-1.795909	8:08:57	-1.795903	0.000012
200	-1.993364	7:53:04	-1.993376	8:01:11	-1.993384	8:09:18	-1.993375	0.000020
180	-1.795993	7:53:24	-1.796003	8:01:32	-1.796008	8:09:39	-1.796001	0.000015
160	-1.598601	7:53:45	-1.598613	8:01:53	-1.598631	8:10:00	-1.598615	0.000030
140	-1.401202	7:54:06	-1.401210	8:02:14	-1.401210	8:10:21	-1.401207	0.000008
120	-1.203783	7:54:27	-1.203790	8:02:35	-1.203792	8:10:42	-1.203788	0.000009
100	-1.006364	7:54:48	-1.006369	8:02:56	-1.006373	8:11:03	-1.006369	0.000009
80	-0.808930	7:55:09	-0.808934	8:03:17	-0.808935	8:11:24	-0.808933	0.000005
60	-0.611468	7:55:30	-0.611472	8:03:38	-0.611469	8:11:45	-0.611470	0.000004
40	-0.413996	7:55:51	-0.413997	8:03:59	-0.413997	8:12:06	-0.413997	0.000001
20	-0.216502	7:56:12	-0.216498	8:04:20	-0.216499	8:12:26	-0.216500	0.000004
0	-0.019006	7:56:33	-0.018998	8:04:40	-0.019001	8:12:47	-0.019002	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<sub>L</sub>) calculation**

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

Application no.:	24-012	At start	At end	
Load cell model:	U2S1-200K	Date:	2013/2/4	2013/2/7
Serial no.:	K9Y0009	Test temperature:	20.3	20.3 °C
E <sub>max</sub> :	200 kg	Relative humidity:	46.9	47.1 %
n <sub>max</sub> :	3000	Barometric pressure:	101.43	100.95 kPa
V <sub>min</sub> :	0.02 kg	Indicator temperature:	24.1	24.5 °C
PLC:	0.7	DR:		
Force-generating system:	Load cell performance testing device	Conversion factor, f:	-0.000658	
Indicating instrument:	HBM DMP40	75% test load (g, kg or t):	150 kg	
Evaluator:	Fukuda	Reference indication at 75% test load:	-1.480736	

**Table D.2**

Test load (kg)	Reference indication (mV/V)	20.3 °C (20°C)		40.2 °C (40°C)		-9.8 °C (-10°C)		20.3 °C (20°C)		mpe (V)
		Indication (mV/V)	Error(E <sub>L</sub> ) (V)	Indication (mV/V)	Error(E <sub>L</sub> ) (V)	Indication (mV/V)	Error(E <sub>L</sub> ) (V)	Indication (mV/V)	Error(E <sub>L</sub> ) (V)	
0	0.000000	0.000000	0.00	0.000000	0.00	0.000000	0.00	0.000000	0.00	0.35
20	-0.197431	-0.197401	-0.05	-0.197420	-0.02	-0.197406	-0.04	-0.197403	-0.04	0.35
40	-0.394863	-0.394821	-0.06	-0.394849	-0.02	-0.394834	-0.04	-0.394827	-0.05	0.70
60	-0.592294	-0.592251	-0.07	-0.592292	0.00	-0.592272	-0.03	-0.592256	-0.06	0.70
80	-0.789726	-0.789690	-0.05	-0.789733	0.01	-0.789712	-0.02	-0.789692	-0.05	0.70
100	-0.987157	-0.987109	-0.07	-0.987185	0.04	-0.987158	0.00	-0.987113	-0.07	0.70
120	-1.184589	-1.184554	-0.05	-1.184656	0.10	-1.184621	0.05	-1.184549	-0.06	0.70
140	-1.382020	-1.382001	-0.03	-1.382122	0.16	-1.382088	0.10	-1.381993	-0.04	1.05
160	-1.579451	-1.579470	0.03	-1.579612	0.24	-1.579578	0.19	-1.579459	0.01	1.05
180	-1.776883	-1.776945	0.09	-1.777105	0.34	-1.777010	0.19	-1.776927	0.07	1.05
200	-1.974314	-1.974417	0.16	-1.974593	0.42	-1.974559	0.37	-1.974398	0.13	1.05
180	-1.776883	-1.777046	0.25	-1.777194	0.47	-1.777148	0.40	-1.777025	0.22	1.05
160	-1.579451	-1.579648	0.30	-1.579776	0.49	-1.579754	0.46	-1.579639	0.28	1.05
140	-1.382020	-1.382239	0.33	-1.382349	0.50	-1.382332	0.47	-1.382231	0.32	1.05
120	-1.184589	-1.184815	0.34	-1.184903	0.48	-1.184893	0.46	-1.184812	0.34	0.70
100	-0.987157	-0.987389	0.35	-0.987452	0.45	-0.987448	0.44	-0.987392	0.36	0.70
80	-0.789726	-0.789950	0.34	-0.789990	0.40	-0.789978	0.38	-0.789957	0.35	0.70
60	-0.592294	-0.592488	0.29	-0.592510	0.33	-0.592519	0.34	-0.592493	0.30	0.70
40	-0.394863	-0.395014	0.23	-0.395024	0.24	-0.395040	0.27	-0.395020	0.24	0.70
20	-0.197431	-0.197518	0.13	-0.197522	0.14	-0.197540	0.16	-0.197523	0.14	0.35
0	0.000000	-0.000025	0.04	-0.000011	0.02	-0.000043	0.07	-0.000025	0.04	0.35

Minimum test load, D<sub>min</sub>: 1.3 kgPASS:  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<sub>L</sub>: 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<sub>min</sub>.

**Form D.3 Repeatability errors (E<sub>R</sub>) calculation**

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

Application no.: 24-012  
 Load cell model: U2S1-200K  
 Serial no.: K9Y0009  
 E<sub>max</sub>: 200 kg  
 n<sub>max</sub>: 3000  
 V<sub>min</sub>: 0.02 kg  
 P<sub>Lc</sub>: 0.7 DR:  
 Force-generating system: Load cell performance testing device  
 Indicating instrument: HBM DMP40  
 Evaluator: Fukuda

Conversion factor, f: -0.000658

**Table D.3**

Test load (kg)	20.3 °C (20°C)		40.2 °C (40°C)		-9.8 °C (-10°C)		20.3 °C (20°C)		mpe (V)
	Repeatability error (mV/V)	Repeatability error (V)	Repeatability error (mV/V)	Repeatability error (V)	Repeatability error (mV/V)	Repeatability error (V)	Repeatability error (mV/V)	Repeatability error (V)	
	0	0.000015	-0.02	0.000004	-0.01	0.000044	-0.07	0.000014	
20	0.000021	-0.03	0.000004	-0.01	0.000041	-0.06	0.000015	-0.02	0.35
40	0.000018	-0.03	0.000007	-0.01	0.000044	-0.07	0.000014	-0.02	0.70
60	0.000017	-0.03	0.000002	0.00	0.000042	-0.06	0.000017	-0.03	0.70
80	0.000016	-0.02	0.000006	-0.01	0.000046	-0.07	0.000032	-0.05	0.70
100	0.000013	-0.02	0.000013	-0.02	0.000049	-0.07	0.000021	-0.03	0.70
120	0.000012	-0.02	0.000003	0.00	0.000039	-0.06	0.000020	-0.03	0.70
140	0.000010	-0.02	0.000006	-0.01	0.000035	-0.05	0.000022	-0.03	1.05
160	0.000018	-0.03	0.000005	-0.01	0.000035	-0.05	0.000032	-0.05	1.05
180	0.000003	0.00	0.000013	-0.02	0.000022	-0.03	0.000012	-0.02	1.05
200	0.000032	-0.05	0.000012	-0.02	0.000025	-0.04	0.000020	-0.03	1.05
180	0.000007	-0.01	0.000008	-0.01	0.000012	-0.02	0.000015	-0.02	1.05
160	0.000004	-0.01	0.000014	-0.02	0.000023	-0.03	0.000030	-0.05	1.05
140	0.000005	-0.01	0.000008	-0.01	0.000024	-0.04	0.000008	-0.01	1.05
120	0.000006	-0.01	0.000008	-0.01	0.000021	-0.03	0.000009	-0.01	0.70
100	0.000004	-0.01	0.000009	-0.01	0.000021	-0.03	0.000009	-0.01	0.70
80	0.000005	-0.01	0.000012	-0.02	0.000033	-0.05	0.000005	-0.01	0.70
60	0.000004	-0.01	0.000009	-0.01	0.000019	-0.03	0.000004	-0.01	0.70
40	0.000003	0.00	0.000005	-0.01	0.000017	-0.03	0.000001	0.00	0.70
20	0.000004	-0.01	0.000009	-0.01	0.000017	-0.03	0.000004	-0.01	0.35
0	0.000004	-0.01	0.000007	-0.01	0.000016	-0.02	0.000008	-0.01	0.35

PASS:  x FAIL:

Note: Error, E<sub>R</sub>: 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 (CM) calculation**

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

Application no.: 24-012  
 Load cell model: U2S1-200K  
 Serial no.: K9Y0009  
 $E_{max}$ : 200 kg  
 $n_{max}$ : 3000  
 $V_{min}$ : 0.02 kg  
 $\rho_{LC}$ : 0.7 DR: \_\_\_\_\_

Force-generating system: Load cell performance testing device Conversion factor, f: -0.000658

Indicating instrument: HBM DMP40

Evaluator: Fukuda

**Table D.4**

Temperature °C	Indication (mVV)	Change (CM) (V)	Change ( $V_{min}/5\text{ }^{\circ}\text{C}$ )	mpc ( $V_{min}/5\text{ }^{\circ}\text{C}$ )
20.3	-0.018880			
40.2	-0.018679	-0.30	-0.26	0.70
-9.8	-0.019272	0.90	-0.30	0.70
20.3	-0.018976	-0.45	-0.25	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: ( $V_{min}/5\text{ }^{\circ}\text{C}$ ) for classes B, C, and D; ( $V_{min}/2\text{ }^{\circ}\text{C}$ ) for class A.
- 4 Change, CM(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.: 24-012  
 Load cell model: U2S1-200K  
 Serial no.: K9Y0009  
 $E_{max}$ : 200 kg  
 $n_{max}$ : 3000  
 $V_{min}$ : 0.02 kg  
 PLC: 0.7 DR: \_\_\_\_\_  
 Force generating system: Load cell performance testing device  
 Indicating instrument: HBM DMP40  
 Evaluator: Fukuda

	At start	At end	
Date:	2013/2/4	2013/2/4	
Temperature:	20.3	20.3	°C
Relative humidity:	46.2	46.7	%
Barometric pressure:	101.44	101.46	kPa
Indicator temperature:	24.5	24.7	°C

Conversion factor, f: -0.000626

**Table D.5**

Test load (kg)	Indication (mV/V)	Barometric pressure (kPa)	Time	Change (v)	mpc (v)
0					
0					
0					
0					
(*) → 0	-0.018841	101.34	9:36:04		
Fill in time →	Record time of initial loading →			9:36:04	
(**) → 180	-1.896300	101.34	9:36:34	0.00	0.735
Constant maximum test load, Dmax	-1.896332	101.34	9:37:35	0.05	0.735
	-1.896339	101.34	9:38:34	0.06	0.735
	-1.896343	101.33	9:39:34	0.07	0.735
	-1.896345	101.32	9:40:33	0.07	0.735
	-1.896346	101.31	9:41:32	0.07	0.735
	-1.896346	101.30	9:42:31	0.07	0.735
	-1.896346	101.31	9:43:30	0.07	0.735
	-1.896346	101.31	9:44:29	0.07	0.735
	-1.896347	101.31	9:45:29	0.08	0.735
	-1.896349	101.30	9:46:28	0.08	0.735
	-1.896352	101.30	9:51:27	0.08	0.735
	-1.896351	101.30	9:56:26	0.08	0.735
	-1.896354	101.29	10:01:25	0.09	0.735
	-1.896351	101.26	10:06:24	0.08	0.735
Fill in time →	Record time of initial unloading →			10:06:24	
(***) → 0	-0.018894	101.26	10:06:54	0.08	0.500
These rows are for reference purposes only	-0.018880	101.26	10:07:13	0.06	0.500
	-0.018874	101.26	10:07:32	0.05	0.500
	-0.018870	101.26	10:07:51	0.05	0.500
	-0.018868	101.26	10:08:10	0.04	0.500
	-0.018865	101.26	10:08:29	0.04	0.500
	30-20 minute creep difference in units:				0.00

DR (v):	0.08	30 minute creep:	PASS:	x	FAIL:	
actual time (s):	30	30-20 minute creep diffence:	PASS:	x	FAIL:	
specified time (s):	30	DR ≤ 0.5v:	PASS:	x	FAIL:	
mpc for DR (v):	0.50	DR within manufacturer specified DR requirements:	PASS:		FAIL:	

- Notes:
- 1 Change (v) for creep: the observed indication minus the initial "load" indication (\*\*) divided 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.: 24-012  
 Load cell model: U2S1-200K  
 Serial no.: K9Y0009  
 $E_{max}$ : 200 kg  
 $n_{max}$ : 3000  
 $V_{min}$ : 0.02 kg  
 $P_{LC}$ : 0.7 DR: \_\_\_\_\_

	At start	At end	
Date:	2013/2/5	2013/2/5	
Temperature:	40.2	40.2	°C
Relative humidity:	34.9	35.2	%
Barometric pressure:	101.74	101.75	kPa
Indicator temperature:	24.8	24.0	°C

Force generating system: Load cell performance testing device Conversion factor, f: -0.000626  
 Indicating instrument: HBM DMP40  
 Evaluator: Fukuda

**Table D.5**

Test load (kg)	Indication (mV/V)	Barometric pressure (kPa)	Time	Change (v)	mpc (v)
0					
0					
0					
0					
(*) → 0	-0.018695	101.74	11:07:46		
Fill in time →	Record time of initial loading →		11:07:46		
(**) → 180	-1.896333	101.74	11:08:16	0.00	0.735
Constant maximum test load, Dmax	-1.896343	101.74	11:09:17	0.02	0.735
	-1.896335	101.74	11:10:17	0.00	0.735
	-1.896328	101.74	11:11:16	-0.01	0.735
	-1.896323	101.74	11:12:15	-0.02	0.735
	-1.896317	101.74	11:13:14	-0.03	0.735
	-1.896312	101.74	11:14:13	-0.03	0.735
	-1.896311	101.74	11:15:12	-0.04	0.735
	-1.896307	101.74	11:16:12	-0.04	0.735
	-1.896304	101.73	11:17:11	-0.05	0.735
	-1.896300	101.73	11:18:10	-0.05	0.735
	-1.896284	101.72	11:23:09	-0.08	0.735
	-1.896277	101.71	11:28:08	-0.09	0.735
	-1.896264	101.70	11:33:07	-0.11	0.735
	-1.896254	101.68	11:38:06	-0.13	0.735
Fill in time →	Record time of initial unloading →		11:38:06		
(***) → 0	-0.018629	101.68	11:38:36	-0.11	0.500
These rows are for reference purposes only	-0.018620	101.68	11:38:55	-0.12	0.500
	-0.018620	101.68	11:39:14	-0.12	0.500
	-0.018621	101.68	11:39:33	-0.12	0.500
	-0.018620	101.68	11:39:52	-0.12	0.500
	-0.018620	101.69	11:40:11	-0.12	0.500
	30-20 minute creep difference in units:				-0.04

DR (v):	-0.11	30 minute creep:	PASS:	x	FAIL:	
actual time (s):	30	30-20 minute creep diffence:	PASS:	x	FAIL:	
specified time (s):	30	DR ≤ 0.5v:	PASS:	x	FAIL:	
mpc for DR (v):	0.50	DR within manufacturer specified DR requirements:	PASS:		FAIL:	

- Notes: 1 Change (v) for creep: the observed indication minus the initial "load" indication (\*\*) divided 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.: 24-012  
 Load cell model: U2S1-200K  
 Serial no.: K9Y0009  
 $E_{max}$ : 200 kg  
 $n_{max}$ : 3000  
 $v_{min}$ : 0.02 kg  
 PLC: 0.7 DR: \_\_\_\_\_  
 Force generating system: Load cell performance testing device  
 Indicating instrument: HBM DMP40  
 Evaluator: Fukuda

	At start	At end	
Date:	2013/2/6	2013/2/6	
Temperature:	-9.8	-9.8	°C
Relative humidity:	34.6	34.6	%
Barometric pressure:	101.11	101.12	kPa
Indicator temperature:	24.7	23.9	°C

Conversion factor, f: -0.000626

**Table D.5**

Test load (kg)	Indication (mV/V)	Barometric pressure (kPa)	Time	Change (v)	mpc (v)
0					
0					
0					
0					
(*) → 0	-0.019233	101.04	8:35:09		
Fill in time →	Record time of initial loading →		8:35:09		
(**) → 180	-1.896797	101.04	8:35:39	0.00	0.735
Constant maximum test load, Dmax	-1.896841	101.04	8:36:40	0.07	0.735
	-1.896857	101.03	8:37:40	0.10	0.735
	-1.896867	101.04	8:38:39	0.11	0.735
	-1.896875	101.04	8:39:38	0.12	0.735
	-1.896880	101.04	8:40:37	0.13	0.735
	-1.896885	101.04	8:41:36	0.14	0.735
	-1.896892	101.04	8:42:36	0.15	0.735
	-1.896895	101.04	8:43:35	0.16	0.735
	-1.896899	101.04	8:44:34	0.16	0.735
	-1.896905	101.04	8:45:33	0.17	0.735
	-1.896918	101.04	8:50:32	0.19	0.735
	-1.896933	101.04	8:55:31	0.22	0.735
	-1.896940	101.04	9:00:30	0.23	0.735
	-1.896951	101.02	9:05:29	0.25	0.735
Fill in time →	Record time of initial unloading →		9:05:29		
(***) → 0	-0.019384	101.02	9:05:59	0.24	0.500
These rows are for reference purposes only	-0.019369	101.02	9:06:18	0.22	0.500
	-0.019360	101.02	9:06:37	0.20	0.500
	-0.019354	101.01	9:06:56	0.19	0.500
	-0.019347	101.01	9:07:15	0.18	0.500
	-0.019344	101.01	9:07:34	0.18	0.500
	30-20 minute creep difference in units:				0.03

DR (v):	0.24	30 minute creep:	PASS:	x	FAIL:	
actual time (s):	30	30-20 minute creep difference:	PASS:	x	FAIL:	
specified time (s):	30	DR ≤ 0.5v:	PASS:	x	FAIL:	
mpc for DR (v):	0.50	DR within manufacturer specified DR requirements:	PASS:		FAIL:	

- Notes:
- 1 Change (v) for creep: the observed indication minus the initial "load" indication (\*\*) divided 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.: 24-012  
 Load cell model: U2S1-200K  
 Serial no.: K9Y0009  
 $E_{max}$ : 200 kg  
 $\eta_{max}$ : 3000  
 $v_{min}$ : 0.02 kg  
 PLC: 0.7 DR: \_\_\_\_\_

	At start	At end	
Date:	2013/2/7	2013/2/7	
Temperature:	20.3	20.3	°C
Relative humidity:	47.1	47.2	%
Barometric pressure:	100.96	100.95	kPa
Indicator temperature:	24.9	24.7	°C

Force generating system: Load cell performance testing device Conversion factor, f: -0.000626  
 Indicating instrument: HBM DMP40  
 Evaluator: Fukuda

**Table D.5**

Test load (kg)	Indication (mV/V)	Barometric pressure (kPa)	Time	Change (v)	mpc (v)
0					
0					
0					
0					
(*) → 0	-0.018939	100.83	9:13:06		
Fill in time →	Record time of initial loading →		9:13:06		
(**) → 180	-1.896374	100.83	9:13:36	0.00	0.735
Constant maximum test load, Dmax	-1.896402	100.82	9:14:36	0.04	0.735
	-1.896410	100.82	9:15:35	0.06	0.735
	-1.896412	100.82	9:16:34	0.06	0.735
	-1.896417	100.82	9:17:33	0.07	0.735
	-1.896417	100.82	9:18:32	0.07	0.735
	-1.896420	100.81	9:19:32	0.07	0.735
	-1.896422	100.81	9:20:31	0.08	0.735
	-1.896422	100.81	9:21:30	0.08	0.735
	-1.896424	100.81	9:22:29	0.08	0.735
	-1.896422	100.81	9:23:28	0.08	0.735
	-1.896428	100.81	9:28:27	0.09	0.735
	-1.896429	100.80	9:33:26	0.09	0.735
	-1.896432	100.80	9:38:25	0.09	0.735
	180	-1.896434	100.79	9:43:24	0.10
Fill in time →	Record time of initial unloading →		9:43:24		
(***) → 0	-0.018988	100.79	9:43:54	0.08	0.500
These rows are for reference purposes only	-0.018975	100.79	9:44:13	0.06	0.500
	-0.018968	100.79	9:44:32	0.05	0.500
	-0.018967	100.79	9:44:51	0.04	0.500
	-0.018964	100.79	9:45:10	0.04	0.500
	-0.018962	100.79	9:45:29	0.04	0.500
30-20 minute creep difference in units:				0.01	0.1575

DR (v):	0.08	30 minute creep:	PASS:	x	FAIL:	
actual time (s):	30	30-20 minute creep diffence:	PASS:	x	FAIL:	
specified time (s):	30	DR ≤ 0.5v:	PASS:	x	FAIL:	
mpc for DR (v):	0.50	DR within manufacturer specified DR requirements:	PASS:		FAIL:	

- Notes: 1 Change (v) for creep: the observed indication minus the initial "load" indication (\*\*) divided 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.

**General information concerning test conditions**

Ref.:A3

Application no.: 24-012

Load cell model: U2S1-1T Serial no.: K9Y0035 E<sub>max</sub>: 1000 kgn<sub>max</sub>: 3000 v<sub>min</sub>: 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 Equipment ASE-210

Temperature: 20.3 °C

Relative humidity: 46.4 ~ 47.1 %RH

Barometric pressure: 101.49 ~ 102.22 kPa

Test location: Room 023

Acceleration of gravity at test location: 9.79949 m/sec<sup>2</sup>

Evaluator: Fukuda

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



**Summary of the test**Application no.: 24-012Load cell model: U2S1-1TSerial no.: K9Y0035 $E_{max}$ : 1000 kg $v_{min}$ : 0.1 kgForce-generating system: Load cell performance testing deviceIndicating instrument: HBM DMP40Evaluator: Fukuda $n_{max}$ : 3000

DR: \_\_\_\_\_

p<sub>LC</sub>: 0.7

No.	Test description	Passed	Failed	Report page	Remarks
D.2	Load cell errors ( $E_L$ )	x		39	Compression
D.3	Repeatability errors ( $E_R$ )	x		40	Compression
D.4	Temperature effects on MDLO ( $C_M$ )	x		41	
D.5	Creep ( $C_C$ )	x		42-45	Compression
D.5	DR( $C_{DR}$ )	x		42-45	(see Note 2) DR: -0.12 kg
D.6	Barometric pressure effects ( $C_p$ )				
D.7	Humidity effects (CH or no mark) ( $C_{Hmin}$ )				
D.7	Humidity effects (CH or no mark) ( $C_{Hmax}$ )				
D.8	Humidity effects (SH)				
D.9	Marking requirements	See Page 46, 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 $n_{max}$	x		x		x	
C.4.4	Check that $v_{min} \leq \frac{D_{max}-D_{min}}{n_{max}}$	Pass		Fail			
		x					

Worst case figure for minimum dead load output return error (in mass units) = DR = -0.12 kg see Note 3

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

**Form D.1 (3 runs) Load test data (E<sub>L</sub>)**

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.: 24-012  
 Load cell model: U2S1-1T  
 Serial no.: K9Y0035  
 E<sub>max</sub>: 1000 kg  
 n<sub>max</sub>: 3000  
 V<sub>min</sub>: 0.1 kg  
 PLC: 0.7 DR: \_\_\_\_\_  
 Force-generating system: Load cell performance testing device  
 Indicating instrument: HBM DMP40  
 Evaluator: Fukuda

	At start	At end	
Date:	2013/2/25	2013/2/25	
Temperature:	20.3	20.3	°C
Relative humidity:	47.0	46.4	%
Barometric pressure:	102.21	102.22	kPa
Indicator temperature:	25.1	24.6	°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	0.013179	7:15:52						
1000	2.377411	7:16:22						
0	0.013227	7:16:51						
1000	2.377423	7:17:21						
0	0.013230	7:17:50						
1000	2.377426	7:18:20						
0	0.013229	7:18:49						
0	0.013196	7:23:59	0.013190	7:32:04	0.013182	7:40:08	0.013189 *	0.000014
100	0.247156	7:24:20	0.247150	7:32:25	0.247136	7:40:29	0.247147	0.000020
200	0.481164	7:24:41	0.481154	7:32:45	0.481134	7:40:49	0.481151	0.000030
300	0.715175	7:25:01	0.715163	7:33:06	0.715144	7:41:10	0.715161	0.000031
400	0.949232	7:25:22	0.949220	7:33:26	0.949193	7:41:30	0.949215	0.000039
500	1.183291	7:25:43	1.183279	7:33:47	1.183251	7:41:51	1.183274	0.000040
600	1.417403	7:26:03	1.417386	7:34:07	1.417357	7:42:11	1.417382	0.000046
700	1.651527	7:26:24	1.651514	7:34:28	1.651477	7:42:32	1.651506	0.000050
800	1.885691	7:26:45	1.885677	7:34:48	1.885636	7:42:52	1.885668	0.000055
900	2.119867	7:27:05	2.119852	7:35:09	2.119812	7:43:13	2.119844	0.000055
1000	2.354042	7:27:26	2.354030	7:35:30	2.353980	7:43:34	2.354017	0.000062
900	2.119918	7:27:47	2.119904	7:35:50	2.119861	7:43:54	2.119894	0.000057
800	1.885794	7:28:08	1.885786	7:36:11	1.885746	7:44:15	1.885775	0.000048
700	1.651678	7:28:28	1.651670	7:36:32	1.651632	7:44:36	1.651660	0.000046
600	1.417573	7:28:49	1.417563	7:36:53	1.417529	7:44:57	1.417555	0.000044
500	1.183478	7:29:10	1.183469	7:37:14	1.183441	7:45:17	1.183463	0.000037
400	0.949399	7:29:31	0.949388	7:37:34	0.949365	7:45:38	0.949384	0.000034
300	0.715336	7:29:52	0.715313	7:37:55	0.715308	7:45:59	0.715319	0.000028
200	0.481283	7:30:13	0.481264	7:38:16	0.481258	7:46:20	0.481268	0.000025
100	0.247228	7:30:33	0.247215	7:38:37	0.247209	7:46:41	0.247217	0.000019
0	0.013199	7:30:54	0.013192	7:38:58	0.013187	7:47:02	0.013193	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<sub>L</sub>)**

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.: 24-012  
 Load cell model: U2S1-1T  
 Serial no.: K9Y0035  
 E<sub>max</sub>: 1000 kg  
 n<sub>max</sub>: 3000  
 V<sub>min</sub>: 0.1 kg  
 PLC: 0.7 DR:  
 Force-generating system: Load cell performance testing device  
 Indicating instrument: HBM DMP40  
 Evaluator: Fukuda

	At start	At end	
Date:	2013/2/26	2013/2/26	
Temperature:	40.2	40.2	°C
Relative humidity:	34.6	34.7	%
Barometric pressure:	102.40	102.39	kPa
Indicator temperature:	25.3	25.2	°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	0.013120	7:11:04						
1000	2.377285	7:11:33						
0	0.013200	7:12:03						
1000	2.377234	7:12:32						
0	0.013196	7:13:02						
1000	2.377228	7:13:31						
0	0.013190	7:14:01						
0	0.013182	7:19:11	0.013158	7:27:16	0.013118	7:35:20	0.013153 *	0.000064
100	0.247127	7:19:32	0.247094	7:27:37	0.247067	7:35:41	0.247096	0.000060
200	0.481115	7:19:53	0.481082	7:27:57	0.481050	7:36:01	0.481082	0.000065
300	0.715115	7:20:13	0.715083	7:28:18	0.715049	7:36:22	0.715082	0.000066
400	0.949162	7:20:34	0.949133	7:28:38	0.949094	7:36:42	0.949130	0.000068
500	1.183213	7:20:55	1.183187	7:28:59	1.183147	7:37:03	1.183182	0.000066
600	1.417310	7:21:15	1.417282	7:29:19	1.417262	7:37:23	1.417285	0.000048
700	1.651419	7:21:36	1.651392	7:29:40	1.651377	7:37:44	1.651396	0.000042
800	1.885558	7:21:57	1.885533	7:30:00	1.885515	7:38:04	1.885535	0.000043
900	2.119725	7:22:17	2.119689	7:30:21	2.119671	7:38:25	2.119695	0.000054
1000	2.353860	7:22:38	2.353838	7:30:42	2.353821	7:38:46	2.353840	0.000039
900	2.119735	7:22:59	2.119716	7:31:02	2.119699	7:39:06	2.119717	0.000036
800	1.885617	7:23:19	1.885597	7:31:23	1.885581	7:39:27	1.885598	0.000036
700	1.651507	7:23:40	1.651487	7:31:44	1.651473	7:39:48	1.651489	0.000034
600	1.417415	7:24:01	1.417393	7:32:05	1.417377	7:40:09	1.417395	0.000038
500	1.183329	7:24:22	1.183287	7:32:25	1.183292	7:40:30	1.183303	0.000042
400	0.949260	7:24:43	0.949221	7:32:46	0.949221	7:40:50	0.949234	0.000039
300	0.715208	7:25:04	0.715174	7:33:07	0.715171	7:41:11	0.715184	0.000037
200	0.481175	7:25:24	0.481147	7:33:28	0.481137	7:41:32	0.481153	0.000038
100	0.247150	7:25:45	0.247123	7:33:49	0.247111	7:41:53	0.247128	0.000039
0	0.013137	7:26:06	0.013113	7:34:10	0.013094	7:42:14	0.013115	0.000043

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<sub>L</sub>)**

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.: 24-012  
 Load cell model: U2S1-1T  
 Serial no.: K9Y0035  
 E<sub>max</sub>: 1000 kg  
 n<sub>max</sub>: 3000  
 V<sub>min</sub>: 0.1 kg  
 PLC: 0.7 DR:  
 Force-generating system: Load cell performance testing device  
 Indicating instrument: HBM DMP40  
 Evaluator: Fukuda

	At start	At end	
Date:	2013/2/27	2013/2/27	
Temperature:	-9.9	-9.9	°C
Relative humidity:	32.1	32.1	%
Barometric pressure:	101.37	101.33	kPa
Indicator temperature:	24.6	24.7	°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	0.013317	7:06:33						
1000	2.377882	7:07:03						
0	0.013450	7:07:33						
1000	2.377894	7:08:02						
0	0.013464	7:08:32						
1000	2.377902	7:09:01						
0	0.013472	7:09:30						
0	0.013440	7:14:41	0.013459	7:22:46	0.013466	7:30:50	0.013455 *	0.000026
100	0.247395	7:15:02	0.247413	7:23:07	0.247419	7:31:11	0.247409	0.000024
200	0.481399	7:15:23	0.481416	7:23:27	0.481424	7:31:31	0.481413	0.000025
300	0.715426	7:15:43	0.715439	7:23:48	0.715446	7:31:52	0.715437	0.000020
400	0.949506	7:16:04	0.949522	7:24:08	0.949525	7:32:12	0.949518	0.000019
500	1.183591	7:16:25	1.183604	7:24:29	1.183610	7:32:33	1.183602	0.000019
600	1.417731	7:16:45	1.417741	7:24:49	1.417749	7:32:53	1.417740	0.000018
700	1.651860	7:17:06	1.651900	7:25:10	1.651906	7:33:14	1.651889	0.000046
800	1.886046	7:17:27	1.886087	7:25:30	1.886096	7:33:34	1.886076	0.000050
900	2.120269	7:17:47	2.120299	7:25:51	2.120311	7:33:55	2.120293	0.000042
1000	2.354459	7:18:08	2.354509	7:26:12	2.354518	7:34:16	2.354495	0.000059
900	2.120330	7:18:29	2.120375	7:26:32	2.120381	7:34:36	2.120362	0.000051
800	1.886200	7:18:50	1.886240	7:26:53	1.886247	7:34:57	1.886229	0.000047
700	1.652070	7:19:10	1.652109	7:27:14	1.652115	7:35:18	1.652098	0.000045
600	1.417946	7:19:31	1.417976	7:27:35	1.417985	7:35:39	1.417969	0.000039
500	1.183825	7:19:52	1.183853	7:27:56	1.183860	7:36:00	1.183846	0.000035
400	0.949722	7:20:13	0.949745	7:28:16	0.949751	7:36:20	0.949739	0.000029
300	0.715636	7:20:34	0.715656	7:28:37	0.715661	7:36:41	0.715651	0.000025
200	0.481562	7:20:55	0.481578	7:28:58	0.481583	7:37:02	0.481574	0.000021
100	0.247509	7:21:15	0.247519	7:29:19	0.247525	7:37:23	0.247518	0.000016
0	0.013474	7:21:36	0.013480	7:29:40	0.013487	7:37:44	0.013480	0.000013

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<sub>L</sub>)**

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.: 24-012  
 Load cell model: U2S1-1T  
 Serial no.: K9Y0035  
 E<sub>max</sub>: 1000 kg  
 n<sub>max</sub>: 3000  
 V<sub>min</sub>: 0.1 kg  
 P<sub>LC</sub>: 0.7 DR:  
 Force-generating system: Load cell performance testing device  
 Indicating instrument: HBM DMP40  
 Evaluator: Fukuda

	At start	At end	
Date:	2013/2/28	2013/2/28	
Temperature:	20.3	20.3	°C
Relative humidity:	46.8	47.1	%
Barometric pressure:	101.49	101.54	kPa
Indicator temperature:	24.6	24.5	°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	0.013181	7:12:37						
1000	2.377481	7:13:07						
0	0.013253	7:13:37						
1000	2.377485	7:14:06						
0	0.013255	7:14:36						
1000	2.377485	7:15:05						
0	0.013256	7:15:34						
0	0.013222	7:20:45	0.013217	7:28:49	0.013212	7:36:51	0.013217 *	0.000010
100	0.247184	7:21:06	0.247178	7:29:10	0.247171	7:37:12	0.247178	0.000013
200	0.481193	7:21:26	0.481184	7:29:30	0.481175	7:37:32	0.481184	0.000018
300	0.715196	7:21:47	0.715201	7:29:51	0.715197	7:37:53	0.715198	0.000005
400	0.949254	7:22:08	0.949265	7:30:11	0.949261	7:38:13	0.949260	0.000011
500	1.183314	7:22:28	1.183331	7:30:32	1.183326	7:38:34	1.183324	0.000017
600	1.417418	7:22:49	1.417443	7:30:52	1.417437	7:38:54	1.417433	0.000025
700	1.651548	7:23:09	1.651574	7:31:12	1.651568	7:39:14	1.651563	0.000026
800	1.885700	7:23:30	1.885737	7:31:33	1.885730	7:39:35	1.885722	0.000037
900	2.119875	7:23:50	2.119915	7:31:54	2.119911	7:39:56	2.119900	0.000040
1000	2.354047	7:24:11	2.354090	7:32:14	2.354085	7:40:16	2.354074	0.000043
900	2.119925	7:24:31	2.119963	7:32:35	2.119961	7:40:37	2.119950	0.000038
800	1.885810	7:24:52	1.885842	7:32:55	1.885838	7:40:57	1.885830	0.000032
700	1.651695	7:25:13	1.651722	7:33:16	1.651719	7:41:18	1.651712	0.000027
600	1.417593	7:25:33	1.417614	7:33:37	1.417610	7:41:39	1.417606	0.000021
500	1.183498	7:25:54	1.183516	7:33:58	1.183511	7:42:00	1.183508	0.000018
400	0.949422	7:26:15	0.949436	7:34:18	0.949429	7:42:20	0.949429	0.000014
300	0.715367	7:26:36	0.715366	7:34:39	0.715358	7:42:41	0.715364	0.000009
200	0.481311	7:26:56	0.481307	7:35:00	0.481300	7:43:02	0.481306	0.000011
100	0.247256	7:27:17	0.247253	7:35:20	0.247246	7:43:22	0.247252	0.000010
0	0.013228	7:27:38	0.013222	7:35:41	0.013216	7:43:43	0.013222	0.000012

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

**Form D.2 Load cell errors (E<sub>L</sub>) calculation**

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

Application no.:	24-012	At start	At end
Load cell model:	U2S1-1T	Date: 2013/2/25	2013/2/28
Serial no.:	K9Y0035	Test temperature:	20.3      20.3      °C
E <sub>max</sub> :	1000 kg	Relative humidity:	47.0      47.1      %
n <sub>max</sub> :	3000	Barometric pressure:	102.21      101.54      kPa
V <sub>min</sub> :	0.1 kg	Indicator temperature:	25.1      24.5      °C
P <sub>LC</sub> :	0.7	DR:	
Force-generating system:	Load cell performance testing device	Conversion factor, f:	0.000780
Indicating instrument:	HBM DMP40	75% test load (g, kg or t):	750 kg
Evaluator:	Fukuda	Reference indication at 75% test load:	1.755398

**Table D.2**

Test load (kg)	Reference indication (mV/V)	20.3 °C (20°C)		40.2 °C (40°C)		-9.9 °C (-10°C)		20.3 °C (20°C)		mpe (V)
		Indication (mV/V)	Error(E <sub>L</sub> ) (V)	Indication (mV/V)	Error(E <sub>L</sub> ) (V)	Indication (mV/V)	Error(E <sub>L</sub> ) (V)	Indication (mV/V)	Error(E <sub>L</sub> ) (V)	
0	0.000000	0.000000	0.00	0.000000	0.00	0.000000	0.00	0.000000	0.00	0.35
100	0.234053	0.233958	-0.12	0.233943	-0.14	0.233954	-0.13	0.233981	-0.12	0.35
200	0.468106	0.467961	-0.19	0.467930	-0.23	0.467958	-0.19	0.467967	-0.18	0.70
300	0.702159	0.701971	-0.24	0.701930	-0.29	0.701982	-0.23	0.701981	-0.23	0.70
400	0.936212	0.936026	-0.24	0.935977	-0.30	0.936063	-0.19	0.936043	-0.22	0.70
500	1.170265	1.170084	-0.23	1.170030	-0.30	1.170147	-0.15	1.170107	-0.20	1.05
600	1.404318	1.404193	-0.16	1.404132	-0.24	1.404285	-0.04	1.404216	-0.13	1.05
700	1.638371	1.638317	-0.07	1.638243	-0.16	1.638434	0.08	1.638346	-0.03	1.05
800	1.872424	1.872479	0.07	1.872383	-0.05	1.872621	0.25	1.872505	0.10	1.05
900	2.106477	2.106654	0.23	2.106542	0.08	2.106838	0.46	2.106683	0.26	1.05
1000	2.340530	2.340828	0.38	2.340687	0.20	2.341040	0.65	2.340857	0.42	1.05
900	2.106477	2.106705	0.29	2.106564	0.11	2.106907	0.55	2.106733	0.33	1.05
800	1.872424	1.872586	0.21	1.872446	0.03	1.872774	0.45	1.872613	0.24	1.05
700	1.638371	1.638471	0.13	1.638336	-0.04	1.638643	0.35	1.638495	0.16	1.05
600	1.404318	1.404366	0.06	1.404242	-0.10	1.404514	0.25	1.404389	0.09	1.05
500	1.170265	1.170273	0.01	1.170150	-0.15	1.170391	0.16	1.170291	0.03	1.05
400	0.936212	0.936195	-0.02	0.936081	-0.17	0.936284	0.09	0.936212	0.00	0.70
300	0.702159	0.702130	-0.04	0.702032	-0.16	0.702196	0.05	0.702147	-0.02	0.70
200	0.468106	0.468079	-0.03	0.468000	-0.14	0.468119	0.02	0.468089	-0.02	0.70
100	0.234053	0.234028	-0.03	0.233975	-0.10	0.234063	0.01	0.234035	-0.02	0.35
0	0.000000	0.000003	0.00	-0.000038	-0.05	0.000025	0.03	0.000005	0.01	0.35

Minimum test load, D<sub>min</sub>: 4.7 kgPASS: 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<sub>L</sub>: 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<sub>min</sub>.

**Form D.3 Repeatability errors ( $E_r$ ) calculation**

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

Application no.: 24-012  
 Load cell model: U2S1-1T  
 Serial no.: K9Y0035  
 $E_{max}$ : 1000 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: 0.000780

**Table D.3**

Test load (kg)	20.3 °C (20°C)		40.2 °C (40°C)		-9.9 °C (-10°C)		20.3 °C (20°C)		mpe (V)
	Repeatability error (mV/V)	Repeatability error (V)	Repeatability error (mV/V)	Repeatability error (V)	Repeatability error (mV/V)	Repeatability error (V)	Repeatability error (mV/V)	Repeatability error (V)	
	0	0.000014	0.02	0.000064	0.08	0.000026	0.03	0.000010	
100	0.000020	0.03	0.000060	0.08	0.000024	0.03	0.000013	0.02	0.35
200	0.000030	0.04	0.000065	0.08	0.000025	0.03	0.000018	0.02	0.70
300	0.000031	0.04	0.000066	0.08	0.000020	0.03	0.000005	0.01	0.70
400	0.000039	0.05	0.000068	0.09	0.000019	0.02	0.000011	0.01	0.70
500	0.000040	0.05	0.000066	0.08	0.000019	0.02	0.000017	0.02	1.05
600	0.000046	0.06	0.000048	0.06	0.000018	0.02	0.000025	0.03	1.05
700	0.000050	0.06	0.000042	0.05	0.000046	0.06	0.000026	0.03	1.05
800	0.000055	0.07	0.000043	0.06	0.000050	0.06	0.000037	0.05	1.05
900	0.000055	0.07	0.000054	0.07	0.000042	0.05	0.000040	0.05	1.05
1000	0.000062	0.08	0.000039	0.05	0.000059	0.08	0.000043	0.06	1.05
900	0.000057	0.07	0.000036	0.05	0.000051	0.07	0.000038	0.05	1.05
800	0.000048	0.06	0.000036	0.05	0.000047	0.06	0.000032	0.04	1.05
700	0.000046	0.06	0.000034	0.04	0.000045	0.06	0.000027	0.03	1.05
600	0.000044	0.06	0.000038	0.05	0.000039	0.05	0.000021	0.03	1.05
500	0.000037	0.05	0.000042	0.05	0.000035	0.04	0.000018	0.02	1.05
400	0.000034	0.04	0.000039	0.05	0.000029	0.04	0.000014	0.02	0.70
300	0.000028	0.04	0.000037	0.05	0.000025	0.03	0.000009	0.01	0.70
200	0.000025	0.03	0.000038	0.05	0.000021	0.03	0.000011	0.01	0.70
100	0.000019	0.02	0.000039	0.05	0.000016	0.02	0.000010	0.01	0.35
0	0.000012	0.02	0.000043	0.06	0.000013	0.02	0.000012	0.02	0.35

PASS:  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<sub>M</sub>) calculation**

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

Application no.: 24-012  
 Load cell model: U2S1-1T  
 Serial no.: K9Y0035  
 E<sub>max</sub>: 1000 kg  
 n<sub>max</sub>: 3000  
 v<sub>min</sub>: 0.1 kg  
 p<sub>LC</sub>: 0.7 DR: \_\_\_\_\_

Force-generating system: Load cell performance testing device Conversion factor, f: 0.000780

Indicating instrument: HBM DMP40

Evaluator: Fukuda

**Table D.4**

Temperature °C	Indication (mV/V)	Change (C <sub>M</sub> ) (V)	Change (v <sub>min</sub> /5 °C)	mpc (v <sub>min</sub> /5 °C)
20.3	0.013189			
40.2	0.013153	-0.05	-0.04	0.70
-9.9	0.013455	0.39	-0.13	0.70
20.3	0.013217	-0.31	-0.17	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<sub>min</sub>/5°C) for classes B, C, and D; (v<sub>min</sub>/2°C) for class A.
  - 4 Change, C<sub>M</sub>(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.: 24-012  
 Load cell model: U2S1-1T  
 Serial no.: K9Y0035  
 $E_{max}$ : 1000 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:	2013/2/25	2013/2/25	
Temperature:	20.3	20.3	°C
Relative humidity:	47.1	46.8	%
Barometric pressure:	102.22	102.24	kPa
Indicator temperature:	25.1	24.6	°C

Conversion factor, f: 0.000710

**Table D.5**

Test load (kg)	Indication (mV/V)	Barometric pressure (kPa)	Time	Change (v)	mpe (v)
0					
0					
0					
0					
(*) → 0	0.013180	102.25	8:47:20		
Fill in time →	Record time of initial loading →		8:47:20		
(**) → 900	2.143672	102.25	8:47:50	0.00	0.735
900	2.143697	102.25	8:48:49	0.04	0.735
900	2.143697	102.25	8:49:49	0.04	0.735
900	2.143694	102.25	8:50:48	0.03	0.735
900	2.143691	102.25	8:51:47	0.03	0.735
900	2.143689	102.26	8:52:46	0.02	0.735
900	2.143687	102.25	8:53:45	0.02	0.735
900	2.143683	102.25	8:54:44	0.02	0.735
900	2.143683	102.25	8:55:44	0.02	0.735
900	2.143681	102.25	8:56:43	0.01	0.735
900	2.143681	102.25	8:57:42	0.01	0.735
900	2.143674	102.25	9:02:41	0.00	0.735
900	2.143666	102.25	9:07:40	-0.01	0.735
900	2.143661	102.24	9:12:39	-0.02	0.735
900	2.143655	102.24	9:17:38	-0.02	0.735
Fill in time →	Record time of initial unloading →		9:17:38		
(***) → 0	0.013171	102.24	9:18:08	-0.01	0.500
0	0.013155	102.24	9:18:27	-0.04	0.500
0	0.013148	102.24	9:18:46	-0.05	0.500
0	0.013146	102.24	9:19:05	-0.05	0.500
0	0.013145	102.24	9:19:24	-0.05	0.500
0	0.013144	102.24	9:19:43	-0.05	0.500
30-20 minute creep difference in units:				-0.02	0.1575

DR (v):	-0.01	30 minute creep:	PASS:	x	FAIL:	
actual time (s):	30	30-20 minute creep diffence:	PASS:	x	FAIL:	
specified time (s):	30	DR ≤ 0.5v:	PASS:	x	FAIL:	
mpe for DR (v):	0.50	DR within manufacturer specified DR requirements:	PASS:		FAIL:	

- Notes:
- 1 Change (v) for creep: the observed indication minus the initial "load" indication (\*\*) divided 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.: 24-012  
 Load cell model: U2S1-1T  
 Serial no.: K9Y0035  
 $E_{max}$ : 1000 kg  
 $n_{max}$ : 3000  
 $v_{min}$ : 0.1 kg  
 PLC: 0.7 DR: \_\_\_\_\_

	At start	At end	
Date:	2013/2/26	2013/2/26	
Temperature:	40.2	40.2	°C
Relative humidity:	34.7	34.6	%
Barometric pressure:	102.39	102.40	kPa
Indicator temperature:	24.2	25.3	°C

Force generating system: Load cell performance testing device Conversion factor, f: 0.000710  
 Indicating instrument: HBM DMP40  
 Evaluator: Fukuda

**Table D.5**

Test load (kg)	Indication (mV/V)	Barometric pressure (kPa)	Time	Change (v)	mpe (v)	
0						
0						
0						
0						
(*) →	0	0.013170	102.46	8:42:32		←initial "no load" indication
Fill in time →	Record time of initial loading →			8:42:32		
(**) →	900	2.143552	102.46	8:43:02	0.00	0.735 ←initial "load" indication
Constant maximum test load, Dmax	900	2.143553	102.46	8:44:02	0.00	0.735
	900	2.143530	102.46	8:45:01	-0.04	0.735
	900	2.143513	102.46	8:46:00	-0.06	0.735
	900	2.143498	102.46	8:46:59	-0.09	0.735
	900	2.143488	102.46	8:47:58	-0.10	0.735
	900	2.143475	102.47	8:48:57	-0.12	0.735
	900	2.143463	102.47	8:49:57	-0.14	0.735
	900	2.143457	102.47	8:50:56	-0.15	0.735
	900	2.143451	102.47	8:51:55	-0.16	0.735
	900	2.143441	102.46	8:52:54	-0.18	0.735
	900	2.143407	102.46	8:57:53	-0.23	0.735
	900	2.143385	102.47	9:02:52	-0.27	0.735
	900	2.143358	102.47	9:07:51	-0.31	0.735
900	2.143337	102.47	9:12:50	-0.35	0.735	
Fill in time →	Record time of initial unloading →			9:12:50		
(***) →	0	0.012956	102.47	9:13:20	-0.35	0.500 ←initial indication
These rows are for reference purposes only	0	0.012950	102.47	9:13:39	-0.35	0.500
	0	0.012954	102.47	9:13:58	-0.35	0.500
	0	0.012961	102.47	9:14:17	-0.34	0.500
	0	0.012966	102.47	9:14:36	-0.33	0.500
	0	0.012972	102.47	9:14:55	-0.32	0.500
30-20 minute creep difference in units:				-0.08	0.1575	

DR (v):	-0.35	30 minute creep:	PASS:	x	FAIL:	
actual time (s):	30	30-20 minute creep diffence:	PASS:	x	FAIL:	
specified time (s):	30	DR ≤ 0.5v:	PASS:	x	FAIL:	
mpc for DR (v):	0.50	DR within manufacturer specified DR requirements:	PASS:		FAIL:	

- Notes: 1 Change (v) for creep: the observed indication minus the initial "load" indication (\*\*) divided 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.: 24-012  
 Load cell model: U2S1-1T  
 Serial no.: K9Y0035  
 $E_{max}$ : 1000 kg  
 $n_{max}$ : 3000  
 $v_{min}$ : 0.1 kg  
 $p_{LC}$ : 0.7 DR: \_\_\_\_\_

	At start	At end	
Date:	2013/2/27	2013/2/27	
Temperature:	-9.9	-9.9	°C
Relative humidity:	32.1	32.1	%
Barometric pressure:	101.37	101.33	kPa
Indicator temperature:	24.6	24.7	°C

Force generating system: Load cell performance testing device Conversion factor, f: 0.000710  
 Indicating instrument: HBM DMP40  
 Evaluator: Fukuda

**Table D.5**

Test load (kg)	Indication (mV/V)	Barometric pressure (kPa)	Time	Change (v)	mpe (v)
0					
0					
0					
0					
(*) → 0	0.013433	101.33	8:38:01		
Fill in time →	Record time of initial loading →		8:38:01		
(**) → 900	2.144115	101.33	8:38:31	0.00	0.735
Constant maximum test load, Dmax	900	2.144145	8:39:30	0.05	0.735
	900	2.144156	8:40:29	0.07	0.735
	900	2.144162	8:41:28	0.08	0.735
	900	2.144169	8:42:27	0.09	0.735
	900	2.144175	8:43:27	0.10	0.735
	900	2.144179	8:44:26	0.10	0.735
	900	2.144183	8:45:25	0.11	0.735
	900	2.144184	8:46:24	0.11	0.735
	900	2.144188	8:47:23	0.12	0.735
	900	2.144189	8:48:22	0.12	0.735
	900	2.144200	8:53:21	0.14	0.735
	900	2.144206	8:58:20	0.15	0.735
	900	2.144211	8:58:20	0.15	0.735
	900	2.144214	8:58:20	0.16	0.735
Fill in time →	Record time of initial unloading →		9:08:18		
(***) → 0	0.013537	101.28	9:08:48	0.17	0.500
These rows are for reference purposes only	0	0.013526	9:09:07	0.15	0.500
	0	0.013518	9:09:26	0.14	0.500
	0	0.013515	9:09:45	0.13	0.500
	0	0.013510	9:10:04	0.12	0.500
	0	0.013504	9:10:23	0.11	0.500
30-20 minute creep difference in units:				0.01	0.1575

DR (v):	0.17	30 minute creep:	PASS:	x	FAIL:	
actual time (s):	30	30-20 minute creep difference:	PASS:	x	FAIL:	
specified time (s):	30	DR ≤ 0.5v:	PASS:	x	FAIL:	
mpc for DR (v):	0.50	DR within manufacturer specified DR requirements:	PASS:		FAIL:	

- Notes:
- 1 Change (v) for creep: the observed indication minus the initial "load" indication (\*\*) divided 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.: 24-012  
 Load cell model: U2S1-1T  
 Serial no.: K9Y0035  
 $E_{max}$ : 1000 kg  
 $n_{max}$ : 3000  
 $v_{min}$ : 0.1 kg  
 $p_{LC}$ : 0.7 DR: \_\_\_\_\_

	At start	At end	
Date:	2013/2/28	2013/2/28	
Temperature:	20.3	20.3	°C
Relative humidity:	47.4	46.9	%
Barometric pressure:	101.54	101.56	kPa
Indicator temperature:	24.1	24.7	°C

Force generating system: Load cell performance testing device Conversion factor, f: 0.000710  
 Indicating instrument: HBM DMP40  
 Evaluator: Fukuda

**Table D.5**

Test load (kg)	Indication (mV/V)	Barometric pressure (kPa)	Time	Change (v)	mpe (v)
0					
0					
0					
0					
(*) → 0	0.013207	101.64	8:44:01		
Fill in time →	Record time of initial loading →		8:44:01		
(**) → 900	2.143731	101.64	8:44:31	0.00	0.735
900	2.143757	101.64	8:45:30	0.04	0.735
900	2.143764	101.64	8:46:30	0.05	0.735
900	2.143756	101.64	8:47:29	0.04	0.735
900	2.143753	101.64	8:48:28	0.03	0.735
900	2.143751	101.64	8:49:27	0.03	0.735
900	2.143754	101.64	8:50:26	0.03	0.735
900	2.143750	101.64	8:51:25	0.03	0.735
900	2.143749	101.64	8:52:25	0.03	0.735
900	2.143747	101.64	8:53:24	0.02	0.735
900	2.143746	101.64	8:54:23	0.02	0.735
900	2.143738	101.63	8:59:22	0.01	0.735
900	2.143732	101.63	9:04:21	0.00	0.735
900	2.143729	101.64	9:09:20	0.00	0.735
900	2.143724	101.64	9:14:19	-0.01	0.735
Fill in time →	Record time of initial unloading →		9:14:19		
(***) → 0	0.013208	101.64	9:14:49	0.00	0.500
0	0.013190	101.64	9:15:08	-0.02	0.500
0	0.013185	101.64	9:15:27	-0.03	0.500
0	0.013181	101.64	9:15:46	-0.04	0.500
0	0.013179	101.64	9:16:05	-0.04	0.500
0	0.013179	101.64	9:16:24	-0.04	0.500
30-20 minute creep difference in units:				-0.01	0.1575

DR (v):	0.00	30 minute creep:	PASS:	x	FAIL:	
actual time (s):	30	30-20 minute creep diffence:	PASS:	x	FAIL:	
specified time (s):	30	DR ≤ 0.5v:	PASS:	x	FAIL:	
mpc for DR (v):	0.50	DR within manufacturer specified DR requirements:	PASS:		FAIL:	

- Notes:
- 1 Change (v) for creep: the observed indication minus the initial "load" indication (\*\*) divided 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.9 Marking requirements**

Ref.: 4.6, 4.7.

Application no.: 24-012  
 Load cell model: U2S1-1T  
 Serial no.: K9Y0035  
 E<sub>max</sub>: 1000 kg  
 n<sub>max</sub>: 3000  
 v<sub>min</sub>: 0.1 kg  
 p<sub>LC</sub>: 0.7 DR: \_\_\_\_\_  
 Force-generating system: -  
 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 <sub>max</sub>	+	+
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 <sub>min</sub>	-	+
4.6.6.1, 4.7.1	Maximum capacity, E <sub>max</sub> (see Note 1)	+	+
4.6.6.1	Safe load limit, E <sub>lim</sub>	-	+
4.6.6.1	Minimum load cell verification interval (v <sub>min</sub> )	+	+
4.6.6.1	Other pertinent conditions	-	-
4.6.6.1	Apportionment factor, p <sub>LC</sub> (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 <sub>min</sub> , 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 "/".

**General information concerning test conditions**

Ref.:A3

Application no.: 24-012  
Load cell model: U2S1-1T Serial no.: K9Y0035  $E_{\max}$ : 1000 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: \_\_\_\_\_ 1.3 kg

Indicating instrument - description: HBM DMP40

Environmental equipment - description: Air Supply Equipment ASE-210

Temperature: 20.4 °C

Relative humidity: 46.1 ~ 47.1 %RH

Barometric pressure: 101.30 ~ 102.69 kPa

Test location: Room 023

Acceleration of gravity at test location: 9.79949 m/sec<sup>2</sup>

Evaluator: \_\_\_\_\_ Fukuda

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

**Summary of the test**

Application no.: 24-012  
 Load cell model: U2S1-1T  
 Serial no.: K9Y0035  
 $E_{max}$ : 1000 kg  $n_{max}$ : 3000  
 $v_{min}$ : 0.1 kg DR: \_\_\_\_\_  
 Force-generating system: Load cell performance testing device p<sub>LC</sub>: 0.7  
 Indicating instrument: HBM DMP40  
 Evaluator: Fukuda

No.	Test description	Passed	Failed	Report page	Remarks
D.2	Load cell errors ( $E_L$ )	x		53	Tension
D.3	Repeatability errors ( $E_R$ )	x		54	Tension
D.4	Temperature effects on MDLO ( $C_M$ )	x		55	
D.5	Creep ( $C_C$ )	x		56-59	Tension
D.5	DR( $C_{DR}$ )	x		56-59	(see Note 2) DR: 0.12 kg
D.6	Barometric pressure effects ( $C_p$ )				
D.7	Humidity effects (CH or no mark) ( $C_{Hmin}$ )				
D.7	Humidity effects (CH or no mark) ( $C_{Hmax}$ )				
D.8	Humidity effects (SH)				
D.9	Marking requirements	See Page 46, 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 $n_{max}$	x		x		x	
C.4.4	Check that $v_{min} \leq \frac{D_{max}-D_{min}}{n_{max}}$	Pass		Fail			
		x					

Worst case figure for minimum dead load output return error (in mass units) = DR = 0.12 kg see Note 3

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

**Form D.1 (3 runs) Load test data (E<sub>L</sub>)**

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.: 24-012  
 Load cell model: U2S1-1T  
 Serial no.: K9Y0035  
 E<sub>max</sub>: 1000 kg  
 n<sub>max</sub>: 3000  
 V<sub>min</sub>: 0.1 kg  
 PLC: 0.7 DR: \_\_\_\_\_  
 Force-generating system: Load cell performance testing device  
 Indicating instrument: HBM DMP40  
 Evaluator: Fukuda

	At start	At end	
Date:	2013/2/12	2013/2/12	
Temperature:	20.4	20.4	°C
Relative humidity:	46.1	46.5	%
Barometric pressure:	102.66	102.69	kPa
Indicator temperature:	25.6	24.9	°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	-0.003447	7:31:10						
1000	-2.366451	7:31:40						
0	-0.003476	7:32:09						
1000	-2.366451	7:32:39						
0	-0.003474	7:33:09						
1000	-2.366448	7:33:38						
0	-0.003473	7:34:08						
0	-0.003447	7:39:18	-0.003441	7:47:21	-0.003433	7:55:24	-0.003440 *	0.000014
100	-0.237423	7:39:39	-0.237411	7:47:42	-0.237408	7:55:45	-0.237414	0.000015
200	-0.471380	7:39:59	-0.471365	7:48:02	-0.471368	7:56:05	-0.471371	0.000015
300	-0.705328	7:40:20	-0.705308	7:48:23	-0.705316	7:56:26	-0.705317	0.000020
400	-0.939311	7:40:41	-0.939290	7:48:43	-0.939300	7:56:46	-0.939300	0.000021
500	-1.173259	7:41:01	-1.173234	7:49:04	-1.173245	7:57:07	-1.173246	0.000025
600	-1.407227	7:41:22	-1.407194	7:49:24	-1.407213	7:57:27	-1.407211	0.000033
700	-1.641187	7:41:42	-1.641154	7:49:45	-1.641172	7:57:48	-1.641171	0.000033
800	-1.875156	7:42:03	-1.875116	7:50:05	-1.875135	7:58:08	-1.875136	0.000040
900	-2.109115	7:42:23	-2.109069	7:50:26	-2.109097	7:58:29	-2.109094	0.000046
1000	-2.343040	7:42:44	-2.342991	7:50:46	-2.343021	7:58:49	-2.343017	0.000049
900	-2.109176	7:43:05	-2.109132	7:51:07	-2.109157	7:59:10	-2.109155	0.000044
800	-1.875288	7:43:25	-1.875251	7:51:28	-1.875271	7:59:31	-1.875270	0.000037
700	-1.641386	7:43:46	-1.641348	7:51:48	-1.641362	7:59:52	-1.641365	0.000038
600	-1.407459	7:44:07	-1.407424	7:52:09	-1.407443	8:00:12	-1.407442	0.000035
500	-1.173508	7:44:27	-1.173479	7:52:30	-1.173491	8:00:33	-1.173493	0.000029
400	-0.939535	7:44:48	-0.939512	7:52:51	-0.939517	8:00:54	-0.939521	0.000023
300	-0.705532	7:45:09	-0.705526	7:53:11	-0.705527	8:01:15	-0.705528	0.000006
200	-0.471529	7:45:30	-0.471524	7:53:32	-0.471520	8:01:35	-0.471524	0.000009
100	-0.237510	7:45:50	-0.237501	7:53:53	-0.237496	8:01:56	-0.237502	0.000014
0	-0.003449	7:46:11	-0.003442	7:54:14	-0.003435	8:02:17	-0.003442	0.000014

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<sub>L</sub>)**

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.: 24-012  
 Load cell model: U2S1-1T  
 Serial no.: K9Y0035  
 E<sub>max</sub>: 1000 kg  
 n<sub>max</sub>: 3000  
 V<sub>min</sub>: 0.1 kg  
 PLC: 0.7 DR: \_\_\_\_\_  
 Force-generating system: Load cell performance testing device  
 Indicating instrument: HBM DMP40  
 Evaluator: Fukuda

	At start	At end	
Date:	2013/2/13	2013/2/13	
Temperature:	40.1	40.1	°C
Relative humidity:	34.9	35.2	%
Barometric pressure:	100.54	100.53	kPa
Indicator temperature:	25.6	24.7	°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	-0.003403	7:23:18						
1000	-2.366573	7:23:48						
0	-0.003468	7:24:18						
1000	-2.366560	7:24:47						
0	-0.003462	7:25:17						
1000	-2.366551	7:25:46						
0	-0.003454	7:26:16						
0	-0.003445	7:31:26	-0.003407	7:39:29	-0.003384	7:47:32	-0.003412 *	0.000061
100	-0.237420	7:31:47	-0.237374	7:39:50	-0.237352	7:47:53	-0.237382	0.000068
200	-0.471408	7:32:07	-0.471364	7:40:10	-0.471341	7:48:13	-0.471371	0.000067
300	-0.705386	7:32:28	-0.705345	7:40:31	-0.705324	7:48:34	-0.705352	0.000062
400	-0.939389	7:32:49	-0.939349	7:40:51	-0.939327	7:48:54	-0.939355	0.000062
500	-1.173358	7:33:09	-1.173315	7:41:12	-1.173295	7:49:15	-1.173323	0.000063
600	-1.407331	7:33:30	-1.407292	7:41:32	-1.407271	7:49:35	-1.407298	0.000060
700	-1.641289	7:33:50	-1.641250	7:41:53	-1.641232	7:49:56	-1.641257	0.000057
800	-1.875246	7:34:11	-1.875210	7:42:13	-1.875193	7:50:16	-1.875216	0.000053
900	-2.109195	7:34:31	-2.109154	7:42:34	-2.109136	7:50:37	-2.109162	0.000059
1000	-2.343106	7:34:52	-2.343067	7:42:54	-2.343048	7:50:57	-2.343074	0.000058
900	-2.109231	7:35:13	-2.109196	7:43:15	-2.109179	7:51:18	-2.109202	0.000052
800	-1.875337	7:35:33	-1.875304	7:43:35	-1.875286	7:51:39	-1.875309	0.000051
700	-1.641422	7:35:54	-1.641390	7:43:56	-1.641369	7:51:59	-1.641394	0.000053
600	-1.407487	7:36:15	-1.407455	7:44:17	-1.407437	7:52:20	-1.407460	0.000050
500	-1.173527	7:36:35	-1.173495	7:44:38	-1.173477	7:52:41	-1.173500	0.000050
400	-0.939547	7:36:56	-0.939513	7:44:59	-0.939494	7:53:02	-0.939518	0.000053
300	-0.705539	7:37:17	-0.705511	7:45:19	-0.705490	7:53:23	-0.705513	0.000049
200	-0.471514	7:37:38	-0.471485	7:45:40	-0.471465	7:53:43	-0.471488	0.000049
100	-0.237471	7:37:58	-0.237443	7:46:01	-0.237421	7:54:04	-0.237445	0.000050
0	-0.003411	7:38:19	-0.003388	7:46:22	-0.003369	7:54:25	-0.003389	0.000042

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<sub>L</sub>)**

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.: 24-012  
 Load cell model: U2S1-1T  
 Serial no.: K9Y0035  
 E<sub>max</sub>: 1000 kg  
 η<sub>max</sub>: 3000  
 V<sub>min</sub>: 0.1 kg  
 p<sub>LC</sub>: 0.7 DR:  
 Force-generating system: Load cell performance testing device  
 Indicating instrument: HBM DMP40  
 Evaluator: Fukuda

	At start	At end	
Date:	2013/2/14	2013/2/14	
Temperature:	-9.6	-9.6	°C
Relative humidity:	33.8	34.0	%
Barometric pressure:	102.13	102.14	kPa
Indicator temperature:	24.6	23.7	°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	-0.003194	7:10:20						
1000	-2.366313	7:10:49						
0	-0.003332	7:11:19						
1000	-2.366332	7:11:48						
0	-0.003343	7:12:18						
1000	-2.366340	7:12:48						
0	-0.003352	7:13:17						
0	-0.003321	7:18:27	-0.003342	7:26:30	-0.003347	7:34:34	-0.003337 *	0.000026
100	-0.237308	7:18:48	-0.237325	7:26:51	-0.237334	7:34:55	-0.237322	0.000026
200	-0.471295	7:19:08	-0.471319	7:27:11	-0.471326	7:35:15	-0.471313	0.000031
300	-0.705281	7:19:29	-0.705297	7:27:32	-0.705305	7:35:36	-0.705294	0.000024
400	-0.939261	7:19:50	-0.939283	7:27:52	-0.939287	7:35:56	-0.939277	0.000026
500	-1.173190	7:20:10	-1.173210	7:28:13	-1.173213	7:36:17	-1.173204	0.000023
600	-1.407137	7:20:31	-1.407153	7:28:33	-1.407159	7:36:37	-1.407150	0.000022
700	-1.641078	7:20:51	-1.641097	7:28:54	-1.641104	7:36:58	-1.641093	0.000026
800	-1.875046	7:21:12	-1.875059	7:29:14	-1.875065	7:37:18	-1.875057	0.000019
900	-2.109004	7:21:32	-2.109022	7:29:35	-2.109021	7:37:39	-2.109016	0.000018
1000	-2.342939	7:21:53	-2.342953	7:29:55	-2.342954	7:37:59	-2.342949	0.000015
900	-2.109083	7:22:14	-2.109099	7:30:16	-2.109100	7:38:20	-2.109094	0.000017
800	-1.875208	7:22:34	-1.875222	7:30:36	-1.875222	7:38:40	-1.875217	0.000014
700	-1.641314	7:22:55	-1.641324	7:30:57	-1.641330	7:39:01	-1.641323	0.000016
600	-1.407396	7:23:16	-1.407409	7:31:18	-1.407392	7:39:22	-1.407399	0.000017
500	-1.173459	7:23:36	-1.173471	7:31:39	-1.173457	7:39:43	-1.173462	0.000014
400	-0.939508	7:23:57	-0.939517	7:32:00	-0.939511	7:40:04	-0.939512	0.000009
300	-0.705521	7:24:18	-0.705533	7:32:20	-0.705527	7:40:24	-0.705527	0.000012
200	-0.471490	7:24:39	-0.471498	7:32:41	-0.471494	7:40:45	-0.471494	0.000008
100	-0.237433	7:24:59	-0.237440	7:33:02	-0.237441	7:41:06	-0.237438	0.000008
0	-0.003355	7:25:20	-0.003363	7:33:22	-0.003366	7:41:26	-0.003361	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<sub>L</sub>)**

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.: 24-012  
 Load cell model: U2S1-1T  
 Serial no.: K9Y0035  
 E<sub>max</sub>: 1000 kg  
 n<sub>max</sub>: 3000  
 v<sub>min</sub>: 0.1 kg  
 PLC: 0.7 DR:  
 Force-generating system: Load cell performance testing device  
 Indicating instrument: HBM DMP40  
 Evaluator: Fukuda

	At start	At end	
Date:	2013/2/15	2013/2/15	
Temperature:	20.4	20.4	°C
Relative humidity:	47.1	46.8	%
Barometric pressure:	101.31	101.30	kPa
Indicator temperature:	24.6	24.3	°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	-0.003378	7:20:38						
1000	-2.366395	7:21:07						
0	-0.003446	7:21:37						
1000	-2.366384	7:22:06						
0	-0.003448	7:22:36						
1000	-2.366381	7:23:05						
0	-0.003449	7:23:35						
0	-0.003420	7:28:45	-0.003417	7:36:51	-0.003413	7:44:55	-0.003417 *	0.000007
100	-0.237405	7:29:06	-0.237402	7:37:12	-0.237398	7:45:16	-0.237402	0.000007
200	-0.471370	7:29:27	-0.471372	7:37:32	-0.471369	7:45:36	-0.471370	0.000003
300	-0.705308	7:29:47	-0.705317	7:37:53	-0.705312	7:45:57	-0.705312	0.000009
400	-0.939282	7:30:08	-0.939294	7:38:13	-0.939290	7:46:17	-0.939289	0.000012
500	-1.173222	7:30:29	-1.173241	7:38:34	-1.173234	7:46:38	-1.173232	0.000019
600	-1.407185	7:30:49	-1.407198	7:38:54	-1.407198	7:46:58	-1.407194	0.000013
700	-1.641141	7:31:10	-1.641158	7:39:15	-1.641155	7:47:19	-1.641151	0.000017
800	-1.875097	7:31:31	-1.875123	7:39:35	-1.875120	7:47:39	-1.875113	0.000026
900	-2.109050	7:31:52	-2.109079	7:39:56	-2.109076	7:48:00	-2.109068	0.000029
1000	-2.342976	7:32:12	-2.343008	7:40:17	-2.343005	7:48:21	-2.342996	0.000032
900	-2.109117	7:32:33	-2.109143	7:40:37	-2.109141	7:48:41	-2.109134	0.000026
800	-1.875235	7:32:54	-1.875260	7:40:58	-1.875225	7:49:02	-1.875240	0.000035
700	-1.641334	7:33:14	-1.641356	7:41:19	-1.641324	7:49:23	-1.641338	0.000032
600	-1.407411	7:33:35	-1.407428	7:41:40	-1.407403	7:49:44	-1.407414	0.000025
500	-1.173482	7:33:56	-1.173476	7:42:01	-1.173455	7:50:05	-1.173471	0.000027
400	-0.939512	7:34:17	-0.939506	7:42:22	-0.939488	7:50:26	-0.939502	0.000024
300	-0.705528	7:34:38	-0.705520	7:42:42	-0.705506	7:50:46	-0.705518	0.000022
200	-0.471526	7:34:59	-0.471519	7:43:03	-0.471507	7:51:07	-0.471517	0.000019
100	-0.237495	7:35:20	-0.237490	7:43:24	-0.237481	7:51:28	-0.237489	0.000014
0	-0.003425	7:35:41	-0.003422	7:43:45	-0.003416	7:51:49	-0.003421	0.000009

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

**Form D.2 Load cell errors (E<sub>L</sub>) calculation**

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

Application no.:	<u>24-012</u>								
Load cell model:	<u>U2S1-1T</u>								
Serial no.:	<u>K9Y0035</u>								
E <sub>max</sub> :	<u>1000 kg</u>								
n <sub>max</sub> :	<u>3000</u>								
V <sub>min</sub> :	<u>0.1 kg</u>								
P <sub>Lc</sub> :	<u>0.7</u>	DR:							
Force-generating system:	<u>Load cell performance testing device</u>	Conversion factor, f:	<u>-0.000780</u>						
Indicating instrument:	<u>HBM DMP40</u>	75% test load (g, kg or t):	<u>750 kg</u>						
Evaluator:	<u>Fukuda</u>	Reference indication at 75% test load:	<u>-1.754713</u>						

	At start	At end	
Date:	2013/2/12	2013/2/15	
Test temperature:	20.4	20.4	°C
Relative humidity:	46.1	46.8	%
Barometric pressure:	102.66	101.30	kPa
Indicator temperature:	25.6	24.3	°C

**Table D.2**

Test load (kg)	Reference indication (mV/V)	20.4 °C (20°C)		40.1 °C (40°C)		-9.6 °C (-10°C)		20.4 °C (20°C)		mpe (V)
		Indication (mV/V)	Error(E <sub>L</sub> ) (V)	Indication (mV/V)	Error(E <sub>L</sub> ) (V)	Indication (mV/V)	Error(E <sub>L</sub> ) (V)	Indication (mV/V)	Error(E <sub>L</sub> ) (V)	
0	0.000000	0.000000	0.00	0.000000	0.00	0.000000	0.00	0.000000	0.00	0.35
100	-0.233962	-0.233974	0.02	-0.233970	0.01	-0.233986	0.03	-0.233985	0.03	0.35
200	-0.467923	-0.467931	0.01	-0.467959	0.05	-0.467977	0.07	-0.467954	0.04	0.70
300	-0.701885	-0.701877	-0.01	-0.701940	0.07	-0.701958	0.09	-0.701896	0.01	0.70
400	-0.935847	-0.935860	0.02	-0.935943	0.12	-0.935940	0.12	-0.935872	0.03	0.70
500	-1.169809	-1.169806	0.00	-1.169911	0.13	-1.169868	0.08	-1.169816	0.01	1.05
600	-1.403770	-1.403771	0.00	-1.403886	0.15	-1.403813	0.05	-1.403777	0.01	1.05
700	-1.637732	-1.637731	0.00	-1.637845	0.14	-1.637756	0.03	-1.637735	0.00	1.05
800	-1.871694	-1.871695	0.00	-1.871804	0.14	-1.871720	0.03	-1.871697	0.00	1.05
900	-2.105656	-2.105653	0.00	-2.105750	0.12	-2.105679	0.03	-2.105652	-0.01	1.05
1000	-2.339617	-2.339577	-0.05	-2.339662	0.06	-2.339612	-0.01	-2.339580	-0.05	1.05
900	-2.105656	-2.105715	0.08	-2.105790	0.17	-2.105757	0.13	-2.105717	0.08	1.05
800	-1.871694	-1.871830	0.17	-1.871897	0.26	-1.871881	0.24	-1.871823	0.17	1.05
700	-1.637732	-1.637925	0.25	-1.637982	0.32	-1.637986	0.33	-1.637921	0.24	1.05
600	-1.403770	-1.404002	0.30	-1.404048	0.36	-1.404062	0.37	-1.403997	0.29	1.05
500	-1.169809	-1.170052	0.31	-1.170088	0.36	-1.170126	0.41	-1.170054	0.32	1.05
400	-0.935847	-0.936081	0.30	-0.936106	0.33	-0.936175	0.42	-0.936085	0.31	0.70
300	-0.701885	-0.702088	0.26	-0.702101	0.28	-0.702190	0.39	-0.702101	0.28	0.70
200	-0.467923	-0.468084	0.21	-0.468076	0.20	-0.468157	0.30	-0.468101	0.23	0.70
100	-0.233962	-0.234062	0.13	-0.234033	0.09	-0.234101	0.18	-0.234072	0.14	0.35
0	0.000000	-0.000002	0.00	0.000023	-0.03	-0.000025	0.03	-0.000004	0.01	0.35

Minimum test load, D<sub>min</sub>: 1.3 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<sub>L</sub>: 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<sub>min</sub>.

**Form D.3 Repeatability errors ( $E_r$ ) calculation**

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

Application no.: 24-012  
 Load cell model: U2S1-1T  
 Serial no.: K9Y0035  
 $E_{max}$ : 1000 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: -0.000780

Table D.3

Test load (kg)	20.4 °C (20°C)		40.1 °C (40°C)		-9.6 °C (-10°C)		20.4 °C (20°C)		mpe (V)
	Repeatability error (mV/V)	Repeatability error (V)	Repeatability error (mV/V)	Repeatability error (V)	Repeatability error (mV/V)	Repeatability error (V)	Repeatability error (mV/V)	Repeatability error (V)	
	0	0.000014	-0.02	0.000061	-0.08	0.000026	-0.03	0.000007	
100	0.000015	-0.02	0.000068	-0.09	0.000026	-0.03	0.000007	-0.01	0.35
200	0.000015	-0.02	0.000067	-0.09	0.000031	-0.04	0.000003	0.00	0.70
300	0.000020	-0.03	0.000062	-0.08	0.000024	-0.03	0.000009	-0.01	0.70
400	0.000021	-0.03	0.000062	-0.08	0.000026	-0.03	0.000012	-0.02	0.70
500	0.000025	-0.03	0.000063	-0.08	0.000023	-0.03	0.000019	-0.02	1.05
600	0.000033	-0.04	0.000060	-0.08	0.000022	-0.03	0.000013	-0.02	1.05
700	0.000033	-0.04	0.000057	-0.07	0.000026	-0.03	0.000017	-0.02	1.05
800	0.000040	-0.05	0.000053	-0.07	0.000019	-0.02	0.000026	-0.03	1.05
900	0.000046	-0.06	0.000059	-0.08	0.000018	-0.02	0.000029	-0.04	1.05
1000	0.000049	-0.06	0.000058	-0.07	0.000015	-0.02	0.000032	-0.04	1.05
900	0.000044	-0.06	0.000052	-0.07	0.000017	-0.02	0.000026	-0.03	1.05
800	0.000037	-0.05	0.000051	-0.07	0.000014	-0.02	0.000035	-0.04	1.05
700	0.000038	-0.05	0.000053	-0.07	0.000016	-0.02	0.000032	-0.04	1.05
600	0.000035	-0.04	0.000050	-0.06	0.000017	-0.02	0.000025	-0.03	1.05
500	0.000029	-0.04	0.000050	-0.06	0.000014	-0.02	0.000027	-0.03	1.05
400	0.000023	-0.03	0.000053	-0.07	0.000009	-0.01	0.000024	-0.03	0.70
300	0.000006	-0.01	0.000049	-0.06	0.000012	-0.02	0.000022	-0.03	0.70
200	0.000009	-0.01	0.000049	-0.06	0.000008	-0.01	0.000019	-0.02	0.70
100	0.000014	-0.02	0.000050	-0.06	0.000008	-0.01	0.000014	-0.02	0.35
0	0.000014	-0.02	0.000042	-0.05	0.000011	-0.01	0.000009	-0.01	0.35

PASS: 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<sub>M</sub>) calculation**

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

Application no.: 24-012  
 Load cell model: U2S1-1T  
 Serial no.: K9Y0035  
 E<sub>max</sub>: 1000 kg  
 n<sub>max</sub>: 3000  
 v<sub>min</sub>: 0.1 kg  
 PLC: 0.7 DR: \_\_\_\_\_

Force-generating system: Load cell performance testing device Conversion factor, f: -0.000780

Indicating instrument: HBM DMP40

Evaluator: Fukuda

**Table D.4**

Temperature °C	Indication (mV/V)	Change (C <sub>M</sub> ) (V)	Change (v <sub>min</sub> /5 °C)	mpc (v <sub>min</sub> /5 °C)
20.4	-0.003440			
40.1	-0.003412	-0.04	-0.03	0.70
-9.6	-0.003337	-0.10	0.03	0.70
20.4	-0.003417	0.10	0.06	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<sub>min</sub>/5°C) for classes B, C, and D; (v<sub>min</sub>/2°C) for class A.
  - 4 Change, C<sub>M</sub>(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.: 24-012  
 Load cell model: U2S1-1T  
 Serial no.: K9Y0035  
 $E_{max}$ : 1000 kg  
 $n_{max}$ : 3000  
 $V_{min}$ : 0.1 kg  
 PLC: 0.7 DR: \_\_\_\_\_

	At start	At end	
Date:	2013/2/12	2013/2/12	
Temperature:	20.4	20.4	°C
Relative humidity:	46.3	46.5	%
Barometric pressure:	102.69	102.67	kPa
Indicator temperature:	24.5	24.9	°C

Force generating system: Load cell performance testing device Conversion factor, f: -0.000710  
 Indicating instrument: HBM DMP40  
 Evaluator: Fukuda

**Table D.5**

Test load (kg)	Indication (mV/V)	Barometric pressure (kPa)	Time	Change (v)	mpe (v)
0					
0					
0					
0					
(*) → 0	-0.003429	102.65	9:02:35		
Fill in time →	Record time of initial loading →		9:02:35		
(**) → 900	-2.132924	102.65	9:03:05	0.00	0.735
Constant maximum test load, Dmax	900	-2.132948	9:04:04	0.03	0.735
	900	-2.132949	9:05:03	0.04	0.735
	900	-2.132947	9:06:02	0.03	0.735
	900	-2.132947	9:07:01	0.03	0.735
	900	-2.132944	9:08:00	0.03	0.735
	900	-2.132943	9:09:00	0.03	0.735
	900	-2.132940	9:09:59	0.02	0.735
	900	-2.132938	9:10:58	0.02	0.735
	900	-2.132935	9:11:57	0.02	0.735
	900	-2.132934	9:12:56	0.01	0.735
	900	-2.132926	9:17:55	0.00	0.735
	900	-2.132919	9:22:54	-0.01	0.735
	900	-2.132912	9:27:53	-0.02	0.735
	900	-2.132905	9:32:52	-0.03	0.735
Fill in time →	Record time of initial unloading →		9:32:52		
(***) → 0	-0.003402	102.65	9:33:22	-0.04	0.500
These rows are for reference purposes only	0	-0.003388	9:33:41	-0.06	0.500
	0	-0.003384	9:34:00	-0.06	0.500
	0	-0.003383	9:34:19	-0.06	0.500
	0	-0.003382	9:34:38	-0.07	0.500
	0	-0.003382	9:34:57	-0.07	0.500
30-20 minute creep difference in units:				-0.02	0.1575

DR (v):	-0.04	30 minute creep:	PASS:	x	FAIL:
actual time (s):	30	30-20 minute creep difference:	PASS:	x	FAIL:
specified time (s):	30	DR ≤ 0.5v:	PASS:	x	FAIL:
mpe for DR (v):	0.50	DR within manufacturer specified DR requirements:	PASS:		FAIL:

- Notes:
- 1 Change (v) for creep: the observed indication minus the initial "load" indication (\*\*) divided 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.: 24-012  
 Load cell model: U2S1-1T  
 Serial no.: K9Y0035  
 $E_{max}$ : 1000 kg  
 $n_{max}$ : 3000  
 $v_{min}$ : 0.1 kg  
 PLC: 0.7 DR: \_\_\_\_\_

	At start	At end	
Date:	2013/2/13	2013/2/13	
Temperature:	40.1	40.1	°C
Relative humidity:	35.1	35.2	%
Barometric pressure:	100.53	100.55	kPa
Indicator temperature:	25.4	25.3	°C

Force generating system: Load cell performance testing device Conversion factor, f: -0.000710  
 Indicating instrument: HBM DMP40  
 Evaluator: Fukuda

**Table D.5**

Test load (kg)	Indication (mV/V)	Barometric pressure (kPa)	Time	Change (v)	mpe (v)
0					
0					
0					
0					
(*) → 0	-0.003422	100.60	8:54:42		
Fill in time →	Record time of initial loading →		8:54:42		
(**) → 900	-2.133029	100.60	8:55:12	0.00	0.735
Constant maximum test load, Dmax	-2.133029	100.61	8:56:11	0.00	0.735
	-2.133010	100.60	8:57:10	0.03	0.735
	-2.132997	100.60	8:58:09	0.05	0.735
	-2.132980	100.61	8:59:08	0.08	0.735
	-2.132970	100.60	9:00:07	0.10	0.735
	-2.132961	100.60	9:01:06	0.11	0.735
	-2.132953	100.60	9:02:05	0.12	0.735
	-2.132941	100.59	9:03:05	0.14	0.735
	-2.132932	100.60	9:04:04	0.16	0.735
	-2.132926	100.59	9:05:03	0.17	0.735
	-2.132892	100.59	9:10:02	0.22	0.735
	-2.132864	100.59	9:15:01	0.27	0.735
	-2.132843	100.60	9:20:00	0.30	0.735
	-2.132825	100.60	9:24:59	0.33	0.735
Fill in time →	Record time of initial unloading →		9:24:59		
(***) → 0	-0.003195	100.60	9:25:29	0.37	0.500
These rows are for reference purposes only	-0.003189	100.60	9:25:48	0.38	0.500
	-0.003194	100.60	9:26:07	0.37	0.500
	-0.003203	100.60	9:26:26	0.35	0.500
	-0.003209	100.60	9:26:45	0.34	0.500
	-0.003214	100.61	9:27:04	0.34	0.500
	30-20 minute creep difference in units:				0.06

DR (v):	0.37	30 minute creep:	PASS:	x	FAIL:	
actual time (s):	30	30-20 minute creep difference:	PASS:	x	FAIL:	
specified time (s):	30	DR ≤ 0.5v:	PASS:	x	FAIL:	
mpe for DR (v):	0.50	DR within manufacturer specified DR requirements:	PASS:		FAIL:	

- Notes:
- 1 Change (v) for creep: the observed indication minus the initial "load" indication (\*\*) divided 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.: 24-012  
 Load cell model: U2S1-1T  
 Serial no.: K9Y0035  
 E<sub>max</sub>: 1000 kg  
 n<sub>max</sub>: 3000  
 V<sub>min</sub>: 0.1 kg  
 P<sub>LC</sub>: 0.7 DR: \_\_\_\_\_

	At start	At end	
Date:	2013/2/14	2013/2/14	
Temperature:	-9.6	-9.6	°C
Relative humidity:	33.8	34.0	%
Barometric pressure:	102.13	102.14	kPa
Indicator temperature:	24.6	23.7	°C

Force generating system: Load cell performance testing device Conversion factor, f: -0.000710  
 Indicating instrument: HBM DMP40  
 Evaluator: Fukuda

**Table D.5**

Test load (kg)	Indication (mV/V)	Barometric pressure (kPa)	Time	Change (v)	mpe (v)	
0						
0						
0						
0						
(*) →	0	-0.003312	102.27	8:41:46		
Fill in time →	Record time of initial loading →			8:41:46		
(**) →	900	-2.132820	102.27	8:42:16	0.00	0.735
Constant maximum test load, Dmax	900	-2.132846	102.27	8:43:16	-0.04	0.735
	900	-2.132858	102.27	8:44:15	-0.06	0.735
	900	-2.132867	102.27	8:45:14	-0.08	0.735
	900	-2.132873	102.27	8:46:13	-0.09	0.735
	900	-2.132879	102.27	8:47:13	-0.10	0.735
	900	-2.132884	102.27	8:48:12	-0.10	0.735
	900	-2.132890	102.27	8:49:11	-0.11	0.735
	900	-2.132891	102.27	8:50:10	-0.11	0.735
	900	-2.132890	102.27	8:51:09	-0.11	0.735
	900	-2.132896	102.27	8:52:08	-0.12	0.735
	900	-2.132908	102.26	8:57:07	-0.14	0.735
	900	-2.132914	102.25	9:02:06	-0.15	0.735
	900	-2.132915	102.25	9:07:05	-0.15	0.735
	900	-2.132923	102.26	9:12:04	-0.17	0.735
Fill in time →	Record time of initial unloading →			9:12:04		
(***) →	0	-0.003416	102.25	9:12:34	-0.17	0.500
These rows are for reference purposes only	0	-0.003407	102.25	9:12:53	-0.15	0.500
	0	-0.003399	102.25	9:13:12	-0.14	0.500
	0	-0.003393	102.25	9:13:31	-0.13	0.500
	0	-0.003388	102.26	9:13:50	-0.12	0.500
	0	-0.003379	102.25	9:14:09	-0.11	0.500
30-20 minute creep difference in units:				-0.01	0.1575	

DR (v):	-0.17	30 minute creep:	PASS:	x	FAIL:	
actual time (s):	30	30-20 minute creep diffence:	PASS:	x	FAIL:	
specified time (s):	30	DR ≤ 0.5v:	PASS:	x	FAIL:	
mpe for DR (v):	0.50	DR within manufacturer specified DR requirements:	PASS:		FAIL:	

- Notes:
- 1 Change (v) for creep: the observed indication minus the initial "load" indication (\*\*) divided 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.: 24-012  
 Load cell model: U2S1-1T  
 Serial no.: K9Y0035  
 $E_{max}$ : 1000 kg  
 $\eta_{max}$ : 3000  
 $V_{min}$ : 0.1 kg  
 PLC: 0.7 DR: \_\_\_\_\_  
 Force generating system: Load cell performance testing device  
 Indicating instrument: HBM DMP40  
 Evaluator: Fukuda

	At start	At end	
Date:	2013/2/15	2013/2/15	
Temperature:	20.4	20.4	°C
Relative humidity:	46.8	47.2	%
Barometric pressure:	101.30	101.28	kPa
Indicator temperature:	25.2	24.8	°C

Conversion factor, f: -0.000710

**Table D.5**

Test load (kg)	Indication (mV/V)	Barometric pressure (kPa)	Time	Change (v)	mpe (v)	
0						
0						
0						
0						
(*) → 0	-0.003405	101.23	8:52:06			←initial "no load" indication
Fill in time →	Record time of initial loading →		8:52:06			
(**) → 900	-2.132902	101.23	8:52:36	0.00	0.735	←initial "load" indication
Constant maximum test load, Dmax	900	-2.132930	101.22	8:53:35	0.04	0.735
	900	-2.132932	101.22	8:54:34	0.04	0.735
	900	-2.132934	101.21	8:55:33	0.05	0.735
	900	-2.132933	101.20	8:56:32	0.04	0.735
	900	-2.132937	101.20	8:57:31	0.05	0.735
	900	-2.132937	101.20	8:58:30	0.05	0.735
	900	-2.132935	101.20	8:59:29	0.05	0.735
	900	-2.132932	101.20	9:00:29	0.04	0.735
	900	-2.132931	101.20	9:01:28	0.04	0.735
	900	-2.132932	101.20	9:02:27	0.04	0.735
	900	-2.132926	101.20	9:07:26	0.03	0.735
	900	-2.132921	101.18	9:12:25	0.03	0.735
	900	-2.132918	101.17	9:17:24	0.02	0.735
	900	-2.132911	101.14	9:22:23	0.01	0.735
Fill in time →	Record time of initial unloading →		9:22:23			
(***) → 0	-0.003398	101.14	9:22:53	-0.01	0.500	←initial indication
These rows are for reference purposes only	0	-0.003382	101.14	9:23:12	-0.03	0.500
	0	-0.003378	101.13	9:23:31	-0.04	0.500
	0	-0.003377	101.13	9:23:50	-0.04	0.500
	0	-0.003376	101.13	9:24:09	-0.04	0.500
	0	-0.003378	101.13	9:24:28	-0.04	0.500
30-20 minute creep difference in units:				-0.01	0.1575	

DR (v):	-0.01	30 minute creep:	PASS:	x	FAIL:	
actual time (s):	30	30-20 minute creep diffence:	PASS:	x	FAIL:	
specified time (s):	30	DR ≤ 0.5v:	PASS:	x	FAIL:	
mpc for DR (v):	0.50	DR within manufacturer specified DR requirements:	PASS:		FAIL:	

- Notes: 1 Change (v) for creep: the observed indication minus the initial "load" indication (\*\*) divided 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.