	Catatan Hasil Kalibrasi Internal	No. : F-PM-01-50
	<i>Internal Calibration Record</i>	Rev. : 00
	Buret / Burette	Date : 3 September 2014

Merek :		Bidang/Lokasi :	
<i>Brand</i>		<i>Department/Location</i>	
Type/Kelas :		Suhu ruang :	
<i>Type/Class</i>		<i>Room temperature</i>	
No.Seri :		Kelembaban :	
<i>Serial no.</i>		<i>Humidity</i>	
Kode kalibrasi :		No. Protap :	
<i>Calibration code</i>		<i>SOP No.</i>	
Kapasitas / Resolusi :	ml / ml	Petugas :	
<i>Capacity / Subdivision (Resolution)</i>		<i>Operator</i>	
Syarat (kelas A) :	ml	Tanggal kalibrasi :	
<i>Requirement (Class A)</i>		<i>Calibration date</i>	

Kalibrator yang digunakan <i>Calibrator used</i>	Kode Kalibrasi <i>Calibration Code</i>	Tanggal kalibrasi Kalibrator <i>Cal. date of Calibrator</i>
1. Neraca Analitik 2. Termometer		

Catatan/Note :

$T_{Air} = 24.0$ °C	$\rho_{Air} = 0.99729$ g/ml	$\rho_{air\ 20^{\circ}C} = 998.202$ kg/m ³	$\rho_{AT} = 8$ g/ml
$\rho_{udara} = 0.0012$ g/ml	$V_{borosilikat} = 1.E-05$ /°C	$V_{soda\ lime} = 2.5.E-05$ /°C	$LOP_{Neraca} = 0.0026$ gram
	$U_{Sert\ Termometer} = 0.7$ °C	$\Delta\rho/\Delta T = -0.00026$ g/ml°C	$\Delta\ Suhu = 24.0$ °C

A. Data1. $V_{nominal} = 10$ ml

Ulangan <i>Rep.</i>	W_{kosong} W_{Empty} (g)	$W_{isi(air)}$ W_{Water} (g)	ΔR ΔR (g)
1			
2			
3			
4			
5			
ΔR rata-rata/average		g	
SD (σ_{n-1})		g	
Isi / Volume, $V_{T20\ ^{\circ}C}$		ml	

2. $V_{nominal} = 20$ ml


Ulangan <i>Rep.</i>	W_{kosong} W_{Empty} (g)	$W_{isi(air)}$ W_{Water} (g)	ΔR ΔR (g)
1			
2			
3			
4			
5			
ΔR rata-rata/average		g	
SD (σ_{n-1})		g	
Isi / Volume, $V_{T20\ ^{\circ}C}$		ml	

3. $V_{nominal} = 30$ ml

Ulangan <i>Rep.</i>	W_{kosong} W_{Empty} (g)	$W_{isi(air)}$ W_{Water} (g)	ΔR ΔR (g)
1			
2			
3			
4			
5			
ΔR rata-rata/average		g	
SD (σ_{n-1})		g	
Isi / Volume, $V_{T20\ ^{\circ}C}$		ml	

4. $V_{nominal} = 40$ ml

Ulangan <i>Rep.</i>	W_{kosong} W_{Empty} (g)	$W_{isi(air)}$ W_{Water} (g)	ΔR ΔR (g)
1			
2			
3			
4			
5			
ΔR rata-rata/average		g	
SD (σ_{n-1})		g	
Isi / Volume, $V_{T20\ ^{\circ}C}$		ml	

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5. $V_{nominal} = 50$ ml

Ulangan Rep.	W_{kosong} W_{Empty} (g)	$W_{isi(air)}$ W_{Water} (g)	ΔR ΔR (g)
1			
2			
3			
4			
5			
ΔR rata-rata/average		g	
SD (σ_{n-1})		g	
Isi / Volume, $V_{T20}^{\circ C}$		ml	

B. Perhitungan Ketidakpastian

Calculation of uncertainty

1. Perhitungan ketidakpastian volume nominal = 10 ml


Uncertainty calculation of nominal volume

No. No.	Sumber Ketidakpastian Source of Uncertainty	Satuan Unit	Distribusi Distribution	Nilai U_i U_i value	Pembagi Divisor	u_i	Coeff. C_i		$u_i C_i$ $u_i C_i$	V V
							Coeff.	C_i		
1	Reproducibility, $U_{Rep.} = \sigma_{n-1}$	gram	Normal		$\sqrt{5}$		1.003	1.003	0.00000	4
2	LOP of Balance, $U_{Sert.} = LOP$	gram	Normal		2.0		1.003	1.003	0.00000	∞
3	Density of Air (ρ_{Air}) = 10% x 0,0012	g/ml	Rectangular		$\sqrt{3}$		1,003 ΔR	0.00.E+00	0.00000	∞
4	Density of Water, $U(\rho_{H2O}) = T_{sert} \times \Delta\rho/\Delta T$	g/ml	Normal		1.0		-1,003 ΔR	0.00.E+00	0.000000	∞
5	Density of Weights, $U_{Weights} = 10\% \times p_{Weights}$	g/ml	Rectangular		$\sqrt{3}$		1,88E-5 ΔR	0.00E+00	0.0.E+00	∞
6	Temp. of water, $U_{(TH2O)} = U_{\Delta T room}$	$^{\circ}C$	Normal		$\sqrt{3}$		1,003E-6 ΔR	0.00E+00	0.000000	∞
7	Coef. thermal, $(U_{\gamma}) = 10\% \times \gamma$	$^{\circ}C$	Rectangular		$\sqrt{3}$		-5,015 ΔR	0.00E+00	0.00000	∞
8	Resolution, $U_{Res} = 1/2 \times Resolution$	ml	Rectangular		$\sqrt{3}$		1.00	1.00	0.0000	∞
9	Drift of Balance, $U_{Drift} = 10\% \times LOP$	gram	Rectangular		$\sqrt{3}$		1.003	1.003	0.00000	∞
Ketidakpastian baku gabungan / Combined Uncertainty, $u(D) = \text{SQRT}(\sum (u_i C_i)^2)$									0.00000	
Derajat kebebasan efektif / Effective degree of freedom, V_{eff}									#DIV/0!	
Faktor cakupan pada tingkat kepercayaan 95 % / Coverage Factor on uncertainty 95%, $K_{95\%}$									2	
Ketidakpastian gabungan perluasan / Expanded Uncertainty, $U(D) = u(D) \times K_{95\%}$, dalam / in ml									0.000	

2. Perhitungan ketidakpastian volume nominal = 20 ml

Uncertainty calculation of nominal volume

No. No.	Sumber Ketidakpastian Source of Uncertainty	Satuan Unit	Distribusi Distribution	Nilai U_i U_i value	Pembagi Divisor	u_i	Coeff. C_i		$u_i C_i$ $u_i C_i$	V V
							Coeff.	C_i		
1	Reproducibility, $U_{Rep.} = \sigma_{n-1}$	gram	Normal		$\sqrt{5}$		1.003	1.003	0.00000	4
2	LOP of Balance, $U_{Sert.} = LOP$	gram	Normal		2.0		1.003	1.003	0.00000	∞
3	Density of Air (ρ_{Air}) = 10% x 0,0012	g/ml	Rectangular		$\sqrt{3}$		1,003 ΔR	0.00.E+00	0.00000	∞
4	Density of Water, $U(\rho_{H2O}) = T_{sert} \times \Delta\rho/\Delta T$	g/ml	Normal		1.0		-1,003 ΔR	0.00.E+00	0.000000	∞
5	Density of Weights, $U_{Weights} = 10\% \times p_{Weights}$	g/ml	Rectangular		$\sqrt{3}$		1,88E-5 ΔR	0.00E+00	0.0.E+00	∞
6	Temp. of water, $u_{(TH2O)} = U_{\Delta T room}$	$^{\circ}C$	Normal		$\sqrt{3}$		1,003E-6 ΔR	0.00E+00	0.000000	∞
7	Coef. thermal, $(U_{\gamma}) = 10\% \times \gamma$	$^{\circ}C$	Rectangular		$\sqrt{3}$		-5,015 ΔR	0.00E+00	0.00000	∞
8	Resolution, $U_{Res} = 1/2 \times Resolution$	ml	Rectangular		$\sqrt{3}$		1.00	1.00	0.0000	∞
9	Drift of Balance, $U_{Drift} = 10\% \times LOP$	gram	Rectangular		$\sqrt{3}$		1.003	1.003	0.00000	∞
Ketidakpastian baku gabungan / Combined Uncertainty, $u(D) = \text{SQRT}(\sum (u_i C_i)^2)$									0.00000	
Derajat kebebasan efektif / Effective degree of freedom, V_{eff}									#DIV/0!	
Faktor cakupan pada tingkat kepercayaan 95 % / Coverage Factor on uncertainty 95%, $K_{95\%}$									2	
Ketidakpastian gabungan perluasan / Expanded Uncertainty, $U(D) = u(D) \times K_{95\%}$, dalam / in ml									0.000	

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3. Perhitungan ketidakpastian volume nominal = 30 ml


Uncertainty calculation of nominal volume

No. No.	Sumber Ketidakpastian Source of Uncertainty	Satuan Unit	Distribusi Distribution	Nilai U_i U_i value	Pembagi Divisor	u_i	Coeff. C_i		$u_i C_i$	V
							Coeff.	C_i		
1	Reproducibility, $U_{Rep.} = \sigma_{n-1}$	gram	Normal		$\sqrt{5}$		1.003	1.003	0.00000	4
2	LOP of Balance, $U_{Serf.} = LOP$	gram	Normal		2.0		1.003	1.003	0.00000	∞
3	Density of Air (ρ_{Air}) = 10% x 0,0012	g/ml	Rectangular		$\sqrt{3}$		1,003 ΔR	0.00.E+00	0.00000	∞
4	Density of Water, $U(\rho_{H2O}) = T_{serf.} \times \Delta\rho/\Delta T$	g/ml	Normal		1.0		-1,003 ΔR	0.00.E+00	0.000000	∞
5	Density of Weights, $U_{Weights} = 10\% \times \rho_{Weights}$	g/ml	Rectangular		$\sqrt{3}$		1,88E-5 ΔR	0.00E+00	0.0.E+00	∞
6	Temp. of water, $u_{(TH2O)} = U_{\Delta T room}$	$^{\circ}C$	Normal		$\sqrt{3}$		1,003E-6 ΔR	0.00E+00	0.000000	∞
7	Coef. thermal, $(U\gamma) = 10\% \times \gamma$	$^{\circ}C$	Rectangular		$\sqrt{3}$		-5,015 ΔR	0.00E+00	0.00000	∞
8	Resolution, $U_{Res} = 1/2 \times Resolution$	ml	Rectangular		$\sqrt{3}$		1.00	1.00	0.0000	∞
9	Drift of Balance, $U_{Drift} = 10\% \times LOP$	gram	Rectangular		$\sqrt{3}$		1.003	1.003	0.00000	∞
Ketidakpastian baku gabungan / Combined Uncertainty, $u(D) = \text{SQRT}(\sum (u_i C_i)^2)$									0.00000	
Derajat kebebasan efektif / Effective degree of freedom, V_{eff}									#DIV/0!	
Faktor cakupan pada tingkat kepercayaan 95 % / Coverage Factor on uncertainty 95%, $K_{95\%}$									2	
Ketidakpastian gabungan perluasan / Expanded Uncertainty, $U(D) = u(D) \times K_{95\%}$, dalam / in ml									0.000	

4. Perhitungan ketidakpastian volume nominal = 40 ml

Uncertainty calculation of nominal volume

No. No.	Sumber Ketidakpastian Source of Uncertainty	Satuan Unit	Distribusi Distribution	Nilai U_i U_i value	Pembagi Divisor	u_i	Coeff. C_i		$u_i C_i$	V
							Coeff.	C_i		
1	Reproducibility, $U_{Rep.} = \sigma_{n-1}$	gram	Normal		$\sqrt{5}$		1.003	1.003	0.00000	4
2	LOP of Balance, $U_{Serf.} = LOP$	gram	Normal		2.0		1.003	1.003	0.00000	∞
3	Density of Air (ρ_{Air}) = 10% x 0,0012	g/ml	Rectangular		$\sqrt{3}$		1,003 ΔR	0.00.E+00	0.00000	∞
4	Density of Water, $U(\rho_{H2O}) = T_{serf.} \times \Delta\rho/\Delta T$	g/ml	Normal		1.0		-1,003 ΔR	0.00.E+00	0.000000	∞
5	Density of Weights, $U_{Weights} = 10\% \times \rho_{Weights}$	g/ml	Rectangular		$\sqrt{3}$		1,88E-5 ΔR	0.00E+00	0.0.E+00	∞
6	Temp. of water, $u_{(TH2O)} = U_{\Delta T room}$	$^{\circ}C$	Normal		$\sqrt{3}$		1,003E-6 ΔR	0.00E+00	0.000000	∞
7	Coef. thermal, $(U\gamma) = 10\% \times \gamma$	$^{\circ}C$	Rectangular		$\sqrt{3}$		-5,015 ΔR	0.00E+00	0.00000	∞
8	Resolution, $U_{Res} = 1/2 \times Resolution$	ml	Rectangular		$\sqrt{3}$		1.00	1.00	0.0000	∞
9	Drift of Balance, $U_{Drift} = 10\% \times LOP$	gram	Rectangular		$\sqrt{3}$		1.003	1.003	0.00000	∞
Ketidakpastian baku gabungan / Combined Uncertainty, $u(D) = \text{SQRT}(\sum (u_i C_i)^2)$									0.00000	
Derajat kebebasan efektif / Effective degree of freedom, V_{eff}									#DIV/0!	
Faktor cakupan pada tingkat kepercayaan 95 % / Coverage Factor on uncertainty 95%, $K_{95\%}$									2	
Ketidakpastian gabungan perluasan / Expanded Uncertainty, $U(D) = u(D) \times K_{95\%}$, dalam / in ml									0.000	

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5. Perhitungan ketidaktepatan volume nominal = 50 ml

Uncertainty calculation of nominal volume

No.	Sumber Ketidaktepatan Source of Uncertainty	Satuan Unit	Distribusi Distribution	Nilai U_i U_i value	Pembagi Divisor	u_i	Coeff. C_i		$u_i C_i$	V
							Coeff.	C_i		
1	Reproducibility, $U_{Rep} = \sigma_{n-1}$	gram	Normal		$\sqrt{5}$		1.003	1.003	0.00000	4
2	LOP of Balance, $U_{Sert.} = LOP$	gram	Normal		2.0		1.003	1.003	0.00000	∞
3	Density of Air (ρ_{Air}) = 10% x 0,0012	g/ml	Rectangular		$\sqrt{3}$		1,003 ΔR	0.00.E+00	0.00000	∞
4	Density of Water, $U(\rho_{H_2O}) = T_{sert.} \times \Delta\rho/\Delta T$	g/ml	Normal		1.0		-1,003 ΔR	0.00.E+00	0.000000	∞
5	Density of Weights, $U_{Weights} = 10\% \times \rho_{Weights}$	g/ml	Rectangular		$\sqrt{3}$		1,88E-5 ΔR	0.00E+00	0.0.E+00	∞
6	Temp. of water, $u_{(TH_2O)} = U_{\Delta T room}$	$^{\circ}C$	Normal		$\sqrt{3}$		1,003E-6 ΔR	0.00E+00	0.000000	∞
7	Coef. thermal, $(U\gamma) = 10\% \times \gamma$	$^{\circ}C$	Rectangular		$\sqrt{3}$		-5,015 ΔR	0.00E+00	0.00000	∞
8	Resolution, $U_{Res} = 1/2 \times Resolution$	ml	Rectangular		$\sqrt{3}$		1.00	1.00	0.0000	∞
9	Drift of Balance, $U_{Drift} = 10\% \times LOP$	gram	Rectangular		$\sqrt{3}$		1.003	1.003	0.00000	∞
Ketidaktepatan baku gabungan / Combined Uncertainty, $u(D) = \text{SQRT}(\sum(u_i C_i)^2)$									0.00000	
Derajat kebebasan efektif / Effective degree of freedom, V_{eff}									#DIV/0!	
Faktor cakupan pada tingkat kepercayaan 95 % / Coverage Factor on uncertainty 95%, $K_{95\%}$									2	
Ketidaktepatan gabungan perluasan / Expanded Uncertainty, $U(D) = u(D) \times K_{95\%}$, dalam / in ml									0.000	

C. Hasil Kalibrasi

Calibration Results

No.	$V_{Nominal}$ $V_{Nominal}$ ($^{\circ}C$)	$V_{Kalibrasi}$ $V_{Calibration}$ ($^{\circ}C$)	Koreksi Correction ($^{\circ}C$)	Ketidaktepatan, $U_{95\%}$ Uncertainty, $U_{95\%}$ ($^{\circ}C$)
1				0.000
2				0.000
3				0.000
4				0.000
5				0.000

Dihitung Oleh Calculated by	Tanggal Date	Diperiksa oleh Checked by	Tanggal Date	Catatan / Kesimpulan Note / Conclusion