

Regular CCM KCs of the WG PV

The following 13 comparisons cover the present or intended CMC entries from members of the WG PV and have to be carried out repeatedly. Decision at the meeting 2021-04-16.

Table 1 Comparison needed for the pressure range 10^{-9} Pa up to 10^{-4} Pa

Pressure range CMC	10^{-9} Pa ... 10^{-4} Pa
Comparison needed	KC or supplementary
Name of comparison type	C-IG (P-K3)
Approximate repeat sequence	Every 15 years
Target points	$3 \cdot 10^{-9}$ Pa, $9 \cdot 10^{-9}$ Pa, $3 \cdot 10^{-8}$ Pa, $9 \cdot 10^{-8}$ Pa, $3 \cdot 10^{-7}$ Pa, $9 \cdot 10^{-7}$ Pa, $3 \cdot 10^{-6}$ Pa, $9 \cdot 10^{-6}$ Pa, $3 \cdot 10^{-5}$ Pa, $9 \cdot 10^{-5}$ Pa
Transfer standard (present knowledge)	Hot cathode ionization gauge of Bayard-Alpert type or extractor type
Comment	C-IG is normally extended to $9 \cdot 10^{-3}$ Pa by means of a SRG as transfer standard which also links to C-SRG

Table 2 Comparison needed for the pressure range 10^{-4} Pa up to 1 Pa

Pressure range CMC	10^{-4} Pa ... 1 Pa
Comparison needed	KC or supplementary
Name of comparison type	C-SRG (P-K15)
Approximate repeat sequence	Every 15 years
Target points	$3 \cdot 10^{-4}$ Pa, $9 \cdot 10^{-4}$ Pa, $3 \cdot 10^{-3}$ Pa, $9 \cdot 10^{-3}$ Pa, $3 \cdot 10^{-2}$ Pa, $9 \cdot 10^{-2}$ Pa, $3 \cdot 10^{-1}$ Pa, 1 Pa
Transfer standard (present knowledge)	Spinning rotor gauge
Comment	Highest point (1Pa) serves as linkage to C-CDG

Table 3 Comparison needed for the pressure range 1 Pa to 10^4 Pa

Pressure range CMC	1 Pa ... 10^4 Pa
Comparison needed	KC or supplementary
Name of comparison type	C-CDG/RSG (P-K4)
Approximate repeat sequence	Every 15 years
Target points	1 Pa, 3 Pa, 10 Pa, 30 Pa, 100 Pa, 300 Pa, 1 kPa, 3kPa, 10 kPa
Transfer standard (present knowledge)	Capacitance diaphragm gauge with the support of resonance silicon gauge at 100 Pa ... 10 kPa
Comment	Lowest point serves as linkage to C-SRG

Table 4 Comparison needed for CMC leak rates against vacuum

Leak rate CMC	10^{-15} mol/s ... 10^{-9} mol/s
Comparison needed	KC or supplementary
Name of comparison type	C-STL (P-K12)
Approximate repeat sequence	Every 15 years
Target points	10^{-13} mol/s and $5 \cdot 10^{-11}$ mol/s
Transfer standard (present knowledge)	Helium standard leak by permeation or capillary
Comment	Leak rate against vacuum

Table 5 Comparison needed for CMC leak rates against atmosphere (no CMCs yet)

Leak rate CMC	10⁻¹⁰ mol/s ... 10⁻⁷ mol/s
Comparison needed	KC or supplementary
Name of comparison type	C-ATL
Approximate repeat sequence	Every 15 years
Target points	2·10 ⁻⁹ mol/s (5·10 ⁻³ Pa l/s at 23 °C)
Transfer standard (present knowledge)	R134a standard leak
Comment	Leak rate against atmosphere

Table 6 Comparison needed for the pressure range 10 kPa up to 350 kPa (absolute mode, gas)

Pressure range CMC	10 kPa ... 350 kPa
Pressure range of KC	25 kPa ... 175 kPa
Comparison needed	KC or supplementary
Name of comparison type	C-BarA (similar to P-K2)
Approximate repeat sequence	Every 15 years
Target points	25 kPa, ..., 175 kPa
Transfer standard (present knowledge)	Pressure balance and Piston cylinder assembly.
Comment	Absolute mode, gas

Table 7 Comparison needed for the pressure range 5 kPa up to 350 kPa (gauge mode, gas)

Pressure range CMC	5 kPa ... 350 kPa
Pressure range of KC	25 kPa ... 175 kPa
Comparison needed	KC or supplementary
Name of comparison type	C-BarG (similar to P-K1b)
Approximate repeat sequence	Every 15 years
Target points	To be defined
Transfer standard (present knowledge)	Pressure balance and Piston cylinder assembly.
Comment	Gauge mode, gas

Table 8 Comparison needed for the pressure range 0 kPa up to 5 kPa (gauge mode, gas)

Pressure range CMC	0 kPa ... 5 kPa
Pressure range of KC	0 Pa ... 5 kPa
Comparison needed	Supplementary or KC
Name of comparison type	C-LPgasG
Approximate repeat sequence	Every 15 years
Target points	To be defined
Transfer standard (present knowledge)	CDG, RSG, non-rotating piston gauge.
Comment	Gauge mode, gas

Table 9 Comparison needed for the pressure range -100 kPa ... 0 kPa (gauge mode, gas)

Pressure range CMC	-100 kPa ... 0 kPa
Pressure range of KC	-95 kPa ... 0 kPa
Comparison needed	KC or supplementary
Name of comparison type	C-Neg
Approximate repeat sequence	Every 15 years
Target points	To be defined
Transfer standard (present knowledge)	Piston gauge
Comment	Gauge mode, gas

Table 10 Comparison needed for the pressure range 350 kPa up to 10 MPa (gauge mode, gas) and for the pressure range 350 kPa up to 7 MPa (absolute mode, gas)

Pressure range CMC	350 kPa ... 10 MPa, gauge, absolute, gas
Pressure range of KC	1 MPa ... 7 MPa
Comparison needed	KC or supplementary
Name of comparison type	C-HPgas (similar to P-K1c)
Approximate repeat sequence	Every 15 years
Target points	1 MPa, ..., 7 MPa
Transfer standard (present knowledge)	Pressure balance and Piston cylinder assembly.
Comment	

Table 11 Comparison needed for the pressure range 1 MPa up to 100 MPa (gauge mode, oil)

Pressure range CMC	1 MPa ... 100 MPa
Pressure range of KC	10 MPa ... 100 MPa
Comparison needed	KC or supplementary
Name of comparison type	C-Poil
Approximate repeat sequence	Every 15 years
Target points	To be defined
Transfer standard (present knowledge)	Pressure balance and Piston cylinder assembly.
Comment	Gauge mode, oil

Table 12 Comparison needed for the pressure range 100 MPa up to 1500 MPa (gauge mode, oil)

Pressure range CMC	100 MPa ... 1500 MPa
Pressure range of KC	100 MPa ... 500 MPa
Comparison needed	KC or supplementary
Name of comparison type	C-HPoil
Approximate repeat sequence	Every 15 years
Target points	To be defined
Transfer standard (present knowledge)	Pressure balance and Piston cylinder assembly.
Comment	Gauge mode, oil

Table 13 Comparison needed for the differential pressure range 0 kPa ... 100 kPa (differential, high line pressure up to 80 MPa, gas)

Pressure range CMC	0 kPa ... 100 kPa, differential @ line pressure 0 MPa to 80 MPa
Pressure range of KC	0 kPa ... 100 kPa
Comparison needed	Supplementary
Name of comparison type	C-Diff
Approximate repeat sequence	Every 15 years
Target points	To be defined
Transfer standard (present knowledge)	Pressure gauge.
Comment	Line pressures 5 MPa, 10 MPa