① $CH_4(g) + H_2O(g) \rightleftharpoons CO(g) + 3H_2(g)$

n_i	a	b	0	0
n_f	a − c	b − c	c	3c
p	$\frac{(a+c)RT}{V}$		$\frac{cRT}{V}$	$\frac{3cRT}{V}$
$a = \frac{p}{p^\circ}$	$\frac{(a-c)RT}{Vp^\circ}$	1	$\frac{cRT}{Vp^\circ}$	$\frac{3cRT}{Vp^\circ}$

② $CO(g) + H_2O(g) \rightleftharpoons CO_2(g) + H_2(g)$

n_i	c	b − c	0	0
n_f	c − d	b − c − d	d	d
p	$\frac{(c-d)RT}{V}$		$\frac{dRT}{V}$	$\frac{dRT}{V}$
$a = \frac{p}{p^\circ}$	$\frac{(c-d)RT}{Vp^\circ}$	1	$\frac{dRT}{Vp^\circ}$	$\frac{dRT}{Vp^\circ}$

$$K_{c1} = \frac{\frac{cRT}{Vp^\circ}\left(\frac{3cRT}{Vp^\circ}\right)^3}{\frac{(a-c)RT}{Vp^\circ}} = \frac{3c^2R^2T^2}{V^2p^{\circ 2}} \cdot \frac{Vp^\circ}{(a-c)RT} = \frac{3c^2RT}{(a-c)Vp^\circ}$$

$$K_{c2} = \frac{\frac{dRT}{Vp^\circ}\cdot\frac{dRT}{Vp^\circ}}{\frac{(c-d)RT}{Vp^\circ}} = \frac{d^2R^2T^2}{V^2p^{\circ 2}} \cdot \frac{Vp^\circ}{(c-d)RT} = \frac{d^2RT}{(c-d)Vp^\circ}$$

$3c + d = 0,6948\ n$

$n_{H_2} = 3c + d$

$n_{CO} = \cancel{2c - a}\ \ c - d$

$n_{CH_4} = a - c$

$n_{H_2O} = \cancel{2b - 2c - d}\ \ b - c - d$

$n_{CO_2} = d$

$P_{H_2} = \frac{(3c+d)RT}{V}$ $\quad a_{H_2} = \frac{(3c+d)RT}{Vp^\circ}$

$P_{CO} = \frac{(c-d)RT}{V}$ $\quad a_{CO} = \frac{(c-d)RT}{Vp^\circ}$

$P_{CH_4} = \frac{(a-c)RT}{V}$ $\quad a_{CH_4} = \frac{(a-c)RT}{Vp^\circ}$

$P_{H_2O} = \frac{(b-c-d)RT}{V}$ $\quad a_{H_2O} = \frac{(b-c-d)RT}{Vp^\circ}$

$P_{CO_2} = \frac{dRT}{V}$ $\quad a_{CO_2} = \frac{dRT}{Vp^\circ}$

	$CH_4(g)$	$+ H_2O(g)$	$\rightleftharpoons CO(g)$	$+ 3H_2(g)$
n_i^0	a	b	0	0
n_f	a-c	b-c	c	3c
p^{eq}	$\frac{(a-c)RT}{V}$	/	$\frac{cRT}{V}$	$\frac{3cRT}{V}$

$\frac{p^{eq}}{p^0} = a$ a -

	$CO(g)$	$+ H_2O(g)$	$\rightleftharpoons CO_2(g)$	$+ H_2(g)$
n_i	c	b-c	0	0
n_f	c-d	b-c-d	d	d

$$K_{c_1} = \frac{a_{CO} \cdot a_{H_2}^3}{a_{CH_4} \cdot a_{H_2O}} = \frac{(c-d)RT}{Vp^0} \cdot \frac{(3c+d)^3 R^3 T^3}{V^3 p^{0\,3}} \cdot \frac{Vp^0}{(a-c)RT} \cdot \frac{Vp^0}{(b-c-d)RT}$$

$$= \frac{(c-d)(3c+d)^3 R^2 T^2}{(a-c)(b-c-d) V^2 p^{0\,2}}$$

$$K_{c_2} = \frac{a_{H_2} \cdot a_{CO_2}}{a_{CO} \cdot a_{H_2O}} = \frac{(3c+d)RT}{Vp^0} \cdot \frac{dRT}{Vp^0} \cdot \frac{Vp^0}{(c-d)RT} \cdot \frac{Vp^0}{(b-c-d)RT} = \frac{3c+d}{(c-d)(b-c-d)}$$

$3c + d = 0{,}6848\,M$

$b - c - d = 0{,}2684\,M$