

# SUBSTATION EQUIPMENT RATING WORKSHEET

VI\_C Circuit Breaker Ratings ANNEX II - SAMPLE 230 KV, 4000A, POST-1964, CLASS A INSULATION

## Circuit Breaker

1) Populate the nameplate information table as fully as possible

NAMEPLATE	
STATION	
EQUIPMENT	Circuit Breaker
TYPE	
YEAR MANUF.	
MANUFACTURER	1976
POSITION	----
DESIGNATION	----
RATED VOLTAGE (KV)	230
RATED CURRENT (A)	4000

Note: Correct system voltage must be entered for corresponding MVA values in the table below.

2) Identify a material class and complete the input table

	Breakers manuf. Prior to 1964				Breakers manuf. 1964 and later					
	1	2	3	4	1	2	3	4	5	6
$\theta_{max\ e4}$	85	90	110	135	85	95	105	120	120	165
$\theta_{max}$	70	75	95	120	70	80	90	105	105	150
$\theta_r$	30	35	55	80	30	40	50	65	65	110

INPUT	
$\theta_{max\ e4}$	120
$\theta_{max}$	105
$\theta_r$	65
I Rated	4000
Rated KV	230

Rating	Summer 35° C		Winter 10° C	
	MVA	Amps	MVA	Amps
Normal	1660	4168	1967	4939
Emergency (4Hr)	1850	4643	2134	5358

## CALCULATED RATINGS

AMBIENT TEMP.		RATING ( P.U. )			RATING ( MVA )			RATINGS (AMPS)		
					NORMAL	4 HOUR	Load Dump	NORMAL	4 HOUR	Laod Dump
$\theta_a$ Deg. C	$\theta_a$ Deg. F									
0	32	1.31	1.41	1.89	2080	2240	3015	5221	5623	7567
5	41	1.27	1.37	1.83	2024	2188	2909	5082	5492	7303
<b>10</b>	<b>50</b>	<b>1.23</b>	<b>1.34</b>	<b>1.76</b>	1967	2134	2801	4939	5358	7030
15	59	1.20	1.31	1.69	1909	2080	2689	4793	5221	6749
20	68	1.16	1.27	1.61	1850	2024	2573	4643	5082	6458
25	77	1.12	1.23	1.54	1788	1967	2452	4489	4939	6156
30	86	1.08	1.20	1.46	1725	1909	2327	4331	4793	5842
<b>35</b>	<b>95</b>	<b>1.04</b>	<b>1.16</b>	<b>1.38</b>	1660	1850	2197	4168	4643	5514
40	104	1.00	1.12	1.29	1593	1788	2059	4000	4489	5169