

Environment Canada Imaging Cover Page

Report N.:



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HUMIDITY INDEX FOR SELECTED CANADIAN LOCATIONS

Humidity Index is a term now being used to indicate the degree of discomfort caused by various combinations of temperature and air moisture during the warm season of the year.

The value and usefulness of the humidity index is due to the fact that the Index seems to vary quite closely with the degree of discomfort experienced; although in any particular situation discomfort varies with individuals. Experience has shown that a few people will be uncomfortable in summer from heat and humidity by the time the humidity index reaches 70. Half or more of the people will be uncomfortable by the time the humidity index reaches 75. Everyone will be looking for relief by the time the humidity index reaches 79, and discomfort will become more acute as the index climbs higher than this value.

The following equations are used to determine humidity index values with closely comparable results. The choice of the equation depends on the ease of application to the data available.

$$(1) \text{ HI} = 0.4 (t_d + t_w) + 15 \quad (2) \text{ HI} = .55t_d + .2t_{dp} + 17.5$$

$$(3) \text{ HI} = t_d = (0.55 - 0.55\text{RH}) \cdot (t_d - 58)$$

where HI = Humidity Index (in units), t_d = dry bulb temperature $^{\circ}\text{F.}$,
 t_w = wet bulb temperature $^{\circ}\text{F.}$, t_{dp} = dew point temperature $^{\circ}\text{F.}$,
 RH = relative humidity in decimals (65% used as 0.65)

Table I shows the values of the Humidity Index as derived from equation (1) for various combinations of dry bulb wet bulb temperatures. The values are based on the centre of the class interval, i.e. 62 F. for the class interval 61 - 63 $^{\circ}$.

The Machine Data Processing Section of the Climatology Division of the Meteorological Branch has recently completed a series of tabulations of frequency distributions of hourly dry bulb and wet bulb temperatures to 3 $^{\circ}\text{F.}$ intervals for periods of 8 to 10 years for the four summer months, June-September, for a selection of 33 Canadian locations. This rather comprehensive statistical study will be published in the near future as a Meteorological Memoir of the Meteorological Branch.

As a direct application of the use of the dry and wet bulb temperature data contained in the above mentioned report, a summary is included showing the percentage of time the Humidity Index reaches or exceeds 70, 75 and 80 at various Canadian locations. These calculations are based on equation (1). In view of the widespread interest in this type of information the summary is being distributed in advance of the complete report.

Additional Humidity Index data for Toronto and a list of references are given in CDS #6-59 issued in May 1959. Originally the Humidity Index was called the "Discomfort Index". In the United States the relationship is now termed the Temperature - Humidity Index and in Canada the Humidity Index.

CCB/db
June 1960.

Meteorological Branch,
Department of Transport,
Toronto, Ontario.

DRY BULB °F

	< 20	20-22	23-25	26-28	29-31	32-34	35-37	38-40	41-43	44-46	47-49	50-52	53-55	56-58	59-61	62-64	65-67	68-70	71-73	74-76	77-79	80-82	83-85	86-88	89-91	92-94	95-97	98-100	> 100	Total
Total																														
< 20																														
20-22		32	33	34	35	37	38	39	40	41	43	44	45	46	47	49	50	51	52	53	55	56	57	58	59	61	62	63		
23-25			34	35	37	38	39	40	41	43	44	45	46	47	49	50	51	52	53	55	56	57	58	59	61	62	63	64		
26-28				37	38	39	40	41	43	44	45	46	47	49	50	51	52	53	55	56	57	58	59	61	62	63	64	65		
29-31					39	40	41	43	44	45	46	47	49	50	51	52	53	55	56	57	58	59	61	62	63	64	65	67		
32-34						41	43	44	45	46	47	49	50	51	52	53	55	56	57	58	59	61	62	63	64	65	67	68		70
35-37							44	45	46	47	49	50	51	52	53	55	56	57	58	59	61	62	63	64	65	67	68	69		
38-40								46	47	49	50	51	52	53	55	56	57	58	59	61	62	63	64	65	67	68	69	70		
41-43									49	50	51	52	53	55	56	57	58	59	61	62	63	64	65	67	68	69	70	71		
44-46										51	52	53	55	56	57	58	59	61	62	63	64	65	67	68	69	70	71	73		75
47-49											53	55	56	57	58	59	61	62	63	64	65	67	68	69	70	71	73	74		
50-52												56	57	58	59	61	62	63	64	65	67	68	69	70	71	73	74	75		
53-55													58	59	61	62	63	64	65	67	68	69	70	71	73	74	75	76		
56-58														61	62	63	64	65	67	68	69	70	71	73	74	75	76	77		80
59-61															63	64	65	67	68	69	70	71	73	74	75	76	77	79		
62-64																65	67	68	69	70	71	73	74	75	76	77	79	80		
65-67																	68	69	70	71	73	74	75	76	77	79	80	81		
68-70																		70	71	73	74	75	76	77	79	80	81	82		
71-73																			73	74	75	76	77	79	80	81	82	83		
74-76																				75	76	77	79	80	81	82	83	85		
77-79																					77	79	80	81	82	83	85	86		
80-82																						80	81	82	83	85	86	87		
83-85																							82	83	85	86	87	88		
> 85																														

WET BULB OF

TABLE I

HUMIDITY INDEX (FOR CENTRE OF CLASS INTERVAL)

TABLE II

JDS #7-60

PERCENTAGE OF TIME HUMIDITY INDEX EQUALS OR EXCEEDS VALUES INDICATED

Station	JUNE			JULY			AUGUST			SEPTEMBER			SUMMER SEASON			
	70	75	80	70	75	80	Humidity Index			70	75	80	70	75	80	
							70	75	80							
<u>NEWFOUNDLAND</u>																
Gander	2.5	0.3	0.0	9.0	1.5	0.1	5.6	0.4	0.0	0.6	0.0	0.0	4.4	0.6	*	
Goose	3.4	0.5	0.0	6.7	1.5	0.3	2.7	0.4	0.0	0.7	0.1	0.0	3.4	0.6	0.1	
St. John's(Torbay)	1.0	0.1	0.0	5.0	0.3	0.0	4.5	0.2	0.0	0.4	0.1	0.0	2.7	0.2	0.0	
<u>PRINCE EDWARD IS.</u>																
Charlottetown	4.3	0.3	0.0	11.1	1.4	0.0	9.0	0.7	0.0	3.0	0.2	0.0	6.8	0.6	0.0	
<u>NOVA SCOTIA</u>																
Halifax	2.1	0.2	0.0	6.6	0.2	0.0	7.3	0.6	0.0	2.1	0.2	0.0	4.5	0.3	0.0	
Sydney	4.1	0.7	0.0	13.0	1.9	*	11.4	1.3	0.0	3.0	0.2	0.0	7.9	1.0	*	
<u>NEW BRUNSWICK</u>																
Moncton	8.0	1.6	0.1	16.8	3.9	0.5	12.8	2.4	0.1	3.9	0.2	0.0	10.4	2.0	0.2	
Saint John	2.9	0.3	0.0	7.7	0.9	0.0	4.3	0.4	0.0	0.6	0.1	0.0	3.9	0.4	0.0	
<u>QUEBEC</u>																
Bagotville	6.7	1.0	0.0	15.1	3.7	0.6	8.9	1.5	*	2.3	0.5	*	8.2	1.7	0.2	
Montreal(Dorval)	19.4	5.3	0.7	39.0	12.0	1.3	31.6	9.4	1.7	9.0	2.5	0.1	24.8	7.3	1.0	
Quebec	10.5	2.4	0.1	22.5	5.5	0.9	14.4	2.8	0.1	3.0	0.3	0.0	12.6	2.8	0.3	
Seven Islands	0.2	0.0	0.0	1.6	0.1	0.0	1.1	*	0.0	*	0.0	0.0	0.7	*	0.0	
<u>ONTARIO</u>																
Fort William	5.1	0.6	*	14.1	3.3	0.2	12.0	2.3	0.1	1.0	0.2	0.0	8.1	1.6	0.1	
Kapuskasing	8.9	2.0	0.1	14.2	3.6	0.4	7.9	1.5	*	1.9	0.3	0.0	8.2	1.9	0.1	
London	23.2	7.1	0.9	37.0	12.8	1.7	28.5	7.4	1.3	9.9	2.7	0.5	24.6	7.5	1.1	

* - less than 0.05%

Data from airports except at Halifax and Victoria

TABLE II - PERCENTAGE OF TIME HUMIDITY INDEX EQUALS OR EXCEEDS VALUES INDICATED - CONT'D

	JUNE			JULY			AUGUST			SEPTEMBER			SUMMER SEASON		
	70	75	80	70	75	80	70	75	80	70	75	80	70	75	80
<u>ONTARIO cont.</u>															
North Bay	8.1	0.9	0.0	15.7	2.2	*	9.2	1.1	0.0	2.8	0.6	*	9.0	1.2	*
Ottawa (Uplands)	18.9	5.7	0.4	33.4	11.2	1.7	27.3	8.4	1.7	8.1	2.5	0.3	21.9	7.0	1.0
Toronto (Malton)	23.7	8.0	0.9	38.5	14.2	2.4	33.9	11.2	2.8	12.2	4.1	0.7	27.1	9.4	1.7
Windsor	32.5	12.3	2.4	50.6	19.3	3.0	39.7	12.1	2.0	12.9	4.0	0.8	34.2	11.9	2.1
<u>MANITOBA</u>															
Churchill	1.4	0.4	0.0	4.5	0.6	0.0	2.7	0.6	*	*	0.0	0.0	2.2	0.4	*
Winnipeg	10.7	2.6	0.4	28.3	8.7	1.3	20.7	6.3	1.1	3.7	1.0	0.1	15.9	4.7	0.7
<u>SASKATCHEWAN</u>															
Regina	6.4	1.2	*	19.2	5.8	0.9	15.5	3.9	0.4	31.	0.6	*	11.1	2.9	0.3
Saskatoon	5.1	0.7	0.0	15.9	3.7	0.4	10.1	2.0	0.1	1.9	0.2	0.0	8.3	1.7	0.1
<u>ALBERTA</u>															
Calgary	1.0	0.0	0.0	6.8	0.6	0.0	4.6	0.2	0.0	0.6	*	0.0	3.3	0.2	0.0
Edmonton	2.7	0.1	0.0	8.9	1.6	*	4.9	0.5	0.0	0.7	*	0.0	4.3	0.6	*
Grande Prairie	2.2	0.2	0.0	6.0	0.5	0.0	3.2	0.1	0.0	0.5	*	0.0	3.0	0.2	0.0
Medicine Hat	6.2	0.8	0.0	24.0	8.0	1.1	17.6	5.1	0.3	4.7	0.8	0.0	13.1	3.7	0.4
<u>BRITISH COLUMBIA</u>															
Penticton	5.9	0.6	0.0	24.3	7.8	0.8	18.0	4.4	0.2	5.8	0.5	0.0	13.5	3.3	0.3
Prince George	2.3	0.2	0.0	6.2	0.9	0.0	3.8	*	0.0	0.5	0.0	0.0	3.2	0.3	0.0
Vancouver	0.7	0.0	0.0	5.7	0.3	0.0	4.0	0.1	0.0	1.1	*	0.0	2.9	0.1	0.0
Victoria	0.7	0.1	0.0	1.7	0.1	0.0	0.7	0.0	0.0	0.9	0.0	0.0	1.0	0.1	0.0
<u>YUKON TERRITORY</u>															
Whitehorse	1.1	0.1	0.0	1.9	0.2	0.0	2.4	*	0.0	0.0	0.0	0.0	1.4	0.1	0.0
<u>NORTH WEST TERR.</u>															
Yellowknife	1.3	0.1	0.0	2.8	*	0.0	1.5	*	0.0	*	0.0	0.0	1.4	*	0.0

* - less than 0.05%

Data from airports except at Ha' x and Victoria