

2003

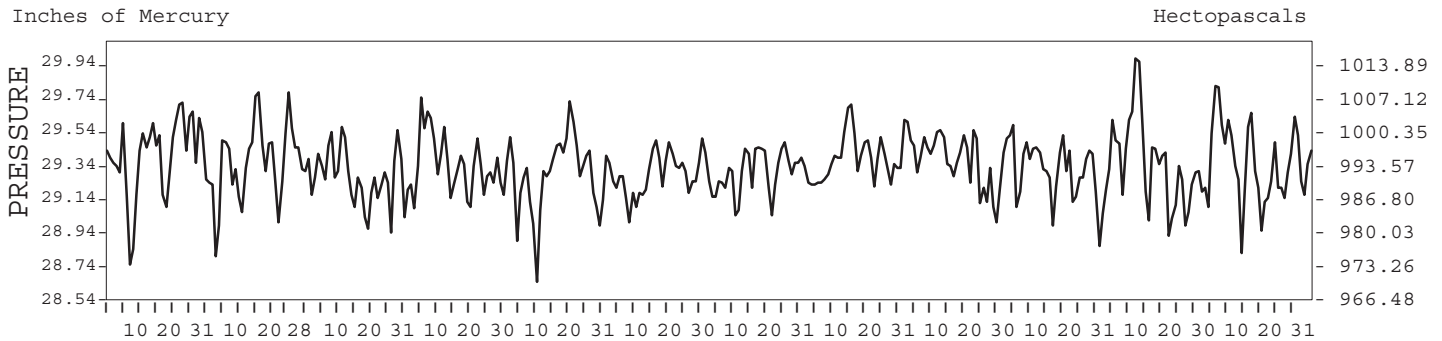
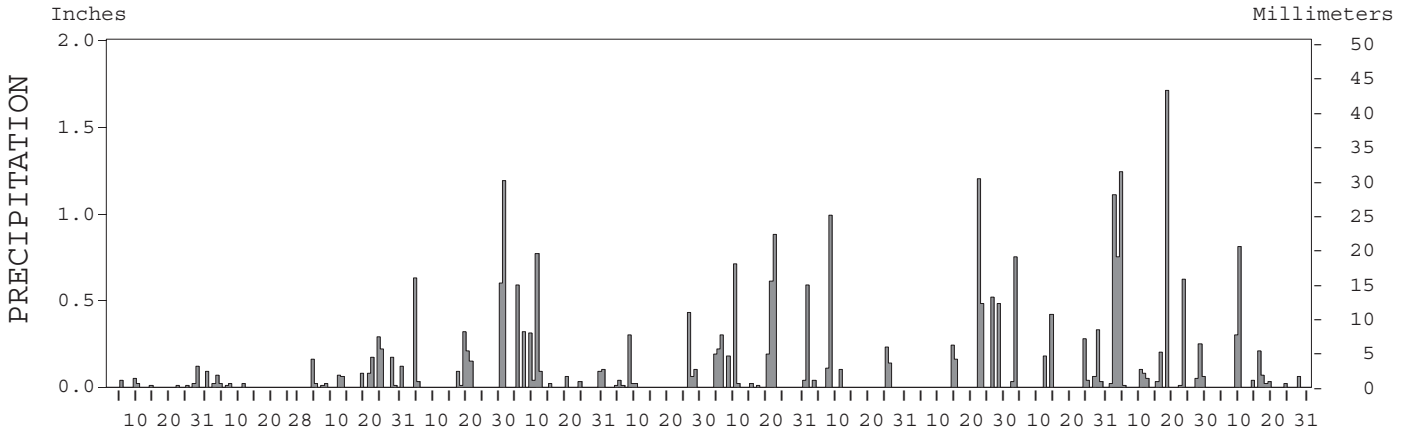
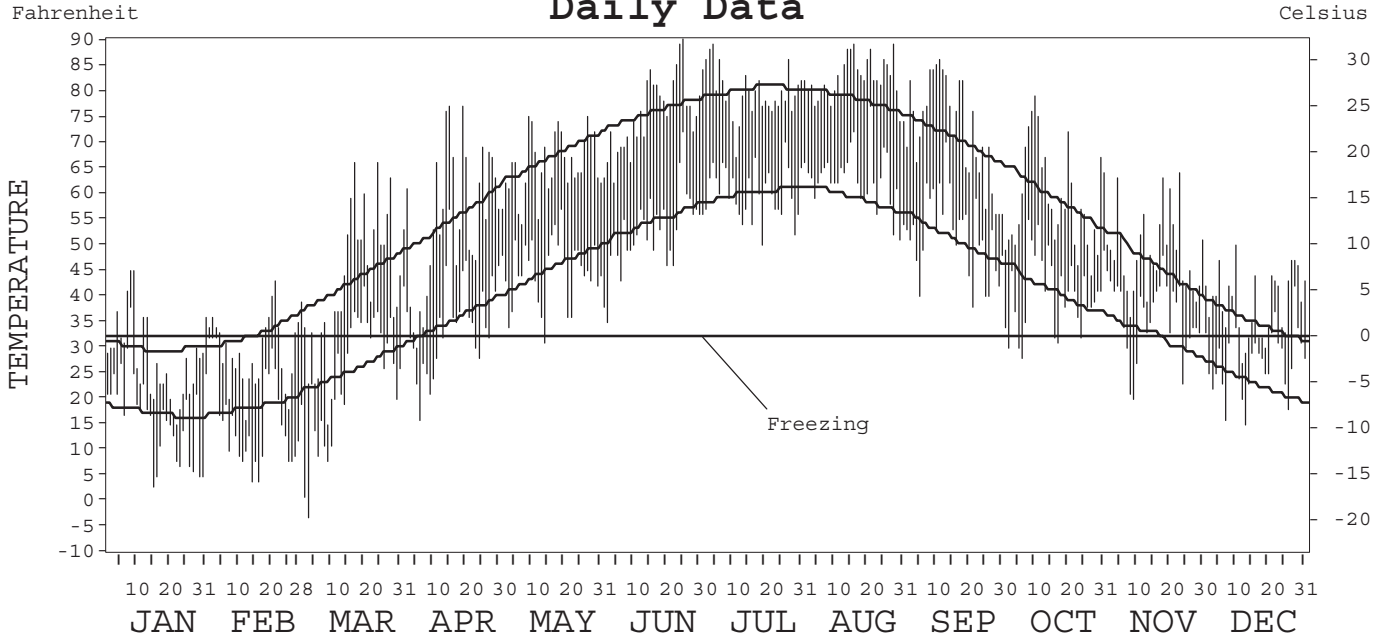
# LOCAL CLIMATOLOGICAL DATA ANNUAL SUMMARY WITH COMPARATIVE DATA



ISSN 0198-2656

## MUSKEGON, MICHIGAN (MKG)

### Daily Data



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# METEOROLOGICAL DATA FOR 2003

## MUSKEGON, MI (MKG)

LATITUDE: 43° 10' 16" N      LONGITUDE: 86° 14' 12" W      ELEVATION (FT.): GRND: 656      BARO: 659      TIME ZONE: EASTERN (UTC + 5)      WBAN: 14840

ELEMENT		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	
TEMPERATURE °F	MEAN DAILY MAXIMUM	27.9	29.0	42.4	54.9	65.5	75.4	79.7	82.2	72.3	58.9	48.5	38.6	56.3	
	HIGHEST DAILY MAXIMUM	45	43	66	77	75	90	89	89	86	79	64	50	90	
	DATE OF OCCURRENCE	09+	21	24+	19+	27+	25	04	28+	11	10	23	10	JUN 25	
	MEAN DAILY MINIMUM	16.7	15.9	24.2	34.8	44.8	52.5	60.0	62.7	51.9	40.7	36.1	27.7	39.0	
	LOWEST DAILY MINIMUM	3	4	-3	16	31	35	50	51	38	28	20	15	-3	
	DATE OF OCCURRENCE	15	16+	03	06	14	02	19	30	21	06	09	13	MAR 03	
	AVERAGE DRY BULB	22.3	22.5	33.3	44.9	55.2	64.0	69.9	72.5	62.1	49.8	42.3	33.2	47.7	
	MEAN WET BULB	20.7	20.6	31.2	39.5	50.4	57.9	64.1	67.4	57.5	47.0	39.9	30.8	43.9	
	MEAN DEW POINT	15.5	15.4	26.5	32.6	45.2	52.9	60.2	64.4	53.2	43.4	36.0	25.7	39.3	
	NUMBER OF DAYS WITH:														
	MAXIMUM ≥ 90°	0	0	0	0	0	1	0	0	0	0	0	0	0	1
	MAXIMUM ≤ 32°	24	17	5	1	0	0	0	0	0	0	0	6	53	
	MINIMUM ≤ 32°	30	28	21	13	1	0	0	0	0	6	7	24	130	
MINIMUM ≤ 0°	0	0	1	0	0	0	0	0	0	0	0	0	1		
H/C	HEATING DEGREE DAYS	1313	1185	973	598	298	88	3	3	143	463	674	978	6719	
	COOLING DEGREE DAYS	0	0	0	2	0	63	164	239	65	0	0	0	533	
RH	MEAN (PERCENT)	74	75	76	66	72	70	73	78	74	79	79	74	74	
	HOUR 01 LST	74	78	83	72	84	82	84	89	84	84	82	77	81	
	HOUR 07 LST	76	78	83	77	83	82	85	94	90	89	84	79	83	
	HOUR 13 LST	74	70	67	57	63	56	60	62	59	68	76	67	65	
	HOUR 19 LST	72	72	72	60	60	60	63	68	66	79	79	73	69	
S	PERCENT POSSIBLE SUNSHINE														
W/O	NUMBER OF DAYS WITH:														
	HEAVY FOG (VISBY ≤ 1/4 MI)	4	3	6	1	1	2	2	2	0	1	4	0	26	
	THUNDERSTORMS	0	0	1	6	6	3	11	7	1	0	2	0	37	
CLOUDINESS	SUNRISE-SUNSET: (OKTAS)														
	CEILOMETER (≤ 12,000 FT.)														
	SATELLITE (> 12,000 FT.)														
	MIDNIGHT-MIDNIGHT: (OKTAS)														
	CEILOMETER (≤ 12,000 FT.)														
	SATELLITE (> 12,000 FT.)														
	NUMBER OF DAYS WITH:														
	CLEAR														
	PARTLY CLOUDY														
	CLOUDY														
PR	MEAN STATION PRESS. (IN.)	29.38	29.35	29.26	29.32	29.26	29.27	29.29	29.37	29.35	29.29	29.32	29.34	29.32	
	MEAN SEA-LEVEL PRESS. (IN.)	30.09	30.05	29.96	30.01	29.94	29.95		30.04	30.03		30.02	30.04		
WINDS	RESULTANT SPEED (MPH)	5.1	2.9	1.3	2.5	1.9	1.8	2.6	1.2	2.2	3.5	3.6	2.0	1.7	
	RES. DIR. (TENS OF DEGS.)	28	27	19	09	05	23	25	28	23	25	24	27	25	
	MEAN SPEED (MPH)	11.2	11.5	9.7	11.1	9.0	7.8	8.0	7.2	8.7	8.6	11.7	11.0	9.6	
	PREVAIL. DIR. (TENS OF DEGS.)	29	29	08	08	09	20	21	29	12	21	30	14	29	
	MAXIMUM 2-MINUTE WIND:														
	SPEED (MPH)	35	36	36	35	36	32	31	26	28	35	38	33	38	
	DIR. (TENS OF DEGS.)	22	32	22	18	21	18	28	20	19	21	30	30	30	
	DATE OF OCCURRENCE	12	11	28	20	11	10	04	24	24	03	13	01	NOV 13	
	MAXIMUM 5-SECOND WIND:														
	SPEED (MPH)	45	46	46	43	49	40	39	32	33	46	55	41	55	
DIR. (TENS OF DEGS.)	21	30	23	19	21	18	30	20	18	21	32	29	32		
DATE OF OCCURRENCE	12	04	28	20+	11	10	04	24	24	03	12	01	NOV 12		
PRECIPITATION	WATER EQUIVALENT:														
	TOTAL (IN.)	0.37	0.16	1.48	2.04	3.61	0.99	3.37	2.20	3.08	2.12	6.29	1.56	27.27	
	GREATEST 24-HOUR (IN.)	0.12	0.09	0.51	0.64	1.65	0.43	0.88	0.99	1.66	0.75	1.71	1.10	1.71	
	DATE OF OCCURRENCE	28	03-04	24-25	04-05	30-01	26	22	08	22-23	03	18	09-10	NOV 18	
	NUMBER OF DAYS WITH:														
	PRECIPITATION ≥ 0.01	9	6	14	8	12	9	12	7	6	9	16	9	117	
PRECIPITATION ≥ 0.10	1	0	6	5	6	3	8	6	6	5	8	3	57		
PRECIPITATION ≥ 1.00	0	0	0	0	1	0	0	0	1	0	3	0	5		
SNOWFALL	SNOW, ICE PELLETS, HAIL:														
	TOTAL (IN.)	20.5	14.5	12.9	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.5	7.3	56.5	
	GREATEST 24-HOUR (IN.)	3.0	4.0	3.7	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.5	4.0	4.0	
	DATE OF OCCURRENCE	26	11	04	04							24	17	DEC 17	
	MAXIMUM SNOW DEPTH (IN.)	10	13	11	0	0	0	0	0	0	0	1	4	13	
	DATE OF OCCURRENCE	29	13+	14+								25	20+	FEB 13+	
	NUMBER OF DAYS WITH:														
SNOWFALL ≥ 1.0	9	5	5	0	0	0	0	0	0	0	0	2	21		

# NORMALS, MEANS, AND EXTREMES

## MUSKEGON, MI (MKG)

LATITUDE: 43° 10' 16" N      LONGITUDE: 86° 14' 12" W      ELEVATION (FT): GRND: 656      BARO: 659      TIME ZONE: EASTERN (UTC + 5)      WBAN: 14840

ELEMENT		POR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
TEMPERATURE °F	NORMAL DAILY MAXIMUM	30	29.8	32.5	42.5	54.6	67.0	75.6	80.0	78.1	70.3	58.7	45.6	34.6	55.8
	MEAN DAILY MAXIMUM	56	29.9	31.9	41.3	54.8	66.6	75.9	80.4	78.7	71.0	59.4	45.8	34.5	55.9
	HIGHEST DAILY MAXIMUM	64	63	67	80	86	93	98	96	99	95	83	76	64	99
	YEAR OF OCCURRENCE		1950	1999	1981	1970	1962	1995	1999	1964	1954	1971	1961	1982	AUG 1964
	MEAN OF EXTREME MAXS.	56	45.8	48.1	64.7	75.4	82.5	88.5	89.7	88.4	85.0	75.3	63.6	51.5	71.5
	NORMAL DAILY MINIMUM	30	17.1	18.3	25.4	35.1	45.1	54.2	59.8	58.8	50.7	40.6	31.8	22.6	38.3
	MEAN DAILY MINIMUM	56	17.9	18.5	25.3	35.6	45.5	55.0	60.4	59.2	51.6	41.8	32.7	23.2	38.9
	LOWEST DAILY MINIMUM	64	-13	-19	-10	1	22	31	39	36	27	21	-14	-15	-19
	YEAR OF OCCURRENCE		1948	1996	1943	1982	1947	1972	2001	1979	1991	1980	1950	1976	FEB 1996
	MEAN OF EXTREME MINS.	56	-1.3	-4	6.4	20.2	31.3	40.6	47.3	46.4	35.0	26.8	17.7	5.1	22.9
	NORMAL DRY BULB	30	23.5	25.4	34.0	44.9	56.1	64.9	69.9	68.5	60.5	49.7	38.7	28.6	47.1
	MEAN DRY BULB	56	23.9	25.2	33.3	45.3	56.1	65.5	70.5	68.9	61.3	50.6	39.2	29.0	47.4
	MEAN WET BULB	19	23.8	25.4	30.9	40.8	50.7	59.7	61.6	64.5	56.8	46.3	36.7	26.7	43.7
	MEAN DEW POINT	19	19.8	20.4	24.9	33.9	44.3	55.0	57.7	61.1	53.2	42.1	32.2	22.8	39.0
NORMAL NO. DAYS WITH:															
MAXIMUM ≥ 90°	30	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.9	0.6	0.1	0.0	0.0	2.2	
MAXIMUM ≤ 32°	30	18.1	14.3	5.7	0.4	0.0	0.0	0.0	0.0	0.0	0.0	2.3	12.0	52.8	
MINIMUM ≤ 32°	30	28.9	25.7	23.5	11.0	1.6	0.1	0.0	0.0	0.5	5.5	16.3	26.3	139.4	
MINIMUM ≤ 0°	30	1.6	1.7	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	4.1	
H/C	NORMAL HEATING DEG. DAYS	30	1288	1124	968	602	296	78	15	27	168	476	784	1117	6943
	NORMAL COOLING DEG. DAYS	30	0	0	0	4	24	86	181	145	44	3	0	0	487
RH	NORMAL (PERCENT)	30	79	76	71	66	66	70	72	76	76	75	76	79	74
	HOUR 01 LST	30	80	78	76	72	75	80	83	87	85	80	78	80	80
	HOUR 07 LST	30	81	81	80	77	77	82	85	90	89	84	80	81	82
	HOUR 13 LST	30	75	70	62	56	56	59	60	63	63	65	70	75	64
	HOUR 19 LST	30	78	74	67	58	56	60	62	67	72	73	74	78	68
S	PERCENT POSSIBLE SUNSHINE														
W/O	MEAN NO. DAYS WITH:														
	HEAVY FOG (VISBY ≤ 1/4 MI)	60	1.8	1.8	2.5	2.0	2.4	2.1	1.6	2.0	1.6	2.2	1.9	1.8	23.7
	THUNDERSTORMS	63	0.2	0.4	1.6	3.4	4.4	6.1	6.3	5.9	4.7	2.2	1.1	0.4	36.7
CLOUDINESS	MEAN:														
	SUNRISE-SUNSET (OKTAS)	54	7.0	6.5	5.8	5.4	4.9	4.6	4.0	4.2	4.6	5.1	6.6	6.9	5.5
	MIDNIGHT-MIDNIGHT (OKTAS)	26	6.8	6.1	5.5	4.8	4.5	4.2	3.8	3.8	4.4	5.1	6.4	6.8	5.2
	MEAN NO. DAYS WITH:														
CLEAR	54	1.6	2.9	5.2	6.5	8.4	8.7	10.9	10.6	8.9	7.4	2.5	1.6	75.2	
PARTLY CLOUDY	54	3.4	4.7	7.3	7.3	8.9	9.8	10.8	10.7	9.1	8.2	4.4	3.8	88.4	
CLOUDY	54	25.9	20.6	18.5	16.1	13.8	11.5	9.3	9.7	12.1	15.4	23.1	25.6	201.6	
PR	MEAN STATION PRESSURE (IN)	29	29.34	29.38	29.32	29.29	29.29	29.28	29.31	29.35	29.37	29.37	29.33	29.36	29.33
	MEAN SEA-LEVEL PRES. (IN)	19	30.04	30.07	30.05	29.97	29.98	29.95	29.98	30.03	30.03	30.06	30.04	30.07	30.02
WINDS	MEAN SPEED (MPH)	37	11.9	11.3	11.5	11.4	9.7	9.1	8.8	8.5	9.3	10.2	11.8	11.5	10.4
	PREVAIL. DIR (TENS OF DEGS)	28	29	29	30	09	20	20	20	20	19	19	29	29	20
	MAXIMUM 2-MINUTE:														
	SPEED (MPH)	7	38	38	39	48	44	33	39	43	32	38	52	35	52
	DIR. (TENS OF DEGS)		08	20	26	22	27	28	34	26	18	27	23	29	23
	YEAR OF OCCURRENCE		1999	1999	2002	1997	1998	2002	1998	2002	2000	2001	1998	2000	NOV 1998
MAXIMUM 5-SECOND:															
SPEED (MPH)	7	48	53	54	62	52	45	51	54	45	54	67	46	67	
DIR. (TENS OF DEGS)		08	18	27	29	24	28	34	26	18	27	23	20	23	
YEAR OF OCCURRENCE		1999	1999	2002	2002	1998	2002	1998	2002	2000	2001	1998	2001	NOV 1998	
PRECIPITATION	NORMAL (IN)	30	2.22	1.58	2.36	2.91	2.95	2.58	2.32	3.77	3.52	2.80	3.23	2.64	32.88
	MAXIMUM MONTHLY (IN)	64	4.55	3.30	6.59	7.12	7.45	5.46	6.63	9.88	13.55	7.33	6.61	5.42	13.55
	YEAR OF OCCURRENCE		1982	1997	1976	1947	2000	1967	1952	1975	1986	1991	1985	1949	SEP 1986
	MINIMUM MONTHLY (IN)	64	0.37	0.16	0.37	0.72	0.33	0.19	0.47	0.11	0.17	0.33	0.62	0.80	0.11
	YEAR OF OCCURRENCE		2003	2003	1999	1989	1992	1959	1951	1969	1979	1944	1986	2000	AUG 1969
	MAXIMUM IN 24 HOURS (IN)	64	1.69	2.11	2.36	2.66	2.59	4.03	2.54	3.72	6.00	3.21	2.31	3.04	6.00
	YEAR OF OCCURRENCE		1974	2001	1976	2001	1989	1994	1959	1975	1986	1954	1990	1982	SEP 1986
	NORMAL NO. DAYS WITH:														
PRECIPITATION ≥ 0.01	30	17.4	13.2	12.6	12.5	10.3	9.4	9.3	9.5	10.2	11.3	14.4	15.9	146.0	
PRECIPITATION ≥ 1.00	30	0.2	0.1	0.3	0.4	0.7	0.5	0.3	0.8	0.7	0.4	0.5	0.3	5.2	
SNOWFALL	NORMAL (IN)	30	34.4	18.3	11.1	3.1	0.*	0.0	0.0	0.0	0.0	0.6	8.7	29.3	105.5
	MAXIMUM MONTHLY (IN)	61	102.4	45.8	35.7	20.4	0.4	0.0	T	0.0	T	4.9	25.7	82.6	102.4
	YEAR OF OCCURRENCE		1982	1981	1965	1982	1954		1990		1994	1967	1995	1963	JAN 1982
	MAXIMUM IN 24 HOURS (IN)	61	22.0	17.5	10.5	12.2	0.4	0.0	T	0.0	T	4.7	9.1	20.1	22.0
	YEAR OF OCCURRENCE		1982	1965	2002	1982	1954		1990		1994	1967	1964	1963	JAN 1982
	MAXIMUM SNOW DEPTH (IN)	53	33	32	22	13	0	0	0	0	0	3	11	34	34
	YEAR OF OCCURRENCE		1979	1958	1963	1982						1967	1955	1963	DEC 1963
NORMAL NO. DAYS WITH:															
SNOWFALL ≥ 1.0	30	9.7	5.2	3.4	0.8	0.0	0.0	0.0	0.0	0.0	0.1	2.5	7.1	28.8	

PRECIPITATION (inches) 2003 MUSKEGON, MI (MKG)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1974	4.30	2.24	4.29	3.56	4.13	2.65	1.48	2.78	0.76	2.06	2.67	1.58	32.50
1975	3.57	1.98	2.54	3.06	2.63	4.97	2.07	9.88	1.32	1.15	4.23	2.79	40.19
1976	1.72	2.81	6.59	3.21	5.11	1.41	1.18	0.95	1.08	1.29	1.51	1.75	28.61
1977	2.91	1.16	3.48	1.71	1.51	2.52	2.41	2.48	4.40	2.46	3.11	3.97	32.12
1978	3.24	0.81	1.69	3.41	2.99	3.19	1.54	4.25	4.53	3.07	2.37	2.81	33.90
1979	2.76	0.90	4.04	2.91	1.96	2.07	1.71	4.15	0.17	4.66	3.26	2.49	31.08
1980	2.35	0.69	1.02	4.41	1.77	4.36	3.62	5.52	4.31	2.17	1.88	3.27	35.37
1981	0.77	2.85	0.95	3.54	2.82	3.93	1.86	3.15	5.41	3.16	2.50	2.17	33.11
1982	4.55	0.36	2.40	2.32	3.40	2.79	2.43	4.67	1.80	1.63	5.34	5.27	36.96
1983	1.20	1.22	2.60	3.26	3.30	1.72	1.61	1.46	7.47	2.53	4.47	4.07	34.91
1984	1.32	1.18	2.06	1.90	5.62	1.90	2.49	2.02	1.97	2.23	3.19	4.82	30.70
1985	2.45	2.83	4.02	2.13	1.55	0.98	3.27	7.08	3.35	5.01	6.61	2.99	42.27
1986	1.03	2.68	1.73	1.77	2.21	1.76	3.15	2.98	13.55	2.21	0.62	1.36	35.05
1987	1.52	0.68	1.48	2.82	2.51	1.15	2.13	8.12	4.56	3.31	3.18	4.21	35.67
1988	2.89	1.66	1.95	3.83	0.43	0.47	1.65	3.11	5.92	4.79	6.58	2.82	36.10
1989	1.61	1.04	1.92	0.72	4.64	0.89	1.36	4.86	2.41	1.58	2.92	1.90	25.85
1990	2.34	1.74	2.42	2.00	6.48	3.63	1.26	1.22	3.79	4.36	5.31	2.60	37.15
1991	1.36	0.75	4.40	3.56	3.52	3.84	3.31	3.88	3.32	7.33	4.25	1.82	41.34
1992	1.36	1.33	2.30	3.30	0.33	1.50	2.68	1.97	3.54	2.46	6.26	2.69	29.72
1993	2.61	0.83	1.66	4.83	2.26	4.40	3.87	6.40	4.59	1.66	2.00	1.10	36.21
1994	2.66	2.65	1.34	2.38	1.28	4.99	2.46	5.22	2.98	2.19	3.71	1.01	32.87
1995	2.82	1.30	1.79	3.47	1.83	0.71	2.67	3.54	0.99	3.68	4.82	1.88	29.50
1996	1.47	1.58	1.22	2.47	3.37	4.46	1.87	1.10	2.62	3.64	1.33	1.87	27.00
1997	2.03	3.30	0.95	1.80	2.25	3.00	2.15	2.88	3.10	1.28	2.43	1.22	26.39
1998	2.61	1.75	3.65	1.84	1.89	1.33	1.03	2.92	3.27	4.09	2.30	1.32	28.00
1999	2.39	1.15	0.37	4.53	4.57	3.30	3.25	3.36	2.56	0.81	0.87	2.36	29.52
2000	1.07	1.08	1.08	5.00	7.45	3.06	2.87	2.24	5.01	1.84	3.58	0.80	35.08
2001	0.76	3.22	0.48	4.37	4.82	2.40	1.66	3.73	3.84	6.09	2.20	1.42	34.99
2002	0.62	1.98	1.51	4.22	2.90	3.23	1.57	4.32	1.86	1.99	1.16	0.85	26.21
2003	0.37	0.16	1.48	2.04	3.61	0.99	3.37	2.20	3.08	2.12	6.29	1.56	27.27
POR= 63 YRS	2.19	1.69	2.33	3.08	2.90	2.61	2.39	3.17	3.39	2.72	3.14	2.49	32.10

WBAN : 14840

AVERAGE TEMPERATURE (°F) 2003 MUSKEGON, MI (MKG)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1974	25.1	20.3	32.9	45.2	52.1	62.2	70.1	68.7	58.5	47.9	39.7	31.0	46.1
1975	28.1	26.0	31.0	41.0	59.5	67.4	71.1	70.2	56.8	53.3	46.0	30.4	48.4
1976	23.6	32.3	37.6	46.5	52.0	67.7	70.0	67.1	58.3	46.0	33.1	20.6	46.2
1977	14.3	22.0	38.8	50.3	63.1	62.3	72.2	66.6	62.3	47.8	39.5	26.2	47.1
1978	19.5	15.7	29.2	44.7	58.0	63.2	67.3	68.5	63.2	48.1	37.6	26.4	45.1
1979	17.0	14.5	33.6	41.2	54.7	64.2	68.6	66.4	60.7	49.4	39.2	31.3	45.1
1980	23.7	22.0	30.6	44.8	56.4	61.5	70.9	70.7	60.9	45.7	37.8	25.2	45.9
1981	20.6	28.1	34.9	47.1	53.8	65.9	69.7	69.6	58.9	47.2	38.7	29.7	47.0
1982	16.1	21.6	30.5	40.1	62.0	59.7	71.6	67.1	60.4	52.4	40.3	35.7	46.5
1983	26.9	30.2	36.4	41.9	50.5	66.2	74.4	72.2	62.6	50.0	40.7	20.8	47.7
1984	19.3	31.9	27.5	46.3	51.4	66.9	68.3	71.7	59.7	52.7	39.4	32.0	47.3
1985	20.4	21.6	35.1	50.3	58.7	62.3	69.3	67.1	63.3	50.8	38.0	24.6	46.8
1986	24.6	24.0	36.5	49.4	58.1	64.5	72.9	65.6	61.9	49.7	36.4	31.1	47.9
1987	26.5	30.7	37.0	48.6	60.6	68.9	73.4	68.7	62.0	46.0	41.8	33.3	49.8
1988	22.9	22.5	34.2	45.6	59.8	67.6	72.7	73.5	61.2	45.2	41.2	28.8	47.9
1989	31.0	21.8	31.5	43.9	54.7	65.0	71.8	67.9	58.7	49.8	36.6	20.5	46.1
1990	32.1	28.7	36.9	46.3	53.7	64.7	69.9	68.2	62.3	49.3	43.0	31.0	48.8
1991	24.5	29.5	37.7	49.1	63.0	69.5	71.1	70.6	60.5	52.1	36.3	30.5	49.5
1992	28.8	29.9	33.6	43.1	55.4	61.7	66.2	64.5	59.9	49.0	38.3	31.0	46.8
1993	26.1	23.6	33.3	43.3	56.9	64.7	72.2	71.8	57.1	47.8	38.2	29.3	47.0
1994	16.0	20.4	32.9	45.5	53.3	66.3	69.7	65.5	63.6	52.3	42.0	33.8	46.8
1995	27.1	23.9	36.2	42.8	55.2	69.8	71.8	74.1	57.7	50.5	32.1	24.5	47.1
1996	21.6	24.2	29.0	41.7	53.8	64.5	65.2	70.0	61.3	49.2	34.1	29.1	45.3
1997	23.6	27.1	33.4	42.3	48.9	66.5	68.9	64.8	60.3	49.8	36.1	31.5	46.1
1998	29.7	35.0	36.3	47.6	61.9	65.0	71.1	71.0	63.8	52.5	42.3	34.2	50.9
1999	22.2	32.1	32.8	48.3	59.9	67.7	73.5	67.4	61.5	49.3	43.3	32.0	49.2
2000	25.3	32.6	41.3	44.5	58.2	64.5	68.3	69.2	60.9	54.0	39.5	22.2	48.4
2001	28.2	26.5	32.7	49.5	58.9	63.8	69.5	70.3	58.9	49.5	46.0	34.8	49.1
2002	32.7	32.4	31.9	45.6	51.2	67.0	74.4	70.3	65.4	47.1	38.3	30.9	48.9
2003	22.3	22.5	33.3	44.9	55.2	64.0	69.9	72.5	62.1	49.8	42.3	33.2	47.7
POR= 63 YRS	23.9	25.1	33.0	45.4	55.9	65.3	70.3	68.9	61.3	50.7	39.3	28.9	47.3

HEATING DEGREE DAYS (base 65°F) 2003 MUSKEGON, MI (MKG)

YEAR	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
1974-75	7	13	215	525	750	1046	1137	1085	1050	714	202	62	6806
1975-76	16	5	249	364	565	1066	1275	942	841	561	400	24	6308
1976-77	5	43	219	581	948	1371	1564	1200	807	436	145	117	7436
1977-78	7	54	101	526	758	1196	1402	1374	1105	599	239	100	7461
1978-79	29	15	125	519	815	1190	1481	1408	969	708	340	84	7683
1979-80	19	49	160	482	766	1039	1277	1239	1060	601	277	152	7121
1980-81	0	8	152	592	806	1228	1368	1028	923	529	345	34	7013
1981-82	17	9	196	545	782	1089	1509	1209	1064	738	147	165	7470
1982-83	9	52	172	390	734	899	1173	969	877	685	449	77	6486
1983-84	20	1	137	457	723	1365	1411	954	1156	559	415	19	7217
1984-85	23	11	193	374	761	1016	1376	1206	920	465	214	123	6682
1985-86	13	15	153	431	802	1244	1244	1144	878	481	219	75	6699
1986-87	7	60	129	466	855	1042	1184	954	863	487	204	32	6283
1987-88	17	35	112	582	690	976	1299	1227	948	573	189	55	6703
1988-89	11	19	130	606	708	1115	1044	1203	1032	626	323	72	6889
1989-90	0	27	215	468	843	1371	1012	1008	863	580	341	79	6807
1990-91	6	24	149	484	655	1046	1249	990	840	469	157	12	6081
1991-92	9	2	199	397	855	1061	1116	1013	965	653	304	134	6708
1992-93	24	70	185	493	796	1047	1200	1152	977	643	277	79	6943
1993-94	0	11	244	530	796	1101	1513	1244	989	582	365	64	7439
1994-95	5	57	94	385	683	957	1166	1144	887	661	298	34	6371
1995-96	21	1	243	449	981	1247	1340	1180	1110	692	357	64	7685
1996-97	42	2	167	483	919	1106	1277	1053	970	674	492	32	7217
1997-98	25	53	148	475	859	1028	1089	833	884	514	124	118	6150
1998-99	1	0	92	382	674	949	1320	915	990	496	187	64	6070
1999-00	3	17	141	479	644	1019	1224	934	724	611	231	69	6096
2000-01	26	17	190	342	758	1316	1135	1071	996	456	201	117	6625
2001-02	38	4	197	473	565	933	994	906	1021	585	432	66	6214
2002-03	0	4	74	556	796	1051	1313	1185	973	598	298	88	6936
2003-	3	3	143	463	674	978							

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COOLING DEGREE DAYS (base 65°F) 2003 MUSKEGON, MI (MKG)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1974	0	0	0	0	3	38	173	137	27	1	0	0	379
1975	0	0	0	0	38	141	213	174	6	11	0	0	583
1976	0	0	0	15	2	113	166	118	21	1	0	0	436
1977	0	0	0	4	95	42	237	114	28	0	0	0	520
1978	0	0	0	0	29	57	109	131	79	0	0	0	405
1979	0	0	0	0	29	67	137	103	36	7	0	0	379
1980	0	0	0	1	20	54	191	190	36	0	0	0	492
1981	0	0	0	0	6	67	172	160	20	0	0	0	425
1982	0	0	0	0	61	12	220	126	41	9	0	0	469
1983	0	0	0	0	4	122	319	230	72	2	0	0	749
1984	0	0	0	2	0	81	134	227	40	0	0	0	484
1985	0	0	0	30	24	47	153	88	108	0	0	0	450
1986	0	0	0	18	11	67	258	82	42	0	0	0	478
1987	0	0	0	1	75	155	282	157	32	0	0	0	702
1988	0	0	0	0	36	140	258	288	23	0	0	0	745
1989	0	0	0	0	12	81	217	122	32	0	0	0	464
1990	0	0	0	25	0	74	166	131	73	4	0	0	473
1991	0	0	0	2	103	154	206	184	70	6	0	0	725
1992	0	0	0	2	13	39	69	62	37	1	0	0	223
1993	0	0	0	0	29	76	229	225	15	2	0	0	576
1994	0	0	0	4	10	110	156	80	59	0	0	0	419
1995	0	0	0	0	0	185	238	290	30	4	0	0	747
1996	0	0	0	0	17	57	52	165	62	0	0	0	353
1997	0	0	0	0	0	86	151	58	13	10	0	0	318
1998	0	0	0	0	37	121	201	193	63	2	0	0	617
1999	0	0	0	2	36	152	274	101	45	0	0	0	610
2000	0	0	0	0	26	62	138	153	72	6	0	0	457
2001	0	0	0	0	19	89	183	176	25	0	0	0	492
2002	0	0	0	10	11	131	296	173	93	6	0	0	720
2003	0	0	0	2	0	63	164	239	65	0	0	0	533

SNOWFALL (inches) 2003 MUSKEGON, MI (MKG)

YEAR	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
1974-75	0.0	0.0	0.0	4.0	8.3	16.3	18.8	21.6	14.1	9.1	0.0	0.0	92.2
1975-76	0.0	0.0	0.0	0.0	6.2	30.1	32.0	11.0	6.8	0.8	T	0.0	86.9
1976-77	0.0	0.0	0.0	T	19.7	36.9	60.5	11.3	9.3	6.2	0.0	0.0	143.9
1977-78	0.0	0.0	0.0	T	14.3	55.3	61.1	24.2	9.9	T	0.0	0.0	164.8
1978-79	0.0	0.0	0.0	0.1	7.8	24.6	65.7	11.8	10.5	2.3	0.0	0.0	122.8
1979-80	0.0	0.0	0.0	T	13.1	4.3	29.6	14.5	8.1	5.8	0.0	0.0	75.4
1980-81	0.0	0.0	0.0	0.2	6.9	28.8	23.7	45.8	2.2	T	0.0	0.0	107.6
1981-82	0.0	0.0	0.0	0.2	6.8	22.8	102.4	8.1	13.2	20.4	0.0	0.0	173.9
1982-83	0.0	0.0	0.0	T	3.4	5.5	7.9	6.0	12.7	T	0.0	0.0	35.5
1983-84	0.0	0.0	T	0.0	2.6	50.9	28.8	2.7	8.7	0.5	0.0	0.0	94.2
1984-85	0.0	0.0	0.0	0.0	T	23.0	46.7	33.7	10.1	2.2	0.0	0.0	115.7
1985-86	0.0	0.0	0.0	0.0	4.3	57.0	23.8	17.7	7.0	T	0.0	0.0	109.8
1986-87	0.0	0.0	0.0	0.0	5.3	16.3	24.6	1.5	6.4	8.3	0.0	0.0	62.4
1987-88	0.0	0.0	0.0	T	3.9	20.4	33.2	26.7	7.2	T	0.0	0.0	91.4
1988-89	0.0	0.0	0.0	0.6	2.3	32.5	10.2	34.7	10.2	0.6	T	0.0	91.1
1989-90	0.0	0.0	0.0	4.1	17.9	77.0	6.5	23.9	5.4	2.0	T	0.0	136.8
1990-91	T	0.0	0.0	0.0	5.1	17.4	25.6	16.1	4.0	0.4	0.0	0.0	68.6
1991-92	0.0	0.0	T	T	14.5	29.5	21.4	8.1	10.7	1.3	0.0	0.0	85.5
1992-93	0.0	0.0	0.0	0.5	9.6	21.4	22.5	24.8	9.7	3.6	0.0	0.0	92.1
1993-94	0.0	0.0	0.0	0.1	0.9	37.6	59.8	33.0	1.1	T	T	0.0	132.5
1994-95	0.0	0.0	T	T	0.4	12.2	27.9	34.5	14.3	2.2	0.0	0.0	91.5
1995-96	0.0	0.0	0.0	T	25.7	29.6	22.8	18.4	18.4	1.3			
1996-97													
1997-98													
1998-99							52.4	2.3					
1999-00													
2000-01					11.7		4.9	6.7	9.4	T	0.0	0.0	
2001-02	0.0	0.0	0.0	T	T	12.5	10.9	6.0	19.7	2.1	0.0	0.0	51.2
2002-03	0.0	0.0	0.0	T	5.3	2.5	20.5	14.5	12.9	0.8	0.0	0.0	56.5
2003-	0.0	0.0	0.0	0.0	0.5	7.3							
POR= 58 YRS	T	0.0	T	0.5	8.6	24.1	30.3	17.0	11.3	2.7	0.0	0.0	94.5

WBAN : 14840

REFERENCE NOTES :

<p>PAGE 1: THE TEMPERATURE GRAPH SHOWS NORMAL MAXIMUM AND NORMAL MINIMUM DAILY TEMPERATURES (SOLID CURVES) AND THE ACTUAL DAILY HIGH AND LOW TEMPERATURES (VERTICAL BARS).</p> <p>PAGE 2 AND 3: H/C INDICATES HEATING AND COOLING DEGREE DAYS. RH INDICATES RELATIVE HUMIDITY W/O INDICATES WEATHER AND OBSTRUCTIONS S INDICATES SUNSHINE. PR INDICATES PRESSURE. CLOUDINESS ON PAGE 3 IS THE SUM OF THE CEILOMETER AND SATELLITE DATA NOT TO EXCEED EIGHT EIGHTHS(OKTAS).</p> <p>GENERAL: T INDICATES TRACE PRECIPITATION, AN AMOUNT GREATER THAN ZERO BUT LESS THAN THE LOWEST REPORTABLE VALUE. + INDICATES THE VALUE ALSO OCCURS ON EARLIER DATES. BLANK ENTRIES DENOTE MISSING OR UNREPORTED DATA. NORMALS ARE 30-YEAR AVERAGES (1971 - 2000). ASOS INDICATES AUTOMATED SURFACE OBSERVING SYSTEM. PM INDICATES THE LAST DAY OF THE PREVIOUS MONTH. POR (PERIOD OF RECORD) BEGINS WITH THE JANUARY DATA MONTH AND IS THE NUMBER OF YEARS USED TO COMPUTE THE MEAN. INDIVIDUAL MONTHS WITHIN THE POR MAY BE MISSING. WHEN THE POR FOR A NORMAL IS LESS THAN 30 YEARS, THE NORMAL IS PROVISIONAL AND IS BASED ON THE NUMBER OF YEARS INDICATED. 0.* OR * INDICATES THE VALUE OR MEAN-DAYS-WITH IS BETWEEN 0.00 AND 0.05. CLOUDINESS FOR ASOS STATIONS DIFFERS FROM THE NON-ASOS OBSERVATION TAKEN BY A HUMAN OBSERVER. ASOS STATION CLOUDINESS IS BASED ON TIME-AVERAGED CEILOMETER DATA FOR CLOUDS AT OR BELOW 12,000 FEET AND ON SATELLITE DATA FOR CLOUDS ABOVE 12,000 FEET. THE NUMBER OF DAYS WITH CLEAR, PARTLY CLOUDY, AND CLOUDY CONDITIONS FOR ASOS STATIONS IS THE SUM OF THE CEILOMETER AND SATELLITE DATA FOR THE SUNRISE TO SUNSET PERIOD.</p>	<p>GENERAL CONTINUED: CLEAR INDICATES 0 - 2 OKTAS, PARTLY CLOUDY INDICATES 3 - 6 OKTAS, AND CLOUDY INDICATES 7 OR 8 OKTAS. WHEN AT LEAST ONE OF THE ELEMENTS (CEILOMETER OR SATELLITE) IS MISSING, THE DAILY CLOUDINESS IS NOT COMPUTED. WIND DIRECTION IS RECORDED IN TENS OF DEGREES (2 DIGITS) CLOCKWISE FROM TRUE NORTH. "00" INDICATES CALM. "36" INDICATES TRUE NORTH. RESULTANT WIND IS THE VECTOR AVERAGE OF THE SPEED AND DIRECTION. AVERAGE TEMPERATURE IS THE SUM OF THE MEAN DAILY MAXIMUM AND MINIMUM TEMPERATURE DIVIDED BY 2. SNOWFALL DATA COMPRISE ALL FORMS OF FROZEN PRECIPITATION, INCLUDING HAIL. A HEATING (COOLING) DEGREE DAY IS THE DIFFERENCE BETWEEN THE AVERAGE DAILY TEMPERATURE AND 65° F. DRY BULB IS THE TEMPERATURE OF THE AMBIENT AIR. DEW POINT IS THE TEMPERATURE TO WHICH THE AIR MUST BE COOLED TO ACHIEVE 100 PERCENT RELATIVE HUMIDITY. WET BULB IS THE TEMPERATURE THE AIR WOULD HAVE IF THE MOISTURE CONTENT WAS INCREASED TO 100 PERCENT RELATIVE HUMIDITY.</p> <p>ON JULY 1, 1996, THE NATIONAL WEATHER SERVICE BEGAN USING THE "METAR" OBSERVATION CODE THAT WAS ALREADY EMPLOYED BY MOST OTHER NATIONS OF THE WORLD. THE MOST NOTICEABLE DIFFERENCE IN THIS ANNUAL PUBLICATION WILL BE THE CHANGE IN UNITS FROM TENTHS TO EIGHTS(OKTAS) FOR REPORTING THE AMOUNT OF SKY COVER.</p>
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## 2003 MUSKEGON, MICHIGAN (MKG)

Muskegon is located on the eastern shore of Lake Michigan approximately 100 miles north of the southern tip of the lake. The terrain is generally level with several sand dunes along the shoreline. Much of the soil is sandy and vegetation grows well, as evidenced by the trees and grass which grow on the dunes. Many crops grow in the area. Asparagus and celery are the principal truck-garden vegetables. A variety of fruits is raised and blueberries lead as a principal product. The main industry in this area is manufacturing with emphasis on foundry and machined products. The area is also a resort center due to features such as extensive sandy beaches, both on Lake Michigan and inland lakes.

Lake Michigan has a very decided effect upon the weather and climate of this area. The prevailing westerly winds tend to moderate the temperatures, resulting in warmer winters than further inland. In the summer the effect is just the opposite. The air temperature usually remains below the uncomfortable readings of the high 90s. Spring arrives about three to four weeks later than normal for this latitude. Autumn is also delayed, as is the cold of early winter.

Precipitation is fairly moderate, but snowfall is moderate to heavy. The heaviest snows occur during late December, January, and February. Precipitation is also influenced by the lake, especially during the winter. Instability in snow showers along the lakeshore vary enormously in intensity, resulting in traces of snow to more than a foot in 24 hours. The heavier snow squalls tend to concentrate over small sections of the shoreline, depending on their intensity and the direction of the wind. With strong winds most snowshowers will fall further inland, sometimes as much as 30 to 40 miles. Snowfall is likely to occur every day for weeks at a time. The daily accumulation of lake effect snow varies greatly. However, due to low water content of most of the storms, the snow settles rapidly.

Summertime thunderstorms have a tendency, as they move inland, to follow the Muskegon and Grand River Valleys. Thus, these areas are more often frequented by severe electrical storms which will pass without a drop of rain 2 to 3 miles from the immediate river valleys. Thunderstorms near the shoreline are most frequent at night. The afternoon convection-type storms seldom occur within 5 miles of the lake. Lake Michigan-spawned thunderstorms give shoreline areas a surprising number of occurrences compared with surrounding areas of the same latitude during late summer and autumn.

Many crops are planted before the frost danger is over. The young plants are protected by farmers, thus extending the length of the growing season.

Based on the 1951-1980 period, the average first occurrence of 32 degrees Fahrenheit in the fall is October 11 and the average last occurrence in the spring is May 8.

# STATION LOCATION

MUSKEGON, MICHIGAN

LOCATION	Occupied From	Occupied To	Airline Distances and Directions from previous Location	LATITUDE NORTH	LONGITUDE WEST	ELEVATION ABOVE										AUTOMATIC OBSERVING EQUIPMENT *	REMARKS
						GROUND											
						SEA LEVEL	GROUND	WIND INSTRUMENT	EXTREME THERMOMETERS	PSYCHROMETER	SUNSHINE SWITCH	RAINING GAUGE	WEIGHING RAIN GAGE	8 INCH RAIN GAGE	HYGROMETER		
*NOTE: <u>AIRPORT</u> Administration and NWS Building Muskegon County Airport	10/15/75	05/01/96	0.9 mi. SSW	43°10'	86°15'	625	g20	5	5		i3	5	3	g6		g. Same site as prior to 10/15/75. h. Moved 1200 feet SE 9/12/68. i. Effective 8/20/87.	
Muskegon County Airport	05/01/96	Present	NA	43°10'	86°14'	j656									S	ASOS Commissioned 05/01/96 j. Ground elevation.	

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\* NOTES: For earlier station history see previous edition.