

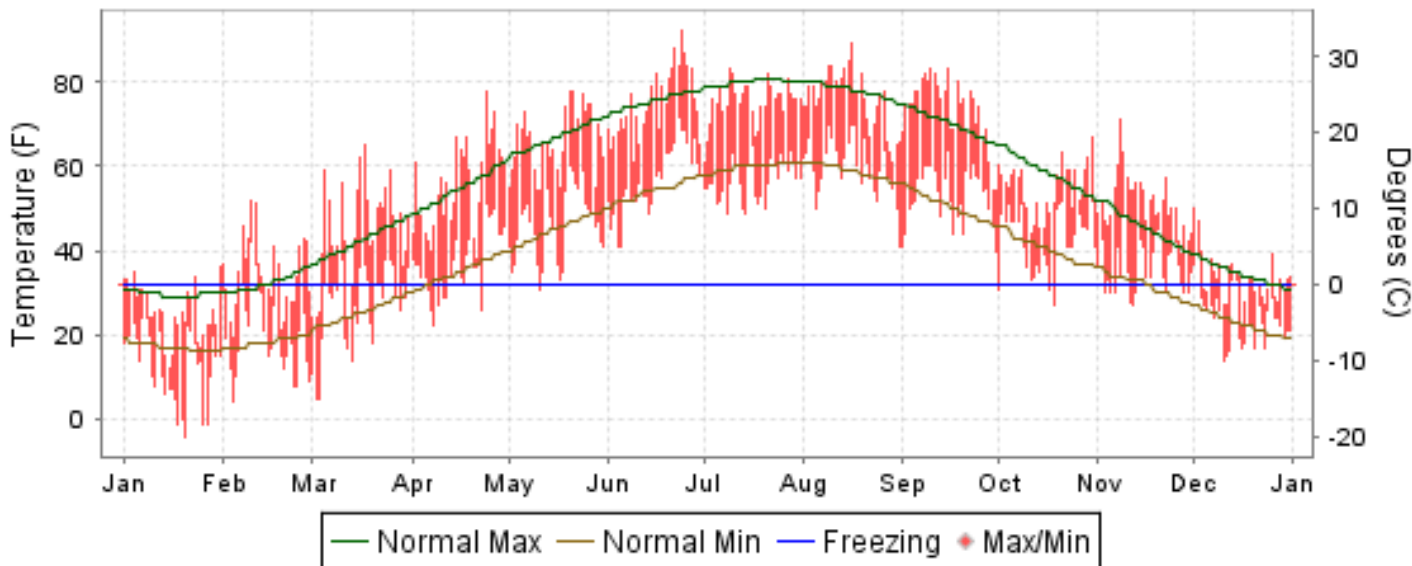


# 2009 LOCAL CLIMATOLOGICAL DATA ANNUAL SUMMARY WITH COMPARATIVE DATA

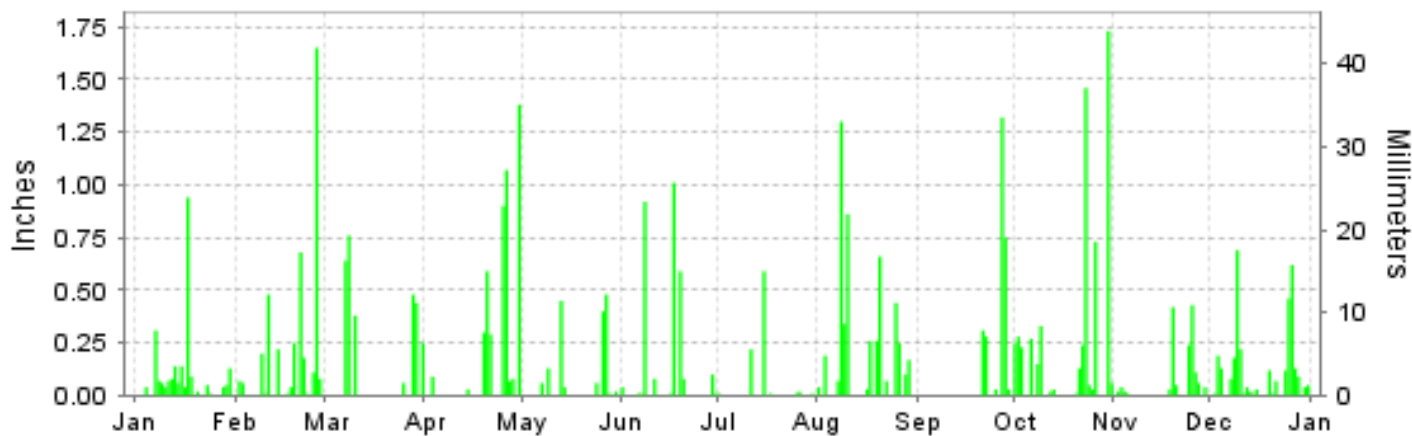
ISSN 0198-2656

## MUSKEGON, MICHIGAN (KMKG)

### Daily Max/Min Temperature



### Daily Precipitation



### Daily Station Pressure



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ASHEVILLE, NORTH CAROLINA

*Thomas R. Karl*  
DIRECTOR  
NATIONAL CLIMATIC DATA CENTER

# METEOROLOGICAL DATA FOR 2009

## MUSKEGON (KMKG)

LATITUDE: 43° 10'N      LONGITUDE: -86° 14'W      ELEVATION (FT): GRND: 626    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	25.5	34.4	44.8	55.6	66.1	75.1	75.2	75.8	73.7	54.7	51.3	33.2	55.5	
	HIGHEST DAILY MAXIMUM	36	52	65	78	78	92	83	89	83	67	71	50	92	
	DATE OF OCCURRENCE	31	10	17	24	21+	24	09	16	15+	30	08	01	JUN 24	
	MEAN DAILY MINIMUM	12.8	19.9	27.0	36.9	45.9	56.9	56.5	59.7	53.0	42.5	35.9	24.0	39.3	
	LOWEST DAILY MINIMUM	-4	4	5	22	31	41	49	41	40	27	27	14	-4	
	DATE OF OCCURRENCE	20	04	03+	08	11	05+	14+	31	30	18	12	10	JAN 20	
	AVERAGE DRY BULB	19.2	27.2	35.9	46.3	56.0	66.0	65.9	67.8	63.4	48.6	43.6	28.6	47.4	
	MEAN WET BULB	17.9	25.7	31.1	40.1	49.5	59.0	60.4	62.2	58.0	45.1	40.3	27.0	43.0	
	MEAN DEW POINT	12.5	20.9	23.1	31.0	42.0	54.1	55.8	58.5	54.0	40.9	35.6	22.6	37.6	
	NUMBER OF DAYS WITH:														
	MAXIMUM >= 90°	0	0	0	0	0	1	0	0	0	0	0	0	0	1
	MAXIMUM <= 32°	5	8	5	0	0	0	0	0	0	0	0	14	32	
MINIMUM <= 32°	31	26	23	8	1	0	0	0	0	3	10	27	129		
MINIMUM <= 0°	5	0	0	0	0	0	0	0	0	0	0	0	5		
H/C	HEATING DEGREE DAYS	1412	1057	895	557	283	72	35	44	95	501	634	1121	6706	
	COOLING DEGREE DAYS	0	0	0	0	11	108	70	137	53	0	0	0	379	
RH	MEAN (PERCENT)	74	76	63	59	62	69	70	74	74	76	74	78	71	
	HOUR 01 LST	76	82	69	64	77	80	82	85	86	81	79	79	78	
	HOUR 07 LST	78	81	73	64	65	73	75	80	85	83	83	81	77	
	HOUR 13 LST	70	67	53	51	50	56	56	63	55	68	63	76	61	
	HOUR 19 LST	73	74	63	57	55	65	67	73	75	76	74	75	69	
S	PERCENT POSSIBLE SUNSHINE														
W/O	NUMBER OF DAYS WITH:														
	HEAVY FOG(VISBY <= 1/4 MI)	4	3	3	1	1	1	0	2	1	1	4	5	26	
	THUNDERSTORMS	0	1	1	3	3	3	2	5	1	1	0	0	20	
CLOUDNESS	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.)	29.31	29.36	29.43	29.28	29.31	29.21	29.26	29.31	29.42	29.28	29.39	29.31	29.32	
	MEAN SEA-LEVEL PRESS. (IN.)	30.03	30.06	30.14	29.96	29.98	29.87	29.94	30.00	30.10	29.99	30.09	30.02	30.02	
WINDS	RESULTANT SPEED (MPH)	3.3	2.1	1.1	0.7	3.5	1.2	3.3	4.0	1.2	2.3	1.3	1.1	1.5	
	RES. DIR. (TENS OF DEGS.)	28	27	14	03	21	27	26	23	35	21	17	24	25	
	MEAN SPEED (MPH)	9.3	10.3	10.1	10.5	8.8	7.1	6.6	8.4	5.9	9.3	8.1	10.5	8.7	
	PREVAIL.DIR.(TENS OF DEGS.)	30	31	11	09	20	29	29	20	10	29	14	09	30	
	MAXIMUM 2-MINUTE WIND														
	SPEED (MPH)	30	30	32	33	30	28	22	39	35	39	30	32	39	
	DIR. (TENS OF DEGS.)	21	20	20	33	21	15	29	26	28	28	23	33	28	
	DATE OF OCCURRENCE	31	10	17	06	13	19	26	09	28	06	30	28	OCT 06	
	MAXIMUM 3-SECOND WIND:														
	SPEED (MPH)	39	44	43	48	40	33	32	61	47	54	40	45	61	
DIR. (TENS OF DEGS.)	20	18	19	20	30	28	20	26	28	28	22	26	26		
DATE OF OCCURRENCE	31	10	17	24	16	28	24	09	28	06	30	10	AUG 09		
PRECIPITATION	WATER EQUIVALENT:														
	TOTAL (IN.)	2.38	4.05	3.01	4.80	1.65	2.86	0.87	5.04	2.72	6.00	1.47	3.32	38.17	
	GREATEST 24-HOUR (IN.)	0.94	1.73	0.92	1.73	0.61	1.02	0.59	1.37	2.04	1.73	0.55	0.69	2.04	
	DATE OF OCCURRENCE	17	26-27	28-29	25-26	26-27	16-17	15	07-08	27-28	30	24-25	09	SEP 27-28	
	NUMBER OF DAYS WITH:														
	PRECIPITATION 0.01	19	15	7	10	9	11	7	15	6	17	12	22	150	
PRECIPITATION 0.10	2	6	6	6	4	4	2	11	4	11	4	10	70		
PRECIPITATION 1.00	0	1	0	2	0	1	0	1	1	2	0	0	8		
SNOWFALL	SNOW,ICE PELLETS,HAIL														
	TOTAL (IN.)	41.7	22.7	0.4	T	0.0	0.0	0.0	0.0	0.0	0.0	T	33.6	98.4	
	GREATEST 24-HOUR (IN.)	14.8	8.0	0.4	T	0.0	0.0	0.0	0.0	0.0	0.0	T	8.8	14.8	
	DATE OF OCCURRENCE	17	21	29	21+							27	26	JAN 17	
	MAXIMUM SNOW DEPTH (IN.)	22	12	0	0	0	0	0	0	0	0	0	12	22	
	DATE OF OCCURRENCE	18	03										28+	JAN 18	
NUMBER OF DAYS WITH:															
SNOWFALL >= 1.0	10	6	0	0	0	0	0	0	0	0	0	9	25		

# NORMALS, MEANS, AND EXTREMES MUSKEGON (KMKG)

**LATITUDE:** 43° 10'N      **LONGITUDE:** -86° 14'W      **ELEVATION (FT):** GRND: 626    BARO: 659      **TIME ZONE:** EASTERN (UTC -5)      **WBAN: 14840**

ELEMENT		POR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
<b>TEMPERATURE °F</b>	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	113	30.1	30.2	40.7	53.2	65.2	73.5	79.5	78.1	69.9	59.4	45.3	33.3	54.9
	HIGHEST DAILY MAXIMUM	70	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	2007	1961	1982	AUG 1964
	MEAN OF EXTREME MAXS.	113	46.5	48.1	65.1	75.6	82.4	88.5	89.6	88.3	85.2	75.5	63.6	51.4	71.7
	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	113	18.2	17.0	25.3	35.1	45.3	53.9	60.2	59.3	51.6	42.5	32.4	22.1	38.6
	LOWEST DAILY MINIMUM	70	-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.	113	-0.9	-0.1	6.5	20.5	31.4	40.7	47.6	46.2	35.5	27.0	17.9	5.5	23.2
	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	113	24.2	23.6	33.0	44.1	55.2	63.8	69.9	68.7	60.8	50.9	38.9	27.7	46.7
	MEAN WET BULB	26	23.1	24.3	30.0	39.7	49.5	59.1	63.8	63.5	56.7	45.9	36.1	27.3	43.3
	MEAN DEW POINT	26	20.4	20.8	26.1	35.0	45.4	55.9	61.1	61.3	54.1	43.0	33.2	24.6	40.1
	NORMAL NO. DAYS WITH: MAXIMUM >= 90	30	0.0	0.0	0.0	0.0	0.0	0.6	0.9	0.6	0.1	0.0	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	
<b>H/C</b>	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
<b>RH</b>	NORMAL (PERCENT)	30	79	76	71	66	66	70	72	76	77	75	76	79	74
	HOURLY 01 LST	30	80	78	76	72	75	80	83	87	85	80	78	80	80
	HOURLY 07 LST	30	81	81	80	77	77	82	85	90	89	85	80	81	82
	HOURLY 13 LST	30	75	70	62	56	56	59	60	63	63	65	70	75	65
	HOURLY 19 LST	30	78	74	67	58	57	60	62	67	72	73	74	78	68
<b>S</b>	PERCENT POSSIBLE SUNSHINE														
<b>W/O</b>	MEAN NO. DAYS WITH: HEAVY FOG(VISBY <= 1/4 MI)	46	2.0	2.2	2.5	1.8	2.3	1.8	1.5	1.9	1.7	1.6	2.0	2.0	23.3
	THUNDERSTORMS	62	0.3	0.3	1.6	3.4	4.5	6.0	6.4	5.8	4.6	2.2	1.2	0.3	36.6
<b>CLOUDNESS</b>	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
<b>PR</b>	MEAN STATION PRESSURE(IN)	26	29.35	29.37	29.35	29.28	29.29	29.28	29.31	29.35	29.36	29.36	29.34	29.36	29.33
	MEAN SEA-LEVEL PRES. (IN)	26	30.06	30.08	30.05	29.97	29.97	29.96	29.98	30.02	30.04	30.05	30.04	30.06	30.02
<b>WINDS</b>	MEAN SPEED (MPH)	26	11.7	11.1	11.0	10.9	9.6	8.6	8.3	8.0	8.6	10.1	11.3	11.3	10.0
	PREVAIL.DIR(TENS OF DEGS)	34	30	30	10	09	21	21	21	21	20	20	30	30	30
	MAXIMUM 2-MINUTE: SPEED (MPH)	13	40	38	39	48	44	33	47	43	36	39	52	56	56
	DIR. (TENS OF DEGS)		05	20	23	22	27	28	23	26	19	28	23	18	18
	YEAR OF OCCURRENCE		2008	1999	2005	1997	1998	2004	2008	2002	2007	2009	1998	2007	DEC 2007
	MAXIMUM 3-SECOND SPEED (MPH)	13	51	53	54	62	52	53	60	61	48	54	67	78	78
	DIR. (TENS OF DEGS)		06	18	27	29	24	19	22	26	18	28	23	19	19
YEAR OF OCCURRENCE		2008	1999	2002	2002	1998	2004	2008	2009	2007	2009	1998	2007	DEC 2007	
<b>PRECIPITATION</b>	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)	70	4.56	4.64	6.59	7.12	9.59	5.46	6.63	9.88	13.55	7.33	6.77	6.99	13.55
	YEAR OF OCCURRENCE		2008	2008	1976	1947	2004	1967	1952	1975	1986	1991	2005	2008	SEP 1986
	MINIMUM MONTHLY (IN)	70	0.37	0.16	0.37	.43	0.33	0.19	0.47	0.11	0.17	0.33	0.50	0.80	0.11
	YEAR OF OCCURRENCE		2003	2003	1999	2005	1992	1959	1951	1969	1979	1944	2007	2000	AUG 1969
	MAXIMUM IN 24 HOURS (IN)	70	1.69	2.11	3.42	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	2006	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	
<b>SNOWFALL</b>	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)	67	102.4	45.8	35.7	20.4	0.4	T	T	T	T	4.9	25.7	82.6	102.4
	YEAR OF OCCURRENCE		1982	1981	1965	1982	1954	2006	2007	2007	1994	1967	1995	1963	JAN 1982
	MAXIMUM IN 24 HOURS (IN)	67	22.0	17.5	10.5	12.2	0.4	T	T	T	T	4.7	9.2	20.1	22.0
	YEAR OF OCCURRENCE		1982	1965	2002	1982	1954	2006	1990	2007	1994	1967	2005	1963	JAN 1982
	MAXIMUM SNOW DEPTH (IN)	59	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) 2009 MUSKEGON (KMKG)**

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
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
2004	1.35	0.57	4.75	1.83	9.59	4.26	1.71	3.06	0.22	3.80	3.15	3.29	37.58
2005	3.32	2.52	2.13	0.43	2.23	0.90	2.05	2.15	3.82	0.39	6.77	2.94	29.65
2006	3.70	2.09	5.71	3.03	4.28	1.61	4.08	1.24	3.70	5.05	2.40	3.11	40.00
2007	1.94	1.45	3.50	4.22	1.82	1.19	1.65	4.94	2.25	2.42	0.50	2.79	28.67
2008	4.56	4.64	3.16	2.62	1.95	4.76	3.14	1.11	6.71	3.40	2.94	6.99	45.98
2009	2.38	4.05	3.01	4.80	1.65	2.86	0.87	5.04	2.72	6.00	1.47	3.32	38.17
POR= 113 YRS	2.20	1.77	2.30	2.67	2.92	2.64	2.36	2.86	3.31	2.78	2.83	2.33	30.97

WBAN : 14840

**AVERAGE TEMPERATURE (°F) 2009 MUSKEGON (KMKG)**

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
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
2004	21.0	26.7	39.0	47.6	57.1	63.0	68.2	65.1	64.0	51.1	40.7	29.2	47.7
2005	23.1	29.1	29.4	49.7	53.9	72.1	72.1	70.5	65.9	52.7	41.4	27.0	48.9
2006	34.2	26.8	35.9	48.8	56.4	66.0	73.0	71.0	59.8	47.3	41.1	36.0	49.7
2007	29.0	20.5	38.9	43.7	60.6	68.1	69.6	70.4	64.2	57.0	38.5	29.7	49.2
2008	27.2	22.3	31.7	48.0	52.8	65.4	69.8	68.7	63.3	49.4	39.4	27.2	47.1
2009	19.2	27.2	35.9	46.3	56.0	66.0	65.9	67.8	63.4	48.6	43.6	28.6	47.4
POR= 113 YRS	24.2	23.6	33.0	44.1	55.2	63.8	69.9	68.7	60.8	50.9	38.9	27.7	46.7

**HEATING DEGREE DAYS (base 65°F) 2009 MUSKEGON (KMKG)**

YEAR	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
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
2003-04	3	3	143	463	674	978	1357	1103	800	517	262	111	6414
2004-05	15	71	90	424	722	1102	1293	1001	1099	453	344	14	6628
2005-06	10	5	63	408	702	1168	947	1064	892	479	298	38	6074
2006-07	3	3	169	540	711	895	1110	1238	803	637	177	43	6329
2007-08	10	17	109	281	788	1085	1161	1232	1025	501	376	55	6640
2008-09	4	4	87	481	764	1166	1412	1057	895	557	283	72	6782
2009-	35	44	95	501	634	1121							

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**COOLING DEGREE DAYS (base 65°F) 2009 MUSKEGON (KMKG)**

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
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
2004	0	0	0	3	23	56	124	81	67	0	0	0	354
2005	0	0	0	0	5	236	240	182	95	32	0	0	790
2006	0	0	0	0	40	75	256	198	18	0	0	0	587
2007	0	0	0	3	44	143	160	189	90	42	0	0	671
2008	0	0	0	1	0	73	161	128	41	2	0	0	406
2009	0	0	0	0	11	108	70	137	53	0	0	0	379

## SNOWFALL (inches) 2009 MUSKEGON (KMKG)

YEAR	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
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
2003-04	0.0	0.0	0.0	0.0	0.5	7.3	47.0	8.5	2.4	T	0.0	0.0	65.7
2004-05	0.0	0.0	0.0	0.0	5.1	19.3	27.0	16.1	23.5	0.1	0.0	0.0	91.1
2005-06	0.0	0.0	0.0	0.0	15.6	32.2	9.6	11.4	5.3	T	0.0	T	74.1
2006-07	0.0	0.0	0.0	0.2	T	15.0	19.8	27.5	10.6	13.7	0.0	0.0	86.8
2007-08	T	T	0.0	0.0	0.1	21.7	38.3	41.7	8.5	T	0.0	0.0	110.3
2008-09	0.0	0.0	0.0	T	14.8	68.6	41.7	22.7	0.4	T	0.0	0.0	148.2
2009-	0.0	0.0	0.0	0.0	T	33.6							
POR= 113 YRS	T	T	T	0.3	6.2	18.8	24.6	14.5	9.4	1.9	0.1	T	75.8

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### REFERENCE NOTES :

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).

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).

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.  
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.

GENERAL CONTINUED:  
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.  
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.  
STATION HISTORY STOPPED WITH THE 2009 ANNUAL. IF YOU NEED HISTORY GO TO "MULTI-NETWORK METADATA SYSTEM", URL IS: <https://mi3.ncdc.noaa.gov/mi3qry/login.cfm>

#### NOTE:

The "Period of Record:(POR) for all "averages" is based on the "Summary of the Day First Order Station" and "Cooperative Summary of the Day" archives.

# 2009 MUSKEGON MICHIGAN (KMKG)

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.

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