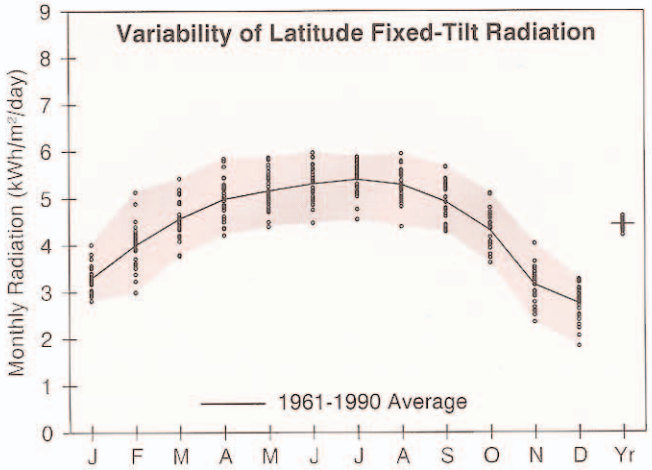
Bridgeport, CT

WBAN NO. 94702



LATITUDE: 41.17° N
LONGITUDE: 73.13° W
ELEVATION: 2 meters
MEAN PRESSURE: 1016 millibars

STATION TYPE: Secondary

Solar Radiation for Flat-Plate Collectors Facing South at a Fixed Tilt (kWh/m²/day), Uncertainty ±11%

Tilt (°)		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
0	Average	1.9	2.7	3.7	4.7	5.4	5.9	5.8	5.2	4.2	3.1	2.0	1.6	3.8
	Min/Max	1.7/2.2	2.2/3.2	3.2/4.1	4.1/5.4	4.7/6.1	4.9/6.6	5.0/6.3	4.4/5.7	3.8/4.7	2.7/3.5	1.7/2.3	1.3/1.7	3.7/4.0
Latitude -15	Average	2.9	3.7	4.4	5.1	5.5	5.8	5.8	5.5	4.9	4.0	2.8	2.4	4.4
	Min/Max	2.5/3.5	2.8/4.6	3.7/5.2	4.3/5.9	4.7/6.2	4.8/6.5	4.9/6.3	4.6/6.2	4.3/5.6	3.5/4.7	2.2/3.6	1.7/2.8	4.2/4.6
Latitude	Average	3.3	4.0	4.6	5.0	5.2	5.3	5.4	5.3	4.9	4.3	3.1	2.8	4.4
	Min/Max	2.8/4.0	3.0/5.1	3.8/5.4	4.2/5.8	4.4/5.9	4.5/6.0	4.6/5.9	4.4/5.9	4.3/5.7	3.6/5.1	2.3/4.0	1.8/3.3	4.2/4.6
Latitude +15	Average	3.5	4.1	4.5	4.6	4.6	4.6	4.7	4.8	4.7	4.3	3.3	2.9	4.2
	Min/Max	3.0/4.3	3.0/5.3	3.6/5.4	3.9/5.4	3.9/5.2	3.9/5.2	4.0/5.1	4.0/5.4	4.1/5.4	3.6/5.2	2.4/4.3	1.9/3.5	4.0/4.4
90	Average	3.3	3.6	3.4	3.0	2.6	2.5	2.6	3.0	3.3	3.5	2.9	2.7	3.0
	Min/Max	2.7/4.2	2.5/4.7	2.7/4.2	2.6/3.6	2.3/2.9	2.2/2.7	2.3/2.8	2.5/3.3	2.9/3.9	2.9/4.3	2.1/3.9	1.7/3.3	2.9/3.2

Solar Radiation for 1-Axis Tracking Flat-Plate Collectors with a North-South Axis (kWh/m²/day), Uncertainty ±11%

Axis Tilt (°)		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
0	Average	2.7	3.7	4.9	6.0	6.8	7.3	7.3	6.7	5.6	4.2	2.7	2.2	5.0
	Min/Max	2.3/3.3	2.8/4.8	4.0/5.9	4.8/7.3	5.8/8.0	5.7/8.4	6.0/8.1	5.3/7.6	4.8/6.4	3.6/5.0	2.0/3.5	1.5/2.6	4.8/5.2
Latitude -15	Average	3.5	4.5	5.5	6.4	6.9	7.3	7.4	7.0	6.1	5.0	3.4	2.8	5.5
	Min/Max	2.9/4.3	3.3/5.9	4.4/6.7	5.1/7.8	5.8/8.1	5.7/8.4	6.0/8.1	5.5/8.0	5.2/7.1	4.2/5.9	2.4/4.4	1.9/3.4	5.2/5.7
Latitude	Average	3.8	4.8	5.6	6.3	6.7	7.0	7.1	6.8	6.1	5.2	3.6	3.1	5.5
	Min/Max	3.2/4.7	3.4/6.3	4.5/6.9	5.0/7.8	5.6/7.9	5.4/8.1	5.7/7.8	5.4/7.8	5.2/7.2	4.3/6.2	2.5/4.8	2.0/3.7	5.2/5.7
Latitude +15	Average	4.0	4.9	5.5	6.1	6.3	6.5	6.6	6.5	6.0	5.2	3.7	3.3	5.4
	Min/Max	3.3/5.0	3.4/6.5	4.4/6.8	4.8/7.5	5.3/7.4	5.1/7.5	5.3/7.3	5.1/7.4	5.0/7.0	4.3/6.3	2.6/5.0	2.0/4.0	5.1/5.6

Solar Radiation for 2-Axis Tracking Flat-Plate Collectors (kWh/m²/day), Uncertainty ±11%

Tracker		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
2-Axis	Average	4.0	4.9	5.6	6.4	7.0	7.5	7.5	7.0	6.2	5.3	3.8	3.3	5.7
	Min/Max	3.3/5.1	3.5/6.5	4.5/6.9	5.1/7.8	5.9/8.2	5.8/8.6	6.1/8.3	5.5/8.0	5.2/7.2	4.3/6.3	2.6/5.0	2.1/4.0	5.4/5.9

Direct Beam Solar Radiation for Concentrating Collectors (kWh/m²/day), Uncertainty ±11%

Tracker		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
1-Axis, E-W Horiz Axis	Average	2.3	2.6	2.7	2.8	3.0	3.3	3.3	3.1	2.9	2.8	2.1	1.9	2.7
	Min/Max	1.8/2.9	1.5/3.9	1.9/3.7	1.8/3.9	2.1/3.9	2.2/4.3	2.2/4.0	2.1/4.0	2.1/3.8	2.0/3.6	1.2/3.1	1.0/2.5	2.5/2.9
1-Axis, N-S Horiz Axis	Average	1.6	2.2	3.0	3.6	3.9	4.3	4.3	4.0	3.4	2.7	1.6	1.3	3.0
	Min/Max	1.3/2.1	1.4/3.4	2.1/4.1	2.2/4.9	2.8/5.1	2.7/5.5	2.7/5.1	2.6/5.1	2.5/4.3	2.0/3.4	0.9/2.4	0.6/1.6	2.7/3.2
1-Axis, N-S Tilt=Latitude	Average	2.5	3.0	3.6	3.8	3.9	4.0	4.1	4.1	3.9	3.5	2.4	2.0	3.4
	Min/Max	2.0/3.2	1.9/4.7	2.5/4.8	2.4/5.3	2.8/5.0	2.6/5.2	2.6/4.9	2.7/5.2	2.8/5.0	2.6/4.5	1.3/3.5	1.0/2.7	3.1/3.6
2-Axis	Average	2.7	3.1	3.6	3.9	4.1	4.4	4.4	4.2	3.9	3.5	2.5	2.2	3.5
	Min/Max	2.1/3.4	1.9/4.8	2.5/4.8	2.4/5.4	3.0/5.3	2.8/5.6	2.8/5.3	2.8/5.4	2.9/5.0	2.6/4.5	1.4/3.7	1.1/2.9	3.2/3.8

Average Climatic Conditions

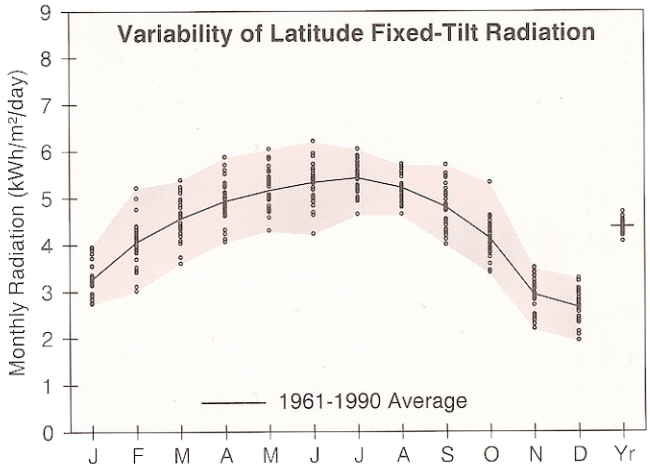
Element	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
Temperature (°C)	-1.7	-0.9	3.7	9.0	14.7	19.8	23.2	22.8	18.8	13.1	7.6	1.3	10.9
Daily Minimum Temp	-5.6	-4.9	-0.6	4.3	10.0	15.1	18.7	18.4	14.2	8.4	3.4	-2.4	6.6
Daily Maximum Temp	2.2	3.1	7.9	13.7	19.3	24.4	27.6	27.2	23.4	17.8	11.7	5.0	15.3
Record Minimum Temp	-21.7	-20.6	-15.6	-7.8	-0.6	5.0	9.4	6.7	2.2	-3.3	-8.9	-20.0	-21.7
Record Maximum Temp	18.3	19.4	28.9	32.8	33.3	35.6	39.4	36.7	37.2	29.4	25.6	18.3	39.4
HDD, Base 18.3°C	622	538	454	280	122	10	0	0	30	168	323	529	3076
CDD, Base 18.3°C	0	0	0	0	8	53	150	139	45	6	0	0	402
Relative Humidity (%)	66	66	65	64	70	73	73	74	74	70	70	69	70
Wind Speed (m/s)	5.9	6.1	6.1	5.9	5.2	4.8	4.6	4.7	5.2	5.3	5.8	5.8	5.5

Hartford, CT

WBAN NO. 14740

LATITUDE: 41.93° N
LONGITUDE: 72.68° W
ELEVATION: 55 meters
MEAN PRESSURE: 1010 millibars

STATION TYPE: Secondary



Solar Radiation for Flat-Plate Collectors Facing South at a Fixed Tilt (kWh/m²/day), Uncertainty ±11%

Tilt (°)		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
0	Average	1.9	2.7	3.7	4.6	5.4	5.9	5.9	5.1	4.1	3.0	1.9	1.5	3.8
	Min/Max	1.7/2.2	2.2/3.2	3.1/4.1	4.0/5.4	4.6/6.3	4.7/6.8	5.1/6.5	4.7/5.6	3.6/4.7	2.6/3.6	1.5/2.1	1.3/1.7	3.6/4.0
Latitude -15	Average	2.9	3.7	4.4	5.1	5.5	5.8	5.8	5.4	4.8	3.9	2.7	2.3	4.4
	Min/Max	2.5/3.5	2.8/4.7	3.6/5.2	4.2/6.0	4.6/6.4	4.6/6.8	5.0/6.5	4.9/5.9	4.0/5.6	3.3/4.9	2.0/3.2	1.8/2.8	4.1/4.7
Latitude	Average	3.3	4.1	4.6	4.9	5.2	5.3	5.4	5.2	4.8	4.1	2.9	2.7	4.4
	Min/Max	2.8/4.0	3.0/5.2	3.6/5.4	4.1/5.9	4.3/6.1	4.2/6.2	4.7/6.1	4.7/5.7	4.0/5.7	3.4/5.3	2.2/3.5	2.0/3.3	4.1/4.7
Latitude +15	Average	3.5	4.2	4.5	4.6	4.6	4.6	4.8	4.7	4.6	4.2	3.0	2.8	4.2
	Min/Max	2.9/4.3	3.0/5.5	3.5/5.4	3.7/5.5	3.8/5.4	3.7/5.4	4.1/5.3	4.2/5.2	3.8/5.5	3.4/5.4	2.2/3.7	2.0/3.5	3.9/4.5
90	Average	3.3	3.8	3.5	3.0	2.7	2.6	2.7	3.0	3.3	3.4	2.7	2.7	3.0
	Min/Max	2.7/4.2	2.6/5.1	2.6/4.4	2.5/3.6	2.3/3.1	2.2/2.9	2.4/2.9	2.7/3.3	2.7/3.9	2.7/4.5	2.0/3.3	1.9/3.4	2.8/3.4

Solar Radiation for 1-Axis Tracking Flat-Plate Collectors with a North-South Axis (kWh/m²/day), Uncertainty ±11%

Axis Tilt (°)		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
0	Average	2.7	3.8	4.9	6.0	6.8	7.3	7.3	6.6	5.4	4.0	2.5	2.1	4.9
	Min/Max	2.2/3.2	2.8/4.9	3.8/5.8	4.7/7.2	5.5/8.0	5.4/8.8	5.9/8.3	5.8/7.3	4.4/6.4	3.3/5.2	1.9/3.0	1.5/2.5	4.6/5.3
Latitude -15	Average	3.4	4.5	5.5	6.3	6.9	7.3	7.4	6.9	5.9	4.7	3.1	2.7	5.4
	Min/Max	2.8/4.2	3.3/6.0	4.2/6.6	5.0/7.7	5.5/8.3	5.4/8.9	5.9/8.4	6.0/7.7	4.7/7.1	3.8/6.3	2.3/3.8	2.0/3.4	5.0/5.8
Latitude	Average	3.7	4.8	5.6	6.2	6.7	7.0	7.1	6.7	6.0	4.9	3.3	3.0	5.4
	Min/Max	3.1/4.6	3.5/6.4	4.2/6.8	4.9/7.7	5.3/8.0	5.1/8.5	5.7/8.1	5.8/7.6	4.7/7.2	4.0/6.6	2.5/4.1	2.1/3.8	5.0/5.9
Latitude +15	Average	3.9	4.9	5.5	6.0	6.2	6.5	6.6	6.4	5.8	5.0	3.4	3.1	5.3
	Min/Max	3.2/4.9	3.5/6.6	4.1/6.7	4.7/7.4	5.0/7.5	4.7/7.9	5.3/7.6	5.5/7.2	4.6/7.0	3.9/6.6	2.5/4.2	2.2/4.0	4.9/5.8

Solar Radiation for 2-Axis Tracking Flat-Plate Collectors (kWh/m²/day), Uncertainty ±11%

Tracker		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
2-Axis	Average	4.0	4.9	5.6	6.3	7.0	7.5	7.5	6.9	6.0	5.0	3.4	3.2	5.6
	Min/Max	3.2/4.9	3.5/6.6	4.2/6.8	5.0/7.8	5.6/8.3	5.5/9.1	6.0/8.6	6.0/7.7	4.8/7.2	4.0/6.7	2.5/4.2	2.2/4.0	5.2/6.1

Direct Beam Solar Radiation for Concentrating Collectors (kWh/m²/day), Uncertainty ±11%

Tracker		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
1-Axis, E-W Horiz Axis	Average	2.1	2.5	2.5	2.7	2.9	3.2	3.2	2.9	2.7	2.6	1.8	1.7	2.6
	Min/Max	1.6/2.7	1.6/3.7	1.7/3.5	1.8/3.7	1.8/3.9	1.6/4.4	2.0/3.9	2.2/3.5	1.8/3.6	1.8/3.9	1.1/2.5	1.0/2.5	2.3/2.9
1-Axis, N-S Horiz Axis	Average	1.5	2.1	2.8	3.4	3.8	4.1	4.1	3.8	3.2	2.4	1.3	1.1	2.8
	Min/Max	1.1/1.8	1.4/3.2	1.9/3.7	2.2/4.7	2.4/5.0	2.1/5.7	2.6/5.1	2.8/4.7	2.1/4.2	1.7/3.8	0.8/1.9	0.6/1.6	2.5/3.1
1-Axis, N-S Tilt=Latitude	Average	2.3	2.9	3.3	3.7	3.7	3.9	4.0	3.9	3.6	3.2	2.0	1.8	3.2
	Min/Max	1.7/2.9	2.0/4.4	2.2/4.5	2.4/5.0	2.4/4.9	2.0/5.4	2.5/4.9	2.9/4.8	2.4/4.8	2.2/4.9	1.2/2.8	1.0/2.6	2.8/3.5
2-Axis	Average	2.5	3.0	3.3	3.7	3.9	4.2	4.3	4.0	3.6	3.2	2.1	2.0	3.3
	Min/Max	1.9/3.1	2.0/4.5	2.2/4.5	2.4/5.1	2.5/5.2	2.2/5.9	2.6/5.2	3.0/4.9	2.4/4.8	2.2/4.9	1.3/2.9	1.1/2.8	3.0/3.7

Average Climatic Conditions

Element	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
Temperature (°C)	-4.1	-2.5	3.1	9.3	15.3	20.3	23.2	22.0	17.4	11.2	5.5	-1.4	9.9
Daily Minimum Temp	-9.0	-7.4	-2.2	3.1	8.7	13.8	16.8	15.8	11.0	4.8	0.4	-5.9	4.2
Daily Maximum Temp	0.7	2.4	8.2	15.5	22.0	26.7	29.4	28.2	23.8	17.6	10.6	3.1	15.7
Record Minimum Temp	-32.2	-29.4	-21.1	-12.8	-2.2	2.8	6.7	2.2	-1.1	-8.3	-17.2	-25.6	-32.2
Record Maximum Temp	18.3	22.8	30.6	35.6	36.1	37.8	38.9	38.3	37.2	32.8	27.2	23.3	38.9
HDD, Base 18.3°C	696	583	474	272	108	11	0	3	53	221	385	612	3417
CDD, Base 18.3°C	0	0	0	0	15	69	150	117	25	0	0	0	376
Relative Humidity (%)	64	63	60	58	63	67	68	71	73	69	68	68	66
Wind Speed (m/s)	3.8	4.0	4.3	4.4	3.8	3.5	3.3	3.1	3.1	3.3	3.7	3.7	3.7