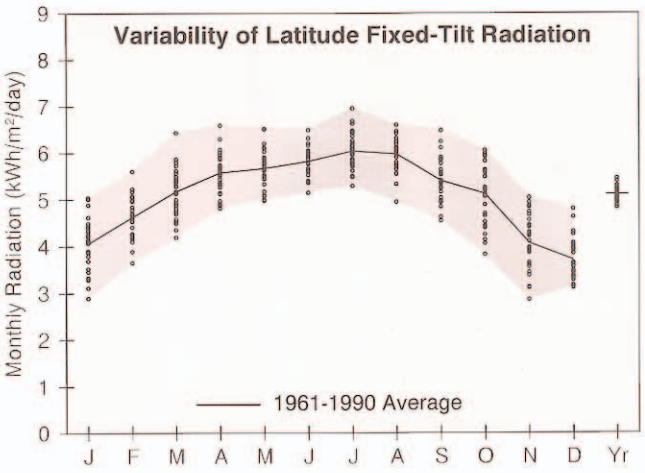


Fort Smith, AR

WBAN NO. 13964

LATITUDE: 35.33° N
LONGITUDE: 94.37° W
ELEVATION: 141 meters
MEAN PRESSURE: 1001 millibars

STATION TYPE: Secondary

Solar Radiation for Flat-Plate Collectors Facing South at a Fixed Tilt (kWh/m²/day), Uncertainty ±9%

Tilt (°)		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
0	Average	2.6	3.4	4.4	5.4	6.0	6.5	6.6	6.0	4.8	3.9	2.8	2.3	4.6
	Min/Max	2.2/3.0	2.8/3.8	3.8/5.2	4.7/6.3	5.3/6.9	5.8/7.3	5.8/7.7	5.1/6.5	4.1/5.6	3.1/4.5	2.2/3.2	2.1/2.7	4.4/4.8
Latitude -15	Average	3.6	4.2	5.0	5.7	6.0	6.3	6.5	6.2	5.3	4.8	3.6	3.2	5.1
	Min/Max	2.7/4.3	3.4/5.0	4.1/6.1	4.9/6.7	5.3/6.9	5.6/7.1	5.7/7.5	5.2/6.8	4.5/6.3	3.6/5.6	2.7/4.4	2.8/4.1	4.8/5.4
Latitude	Average	4.1	4.6	5.2	5.6	5.7	5.8	6.0	6.0	5.4	5.1	4.1	3.7	5.1
	Min/Max	2.9/5.0	3.7/5.6	4.2/6.4	4.8/6.6	5.0/6.5	5.2/6.5	5.3/6.9	4.9/6.6	4.5/6.5	3.8/6.1	2.9/5.0	3.1/4.8	4.8/5.5
Latitude +15	Average	4.3	4.8	5.1	5.2	5.0	5.0	5.3	5.5	5.2	5.2	4.3	4.0	4.9
	Min/Max	3.0/5.4	3.7/5.8	4.0/6.4	4.5/6.1	4.4/5.8	4.5/5.6	4.6/6.0	4.5/6.0	4.3/6.3	3.8/6.2	2.9/5.4	3.3/5.2	4.6/5.2
90	Average	3.9	3.9	3.5	3.0	2.4	2.2	2.4	2.9	3.4	4.0	3.7	3.6	3.2
	Min/Max	2.5/4.9	2.9/4.8	2.8/4.5	2.6/3.4	2.2/2.7	2.1/2.3	2.2/2.5	2.5/3.1	2.9/4.0	2.8/4.8	2.4/4.7	2.9/4.8	3.0/3.5

Solar Radiation for 1-Axis Tracking Flat-Plate Collectors with a North-South Axis (kWh/m²/day), Uncertainty ±9%

Axis Tilt (°)		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
0	Average	3.7	4.7	5.8	7.0	7.8	8.4	8.7	7.9	6.4	5.4	3.8	3.3	6.1
	Min/Max	2.6/4.6	3.6/5.8	4.7/7.5	6.0/8.8	6.5/9.3	7.2/9.8	7.5/10.6	6.3/8.9	5.3/8.0	4.0/6.5	2.7/4.8	2.7/4.2	5.7/6.6
Latitude -15	Average	4.4	5.3	6.3	7.3	7.8	8.3	8.7	8.2	6.8	6.1	4.5	3.9	6.5
	Min/Max	3.0/5.6	4.0/6.7	5.0/8.3	6.2/9.1	6.5/9.4	7.1/9.7	7.5/10.6	6.4/9.2	5.6/8.6	4.4/7.4	3.0/5.7	3.3/5.2	6.0/7.0
Latitude	Average	4.8	5.6	6.4	7.2	7.6	8.0	8.4	8.0	6.9	6.4	4.8	4.3	6.5
	Min/Max	3.2/6.2	4.2/7.1	5.0/8.5	6.1/9.1	6.3/9.1	6.8/9.3	7.2/10.2	6.3/9.1	5.7/8.7	4.5/7.7	3.2/6.2	3.6/5.8	6.1/7.1
Latitude +15	Average	5.0	5.7	6.4	7.0	7.1	7.5	7.8	7.6	6.7	6.4	5.0	4.6	6.4
	Min/Max	3.3/6.5	4.3/7.3	4.9/8.4	5.8/8.7	5.9/8.6	6.4/8.7	6.8/9.5	6.0/8.6	5.5/8.5	4.5/7.8	3.3/6.4	3.7/6.1	5.9/7.0

Solar Radiation for 2-Axis Tracking Flat-Plate Collectors (kWh/m²/day), Uncertainty ±9%

Tracker		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
2-Axis	Average	5.1	5.7	6.5	7.3	7.9	8.5	8.8	8.2	6.9	6.4	5.0	4.6	6.8
	Min/Max	3.3/6.6	4.3/7.3	5.0/8.5	6.2/9.2	6.6/9.5	7.3/9.9	7.7/10.7	6.5/9.3	5.7/8.7	4.6/7.8	3.3/6.5	3.8/6.3	6.3/7.4

Direct Beam Solar Radiation for Concentrating Collectors (kWh/m²/day), Uncertainty ±8%

Tracker		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
1-Axis, E-W Horiz Axis	Average	3.0	3.1	3.1	3.4	3.7	4.1	4.4	4.0	3.3	3.5	2.9	2.8	3.4
	Min/Max	1.5/4.3	2.0/4.4	1.9/4.8	2.4/4.9	2.5/4.9	3.0/5.3	3.4/6.1	2.5/4.8	2.4/4.7	2.1/4.6	1.4/4.1	2.1/4.2	3.0/4.0
1-Axis, N-S Horiz Axis	Average	2.4	3.0	3.7	4.4	4.9	5.4	5.8	5.3	4.1	3.7	2.5	2.1	3.9
	Min/Max	1.1/3.5	1.9/4.3	2.3/5.7	3.3/6.5	3.3/6.6	4.0/6.9	4.6/8.1	3.4/6.4	3.0/6.0	2.2/4.9	1.2/3.5	1.5/3.2	3.4/4.6
1-Axis, N-S Tilt=Latitude	Average	3.3	3.8	4.2	4.6	4.8	5.0	5.5	5.3	4.5	4.5	3.3	3.0	4.3
	Min/Max	1.6/4.8	2.4/5.5	2.7/6.4	3.4/6.7	3.2/6.4	3.7/6.5	4.3/7.7	3.3/6.4	3.2/6.5	2.6/6.0	1.6/4.7	2.2/4.6	3.7/5.0
2-Axis	Average	3.6	3.9	4.2	4.7	5.0	5.5	5.9	5.5	4.5	4.5	3.5	3.3	4.5
	Min/Max	1.7/5.2	2.5/5.6	2.7/6.5	3.4/6.8	3.4/6.7	4.1/7.1	4.6/8.3	3.5/6.6	3.2/6.5	2.7/6.0	1.7/5.0	2.4/4.9	3.9/5.2

Average Climatic Conditions

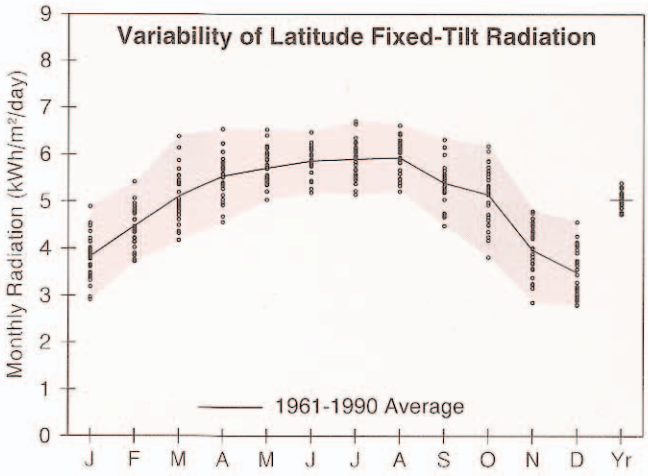
Element	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
Temperature (°C)	2.7	5.5	10.9	16.3	20.6	24.9	27.5	27.0	23.1	16.8	10.3	4.6	15.9
Daily Minimum Temp	-3.6	-1.0	4.0	9.2	14.3	18.8	21.1	20.4	16.6	9.3	3.6	-1.5	9.3
Daily Maximum Temp	9.1	11.9	17.8	23.4	26.9	31.1	33.9	33.6	29.6	24.3	17.1	10.7	22.4
Record Minimum Temp	-23.3	-22.8	-13.9	-5.6	1.7	8.3	10.0	10.6	0.6	-5.6	-13.3	-20.6	-23.3
Record Maximum Temp	27.2	30.0	34.4	35.0	36.7	40.6	43.9	43.3	41.1	35.6	30.0	27.8	43.9
HDD, Base 18.3°C	484	359	237	84	20	0	0	0	7	76	240	426	1932
CDD, Base 18.3°C	0	0	6	24	91	198	284	269	151	29	0	0	1052
Relative Humidity (%)	69	68	64	64	71	71	69	69	72	69	70	71	69
Wind Speed (m/s)	3.6	3.8	4.2	4.0	3.4	2.9	2.8	2.8	3.0	3.0	3.5	3.7	3.4

Little Rock, AR

WBAN NO. 13963

LATITUDE: 34.73° N
LONGITUDE: 92.23° W
ELEVATION: 81 meters
MEAN PRESSURE: 1008 millibars

STATION TYPE: Secondary



Solar Radiation for Flat-Plate Collectors Facing South at a Fixed Tilt (kWh/m²/day), Uncertainty ±9%

Tilt (°)		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
0	Average	2.5	3.3	4.3	5.3	6.1	6.5	6.4	5.9	4.8	3.9	2.7	2.2	4.5
	Min/Max	2.1/3.0	2.9/3.8	3.7/5.2	4.5/6.2	5.3/6.9	5.7/7.3	5.7/7.4	5.3/6.6	4.1/5.5	3.1/4.6	2.2/3.1	1.9/2.6	4.3/4.8
Latitude -15	Average	3.4	4.1	4.9	5.6	6.1	6.4	6.3	6.1	5.3	4.8	3.5	3.0	5.0
	Min/Max	2.7/4.2	3.5/4.9	4.1/6.1	4.7/6.6	5.3/6.9	5.6/7.1	5.5/7.3	5.4/6.8	4.5/6.2	3.6/5.7	2.7/4.2	2.5/3.9	4.7/5.3
Latitude	Average	3.8	4.5	5.1	5.5	5.7	5.9	5.9	5.9	5.4	5.1	4.0	3.5	5.0
	Min/Max	2.9/4.9	3.7/5.4	4.2/6.4	4.6/6.5	5.0/6.5	5.2/6.5	5.2/6.7	5.2/6.6	4.5/6.3	3.8/6.2	2.8/4.8	2.8/4.6	4.7/5.4
Latitude +15	Average	4.1	4.6	5.0	5.1	5.1	5.1	5.2	5.4	5.2	5.2	4.2	3.7	4.8
	Min/Max	3.0/5.3	3.8/5.6	4.0/6.3	4.2/6.1	4.5/5.8	4.5/5.6	4.5/5.8	4.7/6.0	4.3/6.1	3.8/6.3	2.9/5.1	2.9/5.0	4.5/5.2
90	Average	3.6	3.7	3.5	2.9	2.4	2.2	2.3	2.8	3.3	4.0	3.5	3.3	3.1
	Min/Max	2.6/4.8	3.0/4.6	2.8/4.4	2.5/3.3	2.2/2.6	2.1/2.3	2.1/2.4	2.5/3.1	2.8/3.9	2.8/4.8	2.4/4.4	2.6/4.6	2.9/3.4

Solar Radiation for 1-Axis Tracking Flat-Plate Collectors with a North-South Axis (kWh/m²/day), Uncertainty ±9%

Axis Tilt (°)		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
0	Average	3.5	4.5	5.7	7.0	7.8	8.4	8.3	7.8	6.4	5.4	3.7	3.1	6.0
	Min/Max	2.7/4.5	3.7/5.5	4.6/7.3	5.5/8.7	6.6/9.4	7.0/9.8	7.0/10.0	6.6/8.9	5.1/7.4	3.9/6.6	2.7/4.5	2.5/4.1	5.6/6.5
Latitude -15	Average	4.1	5.1	6.2	7.2	7.8	8.3	8.3	8.0	6.8	6.1	4.4	3.7	6.3
	Min/Max	3.1/5.4	4.1/6.4	4.9/8.0	5.7/9.1	6.7/9.4	7.0/9.7	7.0/9.9	6.8/9.1	5.4/8.0	4.3/7.4	3.0/5.3	2.9/5.0	5.9/6.9
Latitude	Average	4.5	5.4	6.4	7.2	7.6	8.0	8.0	7.8	6.8	6.4	4.7	4.1	6.4
	Min/Max	3.3/5.9	4.3/6.8	5.0/8.3	5.6/9.0	6.5/9.1	6.7/9.3	6.8/9.6	6.6/9.0	5.4/8.1	4.4/7.8	3.2/5.8	3.2/5.5	6.0/7.0
Latitude +15	Average	4.7	5.5	6.3	6.9	7.1	7.4	7.5	7.5	6.7	6.4	4.8	4.3	6.3
	Min/Max	3.4/6.3	4.4/6.9	4.9/8.2	5.3/8.6	6.1/8.6	6.2/8.7	6.3/9.0	6.3/8.5	5.2/7.9	4.4/7.9	3.2/6.0	3.3/5.8	5.8/6.8

Solar Radiation for 2-Axis Tracking Flat-Plate Collectors (kWh/m²/day), Uncertainty ±9%

Tracker		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
2-Axis	Average	4.7	5.5	6.4	7.3	7.9	8.5	8.4	8.0	6.9	6.4	4.9	4.3	6.6
	Min/Max	3.4/6.3	4.4/7.0	5.0/8.3	5.7/9.1	6.8/9.5	7.1/9.9	7.1/10.1	6.8/9.1	5.4/8.1	4.5/7.9	3.3/6.1	3.3/5.9	6.1/7.2

Direct Beam Solar Radiation for Concentrating Collectors (kWh/m²/day), Uncertainty ±8%

Tracker		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
1-Axis, E-W Horiz Axis	Average	2.7	3.0	3.1	3.4	3.6	4.0	4.0	3.8	3.2	3.5	2.8	2.5	3.3
	Min/Max	1.6/4.0	1.9/4.2	2.0/4.6	2.3/4.8	2.7/5.0	2.9/5.2	3.0/5.5	2.9/4.7	2.2/4.2	2.0/4.7	1.5/3.7	1.8/4.0	2.8/3.8
1-Axis, N-S Horiz Axis	Average	2.2	2.9	3.7	4.4	4.8	5.2	5.2	5.0	4.0	3.7	2.4	1.9	3.8
	Min/Max	1.3/3.3	1.8/4.1	2.3/5.4	2.9/6.4	3.7/6.6	3.8/6.9	3.9/7.3	3.8/6.1	2.6/5.2	2.1/5.0	1.2/3.2	1.3/3.1
1-Axis, N-S Tilt=Latitude	Average	3.0	3.6	4.2	4.6	4.6	4.9	4.9	5.0	4.4	4.4	3.2	2.7	4.1
	Min/Max	1.8/4.5	2.3/5.2	2.6/6.1	3.0/6.6	3.5/6.4	3.6/6.5	3.7/6.9	3.8/6.2	2.9/5.7	2.6/6.0	1.6/4.3	1.9/4.3	3.5/4.8
2-Axis	Average	3.3	3.7	4.2	4.7	4.9	5.3	5.3	5.1	4.4	4.5	3.3	3.0	4.3
	Min/Max	1.9/4.8	2.4/5.3	2.6/6.2	3.1/6.7	3.7/6.8	3.9/7.0	4.0/7.4	3.9/6.3	2.9/5.7	2.6/6.1	1.7/4.5	2.0/4.7	3.7/5.0

Average Climatic Conditions

Element	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
Temperature (°C)	3.9	6.4	11.7	16.7	21.2	25.8	27.7	27.0	23.4	17.2	11.2	6.0	16.6
Daily Minimum Temp	-1.6	0.7	5.7	10.4	15.0	19.7	21.9	21.0	17.5	10.5	5.3	0.6	10.6
Daily Maximum Temp	9.4	12.2	17.8	23.0	27.4	31.8	33.6	33.0	29.2	23.9	17.1	11.4	22.5
Record Minimum Temp	-20.0	-20.6	-11.7	-2.2	4.4	7.8	12.2	11.1	2.8	-1.7	-8.3	-18.3	-20.6
Record Maximum Temp	28.3	29.4	32.8	35.0	36.7	40.6	44.4	42.2	41.1	36.1	30.0	26.7	44.4
HDD, Base 18.3°C	446	333	213	74	14	0	0	0	4	71	215	382	1753
CDD, Base 18.3°C	0	0	8	26	104	223	291	269	156	37	0	0	1114
Relative Humidity (%)	70	68	65	67	71	70	72	72	74	70	71	71	70
Wind Speed (m/s)	3.7	3.9	4.1	3.8	3.2	3.0	2.8	2.7	2.8	2.9	3.5	3.5	3.3