Static solar shields do not meet the ± 1 °C IEC 61724-1 air temperature specification

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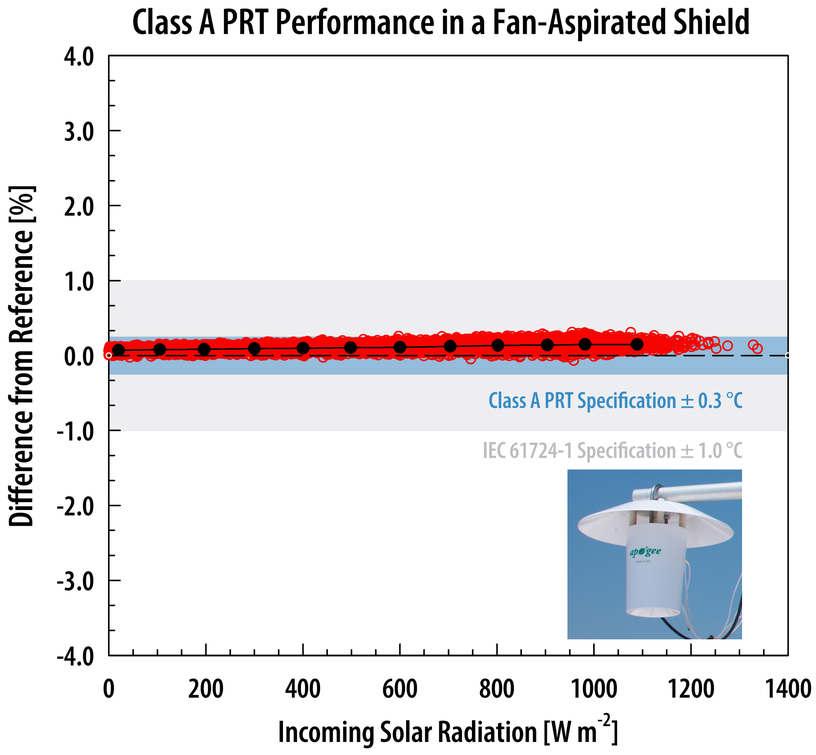
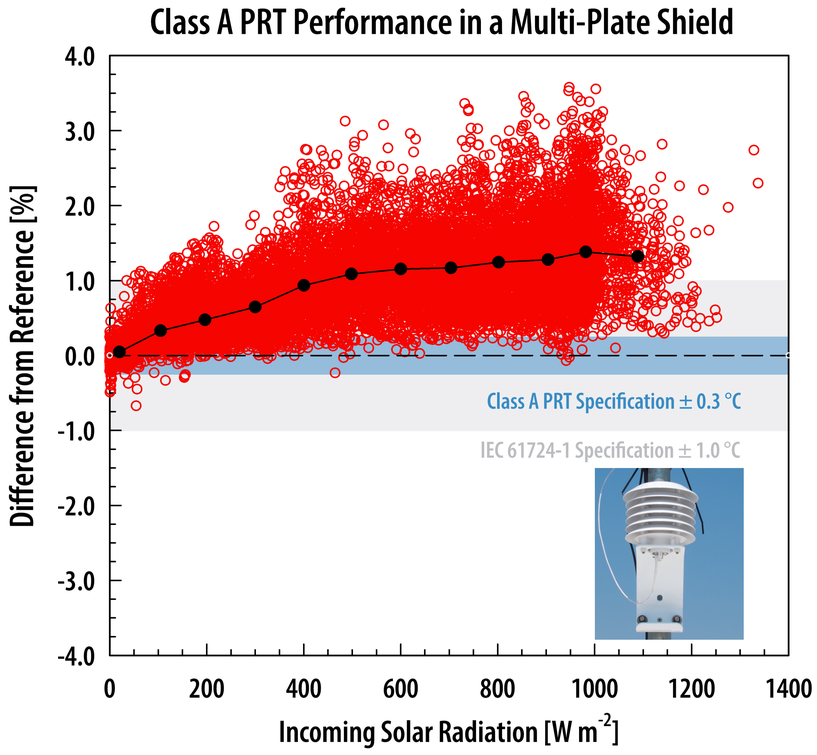
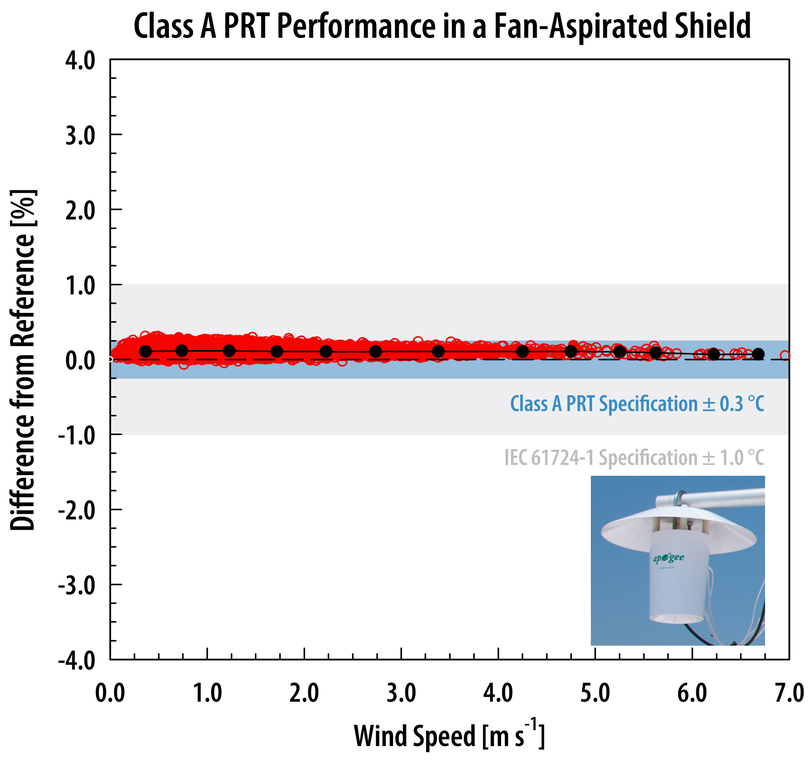
When trying to meet the IEC 61724-1 air-temperature measurement standard of ± 1 °C, many installers place high-end temperature sensors inside non-powered, multi-plate solar shields. These data show the large measurment errors caused when these shields heat up in high-sun, low-wind conditions, a very common occurence at solar farm sites.



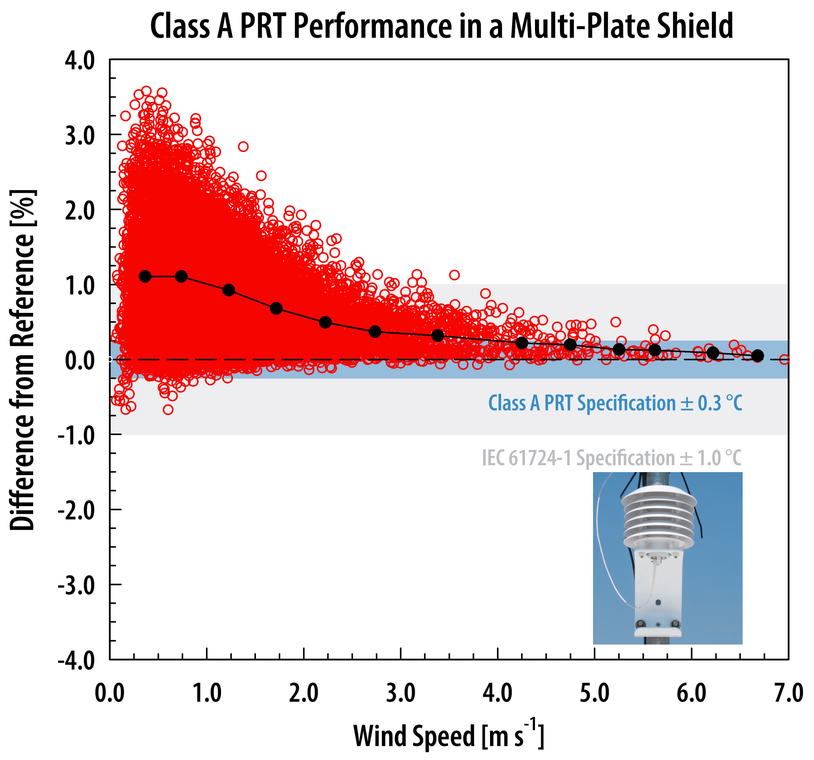
Effect of solar radiation on a Class A PRT housed in an *fan-aspirated* solar radiation shield. These data show that Class A PRTs housed in fan-aspirated shields meet the IEC 61724-1 air temperature specification of ± 1 °C under high solar load. Data shown is from one of four replicate Class A PRTs (Apogee model ST-150) referenced to a 1/10 DIN PRT (Apogee model ST-300), both housed in a fan-aspirated shield (Apogee model TS-100). Red circles are 1 minute average measurements, **black** circles are bin-averages.



Effect of solar radiation on a Class A PRT housed in an *naturally-aspirated, multi-plate* solar radiation shield. These data show that Class A PRTs installed in multi-plate shields ***fail*** to meet the IEC 61724-1 air temperature specification of ± 1 °C. Data shown are from one replicate Class A PRT (Apogee model ST-150) housed in a multi-plate solar shield (RM Young model 41303-5A) referenced to a 1/10 DIN PRT (Apogee model ST-300) in a fan-aspirated shield (Apogee model TS-100). Red circles are 1 minute average measurements, **black** circles are bin-averages.

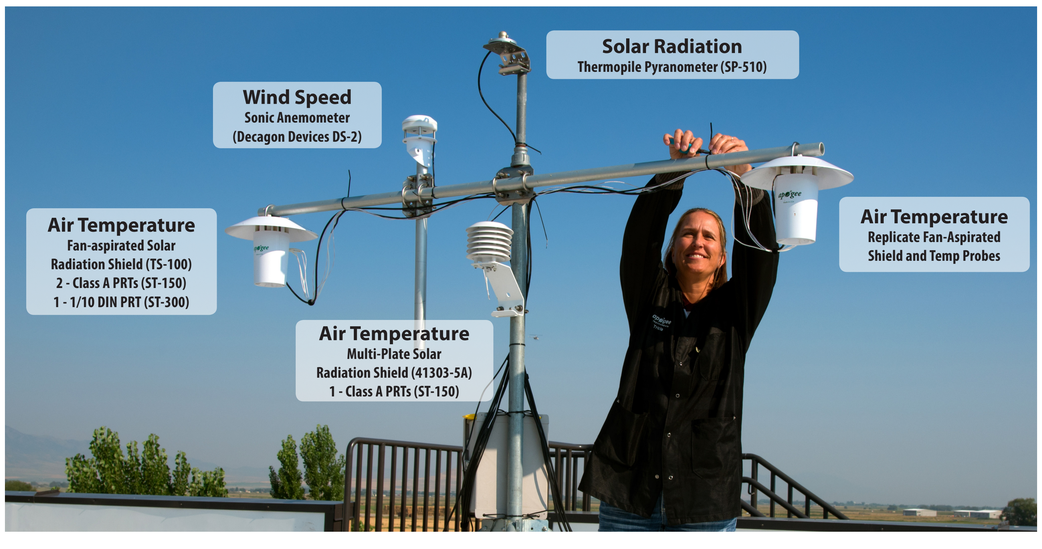


Effect of wind speed on a Class A PRT housed in an *fan-aspirated* solar radiation shield. These data show that Class A PRTs housed in fan-aspirated shields meet the IEC 61724-1 air temperature specification of ± 1 °C in all wind speeds. Data shown is from one of four replicate Class A PRTs (Apogee model ST-150) referenced to a 1/10 DIN PRT (Apogee model ST-300), both housed in a fan-aspirated shield (Apogee model TS-100). Red circles are 1 minute average measurements, **black** circles are bin-averages.



Effect of wind speed on a Class A PRT housed in an *naturally-aspirated, multi-plate* solar radiation shield. These data show that Class A PRTs installed in multi-plate shields ***fail*** to meet the IEC 61724-1 air temperature specification of ± 1 °C when wind speeds are less than approximately 3.5 m sec^{-1}. Data shown are from one replicate Class A PRT (Apogee model ST-150) housed in a multi-plate solar shield (RM Young model 41303-5A) referenced to a 1/10 DIN PRT (Apogee model ST-300) in a fan-aspirated shield (Apogee model TS-100). Red circles are 1 minute average measurements, **black** circles are bin-averages.

Experimental Design



Conclusion

It is necessary to measure air temperature using a high-accuracy sensor housed in a fan-aspirated solar radiation shield to meet the IEC standard 61724 of ± 1.0 °C accuracy.

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