



CRP TECHNOLOGY S.r.l.

Windform SP Specific Heat Results

Sample 1

Temperature (°C)	Heat Capacity (J/K)	Specific Heat Capacity (J/kg-K)	Volumetric Heat Capacity (MJ/m ³ -K)
20	1.300	1386.0	1.512
	1.306	1392.3	1.519
	1.300	1386.0	1.512
Mean	1.302	1388.1	1.514
Standard Deviation	0.003	2.9	0.003
RSD (%)	0.2	0.21	0.2
35	1.328	1414.9	1.543
	1.329	1416.5	1.545
	1.327	1414.4	1.543
Mean	1.328	1415.3	1.544
Standard Deviation	0.001	0.9	0.001
RSD (%)	0.07	0.07	0.07

Notes: Measurements were made using the TPS Specific Heat Method. A test time of 40 seconds and output of power to the TPS sensor of 0.08 Watts was determined to be optimal measurement parameters. For all measurements, data using points 100 to 200 was reported.

Sample 2

Temperature (°C)	Heat Capacity (J/K)	Specific Heat Capacity (J/kg-K)	Volumetric Heat Capacity (MJ/m ³ -K)
20	1.284	1382.2	1.505
	1.288	1387.0	1.510
	1.290	1388.8	1.512
Mean	1.287	1386.0	1.509
Standard Deviation	0.003	2.8	0.003
RSD (%)	0.2	0.20	0.2
35	1.311	1411.9	1.538
	1.310	1410.3	1.536
	1.310	1411.1	1.537
Mean	1.310	1411.1	1.537
Standard Deviation	0.001	0.8	0.001
RSD (%)	0.06	0.06	0.06

Notes: Measurements were made using the TPS Specific Heat Method. A test time of 40 seconds and output of power to the TPS sensor of 0.08 Watts was determined to be optimal measurement parameters. For all measurements, data using points 100 to 200 was reported.

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CRP TECHNOLOGY S.r.l.

Windform SP Directional Thermal Properties

Sample Set 1

Temperature (°C)	Axial Thermal Conductivity (W/m·K)	Axial Thermal Diffusivity (mm ² /s)	Radial Thermal Conductivity (W/m·K)	Radial Thermal Diffusivity (mm ² /s)
20	0.4625	0.3055	0.6055	0.4000
	0.4693	0.3100	0.5996	0.3961
	0.4679	0.3090	0.6003	0.3965
	0.4778	0.3156	0.5913	0.3906
	0.4594	0.3034	0.6073	0.4011
	0.4658	0.3077	0.6017	0.3975
Mean	0.4671	0.3085	0.6010	0.3969
Standard Deviation	0.0058	0.0038	0.0051	0.0034
RSD (%)	1.2	1.2	0.85	0.85
35	0.4955	0.3209	0.5912	0.3829
	0.4958	0.3211	0.5922	0.3835
	0.4937	0.3197	0.5928	0.3839
	0.5011	0.3246	0.5856	0.3793
	0.4938	0.3198	0.5922	0.3836
	0.4972	0.3220	0.5913	0.3830
Mean	0.4962	0.3213	0.5909	0.3827
Standard Deviation	0.0025	0.0016	0.0024	0.0016
RSD (%)	0.51	0.51	0.41	0.41

Notes: Measurements were made using the TPS Anisotropic Analysis Method and TPS sensor #5465 (3.189 mm radius) with Kapton[®] insulation. A test time of 20 seconds and output of power to the TPS sensor of 0.04 Watts was determined to be optimal measurement parameters for all temperatures.

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Sample Set 2

Temperature (°C)	Axial Thermal Conductivity (W/m-K)	Axial Thermal Diffusivity (mm ² /s)	Radial Thermal Conductivity (W/m-K)	Radial Thermal Diffusivity (mm ² /s)
20	0.4699	0.3114	0.6054	0.4012
	0.4746	0.3145	0.5996	0.3973
	0.4593	0.3044	0.6119	0.4055
	0.4750	0.3148	0.5984	0.3966
	0.4754	0.3151	0.5981	0.3963
	0.4732	0.3136	0.5997	0.3974
	0.4682	0.3102	0.6037	0.4000
Mean	0.4708	0.3120	0.6024	0.3992
Standard Deviation	0.0053	0.0035	0.0046	0.0031
RSD (%)	1.1	1.1	0.77	0.77
35	0.4923	0.3203	0.5978	0.3890
	0.5019	0.3265	0.5877	0.3824
	0.4947	0.3218	0.5920	0.3852
	0.5054	0.3288	0.5839	0.3799
	0.4962	0.3229	0.5917	0.3850
	Mean	0.4975	0.3237	0.5911
Standard Deviation	0.0046	0.0030	0.0044	0.0028
RSD (%)	0.92	0.92	0.74	0.74

Notes: Measurements were made using the TPS Anisotropic Analysis Method and TPS sensor #5465 (3.189 mm radius) with Kapton[®] insulation. A test time of 20 seconds and output of power to the TPS sensor of 0.04 Watts was determined to be optimal measurement parameters for all temperatures.

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