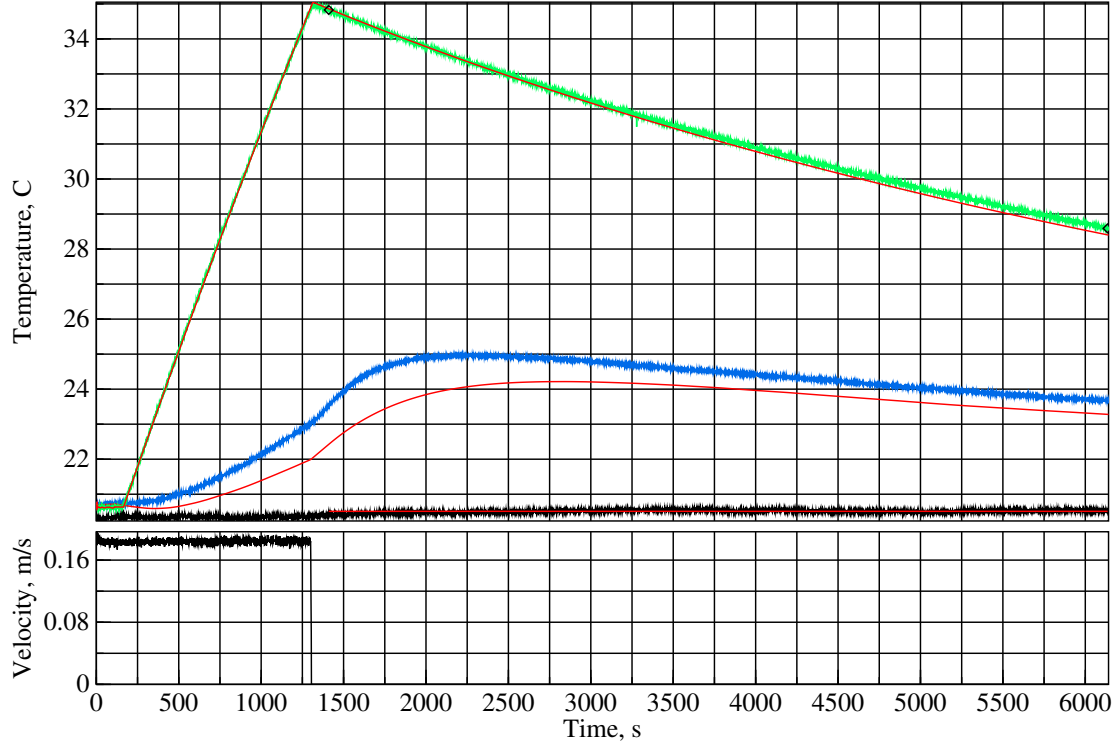


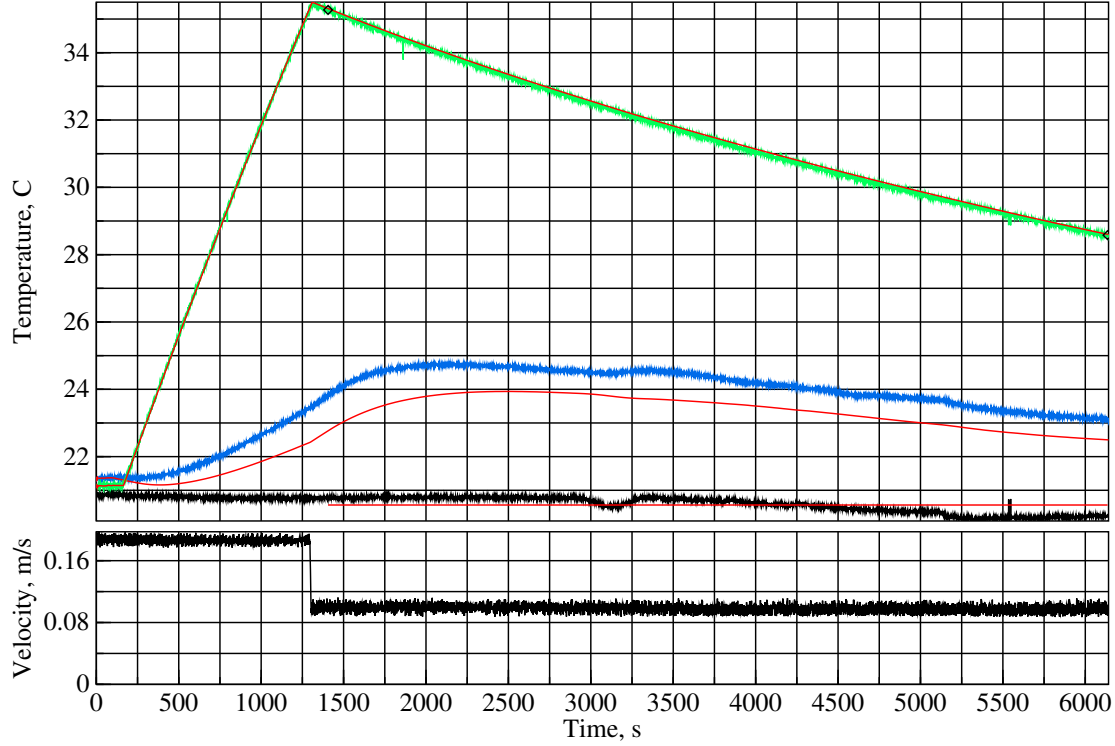
20230630T135252Z – mixed Convection – Roughness=1.04mm; T=20.5+10.8°C; +90.00°
k=0.0256, Ra/L^3=1.054x10^9, h=1.34W/(K.m^2), U=0.124W/K, Nu=15.9, Pr=0.711



Estimated measurement uncertainties of natural convection at $\theta = 90.0$.

Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
T	299K	+0.645%/K	0.50K	0.32%	LM35C temperature sensor
ΔT	10.8K	+37.2%/K	0.10K	3.72%	LM35C differential
T_{bb}	294K	+0.709%/K	0.50K	0.35%	radiative temperature
P	101kPa	+0.0008%/Pa	1.5kPa	1.20%	MPXH6115A6U air pressure
C_{pt}	4.24kJ/K	+0.085%/(J/K)	42J/K	3.62%	plate thermal capacity
L_c	0.305m	+1107%/m	500um	0.55%	characteristic length
L_w	0.305m	+401%/m	500um	0.20%	plate width
D_{PIR}	25.4mm	-895%/m	1.0mm	0.89%	insulation thickness
D_g	1.00mm	-908%/m	500um	0.45%	air gap
L_m	3.57mm	+2559%/m	500um	1.28%	side metal strip width
k_{PIR}	22.2 $\frac{mW}{K \cdot m}$	+0.865%/ $\frac{mW}{K \cdot m}$	1.1 $\frac{mW}{K \cdot m}$	0.96%	PIR thermal conductivity
ϵ_{XPS}	0.515	+78.8%	0.010	0.79%	XPS emissivity
ϵ_{tp}	0.890	+95.1%	0.015	1.43%	tape emissivity
Ω_{tp}	0.540	+64.3%	0.020	1.29%	tape coverage
ϵ_{rs}	0.040	+339%	0.010	3.39%	test-surface emissivity
ϵ_b	0.190	+22.4%	0.020	0.45%	back emissivity
ϵ_{wt}	0.900	+159%	0.025	3.97%	wind-tunnel emissivity
θ	90.0°	-0.975%/°	0.50°	0.49%	plate angle
				8.04%	combined bias uncertainty

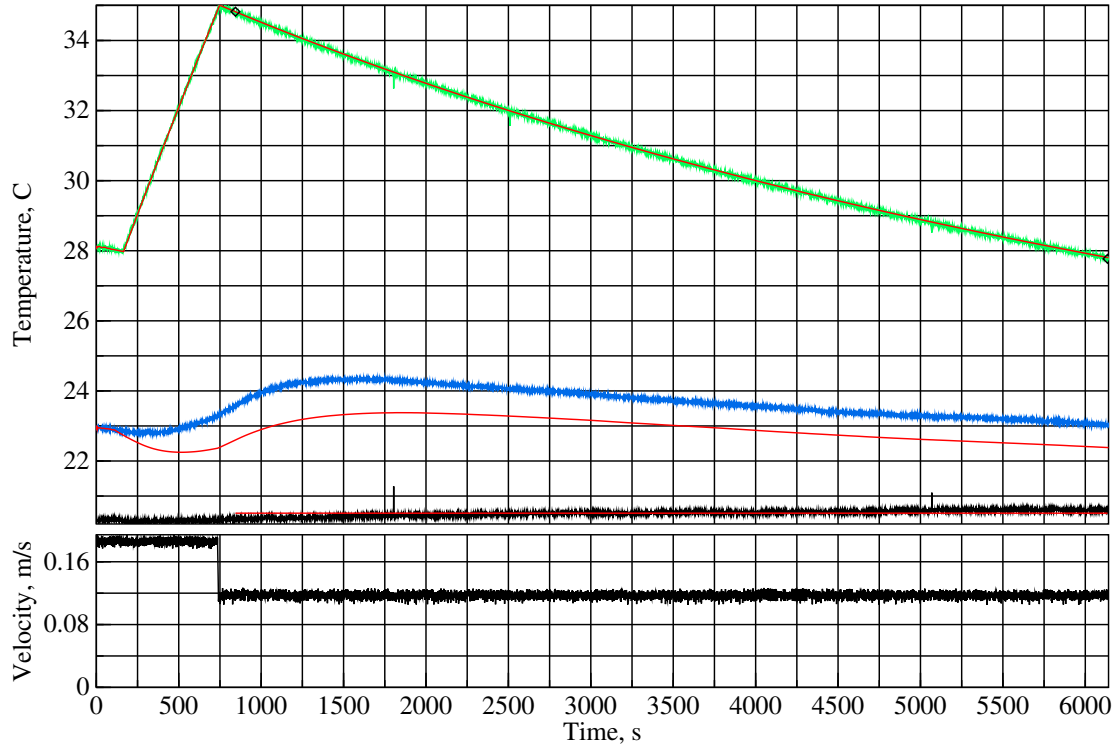
20230717T002348Z – mixed Convection – Roughness=1.04mm; T=20.6+11.0°C; +90.00°
33±1.6r/min, V=98mm/s, Re=1964, Ra/L^3=1.048x10^9, h=1.58W/(K.m^2), U=0.147W/K, Nu=18.8



Estimated measurement uncertainties, bi-level 1mm roughness at $Re = 1964$.

Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
T	299K	+0.614%/K	0.50K	0.31%	LM35C temperature sensor
ΔT	11.0K	+36.8%/K	0.10K	3.68%	LM35C differential
T_{bb}	294K	+0.699%/K	0.50K	0.35%	radiative temperature
P	99.9kPa	+0.0009%/Pa	1.5kPa	1.28%	MPXH6115A6U air pressure
C_{pt}	4.24kJ/K	+0.086%/(J/K)	42J/K	3.65%	plate thermal capacity
L_c	0.305m	+1096%/m	500um	0.55%	characteristic length
L_w	0.305m	+401%/m	500um	0.20%	plate width
D_{PIR}	25.4mm	−1007%/m	1.0mm	1.01%	insulation thickness
D_g	1.00mm	−1021%/m	500um	0.51%	air gap
L_m	3.57mm	+2674%/m	500um	1.34%	side metal strip width
k_{PIR}	22.2 $\frac{mW}{K \cdot m}$	+0.986%/ $\frac{mW}{K \cdot m}$	1.1 $\frac{mW}{K \cdot m}$	1.09%	PIR thermal conductivity
k_{XPS}	28.5 $\frac{mW}{K \cdot m}$	+0.165%/ $\frac{mW}{K \cdot m}$	1.4 $\frac{mW}{K \cdot m}$	0.24%	XPS thermal conductivity
ϵ_{XPS}	0.515	+78.6%	0.010	0.79%	XPS emissivity
ϵ_{tp}	0.890	+94.9%	0.015	1.42%	tape emissivity
Ω_{tp}	0.540	+64.1%	0.020	1.28%	tape coverage
ϵ_{rs}	0.040	+339%	0.010	3.39%	test-surface emissivity
ϵ_b	0.190	+14.3%	0.020	0.29%	back emissivity
ϵ_{wt}	0.900	+157%	0.025	3.92%	wind-tunnel emissivity
θ	90.0°	−0.970%/°	0.50°	0.48%	plate angle
				8.06%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	32.6r/min	+0.280%/(r/min)	1.6r/min	0.45%	fan rotation rate
				8.10%	RSS combined uncertainty

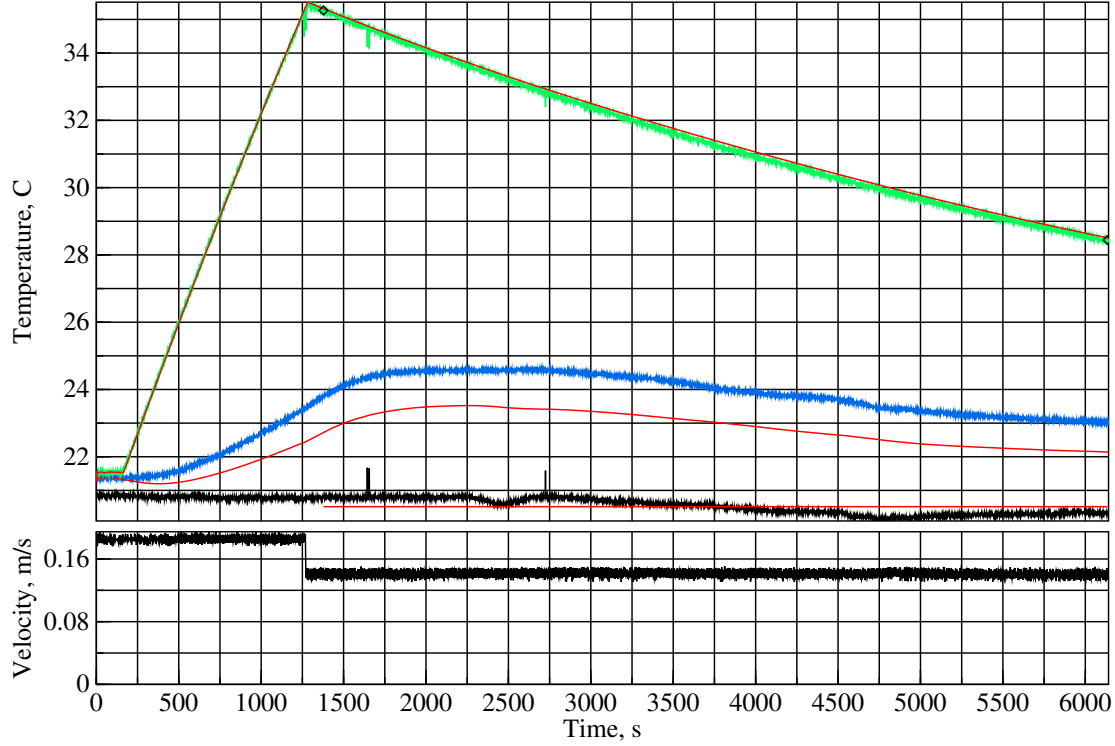
20230717T021323Z – mixed Convection – Roughness=1.04mm; T=20.5+10.3°C; +90.00°
39±1.3r/min, V=0.12m/s, Re=2344, Ra/L^3=0.992x10^9, h=1.52W/(K.m^2), U=0.142W/K, Nu=18.1



Estimated measurement uncertainties, bi-level 1mm roughness at $Re = 2345$.

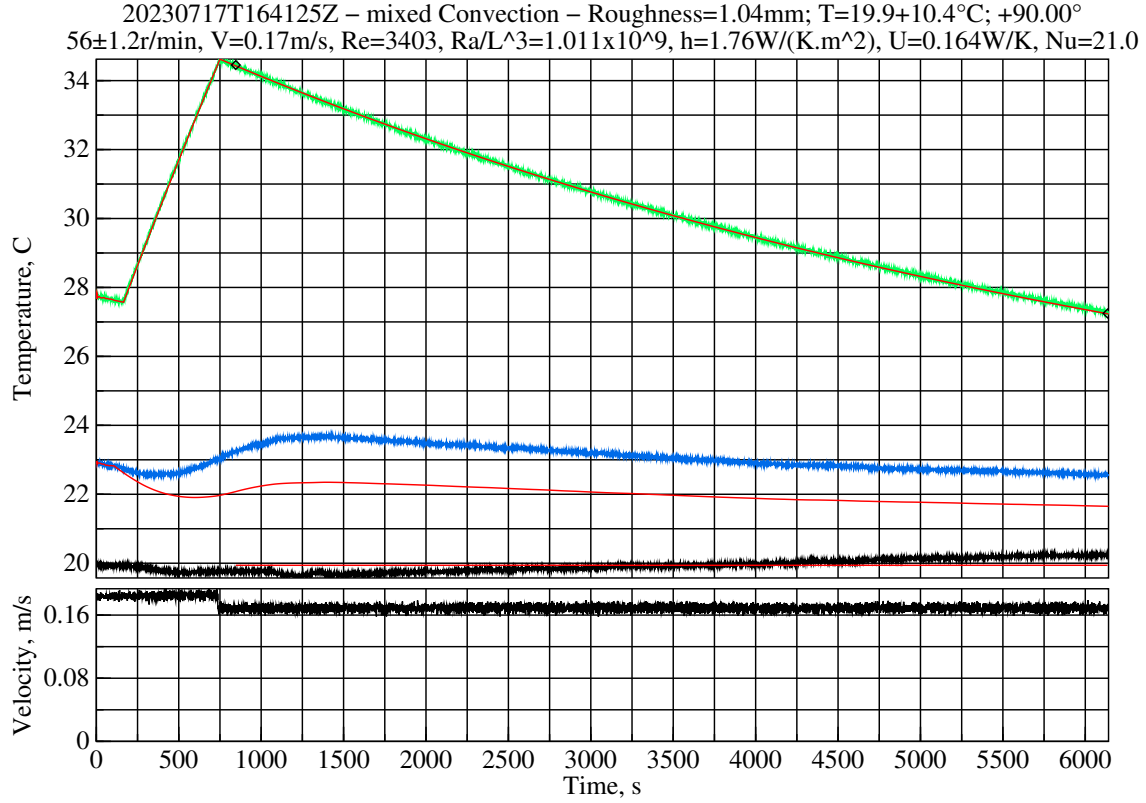
Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
T	299K	+0.598%/K	0.50K	0.30%	LM35C temperature sensor
ΔT	10.3K	+39.0%/K	0.10K	3.90%	LM35C differential
T_{bb}	293K	+0.696%/K	0.50K	0.35%	radiative temperature
P	100.0kPa	+0.0009%/Pa	1.5kPa	1.31%	MPXH6115A6U air pressure
C_{pt}	4.24kJ/K	+0.086%/(J/K)	42J/K	3.65%	plate thermal capacity
L_c	0.305m	+1085%/m	500um	0.54%	characteristic length
D_{PIR}	25.4mm	−1061%/m	1.0mm	1.06%	insulation thickness
D_g	1.00mm	−1076%/m	500um	0.54%	air gap
L_m	3.57mm	+2697%/m	500um	1.35%	side metal strip width
k_{PIR}	22.2 $\frac{mW}{K \cdot m}$	+1.04%/ $\frac{mW}{K \cdot m}$	1.1 $\frac{mW}{K \cdot m}$	1.16%	PIR thermal conductivity
k_{XPS}	28.5 $\frac{mW}{K \cdot m}$	+0.179%/ $\frac{mW}{K \cdot m}$	1.4 $\frac{mW}{K \cdot m}$	0.26%	XPS thermal conductivity
ϵ_{XPS}	0.515	+78.4%	0.010	0.78%	XPS emissivity
ϵ_{tp}	0.890	+94.6%	0.015	1.42%	tape emissivity
Ω_{tp}	0.540	+63.9%	0.020	1.28%	tape coverage
ϵ_{rs}	0.040	+338%	0.010	3.38%	test-surface emissivity
ϵ_b	0.190	+11.6%	0.020	0.23%	back emissivity
ϵ_{wt}	0.900	+156%	0.025	3.90%	wind-tunnel emissivity
θ	90.0°	−0.960%/°	0.50°	0.48%	plate angle
				8.16%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	38.8r/min	+0.343%/(r/min)	1.3r/min	0.46%	fan rotation rate
				8.21%	RSS combined uncertainty

20230717T125602Z – mixed Convection – Roughness=1.04mm; T=20.5+10.9°C; +90.00°
47±1.3r/min, V=0.14m/s, Re=2834, Ra/L^3=1.050x10^9, h=1.73W/(K.m^2), U=0.161W/K, Nu=20.5



Estimated measurement uncertainties, bi-level 1mm roughness at $Re = 2834$.

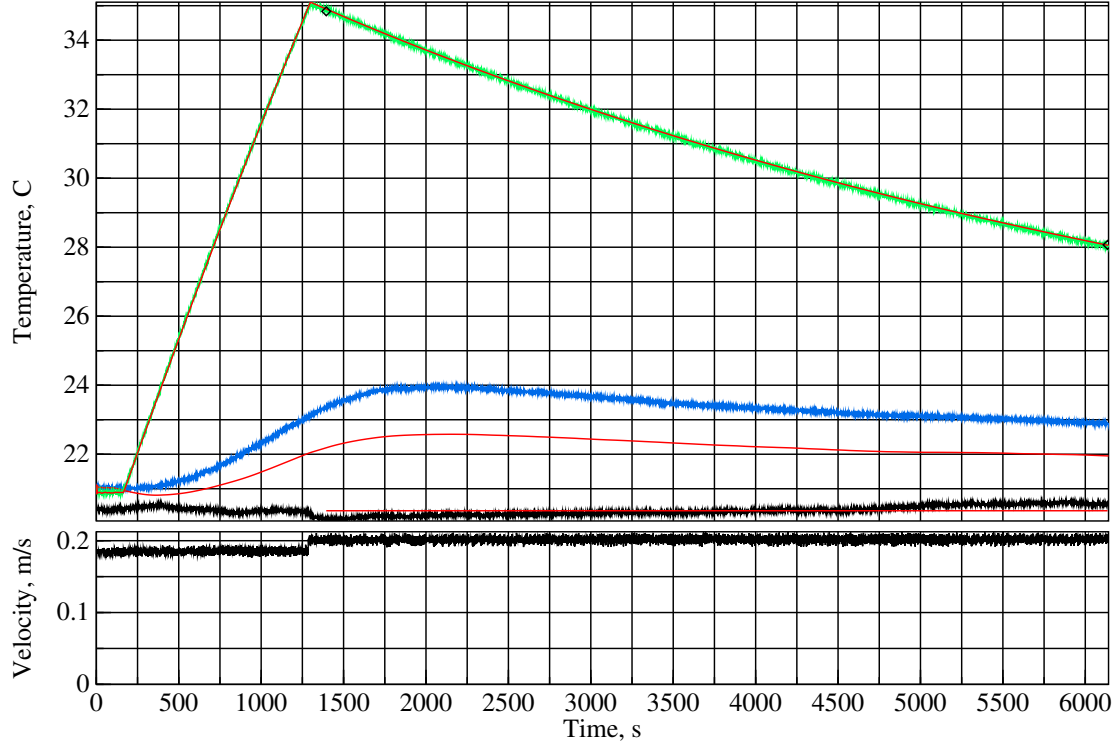
Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
T	299K	+0.550%/K	0.50K	0.27%	LM35C temperature sensor
ΔT	10.9K	+36.3%/K	0.10K	3.63%	LM35C differential
T_{bb}	294K	+0.674%/K	0.50K	0.34%	radiative temperature
P	100kPa	+0.0009%/Pa	1.5kPa	1.39%	MPXH6115A6U air pressure
C_{pt}	4.24kJ/K	+0.085%/(J/K)	42J/K	3.60%	plate thermal capacity
η	0.340	+65.3%	0.003	0.22%	anemometer calibration
L_c	0.305m	+1059%/m	500um	0.53%	characteristic length
D_{PIR}	25.4mm	−1085%/m	1.0mm	1.08%	insulation thickness
D_g	1.00mm	−1100%/m	500um	0.55%	air gap
L_m	3.57mm	+2671%/m	500um	1.34%	side metal strip width
k_{PIR}	22.2 $\frac{mW}{K \cdot m}$	+1.07%/ $\frac{mW}{K \cdot m}$	1.1 $\frac{mW}{K \cdot m}$	1.18%	PIR thermal conductivity
k_{XPS}	28.5 $\frac{mW}{K \cdot m}$	+0.188%/ $\frac{mW}{K \cdot m}$	1.4 $\frac{mW}{K \cdot m}$	0.27%	XPS thermal conductivity
ϵ_{XPS}	0.515	+76.3%	0.010	0.76%	XPS emissivity
ϵ_{tp}	0.890	+92.1%	0.015	1.38%	tape emissivity
Ω_{tp}	0.540	+62.2%	0.020	1.24%	tape coverage
ϵ_{rs}	0.040	+330%	0.010	3.30%	test-surface emissivity
ϵ_{wt}	0.900	+151%	0.025	3.78%	wind-tunnel emissivity
θ	90.0°	−0.943%/°	0.50°	0.47%	plate angle
				7.93%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	46.8r/min	+0.475%/(r/min)	1.3r/min	0.61%	fan rotation rate
				8.02%	RSS combined uncertainty



Estimated measurement uncertainties, bi-level 1mm roughness at $Re = 3403$.

Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
T	298K	+0.454%/K	0.50K	0.23%	LM35C temperature sensor
ΔT	10.4K	+36.7%/K	0.10K	3.67%	LM35C differential
T_{bb}	293K	+0.642%/K	0.50K	0.32%	radiative temperature
P	100kPa	+0.0010%/Pa	1.5kPa	1.55%	MPXH6115A6U air pressure
C_{pt}	4.24kJ/K	+0.082%/(J/K)	42J/K	3.49%	plate thermal capacity
η	0.340	+123%	0.003	0.42%	anemometer calibration
L_c	0.305m	+1015%/m	500um	0.51%	characteristic length
ς	2.00mm	+2467%/m	100um	0.25%	post height
D_{PIR}	25.4mm	−1092%/m	1.0mm	1.09%	insulation thickness
D_g	1.00mm	−1108%/m	500um	0.55%	air gap
L_m	3.57mm	+2595%/m	500um	1.30%	side metal strip width
k_{PIR}	22.2 $\frac{mW}{K \cdot m}$	+1.08%/ $\frac{mW}{K \cdot m}$	1.1 $\frac{mW}{K \cdot m}$	1.20%	PIR thermal conductivity
k_{XPS}	28.5 $\frac{mW}{K \cdot m}$	+0.196%/ $\frac{mW}{K \cdot m}$	1.4 $\frac{mW}{K \cdot m}$	0.28%	XPS thermal conductivity
ϵ_{XPS}	0.515	+72.6%	0.010	0.73%	XPS emissivity
ϵ_{tp}	0.890	+87.6%	0.015	1.31%	tape emissivity
Ω_{tp}	0.540	+59.2%	0.020	1.18%	tape coverage
ϵ_{rs}	0.040	+314%	0.010	3.14%	test-surface emissivity
ϵ_{wt}	0.900	+144%	0.025	3.59%	wind-tunnel emissivity
θ	90.0°	−0.899%/°	0.50°	0.45%	plate angle
				7.75%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	56.0r/min	+0.746%/(r/min)	1.2r/min	0.90%	fan rotation rate
				7.95%	RSS combined uncertainty

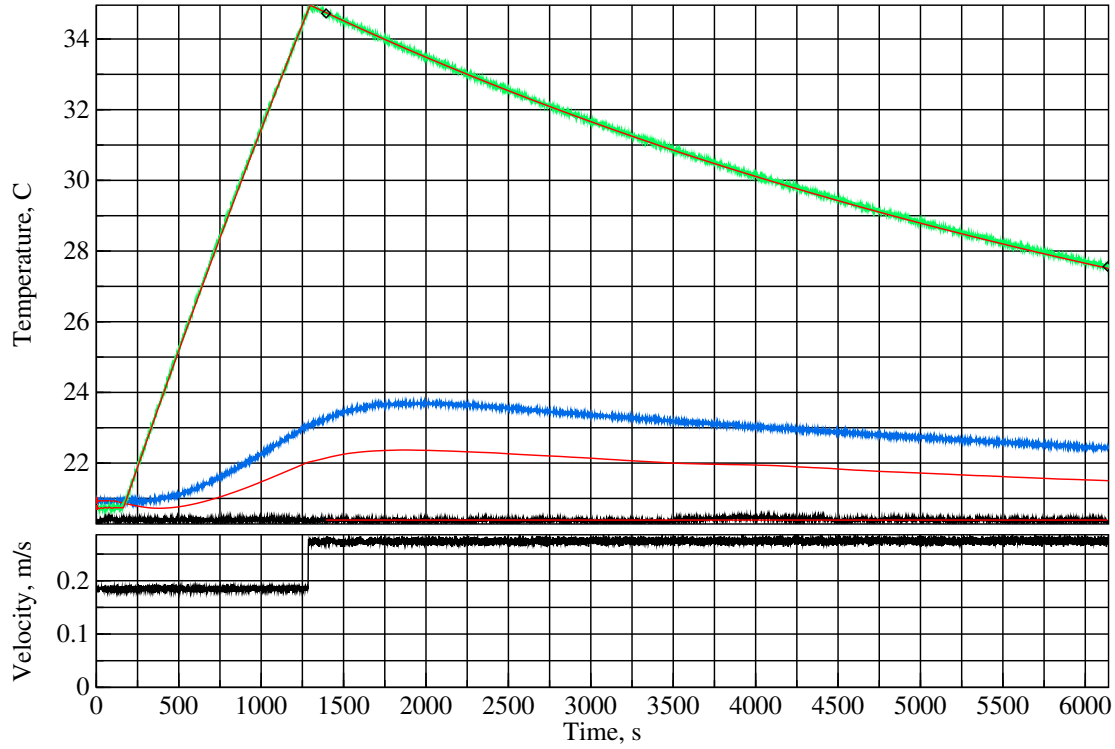
20230718T224330Z – mixed Convection – Roughness=1.04mm; T=20.4+10.7°C; +90.00°
67±1.4r/min, V=0.20m/s, Re=4050, Ra/L^3=1.030x10^9, h=1.89W/(K.m^2), U=0.175W/K, Nu=22.4



Estimated measurement uncertainties, bi-level 1mm roughness at $Re = 4051$.

Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
ΔT	10.7K	+33.5%/K	0.10K	3.35%	LM35C differential
T_{bb}	294K	+0.589%/K	0.50K	0.29%	radiative temperature
P	100kPa	+0.0012%/Pa	1.5kPa	1.77%	MPXH6115A6U air pressure
C_{pt}	4.24kJ/K	+0.078%/(J/K)	42J/K	3.30%	plate thermal capacity
η	0.340	+202%	0.003	0.69%	anemometer calibration
L_c	0.305m	+965%/m	500um	0.48%	characteristic length
D_{PIR}	25.4mm	−1043%/m	1.0mm	1.04%	insulation thickness
D_g	1.00mm	−1057%/m	500um	0.53%	air gap
L_m	3.57mm	+2437%/m	500um	1.22%	side metal strip width
k_{PIR}	22.2 $\frac{mW}{K \cdot m}$	+1.03%/ $\frac{mW}{K \cdot m}$	1.1 $\frac{mW}{K \cdot m}$	1.14%	PIR thermal conductivity
k_{XPS}	28.5 $\frac{mW}{K \cdot m}$	+0.192%/ $\frac{mW}{K \cdot m}$	1.4 $\frac{mW}{K \cdot m}$	0.27%	XPS thermal conductivity
ϵ_{XPS}	0.515	+66.9%	0.010	0.67%	XPS emissivity
ϵ_{tp}	0.890	+80.7%	0.015	1.21%	tape emissivity
Ω_{tp}	0.540	+54.5%	0.020	1.09%	tape coverage
ϵ_{rs}	0.040	+289%	0.010	2.89%	test-surface emissivity
ϵ_{wt}	0.900	+132%	0.025	3.30%	wind-tunnel emissivity
θ	90.0°	−0.827%/°	0.50°	0.41%	plate angle
				7.27%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	66.8r/min	+1.03%/(r/min)	1.4r/min	1.45%	fan rotation rate
				7.83%	RSS combined uncertainty

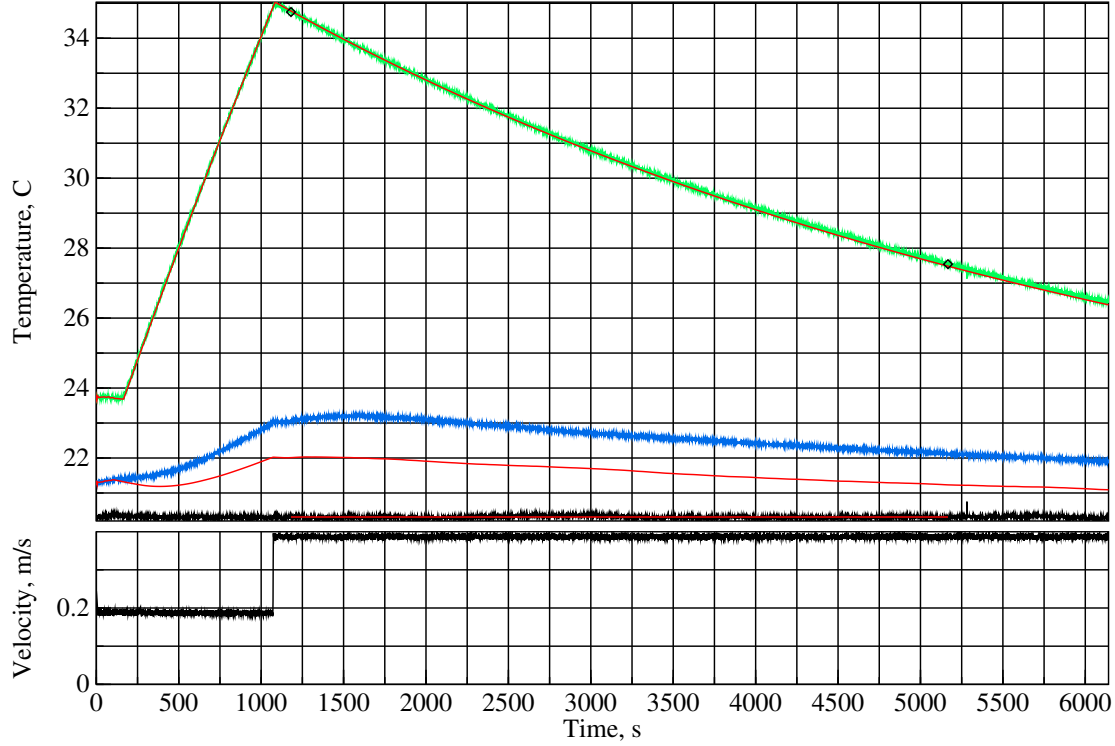
20230704T172731Z – mixed Convection – Roughness=1.04mm; T=20.4+10.3°C; +90.00°
91±1.6r/min, V=0.27m/s, Re=5516, Ra/L^3=0.996x10^9, h=2.39W/(K.m^2), U=0.222W/K, Nu=28.4



Estimated measurement uncertainties, bi-level 1mm roughness at $Re = 5516$.

Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
ΔT	10.3K	+28.5%/K	0.10K	2.85%	LM35C differential
T_{bb}	294K	+0.447%/K	0.50K	0.22%	radiative temperature
P	100kPa	+0.0014%/Pa	1.5kPa	2.13%	MPXH6115A6U air pressure
C_{pt}	4.24kJ/K	+0.065%/(J/K)	42J/K	2.76%	plate thermal capacity
η	0.340	+334%	0.003	1.14%	anemometer calibration
L_c	0.305m	+865%/m	500um	0.43%	characteristic length
L_T	8.34mm	+4466%/m	100um	0.45%	post length
ς	2.00mm	−9723%/m	100um	0.97%	post height
D_{PIR}	25.4mm	−847%/m	1.0mm	0.85%	insulation thickness
D_g	1.00mm	−859%/m	500um	0.43%	air gap
L_m	3.57mm	+1940%/m	500um	0.97%	side metal strip width
k_{PIR}	22.2 $\frac{mW}{K \cdot m}$	+0.840%/ $\frac{mW}{K \cdot m}$	1.1 $\frac{mW}{K \cdot m}$	0.93%	PIR thermal conductivity
k_{XPS}	28.5 $\frac{mW}{K \cdot m}$	+0.165%/ $\frac{mW}{K \cdot m}$	1.4 $\frac{mW}{K \cdot m}$	0.24%	XPS thermal conductivity
ϵ_{XPS}	0.515	+50.8%	0.010	0.51%	XPS emissivity
ϵ_{tp}	0.890	+61.3%	0.015	0.92%	tape emissivity
Ω_{tp}	0.540	+41.4%	0.020	0.83%	tape coverage
ϵ_{rs}	0.040	+220%	0.010	2.20%	test-surface emissivity
ϵ_{wt}	0.900	+100.0%	0.025	2.50%	wind-tunnel emissivity
θ	90.0°	−0.625%/°	0.50°	0.31%	plate angle
				6.22%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	91.1r/min	+1.25%/(r/min)	1.6r/min	1.94%	fan rotation rate
				7.33%	RSS combined uncertainty

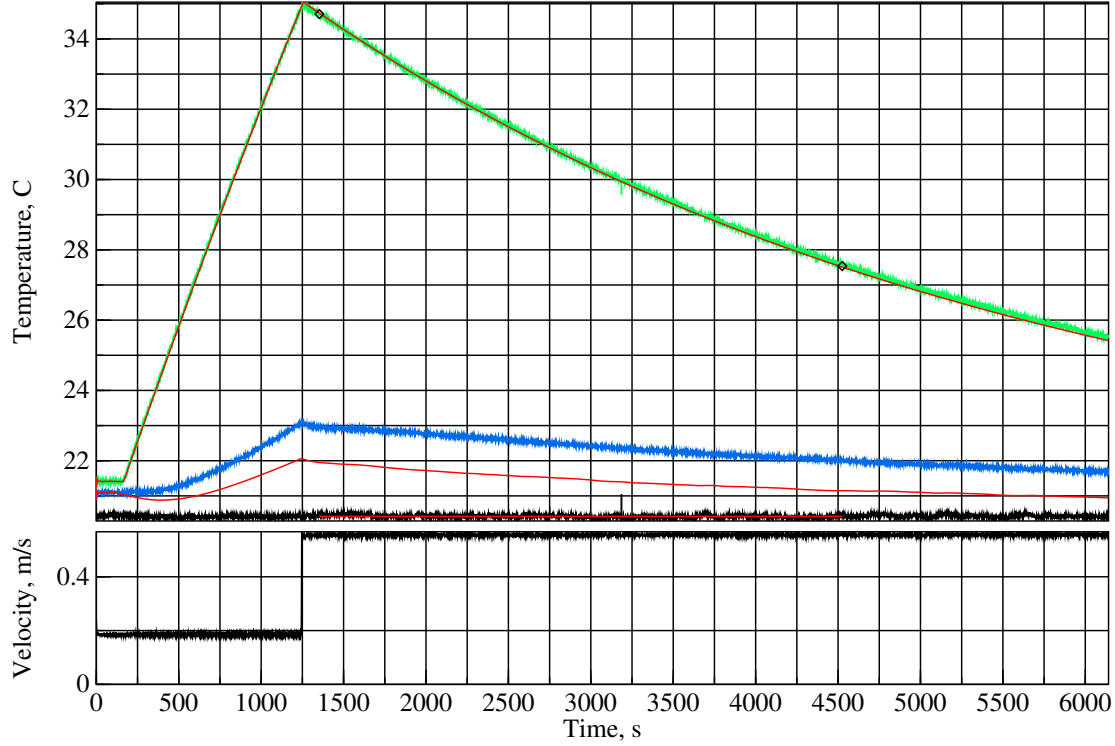
20230703T003733Z – mixed Convection – Roughness=1.04mm; T=20.3+10.4°C; +90.00°
128±1.6r/min, V=0.39m/s, Re=7758, Ra/L^3=1.001x10^9, h=3.61W/(K.m^2), U=0.336W/K, Nu=43.0



Estimated measurement uncertainties, bi-level 1mm roughness at $Re = 7759$.

Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
ΔT	10.4K	+22.0%/K	0.10K	2.20%	LM35C differential
P	100kPa	+0.0014%/Pa	1.5kPa	2.12%	MPXH6115A6U air pressure
C_{pt}	4.24kJ/K	+0.051%/(J/K)	42J/K	2.17%	plate thermal capacity
η	0.340	+365%	0.003	1.24%	anemometer calibration
L_c	0.305m	+707%/m	500um	0.35%	characteristic length
L_T	8.34mm	+7418%/m	100um	0.74%	post length
ς	2.00mm	−19182%/m	100um	1.92%	post height
D_{PIR}	25.4mm	−594%/m	1.0mm	0.59%	insulation thickness
D_g	1.00mm	−602%/m	500um	0.30%	air gap
L_m	3.57mm	+1367%/m	500um	0.68%	side metal strip width
k_{PIR}	22.2 $\frac{mW}{K \cdot m}$	+0.592%/ $\frac{mW}{K \cdot m}$	1.1 $\frac{mW}{K \cdot m}$	0.66%	PIR thermal conductivity
ϵ_{XPS}	0.515	+33.4%	0.010	0.33%	XPS emissivity
ϵ_{tp}	0.890	+40.4%	0.015	0.61%	tape emissivity
Ω_{tp}	0.540	+27.3%	0.020	0.55%	tape coverage
ϵ_{rs}	0.040	+145%	0.010	1.45%	test-surface emissivity
ϵ_{wt}	0.900	+65.7%	0.025	1.64%	wind-tunnel emissivity
θ	90.0°	−9.65%/°	0.50°	4.83%	plate angle
				7.09%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	128r/min	+0.966%/(r/min)	1.6r/min	1.55%	fan rotation rate
				7.74%	RSS combined uncertainty

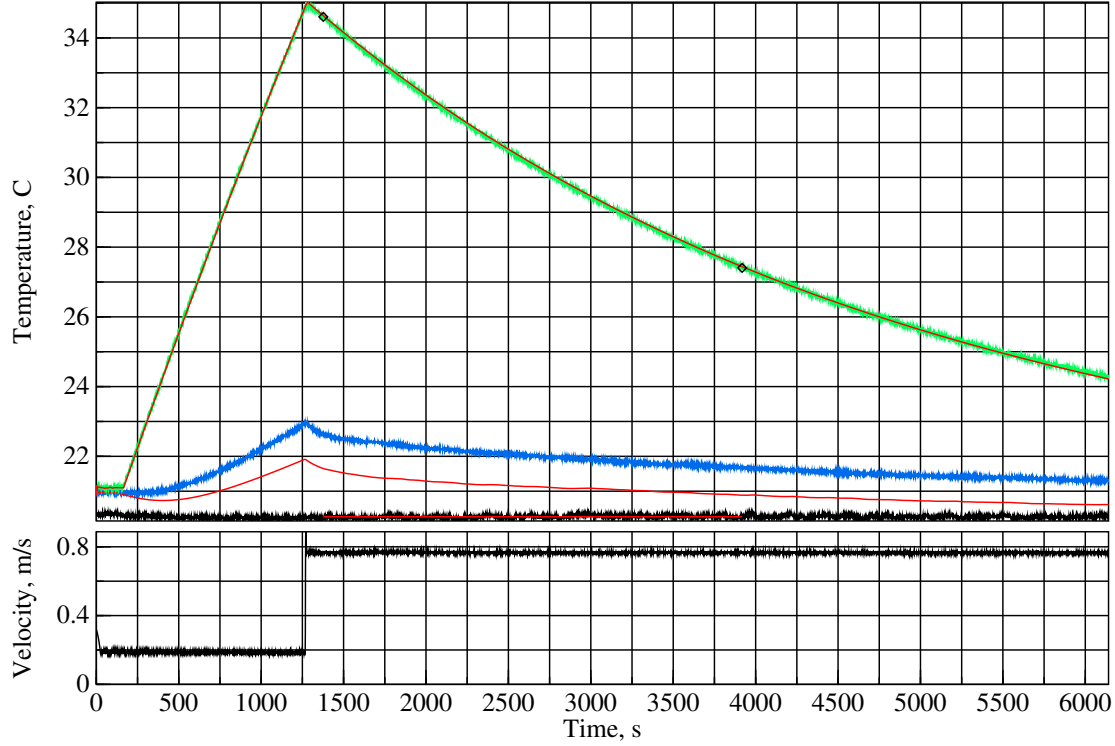
20230705T012225Z – mixed Convection – Roughness=1.04mm; T=20.4+10.3°C; +90.00°
185±1.1r/min, V=0.56m/s, Re=11184, Ra/L^3=0.997x10^9, h=5.75W/(K.m^2), U=0.534W/K, Nu=68.4



Estimated measurement uncertainties, bi-level 1mm roughness at $Re = 11187$.

Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
ΔT	10.3K	+17.9%/K	0.10K	1.79%	LM35C differential
P	100kPa	+0.0012%/Pa	1.5kPa	1.86%	MPXH6115A6U air pressure
C_{pt}	4.24kJ/K	+0.042%/(J/K)	42J/K	1.77%	plate thermal capacity
η	0.340	+332%	0.003	1.13%	anemometer calibration
L_c	0.305m	+500%/m	500um	0.25%	characteristic length
L_T	8.34mm	+8687%/m	100um	0.87%	post length
ς	2.00mm	-17094%/m	100um	1.71%	post height
D_{PIR}	25.4mm	-407%/m	1.0mm	0.41%	insulation thickness
D_g	1.00mm	-413%/m	500um	0.21%	air gap
L_m	3.57mm	+977%/m	500um	0.49%	side metal strip width
k_{PIR}	22.2 $\frac{mW}{K \cdot m}$	+0.408%/ $\frac{mW}{K \cdot m}$	1.1 $\frac{mW}{K \cdot m}$	0.45%	PIR thermal conductivity
ϵ_{XPS}	0.515	+21.7%	0.010	0.22%	XPS emissivity
ϵ_{tp}	0.890	+26.2%	0.015	0.39%	tape emissivity
Ω_{tp}	0.540	+17.7%	0.020	0.35%	tape coverage
ϵ_{rs}	0.040	+94.3%	0.010	0.94%	test-surface emissivity
ϵ_{wt}	0.900	+42.6%	0.025	1.07%	wind-tunnel emissivity
θ	90.0°	-3.96%/°	0.50°	1.98%	plate angle
				4.67%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	185r/min	+0.609%/(r/min)	1.1r/min	0.67%	fan rotation rate
				4.86%	RSS combined uncertainty

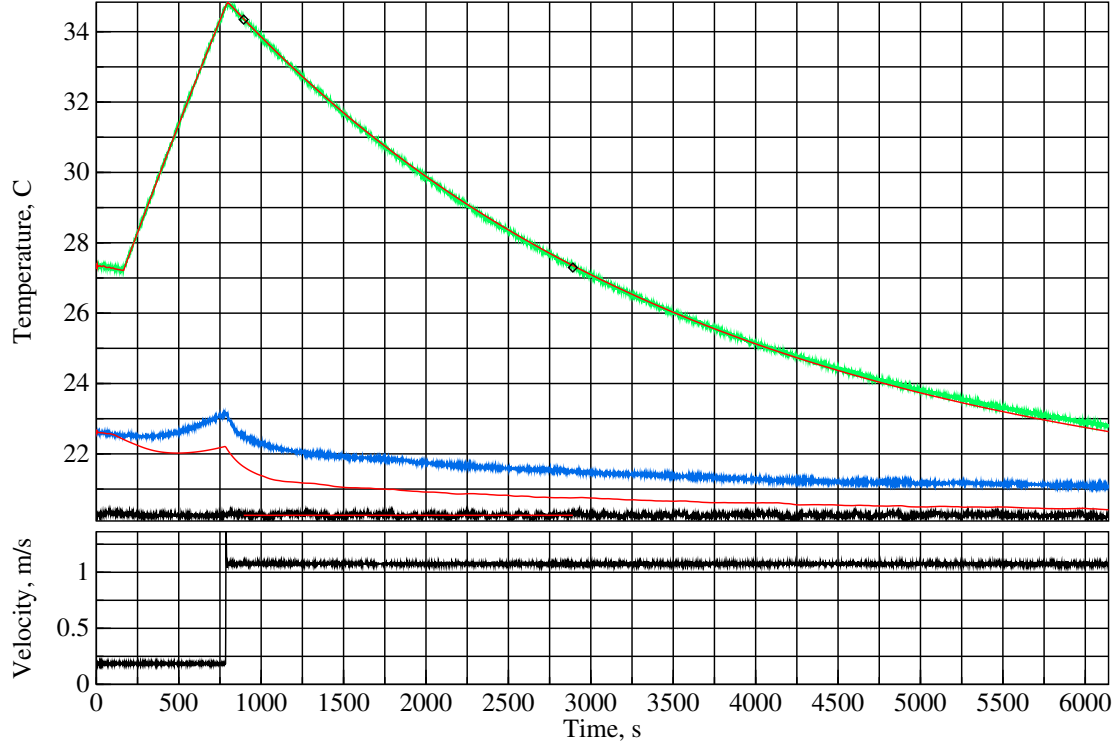
20230702T224545Z – mixed Convection – Roughness=1.04mm; T=20.3+10.3°C; +90.00°
256±1.1r/min, V=0.77m/s, Re=15402, Ra/L^3=0.992x10^9, h=8.15W/(K.m^2), U=0.758W/K, Nu=97.1



Estimated measurement uncertainties, bi-level 1mm roughness at $Re = 15401$.

Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
ΔT	10.3K	+15.6%/K	0.10K	1.56%	LM35C differential
P	99.9kPa	+0.0011%/Pa	1.5kPa	1.65%	MPXH6115A6U air pressure
C_{pt}	4.24kJ/K	+0.037%/(J/K)	42J/K	1.55%	plate thermal capacity
η	0.340	+298%	0.003	1.01%	anemometer calibration
L_T	8.34mm	+9045%/m	100um	0.90%	post length
ς	2.00mm	-12458%/m	100um	1.25%	post height
D_{PIR}	25.4mm	-301%/m	1.0mm	0.30%	insulation thickness
L_m	3.57mm	+770%/m	500um	0.39%	side metal strip width
k_{PIR}	22.2 $\frac{mW}{K \cdot m}$	+0.304%/ $\frac{mW}{K \cdot m}$	1.1 $\frac{mW}{K \cdot m}$	0.34%	PIR thermal conductivity
ϵ_{tp}	0.890	+18.6%	0.015	0.28%	tape emissivity
Ω_{tp}	0.540	+12.6%	0.020	0.25%	tape coverage
ϵ_{rs}	0.040	+67.0%	0.010	0.67%	test-surface emissivity
ϵ_{wt}	0.900	+30.2%	0.025	0.76%	wind-tunnel emissivity
θ	90.0°	-1.93%/°	0.50°	0.97%	plate angle
				3.68%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	256r/min	+0.395%/(r/min)	1.1r/min	0.44%	fan rotation rate
				3.78%	RSS combined uncertainty

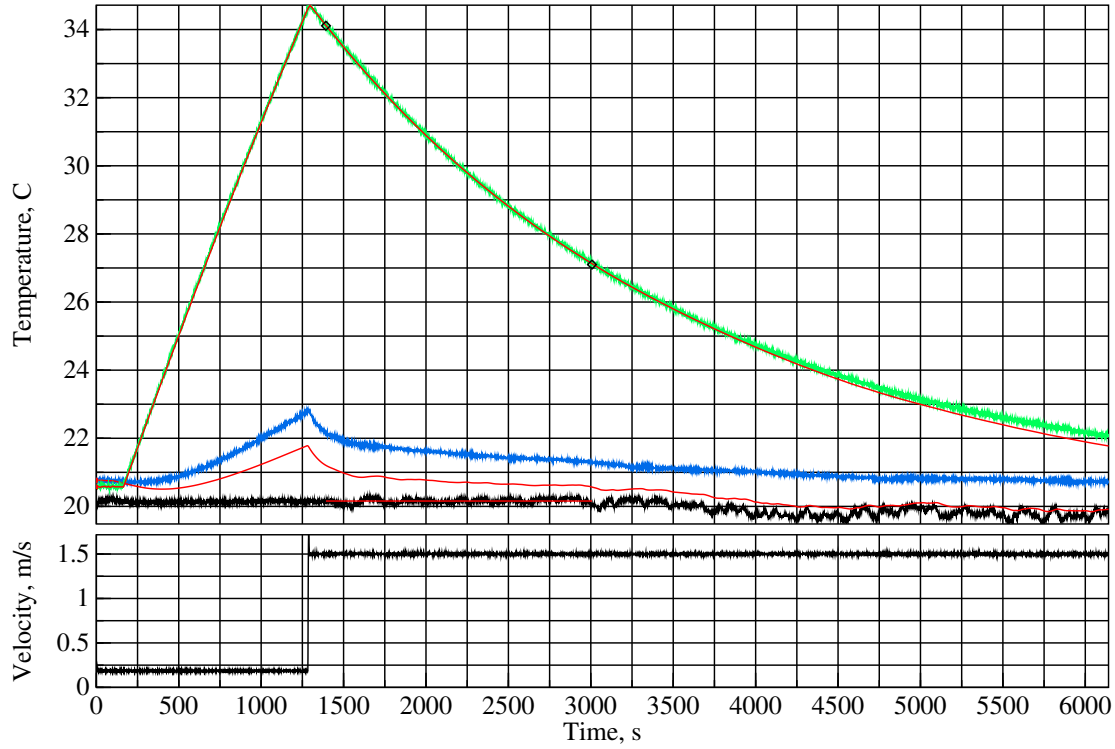
20230704T015123Z – mixed Convection – Roughness=1.04mm; T=20.3+10.2°C; +90.00°
362±2.3r/min, V=1.1m/s, Re=21646, Ra/L^3=0.984x10^9, h=11.5W/(K.m^2), U=1.07W/K, Nu=137.1



Estimated measurement uncertainties, bi-level 1mm roughness at $Re = 21645$.

Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
ΔT	10.2K	+14.2%/K	0.10K	1.42%	LM35C differential
P	100kPa	+0.0010%/Pa	1.5kPa	1.49%	MPXH6115A6U air pressure
C_{pt}	4.24kJ/K	+0.033%/(J/K)	42J/K	1.40%	plate thermal capacity
η	0.340	+269%	0.003	0.91%	anemometer calibration
L_T	8.34mm	+9200%/m	100um	0.92%	post length
ς	2.00mm	−8315%/m	100um	0.83%	post height
D_{PIR}	25.4mm	−224%/m	1.0mm	0.22%	insulation thickness
L_m	3.57mm	+634%/m	500um	0.32%	side metal strip width
k_{PIR}	22.2 $\frac{mW}{K \cdot m}$	+0.227%/ $\frac{mW}{K \cdot m}$	1.1 $\frac{mW}{K \cdot m}$	0.25%	PIR thermal conductivity
ϵ_{tp}	0.890	+13.3%	0.015	0.20%	tape emissivity
ϵ_{rs}	0.040	+48.2%	0.010	0.48%	test-surface emissivity
ϵ_{wt}	0.900	+21.7%	0.025	0.54%	wind-tunnel emissivity
θ	90.0°	−0.945%/°	0.50°	0.47%	plate angle
				3.11%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	362r/min	+0.252%/(r/min)	2.3r/min	0.57%	fan rotation rate
				3.31%	RSS combined uncertainty

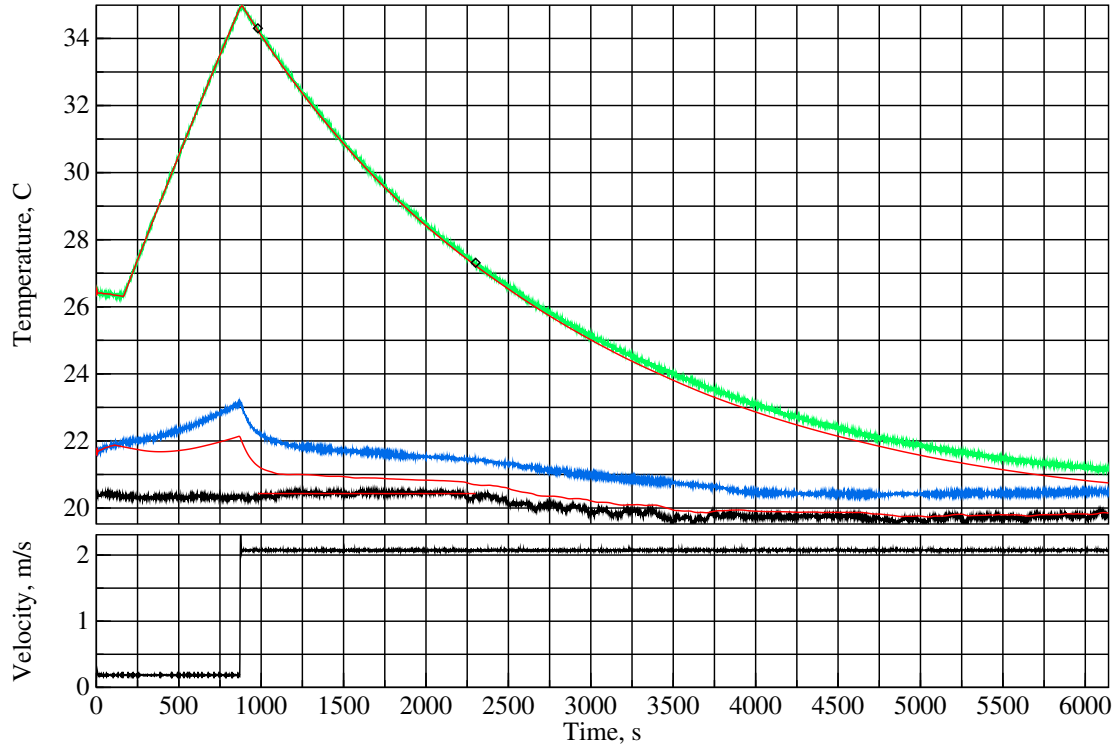
20230702T182824Z – mixed Convection – Roughness=1.04mm; T=20.2+10.1°C; +90.00°
512±2.1r/min, V=1.5m/s, Re=30147, Ra/L^3=0.973x10^9, h=15.2W/(K.m^2), U=1.41W/K, Nu=181.0



Estimated measurement uncertainties, bi-level 1mm roughness at $Re = 30151$.

Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
ΔT	10.1K	+13.2%/K	0.10K	1.32%	LM35C differential
P	100.0kPa	+0.0009%/Pa	1.5kPa	1.38%	MPXH6115A6U air pressure
C_{pt}	4.24kJ/K	+0.031%/(J/K)	42J/K	1.30%	plate thermal capacity
η	0.340	+245%	0.003	0.83%	anemometer calibration
L_T	8.34mm	+9279%/m	100um	0.93%	post length
ς	2.00mm	-5372%/m	100um	0.54%	post height
L_m	3.57mm	+552%/m	500um	0.28%	side metal strip width
ϵ_{rs}	0.040	+35.7%	0.010	0.36%	test-surface emissivity
ϵ_{wt}	0.900	+16.0%	0.025	0.40%	wind-tunnel emissivity
θ	90.0°	-0.485%/°	0.50°	0.24%	plate angle
				2.79%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	512r/min	+0.163%/(r/min)	2.1r/min	0.35%	fan rotation rate
				2.88%	RSS combined uncertainty

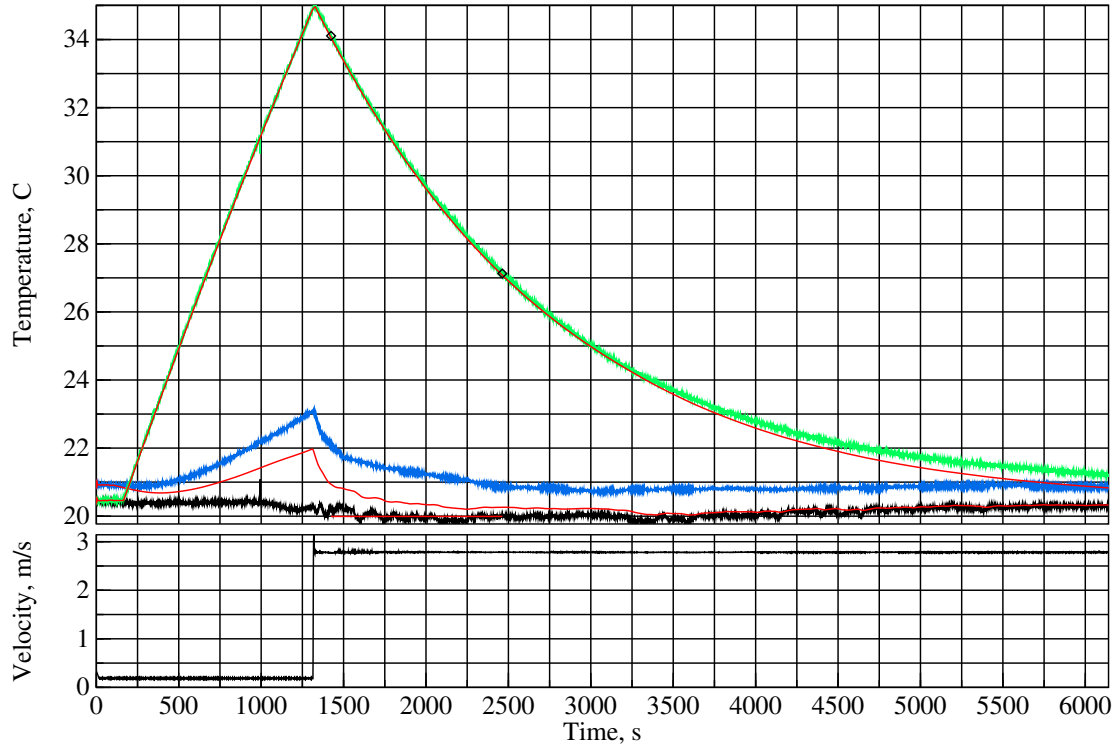
20230703T215438Z – mixed Convection – Roughness=1.04mm; T=20.4+09.9°C; +90.00°
727±2.0r/min, V=2.1m/s, Re=41550, Ra/L^3=0.956x10^9, h=19.6W/(K.m^2), U=1.82W/K, Nu=233.1



Estimated measurement uncertainties, bi-level 1mm roughness at $Re = 41552$.

Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
ΔT	9.93K	+12.7%/K	0.10K	1.27%	LM35C differential
P	100.0kPa	+0.0009%/Pa	1.5kPa	1.31%	MPXH6115A6U air pressure
C_{pt}	4.24kJ/K	+0.029%/(J/K)	42J/K	1.23%	plate thermal capacity
η	0.340	+222%	0.003	0.75%	anemometer calibration
L_T	8.34mm	+9328%/m	100um	0.93%	post length
ς	2.00mm	-3305%/m	100um	0.33%	post height
L_m	3.57mm	+502%/m	500um	0.25%	side metal strip width
ϵ_{rs}	0.040	+27.2%	0.010	0.27%	test-surface emissivity
ϵ_{wt}	0.900	+12.1%	0.025	0.30%	wind-tunnel emissivity
				2.60%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	727r/min	+0.104%/(r/min)	2.0r/min	0.21%	fan rotation rate
				2.63%	RSS combined uncertainty

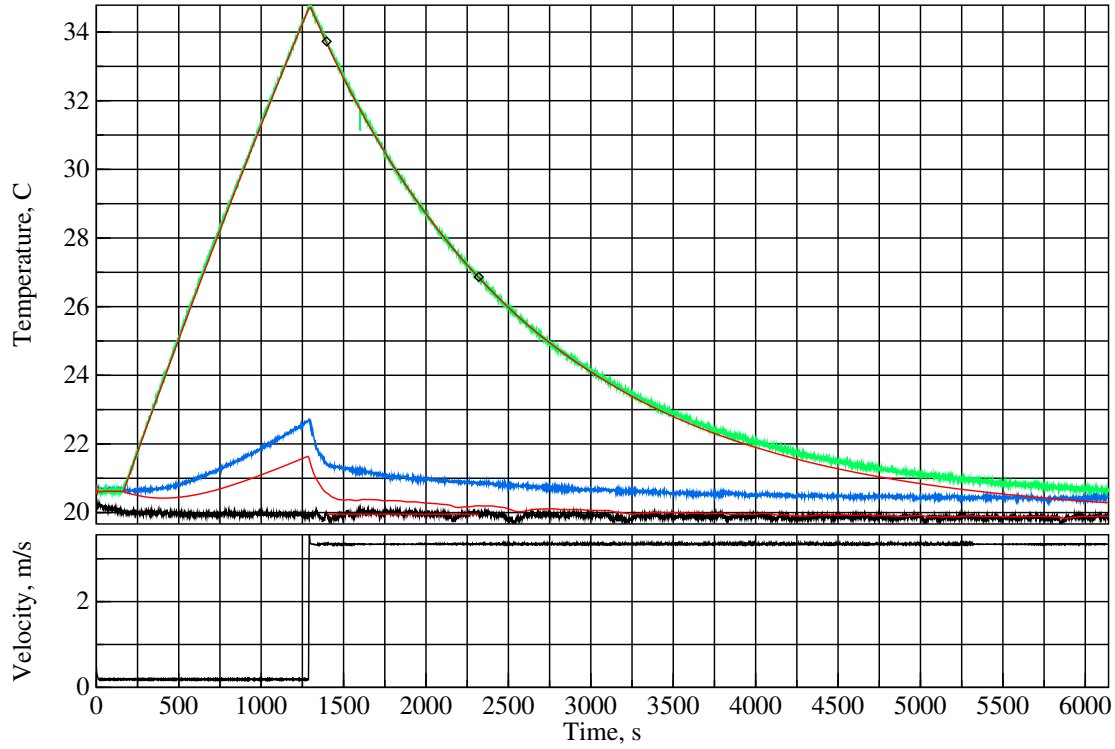
20230712T011216Z – mixed Convection – Roughness=1.04mm; T=20.0+10.2°C; +90.00°
1025±2.5r/min, V=2.8m/s, Re=55931, Ra/L^3=0.992x10^9, h=25.2W/(K.m^2), U=2.34W/K, Nu=299.9



Estimated measurement uncertainties, bi-level 1mm roughness at $Re = 55935$.

Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
ΔT	10.2K	+11.8%/K	0.10K	1.18%	LM35C differential
P	100.0kPa	+0.0008%/Pa	1.5kPa	1.26%	MPXH6115A6U air pressure
C_{pt}	4.24kJ/K	+0.028%/(J/K)	42J/K	1.18%	plate thermal capacity
η	0.340	+195%	0.003	0.66%	anemometer calibration
u_u	6.381	+2.44%	0.100	0.24%	diffuser airflow upper bound
L_T	8.34mm	+9361%/m	100um	0.94%	post length
L_m	3.57mm	+473%/m	500um	0.24%	side metal strip width
ϵ_{rs}	0.040	+21.3%	0.010	0.21%	test-surface emissivity
ϵ_{wt}	0.900	+9.46%	0.025	0.24%	wind-tunnel emissivity
				2.46%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	1.03kr/min	+0.065%/(r/min)	2.5r/min	0.16%	fan rotation rate
				2.48%	RSS combined uncertainty

20230624T185943Z – mixed Convection – Roughness=1.04mm; T=20.0+09.9°C; +90.00°
1300±2.2r/min, V=3.3m/s, Re=67010, Ra/L^3=0.959x10^9, h=29.3W/(K.m^2), U=2.73W/K, Nu=349.3



Estimated measurement uncertainties, bi-level 1mm roughness at $Re = 67089$.

Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
ΔT	9.93K	+11.9%/K	0.10K	1.19%	LM35C differential
P	99.9kPa	+0.0008%/Pa	1.5kPa	1.24%	MPXH6115A6U air pressure
C_{pt}	4.24kJ/K	+0.027%/(J/K)	42J/K	1.16%	plate thermal capacity
η	0.340	+173%	0.003	0.59%	anemometer calibration
u_u	6.381	+3.47%	0.100	0.35%	diffuser airflow upper bound
L_T	8.34mm	+9376%/m	100um	0.94%	post length
L_m	3.57mm	+462%/m	500um	0.23%	side metal strip width
ϵ_{wt}	0.900	+8.11%	0.025	0.20%	wind-tunnel emissivity
				2.42%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	1.30kr/min	+0.045%/(r/min)	2.2r/min	0.10%	fan rotation rate
				2.43%	RSS combined uncertainty