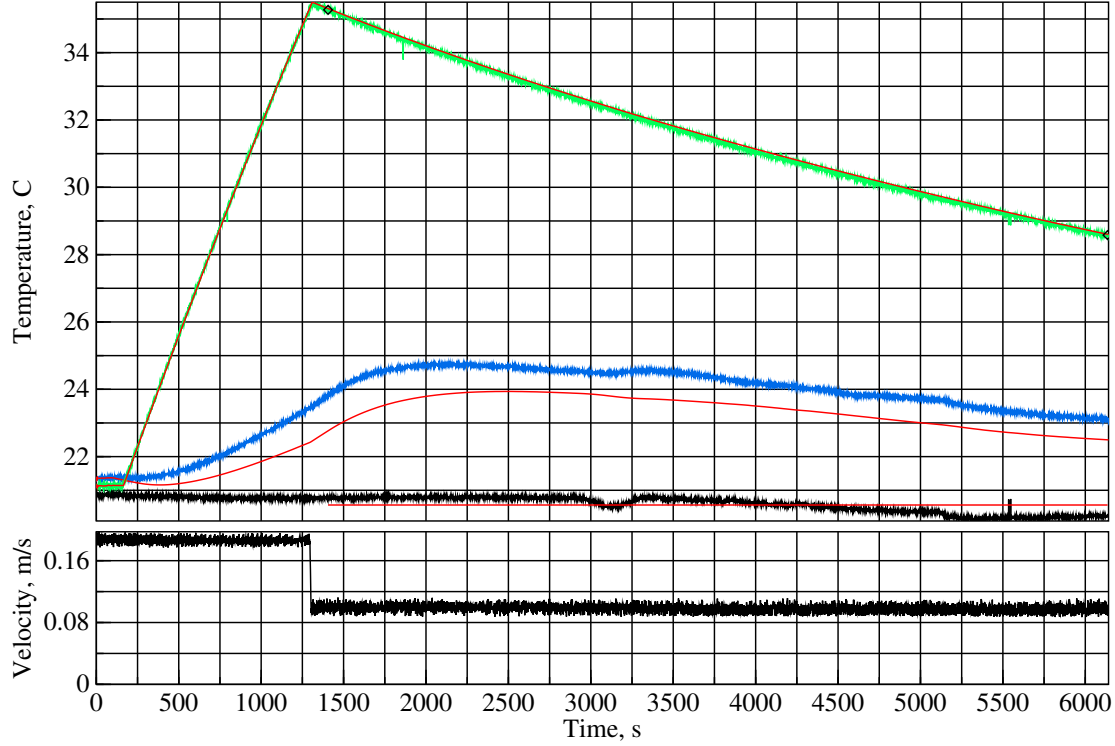


Estimated measurement uncertainties of natural convection at $\theta = 90.0$.

Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
T	299K	+0.644%/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	+1106%/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	+2560%/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	+340%	0.010	3.40%	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

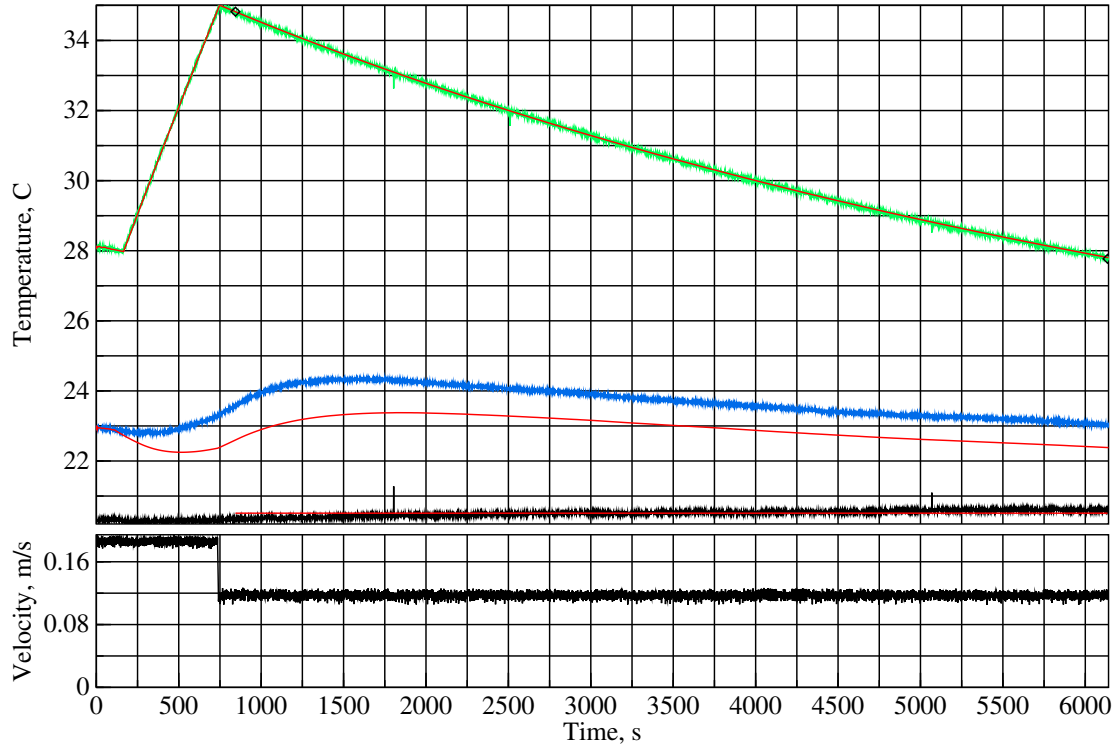
20230717T002348Z – mixed Convection – Roughness=1.04mm; T=20.6+11.0°C; +90.00°
33±1.6r/min, V=98mm/s, Re=1964, Ra/L^3=1.048x10^9, h=1.58W/(K.m^2), U=0.147W/K, Nu=18.8



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

Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
T	299K	+0.613%/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	+1095%/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°	−0.928%/°	0.50°	0.46%	plate angle
				8.05%	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

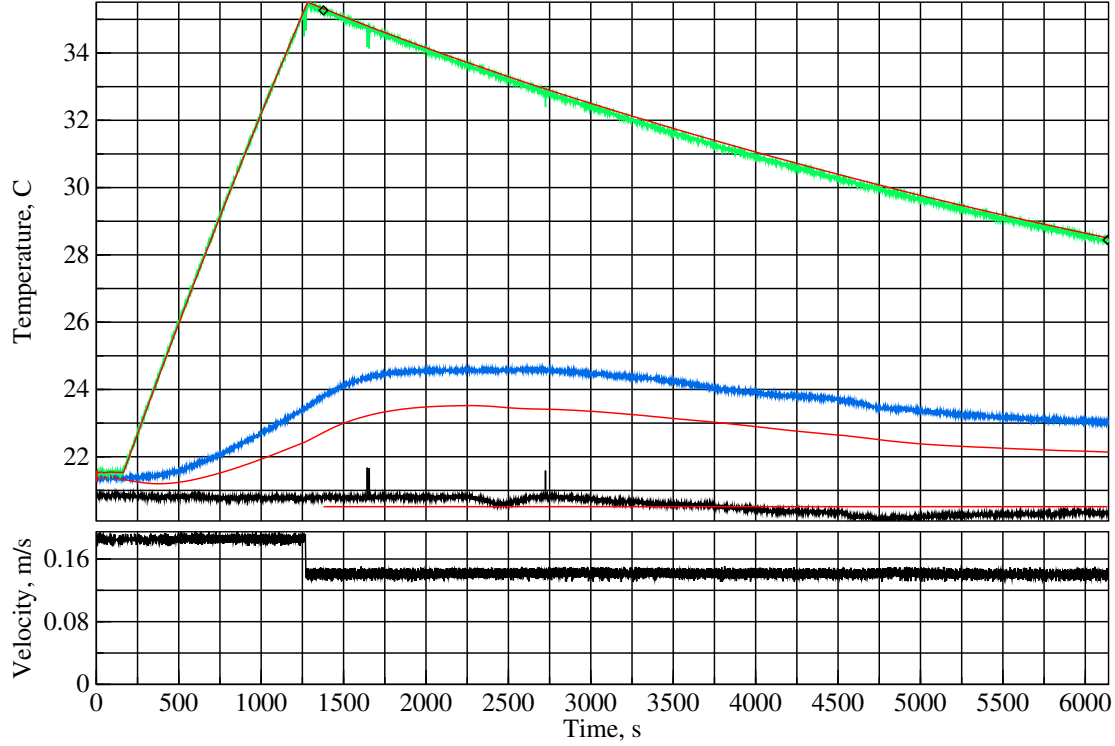
20230717T021323Z – mixed Convection – Roughness=1.04mm; T=20.5+10.3°C; +90.00°
39±1.3r/min, V=0.12m/s, Re=2344, Ra/L^3=0.992x10^9, h=1.52W/(K.m^2), U=0.142W/K, Nu=18.1



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

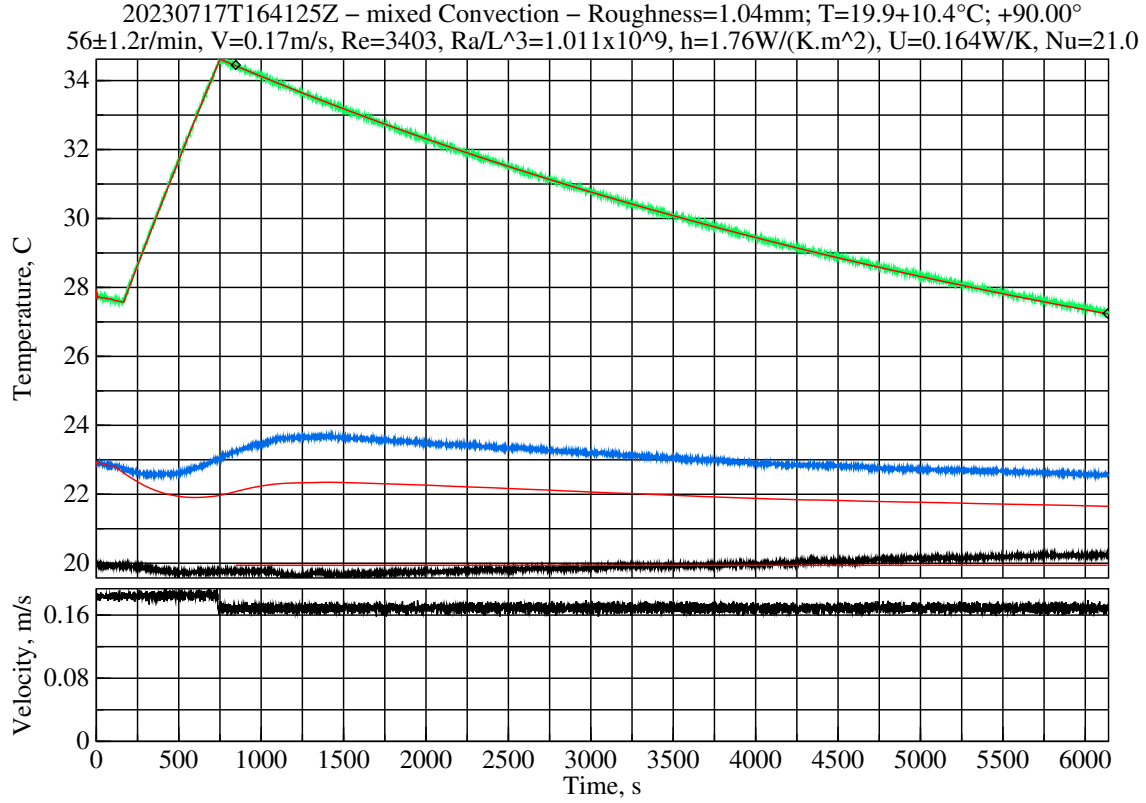
Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
T	299K	+0.596%/K	0.50K	0.30%	LM35C temperature sensor
ΔT	10.3K	+39.0%/K	0.10K	3.90%	LM35C differential
T_{bb}	293K	+0.696%/K	0.50K	0.35%	radiative temperature
P	100.0kPa	+0.0009%/Pa	1.5kPa	1.31%	MPXH6115A6U air pressure
C_{pt}	4.24kJ/K	+0.086%/(J/K)	42J/K	3.65%	plate thermal capacity
L_c	0.305m	+1084%/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°	−0.724%/°	0.50°	0.36%	plate angle
				8.15%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	38.8r/min	+0.346%/(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 $Re = 2834$.

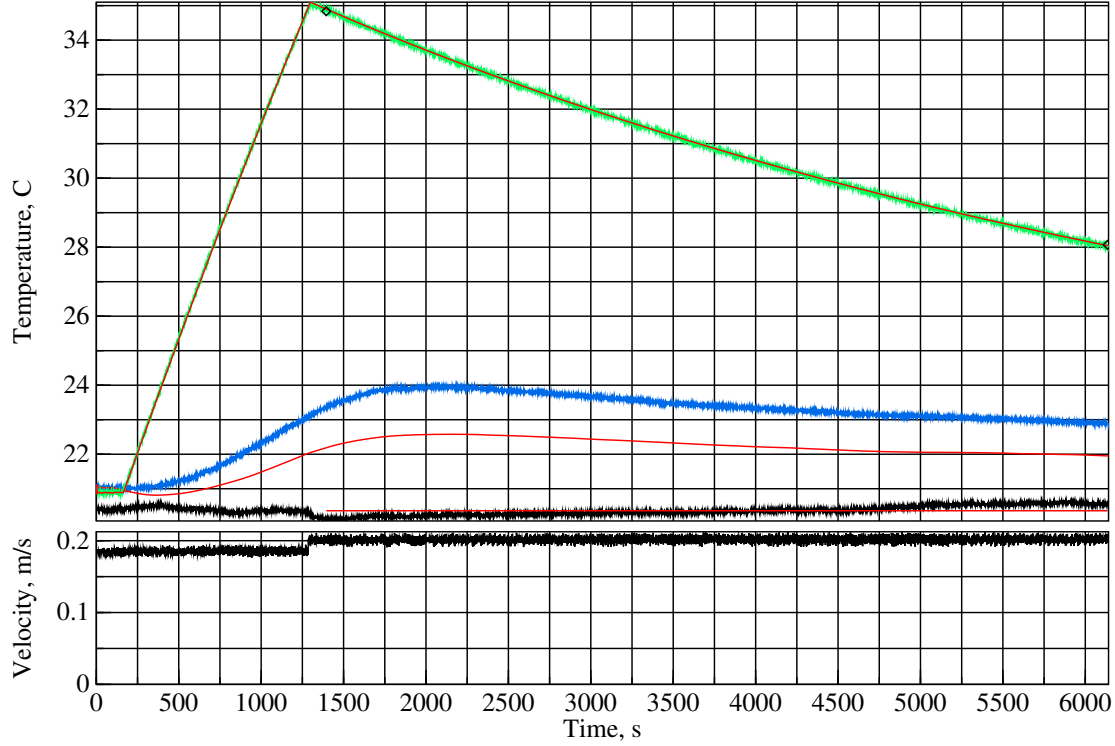
Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
T	299K	+0.545%/K	0.50K	0.27%	LM35C temperature sensor
ΔT	10.9K	+36.2%/K	0.10K	3.62%	LM35C differential
T_{bb}	294K	+0.674%/K	0.50K	0.34%	radiative temperature
P	100kPa	+0.0009%/Pa	1.5kPa	1.39%	MPXH6115A6U air pressure
C_{pt}	4.24kJ/K	+0.085%/(J/K)	42J/K	3.59%	plate thermal capacity
η	0.340	+68.1%	0.003	0.23%	anemometer calibration
L_c	0.305m	+1058%/m	500um	0.53%	characteristic length
D_{PIR}	25.4mm	−1084%/m	1.0mm	1.08%	insulation thickness
D_g	1.00mm	−1099%/m	500um	0.55%	air gap
L_m	3.57mm	+2669%/m	500um	1.33%	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	+92.0%	0.015	1.38%	tape emissivity
Ω_{tp}	0.540	+62.2%	0.020	1.24%	tape coverage
ϵ_{rs}	0.040	+329%	0.010	3.29%	test-surface emissivity
ϵ_{wt}	0.900	+151%	0.025	3.78%	wind-tunnel emissivity
				7.91%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	46.8r/min	+0.495%/(r/min)	1.3r/min	0.64%	fan rotation rate
				8.01%	RSS combined uncertainty



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

Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
T	298K	+0.432%/K	0.50K	0.22%	LM35C temperature sensor
ΔT	10.4K	+36.5%/K	0.10K	3.65%	LM35C differential
T_{bb}	293K	+0.639%/K	0.50K	0.32%	radiative temperature
P	100kPa	+0.0011%/Pa	1.5kPa	1.59%	MPXH6115A6U air pressure
C_{pt}	4.24kJ/K	+0.082%/(J/K)	42J/K	3.47%	plate thermal capacity
η	0.340	+138%	0.003	0.47%	anemometer calibration
L_c	0.305m	+1009%/m	500um	0.50%	characteristic length
ς	2.00mm	+2814%/m	100um	0.28%	post height
D_{PIR}	25.4mm	−1086%/m	1.0mm	1.09%	insulation thickness
D_g	1.00mm	−1102%/m	500um	0.55%	air gap
L_m	3.57mm	+2580%/m	500um	1.29%	side metal strip width
k_{PIR}	22.2 $\frac{mW}{K \cdot m}$	+1.07%/ $\frac{mW}{K \cdot m}$	1.1 $\frac{mW}{K \cdot m}$	1.19%	PIR thermal conductivity
k_{XPS}	28.5 $\frac{mW}{K \cdot m}$	+0.195%/ $\frac{mW}{K \cdot m}$	1.4 $\frac{mW}{K \cdot m}$	0.28%	XPS thermal conductivity
ϵ_{XPS}	0.515	+72.2%	0.010	0.72%	XPS emissivity
ϵ_{tp}	0.890	+87.1%	0.015	1.31%	tape emissivity
Ω_{tp}	0.540	+58.9%	0.020	1.18%	tape coverage
ϵ_{rs}	0.040	+312%	0.010	3.12%	test-surface emissivity
ϵ_{wt}	0.900	+143%	0.025	3.57%	wind-tunnel emissivity
θ	90.0°	+4.88%/°	0.50°	2.44%	plate angle
				8.08%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	56.0r/min	+0.836%/(r/min)	1.2r/min	1.01%	fan rotation rate
				8.33%	RSS combined uncertainty

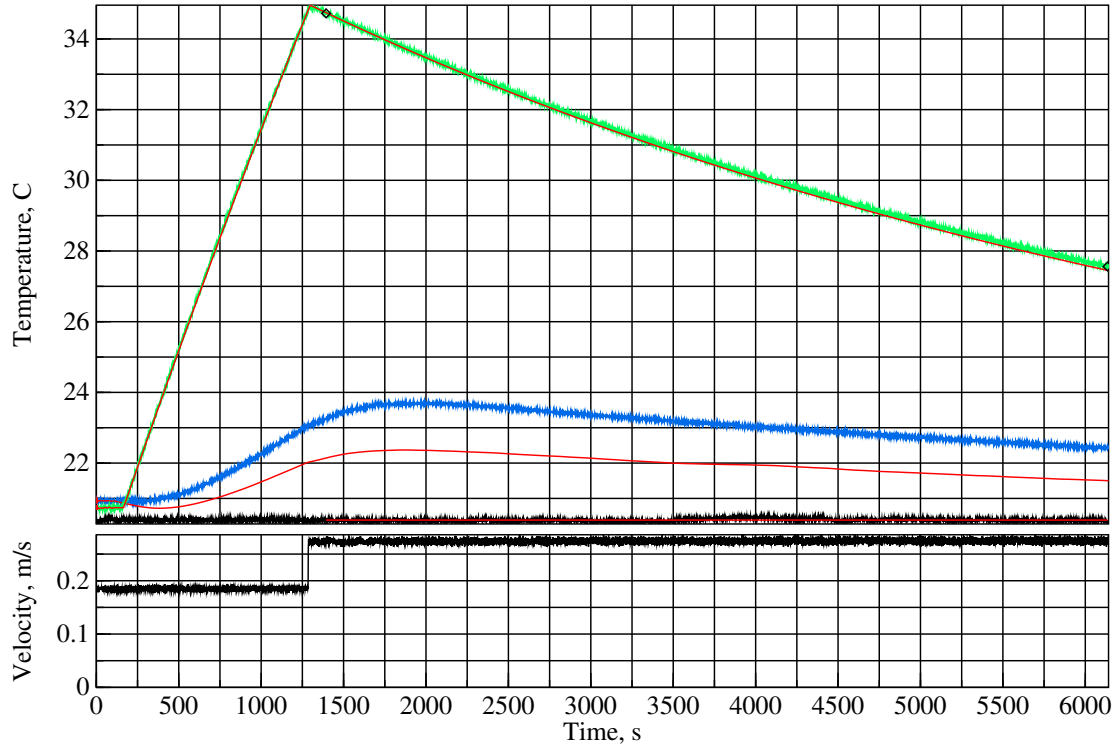
20230718T224330Z – mixed Convection – Roughness=1.04mm; T=20.4+10.7°C; +90.00°
67±1.4r/min, V=0.20m/s, Re=4050, Ra/L^3=1.030x10^9, h=1.89W/(K.m^2), U=0.175W/K, Nu=22.4



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

Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
ΔT	10.7K	+32.9%/K	0.10K	3.29%	LM35C differential
T_{bb}	294K	+0.578%/K	0.50K	0.29%	radiative temperature
P	100kPa	+0.0012%/Pa	1.5kPa	1.87%	MPXH6115A6U air pressure
C_{pt}	4.24kJ/K	+0.077%/(J/K)	42J/K	3.25%	plate thermal capacity
η	0.340	+232%	0.003	0.79%	anemometer calibration
L_c	0.305m	+951%/m	500um	0.48%	characteristic length
D_{PIR}	25.4mm	−1023%/m	1.0mm	1.02%	insulation thickness
D_g	1.00mm	−1037%/m	500um	0.52%	air gap
L_m	3.57mm	+2391%/m	500um	1.20%	side metal strip width
k_{PIR}	22.2 $\frac{mW}{K \cdot m}$	+1.01%/ $\frac{mW}{K \cdot m}$	1.1 $\frac{mW}{K \cdot m}$	1.12%	PIR thermal conductivity
k_{XPS}	28.5 $\frac{mW}{K \cdot m}$	+0.189%/ $\frac{mW}{K \cdot m}$	1.4 $\frac{mW}{K \cdot m}$	0.27%	XPS thermal conductivity
ϵ_{XPS}	0.515	+65.6%	0.010	0.66%	XPS emissivity
ϵ_{tp}	0.890	+79.2%	0.015	1.19%	tape emissivity
Ω_{tp}	0.540	+53.5%	0.020	1.07%	tape coverage
ϵ_{rs}	0.040	+284%	0.010	2.84%	test-surface emissivity
ϵ_{wt}	0.900	+129%	0.025	3.24%	wind-tunnel emissivity
θ	90.0°	+11.7%/°	0.50°	5.84%	plate angle
				9.25%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	66.8r/min	+1.18%/(r/min)	1.4r/min	1.67%	fan rotation rate
				9.84%	RSS combined uncertainty

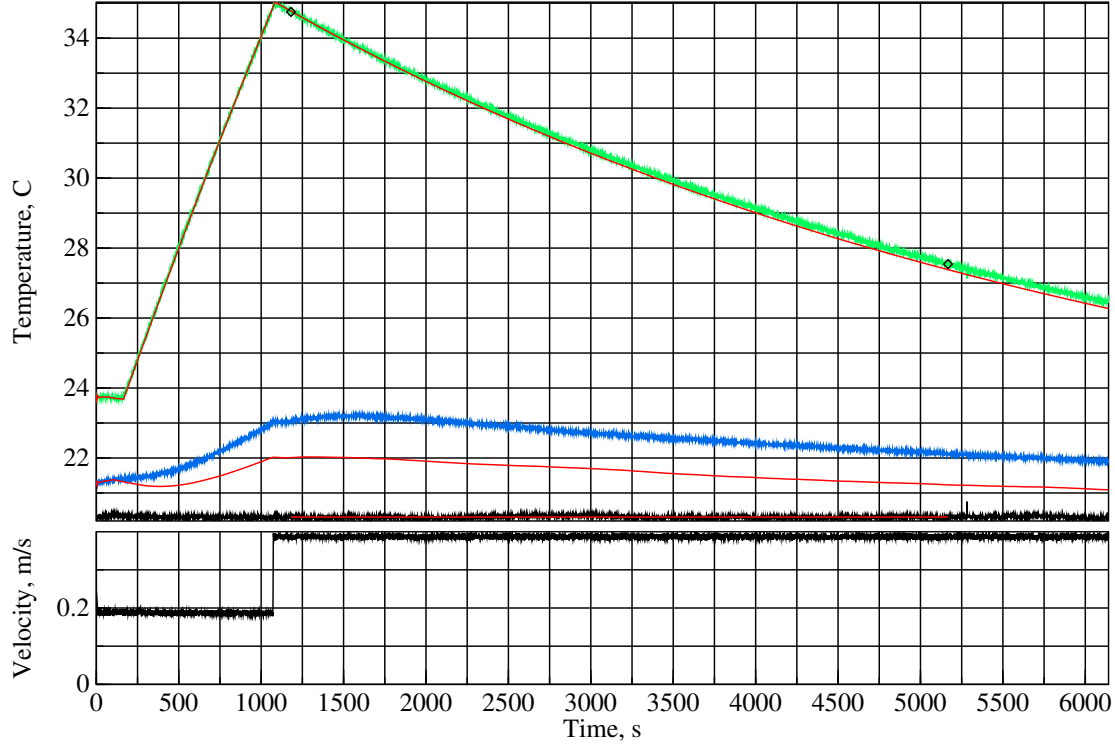
20230704T172731Z – mixed Convection – Roughness=1.04mm; T=20.4+10.3°C; +90.00°
91±1.6r/min, V=0.27m/s, Re=5516, Ra/L^3=0.996x10^9, h=2.39W/(K.m^2), U=0.222W/K, Nu=28.4



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

Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
ΔT	10.3K	+27.6%/K	0.10K	2.76%	LM35C differential
T_{bb}	294K	+0.427%/K	0.50K	0.21%	radiative temperature
P	100kPa	+0.0014%/Pa	1.5kPa	2.16%	MPXH6115A6U air pressure
C_{pt}	4.24kJ/K	+0.063%/(J/K)	42J/K	2.68%	plate thermal capacity
η	0.340	+345%	0.003	1.17%	anemometer calibration
L_c	0.305m	+845%/m	500um	0.42%	characteristic length
L_T	8.34mm	+4619%/m	100um	0.46%	post length
ς	2.00mm	−10074%/m	100um	1.01%	post height
D_{PIR}	25.4mm	−810%/m	1.0mm	0.81%	insulation thickness
D_g	1.00mm	−822%/m	500um	0.41%	air gap
L_m	3.57mm	+1855%/m	500um	0.93%	side metal strip width
k_{PIR}	22.2 $\frac{mW}{K \cdot m}$	+0.804%/ $\frac{mW}{K \cdot m}$	1.1 $\frac{mW}{K \cdot m}$	0.89%	PIR thermal conductivity
k_{XPS}	28.5 $\frac{mW}{K \cdot m}$	+0.158%/ $\frac{mW}{K \cdot m}$	1.4 $\frac{mW}{K \cdot m}$	0.23%	XPS thermal conductivity
ϵ_{XPS}	0.515	+48.6%	0.010	0.49%	XPS emissivity
ϵ_{tp}	0.890	+58.6%	0.015	0.88%	tape emissivity
Ω_{tp}	0.540	+39.6%	0.020	0.79%	tape coverage
ϵ_{rs}	0.040	+210%	0.010	2.10%	test-surface emissivity
ϵ_{wt}	0.900	+95.6%	0.025	2.39%	wind-tunnel emissivity
θ	90.0°	+11.3%/°	0.50°	5.64%	plate angle
				8.27%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	91.1r/min	+1.29%/(r/min)	1.6r/min	2.00%	fan rotation rate
				9.18%	RSS combined uncertainty

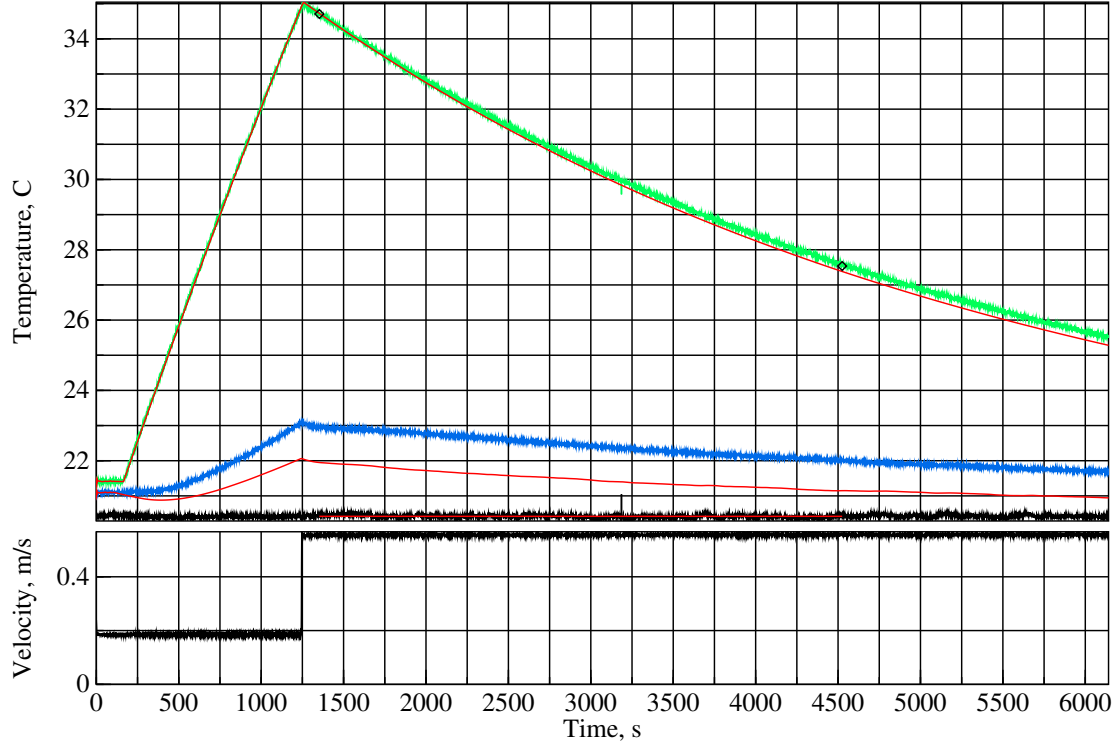
20230703T003733Z – mixed Convection – Roughness=1.04mm; T=20.3+10.4°C; +90.00°
128±1.6r/min, V=0.39m/s, Re=7758, Ra/L^3=1.001x10^9, h=3.61W/(K.m^2), U=0.336W/K, Nu=43.0



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

Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
ΔT	10.4K	+21.5%/K	0.10K	2.15%	LM35C differential
P	100kPa	+0.0014%/Pa	1.5kPa	2.12%	MPXH6115A6U air pressure
C_{pt}	4.24kJ/K	+0.050%/(J/K)	42J/K	2.12%	plate thermal capacity
η	0.340	+366%	0.003	1.25%	anemometer calibration
L_c	0.305m	+695%/m	500um	0.35%	characteristic length
L_T	8.34mm	+7453%/m	100um	0.75%	post length
ς	2.00mm	−19291%/m	100um	1.93%	post height
D_{PIR}	25.4mm	−571%/m	1.0mm	0.57%	insulation thickness
D_g	1.00mm	−579%/m	500um	0.29%	air gap
L_m	3.57mm	+1315%/m	500um	0.66%	side metal strip width
k_{PIR}	22.2 $\frac{mW}{K \cdot m}$	+0.569%/ $\frac{mW}{K \cdot m}$	1.1 $\frac{mW}{K \cdot m}$	0.63%	PIR thermal conductivity
ϵ_{XPS}	0.515	+32.2%	0.010	0.32%	XPS emissivity
ϵ_{tp}	0.890	+38.8%	0.015	0.58%	tape emissivity
Ω_{tp}	0.540	+26.2%	0.020	0.52%	tape coverage
ϵ_{rs}	0.040	+139%	0.010	1.39%	test-surface emissivity
ϵ_{wt}	0.900	+63.2%	0.025	1.58%	wind-tunnel emissivity
θ	90.0°	+5.03%/°	0.50°	2.52%	plate angle
				5.69%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	128r/min	+0.969%/(r/min)	1.6r/min	1.56%	fan rotation rate
				6.49%	RSS combined uncertainty

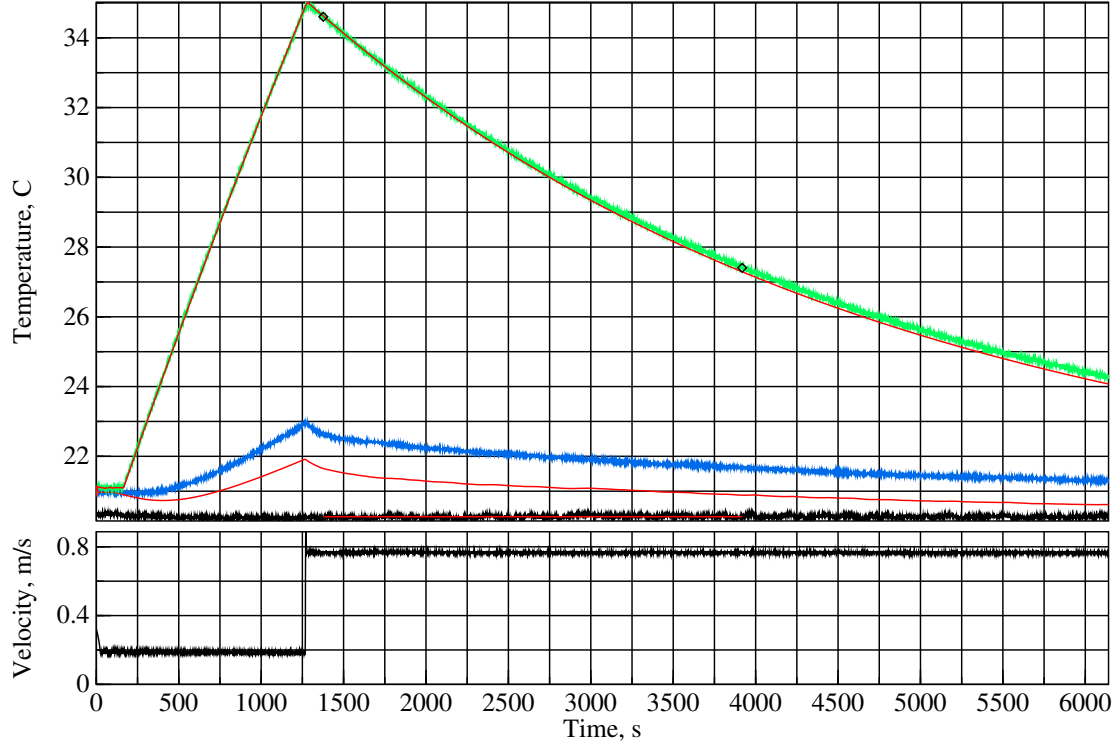
20230705T012225Z – mixed Convection – Roughness=1.04mm; T=20.4+10.3°C; +90.00°
185±1.1r/min, V=0.56m/s, Re=11184, Ra/L^3=0.997x10^9, h=5.75W/(K.m^2), U=0.535W/K, Nu=68.4



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

Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
ΔT	10.3K	+17.6%/K	0.10K	1.76%	LM35C differential
P	100kPa	+0.0012%/Pa	1.5kPa	1.85%	MPXH6115A6U air pressure
C_{pt}	4.24kJ/K	+0.041%/(J/K)	42J/K	1.74%	plate thermal capacity
η	0.340	+333%	0.003	1.13%	anemometer calibration
L_c	0.305m	+492%/m	500um	0.25%	characteristic length
L_T	8.34mm	+8725%/m	100um	0.87%	post length
ς	2.00mm	-17187%/m	100um	1.72%	post height
D_{PIR}	25.4mm	-391%/m	1.0mm	0.39%	insulation thickness
L_m	3.57mm	+937%/m	500um	0.47%	side metal strip width
k_{PIR}	22.2 $\frac{mW}{K \cdot m}$	+0.392%/ $\frac{mW}{K \cdot m}$	1.1 $\frac{mW}{K \cdot m}$	0.44%	PIR thermal conductivity
ϵ_{XPS}	0.515	+20.8%	0.010	0.21%	XPS emissivity
ϵ_{tp}	0.890	+25.2%	0.015	0.38%	tape emissivity
Ω_{tp}	0.540	+17.0%	0.020	0.34%	tape coverage
ϵ_{rs}	0.040	+90.5%	0.010	0.90%	test-surface emissivity
ϵ_{wt}	0.900	+40.9%	0.025	1.02%	wind-tunnel emissivity
θ	90.0°	+1.97%/°	0.50°	0.98%	plate angle
				4.29%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	185r/min	+0.611%/(r/min)	1.1r/min	0.68%	fan rotation rate
				4.50%	RSS combined uncertainty

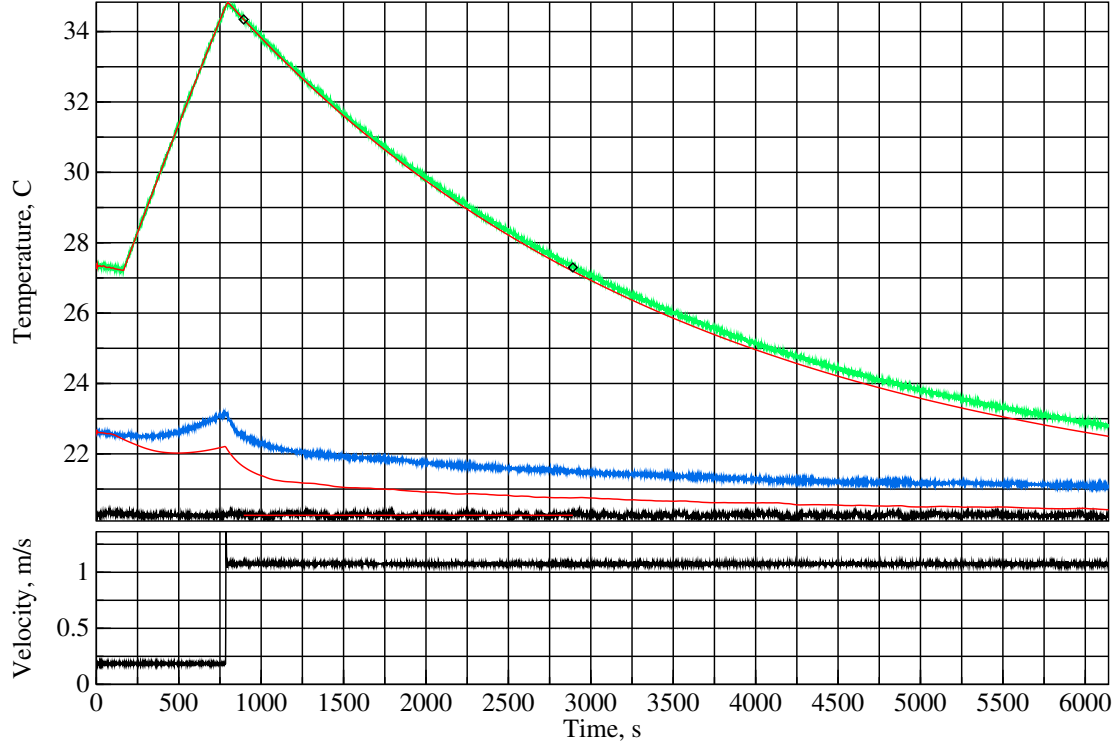
20230702T224545Z – mixed Convection – Roughness=1.04mm; T=20.3+10.3°C; +90.00°
256±1.1r/min, V=0.77m/s, Re=15402, Ra/L^3=0.992x10^9, h=8.15W/(K.m^2), U=0.758W/K, Nu=97.1



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

Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
ΔT	10.3K	+15.4%/K	0.10K	1.54%	LM35C differential
P	99.9kPa	+0.0011%/Pa	1.5kPa	1.65%	MPXH6115A6U air pressure
C_{pt}	4.24kJ/K	+0.036%/(J/K)	42J/K	1.53%	plate thermal capacity
η	0.340	+298%	0.003	1.01%	anemometer calibration
L_T	8.34mm	+9068%/m	100um	0.91%	post length
ς	2.00mm	−12506%/m	100um	1.25%	post height
D_{PIR}	25.4mm	−289%/m	1.0mm	0.29%	insulation thickness
L_m	3.57mm	+739%/m	500um	0.37%	side metal strip width
k_{PIR}	22.2 $\frac{mW}{K \cdot m}$	+0.291%/ $\frac{mW}{K \cdot m}$	1.1 $\frac{mW}{K \cdot m}$	0.32%	PIR thermal conductivity
ϵ_{tp}	0.890	+17.8%	0.015	0.27%	tape emissivity
Ω_{tp}	0.540	+12.0%	0.020	0.24%	tape coverage
ϵ_{rs}	0.040	+64.3%	0.010	0.64%	test-surface emissivity
ϵ_{wt}	0.900	+29.0%	0.025	0.72%	wind-tunnel emissivity
θ	90.0°	+0.923%/°	0.50°	0.46%	plate angle
				3.54%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	256r/min	+0.395%/(r/min)	1.1r/min	0.44%	fan rotation rate
				3.65%	RSS combined uncertainty

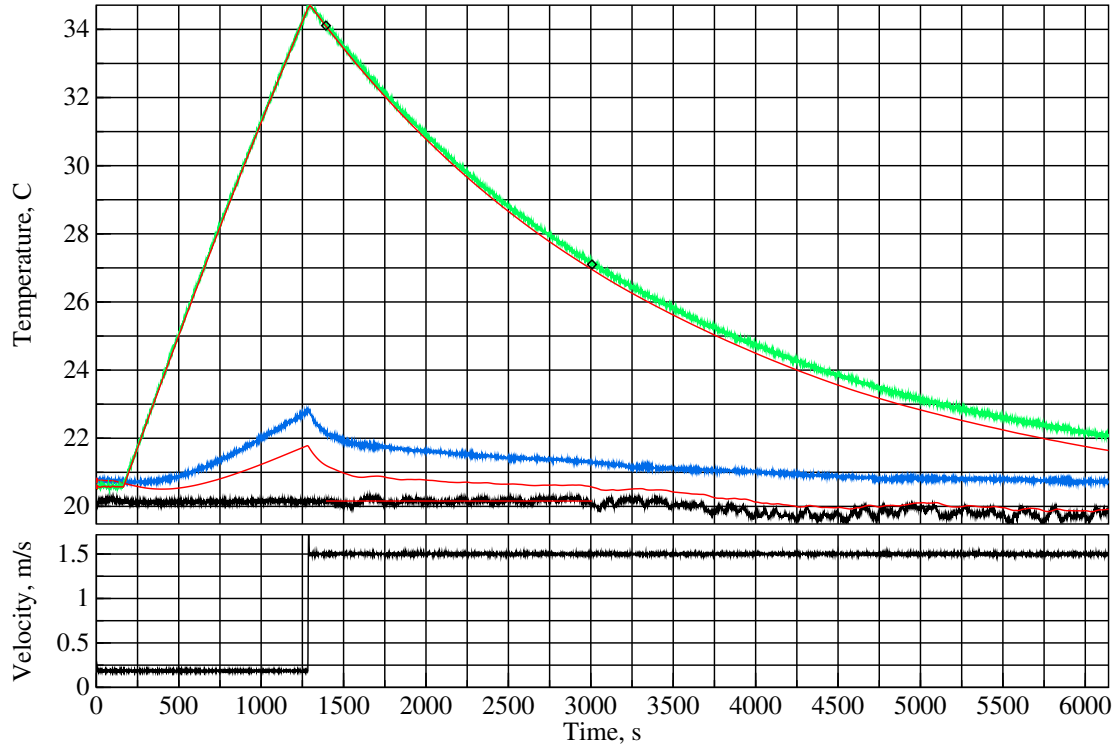
20230704T015123Z – mixed Convection – Roughness=1.04mm; T=20.3+10.2°C; +90.00°
362±2.3r/min, V=1.1m/s, Re=21646, Ra/L^3=0.984x10^9, h=11.5W/(K.m^2), U=1.07W/K, Nu=137.1



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

Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
ΔT	10.2K	+14.0%/K	0.10K	1.40%	LM35C differential
P	100kPa	+0.0010%/Pa	1.5kPa	1.48%	MPXH6115A6U air pressure
C_{pt}	4.24kJ/K	+0.033%/(J/K)	42J/K	1.38%	plate thermal capacity
η	0.340	+269%	0.003	0.91%	anemometer calibration
L_T	8.34mm	+9213%/m	100um	0.92%	post length
ς	2.00mm	−8339%/m	100um	0.83%	post height
D_{PIR}	25.4mm	−215%/m	1.0mm	0.21%	insulation thickness
L_m	3.57mm	+608%/m	500um	0.30%	side metal strip width
k_{PIR}	22.2 $\frac{mW}{K \cdot m}$	+0.218%/ $\frac{mW}{K \cdot m}$	1.1 $\frac{mW}{K \cdot m}$	0.24%	PIR thermal conductivity
ϵ_{rs}	0.040	+46.2%	0.010	0.46%	test-surface emissivity
ϵ_{wt}	0.900	+20.7%	0.025	0.52%	wind-tunnel emissivity
θ	90.0°	+0.434%/°	0.50°	0.22%	plate angle
				3.05%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	362r/min	+0.252%/(r/min)	2.3r/min	0.57%	fan rotation rate
				3.26%	RSS combined uncertainty

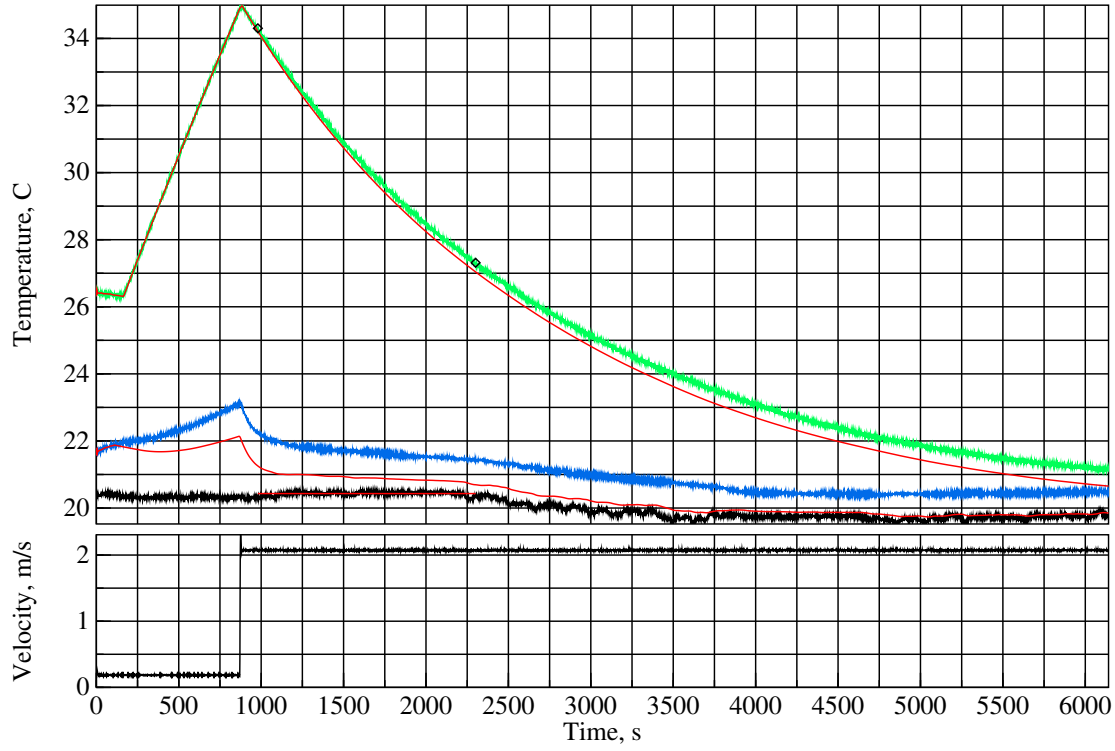
20230702T182824Z – mixed Convection – Roughness=1.04mm; T=20.2+10.1°C; +90.00°
512±2.1r/min, V=1.5m/s, Re=30147, Ra/L^3=0.973x10^9, h=15.2W/(K.m^2), U=1.41W/K, Nu=181.0



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

Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
ΔT	10.1K	+13.1%/K	0.10K	1.31%	LM35C differential
P	100.0kPa	+0.0009%/Pa	1.5kPa	1.38%	MPXH6115A6U air pressure
C_{pt}	4.24kJ/K	+0.030%/(J/K)	42J/K	1.29%	plate thermal capacity
η	0.340	+245%	0.003	0.83%	anemometer calibration
L_T	8.34mm	+9287%/m	100um	0.93%	post length
ς	2.00mm	-5386%/m	100um	0.54%	post height
L_m	3.57mm	+529%/m	500um	0.26%	side metal strip width
ϵ_{rs}	0.040	+34.2%	0.010	0.34%	test-surface emissivity
ϵ_{wt}	0.900	+15.3%	0.025	0.38%	wind-tunnel emissivity
				2.76%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	512r/min	+0.163%/(r/min)	2.1r/min	0.35%	fan rotation rate
				2.85%	RSS combined uncertainty

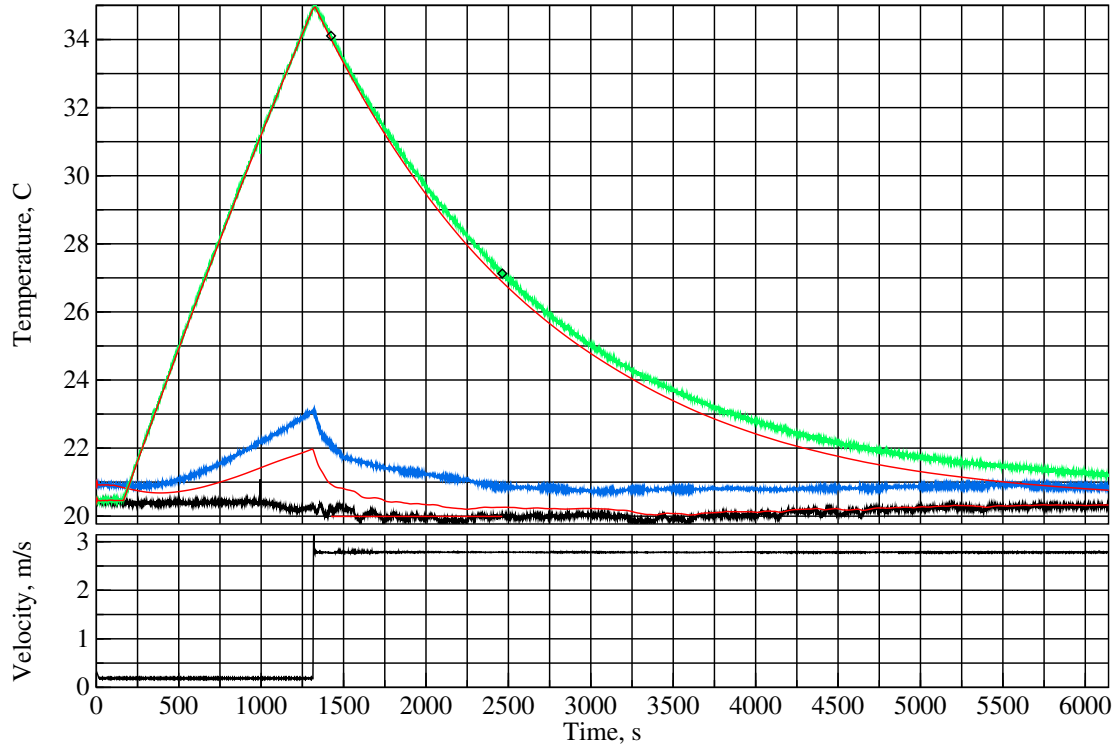
20230703T215438Z – mixed Convection – Roughness=1.04mm; T=20.4+09.9°C; +90.00°
727±2.0r/min, V=2.1m/s, Re=41550, Ra/L^3=0.956x10^9, h=19.6W/(K.m^2), U=1.82W/K, Nu=233.1



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

Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
ΔT	9.93K	+12.5%/K	0.10K	1.25%	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	1.22%	plate thermal capacity
η	0.340	+222%	0.003	0.75%	anemometer calibration
L_T	8.34mm	+9333%/m	100um	0.93%	post length
ς	2.00mm	-3314%/m	100um	0.33%	post height
L_m	3.57mm	+482%/m	500um	0.24%	side metal strip width
ϵ_{rs}	0.040	+26.1%	0.010	0.26%	test-surface emissivity
ϵ_{wt}	0.900	+11.6%	0.025	0.29%	wind-tunnel emissivity
				2.58%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	727r/min	+0.104%/(r/min)	2.0r/min	0.21%	fan rotation rate
				2.61%	RSS combined uncertainty

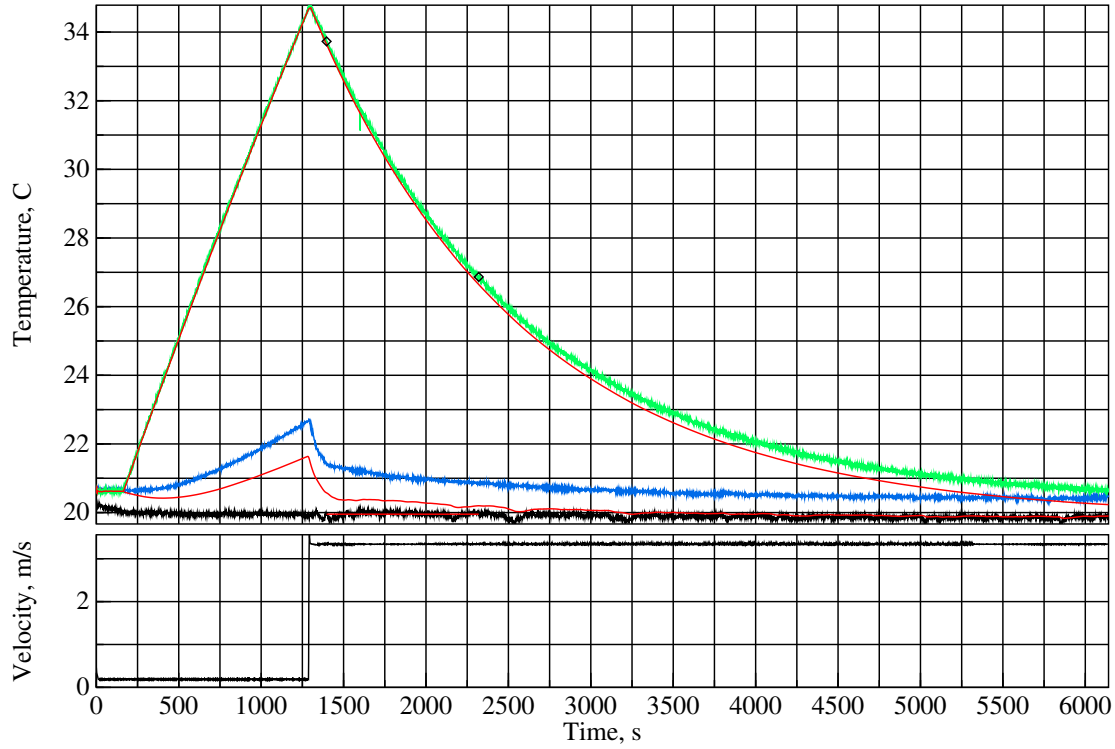
20230712T011216Z – mixed Convection – Roughness=1.04mm; T=20.0+10.2°C; +90.00°
1025±2.5r/min, V=2.8m/s, Re=55931, Ra/L^3=0.992x10^9, h=25.2W/(K.m^2), U=2.34W/K, Nu=299.9



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

Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
ΔT	10.2K	+11.7%/K	0.10K	1.17%	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	+9364%/m	100um	0.94%	post length
L_m	3.57mm	+455%/m	500um	0.23%	side metal strip width
ϵ_{rs}	0.040	+20.4%	0.010	0.20%	test-surface emissivity
ϵ_{wt}	0.900	+9.06%	0.025	0.23%	wind-tunnel emissivity
				2.44%	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
				2.46%	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	+11.8%/K	0.10K	1.18%	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	1.15%	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	+9379%/m	100um	0.94%	post length
L_m	3.57mm	+445%/m	500um	0.22%	side metal strip width
				2.41%	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
				2.42%	RSS combined uncertainty