DATA FILE NAMING CONVENTION

An example data file name is : **`P17-090.DAT`**

- The 2nd character of the file name indicates the angle of attack (α) of the prolate spheroid (1: $\alpha = 10°$; 2: $\alpha = 20°$). So, the example file (**`P17-090.DAT`**) contains data for the prolate spheroid at $\alpha = 10°$.

- The 3rd character of the file name indicates the axial position (x/L) on the prolate spheroid at which the data was acquired (6: $x/L = 0.600$; 7: $x/L = 0.772$). So, the example file (**`P17-090.DAT`**) contains data at $x/L = 0.772$.

- The 5th through 7th characters of the file name indicates the azimuthal position (ϕ) on the prolate spheroid at which the data was acquired (090: $\phi = 90°$; 095: $\phi = 95°$; etc). So, the example file (**`P17-090.DAT`**) contains data at $\phi = 90°$.

COLUMN NAMES

The definitions of the column names for the ASCII pressure spectra data files are given below. A list of symbols is included at the end of this file.

RawF = Dimensional frequency (Hz)
RawP = Dimensional power spectral density ($\mathrm{Pa}^2/\mathrm{Hz}$)
RawPdB = Power spectral density in SPL re 20 µPa
CorcF = Non-dimensional frequency (= $\omega d / 2U_C$: assuming $U_C = 14u_\tau$)
CorcCor = Corcos correction (= $\Phi_{\mathrm{TRUE}} / \Phi_{\mathrm{MEAS}}$)
CorcP = Corcos corrected power spectral density ($\mathrm{Pa}^2/\mathrm{Hz}$)
CorcPdB = Corcos corrected power spectral density in SPL re 20 µPa

$$\mathrm{InF1} = \frac{\omega \nu}{u_\tau^2} \qquad \mathrm{OutF1} = \frac{\omega \delta^*}{U_e}$$

$$\mathrm{InP1} = 10\, log_{10}\left[\frac{\Phi(\omega) u_\tau^2}{\tau_W^2\ \nu}\right] \qquad \mathrm{OutP1} = 10\, log_{10}\left[\frac{\Phi(\omega) U_e}{\tau_W^2\ \delta^*}\right]$$

$$\mathrm{OutP2} = 10\, log_{10}\left[\frac{\Phi(\omega) U_e}{Q_e^2\ \delta^*}\right]$$

LIST OF SYMBOLS

d	Pressure transducer sensing diameter
f	Frequency, Hz
L	Model length, 1.37 m
Q	Dynamic pressure, $\frac{1}{2}\rho U_e^2$
r	Distance from model surface along a line perpendicular to the model axis
Re_L	Model length Reynolds number, $U_\infty L / \nu$
Re_θ	Momentum thickness Reynolds number, $U_\infty \theta / \nu$
u_τ	Friction velocity, $(\tau_W / \rho)^{1/2}$
u, v, w	Fluctuating velocity components in the directions of U, V, and W, respectively
U	Velocity component in a plane parallel to the surface, in the axial direction
U_C	Convection velocity of pressure fluctuations
U_e	Total velocity at edge of shear layer
U_∞	Wind tunnel free-stream velocity
V	Mean velocity component normal to the local model surface
W	Mean velocity component in a plane parallel to the local model surface and perpendicular to the axial direction (positive in $-\phi$ direction)
x	Axial distance from the nose of the model
y^+	$r u_\tau / \nu$
α	Angle of attack of model relative to incoming flow
δ^*	Boundary layer displacement thickness

$$\delta^* = \int_0^\delta \left[1 - \frac{(U^2 + W^2)^{\frac{1}{2}}}{(U^2 + W^2)_e^{\frac{1}{2}}} \right] dr$$

δ	Boundary layer thickness. Distance from the wall where $(U^2+W^2)^{1/2} / U_e = 0.995$
ν	Kinematic viscosity of air
ρ	Mass density of air
θ	Boundary layer momentum thickness

$$\theta = \int_0^\delta \left[1 - \frac{(U^2 + W^2)^{\frac{1}{2}}}{(U^2 + W^2)_e^{\frac{1}{2}}} \right] \left[\frac{(U^2 + W^2)^{\frac{1}{2}}}{(U^2 + W^2)_e^{\frac{1}{2}}} \right] dr$$

τ_W	Shear-stress magnitude at the wall
ϕ	Circumferencial angle coordinate, from windward side
Φ	Spectral power density of surface pressure fluctuations such that

$$\overline{p^2} = \int_0^\infty \Phi(\omega)\, d\omega$$

ω	Circular frequency, $(2\pi f)$, rad/s

superscript:

$(\ )'$	The root mean square value of a fluctuating quantity
$(\ )^+$	Indicates that the variable is made non-dimensional using the viscous scales: τ_W for pressure, u_τ for velocity, and ν/u_τ for length
$(\overline{\ \ })$	Denotes a long-time averaged quantity