NOMENCLATURE: SYMBOLS AND UNITS

Note.— Many of the following definitions and symbols are specific to aircraft noise certification. Some of the definitions and symbols may also apply to purposes beyond aircraft noise certification.

Symbol	*Unit*	*Meaning*
antilog	—	*Antilogarithm to the base 10.*
Best R/C	m/s	*Best rate of climb*. The certificated maximum take-off rate of climb at the maximum power setting and engine speed.
c	m/s	*Speed of sound.* The speed of sound at test conditions.
c_A	m/s	*Speed of sound at aeroplane height.* The speed of sound corresponding to the temperature for an ICAO Standard Atmosphere + 10° C at the aeroplane test height above mean sea level. (See noise data adjustments for test at high altitude test sites, section 4.3.2.3.)
c_B	m/s	*Speed of sound at equivalent aeroplane height.* The speed of sound corresponding to the temperature for an ICAO Standard Atmosphere + 10° C at the aeroplane test height above mean sea level minus the test-site elevation. (See noise data adjustments for test at high altitude test sites, section 4.3.2.3.)
c_{HR}	m/s	*Reference speed of sound.* The reference speed of sound corresponding to the ambient temperature for a standard day at the aeroplane reference height above mean sea level. (See no-acoustical change guidance for propeller-driven aeroplanes, section 5.2.5.3.)
c_R	m/s	*Reference speed of sound*. Speed of sound at reference conditions.
C	dB	*Tone correction factor.* The factor to be added to the PNL of a given spectrum to account for the presence of spectral irregularities such as tones.
CPA	m	*Closest point of approach.* The distance between the aircraft and the microphone at the closest point on the flight path to the microphone. (See determination of noise geometry, section 4.3.1.2.)
CPA_R	m	*Reference closest point of approach.* The distance between the aircraft and the reference microphone at the closest point on the reference flight path to the reference microphone. (See determination of noise geometry, section 4.3.1.2.)
CPA_{OHR}	m	A distance used as an intermediate calculation in the determination of aircraft noise geometry. (See determination of noise geometry, section 4.3.1.2.)

Symbol	*Unit*	*Meaning*
d	s	*Duration.* The time interval between 10 dB-down points in the discrete measured PNLT time history. (See guidelines on adjustment of helicopter land-use planning noise data, section 8.3.1.)
d_R	s	*Reference duration.* For a non-constant airspeed reference flight condition, the time interval between the positions on the reference flight path corresponding to the 10 dB-down points in the discrete measured PNLT time history. (See guidelines on adjustment of helicopter land-use planning noise data, section 8.3.1.)
D	m	*Diameter*. Propeller or rotor diameter.
D_{15}	m	*Take-off distance.* The take-off distance required for an aeroplane to reach 15 m height above ground level. (See no-acoustical change guidance for propeller-driven aeroplanes, section 5.2.5.3.)
D_{50}	ft	*Take-off distance.* The take-off distance required for an aeroplane to reach 50 m height above ground level. (See propeller-driven aeroplane source noise adjustment, section 5.2.5.3.)
e	—	*Euler's number*. The mathematical constant that is the base number of the natural logarithm, approximately 2.78183.
EPNL	EPNdB	*Effective perceived noise level.* A single-number evaluator for an aircraft pass-by, accounting for the subjective effects of aircraft noise on human beings, consisting of an integration over the noise duration of the perceived noise level (PNL) adjusted for spectral irregularities (PNLT), normalized to a reference duration of 10 seconds. (See Appendix 2, section 4.1, of the Annex for specifications.)
$EPNL_A$	EPNdB	*Approach EPNL.* Effective perceived noise level at the aeroplane approach reference measurement points. (See Attachment A of the Annex.)
$EPNL_F$	EPNdB	*Flyover EPNL.* Effective perceived noise level at the aeroplane flyover reference measurement points. (See Attachment A of the Annex.)
$EPNL_L$	EPNdB	*Lateral EPNL.* Effective perceived noise level at the aeroplane lateral reference measurement points. (See Attachment A of the Annex.)
f	Hz	*Frequency.* The nominal geometric mean frequency of a one-third octave band.
f_{DOPP}	Hz	*Doppler-shifted frequency.* The observed frequency at the receiver of an aeroplane noise source that results from the motion of the aeroplane relative to the microphone due to Doppler frequency shift. (See identification of spectral irregularities, section 4.3.2.2.)

Symbol	*Unit*	*Meaning*
f_{flight}	Hz	*Flight frequency*. The predicted, Doppler-shifted frequency of an aeroplane noise source other than jet noise measured during static testing that results from the motion of the aeroplane relative to the microphone. (See static engine noise tests, section 4.2.1.3.)
f_{static}	Hz	*Static frequency*. The frequency of an aeroplane noise source other than jet noise measured during static testing. (See static engine noise tests, section 4.2.1.3.)
F	dB	*Delta-dB.* The difference between the original sound pressure level and the final broadband sound pressure level of a one-third octave band in a given spectrum.
F_N	N	*Engine thrust.* Actual engine net thrust per engine.
FPDdist	m	A distance used as an intermediate calculation in the determination of aircraft noise geometry. (See determination of noise geometry, section 4.3.1.2.)
FPDdist_R	m	A distance used as an intermediate calculation in the determination of aircraft noise geometry. (See determination of noise geometry, section 4.3.1.2.)
FPInc_R	m	A distance used as an intermediate calculation in the determination of aircraft noise geometry. (See determination of noise geometry, section 4.3.1.2.)
F1	—	*Directivity correction factor*. An adjustment to the jet source noise based on the sound emission angle of the one-half-second spectrum being corrected. (See noise data adjustments for test at high altitude test sites, section 4.3.2.3.)
F2	—	*Frequency correction factor*. An adjustment to the jet source noise based on the band number of the one-third octave band sound pressure level being corrected. (See noise data adjustments for test at high altitude test sites, section 4.3.2.3.)
Galt	m	A distance used as an intermediate calculation in the determination of aircraft noise geometry. (See determination of noise geometry, section 4.3.1.2.)
GCPA	m	A distance used as an intermediate calculation in the determination of aircraft noise geometry. (See determination of noise geometry, section 4.3.1.2.)
Ginc	m	A distance used as an intermediate calculation in the determination of aircraft noise geometry. (See determination of noise geometry, section 4.3.1.2.)
Gnorm	m	A distance used as an intermediate calculation in the determination of aircraft noise geometry. (See determination of noise geometry, section 4.3.1.2.)
H	m	*Height*. The aircraft height when overhead or abeam of the centre microphone.
H_{MIC}	m	*Microphone height.* The height of the microphone above the ground. (See determination of noise geometry, section 4.3.1.2.)

Symbol	*Unit*	*Meaning*
H_{MICR}	m	*Reference microphone height.* The height of the reference microphone, 1.2 m, above the reference ground plane. (See determination of noise geometry, section 4.3.1.2.)
H_R	m	*Reference height*. The reference aircraft height when overhead or abeam of the centre microphone.
i	—	*Frequency band index.* The numerical indicator that denotes any one of the 24 one-third octave bands with nominal geometric mean frequencies from 50 to 10 000 Hz.
i_{LGB}	—	*Last good band index.* Index of the highest frequency unmasked one-third octave band in a spectrum. (See background noise adjustment procedure.)
k	—	*Doppler adjustment constant.* A constant used in the calculation of flight sound pressure level from static engine test data. (See static engine noise tests, section 4.2.1.3.)
k	—	*Time increment index*. The numerical indicator that denotes any one of the 0.5 second spectra in a noise time history. For the integrated method, the adjusted time increment associated with each value of k will likely vary from the original 0.5 second time increment when projected to reference conditions.
k_F	—	*First time increment identifier*. Index of the first 10 dB-down point in the discrete measured PNLT time history.
k_{FR}	—	*Reference first time increment identifier*. Index of the first 10 dB-down point in the discrete PNLT time history for the integrated method.
k_L	—	*Last time increment identifier*. Index of the last 10 dB-down point in the discrete measured PNLT time history.
k_{LR}	—	*Reference last time increment identifier*. Index of the last 10 dB-down point in the discrete PNLT time history for the integrated method.
k_M	—	*PNLTM time increment identifier*. Time increment index of PNLTM.
k_{M2}	—	*Secondary peak time increment identifier*. Index of the maximum secondary peak. (See determination of the Δ_{peak} adjustment term, section 4.3.1.3.5.)
log	—	*Logarithm to the base 10.*
log $n(a)$	—	*Noy discontinuity coordinate.* The log n value of the intersection point of the straight lines representing the variation of SPL with log n. (See mathematical formulation of noy tables, Appendix 2, section 4.7, of the Annex.)

Symbol	*Unit*	*Meaning*
L_{AE}	dB SEL	*Sound exposure level (SEL)*. A single event noise level for an aircraft pass-by, consisting of an integration over the noise duration of the A-weighted sound level (dB(A)), normalized to a reference duration of 1 second. (See Appendix 4, section 3, of the Annex for specifications.)
L_{AS}	dB(A)	*Slow A-weighted sound level*. Sound level with frequency weighting A and time weighting S for a specified instance in time.
L_{ASmax}	dB(A)	*Maximum Slow A-weighted sound level*. The maximum value of L_{AS} over a specified time interval.
L_{ASmaxR}	dB(A)	*Reference maximum Slow A-weighted sound level.* The maximum value of L_{AS} over a specified time interval corrected to reference conditions.
$LIMIT_A$	EPNdB	*Approach EPNL limit*. The maximum permitted noise level at the aeroplane approach reference measurement points. (See Attachment A of the Annex.)
$LIMIT_F$	EPNdB	*Flyover EPNL limit*. The maximum permitted noise level at the aeroplane flyover reference measurement points. (See Attachment A of the Annex.)
$LIMIT_L$	EPNdB	*Lateral EPNL limit*. The maximum permitted noise level at the aeroplane lateral reference measurement points. (See Attachment A of the Annex.)
m	—	*Closest valid band time increment identifier*. Index of the nearest record in time that contains a valid level for a given band. (See background noise adjustment procedure, section 3.6.3.)
M	—	*Aircraft Mach number*. The test airspeed of the aircraft divided by the test speed of sound.
M	—	*Noy inverse slope.* The reciprocals of the slopes of straight lines representing the variation of SPL with log n. (See mathematical formulation of noy tables, Appendix 2, section 4.7, of the Annex.)
Malt	m	A distance used as an intermediate calculation in the determination of aircraft noise geometry. (See determination of noise geometry, section 4.3.1.2.)
M_{AT}	—	*Helicopter rotor advancing blade tip Mach number*. The sum of the test rotational tip speed of a rotor and the test airspeed of the helicopter, divided by the test speed of sound.
M_{ATR}	—	*Helicopter rotor reference advancing blade tip Mach number*. The sum of the reference rotor rotational tip speed and the reference speed of the helicopter, divided by the reference speed of sound.
M_H	—	*Propeller helical tip Mach number*. The square root of the sum of the square of the propeller test rotational tip speed and the square of the test airspeed of the aeroplane, divided by the test speed of sound.

Symbol	*Unit*	*Meaning*
M_{HR}	—	*Propeller reference helical tip Mach number*. The square root of the sum of the square of the propeller reference rotational tip speed and the square of the reference speed of the aeroplane, divided by the reference speed of sound.
n	noy	*Perceived noisiness.* The perceived noisiness of a one-third octave band sound pressure level in a given spectrum. (See mathematical formulation of noy tables, Appendix 2, section 4.7, of the Annex.)
N	rpm	*Propeller speed.* (See no-acoustical change guidance for propeller-driven aeroplanes, section 5.2.5.3.)
N	noy	*Total perceived noisiness.* The total perceived noisiness of a given spectrum calculated from the 24 values of n. (See mathematical formulation of noy tables, Appendix 2, section 4.7, of the Annex.)
N_1	rpm	*Compressor speed.* The turbine engine low pressure compressor first stage fan speed.
N_{1C}	rpm	*Corrected compressor speed*. The turbine engine low pressure compressor first stage fan speed corrected to sea level standard day conditions. (See noise data adjustments for test at high altitude test sites, section 4.3.2.3.)
p	—	*Aircraft position time increment index.* Index of a point in the discrete measured aircraft position time history before interpolation to the sound emission time of point k in a noise time history. (See determination of noise geometry, section 4.3.1.2.)
p_A	Pa	*A-weighted sound pressure*. The root-mean-squared sound pressure with frequency weighting A for a specified instance in time, used to calculate A-weighted sound level.
p_{HR}	hPa	*Reference pressure.* The standard day ambient pressure at the aeroplane reference height above mean sea level. (See no-acoustical change guidance for propeller-driven aeroplanes, section 5.2.5.3.)
p_0	Pa	*Reference sound pressure*. The reference root-mean-squared sound pressure of 20 μPa.
P	kW or SHP	*Engine Power*. Engine power generated under test ambient temperature and air density conditions.
PNL	PNdB	*Perceived noise level.* A perception-based noise evaluator representing the subjective effects of broadband noise received at a given point in time during an aircraft pass-by. It is the noise level empirically determined to be equally as noisy as a 1 kHz one-third octave band sample of random noise. (See Appendix 2, section 4.2, of the Annex for specifications.)
PNLT	TPNdB	*Tone-corrected perceived noise level.* The value of the PNL of a given spectrum adjusted for spectral irregularities.

Symbol	*Unit*	*Meaning*
$PNLT_R$	TPNdB	*Reference tone-corrected perceived noise level.* The value of PNLT adjusted to reference conditions.
PNLTM	TPNdB	*Maximum tone-corrected perceived noise level.* The maximum value of PNLT in a specified time history, adjusted for the bandsharing adjustment Δ_B.
$PNLTM_R$	TPNdB	*Reference maximum tone-corrected perceived noise level.* The maximum value of $PNLT_R$ in a specified time history, adjusted for the bandsharing adjustment Δ_B in the simplified method and Δ_{BR} in the integrated method.
P_0	kW or SHP	*Reference engine power. Engine power generated under reference* ambient temperature and air density conditions.
R	J/kgK	*Gas constant.* Gas constant for dry air, 287.04 J/kgK.
R/C	m/s	*Rate of climb*. The take-off rate of climb at the test power setting and engine speed.
RH	%	*Relative humidity.* The ambient atmospheric relative humidity.
s	dB	*Slope of sound pressure level.* The change in level between adjacent one-third octave band sound pressure levels in a given spectrum. (See correction for spectral irregularities, Appendix 2, section 4.3, of the Annex.)
S	—	*Strouhal number*. A dimensionless number describing oscillating flow mechanisms.
s'	dB	*Adjusted slope of sound pressure level.* The change in level between adjacent adjusted one-third octave band sound pressure levels in a given spectrum. (See correction for spectral irregularities, Appendix 2, section 4.3, of the Annex.)
$\bar{s}$	dB	*Average slope of sound pressure level.* (See correction for spectral irregularities, Appendix 2, section 4.3, of the Annex.)
SPL	dB	*Sound pressure level.* The level of sound at any instant in time that occurs in a specified frequency range. The level is calculated as ten times the logarithm to the base 10 of the ratio of the time-mean-square pressure of the sound to the square of the reference sound pressure of 20 μPa. *Note: — Typical aircraft noise certification usage refers to a specific one-third octave band, e.g. SPL(i,k) for the i-th band of the k-th spectrum in an aircraft noise time-history.*
SPL(a)	dB	*Noy discontinuity level.* The SPL value at the discontinuity coordinate of the straight lines representing the variation of SPL with log n. (See mathematical formulation of noy tables, Appendix 2, section 4.7, of the Annex.)

Symbol	*Unit*	*Meaning*
SPL(*b*) SPL(*c*)	dB	*Noy intercept levels.* The intercepts on the SPL-axis of the straight lines representing the variation of SPL with log *n*. (See mathematical formulation of noy tables, Appendix 2, section 4.7, of the Annex.)
SPL(*d*)	dB	*Noy discontinuity level*. The SPL value at the discontinuity coordinate where log *n* equals −1. (See mathematical formulation of noy tables, Appendix 2, section 4.7, of the Annex.)
SPL(*e*)	dB	*Noy discontinuity level*. The SPL value at the discontinuity coordinate where log *n* equals log 0.3. (See mathematical formulation of noy tables, Appendix 2, section 4.7, of the Annex.)
SPL′	dB	*Adjusted sound pressure level.* The first approximation to broadband sound pressure level in a one-third octave band of a given spectrum. (See correction for spectral irregularities, Appendix 2, section 4.3, of the Annex.)
SPL″	dB	*Final broadband sound pressure level.* The second and final approximation to broadband sound pressure level in a one-third octave band of a given spectrum. (See correction for spectral irregularities, Appendix 2, section 4.3, of the Annex.)
SPL_{flight}	dB	*Flight sound pressure level.* A measured static one-third octave band sound pressure level adjusted for changes that result from the motion of the aeroplane relative to the microphone due to Doppler shift. (See static engine noise tests, section 4.2.1.3.)
SPL_{static}	dB	*Static sound pressure level.* A measured static one-third octave band sound pressure level. (See static engine noise tests, section 4.2.1.3.)
SPL_X	dB	*Extrapolated sound pressure level.* Frequency-extrapolated level for masked band *i* and spectral record *k*. (See background noise adjustment procedure, section 3.6.3.)
SPL_R	dB	*Reference sound pressure level*. The one-third octave band sound pressure levels adjusted to reference conditions. (See adjustments to spectrum at PNLTM, Appendix 2, section 8.3.2, of the Annex.)
SPL_S	dB	*Slow-weighted sound pressure level*. The value of one-third octave band sound pressure levels with time weighting S applied. (See analysis systems, Appendix 2, section 3.7.5, of the Annex.)
SR	m	*Slant range.* The distance between the aircraft and the microphone at a given point in time. The related term *sound propagation distance* is the slant range between a sound emission point on the measured flight path and the microphone.

Symbol	*Unit*	*Meaning*
SR_R	m	*Reference slant range.* The distance between the aircraft on the reference flight path and the reference microphone at a given point in time. The related term *reference sound propagation distance* is the slant range between a sound emission point on the reference flight path and the reference microphone location.
t	s	*Elapsed time.* The length of time measured from a reference zero.
T	°C	*Temperature.* The ambient atmospheric temperature.
t_E	s	*Sound emission time.* The time that the sound was emitted by the aircraft.
t_{ER}	s	*Reference sound emission time.* The time that the sound would have been emitted by the aircraft under reference conditions.
t_m	s	*Measurement time.* The time that the sound was measured and output from the analyser, adjusted by −0.75 s.
t_R	s	*Reference reception time*. The reference time of reception calculated from time of reference aircraft position and distance between aircraft and microphone used in the integrated procedure.
T_{HR}	°C	*Temperature at reference aeroplane height.* The standard day ambient temperature at the aeroplane reference height above mean sea level. (See no-acoustical change guidance for propeller-driven aeroplanes, section 5.2.5.3.)
t_{rec}	s	*Sound reception time.* The time of sound reception, calculated by adding to the sound emission the sound propagation time.
t_0	s	*Reference duration*. The length of time used as a reference in the integration equation for computing EPNL, where $t_0 = 10$ s.
t_1	s	*Time of first 10 dB-down point*. The time of the first 10 dB-down point in a continuous function of time. (See k_F.)
t_2	s	*Time of last 10 dB-down point*. The time of the last 10 dB-down point in a continuous function of time. (See k_L.)
T_0	K	*Reference temperature.*
u	m/s	*Wind speed along-track component*. The component of the wind speed vector along the reference ground track. (See test environment, Appendix 2, section 2.2.1, of the Annex.)
U	m/s	*Equivalent relative jet velocity*. The difference between the equivalent jet velocity V_j and the aeroplane test velocity V. (See noise data adjustments for test at high altitude test sites, section 4.3.2.3.)

Symbol	*Unit*	*Meaning*
U_A	m/s	*Equivalent relative jet velocity at condition A.* The equivalent relative jet velocity for the condition where V_j is determined at the corrected engine fan speed for standard acoustical day atmospheric conditions at the aeroplane test height above mean sea level. (See noise data adjustments for test at high altitude test sites, section 4.3.2.3.)
U_B	m/s	*Equivalent relative jet velocity at condition B.* The equivalent relative jet velocity for the condition where V_j is determined at the corrected engine fan speed for standard acoustical day atmospheric conditions at the aeroplane test height above mean sea level minus the test site elevation. (See noise data adjustments for test at high altitude test sites, section 4.3.2.3.)
v	m/s	*Wind speed cross-track component*. The component of the wind speed vector horizontally perpendicular to the reference ground track. (See test environment, Appendix 2, section 2.2.1, of the Annex.)
V_{AR}	km/h	*Adjusted reference speed*. On a non-standard test day, the helicopter reference speed adjusted to achieve the same advancing tip Mach number as the reference speed at reference conditions.
V_{CAS}	km/h	*Calibrated airspeed.* The indicated airspeed of an aircraft, corrected for position and instrument error but uncorrected for adiabatic compressible flow for the test altitude. Calibrated airspeed is equal to true airspeed in standard atmosphere at sea level.
V_{CON}	km/h	*Maximum airspeed in conversion mode*. The never-exceed airspeed of a tilt-rotor when in conversion mode.
V_G	km/h	*Ground speed*. The aircraft true velocity relative to the ground.
V_{GR}	km/h	*Reference ground speed*. The aircraft true velocity relative to the ground in the direction of the ground track under reference conditions. V_{GR} is the horizontal component of the reference aircraft speed V_R.
V_H	km/h	*Maximum airspeed in level flight*. The maximum airspeed of a helicopter in level flight when operating at maximum continuous power.
V_{MCP}	km/h	*Maximum airspeed in level flight*. The maximum airspeed of a tilt-rotor in level flight when operating in aeroplane mode at maximum continuous power.
V_{MO}	km/h	*Maximum operating airspeed*. The maximum operating limit airspeed of a tilt-rotor that may not be deliberately exceeded.
V_{NE}	km/h	*Never exceed airspeed*. The maximum operating limit airspeed that may not be deliberately exceeded.

Symbol	*Unit*	*Meaning*
V_R	km/h	*Reference speed*. The aircraft true velocity at reference conditions in the direction of the reference flight path. *Note:— This symbol should not be confused with the symbol commonly used for aeroplane take-off rotation speed.*
V_{REF}	km/h	*Reference landing airspeed*. The speed of the aeroplane, in a specific landing configuration, at the point where it descends through the landing screen height in the determination of the landing distance for manual landings.
V_S	km/h	*Stalling airspeed*. The minimum steady airspeed in the landing configuration.
V_{tip}	m/s	*Tip speed*. The rotational speed of a rotor or propeller tip at test conditions, excluding the aircraft velocity component.
V_{tipR}	m/s	Reference tip speed. The rotational speed of a rotor or propeller tip at reference conditions, excluding the aircraft velocity component.
V_{IAS}	km/h	*Indicated airspeed.* The aircraft velocity as measured by a pitot-static airspeed system calibrated to reflect standard atmosphere adiabatic compressible flow at sea level uncorrected for airspeed system errors.
V_j	m/s	*Equivalent engine jet velocity.* (See noise data adjustments for test at high altitude test sites, section 4.3.2.3.)
V_{TAS}	km/h	*True airspeed.* The aircraft true velocity relative to the air in the direction of the flight path.
V_Y	km/h	*Speed for best rate of climb.* The test airspeed for best take-off rate of climb.
V_2	km/h	*Take-off safety speed*. The minimum airspeed for a safe take-off.
x	m	*Downstream distance.* The distance downstream from the engine nozzle exit. (See static engine noise tests.)
X	m	*Aircraft position along the ground track.* The position coordinate of the aircraft along the x-axis at a specific point in time.
X_E	m	*Aircraft X position at time of sound emission.* The position coordinate of the aircraft along the x-axis when the sound was emitted by the aircraft. (See determination of noise geometry, section 4.3.1.2.)
X_{MIC}	m	*Microphone X location.* The longitudinal distance along the reference ground track between the microphone and the coordinate system origin. (See determination of noise geometry, section 4.3.1.2.)
X_{MICR}	m	*Reference microphone X location.* The longitudinal distance along the reference ground track between the reference microphone location and the coordinate system origin. (See determination of noise geometry, section 4.3.1.2.)

Symbol	*Unit*	*Meaning*
X_{OH}	m	*Aircraft X position at overhead*. The position coordinate of the aircraft along the x-axis when passing over the centre microphone. (See determination of noise geometry, section 4.3.1.2.)
Y	m	*Lateral aircraft position relative to the reference ground track*. The position coordinate of the aircraft along the y-axis at a specific point in time.
Ydis	m	A distance used as an intermediate calculation in the determination of aircraft noise geometry. (See determination of noise geometry, section 4.3.1.2.)
Y_E	m	*Aircraft Y position at time of sound emission*. The position coordinate of the aircraft along the y-axis when the sound was emitted by the aircraft. (See determination of noise geometry, section 4.3.1.2.)
Y_{MIC}	m	*Microphone Y location.* The lateral distance between the microphone and the reference ground track. (See determination of noise geometry, section 4.3.1.2.)
Y_{MICR}	m	*Reference microphone Y location.* The lateral distance between the reference microphone location and the reference ground track. (See determination of noise geometry, section 4.3.1.2.)
Y_{OH}	m	*Aircraft Y position at overhead*. The position coordinate of the aircraft along the y-axis when passing over the centre microphone. (See determination of noise geometry, section 4.3.1.2.)
Z	m	*Vertical aircraft position relative to the reference ground track*. The position coordinate of the aircraft along the z-axis at a specific point in time.
Z_E	m	*Aircraft Z position at time of sound emission*. The position coordinate of the aircraft along the z-axis when the sound was emitted by the aircraft. (See determination of noise geometry, section 4.3.1.2.)
Zinc	m	A distance used as an intermediate calculation in the determination of aircraft noise geometry. (See determination of noise geometry, section 4.3.1.2.)
Z_{MIC}	m	*Microphone Z location.* The height of the ground at the microphone location relative to the reference ground track. (See determination of noise geometry, section 4.3.1.2.)
Z_{MICR}	m	*Reference microphone Z location.* The height of the ground at the reference microphone location relative to the reference ground track. (See determination of noise geometry, section 4.3.1.2.)
Z_{OH}	m	*Aircraft Z position at overhead*. The position coordinate of the aircraft along the z-axis when passing over the centre microphone. (See determination of noise geometry, section 4.3.1.2.)

Symbol	*Unit*	*Meaning*
Z_{OHR}	m	*Reference aircraft Z position at overhead.* The reference position coordinate of the aircraft along the z-axis when passing over the centre microphone. (See determination of noise geometry, section 4.3.1.2.)
α	dB/100 m	*Test atmospheric absorption coefficient.* The sound attenuation rate due to atmospheric absorption that occurs in a specified one-third octave band for the measured ambient temperature and relative humidity.
α_R	dB/100 m	*Reference atmospheric absorption coefficient.* The sound attenuation rate due to atmospheric absorption that occurs in a specified one-third octave band for a reference ambient temperature and relative humidity.
γ	degrees	*Climb/descent angle.* If positive, the average climb angle during the take-off condition. If negative, the average descent angle during the approach condition. (See determination of noise geometry, section 4.3.1.2.)
γ_R	degrees	*Reference climb/descent angle.* If positive, the reference climb angle during the take-off condition. If negative, the reference descent angle during the approach condition. (See determination of noise geometry, section 4.3.1.2.)
δ_{amb}	—	*Static pressure ratio.* Ratio of the static air pressure at the aeroplane test height above mean sea level to the standard day air pressure at mean sea level of 101.325 kPa.
δt_{prop}	s	*Sound propagation time.* The time interval between the sound emission time and the sound reception time, calculated from the sound propagation distance (slant range) and the speed of sound.
δt_{propR}	s	*Reference sound propagation time.* The time interval between the reference sound emission time and the sound reception time, calculated from the reference sound propagation distance (reference slant range) and the reference speed of sound.
δt_R	s	*Reference time increment.* The effective duration of a time increment between reference reception times associated with PNLT points used in the integrated method.
Δ_A	EPNdB	*Approach condition adjustment.* The difference between flight datum and derivative aeroplane EPNL at the power requirement of the derivative aeroplane at the approach condition. (See static engine noise tests, section 4.2.1.3.)
Δ_B	TPNdB	*Bandsharing adjustment*. The adjustment to be added to the maximum PNLT to account for possible suppression of a tone due to one-third octave bandsharing of that tone. PNLTM is equal to the maximum PNLT plus Δ_B.
Δ_{BR}	TPNdB	*Reference bandsharing adjustment*. The adjustment to be added to the maximum $PNLT_R$ in the integrated method to account for possible suppression of a tone due to one-third octave bandsharing of that tone. $PNLTM_R$ is equal to the maximum $PNLT_R$ plus $\Delta_{BR.}$

Symbol	*Unit*	*Meaning*
Δ_L	EPNdB	*Lateral condition adjustment.* The difference between flight datum and derivative aeroplane EPNL at the power requirement of the derivative aeroplane at the lateral condition. (See static engine noise tests, section 4.2.1.3.)
ΔL	dB	*Total noise level adjustment.* The sum of the adjustments to be added to L_{ASmax} when analytically calculating the change in noise level for the purpose of demonstrating a no-acoustical change to a small propeller-driven aeroplane. (See no-acoustical change guidance for propeller-driven aeroplanes, section 5.2.5.3.)
Δ_{peak}	TPNdB	*Peak adjustment*. The adjustment to be added to the measured EPNL for when the PNLT for a secondary peak, identified in the calculation of EPNL from measured data and adjusted to reference conditions, is greater than the PNLT for the adjusted PNLTM spectrum.
Δs	dB	*Change in slope of sound pressure level.* (See mathematical formulation of noy tables, Appendix 2, section 4.7, of the Annex.)
ΔSPL	dB	*Jet source noise adjustment.* The adjustment to be added to the measured one-third octave band sound pressure levels for each one-half-second spectrum in the integrated method or the PNLTM spectrum in the simplified method to account for jet source noise level changes when tests are conducted at high altitude test sites. (See noise data adjustments for test at high altitude test sites, section 4.3.2.3.)
Δt	s	*Time increment.* The equal time increment between one-third octave band spectra, where $\Delta t = 0.5$ s.
Δ_T	EPNdB	*Take-off condition adjustment.* The difference between flight datum and derivative aeroplane EPNL at the power requirement and altitude of the derivative aeroplane at the take-off condition. (See static engine noise tests, section 4.2.1.3.)
Δ_1	TPNdB	*PNLTM adjustment.* In the simplified adjustment method, the adjustment to be added to the measured EPNL to account for noise level changes due to differences in atmospheric absorption and noise path length between test and reference conditions at PNLTM. For propeller aeroplanes, the adjustment to be added to L_{ASmax} to account for noise level changes due to the difference between test and reference aeroplane heights.
Δ_{1D}	TPNdB	*PNLTM adjustment.* For the purpose of land-use planning data for helicopters tested under Chapter 11 of the Annex, the duration adjustment component of Δ_1. (See guidelines on adjustment of helicopter land-use planning noise data, section 8.3.1.)

Symbol	*Unit*	*Meaning*
Δ_{1SS}	TPNdB	*PNLTM adjustment.* For the purpose of land-use planning data, the spherical spreading adjustment component of Δ_1. (See guidelines on adjustment of helicopter land-use planning noise data, section 8.3.1.)
Δ_2	TPNdB	*Duration adjustment.* In the simplified adjustment method, the adjustment to be added to the measured EPNL to account for noise level changes due to the change in noise duration caused by differences between test and reference aircraft speed and position relative to the microphone.
Δ_3	TPNdB	*Source noise adjustment.* In the simplified or integrated adjustment method, the adjustment to be added to the measured EPNL to account for noise level changes due to differences in source noise generating mechanisms between test and reference conditions.
Δ_4	dB	*Atmospheric absorption adjustment*. For propeller aeroplanes, the adjustment to be added to the measured L_{ASmax} for noise level changes due to the change in atmospheric absorption caused by the difference between test and reference aeroplane heights.
Δ_ϕ	dB	*Inflow angle noise adjustment.* For propeller aeroplanes, the adjustment to be added to L_{ASmax} to account for noise level changes due to a change in propeller inflow angle between a modified aeroplane and a parent aeroplane. (See no-acoustical change guidance for propeller-driven aeroplanes, section 5.2.5.3.)
θ	degrees	*Sound emission angle.* The angle between the flight path and the direct sound propagation path to the microphone. The angle is identical for both the measured and reference flight paths.
θ_R	degrees	*Reference sound emission angle.* The angle between the reference flight path and direct sound propagation path to the reference microphone. The angle is identical for both the measured and reference flight paths.
θ_{T2}	—	*Temperature ratio*. The ratio of the static air temperature in Kelvin at the aeroplane test height above mean sea level to the standard day air temperature at mean sea level of 288.15 K.
μ	—	*Engine noise performance parameter*. For jet aeroplanes, typically the normalized low pressure fan speed, normalized engine thrust, or engine pressure ratio used in the calculation of the source noise adjustment.
ρ_A	kg/m^3	*Density.* The standard acoustical day density at the aeroplane test height above mean sea level. (See noise data adjustments for test at high altitude test sites, section 4.3.2.3.)
ρ_B	kg/m^3	*Density.* The standard acoustical day density at the aeroplane test height above mean sea level minus the test-site elevation. (See noise data adjustments for test at high altitude test sites, section 4.3.2.3.)

Symbol	*Unit*	*Meaning*
ρ_{HR}	kg/m^3	*Reference density.* The standard day density at the aeroplane reference height above mean sea level. (See no-acoustical change guidance for propeller-driven aeroplanes, section 5.2.5.3.)
ϕ	degree	*Propeller inflow angle.* The angle between the propeller blade relative airflow and the propeller rotational plane, typically measured at the 75% radial station. (See no-acoustical change guidance for propeller-driven aeroplanes, section 5.2.5.3.)
χ	degrees	*Lateral cross-track angle.* The horizontal angle between the average ground track and the reference ground track. (See determination of noise geometry, section 4.3.1.2.)
ψ	degrees	*Elevation angle.* The angle between the sound propagation path and a horizontal plane passing through the microphone, where the sound propagation path is defined as a line between a sound emission point on the measured flight path and the microphone diaphragm.
ψ_R	degrees	*Reference elevation angle.* The angle between the reference sound propagation path and a horizontal plane passing through the reference microphone location, where the reference sound propagation path is defined as a line between a sound emission point on the reference flight path and the reference microphone diaphragm.