GENERATION UNCERTAINTIES FOR MEASURING INSTRUMENTS UP TO 6 ½ DIGITS (Generally worst case unless specified on the results)
As stated in HITEK's quality manual & work instructions, all uncertainty claims are calculated via the summation method as shown below unless stated on the accompanying results.
Please note all measurements made are subject to an additional ± 1 least significant digit (LSD) or ± 1 small division for analogue instruments.

RESISTANCE 10Ω = (± 0.02%) 100Ω -100kΩ = (± 75 ppm) 1MΩ = (± 0.015%) 10MΩ =(±0.06%) 100MΩ = (±0.12%) 1GΩ = (± 0.3%) 2GΩ, 3GΩ, 5GΩ & 9GΩ = (± 0.5%)

DC V 0V – 200mV = (± 55 ppm + 10µV) 0.2V – 2V = (± 80ppm) 2V - 20V = (± 55ppm) 20v – 1000V =(±65ppm)

DC I 0A - 200µA = (± 0.015% + 25nA) 0.2mA – 2mA = (± 0.014% + 75nA) 2mA – 20mA = (± 0.015% + 0.7µA)
20mA – 200mA = (0.025% + 7µA) 0.2A – 2A = (± 0.19% + 70µA) 2A – 20A = (± 0.19% + 1.2mA)

ACV 0mV – 200mV @ 40Hz to 1kHz = (± 0.25%) 20mV – 200mV @ 1kHz to 10kHz = (±0.6%) 20mV – 200mV @ 10kHz to 60kHz = (±0.96%)
0.2V – 1000V @ 40Hz to 1kHz = (± 0.15%) 0.2V – 200V @ 1kHz to 10kHz = (± 0.5%) 0.2V – 200V @ 10kHz to 60kHz = (±0.63%)
200V – 1000V @ 1kHz to 10kHz = (± 0.62%)

AC I (FREQ = 40Hz to 1kHz)
0A - 200µA = (± 0.12% + 0.9µA) 0.2mA – 2mA = (± 0.12% + 3.5µA) 2mA – 20mA = (± 0.12% + 35µA) 20mA – 200mA = (0.15% + 260µA)
0.2A – 2A = (± 0.4% + 700µA) 2A – 20A = (± 0.42% + 14mA)

DC I EMULATION 20A – 650A = (± 1.3%) **ACI EMULATION** (FREQ = 20Hz to 1kHz) 20A - 650A = (± 1.3%)

CAPACITANCE 10pF - 1000µF = 0.15% **INDUCTANCE** 10µH – 1H = 0.15

MEASUREMENT UNCERTAINTIES FOR INSTRUMENTS UP TO 5 ½ DIGITS (Generally worst case unless specified on the results)

RESISTANCE 0 - 100Ω = (± 120ppm + 6µΩ) 100Ω -1MΩ = (± 0.022%) 1MΩ - 10MΩ = (± 0.055%) 10MΩ - 100MΩ = (±1.8%)
100MΩ - 1GΩ = (± 1.0%) 1GΩ - 10GΩ = (± 0.25% via voltage)

DC V 0V – 100mV = (± 62 ppm + 5µV) 0.1V – 1V = (± 50 ppm + 10µV) 1V - 10V = (± 82 ppm) 10v – 100V =(± 100 ppm) 100V – 1kV = (± 135 ppm)

DC I 0A – 10mA = (± 0.3%) 10mA – 100mA = (± 0.1%) 100mA – 1A = (± 0.2) 1A – 3A = (0.25%) **AC I (**FREQ = 10Hz to 5kHz) 0A - 1A = (± 0.64%) 1A – 3A = (± 0.5%)

ACV 10mV – 100mV @ 10Hz to 20kHz = (± 0.59%) 10mV – 100V @ 20kHz to 50kHz = (± 0.63%)
0.1V – 100V @ 10Hz to 20kHz = (± 0.45%) 10mV – 100V @ 50kHz to 100kHz = (± 1.4%)
100V – 1000V @ 10Hz to 20kHz = (± 0.86%)

MEASUREMENT UNCERTAINTIES FOR EHT (Generation & Measurement)

EHT (DC) 1kV - 40kV = 0.3% **EHT (AC)** 1kV - 30kV (50 & 60Hz) = 1.5%

UNCERTAINTY FOR ALL OSCILLOSCOPES

TIME BASE See frequency uncertainty **AMPLITUDE 1MV**/div – 50V/div = 0.1% **BANDWIDTH** < 2GHz = 5%

GENERAL MEASUREMENT UNCERTAINTY FOR ALL RF & MICROWAVE TEST EQUIPMENT *(comparison method, uncertainty by arithmetic method)*

RF POWER (<16dBm) @ < 20GHz = (± 4%)
RF HIGH POWER 10MHz- 500MHz (<3watts) = (± 4.5%)
50MHz - 200MHz (<100watts) = (± 5%)
MODULATION AM FM & PHASE < 2GHz = (± 0.3%) **VSWR** (10MHz – 18GHz) = (± 0.25dB) **Attenuation** up to 120dB = (± 0.4dB)

FREQUENCY All types of frequency counters and measuring instruments
0.01Hz to 0.1Hz = ± 1.50 ppm 0.1Hz to 10kHz = ± 0.15 ppm 10kHz to 100kHz = ± 1.50 ppm
100kHz to 1MHz = ± 1.50 ppm 1MHz to 10MHz = ± 0.15 ppm 10MHz to 20GHz = ± 0.03 ppm

GENERAL MEASUREMENT UNCERTAINTY FOR ALL TEMPERATURE AND HUMIDITY TEST EQUIPMENT

TEMPERATURE -20°C - 0°C = (±0.2°C) 0°C - 200°C = (±0.1°C) 200°C - 650°C = (±2°C)
For **PT100** see resistance uncertainty and for **Thermocouples** see the relevant DCV uncertainty

HUMIDITY 10% - 80% = 2% RH *(comparison method, uncertainty by arithmetic method)*

GENERAL MEASUREMENT UNCERTAINTY FOR MECHANICAL TEST EQUIPMENT *(comparison method, uncertainty by arithmetic method)*

TORQUE 10cNm – 10Nm = (±1.5%) 10- 1000Nm = (±0.35%) **PULL** up to 500Nm = (±0.5% + 1 digit) **DIMENSIONAL** slips 1mm to 300mm = (± 2µm)

WEIGHTS APPLIED 1mg to 500mg = (±0.02mg) 1g to 500g = (±0.03%) 500g to 5kg = (± 0.1%)

PRESSURE MEASUREMENT UNCERTAINTY *(comparison method, uncertainty by arithmetic method)*

AIR PRESSURE 0 – 200 bar = <0.05% **FLUID** 0-400 bar = <0.05%

GENERAL MEASUREMENT UNCERTAINTY FOR LUX METERS *(comparison method, uncertainty by arithmetic method)*

LUX 0 - 19900 = (±10%) this is worst case, and may exceed the makers specification

GENERAL MEASUREMENT UNCERTAINTY FOR OPTICAL POWER (*comparison method, uncertainty by arithmetic method)*

850Nm, 1300Nm, 1550Nm **POWER MEASURMENT** ± 0.5dB

GENERAL MEASUREMENT UNCERTAINTY FOR OPTICAL WAVELENGTH (*comparison method, uncertainty by arithmetic method)*

@ 25°C +/- 10°C ± Full width (nm) at half maximum x 5/100 ± 5ppm ± 1 count

GENERAL MEASUREMENT UNCERTAINTY FOR MAGNETICS *(comparison method, uncertainty by arithmetic method)*

MAGNETIC GAUSS (DC) @ fixed values 300G, 1kG **=** (± 0.5%) variable values to 1kG **=** (± 2%)
MAGNETIC GAUSS (AC) not directly traceable, we estimate this to be < 10% using electro magnets @ 50/60Hz)

GENERAL MEASUREMENT UNCERTAINTY FOR SOUND LEVEL METERS *(comparison method, uncertainty by arithmetic method)*

SOUND LEVEL @ 94dB & 114dB = 0.25dB **SOUND LEVEL (CALIBRATORS)** = 0.19dB

GENERAL MEASUREMENT UNCERTAINTY FOR Wind Speed *(comparison method, uncertainty by arithmetic method)*

Max speed 20m/s = ± 3.9%

HITEK Ltd primary calibration standards
All plant equipment numbers used for calibrating the instrument are listed on our web site, at web address
http://www.hitekcal.co.uk/docs/HITEK_PLANT.pdf

Please note: certificates stored and downloaded from our website are of a different cosmetic format, otherwise are identical in content