



Metal Composite Tubular type Non-Inductive Resistors for Ultra High Voltage, High Energy



Energy Tube; Carbon Metal Composite, ultra high voltage Resistors

ET series to meet general set of requirements of various ultra high voltage high energy with composite type tubular resistors, especially for build up R & R-C Tank/Bank at reasonable cost.

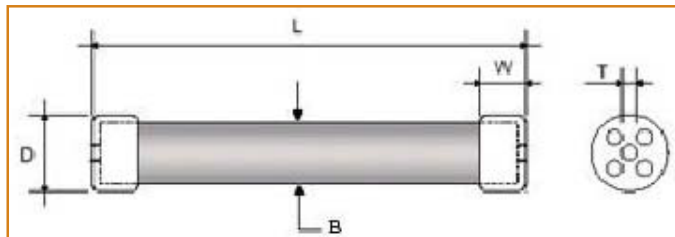
- Power Rating Able to build up Mega Jouls Energy
- Well working in Air, Oil, Mist & harsh condition
- Pulse Modulators
- Surge Absorb
- Charging /Discharging
- Nuclear, Nuclear Fusion
- Dust Collecting Systems
- High Voltage Rectifier, Diode
- High Frequency
- R, R-C Bank /Tank



Model Nr.	Std. Ohmic Rating[Ω]	Low Extended R-value[Ω]	Hi Extended R-value[Ω]
ET-70	10~250	1.5	upto 10k
ET-150	10~500	2	upto 20k
ET-180	10~500	3	upto 25k
ET-210	10~600	5	upto 30k

Custom R-value available upon request related with q'ty basis

DIMENSIONS [mm]



Model Nr.	Power [W] ¹⁾	Energy ²⁾ [J] Max.	Max. Impulse Voltage ³⁾ [kV] 1.2/50uSec	Dimensions in millimeters				
				L	B	D	Dia on Corona Ring	T
ET -70	70	6,790	45	150+/- 2.5	45+/- 1.0	35+/- 0.5	59+/-0.5	M6
ET-70ec	70	6,790	50	183+/- 2.5	45+/- 1.0	39.5+/- 0.5	67+/-0.5	M6
ET-150	150	14,500	100	310+/- 2.5	45+/- 1.0	39.5+/- 0.5	67+/-0.5	M6(M8)
ET-180	180	17,120	110	360+/- 2.5	45+/- 1.0	39.5+/- 0.5	67+/-0.5	M6(M8)
ET-210	210	22,900	125	410+/- 2.5	45+/- 1.0	39.5+/- 0.5	67+/-0.5	M6(M8)

* Custom design and specification available upon request related with q'ty basis * ET70-ec : extended cap and corona ring type

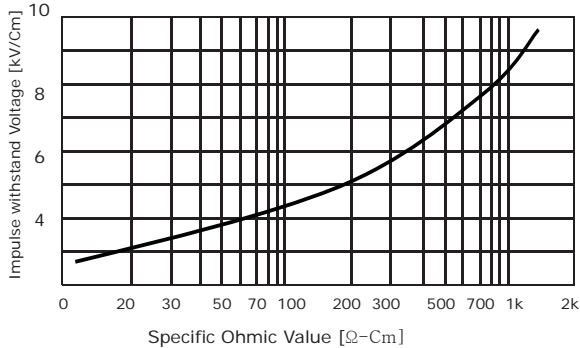
Notes : "1)" limited by chart 2 & chart 3 & Specification. "2)" "3)" limited by chart 1 & chart 4 & Specification



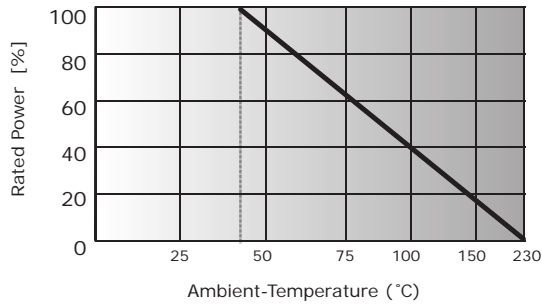
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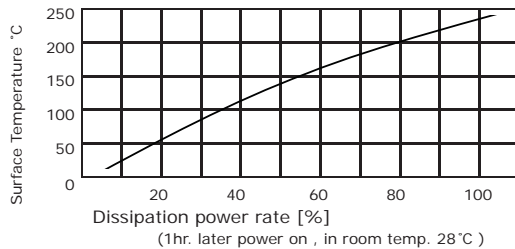
Specific ohmic vs. withstand voltage[1.2/50uSec] co-relations (chart 1)



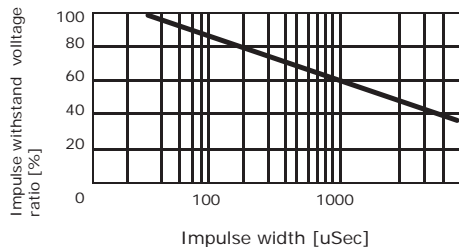
Power derating at continuous loading (chart 2)



Surface temp. rising & power rate (chart 3)



Voltage reduction curve compare to std. impulse 1.2/50uSec (chart 4)



SPECIFICATIONS

Standard Resistance of Toelrance: 20% (15% , 10%, 5% if stocked)

Rated power and power derated : The rated power working at 40 °C . In case of exceed 40 or the individual resistors are on thermal radiation, then the continuous working power must be reduced to 10% ~ 90% of the rated power typ. recommended.

Surface temperature control : In case of continuous working condition , the surface temperature shall be controlled,keep 100 °C max.

An enforced coolant fan or other air coolant must be operate before the resistors working. Water or other chemical fluid what prohibited direct pour in the surface of resistors .

Short time operational surface temperature : 250 °C max. for several mins. {harsh temperature to broken on just resistives : 500°C max. for 30min (must be slowly increased for 20mins) but core shaft made of enforced epoxy and bent/out of order from 230 °C }

Corona Ring and Cap : ET-series supplied in the resistors put on standard corona ring and cap basically. The specified standard cap and corona ring system to optimize at 50% of the rated V-peak on $\leq 1.5/50\mu s$ pulse. So, in case of higher voltages and longer pulse shapes would better use specific corona ring and cap. Especially for the individual resistors what are less than 20R ,which shall be recommended, to optimized on custom ring and cap /electrods , please talk with 3RLab Engrs.

Gap distance of multi conection in parralell and power derate: more than 4ea ,must keep distance between each resistors, because each resistors hit radiation on themselves.

gd=1.5 x B ; derate to 60% of rated power

gd=2.0 x B ; derate to 70% of rated power

gd=2.5 x B ; derate to 80% of rated power

cf. dg = gap distance of center to center between each resistors

B = resistors body diameter

Temperature Coefficient of Resistance ,TCR : 0.15%/°C typ.

Voltage Coefficient of Resistance ,typ. VCR :

1.5% [kV/Cm] at 2R~ 500R ,, 2.5% [kV/Cm] at 600R~1.5kΩ,, 5% [kV/Cm] at higher than 1.6 kΩ .

Load Life Stability : ΔR5% max. at dissipation(less than 50% of rated max power), ΔR7% at 100% of rated power, for 500h. The Long Life stablilify (on Load) and power yield is one of very co-related factor . Recommended dissipate electric power/energy from 10% to 50% of rated power and energy, voltage. Example, long life of several years required ;load on resistors clearly less than rated power , energy, voltage.

Otherwise, just one of short time(1 or 2 times) test application , which might be dissipate full power or higher .

Short time over load : ΔR2% typ. for 10times of rated Wattage for 5secs.

Short time allowable dissipation energy : 90J/cm² Max.

Resistives in bulk of Density : 2.55 typ.

Specific Heat of Bulk Resistives : 500~1200J/kg-K typ.

Thermal Conductivity : 1.2W[m-K]

Water coolant type, or oil coolant type custom : please talk with 3RLab Engrs..

Custom design and specification: please talk with 3RLab Engrs..

Cap and Corona Ring of materials : std. Aluminum

cf.: The described specifications & dimensions subject to change without notice.