Vitreous Enamelled Wirewound Resistors

TT electronics
Welwyn Components

W20 Series

- **CECC approved**
- **Suitable for harsh environments**
- **Impervious lead free vitreous enamel coating**
- **Overload characteristics ideal for protection circuits**
- **High stability and reliability**
- **High power dissipation for size**



Electrical Data

Commercial			**W21**	**W215**	**W22**	**W23**	**W24**
Power rating at 25°C		watts	3.0	5.0	7.0	10.0	14.0
Resistance range at	1% tolerance	ohms	1R to 10K	1R to 15K	1R to 22K	1R to 60K	1R to 100K
	2% tolerance	ohms	0R5 to 10K	0R5 to 15K	0R5 to 22K	1R to 60K	1R to 100K
	5% tolerance	ohms	0R1 to 10K	0R1 to 15K	0R1 to 22K	0R15 to 60K	0R2 to 100K
TCR (-55° to 200°C)		pp/°C	Typically: <+75			Maximum: +200	

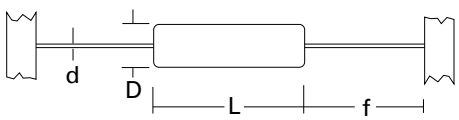
Approved BS CECC 40-201-002		Style	**JB**	**HB**	**KB**	**LB**	**MB**
Power rating at 25°C		watts	2.9	5.0	7.0	10.0	14.0
Power rating at 70°C		watts	2.5	4.3	6.0	9.0	12.0
Resistance range at	1% tolerance	ohms	1R to 10K	1R to 15K	1R to 20K	1R to 56K	1R to 100K
	2% tolerance	ohms	0R5 to 10K	0R5 to 15K	0R5 to 20K	1R to 56K	1R to 100K
	5% tolerance	ohms	0R1 to 10K	0R1 to 15K	0R1 to 20K	0R15 to 56K	0R2 to 100K
TCR (-55° to 200°C)		ppm/°C	≥5 ohms < 10 ohms: ±400			≥10 ohms: ±200	

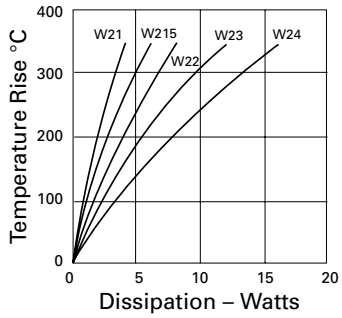
Applicable to commercial and approved ranges						
Limiting element voltage	volts	100	160	200	500	750
Standard values		E24 preferred. Other values to special order				
Thermal impedance	°C/watt	88	58	44	29	22
Ambient temperature range	°C	-55 to 200				

Physical Data

Dimensions (mm) and Weight (g)

Type	L max	D max	f min	d nom	Wt.nom
W21	12.7	5.6	22.75	0.8	1
W215	22.0	7.0	23.1	0.8	2
W22	22.0	8.0	23.1	0.8	2
W23	38.0	8.0	-	0.8	3.5
W24	53.5	8.0	-	0.8	5





Construction

A high purity ceramic substrate is assembled with interference fit end caps to which are welded the termination wires. The resistive element is wound on the substrate and welded to the caps; the vitreous enamel protective coating is then applied.

Terminations

Material Copper clad steel wire, nickel plated and solder-coated.
Strength The terminations meet the requirements of IEC 68.2.21.
Solderability The terminations meet the requirements of IEC 115-1,– Clause 4.17.3.2.
Length W23's and W24's are not supplied on tape. Minimum lead length is 30 mm.

Marking

The resistors are legend marked with type reference, resistance value and tolerance. Values are marked in accordance with IEC 62.

General Note
Welwyn Components reserves the right to make changes in product specification without notice or liability.
All information is subject to Welwyn's own data and is considered accurate at time of going to print.

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Solvent Resistance
The body protection and marking are resistant to all normal industrial cleaning solvents suitable for printed circuits.

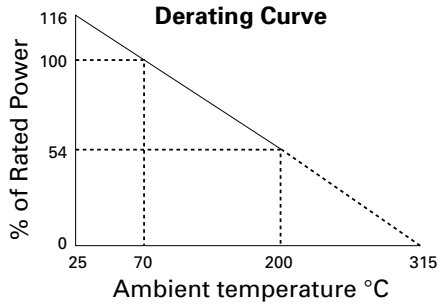
Flammability
All materials used in the construction of 'W' series resistors are inorganic and inherently non burning.

Performance Data

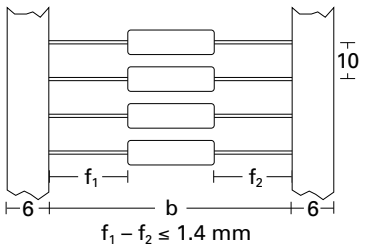
		CECC 40201-002	Actual Performance	
		Requirements	Maximum	Typical
Load at commercial rating: 1000 hrs at 25°c	ΔR%		5	3.5
Load at CECC rating: 1000 hours at 25°c	ΔR%	5	5	3.5
Dry heat: 1000 hours at 200°c	ΔR%	5	2	1
Shelf life: 12 months at room temperature	ΔR%	not specified	0.03	0.02
Derating		see derating curve		
Short term overload	ΔR%	1	1.0	0.2
Climatic	ΔR%	5	0.5	0.2
Climatic category	ΔR%	55/200/56		
Long term damp heat	ΔR%	5	0.05	0.02
Temperature rapid change	ΔR%	1	0.5	0.2
Resistance to solder heat	ΔR%	1	0.25	0.03
Vibration and bump	ΔR%	1	0.25	0.05
Noise (in decade of frequency)	μv/v	not specified	zero	zero
Robustness	ΔR%	1	0.4	0.05
Insulation resistance	ohms	not specified	>.1G ohm	>.1G ohm
Voltage Proof	volts	not specified	500 min	500 min
Pulse handling			data available by request	

Application Notes

The termination should not be bent closer than 1.6mm from the body, and the recommended minimum bend radius is 1.2mm. The terminations are solderable to within 4mm from the body. When cold, vitreous enamel has excellent insulation resistance. In common with all insulants the specific resistance of the enamel decreases with increase in temperature. Therefore, resistors operated at near maximum temperature cannot be classed as insulated and should not be used in contact with any conducting material. Care must be taken when determining clearance distance between the resistor body and the printed circuit board or other components to ensure these are not over heated. Resistance is measured 6mm from body.



Packaging
For W21 and W215 the standard method of packaging is taped in Ammo Packs. For W22 the standard method of packaging is taped and reeled. Alternatives available by special request are detailed in the table below. W23's and W24's are available only as loose packed in boxes. W series resistors can be supplied preformed. Contact factory for details.



Standard Quantities Per Package

Type	W21	W215	W22	W23	W24
Ammo pack	1000	750	500	n/a	n/a
Reel	1000	750	700	n/a	n/a
Small box	n/a	n/a	n/a	50	25

Type	b
W21	63±2
W215	73±2
W22	73±2

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Click to view pricing, inventory, delivery, and lifecycle information:

WELWYN:

W21-2R2JI W22-10RJI W22-33RJI W23-2K2JI W23-33RJI W21-R56JI W23-1K5JI W24-1R5JI W21-1R0JI W21-220RJI W21-2R7JI W22-18RJI W22-3K9JI W24-220RJI W22-120RJI W22-1K8JI W22-270RJI W22-27RJI W23-220RJI W24-6K8JI W21-47RJI W21-R15JI W22-R33JI W23-22KJI PWC2512-15KFI W21-56RJI W21-R12JI W24-1K0JI WCR0402-100RFI W24-3K3JI