

Welding Cables – Rubber Insulated

85°C 100 V



Application

Primary use is for the secondary (high current) connection to automatic or hand-held metal arc welding electrodes. May also be used for non-welding applications such as earth/return leads, flexible tails on power supplies, busbar connections, etc.

Specification

- In accordance with BS638 Part 4
- Flexible Class 6 copper (plain/tinned) conductors to BS EN 60228
- Paper or p.e.t.p. tape separator
- **Insulation:** May be single or dual layer
0361TQ Dual layer insulation
EPR inner layer
HOFR outer layer
- **Temperature Rating:** 85°C maximum conductor operating temperature. Minimum handling temperature: -20°C
- **Voltage:** 100 V rating when used for welding purposes. For non-welding applications, cables may be used at voltages up to and including 450 Vrms phase – phase provided that the cables are adequately protected from damage to the insulation e.g. in panels etc.

Anixter Number	Nominal Conductor Area	Nominal Conductor Stranding	Thickness of Covering	Minimum O/D	Maximum O/D	Approximate Weight	Colour
	mm ²	#/mm	mm	mm	mm	kg/km	
Type 0361TQ – Tinned Copper Conductors							
WELD-0160-08	16	513/0.2	2.0	8.8	11.0	240	Orange
WELD-0250-08	25	783/0.2	2.0	10.1	12.7	350	Orange
WELD-0350-08	35	1107/0.2	2.0	11.4	14.2	450	Orange
WELD-0500-08	50	1566/0.2	2.2	13.2	16.5	625	Orange
WELD-0700-08	70	2214/0.2	2.4	15.3	19.2	825	Orange
WELD-0950-08	95	2997/0.2	2.6	17.1	21.4	1125	Orange
WELD-1200-08	120	608/0.5	2.8	19.2	24.0	1400	Orange
WELD-1850-08	185	925/0.5	3.2	23.1	28.9	2050	Orange

For further technical information see page 2:63.

Technical Specifications for Welding Cables

Welding cables are now used for many duties ranging from automatic welding machines where the current is carried continuously, to hand welding equipment which is used intermittently and where the cable has time to cool between the periods on load.

In order to provide current ratings for intermittently loaded cables, the term 'duty cycle', sometimes called 'arcing time factor' or 'load factor' has been introduced. Duty cycle is defined as the ratio of the duration of operation under load, to the duration of a complete cycle. This ratio, lying between 0 and 1, may be expressed as a percentage.

For example, if a cable carries its load current for six minutes followed by a period of four minutes off load and this cycle is repeated, every ten minutes, this gives a duty cycle of 60%.

Welding equipment to BS638 is rated for repeat cycle operation based on a ten minute period. When authorised, a repeat cycle based on a five minute period may be used.

The current rating tables give ratings corresponding to various duty cycles in common use. The following are typical duty cycles for various welding processes and applications.

Automatic welding up to	100%
Semi-Automatic welding	30-85%
Manual welding	30-60%
Very intermittent or occasional welding up to	20%

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Technical Specifications for Welding Cables

CURRENT RATINGS OF CABLES WITH COPPER CONDUCTORS FOR REPEAT CYCLE BASED ON A 10 MINUTE PERIOD

Nominal Cross Sectional Area of Cond	Current Rating at a Maximum Duty Cycle of						
	100%	85%	80%	60%	35%	20%	8%
mm ²	A	A	A	A	A	A	A
16	135	136	136	139	150	174	243
25	180	182	183	190	213	254	366
35	225	229	231	243	279	338	497
50	285	293	296	316	371	457	681
70	355	367	373	403	482	602	908
95	430	448	456	498	606	765	1164
120	500	524	534	587	721	917	1404
150	580	610	622	689	853	1090	1676
185	665	702	717	797	995	1277	1971

Ambient air temperature 25°C Conductor operating temperature: 85°C

Derating factors for higher ambient temperatures:

30°C	35°C	40°C	45°C
0.96	0.91	0.87	0.82

NOTE: Cables operating at conductor temperatures of 85°C, with the outer surface of the covering approximately 5°C lower, could cause injury if carelessly handled after a period of use at the maximum rated current.

CURRENT RATINGS OF CABLES WITH COPPER CONDUCTORS FOR REPEAT CYCLE BASED ON A 5 MINUTE PERIOD

Nominal Cross Sectional Area of Cond	Current Rating at a Maximum Duty Cycle of						
	100%	85%	80%	60%	35%	20%	8%
mm ²	A	A	A	A	A	A	A
16	135	138	140	148	173	212	314
25	180	186	189	204	244	305	460
35	225	235	239	260	317	400	608
50	285	299	305	336	415	529	811
70	355	375	383	426	531	682	1053
95	430	456	467	523	658	850	1319
120	500	532	545	613	776	1006	1565
150	580	619	634	716	911	1184	1845
185	665	711	729	826	1054	1374	2145

Ambient air temperature 25°C Conductor operating temperature: 85°C

Derating factors for higher ambient temperatures:

30°C	35°C	40°C	45°C
0.96	0.91	0.87	0.82

NOTE: Cables operating at conductor temperatures of 85°C, with the outer surface of the covering approximately 5°C lower, could cause injury if carelessly handled after a period of use at the maximum rated current.

Technical Specifications for Welding Cables

VOLTAGE DROP IN COPPER CONDUCTORS AT NORMAL AND ELEVATED TEMPERATURES

Nominal Cross Sectional Area of Cond.	d.c.* Voltage Drop/100A/10m of Cable at		
	20°C	60°C	85°C
mm ²	V	V	V
16	1.24	1.430	1.560
25	0.795	0.920	0.998
35	0.565	0.654	0.709
50	0.393	0.455	0.493
70	0.277	0.321	0.348
95	0.210	0.243	0.264
120	0.164	0.190	0.206
185	0.108	0.125	0.136

The voltage drop values given above are for 10 metres of cable carrying 100 amperes. For longer lengths of cable and heavier currents, the voltage drop value should be increased proportionally.

*The corresponding values when using a.c. may be much higher depending on the inductance of the circuit.

GUIDE TO MINIMUM BENDING RADII ON FLEXIBLE CORDS AND CABLES

Cable Type	Cable Diameter (mm)			
	$\leq 8 \leq$	$> 8 \leq 12$	$> 12 \leq 20$	> 20
	M.B.R. (Minimum Bending Radius)			
Flexible Cable Thermoplastic (e.g. PVC)				
Fixed installation	3D	3D	4D	4D
Free movement*	5D	5D	6D	6D
Flexible Cable Elastomeric (e.g. rubber)				
Fixed installation	3D	3D	4D	4D
Free movement*	4D	4D	5D	6D

Where D = cable diameter.

The above values are based on recommendations given in BS7540 "Use of cables with a rated voltage not exceeding 450/750 V".

*These values do not apply to cables used on festoon, reeling drum, cranes, robotics, etc., where repetitive flexing and/or twisting is anticipated.

For further details refer to BS7540.