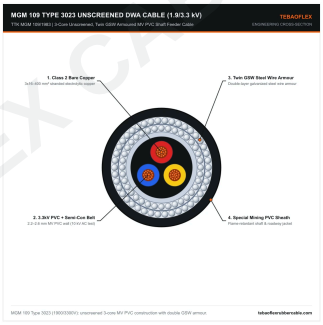
MGM 109 Type 3023 Unscreened Double-Armoured MV Mining Cable (1900/3300V)

MGM 109 Type 3023 is a 1900/3300 V unscreened 3-core medium-voltage mining power cable with twin-layer galvanized steel wire armour (DWA) under Turkish standard MGM 109/1983, engineered for fixed power transmission in vertical shafts, steep inclines, and surface mine plants.

1. CABLE CONSTRUCTION

1. Phase Conductor	Electrolytic circular stranded bare copper wire per IEC 60228 Class 2 (16 mm² to 400 mm²).
2. Core Insulation	Medium-voltage PVC dielectric compound (2.2 mm wall for 16–240 mm², 2.4 mm for 300 mm², 2.6 mm for 400 mm²).
3. Lay-Up & Separator	Three insulated cores laid up in trefoil contact wrapped with a semiconductive separator layer.
4. Inner Bedding	Extruded PVC-based bedding compound (1.6 mm to 2.6 mm radial thickness; 22.8 mm to 70.4 mm inner diameter).
5. Double GSW Armour (DWA)	Two concentric helical layers of galvanized steel round wires (1.6 mm to 2.5 mm wire diameter) with optional galvanized steel binder tape.
6. Outer Sheath	Black special flame-retardant mining PVC jacket (2.0 mm to 3.3 mm radial thickness).

Cross-Section Anatomy



MGM 109 Type 3023 Cross-Section: Three unscreened Class 2 copper MV PVC cores, semiconductive separator layer, PVC bedding, twin GSW wire armour, and special PVC outer jacket.

2. ELECTRICAL, MECHANICAL & STANDARD DATA

Reference Standard	Turkish Hard Coal Enterprises TTK MGM 109/1983 & IEC 60228 Class 2
Rated Voltage (Uo/U)	1900 / 3300 V
Routine AC Test Voltage	10 kV AC
Conductor Cross-Sections	3x16, 3x25, 3x35, 3x50, 3x70, 3x95, 3x120, 3x150, 3x185, 3x240, 3x300, 3x400 mm²
Current Rating Reference	82 A (3x16 mm²) to 620 A (3x400 mm²) continuous at 25°C ambient
Minimum Bending Radius	10 x maximum overall diameter (359 mm to 897 mm)
Armour Resistance Range	1.53 Ω/km (3x16) down to 0.0627 Ω/km (3x400) at 20°C
Service Environment	Fixed installation in deep mines with explosive gas/dust hazard and surface facilities

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3. DIMENSIONAL, ARMOUR & ELECTRICAL SPECIFICATIONS

MGM 109 Type 3023 (1900/3300V) — Unscreened Double-Armoured Schedule (3x16 to 3x400 mm²)

Cable Type	Insul. (mm)	Inner Sheath (mm)	Inner Dia. (mm)	DWA Wire Dia. (mm)	Outer Sheath (mm)	Min. OD (mm)	Max. OD (mm)	Min. Bend (mm)	Current 25°C (A)	Cond. R (Ω/km)	Armour R (Ω/km)	Nom. Cu Wt. (kg/km)	Approx. Cable Wt. (kg/km)
3x16	2.2	1.6	22.8	2 x 1.6	2.0	31.9	35.9	359	82	1.15	1.53	461	2320
3x25	2.2	1.6	25.4	2 x 1.6	2.0	34.5	38.5	385	108	0.727	0.97	720	2800
3x35	2.2	1.6	27.6	2 x 1.6	2.1	36.9	40.9	409	135	0.524	0.699	1008	3280
3x50	2.2	1.8	31.2	2 x 2.0	2.2	42.3	46.3	463	168	0.387	0.516	1440	4320
3x70	2.2	1.8	34.6	2 x 2.0	2.3	45.9	49.9	499	207	0.268	0.357	2016	5220
3x95	2.2	1.8	38.5	2 x 2.0	2.4	50.0	54.0	540	250	0.193	0.257	2736	6380
3x120	2.2	2.2	42.5	2 x 2.5	2.6	56.4	60.4	604	292	0.153	0.204	3456	8050
3x150	2.2	2.2	46.6	2 x 2.5	2.7	60.7	64.7	647	335	0.124	0.165	4320	9220
3x185	2.2	2.2	50.5	2 x 2.5	2.8	64.8	68.8	688	382	0.0991	0.132	5328	10620
3x240	2.2	2.6	56.6	2 x 2.5	2.9	71.1	75.1	751	453	0.0754	0.101	6912	12950
3x300	2.4	2.6	62.4	2 x 2.5	3.1	77.3	81.3	813	523	0.0601	0.0801	8640	15400
3x400	2.6	2.6	70.4	2 x 2.5	3.3	85.7	89.7	897	620	0.0470	0.0627	11520	18950

Mass Calibration Note: Nominal copper and total cable weights above reflect pure unscreened 3-phase Class 2 electrolytic copper geometry (excluding the copper-tape screens present only on Type 3123).

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