COMPARISON: EARTH ENHANCING COMPOUNDS

BENTONITE, RESLO and SRIM PLUS

Table 1 compares the key characteristics of LPI's industry-standard earth enhancing compounds, namely **RESLO** and **SRIM PLUS**, with **Bentonite**.

Table 1: Comparison of the main characteristics of Bentonite, RESLO and SRIM PLUS.

Characteristic	BENTONITE	RESLO	SRIM PLUS	COMMENT
Base materials	Sodium bentonite	Bentonite, gypsum and proprietary formulation	Bentonite, recycled aggregate, cement, carbon composite additives	RESLO and SRIM PLUS have been formulated to provide optimum performance across all key EEC criteria.
Bag Size (kg)	20 or 25 kg	20	20	
Resistivity (Ωm)	> 3	< 0.53	≤ 0.10	Testing performed to standard ASTM G57-06. RESLO and SRIM PLUS have a stable resistivity, bentonite can increase as it dries.
Typical Resistance Reduction (%)	36%	> 50%	> 65%	Temporal / seasonal variability is also greatly decreased by RESLO and SRIM PLUS.
Typical Amount Required (bags)	5 x 0.3 m trench: 2 0.125 x 1 m hole: 1	5 x 0.3 m trench: 2 0.125 x 1 m hole: 1	5 x 0.3 m trench: 2 0.125 x 1 m hole: 1	Amounts required are similar. Even though bentonite swells substantially, it also shrinks substantially.
Leaching	Can wash away	Negligible (but not for use around water tables)	Negligible, product sets like concrete (non-structural)	RESLO and SRIM PLUS leachate testing gives results well below EPA and EN limits or is undetectable.
Sulphur Content	< 2%	> 2% (naturally occurring)	<< 2%	The gypsum in RESLO contains natural, benign sulphur.

Table 1 continued …..

Characteristic	BENTONITE	RESLO	SRIM PLUS	Comment
Corrosion Performance	Unknown, but considered satisfactory	Greatly exceeds IEC 62561-7 requirements	Exceeds IEC 62561-7 requirements	Testing performed to standards IEC 62561-7, ASTM G59-97 and ASTM G102-89.
Hardening	Significant swelling and shrinkage (cracks when dry – see photos in Fig. 1)	Semi-hardens, over a few days	Cementitious – sets in 1 day, fully hardens in 2-3 days	Hardening / curing of each EEC depends on many factors, e.g., surrounding moisture, temperature, etc. Hence, the stated curing times can vary.
Maintenance Required	Nil, although need to keep wet if very dry conditions	Nil	Nil	Once RESLO and SRIM PLUS are installed, no maintenance is required as they set permanently around the electrode.
Standards Compliance	Nil	AS 2239, EPA 1311 Most of IEC 62561-7	EPA 1311 IEC 62561-7	

SUMMARY

Whilst Bentonite is commonly used in some earthing applications, such as power-system earthing, and is reasonably effective when moist, it cracks and pulls away from earth electrodes under dry conditions. This characteristic means that the resistance of the earthing system becomes highly dependent upon environmental conditions.

On the other hand, by virtue of their specially engineered formulations, RESLO and SRIM PLUS provide maintenance-free and effective earth enhancing performance that meets industry requirements and complies with the relevant standards.

The photos in Figure 1 highlight one of the key differences between Bentonite and RESLO or SRIM PLUS, namely the longer-term physical and electrical stability of the latter EECs in maintaining a low-resistivity environment around the earthing electrode.

[1] t = 0

[2] t = 14 days

Figure 1: Visual comparison of the curing of Bentonite, RESLO and SRIM PLUS (respectively ,from left to right) over the first 2 weeks after preparation.

APPLICATION NOTES

[1] Bentonite invariably cracks when it dries and hence leaves a void around the earthing electrode(s). Also, its resistivity increases with time after installation, until the point of separation from the electrode, where the resistivity value suddenly jumps to an extremely high value.

[2] In soils or locations where a corrosive environment exists, e.g., saline conditions (near the sea), it is strongly recommended that stainless steel (SS 316) rods are used to guarantee the longevity of the earthing installation. SS 316 rods are also suitable in rocky areas in conjunction with SRIM PLUS, which sets hard around the rod and forms a permanent, enlarged electrode.

[3] Some people mistakenly think that SS 316 rods are unsuitable for use in earthing because their conductivity is much lower than copper. This assumption is incorrect for many reasons, including: (a) Copper-bonded steel rods are widely used – they are 99% steel (although carbon steel is a little more conductive than SS); (b) SS 316 rod installations often comprise one small (but important) part of the overall earthing system (in terms of overall conductor length); and (c) the resistance of the conductor plays only a tiny role in the overall resistance of the earthing system, which depends on the inductance, conductance and capacitance of the system and, more importantly, on the *contact resistance between soil / EEC and electrode* and the resistivity of the surrounding medium.

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