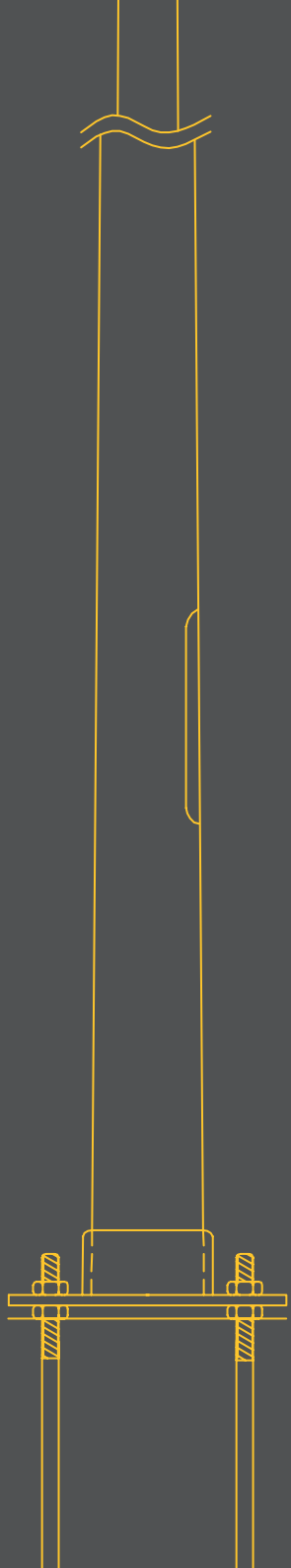
ZINCOMETAL SA



Certified Passive Safety Lighting Poles

At a time when our country is making significant efforts to improve its road safety against a backdrop of major road accidents that often cause public concern and headline in the news, ZINCOMETAL S.A., a pioneer in the field of lighting columns and pillars in Greece and the Balkans, is contributing in the most innovative way towards creating safe road environment. More specifically, it is a pioneer in the design and development of passively safe lighting columns, offering vehicle drivers and passengers additional safety in the event the vehicle veers off course and impacts lighting columns.

In fact, after successful crash tests (impact tests with physical crash tests) performed at special test tracks for passively safe lighting columns, designed and developed by our Department of Design and Studies, ZINCOMETAL S.A. has been certified for the production of passively safe columns in the NE class and for all vehicle speeds of 100, 70 and 50km/h, as defined in the European standard EN 12767.

More specifically, ZINCOMETAL SA has been certified in the following classes of passively safe lighting columns:

100 NE-C for a column height from 3.00m to 13m and for Single or Double Arm up to 1.50m, as well as for columns without an arm and for a speed of 100km/h.

70 NE-C for a column height from 3.00m to 13m and for Single or Double Arm up to 1.50m, as well as for columns without an arm and for a speed of 70km/h.

50 NE-C for a column height from 3.00m to 13m and for Single or Double Arm up to 1.50m, as well as for columns without an arm and for a speed of 50km/h.

All columns are certified for class 'C', the best class in terms of impact severity and occupant safety level during impact. Moreover, the certification of the passively safe lighting columns of ZINCOMETAL SA concerns the safety of occupants for impact with the lighting column from any direction of the vehicle (Multi Directional-MD class). All passively safe lighting columns produced by the company have a conical circular cross-section, are accompanied by a Declaration of Performance in accordance with the European Standard EN 40, a Declaration of Conformity under EN 12767, a CE Certificate under EN12767, as well as a structural tolerance design, and are delivered in hot-dip galvanized form in accordance with the European standard EN 1461, and with additional protection using powder polyester paint (Duplex system).

What is the European standard EN 12767?

In the last decade, in the Nordic countries and the Netherlands, which are characterised by high sensitivity to creating an environment of increased road safety, the so-called “Passive Revolution” has begun, which provides for use of passively safe products on all roads; such products must be certified after first having been exposed to real crash tests on certified tracks operated by a competent European body. In this context, the European standard EN 12767 was created, which standardises, classifies and determines where, when and how passively safe lighting columns should be used, as well as the manner and terms for the certification and conduct of crash tests.

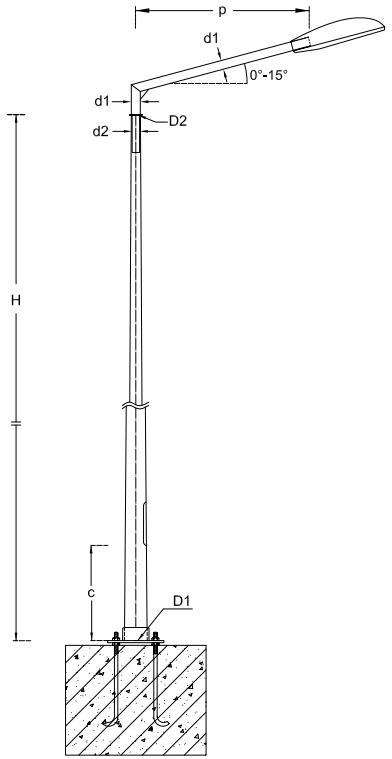
Under the EN 12767 standard, passively safe lighting columns used for road safety are classified into three classes:

NE no energy absorption

LE low energy absorption

HE high energy absorption

They are used according to the category of each road.



NE lighting columns

During impact, NE-class passively safe lighting columns collapse near their base or separate from the base and fall near the vehicle, which usually passes under the column. They perform well in high-speed impacts and are recommended for motorways with a speed limit of 100km/h, as well as for dual-carriage motorways.

They achieve much better results in terms of the level of impact severity than LE or HE-type columns, thus ensuring a better level of occupant safety as a result of reduced impact accelerations. In other words, for a given same level of occupant safety, e.g. class ‘C’, NE columns are safer than LE or HE columns. Of the NE-class columns, preference is given to those which collapse from the base plate, as compared to columns where the entire column separates from the base, as the following problems arise in the second case:

- Corrosion can cause the plate release mechanism to lock up.
- Bolt torque must be checked at regular intervals.

They are directional, as the impact must come from the right direction to ensure slippage and separation.

- These slip-based columns do not perform well, as they are relatively heavy and may bounce away from the vehicle, causing the risk of a second accident.
- They must not be used on soil with embankments, as the vehicle cannot hit the prescribed height of the column in order to cause separation of the column, and there is a risk of the plate release mechanism locking up.

TABLE 1

Table of Energy Absorption Classes

Speed	50km/h	70km/h	100km/h
Energy Absorption Class	**Vehicle exit speed in km/h (VE)**		
HE	Ve = 0	0 ≤ Ve < 50	0 ≤ Ve ≤ 50
LE	0 < Ve ≤ 50	50 ≤ Ve ≤ 30	50 ≤ Ve ≤ 70
NE	50 < Ve ≤ 50	30 ≤ Ve ≤ 70	70 ≤ Ve ≤ 100

TABLE 2

Impact Severity Table

Energy Absorption Class	**Occupant Safety Class**	**Speeds**			
		Low speed test at 35km/h		**High speed tests at 50km/h, 70km/h, 100km/h**	
		Maximum values		**Maximum values**	
		ASI	THIV km/h	ASI	THIV km/h
HE/LE/NE	E	1	27	1,4	44
HE/LE/NE	D	1	27	1,2	33
HE/LE/NE	C	1	27	1,0	27
HE/LE/NE	B	0,6	11	0,6	11
NE	A	No testing required	No testing required	No ASI and THIV measurements required	

TABLE 3

Table of column selection for various classes

Passively safe lighting columns	**Speed limits**	**Passive safety class proposals**	**General Remarks**
Lighting and Signalling Columns	100km/h	100 NE	General single - or dual - carriage motorways or expressways. On dual-carriage roads, columns are always placed on the traffic island in combination with Vehicle Restraint Systems (VRS).
	Maximum speed limit 70km/h	100 or 70 NE	General provincial roads or national motorways
Lighting columns in areas with frequent pedestrian or bicycle traffic	Maximum speed limit 100km/h	100 NE	General expressways
	Maximum speed limit 80 or 90km/h	100 NE	General provincial roads
	Maximum speed limit 70km/h	100 or 70 NE 100 or 70 LE 100 or 70 HE	General provincial roads and urban roads
	Maximum speed limit 60km/h	70 NE 70 LE 70 HE	All three types can be used, but preference is given to HE-class columns, particularly in areas with frequent pedestrian or bicycle traffic
	Maximum speed limit 50km/h	70 or 50 NE 70 LE or 70 NE 70 or 50 HE	All three types can be used, but preference is given to HE-class columns, particularly in areas with frequent pedestrian or bicycle traffic

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