



Service life duration estimation of zinc roofing

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Current expected lifetime of zinc roofing and cladding.

Zinc is valued for its long lasting, maintenance-free service life. The centre of Paris, whose beautiful zinc roofs are an iconic part of the city and now declared a world heritage site, have an average life of between 60 and 80 years. This is well known within the industry. But it is sometimes necessary to provide additional information based on internationally accepted norms that back up the anecdotal evidence, so that this knowledge is able to be 'transferred' to other parts of the world.

ISO 12944 categorizes different environments according to their corrosivity. These categories are determined by the mass loss of mild steel and zinc in each category over the first year of exposure. Taking the values only for zinc gives the following table.

ISO 12944 corrosion categories.

| Corrosion category | Description | Zinc mass loss, g/m ² - thickness loss µm, both over first year of exposure | | Average zinc loss of thickness |
|--------------------|---|---|-------------|-----------------------------------|
| | | Lower limit | Upper limit | |
| C1 very low | Inside of heated rooms, for example offices, shops etc, | ≤0,7 | ≤0,1 | 0,85 |
| C2 low | Rural areas with low contamination | >0,7 to 5 | >0,1 to 0,7 | 0,40 |
| C3 medium | Urban and industrial areas, moderate SO ₂ contamination, coastal areas with low salinity | >5 to 15 | >0,7 to 2,1 | 1,40 |
| C4 high | Industrial areas and coastal areas with moderate salinity | >15 to 30 | >2,1 to 4,2 | 3,15 |
| C5 very high | Industrial areas with high humidity and aggressive atmospheres and coastal areas with high salinity | >30 to 60 | >4,2 to 8,4 | 6,30 |
| CX extreme | Offshore areas with high salinity and industrial areas with extreme humidity and aggressive atmosphere and subtropical and tropical atmospheres | >60 to 180 | >8,4 to 25 | 16,7 |

Note – losses are the same as stipulated in EN9223

Using this information, we can calculate the expected time the zinc sheet takes to halve its thickness, and therefore determine an estimate for its service life. This yields the following table (overleaf):

| Expected service life in years, elZinc® Natural | Thickness | | | |
|---|-----------|-----------|-----------|---------|
| | 0,65 | 0,70 | 0,80 | 1 |
| Atmosphere | | | | |
| C2 (low) | +100 | +100 | +100 | +100 |
| C3 (Medium) | +100 | +100 | +100 | +100 |
| C4 (high) | 77 - +100 | 83 - +100 | 95 - +100 | +100 |
| C5 (very high) | 39 - 52 | 42 - 56 | 48 - 63 | 60 - 79 |
| C5 (Extreme) | 13 - 39 | 14 - 42 | 15 - 48 | 20 - 60 |

The ISO norm does not allow for extrapolation of mass loss / thickness for time periods greater than 1 year. However, it is well known in the industry that the rate of erosion of zinc's surface is significantly greater during the initial period of exposure than it is for the remaining period after its protective patina has formed, so these figures can safely be regarded as a minimum.

Therefore, these figures are estimates, but in fact correlate reasonably well with widely accepted figures, except for the CX category which is low for subtropical and tropical regions when compared with experience gained over the last few decades with real zinc roofs. This is probably due to the protective effect of zinc's patina.

Of course, in aggressive environments it is elZinc's longstanding recommendation to use elZinc Rainbow® or elZinc Advance®, which have protective coatings to increase its protection against corrosion.



FACTORY AND HEAD OFFICE

ASTURIANA DE LAMINADOS, S.A.
Pol. Ind. de Villallana, Parcela 1
33695 Pola de Lena – Spain

T (0034) 98 567 60 00 / 98 410 60 00

F (0034) 98 549 32 02 / 98 569 20 00

elzinc@aslazinc.com

www.elzinc.es

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