

Task 4: Read and understand technical information

Read the following text about galvanized steel inspection and answer the questions below.

Galvanized Steel Inspection**Coating inspection**

The finish and appearance of hot-dip galvanized steel can be influenced by various factors. Some of them can be controlled at production, but a lot of coating defects happen during shipping or use. Operators perform a visual inspection of finish and appearance by looking at all parts of a product. One key feature of hot-dip galvanized products is their durability. The time to first maintenance of such steel products is directly proportional to the thickness of the zinc coating. This can be checked by measuring the thickness with a magnetic thickness gauge which is a non-destructive method. There are specifications covering all types of structural steel and reinforcing steel bars, and the zinc coating layer has to meet these standards.

Typical appearance

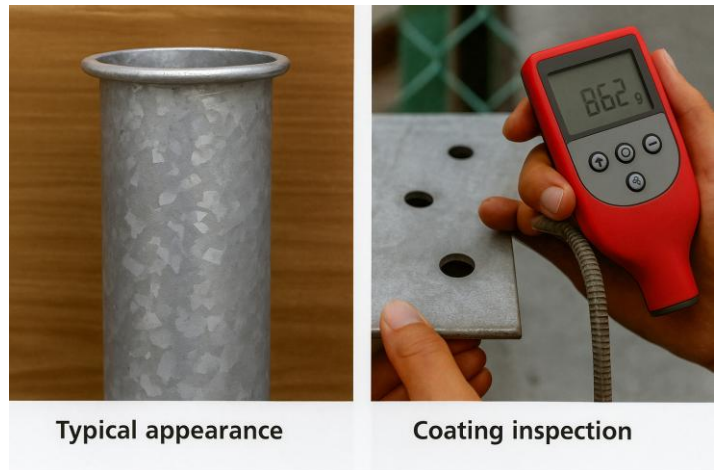
Typically, hot-dip galvanized steel has a bright and shiny surface with a classic zinc spangle formation.

The most frequent reason for variations in the appearance of galvanized steel is the composition of chemical elements in the steel alloy. The two elements that

influence the final appearance of galvanized steel products are phosphorus and silicon.

Silicon and phosphorus levels

Silicon and phosphorus are added to steel during the production process, so their proportions are beyond the control of the galvanizer or surface engineer. The



recommended proportion of silicon in steel which is to be galvanized is between 0.15% and 0.25%. Outside these ranges, steel will form a much thicker zinc layer and develop a less shiny surface appearance. Phosphorus, in excess, can lead to a matt grey coating with so-called zinc ridges where zinc growth was increased. This results in a rough surface profile which may not be acceptable for some applications, such as handrails.

Excess aluminium

Galvanizing bath should contain at least 95 percent pure zinc, the remaining 5 percent being additives like aluminium. Normally, aluminium produces the typical shiny surface, but excess aluminium can lead to black marks and spots. Small areas where such spots occur can be repaired, but if the entire piece is covered with them, it must be rejected. The surface must be cleaned and the whole piece galvanized again.

Steel processing

Pipe surfaces may have dull grey areas resulting from the tube formation process. The striped effect gets even stronger when the pipes are galvanized, but this does not affect the corrosion performance. As long as corrosion protection is not diminished, such products meet specification standards and cannot be rejected by the customer.

Mishandling

Before galvanized steel is painted, sandblasting is generally used for surface pretreatment. An incorrect abrasive medium or the wrong procedure can cause delamination of the zinc coating. This delamination, or peeling, leaves a rough surface profile on the alloyed steel where paint cannot adhere.

Scratch marks

Chain and wire marks are the result of damage in transport. These scratches are acceptable unless they expose the bare steel.