



## Sol-gel coating

Curing of the sol-gel coatings by using residual heat energy accumulated in previous manufacturing processes.

### Challenge

Typically, sol-gel coated surfaces need a separate curing treatment by heating at temperatures between 100 and 200°C. This treatment, however, increases the manufacturing costs, especially when sol-gel coating is applied to already existing production chains. Reasons for such difficulties can be e.g. lack of heat treatment equipment or its inconstant capacity, lack of money needed for the investment or simply lack of room for the new equipment. Furthermore, a separate curing process can be a bottleneck in a company's production chain, when e.g. sol-gel process is implemented.

### Invention

After hot-dip galvanizing, the temperature of a workpiece is approximately 450°C and after thermal spraying process approximately 200°C. Workpieces are commonly air-cooled (or water-cooled if necessary) before next treatment operations. The basic principle of this invention is to utilize the thermal energy that has been accumulated to workpieces in hot-dip galvanizing or thermal spraying process to cure the sol-gel coatings.

Tests carried out at laboratory and industrial scale have shown, that it is possible to cure the sol-gel coating by using residual heat energy accumulated in previous manufacturing processes.

The workpieces were cooled until different selected temperatures and applied then with the sol-gel coating by wet-spraying method. The selected temperatures were 250, 200, 150, 100 and 50°C with hot-dip galvanized parts and 170, 140 and 110°C with WC10Co4Cr thermally sprayed parts. It is very likely that even lower temperatures can be applied if the workpiece has sufficient thermal capacity. This method is also applicable for other thermally sprayed coatings than the one mentioned above.



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### Solution

The invention helps to give new added-value to hot deep sink coated new metal products and also to thermally sprayed components with sol-gel. It provides better outlook, cleanability, corrosion and wear resistance.

It also increases the easy to clean or corrosion resistance for the metal products/surfaces without new treatment phase (heat treatment).

### Application areas

This method is applicable in different products, processes, and materials with enough thermal energy accumulated in previous production steps.

### Additional information

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