

# DIN 50928:2019-03 (E)

## Corrosion of metals - Testing and assessment of the corrosion protection of coated metallic materials under corrosive action by aqueous media

---

| <b>Contents</b>    |  | <b>Page</b> |
|--------------------|--|-------------|
| Foreword .....     |  | 4           |
| Introduction ..... |  | 5           |
| 1                  | Scope .....  | 6           |
| 2                  | Normative references .....   | 6           |
| 3                  | Terms and definitions .....  | 7           |
| 4                  | Coatings .....   | 9           |
| 4.1                | Thin coatings .....  | 9           |
| 4.2                | Thick coatings .....   | 9           |
| 5                  | Electrochemical corrosion protection .....   | 9           |
| 6                  | Corrosive environments .....   | 9           |
| 7                  | Types of corrosive action .....  | 10          |
| 7.1                | General .....  | 10          |
| 7.2                | Cathodic effects .....   | 10          |
| 7.3                | Anodic effects .....   | 10          |
| 7.4                | Physico-chemical action .....  | 10          |
| 8                  | Appearance and causes of changes in coatings and of substrate corrosion .....            | 11          |
| 8.1                | Reduction in the adhesive strength of an undamaged and pinhole-free coating .....        | 11          |
| 8.2                | Pitting of the substrate in the region of pinholes or other defects in the coating ..... | 11          |
| 8.3                | Cathodic disbonding .....  | 11          |
| 8.4                | Blistering .....   | 11          |
| 8.4.1              | General .....  | 11          |
| 8.4.2              | Cathodic blisters .....  | 11          |
| 8.4.3              | Anodic blisters .....  | 12          |
| 8.4.4              | Neutral blisters .....   | 12          |
| 9                  | Methods of testing the properties of coatings .....                                      | 12          |
| 9.1                | Adhesive strength .....  | 12          |
| 9.2                | Specific layer resistance of coating .....   | 12          |
| 9.3                | Cathodic disbonding .....  | 13          |
| 9.4                | Electrochemical blistering .....   | 14          |
| 9.5                | Blistering due to a gradient in temperature .....  | 15          |
| 9.6                | Cathodic effect of coated surfaces .....   | 15          |
| 9.6.1              | General .....  | 15          |
| 9.6.2              | Measurement of cell current .....  | 15          |
| 9.6.3              | Measurement of polarization current .....  | 16          |
| 10                 | Importance of coating properties for the effectiveness of corrosion protection .....     | 17          |
| 10.1               | Adhesive strength .....  | 17          |
| 10.2               | Cathodic disbonding .....  | 17          |
| 10.3               | Blistering .....   | 17          |
| 11                 | Assessment of the effectiveness of corrosion protection and minimum requirements .....   | 17          |

|  |  |    |
|--|--|----|
| 11.1   | Durability and duration of the test .....        | 17 |
| 11.2   | Specific layer resistance of coating .....       | 18 |
| 11.3   | Applications and requirements for coatings ..... | 18 |
| 11.3.1   | General .....                                    | 18 |
| 11.3.2   | Corrosion protection of convex surfaces .....    | 18 |
| 11.3.3   | Corrosion protection of planar surfaces .....    | 19 |
| 11.3.4   | Corrosion protection of concave surfaces .....   | 19 |
| 11.4   | Cell formation and pitting .....                 | 19 |
| Bibliography .....   |  | 20 |
| Figures Figure 1 -- Coplanar element for the measurement of the cell current ..... |  | 16 |