

CPC COOPERATIVE PATENT CLASSIFICATION

C23F NON-MECHANICAL REMOVAL OF METALLIC MATERIAL FROM SURFACE (working metal by laser beams [B23K 26/00](#); desurfacing by applying flames [B23K 7/00](#); working of metal by electro-erosion [B23H](#); producing decorative effects by removing surface material, e.g. by engraving, by etching, [B44C 1/22](#); electrolytic etching or polishing [C25F](#)); **INHIBITING CORROSION OF METALLIC MATERIAL OR INCRUSTATION IN GENERAL; MULTI-STEP PROCESSES FOR SURFACE TREATMENT OF METALLIC MATERIAL INVOLVING AT LEAST ONE PROCESS PROVIDED FOR IN CLASS [C23](#) AND AT LEAST ONE PROCESS COVERED BY SUBCLASS [C21D](#) OR [C22F](#) OR CLASS [C25](#)**

NOTES

1. protective layers or coating compositions or methods of applying them; these are classified in the appropriate places, e.g. [B05](#), [B44](#), [C09D](#), [C23C](#).
2. mechanical devices or constructional features of particular articles for inhibiting incrustation; these are classified in the appropriate places, e.g. in pipes or pipe fittings [F16L 58/00](#).
3. articles characterised by being made of materials selected for their properties of resistance to corrosion or incrustation; these are classified in the appropriate places, e.g. turbine blades [F01D 5/28](#).

WARNING

The following IPC groups are not used in the CPC scheme. Subject matter covered by these groups is classified in the following CPC groups:

[C23F 1/24](#)

covered by

1/00	Etching metallic material by chemical means (manufacture of printing surfaces B41C ; manufacture of printed circuits H05K)	3/06	. . with acidic solutions
1/02	. Local etching	4/00	Processes for removing metallic material from surfaces, not provided for in group C23F 1/00 or C23F 3/00
1/04	. . Chemical milling	4/02	. by evaporation
1/06	. Sharpening files	4/04	. by physical dissolution
1/08	. Apparatus, e.g. for photomechanical printing surfaces (photo- mechanical reproduction G03F)	11/00	Inhibiting corrosion of metallic material by applying inhibitors to the surface in danger of corrosion or adding them to the corrosive agent (adding inhibitors to mineral oil, fuels, or lubricants C10 ; adding inhibitors to pickling solutions C23G)
1/10	. Etching compositions (C23F 1/44 takes precedence)	11/02	. in air or gases by adding vapour phase inhibitors
1/12	. . Gaseous compositions	11/04	. in markedly acid liquids
1/14	. . Aqueous compositions	11/06	. in markedly alkaline liquids
1/16	. . . Acidic compositions (C23F 1/42 takes precedence)	11/08	. in other liquids
1/18	. . . . for etching copper or alloys thereof	11/10	. . using organic inhibitors
1/20	. . . . for etching aluminium or alloys thereof		NOTES
1/22	. . . . for etching magnesium or alloys thereof		1. A compound is classified in the last appropriate place.
1/26	. . . . for etching refractory metals		2. Esters or anhydrides of organic acids are classified as the relevant acid unless otherwise indicated. Salts of a compound with an inorganic compound are classified as that compound unless specifically provided for.
1/28	. . . . for etching iron group metals		
1/30	. . . . for etching other metallic material		
1/32	. . . Alkaline compositions (C23F 1/42 takes precedence)		
1/34	. . . . for etching copper or alloys thereof		
1/36	. . . . for etching aluminium or alloys thereof		
1/38	. . . . for etching refractory metals		
1/40	. . . . for etching other metallic material		
1/42	. . . containing a dispersed water-immiscible liquid		
1/44	. Compositions for etching metallic material from a metallic material substrate of different composition	11/12	. . . Oxygen-containing compounds
1/46	. Regeneration of etching compositions	11/122	. . . . {Alcohols; Aldehydes; Ketones}
3/00	Brightening metals by chemical means	11/124	. . . . {Carboxylic acids}
3/02	. Light metals	11/126	. . . . . {Aliphatic acids}
3/03	. . with acidic solutions	11/128	. . . . {Esters of carboxylic acids}
3/04	. Heavy metals	11/14	. . . Nitrogen-containing compounds
		11/141	. . . . {Amines; Quaternary ammonium compounds}

- 11/142 {Hydroxy amines}
- 11/143 {Salts of amines}
- 11/144 {Aminocarboxylic acids}
- 11/145 {Amides; N-substituted amides}
- 11/146 {containing a multiple nitrogen-to-carbon bond}
- 11/147 {containing a nitrogen-to-oxygen bond}
- 11/148 {containing a nitrogen-to-nitrogen bond}
- 11/149 {Heterocyclic compounds containing nitrogen as hetero atom}
- 11/16 . . . Sulfur-containing compounds
- 11/161 {Mercaptans}
- 11/162 {Thioaldehydes; Thioketones}
- 11/163 {Sulfonic acids}
- 11/164 {containing a -SO₂-N group}
- 11/165 {Heterocyclic compounds containing sulfur as hetero atom}
- 11/167 . . . Phosphorus-containing compounds
- 11/1673 {Esters of phosphoric or thiophosphoric acids}
- 11/1676 {Phosphonic acids}
- 11/173 . . . Macromolecular compounds
- 11/18 . . . using inorganic inhibitors
- 11/181 . . . {Nitrogen containing compounds}
- 11/182 . . . {Sulfur, boron or silicon containing compounds}
- 11/184 . . . {Phosphorous, arsenic, antimony or bismuth containing compounds}
- 11/185 . . . {Refractory metal-containing compounds}
- 11/187 . . . {Mixtures of inorganic inhibitors}
- 11/188 {containing phosphates}
- 13/00 Inhibiting corrosion of metals by anodic or cathodic protection**
- 13/005 . {Anodic protection}
- 13/02 . cathodic; Selection of conditions, parameters or procedures for cathodic protection, e.g. of electrical conditions
- 13/04 . . Controlling or regulating desired parameters
- 13/06 . . Constructional parts, or assemblies of cathodic-protection apparatus
- 13/08 . . . Electrodes specially adapted for inhibiting corrosion by cathodic protection; Manufacture thereof; Conducting electric current thereto
- 13/10 Electrodes characterised by the structure ([C23F 13/16 takes precedence](#))
- 13/12 Electrodes characterised by the material ([C23F 13/16 takes precedence](#))
- 13/14 Material for sacrificial anodes
- 13/16 Electrodes characterised by the combination of the structure and the material
- 13/18 Means for supporting electrodes
- 13/20 Conducting electric current to electrodes
- 13/22 Monitoring arrangements therefor
- 14/00 Inhibiting incrustation in apparatus for heating liquids for physical or chemical purposes (adding scale preventives or removers to water [C02F 5/00](#) {inhibiting incrustation in polymerisation reactors [C23F 15/005](#)})**
- 14/02 . by chemical means
- 15/00 Other methods of preventing corrosion or incrustation**

15/005 . {Inhibiting incrustation}

17/00 Multi-step processes for surface treatment of metallic material involving at least one process provided for in class [C23](#) and at least one process covered by subclass [C21D](#) or [C22F](#) or class [C25](#) ([C23C 28/00](#) takes precedence)

2201/00 Type of materials to be protected by cathodic protection

2201/02 . Concrete, e.g. reinforced

2213/00 Aspects of inhibiting corrosion of metals by anodic or cathodic protection

2213/10 . Controlling or regulating parameters

2213/11 . . for structures subject to stray currents

2213/20 . Constructional parts or assemblies of the anodic or cathodic protection apparatus

2213/21 . . combining at least two types of anodic or cathodic protection

2213/22 . . characterized by the ionic conductor, e.g. humectant, hydratant or backfill

2213/30 . Anodic or cathodic protection specially adapted for a specific object

2213/31 . . Immersed structures, e.g. submarine structures

2213/32 . . Pipes