

**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](#) .**

**NOTE**

protective layers or coating compositions or methods of applying them; these are classified in the appropriate places, e.g. [B05](#) , [B44](#) , [C09D](#) , [C23C](#) .

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](#).

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](#).

**Guidance heading:**

- C23F 1/00**      **Etching metallic material by chemical means** (manufacture of printing surfaces [B41C](#) ; manufacture of printed circuits [H05K](#) )
- C23F 1/02      .    Local etching
- C23F 1/04      . .    Chemical milling
- C23F 1/06      .    Sharpening files
- C23F 1/08      .    Apparatus, e.g. for photomechanical printing surfaces (photo- mechanical reproduction [G03F](#) )
- C23F 1/10      .    Etching compositions ([C23F 1/44](#) takes precedence)
- C23F 1/12      . .    Gaseous compositions
- C23F 1/14      . .    Aqueous compositions
- C23F 1/16      . . .    Acidic compositions ([C23F 1/42](#) takes precedence)
- C23F 1/18      . . . .    for etching copper or alloys thereof
- C23F 1/20      . . . .    for etching aluminium or alloys thereof
- C23F 1/22      . . . .    for etching magnesium or alloys thereof
- C23F 1/26      . . . .    for etching refractory metals
- C23F 1/28      . . . .    for etching iron group metals

- C23F 1/30 . . . . for etching other metallic material
- C23F 1/32 . . . Alkaline compositions ([C23F 1/42](#) takes precedence)
- C23F 1/34 . . . . for etching copper or alloys thereof
- C23F 1/36 . . . . for etching aluminium or alloys thereof
- C23F 1/38 . . . . for etching refractory metals
- C23F 1/40 . . . . for etching other metallic material
- C23F 1/42 . . . containing a dispersed water-immiscible liquid
  
- C23F 1/44 . Compositions for etching metallic material from a metallic material substrate of different composition
  
- C23F 1/46 . Regeneration of etching compositions

### **C23F 3/00      Brightening metals by chemical means**

- C23F 3/02 . Light metals
- C23F 3/03 . . with acidic solutions
  
- C23F 3/04 . Heavy metals
- C23F 3/06 . . with acidic solutions

### **C23F 4/00      Processes for removing metallic material from surfaces, not provided for in group [C23F 1/00](#) or [C23F 3/00](#)**

- C23F 4/02 . by evaporation
  
- C23F 4/04 . by physical dissolution

### **C23F 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](#) )**

- C23F 11/02 . in air or gases by adding vapour phase inhibitors
  
- C23F 11/04 . in markedly acid liquids
  
- C23F 11/06 . in markedly alkaline liquids
  
- C23F 11/08 . in other liquids
- C23F 11/10 . . using organic inhibitors

#### **NOTE**

A compound is classified in the last appropriate place.

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.

C23F 11/12	...	Oxygen-containing compounds
C23F 11/122	....	Alcohols; Aldehydes; Ketones
C23F 11/124	....	Carboxylic acids
C23F 11/126	.....	Aliphatic acids
C23F 11/128	....	Esters of carboxylic acids
C23F 11/14	...	Nitrogen containing compounds
C23F 11/141	....	Amines; Quaternary ammonium compounds
C23F 11/142	.....	Hydroxy amines
C23F 11/143	.....	Salts of amines
C23F 11/144	....	Aminocarboxylic acids
C23F 11/145	....	Amides; N-substituted amides
C23F 11/146	....	containing a multiple nitrogen-to-carbon bond
C23F 11/147	....	containing a nitrogen-to-oxygen bond
C23F 11/148	....	containing a nitrogen-to-nitrogen bond
C23F 11/149	....	Heterocyclic compounds containing nitrogen as hetero atom
C23F 11/16	...	Sulfur containing compounds
C23F 11/161	....	Mercaptans
C23F 11/162	....	Thioaldehydes; Thioketones
C23F 11/163	....	Sulfonic acids
C23F 11/164	....	containing a -SO <sub>2</sub> -N group
C23F 11/165	....	Heterocyclic compounds containing sulfur as hetero atom
C23F 11/167	...	Phosphorus-containing compounds
C23F 11/1673	....	Esters of phosphoric or thiophosphoric acids
C23F 11/1676	....	Phosphonic acids
C23F 11/173	...	Macromolecular compounds
C23F 11/18	..	using inorganic inhibitors
C23F 11/181	...	Nitrogen containing compounds
C23F 11/182	...	Sulfur, boron or silicon containing compounds
C23F 11/184	...	Phosphorous, arsenic, antimony or bismuth containing compound
C23F 11/185	...	Refractory metal-containing compounds
C23F 11/187	...	Mixtures of inorganic inhibitors
C23F 11/188	....	containing phosphates

## **C23F 13/00      Inhibiting corrosion of metals by anodic or cathodic protection**

C23F 13/005	.	{Anodic protection }
C23F 13/02	.	cathodic; Selection of conditions, parameters or procedures for cathodic protection, e.g. of electrical conditions
C23F 13/04	..	Controlling or regulating desired parameters
C23F 13/06	..	Constructional parts, or assemblies of cathodic-protection apparatus
C23F 13/08	...	Electrodes specially adapted for inhibiting corrosion by cathodic protection; Manufacture thereof; Conducting electric current thereto

C23F 13/10	....	Electrodes characterised by the structure ( <a href="#">C23F 13/16 takes precedence</a> )
C23F 13/12	....	Electrodes characterised by the material ( <a href="#">C23F 13/16 takes precedence</a> )
C23F 13/14	.....	Material for sacrificial anodes
C23F 13/16	....	Electrodes characterised by the combination of the structure and the material
C23F 13/18	....	Means for supporting electrodes
C23F 13/20	....	Conducting electric current to electrodes
C23F 13/22	....	Monitoring arrangements therefor

**C23F 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](#) }

C23F 14/02      .    by chemical means

**C23F 15/00**      **Other methods of preventing corrosion or incrustation**

C23F 15/005      .    {[Inhibiting incrustation](#) }

**C23F 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](#))**

**Guidance heading:**

**C23F 2201/00**      **Type of materials to be protected by cathodic protection**

C23F 2201/02      .    Concrete, e.g. reinforced

**Guidance heading:**

**C23F 2213/00**      **Aspects of inhibiting corrosion of metals by anodic or cathodic protection**

C23F 2213/10	.    Controlling or regulating parameters
C23F 2213/11	..    for structures subject to stray currents
C23F 2213/20	.    Constructional parts or assemblies of the anodic or cathodic protection apparatus
C23F 2213/21	..    combining at least two types of anodic or cathodic protection
C23F 2213/22	..    characterized by the ionic conductor, e.g. humectant, hydratant or backfill
C23F 2213/30	.    Anodic or cathodic protection specially adapted for a specific object
C23F 2213/31	..    Immersed structures, e.g. submarine structures
C23F 2213/32	..    Pipes