

**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**

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](#).

**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**

1. A compound is classified in the last appropriate place.
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.

- 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
<b>C23F 13/00</b>		<b>Inhibiting corrosion of metals by anodic or cathodic protection</b>
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

<b>C23F 14/00</b>	<b>Inhibiting incrustation in apparatus for heating liquids for physical or chemical purposes</b> (adding scale preventives or removers to water <a href="#">C02F 5/00</a> {inhibiting incrustation in polymerisation reactors <a href="#">C23F 15/005</a> })
<a href="#">C23F 14/02</a>	. by chemical means
<b>C23F 15/00</b>	<b>Other methods of preventing corrosion or incrustation</b>
<a href="#">C23F 15/005</a>	. {Inhibiting incrustation}
<b>C23F 17/00</b>	<b>Multi-step processes for surface treatment of metallic material involving at least one process provided for in class <a href="#">C23</a> and at least one process covered by subclass <a href="#">C21D</a> or <a href="#">C22F</a> or class <a href="#">C25</a> (<a href="#">C23C 28/00</a> takes precedence)</b>
<b>C23F 2201/00</b>	<b>Type of materials to be protected by cathodic protection</b>
<a href="#">C23F 2201/02</a>	. Concrete, e.g. reinforced
<b>C23F 2213/00</b>	<b>Aspects of inhibiting corrosion of metals by anodic or cathodic protection</b>
<a href="#">C23F 2213/10</a>	. Controlling or regulating parameters
<a href="#">C23F 2213/11</a>	. . for structures subject to stray currents
<a href="#">C23F 2213/20</a>	. Constructional parts or assemblies of the anodic or cathodic protection apparatus
<a href="#">C23F 2213/21</a>	. . combining at least two types of anodic or cathodic protection
<a href="#">C23F 2213/22</a>	. . characterized by the ionic conductor, e.g. humectant, hydratant or backfill
<a href="#">C23F 2213/30</a>	. Anodic or cathodic protection specially adapted for a specific object
<a href="#">C23F 2213/31</a>	. . Immersed structures, e.g. submarine structures
<a href="#">C23F 2213/32</a>	. . Pipes