

CPC COOPERATIVE PATENT CLASSIFICATION

A HUMAN NECESSITIES

B PERFORMING OPERATIONS; TRANSPORTING

NOTE

The following notes are meant to assist in the use of {classes [B01](#) to [B09](#)}; they must not be read as modifying in any way the elaborations.

In this sub-section, the separation of different materials, e.g. of different matter, size, or state, is predominantly found in the following subclasses:

[B01D](#)
[B03B](#), [B03C](#), [B03D](#)
[B04B](#), [B04C](#)
[B07B](#), [B07C](#)

The classifying characteristics of these subclasses are:

- the physical state of the matter to be separated
 - the principle of the process used
 - particular kinds of apparatus
- The first of these characteristics involves six different aspects, assembled in three groups.

a liquid/liquid or liquid/gas and gas/gas
 b solid/liquid or solid/gas
 c solid/solid

These subclasses are to be used according to the following general rules:

- [B01D](#) is the most general class as far as separation other than solids from solids is concerned.
- Apparatus for separating solids from solids are covered by [B03B](#) when the process concerned is regarded as the equivalent of "washing" in the sense of the mining art, even if such apparatus is a pneumatic one, especially pneumatic tables or jigs. Screens PER SE are not covered by this subclass but are classified in [B07B](#), even if they are being used in a wet process. All other apparatus for the separation of solids

from solids according to dry methods are classified in [B07B](#).

- If the separation takes place as a result of the detection or measurement of some feature of the material or articles to be sorted it is classified in [B07C](#).
It should also be noted that the separation of isotopes of the same chemical element is covered by [B01D 59/00](#), whatever process or apparatus is employed.

4. The following scheme illustrates the classification according to these rules.

(a) LIQUID/LIQUID
LIQUID/GAS
GAS/GAS

Subclasses dealing with Operations Apparatus	Method	
General	B01D	B01D
by centrifugal force, using centrifuges or free-vortex apparatus	B01D	B04B , B04C
using magnetic or electrostatic effect	B03C	B03C

(b) SOLID/LIQUID
SOLID/GAS

Subclasses dealing with Operations Apparatus	Method	
General	B01D	B01D
by centrifugal force	B01D	B01D
using centrifuges or free-vortex apparatus	B01D	B04B , B04C
using magnetic or electrostatic effect	B03C	B03C

(c) SOLID/SOLID

 Dry Methods

Subclasses dealing with Operations Apparatus	Method	
General for material in bulk	B07B	B07B
Individual sorting	B07C	B07C
Screening, sifting, pneumatic sorting	B07B	B07B
using pneumatic tables or jigs	B03B	B03B
by magnetic or electrostatic effect	B03C	B03C
by centrifugal force	B07B	B07B
using centrifuges or free-vortex apparatus	B07B	B04B, B04C

 Wet Methods

Subclasses dealing with Operations Apparatus	Method	
General	B03B	B03B
flotation, differential sedimentation	B03D	B03D
screening	B07B	B07B

Combinations = dry methods - wet methods: [B03B](#)

C

CHEMISTRY; METALLURGY

NOTE

In section C, the definitions of groups of chemical elements are as follows:

- ALKALI METALS: Li, Na, K, Rb, Cs, Fr
- ALKALINE EARTH METALS: Ca, Sr, Ba, Ra

- LANTHANIDES: elements with atomic numbers 57 to 71 inclusive
- RARE EARTHS: Sc, Y, Lanthanides
- ACTINIDES: elements with atomic numbers 89 to 103 inclusive
- REFRACTORY METALS: Ti, V, Cr, Zr, Nb, Mo, Hf, Ta, W
- HALOGENS: F, Cl, Br, I, At
- NOBLE GASES: He, Ne, Ar, Kr, Xe, Rn
- PLATINUM GROUP: Os, Ir, Pt, Ru, Rh, Pd
- NOBLE METALS: Ag, Au, Platinum group
- LIGHT METALS: alkali metals, alkaline earth metals, Be, Al, Mg
- HEAVY METALS: metals other than light metals
- IRON GROUP: Fe, Co, Ni
- NON-METALS: H, B, C, Si, N, P, O, S, Se, Te, noble gases, halogens
- METALS: elements other than non-metals
- TRANSITION ELEMENTS: elements with atomic numbers 21 to 30 inclusive, 39 to 48 inclusive, 57 to 80 inclusive, 89 upwards

The following notes are meant to assist in the use of this part of the classification scheme; they must not be read as modifying in any way the elaborations.

Section C covers:

pure chemistry, which covers inorganic compounds, organic compounds, macromolecular compounds, and their methods of preparation;

applied chemistry, which covers compositions containing the above compounds, such as: glass, ceramics, fertilisers, plastics compositions, paints, products of the petroleum industry. It also covers certain compositions on account of their having particular properties rendering them suitable for certain purposes, as in the case of explosives, dyestuffs, adhesives, lubricants, and detergents;

certain marginal industries, such as the manufacture of coke and of solid or gaseous fuels, the production and refining of oils, fats, and waxes, the fermentation industry, (e.g. brewing and wine-making) the sugar industry;

certain operations or treatments, which are either purely mechanical, e.g. the mechanical treatment of leather and skins, or partly mechanical, e.g. the treatment of water, or the prevention of corrosion in general;

metallurgy, ferrous or non-ferrous alloys.

In the case of operations, treatments, products, or articles which have both a chemical and non-chemical part or aspect, the general rule is that the chemical part or aspect is covered by section C.

In some of these cases, the chemical part or aspect brings with it a non-chemical one, even though purely mechanical, because this latter aspect either is essential to the operation or treatment or constitutes an important element of it; it has seemed, in fact, more logical not to dissociate the different parts or aspects of a coherent whole. This is the case for applied chemistry and for the industries, operations, and treatments mentioned in Notes 1), c), d) and e). For example, furnaces

peculiar to the manufacture of glass are covered by class [C03](#) and not by class [F27](#).

There are, however, some exceptions in which the mechanical (or non-chemical) aspect carries with it the chemical aspect, for example:

- certain extractive processes in subclass [A61K](#);
- the chemical purification of air in subclass [A61L](#);
- chemical methods of fire-fighting in subclass [A62D](#);

- chemical processes and apparatus in class [B01](#);
- impregnation of wood in subclass [B27K](#);
- chemical methods of analysis or testing in subclass [G01N](#);
- photographic materials and processes in class [G03](#), and generally, the chemical treatment of textiles and the production of cellulose or paper in section D.

In still other cases, the pure chemical aspect is covered by section C and the applied chemical aspect by another section such as A, B, F, e.g. the use of a substance or composition for

- treatment of plants or animals covered by subclass [A01N](#);
- foodstuffs covered by class [A23](#);
- munitions or explosives covered by class [F42](#).

When the chemical and mechanical aspects are so closely interlocked that a neat and simple division is not possible, or when certain mechanical processes follow as a natural or logical continuation of a chemical treatment, section C may cover, in addition to the chemical aspect, a part only of the mechanical aspect, e.g. after-treatments of artificial stone covered by class [C04](#). In this latter case a note or a reference is usually given to make the position clear, even if sometimes the division is rather arbitrary.

D **TEXTILES; PAPER**

E **FIXED CONSTRUCTIONS**

F **MECHANICAL ENGINEERING; LIGHTING;
HEATING; WEAPONS; BLASTING ENGINES OR
PUMPS**

NOTE

Guide to the use of this subsection (classes F01 to F04)The following notes are meant to assist in the use of this part of the classification scheme.

In this subsection, subclasses or groups designating "engines" or "pumps" cover methods of operating the same, unless otherwise specifically provided for.

In this subsection, the following terms or expressions are used with the meanings indicated:

- "engine" means a device for continuously converting fluid energy into mechanical power. Thus this term includes, for example, steam piston engines or steam turbines, PER SE, or internal-combustion piston engines, but it excludes single-stroke devices. "Engine" also includes the fluid-motive portion of a meter unless such portion is particularly adapted for use in a meter;
- "pump" means a device for continuously raising, forcing, compressing, or exhausting fluid by mechanical or other means; thus this term includes fans or blowers;
- "machine" means a device which could equally be an engine and a pump, and not a device which is restricted to an engine or one which is restricted to a pump;
- "positive displacement" means the way the energy of a working fluid is transformed into mechanical energy, in which variations of volume created by the working fluid in a working chamber produce equivalent displacements of the mechanical member transmitting the energy, the dynamic effect of the fluid being of minor importance; and VICE-VERSA;
- "non-positive displacement" means the way the energy of a working fluid is transformed into mechanical energy, by transformation of the energy of the working fluid into kinetic energy; and VICE-VERSA;
- "oscillating-piston machine" means a positive-displacement machine in which a fluid-engaging work-transmitting member oscillates. This definition applies also to engines and pumps;
- "rotary-piston machine" means a positive-displacement machine in which a fluid-engaging work-transmitting member rotates about a fixed axis or about an axis moving along a circular or similar orbit. This definition applies also to engines and pumps;

- "rotary piston" means the work-transmitting member of a rotary-piston machine and may be of any suitable form, e.g. like a toothed gear;

- "co-operating members" means the "oscillating piston" or "rotary piston" and another member, e.g. the working-chamber wall, which assists in the driving or pumping action;
- "movement of the co-operating members" is to be interpreted as relative, so that one of the "co-operating members" may be stationary, even though reference may be made to its rotational axis, or both may move;
- "teeth or tooth-equivalents", include lobes, projections or abutments;
- "internal-axis type" means that the rotational axes of the inner and outer co-operating members remain at all times within the outer member, e.g. in a similar manner to that of a pinion meshing with the internal teeth of a ring gear;
- "free-piston" means a piston of which the length of stroke is not defined by any member driven thereby;
- "cylinders" means positive-displacement working chambers in general and thus this term is not restricted to cylinders of circular cross-section;
- "main shaft" means the shaft which converts reciprocating piston motion into rotary motion or VICE-VERSA;
- "plant" means an engine together with such additional apparatus as is necessary to run the engine. For example, a steam engine plant includes a steam engine and means for generating the steam;
- "working fluid" means the driven fluid in a pump and the driving fluid in an engine. The working fluid may be in a gaseous state, i.e. compressible, or liquid. In the former case coexistence of two states is possible;
- "steam" includes condensable vapours in general, and "special vapour" is used when steam is excluded;
- "reaction type" as applied to non-positive-displacement machines or engines means machines or engines in which pressure/velocity transformation takes place wholly or

partly in the rotor; machines or engines with no, or only slight, pressure/velocity transformation in the rotor are called "impulse type".

In this subsection:

- cyclically operating valves, lubricating, gas-flow silencers or exhaust apparatus, or cooling should be classified in subclasses [F01L](#), [F01M](#), [F01N](#), [F01P](#) irrespective of their stated application, unless their classifying features are peculiar to their application, in which case they should be classified only in the relevant subclass of classes [F01](#) to [F04](#);
- lubricating, gas-flow silencers or exhaust apparatus, or cooling of machines or engines should be classified in sub-classes [F01M](#), [F01N](#), [F01P](#) except for those peculiar to steam engines which should be classified in subclass [F01B](#).

For use of this subsection with a good understanding, it is essential to remember, so far as subclasses [F01B](#), [F01C](#), [F01D](#), [F03B](#), [F04B](#), [F04C](#) and [F04D](#), which form its skeleton, are concerned:

- the principle which resides in their elaboration
- the classifying characteristics which they call for, and
- their complementarity

PrincipleThis concerns essentially the subclasses listed above. Other subclasses, notably those of class [F02](#), which cover better-defined matter, are not considered here. Each subclass covers fundamentally a genus of apparatus (engine or pump) and by extension covers equally "machines" of the same kind. Two different subjects, one having a more general character than the other, are thus covered by in the same subclass. Subclasses [F01B](#), [F03B](#), [F04B](#), beyond the two subjects which they cover, have further a character of generality in relation to other subclasses concerning the different species of apparatus in the genus concerned. This generality applies as well for the two subjects dealt with, without these always being in relation to the same subclasses. Thus, subclass [F03B](#), in its part dealing with "machines" should be considered as being the general class relating to subclasses [F04B](#), [F04C](#) and in its part dealing with "engines" as being general in relation to subclass [F03C](#).

CharacteristicsThe principal classifying characteristic of the subclass is that of genera of apparatus, of which there are three possible:

Machines; engines; pumps.

As stated above, "machines" are always associated with one of the other two genera. These main genera are subdivided according to the general principles of operation of the apparatus:

Positive displacement; non-positive displacement. The positive displacement apparatus are further subdivided according to the ways of putting into effect the principle of operation, that is, to the kind of apparatus:

Simple reciprocating piston; rotary or oscillating piston; other kind. Another classifying characteristic is that of the working fluid, in respect of which three kinds of apparatus are possible, namely:

Liquid and elastic fluid; elastic fluid; liquid.

Complementarity This resides in association of pairs of the subclasses listed above, according to the characteristics under consideration in respect of kind of apparatus or working fluid.

The subclasses concerned with the various principles, characteristics and complementarity are shown in the following table:

Kind of generality in place-respectment kind	positive reciprocating piston	rotary or oscillating piston other	non-positive elastic fluid	Working fluid liquid and elastic fluid	of displacement
MACHINES					
X	X		X	X	F01B
X		X	X		F01C
X	X	X	F01D		
X		X	F03B		
X		X		X	F04B
X				X	F04C
ENGINES					
X	X		X	X	F01B
X		X	X		F01C
X	X	X	F01D		

X				X			F03B
X	X		X				X F03C
PUMPS							
<hr/>							
X			X		X	X	X F04B
X				X	X	X	F04C
X	X		X	X			F04D

It is seen from the table that :

- For the same kind of apparatus in a given genus, the characteristic of "working fluid" associates:

[F01B](#) and [F04B](#))

[F01C](#) and [F04C](#)) Machines

[F01D](#) and [F03B](#))

[F01B](#) and [F03C](#))

[F01C](#) and [F03C](#)) Engines

[F01D](#) and [F03B](#))

- For the same kind of working fluid, the "apparatus" characteristic relates subclasses in the same way as considerations of relative generality.

G

PHYSICS

NOTE

In this section, the following term is used with the meaning indicated :

- "variable" (as a noun) means a feature or property, (e.g. a

dimension, a physical condition such as temperature, a quality such as density or colour) which, in respect of a particular entity (e.g. an object, a quantity of a substance, a beam of light) and at a particular instant, is capable of being measured; the variable may change, so that its numerical expression may assume different values at different times or in different conditions or individual cases, but may be constant in respect of a particular entity in certain conditions or for practical purposes, (e.g. the length of a bar may be regarded as constant for many purposes).

Attention is drawn to the definitions of terms used appearing in the notes of several of the classes in this Section, particularly of "measuring" in class [G01](#) and "control" and "regulation" in class [G05](#).

The classification of inventions in this Section may present more difficulty than in others because the distinction between different fields of use rests to a considerable extent on differences in the intention of the user rather than on any constructional differences or differences in the manner of use of inventions, and also because the subjects dealt with are often in effect systems or combinations which have features or parts in common rather than "things" which are readily distinguishable as a whole. For example, information, (e.g. a set of figures) may be displayed for the purpose of education or advertising ([G09](#)), for enabling the result of a measurement

to be known (G01), for signalling the information to a distant point or for giving information which has been signalled from a distant point (G08); the words used to describe the purpose depend on features which may be irrelevant to the form of the apparatus concerned - such features as the desired effect on the person who sees the display or whether the display is controlled from a remote point. Again, a device which responds to some change in a condition, e.g. in the pressure of a fluid, may be used, without modification of the device itself, to give information about the pressure (G01L) or about some other condition connected with the pressure (another subclass of G01, e.g. G01K for temperature), to make a record of the pressure or of its occurrence (G07C), to give an alarm (G08B), or to control some other apparatus (G05). The classification scheme is intended to enable things of a similar nature (as indicated above) to be classified together, and it is therefore particularly necessary for the real nature of any invention to be decided before it can be properly classified.

H

ELECTRICITY

NOTE

These notes cover the basic principles and general instructions for use of section H.

Section H covers :

basic electric elements, which cover all electric units and the general mechanical structure of apparatus and circuits, including the assembly of various basic elements into what are called printed circuits and also cover to a certain extent the manufacture of these elements (when not covered elsewhere);

generation of electricity, which covers the generation, conversion, and distribution of electricity together with the controlling of the corresponding gear;

applied electricity, which covers :

general utilisation techniques, viz. those of electric heating and electric lighting circuits;

some special utilisation techniques, either electric or electronic in the strict sense, which are not covered by other sections of the Classification, including :

- electric light sources, including lasers;
- electric X-ray technique;
- electric plasma technique and the generation and

acceleration of electrically charged particles or neutrons;

basic electronic circuits and their control;

radio or electric communication technique, including electromechanical transducers in general;

the use of a specified material for the manufacture of the article or element described. In this connection, paragraphs 56 to 58 of the Guide should be referred to.

In this section, the following general rules apply :

subject to the exceptions stated in I (c) above, any electric aspect or part peculiar to a particular operation, process, apparatus, object, or article classified in one of the sections of the Classification other than section H is always classified in the subclass for that operation, process, apparatus, object, or article, or where common characteristics concerning technical subjects of similar nature have been brought out at class level, it is classified, in conjunction with the operation, process, apparatus, object, or article in a subclass which covers entirely the general electrical applications for the technical subject in question;

such electrical applications, either general or particular, include the therapeutic processes and apparatus, in class [A61](#);

the electric processes and apparatus used in various laboratory or industrial operations, in classes [B01](#), [B03](#), and subclass [B23K](#);

the electricity supply, electric propulsion and electric lighting of vehicles in general and of particular vehicles, in the "Transporting" subsection of section B;

the electric ignition systems of internal-combustion engines, in subclass [F02P](#), and of combustion apparatus in general, in subclass [F23Q](#);

the whole electrical part of section G, i.e. measuring devices including apparatus for measuring electric variables, checking, signalling, and calculating. Electricity in that section is generally dealt with as a means and not as an end in itself;

all electrical applications, both general and particular, presuppose that the "basic electricity" aspect appears in section H (see 1 (a) above) as regards the electric "basic elements" which they comprise. This rule is also valid for applied electricity, referred to under 1 (c) above, which appears in section H itself.

In this section, the following special cases occur :

among the general applications covered by sections other than section H, it is worth noting that electric heating in general is covered by subclasses [F24D](#) or [F24H](#) or class [F27](#), and that electric lighting in general is partly covered by class [F21](#), since in section H (see 1 (c) above) there are places in [H05B](#) which cover the same technical subjects;

in the above two cases, the subclasses of section F, which deal with the respective subjects, essentially cover in the first place the whole mechanical aspect of the apparatus or devices, whereas the electrical aspect, as such, is covered by subclass [H05B](#);

in the case of lighting, this mechanical aspect should be taken to cover the material arrangement of the various electric elements, i.e. their geometrical, or physical, position in relation to one another; this is

covered by subclass [F21V](#), the elements themselves and the primary circuits remaining in section H. The same applies to electric light sources, when combined with light sources of a different kind. These are covered by subclass [H05B](#), whereas the physical arrangement which their combination constitutes is covered by the various subclasses of class [F21](#);

as regards heating, not only the electric elements and circuitry designs, as such, are covered by subclass [H05B](#), but also the electric aspects of their arrangement, where these concern cases of general application; electric furnaces being considered as such. The physical disposition of the electric elements in furnaces is covered by section F. If a comparison is made with electric welding circuits which are covered by subclass [B23K](#) in connection with welding, it can be seen that electric heating is not covered by the general rule stated in 2 above.

Y

GENERAL TAGGING OF NEW TECHNOLOGICAL DEVELOPMENTS; GENERAL TAGGING OF CROSS-SECTIONAL TECHNOLOGIES SPANNING OVER SEVERAL SECTIONS OF THE IPC; TECHNICAL SUBJECTS COVERED BY FORMER USPC CROSS-REFERENCE ART COLLECTIONS [XRACs] AND DIGESTS

NOTE

In this section, classes [Y02](#) and [Y04](#) are only to be used for tagging documents which are already classified or indexed elsewhere and which relate in a broad sense to specific major technical fields, these fields being defined by the notes following the title of the subclasses of this section.

As the primary purpose of the tagging according to Note (1) is to monitor new technological development and to tag cross-sectional technologies that do not fit in a single other section of the IPC, the tagging codes of this section do not in any way replace the classification or indexing codes of the other sections.

Class [Y10](#) has been introduced in July 2012 in view of the CPC to accommodate for technical subjects formerly covered by USPC cross-reference art collections [XRACs] and digests