

H05B

ELECTRIC HEATING; ELECTRIC LIGHTING NOT OTHERWISE PROVIDED FOR (apparatus for special application, see the relevant places, e.g. A47J, C21, C22, C23, F21, F24, F27)

Definition statement

This subclass/group covers:

- Electric heating:
 - Heat sources utilising ohmic resistance, electric, magnetic or electromagnetic fields, electric discharge, or combinations thereof;
 - Light sources specially adapted for heating, e.g. infrared sources as used in light ovens.

Not only the electric elements and circuitry designs are covered by this subclass but also the electric aspects of their arrangement, where these concern cases of general application. Where heating elements are used in specific applications, please see the relevant subclasses.

- Electric lighting:
 - Electric arc lamps, electroluminescent light sources and light sources using a combination of different types of light generation;
 - Circuit arrangements for electric light sources.

The primary circuits of the above light sources and the elements themselves of the circuits are covered by this subclass. The above light sources when combined with light sources of a different kind are also covered by this subclass.

Relationship between large subject matter areas

- Electric heating:

Uses of electric heat sources, or apparatus incorporating such heat sources, are too numerous to mention and cover all possible areas of technology. Examples of places where such uses or apparatus could be found include [A47J](#) (domestic cooking); [B21J](#), [B21K](#) (forging by heat); C21, C22, C23 (metallurgy); F24 (domestic heating and stoves); F27 (furnaces and ovens). See also the references below.

- Electric lighting:

Uses of electric light sources are also too numerous to mention and cover all possible areas of technology.

Class F21 covers the material arrangement of the various electric elements, i.e. their geometrical or physical position in relation to one another, such as the structures or constructional features of lighting devices incorporating a light source, electric or otherwise.

References relevant to classification in this subclass

This subclass/group does not cover:

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| Regulating electric characteristics of arcs in general | G05F 1/02 |
| Heating or cooling appliances for medical or therapeutic treatment | A61F 7/00 |
| Thermally-actuated switches | H01H 37/00 |
| Electron beam or ion beam tubes for localised treatment of objects | H01J 37/30 |
| Joining of preformed parts by heating of plastics or substances in a plastic state | B29C 65/02 |
| Heating by electric, magnetic or electromagnetic fields for therapeutic purposes | A61N 5/00 |

Places in relation to which this subclass is residual:

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| Electric discharge tubes | H01J |
| Electric discharge lamps | H01J 61/00-H01J 65/00 |
| Electric incandescent lamps | H01K |
| Semiconductor devices with at least one particular jump barrier or surface barrier, specially adapted for light emission | H01L 27/15 , H01L 33/00 |
| Organic light emitting devices (OLED) | H01L 27/32 , H01L 51/50 |
| Stimulated-emission devices | H01S |

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| Plasma torches | H05H 1/26 |
| Electric lighting | Numerous areas of technology, e.g. F21. |

Informative references

Attention is drawn to the following places, which may be of interest for search:

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| Measuring of temperature by colorimeter | G01J |
| Control of temperature in general | G05D 23/00 |
| Regulating electric power in general | G05F 1/66 |

H05B 1/00

Details of electric heating devices

Definition statement

This subclass/group covers:

This main group covers:

General automatic switching arrangements specially adapted to heating applications, when no specific class exist for the particular heating application.

Control of heating devices, when no specific class exist for the particular heating application.

Further information:

[H05B 1/0202](#) relates to automatic switching.

[H05B 1/0227](#) relates to automatic control, classified according to the type of application.

References relevant to classification in this main group

This subclass/group does not cover:

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|-----------------------------------|----------------------------|
| Control of temperature in general | G05D 23/00 |
| Thermally-actuated switches | H01H 37/00 |

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| Control of induction heating devices | H05B 6/06 |
| Control of electric discharge heating devices | H05B 6/148 |
| Control of microwave heating devices | H05B 6/68 |

Informative references

Attention is drawn to the following places, which may be of interest for search:

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| Bakers' ovens; machines or equipment for baking | A21B |
| Industrial microwave ovens | A23L 1/01 |
| Characteristic features of footwear; parts of footwear | A43B |
| Heated mirrors | A47G 1/00 |
| Kitchen equipment; coffee mills; spice mills; apparatus for making beverages | A47J |
| Dentistry | A61C |
| Methods or apparatus for sterilising materials | A61L |
| Chemical or physical processes | B01J |
| Soldering or welding; cutting by applying heat locally | B23K |
| Shaping or joining of plastics | B29C |
| Vehicle heating | B60H |
| Car seats | B60N |
| Heated mirrors for cars | B60R 1/0602 |
| Heated windshield window (car) / | B60S 1/00 |

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| heated rear window (car) | |
| Helicopters de-icing | B64C |
| Airplane wings de-icing | B64D |
| Containers for storage or transport | B65D |
| Pop corn heating | B65D 81/3469 |
| Nanotechnology | B82Y |
| Carbon nanotubes | C01B 31/0206 |
| Ceramics | C04B |
| Adhesives | C09J 4/00 |
| Heat treatment of metals or alloys | C21D |
| Metal-spraying | C23C 4/00 |
| Heating of sport playgrounds | E01C 13/02 |
| Cleaning open waters, e.g. deicing | E02B 15/00 |
| Roofs de-icing | E04D 13/00 |
| Devices for securing together constructional elements or machine parts | F16B 1/00 |
| Pipes; joints or fittings for pipes; supports for pipes or cables | F16L |
| Glow plugs | F23Q 7/001 |
| Electrical cooker / glow plug / gas cooker | F24C |
| Removal of fumes associated to cooking range (or microwave ovens) | F24C 15/2042 |
| Domestic- or space-heating systems e.g. central heating | F24D |

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| Fluid heaters | F24H |
| Drying solid materials or objects by removing liquid there from | F26B |
| Electric furnaces | F27B 3/08 |
| Details or accessories of furnaces | F27D |
| Electrography; electrophotography; magnetography | G03G |
| Controlling non-electric variables | G05D |
| Controlling electric or magnetic variables | G05F |
| Resistors; methods of production | H01C 7/00 |
| Electric switches | H01H |
| Semiconductor devices; methods of production | H01L |
| Aerials | H01Q |
| Connectors | H01R |
| Removing snow from cables | H02G 7/16 |
| Electric power conversion | H02M |
| Printed circuits | H05K 1/00 |

H05B 3/00

Ohmic-resistance heating

Definition statement

This subclass/group covers:

Heating by applying a voltage to a material with a certain conductivity, so that an electric current is generated that will according to the resistivity of the material will dissipate energy in form of heat.

According with this type of generation of heat, the heat can be generated in the same object that needs to be heated, or otherwise the heat has to be transferred to the object that needs to be heated by radiation, conduction or convection.

Further information:

[H05B 3/0033](#)- [H05B 3/009](#) deal with heating devices using lamps

[H05B 3/06](#) does not cover connectors (suitable) for heating elements, but covers the particular cases when the heater is structurally combined with the technical means allowing the electrical connection, otherwise only the classification in connectors, i.e. in [H01R](#), applies.

[H05B 3/10](#)- [H05B 3/58A](#) deal with heater elements characterised by the composition or nature of the materials or by the arrangement of the conductor.

[H05B 3/34](#) covers car seat heaters.

[H05B 3/345](#) covers any heater to be used in a textile material (even if they are not clothes)

[H05B 3/50](#) covers any car air heater (independently of the structure of the heater).

[H05B 3/62](#)- [H05B 3/66](#) deal with heating elements specially adapted for furnaces.

[H05B 3/62](#)-82 only cover electrical details, or details about the generation or transmission of heat. For other mechanical details the corresponding F24 or F27 class applies.

[H05B 3/68](#)- [H05B 3/76](#) deal with heating arrangements specially adapted for cooking plates or analogous hot-plates

[H05B 3/78](#)- [H05B 3/82](#) deal with heating arrangements specially adapted for immersion heating

[H05B 3/84](#)- [H05B 3/86M](#) deal with heating arrangements specially adapted for transparent or reflecting areas

References relevant to classification in this main-group

This subclass/group does not cover:

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| Devices for radiation therapy | A61N |
| Electric cigarettes | A24F 47/008 |
| Electrothermic treatment of ores | C22B 4/00 |
| Ironing | D06F 61/00 |

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|---|---|
| Combustion engines heaters | F02M 31/00 |
| Arrangements of heating elements in furnaces | F27D 11/00 |
| Heat exchangers | F28F 21/00 |
| Electric conductive compositions characterised by PTC or NTC resistance, per se | H01C 7/02 , H01C 7/04 |
| Electric discharge tubes or discharge lamps | H01J |
| Apparatus for thermal treatment of semiconductor or solid-state devices or of parts thereof | H01L 21/67 |
| Connectors | H01R |

Informative references

Attention is drawn to the following places, which may be of interest for search:

| | |
|--|-----------------------------|
| Aquarium heaters | A01K 63/065 |
| Bakers' ovens; machines or equipment for baking | A21B |
| Characteristic features of footwear; parts of footwear | A43B |
| Warming plates | A47F 3/00 |
| Heated mirrors | A47G 1/00 |
| Kitchen equipment; coffee mills; spice mills; apparatus for making beverages | A47J |
| Dentistry | A61C |
| Chemical or physical processes | B01J |

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|---|------------------------------|
| Soldering or welding; cutting by applying heat locally | B23K |
| Shaping or joining of plastics | B29C |
| Layered products comprising glass | B32B 17/00 |
| Thermal printers | B41J 11/00 |
| Vehicle heating | B60H |
| Car seats | B60N |
| Heated mirrors (for cars) | B60R 1/0602 |
| Heated windshield window (car) / heated rear window (car) | B60S 1/00 |
| Helicopters de-icing | B64C |
| Aircraft de-icing | B64D 15/00 |
| Containers for storage or transport | B65D |
| Pop corn heating | B65D 81/3469 |
| Nanotechnology | B82Y |
| Carbon nanotubes | C01B 31/0206 |
| Surface treatment of glass-plate materials | C03C 17/00 |
| Ceramics | C04B |
| Adhesives | C09J 4/00 |
| Heat treatment of metals or alloys | C21D |
| Metal-spraying | C23C 4/00 |
| Heating of sport playgrounds | E01C 13/02 |
| Cleaning open waters, e.g. deicing | E02B 15/00 |

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|--|------------------------------|
| Roofs de-icing | E04D 13/00 |
| Devices for securing together constructional elements or machine parts | F16B 1/00 |
| Pipes; joints or fittings for pipes; supports for pipes or cables | F16L |
| Glow plugs | F23Q 7/001 |
| Electrical cooker / glow plug / gas cooker | F24C |
| Removal of fumes associated to cooking ranges | F24C 15/2042 |
| Domestic- or space-heating systems e.g. central heating | F24D |
| Air-conditioning | F24F |
| Fluid heaters | F24H |
| Drying solid materials or objects by removing liquid there from | F26B |
| Electric furnaces | F27B 3/08 |
| Details or accessories of furnaces | F27D |
| Electrography; electrophotography; magnetography | G03G |
| Image fixing devices | G03G 15/2064 |
| Controlling non-electric variables | G05D |
| Resistors-methods of production | H01C 7/00 |
| Electric switches | H01H |
| Gas-filled discharge tubes | H01J 37/32 |
| Semiconductor devices; methods of | H01L |

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|----------------------------------|---------------------------|
| production | |
| Aerials | H01Q |
| Removing snow or ice from cables | H02G 7/16 |
| Removing snow from cables | H02G 7/16 |
| Electric power conversion | H02M |
| Printed circuits | H05K 1/00 |

H05B 6/00

Heating by electric, magnetic, or electromagnetic fields (for therapeutic purposes A61N5/00; joining of preformed parts by heating of plastics or substances in a plastic state B29C65/02)

Definition statement

This subclass/group covers:

- Induction heating
- Dielectric heating
- Microwave heating

Further information:

[H05B 6/02](#) and subgroups relate to induction heating

[H05B 6/46](#) and subgroups relate to dielectric heating

[H05B 6/64](#) and subgroups relate to microwave heating

Control of cooking plates is covered by [H05B 6/062](#). Control of cooking appliances other than cooking plates is covered by [H05B 6/06](#).

Apportioning of the total heating power among the different heating coils is covered by [H05B 6/065](#). Also apportioning in time, e.g. cyclic powering on and off of each heating coil. Also supplying a coil from multiple generators or multiple coils with a controlled amount of power from multiple generators. Also synchronisation, e.g. for avoiding generation of noise, or avoiding electromagnetic interferences. Not simply matrix heating plate per-se.

Induction heating apparatus, other than furnaces, for specific applications are

covered by [H05B 6/10](#).

Cooking devices are covered by [H05B 6/12](#) but control of induction cooking devices is covered by [H05B 6/06](#) and continuous movement of food is covered by [H05B 6/10](#).

Induction cooking plates or the like and devices to be used in combination with them are covered by [H05B 6/1209](#), but control for induction cooking plates is covered by [H05B 6/062](#) and ohmic heating plates are covered by [H05B 3/68](#).

[H05B 6/1218](#) deals with induction cooking plates with arrangements using lights for the indication of the state of the heating zones. The typical application deals with the provision of LED's on a cooking area that are switched on when the induction heating power of that cooking area is switched on. Also particular details of the glass ceramic plate in order to achieve such effect, for example cut out, and darken areas to only illuminate the desired portion of the cooking area. Also glass plates having a substance or material sandwiched there inside that will interact with the magnetic field of the induction coils so that light is generated when the corresponding induction coil is switched on.

[H05B 6/1227](#) deals with Induction cooking plates specially designed for wok pans, or similar shaped pans; also wok supports specially adapted for induction cooking (facilitating magnetic field transmission, coils provided inside the support...), cook-tops with wok-shaped upper surface (so substantially concave upper surface), but also cylinder surface with coils from top to bottom; wok is also called Chinese Pan.

[H05B 6/1236](#) deals with Induction cooking plates adapted to induce current in a coil to supply power to a device and electrical heating devices powered in this way, If it is described any of the heating device itself or a particular control of the cook-top to recognise the load and correctly supply it with power. Typically the system acts as a transformer. The heating device is provided with a secondary coil for which the induction coil of the cook-top acts as primary.

[H05B 6/1245](#) deals with induction cooking plates with special coil arrangements. The typical application deals with a particular coil material, coil shape, coil geometry , coil position within the plate or with respect to other coils.

[H05B 6/1272](#) deals with induction cooking plates with more than one coil or coil segment per heating zone. Also when different concentric coils or coil segments or section with different coil distance or winding direction are provided . Also when coils are provided in different planes for the same heating zone.

[H05B 6/1281](#) deals with induction cooking plates with flat coils. This means that the coil as a whole is constructed in a flat distribution, the coil conductor can however present a non-flat section. The typical application deals with coils particularly designed to be have a small total thickness, normally by printing a

conductor on a substrate or by having a thin conductor embedded in a substrate. The flatness of the conductor used for the coil is not relevant.

[H05B 6/129](#) deals with induction ovens. These are domestic appliances similar to a kitchen ovens wherein the heating means include at least an induction coil, (possibly in addition to any of the traditional heating means resistance heating, microwave heating, convection heating). Also induction heated trolleys, for catering, for example in airplanes. Also pop-corn machines (provided there is a closable / closed) cavity. Also vending machines in general (provided there is a closable / closed) cavity. Also induction warming drawers or the like (provided there is a closable / closed) cavity. Metal heat-treating apparatus only if there is a closable / closed cavity (therefore if it looks like a domestic oven). This class applies to cooking, de-freezing, warming, heat treating and re-heating appliances (the temperature achieved is unimportant).

[H05B 6/14](#) can be assigned in combination with any of [H05B 6/36](#), [H05B 6/101](#) and [H05B 6/105](#).

[H05B 6/1209](#) takes precedence over [H05B 6/34](#).

[H05B 6/36](#) deals with coil arrangements with flat coil conductors. This means that the conductor used for the coil present a flat section (as a band), but the coil itself can have a (not flat) tri-dimensional distribution.

[H05B 6/6402](#) deals with aspects relating to the microwave cavity but multiple cavity ovens are covered by [H05B 6/80](#), continuous movement of material is covered by [H05B 6/78](#), ovens specially adapted to a particular application are covered by [H05B 6/80](#).

[H05B 6/6408](#) deals with support or covers for the load inside the cavity. Supports or covers including microwave susceptors (e.g. browning plates) are additionally covered by [H05B 6/6494](#).

[H05B 6/6414](#) deals with aspects relating to the door of the microwave heating apparatus but microwave leakage is covered by [H05B 6/76](#), and microwave leakage testing is covered by [H05B 6/6432](#).

[H05B 6/6417](#) deals with door interlocks of the microwave heating apparatus and related circuits. Also door position detecting circuits (e.g. with switches).

[H05B 6/642](#) deals with the cooling of the microwave components and related air circulation systems, however if the refrigerating air is being re-circulated through the cavity for convection heating the class [H05B 6/6476](#) is relevant instead.

[H05B 6/6426](#) deals with any aspect relating to the exterior of the microwave heating apparatus, e.g. metal casing, power cord. Also handles (in portable microwave ovens) to allow carrying the microwave oven. Portable microwave ovens are additionally covered by [H05B 6/80](#).

[H05B 6/6432](#) deals with aspects relating to testing or detecting leakage in a

microwave heating apparatus. This means detecting or testing the microwave radiation leaking out of the microwave oven but also microwave switching off upon detection of microwave leakage. Also testing the quality of microwave seals and screens by measuring the microwave leakage. However, detecting leaked or reflected microwaves going back to the magnetron is covered by [H05B 6/76](#).

[H05B 6/6447](#) deals with methods of operation or details of the microwave heating apparatus related to the use of detectors or sensors. However detecting reflected radiation for feedback control purposes is covered by [H05B 6/705](#).

[H05B 6/645](#) deals with the use of temperature sensor or thermistors for detecting the temperature of interior of the cavity or the product placed inside. However detecting the temperature of the magnetron or any related safety aspect is covered by [H05B 6/666](#).

Details of particular circuits or particular components of the microwave generation circuit, e.g. a particular capacitor, a particular inductor... are classified under [H05B 6/66](#) when no other more specific subgroup is provided for.

[H05B 6/662](#) deals with aspects related to the boost transformer of the microwave heating apparatus. However cooling of the boost transformer is covered by [H05B 6/642](#).

[H05B 6/666](#) deals with safety circuits. The general idea in this subgroup is identifying situations where possible damage to the circuits (including inverter and magnetron) can occur. Also simply detecting the temperature of the magnetron/inverter or measuring anode current for limiting control, detecting status or detecting moding and eventually switching off the microwave oven/signalling alarm. Also soft start-up, control of preheating mode, controlled ramp up power supply at start up or at changing power level. However [H05B 6/666](#) does not cover:

- fume or fire detection, covered by [H05B 6/6461](#)
- avoiding leakage, covered by [H05B 6/76](#)
- sensing leakage outside the microwave oven, covered by [H05B 6/6432](#)
- aspects related with door interlocks, even if relating to avoiding over-current at start up, covered by [H05B 6/6417](#)
- circuit where a variable (e.g. anode current) is measured on a power supplied feedback control (feedback power control with anode current), covered by [H05B 6/683](#)
- circuit for feedback power control with input current or inverter current being measured, covered by [H05B 6/685](#)
- avoiding radiation back into the waveguide or in the magnetron, covered by

[H05B 6/76](#)

- avoiding generation of harmonics, covered by [H05B 6/68](#)

[H05B 6/68](#) deals with circuits for monitoring or control. Typically the power supplied is controlled in a feedback loop. Includes monitoring input / output voltage / current / power in a feedback loop. Also if it is described compensation of the cooking time taking account of fluctuations in the power supply, temperature in the cavity or variables of the magnetron. If the presence of an inverter or of a solid state oscillator is not specified then this group is given and not the sub-groups. Also avoiding generation of harmonics. Also ZVS and ZCS.

However [H05B 6/68](#) does not cover:

- limiting threshold control, (keeping a variable below a safety threshold value) covered by [H05B 6/666](#)
- soft start-up, control of preheating mode, controlled ramp up power supply at start up or at changing power level, covered by [H05B 6/666](#)

[H05B 6/681](#) deals with circuits comprising an inverter, a boost transformer and a magnetron. Determinant is the presence of an inverter (there will always be a boost transformer and a magnetron). Includes methods of switching the inverter to regulate power (Duty-Ratio control and Frequency control). However, [H05B 6/681](#) does not cover control based on sensors readings of non electrical variables (e.g. temperature, humidity... inside the cavity), covered by [H05B 6/687](#) and [H05B 6/6447](#).

[H05B 6/686](#) deals with circuits comprising a signal generator and power amplifier, e.g. using solid state oscillators. Determinant is the presence of any of a power amplifier or a solid state oscillator (one implies the other).

[H05B 6/687](#) deals with circuits for monitoring or control for cooking. The general idea is solving the problem of how to bring the cooked product to a certain status. Cooking is to be understood in the broad sense, therefore meaning also simply (re-)heating food or beverages. However, it is not enough the mere mention of cooking. It must be described a method of cooking with different steps in time or upon reaching certain status based on sensors readings. Also if a method of heating a particular type of food is described. [H05B 6/688](#), [H05B 6/6435](#), [H05B 6/6447](#) and [H05B 6/647](#) can be assigned in combination with [H05B 6/687](#). However [H05B 6/687](#) does not cover any of the following:

- a particular apparatus for heating a particular food product covered by [H05B 6/80](#) or [H05B 6/782](#)
- switching off upon reaching a certain status for safety reasons covered by [H05B 6/666](#)
- circuits controlling the switching of the inverter covered by [H05B 6/681](#)

- compensation of the cooking time taking account of fluctuations in the power supply, temperature in the cavity, temperature of the magnetron or age of the magnetron covered by [H05B 6/68](#).

[H05B 6/688](#) is equivalent to [H05B 6/687](#) but for the case of thawing.

[H05B 6/70](#) deals with feed lines. This means the special way of providing microwave radiation to the load (not provided for in the sub-classes), like: application of microwaves using antennas inserted in the load; application of microwaves from multiple directions and/or with different parameters (frequency, phase, power); modification of the cavity (both periodically or according to a feedback control).

[H05B 6/701](#) deals with the use of microwave applicators. It is not enough the mere mention of the word applicator (as any cavity can be called applicator, and this interpretation would be too broad). Typically for continuous movement of material (but not only). The waveguide ends with a particular shape that acts as a resonant cavity. To distinguish from the subject-matter covered by [H05B 6/6402](#), it is considered an applicator when the applicator is a resonant cavity of dimensions similar to those of the waveguide and in this sense the applicator/cavity can be considered a continuation of the waveguide or waveguides.

However, magnetrons providing microwaves directly to the cavity or only using a coaxial cable (so no waveguide) are covered by [H05B 6/70](#) or [H05B 6/702](#).

[H05B 6/702](#) takes precedence over [H05B 6/707](#) and s.gr. when coaxial cables are used in combination with waveguides.

[H05B 6/704](#) deals with the use of microwave polarisers. This includes when there is an explicit description of means for polarising the microwave radiation and also when it is described a method or apparatus where the use of polarised microwave radiation solves a technical problem.

[H05B 6/705](#) deals with the use of microwave tuning. This includes changing the phase of the microwave radiation at the point of entering the cavity. Typically a waveguide with movable parts is used to change the phase of the standing wave generated. Microwave tuning comprises also impedance matching. Also changing the frequency with the intention of obtaining minimal impedance at the input of the cavity (in a feedback loop). Also detecting / sensing / measuring the microwave radiation reflected / not adsorbed, typically to make a feedback control on the power, frequency, phase applied (also with multiple microwave sources).

[H05B 6/707](#) deals with the use of waveguides. Also when multiple waveguides are used.

However, waveguides used in combination with coaxial cables are covered by [H05B 6/702](#).

[H05B 6/72](#) deals with radiators or aerials. Also when multiple antennas are

used. Antennas can receive microwaves directly from the magnetron, from a waveguide or from a coaxial cable.

[H05B 6/725](#) deals with rotatable antennas. This also includes microwave stirring devices located inside the waveguide or at the opening of a waveguide to the cavity.

[H05B 6/74](#) deals with mode transformers or mode stirrers. Stirrers are not antennas. The stirrers "only" reflect microwaves coming from the walls of the cavity. Also Cavity with moving walls or changing shape.

However, microwave stirring devices placed inside a waveguide or at the opening of a waveguide to the cavity are covered by [H05B 6/72](#).

[H05B 6/76](#) deals with the prevention of microwave leakage, e.g. door sealings. This includes also screens or deflectors for avoiding radiation back into the waveguide or in the magnetron. Also using dummy loads.

However, detection of microwave leakage is covered by [H05B 6/6432](#).

[H05B 6/763](#) deals with microwave radiation seals for doors.

However, mere air seals are covered by [H05B 6/6414](#).

[H05B 6/78](#) deals with arrangements for the continuous movement of material. However [H05B 6/78](#) does not cover:

- arrangements for heating fluids covered by [H05B 6/802](#)
- the invention only refers to the applicator covered by [H05B 6/701](#)

[H05B 6/782](#) deals with arrangements for the continuous movement of material wherein the material moved is food. This also includes particular apparatus for cooking / thawing a particular food product. However, [H05B 6/782](#) does not cover:

- method of cooking / Thawing a particular food product in a normal microwave oven covered by [H05B 6/687](#) and [H05B 6/688](#)
- the invention only refers to the applicator covered by [H05B 6/701](#)

[H05B 6/80](#) deals with microwave apparatus for specific applications. Also particular apparatus for cooking / Thawing a particular food product. Also special type of microwave ovens, (e.g. portable, for vehicles or with DC power supply). Also multiple cavity oven. Also microwave oven with a separate cavity functioning as toaster, eventually in combination with other relevant classes ([H05B 6/6414](#), [H05B 6/6402](#)).

However [H05B 6/80](#) does not cover:

- methods of cooking / thawing a particular food product in a normal microwave oven covered by [H05B 6/687](#) or [H05B 6/688](#)

- single cavity microwave including additionally radiating means (capable of toasting bread), covered by [H05B 6/6482](#)

- continuous movement of material covered by [H05B 6/78](#)

[H05B 6/802](#) deals with microwave apparatus for heating fluids.

[H05B 6/802](#) does not cover:

- methods of heating fluids in conventional microwave ovens covered by [H05B 6/66M](#)

- documents where the invention only refers to the applicator covered by [H05B 6/701](#)

[H05B 6/806](#) deals with microwave apparatus for laboratory use. Typically it is mentioned a chemical reactor or similar. [H05B 6/806](#) takes precedence over [H05B 6/802](#).

References relevant to classification in this main-group

This subclass/group does not cover:

| | |
|---|---|
| For therapeutic purposes | A61N 5/00 |
| Soldering | B23K 1/002 |
| Sealing of packages | B65B 51/227 |
| Containers, packaging elements or packages specially adapted to be heated by microwaves | B65D 81/3446 |
| Heating of pipes | F16L 53/004 |
| Inductive transmission of power in general, not directly related to heating | H01F 38/14 |
| Heat treatment of metals or alloys | C21D 1/10 , C21D 1/42 , C21D 9/60 |
| Joining of preformed parts by heating of plastics or substances in a plastic state | B29C 65/02 |
| General details of cooking plates not related to the generation or transmission of heat | F24C 7/00 |
| Refining or remelting of metals | C22B 9/003 |

| | |
|---|---|
| Melting furnaces | C03B 5/021 |
| Battery chargers using inductive or capacitive power transmission | H02J 7/025 |
| Removing dry paint | B44D 3/168 |
| Laser engraving of inorganic materials | B41M 5/262 |
| Furnaces, kilns, ovens or retorts and details thereof | F27B 9/067 , F27B 14/061 , F27D 11/06 |
| Tube through flow heaters | F24H 1/105 |

Informative references

Attention is drawn to the following places, which may be of interest for search:

| | |
|---|--|
| Kitchen equipment of specific material or particular construction | A47J 36/02 , A47J 27/002 |
| Trolleys with heating cooling or ventilating means | A47B 31/02 |
| Warming devices with electrical heating means | A47J 36/2483 |
| Heat insulated warming chambers for heating food | A47J 39/006 |
| Melt casting nozzles with heating means | B22D 41/60 |
| Shrink fit tools | B23P 11/025 |
| Glass-plate processing | C03C 17/36 |
| Induction heating of molten crystal zone | C30B 13/20 |
| Heating of cords using rolls | D02J 13/005 |
| Doors specially adapted for stoves or | F24C 15/02 |

| | |
|---|------------------------------|
| ranges | |
| Sealings for doors or transparent panels (for doors specially adapted for stoves or ranges) | F24C 15/021 |
| Latches (for doors specially adapted for stoves or ranges) | F24C 15/022 |
| Mounting of doors, e.g. hinges, counterbalancing (for doors specially adapted for stoves or ranges) | F24C 15/023 |
| Handles (for doors specially adapted for stoves or ranges) | F24C 15/024 |
| Transparent panels (for doors specially adapted for stoves or ranges) | F24C 15/04 |
| Tops with provisions of circulation of air | F24C 15/101 |
| Electro-photography | G03G 15/2053 |
| Vending machines in general | G07F |
| Inductive couplings | H01F 38/14 |
| Coils in general | H01F 5/00 |
| Waveguides; resonators, lines, or other devices of the waveguide type | H01P |
| Inductive charging batteries from ac mains by converters | H02J 7/025 |

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

In this group, the following terms(or expressions) are used with the meaning indicated:

| | | |
|-------------|-----|----|
| Chinese Pan | wok | 20 |
|-------------|-----|----|

H05B 7/00

Heating by electric discharge (electron beam or ion beam tubes for localised treatment of objects H01J37/30; plasma torches H05H1/26)

Definition statement

This subclass/group covers:

Details about the electrodes of electric discharge heating apparatus, including mounting of the electrodes, electrical and mechanical connections. Also methods of supplying current and controlling power in electric discharge apparatus. Also heating by glow discharge and heating by arc discharge.

Further information:

[H05B 7/02](#) - [H05B 7/09](#) cover details of the electrodes

[H05B 7/10](#) - [H05B 7/14](#) cover details about how electrodes are mounted or connected

[H05B 7/148](#) - [H05B 7/156](#) cover power supplies for heating by electric discharge

[H05B 7/16](#) covers heating by glow discharge

[H05B 7/18](#) - [H05B 7/225](#) cover heating by arc discharge

References relevant to classification in this main-group

This subclass/group does not cover:

| | |
|--|----------------------------|
| Electron beam or ion beam tubes for localised treatment of objects | H01J 37/30 |
| Plasma torches | H05H 1/26 |

Informative references

Attention is drawn to the following places, which may be of interest for search:

| | |
|---|---------------------------|
| Soldering or welding; cutting by applying heat locally | B23K |
| Automatic feeding of electrodes for spot or seam welding or cutting | B23K 9/12 |

| | |
|--|----------------------------|
| Electric furnaces | F27B 3/08 |
| Details or accessories of furnaces | F27D |
| Disposition of electrodes in or on furnaces | F27D 11/10 |
| Control of position in general | G05D 3/00 |
| Regulating electric characteristics of arcs in general | G05F 1/02 |
| Regulating electric power in general | G05F 1/66 |
| Non-insulated conductors or conductive bodies in general | H01B 5/00 |
| Insulated conductors or cables in general | H01B 7/00 |
| Gas-filled discharge tubes | H01J 37/32 |
| Circuit arrangements for supplying electric power in general | H02J |
| Electric power conversion | H02M |

H05B 11/00

Heating by combined application of processes covered by two or more of groups H05B3/00 to H05B7/00

Definition statement

This subclass/group covers:

Heating by combined application of ohmic heating, induction heating, dielectric heating or electric discharge heating.

References relevant to classification in this main-group

This subclass/group does not cover:

| | |
|---|----------------------------|
| Aspects related to microwave heating combined with other heating techniques | H05B 6/647 |
|---|----------------------------|

Informative references

Attention is drawn to the following places, which may be of interest for search:

| | |
|--|-----------------------------|
| Bakers' ovens; machines or equipment for baking | A21B |
| Industrial microwave ovens | A23L 1/01 |
| Characteristic features of footwear; parts of footwear | A43B |
| Heated mirrors | A47G 1/00 |
| Kitchen equipment; coffee mills; spice mills; apparatus for making beverages | A47J |
| Dentistry | A61C |
| Methods or apparatus for sterilising materials | A61L |
| Chemical or physical processes | B01J |
| Soldering or welding; cutting by applying heat locally | B23K |
| Shaping or joining of plastics | B29C |
| Vehicle heating | B60H |
| Car seats | B60N |
| Heated mirrors for cars | B60R 1/0602 |
| Heated windshield window (car) / heated rear window (car) | B60S 1/00 |
| Helicopters de-icing | B64C |
| Airplane wings de-icing | B64D |
| Containers for storage or transport | B65D |

| | |
|--|------------------------------|
| Pop corn heating | B65D 81/3469 |
| Nanotechnology | B82Y |
| Carbon nanotubes | C01B 31/0206 |
| Ceramics | C04B |
| Adhesives | C09J 4/00 |
| Heat treatment of metals or alloys | C21D |
| Metal-spraying | C23C 4/00 |
| Heating of sport playgrounds | E01C 13/02 |
| Cleaning open waters, e.g. deicing | E02B 15/00 |
| Roofs de-icing | E04D 13/00 |
| Devices for securing together constructional elements or machine parts | F16B 1/00 |
| Pipes; joints or fittings for pipes; supports for pipes or cables | F16L |
| Glow plugs | F23Q 7/001 |
| Electrical cooker / glow plug / gas cooker | F24C |
| Removal of fumes associated to cooking range (or microwave ovens) | F24C 15/2042 |
| Domestic- or space-heating systems e.g. central heating | F24D |
| Fluid heaters | F24H |
| Drying solid materials or objects by removing liquid there from | F26B |
| Electric furnaces | F27B 3/08 |

| | |
|--|---------------------------|
| Details or accessories of furnaces | F27D |
| Electrography; electrophotography; magnetography | G03G |
| Controlling non-electric variables | G05D |
| Controlling electric or magnetic variables | G05F |
| Resistors; methods of production | H01C 7/00 |
| Electric switches | H01H |
| Semiconductor devices; methods of production | H01L |
| Aerials | H01Q |
| Connectors | H01R |
| Removing snow from cables | H02G 7/16 |
| Electric power conversion | H02M |
| Printed circuits | H05K 1/00 |

H05B 31/00

Electric arc lamps (regulating electric characteristics of arcs G05F1/02; with non-consumable electrodes H01J61/00)

Definition statement

This subclass/group covers:

Lamps where an arc is established through air or a gas mixture using consumable electrodes (for example carbon rods).

References relevant to classification in this group

This subclass/group does not cover:

| | |
|--|-----|
| Luminaries and their mechanical construction | F21 |
|--|-----|

| | |
|---|----------------------------|
| Regulating electric characteristics of arcs | G05F 1/02 |
| Electric discharge tubes or discharge lamps | H01J |
| Electric arc lamps with non-consumable electrodes | H01J 61/00 |

Special rules of classification within this group

[G05F 1/02](#) with non-consumable electrodes [H01J 61/00](#)

Circuit for gas discharge lamps in [H05B 41/00](#)

H05B 33/00

Electroluminescent light sources (discharge lamps H01J61/00 to H01J65/00; semi-conductor devices with at least one particular jump barrier or surface barrier adapted for light emission H01L27/15, H01L33/00; organic light emitting devices H01L27/32, H01L51/50; lasers H01S3/00, H01S5/00; compositions per se, see the relevant subclasses; [N: luminescent scales or hands G01D13/20, G01D13/28; luminescent dials G09F13/20; conductive layers on isolated substrate H01B1/00; solid state image amplifiers H01L31/14; electronic gates with electroluminescent elements H03K17/78; pulse generation with electroluminescent elements H03K3/00 ; memory devices with electroluminescent elements 42M37G3/00])

Definition statement

This subclass/group covers:

Elements, compositions, chemical compounds capable of emitting light and circuit arrangements for driving said sources.

References relevant to classification in this group

This subclass/group does not cover:

| | |
|-----------------------------|---|
| Luminescent scales or hands | G01D 13/20 , G01D 13/28 |
| Luminescent dials | G09F 13/20 |

| | |
|--|--|
| Conductive layers on isolated substrate | H01B 1/00 |
| Discharge lamps | H01J 61/00 to H01J 65/00 |
| Semi-conductor devices with at least one particular jump barrier or surface barrier adapted for light emission | H01L 27/15 , H01L 33/00 |
| Organic light emitting devices | H01L 27/32 , H01L 51/50 |
| Solid state image amplifiers | H01L 31/14 |
| Lasers | H01S 3/00 , H01S 5/00 |
| Electronic gates with electroluminescent elements | H03K 17/78 |
| Pulse generation with electroluminescent elements | H03K 3/00 |

Special rules of classification within this group

The sub-range [H05B 33/08](#) dealing with electronics has to be circulated to and classified separately in [H05B 33/08](#).

OLED's have to be circulated to [H01L 51/00](#).

Inorganic LED have to be circulated to [H01L 25/00](#), [H01L 27/00](#), [H01L 33/00](#)

Other aspects of semiconductor have to be circulated to the appropriate classes, mainly in [H01L](#).

H05B 33/08

Circuit arrangements not adapted to a particular application

Definition statement

This subclass/group covers:

Circuits for driving Electroluminescent panels, Light Emitting Diodes, Organic Light Emitting Diodes

Relevant documentation for LED/OLED colour control, optics: see SPIE digital library (www.spie.org)

Relevant documentation for Organic LEDs is to be found mainly in then on patent literature

References relevant to classification in this group

This subclass/group does not cover:

| | |
|--|--|
| Physical arrangement of lamp components and construction aspects | F21 |
| Displays | G09G 3/00 |
| LED fabrication and semiconductor | H01L 25/00 , H01L 27/00 , H01L 33/00 |
| Lasers | H01S 3/00 , H01S 5/00 |
| Switching power supplies in general and inverters | H02M |
| Chemistry of Luminescent materials | H05B 33/00 |
| Control of light sources general | H05B 37/00 |
| Drivers for Fluorescent Lamps | H05B 41/00 |
| Heat sinks and PCBs | H05K |

Special rules of classification within this group

- Control of white light is classified in the colour section [H05B 33/0857](#) and subgroups.
- See also attached classification document [H05B](#) Bible

H05B 33/10

Apparatus or processes specially adapted to the manufacture of electroluminescent light sources, light sources with substantially two-dimensional radiating surfaces

References relevant to classification in this group

This subclass/group does not cover:

| | |
|-----------------------|----------------------------|
| Luminescent materials | C09K 11/00 |
|-----------------------|----------------------------|

H05B 35/00

Electric light sources using a combination of different types of light generation (combinations of dissimilar light sources F21, H01J61/96)

Definition statement

This subclass/group covers:

Circuits and apparatus for driving two dissimilar light sources (i.e. a compact fluorescent lamp and LEDs)

References relevant to classification in this group

This subclass/group does not cover:

| | |
|--|----------------------------|
| Luminaries and their mechanical construction | F21 |
| Lamps with light-emitting discharge path and separately-heated incandescent body within a common envelope. | H01J 61/96 |

Informative references

Attention is drawn to the following places, which may be of interest for search:

| | |
|------------------------------------|------------------------------|
| Driving Electroluminescent panels | H05B 33/08 |
| Driving LEDs | H05B 33/0803 |
| Controlling of lighting in general | H05B 37/00 |
| Driving Incandescent lamps | H05B 39/00 |
| Driving Fluorescent lamps | H05B 41/00 |

Special rules of classification within this group

The two dissimilar light sources must be in the same casing.

This group is meant for two types of light sources used simultaneously. Phosphors or different coloured LEDs are not to be considered as dissimilar light sources for the purpose of this group.

Not for substitution of the light source in case of failure, for that application see [H05B 41/46](#)

for emergency lighting check possibly [H02J 9/065](#)

rarely used

Synonyms and Keywords

In patent documents the following abbreviations are often used:

| | |
|------|-------------------------------|
| LED | Light emitting diode |
| OLED | Organic Light emitting diode |
| CCFL | Cold Cathode Fluorescent lamp |
| CFL | Compact Fluorescent lamp |
| HID | High Intensity discharge lamp |
| HPS | High Pressure lamp |

H05B 37/00

Circuit arrangements for electric light sources in general [N: (vehicle lights B60L1/14, B60Q; railways light signals B61L; lighting for photographic purposes G03B15/02, for advertising purposes G09F)]

Definition statement

This subclass/group covers:

Application circuits for control of light sources. Where the focus of the control is in the application and not in the light source, controlling the light source when some external condition occurs (light dependent, occupancy, data communication, etc).

References relevant to classification in this group

This subclass/group does not cover:

| | |
|---|--|
| Wakeup lights | A61M 21/02 |
| Radiation Therapy | A61N 5/00 |
| Colour Music | A63J 17/00 |
| Vehicle lights | B60L 1/14 , B60Q |
| Monitoring vehicle lamps | B60Q 11/00 |
| Railways light signals | B61L |
| Stage Lighting Lamp mechanical construction aspects | F21P 5/00 |
| Lighting for photographic purposes | G03B 15/02 |
| Time controlled switching | G04, H01H , H03K |
| Building Automation Systems as e.g. domotics. | G05B 15/02 |
| Blinds and Shutters | G05D 25/00 |
| Regulating Voltage and current | G05F |
| Illuminated switch circuits | G08B , G08C , H02B 15/00 |
| Traffic Lights | G08G 1/00 |
| For advertising purposes | G09F |
| Light or sound activated switches | H03K 17/00 |
| Data Communication in general | H04L , H04N |

Special rules of classification within this group

When the light source is not relevant, release [A61L 9/00](#)

H05B 39/00

Circuit arrangements or apparatus for operating incandescent

light sources and not adapted to a particular application [N: (incandescent lamps per se H01K)]

Definition statement

This subclass/group covers:

Circuits controlling the light intensity of incandescent lamps.

References relevant to classification in this group

This subclass/group does not cover:

| | |
|--|----------------------|
| Control of voltage and current | G05F |
| Incandescent lamps per se | H01K |
| Switching power supplies and inverters | H02M |
| Switching in general | H03K |

Special rules of classification within this group

See attached classification document [H05B](#) Bible

H05B 41/00

Circuit arrangements or apparatus for igniting or operating discharge lamps [N: (circuit elements structurally associated with discharge lamps H01J7/44, H01J19/78; discharge lamps per se H01J61/00 to H01J65/00; arc lamps with consumable electrodes H05B31/00; transformers or chokes for supplying discharge lamps H01F38/08)]

Definition statement

This subclass/group covers:

Circuits and drivers for discharge lamps.

References relevant to classification in this group

This subclass/group does not cover:

| | |
|---------------------------------|----------------------------|
| Welding with accumulated energy | B23K 11/24 |
| Physical arrangement of lamp | F21 |

| | |
|---|--|
| components and construction aspects | |
| Transformers or chokes for supplying discharge lamps | H01F 38/08 |
| Discharge lamps per se | H01J 61/00 to H01J 65/00 |
| Circuit elements structurally associated with discharge lamps | H01J 7/44 , H01J 19/78 |
| Discharge lasers | H01S 3/00 |
| Switches and switching | H03K |
| Arc lamps with consumable electrodes | H05B 31/00 |
| PCBs in general and heatsinks | H05K |

Special rules of classification within this group

discharge lamps per se [H01J](#)

circuit elements structurally associated with discharge lamps [H01J 7/44](#) ,
[H01J 19/78](#)

arc lamps with consumable electrodes [H05B 31/00](#)

transformers or chokes for supplying discharge lamps [H01F 38/08](#)

Synonyms and Keywords

In this group, the following terms are used with the meaning indicated:

| | |
|------|-----------------------------------|
| DDBL | Dielectric Barrier Discharge Lamp |
| CCFL | Cold cathode fluorescent Lamp |
| CFL | Compact Fluorescent Lamp |
| HID | High Intensity Discharge |
| HPL | High Pressure Lamp |
| HPS | High Pressure Sodium |

H05B 43/00

Circuit arrangements for light sources, not otherwise provided for (H05B37/00 takes precedence)

Definition statement

This subclass/group covers:

Combustible light sources like magnesium flashes and other light sources not provided by the above groups

References relevant to classification in this group

This subclass/group does not cover:

| | |
|--|----------------------------|
| Physical arrangement of lamp components and construction aspects | F21 |
| Circuit arrangements for electric light sources in general (control oriented rather than light source) | H05B 37/00 |

Informative references

Attention is drawn to the following places, which may be of interest for search:

| | |
|------------------------------------|----------------------------|
| Circuits for discharge flash lamps | H05B 41/30 |
|------------------------------------|----------------------------|

Special rules of classification within this group

[H05B 37/00](#) takes precedence

very rarely used