

CPC COOPERATIVE PATENT CLASSIFICATION

F MECHANICAL ENGINEERING; LIGHTING; HEATING; WEAPONS; BLASTING (NOTE omitted)

LIGHTING; HEATING

F24 HEATING; RANGES; VENTILATING (NOTE omitted)

F24S SOLAR HEAT COLLECTORS; SOLAR HEAT SYSTEMS (for producing mechanical power from solar energy [F03G 6/00](#))

NOTE

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

- "solar heat collector modules", often referred to simply as "modules", covers;
 - a. whole solar heat collectors
 - b. elements of solar heat collectors, e.g. reflectors, lenses or heat storage elements.
- "absorbing elements" covers elements for absorbing solar-rays and converting it into heat.
- "solar heat systems" covers systems having solar heat collectors as their components and using the collected heat

10/00 Solar heat collectors using working fluids

- 10/10 . the working fluids forming pools or ponds
- 10/13 . . Salt-gradient ponds
- 10/17 . . using covers or floating solar absorbing elements
- 10/20 . having circuits for two or more working fluids ([with means for exchanging heat between two or more fluids F24S 10/30](#))
- 10/25 . having two or more passages for the same working fluid layered in direction of solar-rays, e.g. having upper circulation channels connected with lower circulation channels
- 10/30 . with means for exchanging heat between two or more working fluids
- 10/40 . in absorbing elements surrounded by transparent enclosures, e.g. evacuated solar collectors
- 10/45 . . {the enclosure being cylindrical}
- 10/50 . the working fluids being conveyed between plates
- 10/501 . . {having conduits of plastic material}
- 10/502 . . {having conduits formed by paired plates and internal partition means}
- 10/503 . . {having conduits formed by paired plates, only one of which is plane}
- 10/504 . . {having conduits formed by paired non-plane plates}
- 10/505 . . {having curved plate-like conduits, e.g. semi-spherical}
- 10/506 . . {having conduits formed by inflation of portions of a pair of joined sheets}
- 10/55 . . with enlarged surfaces, e.g. with protrusions or corrugations ([collectors comprising porous materials or permeable masses directly contacting the working fluids F24S 10/80](#))
- 10/60 . the working fluids trickling freely over absorbing elements
- 10/70 . the working fluids being conveyed through tubular absorbing conduits
- 2010/71 . . {the conduits having a non-circular cross-section}

- 10/72 . . {the tubular conduits being integrated in a block; the tubular conduits touching each other}
- 10/73 . . {the tubular conduits being of plastic material}
- 10/74 . . {the tubular conduits are not fixed to heat absorbing plates and are not touching each other}
- 10/742 . . . {the conduits being parallel to each other}
- 10/744 . . . {the conduits being helically coiled}
- 10/746 . . . {the conduits being spirally coiled}
- 10/748 . . . {the conduits being otherwise bent, e.g. zig-zag}
- 10/75 . . with enlarged surfaces, e.g. with protrusions or corrugations ([collectors comprising porous material or permeable masses directly contacting the working fluids F24S 10/80](#))
- 2010/751 . . . {Special fins}
- 2010/752 . . . {extending obliquely}
- 10/753 . . . {the conduits being parallel to each other}
- 10/754 . . . {the conduits being spirally coiled}
- 10/755 . . . {the conduits being otherwise bent, e.g. zig-zag}
- 10/80 . comprising porous material or permeable masses directly contacting the working fluids ([for conveying liquefied working fluid from evaporator sections to condenser sections with capillary force F24S 10/95](#))

WARNING

Group [F24S 10/80](#) is impacted by reclassification into group [F24S 10/95](#).

Groups [F24S 10/80](#) and [F24S 10/95](#) should be considered in order to perform a complete search.

| | | | |
|----------|---|-------|--|
| 10/90 | <ul style="list-style-type: none"> using internal thermosiphonic circulation <p><u>WARNING</u></p> <p>Group F24S 10/90 is incomplete pending reclassification of documents from group F24S 90/10.</p> <p>Group F24S 10/90 is also impacted by reclassification into groups F24S 10/95 and F24S 90/10.</p> <p>All groups listed in this Warning should be considered in order to perform a complete search.</p> | 20/30 | <ul style="list-style-type: none"> Solar heat collectors for heating objects, e.g. solar cookers or solar furnaces <p><u>WARNING</u></p> <p>Group F24S 20/30 is impacted by reclassification into group F24S 50/20.</p> <p>Groups F24S 20/30 and F24S 50/20 should be considered in order to perform a complete search.</p> |
| 10/95 | <ul style="list-style-type: none"> having evaporator sections and condenser sections, e.g. heat pipes <p><u>WARNING</u></p> <p>Group F24S 10/95 is incomplete pending reclassification of documents from groups F24S 10/80, F24S 10/90 and F24S 90/10.</p> <p>Groups F24S 10/80, F24S 10/90, F24S 90/10, and F24S 10/95 should be considered in order to perform a complete search.</p> | 20/40 | <ul style="list-style-type: none"> Solar heat collectors combined with other heat sources, e.g. using electrical heating or heat from ambient air |
| 20/00 | <p>Solar heat collectors specially adapted for particular uses or environments</p> <p><u>WARNING</u></p> <p>Group F24S 20/00 is incomplete pending reclassification of documents from group F24S 21/00.</p> <p>Groups F24S 20/00 and F24S 21/00 should be considered in order to perform a complete search.</p> | 20/50 | <ul style="list-style-type: none"> Rollable or foldable solar heat collector modules <p><u>WARNING</u></p> <p>Group F24S 20/50 is impacted by reclassification into group F24S 20/55.</p> <p>Groups F24S 20/50 and F24S 20/55 should be considered in order to perform a complete search.</p> |
| 20/02 | <ul style="list-style-type: none"> {for swimming pools} | 20/55 | <ul style="list-style-type: none"> made of flexible materials <p><u>WARNING</u></p> <p>Group F24S 20/55 is incomplete pending reclassification of documents from group F24S 20/50.</p> <p>Groups F24S 20/50 and F24S 20/55 should be considered in order to perform a complete search.</p> |
| 20/04 | <ul style="list-style-type: none"> {for showers} | 20/60 | <ul style="list-style-type: none"> Solar heat collectors integrated in fixed constructions, e.g. in buildings |
| 2020/10 | <ul style="list-style-type: none"> {Solar modules layout; Modular arrangements} | 20/61 | <ul style="list-style-type: none"> Passive solar heat collectors, e.g. operated without external energy source |
| 2020/11 | <ul style="list-style-type: none"> {in the form of multiple rows and multiple columns, all solar modules being coplanar} | 20/62 | <ul style="list-style-type: none"> in the form of fences, balustrades or handrails |
| 2020/12 | <ul style="list-style-type: none"> {Coplanar arrangements with frame overlapping portions} | 20/63 | <ul style="list-style-type: none"> in the form of windows |
| 2020/13 | <ul style="list-style-type: none"> {Overlaying arrangements similar to roof tiles} | 20/64 | <ul style="list-style-type: none"> in the form of floor constructions, grounds or roads |
| 2020/14 | <ul style="list-style-type: none"> {Stepped arrangements, e.g. in parallel planes, without module overlapping} | 20/66 | <ul style="list-style-type: none"> in the form of facade constructions, e.g. wall constructions (in the form of shingles or tiles F24S 20/69) <p><u>WARNING</u></p> <p>Group F24S 20/66 is impacted by reclassification into group F24S 20/69.</p> <p>Groups F24S 20/66 and F24S 20/69 should be considered in order to perform a complete search.</p> |
| 2020/15 | <ul style="list-style-type: none"> {Non-parallel arrangements} | 20/67 | <ul style="list-style-type: none"> in the form of roof constructions (in the form of shingles or tiles F24S 20/69) |
| 2020/16 | <ul style="list-style-type: none"> {Preventing shading effects} | 20/69 | <ul style="list-style-type: none"> in the form of shingles or tiles <p><u>WARNING</u></p> <p>Group F24S 20/69 is incomplete pending reclassification of documents from group F24S 20/66.</p> <p>Groups F24S 20/66 and F24S 20/69 should be considered in order to perform a complete search.</p> |
| 2020/17 | <ul style="list-style-type: none"> {Arrangements of solar thermal modules combined with solar PV modules} | | |
| 2020/18 | <ul style="list-style-type: none"> {having a particular shape, e.g. prismatic, pyramidal} | | |
| 2020/183 | <ul style="list-style-type: none"> {in the form of louvers} | | |
| 2020/186 | <ul style="list-style-type: none"> {allowing change of position for optimization of heat collection} | | |
| 20/20 | <ul style="list-style-type: none"> Solar heat collectors for receiving concentrated solar energy, e.g. receivers for solar power plants | | |
| 2020/23 | <ul style="list-style-type: none"> {movable or adjustable} | | |
| 20/25 | <ul style="list-style-type: none"> using direct solar radiation in combination with concentrated radiation | | |

- 20/70 . Waterborne solar heat collector modules (for working fluids forming pools or ponds [F24S 10/10](#))
- WARNING**
- Group is impacted by reclassification into groups [F24S 30/00](#), [F24S 30/20](#), [F24S 30/40](#), [F24S 30/42](#), [F24S 30/422](#), [F24S 30/425](#), [F24S 30/428](#), [F24S 30/45](#), [F24S 30/452](#), [F24S 30/455](#), [F24S 30/458](#), and [F24S 30/48](#).
- All groups listed in this Warning should be considered in order to perform a complete search.
- 20/80 . Airborne solar heat collector modules, e.g. inflatable structures
- 21/00 Solar heat collectors not provided for in groups [F24S 10/00](#)-[F24S 20/00](#)**
- WARNING**
- Group [F24S 21/00](#) is impacted by reclassification into group [F24S 20/00](#).
- Groups [F24S 21/00](#) and [F24S 20/00](#) should be considered in order to perform a complete search.
- 23/00 Arrangements for concentrating solar-rays for solar heat collectors**
- WARNING**
- Group [F24S 23/00](#) is impacted by reclassification into group [F24S 50/20](#).
- Groups [F24S 23/00](#) and [F24S 50/20](#) should be considered in order to perform a complete search.
- 23/10 . {Prisms}
- 23/11 . {Fluorescent material}
- 23/12 . {Light guides}
- 23/30 . with lenses
- 23/31 . . {having discontinuous faces, e.g. Fresnel lenses}
- 23/70 . with reflectors
- 23/71 . . with parabolic reflective surfaces (with cylindro-parabolic reflective surfaces [F24S 23/74](#))
- WARNING**
- Group [F24S 23/71](#) is impacted by reclassification into group [F24S 23/74](#).
- Groups [F24S 23/71](#) and [F24S 23/74](#) should be considered in order to perform a complete search.
- 23/715 . . . {flexible}
- 23/72 . . with hemispherical reflective surfaces
- 23/74 . . with trough-shaped or cylindro-parabolic reflective surfaces
- WARNING**
- Group [F24S 23/74](#) is incomplete pending reclassification of documents from group [F24S 23/71](#).
- Groups [F24S 23/71](#) and [F24S 23/74](#) should be considered in order to perform a complete search.
- 23/745 . . . {flexible}
- 23/75 . . with conical reflective surfaces
- 23/77 . . with flat reflective plates

- 23/79 . . with spaced and opposed interacting reflective surfaces
- 23/80 . . {having discontinuous faces}
- 23/81 . . {flexible ([F24S 23/715](#), [F24S 23/745](#) take precedence)}
- 23/82 . . {characterised by the material or the construction of the reflector}
- 2023/83 . . {Other shapes}
- 2023/831 . . . {corrugated}
- 2023/832 . . . {curved}
- 2023/833 . . . {dish-shaped}
- 2023/834 . . . {trough-shaped}
- 2023/835 {asymmetric}
- 2023/836 . . . {spiral}
- 2023/837 . . . {hyperbolic}
- 2023/838 . . . {involutes}
- 2023/84 . . {Reflective elements inside solar collector casings}
- 2023/85 . . {Micro-reflectors}
- 2023/86 . . {in the form of reflective coatings}
- 2023/87 . . {Reflectors layout}
- 2023/872 . . . {Assemblies of spaced reflective elements on common support, e.g. Fresnel reflectors}
- 2023/874 . . . {Reflectors formed by assemblies of adjacent similar reflective facets}
- 2023/876 . . . {Reflectors formed by assemblies of adjacent reflective elements having different orientation or different features}
- 2023/878 . . . {Assemblies of spaced reflective elements in the form of grids, e.g. vertical or inclined reflective elements extending over heat absorbing elements}
- 2023/88 . . {Multi reflective traps}

WARNING

Group [F24S 2023/88](#) is impacted by reclassification into group [F24S 2070/62](#).

Groups [F24S 2023/88](#) and [F24S 2070/62](#) should be considered in order to perform a complete search.

25/00 Arrangement of stationary mountings or supports for solar heat collector modules**NOTE**

Arrangements also intended for use with photovoltaic modules should further be classified in the relevant groups of subclass [H02S](#).

- 2025/01 . {Special support components; Methods of use}
- 2025/011 . . {Arrangements for mounting elements inside solar collectors; Spacers inside solar collectors}
- 2025/012 . . {Foldable support elements}
- 2025/013 . . {Stackable support elements}
- 2025/014 . . {Methods for installing support elements}
- 2025/015 . . {Supports with play between elements}
- 2025/016 . . {Filling or spacing means; Elastic means}
- 2025/017 . . {Tensioning means}
- 2025/018 . . {Means for preventing movements, e.g. stops}
- 2025/019 . . {Means for accommodating irregularities on mounting surface; Tolerance compensation means}
- 2025/02 . . {Ballasting means}

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|-----------|--|--------------|---|
| 2025/021 | . . {Sealing means between support elements and mounting surface} | 25/617 | . . . Elements driven into the ground, e.g. anchor-piles; Foundations for supporting elements; Connectors for connecting supporting structures to the ground or to flat horizontal surfaces |
| 2025/022 | . . {Sealing means between support elements, e.g. overlapping arrangements; Gap closing arrangements} | 25/63 | . . for fixing modules or their peripheral frames to supporting elements |
| 2025/023 | . . {Means for preventing theft; Locking means} | 25/632 | . . . Side connectors; Base connectors |
| 25/10 | . extending in directions away from a supporting surface | 25/634 | . . . Clamps; Clips |
| 25/11 | . . using shaped bodies, e.g. concrete elements, foamed elements or moulded box-like elements | 25/636 | clamping by screw-threaded elements |
| 25/12 | . . using posts in combination with upper profiles | 25/65 | . . for coupling adjacent supporting elements, e.g. for connecting profiles together |
| 25/13 | . . Profile arrangements, e.g. trusses (F24S 25/12 takes precedence) | 25/67 | . . for coupling adjacent modules or their peripheral frames (for fixing modules or their peripheral frames to supporting elements F24S 25/63) |
| 25/15 | . . using bent plates; using assemblies of plates | 25/70 | . with means for adjusting the final position or orientation of supporting elements in relation to each other or to a mounting surface; with means for compensating mounting tolerances |
| 25/16 | . . Arrangement of interconnected standing structures; Standing structures having separate supporting portions for adjacent modules | 2025/80 | . {Special profiles} |
| 25/20 | . Peripheral frames for modules | 2025/801 | . . {having hollow parts with closed cross-section} |
| 25/30 | . using elongate rigid mounting elements extending substantially along the supporting surface, e.g. for covering buildings with solar heat collectors (extending in directions away from a supporting surface F24S 25/10 ; peripheral frames for modules F24S 25/20) | 2025/802 | . . {having circular or oval cross-section} |
| 25/33 | . . forming substantially planar assemblies, e.g. of coplanar or stacked profiles | 2025/803 | . . {having a central web, e.g. I-shaped, inverted T-shaped} |
| 25/35 | . . . by means of profiles with a cross-section defining separate supporting portions for adjacent modules | 2025/804 | . . {U-, C- or O-shaped; Hat profiles} |
| 25/37 | . . . forming coplanar grids comprising longitudinal and transversal profiles | 2025/805 | . . {in the form of corrugated profiles} |
| 25/40 | . using plate-like mounting elements, e.g. profiled or corrugated plates; Plate-like module frames (extending in directions away from a supporting surface F24S 25/10) | 2025/806 | . . {having curved portions} |
| 25/50 | . comprising elongate non-rigid elements, e.g. straps, wires or ropes | 2025/807 | . . {having undercut grooves} |
| 25/60 | . Fixation means, e.g. fasteners, specially adapted for supporting solar heat collector modules | 30/00 | Arrangements for moving or orienting solar heat collector modules |
| 2025/6001 | . . {by using hook and loop-type fasteners} | | NOTE |
| 2025/6002 | . . {by using hooks} | | Arrangements also intended for use with photovoltaic modules should further be classified in the relevant groups of subclass H02S . |
| 2025/6003 | . . {by clamping} | | WARNING |
| 2025/6004 | . . {by clipping, e.g. by using snap connectors} | | Group F24S 30/00 is incomplete pending reclassification of documents from groups F24S 20/70 and F24S 30/20 |
| 2025/6005 | . . {by screwed connection} | | Groups F24S 20/70 , F24S 30/20 , and F24S 30/00 should be considered in order to perform a complete search. |
| 2025/6006 | . . {by using threaded elements, e.g. stud bolts} | 2030/10 | . {Special components} |
| 2025/6007 | . . {by using form-fitting connection means, e.g. tongue and groove} | 2030/11 | . . {Driving means} |
| 2025/6008 | . . {by using toothed elements} | 2030/115 | . . . {Linear actuators, e.g. pneumatic cylinders} |
| 2025/6009 | . . {by deforming the material, e.g. by crimping or clinching} | 2030/12 | . . {Coupling means} |
| 2025/601 | . . {by bonding, e.g. by using adhesives} | 2030/13 | . . {Transmissions} |
| 2025/6011 | . . {by welding or brazing} | 2030/131 | . . . {in the form of articulated bars} |
| 2025/6012 | . . {Joining different materials} | 2030/132 | {in the form of compasses, scissors or parallelograms} |
| 2025/6013 | . . . {Joining glass with non-glass elements} | 2030/133 | . . . {in the form of flexible elements, e.g. belts, chains, ropes} |
| 25/61 | . . for fixing to the ground or to building structures | 2030/134 | . . . {in the form of gearings or rack-and-pinion transmissions} |
| 25/613 | . . . in the form of bent strips or assemblies of strips; Hook-like connectors; Connectors to be mounted between building-covering elements | 2030/135 | . . . {in the form of threaded elements} |
| 25/615 | . . . for fixing to protruding parts of buildings, e.g. to corrugations or to standing seams | 2030/136 | . . . {for moving several solar collectors by common transmission elements} |
| | | 2030/137 | . . . {for deriving one movement from another one, e.g. for deriving elevation movement from azimuth movement} |
| | | 2030/14 | . . {Movement guiding means} |
| | | 2030/145 | . . . {Tracks} |

- 2030/15 . . {Bearings}
- 2030/16 . . {Hinged elements; Pin connections}
- 2030/17 . . {Spherical joints}
- 2030/18 . . {Load balancing means, e.g. use of counter-weights}
- 2030/19 . . {Movement dampening means; Braking means}
- 30/20 . . for linear movement

WARNING

Group [F24S 30/20](#) is incomplete pending reclassification of documents from group [F24S 20/70](#).

Group [F24S 30/20](#) is also impacted by reclassification into group [F24S 30/00](#).

Groups [F24S 20/70](#), [F24S 30/20](#), and [F24S 30/00](#) should be considered in order to perform a complete search

- 30/40 . . for rotary movement

WARNING

Group [F24S 30/40](#) is incomplete pending reclassification of documents from group [F24S 20/70](#).

Groups [F24S 20/70](#) and [F24S 30/40](#) should be considered in order to perform a complete search.

- 30/42 . . with only one rotation axis

WARNING

Group [F24S 30/42](#) is incomplete pending reclassification of documents from group [F24S 20/70](#).

Groups [F24S 20/70](#) and [F24S 30/42](#) should be considered in order to perform a complete search.

- 30/422 . . . Vertical axis

WARNING

Group [F24S 30/422](#) is incomplete pending reclassification of documents from group [F24S 20/70](#).

Groups [F24S 20/70](#) and [F24S 30/422](#) should be considered in order to perform a complete search.

- 30/425 . . . Horizontal axis

WARNING

Group [F24S 30/425](#) is incomplete pending reclassification of documents from group [F24S 20/70](#).

Groups [F24S 20/70](#) and [F24S 30/425](#) should be considered in order to perform a complete search.

- 30/428 . . . with inclined axis

WARNING

Group [F24S 30/428](#) is incomplete pending reclassification of documents from group [F24S 20/70](#).

Groups [F24S 20/70](#) and [F24S 30/428](#) should be considered in order to perform a complete search.

- 30/45 . . with two rotation axes

WARNING

Group [F24S 30/45](#) is incomplete pending reclassification of documents from group [F24S 20/70](#).

Groups [F24S 20/70](#) and [F24S 30/45](#) should be considered in order to perform a complete search.

- 30/452 . . . Vertical primary axis

WARNING

Group [F24S 30/452](#) is incomplete pending reclassification of documents from group [F24S 20/70](#).

Groups [F24S 20/70](#) and [F24S 30/452](#) should be considered in order to perform a complete search.

- 30/455 . . . Horizontal primary axis

WARNING

Group [F24S 30/455](#) is incomplete pending reclassification of documents from group [F24S 20/70](#).

Groups [F24S 20/70](#) and [F24S 30/455](#) should be considered in order to perform a complete search.

- 30/458 . . . with inclined primary axis

WARNING

Group [F24S 30/458](#) is incomplete pending reclassification of documents from group [F24S 20/70](#).

Groups [F24S 20/70](#) and [F24S 30/458](#) should be considered in order to perform a complete search.

- 30/48 . . with three or more rotation axes or with multiple degrees of freedom

WARNING

Group [F24S 30/48](#) is incomplete pending reclassification of documents from group [F24S 20/70](#).

Groups [F24S 20/70](#) and [F24S 30/48](#) should be considered in order to perform a complete search.

| | | | |
|-------|--|--------------|--|
| 40/00 | Safety or protection arrangements of solar heat collectors; Preventing malfunction of solar heat collectors (control arrangements F24S 50/00) | 40/90 | . Arrangements for testing solar heat collectors |
| | <u>WARNING</u> | | <u>WARNING</u> |
| | Group F24S 40/00 is impacted by reclassification into group F24S 40/90 . | | Group F24S 40/90 is incomplete pending reclassification of documents from group F24S 40/00 . |
| | Groups F24S 40/00 and F24S 40/90 should be considered in order to perform a complete search. | | Groups F24S 40/00 and F24S 40/90 should be considered in order to perform a complete search. |
| 40/10 | . Protective covers or shrouds; Closure members, e.g. lids (transparent coverings F24S 80/50) | 50/00 | Arrangements for controlling solar heat collectors |
| 40/20 | . Cleaning; Removing snow | 50/20 | . for tracking |
| 40/40 | . Preventing corrosion; Protecting against dirt or contamination | | <u>WARNING</u> |
| 40/42 | . . Preventing condensation inside solar modules (by venting F24S 40/53) | | Group F24S 50/20 is incomplete pending reclassification of documents from groups F24S 20/30 and F24S 23/00 . |
| | <u>WARNING</u> | | Groups F24S 50/20 and F24S 50/20 should be considered in order to perform a complete search. |
| | Group F24S 40/42 is impacted by reclassification into group F24S 40/53 . | | |
| | Groups F24S 40/42 and F24S 40/53 should be considered in order to perform a complete search . | 2050/25 | . . {Calibration means; Methods for initial positioning of solar concentrators or solar receivers} |
| 40/44 | . . Draining rainwater or condensation | 50/40 | . responsive to temperature |
| 40/46 | . . Maintaining vacuum, e.g. by using getters | 50/60 | . responsive to wind |
| 40/48 | . . Deaerating or degassing the working fluid | 50/80 | . for controlling collection or absorption of solar radiation |
| 40/50 | . Preventing overheating or overpressure (by draining the working fluid F24S 40/60) | 60/00 | Arrangements for storing heat collected by solar heat collectors (working fluids forming pools or ponds F24S 10/10) |
| 40/52 | . . by modifying the heat collection, e.g. by defocusing or by changing the position of heat-receiving elements | | <u>WARNING</u> |
| 40/53 | . . by venting solar heat collector enclosures | | Group F24S 60/00 is impacted by reclassification into groups F24S 60/10 and F24S 60/20 . |
| | <u>WARNING</u> | | Groups F24S 60/00 , F24S 60/10 , and F24S 60/20 should be considered in order to perform a complete search. |
| | Group F24S 40/53 is incomplete pending reclassification of documents from group F24S 40/42 . | | |
| | Groups F24S 40/42 and F24S 40/53 should be considered in order to perform a complete search. | 60/10 | . using latent heat |
| 40/55 | . . Arrangements for cooling, e.g. by using external heat dissipating means or internal cooling circuits (by venting F24S 40/53) | | <u>WARNING</u> |
| 40/57 | . . Preventing overpressure in solar collector enclosures (by venting F24S 40/53) | | Group F24S 60/10 is incomplete pending reclassification of documents from groups F24S 60/00 and F24S 60/30 . |
| 40/58 | . . Preventing overpressure in working fluid circuits | | Groups F24S 60/00 , F24S 60/30 , and F24S 60/10 should be considered in order to perform a complete search. |
| 40/60 | . Arrangements for draining the working fluid | 60/20 | . using chemical reactions, e.g. thermochemical reactions or isomerisation reactions |
| 40/70 | . Preventing freezing (arrangements for draining the working fluid F24S 40/60) | | <u>WARNING</u> |
| 40/80 | . Accommodating differential expansion of solar collector elements | | Group F24S 60/20 is incomplete pending reclassification of documents from groups F24S 60/00 and F24S 60/30 . |
| 40/85 | . . {Arrangements for protecting solar collectors against adverse weather conditions (F24S 40/10 takes precedence)} | | Groups F24S 60/00 , F24S 60/30 , and F24S 60/20 should be considered in order to perform a complete search. |

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|--------|--|----------|---|
| 60/30 | <ul style="list-style-type: none"> storing heat in liquids <p>WARNING</p> <p>Group F24S 60/30 is impacted by reclassification into groups F24S 60/10 and F24S 60/20.</p> <p>Groups F24S 60/30, F24S 60/10, and F24S 60/20 should be considered in order to perform a complete search.</p> | 70/60 | <ul style="list-style-type: none"> characterised by the structure or construction (absorbing coatings or surface treatment for increasing absorption F24S 70/20; auxiliary coatings F24S 70/30) |
| | | 2070/62 | <ul style="list-style-type: none"> {Heat traps} <p>WARNING</p> <p>Group F24S 2070/62 is incomplete pending reclassification of documents from group F24S 2023/88.</p> <p>Groups F24S 2023/88 and F24S 2070/62 should be considered in order to perform a complete search.</p> |
| 70/00 | <p>Details of absorbing elements</p> <p>WARNING</p> <p>Group F24S 70/00 is incomplete pending reclassification of documents from group F24S 80/00.</p> <p>Groups F24S 80/00 and F24S 70/00 should be considered in order to perform a complete search.</p> | | |
| 70/10 | <ul style="list-style-type: none"> characterised by the absorbing material (absorbing coatings or surface treatment for increasing absorption F24S 70/20) | 70/12 | <ul style="list-style-type: none"> made of metallic material |
| 70/14 | <ul style="list-style-type: none"> made of plastics | 70/16 | <ul style="list-style-type: none"> made of ceramic; made of concrete; made of natural stone |
| 70/20 | <ul style="list-style-type: none"> characterised by absorbing coatings; characterised by surface treatment for increasing absorption <p>WARNING</p> <p>Group F24S 70/20 is impacted by reclassification into group F24S 70/225.</p> <p>Groups F24S 70/20 and F24S 70/225 should be considered in order to perform a complete search.</p> | 2080/01 | <ul style="list-style-type: none"> {Selection of particular materials} |
| | | 2080/011 | <ul style="list-style-type: none"> {Ceramics} |
| | | 2080/012 | <ul style="list-style-type: none"> {Concrete} |
| | | 2080/013 | <ul style="list-style-type: none"> {Foams} |
| | | 2080/014 | <ul style="list-style-type: none"> {Carbone, e.g. graphite} |
| | | 2080/015 | <ul style="list-style-type: none"> {Plastics} |
| | | 2080/016 | <ul style="list-style-type: none"> {Textiles; Fabrics} |
| | | 2080/017 | <ul style="list-style-type: none"> {Natural materials, e.g. wood} |
| | | 2080/018 | <ul style="list-style-type: none"> {Recycled materials} |
| | | 2080/03 | <ul style="list-style-type: none"> {Arrangements for heat transfer optimization} |
| | | 2080/05 | <ul style="list-style-type: none"> {Flow guiding means; Inserts inside conduits} |
| | | 2080/07 | <ul style="list-style-type: none"> {Arrangements for one-way heat transfer, e.g. thermal diodes} |
| 70/225 | <ul style="list-style-type: none"> for spectrally selective absorption <p>WARNING</p> <p>Group F24S 70/225 is incomplete pending reclassification of documents from groups F24S 70/20, F24S 70/25, and F24S 70/275.</p> <p>All groups listed in this Warning should be considered in order to perform a complete search.</p> | 2080/09 | <ul style="list-style-type: none"> {Arrangements for reinforcement of solar collector elements} |
| | | 80/10 | <ul style="list-style-type: none"> Materials for heat-exchange conduits |
| | | 80/20 | <ul style="list-style-type: none"> Working fluids specially adapted for solar heat collectors |
| 70/25 | <ul style="list-style-type: none"> Coatings made of metallic material <p>WARNING</p> <p>Group F24S 70/25 is impacted by reclassification into group F24S 70/225.</p> <p>Groups F24S 70/25 and F24S 70/225 should be considered in order to perform a complete search.</p> | 80/30 | <ul style="list-style-type: none"> Arrangements for connecting the fluid circuits of solar collectors with each other or with other components, e.g. pipe connections; Fluid distributing means, e.g. headers |
| | | 80/40 | <ul style="list-style-type: none"> Casings |
| | | 80/45 | <ul style="list-style-type: none"> characterised by the material |
| | | 80/453 | <ul style="list-style-type: none"> made of metallic material |
| | | 80/457 | <ul style="list-style-type: none"> made of plastics |
| 70/275 | <ul style="list-style-type: none"> Coatings made of plastics <p>WARNING</p> <p>Group F24S 70/275 is impacted by reclassification into group F24S 70/225.</p> <p>Groups F24S 70/275 and F24S 70/225 should be considered in order to perform a complete search.</p> | 80/50 | <ul style="list-style-type: none"> Elements for transmitting incoming solar rays and preventing outgoing heat radiation; Transparent coverings <p>WARNING</p> <p>Group F24S 80/50 is impacted by reclassification into groups F24S 80/56 and F24S 80/58.</p> <p>Groups F24S 80/50, F24S 80/56, and F24S 80/58 should be considered in order to perform a complete search.</p> |
| 70/30 | <ul style="list-style-type: none"> Auxiliary coatings, e.g. anti-reflective coatings | 2080/501 | <ul style="list-style-type: none"> {Special shape} |
| | | 2080/502 | <ul style="list-style-type: none"> {in the form of multiple covering elements} |

- 2080/503 . . . {in the form of curved covering elements}
 80/52 . . characterised by the material (for preventing heat loss [F24S 80/56](#))

WARNING

Group [F24S 80/52](#) is impacted by reclassification into groups [F24S 80/56](#) and [F24S 80/58](#).

Groups [F24S 80/52](#), [F24S 80/56](#), and [F24S 80/58](#) should be considered in order to perform a complete search.

- 80/525 . . . made of plastics

WARNING

Group [F24S 80/525](#) is impacted by reclassification into groups [F24S 80/56](#) and [F24S 80/58](#).

Groups [F24S 80/525](#), [F24S 80/56](#), and [F24S 80/58](#) should be considered in order to perform a complete search.

- 80/54 . . using evacuated elements

WARNING

Group [F24S 80/54](#) is impacted by reclassification into groups [F24S 80/56](#) and [F24S 80/58](#).

Groups [F24S 80/54](#), [F24S 80/56](#), and [F24S 80/58](#) should be considered in order to perform a complete search.

- 80/56 . . characterised by means for preventing heat loss

WARNING

Group [F24S 80/56](#) is incomplete pending reclassification of documents from groups [F24S 80/50](#), [F24S 80/52](#), [F24S 80/525](#), and [F24S 80/54](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 80/58 . . characterised by their mountings or fixing means

WARNING

Group [F24S 80/58](#) is incomplete pending reclassification of documents from groups [F24S 80/50](#), [F24S 80/52](#), [F24S 80/525](#), and [F24S 80/54](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 80/60 . Thermal insulation (transparent coverings [F24S 80/50](#))

- 80/65 . . characterised by the material

- 80/70 . Sealing means

- 90/00 Solar heat systems not otherwise provided for**

- 90/10 . using thermosiphonic circulation

WARNING

Group [F24S 90/10](#) is incomplete pending reclassification of documents from group [F24S 10/90](#).

Group [F24S 90/10](#) is also impacted by reclassification into groups [F24S 10/90](#) and [F24S 10/95](#).

All groups listed in this Warning should be considered in order to perform a complete search.

2201/00 Prediction; Simulation