

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

- 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 . . . {involutives}
- 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}

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 ( <a href="#">F24S 25/12 takes precedence</a> )	25/67	. . for coupling adjacent modules or their peripheral frames ( <a href="#">for fixing modules or their peripheral frames to supporting elements F24S 25/63</a> )
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 ( <a href="#">extending in directions away from a supporting surface F24S 25/10</a> ; <a href="#">peripheral frames for modules F24S 25/20</a> )	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 ( <a href="#">extending in directions away from a supporting surface F24S 25/10</a> )	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	<b>30/00</b>	<b>Arrangements for moving or orienting solar heat collector modules</b>
2025/6001	. . {by using hook and loop-type fasteners}		<b>NOTE</b>
2025/6002	. . {by using hooks}		Arrangements also intended for use with photovoltaic modules should further be classified in the relevant groups of subclass <a href="#">H02S</a> .
2025/6003	. . {by clamping}		<b>WARNING</b>
2025/6004	. . {by clipping, e.g. by using snap connectors}		Group <a href="#">F24S 30/00</a> is incomplete pending reclassification of documents from groups <a href="#">F24S 20/70</a> and <a href="#">F24S 30/20</a>
2025/6005	. . {by screwed connection}		Groups <a href="#">F24S 20/70</a> , <a href="#">F24S 30/20</a> , and <a href="#">F24S 30/00</a> 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](#))

##### **WARNING**

Group [F24S 40/00](#) is impacted by reclassification into group [F24S 40/90](#).

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](#))
- 40/20 . Cleaning; Removing snow
- 40/40 . Preventing corrosion; Protecting against dirt or contamination
- 40/42 . . Preventing condensation inside solar modules ([by venting F24S 40/53](#))

##### **WARNING**

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 .

- 40/44 . . Draining rainwater or condensation
- 40/46 . . Maintaining vacuum, e.g. by using getters
- 40/48 . . Deaerating or degassing the working fluid
- 40/50 . Preventing overheating or overpressure ([by draining the working fluid F24S 40/60](#))
- 40/52 . . by modifying the heat collection, e.g. by defocusing or by changing the position of heat-receiving elements
- 40/53 . . by venting solar heat collector enclosures

##### **WARNING**

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.

- 40/55 . . Arrangements for cooling, e.g. by using external heat dissipating means or internal cooling circuits ([by venting F24S 40/53](#))
- 40/57 . . Preventing overpressure in solar collector enclosures ([by venting F24S 40/53](#))
- 40/58 . . Preventing overpressure in working fluid circuits
- 40/60 . Arrangements for draining the working fluid
- 40/70 . Preventing freezing ([arrangements for draining the working fluid F24S 40/60](#))
- 40/80 . Accommodating differential expansion of solar collector elements
- 40/85 . . { Arrangements for protecting solar collectors against adverse weather conditions ([F24S 40/10 takes precedence](#)) }

- 40/90 . Arrangements for testing solar heat collectors

##### **WARNING**

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.

- 50/00 **Arrangements for controlling solar heat collectors**
- 50/20 . for tracking

##### **WARNING**

Group [F24S 50/20](#) is incomplete pending reclassification of documents from groups [F24S 20/30](#) and [F24S 23/00](#).

Groups [F24S 50/20](#) and [F24S 50/20](#) should be considered in order to perform a complete search.

- 2050/25 . . { Calibration means; Methods for initial positioning of solar concentrators or solar receivers }
- 50/40 . responsive to temperature
- 50/60 . responsive to wind
- 50/80 . for controlling collection or absorption of solar radiation

- 60/00 **Arrangements for storing heat collected by solar heat collectors (working fluids forming pools or ponds [F24S 10/10](#))**

##### **WARNING**

Group [F24S 60/00](#) is impacted by reclassification into groups [F24S 60/10](#) and [F24S 60/20](#).

Groups [F24S 60/00](#), [F24S 60/10](#), and [F24S 60/20](#) should be considered in order to perform a complete search.

- 60/10 . using latent heat

##### **WARNING**

Group [F24S 60/10](#) is incomplete pending reclassification of documents from groups [F24S 60/00](#) and [F24S 60/30](#).

Groups [F24S 60/00](#), [F24S 60/30](#), and [F24S 60/10](#) should be considered in order to perform a complete search.

- 60/20 . using chemical reactions, e.g. thermochemical reactions or isomerisation reactions

##### **WARNING**

Group [F24S 60/20](#) is incomplete pending reclassification of documents from groups [F24S 60/00](#) and [F24S 60/30](#).

Groups [F24S 60/00](#), [F24S 60/30](#), and [F24S 60/20](#) should be considered in order to perform a complete search.

60/30	<ul style="list-style-type: none"> <li>storing heat in liquids</li> </ul> <p><b>WARNING</b></p> <p>Group <a href="#">F24S 60/30</a> is impacted by reclassification into groups <a href="#">F24S 60/10</a> and <a href="#">F24S 60/20</a>.</p> <p>Groups <a href="#">F24S 60/30</a>, <a href="#">F24S 60/10</a>, and <a href="#">F24S 60/20</a> should be considered in order to perform a complete search.</p>	70/60	<ul style="list-style-type: none"> <li>characterised by the structure or construction (absorbing coatings or surface treatment for increasing absorption <a href="#">F24S 70/20</a>; auxiliary coatings <a href="#">F24S 70/30</a>)</li> </ul>
70/00	<p><b>Details of absorbing elements</b></p> <p><b>WARNING</b></p> <p>Group <a href="#">F24S 70/00</a> is incomplete pending reclassification of documents from group <a href="#">F24S 80/00</a>.</p> <p>Groups <a href="#">F24S 80/00</a> and <a href="#">F24S 70/00</a> should be considered in order to perform a complete search.</p>	2070/62	<ul style="list-style-type: none"> <li>{Heat traps}</li> </ul> <p><b>WARNING</b></p> <p>Group <a href="#">F24S 2070/62</a> is incomplete pending reclassification of documents from group <a href="#">F24S 2023/88</a>.</p> <p>Groups <a href="#">F24S 2023/88</a> and <a href="#">F24S 2070/62</a> should be considered in order to perform a complete search.</p>
70/10	<ul style="list-style-type: none"> <li>characterised by the absorbing material (absorbing coatings or surface treatment for increasing absorption <a href="#">F24S 70/20</a>)</li> </ul>	70/65	<ul style="list-style-type: none"> <li>Combinations of two or more absorbing elements</li> </ul>
70/12	<ul style="list-style-type: none"> <li>made of metallic material</li> </ul>	80/00	<p><b>Details, accessories or component parts of solar heat collectors not provided for in groups <a href="#">F24S 10/00</a>-<a href="#">F24S 70/00</a></b></p> <p><b>WARNING</b></p> <p>Group <a href="#">F24S 80/00</a> is impacted by reclassification into group <a href="#">F24S 70/00</a>.</p> <p>Groups <a href="#">F24S 80/00</a> and <a href="#">F24S 70/00</a> should be considered in order to perform a complete search.</p>
70/14	<ul style="list-style-type: none"> <li>made of plastics</li> </ul>	2080/01	<ul style="list-style-type: none"> <li>{Selection of particular materials}</li> </ul>
70/16	<ul style="list-style-type: none"> <li>made of ceramic; made of concrete; made of natural stone</li> </ul>	2080/011	<ul style="list-style-type: none"> <li>{Ceramics}</li> </ul>
70/20	<ul style="list-style-type: none"> <li>characterised by absorbing coatings; characterised by surface treatment for increasing absorption</li> </ul> <p><b>WARNING</b></p> <p>Group <a href="#">F24S 70/20</a> is impacted by reclassification into group <a href="#">F24S 70/225</a>.</p> <p>Groups <a href="#">F24S 70/20</a> and <a href="#">F24S 70/225</a> should be considered in order to perform a complete search.</p>	2080/012	<ul style="list-style-type: none"> <li>{Concrete}</li> </ul>
70/225	<ul style="list-style-type: none"> <li>for spectrally selective absorption</li> </ul> <p><b>WARNING</b></p> <p>Group <a href="#">F24S 70/225</a> is incomplete pending reclassification of documents from groups <a href="#">F24S 70/20</a>, <a href="#">F24S 70/25</a>, and <a href="#">F24S 70/275</a>.</p> <p>All groups listed in this Warning should be considered in order to perform a complete search.</p>	2080/013	<ul style="list-style-type: none"> <li>{Foams}</li> </ul>
70/25	<ul style="list-style-type: none"> <li>Coatings made of metallic material</li> </ul> <p><b>WARNING</b></p> <p>Group <a href="#">F24S 70/25</a> is impacted by reclassification into group <a href="#">F24S 70/225</a>.</p> <p>Groups <a href="#">F24S 70/25</a> and <a href="#">F24S 70/225</a> should be considered in order to perform a complete search.</p>	2080/014	<ul style="list-style-type: none"> <li>{Carbone, e.g. graphite}</li> </ul>
70/275	<ul style="list-style-type: none"> <li>Coatings made of plastics</li> </ul> <p><b>WARNING</b></p> <p>Group <a href="#">F24S 70/275</a> is impacted by reclassification into group <a href="#">F24S 70/225</a>.</p> <p>Groups <a href="#">F24S 70/275</a> and <a href="#">F24S 70/225</a> should be considered in order to perform a complete search.</p>	2080/015	<ul style="list-style-type: none"> <li>{Plastics}</li> </ul>
70/30	<ul style="list-style-type: none"> <li>Auxiliary coatings, e.g. anti-reflective coatings</li> </ul>	2080/016	<ul style="list-style-type: none"> <li>{Textiles; Fabrics}</li> </ul>
		2080/017	<ul style="list-style-type: none"> <li>{Natural materials, e.g. wood}</li> </ul>
		2080/018	<ul style="list-style-type: none"> <li>{Recycled materials}</li> </ul>
		2080/03	<ul style="list-style-type: none"> <li>{Arrangements for heat transfer optimization}</li> </ul>
		2080/05	<ul style="list-style-type: none"> <li>{Flow guiding means; Inserts inside conduits}</li> </ul>
		2080/07	<ul style="list-style-type: none"> <li>{Arrangements for one-way heat transfer, e.g. thermal diodes}</li> </ul>
		2080/09	<ul style="list-style-type: none"> <li>{Arrangements for reinforcement of solar collector elements}</li> </ul>
		80/10	<ul style="list-style-type: none"> <li>Materials for heat-exchange conduits</li> </ul>
		80/20	<ul style="list-style-type: none"> <li>Working fluids specially adapted for solar heat collectors</li> </ul>
		80/30	<ul style="list-style-type: none"> <li>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</li> </ul>
		80/40	<ul style="list-style-type: none"> <li>Casings</li> </ul>
		80/45	<ul style="list-style-type: none"> <li>characterised by the material</li> </ul>
		80/453	<ul style="list-style-type: none"> <li>made of metallic material</li> </ul>
		80/457	<ul style="list-style-type: none"> <li>made of plastics</li> </ul>
		80/50	<ul style="list-style-type: none"> <li>Elements for transmitting incoming solar rays and preventing outgoing heat radiation; Transparent coverings</li> </ul> <p><b>WARNING</b></p> <p>Group <a href="#">F24S 80/50</a> is impacted by reclassification into groups <a href="#">F24S 80/56</a> and <a href="#">F24S 80/58</a>.</p> <p>Groups <a href="#">F24S 80/50</a>, <a href="#">F24S 80/56</a>, and <a href="#">F24S 80/58</a> should be considered in order to perform a complete search.</p>
		2080/501	<ul style="list-style-type: none"> <li>{Special shape}</li> </ul>
		2080/502	<ul style="list-style-type: none"> <li>{in the form of multiple covering elements}</li> </ul>

- 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**