

CPC COOPERATIVE PATENT CLASSIFICATION

F05D INDEXING SCHEME FOR ASPECTS RELATING TO NON-POSITIVE-DISPLACEMENT MACHINES OR ENGINES, GAS-TURBINES OR JET-PROPULSION PLANTS

2200/00	Mathematical features	2220/30	. in turbines
2200/10	. Basic functions	2220/31	. . in steam turbines
2200/11	. . Sum	2220/32	. . in gas turbines
2200/12	. . Subtraction	2220/321	. . . for a special turbine stage
2200/13	. . Product	2220/3212	. . . . the first stage of a turbine
2200/14	. . Division	2220/3213	. . . . an intermediate stage of the turbine
2200/15	. . Inverse	2220/3215	. . . . the last stage of the turbine
2200/20	. Special functions	2220/3216	. . . . for a special compressor stage
2200/21	. . Root	2220/3217	. . . . . for the first stage of a compressor or a low pressure compressor
2200/211	. . . Square root	2220/3218	. . . . . for an intermediate stage of a compressor
2200/212	. . . Cubic root	2220/3219	. . . . . for the last stage of a compressor or a high pressure compressor
2200/22	. . Power	2220/323	. . . for aircraft propulsion, e.g. jet engines
2200/221	. . . Square power	2220/324	. . . to drive unshrouded, low solidity propeller
2200/222	. . . Cubic power	2220/325	. . . to drive unshrouded, high solidity propeller
2200/23	. . Logarithm	2220/326	. . . to drive shrouded, low solidity propeller
2200/24	. . exponential	2220/327	. . . to drive shrouded, high solidity propeller
2200/25	. . Hyperbolic trigonometric, e.g. sinh, cosh, tanh	2220/328	. . . providing direct vertical lift
2200/26	. . trigonometric	2220/329	. . . in helicopters
2200/261	. . . Sine	2220/34	. . in ram-air turbines ("RATS")
2200/262	. . . Cosine	2220/36	. . specially adapted for the fan of turbofan engines
2200/263	. . . Tangent	2220/40	. in turbochargers
2200/264	. . . Cotangent	2220/50	. for auxiliary power units (APU's)
2200/30	. miscellaneous	2220/60	. making use of surplus or waste energy
2200/31	. . odd	2220/62	. . with energy recovery turbines
2200/32	. . even	2220/64	. . for domestic central heating or production of electricity
2200/33	. . bigger or smaller	2220/70	. in combination with
2200/34	. . biggest or smallest	2220/72	. . a steam turbine
2200/35	. . first	2220/722	. . . as part of an integrated gasification combined cycle
2200/36	. . last	2220/74	. . a gas turbine
2210/00	Working fluids	2220/75	. . equipment using fuel having a low calorific value, e.g. low BTU fuel, waste end, syngas, biomass fuel or flare gas
2210/10	. Kind or type	2220/76	. . an electrical generator
2210/11	. . liquid, i.e. incompressible	2220/762	. . . of the direct current (D.C.) type
2210/12	. . gaseous, i.e. compressible	2220/764	. . . of the alternating current (A.C.) type
2210/13	. . mixed, e.g. two-phase fluid	2220/7642	. . . . of the synchronous type
2210/132	. . . Pumps with means for separating and evacuating the gaseous phase	2220/7644	. . . . of the asynchronous type, i.e. induction type
2210/14	. . Refrigerants with particular properties, e.g. HFC	2220/7646	. . . . . Double fed induction generators (DFIGs)
2210/20	. Properties	2220/766	. . . via a direct connection, i.e. a gearless transmission
2210/30	. Flow characteristics	2220/768	. . . equipped with permanent magnets
2210/31	. . with Mach-number kept constant along the flow	2220/77	. . . of the linear type
2210/32	. . Pressure kept constant along the flow	2220/80	. in supersonic vehicles excluding hypersonic vehicles or ram, scram or rocket propulsion
2210/33	. . Turbulent flow	2220/90	. in vehicles adapted for vertical or short take off and landing (v/stol vehicles)
2210/34	. . Laminar flow		
2210/40	. Flow geometry or direction		
2210/41	. . upwards due to the buoyancy of compressed air		
2210/42	. . Axial inlet and radial outlet		
2210/43	. . Radial inlet and axial outlet		
2210/44	. . bidirectional, i.e. in opposite, alternating directions		
2220/00	Application	2230/00	Manufacture
2220/10	. in ram-jet engines or ram-jet driven vehicles	2230/10	. by removing material
2220/20	. within closed fluid conduits, e.g. pipes	2230/11	. . by electrochemical methods

2230/12	. . by spark erosion methods	2240/121	. . . related to the leading edge of a stator vane
2230/13	. . using lasers	2240/122	. . . related to the trailing edge of a stator vane
2230/14	. . Micromachining	2240/123	. . . related to the pressure side of a stator vane
2230/18	. . Manufacturing tolerances	2240/124	. . . related to the suction side of a stator vane
2230/20	. essentially without removing material	2240/125	. . . related to the tip of a stator vane
2230/21	. . by casting	2240/126	. . . Baffles or ribs
2230/211	. . . by precision casting, e.g. microfusing or investment casting	2240/127	. . . Vortex generators, turbulators, or the like, for mixing (by creating turbulence F05D 2260/2212)
2230/22	. . by sintering	2240/128	. . . Nozzles
2230/23	. . by permanently joining parts together	2240/1281	. . . . Plug nozzles
2230/232	. . . by welding	2240/129	. . . Cascades, i.e. assemblies of similar profiles acting in parallel
2230/233	. . . . Electron beam welding	2240/14	. . Casings or housings protecting or supporting assemblies within
2230/234	. . . . Laser welding	2240/15	. . Heat shield
2230/235	. . . . TIG or MIG welding	2240/20	. Rotors
2230/236	. . . . Diffusion bonding	2240/24	. . for turbines
2230/237	. . . . Brazing	2240/241	. . . of impulse type
2230/238	. . . . Soldering	2240/242	. . . of reaction type
2230/239	. . . . Inertia or friction welding	2240/243	. . . of the Archimedes screw type
2230/24	. . by extrusion	2240/30	. . Characteristics of rotor blades, i.e. of any element transforming dynamic fluid energy to or from rotational energy and being attached to a rotor
2230/25	. . by forging	2240/301	. . . Cross-sectional characteristics
2230/26	. . by rolling	2240/302	. . . characteristics related to shock waves, transonic or supersonic flow
2230/30	. with deposition of material	2240/303	. . . related to the leading edge of a rotor blade
2230/31	. . Layer deposition	2240/304	. . . related to the trailing edge of a rotor blade
2230/311	. . . by torch or flame spraying	2240/305	. . . related to the pressure side of a rotor blade
2230/312	. . . by plasma spraying	2240/306	. . . related to the suction side of a rotor blade
2230/313	. . . by physical vapour deposition	2240/307	. . . related to the tip of a rotor blade
2230/314	. . . by chemical vapour deposition	2240/31	. . . with roughened surfaces
2230/40	. Heat treatment	2240/35	. Combustors or associated equipment
2230/41	. . Hardening; Annealing	2240/36	. . Fuel vaporizer
2230/411	. . . Precipitation hardening	2240/40	. Use of a multiplicity of similar components
2230/42	. . by hot isostatic pressing	2240/50	. Bearings
2230/50	. Building or constructing in particular ways	2240/51	. . Magnetic
2230/51	. . in a modular way, e.g. using several identical or complementary parts or features	2240/511	. . . with permanent magnets
2230/52	. . using existing or "off the shelf" parts, e.g. using standardized turbocharger elements	2240/515	. . . Electromagnetic
2230/53	. . by integrally manufacturing a component, e.g. by milling from a billet or one piece construction	2240/52	. . Axial thrust bearings
2230/54	. . by sheet metal manufacturing	2240/53	. . Hydrodynamic or hydrostatic bearings
2230/60	. Assembly methods	2240/54	. . Radial bearings
2230/61	. . using limited numbers of standard modules which can be adapted by machining	2240/55	. Seals
2230/64	. . using positioning or alignment devices for aligning or centring, e.g. pins	2240/56	. . Brush seals
2230/642	. . . using maintaining alignment while permitting differential dilatation	2240/57	. . Leaf seals
2230/644	. . . for adjusting the position or the alignment, e.g. wedges or eccenters	2240/58	. . Piston ring seals
2230/68	. . using auxiliary equipment for lifting or holding	2240/581	. . . Double or plural piston ring arrangements, i.e. two or more piston rings
2230/70	. Disassembly methods	2240/59	. . Lamellar seals
2230/72	. Maintenance	2240/60	. Shafts
2230/80	. Repairing, retrofitting or upgrading methods	2240/61	. . Hollow
2230/90	. Coating; Surface treatment (manufacture with deposition of material F05D 2230/30)	2240/62	. . Flexible
		2240/63	. . Glands for admission or removal of fluids from shafts
2240/00	Components	2240/70	. Slinger plates or washers
	NOTE	2240/80	. Platforms for stationary or moving blades
	Components are the basic elements of construction	2240/81	. . Cooled platforms
2240/10	. Stators	2240/90	. Mounting on supporting structures or systems
2240/11	. . Shroud seal segments	2240/91	. . on a stationary structure
2240/12	. . Fluid guiding means, e.g. vanes		

2250/00 Geometry**NOTE**

Geometry indicates the shape or form of a component or the configuration or arrangement of components in a machine or in a plant

- 2250/10 . Two-dimensional
- 2250/11 . . triangular
- 2250/12 . . rectangular
- 2250/121 . . . square
- 2250/13 . . trapezoidal
- 2250/131 . . . polygonal
- 2250/132 . . . hexagonal
- 2250/14 . . elliptical
- 2250/141 . . . circular
- 2250/15 . . spiral
- 2250/16 . . parabolic
- 2250/17 . . hyperbolic
- 2250/18 . . patterned
- 2250/181 . . . ridged
- 2250/182 . . . crenellated, notched
- 2250/183 . . . zigzag
- 2250/184 . . . sinusoidal
- 2250/185 . . . serpentine-like
- 2250/19 . . machined; miscellaneous
- 2250/191 . . . perforated
- 2250/192 . . . bevelled
- 2250/193 . . . milled
- 2250/20 . Three-dimensional
- 2250/21 . . pyramidal
- 2250/22 . . parallelepipedal
- 2250/221 . . . cubic
- 2250/23 . . prismatic
- 2250/231 . . . cylindrical
- 2250/232 . . . conical
- 2250/24 . . ellipsoidal
- 2250/241 . . . spherical
- 2250/25 . . helical
- 2250/26 . . paraboloid
- 2250/27 . . hyperboloid
- 2250/28 . . patterned
- 2250/281 . . . threaded
- 2250/282 . . . cubic pattern
- 2250/283 . . . honeycomb
- 2250/29 . . machined; miscellaneous
- 2250/291 . . . hollowed
- 2250/292 . . . tapered
- 2250/293 . . . lathed, e.g. rotation symmetrical
- 2250/294 . . . grooved
- 2250/30 . Arrangement of components
- 2250/31 . . according to the direction of their main axis or their axis of rotation
- 2250/311 . . . the axes being in line
- 2250/312 . . . the axes being parallel to each other
- 2250/313 . . . the axes being perpendicular to each other
- 2250/314 . . . the axes being inclined in relation to each other
- 2250/315 . . . the main axis being substantially vertical
- 2250/32 . . according to their shape
- 2250/321 . . . asymptotic
- 2250/322 . . . tangential
- 2250/323 . . . convergent

- 2250/324 . . . divergent
- 2250/33 . . symmetrical
- 2250/34 . . translated
- 2250/35 . . rotated
- 2250/36 . . in inner-outer relationship, e.g. shaft-bearing arrangements
- 2250/37 . . circumferential
- 2250/38 . . angled, e.g. sweep angle
- 2250/40 . Movement of components
- 2250/41 . . with one degree of freedom
- 2250/411 . . . in rotation
- 2250/42 . . with two degrees of freedom
- 2250/43 . . with three degrees of freedom
- 2250/44 . . by counter rotation
- 2250/50 . Inlet or outlet
- 2250/51 . . Inlet
- 2250/511 . . . augmenting, i.e. with intercepting fluid flow cross sectional area greater than the rest of the machine behind the inlet
- 2250/512 . . . concentrating only, i.e. with intercepting fluid flow cross sectional area not greater than the rest of the machine behind the inlet
- 2250/52 . . Outlet
- 2250/53 . . of regenerative pumps
- 2250/60 . Structure; Surface texture
- 2250/61 . . corrugated
- 2250/611 . . . undulated
- 2250/62 . . smooth or fine
- 2250/621 . . . polished
- 2250/63 . . coarse
- 2250/70 . Shape
- 2250/71 . . curved
- 2250/711 . . . convex
- 2250/712 . . . concave
- 2250/713 . . . inflexed
- 2250/72 . . symmetric
- 2250/73 . . asymmetric
- 2250/74 . . given by a set or table of xyz-coordinates
- 2250/75 . . given by its similarity to a letter, e.g. T-shaped
- 2250/80 . Size or power range of the machines
- 2250/82 . . Micromachines
- 2250/84 . . Nanomachines
- 2250/90 . Variable geometry

2260/00 Function

- 2260/02 . Transport and handling during maintenance and repair
- 2260/10 . Particular cycles
- 2260/12 . Testing on a test bench
- 2260/14 . Preswirling
- 2260/15 . Load balancing
- 2260/16 . Fluid modulation at a certain frequency
- 2260/20 . Heat transfer, e.g. cooling
- 2260/201 . . by impingement of a fluid
- 2260/202 . . by film cooling
- 2260/203 . . by transpiration cooling
- 2260/204 . . by the use of microcircuits
- 2260/205 . . Cooling fluid recirculation, i.e. after cooling one or more components is the cooling fluid recovered and used elsewhere for other purposes
- 2260/207 . . using a phase changing mass, e.g. heat absorbing by melting or boiling

- 2260/208 . . using heat pipes
- 2260/209 . . using vortex tubes
- 2260/211 . . by intercooling, e.g. during a compression cycle
- 2260/212 . . by water injection
- 2260/213 . . by the provision of a heat exchanger within the cooling circuit
- 2260/221 . . Improvement of heat transfer
- 2260/2212 . . . by creating turbulence ([vortex generators, turbulators or the like for mixing F05D 2240/127](#))
- 2260/2214 . . . by increasing the heat transfer surface
- 2260/22141 using fins or ribs
- 2260/231 . . Preventing heat transfer
- 2260/232 . . characterized by the cooling medium
- 2260/2322 . . . steam
- 2260/234 . . of the generator by compressor inlet air
- 2260/24 . . for draft enhancement in chimneys, using solar or other heat sources
- 2260/30 . Retaining components in desired mutual position
- 2260/31 . Retaining bolts or nuts
- 2260/311 . of the frangible or shear type
- 2260/32 . . by means of magnetic or electromagnetic forces
- 2260/33 . . with a bayonet coupling
- 2260/34 . . Balancing of radial or axial forces on regenerative rotors
- 2260/35 . . Reducing friction between regenerative impeller discs and casing walls
- 2260/36 . . by a form fit connection, e.g. by interlocking
- 2260/37 . . by a press fit connection
- 2260/38 . . by a spring, i.e. spring loaded or biased towards a certain position
- 2260/39 . . by a V-shaped ring to join the flanges of two cylindrical sections, e.g. casing sections of a turbocharger
- 2260/40 . Transmission of power
- 2260/402 . . through friction drives
- 2260/4021 . . . through belt drives
- 2260/4022 . . . through endless chains
- 2260/4023 . . . through a friction clutch
- 2260/403 . . through the shape of the drive components
- 2260/4031 . . . as in toothed gearing
- 2260/40311 of the epicyclical, planetary or differential type
- 2260/404 . . through magnetic drive coupling
- 2260/4041 . . . the driven magnets encircling the driver magnets
- 2260/406 . . through hydraulic systems
- 2260/407 . . through piezoelectric conversion
- 2260/408 . . through magnetohydrodynamic conversion
- 2260/42 . Storage of energy
- 2260/43 . . in the form of rotational kinetic energy, e.g. in flywheels
- 2260/50 . Kinematic linkage, i.e. transmission of position
- 2260/52 . . involving springs
- 2260/53 . . using gears
- 2260/532 . . . of the bevelled or angled type
- 2260/54 . . using flat or V-belts and pulleys
- 2260/55 . . using chains and sprockets; using toothed belts
- 2260/56 . . using cams or eccentrics
- 2260/57 . . using servos, independent actuators, etc.
- 2260/60 . Fluid transfer
- 2260/601 . . using an ejector or a jet pump
- 2260/602 . . Drainage
- 2260/6022 . . . of leakage having past a seal ([seals F05D 2240/57; glands F05D 2240/63](#))
- 2260/604 . . Vortex non-clogging type pumps
- 2260/605 . . Venting into the ambient atmosphere or the like
- 2260/606 . . Bypassing the fluid
- 2260/607 . . Preventing clogging or obstruction of flow paths by dirt, dust, or foreign particles
- 2260/608 . . Aeration, ventilation, dehumidification or moisture removal of closed spaces
- 2260/609 . . Deoiling or demisting
- 2260/61 . . Removal of CO₂ ([removal of CO₂ from waste gases B01D 53/62](#))
- 2260/611 . . Sequestration of CO₂
- 2260/70 . Adjusting of angle of incidence or attack of rotating blades
- 2260/71 . . as a function of flow velocity
- 2260/72 . . by turning around an axis parallel to the rotor centre line
- 2260/74 . . by turning around an axis perpendicular the rotor centre line
- 2260/75 . . the adjusting mechanism not using auxiliary power sources, e.g. by "servos"
- 2260/76 . . the adjusting mechanism using auxiliary power sources
- 2260/77 . . the adjusting mechanism driven or triggered by centrifugal forces
- 2260/78 . . the adjusting mechanism driven or triggered by aerodynamic forces
- 2260/79 . . Bearing, support or actuation arrangements therefor
- 2260/80 . Diagnostics
- 2260/81 . Modelling or simulation
- 2260/82 . Forecasts
- 2260/821 . . Parameter estimation or prediction
- 2260/83 . Testing, e.g. methods, components or tools therefor
- 2260/84 . Redundancy
- 2260/85 . Starting
- 2260/90 . Braking
- 2260/901 . . using aerodynamic forces, i.e. lift or drag
- 2260/902 . . using frictional mechanical forces
- 2260/903 . . using electrical or magnetic forces
- 2260/904 . . using hydrodynamic forces
- 2260/94 . Functionality given by mechanical stress related aspects such as low cycle fatigue [LCF] of high cycle fatigue [HCF]
- 2260/941 . . particularly aimed at mechanical or thermal stress reduction
- 2260/95 . Preventing corrosion ([coating or surface treatment F05D 2230/90](#))
- 2260/96 . Preventing, counteracting or reducing vibration or noise
- 2260/961 . . by mistuning rotor blades or stator vanes with irregular interblade spacing, airfoil shape
- 2260/962 . . by means of "anti-noise"
- 2260/963 . . by Helmholtz resonators
- 2260/964 . . counteracting thermoacoustic noise
- 2260/97 . Reducing windage losses
- 2260/972 . . in radial flow machines
- 2260/98 . Lubrication
- 2260/99 . Ignition, e.g. ignition by warming up of fuel or oxidizer in a resonant acoustic cavity

2270/00	Control	
2270/01	. Purpose of the control system	
2270/02	. . to control rotational speed (n)	
2270/021	. . . to prevent overspeed	
2270/022	. . . to prevent underspeed	
2270/023	. . . of different spools or shafts	
2270/024	. . . to keep rotational speed constant	
2270/03	. . in variable speed operation	
2270/04	. . to control acceleration (u)	
2270/042	. . . by keeping it below damagingly high values	
2270/044	. . . by making it as high as possible	
2270/05	. . to affect the output of the engine	
2270/051	. . . Thrust	
2270/052	. . . Torque	
2270/053	. . . Explicitly mentioned power	
2270/06	. . to match engine to driven device	
2270/061	. . . in particular the electrical frequency of driven generator	
2270/07	. . to improve fuel economy	
2270/071	. . . in particular at idling speed	
2270/08	. . to produce clean exhaust gases	
2270/081	. . . with as little smoke as possible	
2270/082	. . . with as little NOx as possible	
2270/083	. . . by monitoring combustion conditions	
2270/0831	. . . . indirectly, at the exhaust	
2270/09	. . to cope with emergencies	
2270/091	. . . in particular sudden load loss	
2270/092	. . . in particular blow-out and relight	
2270/093	. . . of one engine in a multi-engine system	
2270/094	. . . by using back-up controls	
2270/095	. . . by temporary overriding set control limits	
2270/096	. . . caused by water or hail ingestion	
2270/10	. . to cope with, or avoid, compressor flow instabilities	
2270/101	. . . Compressor surge or stall	
2270/102	. . . . caused by working fluid flow velocity profile distortion	
2270/1022	. . . . . due to high angle of attack of aircraft	
2270/1024	. . . . . due to compressor degradation	
2270/11	. . to prolong engine life	
2270/112	. . . by limiting temperatures	
2270/114	. . . by limiting mechanical stresses	
2270/116	. . . by preventing reverse rotation	
2270/12	. . to maintain desired vehicle trajectory parameters	
2270/121	. . . Altitude	
2270/122	. . . Speed or Mach number	
2270/13	. . to control two or more engines simultaneously	
2270/14	. . to control thermoacoustic behaviour in the combustion chambers (counteracting noise or vibration F05D 2260/96)	
2270/16	. . to control water or steam injection	
2270/17	. . to control boundary layer	
2270/172	. . . by a plasma generator, e.g. control of ignition	
2270/173	. . . by the Coanda effect	
2270/18	. . using fluidic amplifiers or actuators	
2270/20	. . to optimize the performance of a machine	
2270/30	. Control parameters, e.g. input parameters	
2270/301	. . Pressure	
2270/3011	. . . Inlet pressure	
2270/3013	. . . Outlet pressure	
2270/3015	. . . differential pressure	
2270/303	. . Temperature	
2270/3032	. . . excessive temperatures, e.g. caused by overheating	
2270/304	. . Spool rotational speed	
2270/305	. . Tolerances	
2270/306	. . Mass flow	
2270/3061	. . . of the working fluid	
2270/3062	. . . of the auxiliary fluid for heating or cooling purposes	
2270/309	. . Rate of change of parameters	
2270/31	. . Fuel schedule for stage combustors	
2270/311	. . Air humidity	
2270/312	. . Air pressure	
2270/313	. . Air temperature	
2270/331	. . Mechanical loads	
2270/332	. . Maximum loads or fatigue criteria	
2270/333	. . Noise or sound levels	
2270/334	. . Vibration measurements	
2270/335	. . Output power or torque	
2270/336	. . Blade lift measurements	
2270/40	. Type of control system	
2270/42	. . passive or reactive, e.g. using large wind vanes	
2270/44	. . active, predictive, or anticipative	
2270/46	. . redundant, i.e. failsafe operation	
2270/50	. Control logic embodiments	
2270/52	. . by electrical means, e.g. relays or switches	
2270/54	. . by electronic means, e.g. electronic tubes, transistors or IC's within an electronic circuit	
2270/56	. . by hydraulic means, e.g. hydraulic valves within a hydraulic circuit	
2270/58	. . by mechanical means, e.g. levers, gears or cams	
2270/60	. Control system actuates means	
2270/62	. . Electrical actuators	
2270/64	. . Hydraulic actuators	
2270/65	. . Pneumatic actuators	
2270/66	. . Mechanical actuators (F05D 2270/62 takes precedence)	
2270/70	. Type of control algorithm	
2270/701	. . proportional	
2270/702	. . differential	
2270/703	. . integral	
2270/704	. . proportional-differential	
2270/705	. . proportional-integral	
2270/706	. . proportional-integral-differential	
2270/707	. . fuzzy logic	
2270/708	. . with comparison tables	
2270/709	. . with neural networks	
2270/71	. . synthesized, i.e. parameter computed by a mathematical model	
2270/80	. Devices generating input signals, e.g. transducers, sensors, cameras or strain gauges	
2270/802	. . Calibration thereof	
2270/803	. . Sampling thereof	
2270/804	. . Optical devices	
2270/8041	. . . Cameras	
2270/805	. . Radars	
2270/806	. . Sonars	
2270/807	. . Accelerometers	
2270/808	. . Strain gauges; Load cells	
2270/809	. . Encoders	
2270/81	. . Microphones	
2270/821	. . Displacement measuring means, e.g. inductive	

2300/00	Materials; Properties thereof	
2300/10	. Metals, alloys or intermetallic compounds	
2300/11	. . Iron	
2300/111	. . . Cast iron	
2300/12	. . Light metals	
2300/121	. . . Aluminium	
2300/122	. . . Beryllium	
2300/123	. . . Boron	
2300/124	. . . Lithium	
2300/125	. . . Magnesium	
2300/13	. . Refractory metals, i.e. Ti, V, Cr, Zr, Nb, Mo, Hf, Ta, W	
2300/131	. . . Molybdenum	
2300/132	. . . Chromium	
2300/133	. . . Titanium	
2300/134	. . . Zirconium	
2300/135	. . . Hafnium	
2300/14	. . Noble metals, i.e. Ag, Au, platinum group metals	
2300/141	. . . Silver	
2300/142	. . . Gold	
2300/143	. . . Platinum group metals, i.e. Os, Ir, Pt, Ru, Rh, Pd	
2300/1431	. . . . Palladium	
2300/1432	. . . . Ruthenium	
2300/1433	. . . . Osmium	
2300/1434	. . . . Iridium	
2300/1435	. . . . Rhodium	
2300/15	. . Rare earth metals, i.e. Sc, Y, lanthanides	
2300/16	. . Other metals not provided for in groups F05D 2300/11 - F05D 2300/15	
2300/1602	. . . Arsenic	
2300/1604	. . . Antimony	
2300/1606	. . . Bismuth	
2300/1608	. . . Barium	
2300/161	. . . Manganese	
2300/1612	. . . Lead	
2300/1614	. . . Tin	
2300/1616	. . . Zinc	
2300/1618	. . . Mercury	
2300/17	. . Alloys	
2300/171	. . . Steel alloys	
2300/172	. . . Copper alloys	
2300/1721	. . . . Bronze	
2300/1722	. . . . Phosphor-bronze alloy	
2300/1723	. . . . Nickel-Copper alloy, e.g. Monel	
2300/173	. . . Aluminium alloys, e.g. AlCuMgPb	
2300/174	. . . Titanium alloys, e.g. TiAl	
2300/175	. . . Superalloys	
2300/176	. . . Heat-stable alloys	
2300/177	. . . Ni - Si alloys	
2300/18	. . Intermetallic compounds	
2300/182	. . . Metal-aluminide intermetallic compounds	
2300/20	. . Oxide or non-oxide ceramics	
2300/21	. . Oxide ceramics	
2300/2102	. . . Glass	
2300/2104	. . . MIBA	
2300/2106	. . . Quartz	
2300/2108	. . . Phosphor	
2300/211	. . . Silica	
2300/2112	. . . Aluminium oxides	
2300/2114	. . . Sapphire	
2300/2116	. . . Zinc oxide	
2300/2118	. . . Zirconium oxides	
2300/212	. . . Aluminium titanate	
2300/22	. . Non-oxide ceramics	
2300/222	. . . Silicon	
2300/224	. . . Carbon, e.g. graphite	
2300/226	. . . Carbides	
2300/2261	. . . . of silicon	
2300/2262	. . . . of titanium, e.g. TiC	
2300/2263	. . . . of tungsten, e.g. WC	
2300/228	. . . Nitrides	
2300/2281	. . . . of aluminium	
2300/2282	. . . . of boron	
2300/2283	. . . . of silicon	
2300/2284	. . . . of titanium	
2300/2285	. . . . of zirconium	
2300/229	. . . Sulfides	
2300/2291	. . . . of molybdenum	
2300/30	. Inorganic materials other than provided for in groups F05D 2300/10 - F05D 2300/2291	
2300/40	. Organic materials	
2300/41	. . Leather	
2300/42	. . Cellulosic materials, e.g. wood	
2300/43	. . Synthetic polymers, e.g. plastics; Rubber	
2300/431	. . . Rubber	
2300/432	. . . PTFE [PolyTetraFluorEthylene]	
2300/433	. . . Polyamides, e.g. NYLON	
2300/434	. . . Polyimides, e.g. AURUM	
2300/436	. . . Polyetherketones, e.g. PEEK	
2300/437	. . . Silicon polymers	
2300/44	. . Resins	
2300/48	. . other organic materials	
2300/50	. Intrinsic material properties or characteristics	
2300/501	. . Elasticity	
2300/502	. . Thermal properties	
2300/5021	. . . Expansivity	
2300/50211	. . . . similar	
2300/50212	. . . . dissimilar	
2300/5023	. . . Thermal capacity	
2300/5024	. . . Heat conductivity	
2300/504	. . Reflective properties	
2300/505	. . Shape memory behaviour	
2300/506	. . Hardness	
2300/507	. . Magnetic properties	
2300/509	. . Self lubricating materials; Solid lubricants	
2300/51	. . Hydrophilic, i.e. being or having wettable properties	
2300/512	. . Hydrophobic, i.e. being or having non-wettable properties	
2300/514	. . Porosity	
2300/516	. . Surface roughness	
2300/518	. . Ductility	
2300/52	. . Translucence	
2300/522	. . Density	
2300/60	. Properties or characteristics given to material by treatment or manufacturing	
2300/601	. . Fabrics	
2300/6012	. . . Woven fabrics	
2300/603	. . Composites; e.g. fibre-reinforced	
2300/6031	. . . Functionally graded composites	
2300/6032	. . . Metal matrix composites [MMC]	
2300/6033	. . . Ceramic matrix composites [CMC]	

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- 2300/6034 . . . Orientation of fibres, weaving, ply angle
- 2300/604 . . Amorphous
- 2300/605 . . Crystalline
- 2300/606 . . Directionally-solidified crystalline structures
- 2300/607 . . Monocrystallinity
- 2300/608 . . Microstructure
- 2300/609 . . Grain size
- 2300/61 . . Syntactic materials, i.e. hollow spheres embedded
in a matrix
- 2300/611 . . Coating
- 2300/6111 . . functionally graded coating
- 2300/612 . . Foam
- 2300/613 . . Felt
- 2300/614 . . Fibres or filaments
- 2300/615 . . Filler
- 2300/70 . Treatment or modification of materials
- 2300/701 . . Heat treatment
- 2300/702 . . Reinforcement