

# CPC COOPERATIVE PATENT CLASSIFICATION

## Y02P CLIMATE CHANGE MITIGATION TECHNOLOGIES IN THE PRODUCTION OR PROCESSING OF GOODS

### NOTE

This subclass covers climate change mitigation technologies in any kind of industrial processing or production activity, including the agroalimentary industry, agriculture, fishing, ranching and the like.

<b>10/00</b>	<b>Technologies related to metal processing</b>	<b>10/295</b>	. . . . of metals
10/10	. Reduction of greenhouse gas [GHG] emissions	10/30	. . characterised by the energy source
10/12	. . CO <sub>2</sub>	10/32	. . . the energy source being renewable
10/122	. . . by capturing CO <sub>2</sub>	10/34	. . . Cogeneration with other industries
10/124	. . . . Recycling of CO <sub>2</sub> -rich gas	<b>20/00</b>	<b>Technologies relating to chemical industry</b>
10/126	. . . . Recycling of CO <sub>2</sub> -lean gas	20/10	. General improvement of production processes causing greenhouse gases [GHG] emissions
10/128	. . . . Oxycombustion	20/12	. . Energy input
10/13	. . . . Post-combustion	20/121	. . . Energy efficiency measures, e.g. energy management
10/132	. . . . CO <sub>2</sub> storage	20/122	. . . . characterised by the type of apparatus
10/134	. . . by CO <sub>2</sub> avoidance	20/123	. . . . . Motor systems
10/136	. . . . using hydrogen, e.g. H <sub>2</sub>	20/124	. . . . . Boilers, furnaces, lighting or vacuum systems
10/138	. . . . Electrolysis	20/125	. . . . Process integration
10/14	. . Greenhouse gases [GHG] other than CO <sub>2</sub>	20/126	. . . . Membrane separation
10/143	. . . Methane [CH <sub>4</sub> ]	20/127	. . . . Reactive distillation
10/146	. . . Perfluorocarbons [PFC]; Hydrofluorocarbons [HFC]; Sulfur hexafluoride [SF <sub>6</sub> ]	20/128	. . . Alternative fuel sources, e.g. for process heat or steam
10/20	. Process efficiency	20/129	. . . Energy recovery
10/21	. . by recovering materials	20/13	. . . . Cogeneration
10/212	. . . Recovering metals from waste	20/131	. . . . Pressure recovery turbines
10/214	. . . . by pyro metallurgy	20/132	. . . . H <sub>2</sub> recovery
10/216	. . . . . of Fe	20/133	. . . Renewable energy sources
10/218	. . . . . of Al	20/134	. . . . Sunlight
10/22	. . . . . of Cu	20/135	. . . . . Photoelectrochemical processes
10/224	. . . . . of Co or Ni	20/136	. . . . of biological origin, e.g. biomass, biofuels, biogas
10/226	. . . . . of Mg	20/14	. . Reagents; Educts; Products
10/228	. . . . . of Sn	20/141	. . . Feedstock
10/23	. . . . . of refractory metals	20/142	. . . . the feedstock being CO <sub>2</sub>
10/232	. . . . . of Zn or ZnO	20/143	. . . . the feedstock being recycled plastics
10/234	. . . . by hydro metallurgy	20/144	. . . . . to generate syngas, i.e. H <sub>2</sub> + CO
10/236	. . . . . of Cu	20/145	. . . . the feedstock being materials of biological origin
10/238	. . . . by means other than pyro metallurgy or hydro metallurgy	20/146	. . . Changing the product type or product distribution
10/24	. . . . . powder metallurgy	20/147	. . . Using materials efficiently
10/242	. . . Slag reuse in metallurgical processes	20/148	. . . . Recycling
10/25	. . by increasing the energy efficiency of the process	20/149	. . . . Reduced process losses
10/253	. . . using induction furnaces	20/15	. . . . Reduced transportation losses
10/256	. . . Design or operational measures for increasing the efficiency of electric conversion	20/151	. . . Reduction of greenhouse gas [GHG] emissions
10/259	. . . . in electric arc furnaces	20/152	. . . . CO <sub>2</sub>
10/262	. . . . in electrolytic cells	20/153	. . . . N <sub>2</sub> O
10/265	. . . by heat recovery	20/154	. . . . Halogenated hydrocarbons
10/268	. . . . with by-product gas in energy cycle	20/155	. . . . . Perfluorocarbons [PFC]; Hydrofluorocarbons [HFC]; Hydrochlorofluorocarbons [HCFC]; Chlorofluorocarbons [CFC]
10/271	. . . . . low temperature heat recovery	20/156	. . . . . Methane [CH <sub>4</sub> ]
10/274	. . . . . medium temperature heat recovery		
10/277	. . . . . high temperature heat recovery		
10/28	. . . . using by-product gases		
10/283	. . . . using water, e.g. for cooling		
10/286	. . . by process control or by modelling		
10/29	. . . Additive manufacturing		
10/292	. . . . of casting moulds		

20/20	. Improvements relating to chlorine production	40/121	. . . Energy efficiency measures, e.g. improving or optimising the production methods
20/22	. . Optimization of Deacon process	40/123	. . . . Integrated production plants
20/224	. . . by process design	40/125	. . . Fuels from renewable energy sources
20/228	. . . by improving the materials, e.g. gauze composition or structure	40/126	. . . . Waste
20/30	. Improvements relating to adipic acid or caprolactam production	40/128	. . . . Biomass
20/32	. . Technologies aiming at reducing N <sub>2</sub> O emissions	40/14	. . Reduction of clinker content in cement
20/324	. . . by thermal destruction of N <sub>2</sub> O	40/141	. . . Blended cements
20/328	. . . by catalytic reduction of N <sub>2</sub> O	40/143	. . . . Clinker replacement by slag
20/40	. Improvements relating to chlorodifluoromethane [HCFC-22] production	40/145	. . . . Clinker replacement by combustion residues
20/42	. . Reducing fluoroform [HFC-23] emissions	40/146	. . . . Clinker replacement by ground limestone
20/424	. . . by capture and subsequent thermal oxidation	40/148	. . . Belite cements
20/50	. Improvements relating to the production of products other than chlorine, adipic acid, caprolactam, or chlorodifluoromethane, e.g. bulk or fine chemicals or pharmaceuticals	40/16	. . Non-limestone based cements, e.g. alkali-activated cements
20/51	. . Bulk chemicals	40/165	. . . Geopolymers
20/514	. . . Aldehydes; Alcohols	40/18	. . Carbon capture and storage [CCS]
20/518	. . . Hydrocyanation products, e.g. adipodinitrile	40/20	. Cement grinding
20/52	. . using catalysts, e.g. selective catalysts	40/30	. Manufacturing or processing of sand or stone
20/54	. . characterised by the solvent	40/40	. Production or processing of lime
20/542	. . . the solvent being an ionic liquid	40/42	. . Limestone calcination
20/544	. . . Supercritical solvents, e.g. supercritical H <sub>2</sub> O or CO <sub>2</sub>	40/44	. . Regeneration of lime in pulp and sugar mills
20/546	. . . Mixtures of ionic liquids and supercritical solvents	40/45	. . using fuels from renewable energy sources
20/55	. . Synthetic design, e.g. reducing the use of auxiliary or protecting groups	40/47	. . Reduction of lime consumption, e.g. in sugar industry
20/57	. . Efficient separation techniques	40/49	. . . Limestone grinding
20/572	. . . Membranes	40/50	. Glass production
20/58	. . Recycling	40/51	. . Producing or shaping of glass
20/582	. . . of unreacted starting or intermediate materials	40/52	. . Use of cullet or other waste
20/584	. . . of catalysts	40/53	. . Reusing waste heat during processing or shaping
20/586	. . . of reagents, e.g. co-catalysts, adjuvants	40/535	. . . Regenerative heating
20/588	. . . involving immobilised starting materials, reagents or catalysts	40/55	. . Oxy-fuel
20/59	. . Biological synthesis; Biological purification	40/56	. . Batch or cullet pre-heating
<b>30/00</b>	<b>Technologies relating to oil refining and petrochemical industry</b>	40/57	. . Reduction of reject rates; Improving the yield
30/10	. Reduction of greenhouse gas [GHG] emissions during production processes	40/58	. . Fuels from renewable energy sources
30/20	. Bio-feedstock	40/59	. . CO <sub>2</sub> capture, e.g. for large oxy-fuel furnaces
30/30	. Carbon capture or storage [CCS] specific to hydrogen production	40/60	. Production of ceramic materials or ceramic elements
30/40	. Ethylene production	40/61	. . Manufacturing of materials for construction, e.g. beams, bricks or tiles
30/42	. . using bio-feedstock	40/615	. . . Bricks made from lime and sand
30/44	. . Cracking, e.g. steam cracking	40/63	. . Improving processing, storage or transport systems
30/442	. . . Furnace or cracking tube materials, e.g. chemical composition of the tubes; Controlling or regulating the tube furnaces	40/65	. . Improving kilns
30/444	. . . Cogeneration using furnace exhaust	40/67	. . Fuels from renewable energy sources
30/446	. . . Catalytic cracking	40/69	. . Substitution of clay or shale by alternative raw materials, e.g. ashes
30/46	. . Separation	<b>60/00</b>	<b>Technologies relating to agriculture, livestock or agroalimentary industries</b>
30/462	. . . using low temperature distillation	60/10	. Agricultural machinery or equipment
30/464	. . . using absorption or adsorption techniques	60/12	. . using renewable energies
30/48	. . Compression	60/122	. . . for irrigation, e.g. solar water pumping
<b>40/00</b>	<b>Technologies relating to the processing of minerals</b>	60/124	. . . Collecting solar energy in greenhouses
40/10	. Production of cement	60/14	. . Measures for saving energy
40/12	. . Clinker production	60/141	. . . in irrigation, i.e. motor control
		60/142	. . . Reduction of fuel consumption
		60/144	. . . Combined machines, e.g. seeder combined with fertilizers
		60/146	. . . in greenhouses
		60/147	. . . . Heating, ventilation or air conditioning
		60/148	. . . . Constructive measures, e.g. light structures or improved insulation
		60/149	. . . . Efficient lighting, e.g. LED lighting

60/15	. . . in preparing or milling grain	70/00	<b>Climate change mitigation technologies in the production process for final industrial or consumer products</b>
60/16	. . Machines for direct seeding, i.e. sod or grassland seeding	70/10	. Greenhouse gas [GHG] capture, material saving, heat recovery or other energy efficient measures, e.g. motor control, characterised by manufacturing processes
60/18	. . Activities not otherwise provided for, e.g. storage	70/12	. . related technologies for improving processes or machines for shaping products
60/20	. Reduction of greenhouse gas [GHG] emissions in agriculture	70/121	. . . Machines for rolling metal, e.g. rolling mills
60/21	. . N <sub>2</sub> O	70/123	. . . . Motor control
60/212	. . . Reducing the use of fertilizers	70/125	. . . . Removing fumes from rolling mills
60/214	. . . . Efficient applying machines	70/127	. . . . using heat shields
60/215	. . . . Efficient spraying methods	70/129	. . . . Heat recovery during rolling
60/216	. . . . Aquaponics or hydroponics	70/131	. . . . using liquid recovering devices
60/218	. . . use of additives, e.g. nitrification inhibitors, biochar	70/133	. . . . . for recovering coolants
60/22	. . Reducing methane [CH <sub>4</sub> ] emissions from agricultural lands, e.g. from rice paddies	70/135	. . . . . for recovering lubricants
60/23	. . Reduction of CO <sub>2</sub> emissions from biota and soils	70/137	. . . relating to forging, hammering, pressing or riveting
60/24	. . Enhancing carbon sequestration in biota and soils	70/139	. . . relating to the manufacture or working of metal sheets or profiles
60/242	. . . Roof greening	70/141	. . . relating to pressing processes or machines therefore
60/244	. . . Wall greening	70/143	. . . . Optimisation of energy consumption
60/246	. . . Use of plant growth regulators to improve carbon dioxide up-take by crop plants	70/145	. . . . . by control of drive motors
60/247	. . . Plants with high carbon sequestration potential	70/16	. . related technologies for metal working by removing or adding material
60/25	. . Biomass with low greenhouse gas [GHG] emissions	70/161	. . . Power management, e.g. limiting power to tools
60/30	. Land use policy measures	70/163	. . . Power down for energy saving
60/40	. Afforestation or reforestation	70/167	. . . relating to the design or operation of machining centres or machine tools
60/50	. Livestock or poultry management	70/169	. . . . using minimal quantities of coolants or lubricants
60/52	. . use of renewable energies	70/171	. . . . Devices or processes for removing and reusing chips
60/521	. . . Solar lighting, e.g. for poultry	70/173	. . . . Machine centres provided for turning, boring or milling
60/524	. . . for pumping or supplying water to livestock	70/175	. . . relating to the design or operation of machines for dry cutting gears or toothed racks
60/526	. . . for electric energy supply	70/177	. . . Grinding or polishing
60/528	. . . . for electric livestock fences	70/179	. . . . Treatment of used abrasive materials aiming at a further reuse
60/54	. . Environmental control in livestock or poultry housing	70/181	. . . relating to the design or operation of machines for soldering, welding or cutting by applying heat locally
60/542	. . . using renewable energy	70/183	. . . relating to the design or operation of machines for machines for sawing, cutting, perforating, punching or severing
60/56	. . Methane [CH <sub>4</sub> ] capture	70/185	. . . relating to the operation of machines combining different processes for working of metal
60/60	. Fishing	70/187	. . . relating to the design or operation of machines for working metal not otherwise provided for
60/62	. . Fishing equipment	70/20	. . related technologies for printing, lining or stamping machines
60/64	. . Aquaculture; Aquafarming	70/22	. . Technologies for working on wood, veneer or plywood
60/642	. . . combined with aquaponics or hydroponics	70/24	. . related technologies for saving energy and raw materials during the production of paper or paper articles
60/70	. Apiculture	70/26	. . related technologies for working on or processing of plastics
60/80	. Food processing		
60/81	. . Use of renewable energies or variable speed drives in handling, conveying or stacking		
60/83	. . Warming or cooking		
60/831	. . . using steam		
60/833	. . . using microwave ovens		
60/835	. . . by boiling		
60/85	. . Food storage or conservation		
60/851	. . . Cooling, refrigeration or freezing		
60/853	. . . Drying		
60/855	. . . Ice production, e.g. for conservation purposes		
60/87	. . Re-use of by-products of food processing for fodder production		
60/871	. . . from molasses		
60/873	. . . from distillers' or brewers' waste		
60/875	. . . from waste products of dairy plants		
60/877	. . . from by-products of vegetal origin		
60/89	. . characterised by the product		
60/891	. . . Dairy products		

70/261	. . . recovering energy or power from drive motors in injection moulding	70/62	. . related technologies for production or treatment of textile or flexible materials or products thereof, including footwear
70/263	. . . recovering energy or reusing materials in extrusion moulding	70/621	. . . Production or treatment of artificial filaments or the like
70/265	. . . relating to blow moulding	70/623	. . . . Energy efficient measures, e.g. motor control or heat recovery
70/267	. . . . Means for recycling or reusing auxiliaries or materials	70/625	. . . . Recovery of starting material, waste material or solvents during the manufacturing process
70/269	. . . . reducing blowing fluid consumption	70/627	. . . . . of cellulose, cellulose derivatives or proteins
70/271	. . . . . by recycling blow fluid	70/629	. . . . . of synthetic polymers
70/273	. . . . recycling reactive gas	70/631	. . . Production or treatment of lace, e.g. knitting or braiding
70/275	. . . . reusing heat	70/633	. . . . Saving materials
70/277	. . . relating to thermoforming	70/635	. . . . Saving energy by reducing inertia of moving parts
70/279	. . . . Recycling or reuse of materials	70/637	. . . Treatment of textiles
70/281	. . . . Reuse of pressure or vacuum	70/639	. . . . Energy efficient measures, e.g. motor control or heat recovery
70/30	. . related to technologies for conveying, packing or storing of goods or handling thin or filamentary material	70/641	. . . . Recovery of solvents
70/32	. . relating to mixing	70/643	. . . . Treatment of textiles using a short bath ratio
70/34	. . relating to separation, flotation or differential sedimentation	70/645	. . . Manufacturing of wall or floor covering materials or the like
70/36	. . Recycling or reuse of a liquid sprayed or atomised	70/647	. . . . Energy efficient measures, e.g. motor control or heat recovery
70/38	. . Apparatus or processes for applying liquids or other fluent materials	70/649	. . . . using scraps or recycled materials
70/40	. . Drying by removing liquid	70/651	. . . . . the materials being particles
70/405	. . . Drying with heating arrangements using waste heat	70/653	. . . Footwear made at least partially of recyclable material
70/50	. Manufacturing or production processes characterised by the final manufactured product	70/66	. . Greenhouse gas [GHG] capture, use of renewable energies, heat recovery or other energy efficient measures for manufacturing or preparation of tobacco products, e.g. motor control
70/52	. . Manufacturing of products or systems for producing renewable energy	<b>80/00</b>	<b>Climate change mitigation technologies for sector-wide applications</b>
70/521	. . . Photovoltaic generators	80/10	. Efficient use of energy
70/523	. . . Wind turbines	80/11	. . of electric energy
70/525	. . . Hydropower turbines	80/112	. . . Power supplies with power electronics for efficient use of energy, e.g. power factor correction [PFC] or resonant converters
70/527	. . . . for tidal streams or dam-less hydropower, e.g. sea flood and ebb or stream current	80/114	. . . Control systems or methods for efficient use of energy
70/54	. . Manufacturing of lithium-ion, lead-acid or alkaline secondary batteries	80/116	. . . . Electronic drive motor controls
70/56	. . Manufacturing of fuel cells	80/12	. . using compressed air as energy carrier, e.g. for pneumatic systems
70/58	. . Greenhouse gas [GHG] capture, heat recovery or other energy efficient measures relating to manufacturing or assembling of vehicles, e.g. motor control	80/13	. . using pressurized fluid as energy carrier, e.g. for hydraulic systems
70/585	. . . Aircraft Eco design, i.e. taking into account the full life cycle of the aircraft including re-use, recyclability and disposal	80/14	. . District level solutions, i.e. local energy networks
70/60	. . Greenhouse gas [GHG] capture, heat recovery or other energy efficient measures relating to production or assembly of electric or electronic components or products, e.g. motor control	80/15	. . On-site combined power, heat or cool generation or distribution, e.g. combined heat and power [CHP] supply
70/601	. . . the product being a basic electric component or element, i.e. cables, resistors, capacitors, switches, connectors, relays or protections	80/152	. . . for heat recovery
70/603	. . . the product being a lighting component	80/154	. . . for steam generation or distribution
70/605	. . . the product being a semiconductor or solid state device or parts thereof	80/156	. . in fluid distribution systems
70/607	. . . . Manufacturing of electronic silicon based components	80/158	. . . Solar or wind-powered water pumping not specially adapted for irrigation
70/609	. . . the product being a dynamo-electric machine, i.e. electrical generators or motors	80/20	. Sector-wide applications using renewable energy
70/611	. . . the product being a printed circuit board [PCB]	80/21	. . Biomass as fuel
70/613	. . . involving the assembly of several electronic elements	80/22	. . Wind energy
		80/23	. . Solar energy
		80/24	. . . Solar thermal energy
		80/25	. . . Photovoltaic energy

- 80/30 . Reducing waste in manufacturing processes;  
Calculations of released waste quantities
- 80/40 . Minimising material used in manufacturing processes
- 90/00 Enabling technologies with a potential contribution to greenhouse gas [GHG] emissions mitigation**
- 90/02 . Total factory control, e.g. smart factories, flexible manufacturing systems [FMS] or integrated manufacturing systems [IMS]
- 90/04 . . characterised by the assembly processes
- 90/06 . . characterised by direct numerical control [DNC]
- 90/08 . . characterised by the cooperation between machine tools, manipulators or work piece supply systems
- 90/083 . . . Manipulators cooperating with conveyors
- 90/087 . . . Manipulators cooperating with machine tools
- 90/10 . . characterised by identification, e.g. of work pieces or equipment
- 90/12 . . characterised by programme execution
- 90/14 . . characterised by fault tolerance, reliability of production system
- 90/16 . . characterised by system universality, i.e. configurability or modularity of production units
- 90/18 . . characterised by the network communication
- 90/185 . . . using local area networks [LAN]
- 90/20 . . characterised by job scheduling, process planning or material flow
- 90/205 . . . Tool management
- 90/22 . . characterised by quality surveillance of production
- 90/24 . . characterised by computer integrated manufacturing [CIM], planning or realisation
- 90/26 . . characterised by modelling or simulation of the manufacturing system
- 90/265 . . . Product design therefor
- 90/28 . . characterised by transport systems
- 90/285 . . . using automatic guided vehicles [AGV]
- 90/30 . Computing systems specially adapted for manufacturing
- 90/40 . Fuel cell technologies in production processes
- 90/45 . Hydrogen technologies in production processes
- 90/50 . Energy storage in industry with an added climate change mitigation effect
- 90/60 . Electric or hybrid propulsion means for production processes
- 90/70 . Combining sequestration of CO<sub>2</sub> and exploitation of hydrocarbons by injecting CO<sub>2</sub> or carbonated water in oil wells
- 90/80 . Management or planning
- 90/82 . . Energy audits or management systems therefor
- 90/84 . . Greenhouse gas [GHG] management systems
- 90/845 . . . Inventory and reporting systems for greenhouse gases [GHG]
- 90/86 . . Maintenance planning
- 90/90 . Financial instruments for climate change mitigation, e.g. environmental taxes, subsidies or financing
- 90/95 . . CO<sub>2</sub> emission certificates or credits trading