

# CPC COOPERATIVE PATENT CLASSIFICATION

## G21C NUCLEAR REACTORS (analogue computers therefor [G06G 7/54](#); fusion reactors, hybrid fission-fusion reactors [G21B](#); nuclear explosives [G21J](#))

### WARNING

The following IPC groups are not used in the CPC scheme:

[G21C 1/01](#)

covered by

all other groups of [G21C](#)

[G21C 19/33](#)

covered by

all other subgroups of [G21C 19/34](#)

<b>1/00</b>	<b>Reactors</b>	<b>1/30</b>	• Subcritical reactors; {Experimental reactors with exception of swimming-pool reactors or zero-energy reactors}
1/02	• Fast fission reactors, i.e. reactors not using a moderator; {Metal cooled reactors; Fast breeders}	<b>1/303</b>	• • {Experimental and irradiation arrangements inside the reactor (irradiation loops <a href="#">G21C 1/306</a> ; material testing by neutrons <a href="#">G01N 23/005</a> )}
1/022	• • {Characterised by the concept and properties of the core}	<b>1/306</b>	• • {Irradiation loops}
1/024	• • • {where the core is divided in zones with fuel and zones with breeding material}	<b>1/32</b>	• Integral reactors, i.e. reactors wherein parts functionally associated with the reactor but not essential to the reaction, e.g. heat exchangers, are disposed inside the enclosure with the core ( <a href="#">G21C 1/02</a> - <a href="#">G21C 1/30</a> take precedence)
1/026	• • • {Reactors not needing refueling, i.e. reactors of the type breed-and-burn, e.g. travelling or deflagration wave reactors or seed-blanket reactors}	<b>1/322</b>	• • {wherein the heat exchanger is disposed above the core}
1/028	• • {cooled by a pressurised coolant (cooling arrangements <a href="#">G21C 15/00</a> )}	<b>1/324</b>	• • {wherein the heat exchanger is disposed beneath the core}
1/03	• • cooled by a coolant not essentially pressurised, e.g. pool-type reactors	<b>1/326</b>	• • {wherein the heat exchanger is disposed next to or beside the core}
1/04	• Thermal reactors; {Epithermal reactors}	<b>1/328</b>	• • {wherein the prime mover is also disposed in the vessel}
1/06	• • Heterogeneous reactors, i.e. in which fuel and moderator are separated	<b>3/00</b>	<b>Reactor fuel elements and their assemblies; Selection of substances for use as reactor fuel elements</b>
1/07	• • • Pebble-bed reactors; Reactors with granular fuel	<b>3/02</b>	• Fuel elements {(manufacture thereof <a href="#">G21C 21/02</a> )}
1/08	• • • moderator being highly pressurised, e.g. boiling water reactor, integral super-heat reactor, pressurised water reactor ( <a href="#">G21C 1/22</a> takes precedence)	<b>3/04</b>	• • Constructional details
1/082	• • • • {Reactors where the coolant is overheated}	<b>3/041</b>	• • • {Means for removal of gases from fuel elements}
1/084	• • • • {Boiling water reactors}	<b>3/042</b>	• • • {Fuel elements comprising casings with a mass of granular fuel with coolant passages through them}
1/086	• • • • {Pressurised water reactors}	<b>3/044</b>	• • • {Fuel elements with porous or capillary structure}
2001/088	• • • • {Inherently safe boiling water reactors}	<b>2003/045</b>	• • • {Pellets}
1/09	• • • • Pressure regulating arrangements, i.e. pressurisers	<b>2003/047</b>	• • • • {Pellet-clad interaction}
1/10	• • • • moderator and coolant being different or separated	<b>2003/048</b>	• • • • {Shape of pellets}
1/12	• • • • • moderator being solid, e.g. Magnox reactor {gas-graphite reactor}	<b>3/06</b>	• • • Casings; Jackets
1/14	• • • moderator being substantially not pressurised, e.g. swimming-pool reactor ( <a href="#">G21C 1/22</a> takes precedence)	<b>3/07</b>	• • • • characterised by their material, e.g. alloys
1/16	• • • • moderator and coolant being different or separated, e.g. sodium-graphite reactor {sodium-heavy water reactor, organic coolant-heavy water reactor}	<b>3/08</b>	• • • • provided with external means to promote heat-transfer, e.g. fins, baffles
1/18	• • • • • coolant being pressurised	<b>3/10</b>	• • • • End closures; {Means for tight mounting therefor}
1/20	• • • • • moderator being liquid, e.g. pressure-tube reactor {also the construction of the pressure-tubes}	<b>3/105</b>	• • • • • {Flattened end-closures}
1/22	• • • using liquid or gaseous fuel	<b>3/12</b>	• • • • Means forming part of the element for locating it within the reactor core {(means not forming part of the element <a href="#">G21C 5/06</a> )}
1/24	• • Homogeneous reactors, i.e. in which the fuel and moderator present an effectively homogeneous medium to the neutrons	<b>3/14</b>	• • • • Means forming part of the element for inserting it into, or removing it from, the core; Means for coupling adjacent elements, {e.g. to form a stringer}
1/26	• • • Single-region reactors	<b>3/16</b>	• • • Details of the construction within the casing
1/28	• • • Two-region reactors		

3/17	. . . . Means for storage or immobilisation of gases in fuel elements	3/3424	. . . . {Fabrication of spacer grids}
3/18	. . . . Internal spacers or other non-active material within the casing, e.g. compensating for expansion of fuel rods or for compensating excess reactivity ( <a href="#">interlayers G21C 3/20</a> )	2003/3432	. . . . {Grids designed to influence the coolant, i.e. coolant mixing function}
3/20	. . . . with coating on fuel or on inside of casing; with non-active interlayer between casing and active material {with multiple casings or multiple active layers}	3/344	. . . . formed of assembled tubular elements
3/22	. . with fissile or breeder material in contact with coolant	3/348	. . . . formed of assembled non-intersecting strips
3/24	. . with fissile or breeder material in fluid form within a non-active casing	3/352	. . . . formed of assembled intersecting strips
3/26	. . with fissile or breeder material in powder form within a non-active casing	3/356	. . . . being provided with fuel element supporting members
3/28	. . with fissile or breeder material in solid form within a non-active casing	3/3563	. . . . . {Supporting members formed only by deformations in the strips}
3/30	. Assemblies of a number of fuel elements in the form of a rigid unit	3/3566	. . . . . {Supporting members formed only of elements fixed on the strips}
3/32	. . Bundles of parallel pin-, rod-, or tube-shaped fuel elements	3/36	. . Assemblies of plate-shaped fuel elements or coaxial tubes
3/3206	. . . {Means associated with the fuel bundle for filtering the coolant, e.g. nozzles, grids}	3/38	. Fuel units consisting of a single fuel element in a supporting sleeve {or in another supporting element}
3/3213	. . . {Means for the storage or removal of fission gases (means for the storage of fission gases in the elements <a href="#">G21C 3/16</a> ; means for the removal of fission gases from elements <a href="#">G21C 3/04</a> )}	3/40	. Structural combination of fuel element with thermoelectric element for direct production of electric energy from fission heat ( <a href="#">for temperature measurement G21C 17/10</a> ) {or with another arrangement for direct production of electric energy, e.g. a thermionic device (combination with thermoelements for temperature measurements <a href="#">G21C 17/102</a> )}
3/322	. . . Means to influence the coolant flow through or around the bundles	3/42	. Selection of substances for use as reactor fuel
2003/3225	. . . . {by waterrods}	3/44	. . Fluid or fluent reactor fuel
3/324	. . . Coats or envelopes for the bundles	3/46	. . . Aqueous compositions
3/3245	. . . . {made of moderator material}	3/48	. . . . True or colloidal solutions of the active constituent
3/326	. . . comprising fuel elements of different composition; comprising, in addition to the fuel elements, other pin-, rod-, or tube-shaped elements, e.g. control rods, grid support rods, fertile rods, poison rods or dummy rods	3/50	. . . . Suspensions of the active constituent; Slurries
2003/3262	. . . . . {Enrichment distribution in zones}	3/52	. . . Liquid metal compositions
2003/3265	. . . . . {Radial distribution}	3/54	. . . Fused salt, oxide or hydroxide compositions
2003/3267	. . . . . {Axial distribution}	3/56	. . . Gaseous compositions; Suspensions in a gaseous carrier
3/328	. . . . Relative disposition of the elements in the bundle lattice	3/58	. . Solid reactor fuel {Pellets made of fissile material}
3/33	. . . Supporting or hanging of elements in the bundle ( <a href="#">spacer grids G21C 3/34</a> ); Means forming part of the bundle for inserting it into, or removing it from, the core; Means for coupling adjacent bundles	3/60	. . . Metallic fuel; Intermetallic dispersions
3/3305	. . . . {Lower nozzle}	3/62	. . . Ceramic fuel
3/331	. . . . {Comprising hold-down means, e.g. springs}	3/623	. . . . {Oxide fuels}
3/3315	. . . . {Upper nozzle}	3/626	. . . . {Coated fuel particles}
3/332	. . . Supports for spacer grids	3/64	. . . . Ceramic dispersion fuel, e.g. cermet
3/334	. . . Assembling {, maintenance or repair of} the bundles {( <a href="#">assembling, maintenance or repair of other reactor components G21C 19/207</a> )}	<b>5/00</b>	<b>Moderator or core structure; Selection of materials for use as moderator</b>
3/335	. . . Exchanging elements in irradiated bundles	5/02	. Details
3/336	. . . Spacer elements for fuel rods in the bundle ( <a href="#">spacer grids G21C 3/34</a> )	5/04	. . Spatial arrangements allowing for Wigner growth
3/338	. . . . Helicoidal spacer elements	5/06	. . Means for locating or supporting fuel elements {( <a href="#">means forming part of the element G21C 3/12</a> )}
3/34	. . . Spacer grids	5/08	. . Means for preventing undesired asymmetric expansion of the complete structure; { <a href="#">Stretching devices, pins</a> }
3/3408	. . . . {Compact spacer grids, e.g. made of a plate or a blade}	5/10	. . Means for supporting the complete structure {( <a href="#">arrangements for supporting vessels and core-structures G21C 13/024</a> )}
3/3416	. . . . {Spacer grids formed by metallic wires, e.g. springs}	5/12	. characterised by composition, e.g. the moderator containing additional substances which ensure improved heat resistance of the moderator {( <a href="#">purification of fluid moderators during the operation of the reactor G21C 19/30</a> )}
		5/123	. . {Moderators made of organic materials}

5/126	. . {Carbonic moderators (carbon and graphite in general <a href="#">C01B 31/00</a> ; refractory carbon-bulbs <a href="#">C04B 35/00</a> ; carbon electrodes <a href="#">C25B</a> )}	9/002	. {against Na- or Ka- reactions}
5/14	. characterised by shape	9/004	. Pressure suppression
5/16	. . Shape of its constituent parts	9/008	. . by rupture-discs or -diaphragms
5/18	. characterised by the provision of more than one active zone	9/012	. . by thermal accumulation or by steam condensation, e.g. ice condensers
5/20	. . wherein one zone contains fissile material and another zone contains breeder material	9/016	. Core catchers
5/22	. . wherein one zone is a superheating zone	9/02	. Means for effecting very rapid reduction of the reactivity factor under fault conditions, e.g. reactor fuse; {Control elements having arrangements activated in an emergency} ( <a href="#">control elements per se G21C 7/00</a> )
<b>7/00</b>	<b>Control of nuclear reaction</b>	9/022	. . {Reactor fuses}
7/005	. {Flux flattening}	9/024	. . {Rupture diaphragms}
7/02	. by using self-regulating properties of reactor materials, {e.g. Doppler effect} ( <a href="#">arrangements that involve temperature stability G21C 7/32</a> )	9/027	. . by fast movement of a solid, e.g. pebbles
7/04	. . of burnable poisons ( <a href="#">burnable poisons in fuel rods G21C 3/326</a> )	9/033	. . by an absorbent fluid
7/06	. by application of neutron-absorbing material, i.e. material with absorption cross-section very much in excess of reflection cross-section	9/04	. Means for suppressing fires {Earthquake protection}
7/08	. . by displacement of solid control elements, e.g. control rods	9/06	. . Means for preventing accumulation of explosives gases, e.g. recombiners
7/10	. . . Construction of control elements	<b>11/00</b>	<b>Shielding structurally associated with the reactor</b>
7/103	. . . . Control assemblies containing one or more absorbants as well as other elements, e.g. fuel or moderator elements	11/02	. Biological shielding ( <a href="#">in general G21F</a> ) {Neutron or gamma shielding}
7/107	. . . . Control elements adapted for pebble-bed reactors	11/022	. . {inside the reactor vessel}
7/11	. . . . Deformable control elements, e.g. flexible, telescopic, articulated	11/024	. . . {structurally combined with the casing}
7/113	. . . . Control elements made of flat elements; Control elements having cruciform cross-section	11/026	. . {in apertures or channels through a wall}
7/117	. . . . Clusters of control rods; Spider construction	11/028	. . {characterised by the form or by the material}
7/12	. . . Means for moving control elements to desired position ( <a href="#">dropping rods in an emergency G21C 9/02</a> )	11/04	. . on waterborne craft
7/14	. . . . Mechanical drive arrangements	11/06	. Reflecting shields, i.e. for minimising loss of neutrons
7/16	. . . . Hydraulic or pneumatic drive	11/08	. Thermal shields; Thermal linings, i.e. for dissipating heat from gamma radiation which would otherwise heat an outer biological shield {Thermal insulation}
7/18	. . . Means for obtaining differential movement of control elements	11/081	. . {consisting of a non-metallic layer of insulating material}
7/20	. . . Disposition of shock-absorbing devices ( <a href="#">shock-absorbers in general F16F</a> ) {Braking arrangements}	11/083	. . {consisting of one or more metallic layers}
7/22	. . by displacement of a fluid or fluent neutron-absorbing material, {e.g. by adding neutron-absorbing material to the coolant}	11/085	. . . {consisting exclusively of several metallic layers}
7/24	. . Selection of substances for use as neutron-absorbing material	11/086	. . {consisting of a combination of non-metallic and metallic layers, e.g. metal-sand-metal-concrete}
7/26	. by displacement of the moderator or parts thereof {by changing the moderator concentration}	11/088	. . {consisting of a stagnant or a circulating fluid}
7/27	. . Spectral shift control	<b>13/00</b>	<b>Pressure vessels; Containment vessels;</b>
7/28	. by displacement of the reflector or parts thereof		<b>Containment in general</b> ( <a href="#">for chemical or physical processes B01J 3/00</a> ; <a href="#">pressure vessels in general F16J 12/00</a> )
7/30	. by displacement of the reactor fuel or fuel elements	13/02	. Details
7/32	. by varying flow of coolant through the core {by adjusting the coolant or moderator temperature}	13/022	. . {Ventilating arrangements}
7/34	. by utilisation of a primary neutron source	13/024	. . Supporting constructions for pressure vessels or containment vessels
7/36	. Control circuits	13/028	. . Seals, e.g. for pressure vessels or containment vessels
<b>9/00</b>	<b>Emergency protection arrangements structurally associated with the reactor {, e.g. safety valves provided with pressure equalisation devices} (<a href="#">emergency cooling arrangements G21C 15/18</a>)</b>	13/0285	. . . {for container apertures}
9/001	. {against explosions, e.g. blast shields}	13/032	. . Joints between tubes and vessel walls, e.g. taking into account thermal stresses
		13/036	. . . the tube passing through the vessel wall, i.e. continuing on both sides of the wall
		13/04	. . Arrangements for expansion and contraction
		13/06	. . Sealing-plugs ( <a href="#">for pressure vessels in general F16J 13/00</a> )
		2013/063	. . . {Seals for closures or for rotatable closures}
		13/067	. . . for tubes, e.g. standpipes; Locking devices for plugs
		13/0675	. . . . {Seals for the plugs}

13/073	. . . Closures for reactor-vessels, e.g. rotatable	17/013	. . Inspection vehicles
13/0735	. . . . {Seals for closures or for rotatable closures}	17/017	. Inspection or maintenance of pipe-lines or tubes in nuclear installations
13/08	. Vessels characterised by the material; Selection of materials for pressure vessels	17/02	. Devices or arrangements for monitoring coolant or moderator
13/087	. . Metallic vessels	17/021	. . {Solid moderators testing, e.g. graphite}
13/0875	. . . {Tube-type vessels, e.g. for not essentially pressurised coolants}	17/022	. . for monitoring liquid coolants or moderators
13/093	. . Concrete vessels	17/0225	. . . {Chemical surface treatment, e.g. corrosion (corrosion prevention in presence of water from scale removal or by modification of the properties of the liquid <a href="#">C02F 5/00</a> ; inhibiting corrosion by adding corrosion inhibitors <a href="#">C23F 11/00</a> )}
13/0933	. . . {made of prestressed concrete}	17/025	. . . for monitoring liquid metal coolants {(molten metal sampling in general <a href="#">G01N 1/125</a> )}
13/0936	. . . . {Particulars concerning prestressing devices and cables}	17/0255	. . . . {Liquid metal leaks detection (detecting leaks in pipe-line systems in general <a href="#">F17D 5/00</a> )}
13/10	. Means for preventing contamination in the event of leakage, {e.g. double wall}	17/028	. . for monitoring gaseous coolants
<b>15/00</b>	<b>Cooling arrangements within the pressure vessel containing the core; Selection of specific coolants</b>	17/032	. . Reactor-coolant flow measuring or monitoring {(measuring volume or mass flow in general <a href="#">G01F</a> )}
15/02	. Arrangements or disposition of passages in which heat is transferred to the coolant; {Coolant flow control devices ( <a href="#">G21C 19/04</a> takes precedence; coolant flow control through fuel assemblies, e.g. flow restrictors <a href="#">G21C 3/322</a> )}	17/035	. . Moderator- or coolant-level detecting devices {(indicating or measuring liquid level in general <a href="#">G01F 23/00</a> )}
15/04	. . from fissile or breeder material {( <a href="#">G21C 3/32</a> takes precedence)}	17/038	. . Boiling detection in moderator or coolant
15/06	. . . in fuel elements	17/04	. . Detecting burst slugs
15/08	. . from moderating material	17/041	. . . {characterised by systems for checking the coolant channels, e.g. matrix systems}
15/10	. . from reflector or thermal shield	17/042	. . . {Devices for selective sampling, e.g. valves, shutters, rotatable selector valves}
15/12	. . from pressure vessel; from containment vessel	17/044	. . . {Detectors and metering devices for the detection of fission products}
15/14	. . from headers; from joints in ducts	17/045	. . . . {Precipitation chambers}
15/16	. comprising means for separating liquid and steam (separating in general <a href="#">B01D</a> ; steam traps <a href="#">F16D</a> )	17/047	. . . . {Detection and metering circuits}
15/18	. Emergency cooling arrangements; Removing shut-down heat	17/048	. . . {characterised by a special construction of fuel elements, e.g. by a confined "tracer"}
15/182	. . {comprising powered means, e.g. pumps}	17/06	. Devices or arrangements for monitoring or testing fuel or fuel elements outside the reactor core, e.g. for burn-up, for contamination ( <a href="#">G21C 17/08</a> , <a href="#">G21C 17/10</a> take precedence; detecting leaking fuel elements during reactor operation <a href="#">G21C 17/04</a> )
2015/185	. . . {using energy stored in reactor system}	17/063	. . {Burn-up control ( <a href="#">G21C 17/066</a> takes precedence)}
2015/187	. . . {using energy from the electric grid}	17/066	. . {Control of spherical elements}
15/20	. Partitions or thermal insulation between fuel channel and moderator	17/07	. . Leak testing
15/22	. Structural association of coolant tubes with headers (joints of tubes in general <a href="#">F16L</a> )	17/08	. Structural combination of reactor core or moderator structure with viewing means, e.g. with television camera, periscope, window
15/24	. Promoting flow of the coolant (electrodynamic pumps <a href="#">H02K 44/02</a> )	17/10	. Structural combination of fuel element, control rod, reactor core, or moderator structure with sensitive instruments, e.g. for measuring radioactivity, strain
15/243	. . for liquids	17/102	. . {the sensitive element being part of a fuel element or a fuel assembly (structural combination with a thermoelectric element for direct production of electrical energy <a href="#">G21C 3/40</a> )}
15/247	. . . for liquid metals	17/104	. . Measuring reactivity
15/25	. . . using jet pumps	17/108	. . Measuring reactor flux
15/253	. . for gases, e.g. blowers	17/112	. . Measuring temperature
15/257	. . using heat-pipes {(in general <a href="#">F28D</a> , <a href="#">F28F</a> )}	17/116	. . Passages or insulators, e.g. for electric cables
15/26	. . by convection, e.g. using chimneys, using divergent channels	17/12	. . Sensitive element forming part of control element
15/28	. Selection of specific coolants (if serving as the moderator <a href="#">G21C 5/12</a> ; compositions per se <a href="#">C09K 5/00</a> ; {organic coolants <a href="#">G21C 5/123</a> }); {Additions to the reactor coolants, e.g. against moderator corrosion (purification and regeneration of the reactor coolants <a href="#">G21C 19/30</a> )}	17/14	. Period meters
<b>17/00</b>	<b>Monitoring; Testing (measuring in general <a href="#">G01</a>); {Maintaining}</b>		
17/001	. {Mechanical simulators (electrical or magnetic simulators <a href="#">G06G 7/54</a> )}		
17/002	. {Detection of leaks (by testing the coolant or the moderator <a href="#">G21C 17/04</a> )}		
17/003	. Remote inspection of vessels, e.g. pressure vessels		
17/007	. . Inspection of the outer surfaces of vessels		
17/01	. . Inspection of the inner surfaces of vessels		



<b>19/00</b>	<b>Arrangements for treating, for handling, or for facilitating the handling of, fuel or other materials which are used within the reactor, e.g. within its pressure vessel</b>	19/307	. . . specially adapted for liquids ( <a href="#">decontamination of liquids G21F 9/04</a> )
19/02	. Details of handling arrangements	19/31	. . . . for molten metals
19/04	. . Means for controlling flow of coolant over objects being handled; Means for controlling flow of coolant through channel being serviced, {e.g. <a href="#">for preventing "blow-out"</a> }	19/313	. . . . . using cold traps
		19/317	. . . Recombination devices for radiolytic dissociation products
19/06	. . Magazines for holding fuel elements or control elements	19/32	. Apparatus for removing radioactive objects or materials from the reactor discharge area, e.g. to a storage place; Apparatus for handling radioactive objects or materials within a storage place or removing them therefrom ( <a href="#">disposal of waste material G21F 9/00</a> )
19/065	. . . { <a href="#">Rotatable magazines</a> }	19/34	. Apparatus or processes for dismantling nuclear fuel, e.g. before reprocessing; { <a href="#">Apparatus or processes for dismantling strings of spent fuel elements</a> } ( <a href="#">shielded cells G21F 7/00</a> )
19/07	. . . Storage racks; Storage pools	19/36	. . Mechanical means only
19/08	. . Means for heating fuel elements before introduction into the core; Means for heating or cooling fuel elements after removal from the core	19/365	. . . Removing cannings or casings from fuel
19/10	. . Lifting devices or pulling devices adapted for co-operation with fuel elements or with control elements ( <a href="#">manipulators B25J</a> )	19/37	. . . . by separating into pieces both the canning or the casing and the fuel element, e.g. by cutting or shearing
19/105	. . . with grasping or spreading coupling elements	19/375	. . . Compacting devices, e.g. for fuel assemblies
19/11	. . . with revolving coupling elements, e.g. socket coupling	19/38	. . Chemical means only
19/115	. . . with latching devices and ball couplings	19/40	. Arrangements for preventing occurrence of critical conditions, e.g. during storage
19/12	. . Arrangements for exerting direct hydraulic or pneumatic force on fuel element or on control element	19/42	. Reprocessing of irradiated fuel
19/14	. characterised by their adaptation for use with horizontal channels in the reactor core	19/44	. . of irradiated solid fuel
19/16	. Articulated or telescopic chutes or tubes for connection to channels in the reactor core	19/46	. . . Aqueous processes, {e.g. <a href="#">by using organic extraction means, including the regeneration of these means</a> }
19/18	. Apparatus for bringing fuel elements to the reactor charge area, e.g. from a storage place	19/48	. . . Non-aqueous processes
19/19	. Reactor parts specifically adapted to facilitate handling, e.g. to facilitate charging or discharging of fuel elements	19/50	. . of irradiated fluid fuel, {e.g. <a href="#">regeneration of fuels while the reactor is in operation</a> }
19/20	. Arrangements for introducing objects into the pressure vessel; Arrangements for handling objects within the pressure vessel; Arrangements for removing objects from the pressure vessel	<b>21/00</b>	<b>Apparatus or processes specially adapted to the manufacture of reactors or parts thereof (in <a href="#">general section B</a>, e.g. <a href="#">B23</a>)</b>
19/202	. . { <a href="#">Arrangements for handling ball-form, i.e. pebble fuel</a> }	21/02	. Manufacture of fuel elements or breeder elements contained in non-active casings
19/205	. . { <a href="#">Interchanging of fuel elements in the core, i.e. fuel shuffling</a> }	21/04	. . by vibrational compaction or tamping {of fuel in the jacket}
19/207	. . { <a href="#">Assembling, maintenance or repair of reactor components (G21C 3/334 takes precedence)</a> }	21/06	. . by { <a href="#">rotatable</a> } swaging {of the jacket around the fuel}
19/22	. . Arrangements for obtaining access to the interior of a pressure vessel whilst the reactor is operating	21/08	. . by a slip-fit cladding process {by <a href="#">crimping the jacket around the fuel</a> }
19/24	. . . by using an auxiliary vessel which is temporarily sealed to the pressure vessel	21/10	. . by extrusion, drawing, or stretching {by <a href="#">rolling, e.g. "picture frame" technique</a> }
19/26	. Arrangements for removing jammed or damaged fuel elements or control elements; Arrangements for moving broken parts thereof	21/12	. . by hydrostatic or thermo-pneumatic canning {in general by pressing without lengthening, e.g. <a href="#">explosive coating</a> }
19/28	. Arrangements for introducing fluent material into the reactor core; Arrangements for removing fluent material from the reactor core ( <a href="#">pumping coolant G21D</a> )	21/14	. . by plating {the fuel} in a fluid
19/30	. . with continuous purification of circulating fluent material, e.g. by extraction of fission products { <a href="#">deterioration or corrosion products, impurities, e.g. by cold traps (purification of circulating fluid fuels G21C 19/50; separation in general B01D)</a> }	21/16	. . by casting or dipping techniques
19/303	. . . specially adapted for gases ( <a href="#">decontamination of gases G21F 9/02</a> )	21/18	. Manufacture of control elements covered by group <a href="#">G21C 7/00</a>
		<b>23/00</b>	<b>Adaptations of reactors to facilitate experimentation or irradiation</b>