

CPC COOPERATIVE PATENT CLASSIFICATION

E FIXED CONSTRUCTIONS

BUILDING

E02 HYDRAULIC ENGINEERING; FOUNDATIONS; SOIL SHIFTING

E02D FOUNDATIONS; EXCAVATIONS; EMBANKMENTS (specially adapted for hydraulic engineering [E02B](#)); UNDERGROUND OR UNDERWATER STRUCTURES {(tunnels, tunnelling, mining [E21](#))}

WARNINGS

- The following IPC groups are not in the CPC scheme. The subject matter for these IPC groups is classified in the following CPC groups:
[E02D 29/09](#) covered by [E02D 29/06](#)
- In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.

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| <p>1/00 Investigation of foundation soil <u>in situ</u>
 (investigation involving boring or specially adapted to earth drilling E21B 25/00, E21B 49/00; investigating or analysing materials by determining their chemical or physical properties, in general G01N, e.g. sampling G01N 1/00)</p> <p>1/02 . before construction work</p> <p>1/022 . . {by investigating mechanical properties of the soil (E02D 1/027 takes precedence)}</p> <p>1/025 . . . {combined with sampling}</p> <p>1/027 . . {by investigating properties relating to fluids in the soil, e.g. pore-water pressure, permeability (sampling of groundwater E02D 1/06)}</p> <p>1/04 . . Sampling of soil {(E02D 1/025 takes precedence)}</p> <p>1/06 . . Sampling of ground water</p> <p>1/08 . . after finishing the foundation structure {(testing of piles E02D 33/00)}</p> <p>3/00 Improving or preserving soil or rock, e.g. preserving permafrost soil (securing of slopes or inclines E02D 17/20; damming or interrupting passage of underground water E02D 19/12; improving soil for agricultural purposes A01; soil stabilisation for road building or like purposes E01C 21/00, E01C 23/10; setting rock anchoring bolts E21D)</p> <p>3/005 . {Soil-conditioning by mixing with fibrous materials, filaments, open mesh or the like}</p> <p>3/02 . Improving by compacting (E02D 3/11 takes precedence; compacting soil locally before or while forming foundations E02D 27/26, E02D 27/28)</p> <p>3/026 . . by rolling with rollers usable only for or specially adapted for soil compaction, e.g. sheepfoot rollers (rollers for soil working in agriculture A01B 29/00; rollers for road paving, such rollers usable also for compacting soil E01C 19/23)</p> <p>3/0265 . . . {Wheels specially adapted therefor; Cleats for said wheels}</p> <p>3/032 . . . Trench rollers</p> <p>3/039 . . . Slope rollers</p> | <p>3/046 . . by tamping or vibrating, e.g. with auxiliary watering of the soil (E02D 3/026, E02D 3/08 take precedence; generating or transmitting mechanical vibrations for performing mechanical work in general B06B; tamping or vibrating apparatus for working ballast or railways E01B 27/00, for consolidating paving materials E01C 19/30, for consolidating concrete in general E04G 21/06)</p> <p>3/054 . . . involving penetration of the soil, e.g. vibroflotation</p> <p>3/061 . . . Tampers with directly acting explosion chambers (pile drivers with explosion chambers E02D 7/12)</p> <p>3/068 . . . Vibrating apparatus operating with systems involving reciprocating masses (E02D 3/054, E02D 3/061 take precedence)</p> <p>3/074 . . . Vibrating apparatus operating with systems involving rotary unbalanced masses (E02D 3/054 takes precedence)</p> <p>3/08 . . by inserting stones or lost bodies, e.g. compaction piles (sand drains for soil compaction E02D 3/10; stressing soil while forming foundations E02D 27/28)</p> <p>3/10 . . by watering, draining, de-aerating or blasting, e.g. by installing sand or wick drains (E02D 3/11 takes precedence; soil-penetrating vibrators with auxiliary watering E02D 3/054; drainage of soil in general E02B 11/00)</p> <p>3/103 . . . {by installing wick drains or sand bags}</p> <p>3/106 . . . {by forming sand drains containing only loose aggregates (sand piles E02D 3/08)}</p> <p>3/11 . by thermal, electrical or electro-chemical means (freezing soil for interrupting passage of underground water E02D 19/14)</p> <p>3/115 . . by freezing</p> <p>3/12 . Consolidating by placing solidifying or pore-filling substances in the soil (making piles E02D 5/46; soil-conditioning or soil-stabilising materials C09K 17/00; consolidation of ground around boreholes or wells E21B 43/025)</p> |
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- 3/123 . . {and compacting the soil ([E02D 3/126](#) takes precedence)}
- 3/126 . . {and mixing by rotating blades}
- 5/00 Bulkheads, piles, or other structural elements specially adapted to foundation engineering (engineering elements in general [F16](#))**
- 5/02 . Sheet piles or sheet pile bulkheads {(foundations made with sheet pile bulkheads [E02D 27/30](#); cofferdams [E02D 19/04](#))}
- 5/03 . . Prefabricated parts {, e.g. composite sheet piles}
- 5/04 . . . made of steel
- 5/06 Fitted piles or other elements specially adapted for closing gaps between two sheet piles or between two walls of sheet piles
- 5/08 Locking forms; Edge joints; Pile crossings; Branch pieces
- 5/10 . . . made of concrete or reinforced concrete {(moulds therefor [E02D 5/70](#))}
- 5/105 {of prestressed concrete ([E02D 5/12](#) takes precedence)}
- 5/12 Locking forms; Edge joints; Pile crossings; Branch pieces
- 5/14 . . Sealing joints between adjacent {sheet} piles (sealing joints not restricted to foundation piles [E04B 1/68](#))
- 5/16 . . Auxiliary devices rigidly or detachably arranged on sheet piles for facilitating assembly {(as parts of driving or pulling apparatus [E02D 7/00](#), [E02D 13/00](#))}
- 5/18 . Bulkheads or similar walls made solely of concrete in situ {(moulds therefor [E02D 5/68](#); making foundation slots [E02D 17/13](#); sealing diaphragms other than those made of concrete [E02D 19/18](#))}
- 5/182 . . {using formworks to separate sections}
- 5/185 . . {with flexible joint members between sections (joints in foundation structures [E02D 29/16](#); flexible joints in hydraulic engineering [E02B 3/16](#), in building [E04B 1/68](#))}
- 5/187 . . {the bulkheads or walls being made continuously, e.g. excavating and constructing bulkheads or walls in the same process, without joints}
- 5/20 . Bulkheads or similar walls made of prefabricated parts and concrete, including reinforced concrete, in situ
- 5/22 . Piles (sheet piles, {i.e. elements shaped to mutually lock or mate} [E02D 5/02](#); {pile shoes [E02D 5/72](#); foundations on piles [E02D 27/12](#), [E02D 27/20](#))}
- 5/223 . . {Details of top sections of foundation piles ([E02D 5/54](#) takes precedence)}
- 5/226 . . {Protecting piles (piles with protecting cases [E02D 5/60](#))}
- 5/24 . . Prefabricated piles
- NOTE**
- Documents covered both by [E02D 5/26](#) - [E02D 5/32](#) and by one or several of the groups [E02D 5/48](#) - [E02D 5/64](#) are classified in all relevant groups unless specific priority rules to the contrary are given
- 5/26 . . . made of timber with or without reinforcement; Means affording protection against spoiling of the wood (cases [E02D 5/60](#); impregnating agents [B27K 3/16](#)); Self-cleaning of piles placed in water
- 5/28 . . . made of steel {or other metals ([E02D 5/52](#) takes precedence)}
- 5/285 {tubular, e.g. prefabricated from sheet pile elements (sheet pile boxes [E02D 27/30](#); concrete piles with metal casings [E02D 5/30](#))}
- 5/30 . . . made of concrete or reinforced concrete or made of steel and concrete {([E02D 5/50](#) takes precedence; assembled from segments [E02D 5/523](#); prestressed concrete [E02D 5/58](#))}
- 5/32 . . . with arrangements for setting {or assisting in setting} in position by fluid jets {(placing piers by using fluid jets in general [E02D 7/24](#))}
- 5/34 . . Concrete or concrete-like piles cast in position {; Apparatus for making same ([E02D 5/50](#) takes precedence; moulds [E02D 5/665](#); placing, removing moulds [E02D 7/00](#) - [E02D 11/00](#); placing the concrete [E02D 15/04](#))}
- 5/36 . . making without use of mouldpipes or other moulds
- NOTE**
- Documents covered both by [E02D 5/34](#) - [E02D 5/46](#) and by one or several of the groups [E02D 5/48](#) - [E02D 5/64](#) are classified in all relevant groups unless specific priority rules to the contrary are given
- 5/38 . . . making by use of mould-pipes or other moulds
- 5/385 {with removal of the outer mould-pipes (documents also covered by one or several of the groups [E02D 5/40](#) - [E02D 5/44](#) are classified in all the relevant groups)}
- 5/40 in open water
- 5/42 by making use of pressure liquid or pressure gas for compacting the concrete
- 5/44 with enlarged footing or enlargements at the bottom of the pile
- 5/445 {by application of pyrotechniques}
- 5/46 . . . making in situ by forcing bonding agents into gravel fillings or the soil (consolidating soil in general [E02D 3/12](#))
- 5/48 . . Piles varying in construction along their length {, i.e. along the body between head and shoe, e.g. made of different materials along their length ([E02D 5/50](#), [E02D 5/52](#) take precedence)}
- 5/50 . . Piles comprising both precast concrete portions and concrete portions cast in situ {([E02D 5/523](#) takes precedence)}
- 5/52 . . Piles composed of separable parts, e.g. telescopic tubes {Piles composed of segments}
- 5/523 . . . {composed of segments}
- 5/526 {Connection means between pile segments}
- 5/54 . . Piles with prefabricated supports or anchoring parts; Anchoring piles {([E02D 5/44](#) takes precedence; ground anchors [E02D 5/80](#); anchored foundations [E02D 27/50](#))}
- 5/56 . . Screw piles {(placing piles by screwing down [E02D 7/22](#))}
- 5/58 . . Prestressed concrete piles {(segmental piles [E02D 5/523](#))}
- 5/60 . . Piles with protecting cases

5/62	<ul style="list-style-type: none"> Compacting the soil at the footing or in {or along} a casing by forcing cement or like material through tubes 	9/00	Removing sheet piles bulkheads, piles, mould-pipes or other moulds {or parts thereof} (for both placing and removing E02D 11/00)
5/64	<ul style="list-style-type: none"> Repairing piles 	9/005	<ul style="list-style-type: none"> {removing the top of placed piles of sheet piles (E02D 9/04 takes precedence)}
5/66	<ul style="list-style-type: none"> Mould-pipes or other moulds {(for plant use B28B)} 	9/02	<ul style="list-style-type: none"> by withdrawing
5/665	<ul style="list-style-type: none"> {for making piles} 	9/04	<ul style="list-style-type: none"> by cutting-off under water
5/68	<ul style="list-style-type: none"> for making bulkheads or elements thereof 	11/00	Methods or apparatus {specially adapted} for both placing and removing sheet pile bulkheads, piles, or mould-pipes (features relating to placing only E02D 7/00, to removing only E02D 9/00 {; placing apparatus which without special provisions, can be operated to remove, e.g. vibrating drivers E02D 7/00})
5/70	<ul style="list-style-type: none"> for making sheet piles {not used} 		
5/72	<ul style="list-style-type: none"> Pile shoes 		
5/74	<ul style="list-style-type: none"> Means for anchoring structural elements or bulkheads (anchoring piles E02D 5/54 {; anchored foundations E02D 27/50}) 		
5/76	<ul style="list-style-type: none"> Anchoring for bulkheads or sections thereof {in as much as specially adapted therefor} 		
5/765	<ul style="list-style-type: none"> {removable} 	13/00	Accessories for placing or removing piles or bulkheads {, e.g. noise attenuating chambers}
5/80	<ul style="list-style-type: none"> Ground anchors {(for galleries, tunnels or shafts E21D 21/00)} 	13/005	<ul style="list-style-type: none"> {Sound absorbing accessories in piling}
5/801	<ul style="list-style-type: none"> {driven by screwing} 	13/02	<ul style="list-style-type: none"> specially adapted for placing or removing bulkheads
5/803	<ul style="list-style-type: none"> {with pivotable anchoring members} 	13/04	<ul style="list-style-type: none"> Guide devices; Guide frames {(as parts of the driver scaffold E02D 7/16)}
5/805	<ul style="list-style-type: none"> {with deformable anchoring members} 		
5/806	<ul style="list-style-type: none"> {involving use of explosives} 	13/06	<ul style="list-style-type: none"> for observation while placing
5/808	<ul style="list-style-type: none"> {anchored by using exclusively a bonding material} 	13/08	<ul style="list-style-type: none"> Removing obstacles
7/00	Methods or apparatus for placing sheet pile bulkheads, piles, mouldpipes, or other moulds (for both placing and removing E02D 11/00; {accessories for coupling driver to piles or the like E02D 13/10; for trees or other plants A01G 17/16; placing posts E04H 17/26})	13/10	<ul style="list-style-type: none"> Follow-blocks of pile-drivers or like devices
7/02	<ul style="list-style-type: none"> Placing by driving {(E02D 7/18 - E02D 7/24 take precedence)} 		NOTE
7/04	<ul style="list-style-type: none"> Hand {-actuated} pile-drivers 		<p>The IPC wording is replaced by the following wording: Devices adapted to, e.g. interposed on, the top of the pile to be driven, e.g. follow-blocks or the like caps, rings</p>
7/06	<ul style="list-style-type: none"> Power-driven drivers {(tampers E02D 3/061)} 	15/00	Handling building or like materials for hydraulic engineering or foundations ({soil-shifting E02F; conveying or working-up concrete or similar masses in general E04G 21/02})
7/08	<ul style="list-style-type: none"> Drop drivers with free-falling hammer {(E02D 7/10 takes precedence)} 	15/02	<ul style="list-style-type: none"> Handling of bulk concrete specially for foundation {or hydraulic engineering} purposes {(lining canals E02B 5/02; banks of the bodies of water E02B 3/121)}
7/10	<ul style="list-style-type: none"> with pressure-actuated hammer, {i.e. the pressure fluid acting directly on the hammer structure (E02D 7/12 takes precedence; vibrating drivers E02D 7/18)} 	15/04	<ul style="list-style-type: none"> Placing concrete in mould-pipes, pile tubes, bore-holes or narrow shafts
7/12	<ul style="list-style-type: none"> Drivers with explosion chambers 	15/06	<ul style="list-style-type: none"> Placing concrete under water {(for surfacing the bottom of bodies of water E02B 3/121)}
7/125	<ul style="list-style-type: none"> {Diesel drivers} 	15/08	<ul style="list-style-type: none"> Sinking workpieces into water or soil {inasmuch as not provided for elsewhere}
7/14	<ul style="list-style-type: none"> Components for drivers {inasmuch as not specially for a specific driver construction} 	15/10	<ul style="list-style-type: none"> Placing gravel or light material under water {inasmuch as not provided for elsewhere}
7/16	<ul style="list-style-type: none"> Scaffolds {or supports} for drivers {(guide frames for the elements to be driven per se E02D 13/04; supports of the artificial island type E02B 17/00)} 	17/00	Excavations; Bordering of excavations; Making embankments (soil-shifting apparatus E02F; earth drilling E21)
7/165	<ul style="list-style-type: none"> {of variable length, e.g. foldable or telescopic} 	17/02	<ul style="list-style-type: none"> Foundation pits
7/18	<ul style="list-style-type: none"> Placing by vibrating {(vibrators for soil compacting E02D 3/046)} 	17/04	<ul style="list-style-type: none"> Bordering {surfacing} or stiffening the sides of foundation pits
7/20	<ul style="list-style-type: none"> Placing by pressure or pulling power 	17/06	<ul style="list-style-type: none"> Foundation {trenches} ditches or narrow shafts
7/22	<ul style="list-style-type: none"> Placing by screwing down {(screw piles per se E02D 5/56)} 	17/08	<ul style="list-style-type: none"> Bordering or stiffening the sides of ditches {trenches} or narrow shafts for foundations
7/24	<ul style="list-style-type: none"> Placing by using fluid jets {(prefabricated concrete piles with arrangements therefor E02D 5/32)} 	17/083	<ul style="list-style-type: none"> {Shoring struts}
7/26	<ul style="list-style-type: none"> Placing by using several means simultaneously 	17/086	<ul style="list-style-type: none"> {Travelling trench shores}
7/28	<ul style="list-style-type: none"> Placing of hollow pipes or mould pipes by means arranged inside the piles or pipes {(E02D 13/08 takes precedence)} 	17/10	<ul style="list-style-type: none"> Covering trenches for foundations
7/30	<ul style="list-style-type: none"> by driving cores 	17/12	<ul style="list-style-type: none"> Back-filling of foundation trenches or ditches {(apparatus therefor E02F 5/12, E02F 5/22)}
		17/13	<ul style="list-style-type: none"> Foundation slots {or slits}; Implements for making these slots {or slits}

17/16	Loosening of soil or rock, under water (for correcting streams E02B 3/02 ; by dredgers or excavators E02F)	23/14	Decreasing the skin friction while lowering
17/18	Making embankments, {e.g. dikes, dams} (E02D 17/20 takes precedence; {foundations for dams E02D 27/40 })	23/16	Jointing caissons to the foundation soil, specially to uneven foundation soil
17/20	Securing of slopes or inclines {(by soil E02D 3/12 ; protection against snowslides or avalanches E01F 7/04 , E01F 15/00 ; securing banks or like surfaces facing on bodies of water E02B 3/12)}	25/00	Joining caissons, sinkers, or other units to each other under water
17/202	. . {with flexible securing means}	27/00	Foundations as substructures
17/205	. . {with modular blocks, e.g. pre-fabricated}	27/01	Flat foundations
17/207	. . {with means incorporating sheet piles or piles}	27/013	. . {Shuttering specially adapted therefor}
19/00	Keeping dry foundation sites or other areas in the ground (sheet piles or bulkheads E02D 5/02)	27/016	. . {made mainly from prefabricated concrete elements}
19/02	Restraining of open water	27/02	. . Flat foundations without substantial excavation (E02D 27/04 , E02D 27/08 take precedence)
19/04	. . by coffer-dams {, e.g. made of sheet piles (permanent sheet piling boxes E02D 27/30)}	27/04	. . in water or on quicksand
19/06	Restraining of underground water	27/06	. . . Floating caisson foundations
19/08	. . by employing open ditches arranged below the level of the water	27/08	. . Reinforcements for flat foundations {(E02D 27/48 takes precedence)}
19/10	. . by lowering level of ground water {(installation for obtaining or collecting drinking water E03B 3/00)}	27/10	Deep foundations
19/12	. . by damming or interrupting the passage of underground water	27/12	. . Pile foundations
19/14	. . . by freezing the soil (in connection with sinking shafts E21D 1/12)	27/14	. . . Pile framings {, i.e. piles assembled to form the substructure}
19/16	. . . by placing or applying sealing substances {(E02D 19/18 takes precedence); consolidating by placing solidifying or pore-filling pore-filling substances in the soil E02D 3/12 {; improving soil by chemical substances C09K 17/00)}	27/16	. . . Foundations formed of separate piles
19/18	. . . by making use of sealing aprons, {e.g. diaphragms made from bituminous or clay material} {(concrete diaphragms E02D 5/18 ; sealing or joints for {hydraulic} engineering work E02B 3/16)}	27/18	. . Foundations formed by making use of caissons
19/185 {Joints between sheets constituting the sealing aprons}	27/20	. . Caisson foundations combined with pile foundations
19/20	. . . by displacing the water, e.g. by compressed air {(pneumatic caissons E02D 23/04)}	27/22	. . Caisson foundations made by starting from fixed or floating artificial islands by using protective bulkheads
19/22	Lining sumps in trenches {or other foundation pits}	27/24	Foundations constructed by making use of diving-bells (equipment for dwelling or working under water B63C 11/00)
23/00	Caissons; Construction or placing of caissons (tunnels submerged into or built in open water E02D 29/063 {; moles, piers, quays, breakwaters incorporating caissons E02B 3/06; foundation formed by caissons E02D 27/18 - E02D 27/22; caisson-like artificial islands E02B 17/00)}	27/26	Compacting soil locally before forming foundations; Construction of foundation structures by forcing binding substances into gravel fillings (consolidating foundation soil in general E02D 3/02 - E02D 3/12 ; {for piles E02D 5/02 , E02D 5/46 })
23/02	Caissons able to be floated on water and to be lowered into water <i>in situ</i> {(floating caisson foundations E02D 27/06)}	27/28	Stressing the soil or the foundation structure while forming foundations
23/04	Pneumatic caissons {(sinking of same E02D 23/10)}	27/30	Foundations made with permanent use of sheet pile bulkheads, walls of planks, or sheet piling boxes
23/06	. . Bringing persons or material into or out of compressed air caissons {(air locks in mines E21F 1/14)}	27/32	Foundations for special purposes {(for paving of roads E01C 3/00)}
23/08	Lowering or sinking caissons {(sinking mine shaft E21D 1/00)}	27/34	. . Foundations for sinking or earthquake territories (building constructions with protection arrangements against earthquakes E04H 9/02)
23/10	. . Caissons filled with compressed air {(E02D 23/06 takes precedence)}	27/35	. . Foundations formed in frozen ground, e.g. in permafrost soil
23/12	. . Inclined lowering	27/36	. . Foundations formed in moors or bogs
		27/38	. . Foundations for large tanks, e.g. oil tanks
		27/40	. . Foundations for dams across valleys or for dam constructions {(dams <i>per se</i> E02B 3/10 , E02B 7/04)}
		27/42	. . Foundations for poles, masts or chimneys {(sockets or holders for poles or masts <i>per se</i> E04H 12/22)}
		27/425	. . . {specially adapted for wind motors masts (wind motors <i>per se</i> F03D 1/00)}
		27/44	. . Foundations for machines, engines or ordnance (special layout of foundations with respect to machinery to be supported F16M 9/00)

- 27/46 . . Foundations for supply conduits or other canals { (bridges for supporting conduits [E01D 18/00](#); elevated canals [E02B 5/005](#); penstocks [E02B 9/06](#)) }
- 27/48 . . Foundations inserted underneath existing buildings or constructions { (making a new substructure subsequent to lifting or moving of buildings [E04G 23/06](#)) }
- 27/50 . . Anchored foundations
- 27/52 . . Submerged foundations { , i.e. submerged in open water ([E02D 27/12](#) - [E02D 27/24](#) take precedence) }
- 27/525 . . . { using elements penetrating the underwater ground (sinking work pieces [E02D 15/08](#), sinking caissons [E02D 23/02](#)) }
- 29/00 {Independent} underground or underwater structures** (underground tanks [B65D 88/76](#); hydraulic engineering, e.g. sealings or joints, [E02B](#); underground garages [E04H 6/00](#); underground air-raid shelters [E04H 9/12](#); burial vaults [E04H 13/00](#)); **Retaining walls**
- 29/02 . Retaining or protecting walls (piers or quay walls [E02B 3/06](#))
- 29/0208 . . { Gabions }
- 29/0216 . . { Cribbing walls }
- 29/0225 . . { comprising retention means in the backfill }
- 29/0233 . . . { the retention means being anchors (details of anchors [E02D 5/80](#)) }
- 29/0241 . . . { the retention means being reinforced earth elements }
- 29/025 . . { made up of similar modular elements stacked without mortar }
- 29/0258 . . { not used, see subgroups ([E02D 29/0208](#) - [E02D 29/025](#) take precedence) }
- 29/0266 . . . { made up of preformed elements }
- 29/0275 . . . { cast *in situ* }
- 29/0283 . . . { of mixed type }
- 29/0291 . . . { made up of filled, bag-like elements }
- 29/04 . { Making large underground spaces, e.g. for underground plants, e.g. stations of underground railways; Construction or layout thereof ([E02D 29/10](#) takes precedence; water-supply or sewerage plants [E03](#); layout of water power plants [E02B 9/00](#); making large underground chambers by underground methods only [E21D 13/00](#)) }
- 29/045 . Underground structures, e.g. tunnels or galleries, built in the open air or by methods involving disturbance of the ground surface all along the location line; Methods of making them
- 29/05 . . at least part of the cross-section being constructed in an open excavation or from the ground surface, e.g. assembled in a trench
- 29/055 . . . further excavation of the cross-section proceeding underneath an already installed part of the structure, e.g. the roof of a tunnel
- 29/06 . { Constructions, or methods of constructing, in water ([E02D 15/00](#) takes precedence; submerged foundations [E02D 27/52](#)) }
- 29/063 . Tunnels submerged into, or built in, open water (construction or placing of caissons in general [E02D 23/00](#); joining caissons to each other under water, in general [E02D 25/00](#))
- 29/067 . . Floating tunnels; Submerged bridge-like tunnels, i.e. tunnels supported by piers or the like above the water-bed (pontoon or floating bridges [E01D 15/14](#))
- 29/07 . . Tunnels or shuttering therefor preconstructed as a whole or continuously made, and moved into place on the water-bed, e.g. into a preformed trench
- 29/073 . . Tunnels or shuttering therefor assembled from sections individually sunk onto, or laid on, the water-bed, e.g. in a preformed trench (caisson-type sections lowered onto the water-bed [E02D 29/077](#))
- 29/077 . . Tunnels at least partially built beneath the water-bed characterised by being made by methods involving disturbance thereof all along the location line, e.g. by cut-and-cover or caisson methods
- 29/08 . { Siphons (for sewerage [E03F 5/20](#); siphon weirs [E02B 7/18](#); siphons in general [F04F 10/00](#)) }
- 29/10 . { Tunnels or galleries specially adapted to house conduits, e.g. oil pipe-lines, sewer pipes (for pressure water conduits [E02B 9/06](#); for cables [H02G 9/02](#); layout of tunnels or galleries in general [E21D 9/14](#); road kerbs with housings for pipes or the like [E01C 11/222](#)); Making conduits *in situ*, e.g. of concrete (combined with digging of trenches or ditches [E02F 5/10](#); making or lining tunnels or galleries [E21D](#); constructing tunnels or galleries in open excavations [E02D 29/045](#); in open water [E02D 29/063](#)); Casings, i.e. manhole shafts, access or inspection chambers or coverings of boreholes or narrow wells (wells for drinking water [E03B 3/08](#); boreholes or wells formed by deep drilling [E21B](#); shafts [E21D](#)) }
- 29/12 . Manhole shafts; Other inspection or access chambers; Accessories therefor (for underground tanks [B65D 90/10](#); for sewerage [E03F 5/02](#) { ; climbing irons or ladders [E06C 9/00](#)) }
- 29/121 . . { characterised by the connection between shaft elements, e.g. of rings forming said shaft }
- 29/122 . . { Steps or handrails for shafts }
- 29/124 . . { Shaft entirely made of synthetic material }
- 29/125 . . { characterised by the lining of the shaft }
- 29/127 . . { with devices for impeding fall or injuries of persons }
- 29/128 . . { Repairs of manhole shafts }
- 29/14 . . Covers for manholes or the like; Frames for covers { (gully gratings [E03F 5/06](#)) }
- 29/1409 . . . { adjustable in height or inclination }
- 29/1418 . . . { with implements to assist in lifting, e.g. counterweights, springs (lifting devices for covers [B66F 19/005](#)) }
- 29/1427 . . . { Locking devices (of bayonet type [E02D 29/14](#)) }
- 29/1436 . . . { with overflow or explosion control means, e.g. check or relief valves }
- 29/1445 . . . { Tools for positioning or removing cover frames }
- 29/1454 . . . { Non-circular covers, e.g. hexagonal, elliptic }
- 29/1463 . . . { Hinged connection of cover to frame }
- 29/1472 . . . { Cover entirely made of synthetic material }
- 29/1481 . . . { Security devices, e.g. indicating unauthorised opening ([E02D 29/1427](#) takes precedence) }
- 29/149 . . . { Annular gaskets }

29/16	<ul style="list-style-type: none"> Arrangement or construction of joints in foundation structures (for hydraulic engineering E02B 3/16); sealing joints not restricted to foundation structures E04B 1/68) 	2200/143	<ul style="list-style-type: none"> helically or spirally shaped
		2200/146	<ul style="list-style-type: none"> Springs
		2200/15	<ul style="list-style-type: none"> including at least a hinge
		2200/16	<ul style="list-style-type: none"> Shapes
		2200/1607	<ul style="list-style-type: none"> round, e.g. circle
		2200/1614	<ul style="list-style-type: none"> made from single element
		2200/1621	<ul style="list-style-type: none"> made from multiple elements
		2200/1628	<ul style="list-style-type: none"> rectangular
		2200/1635	<ul style="list-style-type: none"> made from single element
		2200/1642	<ul style="list-style-type: none"> made from multiple elements
		2200/165	<ul style="list-style-type: none"> polygonal
		2200/1657	<ul style="list-style-type: none"> made from single element
		2200/1664	<ul style="list-style-type: none"> made from multiple elements
		2200/1671	<ul style="list-style-type: none"> helical or spiral
		2200/1678	<ul style="list-style-type: none"> triangular
		2200/1685	<ul style="list-style-type: none"> cylindrical
		2200/1692	<ul style="list-style-type: none"> conical or convex
		2200/17	<ul style="list-style-type: none"> including an electric conductive element
31/00	Protective arrangements for foundations or foundation structures (protective casings for piles E02D 5/60); Ground foundation measures for protecting the soil or the subsoil water, e.g. preventing or counteracting oil pollution (spillage retaining means for tanks B65D 90/24)	2220/00	Temporary installations or constructions
31/002	<ul style="list-style-type: none"> {Ground foundation measures for protecting the soil or subsoil water, e.g. preventing or counteracting oil pollution (not used, see subgroups and E02D 31/00)} 	2250/00	Production methods
31/004	<ul style="list-style-type: none"> {Sealing liners} 	2250/0007	<ul style="list-style-type: none"> using a mold
31/006	<ul style="list-style-type: none"> {Sealing of existing landfills, e.g. using mining techniques} 	2250/0015	<ul style="list-style-type: none"> using extrusion
31/008	<ul style="list-style-type: none"> {against entry of noxious gases, e.g. Radon} 	2250/0023	<ul style="list-style-type: none"> Cast, i.e. <i>in situ</i> or in a mold or other formwork
31/02	<ul style="list-style-type: none"> against ground humidity or ground water (E02D 31/06 takes precedence; arrangements other than according to E02D 31/04; against hydraulic pressure of groundwater E02D 31/10)} 	2250/003	<ul style="list-style-type: none"> Injection of material
31/025	<ul style="list-style-type: none"> {Draining membranes, sheets or fabric specially adapted therefor, e.g. with dimples} 	2250/0038	<ul style="list-style-type: none"> using an auger, i.e. continuous flight type
31/04	<ul style="list-style-type: none"> Watertight packings for use under hydraulic pressure (sealings for hydraulic engineering in general E02B 3/16; for building structures in general E04B 1/66)} 	2250/0046	<ul style="list-style-type: none"> using prestressing techniques
31/06	<ul style="list-style-type: none"> against corrosion by soil or water 	2250/0053	<ul style="list-style-type: none"> using suction or vacuum techniques
31/08	<ul style="list-style-type: none"> against transmission of vibrations or movements in the foundation soil (E02D 27/34 takes precedence; foundations for machines, engines or ordnance E02D 27/44; for road foundations E01C 3/06)} 	2250/0061	<ul style="list-style-type: none"> for working underwater
31/10	<ul style="list-style-type: none"> against soil pressure or hydraulic pressure (anchored foundations E02D 27/50; joint sealings for use under hydraulic pressure E02D 31/04)} 	2250/0069	<ul style="list-style-type: none"> Welding
31/12	<ul style="list-style-type: none"> against upward hydraulic pressure 	2250/0076	<ul style="list-style-type: none"> Drilling
31/14	<ul style="list-style-type: none"> against frost heaves in soil 	2250/0084	<ul style="list-style-type: none"> using pneumatical means
33/00	Testing foundations or foundation structures (testing methods and apparatus, see the relevant subclasses of class G01 ; testing structures or apparatus as regards function, in general, G01M ; testing or determining chemical or physical properties, in general G01N)	2250/0092	<ul style="list-style-type: none"> using hydraulical means
35/00	Straightening, lifting, or lowering of foundation structures or of constructions erected on foundations (foundations for sinking territories with incorporated means for remedying settlement E02D 27/34 ; lifting or moving buildings E04G 23/06)	2300/00	Materials
35/005	<ul style="list-style-type: none"> {Lowering or lifting of foundation structures} 	2300/0001	<ul style="list-style-type: none"> Rubbers
37/00	Repair of damaged foundations or foundation structures (renewing piles E02D 5/64 ; roads E01C 11/005 ; bridges E01D 22/00 ; repairing buildings E04G 23/02)	2300/0003	<ul style="list-style-type: none"> Car tires
2200/00	Geometrical or physical properties	2300/0004	<ul style="list-style-type: none"> Synthetics
2200/11	<ul style="list-style-type: none"> Height being adjustable 	2300/0006	<ul style="list-style-type: none"> Plastics
2200/115	<ul style="list-style-type: none"> with separate pieces 	2300/0007	<ul style="list-style-type: none"> PVC
2200/12	<ul style="list-style-type: none"> corrugated 	2300/0009	<ul style="list-style-type: none"> PE
2200/13	<ul style="list-style-type: none"> having at least a mesh portion 	2300/001	<ul style="list-style-type: none"> PP
2200/14	<ul style="list-style-type: none"> resilient or elastic 	2300/0012	<ul style="list-style-type: none"> recycled
		2300/0014	<ul style="list-style-type: none"> PU
		2300/0015	<ul style="list-style-type: none"> HDPE
		2300/0017	<ul style="list-style-type: none"> thermoplastic
		2300/0018	<ul style="list-style-type: none"> Cement used as binder
		2300/002	<ul style="list-style-type: none"> Concrete
		2300/0021	<ul style="list-style-type: none"> Mortar
		2300/0023	<ul style="list-style-type: none"> Slurry
		2300/0025	<ul style="list-style-type: none"> Adhesives, i.e. glues
		2300/0026	<ul style="list-style-type: none"> Metals
		2300/0028	<ul style="list-style-type: none"> Copper
		2300/0029	<ul style="list-style-type: none"> Steel; Iron
		2300/0031	<ul style="list-style-type: none"> in cast iron form
		2300/0032	<ul style="list-style-type: none"> in sheet form, i.e. bent or deformed plate-material
		2300/0034	<ul style="list-style-type: none"> in wire form
		2300/0035	<ul style="list-style-type: none"> Aluminium
		2300/0037	<ul style="list-style-type: none"> Clays
		2300/0039	<ul style="list-style-type: none"> mixed with additives
		2300/004	<ul style="list-style-type: none"> Bentonite or bentonite-like

E02D

- 2300/0042 . . . being modified by adding substances
- 2300/0043 . . . with other ingredients
- 2300/0045 . Composites
- 2300/0046 . Foams
- 2300/0048 . . PU
- 2300/005 . . PE
- 2300/0051 . Including fibers
- 2300/0053 . . made from glass
- 2300/0054 . . made from plastic
- 2300/0056 . . . PVC
- 2300/0057 . . . PE
- 2300/0059 . . . PP
- 2300/006 . . . being recycled
- 2300/0062 Shredded car tires
- 2300/0064 . . made from metal
- 2300/0065 . . made from textile
- 2300/0067 . . made from cellulose
- 2300/0068 . . made from carbon
- 2300/007 . Resins including glasfibers
- 2300/0071 . Wood
- 2300/0073 . Explosives
- 2300/0075 . Textiles
- 2300/0076 . . non-woven
- 2300/0078 . . woven
- 2300/0079 . Granulates
- 2300/0081 . Ceramics
- 2300/0082 . Cellulose
- 2300/0084 . Geogrids
- 2300/0085 . Geotextiles
- 2300/0087 . . woven
- 2300/0089 . . non-woven
- 2300/009 . . with multi-layer structure
- 2300/0092 . . . including a liquid tight layer
- 2300/0093 including bentonite
- 2300/0095 including a plastic membrane
- 2300/0096 . . with external friction enhancement features
- 2300/0098 . Bitumen

2450/00 Gaskets

- 2450/10 . Membranes
- 2450/101 . . permeable
- 2450/102 . . . for liquids
- 2450/103 . . . for gases
- 2450/105 . . impermeable
- 2450/106 . . . for liquids
- 2450/107 . . . for gases
- 2450/108 . . multi-layered

2600/00 Miscellaneous

- 2600/10 . comprising sensor means
- 2600/20 . comprising details of connection between elements
- 2600/30 . comprising anchoring details
- 2600/40 . comprising stabilising elements