

CPC COOPERATIVE PATENT CLASSIFICATION

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

WARNING

The following IPC groups are not used in the CPC scheme. Subject matter covered by these groups is classified in the following CPC groups:

E02D 29/09

covered by

[E02D 29/06](#)

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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> <p>3/123 . . {and compacting the soil (E02D 3/126 takes precedence)}</p> <p>3/126 . . {and mixing by rotating blades}</p> <p>5/00 Bulkheads, piles, or other structural elements specially adapted to foundation engineering (engineering elements in general F16)</p> <p>5/02 . Sheet piles or sheet pile bulkheads {(foundations made with sheet pile bulkheads E02D 27/30; cofferdams E02D 19/04)}</p> <p>5/03 . . Prefabricated parts {, e.g. composite sheet piles}</p> <p>5/04 . . . made of steel</p> <p>5/06 Fitted piles or other elements specially adapted for closing gaps between two sheet piles or between two walls of sheet piles</p> <p>5/08 Locking forms; Edge joints; Pile crossings; Branch pieces</p> <p>5/10 . . . made of concrete or reinforced concrete {(moulds therefor E02D 5/70)}</p> <p>5/105 {of prestressed concrete (E02D 5/12 takes precedence)}</p> |
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- 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 . . Compacting the soil at the footing or in {or along} a casing by forcing cement or like material through tubes
- 5/64 . . Repairing piles
- 5/66 . . Mould-pipes or other moulds {(for plant use [B28B](#))}
- 5/665 . . {for making piles}
- 5/68 . . for making bulkheads or elements thereof
- 5/70 . . for making sheet piles {not used}
- 5/72 . . Pile shoes
- 5/74 . . Means for anchoring structural elements or bulkheads (anchoring piles [E02D 5/54](#); {anchored foundations [E02D 27/50](#))}
- 5/76 . . Anchoring for bulkheads or sections thereof {in as much as specially adapted therefor}
- 5/765 . . . {removable}
- 5/80 . . Ground anchors {(for galleries, tunnels or shafts [E21D 21/00](#))}
- 5/801 . . . {driven by screwing}
- 5/803 . . . {with pivotable anchoring members}

- 5/805 . . . {with deformable anchoring members}
- 5/806 . . . {involving use of explosives}
- 5/808 . . . {anchored by using exclusively a bonding material}

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](#))

- 7/02 . Placing by driving {(E02D 7/18 - E02D 7/24 take precedence)}
- 7/04 . . Hand {(actuated)} pile-drivers
- 7/06 . . Power-driven drivers {(tamperers [E02D 3/061](#))}
- 7/08 . . . Drop drivers with free-falling hammer {(E02D 7/10 takes precedence)}
- 7/10 . . . 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](#))}
- 7/12 . . . Drivers with explosion chambers
- 7/125 {Diesel drivers}
- 7/14 . . . Components for drivers {inasmuch as not specially for a specific driver construction}
- 7/16 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](#))}
- 7/165 {of variable length, e.g. foldable or telescopic}
- 7/18 . Placing by vibrating {(vibrators for soil compacting [E02D 3/046](#))}
- 7/20 . Placing by pressure or pulling power
- 7/22 . Placing by screwing down {(screw piles per se [E02D 5/56](#))}
- 7/24 . Placing by using fluid jets {(prefabricated concrete piles with arrangements therefor [E02D 5/32](#))}
- 7/26 . Placing by using several means simultaneously
- 7/28 . Placing of hollow pipes or mould pipes by means arranged inside the piles or pipes {(E02D 13/08 takes precedence)}
- 7/30 . . by driving cores

9/00 Removing sheet piles bulkheads, piles, mould-pipes or other moulds {or parts thereof} (for both placing and removing [E02D 11/00](#))

- 9/005 . {removing the top of placed piles of sheet piles ([E02D 9/04](#) takes precedence)}
- 9/02 . by withdrawing
- 9/04 . by cutting-off under water

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](#)})

13/00 Accessories for placing or removing piles or bulkheads, {e.g. noise attenuating chambers}

- 13/005 . {Sound absorbing accessories in piling}
- 13/02 . specially adapted for placing or removing bulkheads
- 13/04 . Guide devices; Guide frames {(as parts of the driver scaffold [E02D 7/16](#))}

- 13/06 . for observation while placing
- 13/08 . Removing obstacles
- 13/10 . Follow-blocks of pile-drivers or like devices

NOTE

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

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](#))

- 15/02 . 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](#))}
- 15/04 . . Placing concrete in mould-pipes, pile tubes, bore-holes or narrow shafts
- 15/06 . . Placing concrete under water {(for surfacing the bottom of bodies of water [E02B 3/121](#))}
- 15/08 . Sinking workpieces into water or soil {inasmuch as not provided for elsewhere}
- 15/10 . Placing gravel or light material under water {inasmuch as not provided for elsewhere}

17/00 Excavations; Bordering of excavations; Making embankments (soil-shifting apparatus [E02F](#); earth drilling [E21](#))

- 17/02 . Foundation pits
- 17/04 . . Bordering {surfacing} or stiffening the sides of foundation pits
- 17/06 . Foundation {trenches} ditches or narrow shafts
- 17/08 . . Bordering or stiffening the sides of ditches {trenches} or narrow shafts for foundations
- 17/083 . . . {Shoring struts}
- 17/086 . . . {Travelling trench shores}
- 17/10 . Covering trenches for foundations
- 17/12 . . Back-filling of foundation trenches or ditches {(apparatus therefor [E02F 5/12](#), [E02F 5/22](#))}
- 17/13 . 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](#))
- 17/18 . Making embankments, {e.g. dikes, dams} ([E02D 17/20](#) takes precedence; {foundations for dams [E02D 27/40](#)})
- 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](#))}
- 17/202 . . {with flexible securing means}
- 17/205 . . {with modular blocks, e.g. pre-fabricated}
- 17/207 . . {with means incorporating sheet piles or piles}

19/00 Keeping dry foundation sites or other areas in the ground (sheet piles or bulkheads [E02D 5/02](#))

- 19/02 . Restraining of open water
- 19/04 . . by coffer-dams {, e.g. made of sheet piles (permanent sheet piling boxes [E02D 27/30](#))}
- 19/06 . Restraining of underground water
- 19/08 . . by employing open ditches arranged below the level of the water

- 19/10 . . by lowering level of ground water [{\(installation for obtaining or collecting drinking water E03B 3/00\)}](#)
- 19/12 . . by damming or interrupting the passage of underground water
- 19/14 . . . by freezing the soil [\(in connection with sinking shafts E21D 1/12\)](#)
- 19/16 . . . by placing or applying sealing substances [\({E02D 19/18 takes precedence}; consolidating by placing solidifying or pore-filling pore-filling substances in the soil E02D 3/12; {improving soil by chemical substances C09K 17/00}\)](#)
- 19/18 . . . by making use of sealing aprons, {e.g. diaphragms made from bituminous or clay material} [\({concrete diaphragms E02D 5/18}; sealing or joints for {hydraulic} engineering work E02B 3/16\)](#)
- 19/185 {Joints between sheets constituting the sealing aprons}
- 19/20 . . . by displacing the water, e.g. by compressed air [{\(pneumatic caissons E02D 23/04\)}](#)
- 19/22 . Lining sumps in trenches [{or other foundation pits}](#)
- 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})
- 23/02 . Caissons able to be floated on water and to be lowered into water [in situ {\(floating caisson foundations E02D 27/06\)}](#)
- 23/04 . Pneumatic caissons [{\(sinking of same E02D 23/10\)}](#)
- 23/06 . . bringing persons or material into or out of compressed air caissons [{\(air locks in mines E21F 1/14\)}](#)
- 23/08 . Lowering or sinking caissons [{\(sinking mine shaft E21D 1/00\)}](#)
- 23/10 . . Caisson filled with compressed air [{\(E02D 23/06 takes precedence\)}](#)
- 23/12 . . inclined lowering
- 23/14 . . Decreasing the skin friction while lowering
- 23/16 . Jointing caissons to the foundation soil, specially to uneven foundation soil
- 25/00 Joining caissons, sinkers, or other units to each other under water**
- 27/00 Foundations as substructures**
- 27/01 . Flat foundations
- 27/013 . . {Shuttering specially adapted therefor}
- 27/016 . . {made mainly from prefabricated concrete elements}
- 27/02 . . Flat foundations without substantial excavation [\(E02D 27/04, E02D 27/08 take precedence\)](#)
- 27/04 . . in water or on quicksand
- 27/06 . . . Floating caisson foundations
- 27/08 . . Reinforcements for flat foundations [{\(E02D 27/48 takes precedence\)}](#)
- 27/10 . Deep foundations
- 27/12 . . Pile foundations
- 27/14 . . . Pile framings, [{i.e. piles assembled to form the substructure}](#)
- 27/16 . . . Foundations formed of separate piles
- 27/18 . . Foundations formed by making use of caissons
- 27/20 . . Caisson foundations combined with pile foundations
- 27/22 . . Caisson foundations made by starting from fixed or floating artificial islands by using protective bulkheads
- 27/24 . Foundations constructed by making use of diving-bells [\(equipment for dwelling or working under water B63C 11/00\)](#)
- 27/26 . Compacting soil locally before forming foundations; Construction of foundation structures by forcing binding substances into gravel fillings [\(consolidating foundation soil in general E02D 3/02 - E02D 3/12; {for piles E02D 5/02, E02D 5/46}\)](#)
- 27/28 . Stressing the soil or the foundation structure while forming foundations
- 27/30 . Foundations made with permanent use of sheet pile bulkheads, walls of planks, or sheet piling boxes
- 27/32 . Foundations for special purposes [{\(for paving of roads E01C 3/00\)}](#)
- 27/34 . . Foundations for sinking or earthquake territories [\(building constructions with protection arrangements against earthquakes E04H 9/02\)](#)
- 27/35 . . Foundations formed in frozen ground, e.g. in permafrost soil
- 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 [{\(dams per se E02B 3/10, E02B 7/04\)}](#)
- 27/42 . . Foundations for poles, masts or chimneys [{\(sockets or holders for poles or masts per se E04H 12/22\)}](#)
- 27/425 . . . {specially adapted for wind motors masts (wind motors per se F03D 1/00)}
- 27/44 . . Foundations for machines, engines or ordnance [\(special lay-out of foundations with respect to machinery to be supported F16M 9/00\)](#)
- 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 . . Arrangement or construction of joints in foundation structures ({for hydraulic engineering [E02B 3/16](#)}; sealing joints not restricted to foundation structures [E04B 1/68](#))
- 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](#))**
- 31/002 . . {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](#))}
- 31/004 . . {Sealing liners}
- 31/006 . . {Sealing of existing landfills, e.g. using mining techniques}
- 31/008 . . {against entry of noxious gases, e.g. Radon}

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)} 	2200/17	<ul style="list-style-type: none"> including an electric conductive element
31/025	<ul style="list-style-type: none"> <ul style="list-style-type: none"> {Draining membranes, sheets or fabric specially adapted therefor, e.g. with dimples} 	2220/00	Temporary installations or constructions
31/04	<ul style="list-style-type: none"> <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)} 	2250/00	Production methods
31/06	<ul style="list-style-type: none"> against corrosion by soil or water 	2250/0007	<ul style="list-style-type: none"> using a mold
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)} 	2250/0015	<ul style="list-style-type: none"> using extrusion
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)} 	2250/0023	<ul style="list-style-type: none"> Cast, i.e. <u>in situ</u> or in a mold or other formwork
31/12	<ul style="list-style-type: none"> <ul style="list-style-type: none"> against upward hydraulic pressure 	2250/003	<ul style="list-style-type: none"> Injection of material
31/14	<ul style="list-style-type: none"> <ul style="list-style-type: none"> against frost heaves in soil 	2250/0038	<ul style="list-style-type: none"> using an auger, i.e. continuous flight type
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)	2250/0046	<ul style="list-style-type: none"> using prestressing techniques
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)}	2250/0053	<ul style="list-style-type: none"> using suction or vacuum techniques
35/005	<ul style="list-style-type: none"> {Lowering or lifting of foundation structures} 	2250/0061	<ul style="list-style-type: none"> for working underwater
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)}	2250/0069	<ul style="list-style-type: none"> <ul style="list-style-type: none"> Welding
		2250/0076	<ul style="list-style-type: none"> <ul style="list-style-type: none"> Drilling
		2250/0084	<ul style="list-style-type: none"> <ul style="list-style-type: none"> using pneumatical means
		2250/0092	<ul style="list-style-type: none"> <ul style="list-style-type: none"> using hydraulical means
		2300/00	Materials
		2300/0001	<ul style="list-style-type: none"> Rubbers
		2300/0003	<ul style="list-style-type: none"> <ul style="list-style-type: none"> Car tires
		2300/0004	<ul style="list-style-type: none"> Synthetics
		2300/0006	<ul style="list-style-type: none"> <ul style="list-style-type: none"> Plastics
		2300/0007	<ul style="list-style-type: none"> <ul style="list-style-type: none"> PVC
		2300/0009	<ul style="list-style-type: none"> <ul style="list-style-type: none"> PE
		2300/001	<ul style="list-style-type: none"> <ul style="list-style-type: none"> PP
		2300/0012	<ul style="list-style-type: none"> <ul style="list-style-type: none"> recycled
		2300/0014	<ul style="list-style-type: none"> <ul style="list-style-type: none"> PU
		2300/0015	<ul style="list-style-type: none"> <ul style="list-style-type: none"> HDPE
		2300/0017	<ul style="list-style-type: none"> <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"> <ul style="list-style-type: none"> Concrete
		2300/0021	<ul style="list-style-type: none"> <ul style="list-style-type: none"> Mortar
		2300/0023	<ul style="list-style-type: none"> <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"> <ul style="list-style-type: none"> in cast iron form
		2300/0032	<ul style="list-style-type: none"> <ul style="list-style-type: none"> in sheet form, i.e. bent or deformed plate-material
		2300/0034	<ul style="list-style-type: none"> <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"> <ul style="list-style-type: none"> mixed with additives
		2300/004	<ul style="list-style-type: none"> Bentonite or bentonite-like
		2300/0042	<ul style="list-style-type: none"> <ul style="list-style-type: none"> being modified by adding substances
		2300/0043	<ul style="list-style-type: none"> <ul style="list-style-type: none"> with other ingredients
		2300/0045	<ul style="list-style-type: none"> Composites
		2300/0046	<ul style="list-style-type: none"> Foams
		2300/0048	<ul style="list-style-type: none"> PU
		2300/005	<ul style="list-style-type: none"> PE
		2300/0051	<ul style="list-style-type: none"> Including fibers
		2300/0053	<ul style="list-style-type: none"> <ul style="list-style-type: none"> made from glass
		2300/0054	<ul style="list-style-type: none"> <ul style="list-style-type: none"> made from plastic
		2300/0056	<ul style="list-style-type: none"> <ul style="list-style-type: none"> PVC
		2300/0057	<ul style="list-style-type: none"> <ul style="list-style-type: none"> PE
		2300/0059	<ul style="list-style-type: none"> <ul style="list-style-type: none"> PP
		2300/006	<ul style="list-style-type: none"> <ul style="list-style-type: none"> being recycled
		2300/0062	<ul style="list-style-type: none"> <ul style="list-style-type: none"> Shredded car tires
		2300/0064	<ul style="list-style-type: none"> <ul style="list-style-type: none"> made from metal
		2300/0065	<ul style="list-style-type: none"> <ul style="list-style-type: none"> made from textile
		2300/0067	<ul style="list-style-type: none"> <ul style="list-style-type: none"> made from cellulose
2200/00	Geometrical or physical properties		
2200/11	<ul style="list-style-type: none"> Height being adjustable 		
2200/115	<ul style="list-style-type: none"> <ul style="list-style-type: none"> with separate pieces 		
2200/12	<ul style="list-style-type: none"> corrugated 		
2200/13	<ul style="list-style-type: none"> having at least a mesh portion 		
2200/14	<ul style="list-style-type: none"> resilient or elastic 		
2200/143	<ul style="list-style-type: none"> <ul style="list-style-type: none"> helically or spirally shaped 		
2200/146	<ul style="list-style-type: none"> <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"> <ul style="list-style-type: none"> round, e.g. circle 		
2200/1614	<ul style="list-style-type: none"> <ul style="list-style-type: none"> <ul style="list-style-type: none"> made from single element 		
2200/1621	<ul style="list-style-type: none"> <ul style="list-style-type: none"> <ul style="list-style-type: none"> made from multiple elements 		
2200/1628	<ul style="list-style-type: none"> <ul style="list-style-type: none"> rectangular 		
2200/1635	<ul style="list-style-type: none"> <ul style="list-style-type: none"> <ul style="list-style-type: none"> made from single element 		
2200/1642	<ul style="list-style-type: none"> <ul style="list-style-type: none"> <ul style="list-style-type: none"> made from multiple elements 		
2200/165	<ul style="list-style-type: none"> <ul style="list-style-type: none"> polygonal 		
2200/1657	<ul style="list-style-type: none"> <ul style="list-style-type: none"> <ul style="list-style-type: none"> made from single element 		
2200/1664	<ul style="list-style-type: none"> <ul style="list-style-type: none"> <ul style="list-style-type: none"> made from multiple elements 		
2200/1671	<ul style="list-style-type: none"> <ul style="list-style-type: none"> helical or spiral 		
2200/1678	<ul style="list-style-type: none"> <ul style="list-style-type: none"> triangular 		
2200/1685	<ul style="list-style-type: none"> <ul style="list-style-type: none"> cylindrical 		
2200/1692	<ul style="list-style-type: none"> <ul style="list-style-type: none"> conical or convex 		

E02D

- 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