

## ECLA EUROPEAN CLASSIFICATION

**F03B** **MACHINES OR ENGINES FOR LIQUIDS** (positive-displacement engines for liquid F03C; machines for liquids and gases F01; positive-displacement machines for liquids F04 , rotary fluid gearing of the hydrokinetic type [F16H41/00](#))

### Notes

1. Attention is drawn to the notes preceding Class F01, especially as regards the definition of "reaction type".
2. This subclass comprises:
  - engines, other than of positive-displacement type, driven by liquids;
  - machines, other than of positive-displacement type, for liquids.

**Guide heading:** **Non-positive-displacement machines or engines characterised by specified type, e.g. water turbines (adaptations of machines or engines for special use F03B13/00; controlling F03B15/00)**

**F03B1/00** **Engines of impulse type, i.e. turbines with jets of high-velocity liquid impinging on blades or like rotors, e.g. Pelton wheels; Parts or details peculiar thereto**

F03B1/02 . Buckets; Bucket-carrying rotors

F03B1/04 . Nozzles (in general [B05B](#)); Nozzle-carrying members

**F03B3/00** **Machines or engines of reaction type; Parts or details peculiar thereto**

F03B3/02 . with radial flow at high-pressure side and axial flow at low-pressure side of rotors, e.g. Francis turbines [N: (rotors per se [F03B3/12C](#))]

F03B3/04 . with substantially axial flow throughout rotors, e.g. propeller turbines [N: (rotors per se [F03B3/14D](#))]

F03B3/06 . . with adjustable blades, e.g. Kaplan turbines [N: (rotors per se [F03B3/14](#))]

F03B3/08 . with pressure-velocity transformation exclusively in rotors

F03B3/10 . characterised by having means for functioning alternatively as pumps or turbines [N: starting [F03B15/00B](#)]

F03B3/10B . . [N: the same wheel acting as turbine wheel and as pump wheel]

F03B3/10C . . [N: the turbine wheel and the pumps wheel being mounted in adjacent positions on the same shaft in a single casing]

F03B3/12 . Blades; Blade-carrying rotors

F03B3/12B . . [N: Blades, their form or construction]

- F03B3/12B2 . . . [N: specially designed as adjustable blades, e.g. for Kaplan-type turbines]
- F03B3/12C . . [N: Rotors for radial flow at high-pressure side and axial flow at low-pressure side, e.g. for Francis-type turbines]
- F03B3/12D . . [N: Rotors for essentially axial flow, e.g. for propeller turbines (with adjustable blades [F03B3/14](#))]
- F03B3/12F . . [N: Mounting, demounting]
- F03B3/14 . . Rotors having adjustable blades [N: blade form or construction [F03B3/12B2](#)]
- F03B3/14B . . . [N: Mechanisms for adjusting the blades (if the regulation aspect is preponderant, see [F03B15/00](#) and subgroups)]
  
- F03B3/16 . Stators
- F03B3/18 . . Stator blades; Guide conduits or vanes, e.g. adjustable [N: Conduits in dams or the like [F03B13/08](#); arrangement of valves [F03B11/00C](#)]
- F03B3/18B . . . [N: Adjustable vanes, e.g. wicket gates]
- F03B3/18D . . . [N: Spiral or volute casings]
  
- F03B5/00** **Machines or engines characterised by non-bladed rotors, e.g. serrated, using friction**
  
- F03B7/00** **Water wheels** [N: of swinging flap type [F03B17/06](#)]
  
- F03B7/00B . [N: with buckets receiving the liquid]
- F03B7/00D . [N: of the endless-chain type] [N1202]
  
- F03B9/00** **Endless-chain machines or engines** [C1202]
  
- F03B9/00B . [N: with buckets receiving the liquid]
  
- F03B11/00** **Parts or details not provided for in, or of interest apart from, the preceding groups (controlling [F03B15/00](#)), [N: e.g. wear-protection couplings, between turbine and generator]**
  
- F03B11/00B . [N: Injecting air or other fluid ([F03D11/00D](#), [F03B11/04](#), [F03B15/00](#) take precedence)] [C1202]
- F03B11/00C . [N: Valve arrangements ([F03B3/10](#) takes precedence; adjustable wicket gates [F03B3/18B](#); valves in general [F16K](#))]
- F03B11/00D . [N: Sealing arrangements ([F03B3/14](#), [F03B3/18B](#), [F03B13/08B](#) takes precedence; sealings in general [F16J](#))]
- F03B11/00F . [N: Measuring or testing arrangements (in general [G01](#))]
- F03B11/02 . Casings [N: Spiral or volute casings [F03B3/18D](#)]
- F03B11/02B . . [N: Covers]
- F03B11/04 . for diminishing cavitation or vibration, e.g. balancing

- F03B11/06 . Bearing arrangements
- F03B11/06B . . [N: Arrangements for balancing axial thrust]
- F03B11/06B2 . . . [N: in vertical axis machines] [N9711]
  
- F03B11/08 . for removing foreign matter, e.g. mud
  
- F03B13/00** **Adaptations of machines or engines for special use; Combinations of machines or engines with driving or driven apparatus (if the apparatus aspects are predominant, see the relevant subclasses for such apparatus, e.g. H02K7/18); Power stations or aggregates (incorporating only machines or engines of positive-displacement type F03C; hydraulic engineering aspects E02B; [N: combinations with wind energy converters F03D9/00F])**
  
- F03B13/02 . Adaptations for drilling wells
  
- F03B13/04 . Adaptations for use in dentistry [N: for driving tools or the like having relatively small outer diameter, e.g. pipe cleaning tools]
  
- F03B13/06 . Stations or aggregates of water-storage type, [N: e.g. comprising a turbine and a pump] (turbines characterised by having means for functioning alternatively as pumps [F03B3/10](#))
  
- F03B13/08 . Machine or engine aggregates in dams or the like; Conduits therefor, [N: e.g. diffusors (bulb groups [F03B13/10B](#))]
- F03B13/08B . . [N: The generator rotor being mounted as turbine rotor rim]
- F03B13/08C . . [N: Plants characterised by the use of siphons; their regulation (siphon weirs [E02B7/18](#); siphons in general [F04F10/00](#))]
  
- F03B13/10 . Submerged units incorporating electric generators or motors
- F03B13/10B . . [N: Bulb groups]
  
- F03B13/12 . characterised by using wave or tide energy
- F03B13/14 . . using wave energy
- F03B13/14B . . . [N: with a static energy collector]
- F03B13/14B2 . . . . [N: which creates an oscillating water column]
- F03B13/14B4 . . . . [N: which lifts water above sea level]
- F03B13/14B4B . . . . . [N: for immediate use in an energy converter]
- F03B13/14B4D . . . . . [N: for later use]
- F03B13/14C . . . [N: using the static pressure increase due to the wave]
- F03B13/16 . . . using the relative movement between a wave-operated member, [N: i.e. a "wom"] and another member, [N: i.e. a reaction member or "rem"]
- F03B13/18 . . . . where the other member, [N: i.e. rem] is fixed, at least at one point, with respect to the sea bed or shore
- F03B13/18B . . . . . [N: and the wom is hinged to the rem]
- F03B13/18B2 . . . . . [N: for limited rotation]
- F03B13/18B2B . . . . . {7 dots} [N: with an up-and-down movement]
- F03B13/18B2D . . . . . {7 dots} [N: with a to-and-fro movement]
- F03B13/18B4 . . . . . [N: for 360° rotation]

- F03B13/18B4B . . . . . {7 dots} [N: of a turbine-like wom]
- F03B13/18B4D . . . . . {7 dots} [N: of an endless-belt type wom]
- F03B13/18B4F . . . . . {7 dots} [N: of a water-wheel type wom]
- F03B13/18D . . . . . [N: and the wom slides relative to the rem]
- F03B13/18D4 . . . . . [N: not vertically]
- F03B13/18D6 . . . . . [N: where the connection between wom and conversion system takes tension and compression ([F03B13/18D10](#), [F03B13/18D12](#) take precedence)]
- F03B13/18D6B . . . . . {7 dots} [N: the connection being of the rack-and-pinion type]
- F03B13/18D8 . . . . . [N: where the connection between wom and conversion system takes tension only ([F03B13/18D10](#), [F03B13/18D12](#) take precedence)]
- F03B13/18D10 . . . . . [N: and the wom directly actuates the piston of a pump]
- F03B13/18D12 . . . . . [N: and the wom is the piston or the cylinder in a pump]
- F03B13/18F . . . . . [N: and the wom is flexible or deformable]
- F03B13/18H . . . . . [N: and the wom is tied to the rem]
- F03B13/18H2 . . . . . [N: acting directly on the piston of a pump]
- F03B13/18H4 . . . . . [N: where the tie is a tension/compression member]
- F03B13/20 . . . . . wherein both members [N: i.e. wom and rem] are movable relative to the sea bed or shore
- F03B13/22 . . . . . using the flow of water resulting from wave movements to drive a motor or turbine [N: ([F03B13/14B4](#) takes precedence)]
- F03B13/24 . . . . . to produce a flow of air, e.g. to drive an air turbine [N: ([F03B13/14B2](#) takes precedence)]
- F03B13/26 . . . . . using tide energy
- F03B13/26B . . . . . [N: using the relative movement between a tide-operated member and another member]
- F03B13/26C . . . . . [N: using the horizontal flow of water resulting from tide movement]
- F03B13/26D . . . . . [N: to compress air]
- F03B13/26F . . . . . [N: making use of a dam]
  
- F03B15/00** **Controlling (controlling in general G05)** [N: regulation of plants characterised by the use of siphons [F03B13/08C](#)]
  
- F03B15/00B . . . . . [N: Starting, also of pump-turbines]
  
- F03B15/02 . . . . . by varying liquid flow
- F03B15/04 . . . . . of turbines (rotors having adjustable blades [F03B3/06](#), [F03B3/14](#); adjustable guide vanes [F03B3/18](#); specially adapted for turbines with jets of high-velocity liquid impinging on bladed or like rotors [F03B15/20](#))
- F03B15/06 . . . . . Regulating, i.e. acting automatically
- F03B15/08 . . . . . by speed, e.g. by measuring electric frequency or liquid flow
- F03B15/10 . . . . . without retroactive action
- F03B15/12 . . . . . with retroactive action
- F03B15/14 . . . . . by or of water level
- F03B15/16 . . . . . by power output
- F03B15/18 . . . . . for safety purposes, e.g. preventing over-speed

- F03B15/20 . . specially adapted for turbines with jets of high-velocity liquid impinging on bladed or like rotors (nozzles [F03B1/04](#))
- F03B15/22 . . . for safety purposes
- F03B17/00 Other machines or engines**
- F03B17/00B . [N: Installations wherein the liquid circulates in a closed loop ([F03B13/06](#) takes precedence); Alleged perpetua mobilia of this or similar kind (perpetua mobilia using hydrostatic thrust or buoyancy [F03B17/04](#))] [C1202]
- F03B17/02 . using hydrostatic thrust
- F03B17/02B . . [N: and reciprocating motion] [N9710]
- F03B17/04 . . Alleged perpetua mobilia [N: (with closed loop circulation or similar [F03B17/00B](#))]
- F03B17/06 . using liquid flow [N: with predominantly kinetic energy conversion], e.g. of swinging-flap type, [N: "run-of-river", "ultra-low head" ([F03B13/26C](#) takes precedence)] [C9802]
- F03B17/06B . . [N: with rotation axis substantially in flow direction]
- F03B17/06C . . [N: with rotation axis substantially at right angle to flow direction]
- F03B17/06C2 . . . [N: the flow engaging parts having no movement relative to the rotor during its rotation]
- F03B17/06C2B . . . . [N: and a rotor of the endless-chain type] [N9802]
- F03B17/06C3 . . . [N: the flow engaging parts having a cyclic movement relative to the rotor during its rotation]
- F03B17/06C3A . . . . [N: and a rotor of the endless-chain type] [N9802]
- F03B17/06C3B . . . . [N: the cyclic relative movement being positively coupled to the movement of rotation] [C9802]
- F03B17/06C3B2 . . . . . [N: and a rotor of the endless-chain type] [N9802]