

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	<ul style="list-style-type: none"> <ul style="list-style-type: none"> [N: specially designed as adjustable blades, e.g. for Kaplan-type turbines]
F03B3/12C	<ul style="list-style-type: none"> <ul style="list-style-type: none"> [N: Rotors for radial flow at high-pressure side and axial flow at low-pressure side, e.g. for Francis-type turbines]
F03B3/12D	<ul style="list-style-type: none"> <ul style="list-style-type: none"> [N: Rotors for essentially axial flow, e.g. for propeller turbines (with adjustable blades F03B3/14)]
F03B3/12F	<ul style="list-style-type: none"> <ul style="list-style-type: none"> [N: Mounting, demounting]
F03B3/14	<ul style="list-style-type: none"> <ul style="list-style-type: none"> Rotors having adjustable blades [N: blade form or construction F03B3/12B2]
F03B3/14B	<ul style="list-style-type: none"> <ul style="list-style-type: none"> [N: Mechanisms for adjusting the blades (if the regulation aspect is preponderant, see F03B15/00 and subgroups)]
F03B3/16	<ul style="list-style-type: none"> Stators
F03B3/18	<ul style="list-style-type: none"> <ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> <ul style="list-style-type: none"> [N: Adjustable vanes, e.g. wicket gates]
F03B3/18D	<ul style="list-style-type: none"> <ul style="list-style-type: none"> [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	<ul style="list-style-type: none"> [N: with buckets receiving the liquid]
F03B7/00D	<ul style="list-style-type: none"> [N: of the endless-chain type] [N1202]
F03B9/00	Endless-chain machines or engines [C1202]
F03B9/00B	<ul style="list-style-type: none"> [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	<ul style="list-style-type: none"> [N: Injecting air or other fluid (F03D11/00D, F03B11/04, F03B15/00 take precedence)] [C1202]
F03B11/00C	<ul style="list-style-type: none"> [N: Valve arrangements (F03B3/10 takes precedence; adjustable wicket gates F03B3/18B; valves in general F16K)]
F03B11/00D	<ul style="list-style-type: none"> [N: Sealing arrangements (F03B3/14, F03B3/18B, F03B13/08B takes precedence; sealings in general F16J)]
F03B11/00F	<ul style="list-style-type: none"> [N: Measuring or testing arrangements (in general G01)]
F03B11/02	<ul style="list-style-type: none"> Casings [N: Spiral or volute casings F03B3/18D]
F03B11/02B	<ul style="list-style-type: none"> <ul style="list-style-type: none"> [N: Covers]
F03B11/04	<ul style="list-style-type: none"> 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]