Symbol	Typ	Titel
F	**Sektion**	**SECTION F — MECHANICAL ENGINEERING; LIGHTING; HEATING; WEAPONS; BLASTING**
F04	**Klasse**	**POSITIVE-DISPLACEMENT MACHINES FOR LIQUIDS; PUMPS FOR LIQUIDS OR ELASTIC FLUIDS (portable fire extinguishers with manually-operated pumps A62C 11/00, with power-driven pumps A62C 25/00; charging or scavenging combustion engines by pumps F02B; engine fuel-injection pumps F02M; ion pumps H01J 41/12; electrodynamic pumps H02K 44/02)**
F04B	**Unterklasse**	**POSITIVE-DISPLACEMENT MACHINES FOR LIQUIDS; PUMPS (machines for liquids, or pumps, of rotary-piston or oscillating-piston type F04C; non-positive-displacement pumps F04D; pumping of fluid by direct contact of another fluid or by using inertia of fluid to be pumped F04F; crankshafts, crossheads, connecting-rods F16C; flywheels F16F; gearings for interconverting rotary motion and reciprocating motion in general F16H; pistons, piston-rods, cylinders, in general F16J)**
		Pumps for liquids or for liquid and elastic fluids; Positive-displacement machines for liquids (having flexible working members F04B 43/00; pumps for raising fluids from great depths F04B 47/00)
F04B 1/00	**Hauptgruppe**	**Multi-cylinder machines or pumps characterised by number or arrangement of cylinders (F04B 3/00 takes precedence; fluid-driven pumps F04B 9/08; control of reciprocating machines or pumps in general F04B 49/00)**
F04B 1/02	1-Punkt Untergruppe	. having two cylinders (in V-arrangement F04B 1/04)
F04B 1/04	1-Punkt Untergruppe	. having cylinders in star- or fan-arrangement [6]
F04B 1/047	2-Punkt Untergruppe	. . with an actuating or actuated element at the outer ends of the cylinders [6]
F04B 1/053	2-Punkt Untergruppe	. . with an actuating or actuated element at the inner ends of the cylinders [6]
F04B 1/06	2-Punkt Untergruppe	. . Control
F04B 1/07	3-Punkt Untergruppe	. . . by varying the relative eccentricity between two members, e.g. a cam and a drive shaft [6]
F04B 1/08	3-Punkt Untergruppe	. . . regulated by delivery pressure
F04B 1/10	2-Punkt Untergruppe	. . the cylinders being movable, e.g. rotary [6]
F04B 1/107	3-Punkt Untergruppe	. . . with an actuating or actuated element at the outer ends of the cylinders [6]
F04B 1/113	3-Punkt Untergruppe	. . . with an actuating or actuated element at the inner ends of the cylinders [6]
F04B 1/12	1-Punkt Untergruppe	. having cylinder axes coaxial with, or parallel or inclined to, main shaft axis
F04B 1/14	2-Punkt Untergruppe	. . having stationary cylinders
F04B 1/16	3-Punkt Untergruppe	. . . having two or more sets of cylinders or pistons
F04B 1/18	3-Punkt Untergruppe	. . . having self-acting distribution members, i.e. actuated by working fluid
F04B 1/20	2-Punkt Untergruppe	. . having rotary cylinder block
F04B 1/22	3-Punkt Untergruppe	. . . having two or more sets of cylinders or pistons
F04B 1/24	4-Punkt Untergruppe	. . . . inclined to main shaft axis
F04B 1/26	2-Punkt Untergruppe	. . Control
F04B 1/28	3-Punkt Untergruppe	. . . for machines or pumps with stationary cylinders

Symbol	Typ	Titel
F04B 1/29	4-Punkt Untergruppe	. . . . by varying the relative positions of a swash plate and a cylinder block [6]
F04B 1/30	3-Punkt Untergruppe	. . . for machines or pumps with rotary cylinder block
F04B 1/32	4-Punkt Untergruppe	. . . . by varying the relative positions of a swash plate and a cylinder block [6]
F04B 1/34	1-Punkt Untergruppe	. Control not provided for in a single group of groups F04B 1/02-F04B 1/32 [6]
F04B 3/00	**Hauptgruppe**	**Machines or pumps with pistons coacting within one cylinder, e.g. multi-stage**
F04B 5/00	**Hauptgruppe**	**Machines or pumps with differential-surface pistons**
F04B 5/02	1-Punkt Untergruppe	. with double-acting pistons [6]
F04B 7/00	**Hauptgruppe**	**Piston machines or pumps characterised by having positively-driven valving (with cylinders in star- or fan-arrangement F04B 1/04; with cylinder axes coaxial with, or parallel or inclined to, main shaft axis F04B 1/12)**
F04B 7/02	1-Punkt Untergruppe	. the valving being fluid-actuated
F04B 7/04	1-Punkt Untergruppe	. in which the valving is performed by pistons and cylinders coacting to open and close intake or outlet ports [3]
F04B 7/06	2-Punkt Untergruppe	. . the pistons and cylinders being relatively reciprocated and rotated [3]
F04B 9/00	**Hauptgruppe**	**Piston machines or pumps characterised by the driving or driven means to or from their working members**
F04B 9/02	1-Punkt Untergruppe	. the means being mechanical
F04B 9/04	2-Punkt Untergruppe	. . the means being cams, eccentrics, or pin-and-slot mechanisms (with cylinder axes coaxial with, or parallel or inclined to, main shaft axis F04B 1/12)
F04B 9/06	2-Punkt Untergruppe	. . the means including spring- or weight-loaded lost-motion devices
F04B 9/08	1-Punkt Untergruppe	. the means being fluid
F04B 9/10	2-Punkt Untergruppe	. . the fluid being liquid
F04B 9/103	3-Punkt Untergruppe	. . . having only one pumping chamber [6]
F04B 9/105	4-Punkt Untergruppe	. . . . reciprocating movement of the pumping member being obtained by a double-acting liquid motor [6]
F04B 9/107	4-Punkt Untergruppe	. . . . rectilinear movement of the pumping member in the working direction being obtained by a single-acting liquid motor, e.g. actuated in the other direction by gravity or a spring [6]
F04B 9/109	3-Punkt Untergruppe	. . . having plural pumping chambers [6]
F04B 9/111	4-Punkt Untergruppe	. . . . with two mechanically connected pumping members [6]
F04B 9/113	5-Punkt Untergruppe	. . . . . reciprocating movement of the pumping members being obtained by a double-acting liquid motor [6]
F04B 9/115	5-Punkt Untergruppe	. . . . . reciprocating movement of the pumping members being obtained by two single-acting liquid motors, each acting in one direction [6]
F04B 9/117	4-Punkt Untergruppe	. . . . the pumping members not being mechanically connected to each other [6]
F04B 9/12	2-Punkt Untergruppe	. . the fluid being elastic, e.g. steam or air
F04B 9/123	3-Punkt Untergruppe	. . . having only one pumping chamber [6]
F04B 9/125	4-Punkt Untergruppe	. . . . reciprocating movement of the pumping member being obtained by a double-acting elastic-fluid motor [6]
F04B 9/127	4-Punkt Untergruppe	. . . . rectilinear movement of the pumping member in the working direction being obtained by a single-acting elastic-fluid motor, e.g. actuated in the other direction by gravity or a spring [6]

Symbol	Typ	Titel
F04B 9/129	3-Punkt Untergruppe	. . . having plural pumping chambers [6]
F04B 9/131	4-Punkt Untergruppe	. . . . with two mechanically connected pumping members [6]
F04B 9/133	5-Punkt Untergruppe	. . . . . reciprocating movement of the pumping members being obtained by a double-acting elastic-fluid motor [6]
F04B 9/135	5-Punkt Untergruppe	. . . . . reciprocating movement of the pumping members being obtained by two single-acting elastic-fluid motors, each acting in one direction [6]
F04B 9/137	4-Punkt Untergruppe	. . . . the pumping members not being mechanically connected to each other [6]
F04B 9/14	1-Punkt Untergruppe	. Pumps characterised by muscle-power operation
F04B 11/00	**Hauptgruppe**	**Equalisation of pulses, e.g. by use of air vessels; Counteracting cavitation**
F04B 13/00	**Hauptgruppe**	**Pumps specially modified to deliver fixed or variable measured quantities (for transferring liquid from bulk storage containers or reservoirs into vehicles or into portable containers B67D 5/40)**
F04B 13/02	1-Punkt Untergruppe	. of two or more fluids at the same time
F04B 15/00	**Hauptgruppe**	**Pumps adapted to handle specific fluids, e.g. by selection of specific materials for pumps or pump parts**
F04B 15/02	1-Punkt Untergruppe	. the fluids being viscous or non-homogeneous
F04B 15/04	1-Punkt Untergruppe	. the fluids being hot or corrosive (F04B 15/06 takes precedence)
F04B 15/06	1-Punkt Untergruppe	. for liquids near their boiling point, e.g. under subnormal pressure
F04B 15/08	2-Punkt Untergruppe	. . the liquids having low boiling points
F04B 17/00	**Hauptgruppe**	**Pumps characterised by combination with, or adaptation to, specific driving engines or motors**
F04B 17/02	1-Punkt Untergruppe	. driven by wind motors
F04B 17/03	1-Punkt Untergruppe	. driven by electric motors [6]
F04B 17/04	2-Punkt Untergruppe	. . using solenoids [6]
F04B 17/05	1-Punkt Untergruppe	. driven by internal-combustion engines [6]
F04B 17/06	1-Punkt Untergruppe	. Mobile combinations
F04B 19/00	**Hauptgruppe**	**Machines or pumps having pertinent characteristics not provided for in, or of interest apart from, groups F04B 1/00-F04B 17/00**
F04B 19/02	1-Punkt Untergruppe	. having movable cylinders
F04B 19/04	1-Punkt Untergruppe	. Pumps for special use (for transferring liquids from bulk storage containers or reservoirs into vehicles or into portable containers B67D 5/40)
F04B 19/06	2-Punkt Untergruppe	. . Pumps for delivery of both liquid and elastic fluids at the same time (wet gas pumps F04B 37/20) [6]
F04B 19/08	1-Punkt Untergruppe	. Scoop devices
F04B 19/10	2-Punkt Untergruppe	. . of wheel type
F04B 19/12	2-Punkt Untergruppe	. . of helical or screw type
F04B 19/14	2-Punkt Untergruppe	. . of endless-chain type, e.g. with the chains carrying pistons co-operating with open-ended cylinders
F04B 19/16	1-Punkt Untergruppe	. Adhesion-type liquid-lifting devices
F04B 19/18	2-Punkt Untergruppe	. . Adhesion members therefor
F04B 19/20	1-Punkt Untergruppe	. Other positive-displacement pumps

Symbol	Typ	Titel
F04B 19/22	2-Punkt Untergruppe	. . of reciprocating-piston type
F04B 19/24	2-Punkt Untergruppe	. . Pumping by heat expansion of pumped fluid
F04B 23/00	**Hauptgruppe**	**Pumping installations or systems (F04B 17/00 takes precedence)**
F04B 23/02	1-Punkt Untergruppe	. having reservoirs
F04B 23/04	1-Punkt Untergruppe	. Combinations of two or more pumps
F04B 23/06	2-Punkt Untergruppe	. . the pumps being all of reciprocating positive-displacement type
F04B 23/08	2-Punkt Untergruppe	. . the pumps being of different types
F04B 23/10	3-Punkt Untergruppe	. . . at least one pump being of the reciprocating positive-displacement type
F04B 23/12	3-Punkt Untergruppe	. . . at least one pump being of the rotary-piston positive-displacement type (F04B 23/10 takes precedence)
F04B 23/14	3-Punkt Untergruppe	. . . at least one pump being of the non-positive-displacement type (F04B 23/10, F04B 23/12 take precedence)
		Pumps specially adapted for elastic fluids (having a flexible working member F04B 45/00; for raising fluid from great depths F04B 47/00)
F04B 25/00	**Hauptgruppe**	**Multi-stage pumps**
F04B 25/02	1-Punkt Untergruppe	. of stepped-piston type
F04B 25/04	1-Punkt Untergruppe	. having cylinders coaxial with, or parallel or inclined to, main shaft axis
F04B 27/00	**Hauptgruppe**	**Multi-cylinder pumps characterised by number or arrangement of cylinders (F04B 25/00 takes precedence; control of reciprocating machines or pumps in general F04B 49/00)**
F04B 27/02	1-Punkt Untergruppe	. having cylinders arranged oppositely relative to main shaft
F04B 27/04	1-Punkt Untergruppe	. having cylinders in star- or fan-arrangement [6]
F04B 27/047	2-Punkt Untergruppe	. . with an actuating element at the outer ends of the cylinders [6]
F04B 27/053	2-Punkt Untergruppe	. . with an actuating element at the inner ends of the cylinders [6]
F04B 27/06	2-Punkt Untergruppe	. . the cylinders being movable, e.g. rotary
F04B 27/067	2-Punkt Untergruppe	. . Control [6]
F04B 27/073	3-Punkt Untergruppe	. . . by varying the relative eccentricity between two members, e.g. a cam and a drive shaft [6]
F04B 27/08	1-Punkt Untergruppe	. having cylinders coaxial with, or parallel or inclined to, main shaft axis
F04B 27/10	2-Punkt Untergruppe	. . having stationary cylinders [6]
F04B 27/12	3-Punkt Untergruppe	. . . having plural sets of cylinders or pistons [6]
F04B 27/14	2-Punkt Untergruppe	. . Control [6]
F04B 27/16	3-Punkt Untergruppe	. . . of pumps with stationary cylinders [6]
F04B 27/18	4-Punkt Untergruppe	. . . . by varying the relative positions of a swash plate and a cylinder block [6]
F04B 27/20	3-Punkt Untergruppe	. . . of pumps with rotary cylinder block [6]
F04B 27/22	4-Punkt Untergruppe	. . . . by varying the relative positions of a swash plate and a cylinder block [6]
F04B 27/24	1-Punkt Untergruppe	. Control not provided for in a single group of groups F04B 27/02-F04B 27/22 [6]
F04B 31/00	**Hauptgruppe**	**Free-piston pumps; Systems incorporating such pumps (muscle-driven pumps in which the stroke is not defined by gearing F04B 33/00; free-piston combustion engines, free-piston gas generators F02B 71/00; systems predominated by prime mover aspects,**

Symbol	Typ	Titel
		see the relevant class for the prime mover)
F04B 33/00	**Hauptgruppe**	**Pumps actuated by muscle power, e.g. for inflating**
F04B 33/02	1-Punkt Untergruppe	. with intermediate gearing
F04B 35/00	**Hauptgruppe**	**Piston pumps characterised by the driving means to their working members, or by combination with, or adaptation to, specific driving engines or motors, not otherwise provided for (predominant aspects of the engines or motors, see the relevant classes)**
F04B 35/01	1-Punkt Untergruppe	. the means being mechanical [6]
F04B 35/02	1-Punkt Untergruppe	. the means being fluid
F04B 35/04	1-Punkt Untergruppe	. the means being electric
F04B 35/06	1-Punkt Untergruppe	. Mobile combinations
F04B 37/00	**Hauptgruppe**	**Pumps having pertinent characteristics not provided for in, or of interest apart from, groups F04B 25/00-F04B 35/00**
F04B 37/02	1-Punkt Untergruppe	. for evacuating by absorption or adsorption (absorption or adsorption in general B01J)
F04B 37/04	2-Punkt Untergruppe	. . Selection of specific absorption or adsorption materials
F04B 37/06	1-Punkt Untergruppe	. for evacuating by thermal means
F04B 37/08	2-Punkt Untergruppe	. . by condensing or freezing, e.g. cryogenic pumps (cold traps B01D 8/00)
F04B 37/10	1-Punkt Untergruppe	. for special use (F04B 37/02, F04B 37/06 take precedence)
F04B 37/12	2-Punkt Untergruppe	. . to obtain high pressure
F04B 37/14	2-Punkt Untergruppe	. . to obtain high vacuum
F04B 37/16	3-Punkt Untergruppe	. . . Means for nullifying unswept space
F04B 37/18	2-Punkt Untergruppe	. . for specific elastic fluids
F04B 37/20	3-Punkt Untergruppe	. . . for wet gases, e.g. wet air
F04B 39/00	**Hauptgruppe**	**Component parts, details, or accessories, of pumps or pumping systems, not otherwise provided for in, or of interest apart from, groups F04B 25/00-F04B 37/00 (for controlling F04B 49/00)**
F04B 39/02	1-Punkt Untergruppe	. Lubrication (of machines or engines in general F01M)
F04B 39/04	1-Punkt Untergruppe	. Measures to avoid lubricant contaminating the pumped fluid
F04B 39/06	1-Punkt Untergruppe	. Cooling (of machines or engines in general F01P); Heating; Prevention of freezing
F04B 39/08	1-Punkt Untergruppe	. Actuation of distribution members
F04B 39/10	1-Punkt Untergruppe	. Adaptation or arrangement of distribution members
F04B 39/12	1-Punkt Untergruppe	. Casings (casings for machines or engines in general F16M); Cylinders; Cylinder heads; Fluid connections
F04B 39/14	1-Punkt Untergruppe	. Provisions for readily assembling or disassembling
F04B 39/16	1-Punkt Untergruppe	. Filtration; Moisture separation
F04B 41/00	**Hauptgruppe**	**Pumping installations or systems (F04B 31/00, F04B 35/00 take precedence)**
F04B 41/02	1-Punkt Untergruppe	. having reservoirs
F04B 41/04	1-Punkt Untergruppe	. Conversion of internal-combustion engine cylinder units to pumps

Symbol	Typ	Titel
F04B 41/06	1-Punkt Untergruppe	. Combinations of two or more pumps
		Machines or pumps having flexible working members
F04B 43/00	**Hauptgruppe**	**Machines, pumps, or pumping installations having flexible working members (pumps or pumping installations specially adapted for elastic fluids F04B 45/00)**
F04B 43/02	1-Punkt Untergruppe	. having plate-like flexible members, e.g. diaphragms (F04B 43/14 takes precedence) [3]
F04B 43/04	2-Punkt Untergruppe	. . Pumps having electric drive
F04B 43/06	2-Punkt Untergruppe	. . Pumps having fluid drive
F04B 43/067	3-Punkt Untergruppe	. . . the fluid being actuated directly by a piston [6]
F04B 43/073	3-Punkt Untergruppe	. . . the actuating fluid being controlled by at least one valve [6]
F04B 43/08	1-Punkt Untergruppe	. having tubular flexible members (F04B 43/12 takes precedence)
F04B 43/09	2-Punkt Untergruppe	. . Pumps having electric drive [6]
F04B 43/10	2-Punkt Untergruppe	. . Pumps having fluid drive
F04B 43/107	3-Punkt Untergruppe	. . . the fluid being actuated directly by a piston [6]
F04B 43/113	3-Punkt Untergruppe	. . . the actuating fluid being controlled by at least one valve [6]
F04B 43/12	1-Punkt Untergruppe	. having peristaltic action
F04B 43/14	2-Punkt Untergruppe	. . having plate-like flexible members [3]
F04B 45/00	**Hauptgruppe**	**Pumps or pumping installations having flexible working members and specially adapted for elastic fluids**
F04B 45/02	1-Punkt Untergruppe	. having bellows
F04B 45/027	2-Punkt Untergruppe	. . having electric drive [6]
F04B 45/033	2-Punkt Untergruppe	. . having fluid drive [6]
F04B 45/04	1-Punkt Untergruppe	. having plate-like flexible members, e.g. diaphragms (F04B 45/10 takes precedence) [3]
F04B 45/047	2-Punkt Untergruppe	. . Pumps having electric drive [6]
F04B 45/053	2-Punkt Untergruppe	. . Pumps having fluid drive [6]
F04B 45/06	1-Punkt Untergruppe	. having tubular flexible members (F04B 45/02, F04B 45/08 take precedence) [3]
F04B 45/067	2-Punkt Untergruppe	. . Pumps having electric drive [6]
F04B 45/073	2-Punkt Untergruppe	. . Pumps having fluid drive [6]
F04B 45/08	1-Punkt Untergruppe	. having peristaltic action [3]
F04B 45/10	2-Punkt Untergruppe	. . having plate-like flexible members [3]
F04B 47/00	**Hauptgruppe**	**Pumps or pumping installations specially adapted for raising fluids from great depths, e.g. well pumps (by using positive or negative pressurised fluid medium acting directly on the liquid to be pumped F04F 1/00)**
F04B 47/02	1-Punkt Untergruppe	. the driving mechanisms being situated at ground level (F04B 47/12 takes precedence)
F04B 47/04	2-Punkt Untergruppe	. . the driving means incorporating fluid means
F04B 47/06	1-Punkt Untergruppe	. having motor-pump units situated at great depth

Symbol	Typ	Titel
F04B 47/08	2-Punkt Untergruppe	. . the motors being actuated by fluid
F04B 47/10	3-Punkt Untergruppe	. . . the units or parts thereof being liftable to ground level by fluid pressure
F04B 47/12	1-Punkt Untergruppe	. having free plunger lifting the fluid to the surface
F04B 47/14	1-Punkt Untergruppe	. Counterbalancing
F04B 49/00	**Hauptgruppe**	**Control of, or safety measures for, machines, pumps, or pumping installations, not otherwise provided for in, or of interest apart from, groups F04B 1/00-F04B 47/00**
F04B 49/02	1-Punkt Untergruppe	. Stopping, starting, unloading, or idling control (controlled electrically F04B 49/06) [6]
F04B 49/025	2-Punkt Untergruppe	. . by means of floats [6]
F04B 49/03	2-Punkt Untergruppe	. . by means of valves [6]
F04B 49/035	3-Punkt Untergruppe	. . . Bypassing [6]
F04B 49/04	1-Punkt Untergruppe	. Regulating by means of floats (F04B 49/025 takes precedence) [6]
F04B 49/06	1-Punkt Untergruppe	. Control using electricity (regulating by means of floats actuating electric switches F04B 49/04)
F04B 49/08	1-Punkt Untergruppe	. Regulating by delivery pressure
F04B 49/10	1-Punkt Untergruppe	. Other safety measures
F04B 49/12	1-Punkt Untergruppe	. by varying the length of stroke of the working members [6]
F04B 49/14	2-Punkt Untergruppe	. . Adjusting abutments located in the path of reciprocation [6]
F04B 49/16	1-Punkt Untergruppe	. by adjusting the capacity of dead spaces of working chambers [6]
F04B 49/18	1-Punkt Untergruppe	. by changing the effective cross-section of the working surface of the piston [6]
F04B 49/20	1-Punkt Untergruppe	. by changing the driving speed (controlled electrically F04B 49/06) [6]
F04B 49/22	1-Punkt Untergruppe	. by means of valves (F04B 49/03 takes precedence) [6]
F04B 49/24	2-Punkt Untergruppe	. . Bypassing [6]
F04B 51/00	**Hauptgruppe**	**Testing machines, pumps, or pumping installations**
F04B 53/00	**Hauptgruppe**	**Component parts, details or accessories not provided for in, or of interest apart from, groups F04B 1/00-F04B 23/00 or F04B 39/00-F04B 47/00 [6]**
F04B 53/02	1-Punkt Untergruppe	. Packing the free space between cylinders and pistons [6]
F04B 53/04	1-Punkt Untergruppe	. Draining [6]
F04B 53/06	1-Punkt Untergruppe	. Venting [6]
F04B 53/08	1-Punkt Untergruppe	. Cooling (of machines or engines in general F01P); Heating; Preventing freezing [6]
F04B 53/10	1-Punkt Untergruppe	. Valves; Arrangement of valves [6]
F04B 53/12	2-Punkt Untergruppe	. . arranged in or on pistons [6]
F04B 53/14	1-Punkt Untergruppe	. Pistons, piston-rods or piston-rod connections [6]
F04B 53/16	1-Punkt Untergruppe	. Casings; Cylinders; Cylinder liners or heads; Fluid connections [6]
F04B 53/18	1-Punkt Untergruppe	. Lubricating (of machines or engines in general F01M) [6]
F04B 53/20	1-Punkt Untergruppe	. Filtering [6]

Symbol	Typ	Titel
F04B 53/22	1-Punkt Untergruppe	. Arrangements for enabling ready assembly or disassembly [6]