

ECLA**EUROPEAN CLASSIFICATION****B81B**

MICRO-STRUCTURAL DEVICES OR SYSTEMS, e.g. MICRO-MECHANICAL DEVICES (piezo-electric, electrostrictive or magnetostrictive elements per se [H01L41/00](#))

Notes

1. This subclass does not cover:
 - purely electrical or electronic devices per se which are covered by section H, e.g. subclass H01L;
 - purely optical devices per se which are covered by subclasses G02B or G02F;
 - essentially two-dimensional structures, e.g. layered products which are covered by subclass B32B;
 - chemical or biological structures per se which are covered by section C;
 - structures in atomic scale produced by manipulation of single atoms or molecules, which are covered by group [B82B1/00](#).
2. Devices or systems classified in this subclass are also classified in appropriate subclasses providing for their structural or functional features, if such features are of interest.
3. Attention is drawn to the following places:

A61K9/50	Microcapsules for medicinal preparations
B25J7/00	Micromanipulators
G02B21/32	Micromanipulators combined with microscopes
G11B5/127	Magnetic heads
H01P3/08	Waveguide microstrips.

[N: **Note** [N1108]

In this subclass, local "residual" subgroups, e.g. [B81B7/00P20](#), are used with the following purpose:

When classifying a document which does not fit in any of a set of subgroups with the same dot-level, the document should be classified in the residual group, if present, and not in the group at the hierarchical level one dot above.

In the example, the document shall be classified in [B81B7/00P20](#) and not in [B81B7/00P](#) as [B81B7/00P20](#) is "residual" to [B81B7/00P2-B81B7/00P16](#)

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B81B1/00

Devices without movable or flexible elements, e.g. micro-capillary devices [N9803]

B81B1/00H

- [N: Holes characterised by their shape, in either longitudinal or sectional plane] [N9807]

B81B1/00H2

- · [N: Through-holes, i.e. extending from one face to the other face of the wafer] [N9807]

B81B1/00S

- [N: Microdevices formed as a single homogeneous piece, i.e. wherein the mechanical function is obtained by the use of the device, e.g. cutters] [N9807]

B81B1/00S2

- · [N: Microtips] [N9807]

- B81B3/00** **Devices comprising flexible or deformable elements, e.g. comprising elastic tongues or membranes ([B81B5/00](#) takes precedence) [N9803]**
- B81B3/00F** . [N: Arrangements for avoiding sticking of the flexible or moving parts] [N9807] [C1105]
- B81B3/00F2** . . [N: Anti-stiction coatings] [N9807] [C1105]
- B81B3/00F4** . . [N: Structures for avoiding electrostatic attraction, e.g. avoiding charge accumulation] [N1204]
- B81B3/00F6** . . [N: Structures having a reduced contact area, e.g. with bumps or with a textured surface] [N1105]
- B81B3/00F10** . . [N: Structures dimensioned for mechanical prevention of stiction, e.g. spring with increased stiffness] [N0711] [C1105]
- B81B3/00F99** . . [N: Arrangements for avoiding sticking of the flexible or moving parts not provided for in groups [B81B3/00F2](#) to [B81B3/00F10](#)] [N1105]
- B81B3/00H** . [N: Structures acting upon the moving or flexible element for transforming energy into mechanical movement or vice-versa, i.e. actuators, sensors, generators] [N9807] [C0706]
- B81B3/00H2** . . [N: Transducers for transforming electrical into mechanical energy or vice versa (dynamo-electric machines [H02K57/00](#); electrostatic machines [H02N1/00](#); piezo-electric devices [H01L41/00](#))] [N0706] [C1004]
- B81B3/00H4** . . [N: Transducers for transforming thermal into mechanical energy or vice versa, e.g. thermal or bimorph actuators (electric motors using thermal effects [H02N10/00](#))] [N0706] [C1004]
- B81B3/00H6** . . [N: Structures for transforming mechanical energy, e.g. potential energy of a spring into translation, sound into translation] [N0706]
- B81B3/00H8** . . [N: Transducers for transforming light into mechanical energy or viceversa] [N0803]
- B81B3/00H10** . . [N: Structures for transforming energy not provided for in groups [B81B3/00H2](#) to [B81B3/00H8](#)] [N0706] [C0803]
- B81B3/00K** . [N: Constitution or structural means for controlling the movement of the flexible or deformable elements] [N9807] [C1004]
- B81B3/00K2** . . [N: For increasing stroke, i.e. achieve large displacement of actuated parts] [N0706]
- B81B3/00K4** . . [N: Angular deflection] [N0706] [C1112]
- B81B3/00K4B** . . . [N: Increasing angular deflection] [N1112]
- B81B3/00K4P** . . . [N: Improve properties related to angular swinging, e.g. control resonance frequency] [N1112]
- B81B3/00K4Z** . . . [N: Constitution or structural means for controlling angular deflection not provided for in groups [B81B3/00K4B](#) to [B81B3/00K4P](#)] [N1112]
- B81B3/00K6** . . [N: For defining the movement, i.e. structures that guide or limit the movement of an element (mechanical arrangements for preventing or damping vibration or shock [H01H3/60](#))] [N0706] [C0803]
- B81B3/00K8** . . [N: For holding or placing an element in a given position] [N0706]
- B81B3/00K10** . . [N: Adjusting the distance between two elements, at least one of them being movable, e.g. air-gap tuning] [N1112]
- B81B3/00K99** . . [N: Constitution or structural means for controlling the movement not provided for in groups [B81B3/00K2](#) to [B81B3/00K10](#)] [N1112]
- B81B3/00P** . [N: Devices moving in two or more dimensions, i.e. having special features which allow movement in more than one dimension] [N9807]

- B81B3/00S . [N: Constitution or structural means for improving or controlling the physical properties of a device] [N0706] [C1112]
- B81B3/00S2 . . [N: Mechanical properties] [N0706] [C0711]
- B81B3/00S2B . . . [N: For controlling stiffness, e.g. ribs] [N0711] [C0904]
- B81B3/00S2S . . . [N: For controlling internal stress or strain in moving or flexible elements, e.g. stress compensating layers] [N0711]
- B81B3/00S2W . . . [N: For improving wear resistance] [N0711]
- B81B3/00S2Z . . . [N: Constitution or structural means for improving mechanical properties not provided for in [B81B3/00S2B](#) to [B81B3/00S2W](#)] [N0711] [C1004]
- B81B3/00S4 . . [N: Thermal properties] [N0706]
- B81B3/00S6 . . [N: Optical properties] [N0706]
- B81B3/00S8 . . [N: Electrical characteristics, e.g. reducing driving voltage, improving resistance to peak voltage] [N0706]
- B81B3/00S10 . . [N: Chemical or biological characteristics, e.g. layer which makes a surface chemically active] [N0711]
- B81B3/00S12 . . [N: Magnetic properties, e.g. guiding magnetic flux] [N1112]
- B81B3/00S99 . . [N: Constitution or structural means for improving or controlling physical properties not provided for in [B81B3/00S2](#) to [B81B3/00S12](#)] [N1112]

- B81B3/00Z . [N: Devices comprising flexible or deformable elements not provided for in groups B81B3/00F to B81B3/00S99] [N1204]

- B81B5/00** **Devices comprising elements which are movable in relation to each other, e.g. comprising slidable or rotatable elements** [N9803]

- B81B7/00** **Micro-structural systems; [N: Auxiliary parts of micro-structural devices or systems]** [N9803] [C9807]

- B81B7/00A . [N: MEMS mechanisms for assembling automatically hinged components, self-assembly devices (self-assembly processes B81C1/00A)] [N0608]
- B81B7/00C . [N: Interconnects] [N9807]
- B81B7/00F . [N: Structural features, others than packages, for protecting a device against environmental influences (B81C1/00L takes precedence)] [N1204]
- B81B7/00F7 . . [N: Protection against reverse engineering, unauthorised use, use in unintended manner, wrong insertion or pin assignment] [N1204]
- B81B7/00F9 . . [N: Protection against shocks or vibrations, e.g. vibration damping] [N1204]
- B81B7/00F11 . . [N: Protection against thermal alteration or destruction (B81B7/00T takes precedence)] [N1204]
- B81B7/00F13 . . [N: Protection against electrostatic discharge (electrostatic discharge protection for electronic semiconductor circuits H01L27/02B4; circuit arrangements for protecting electronic switching circuits used for pulse technique against overcurrent or overvoltage H03K17/08)] [N1204]
- B81B7/00F15 . . [N: Protection against chemical alteration] [N1204]
- B81B7/00F99 . . [N: Protection against environmental influences not provided for in groups B81B7/00F7 to B81B7/00F15] [N1204]

- B81B7/00P . [N: Packages or encapsulation (processes for packaging MEMS [B81C1/00C14](#); packaging of smart-MEMS [B81C1/00C12B](#))] [N0608] [C0711]
- B81B7/00P2 . . [N: for maintaining a controlled atmosphere inside of the chamber containing the MEMS] [N0608]
- B81B7/00P2G . . . [N: using materials for controlling the level of pressure, contaminants or moisture inside of the package, e.g. getters] [N0803] [C0904]
- B81B7/00P2Z . . . [N: maintaining a controlled atmosphere with techniques not provided for in [B81B7/00P2G](#)] [N0803]
- B81B7/00P4 . . [N: for reducing stress inside of the package structure] [N0608]
- B81B7/00P4D . . . [N: between the MEMS die and the substrate] [N0803]
- B81B7/00P4L . . . [N: between the package lid and the substrate] [N0803]
- B81B7/00P4Z . . . [N: between other parts not provided for in [B81B7/00P4D](#) to [B81B7/00P4L](#)] [N0803]
- B81B7/00P6 . . [N: for protecting against damages due to external chemical or mechanical influences, e.g. shocks or vibrations] [N0608] [C0701]
- B81B7/00P8 . . [N: suitable for fluid transfer from the MEMS out of the package or vice-versa, e.g. transfer of liquid, gas, sound] [N0608] [C0902]
- B81B7/00P10 . . [N: for protecting against electromagnetic or electrostatic interferences] [N0608] [C0611]
- B81B7/00P12 . . [N: for controlling the passage of optical signals through the package] [N0608]
- B81B7/00P14 . . [N: Interconnections between the MEMS and external electrical signals] [N0608]
- B81B7/00P16 . . [N: 3D packaging, i.e. encapsulation containing one or several MEMS devices arranged in planes non-parallel to the mounting board] [N1008] [C1112]
- B81B7/00P20 . . [N: Other packages not provided for in groups [B81B7/00P2](#) to [B81B7/00P16](#)] [N0608] [C1008]

- B81B7/00S . [N: MEMS characterised by an electronic circuit specially adapted for controlling or driving the same ([B81B7/00T2](#) takes precedence; arrangements for starting, regulating, braking, or otherwise controlling an actuator H02N; control arrangements or circuits for visual indicators [G09G3/00](#))] [N1204]
- [N: **Note** [N1205]
This group covers: only MEMS with an electronic circuit which is not specific to a particular application. This group does not cover: electronic circuits per se, e.g. for controlling or driving application specific MEMS
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- B81B7/00T . [N: Temperature control] [N9807]
- B81B7/00T2 . . [N: On-device systems and sensors for controlling, regulating or monitoring] [N9807]
- B81B7/00T4 . . [N: Maintaining a constant temperature by heating or cooling] [N9807]
- B81B7/00T4C . . . [N: by cooling] [N9807]
- B81B7/00T4H . . . [N: by heating] [N9807]

- B81B7/02 . containing distinct electrical or optical devices of particular relevance for their function, e.g. micro-electro-mechanical systems (MEMS) ([B81B7/04](#) takes precedence) [N9803]

- B81B7/04 . Networks or arrays of similar micro-structural devices [N0407]