

# KBE Bauelemente Water, our Element



We bring variety to your swimming pool



# Company

# KBE Bauelemente



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The company KBE Bauelemente was founded in 1965 with the aim to develop and design facilities that permit the water depth to be adjusted in swimming pools for schools. The “height-adjustable intermediate floor” was created - only later referred to as moving floor.

During the initial years, moving floors were operated oil-hydraulically. Despite using synthetic oils, it was not always possible to avoid problems generally caused by leaks. Subsequently, electro-mechanically operated systems were rapidly developed and were introduced to the market in 1972. These moving floor systems have been constantly updated, supplemented and patented. They are not only very reliable but also simple and robust in terms of conceptual design.

From 1980 KBE started to sell moving floor systems worldwide and for many different applications - for public and private pools, for hospitals and therapy centres, for special schools and universities.

Further developments have been added over the course of time. Swimming pools were meant to be variable not only in terms of their water depth, but also in terms of their length. This was achieved by means of fixed pool dividers and movable bulkheads.

Today these facilities are manufactured, pre-assembled and tested at two production lines and an additional assembly hall (with a roofed area of approximately 1800 m<sup>2</sup>). The construction components (pool facilities) are assembled by our own personnel throughout the world.

Throughout the European mainland, the components are shipped by road on lorries; overseas shipping is container using the new container port in Wilhelmshaven.

You will find KBE agencies in Sweden, the UK, Holland, France and the US. This network of consultants is expanded continuously.



# Moving Floors

## Spindle Floors

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Basically, moving floors are used to adjust the pool water to various depths. It therefore becomes possible to reduce the number of pools designed for different purposes: as a pool for swimmers, non-swimmers or even as a pool for swimming lessons.

This allows operators to offer all kinds of opportunities for swimming or learning to swim, within an organised programme.

This advantage has been seized upon by architects and operators alike, which is why almost every newly built swimming pool is equipped with at least one moving floor.

This is almost standard practice in Germany, Holland and the UK.

Moving floors have become common in public swimming pools, however such systems are also installed in some private swimming pools. Here the moving floor is usually finished with the same surface as the pool surround so that a uniform surface is created when the moving floor is lifted level to the pool-side. This space can then be used for

other purposes.

KBE's moving floors are distinguished according to the following types:

Floors for teaching pools (LSB floors),  
floors for multipurpose pools (MZB floors),  
moving floors for pools for children, senior citizens and people with a handicap (KSB floors), and  
inner spindle floors (ISB floors).



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# Moving Floors

## Floors for Training Pools

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Floors for teaching pools (LSB floors) were originally designed for swimming pools used by schools. Such pools are usually used by schools until midday and are then opened to the general public or swimming clubs later on in the day.

LSB floors have the same dimensions as the corresponding pool, usually the water depth can be set to between 0.3 and 1.8 or 2.0 m.

At times when the pool is not used, the moving floor can be raised up to 3 cm above the water level, thereby covering the water surface and saving heating and ventilation costs.

It is also possible to tilt the moving floor by up to 6 % relative to the longitudinal direction. At least 2 water depth indicators are prescribed for this purpose: one for the minimum and one for the maximum water depth.

The LSB floors are operated from a space outside the pool, usually from one of the two ends by means of two coupled bevel gear systems.

Couplings connect the output shafts of the gears to stuffing-box shafts. They are going through the pool walls and drive horizontal shafts, which lift or lower the moving floor relative to the adjusted tilt angle of the supports and relative to the direction of rotation.

Since the floor is also used to cover the water surface, the insulating glass-fibre reinforced plastic (GRP) surface composed of individual supporting elements, is the most suitable material.

Any colour may be chosen for the floor surface.



# Moving Floors

## Floors for Multipurpose Pools

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Floors for multipurpose pools (MZB floors) are installed in larger pools as partial moving floors, enabling the pool to be used for different activities at the same time. Various exercises, activities or therapies can be carried out at reduced water depth, while the other section of the pool is available to swimmers. When the MZB floor is fully lowered, the entire pool is transformed into a pure swimming pool. A popular approach is to use the moving floor to adjust the basin depth to a third of the multipurpose pool's area.

A so-called trailing ramp is commonly provided as a barrier to prevent people from swimming underneath the floor. It is fastened to the moving floor by means of hinges and rolls on to the bottom of the pool. A lifting or hinged wall, or one of the two bulkhead versions, may also be used instead however.

It is possible to tilt the MZB floor in the direction of this barrier by up to 6 % using an additional motor unit.

The floor is driven electro-mechanically according to the screw-actuated lifting

principle, as described for the LSB floor - in this case, it is generally done from either of the two side walls of the basin however.

Generally speaking, the MZB floor is not used to cover the water surface. For this reason, the surface of the floor can be made of slip-resistant stainless steel components as an alternative to the glass-fibre reinforced plastic surface, including the trailing ramp.

The individual stainless steel component sections are bolted together with a gap of 6 mm, and this also applies to glass-fibre reinforced surfaces. This creates a zone for the free exchange of water during moving floor operations, also facilitating the circulation of pool water required by the facilities for water treatment (amounting to approximately 1.5 to 2 % of the moving floor area).



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# Moving Floors For children, senior citizens and disabled people

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We call these types of moving floors KSB lifting floors. They are mostly used for smaller pools and cover the entire water surface. In some cases they are also used as partial moving floors. However, this is only for the purpose of saving space with a vertically anchored barrier, which is sunk into a recess in the pool floor when the moving floor is lowered.

The KSB moving floor is driven by at least four vertical spindles. These spindles are located in stainless steel housings and are installed opposite one another in recesses within the side walls. They are mechanically linked and driven by a geared electric motor located outside the pool. Depending on the direction of rotation of the motor and the lifting screws, the lifting floor platform is raised or lowered.

KBE developed the corner spindle floor especially for smaller lifting floors and for pools that were subsequently to be retro-fitted with a moving floor. For this type, four vertical spindles are installed in triangular spindle fittings which are positioned in the four corners of the pool. The floor section is then posi-

tioned on to the support arms. One of these components projects from each spindle fitting. The pool contractor only needs to drill two tapping holes with a diameter of 150 mm through the pool walls according to our specifications.

KSB pools are frequently designed as freeform basins for added interest, and KSB moving floors can also be installed in these types of pools.

There are examples of round, octagonal, triangular or trapezoidal basin contours with lifting floors.



# Moving Floors

## Inner Spindle Floors

Inner spindle floors (ISB floors) represent our most recent development which has been patented. They were created for the installation of moving floors for high diving pools of relatively small dimensions with a lifting distance of up to 5 m. We have called these floors inner spindle floors because a spindle is located inside a tubular support leg. As it is electro-mechanically driven outward, the support legs are extended. Depending on the moving floor's size, the support legs may be arranged in two, three or four rows with four support legs respectively.

The electro-mechanical drive unit for the ISB floor is situated outside the pool. As is the case for the other system described here, the floor is driven via passages, corresponding to the number of support leg rows, going through the pool wall and using stuffing boxes, which are sealed-in waterproof after assembly.

The drive shafts synchronously drive fixed gear units. These, in turn, drive the spindles inside the support legs outward or inward to either lift or lower the moving floor according to the

direction of rotation.

If required, grilles can be inserted into the ISB floor to operate bubbler systems that are installed within the basin floor and assigned to the various diving boards and platforms.

Alternatively, the bubbler systems can be integrated into the lifting floor surface for use at various water depths.



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# Pool Dividers Walls and Bulkheads

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If pools need to be divided into two units, fixed or movable pool dividers are deployed.

There are two different designs to achieve this. Stationary pool dividers are defined as either lifting walls or hinged walls. Both designs permit two predefined pool dimensions.

The movable pool dividers are collectively referred to as bulkheads or booms. Here we differentiate between running and floating bulkheads. Bulkheads can be used to divide the available pool length into different sections according to requirements and use.

All pool dividers are driven electro-mechanically except the floating bulkhead, which is operated manually. Optionally, pool dividers can be furnished with glass-fibre reinforced sheeting that is aligned with the tiles used for the pool itself in terms of style and colour or (except for floating bulkheads) with stainless steel sections.

Pool dividers have lanes at either side matching the lanes used in the remaining pool area in terms of colour, width

and alignment.

For partial moving floors, bulkheads (booms) can also be used as a barrier to prevent people from swimming underneath the floor instead of a trailing ramp.

Pool dividers comply with the safety requirements according to the European Standard EN 13451.11 combined with part 1, as well as the previously described moving floors.





# Pool Dividers

## Lifting Walls

Lifting walls consist of a stainless steel frame that is finished with fibre-reinforced or stainless steel sections. The width of the lifting walls is determined by customers' individual requirements and specifications. It should not be less than 1.0 m however so that they may also be used as a catwalk connecting the two long walls of the pool. Usually the lifting wall is lifted to 30 cm above the water level at its uppermost position and is aligned with the basin floor when it is moved to its lowest position. Reaching the bottom position is optically indicated by two illuminated pictograms.

To permit complete immersion of the lifting wall, the manufacturer of the pool must provide a recess of matching depth. In this respect, it does not matter whether the pool is made of concrete, stainless steel or glass-fibre reinforced material.

The frame structure is of torsion and bend resistant design (to minimise deflection) and the lifting wall is additionally equipped with guide rollers at the facing side, which run in the guide rails along the long walls of the pool.

Fastening anchors can be attached to one or both sides of the wall for racing lane lines.

At the request of the customer, it is also possible to provide sockets on the lifting wall for temporary use of starting blocks, as well as a cable channel for an electronic timing system.

The lifting walls are driven electro-mechanically from one of the two longitudinal walls of the pool. The lifting process is carried out by two vertical spindles for lifting walls up to 10 m long. Longer lifting walls are equipped with a horizontal spindle drive similar to the drive for MZB and LSB lifting floors. The type of drive used for ISB floors is also suitable for special cases.



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# Pool Dividers

## Hinged Walls

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Hinged walls are used either as pool dividers, dividing components or as a sealing facility: namely within the swimming channels connecting inner and outer pool. During periods when they are not in use, the walls rest flat within a recess in the pool floor and are raised upright into a 90° vertical position when required. The recess in the pool floor must be as deep as the hinged wall is high, and the same width as the hinged wall is wide. The hinged walls are manufactured as slim as possible to reduce the depth of the recess accordingly. The dimensions for hinged wall widths range between 20 and 30 cm, which depends on the length of the hinged wall.

The hinged wall consists of bend-resistant torsion box of stainless steel with reinforced ribs (also of stainless steel) arranged diagonally on top to minimise deflection. Optionally these ribs are covered with either glass-fibre reinforced or stainless steel elements.

The wall is driven from outside the pool by one or two motor units depending on the length of the hinged wall. The drive shaft is conducted through a

stuffing box and is permanently connected to the torsion box. The time required for folding the wall down or raising it up is approx. 3 minutes.

Because hinged walls are constructed as slim as possible they cannot be used for walking on, however they can be fitted with anchors for attaching the starting line. For this reason, each facing side of the hinged wall provides a manually operated locking mechanism. It establishes a firm connection to the facing walls of the basin. On request, this locking mechanism can also be supplied as an electro-mechanically driven design. In this case, the mechanism is driven from the side of the pool surround. Reaching the bottom position is optically indicated by two illuminated pictograms.

The hinged wall is controlled by means of a control panel which is supplied optionally as a surface-mounted or concealed design and should be installed in close vicinity to the hinged wall if possible.



# Pool Dividers

## Bulkheads, running



Running bulkheads consist of bend and torsion resistant stainless steel construction designed to minimise deflection. They are supplied either with glass-fibre reinforced or stainless steel sections. The bulkheads are provided with resting step positions at both sides which are aligned with the resting step positions of the pool. They are always designed with recessed resting step positions - regardless of whether the pool has a recessed step position or a projecting step position.

The drive unit consists of a DC motor with a voltage of 24 or 42 volts. This motor drives gear trains via two cardan shafts or (depending on the design of the tooth rails) via two bevel gear systems. The gear trains then enable movement of the bulkheads. Two pairs of stainless steel rails are located in the pool. These rails are either sunk flush into the pool floor or the standing steps at the perimeter. Plastic wheel sets with rocker bearings run on these rail pairs. They transfer the weight of the bulkhead onto the pool construction via the respective rails. The width of the rails is aligned with the width of the tiles used so that the tile pattern is

not disturbed. A part of the rail's width is furnished with teeth that mesh with the gear wheel of the bulkhead.

Power is supplied via a temporary cable, which is connected by means of plug-connectors as is the control panel. Distance covered and individual stop points are detected by the number of motor revolutions. For this reason it is possible to change the stop points subsequently as required. Because the transmission ratio is so high, the bulkhead is locked in every stop position and secured against sliding by means of the gear wheels meshing with toothed rail.

Depending on its width, the bulkhead can be equipped with one or two rows of starting blocks. If required, the bulkhead can also be supplied with a cable channel for an electronic timing system. The cable channel is always protected by a grid cover.

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# Pool Dividers

## Bulkheads, floating



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A floating bulkhead is made purely of plastic components up to 7 m in length, which are assembled in the drained pool. Two stainless steel longitudinal beams are also included in the construction to reduce vertical and horizontal deviation. As the pool is filled with water, the bulkhead starts to float and can be pulled into its parking position. Here the excess air is vented from the inner air chambers so that the shoulders projecting from the front side of the bulkhead come to rest on the edge of the basin. Lock bolts are used to secure the bulkhead against displacement when it is in its position for use. They are inserted, through the shoulder, into the sockets which are fitted in the approach slope of the basin's edge.

A rope winch with pull rope and a floor socket for each front side respectively, as well as a compressor with a temporary hose connection are included in the scope of delivery for the floating bulkhead.

To start moving the floating bulkhead, air is initially injected into the float chambers. Then the standing step ele-

ments are folded in pneumatically via stainless steel cylinders. This process provides sufficient clearance for the exchange of displaced water, facilitating movement of the bulkhead.

The mounted folding elements are used as standing steps at the outside. In terms of height, they are aligned with the standing steps of the basin - regardless of whether the latter are integrated into walls of the pool or project.

Depending on width, the floating bulkheads can be furnished with one or two rows of starting blocks. As a rule, they are provided with a cable channel covered with grids - for a permanently installed or an additional temporary timing system.

Similar to running bulkheads, floating bulkheads are equipped with flow-through openings at the level of the waterline.



# Accessories

## Steps and Bars



### Rolling steps

Rolling steps can be provided with a put-on stairway complying with EN 13451.2. They roll on the surface of the moving floor and change their tilt angle with changing water depths. During the adjustment the number of steps remains the same, but the pitch dimension is reduced with decreasing water depth from step to step.

### Integrated stairway

This type of stairway is integrated into the surface of the lifting floor. As the moving floor is lowered, one step after the other, from top to bottom, is placed onto step frame permanently installed in the basin. When the moving floor is completely lowered, the stairway is therefore completely extended in terms of both length and height. When the moving floor is lifted, the individual steps are picked up again, starting with the bottom step, and integrated into the surface of the lifting floor. This stairway changes the number of steps relative to water depth. Pitch and tread dimensions remain identical for every individual step however. That is the reason why integrated stairways are the preferred design for facilities for people

with special needs or rehabilitation centres.

The integrated stairway can also be supplied with an electro-mechanically operated folding mechanism that folds the step frame over if this is requested. During the traversing movement of the moving floor there is the option, whether

~ the stairway becomes visible

or not

~ for example, when the entire water area is to be used and the stairway would only get in the way.

### Bars

Stainless steel bar structures are sometimes used in rehabilitation centres to assist convalescents walking. These can be inserted into the sockets in the surface of the lifting floor as required. They are vertically and laterally adjustable, so they can be adapted to suit the particular requirements of the therapist or the size of the patient.

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# **KBE** Bauelemente Customer Service



The support of KBE's products by their customer service staff is an essential component of the company's philosophy.

Their trained and qualified personnel are familiar with the entire range of both older products and new technical innovations.

KBE guarantee direct maintenance and optimum servicing of the high-quality facilities they supply and assemble, as well as fast access to original parts.

In the event that this brochure has "got you swimming" in this flood of information, please do not hesitate to contact us or our specialist consultants:



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