



## 3D MOULD SOLUTIONS

***RATEC***  
MEET THE BETTER IDEAS

## 3D Moulds

# Custom-made Precision

*Products for the production of high-quality volumetric precast concrete elements*

We have significantly expanded our mould portfolio for the production of volumetric precast concrete elements. In addition to room module moulds for residential construction, we also offer various mould solutions for transformer stations, elevator shafts or sanitary cells.

For room elements that require top-notch surface quality, our upcrete® compatible module mould for pressure filling from below offers the perfect solution. More information about the different solutions is provided on the next few pages.

**Benefit from experience and flexibility –  
MEET THE BETTER IDEAS!**



**DURABILITY WITH HIGH QUALITY  
PROCESSING**



**100 % ECONOMICALLY VIABLE  
FOR YOUR SUCCESS**

**EASY TO USE**



**TAILORED TO CUSTOMER  
REQUIREMENTS**

**STURDY CONSTRUCTION**

## Room modules

# The flexible mould kit

*High quality also for smaller series – our newly developed modular mould kit offers the perfect solution also for smaller projects.*

One of the unique features of the new concept is the patented shrinking mechanism, whereby the module is lifted while the inner core is shrunk at the same time. The mould was also deliberately designed to be modular. The core and exterior panels consist of various standardised components that can be easily swapped out and adapted to other room dimensions. This means the mould can be used efficiently even if the production volume of a room is small.





## PROPERTIES

- Modular design of the core and exterior panels, made from various standardised base elements that can be re-combined as needed
- Patented shrink mechanism of the inner core: simultaneous shrinking and lifting of the element
- Also adaptable to complex details of the element
- Suitable for filling from above and below
- Easy to integrate into existing production system



Example:  
finished room module

Shrinkable window for break-free recesses

## ACCESSORIES – TURNING STATION



# 3D mould kit

## Application examples

### PROJECT SINGAPORE

#### MULTI-STOREY MODULAR CONSTRUCTION WITH COMPLEX DETAILS ACCORDING TO THE PPVC STANDARD

The 3D mould kit was installed for the production of room modules to construct multi-storey worker's accommodations. What proved to be particularly challenging were the complex element details and connection reinforcement, which are based on the construction standards for PPVC (Prefabricated Prefinished Volumetric Construction) applicable in Singapore.

##### Project scope

➤ A total of four module moulds were installed



Project report  
3D mould Kit

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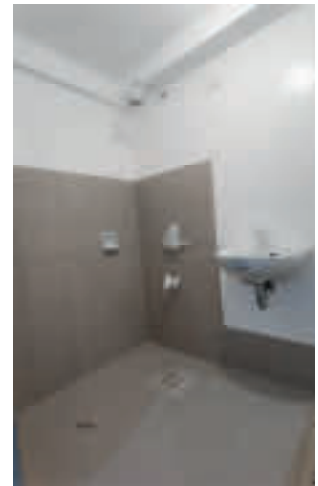
## PROJECT PHILIPPINES PRODUCTION OF SANITARY CELLS

The 3D mould kit was adapted for the production of sanitary cell elements (so-called PBUs – Prefabricated Bathroom Units).

➤ Even the height of the modules can be variably changed from 2.00–2.90 m by adjusting the floor shuttering.

### Project scope

- A total of four module shutterings were installed
- By intelligently combining rails and the exterior panels that move on them, the shuttering can be varied 450 mm lengthwise and 300 mm in width.
- Wall thicknesses between 75–125 mm can be produced.



Find out more about  
the 3D mould kit on  
our website.



# Transformer stations

## Versatility is key

*Many different shapes are possible with just one mould – notwithstanding easy handling and short retooling times.*

The easiest way to produce a 3D room element is to use a fixed inner core with a draft angle. However, this approach is only suitable to elements in which the formation of a wall slope in the element is possible within the scope of the standards and static requirements. Such is the case for the design of garages or the production of transformer stations. For the production of substation elements in particular, we developed a solution that covers common types of stations, is flexible to use, and which can speed up the process in the plant.





## PROPERTIES

- The mould is designed for two different lengths, i.e. the core and exterior panels can be converted to another length
- Swappable, customised attachments for the production of interior walls, recesses etc.
- Changing attachments for other station types generally takes less than 20 minutes
- The floor is hydraulically lifted by 10 cm to facilitate stripping
- Integrated vibrator unit used with normal or washed concrete



Example: Two different shapes of the possible concrete elements

Example: Shuttering for the production of transformer stations measuring 2.4 x 2.1 x 2.3 m and 2.9 x 2.1 x 2.3 m



Based on the element programme (in the example 14 different variants), the customer has a total of 23 different attachments at his disposal.



# 3D mould for transformer stations

## Application examples

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### GERMANY

#### PROJECT 1

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The installed mould is designed for the production of transformer stations with the dimensions 2.4 x 2.1 x 2.3 m (L x W x H) and 2.9 x 2.1 x 2.3 m (L x W x H). In this case, the core can be converted to accommodate the other length. This variability also had to be taken into account in the base frame and the exterior panels. The exterior panels can be moved manually and are firmly locked together using corner braces.

The vastly different interiors of the transformer stations are realised using interchangeable attachments that are held securely on the core with a hydraulic clamping device. The customer can select from 23 different attachments from our product range (14 different attachments in the example). For window recesses in one or more side walls of the elements,

RATEC also supplied the corresponding steel frames that are attached to the exterior panels of the shuttering and are held in place by high-performance magnets. Prior to this, retooling from one variant to the next took up to half a working day. Now, changing the attachments is significantly faster with similar station sizes. And it's no longer necessary for a worker to enter the core in order to fix the attachments, as these are clamped with a hydraulic mechanism.



Project report 3D  
shuttering for  
transformer stations

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## GERMANY PROJECT 2

Delivery of a mould for the production of a station type with length = 3.1 m, height = 2.67 m, width = 2.2 m. The core is prepared with three attachments, which are permanently fixed in place. The customer did not opt for variability for other station types. The core is accessible thanks to recesses that are screwed to the core from the inside. It also had to be

possible to heat the core from the inside. A ceiling shuttering was also delivered: The all-round recess for anchoring with the station element is realised through foldable profile attachments. These replace the frame traverse previously used and simplify and speed up the production process.



## GERMANY PROJECT 3 – VARIABLE BASEMENT MOULD

The newly developed mould solution for basement shaft elements can be flexibly adjusted lengthwise on the 10 cm grid from 2.96 to 9.96 m. This is achieved through an intelligent combination of sections of different lengths, from which the core can be put together as needed.

At the same time, elements can be manufactured in 3 different widths (2.45 m, 2.76 m and 2.96 m) and in 3 different heights (0.89 m, 1.19 m and 1.34 m).





# upcrete® room modules

## Production in final installation position

*Visionary concepts come true with upcrete® modular moulds – even complex concrete bodies can be produced in this way with smooth surfaces on all sides.*

The room module mould with “flying” shrinking core was the first room cell mould developed in Hockenheim and was used for a modular housing project for a Peruvian customer. This mould variant is based on the upcrete® technology, in which self-compacting concrete is pumped from below into a closed mould. This process allows the concrete to optimally distribute within the mould and yields smooth surfaces on all sides, as well as precise edges and recesses. Another advantage is that the structure can be produced in its final installation position, which means that subsequent turning is no longer required.



## PROPERTIES

- Maximum dimensional accuracy on the component
- Complete filling of the most difficult geometries
- Production of complex concrete bodies in final installation position
- All-around smooth surfaces
- Minimal concrete residue
- Quiet, material-friendly, efficient and employee-friendly concrete element production
- High utilisation of the mould



Example:  
finished room module



# upcrete® room module mould

## Application examples

### PROJECT PERU 1

#### FROM VISION TO REALITY: MODULAR HOUSING WITH UPCRETE®

The objective here was to build 3,600 houses, each with three rooms, 70 m<sup>2</sup> of living space on two floors, a private patio and garden, on an area of 1,000,000 m<sup>2</sup> in just 60 months. The houses had to be both earthquake- and storm-proof and offer a pleasant indoor climate. Some other requirements were excellent surface quality, thin-walled cross-sections and minimal use of materials.

Reymann Technik planned and implemented the necessary upcrete® production plant, while RATEC provided the upcrete® moulds and pumps. Two complete houses are produced in Ica every day.

#### Delivery scope

- 3 Room modules 3 x 6 x 3 m (W x L x H)
- 1 Battery mould with 6 pockets 8 x 3 m
- 2 Staircase moulds
- 2 Balcony moulds
- 2 PumpCars based on UPP 100

In the meantime, beyond the first residential area, other development projects have emerged within a radius of up to 50 km, for which the room modules and concrete elements are manufactured in Ica.



Project report modular housing Peru I

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## PROJECT PERU 2

### SECOND MODULAR HOUSING PROJECT IN NORTHERN PERU

At the start of 2021, the second modular building factory in Peru's northern region of Piura went operational. The housing concept for the new settlement "Los Altos de Castilla" was tailored to the region and needs. A house consists of one module each with a total area of 25 m<sup>2</sup>, divided into a living room/kitchen, bedroom and bathroom. What is sold is a complete package, consisting of the house with a plot of 70 m<sup>2</sup>, electricity, water and drainage. The houses are subsidised up to 80% by government interest-free loans made available by the Department of Housing to low-income families. The house can later be expanded on the associated property according to the needs of the residents. This project is also

ambitious: more than 20,000 apartments are to be built here with the aim of offering residents a better quality of life.

Due to the larger module dimensions of 7.15 x 3.54 m and a height of 2.60 m, the modular mould had to be designed with extra stability in mind in order to withstand the concrete pressure without any major deflection. During filling, the inner core, which weighs 35 tonnes, is pushed upwards with about 150 tonnes. This is counteracted by the resilient upper bracing of the core and exterior panels.



*Project report modular housing Peru II*

**Press article (PDF)**  
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# Additional solutions for Volumetric elements

## ➤ STAIRCASE MOULDS



Special solution for staircase moulds. Three of these stair forms were fitted into a circulating pallet and introduced to regular rotation in the plant.

## ➤ ROADBED ELEMENTS



The concrete elements for a cable railway were to be produced with protruding reinforcements. The mould was designed so that the tables can still be used for the production of other elements after this "special mission".





## ➤ ROOF MOULDS



Example: Roof moulds for upcrete®, filling from below



Moulds for a flat roof with contouring at the bottom for filling from above



# RATEC references worldwide

*We deliver our products in more than 72 countries worldwide*

At RATEC we combine and execute the outstanding ideas generated by the Reymann Group. In our inter-knitted environment we develop and optimise a wide range of customer related projects. We provide special attention to perfectionise the relationship between production processes and the corresponding precast concrete plants to guarantee a production set up that will generate a smooth workflow for each individual client. By combining our skills, expertise and experience we are proud to offer successful solutions to very specific challenges that have proven their place in the world marked with a variety of our system components.

This specific approach to custom adaptations combined with our variety of high quality standard products are tailored to satisfy the individual needs of our customers in an extremely economical and reliable manner. Benefit from our extensive experience and comprehensive advice.

Netherlands  
**PSV2**



USA  
**upcrete® UPP 100  
Battery System**



Peru  
**3D module mold**



Chile  
**SAS**







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