MEET THE BETTER IDEAS – UPCRETE® YOUR BUSINESS
uprete® – a new dimension of precast concrete element quality.

Almost every imaginable precast concrete element geometry can be manufactured with uprete® in one work operation. For this, self-compacting concrete is pumped from below into a partially closed form. The flexibility of the system offers unique possibilities for design, element geometry and production process – with maximum quality and formwork-smooth surfaces on all sides at the same time.
**What is upcrete®?**

**Definition: upcrete® („concreting upwards“)**

upcrete® describes the process of concreting a pre-cast concrete element in the die-cast, flush-rising concreting method, which combines all sides smooth surfaces and production in the installation position with the greatest possible economical efficiency.

The molds are filled from below (injection) with a pump. Thereby very little air is introduced into the concrete through the filling process, so that one can work with self-compacting concrete and no additional mechanical compacting is required.

Almost all limiting surfaces can be molded, merely escape openings for air are to be provided at certain points of the molded geometry, similar to what one knows from injection molding technology for plastics and metals.

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**SPECIAL TECHNOLOGICAL PRECONDITIONS**

- Pressure-resistant formwork, e.g. RATEC Battery System
- Pumping technology and pump connection using UPP pumping station and universal filling connection.
- Concrete recipe for a pumpable self-compacting concrete

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**UPCRETE®-MILESTONES**

<table>
<thead>
<tr>
<th>Project</th>
<th>Year(s)</th>
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<tr>
<td>Germany Suba-Resultit Modular House Project</td>
<td>2001</td>
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<tr>
<td>Sweden Project for Filling a Battery Mold with SCC</td>
<td>2004</td>
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<td>Switzerland Initial Studies for Pumping Concrete from Below</td>
<td>2004</td>
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<td>Mexico Modular House Project - Birth of upcrete®</td>
<td>2005–2007</td>
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<td>Austria Manufacture of Sandwich Walls using upcrete® in a Battery Formwork</td>
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<td>Peru Modular House Project</td>
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<td>Philippines Modular House Project</td>
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<td>Follow-on projects in Peru, Philippines and other countries at the planning stage ...</td>
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</tbody>
</table>
THE SMOOTH SEQUENCE OF THE UPCRETE® METHOD

01 Preparation of the steel reinforcement

02 Installation of the power- and water lines

03 Closing of the room module formwork

04 Automatic preparation of the concrete in the mixing plant with concrete laboratory

05 Connection of the concrete pump to the formwork and pumping the concrete (here SCC) into the formwork

06 Curing of the concrete in the formwork (depending on mixture approx. 8 – 10 hours)

07 Demolding the finished room module

08 Hardening of the finished room module

09 Assembly of all necessary fittings (windows, doors)

10 Final assembly of the finished room modules on the building site

Using modular house production as an example
POSSIBLE APPLICATIONS

A great variety of products have already been manufactured using upcrete® technology, such as for example:

- Solid walls / sandwich walls in battery formwork
- Room modules in installation position
- Round columns, architectural columns and roof trusses
- Segments
- Festival products such as waste bin boxes
- Sound barriers
- Architectural walls with matrices on both sides
- Stairs
- Roof elements
- Balconies
- Drains
- etc.

UPCRETE® TECHNOLOGY – BENEFITS FOR EVERYONE

- Fewer limitations with regard to feasibility
- Maximum dimensional accuracy on the precast concrete element
- Complete filling of the most difficult geometries
- Production of complex concrete structures in the installation position
- Formwork-smooth surfaces on all sides
- No floating and smoothing of surfaces
- Minimum quantities of concrete residue
- Maximum performance
- Quiet, material-saving, efficient and employee-friendly concrete element production
- High utilization of the formwork
- Simple integration into existing production is possible using our concrete plant-compatible pump, that can be adapted to the given local concrete logistics (mixer, ready-mixed concrete, bucket conveyor)
upcrete® for existing production.

upcrete® offers manufacturers the possibility to expand their product portfolio with such elements that, due to their geometry or the requirements on the surface quality, could not be precast up until now. Through the integration of upcrete® for the filling of formwork, a decisive leap in quality is also possible in ongoing production.

**INTEGRATION OF UP CRETE®**

- Improvement of the surface quality of the pre-cast concrete elements through the reduction of air inclusions, sharp edges and higher concrete density.
- Surfaces that have to be filled or smoothened with the conventional (horizontal) production, now emerge from the formwork as high-quality exposed concrete elements.
- Complex elements, which otherwise were joined together from multiple parts on the building site, can now be manufactured in one piece.
- With upcrete® and the use of SCC the vibration unit can be dispensed with, as a result the noise level sinks and the service life of the formwork is extended.
- Particularly narrow formwork (battery formwork) can be filled via the UCI filling connection more easily than from above with a bucket.
- Filling formwork by means of a pump does not require a crane with bucket and as a result can also rationalize processes in the precast concrete plant.

**UPCRETE® – EFFICIENT, FAST AND CONCRETE PLANT-COMPATIBLE PRODUCTION SOLUTION FOR MANUFACTURERS.**

upcrete® pump truck, the mobile pumping station for the efficient supply of concrete.
For the construction of the overland waste water pipeline for Tel Aviv, the concrete pipes required were produced with supports by the customer using upcrete® technology. The formwork was filled with the UPP 100 within 90 minutes through a UCI 100. The concrete pipe weighs over 54 t and is 8 m long. Every other production method was considered and tested – but discarded with regard to feasibility, economic efficiency and the required quality. All the results required could only be achieved with the upcrete® system. In another plant the manufacturer also used the upcrete® pumping technology for the manufacture of jacking pipes, as well as for filling L-shaped walls with architectural requirement.

Production of concrete pipes with highly complex geometry.

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The higher the demands on the concrete element, the more advantageous is the use of upcrete®.
Upcrete® as complete system.

Efficient, space-saving and mobile when required.

For the battery production upcrete® offers a space-saving and efficient method to manufacture high-quality precast concrete elements in large numbers within the shortest possible time. And that without the risk of investment or the space required for a circulation system.

- Compared to competitors with purely horizontal production, with upcrete® a higher quality standard can immediately be set. As a result a clear “unique selling point” can be achieved.
- upcrete® plants are significantly more compact. Smaller halls are required in comparison to classic circulation plants. Consequently a better overview is achieved and the quality control is facilitated.
- Since upcrete® formwork is closed, the volume of concrete required on every day of production can be determined exactly. That saves costs and with good planning creates no concrete residue at all.

Upcrete® enables quiet and material-saving production

If necessary upcrete® plants can be moved simply to another location.
Dusaspun, founded in 1982, is one of the leading manufacturers of precast concrete elements for infrastructure- and structural engineering projects in the Indonesian market. In 2013 Dusaspun was awarded the contract to manufacture the façade elements for a hotel construction project in Solo in Central Java. The hotel building will be constructed as a skeleton structure with concrete columns and provided with a suspended façade made from precast concrete elements.

A suitable and user-friendly production solution – as vertical as possible – was required for this project. This was ultimately found with the upcrete® technology and put into operation in the Summer of 2014.

**Vertical production of façade elements in Indonesia.**

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**PROJECT-DETAILS**

One of the leading Indonesian precast concrete manufacturers relies on the upcrete® technology from Ratec

- **Product:** façade elements for the construction of a new hotel
- **Battery formwork with 4 pockets,** each 9 x 3.9 x 0.1 m
- **UPP 100 pumping station**

**CHALLENGES:**

- **Element size**
- **Available production area**
- **Short construction period**
- **Maximum exposed concrete quality**

**PROJECT-DETAILS**

**APPLICATION EXAMPLE**

**INDONESIA**

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**APPLICATION EXAMPLE**

**INDONESIA**
upcrete® for creative forms.

Rethinking architecture – upcrete® creates space for creativity.

Geometry and forms, that up to now could not be precast or only with great difficulty, can be manufactured without significant problems using upcrete® technology. This not only offers more scope for precast works to rise above the competition. With this method the boundaries of the feasible shift even during the planning of new structures.

UPCRETE® OFFERS POSSIBILITIES FOR THE MANUFACTURE OF PRECAST CONCRETE ELEMENTS THAT UP TO NOW COULD NOT BE REALIZED.

We develop the matching element form for you or examine your existing mold for upcrete® suitability!
For the World’s Fair Expo 2015 in Milan, the Roman architecture firm Nemesi & Partners designed the Italian pavilion Palazzo Italia with a façade that was just as attractive as it was pragmatic. The outside of the building, resembling a petrified forest, thereby impressed with a special cement, which cleaned the smog-polluted air of the city.

A large part of the façade elements for the Italian Expo pavilion were produced vertically by the Italian precast element manufacturer Styl Comp in a battery formwork using upcrete® technology, in order to be able to realize in particular the filigree “branches” of the façade.

One decided in favor of a special high-performance mortar from Italcementi, which is photokatalytic white, cement-based, self-leveling and has a particularly high flexural strength. For the element geometry of the Palazzo Italia, polyurethane forms custom made by the customer were clamped in the battery formwork and filled from below with the previously described biodynamic mortar using an upcrete®-peristaltic pump.
One of the great challenges of our time is the creation of living space. We have developed the technology to do this efficiently and economically.

The basic concept of the production is the monolithic production of a room module, which already contains supporting walls, floor, beams as well as electrical and sanitary fittings and is manufactured “in one pour”. Only the roof, partition walls, stairs and, if necessary, balconies need to be added, which are concreted in separate formworks and assembled on the building site. This concept was implemented for the first time in 2012 in Peru. Already after the initial discussions between the Peruvian customer Llaxta and Ratec / Keymann Technik at the end of 2009 it was clear, that with their know-how in engineering, the room module formwork, highly precise formwork technology and upcrete® technology, the Hockenheim corporate group offered exactly those solutions, in order to realize a housing construction project of this magnitude and with the required element quality.

MONOLITHIC PRODUCTION – MANUFACTURE “IN ONE POUR”

From design to modeling through to production - made in Hockenheim.

CONSTRUCTION METHODS IN COMPARISON

<table>
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<tr>
<th>Masonry construction</th>
<th>In-situ concrete</th>
<th>Skeleton construction</th>
<th>Panel construction</th>
<th>Modular Housing</th>
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</thead>
<tbody>
<tr>
<td>Solid construction</td>
<td>Solid construction</td>
<td>Columns and beams concentrate the loads from wall and ceiling elements</td>
<td>Large panel</td>
<td>Self-supporting room module</td>
</tr>
<tr>
<td></td>
<td>Complex formwork needed</td>
<td>Beaming elements are required</td>
<td>Panel performs load transfer</td>
<td>Solid housing room module</td>
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<td></td>
<td></td>
<td></td>
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<td>Great influence of the production process on efficiency</td>
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</tbody>
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Flexibility ✔ ✔ ✔ ✔ ✔ ✔ ✔ ✔ ✔ ✔
Construction progress ✘ ✘ ✘ ✔ ✔ ✔ ✔ ✔ ✔ ✔ ✔
Degree of prefabrication ✘ ✘ ✘ ✘ ✔ ✔ ✔ ✔ ✔ ✔
Assembly work involved ✘ ✘ ✘ ✘ ✔ ✔ ✔ ✔ ✔ ✔
Quality assurance ✔ ✘ ✘ ✔ ✔ ✔ ✔ ✔ ✔
Modular Housing Project Ica (Peru).

From vision to reality: Modular Housing with upcrete®.

3,600 houses, each with three rooms, 70 m² of living area on two floors, own patio and garden, are to be built on an area of 1,000,000 m² within a period of just 60 months. The houses are to be proof against both earthquakes as well as storms and have a pleasant indoor climate. Further requirements are: excellent surface qualities, thin-walled cross-sections and minimum use of materials.

Reymann Technik planned and implemented the upcrete® production plant necessary for this, the upcrete® formwork and pumps were provided by RATEC. Two complete houses are produced with it every day in Ica.

APPLICATION EXAMPLE

FROM THE INITIAL CONCEPT TO THE LAST ELEMENT – 100 % MADE IN HOCKENHEIM

FROM THE INITIAL CAD drawing through to the smallest parts, formwork units and pumps were produced in Hockenheim, altogether:

- 3 room modules 3 x 6 x 3 m (W x L x H)
- 1 battery formwork with 6 pockets 8 x 3 m
- 2 stairway formwork units
- 2 balcony formwork units
- 2 PumpCars based on the UPP 100

Modular Housing – System for the creation of earthquake-proof living space

- Area of 1,000,000 m²
- Period of only 60 months
- 3,600 houses with garden
- 70 m² of living area with three rooms split up on two floors
With the help of upcrete® technology the Philippine precast concrete manufacturer DATEM has now positioned itself locally with its own promising module house project and is taking the next step to become the leading provider in the country’s building sector. Following the realization of numerous construction projects with an upcrete® battery production, now in 2016 the first module house factory goes into production at DATEM. Room modules of the size 5.6 x 2.5 m will be manufactured, which when combined will in each case produce a house of 28 m².

With approx. 300 working days and 2 shifts per day, DATEM is able to produce 600 of these houses every year.

- Each house consists of two room modules. Initially the modules are simply to be placed horizontally next to each other. However in future it is possible to also produce stackable modules with the already existing technology and therefore build multi-storey houses.
- 2 formwork units for room modules, each 2.5 x 5.6 x 3 m
- UPP 100 pumping station

**PROJECT-DETAILS**

The Philippines are one of those countries in which solutions for safe and inexpensive living space are in particular demand.

**APPLICATION EXAMPLE PHILIPPINES**

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The customer can build both single- as well as multi-storey houses with the existing equipment.
What can you create with upcrete®?

Contact us. We will be very happy to inform you about the possibilities that upcrete® offers you.

RATEC GmbH
Karlsruher Strasse 32
D-68766 Hockenheim
Tel. +49-6205-9407-29
Fax +49-6205-9407-30
info@ratec.org
www.ratec.org

Reymann Technik
Karlsruher Strasse 32
D-68766 Hockenheim
Tel. +49-6205-9407-0
Fax +49-6205-9407-20
info@reymann-technik.de
www.reymann-technik.de

RATEC LLC
6003 126 th Ave North
Clearwater, FL 33760 USA
Tel. +1-727-363-7732
Fax +1-727-363-7463
infoUS@ratec.org
www.ratec.org