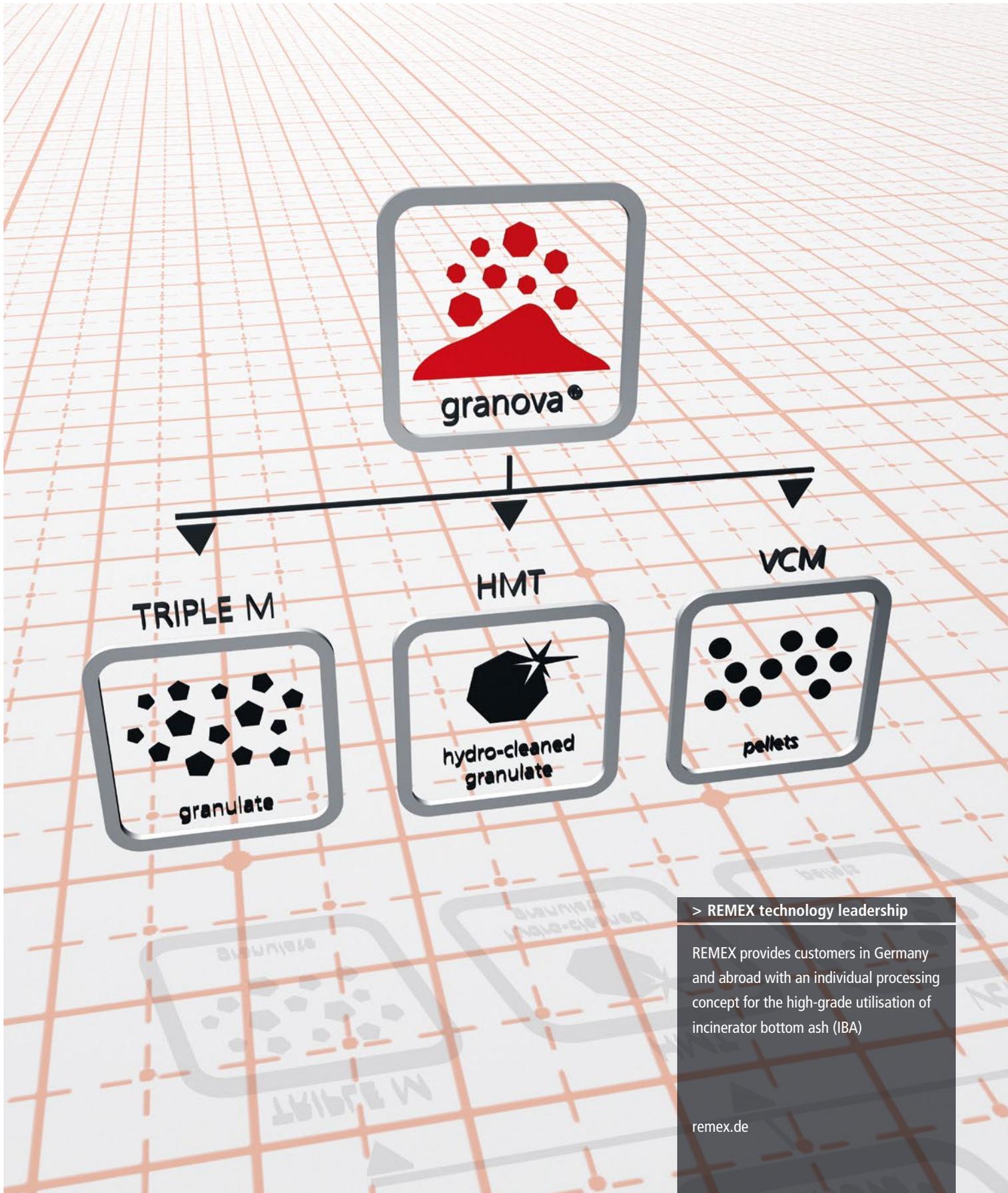


# The processing concept that turns IBA into new products



> REMEX technology leadership

REMEX provides customers in Germany and abroad with an individual processing concept for the high-grade utilisation of incinerator bottom ash (IBA)

Application in concrete products

Future potential in asphalt



> REMEX PROCESSING

## The intelligent processing concept

An industry leader in technology and innovation, REMEX has developed a concept for the treatment of residues from municipal solid waste incineration, which ensures not only maximum metal recovery, but also enables the complete recycling of incinerator bottom ash aggregate for use as quality construction material.

### The central processing unit as basis

The treatment of bottom ash from municipal solid waste incineration in a central processing unit forms the basis of all granova® construction materials. Ferrous and non-ferrous metals are separated from mineral elements by means of different sieving techniques, multi-stage sieving processes, the use of magnets, eddy current separators and our MERIT® technology. In addition, organic contaminants are removed by wind sifters. Manual sorting is also part of the process.

The result is conditioned incinerator bottom ash aggregate (IBAA) of grain size 0/32 mm that REMEX markets under the brand granova® for application in earthworks and road construction. It also serves as a base material for further higher grade processing.

### REMEX innovation: Three additional technologies for high-grade recycling

Through the development of our technologies TRIPLE M, HMT and VCM we can manufacture products that meet the technological requirements for use as secondary aggregate in concrete products, lightweight concrete and asphalt.



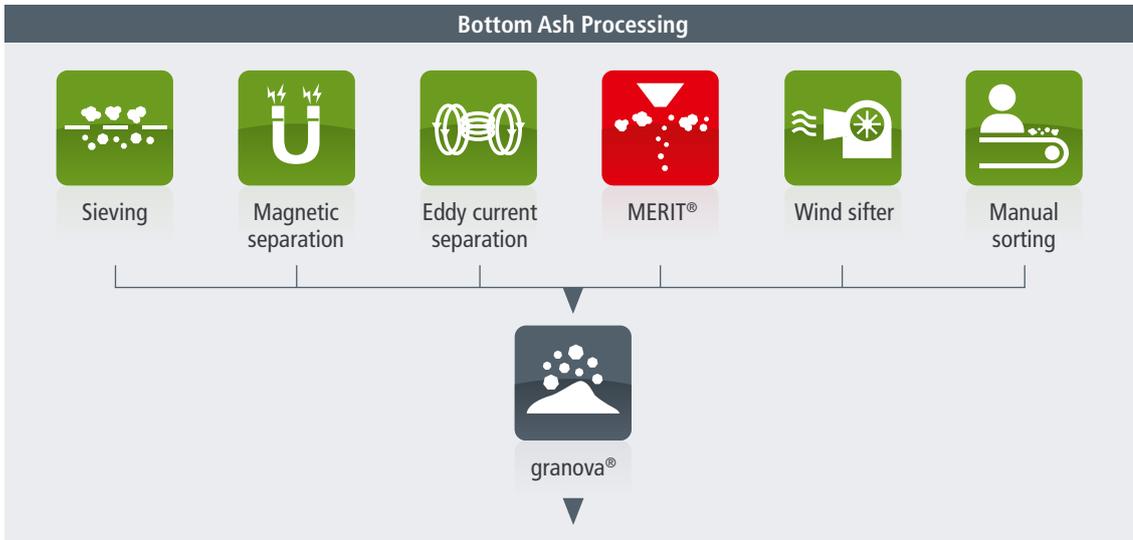
We bundle our competence for the innovative recycling of incinerator bottom ash in our modular technology concept. Find out more online > [remex-processing.com](http://remex-processing.com)



Road construction as typical field of application

Application as secondary aggregate in dams and embankments

granova® applications are numerous and allow for the full and safe utilisation of incinerator bottom ash aggregate



The processing of bottom ash separates valuable metals from the mineral fraction. The metals are recycled, and the incinerator bottom ash aggregates are marketed as granova®



There are three optional technologies for the production of granulates, hydro-cleaned granulates and pellets on the basis of granova®



Aerial photograph of the processing plant of HEROS Sluiskil B.V. in the Netherlands, a 100% owned subsidiary of REMEX GmbH

# REMEX leads the way in the Netherlands

Since the conclusion of the 2012 Green Deal in the Netherlands, clear targets for the qualitative further development of bottom ash from waste incineration have been set. In cooperation with the Dutch Waste Management Association and the Ministry of Infrastructure and Environment, it is a declared target to produce only material that can be applied in construction projects without environmental restrictions, or in corresponding new and high-quality applications.



The adoption of the Dutch Green Deal promotes the quality improvement of incinerator bottom ash > [greendeals.nl](https://greendeals.nl)

## Clear targets

The Green Deal requires that 100% of incinerator bottom ash be recycled without the need for additional technical safeguards. In order to achieve the necessary construction material quality, the ash needs to undergo further processing. This includes optimising the metal recovery rate and achieving a relevant reduction of impurities.



## Technological innovations

As part of the implementation of the Green Deal, REMEX GmbH has invested in the expansion of the existing plant as well as in the development of new technologies at the site of its subsidiary HEROS Sluiskil B.V. The new recycling technologies used on site include the washing of IBA in the HMT unit, the 3D sieving process TRIPLE M as well as the MERIT® technology for improved metal recovery.

## High variety of construction materials

HEROS processes around 650,000 tons of bottom ash per year. Within the framework of product management, the company has initiated corresponding research projects in order to develop new application potentials for the high-quality construction aggregates from ash. The development topics include the production of cement, use as an aggregate in the production of ceramics and bricks, and possible pelletising.

## heros.nl

Learn more about Dutch construction aggregates made from incinerator bottom ash on the website of our subsidiary.



# Multi Mesh Manufacturing

TRIPLE M uses a complex sieving process, leaving the remaining aggregates with improved construction characteristics

From granova® incinerator bottom ash aggregate, the TRIPLE M unit produces a sustainable aggregate that serves as (partial) substitute for primary construction materials. After the base treatment in the central processing unit, the material of the grain size 2/12 mm is passed through a special sieve design for additional cleaning. Magnetic and eddy current separators remove any further ferrous and non-ferrous metals. The resulting granulate is of high interest to the Dutch asphalt and concrete industry. Different grading curves, as indicated in these applications, are manufactured through our multi-functional sieving facility.

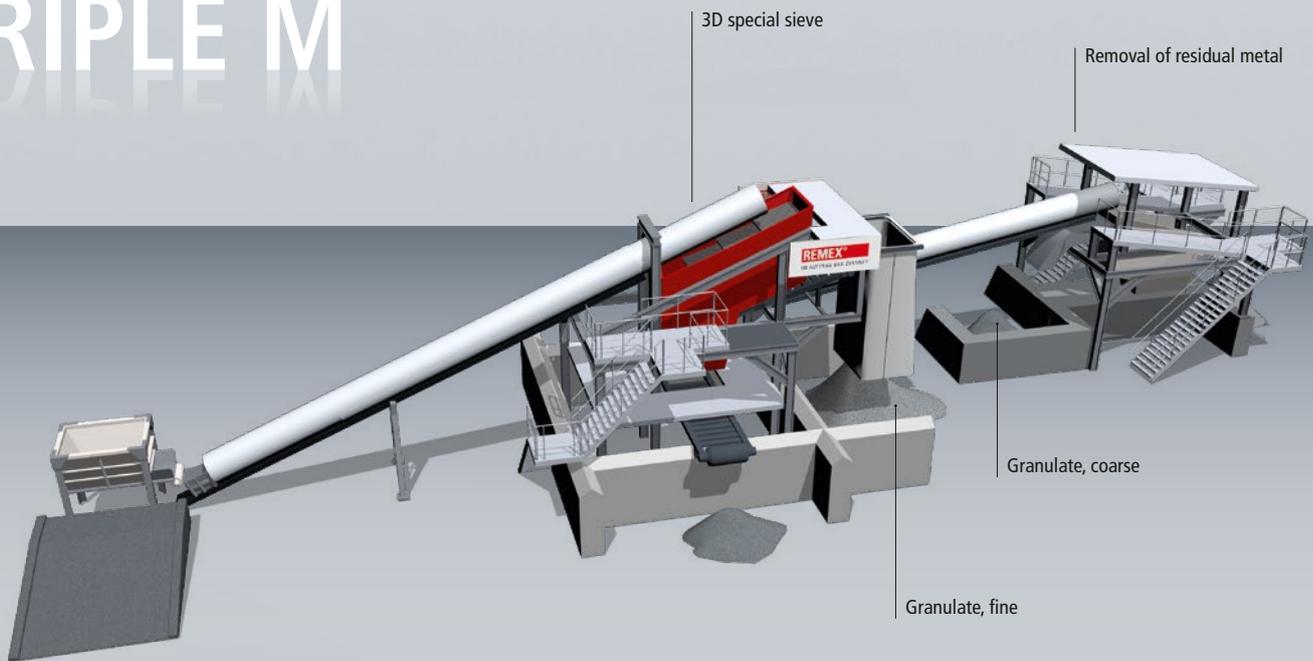


granova® granulates: permitted in Dutch concrete products



Individual grading curves for the asphalt and concrete industry

# TRIPLE M



# Hydro Mechanical Treatment

With the Hydro Mechanical Treatment we substantially improve the environmental characteristics of granova®

By means of a combined washing and crushing facility, the quality of granova® is verifiably enhanced. The pollution levels are reduced, which can be seen from eluate values. In Hydro Mechanical Treatment both the sludge fractions and (light) organic components are removed. After this process, the remaining sandy and coarse fraction is proportionally mixed and provided with an additive. The result is a hydro-cleaned granulate 0/16 containing significantly improved environmental characteristics, so that the protection of soil and groundwater is ensured. In the Netherlands, this material may be used in open constructions without additional environmental safeguards.

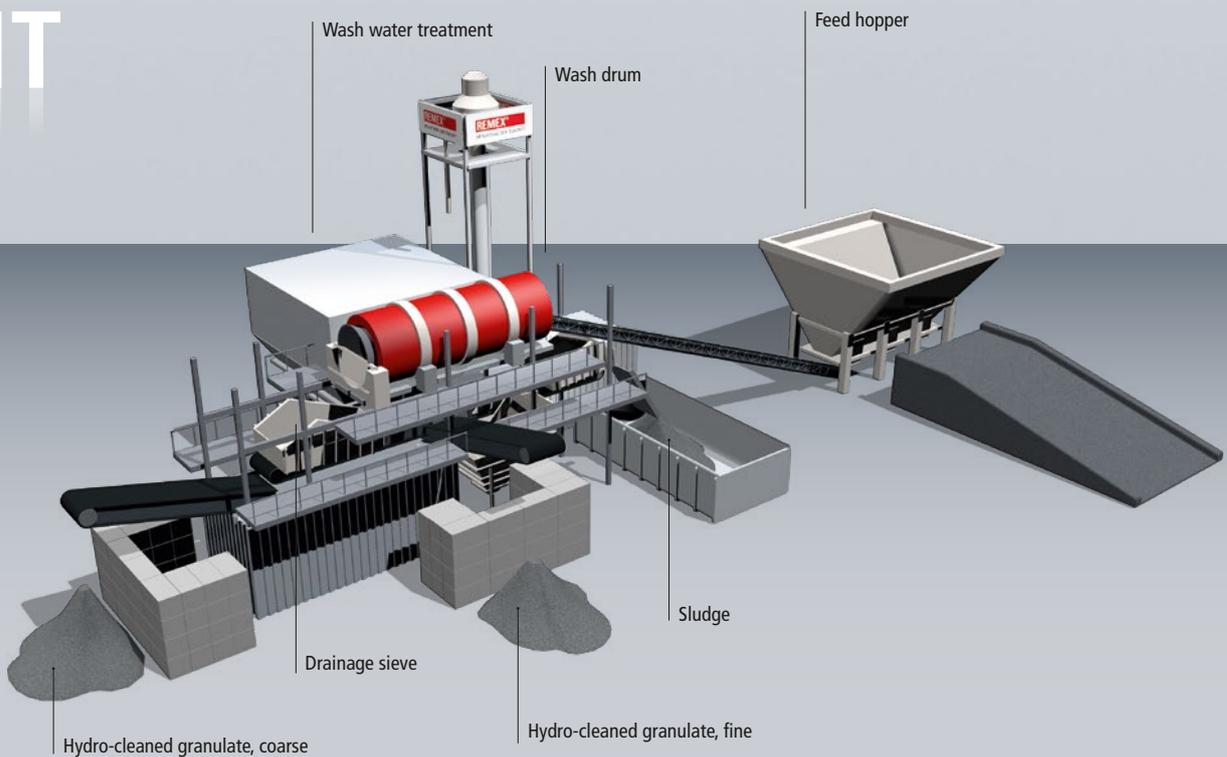


Ecologically safe usage in earthworks and road construction



Hydro-cleaned granulate: free from sludge and extraneous material

# HMT



# Volume Control Manufacturing

Application of granova® material in lightweight concrete can be realised through controlled volume change

With this technology, which is under development, incinerator bottom ash aggregate shall be reprocessed in a system of pelletisation. The base for this is granova® 0/2 mm. Through the precisely matched addition of binding agents, additives and moisture, a mixture is generated in a drum, gaining volume in the pelletisation unit. The planned grain curve of 2/8 mm is developed for use as aggregate in lightweight concrete. As the material is substantially lighter than gravel or grit, it is ideally suited for applications requiring a reduced weight.

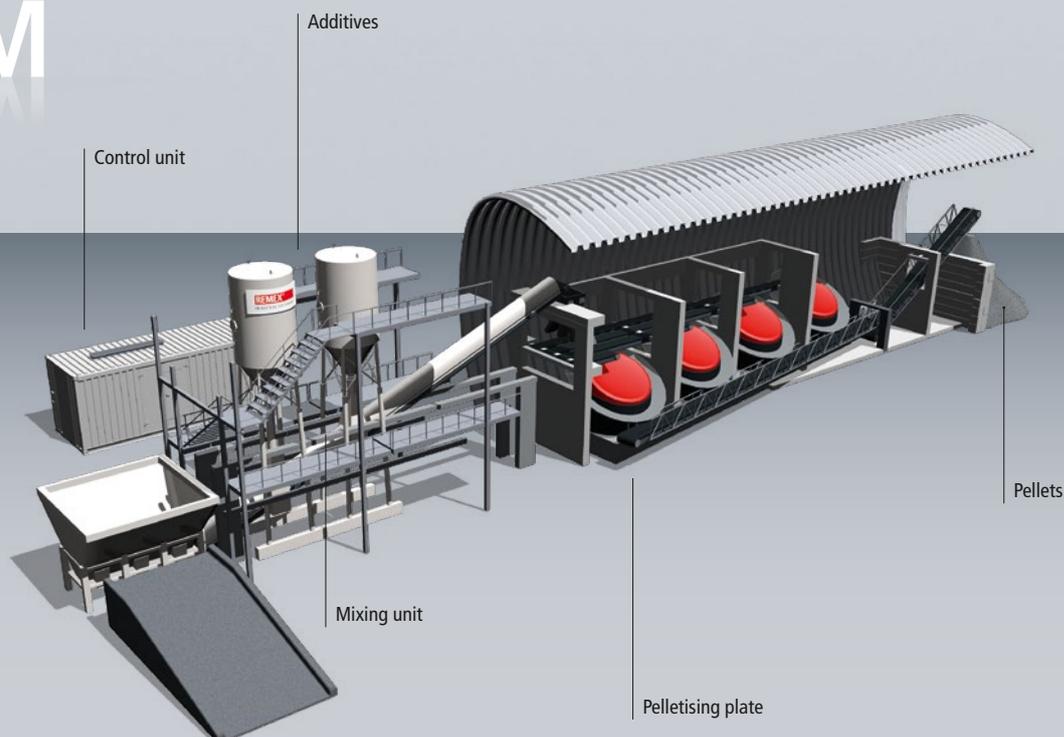


Potential as aggregate for lightweight concrete



Pellets based on incinerator bottom ash

## VCM



# REMEX is the successful processing specialist in Germany and abroad

With more than 30 subsidiaries and associated companies, REMEX GmbH is an internationally sought-after specialist for the recovery of raw materials from different mineral waste sources – whether from industrial processes, construction activities or municipal waste incineration. In addition, the company manages commercial operations in the areas of stowage and stabilisation of underground mines, site remediation and landfill operation.

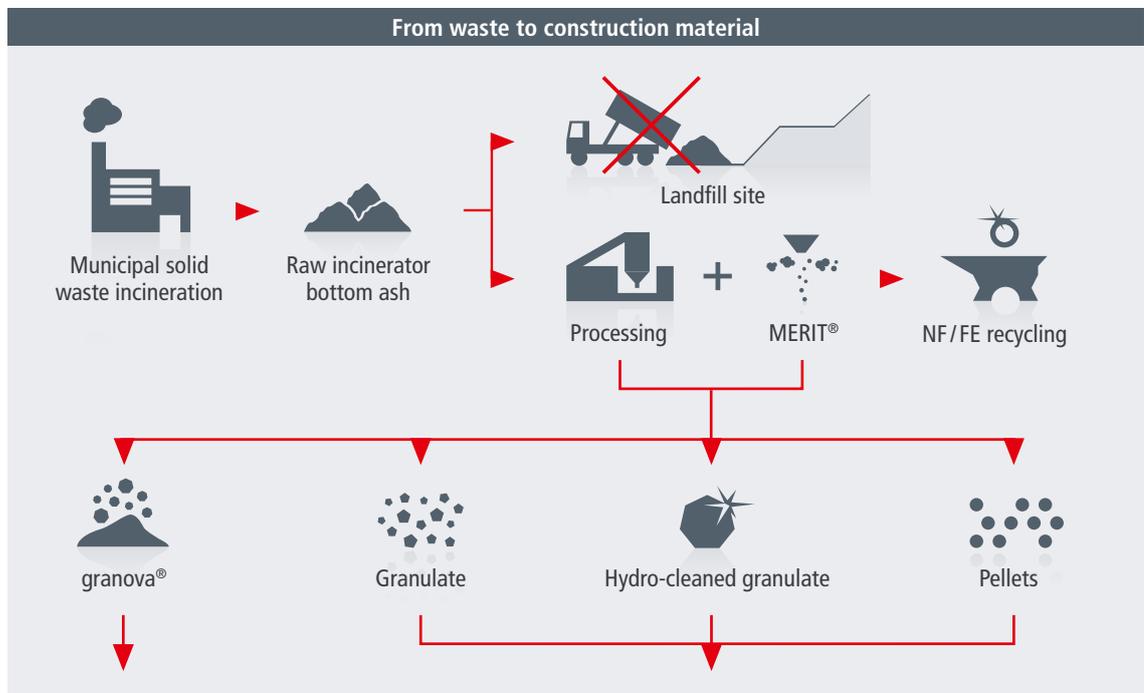


Our recycling specialists can be found at more than **60** locations in Europe and Asia

Core international activities include the processing of incinerator bottom ash (IBA). For the optimal utilisation of the resources contained therein, REMEX operates numerous plants in Germany and abroad. The spectrum ranges from large stationary facilities with an annual capacity of up to 700,000 tonnes to highly efficient smaller mobile solutions that can serve more than one site.

a development that continues to grow and is reflected in the increasing quality of our IBA aggregate. We market this as a high-grade and sustainable substitute construction material under the brand granova®. Technologies designed by REMEX are thus contributing to further improvement in the quality of incinerator bottom ash aggregate, ensuring a future oriented approach for the use of IBAA in new applications and products.

Unique is our MERIT® technology which enables the smallest metal particles to be recovered from bottom ash. This is



REMEX ensures IBA is not disposed of, but rather utilised as high-grade construction material

**Typical applications**

Earthworks, road construction, landfill construction

**Additional applications**

Asphalt    Earthworks, road construction (open placing)    Concrete products    Lightweight concrete

Actual applications of the resulting construction materials are subject to national rules and regulations

# REMEX®

WORKING FOR THE FUTURE

Being a specialist for managing and recycling mineral waste as well as for remediation work, underground stowage and landfill operation, REMEX is part of the REMONDIS Group, one of the world's largest recycling, service and water companies. The company group has branches and associated businesses in more than 30 countries across Europe, Africa, Asia and Australia. With over 30,000 employees, the group serves around 30 million people as well as many thousands of companies. The highest levels of quality. Working for the future.

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