

## Secondary aggregates in brand quality



> **GRANOVA**

Municipal solid waste incinerator  
bottom ash as sustainable construction  
material alternative

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## On solid grounds

Our group of companies is a world leader in the production of secondary aggregates from incinerator bottom ash

GRANOVA is a mineral aggregate produced from the bottom ash of municipal solid waste incineration. Municipal waste that cannot be recycled is thermally utilised in waste incineration plants. In the course of this process, energy is recovered and the waste is reduced to a quarter of the original amount. We use the remaining incinerator bottom ash (IBA) as a resource to produce secondary aggregates for use in a variety of applications in the construction industry.

### Numerous fields of application

Whether in road construction, classic earthworks or landfill construction: secondary aggregates such as GRANOVA can be used in a many ways. The relevant construction regulations and environmental legislation are decisive for use in these applications. Consequently, it is essential that local requirements for safe use are fulfilled. This enables both primary and secondary materials to be optimally used in construction projects – with corresponding benefits for the environment.

### Production at a glance

In order to reuse the incinerator bottom ash from Waste-to-Energy plants, it first has to be processed in dedicated recycling plants. The process essentially consists of classifying the mineral fraction and separating the ferrous and non-ferrous metals as well as organic foreign components. After an appropriate storage period, during which important mineral transformation processes take place, incinerator bottom ash meets the requirements for use as a secondary aggregate.

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On our website you can learn more about incinerator bottom ash – from the origin of the material to production and possibilities for recovery.





### Using the latest recycling technologies

In our plants, the bottom ash is processed using a modular technology approach. This is where our decades of expertise make the difference. We apply our knowledge from the continuous monitoring of treatment results and processing efficiency to develop and implement new recycling technologies adapted specifically to the material. Our unique selling points include the introduction of TRIPLE M 3D screening technology and HMT hydromechanical processing. We also use MERIT® technology, which increases metal recovery in the fine-grain range, resulting in a further increase in the quality of the recovered resources.

### Certified quality

As part of the quality monitoring of GRANOVA aggregates, defined physical and chemical parameters are regularly checked. Test certificates from independent third parties serve as proof that the material properties required for the corresponding application are complied with. Further information can be found at > [quality.granova.de](http://quality.granova.de)

### Regulatory framework at a glance

Like all aggregates, secondary construction materials must also meet the technical requirements for use in construction. In addition, a comprehensive set of environmental regulations must be observed. The permissible areas of application are influenced by factors such as the location of the construction site in relation to the groundwater, water protection area status or type of construction.

In the application of secondary aggregates, both environmental and structural requirements must be considered



[applications.granova.de](http://applications.granova.de)

The traffic light system that we developed for German customers, serves to illustrate the possible uses of IBA in relation to the regulatory framework.

## Convincing references

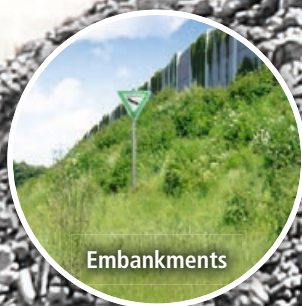
Our references demonstrate the range of possible applications for GRANOVA aggregates. Each measure has a unique nature – because each project has its own challenges. All measures have one thing in common: the use of incinerator bottom ash improves both economic efficiency and sustainability.

### Project examples online

On our reference page, we present various projects – from the construction of a motorway and noise protection barrier to use as a landfill construction material in the expansion of the Kapiteltal landfill site. Additionally, in the Netherlands, our subsidiary HEROS Sluiskil B. V. is already using GRANOVA as an aggregate for concrete and asphalt production as part of the Green Deal. You can find current project examples on our > [references.granova.de](https://www.granova.de/references)

### Production locations

GRANOVA is an international brand of sustainable construction material that is produced exclusively in the plants of the REMEX Group. An overview of all production locations including the corresponding contact details can be found at > [locations.granova.de](https://www.granova.de/locations)



# Sustainable advantages for climate protection

Climate credit of **0.2 t** CO<sub>2</sub> equivalent per tonne of municipal solid waste incinerator bottom ash

As with all secondary construction materials, the reuse of municipal waste incineration bottom ash also contributes to protecting landscape and reducing the burden on landfills. In addition, metal recovery during the processing of waste incineration ash has proven to be especially valuable with regard to climate protection.

### Recycled metals = improved climate balance

During the processing of bottom ash, valuable metals are separated from the ash. These recycled metals have a significantly improved climate balance compared to metals produced with primary materials. Looking at the recovery rate of metals from ash, an actual climate benefit can be calculated. In Germany, for example, the recovery of iron from ash averages about 7.7% by mass, and that of non-ferrous metals about 1.3% by mass. In our experience, the non-ferrous metals amount to 0.7 mass-% aluminium and 0.3 mass-% copper. A further 0.3 mass-% of mixed

non-ferrous metals are omitted from the calculation of the climate benefit using a conservative approach.

### Calculation of the climate benefit

Multiplying the recovery rate of the metals from one tonne of bottom ash by the respective CO<sub>2</sub> savings of the individual metal type determines the amount of climate credit. It amounts to approximately 0.2 tonnes of CO<sub>2</sub> equivalent per tonne of processed municipal solid waste incinerator bottom ash.

Most important recycled metals from bottom ash	Iron	Copper	Aluminium
CO <sub>2</sub> savings from recycled metals in metal production	1.75 t CO <sub>2</sub> -eq./t	4.76 t CO <sub>2</sub> -eq./t	12.58 t CO <sub>2</sub> -eq./t
Average metal recovery from 1 tonne of bottom ash	0.077 t	0.003 t	0.007 t
Climate benefit of recycled metals from 1 tonne of bottom ash	0.135 t	0.014 t	0.088 t

The REMEX Group combines special construction material solutions and service concepts for the waste management industry, construction sector and industrial production under the name REMEX Solutions. The portfolio includes secondary aggregates GRANOVA and REMEXIT as well as the services PP-LANDFILL for cooperation in landfill projects and TS-RECOVERY for the management of road demolition waste containing tar.