

**HAZEMAG Test Plant |
Material testing, application advice**





Our state of the art facility is your research center

Material Analysis and Testing

HAZEMAG offers a range of application support services found in our material testing facility. We have the ability to offer our customers a full scale testing program for the analysis and further understanding of their raw material. For example, we can conduct tests for both fine and coarse crushing. Drying as well as a combination of drying and grinding tests can also be carried out with the latest technologies and measurement systems. The complete program offers our customers important information and data in regard to throughput rates, wear costs, energy consumption and behavior characteristics for their raw material. These practical and comprehensive results are often looked upon as the basis for the investment decision.

What is needed?

Feed materials (representative samples) for comminution or drying tests must be provided by the customer free of charge. Please refer to the table 'Test procedures and sample description' with regard to required quantities and sizes.

For the test numbers 15-19, we require delivery in 1t Big Bags. Smaller quantities may be delivered in barrels or similar. Please feel free to contact HAZEMAG to discuss in detail the amount of test material that is needed for your specific project.

The test sample shall be identified with the following information:

- Company name
- Contact person
- Phone number
- Description of material (e.g. Limestone)
- Identification (e.g. Project, Site, etc.)

What else is needed?

Required raw material and process data

- Chemical and/or mineralogical analysis
- Hardness and compressive strength of the feed material
- Moisture content of the supplied material and (in the event of deviations) the humidity of the typical feed material
- Source of the material
- Your requirements for the product
- Desired intended use and purpose
- Safety data sheet of the material (if applicable)

Test Plant Location / Shipping Information

The HAZEMAG Test Plant is located in Dülmen. Customer samples shall be shipped, freight pre-paid, to the following address:

HAZEMAG & EPR GmbH

Test Plant
Brokweg 75
48249 Dülmen
Germany

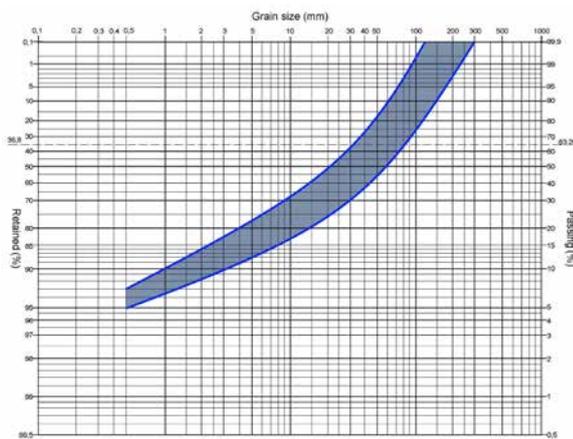
Accompanying documents necessary are:

- Proforma invoice
- Packing list
- Bill of Lading

Please send those documents prior to arrival of samples via Email to:

testplant@hazemag.de





Particle size distribution curve as part of the test report

How does it work?

Based on your information regarding the material and product description we define and choose the test procedure to be used. Please refer to the table 'Test procedures and sample description'.

After receipt of the samples appropriate dates for the test program will be agreed.

What does it cost?

In general tests will be charged at 2.500 € / day plus possible test material disposal cost. If you decide to purchase a machine or plant as a result of such tests, these costs will be credited against the order value.

HAZEMAG Partnership

With total customer support and satisfaction in mind, the HAZEMAG Test Plant offers an intense commitment to the success of our customers by offering a range of our material testing and product support services. Our modernized facility truly strengthens and emphasizes our focus around you – The HAZEMAG Customer!

We look forward to serving your needs.

HAZEMAG Test Report

Customers are provided with a detailed, informative report specific to the project characteristics of their raw material sample(s).

This is your test plant

A place for practical, application specific, raw material investigation. A program that helps establish valuable information specific to your project goals, material processing needs and the potential use of HAZEMAG equipment and services. It's all about you: The HAZEMAG Customer!

It goes without saying that you are invited to accompany the tests in our Test Plant, which would in addition be a great opportunity to discuss your project in detail.

Behind the operation of every HAZEMAG product is found a wealth of experience, backed by a level of partnership and product support that remains second to none. Our application knowledge, equipment flexibility and market competitiveness puts us in a unique position to react to your precise project needs. We call it „Partnership Unlimited – the HAZEMAG Way“.





Test Plant facilities

The existing plant facilities allow for the equipment to be combined and operated within the following groups:

- laboratory testing
- coarse crushing / sieving
- fine crushing/grinding
- drying
- grinding & drying

The machines in the plant are all from the current HAZEMAG range of equipment, to ensure that field conditions are replicated as close as possible.

The layout of the coarse crushing section has been designed to use one of the two impactors or the roll crusher. If a screen unit is used, oversize material can be returned to the feed material flow, i.e. operation in closed circuit.

The fine crushing and drying section with a hammer mill and a rapid dryer forms another core part of the test plant.

The hammer mill has been integrated into the system in such a way that a range of crushing/ grinding & drying operations are possible.

In the section set aside solely for drying technology and the processing of wet feed materials is a rapid dryer, the feeding and discharge of which is effected by HAZEMAG rotary gate valves; the fine material is separated via cyclone and filter.

The whole plant is computer-controlled. There is a visual display of the current operational status of all units. A total of six basic menus are available, which can be modified as needed.

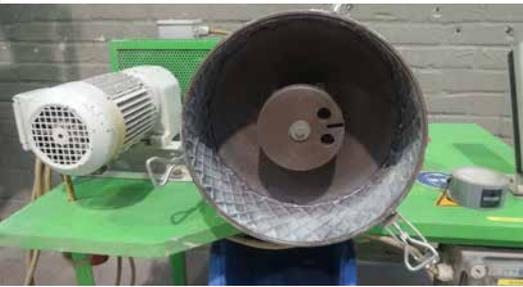


Roll Crusher/Sizer



Fine Grind





During the test process, the status of the individual equipment, such as the power input of the electric drives, the rotor tip speed of the crushers as well as the various system temperatures are displayed. Pre-programming of various parameters is also possible.

Laboratory equipment and test evaluation

All the results from the tests carried out in the HAZEMAG Test Plant as well as any other special tests and investigations are evaluated in the test plant's own laboratory. Such tests are carried out to determine the following:

- Plant capacity
- Power requirements
- Granulation curves
- Wear rates
- Thermal loads
- Moisture contents

Such data forms the basis for the fulfilment of user requirements.

For specific detailed tests, a laboratory crusher, a laboratory roll mill, adhesion measuring device, Liquid limit apparatus by Casagrande, HAZEMAG Abrasion test equipment according to the Pennsylvania Test method and a point load tester are available.



Test procedures and sample description

no.	procedure	scope of test	required sample quantity	required sample particle size	comminution	drying
1	Bulk density	Bulk density	–	–	■	■
2	Sieving	Particle size distribution	–	–	■	■
3	Point load test	Compression strength	30 - 50 particles	25 - 70 mm (typical Ø 50 mm)	■	–
4	UCS	Compression strength	30 - 50 particles	Cube of 50 or 70 mm edge length, alternatively drilling core (cylinder)	□	–
5	Wear disc test	Wear determination	5 - 10 particles	180 - 220 mm	□	–
6	HAZEMAG Abrasion test	Wear determination	4 x 400 g	12.5 - 19 mm	■	–
7	Chemical analysis	Chemical composition and free SiO ₂ content	500 g	< 150 mm	■	■
8	Rock texture analysis	Crushability forecast	3 particles	130 - 170 mm	□	–
9	Hardgrove Test	Grindability of coal	2 kg	≤ 100 mm	□	–
10	Laboratory impactor	Crushability and wear determination	40 kg	10 - 25 mm	■	–
11	Moistening and Drying	Determination of moisture content and saturation point	–	–	■	■
12	HAZEMAG adhesion measuring device	Determination of the potential of clogging of cohesive soils	–	Soils and clays only	□	□
13	<ul style="list-style-type: none"> • Liquid Limit • Plastic Limit • Plasticity Index • Consistency Index 	Determination of the potential of clogging of cohesive soils	–	Soils and clays only	□	□
14	Laboratory roll mill	Determination of crushability	20 kg	< 35 mm	□	–
15	Hammermill	Crushability, wear and energy requirement determination For grinding & drying: Remaining moisture content	2 Big Bags or 10 kg for quick test	< 45/50 mm Additional with hot gas generator for drying	□	–
16	HSI impactor	Crushability, wear and energy requirement determination	4 Big Bags	< 220 mm	□	–
17	HTI impactor	Crushability, wear and energy requirement determination	4 Big Bags	< 150 mm or < 70 mm for sand application	□	–
18	HRC / HCS	Crushability, wear and energy requirement determination	1 Big Bag or 20 par- ticles for quick test	< 150 mm	□	–
19	HRD	Remaining moisture content, particle size distribution and energy requirement determination	5 - 6 Big Bags	≤ 100 mm	–	■

Legend: ■ mandatory □ optional – not applicable

Table 20-1: Test procedures and sample description

TEST PROGRAM RAW MATERIAL & PROCESS DATA SHEET

To assist us in putting together the appropriate test program, please provide as much information as possible. A copy of this form be mailed to: **testplant@hazemag.de**

CUSTOMER NAME AND ADDRESS:

_____ Contact Person: _____
_____ Telephone Number: _____
_____ Fax Number: _____
_____ E-Mail Address: _____

TESTING MATERIAL DETAILS:

Description of the material: _____
Source of the material: _____
What is the moisture content: _____ %

PROPERTIES:

PHYSICAL (if known):
Compressive Strength: _____

CHEMICAL (if known):
SiO₂ _____ % MgO _____ % CaCO₃ _____ %

APPLICATION REQUIREMENTS:

Capacity of feed per hour: _____ t/h
Feed Size(s) required: _____
Has material been pre-crushed? _____
If so, in what type of crusher? _____
Required product size: _____
Required remaining moisture content: _____

OTHER INFORMATION:

Signature, Date

The HAZEMAG Know-How becoming apparent in connection with the tests is to be understood and treated as confidential and is not to be communicated to a third party.
Terms and conditions as per HAZEMAG Test Plant-Brochure apply.



**HAZEMAG Test Plant –
looking forward to serving your needs!**