

FA test cores and results

Action B3 Test series of molds, cores and casts produced by inorganic and organic binder systems

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- ❑ Cores production: the procedure for the production of cores with inorganic binders
- ❑ Cores analysis tests: test to evaluate and estimate the behaviour of cores produced with inorganic binders
- ❑ Tests on foundry castings: tests to evaluate the characteristics of castings made with inorganic cores



CORES PRODUCTION



- ❑ Outsourced to a core shop factory. 2 production lines, one for organic and the other for inorganic binders (non ferrous metals mainly). 4 core blowing machines for inorganic binders
- ❑ Unipg, FA supervision



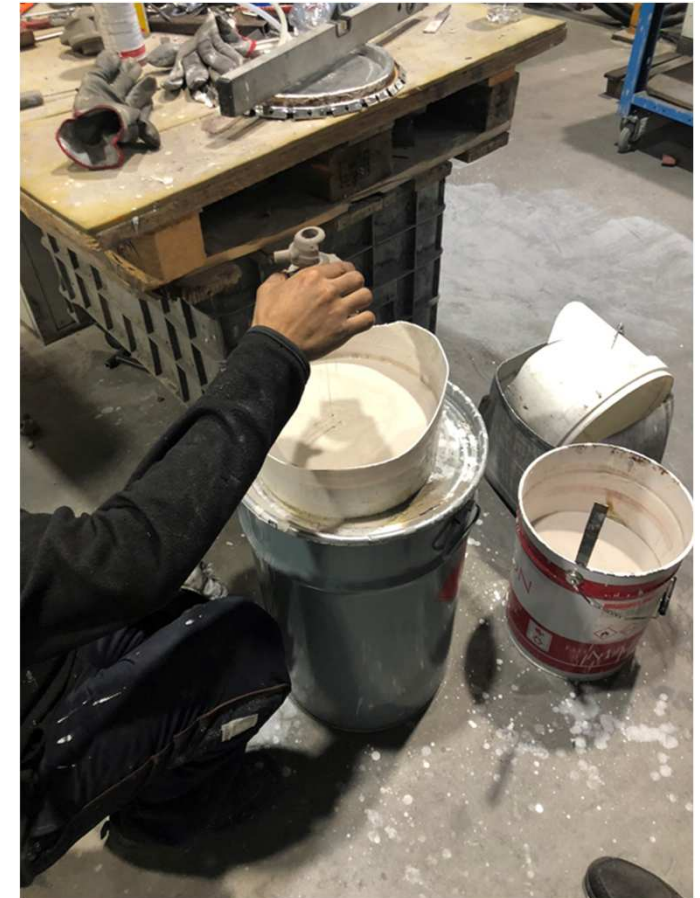
CORES PRODUCTION

- ❑ 2 different binders used:
 - ✓ Cordis 8593 with additive "Anorgit 8608". HÜTTENESALBERTUS S.P.A.
 - ✓ "Inotec hc 2000f" with additive "Inotec promotor tc 500".



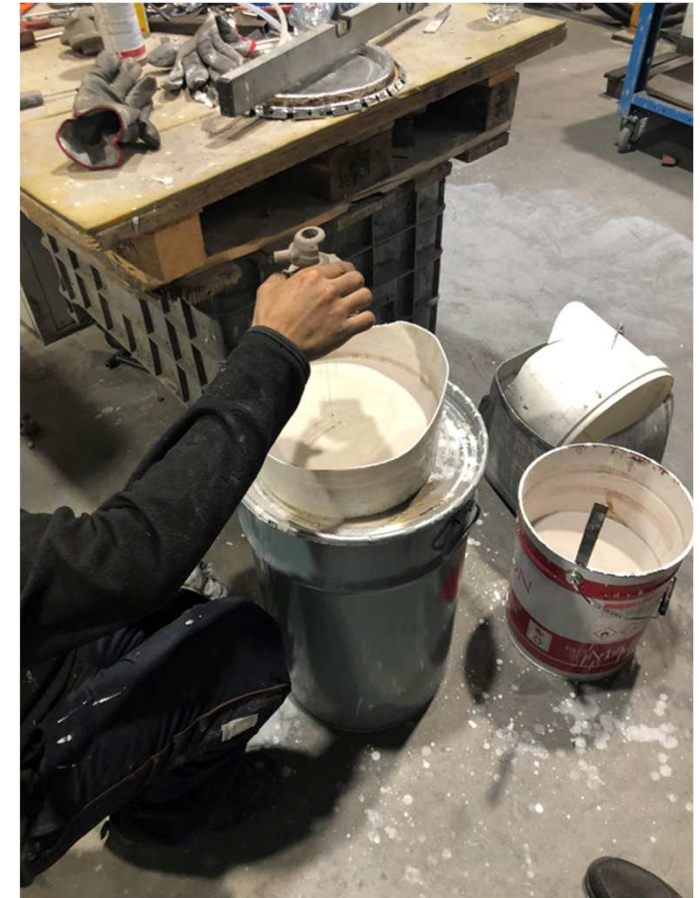
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- FA core box adapted for heating.
- An alcohol paint used except few cores for control checking.



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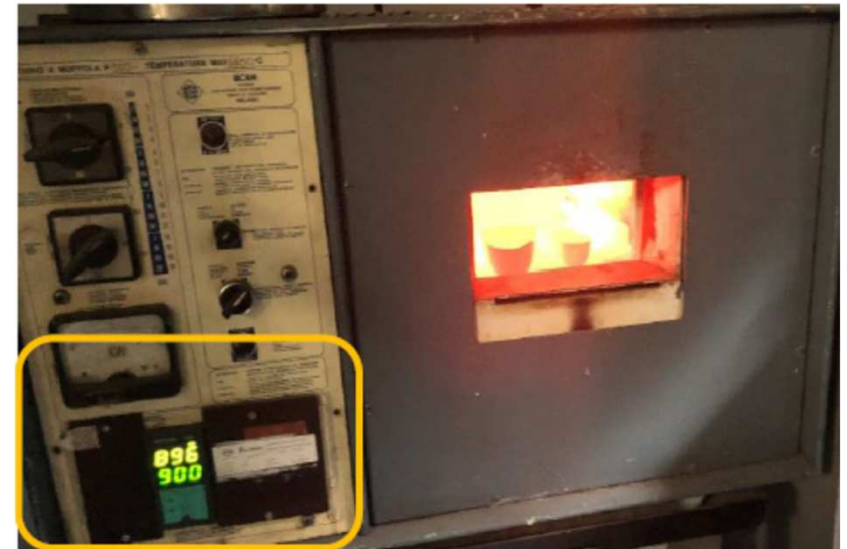


CORES PRODUCTION

- ❑ Core packed and sent to FA
- ❑ An alcohol paint used except few cores for control checking.

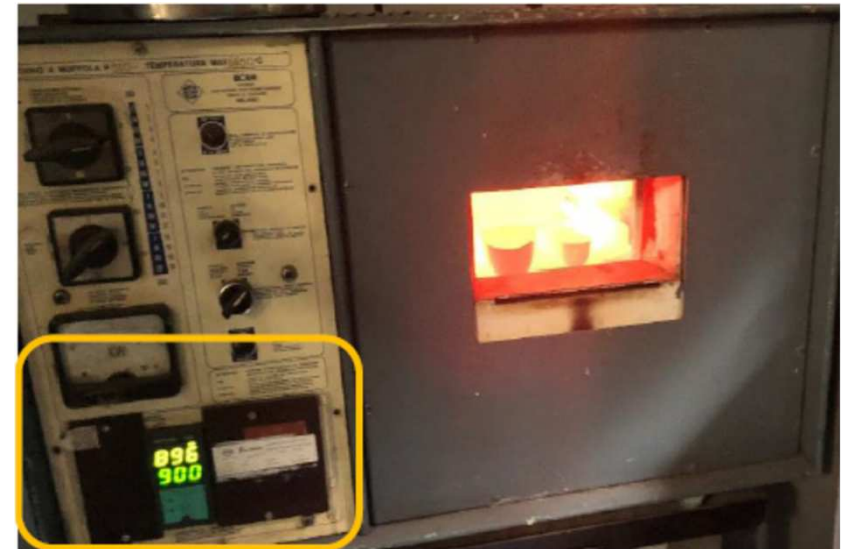


CORES ANALYSIS TESTS



- ❑ In the “FA” chemical laboratory
 - ✓ loss of ignition analysis or loss on calcination i.e. loss in weight of the sample after passage in the muffle at 900 °C for 2 hours
 - ✓ Visual evaluation of the calcined residue
 - ✓ Optical microscope evaluation of the sand residue obtained after calcination

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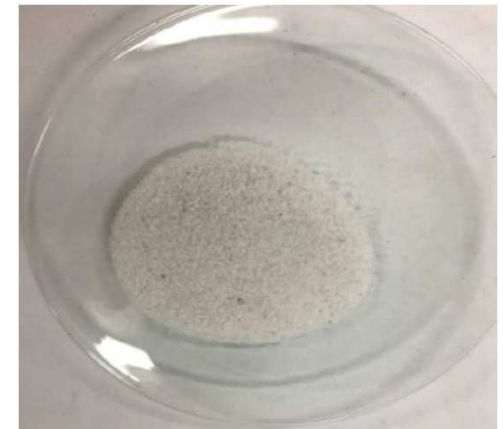
Organic Binder

Inorganic Cordis

Inorganic Inotec

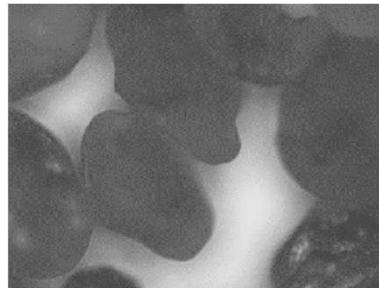
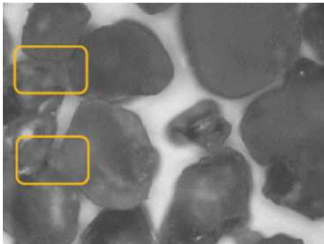
CORES ANALYSIS TESTS

	Core with organic binder	Core with CORDIS inorganic binder	Core with INOTEC inorganic binder
Core upon arrival	1,60	0,42	0,57
Core after staying for 6 days in the laboratory	1,57	0,40	0,44
Core after staying for 6 days in the production department	1,54	0,27	0,40



CORES ANALYSIS TESTS

- ❑ Microscopic evaluation of the sands before and after calcination in the muffle at 900 °C



CORES ANALYSIS TESTS Results

- ❑ The cores have a significantly lower LOI than those produced with organic binder and Cold-Box system (isocyanic-phenolic resin). (lower gas);
- ❑ Cores with inorganic binders not particularly hygroscopic and do not show any visible weakening upon handling;
- ❑ weight lost during is water vapor and not by organic compounds;
- ❑ state of aggregation. in the shakeout phase, the cores remain compact within the casting but in the shot blasting phase the cores are easily extruded;

CORES ANALYSIS TESTS

- ❑ the sand grains after calcination, for both cores produced with an inorganic system, appear to be coated with a vitrified and adherent layer, which could influence the behaviour of the sand reused as material for external moulding bonded with clay (green sand). The tests on green sand are being carried out in external laboratories.
- ❑ However, it is still necessary to make evaluations after many cycles of use in production and with significant quantities.

Test of foundry castings

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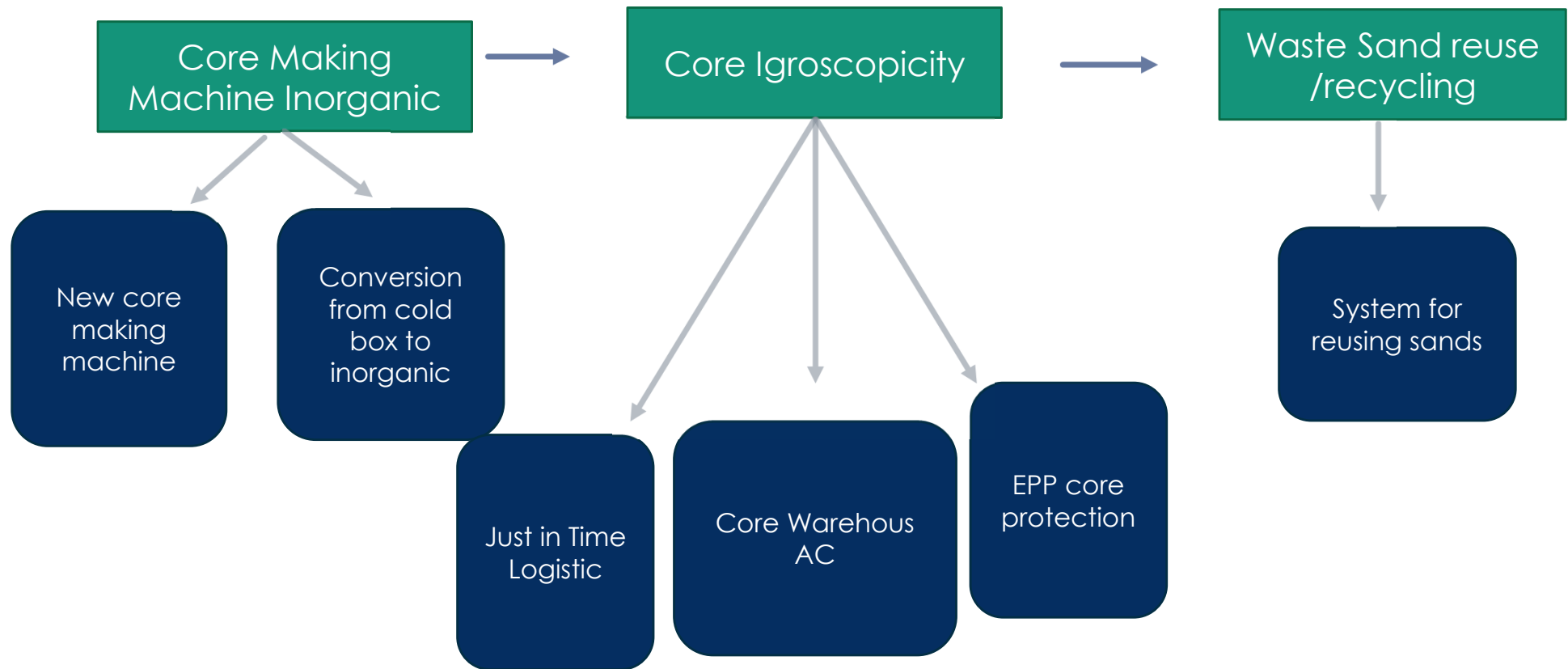
- ❑ A total of 320 castings are produced
- ❑ 96 pieces are knocked out by hand: picking the casted mould (sand mould with metal bracket).
- ❑ The remaining 224 are knocked out in automated plant with vibrating channel: automated system of extraction of the sand mould with casted part and feeding system, from metal bracket by mechanical system through a piston and subsequent passage on a vibrating belt that separates the loose sand from the cast metal.



Test of foundry castings

- ❑ Type X : total of 135 casted irons, 106 are ok, 29 broken core (21.5%)
 - ❑ Type I : total of 84 casted irons, 83 are ok, 1 broken core (11.9%)
 - ❑ No identification: total of 5, all KO because of broken core
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- ❑ Final Results: The quality of product with inorganic binder is good

Feasibility Study



Thanks
QUESTIONS?