

## SUMMARY 1



Green Foundry LIFE project (LIFE17 ENV/FI/000173)

AGH – University of Science and Technology Faculty of Foundry Engineering

*The new inorganic binder system is based on the sodium silicate (glass water) or aluminosilicate, which reduces the amount of harmful components indoor and in ambient air.*

**Action B1: Emissions of different binder classifications during small – scale test casts.**

**Method 1. Testing foundry at AGH-UST - laboratory test.**

Investigation of the gases emission in the small test were performed according to the original method. The six binders for moulding sands were tested:

organic binders: furan resin (code MF) and phenol-formaldehyde resin (code MA).

inorganic binders: (code MI and code MC and code MG )

greensand – activated bentonite (code MB).

Total emission BTEX and benzene calculated per 1 kg of binder and 1 kg of moulding sand

CODE	Per 1 kg of binder, mg		Per 1 kg of moulding sand, mg	
	Total BTEX	Benzene	Total BTEX	Benzene
<b>MF</b>	43 852	40 158	658	602
<b>MA</b>	32 994	30 911	495	464
<b>MG</b>	3 342	2 837	60	51
<b>MC</b>	715	496	24	16
<b>MB</b>	2 510	2 301	176	161
<b>MI</b>	860	556	22	14

Total emission PAHs and benzo(a)pyrene calculated per 1 kg of binder and 1 kg of moulding sand

CODE	Per 1 kg of binder, mg		Per 1 kg of moulding sand, mg	
	Total PAHs	Benzo(a)pyrene	Total PAHs	Benzo(a)pyrene
<b>MF</b>	806	16	12.09	0.24
<b>MA</b>	658	11	9.87	0.17
<b>MG</b>	175	3	3.14	0.06
<b>MC</b>	66	0.39	2.18	0.01
<b>MB</b>	83	2.19	5.80	0.15
<b>MI</b>	76	0.6	2.0	0.02

### Main conclusions:

- moulding sand with organic binder generated 2 to 3 times more gas volume than inorganic,
- green sand (MB) showed relatively low emission of compounds from the PAHs and BTEX groups because in the bentonite mixture the coal dust was partly replaced by more environmentally friendly components.