In industrial nations with a high population density and a limited supply of industrial real estate, the use of buildings and space is continually subjected to change. Therefore an examination of the soil is inevitable for investors, authorities and private users. Environmental analyses are the basis for the detection of potential hazards and the protection of people and invested capital.

ALcontrol Laboratories prepare and analyze up to 600 soil samples per day and have recently been involved in a major share of the land remediation for the East London Olympic village site ahead of construction for the 2012 London Games.

Sample preparation of soils

The standard ISO 11464 12.96 stipulates the determination of inorganic hazardous substances in soils. For most soil samples it is sufficient to separate the coarser grains above 2 mm by sieving and only examine the finer particles. If there is an indication for an increased level of hazardous substances in the coarser fraction, this can also be analyzed after preliminary size reduction and subsequent homogenization.

Typically ALcontrol were testing 150 g samples dried at 35°C to prevent the loss of volatiles, pre-crushed to 10.0 mm (if required) and the whole sample milled to a fine and homogenous powder.

Rapid preparation of the sample, avoidance of contamination (especially heavy metal trace elements such as Nickel and Chrome) from any contact surfaces of the mill and ease of cleaning were of paramount importance in selecting instruments to cope with this high throughput demand to avoid a bottle neck at the analytical instruments.

ALcontrol Laboratories approached RETSCH (U.K.) to help solve this problem and they were invited to spend a day at our Application Laboratory in Leeds. Darren Rose, Laboratory Manager at ALcontrol brought a variety of different samples to Leeds to test RETSCH instruments and to see how they handle difficult samples. A number of the samples ALcontrol deal with contain hard material such as concrete which in the past has proved difficult and time consuming to prepare.

“WITH SHORTER GRINDING TIMES AND LESS PHYSICAL LABOUR, RETSCH HAS REALLY HELPED IN IMPROVING OUR EFFICIENCY.”

(Darren Rose, ALcontrol)
Following extensive timed suitability trials the solution to their problem was to use two BB 200 Jaw Crushers to pre-crush coarse material to < 10.0 mm and the use of six RS 200 Vibratory Disc Mills each supplied with two heavy metal free (no Nickel or Chrome) steel grinding jars. Darren Rose commented “It is very important for us not to contaminate the samples we grind so using heavy metal free steel grinding jars was a perfect solution to this and reduces cleaning time in between different samples.”

Typical grinding times were reduced from approximately two minutes on the previous instruments to 8 seconds using the RS 200 at 1,200 rpm thus meeting the high demand with ease. “The instruments we previously used at ALcontrol would take a considerable amount of time to mill a sample. RETSCH have not only reduced this time but also improved the quality as the 8 seconds grinding time allow us to achieve a perfect particle size of 212 µm. This gives us a proper representative sample for the customer”.

Health and Safety issues have also been resolved with the use of RETSCH instruments. “Before RETSCH, the mills we used were heavy and awkward. Even the jars we used were heavy, making the job of running samples more physically demanding. This has now been resolved so along with shorter grinding times and less physical labour, RETSCH has really helped in improving our efficiency. We can now run samples much quicker thus meeting and exceeding customer waiting times. Everything is urgent in the soil business so RETSCH instruments are ideal for our needs, we are really happy with the level of service they deliver”.

“Using heavy metal free steel jars was a perfect solution not to contaminate the samples.”
(Darren Rose, ALcontrol)

JAW CRUSHER BB 200
- Feed material: medium-hard, hard, brittle, tough
- Material feed size*: < 90 mm
- Final fineness*: < 2 mm
- Zero-point adjustment for wear compensation
- Breaking jaws made of various materials

VIBRATORY DISC MILL RS 200
- Feed material: medium-hard, hard, brittle, fibrous
- Material feed size*: < 15 mm
- Final fineness*: < 40 µm
- Analytical fineness within seconds
- Excellent reproducibility

The ALcontrol facility at Hawarden

The sample page 5