

Technology Development Headquarters

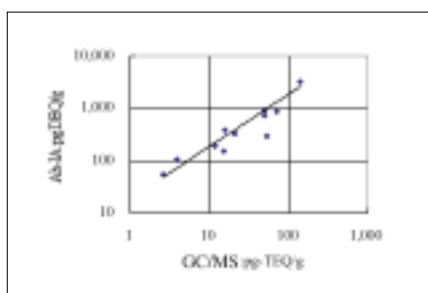
“Ah-Immunoassay” kit for toxic analysis of dioxins

The standard method of assessing the dioxin-like toxicity of a test mixture is to separate laboriously the compounds by Gas chromatography-mass spectrometry (GC/MS). This method is exquisitely sensitive, but expensive and labor-intensive. Thus, this standard assay method is not well adapted to

high sample throughput screening. All dioxin-like compounds are toxic by virtue of their ability to interact with a cellular protein called the “Ah-receptor”. The Ah-IMMUNOASSAY is an Ah-Receptor binding assay designed to screen rapidly and economically for dioxin-like toxicity in environmental and

tissue samples, based on toxic appearance mechanism by Ah-receptor mediation.

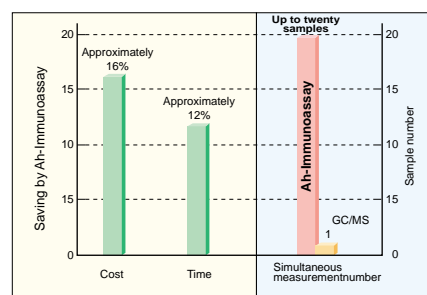
Kubota will contribute to environmental conservation by an innovative screening tool, Ah-Immunoassay.



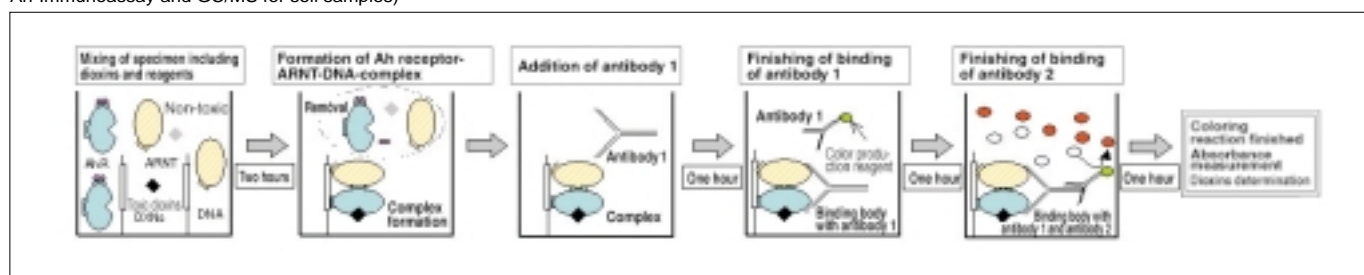
An example of analysis result (Relationship between Ah-Immunoassay and GC/MS for soil samples)



Ah-Immunoassay kit



Comparison with GC/MS



Principle of Ah-Immunoassay

Aluminum alloy parts development by high-strain-rate superplastic forming

Small sized and lightweight parts are socially considered to be essential in automobile industry, electric industry and precision machinery industry from the viewpoint of environmental conservation and saving energy. Therefore, lightweight and high functional aluminum alloy development is strongly expected. Aluminum alloy formed by powder metallurgy using rapid solidification powder and so on is excellent in function. However the alloy has problem such as less machinability and high manufacturing cost. We at Kubota has solved this problem by

development of new powder metallurgical process based on high-strain-rate superplasticity whose strain rate is greater than 10-2/sec (equivalent to that of industrial press forming) to realize high function, high productivity and low manufacturing cost of parts.

This forming process can save energy and resources by near net shape forming of complicated shape parts with low cost and with little burr. Notch sensitivity (fracture toughness), which was problem in conventional powder aluminum alloy, was also improved. This process is applica-

ble to various kinds of machinery parts.

We are now considering the application to the pistons of automobile engines, and automobile air conditioner scroll parts with thin and high tooth.



Automobile air conditioner scroll parts

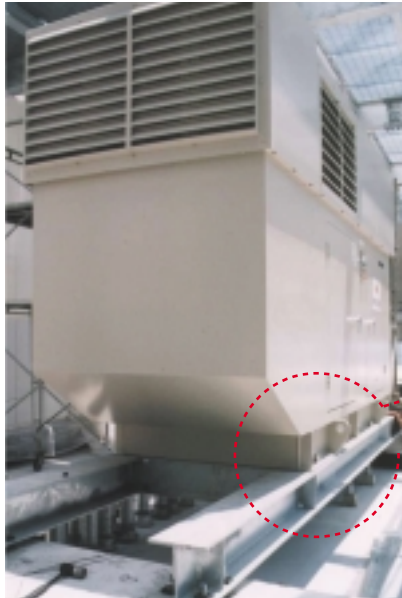


Pre-formed product (billet)

Vibration isolator for independent electric power generator

There is a growing need for power generator as emergency or backup electric power supply in the buildings such as condominium and so on. The power generator is usually installed on the roofs of the buildings. Vibration or noise may occur by generator installation.

We at Kubota has developed vibration isolator by using new vibration isolated material, in collaboration with a construction company and a equipment company, to reduce vibration or



An example of independent electric power generator

noise. This isolator is made of cast iron flakes (FC25), which is excellent in vibration damping ability in many metal materials. This material is manufactured by press forming following direct electricity heating, consisting of three layers, namely thin,

dense and thin.

This material is excellent in vibration damping and sound insulation, and hardly deforms because of its hardness unlike rubber. We have reduced 3dB in vibration, and 2dB in noise by this vibration isolator compared with conventional direct support by steel plate.



Vibration isolator

Bio-pesticide "Bui Hunter"

"Bui Hunter", we at Kubota are now promoting putting it into practice, is a bio-pesticide (BT agent) which is effective only to scarabaeid beetle larvae for the first time in the world. We are developing economical culture method

and formulation method to turn it into products as control agent of scarabaeid beetle larvae, main injurious insect in soil.

"Bui Hunter" has the same control effect as conventional chemical insecti-

cide has. Injurious insect control in soil by chemical insecticide may pollute soil and water. On the other hand, "Bui Hunter" is harmless to animals and humans, and hardly pollutes environment.



This is an electron micrograph of *Bacillus thuringiensis* var. *japonensis* strain Buibui, active ingredient of "Bui Hunter". Its length is approximately 1 to 2 μ m. They have spores and insecticidal protein in their cells. When insects eat this insecticidal protein, they are dead because of food poisoning. Therefore these kinds of bacteria have been being used in Europe and America for about thirty years. BT agents are used to control butterflies and moths so far, however "Bui Hunter" is a BT agent to control scarabaeid larvae for the first time in the world. (This strain was discovered by Kubota.)