Examples of Initiatives to Ensure Environment-friendliness

Environment-friendly *Johkasou*, Decentralized Wastewater Treatment Plant

Johkasou is used to treat wastewater from houses, public and commercial facilities in areas not served by an adequate sewerage system. This product was developed in Japan but is currently also in widespread use overseas, particularly in Southeast Asia, where rapid urbanization has led to problems with contamination of the aquatic environment.

The Kubota Group offers customers a varied range of *Johkasou* depending on the quality and volume of the wastewater. In addition to contributing to improving the local aquatic environment, the development of high-performance, compact *Johkasou* brings environmental benefits at each stage of the product lifecycle.

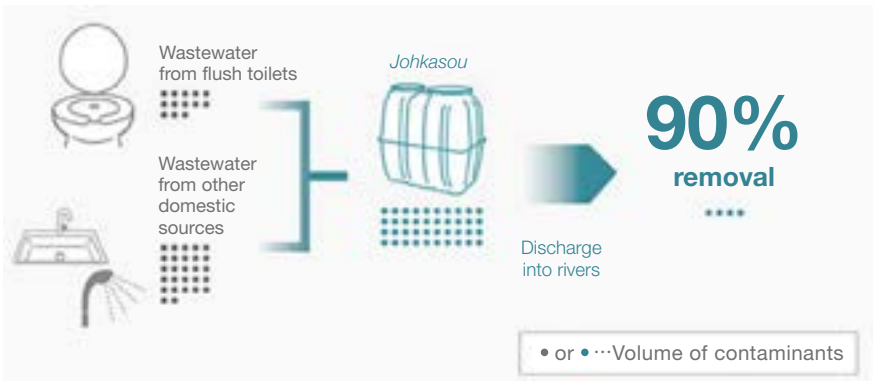
[Examples of Kubota-manufactured *Johkasou* in Use Overseas]

Small *Johkasou* in use for detached housing (Indonesia)

Large *Johkasou* in use at a hospital (Vietnam)

How a *Johkasou* Works

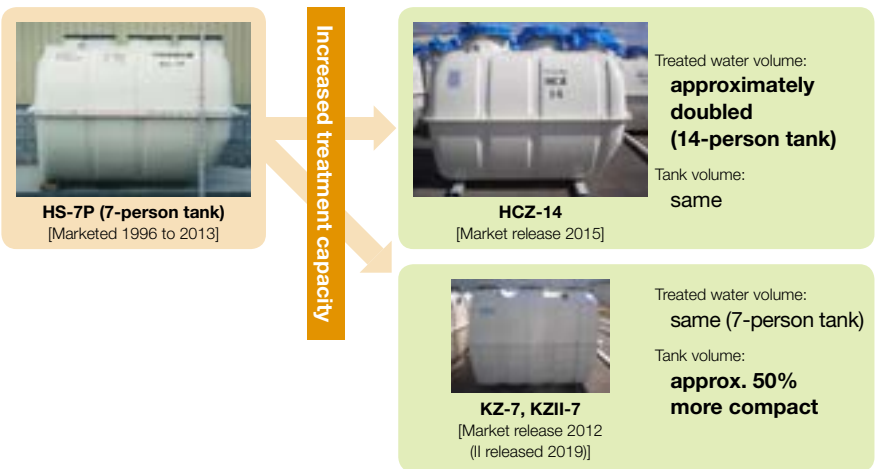
Johkasou uses the action of microorganisms to remove contaminants from domestic wastewater including effluent from flush toilets. Advanced treatment *Johkasou* removes not only contaminants but also nitrogen, which is a cause of red tides in enclosed bay and algal blooms in wetlands.



Treatment capacity of *Johkasou*

Development of *Johkasou* with Higher Performance and More Compact Dimensions

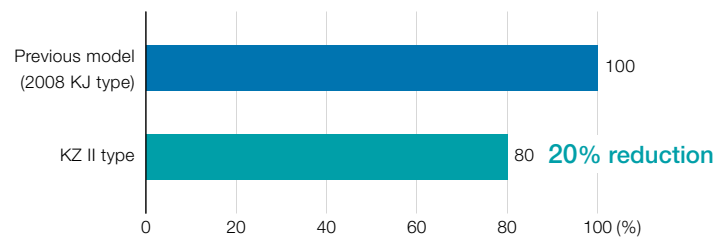
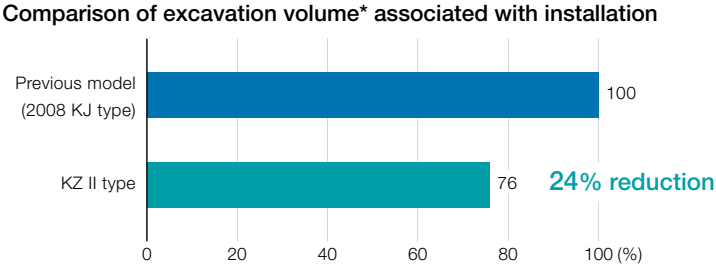
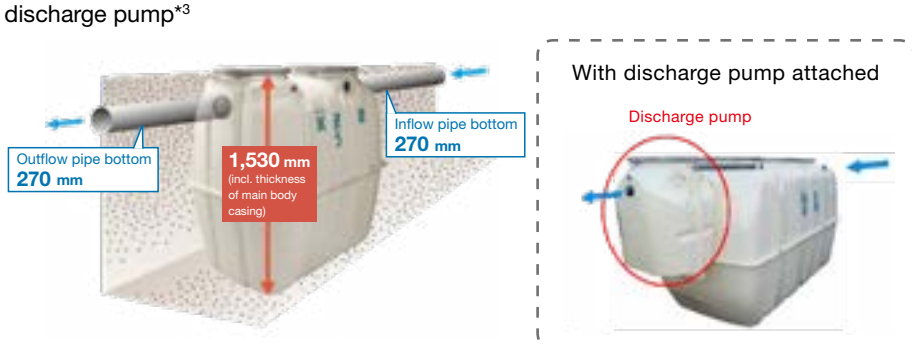
By using sponge-type carriers that can hold a larger number of microorganisms and making other improvements, the Kubota Group's *Johkasou* increases the treatment capacity per unit of volume to realize a compact design that fits neatly into any underground space. As it requires little excavation, it makes for less labor-intensive and speedier installation. In environmental terms too, it realizes savings in energy and resources.



Increased treatment capacity realizes increase in treated water volume and more compact dimensions

Johkasou with Environment-friendly Features at Each Stage of the Lifecycle

As illustrated below, Kubota Group *Johkasou* displays environment-friendly features at each stage of the lifecycle.

Lifecycle stage	Environmental issue	Environment-friendly feature of *Johkasou* (KZ II-5,7,10)
Procurement	Reduction of chemical substances	・Use of raw materials free of certain substances restricted by RoHS*1 directive
Production	Energy saving	・Number of assembly parts reduced through integration of functions, parts designed to be fitted in a single action—removing need for electric power tools operations such as screw fixing, reducing energy consumption in assembly process
	Resource conservation	・20% weight reduction in main body of product through more compact dimensions, resulting in 20% reduction in raw material use **Comparison of weight** 
Transportation	Energy saving	・Increased transportation efficiency through more compact dimensions, resulting in reduced fuel consumption
Installation	Energy saving	・24% reduction in excavation volume through more compact dimensions, resulting in shorter time using heavy machinery and reduced fuel consumption **Comparison of excavation volume* associated with installation**  * Excavation volume calculated based on Kubota in-house standards
		・The base plate used for installation is a dedicated product realizing weight reduction of around 85% and requiring less use of heavy machinery for laying, resulting in reduced fuel consumption*2
	Resource conservation	・As the outflow pipe is installed at the same high position as the inflow pipe, with no height difference between the bottom of the two pipes, a natural flow arises readily with no need for a discharge pump*3  KZ II type—no height difference between the bottom of the two pipes
Operation	Energy saving	・Switching to an energy-saving type for the blower that aerates the inside of the *Johkasou* results in reduced electric power consumption
	Ease of maintenance	・Simple opening and shutting of the attached valve effects cleansing of the interior (anaerobic filter tank) for easy maintenance

*1 RoHS directive: EU directive issued on July 1, 2006, limiting the use of certain hazardous substances in electric and electronic equipment (major revision on July 21, 2011)
*2 As the *Johkasou* must be installed on a level surface, in general concrete is either cast on site or a precast concrete base plate is laid. The Kubota Group markets the KB plate, a dedicated KZ II lightweight foundation base plate weighing 48 kg for a 5-person tank.
*3 Depending on conditions at the installation site, if the water level at the discharge point is higher than the bottom of the outflow pipe, a discharge pump may be needed.

For detailed information on *Johkasou* follow this link:
www.kubota.com/products/johkasou/