Domestic Wastewater Treatment

by Johkasou Systems in Japan

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What is Johkasou?

An Example of Johkasou Installed at Individual House
A small-scale Johkasou (FRP)

An example of small-scale johkasous

Influent → Anaerobic filter tank → Contact aeration tank → Sedimentation tank → Disinfection tank → Effluent

- Separated sludge
- Sludge

Effluent water quality
BOD ≤ 20 mg/l
A Middle-scale Johkasou (FRP)
A Middle-scale Johkasou (RC)
Main Systems for Domestic Wastewater Treatment

- Johkasou
- Rural Sewerage
- Public Sewerage
Note: 1. Night soil treatment facilities also treat sludge collected from tandoku-shori johkasous, community plants, gappei-shori johkasous and sewerage system in rural area.
2. The many are installed in individual houses.
3. Gray water is miscellaneous domestic wastewater except night soil.
4. Though not many facilities are installed in individual houses, the number is increasing.
Trends of Populations Served by Johkasou, etc.

- Total population
- Population of flush toilets use
- Population served by sewerage system
- Population of johkasou use
<table>
<thead>
<tr>
<th>Advantages of Johkasou System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flush toilets can be used in unsewered districts.</td>
</tr>
<tr>
<td>Miscellaneous domestic wastewater can be treated, contributing to prevention of water pollution.</td>
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<tr>
<td>Conserving water in small rivers, a human-closely water environment will be formed.</td>
</tr>
<tr>
<td>A small-scale johkasou can be installed at a low cost and in short time.</td>
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<tr>
<td>Wastewater collection and johkasou installation receive less influence of topographic conditions at the site.</td>
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<tr>
<td>Treated water can easily be reused for various purposes as a reliable water resource.</td>
</tr>
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<td>Sludge from johkasous can be used as fertilizer or for biomass production.</td>
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<tr>
<td>Johkasous have high resistance against earthquake and other disasters.</td>
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</tbody>
</table>
BOD Loading per capita per day of Domestic Wastewater from Household

- **Cooking**: 17g (40%)
- **Cleaning etc.**: 9g (10%)
- **Night soil**: 13g (30%)
- **Gray water**:约70% (30g)

BOD loading 43g/cap·d

Wastewater amount (200L/cap·day)

- **Flushing toilet**: 40L
- **Cleaning etc.**: 72L
- **Washing/Bathing**: 50L
- **Bathing**: 38L
# Johkasou Technicians and Vendors on Johkasou Business

<table>
<thead>
<tr>
<th>Classification</th>
<th>Number of person/vendor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Johkasou operator</td>
<td>63,104</td>
</tr>
<tr>
<td>Johkasou installation worker</td>
<td>77,728</td>
</tr>
<tr>
<td>Johkasou inspector</td>
<td>2,533</td>
</tr>
<tr>
<td>Johkasou desludging technician</td>
<td>14,205</td>
</tr>
<tr>
<td>Vendor for johkasou O&amp;M</td>
<td>9,087</td>
</tr>
<tr>
<td>Vendor for johkasou desludging</td>
<td>4,806</td>
</tr>
<tr>
<td>Specified examination agency</td>
<td>65</td>
</tr>
<tr>
<td>Johkasou manufacturer</td>
<td>38</td>
</tr>
</tbody>
</table>
Reuse of Effluent and Sludge

Domestic Wastewater can be used for:
- Flushing toilet
- Watering
- Car washing
- Firefighting

Sludge can be for Compost

Effluent can be used for:
- Flushing toilet
- Watering
- Car washing
- Firefighting

Effluent Storage Tank

Sludge can be for Compost
# Comparison of Different Subsidy Programs

(For installing a johkasou of 5 NUD, which will cost ¥860,000 if it is not subsidized)

### In the case of Johkasou Installation Promotion Program:

<table>
<thead>
<tr>
<th>Amount subsidized by municipalities and the government (¥340,000)</th>
<th>Amount borne by the house owner (¥520,000)</th>
</tr>
</thead>
</table>

### In the case of Johkasou Installation Program in Specified Areas:

| Sewerage works construction bond (¥480,000) | Amount subsidized by government funding (¥290,000) | Amount borne by the house owner (¥90,000) |
Toward the Water Quality Protection in Public Water Bodies and the Creation of Desirable Water, Reuse of Effluent and Sludge