Purpose of the development
Cost reduction: No sludge thickening facility is required. Reduce LCC.

Problems can be solved
- Problems of Gravity thickening system
  - Slow thickening process, low solids concentration
    ⇒ Low treatment efficiency in the subsequent treatment facilities
  - Low recovery rate by sludge flotation
    ⇒ Bad influence to wastewater treatment system by water quality deterioration of recycle flow
- Mechanical thickening system (new construction)
  - Requires large footprint
  - Increase in costs and O&M matters

Technology overview
The system of Type 4 Screw Press Dehydrator with Enhanced Internal Thickener directly dewater's unthickened sludge without thickening process.
This simple sludge treatment process has the following benefits:
- Reduce LCC
- Reduce greenhouse gas emission
- Require no thickening facility that has low recovery rate of SS
- Reduce the recycle flow load by rapid dehydration of sludge from WWTP
Inflow → Primary settling tank → Reactor → Final settling tank → Disinfection Discharge

Return partly

Gravity thickener

Mechanical thickener

Chemical dosing facilities

No thickening process are required

Mixed sludge storage tank (Unthicken mixed sludge)

Screw press dehydrator (Type4) → Dewatered sludge
**Type 4 Screw Press Dehydrator with Enhanced Internal Thickener**

### Features
- Its internal thickener has the larger filtration area than the external thickener of type 3 screw press dehydrator
- Better thickening performance than type 3

### Scopes of Application
1. Type of sewerage system: Separate system or Partly combined system
2. Sludge treatment process: WWTP that generates primary sludge and has no digestion process
3. Applied sludge: Mixed raw sludge (unthickened)

### Comparisons with Type 3

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*1 Thickening/dehydration is the system that withdraws sludge from a primary settling tank or a final settling tank, thickens or digests it with individual or combined methods, and then dehydrates it. The main purposes of thickening and dehydration are the volume reduction of sludge or solid matters, and the stabilization of their qualities. Since the system applies to any wastewater treatment system or capacity, it has been widely used.

*2 As same as Type 3, Type 4 dehydrator achieves the 6 points less moisture content than the conventional one. On the other hand, because Type 4 deals with unthickened sludge, its dehydration performance is 70% of Type 3, and its chemical dosing rate is 0.1 to 0.15 points more than that of Type 3.
Type 4 Screw Press Dehydrator with Enhanced Internal Thickener

Type 4 dehydrator has the 5 to 6 times larger filtration area of thickening part than that of Type 3.