


**Makes quantitative measurements of soils freeze expansion ratio in arbitrary stress field and temperature field**

Registration No.	Number 00331		
Registration Date	September 13, 2022	Registration Category	Category 2 (single or produced in very small quantities product(s))

Name (Model, etc.)	Frost Heave Test Apparatus under Controlled Freeze Speed (No.4)		
Location	Toyonaka-shi, Osaka		
	SEIKEN Co., Ltd.		
Owner (Custodian)	SEIKEN Co., Ltd.		
Manufacturer (Company)	SEIKEN REIKI Co., Ltd. (present:SEIKEN Co., Ltd.)		
Year Manufactured	1978		
Year first appeared	1969		
Reason For Selection	<p>This is a test device that measures the freeze expansion ratio of the soils, which is important in construction that uses ground freezing method. It was the world's first measuring instrument with quantitative measurement in an arbitrary stress field and temperature field, and is the oldest existing device. This method of artificially freezing the ground was independently carried out the experiment and theoretically analyzed in Japan without technology import, and was developed especially for precision civil engineering work in urban areas. It has also been used in large-scale construction such as underground LNG storage facilities and a submarine tunnel for Tokyo Bay Aqua-Line. The development of equipment and empirical formulas made it possible to accurately predict ground freeze expansion required for construction, enabling quantitative design and construction management. Records and reference materials during research and development leading to this machine, drawings of test machines, data sheets of numerical values measured by this machine, and related documents such as the calculation are also stored. It is an important technology that enhances the reliability and possibilities of civil engineering work.</p>		
Registration Standard	<p>1-B (Show a uniquely Japanese scientific or technological development from an international perspective.)            1-C (Contributed to the creation of a new scientific or technological field.)</p>		

Open/Closed to Public	Closed to Public		
Photo			
Other useful information			