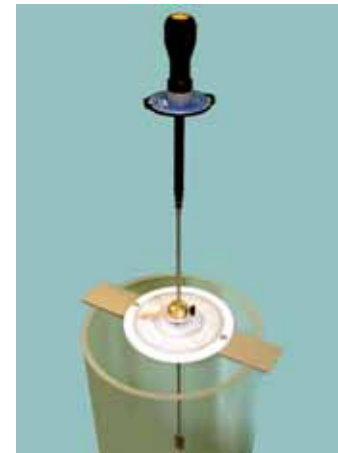


## HAND VANE Model No. DO-1018



**HAND VANE**



Bearing guide DO-1018G makes possible to do accurate measuring without inclining of vane.

### Outline :

This is used for measuring hardening time, etc. of soft soil, hard soil comparatively and improved (reinforced) soil at laboratory or at site easily. And, if you use Bearing guide together with hand vane, you can do strength test with any size container. (Regarding to select a suitable torque meter & vane, please do it with calculation shown in the next page, which is quoted from Soil investigation method.)

Torque meter Model	Measuring Range		Dimension		Weight	Vane Size (Please choose the following) Widthx Length	Extension Rod (Please choose the following)	Selection sign
	Capacity (cN·m)	Grad. (cN·m)	Overall Length					
1 FTD2CN-S	0.3 ~ 2	0.05	152 mm	0.14 kg	A. 10 × 20mm	L <sub>1</sub> 6 × 200	<b>Order example in set</b> 1 + C + A + L <sub>1</sub> + DO-1018G 1: Torque meter C: Coupling A: Vane L <sub>1</sub> : Extension rod DO-1018G Bearing guide	
2 FTD5CN-S	0.5 ~ 5	0.1				L <sub>2</sub> 6 × 400		
3 FTD10CN-S	1 ~ 10	0.2				L <sub>3</sub> 6 × 500		
4 FTD20CN-S	3 ~ 20	0.5						
5 FTD50CN2-S	5 ~ 50	1	272 mm	0.37 kg	C. 20 × 40mm	L <sub>4</sub> 8 × 200		
6 FTD100CN2-S	10 ~ 100	2				L <sub>5</sub> 8 × 400		
7 FTD200CN2-S	30 ~ 200	5			L <sub>6</sub> 8 × 500			
8 FTD400CN2-S	50 ~ 400	10						

C (coupling) that ties to extension rod the torque meter is need when bought for the first time.



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Comparing of Torque meter: N·m (S-I unit) and kgf·cm (Former unit)

$$10\text{cN}\cdot\text{m}=1\text{kgf}\cdot\text{cm}$$

$$100\text{cN}\cdot\text{m}=10\text{kg}\cdot\text{cm}$$

For example,

In case of Combination Torque meter No.4 and Vane “C”, “D”

“Torque meter No + Vane : Shearing strength

$$4 + C = 6.8 \text{ kN/m}^2$$

Please refer to above when you select suitable Hand vane’s torque meter and vane with shearing strength.

Calculation of Shearing strength

The following numerical expression is quoted from “Soil Investigation Method”.

$$M_{\text{max}} = \tau \left\{ \pi DH \cdot \frac{D}{2} + 2\pi \left( \frac{D}{2} \right)^2 \frac{2}{3} \cdot \frac{D}{2} \right\}$$

$$\therefore \tau = \frac{M_{\text{max}}}{\pi \left( \frac{D^2 H}{2} + \frac{D^3}{6} \right)}$$

$\tau$  : Shearing strength (N/m<sup>2</sup>)

Mmax : Maximum revolving moment(N·m)

D : Width of Vane (Diameter) (m)

H : Height of Vane (m)

For example, It takes Torque meter “FTD20CN-S (20cN·m)”and

it shows 15cN·m(= 15 X 1/100(N·m)=0.15)

$$M_{\text{max}} : 0.15$$

$$D : 0.02\text{m}$$

$$H : 0.04\text{m}$$

$$\tau = 0.15 / \pi (0.0004 \times 0.04 / 2 + 0.000008 / 6)$$

$$= 0.15 / \pi (0.000008 + 0.000001333)$$

$$= 0.15 / \pi \times 0.000009333$$

$$= 0.15 / 0.00002932$$

$$\tau = 5115.9\text{N/m}^2 \doteq 5.116 \text{ kN/m}^2$$

Therefore, supposing that Vane D=0.02m, H=0.04m is used,

in case of FTD20CN-S(20cN-m), it can measure the shearing strength until 6.821kN/m<sup>2</sup>,

in case of taking FTD100CN-S(100cN-m), it can measure the shearing strength until 34.106kN/m<sup>2</sup>.