

Reduction Viscosity Agent for TBM Driving

NJ Power

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1. Type of NJ Power

Since there are two types of NJ power as NJ power A and NJ power N, They are properly used depend on the soil condition.

- NJ power A mainly shall be used for Lower Volcanic Ashe Soil (Kanto Loam).
- NJ power N shall be used for Swelling Clay.

2. Specified Mix of NJ Power A

(1) NJ power A for Lower Volcanic Ashe Soil

Please adjust combination to solution 1% - 2% by the following combination.

| Specified Mix of NJ power A (per 1m3) | |
|---------------------------------------|------------|
| NJ power A | 10 ~ 20kg |
| Water | 986 ~ 993L |

(2) NJ power N for Swelling Clay

Please adjust combination to solution 0.4% - 0.8% by the following combination.

| Specified Mix of NJ power N (per 1m3) | |
|---------------------------------------|------------|
| NJ power N | 4 ~ 8kg |
| Water | 994 ~ 997L |

3. Ingredients and Properties of NJ power

| | | |
|----------------|------------------|----------------------------------|
| (1) NJ power A | Main Ingredients | Silicate Oxide Alkali Metal Salt |
| | Appearance | Colourless, Transparent Liquid |
| | Specific Gravity | 1.30 ~ 1.40 |
| (2) NJ power N | Main Ingredients | Poly-Acryl Acid Mixture |
| | Appearance | Light Yellow, Transparent Liquid |
| | Specific Gravity | 1.25 ~ 1.35 |

4. Calculation of Injection Rate

(1) Measurement of Natural Water Content and Liquid Limit

As the preceding for calculating Injection Rate of NJ power, Natural Water Content and Liquid Limit shall be measured. (Measuring method: Conformity with JIS A1203)

(2) Calculation of Injection Rate for 1m³ excavated soil volume

The amount of addition of NJ power shall be calculated from Natural Water Content and Liquid Limit for soil sample.

Respectively, they shall be changed into Natural Water Content Ratio and Liquid Limit Ratio.

$$Q (\%) = 0.6 \cdot \alpha \cdot \left\{ \frac{(W_L' - W')}{(100 - W_L')} \right\} \cdot 100d$$

Where

W' : Natural Water Content Ratio (%)

W_L' : Liquid Limit Ratio (%)

d : Unit Weight of Excavated Soil

α : Coefficient of Earth Pressure

When the Controlled Earth Pressure in the Chamber is 1kg/cm² $\alpha = 1.01$

When the Controlled Earth Pressure in the Chamber is 2kg/cm² $\alpha = 1.02$

When the Controlled Earth Pressure in the Chamber is 1.5kg/cm² $\alpha = 1.015$

(i.e. It is taking into consideration of dehydration under the compressed air)

Q : Injection Rate for 1m³ excavated soil volume (%)

5. The Type of Packing of NJ power

| NJ power A | NJ power N |
|-------------------|-------------------|
| 25kg Plastic Tank | 25kg Plastic Tank |
| 1t Tank | 1t Tank |



Left side of Photograph : After added NJ power N

Right side of Photograph : Original soil