

## Notched Geomembrane의 온도-시간-인장거동 고찰

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## Consideration of Temperature-Time-Tensile Behaviors of Notched Geomembranes

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### 1. Introduction

In waste landfill, performance of geomembranes may be dependent on the installation conditions such as weight of waste, working load etc. But geomembranes must keep the optimum performance during the service period. To consider these possibilities/factors into account, it is reasonable to test some damaged HDPE GMs and to know their mechanical properties. In this study, we examined their durability performance as temperature-time-tensile behaviors.

### 2. Experimental

1.5mm thickness HDPE geomembrane was used for this study. For tensile test all the specimens were classified as UN-S (un-notched smooth), UN-T (un-notched textured), N-S (notched smooth) and N-T (notched textured). Tensile test was performed with recording the load at yield point and break point for both original and treated samples. HCl, NaOH and distilled water were used to get pH values of 4, 7, 8 and 12.

### 3. Results and Discussion

Figure 1 shows the load and elongation behaviors at break of notched GMs under pH values of 4 and 12 in different temperatures. At 20°C and 80°C, the increasing tendency of breaking of notched samples at much lower loads have been shown in first 60 days periods and after this period, this tendency has reduced. However, between 60-90 days period, notched samples have ruptured comparatively at higher loads than other periods of tested. In most of the cases, load at break has reduced at the higher temperature (80°C) but no significant correlations have been found between variations of breaking loads and pH values for notched GM samples. Figure 2 shows the load and elongations at break of un-notched GMs under different temperatures and pH values. Un-notched GMs have ruptured at significantly higher loads compared to notched samples under tested conditions. After 120 days period, it has shown a positive tendency of increasing breaking loads of un-notched samples with increasing temperature.

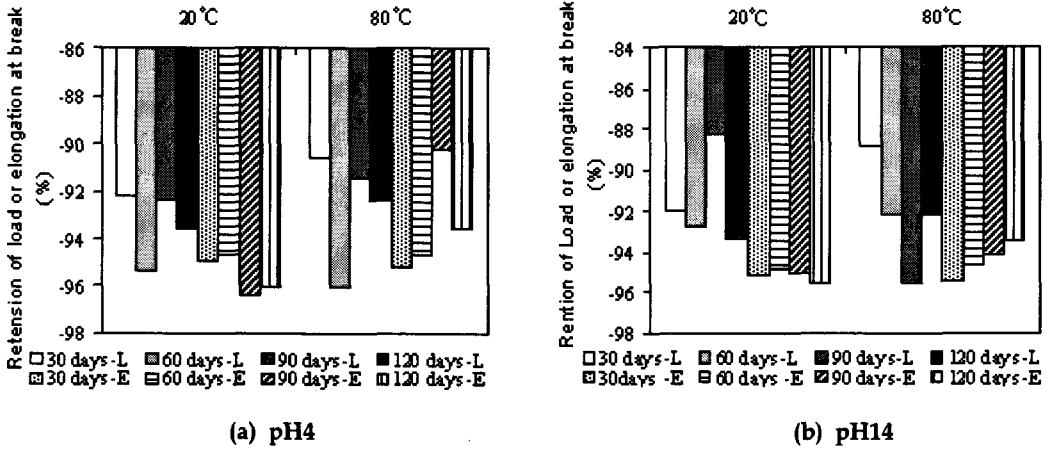


Figure 1. Load and elongation behaviors at break of N-S GMs

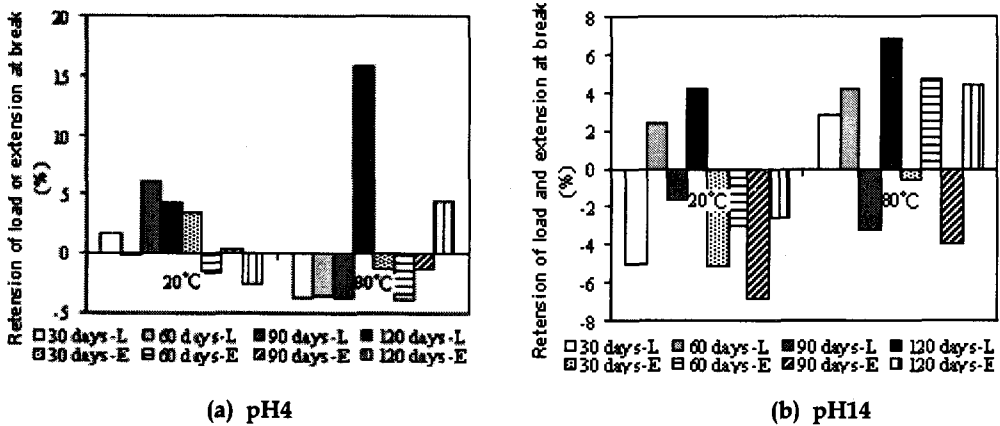


Figure 2. Load and elongation behaviors at break of UN-S GMs

#### 4. Conclusion

Breaking loads are negatively correlated to temperature and no significant correlations found between breaking load and pH values for notched samples. Also, breaking elongations do not show significant correlations with temperature and pH variations for notched samples. Significantly higher breaking loads and elongations gave by un-notched samples and no significant correlations found with breaking loads and temperature or pH values in most of the cases, but, higher breaking loads and elongations found at 80°C after 120 days period for un-notched samples with irrespective to pH variations.

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#### Reference

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