



Performance Verification of V220 & V940X Neutralization Tank

Prepared for:

METHOD ENTERPRISE SDN. BHD.

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February 2025

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REPORT INFORMATION

Test Title:

Performance Verification of V220 & V940X Neutralization Tank

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Date: 26 February 2025

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1. VERIFICATION OVERVIEW

Method Enterprise Sdn. Bhd. has requested SIRIM Berhad to carry out performance evaluation of their neutralization system. The evaluation was carried out on two (2) simulation units at Method Enterprise's premise at No.1, Jalan Pelubang 32/200, Persiaran Kemuning Prima, Seksyen 32, 40460 Shah Alam, Selangor on the 17 February 2025. Two SIRIM personnel were present throughout the evaluation exercise to conduct measurement and record the data required to establish the performance of the neutralization system. This report documents the verification scope, procedures and the performance results obtained from the onsite measurement.

2. TEST PROCEDURES

The specifications of the tested neutralization tank are as follow:



Model:	V220
Dimension:	439 x 337 x 390 mm
Material:	Polypropylene (PP)
Working principle:	Receive, dilute and neutralise concentrated corrosive and harmful chemical waste before discharging into public sewers.



Model:	V940X
Dimension:	915 x 610 x 655 mm
Material:	Fibre-Reinforced Polyester (FRP)
Working principle:	Receive, dilute and neutralise concentrated corrosive and harmful chemical waste before discharging into the public sewer.

The performance study of the Neutralization Tank was conducted to measure the neutralization rate achieved by the limestone which act as the neutralization agent in an acidic waste stream. For the V220 model, 5 mL sulfuric acid (H_2SO_4) was first diluted with 20 Litre tap water to get to the desired starting pH to simulate the acidic condition. The limestone bucket was filled in with the limestone and the acidic solution prepared earlier were added gradually into the Neutralization Tank. The initial contact between the limestone and the test solution was taken as "0 min. sampling time". Temporal measurements of pH were taken at an appropriate interval as shown in Table 3.1.

Similarly, for model V940X, the limestone bucket was first filled in with limestone. 5 mL sulfuric acid (H_2SO_4) was diluted with 60 Litre tap water to get to the desired starting pH. Fresh and different amount of limestone were added for the bigger capacity model to determine the effectiveness of the neutralization agent.

3. FINDINGS

Separate rounds of testing were conducted for the two (2) model as shown in Tables 3.1 and 3.2 which tabulate the raw data recorded. Figures 3.1 and Figure 3.2 demonstrate the profile of pH changes over time.

Table 3.1: Neutralization changes recorded in V220.

Sampling time (minute)	pH	Weight of limestone (kg)
0	1.9	20
15	2.6	
20	2.7	
25	4.1	
30	5.8	
60	5.9	

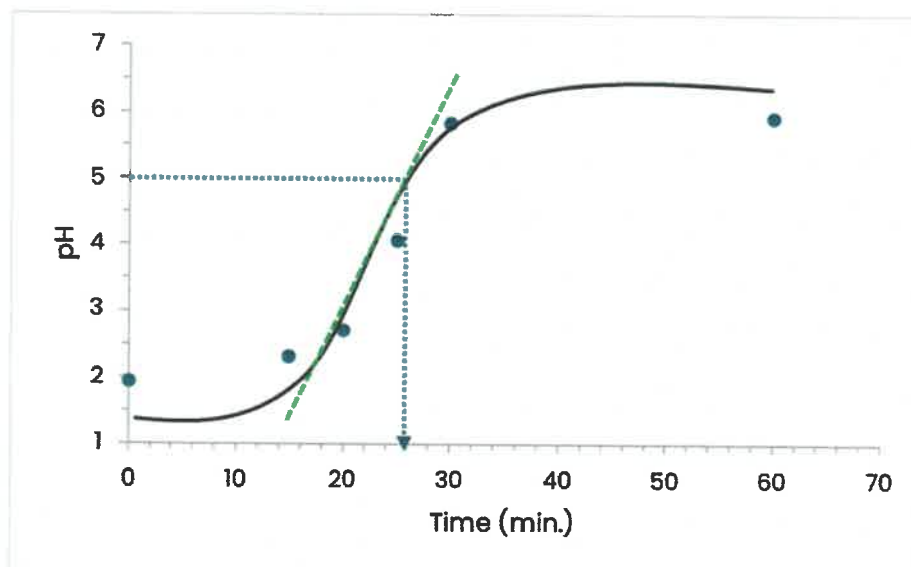


Figure 3.1: Neutralization profile of V220.

Table 3.2: Neutralization changes recorded in V940X.

Sampling time (minute)	pH	Weight of limestone (kg)
0	2.4	50
5	2.5	
15	4.9	
35	5.2	

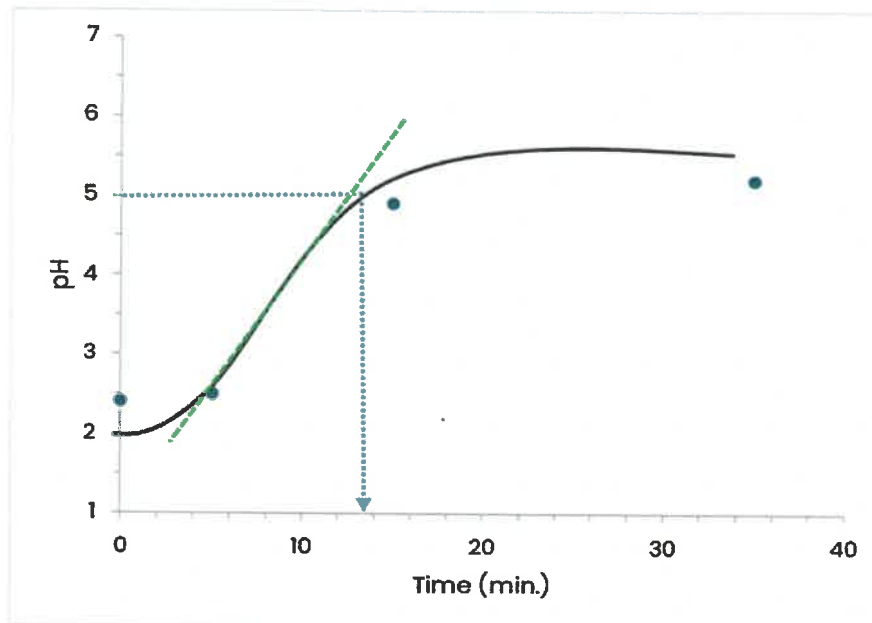


Figure 3.1: Neutralization profile of V940X.

4. DISCUSSION

To reach pH 5, the test solution in the Neutralization Tank V220 took approximately 26 minutes, whilst the test solution in the Neutralization Tank V940X took approximately 15 minutes. The result also shows that the rate of pH change differs with different weight of limestone used.

Table 4.1: Summary of Neutralization Rate and pH changes.

pH range	Rate of neutralization (min ⁻¹)
1.9 - 5.9	0.15
2.4 - 5.2	0.09

The performance evaluation exercise on the Neutralization Tank was limited in experimental setup which may not entirely represent the actual mode of application. The monitoring exercise was conducted in batches where no continuous flow of spent acidic solutions passes through the neutralization agent.

5. CONCLUSION

The simulated performance study has shown that the Neutralization Tank system shall increase the pH of the acidic solution when reacted with the neutralization agent used, which is the limestone. However, the rate of neutralization depends on the quantity of limestone added and the retention time.

Appendix 1



A.1: Measurement taken on V220.



A.2: Measurement taken on V940X.