



**Ranhill
SAJ**

**SPECIFICATION FOR POLYALUMINIUM CHLORIDE
(LPAC) USED FOR POTABLE WATER SUPPLY**
MATERIAL REQUIREMENTS

SPECIFICATION SAJ CH/ LPAC/ 001
(REV 5.0/09.2018)

QUALITY ASSURANCE DEPARTMENT
RANHILL SAJ SDN BHD

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SPECIFICATION FOR POLYALUMINIUM CHLORIDE (LPAC) USED FOR POTABLE WATER SUPPLY

1.0 General

- 1.1 This SAJ Ranhill Standard Specification is applicable to Polyaluminium Chloride (PAC) accordingly to MS 1454:2007, Specification for Liquid Polyaluminium Chloride for Potable Water Supply.
- 1.2 Features required for this specification are as follows or otherwise the above specification shall be used.

2.0 Features required

- 2.1 Liquid Polyaluminium Chloride (LPAC) used for Potable Water Supply shall comply with requirements as specified in **Table 1-Requirements for liquid polyaluminium chloride**.
- 2.2 Physical properties of Liquid Polyaluminium Chloride (LPAC) used for potable water supply as follows in **Table 2-Physical Properties**.
- 2.3 The Liquid Polyaluminium Chloride (LPAC) shall not contain any impurities and additives.

Table 1 – Requirements for liquid polyaluminium chloride

Parameter	Requirements			Test Method (Based on MS 1454:2007)
	Type 1	Type 2	Type 3	
A. Product Requirement				
Density (ambient temperature), g/ml	1.13-1.23	1.18-1.35	1.32-1.38	Annex B
Aluminium oxide (Al ₂ O ₃), % w/w (min)	10	15	22	Annex C
Basicity, % w/w	35-83	35-83	>83	Annexes D,E and F
pH (1% w/v solution)	3.5-5.0	3.5-5.0	3.5-5.0	Annex G
Sulphate ion (SO ₄ ²⁻), % w/w (max)	3.5	3.5	3.5	Annex H
B. Impurities	Limit, max			
Insoluble matter, % w/w	1.0	1.0	1.0	Annex J
Total iron (Fe), % w/w	0.05	0.05	0.05	Annex K
Ammoniacal nitrogen (N), % w/w	0.01	0.01	0.01	Annex L
C. Toxic substances	Limits as mg/kg of Al, max			
	Type 1 and 2	Type 3 ^a		BS EN 1302:1999
Arsenic (As)	40	14		BS EN 1302:1999
Manganese (Mn)	300	40		
Cadmium (Cd)	50	3		
Chromium (Cr)	700	30		
Mercury (Hg)	10	4		
Nickel (Ni)	700	20		
Lead (Pb)	200	40		
Antimony (Sb)	40	20		
Selenium (Se)	40	20		
NOTES:				
1. The contribution of toxic substances in the chemical used for treatment of drinking water should not be more than 10 percent of the maximum allowable concentration of those toxic substances to the drinking water ("the 1/10 th rule").				
2. For allowable limit of toxic substances in mg/kg PACl as stated concentration, the values after calculation are given in Table A3 of MS 1454:2007.				
^a Type 3 PACl is also known as aluminium chlorohydrate or ACH in other countries.				

Table 2 – Physical Properties

Physical Properties	Description
Appearance	Colourless to yellowish solution

3.0 Test and Inspection

- 3.1 All Liquid Polyaluminium Chloride (LPAC) shall comply with test in accordance with the requirement of specification.

4.0 Packing and Storage

- 4.1 Container or tanker load for Liquid Polyaluminium Chloride (LPAC)
- 4.2 For storage purpose, storage tank shall be of acid-resistant and place in cool-dry and well-ventilated place.
- 4.3 Avoid contact with chlorites, hypochlorites and sulphites.

5.0 Mandatory Marking

- 5.1 Each shipment of Liquid Polyaluminium Chloride (LPAC) shall have mark legibly on it including:-
- “Liquid Polyaluminium Chloride (LPAC)”, trade name and grade
 - Net weight
 - Name, address and telephone number or supplier and/or manufacturer
 - Batch number
 - Date of manufacturing or packaging and shall bear such other markings as required by applicable laws

6.0 Certificate of analysis

- 6.1 A certificate of analysis, with the indication of country of origin should accompany all deliveries for the chemical and be given to Ranhill SAJ's.
- 6.2 The contents of the certificate of analysis shall include the following;
- Density (ambient temperature) g/ml;
 - Aluminium content as (Al₂O₃), % w/w;
 - Basicity, % w/w;
 - pH (1% w/v solution);
 - Sulphate ion (SO₄²⁻), %w/w;
 - Insoluble matter, % w/w; and
 - Total ion (Fe); % w/w.
- 6.3 A comprehensive certificate of analysis shall include the following;
- Ammoniacal nitrogen (N), % w/w and
 - As, Mn, Cd, Pb, Hg, Cr, Ni, Sb, Se as mg/kg of product.

7.0 Delivery Inspection and Evaluation

- a) It is the responsibility of the tenderer to inform SAJ Ranhill for inspection purposes during manufacturing and before delivery.
- b) SAJ Ranhill reserve the right to inspect and witness the testing of product offered without notice.
- c) At anytime, when requested, the supplier is to provide SAJ Ranhill a sample of the product offered for evaluation purposes. All costs shall be borne by the supplier.
- d) If at any time the supplier fails to deliver the required sample, the products is deemed fail to meet the specification.

8.0 Certification

- 8.1 Manufacturer and/or supplier of the product are required to provide the copy of the certificate and testing report from SIRIM, IKRAM and SPAN or other recognize certification bodies.
- 8.2 Tests report required should be those tests conducted within a year period.
- 8.3 SAJ has the right to refuse offer or reject supply if those documents required are not enclosed or results provided are not complied with SAJ Ranhill requirement.