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SAJ**

**SPECIFICATION FOR POLYETHYLENE  
ALUMINIUM COMPOSITE (PE-AL-PE) PIPES  
FOR WATER SUPPLY SYSTEM**

**SPECIFICATION SAJ PS / PA / 001**

**(Rev.3.0 / 12.2018)**

QUALITY ASSURANCE DEPARTMENT  
RANHILL SAJ SDN. BHD.

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Ass General Manager Quality Management

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COMPOSITE (PE-AL-PE) PIPES FOR WATER SUPPLY  
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## **SAJ SPECIFICATION FOR POLYETHYLENE ALUMINIUM COMPOSITE (PE) PIPE**

### **1.0 General**

- 1.1 This specification is applicable to Polyethylene Aluminium Composite (PE-AL-PE) Pipe for water supply systems and shall conform to American Standard Specification ASTM F 1282-03.
- 1.2 These specifications will provide necessary information on the product dimension and requirements for the supply of pipes only.

### **2.0 Material**

- 2.1 The PE-AL-PE Pipe is composed of one metallic layer, two layers of the same polymeric adhesive and two layers of the same polyethylene.
- 2.2 The aluminium shall have thickness as specified in Table 1). The material shall have minimum elongations and ultimate tensile strengths of 20% and 100 Mpa (14600 psi) respectively.
- 2.3 The PE-AL-PE Pipe shall be made from base polymer and shall conform to the requirements as specified in MS 1058 Part 1:2002.
- 2.2 The base polymer shall be a single grade of polyethylene, PE 80 with a derived density greater than 0.93g/cm<sup>3</sup> tested at 20° C.
- 2.3 No rework material is allowed to be used for the manufacture of the pipes.
- 2.4 No additives that can contribute to toxic hazard, impair the fabrication of properties and chemical and physical properties in particular to long term mechanical and strength is allowed.

### **3.0 Colour**

The colour of the pipes shall be blue. The material for colouring shall be of the same type of resin as used in the compound for the pipe.

#### 4.0 Classification and Dimension of Pipes

4.1 Outside diameters, aluminium thickness and tolerances for PE-AL-PE are given in table below.

| Nominal pipe size mm | Minimum Outside Diameter, mm | Tolerance on minimum, mm | Maximum out-of-roundness, mm | Minimum aluminium thickness, mm | Tolerance on thickness, mm |
|----------------------|------------------------------|--------------------------|------------------------------|---------------------------------|----------------------------|
| 1216                 | 16.00                        | +0.30                    | 0.4                          | 0.18                            | +0.09                      |
| 1620                 | 20.00                        | +0.30                    | 0.5                          | 0.23                            | +0.09                      |
| 2025                 | 25.00                        | +0.30                    | 0.5                          | 0.23                            | +0.09                      |
| 2532                 | 32.00                        | +0.30                    | 0.5                          | 0.28                            | +0.09                      |
| 3240                 | 40.10                        | +0.30                    | 0.5                          | 0.33                            |                            |
| 4150                 | 50.10                        | +0.30                    | 0.5                          | 0.47                            |                            |
| 5163                 | 63.10                        | +0.40                    | 0.5                          | 0.57                            |                            |
| 6075                 | 75.10                        | +0.60                    | 0.1                          | 0.67                            |                            |

Table 1

4.2 Wall thickness for PE-AL-PE Composite Pipe are given in table below.

| Nominal Pipe Size mm | Total wall thickness, min. mm | Wall tolerance (+) mm | Outer PE layer thickness, min. mm | Inner PE layer thickness, min. mm |
|----------------------|-------------------------------|-----------------------|-----------------------------------|-----------------------------------|
| 1216                 | 1.65                          | 0.40                  | 0.40                              | 0.90                              |
| 1620                 | 1.90                          | 0.40                  | 0.40                              | 1.00                              |
| 2025                 | 2.25                          | 0.50                  | 0.40                              | 1.10                              |
| 2532                 | 2.90                          | 0.60                  | 0.40                              | 1.20                              |
| 3240                 | 3.85                          | 0.60                  | 0.40                              | 1.70                              |
| 4150                 | 4.35                          | 0.60                  | 0.40                              | 1.70                              |
| 5163                 | 5.80                          | 0.60                  | 0.40                              | 2.05                              |
| 6075                 | 7.25                          | 0.60                  | 0.40                              | 2.80                              |

Table 2

#### 5.0 Appearance

- 7.1 The internal diameter and external surfaces of pipes must smooth, clean and free from scoring, cavities and other surface defects which may affect pipe performance.
- 7.2 The ends of pipe shall cut cleanly and square to the axis of the pipe.
- 7.3 Appearance shall be checked at the point of manufacture.

#### 6.0 Testing requirements

The pipe suppliers shall, as and when requested by the purchasers, furnish results carried out in accordance with requirements of ASTM F 1282-03.

## 7.0 Markings of pipes

All pipes must be show the markings at least the following information:

- a) Manufacturer's name or trade mark
- b) The dimensions
- c) Material designation "PE-AL-PE"
- d) Pipe length in meter
- e) Year of manufacture (last two digits)
- f) Batch production number

## 8.0 Pre – Delivery Inspection and Evaluation

- a) It is the responsibility of the tenderer to inform SAJ for inspection purposes during manufacturing and before delivery.
- b) SAJ reserve the right to inspect and witness the testing of product offered.
- c) At any time, when requested, the supplier is to provide SAJ 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 product is deemed fail to meet the specifications.

## 9.0 Certification

- a) Manufacturer of supplier are requirement to provide a copy of the certificate and testing report from SIRIM, IKRAM or other recognized certification body.
- b) Tests report required shall be those tests conducted within a year period.
- c) SAJ have the right to refuse offer or reject supply if the documents required are not enclosed.

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# **SCHEDULE OF STORES**

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**SCHEDULE OF STORES**  
**Supply And Delivery of Polyethylene (PE) Pipe**  
**To Specification SAJ PS/PE/001 For The Period of ..... Year(s)**

| NO. | SIZE<br>DIAMETER<br>mm | SIZE<br>DIAMETER<br>(INCH) | UNIT | PROV.<br>QUANTITY | RATE<br>(RM) | AMOUNT<br>(RM) |
|-----|------------------------|----------------------------|------|-------------------|--------------|----------------|
| 1   | 16                     | 1/2                        |      |                   |              |                |
| 2   | 18                     | 5/8                        |      |                   |              |                |
| 3   | 20                     | 3/4                        |      |                   |              |                |
| 4   | 25                     | 1                          |      |                   |              |                |
| 5   | 32                     | 1 1/4                      |      |                   |              |                |
| 6   | 40                     | 1 1/2                      |      |                   |              |                |
| 7   | 50                     | 2                          |      |                   |              |                |
| 8   | 63                     | 2 1/2                      |      |                   |              |                |
| 9   | 75                     | 3                          |      |                   |              |                |

**(Ringgit:.....)**

Signature of Tenderer:..... Signature of witness:.....

Name:..... Name:.....

In the capacity of:..... Address:.....

Tenderer's Seal or chop:.....

Date:..... Date:.....





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