



**Ranhill  
SAJ**

**SPECIFICATIONS FOR  
FLANGE ADAPTORS FOR RIGID PIPES  
(AC, DI, MS AND uPVC PIPES)**

**SPECIFICATION SAJ FT / FA / 001  
(Rev.5.0 / 12.2019)**

QUALITY ASSURANCE DEPARTMENT  
RANHILL SAJ SDN. BHD.

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**(AC, DI, MS AND UPVC PIPES)**

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## **SAJ SPECIFICATION FOR FLANGE ADAPTORS FOR RIGID PIPES (AC, DI, MS AND uPVC PIPES)**

### **1.0 General**

- 1.1 All flexible joints supplied otherwise stated shall conform to Spesifikasi JKR 20200-0048-99, JKR Standard Specification for Flexible Couplings and Flange Adaptors For Rigid Pipes (MS, uPVC, MS and AC Pipes). It should provide a quick, leak free and reliable method of joining plain-ended pipes for the conveyance of water.
- 1.2 Flange adaptors shall consists of flanged sleeve piece and end rings, complete with stud bolts, nuts and washers, and elastomeric. The main flange for connection to other flanged equipment shall be provided with a raised face flanges drilled in accordance with requirement.
- 1.3 The flange adaptors used for jointing plain ended pipes and fittings shall be bolted, gasketed, sleeve type with diameter to properly fit onto a pipe/flange forming permanently tight joints under all reasonable conditions of expansion contraction, shifting and settlement between two couplings.
- 1.4 The flange adaptors shall be capable of withstanding a shear force corresponding to the load applied by a 10 m length of coupled pipe which is filled with water and suspended between two couplings.
- 1.5 Each flange adaptor shall accommodate approximately 10 m pipe movement during pipe expansion and contraction and allow for an angular deflection of at least 3 deg for pipe diameter 450 mm and below and 0.5 deg for pipe diameter above 1800 mm. The allowable setting gaps for each flexible coupling shall not be less than 7 mm.
- 1.6 Flange adaptors types:
  - 1.6.1 Flange adaptor – connecting flanged pipe or any flanged fitting to plain pipe.
  - 1.6.2 Universal Flange Adaptor – consists of flanged and bell ended sleeve for joining to various ranges of outside diameter pipes.

### **2.0 Adaptor Dimensions**

Flange adaptor dimensions for the various sizes and different pipes usage shall follow Table 15 to 19 of the specification and for Universal Flange Adaptor Table 21 (Refer to the above specification).

### **3.0 Working Pressures**

Flexible coupling of various nominal sizes shall fit the respective pipes of same nominal size as specified in the specification with the working pressures of 16 bar.

#### 4.0 End Rings

All end rings shall be of ductile iron complying with BS 2789 of minimum Grade 420/10.

#### 5.0 Flange Sleeve

All flange sleeves shall be of ductile iron complying with BS 2789 of minimum Grade 420/10.

#### 6.0 Bolts

- a) Bolts, nuts and washers shall be of hot-dipped galvanized carbon steel with finish thickness between 75 µm and 125 µm.
- b) Bolts shall be provided with a trackhead or other suitable methods, to allow the use of one spanner during tightening process.

#### 7.0 Gasket

Gasket shall be vulcanised, moulded or extruded elastomer made of EPDM of hardness range 66-75 IRHD as detailed in MS 672-1999 or AS 1646:1992.

#### 8.0 Coating

Internal and external components of the flange adaptors shall undergo the necessary surface preparation for polymeric coating of fusion-bonded epoxy powder of thickness shall be from 250 µm to 350 µm.

#### 9.0 Materials Used

All non-metallic materials used for flange adaptors intended for the conveyance of water for human consumption shall comply with BS 6920.

#### 10.0 Tests and Inspections

- a. All test and inspection will be carried out in accordance to the specification.
- b. It is the responsibility of the Supplier to inform SAJ when the goods are being manufactured for inspection and testing prior to delivery, by which, failing to will allow SAJ reserves the right to refuse delivery.
- c. Tests shall be carried out in the premise of the supplier with all apparatus and equipment required be made available to perform all tests.
- d. Minimum of 10 percent of the fittings supplied will be tested prior to delivery. Any test, which fails, will render the whole batch rejected.
- e. The supplier shall deem to have included all costs for inspection and testing be it done by SAJ or independent body appointed by SAJ.

- f. 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.
- g. If at any time the supplier fails to deliver the required sample, the product is deemed fail to meet the specifications.

## 11.0 Other Requirements

- 11.1 Harnessing, if required, shall be provided as recommended by the manufacturer of couplings / flange adaptors. Harness joint shall be designed to withstand for the pullout force caused by the internal pressure of 16 bar at the joint.

## 12.0 Mandatory Markings

All joint supplied shall embody the following markings: -

- a) Body material –'DI'
- b) Nominal size
- c) Class / Working pressure (PN)
- d) Joint type
- e) Gasket markings – manufacturer, size and mould number, material grade and code used.
- f) Manufacturer's name or trade mark
- g) Year of manufacture (last two digit)
- h) Lettering "SAJ"

## 13.0 Packing

All flexible coupling shall be individually packed with proper methods and protected from damage during transit.

## 14.0 Certification

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



# **SCHEDULE OF STORES**

# Ranhill SAJ

**Schedule of Stores (A)**

Supply and Delivery of **Flange Adaptors** To Suit **Mild Steel Pipe (JKR Standard)**  
 Flange Drilled to PN 16 In Accordance to Specification SAJ FT / FA / 001 (Rev.5.0/12.2011)  
 For the Period of ..... Year(s)

No	Nominal Diameter (mm)	Outside Diameter of pipe (mm)	Flange Size	Unit	Provisional Quantity	Rate (RM)	Amount (RM)
1	100	121.9	100	Nos			
2	150	177.3	150	Nos			
3	200	232.2	200	Nos			
4	250	286	250	Nos			
5	300	345.4	300	Nos			
6	350	399.3	350	Nos			
7	400	453.1	400	Nos			
8	450	507	450	Nos			
9	500	560.3	500	Nos			
10	600	667	600	Nos			
11	650	692	700	Nos			
12	700	754	700	Nos			
13	750	804	750	Nos			
14	800	854	800	Nos			
15	850	904	800	Nos			
16	900	954	900	Nos			
17	100	1054	1000	Nos			
18	1100	1157	1100	Nos			
19	1200	1270	1200	Nos			
20	1400	1472	1400	Nos			
	<b>TOTAL</b>	<b>TENDER</b>		<b>SUM</b>			

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

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

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

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

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

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

**Schedule of Stores (B)**

Supply and Delivery of **Flange Adaptor** To Suit **Mild Steel Pipe (BS 534:1990)**  
 Flange Drilled to PN 16 In Accordance to Specification SAJ FT / FA / 001 (Rev.5.0/12.2018)  
 For the Period of ..... Year(s)

No	Nominal Diameter (mm)	Outside Diameter of pipe (mm)	Flange Size	Unit	Provisional Quantity	Rate (RM)	Amount (RM)
1	80	88.9	80	Nos			
2	100	114.3	100	Nos			
3	150	168.3	150	Nos			
4	200	219.1	200	Nos			
5	250	273	250	Nos			
6	300	323.9	300	Nos			
7	350	355.6	350	Nos			
8	400	406.4	400	Nos			
9	450	457	450	Nos			
10	500	508	500	Nos			
11	600	610	600	Nos			
12	700	711	700	Nos			
13	750	711	750	Nos			
14	800	813	800	Nos			
15	850	813	800	Nos			
16	900	914	900	Nos			
17	1000	1016	1000	Nos			
18	1100	1118	1100	Nos			
19	1200	1219	1200	Nos			
20	1400	1420	1400	Nos			
21	1600	1620	1600	Nos			
22	1800	1820	1800	Nos			
23	2000	2020	2000	Nos			
	<b>TOTAL</b>	<b>TENDER</b>		<b>SUM</b>			

(Ringgit: .....)

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

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

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

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

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



**Schedule of Stores (C)**

Supply and Delivery of **Flange Adaptor** To Suit **Ductile Iron Pipe (BS 4772:1988)**  
 Flange Drilled to PN 16 In Accordance to Specification SAJ FT / FA / 001 (Rev.5.0/12.2018)  
 For the Period of ..... Year(s)

No	Nominal Diameter (mm)	Outside Diameter of pipe (mm)	Flange Size	Unit	Provisional Quantity	Rate (RM)	Amount (RM)
1	80	98	80	Nos			
2	100	118	100	Nos			
3	150	170	150	Nos			
4	200	222	200	Nos			
5	250	274	250	Nos			
6	300	326	300	Nos			
7	350	378	350	Nos			
8	400	429	400	Nos			
9	450	480	450	Nos			
10	500	532	500	Nos			
11	600	635	600	Nos			
12	700	738	700	Nos			
13	800	842	800	Nos			
14	900	945	900	Nos			
15	100	1048	100	Nos			
16	1100	1152	1100	Nos			
17	1200	1255	1200	Nos			
18	1400	1462	1400	Nos			
19	1600	1668	1600	Nos			
20	1800	1875	1800	Nos			
21	2000	2082	2000	Nos			
	<b>TOTAL</b>	<b>TENDER</b>		<b>SUM</b>			

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

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

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

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

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

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

**Schedule of Stores (D)**

Supply and Delivery of **Flange Adaptor** To Suit **uPVC Pipe (MS 628)**  
 Flange Drilled to PN 16 In Accordance to Specification SAJ FT / FA / 001 (Rev.5.0/12.2018)  
 For the Period of ..... Year(s)

No	Nominal Diameter (mm)	Outside Diameter of pipe (mm)	Flange Size	Unit	Provisional Quantity	Rate (RM)	Amount (RM)
1	80	88.9	80	Nos			
2	100	114.3	100	Nos			
3	150	168.3	150	Nos			
4	200	219.1	200	Nos			
5	250	273	250	Nos			
6	300	329	300	Nos			
7	350	355.6	350	Nos			
8	400	406.4	400	Nos			
9	450	457	450	Nos			
10	500	508	500	Nos			
	<b>TOTAL</b>	<b>TENDER</b>		<b>SUM</b>			

(Ringgit: .....)

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

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

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

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

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



**Schedule of Stores (G)**  
 Supply and Delivery of **Universal Flange Adaptor**  
 To Connect Various Diameter Pipes Within Permissible Range  
 In Accordance to Specification SAJ FT / FA / 001 (Rev.5.0/12.2018)  
 For the Period of ..... Year(s)

No	N. D. (mm)	O. D. Min. (mm)	O. D. Max. (mm)	Unit	Provisional Quantity	Rate (RM)	Amount (RM)
1	80	88.9	99	Nos			
2	100	114	126	Nos			
3	150	168	179	Nos			
4	200	219	234	Nos			
5	250	273	286	Nos			
6	300	324	334	Nos			
	<b>TOTAL</b>	<b>TENDER</b>		<b>SUM</b>			

(Ringgit:.....)

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

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

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

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

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

