

PB & MD Side Entering Agitator

Mark II Impellers**Addendum - New Mark II Impellers**

Mark II impellers are manufactured with bolted blades for sizes 25A through 87D , and with welded blades for sizes 13A through 23D as they will pass easily through a 24" manway. They are manufactured in both three (3) and six (6) bladed versions. A bolted three (3) blade version is shown below in **Figure 1**

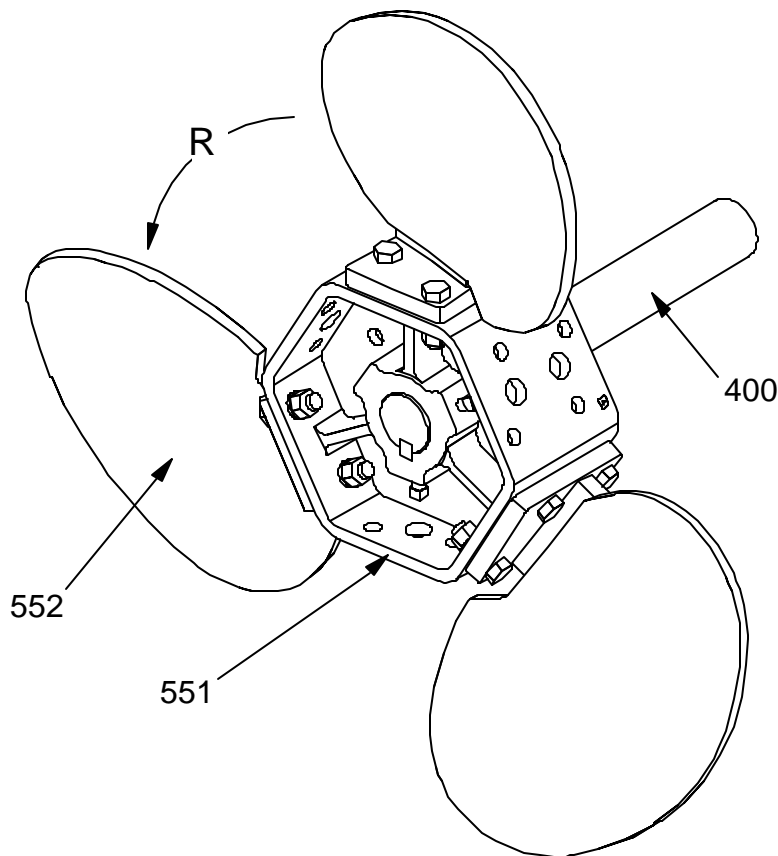


Figure 1 Maxflo Mark II Impeller (Bolted Blade Shown)

Item	Description	Item	Description
400	Shaft	552	Impeller Blade - Mark II
551	Impeller Body - Mark II		
R	Direction of Rotation		

Unless specified otherwise on the unit assembly drawing, the impeller attaches to the shaft with a key and set screws.

Bolted Blade Impellers (Figure 2): If the impeller is received assembled, disassemble each blade. The minimum insertion opening diameter for these impellers is listed in **Table 1** below:

Table 1: Minimum Insertion Diameters

Impeller Diameter, in.	Minimum Insertion Opening Diameter, in.		
	Dissassembled 3 or 6 Blade	Assembled 3 Blade	Assembled 6 Blade
25A - 25D	13	23.5	25
27A - 27D	13	25.5	27
30A - 30D	13	28.5	30
32A - 32D	13	30.0	32
35A - 35D	17	33.0	35
38A - 38D	17	36.0	38
41A - 41D	17	38.5	41
45A - 45D	17	42.5	45
49A - 49D	23	46.0	49
53A - 53D	23	50.0	53
57A - 57D	23	53.5	57
62A - 62D	23	58.5	62
68A - 68D	32	64.0	68
74A - 74D	32	69.5	74
80A - 80D	32	75.5	80
87A - 87D	32	82.0	87

Care should be exercised in handling each component. It is recommended that mechanical assists be used to insert and install all impellers or components weighing over 40 lbs. Approximate component weights are shown in **Table 2**:

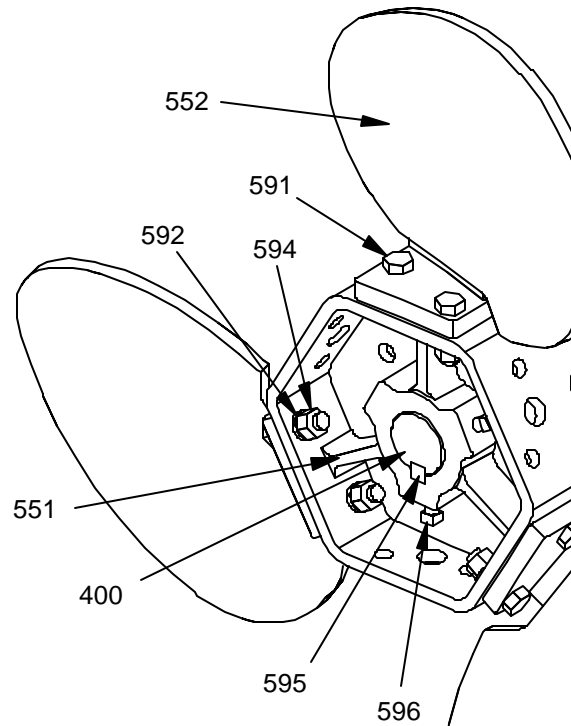
Mark II Impellers**Table 2: Blade and Hub Weights - Bolted Blades**

Bolted Impellers		
Impeller Diameter, in	Hub Weight, lbs.	Blade Weight, lbs
25A-25D	42.4	12.3
27A-27D	42.4	13.4
30A-30D	42.4	14.8
32A-32D	42.4	16.4
35A-35D	102	27.5
38A-38D	102	30.2
41A-41D	102	33.7
45A-45D	102	43.2
49A-49D	208	65.7
53A-53D	208	72.7
57A-57D	208	81.2
62A-62D	208	102
68A-69D	498	161
74A-74D	498	177
80A-80D	498	197
87A-87D	498	222

All blades are match marked to fit against a matching face. The impeller balance test was performed with the blades in their respective positions. They must be installed in these same relative positions.

For 3 bladed impellers, the blades are to be installed on the sides marked 1, 2, and 3. When a six (6) bladed impeller is supplied, three (3) blades will match to the sides 1, 2, and 3 and the other three (3) blades to the sides 4, 5, and 6. The bolt patterns are different for sides 1, 2, and 3 versus sides 4, 5, and 6. Be sure to match the correct blade to each of the hub surfaces. Bolt tolerances are tight to hold blade pitch tolerances. No attempt should be made to redrill any of the holes. The blades (552) may be installed on the hub (551) either before the hub is mounted on the shaft or afterwards. However, it is recommended that the hub be installed first.

1. Install the key (595) onto the end of shaft (400)
2. Slide the hub (551) onto the end of the shaft (400) with key (595) in position and tighten the four (4) set screws (596) to values shown in the Table 3. The tapped holes for the set screws have been made with a self locking, Spiralock® thread form. Auxiliary fastener locking is not necessary. These set screws will only perform as designed if torqued to the prescribed values.



*Figure 2 Maxflo Mark II with Bolted Blades
25" Through 87" Diameter*

Item	Description	Item	Description
400	Shaft	592	Lockwasher
551	Impeller Body - Mark II	594	Hex. Nut
552	Impeller Blade - Mark II	595	Impeller Key
591	Hex. Head Bolt	596	Sq. Hd. Setscrew

3. Bolt the blades (552) in their match marked positions using fasteners (591), hex nuts (594), and lockwashers (592). Keep the bolt heads to the outside. Use the tightening torques shown in **Table 3**.

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Table 3: Bolt and Set Screw Tightening Torques for 300 Series Stainless Fasteners⁽¹⁾⁽²⁾

Bolt Size	Tightening Torque ⁽³⁾	
	ft-lb _f	Nm
5/16-18	8.3	11
3/8-16	15	20
1/2-13	38	51
5/8-11	68	92
3/4-10	120	163
7/8-9	182	247
1-8	273	370

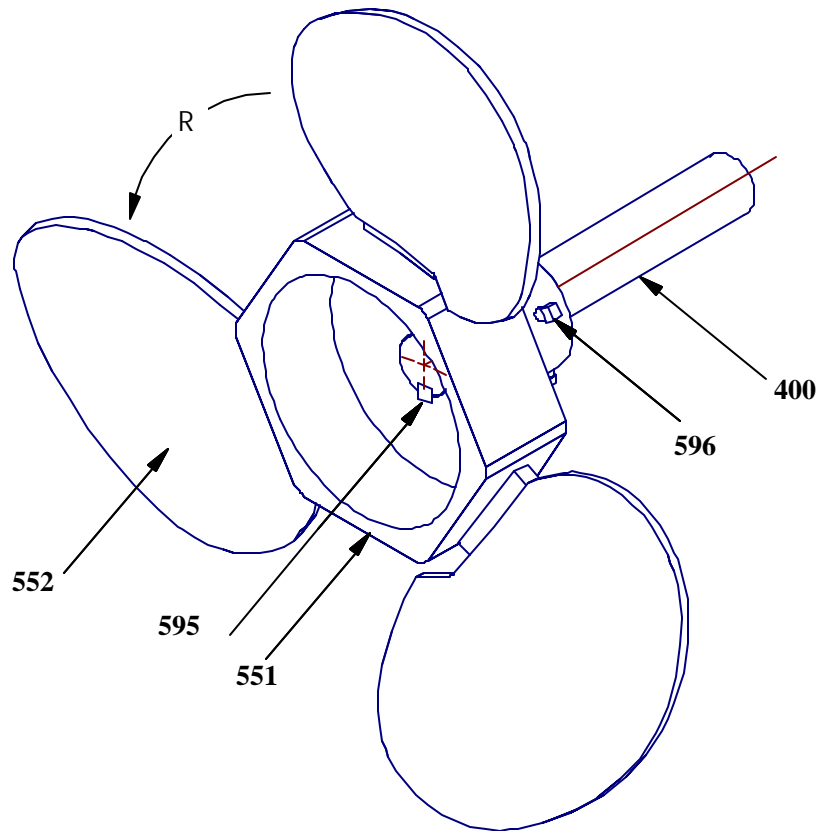
(1) Tighten all fasteners to values shown unless specifically instructed to do otherwise.

(2) Lubricate all fasteners at assembly with grease, oil or an anti-seize material. Bolt threads and contact surfaces of bolt heads and nuts should be lubricated.

(3) If fasteners cannot be lubricated, multiply table values by 1.25.

Welded Blade Impellers: Maxflo Mark II impellers from 13" through 23" are provided with welded blades as shown in **Figure 3**. Impeller sizes from 13" through 17" use set screws for driving the impeller. Impeller sizes from 18" through 23" use a key and set screws.

A welded Mark II impeller can pass through a tank opening in different ways depending on the number of blades. Impellers with three blades can pass through an opening smaller than the impeller diameter by rotating it through the opening. For all practical purposes the six bladed version cannot be rotated through a nozzle. The front view of a Maxflo Mark II impeller is shown in **Figure 4** and **Figure 5** as it passes through a tank opening. Refer to the equipment certification package to identify impeller diameter and number of blades.



**Figure 3 Maxflo Mark II with Welded Blades
13" Through 23" Diameter**

Item	Description	Item	Description
400	Shaft	595	Impeller Key (18" thru 23" only)
551	Impeller Body - Mark II	596	Sq. Hd. Setscrew
552	Impeller Blade - Mark II		

Refer to **Table 4** below for the minimum insertion diameter. The minimum insertion diameter for three bladed Mark II impellers with rotation depends on the length of the nozzle. If the length of the nozzle exceeds dimension "B" as shown in **Figure 6**, use the dimension for no rotation to be certain the impeller can be introduced into the tank or chest.

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Mark II Impellers**Table 4: Minimum Insertion Openings for Welded Impellers**

Impeller Dia., in.	Minimum Insertion Opening Diameter, in.			
	3 Blade			6 Blade
	No Rotation	With Rotation	B (Max)	
13A-13-D	12	9.12	3.00	13
14A-14D	13	9.88	3.25	14
16A-16D	14.5	11.25	3.75	16
17A-17D	15.5	11.88	3.88	17
18A-18D	16.5	12.62	4.12	18
20A-20D	18.5	14.00	4.50	20
21A-21D	19.5	14.75	4.75	21
23A-23D	21.5	16.12	5.25	23

Welded three (3) and six (6) blade impeller weights are shown in the **Table 5**. It is recommended that mechanical assists be used to insert and install all impellers weighing over 40 lbs.

Table 5: Welded Impeller Weights

Welded Impellers		
Impeller Diameter, in.	3 Blade Impeller Weight, lbs.	6 Blade Impeller Weight, lbs.
13A-13D	5.70	7.40
14A-14D	6.00	8.00
16A-16D	6.40	8.80
17A-17D	6.80	9.70
18A-18D	26.0	37.5
20A-20D	27.1	39.7
21A-21D	28.5	42.4
23A-23D	30.1	45.6

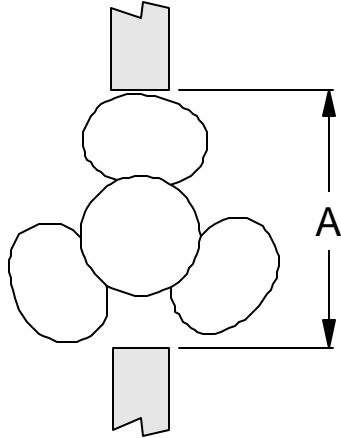


Figure 4: No Rotation

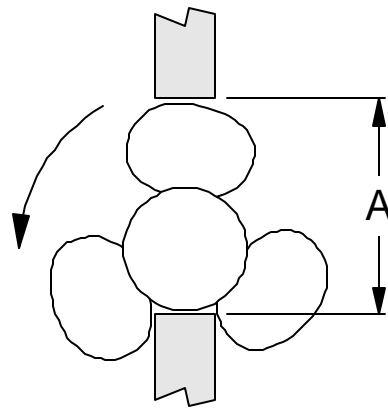


Figure 5: With Rotation

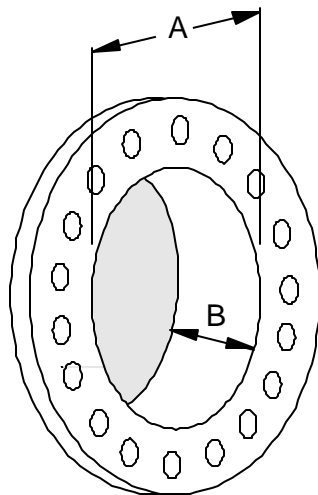


Figure 6: Typical Tank Opening

Item Description

A Minimum Opening Diameter

Item Description

B Maximum Opening Length

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To install impellers 13" through 17" onto the shaft (refer to Figure 3)

1. Slide the hub (551) onto the end of the shaft (400)
2. Tighten the four (4) set screws (596) to values shown in the **Table 3**. The tapped holes for the set screws have been made with a self locking, Spiralock® thread form. Auxiliary fastener locking is not necessary. These set screws will only perform as designed if torqued to the prescribed values.

To install impellers 18" through 23" onto the shaft (refer to Figure 3)

1. Install the key (595) onto the end of shaft (400)
2. Slide the hub (551) onto the end of the shaft (400) with key (595) in position
3. Tighten the four (4) set screws (596) to values shown in the **Table 3**. The tapped holes for the set screws have been made with a self locking, Spiralock® thread form. Auxiliary fastener locking is not necessary. These set screws will only perform as designed if torqued to the prescribed values.