ARJ type Rotary Blower

UNOZAWA-GUMI IRON WORKS, LTD *1

1. ARJ type rotary blower

First machine of three lobe rotary blower was produced in 1977 to get low noise, less vibration performance. And in 1980, ARJ type rotary blowers were commercialized line-up as flow range 1-480m³/min, pressure range 9.8-215kPa (2 stages).

ARJ type rotary blower has simple structure, oil free performance, and stable flow against pressure variation. Many industries such as steel, chemical, food, brewing, and water treatment apply this blower as high pressure compressor, special gas pipe line, pneumatic conveyor, aeration system to get customer’s reliance in the safety and performance.

2. Structure and Principle

ARJ type rotary blower is consisted of casing, rotor, side cover, bearings, timing gear and lubricating oil tank as shown in Fig.1.

In the casing, two rotors rotate in opposite direction with keeping very small clearance between two rotors themselves and the casing. When the lobe end pass the suction entrance, gas is caught with the lobe and casing and is transferred and discharged, forced towards the high pressure side as shown in Fig.2.

![Fig.1 Structure of ARJ rotary blower](image)

![Fig.2 Principle of ARJ rotary blower](image)

3. The strong points of ARJ type rotary blower

3.1 Shaft sealing

ARJ type rotary blower has various options of the shaft sealing for the various gas application as shown in Fig.3 and Table 1.

The mechanical sealing is applied for the special gas cases.

![Fig.3 Shaft sealing of ARJ rotary blower](image)

<table>
<thead>
<tr>
<th>Type</th>
<th>General applications</th>
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<tbody>
<tr>
<td>Standard type</td>
<td>The standard type for blower mainly suitable for blower that handles air. One oil seal is provided on the shaft (“A” part on Fig.3). Four labyrinth seals are provided each on the back of the bearing (“B” part on Fig.3) and the rotor shaft (“C” part on Fig.3)</td>
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<tr>
<td>One-Mechanical seal &quot;K&quot; Type</td>
<td>Provided with one mechanical seal on the shaft (“A” part on Fig.3) suitable for sealing the shaft when gas that should not be leaked into air are handled-N₂, H₂, Ar, CO, CO₂ and other non-solvent gas; and also coke oven gas, city gas digested gas, etc.</td>
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<tr>
<td>Four-Mechanical seal &quot;B&quot; Type</td>
<td>Mechanical seals are provided at four points on the back of the bearing (“B” part on Fig.3). Used for sealing the shaft when handling solvent gas. This type is available with either single mechanical seals or double mechanical seals according to the constituents of the gas being handled.</td>
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<tr>
<td>Four-Mechanical seal &quot;I&quot; Type</td>
<td>Mechanical seals are provided at four position of the rotor shaft (“C” part on Fig.3). Handled gas is completely separated from the bearing.</td>
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</table>

3.2 Back-flow Cooling System

Back-flow cooling system is using the principal of ARJ type rotary blower as shown in Fig.4. By reducing the temperature of discharge gas, this system provide following advantages.

1. High temperature suction gas can be applied.
2. Higher delivery gas pressure can be applied.
3. In case of air application, atmospheric air can be used for back flow.
4. In case of special gas application, cooler is used in back flow gas line.

![Fig.4 Back-flow Cooling System](image)

4. Sales Result

(1) Special gas blower (hydrogen, nitrogen, city gas, etc.) 4 years (2012-2015) market shear were 10-24% (average 17%).
(2) ARJ type rotary blower can only meets the multiple technical requirements, such as shaft sealing, and cooling system. With these technical merits, ARJ type has distinction between other products and has exclusively the difficult specification market.

5. Conclusion

ARJ type rotary blower can be widely applicable for the various gas and its purpose by choosing shaft sealing properly.

Because of the simple structure, maintenance can be done very easily. It is forecasted that easy operation, maintenance and applicability of various gas will open the market widely.

We will challenge higher function, free maintenance, and lower cost and higher performance rotary blower.

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