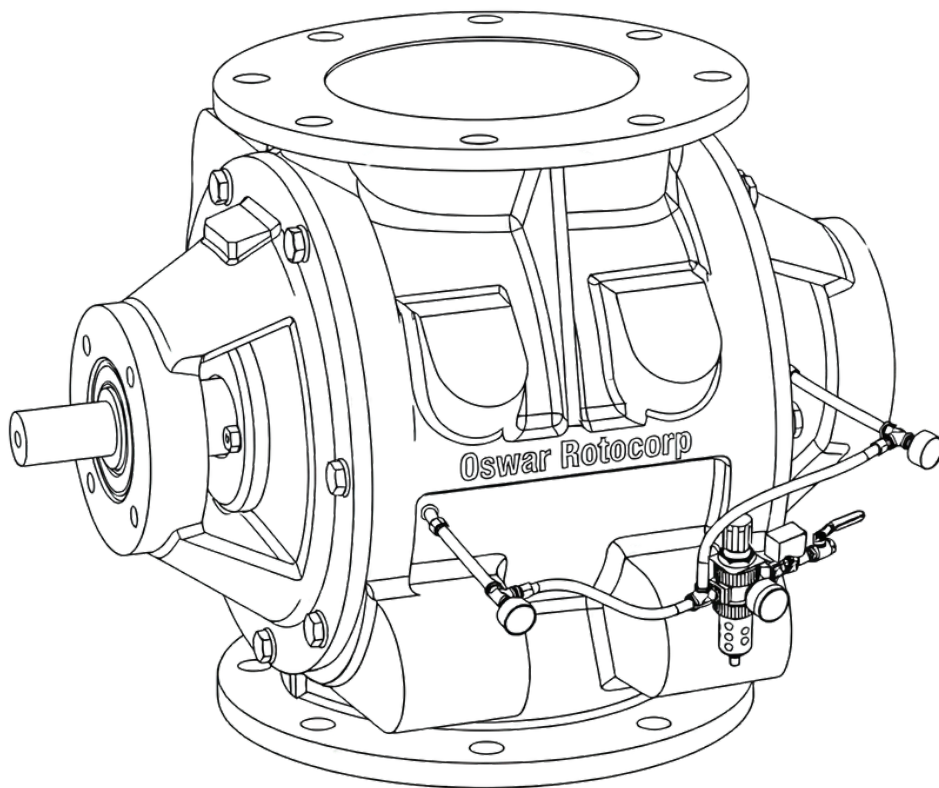
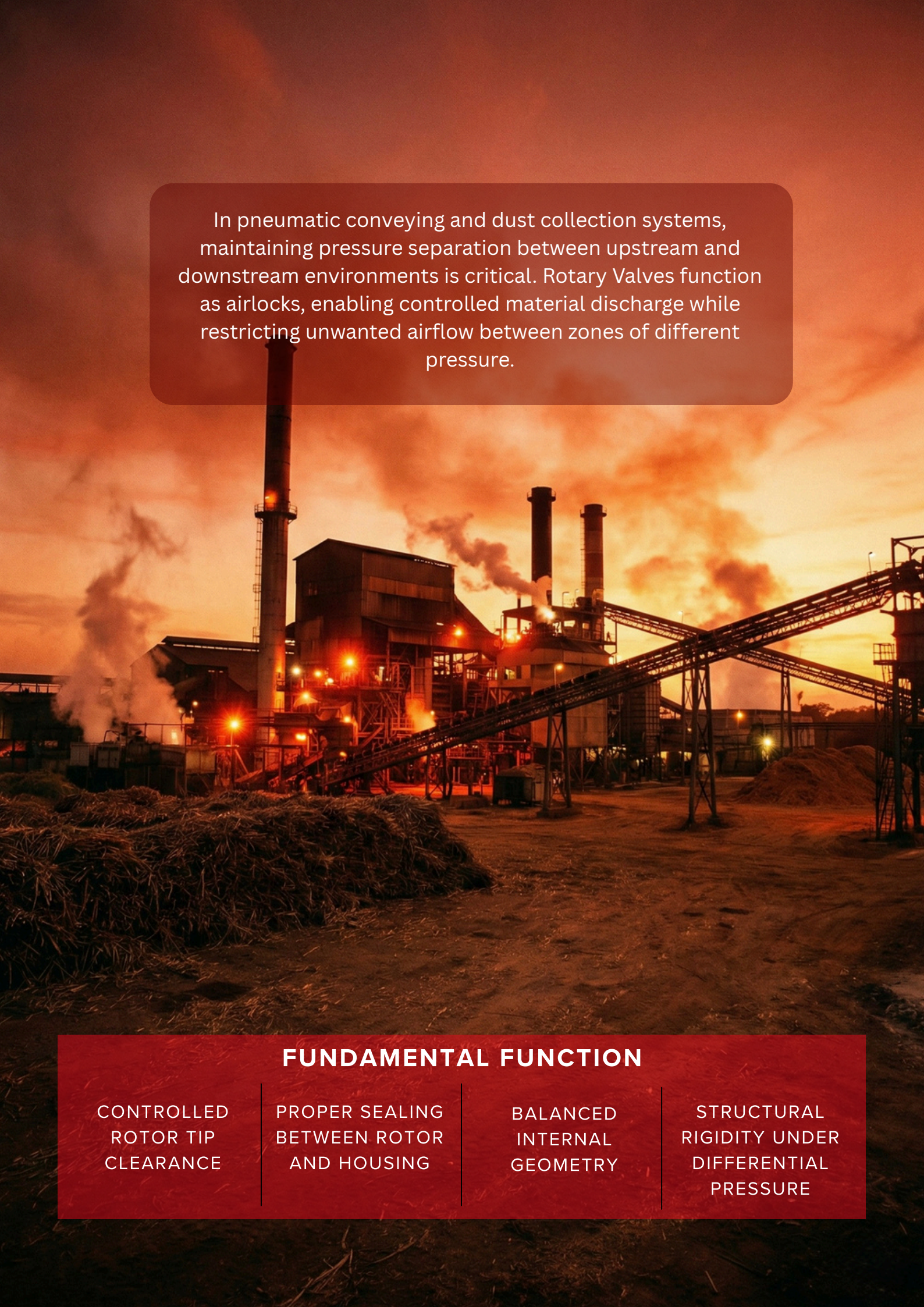


ROTARY AIR LOCK

LEAKAGE & PRESSURE INTEGRITY WHITEPAPER



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A photograph of an industrial facility, likely a sugar mill, at sunset. The sky is a mix of orange, red, and yellow. In the foreground, there are large piles of harvested sugarcane stalks. The middle ground shows a complex of industrial buildings, including a tall chimney stack on the left and several conveyor belts crossing the scene. The background features more industrial structures and another tall chimney stack. The overall atmosphere is industrial and dramatic due to the lighting.

In pneumatic conveying and dust collection systems, maintaining pressure separation between upstream and downstream environments is critical. Rotary Valves function as airlocks, enabling controlled material discharge while restricting unwanted airflow between zones of different pressure.

FUNDAMENTAL FUNCTION

CONTROLLED
ROTOR TIP
CLEARANCE

PROPER SEALING
BETWEEN ROTOR
AND HOUSING

BALANCED
INTERNAL
GEOMETRY

STRUCTURAL
RIGIDITY UNDER
DIFFERENTIAL
PRESSURE

CRITICAL PARAMETERS IMPACTING PRESSURE INTEGRITY

Technical Analysis:

Leakage in a Rotary Valve is primarily governed by:

1. Rotor Tip Clearance

Smaller clearances improve sealing but must account for thermal expansion and material buildup.

2. Differential Pressure

Higher pressure differences increase airflow across clearances, directly impacting airlock efficiency.

3. Rotor Speed

Increased rotational speed can influence volumetric efficiency and leakage characteristics.

4. Material Characteristics

Abrasive materials accelerate wear, increasing internal clearances over time.

5. Housing & End Cover Alignment

Improper installation may compromise pressure integrity.

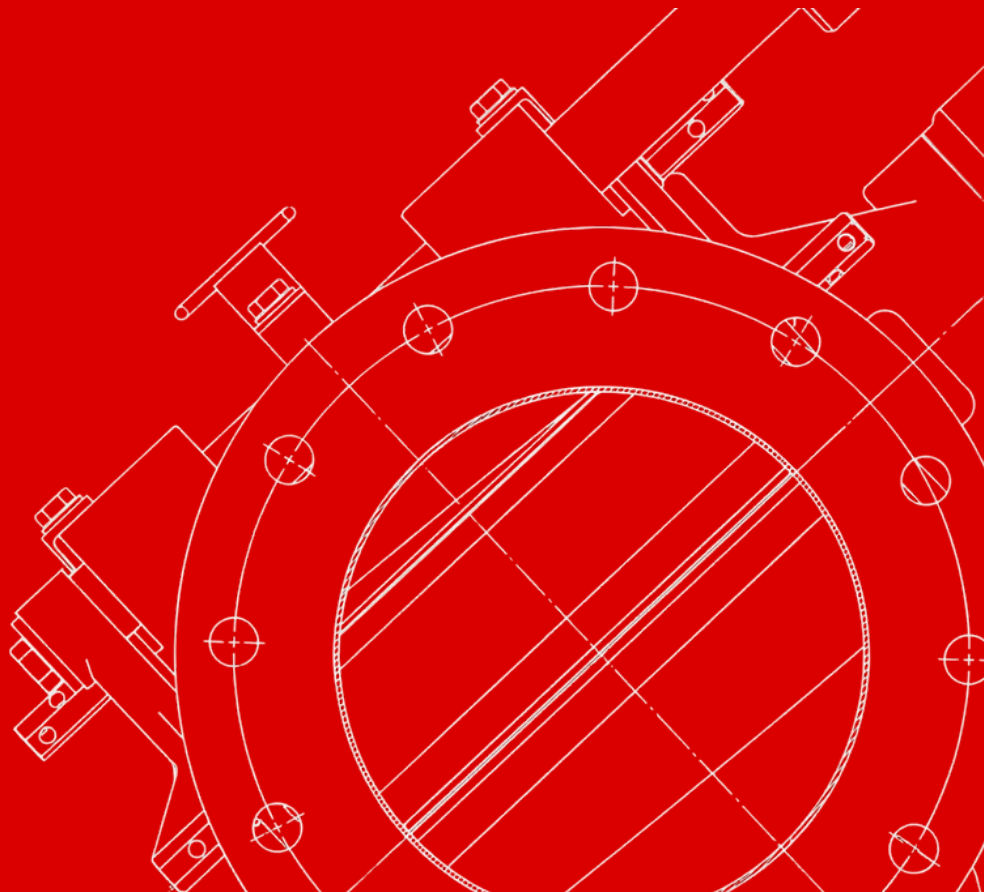
PERFORMANCE INDICATORS

- Air Leakage Rate
- Volumetric Efficiency
- Pressure Drop Across System
- Energy Consumption Impact
- Maintenance Frequency

ENGINEERING SOLUTIONS TO MINIMIZE LEAKAGE

Design Considerations:

- Optimized rotor-to-housing clearances
- Precision machining of sealing surfaces
- Reinforced housing structures for high-pressure applications
- Selection of wear-resistant materials
- Proper shaft sealing mechanisms
- Application-specific rotor configurations



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Corporate Office

Jaipur, Rajasthan India
Nagpur, Maharashtra India

Sales Inquiries

info@oswarrotocorp.com

Helpline

[+44 7917 128505](tel:+447917128505) | +91 77422 36474

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