FLAP VALVE PUMPS

APRIL 2019 LAUNCH
PRODUCT PRESENTATION
ABOUT IWAKI AMERICA

CONSISTS OF FOUR DIVISIONS

• IWAKI PUMPS
  • Non-Metallic Mag-Drive Chemical Transfer Pumps
  • SANWA Stainless Steel Chemical Transfer Pumps

• WALCHEM
  • Water Treatment Controllers
  • Metering Pumps

• IWAKI AQUATIC
  • Engineered Aquatic Research Systems

• IWAKI AIR AODD
  • Industrial and Pure PTFE Air-Operated Double Diaphragm Pumps
NEW PRODUCT INTRODUCTION

2” HEAVY DUTY METALLIC FLAP VALVE PUMPS

TWO MODELS AVAILABLE

TC-X500AN-HV-FLA
2” Aluminum with HNBR-Encapsulated Flap Valves and BUNA-N Diaphragms

TC-X500AS-HV-FLA
2” Aluminum with HNBR-Encapsulated Flap Valves and Santoprene Diaphragms
FLAP VALVE PUMP CHARACTERISTICS OVERVIEW

- Incorporates four flap/hinge style check valves
- Top Inlet/Bottom Discharge for heavy solids and settling fluids
- Designed and Engineered to transfer large-sized solids
- Can also Transfer Sludges and Slurries
- Very Good for Heavy and Dense Slurries
- Very Good handling of Heavy, Solids-laden Slurries
- Very Good For Slurries with Fibrous or Stringy Materials
- Sometimes Referred to as Slurry Pumps or Hinge-Valve Pumps
ABOUT THE MARKET FOR FLAP VALVE PUMPS

• Industrial/Municipal Waste Water applications – 40% to 50%
  • Including small industrial and municipal waste water treatment, DAF systems, etc...

• General Industry – 20% to 30%
  • Utility or Production transfer of liquids containing large solids, fibers, sedimentary particles, etc...

• Mining, Oil & Gas – 20% to 30%
  • Can be used in place of Ball Check AODD pumps where large solids are present

• Food processing – 20% to 30%
  • For Batching applications and ingredient transfer as well as food waste disposal

Estimated market potential in the USA, Canada, Central & South America
Approximately 2000 units per year
TYPICAL FLAP VALVE PUMP APPLICATIONS

- Small Municipal WWTP
  - Deactivated Sludge
- DAF Systems
  - Sludge from Dissolved Air Flotation Treatment
- Food & Beverage
  - Ingredient Transfer and Process Waste
- Mining
  - Solids Dewatering, Drilling Mud
- Tunneling/Boring
  - Solids Dewatering
- Construction
  - Solids Dewatering
- Spill Remediation
  - Solids-Laden Liquids
- Pet Food Manufacturing
  - Process applications & Process Waste
- Meat Processing
  - Rendering Waste
- Fiber Board & Insulation
  - Transfer Fiber-laden Slurries

- Wine / Juice
  - Fruit skins and seeds
- Industrial Waste Water Treatment
  - Solids / Sludge Handling
- Fishing Industry
  - Process Applications & Waste Transfer
- Chemical
  - Solvents solids, Waste solids/sludge transfer
- Ceramics/Tile Manufacturing
  - Ceramic slip and Waste transfer
- Tank Recirculation / Transfer
  - Solid laden sludge and slurry
- Sump & Drainage Discharge
  - Solid laden sludge and slurry
- Magnet Manufacturing
  - Transfer raw powder laden Slurry
TYPICAL FLAP VALVE PUMP APPLICATIONS

- Pumping Chicken Bones & Skin
- Pumping Citrus Skins and Seeds
- Underground Mine Dewatering Pump
- Pumping blood with solids
- Rental Pump for Dewatering applications
- DAF System Pumps
TYPICAL FLAP VALVE PUMP APPLICATIONS

- Fish Transfer / Processing
- Wine Waste Transfer Pump
- Wine / Grape Skins Transfer Pump
- Mine Dewatering Pump
- Construction Dewatering Pump
- Mine and construction Pumps
TYPICAL FLAP VALVE PUMP APPLICATIONS

Tank recirculation/Transfer Pump

Portable pump to Empty Sump or Pits

Tunnelling Dewatering Pumps

Spill Remediation Pump
Flap Valve Pumps Utilize Top-Inlet/Bottom Discharge to ensure passage of materials through the Pump

- Allows for passage of larger solids than traditional ball check AODD pumps
- Gravity assist is ideal for pumping liquids with settling solids and slurry
- Able to Transfer Sludge & Slurry with large sized hard or soft solids up to 2”
- Able to Transfer Slurries with very high percentage Solid-Laden materials
- Able to transfer Sludge & Slurry containing stringy & fibrous materials
- Able to handle Slurry with heavy or dense Sedimentary particles
- Eliminates typical damage caused by settling solids in the pump
- Flap valve pumps generate Very High Vacuum & Suction pressure
- Flap Valve Pumps have relatively High flow rates.
• Short Flap Valve life expectancy can be from
  • Inferior Flap valve materials of construction
  • Damage to flap from abrasive passage of solids
  • Failure of the flap because of cheap and/or poorly designed flap valves
• Requires a lot of maintenance to the pump with more frequent service intervals
• Must pull the pump out of service to perform even the most basic maintenance needs
• Requires maintenance personnel to fully dismantle pump just to inspect, clean or change the flap valves
• Tend to get clogged with debris which requires more regular cleaning or inspection so have to pull the pump
• Don’t handle abrasives well with aluminium construction & typically low-quality flap components
• Run with high back pressure or dead head which can lead to stalling issues
• Some pumps operate 24/7 which lead to high air consumption costs
TC-X500 SERIES FLAP VALVE PUMP OVERVIEW

Model Descriptions

TC-X500AN-HV-FLA Nomenclature

<table>
<thead>
<tr>
<th>500A:</th>
<th>2” Aluminum Pump Heavy Duty Mechanical Air Spool Model</th>
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</thead>
<tbody>
<tr>
<td>N:</td>
<td>Buna-N Diaphragms and Seals</td>
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<tr>
<td>HV:</td>
<td>Hinged Flap Valves (HNBR* Encapsulated Steel Flap Valves)</td>
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<td>FLA:</td>
<td>Flanged Liquid Connections (Center Ported)</td>
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TC-X500AS-HV-FLA Nomenclature

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<th>2” Aluminum Pump Heavy Duty Mechanical Air Spool Model</th>
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Pump Performance Data

Max Flow Rate: 158.5 GPM (600 LPM) (Buna-N Diaphragms)
Max Discharge Pressure: 100 PSI (0.7 MPa)
Max Air Inlet Pressure: 100 PSI (0.7 MPa)
Max Solids Size: 1.2” (30mm) Spherical or 0.60” (15mm) × 1.77” (45mm) Oblong
Pump Weight: 160 Lbs. (73kg)

(*) HNBR (Highly Saturated Nitrile) has better wear and abrasion resistance than standard NBR (BUNA-N) and improve upper temperature range
TC-X500 SERIES FLAP VALVE PUMP PERFORMANCE CURVE

OPERATING POINTS OF THIS CURVE

• MAXIMUM FLOW RATE
  • UP TO 158.5 GPM (600 LPM)

• MAXIMUM DISCHARGE HEAD PRESSURE
  • UP TO 225’ (68.6 M)

• MAXIMUM REQUIRED SCFM
  • UP TO 211.9 SCFM (6000 L/M)

• MAXIMUM INLET PRESSURE
  • UP TO 100 PSI (0.7 MPa)
TC-X500 SERIES PRODUCT FEATURES

**Heavy Duty Construction**
- 160 Lbs. (73 Kg) Total Net Weight
- Thick Walled Construction
- Reinforced Flanges, Legs & Manifolds
- Manifolds Require Only Four Bolts
- Heavy Duty Designed Flap Valves
- Designed to handle highly abrasive slurry
- Designed to handle 2:1 high pressure discharge

**Flanged liquid Connections**
- Fully Bolted Construction
- Thick & Reinforced Design

**All Bolted Construction.**
- Fully Bolted manifolds
- Mating Surfaces are Machined

**Wide, Sturdy & Stable Base**
- Modular and replaceable
- Stainless Steel construction
- Drop in dimensions
- Rubber feet

**Heavy Duty Mechanical Air Motor.**
- Fitted with Heavy Duty Mechanical Coil
  Spring-assisted, non-centering Air Spool
- Designed for very difficult & demanding liquid transfer applications
- Resists stalling and freezing in nearly all operating conditions
- Can reliability and efficiently achieve very high flow rates & high discharge heads
TC-X SERIES PRODUCT FEATURES

**Vented Diaphragm Chambers**
- Alleviates trapped air/gas issues

**Air Motor**
- Heavy Duty Mechanical Air Motor
- No Oil or Grease lubrication Required
- Emissions Free Exhaust Air
- Outside Accessible Air Spools
- Unified Air Motor with Common Parts
- Efficient Air Consumption
- No Air Blow through

**Additional Pump Features**
- Drop-in Dimensions
- Fully Bolted Construction
- Designed for Ease of Service
- All Modular Wear Components
- High Flow Rates
- High discharge Pressures
- High Vacuum Pressures

**Pump Design**
- 2” Aluminium Pump
- HNBR Rubber Encapsulated Steel Flap Valves
- Top-suction / Bottom-Discharge keeps solids from settling in pump
- Integrated Flap Valve Access ports
- Permits passage of soft solids up to 2 inches

**Flap Valve Access Ports (X4)**
- Ease of Access for Service
- Ease of Access for Inspection
- Ease of Access for Cleaning
- No need to remove the pump from service

In-line maintenance facilitates servicing pump without removal from installation

**HNBR Heavy-Duty Flap Valves**
- Modular unit with Extended life expectancy
- Extended flex life
- Abrasion resistant
- Impact resistant
- Cut Resistant

HNBR has higher chemical temperature, abrasion and flex life when compared to standard Buna-N
Flap Valve Pump Design Features
- Fully Modular Construction
- Very Heavy Duty Design
- HNBR Rubber Encapsulated Steel
  - High mechanical strength
  - Abrasion Resistant
  - Impact Resistant
  - Cut Resistant
  - Temperature resilient
  - Chemical resistant
- Clean, Remove or Replace Directly
- Remove with Only Four Bolts
- 3rd Generation Design – Latest & Greatest

Flap Valve Access Panels
- Easy External Access
- Four Bolt Access Design
- Easy Inline Maintenance
  - Easy access for service
  - Easy access for inspection
  - Easy access for cleaning
TC-X500 SERIES PRODUCT FEATURES (FLAP CHECK VALVE DESIGN)

**Stroke Control Bar**
- Reduces over stroke (Over flex)
- Helps to rebound flap
- Helps improve flex life

**NBR Stroke Pad**
- Reduces over stroke (Over Flex)
- Reduces impact
- Helps to rebound flap
- Helps improve flex life

**HNBR Flap Seat**
- Special Raised & Angled Seat Design
- Heavy duty construction
- Compensates for wear & tear over time
- Allows faster seating of flap valve
- Allows for better sealing
- Cut & abrasion resistant
- Chemical & heat resistant
- High Mechanical strength and more flexible

**HNBR Base Plate**
- HNBR Rubber Encapsulated steel plate
- Heavy duty construction
- Cut & abrasion resistant
- Chemical & heat resistant
- High Mechanical strength and more flexible
- 4 bolt removal
- No gaskets or O-rings

**Modular Construction**
- 4 bolts for Easy replacement
- Sold as a modular set
  - Parts can also be sold individually
- Heavy duty construction
- Rubber on rubber sealing
- Integrated gasket > No O-rings

**HNBR Flap Valve**
- HNBR Rubber Encapsulated steel plate
- Heavy duty construction
- Cut & abrasion resistant
- Chemical & heat resistant
- High Mechanical strength and more flexible
- Raised from Base plate to reduce chance of solids jamming / abrasion damage
TC-X500 SERIES TRIAL PUMP APPLICATION (GYPSUM TRANSFER)
MAJOR FLAP VALVE PUMP COMPETITORS

MOST COMMON FLAP VALVE PUMP MODEL
• 2” Aluminium with NBR diaphragms

COMPETITIVE BRANDS
• Warren Rupp (Sandpiper HDF Series)
  • Market Leader – IDEX Corporation
• Wilden (Brahma)
  • Sandpiper Copy – Dover Corporation
• Warren Rupp (Marathon MSA/MHDF Series)
  • Sandpiper Private Label – IDEX Corporation
• Warren Rupp (Blagdon X25/X50/X75 Series)
  • Sandpiper Based Design – IDEX Corporation
• Yamada (SolidPRO Series)
  • Since 2007 – Original design by Shigiru Murata (YTS)
• ARO (PF20 Series)
  • ARO Designed – Ingersoll Rand Corporation
MAJOR FLAP VALVE PUMP COMPETITORS

SANDPIPER

WILDEN

YAMADA
MAJOR FLAP VALVE PUMP COMPETITORS

ARO

MARATHON

BLAGDON
# TC-X500 SERIES COMPETITOR ANALYSIS

<table>
<thead>
<tr>
<th>SPECIFICATION</th>
<th>IWAKI AIR FLAP VALVE</th>
<th>Yamada SOLIDSPRO SERIES</th>
<th>SANDPIPER HDF SERIES</th>
<th>Wilden BRAHMA SERIES</th>
<th>ARO PF20R/Y SERIES</th>
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<tbody>
<tr>
<td></td>
<td>ENGLISH</td>
<td>METRIC</td>
<td>ENGLISH</td>
<td>METRIC</td>
<td>ENGLISH</td>
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<tr>
<td>MAX FLOW RATE</td>
<td>158.5 GPM</td>
<td>600 LPM</td>
<td>158.5 GPM</td>
<td>600 LPM</td>
<td>208 GPM</td>
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<tr>
<td>MAX INLET AIR PRESSURE</td>
<td>100 PSI</td>
<td>0.7 MPa</td>
<td>100 PSI</td>
<td>0.7 MPa</td>
<td>100 PSI</td>
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<tr>
<td>MAX SLURRY SIZE</td>
<td>1.8”</td>
<td>45 mm</td>
<td>1.18”</td>
<td>30 mm</td>
<td>2”</td>
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<tr>
<td>DRY SUCTION LIFT</td>
<td>16.5’</td>
<td>5.0 m</td>
<td>24’</td>
<td>7.2 m</td>
<td>24.3’</td>
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<tr>
<td>WET SUCTION LIFT</td>
<td>26.3’</td>
<td>8.0 m</td>
<td>29.5’</td>
<td>9.0 m</td>
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<td>CONNECTION SIZE(S)</td>
<td>2&quot; FLANGE</td>
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<td>2” FLANGE/NPT</td>
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<td>2” NPT</td>
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<td>WETTED MATERIALS</td>
<td>ALUMINUM</td>
<td></td>
<td>ALUMINUM</td>
<td></td>
<td>ALUMINUM, CAST IRON, STAINLESS STEEL</td>
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<tr>
<td>DIAPHRAGM MATERIALS</td>
<td>BUNA, Santoprene</td>
<td></td>
<td>BUNA</td>
<td></td>
<td>BUNA, NEOPRENE, HYTREL, Santoprene, EPDM</td>
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<tr>
<td>FLAP VALVE MATERIAL</td>
<td>HNBR</td>
<td></td>
<td>HNBR</td>
<td></td>
<td>BUNA, NEOPRENE</td>
</tr>
<tr>
<td>AIR MOTOR TYPE</td>
<td>MECHANICAL</td>
<td>C-SPRING SLEEVE &amp; SPOOL</td>
<td>SPOOL VALVE</td>
<td>PRO-FLO SHIFT</td>
<td>UNBALANCED SPOOL</td>
</tr>
<tr>
<td>MAX DISCHARGE/CYCLE</td>
<td>.925 G</td>
<td>3.5 L</td>
<td>.791 G</td>
<td>3.0 LPM</td>
<td>.47 G</td>
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<tr>
<td>PRODUCT WEIGHT</td>
<td>160 LBS.</td>
<td>78 KG</td>
<td>115 LBS.</td>
<td>52 KG</td>
<td>88 LBS.</td>
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<tr>
<td>MAX AIR CONSUMPTION</td>
<td>211.9 SCFM</td>
<td>6000 LPM (ANR)</td>
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TC-X500 SERIES PRODUCT SUPPORT MATERIALS

Available for Download at www.IwakiAIR.com