QUALITY IS NEVER AN ACCIDENT.
BDF INDUSTRIES, SINCE 1906.
**MELTING**

BDF Industries Melting product line includes the complete glass melting and conditioning technologies for design and supply of furnaces, working end & forehearts. The range of products includes also the relevant equipment like oil and gas burners and firing system, air and exhaust reverse valve, batch chargers, forehearth glass mixers etc.

BDF Industries furnaces are engineered by high level of customization with focus on energy efficiency and the attention to the environmental impacts. Long time experience skilled people work together in synergic team with young generation technician in order to offer a wide range in design, manufacture and supply of different furnaces types for production of containers, tableware, lighting ware and technical glassware.

**FORMING**

BDF Industries glass container forming product line is the historical core business. BDF Industries is able to provide a wide range of machineries with a high level of production flexibility to meet the customers’ requirements.

With more than 65 years’ experience in glass forming field, BDF Industries can offer the complete range of IS machine including gob forming and delivery, ware handling, container and variable equipment. The glass forming machineries are fully designed and assembled in house by BDF Industries in Italy, which has relevant knowledge of production process of the most important glass manufacturers in the world (e.g. strong credentials for forming business in O-I, Saverglass, Sisecam, Vetropack, Vitro...)

Our R&D office is focused to find the best solutions applied into IS machines in order to match lower production costs for our Customers thanks to higher reliability and maintainability of our product. We continue to work towards research and innovations that will deliver genuine advantages in productivity and efficiency for our customers glass factories located in different area around the world.

**AUTOMATION**

The automation team involved in the Glass Industries focused its activity in the engineering process and software, during reconditioning and retrofitting of all part of Glass Factory including: plant designing, installation and start-up, network configuration, control, staff training, customer service and remote assistance.

The experienced, qualified, passionate and customer-focused staff is there to add value for customers, partners and suppliers.

As part of its own philosophy, the team believes and operates in the sustainable development: the application of its carefully designed and implemented systems greatly save energy and relevant impact on the environment, thus improving the quality of life and the safety of the operators in the field as well as adding economic and social value to the community.

A fundamental key of success in the automatic control is the interlink with melting and forming teams which makes the final product completely fit with the Glass Factory requirements.
ENERGY

The large BDF Industries experience in the glass industry and automation makes us the more qualified counterpart when it comes to improve, re-qualify or reinvent a glass production plant.

To master the challenges of global competition, our customers must minimize costs, continually increase the productivity of their systems and meet ever-stricter environmental regulations.

Our innovative and ecofriendly solutions help to conserve natural resources, improve energy and capital utilization and optimize processes. For our customers, this means lower raw materials consumption, fewer emissions, greater energy efficiency, lower costs and increased output. The experience into demanding environment as the glass industry is our key point to succeed around you.

We can all make a difference. By applying different type of technologies, BDF Industries is able to supply a full package of energy recovering and/or renewable energy systems.

Resources from waste: heat recovery system of waste gases to produce electric energy via ORC turbine or steam turbine. Waste gases treatment: dust filtration and waste gases chemical compounds abatement techniques. These are some package solution examples of what BDF Industries can offer, develop, deliver and install.

SERVICE

The reliable and innovative partner for running glass making plants to maximize productivity, quality, reliability, maintain assets and contain costs.

BDF Industries has a Service organization dedicated to provide a complete spectrum of the highest quality service solutions to satisfy the needs of our clients from a single source. Our services support the entire product value chain from melting glass making to forming, filtering, energy facilities and automation.

The service product line includes installation & startup, upgrades of mechanical equipment and automation, technical assistance for repairing and overhauling, training, performance evaluation & long term service agreement, integrated maintenance management & diagnostic solutions and systems, spare parts.

The contents of service are the following:

- Supply local qualified supervisors
- Supply of certified end/or upgraded OEM (Original Equipment Manufacturer) spare parts for all maintenance operations
- Performance of all equipment maintenance
- Repairs using state-of-the-art technology
- Optimization of Spare Parts inventory
- On the job Training of local maintenance and operation personnel

The BDF Industries service team supports the strategic goals of glass factory by stimulating growth in core skills and providing personalized programs for the glass industry.

The BDF Industries Learning Center in Italy and strategically located Service Centers offer a wide range of programs in technical courses. Our technical courses are presented by field-tested experts combining understanding of theory and practical experience.

The quality training provided is a prerequisite to improve the skills of operating and maintenance personnel, so as to assure knowledge, safety and higher equipment availability.
GLASS IS MACHINE
Innovation, technology and versatility make the BDF IS Machines the ideal solutions for high productivity, improved word surroundings and considerable energy savings.

The BDF machines are particularly designed for being functional in all their mechanical components (gob delivery, servo and pneumatic mechanism, molds cooling, easy mounting of variable equipments, special process apparatus, ware handling) and also in electronic control systems (integrated and stand-alone).
IS ANGULAR ADV 8000 HS

8-10-12 SECTIONS AND TANDEM
IS 41/4” : SG-DG TG3”-TG 3 1/8” - QG 2 1/8”
IS 5” B: SG-DG-TG 96MM
IS 5” S: SG-DG-TG 85MM
IS 5 ½”: SG-DG
IS 6 ¼”: SG-DG-TG 4 ¼”

STANDARD MACHINE CONFIGURATION

FEEDER
• Servo plunger
• Gear type revolving tube mechanism
• Servo Arcuate shear
• Shear spray system

DELIVERY SYSTEM
• Servo gob distributor SGD 330
• Easy Aligning Delivery System (EADS)

MACHINE
• Angular opening close mechanism
• 21 lines valve block
• Blank side DAC cooling
• Blow side vertical cooling
• Blow side vacuum system
• Blow head antideflection
• Servo invert
• Servo take out

PROCESS
• Blow & Blow
• Press & Blow
• Narrow Neck Press and Blow (NNPB)

WARE HANDLING
• Step pusher
• HS Conveyor

TIMING SYSTEM
• ADV 8000
OPTIONAL

FEEDER
- Servo parallel Shear mechanism

DELIVERY SYSTEM
- Multi Direct Drive servo gob distributor X2/X3/X4

MACHINE
- 26 lines valve block
- Blow side DAC cooling
- Take Out anti deflection
- Proportional valves:
  - Plunger up
  - Counter blow
  - Final Blow
- IWS system

WARE HANDLING
- AP Pusher mechanism (dual motor)
- HS Conveyor
STANDARD MACHINE
CONFIGURATION

FEEDER
• Servo plunger
• Gear type revolving tube mechanism
• Servo parallel Shear mechanism
• Shear spray system

DELIVERY SYSTEM
• Multi Direct Drive servo gob distributor X2/X3/X4
• Easy Aligning Delivery System (EADS)

MACHINE
• Parallel opening close mechanism
• 21 lines valve block
• Blow side DAC cooling + Vertical cooling
• Blow side vacuum system
• Blow head antideflection
• Servo Invert
• Servo Take Out
• Take Out anti deflection

PROCESS
• Blow & Blow
• Press & Blow
• Narrow Neck Press and Blow (NNPB)

WARE HANDLING
• AP Pusher mechanism (dual motor)
• HS Conveyor

TIMING SYSTEM
• ADV 8000
OPTIONAL

MACHINE

- 26 lines valve block
- Proportional valves:
  - Plunger up
  - Counter blow
  - Final Blow
- IWS system
IS PARALLEL ADV 8000 HSS

8-10-12 SECTIONS AND TANDEM
IS-P: DG 6 ¼”-TG 4 ¼”

STANDARD MACHINE CONFIGURATION

FEEDER
- Servo plunger
- Gear type revolving tube mechanism
- Servo parallel Shear mechanism
- Shear spray system

DELIVERY SYSTEM
- Multi Direct Drive servo gob distributor X2/X3/X4
- Constant Angle 30° Delivery system

MACHINE
- Parallel opening close mechanism
- 26 lines valve block
- Blank side DAC cooling
- Blow side DAC cooling + Vertical cooling
- Blow side vacuum system
- Blow head antideflection
- Servo Invert
- Servo Take Out
- Take Out anti deflection
- Proportional valves:
  - Plunger up
  - Counter blow
  - Final Blow
- IWS system

PROCESS
- Blow & Blow
- Press & Blow
- Narrow Neck Press and Blow (NNPB)

WARE HANDLING
- AP Pusher mechanism (dual motor)
- HSS Conveyor

TIMING SYSTEM
- ADV 8000
### MEASURES

#### I.S. MACHINE MEASURES AND PRODUCTION TIME TABLE

<table>
<thead>
<tr>
<th>Application</th>
<th>Pressure</th>
<th>6 sect.</th>
<th>8 sect.</th>
<th>10 sect.</th>
<th>12 sect.</th>
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<tbody>
<tr>
<td><strong>L.P. COMPRESSED AIR</strong></td>
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<td>2.1 kg/cm²</td>
<td>283 ft³/min</td>
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<tr>
<td><strong>H.P. COMPRESSED AIR</strong></td>
<td>45 p.s.i.</td>
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<td><strong>P&amp;B - PLUNGER COOLING</strong></td>
<td>45 p.s.i.</td>
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* For NPNB plunger cooling pressures above 3.15 Kg/cm² (if required by the customer)

- Quantities specified are free air (21°C-70°F and 1 Kg/cm²-14.7 p.s.i.)
- The operating air supply must be clean and dry (it is required the installation of drying and filter system before the piping connection to the machine with an efficiency of 98% and a nominal retention of 4 × 10 μ).

### STANDARD SERVICE REQUIREMENTS FOR BDF I.S. MACHINES

#### I.S. MACHINES TYPE 4” 1/4 - 5”

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- The operating air supply must be clean and dry (it is required the installation of drying and filter system before the piping connection to the machine with an efficiency of 98% and a nominal retention of 4 × 10 μ).
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</tbody>
</table>

- Maximum temperature of compressed air supply to the machine = 80°C
- Minimum temperature of compressed air supply to the solenoid valve block = 10°C
- Pilot air (Valve Block) 0.5 m³/min of free air at 21°C (clean, oil and water free)
- Dew point of compressed air: -5°C = -2°C
- Water hardness 100 parts CaCO₃ per 1,000,000 parts of water (P.P.M.)
**VALVE BLOCK 21 LINES**

**GENERAL DATA**
- Poppet type valve with 265 mm$^2$ air passage section;
- Valve body in aluminium alloy with vulcanised polymer seal;
- Valves in vertical working position
- Quick change valves system;
- Pilot air pressure down to 1.5 bar
- Possibility of direct air feed for all 21 lines
- Precise needle valves for all 21 lines
- Light alloy main body construction
- 21 manual controls with safety micro switches;
- Interchangeable with others type valves block;
- Frontal guard with 21 leds
- Wire harness protected against moisture

**BENEFITS**
- More air available for mechanism operation
- Higher working speed and lower pressure drop
- Improved valve operation with reduced wear
- Improved mechanisms speed control
- Visual control of electric pilot signals
- Less down time for valve replacement
- Reduced weight thanks to construction
MAIN DATA
• 26 pneumatic valves (N.O. or N.C.) controlled by a pilot;
• Valves air flow = 4000 Nl/min;
• Air-air valves control (no spring return);
• Valve pilot made with a 5/2 solenoid micro-valve.

BENEFITS
• Each valve can operate with high, low or direct pressure just trough the positioning of a special plug on each air feed duct;
• Each pneumatic line can be controlled in feed or exhaust just changing the position of the pin-valve;
• No more use of check-valves;
• High flexibility on the valve-block configuration (air pressure or air control) with the machine in operation.
• Manual controls with 3 positions (run-stop-manual).

BENEFITS
• Low and high pressure manifolds integrated in the valve block;
• Design of ducts and manifold for very low pressure drop;
• Easy change electro-pneumatic valves;
• Led system to check the pilot signals of the valves;
• Valve block in aluminium;
• Auxiliary connector for 11 external signals.
IWS 2.0 WEIGHT CONTROL SYSTEM

MAIN DATA
• BDF automatic weight control system through the position control of the plunger mechanism
• Position control of the plunger mechanisms
• Capacitive linear transducer
• Complete plunger stroke control
• Available for SG-DG-TG-QG on all machines type
• Glass weight controlled by height regulation of revolving tube
• DG - TG - QG gobs balance through individual refractory plunger height control
• Process control fully integrated in ADV 8000 control system

BENEFITS
• Automatic regulation of the gob weight
• Reduction mechanical interventions of the operators
• Qualitative and quantitative improvement of the production
• Stability of the gob weight
• Defects reduction on the finish of the articles
• Best thermal stability of the forehearth, machine and production
• The interaction with the inductive transducers facilitates and speedup the set-up of the mechanism
• Increased speed and production quality thanks to the control of the operating air with proportional valve (optional)

TECHNICAL FEATURES
• Fast change Plunger Mechanism thanks to the “wireless data transmission and inductive transformer” between plunger mechanism and foot plate
• Linear transducer made in heavy-duty and high stability materials (ceramic)
• New wireless technology on transmission serial data (RS485) with high frequency (27MHz) and high speed (1Mb/sec) transceiver
• New inductive technology on the power transmission between plunger foot and sensor on the plunger cylinder
• Possibility to up-grade existing machines with standard plunger mechanisms

ACCESSORIES

IWS 2.0 | FORMING IS MACHINE
COOLING SYSTEM

Improved cooling efficiency and thermal homogeneity maintaining standard moulds and equipment:

- Use of standard moulds designed for stack-cooling (radial)
- Use of standard mould holders, arms, plates or inserts
- Dual on-off valve for blank cooling and neck-ring cooling (blank side)
- Neck-ring cooling design with standard nozzles and spacers (blank side)
- Telescopic tube with quick self centering clamping system

DAC

DUAL AXIAL COOLING
RADIAL COOLING 360°
- Radial cooling plenum chamber with easy change and customizable flat drilled plates
- Available for blank and blow side

DUAL AXIAL COOLING
SIDE AXIAL
- Dedicated plenum chamber shaped according mould’s diameter and height
- Two separated cooling air flows (upwards and downwards) with independent air volume optimization
- Available for blank and blow side

DUAL AXIAL COOLING
BOTTOM-UP
- Dedicated plenum chamber shaped according mould’s diameter and height
- One cooling air flow direction: from bottom to top
- Available for blank and blow side
IS MACHINE TIMING SYSTEMS
INTEGREX

- Simple but effective integrated electronic control system to move from mechanical IS machine
- Compact electric cabinet
- Integrated control system
- Reduced set of cables from cabinet to the machine
- Unique control board as with PLC and Operator's interface functions
- From 4 up to 10 sect,
- Single gob, Double Gob,

Drive Controller: max 4 motors for brushless motors.
Electro-mechanical pusher control
Servo gob distributor control.
The Section Controller has max 48 (32 on valves block, 8 blank side, 8 blow side).

ADV SERIES - MUTUAL FEATURES

- Complete integrated control system for control of the entire machine operation from stirrer to ware handling
- Real time telediagnostic
- Automatic set of feeder mechanism, gob distributor mechanism, machine, transport line, articles reject according to the production changes
- Open system with field bus architecture
- Modular machine and industrial standard for Hw and Sw, with centralised, decentralised and with distributed intelligence
- Full integration of BDF stand-alone systems in 3rd part timer

ADV 1000

- User friendly
- Low cost basic functions
- Possible Servo Feeder Control
- From 4 up to 12 sect,
- Single gob, Double Gob, Triple Gob.
- Tandem Capability

The Control is made up of One CPU per section controller for each 4 sections, Independent MS and EME-Stop with certified safety relay per each section and servo motor to fit CE safety requirements, Ethernet communication and remote access.

Machine Controls for Servo Plunger, Servo Parallel Shear, Servo Gob Distributor; on demand: Servo Tube Height Positioning and Servo Tube Rotation.

Integrated Drive Controller For Mechanical Feeder (when the Servo Feeder is not present), Conveyor, Transfer and Cross Conveyor.

The Section Controller has 48 outputs, Free assignable events to outputs with attributes for blank or blow side, Integrated electric pusher with step motor, Individual Ware-Rejection with manual or automatic stop, Special cycles.

ADV 1000 PLUS

- Servo Mechanisms Control
- Stand Alone Mechanisms Control
- Energy Saving With AFE Technology
- From 6, up to 12 sect
- Single, Double, Triple or Quad Gob
- Tandem Capability

The Control is made up of Individual section controller and 24 VDC power supply (one per section), Independent MS and E-Stop with robust safety relay per section and servo motor to meet CE requirements, Ethernet communication and remote access through internet or telephone modem.

Machine Integrated controls for Servo Plunger, Servo Tube Height Positioning, Servo Tube Rotation, Servo Parallel Shear, Servo Gob Distributor, BDF-CWD Conveyor Ware Detector

ADV 8000

- Servo Mechanisms Control
- Stand Alone Mechanisms Control
- Energy Saving With AFE Technology
- From 6, up to 12 sect
- Single, Double, Triple or Quad Gob
- Tandem Capability

The Control is made up of Individual section controller and 24 VDC power supply (one per section), Independent MS and E-Stop with robust safety relay per section and servo motor to meet CE requirements, Ethernet communication and remote access through internet or telephone modem.

Machine Integrated controls for Servo Plunger, Servo Tube Height Positioning, Servo Tube Rotation, Servo Parallel Shear, Servo Gob Distributor, BDF-CWD Conveyor Ware Detector

Integrated Drive Controller For Mechanical Feeder (when the Servo Feeder is not present), Conveyor, Transfer, Cross conveyor, BDF Dual Axes servo stacker.
AFE - ACTIVE FRONT END
OUR ENERGY SAVING PHILOSOPHY

We consider a complete BDF system equipped with servo plunger, servo shears, servo gob, servo pusher, servo invert and servo take-out mechanisms.

Considering the system from a mechanical point of view, there is a continuous energetic inertial changing due to the continuously mechanisms acceleration and deceleration.

We may say that for every movement the energy needs for the acceleration is balanced with the energy needs for the deceleration, more the energy to compensate the mechanical and electronic losses.

These losses are functions of the machine speed.

As the servomechanisms movements are not in the same time, the excised energy is recovered on the CC BUS.

The system takes from the main line only the energy to compensate all the losses (passive energy) that are not compensate from the recovered energy.

The system transfer from the main line to the BUS full power (without cutting) with cos = 1.

The sinusoidal current is without low harmonic (is remaking signal), and the only harmonic signal present is very low and with high frequency, because depend from the modulation frequency (PWM signal).

The converter system on the BDF control cabinet is reversible and recover the energy on the BUS line.

- Sinusoidal line current with reduction of the harmonic current distortion THDi
- Compensation of line voltage variations
- Energy saving
- DC BUS Control also with power line voltage fluctuations
- Regenerative capability thus to make power flow in both directions
In order to ensure a continuous improvement of the products, BDF Industries reserves the right to make modifications to the characteristics and pictures (without notice).