

The future we see through

FORMING DELIVERY

SERVO PLUNGER
SERVO SHEARS
SERVO GOB DISTRIBUTOR X2 X3 X4
DELIVERY CONSTANT ANGLE 30°

OUR HERITAGE

The development and integration of complex technologies to help industrial progress has been BDF Industries core business since 1906.

The **global market** requires the multi-tasking, multicultural and multi-expertise approach of BDF, that over the years has been able to evolve and shape itself according to the necessities.

With its collaboration instinct and the professionalism demonstrated in more than **115 years of tradition**, BDF offers the chance to take part in a first-rate technologic group ready to challenge current and future business opportunities in terms of **competitiveness, performances** and **reliability** of products and processes.

**The future
we see through.**

OUR MISSION

BDF Industries is a manufacturer of technologically advanced machinery, a Group where performance and innovation melt together in an everlasting pursuit of excellence.

MELTING



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

BDF Industries furnaces are engineered with an **high level of customization**, focusing in particular on energy efficiency and environmental impacts. Thanks to a long time experience, combined with a team of skilled people that work together in a synergistic way, BDF Industries is able 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 of experience in glass forming field, BDF Industries can offer a 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 at BDF Industries in Italy, which has relevant knowledge of production process with the most important glass manufacturers in the world (e.g. strong credentials for forming business in O-I, Saverglass, Sisecam, Vetropack, Vitro...).

SERVICE



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 personel.

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.



Forming Delivery

Feeder



SERVO PLUNGER & SERVO INDIPENDENT PLUNGER HEIGHT REGOLATION

TECHNICAL FEATURES

- Versatile installation on conventional feeders
- Use of standard plunger chuck
- Use of low inertia brushless motor and digital electronic drive
- Plunger position accuracy < 0,02 mm
- Motion control with electronic cams
- Controlled by integrated or stand-alone system
- Interface with any type of machine electronic control

MECHANICAL FEATURES

- Housing structure in cast iron containing the carriage, the linear guides and the ball-screw in oil bath
- Ball screw with double preloaded ball-bushings for long-life service
- Low inertia brushless motor
- Long-life synchronous belt transmission

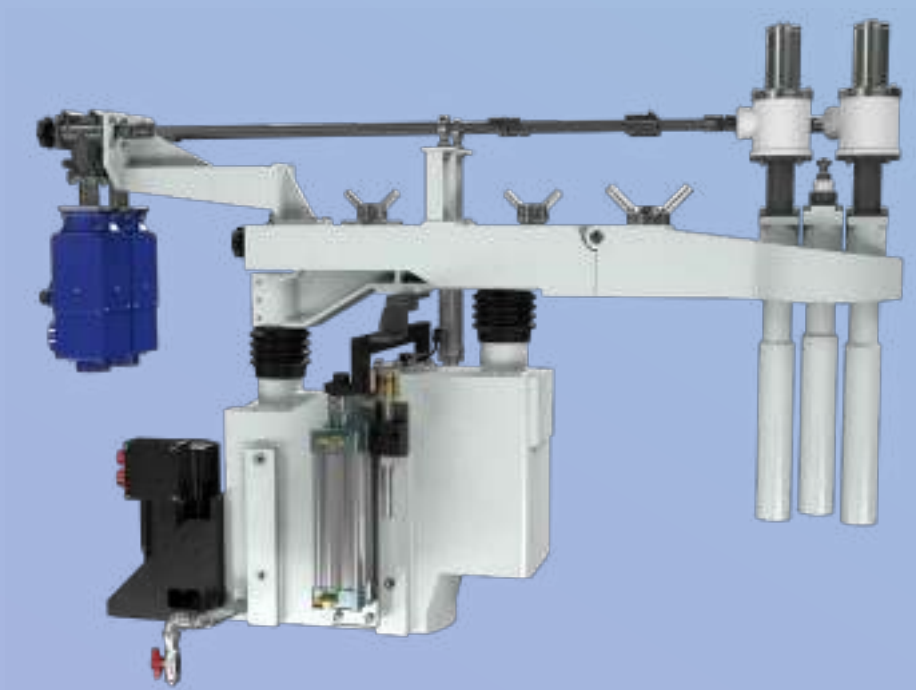
MAIN DATA

- Max. Plunger Stroke 7" (180 mm)
- Min. Plunger Stroke 5 mm

SERVO PLUNGER HIGHT REGOLATION

- Mechanical precision regulation of refractory plunger height
- Small step programmable starting from 0,01 mm
- Easy maintenance motor's position

Possibility to work in manual step or in close loop with weight control system integrated in BDF electronic control Available in DG and TG configuration.



GEAR TYPE REVOLVING TUBE MECHANISM

MECHANICAL FEATURES

- Height adjusting stroke = 130 mm
- Tube supports size: 5"-6"-7"-8"-10"-12"
- Lifting mechanism with 0,5 mm of positioning stroke per revolution
- Tube rotation speed and direction controlled with brushless motor by the machine computer
- Air cooling with fanned or compressed air
- Torque limiting device to prevent damage to the refractory
- Ball bearing or carbon bearing for the tube support
- Manual or servo controlled lifting device

FEEDER TYPE	SPOUT	PULL (T/24h)	GOB WEIGHT (gr)				REFRACTORY		
			SG	DG		TG	SPOUT		TUBE
			-	3"	4 ³ / ₈ "	3"	Depth.	Office Ring	Diam.
64	144 Std.	4.5-18	100-2000	10-300	-	-	6"	5"	5-6-7
	144 Deep	18-32	180-2300	50-350	120-350	-	10"	5"-7"	5-6-7
65	81 Std.	18-40	100-2000	-	15-400	10-100	7 ³ / ₄ "	7"-8"	7-8-10
	81 Deep	27-68	180-2300	10-300	50-700	50-250	10"	7"-8"	7-8-10
	194 Std.	5-35	100-2000	-	15-400	10-100	7 ³ / ₄ "	7"-8"	7-8-10
	194 Deep	15-60	140-2300	-	50-700	50-250	10"	7"-8"	7-8-10
65	115	45-90	180-2800	-	100-1200	50-450	11 ⁵ / ₁₆ "	7"	7-8-10
	503	30-90	180-2800	-	100-1200	50-450	11 ⁵ / ₁₆ "	7"÷10"	8-10-11-12
	503 Deep	45-90	180-2800	-	100-1200	50-450	13 ⁵ / ₁₆ "	10"	10-11-12
	515	90-136	180-2800	-	100-1200	50-450	13"	12"	12







Forming Delivery

Cutting Gob



SERVO ARCUATE

MAIN DATA

- Max. Speed 180 cuts/min
- Min. cutting time 330 msec
- Max. Shear opening angle 30° or 40°
- Cut angles 0°÷90° LH and 0°÷30° RH
- With cut angles > 30° RH a symmetrical mechanism can be used
- C.D.: SG-DG 3" - DG 4"3/8
- Integrated or stand-alone system, even on conventional feeders
- Interface with any type of machine

BENEFIT

- No reverse motor rotation at the cutting point
- No mechanical cams:
 - Reduced job change downtime
 - Easy cam customization
- Constant cutting time at all machine speeds
- Reduced set up times
- More constant gob weight at high speed
- Presetting cutting cams
- High reliability

FEATURES

- Connecting rod-crank transmission
- Air spring on the no-motorized arm to guarantee a constant contact between teeth of the arm gears
- Motor support assembled on a carriage and controlled by a pneumatic cylinder for mechanism's emergency stop
- Overlap shear position's adjustment by motor support's position control (carriage end-stroke control)
- Opening and emergency positions' control
- Data programming by operator's computer or hand-terminal
- Easy and efficient trouble diagnostic



DUAL MOTOR SERVO ARCUATE

MAIN DATA

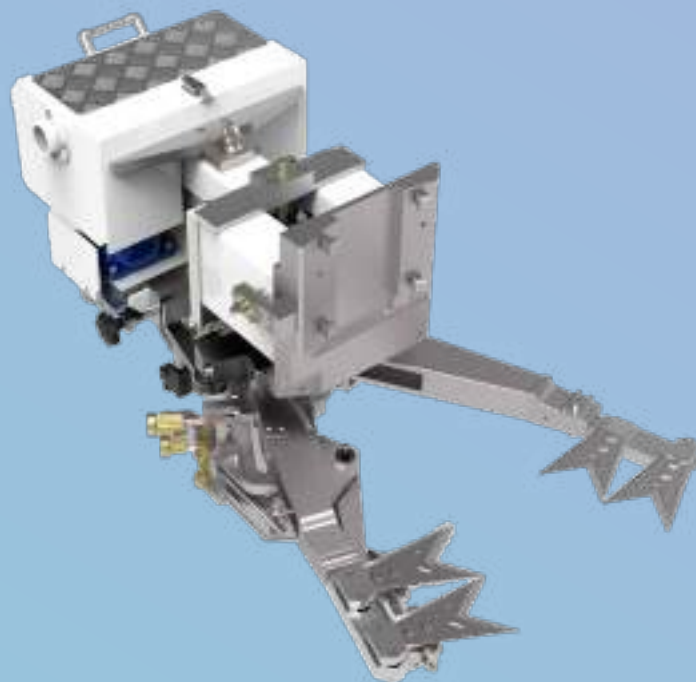
- Max. Speed 240 cut/min (at 13° configuration)
- Max speed 210 cut/min (at 17° configuration)
- Weight of shear approx: 160 kg
- C.D.: SG-DG 3"- DG 4"3/8 - TG 3"
- Integrated or stand-alone system, even on conventional feeders
- Interface with any type of machine

BENEFIT

- Reproducible motion and thus improved constant weight of gobs (max. possible timing error 0.2 ms)
- Motion profiles to be selected inside the BDF software
- Production speeds of up to 240 cuts per minute
- Dwell time of the shears improved the cooling shears conditions
- Almost maintenance-free operation
- No reverse motor rotation at the cutting point come benefit

FEATURES

- Each of the shear arms is driven by a separate brushless servo motor
- The tension of the blades can always be adjusted by means of a handwheel, which adjusts the position of a threaded shaft
- The movement of each arm is 17° (Optional Kit 13°)
- Joints of moving parts are equipped with spherical roller bearings, so it's nearly wear- and backlash-free
- Opening and emergency positions' control
- Data programming by operator's computer or hand-terminal
- Easy and efficient trouble diagnostic



SERVO PARALLEL

MAIN DATA

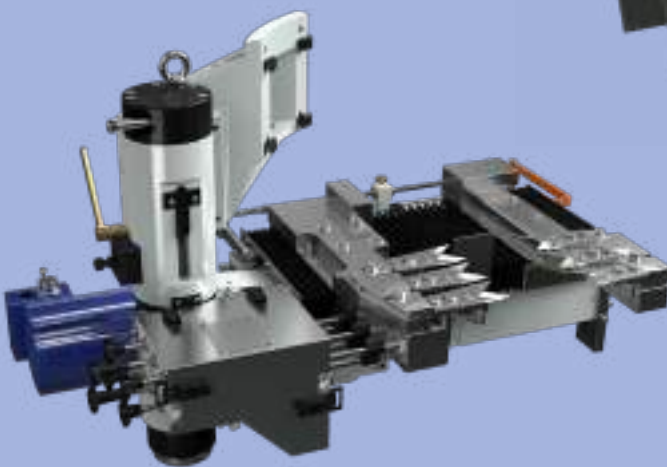
- Max. Shear opening - 280 mm
- Max stroke 82 mm (at min. cutting time)
- Cut angles $0^{\circ} \div 90^{\circ}$ LH and $0^{\circ} \div 30^{\circ}$ RH
- C.D.: SG - DG 3" - DG 4"3/8 - TG 3"
- Integrated or stand-alone system, even on conventional feeder
- Interface with any type of machine

BENEFIT

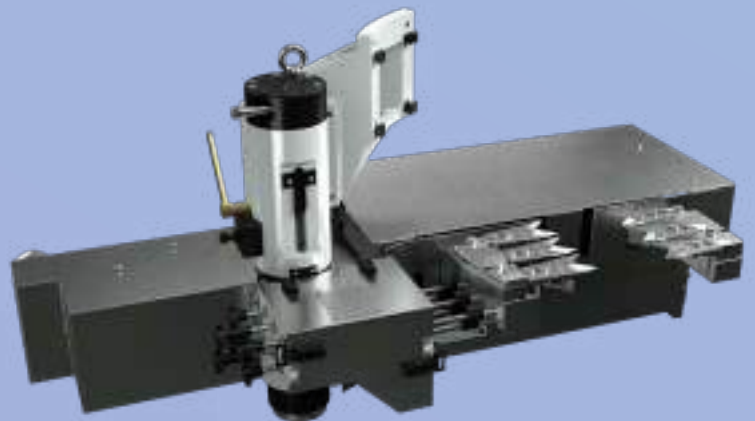
- Parallel shear motion
- Simultaneous cut for each gob
- Modular and independent gob guide system
- Easy maintenance
- Reduce inventory
- Reduced job change downtime
- Constant cutting time at all machine speeds
- Reduced set up times
- More constant gob weight at high speed
- Presetting cutting cams
- Improved shear blade life

FEATURES

- Outside shear arms bearings to improve the rigidity of the arms
- New modular gob guide for easy change
- Right shear arm with independent gob guides adjustment
- Left shear blades holder arm with adjusting system for blades tension
- Lateral support with magnetic lock for mechanism clamping in working position
- Safety shear arms opening with pneumatic cylinders
- Shears mechanism support with height adjustment and lateral centring system



Servo Parallel without carter



Servo Parallel with carter

HS SERVO PARALLEL

MAIN DATA

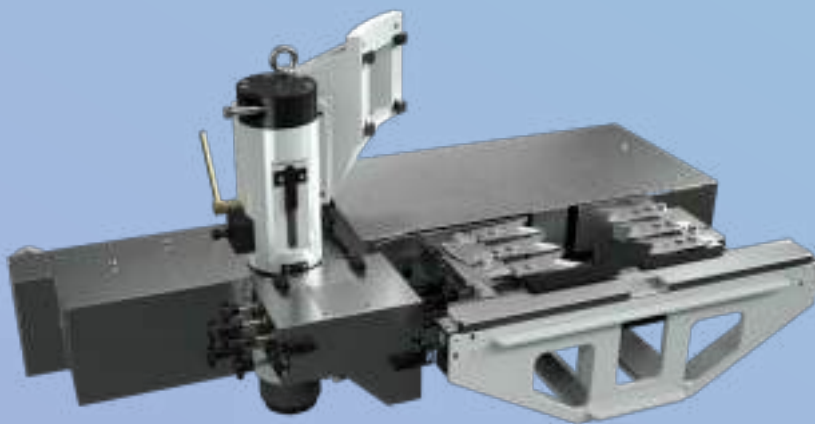
- Max. Shear opening - 280 mm
- Max stroke 82 mm (at min. cutting time)
- Cut angles $0^{\circ} \div 90^{\circ}$ LH and $0^{\circ} \div 30^{\circ}$ RH
- C.D.: SG - DG 3" - DG 4"3/8 - TG 3"
- Integrated or stand-alone system, even on conventional feeder
- Interface with any type of machine

BENEFIT

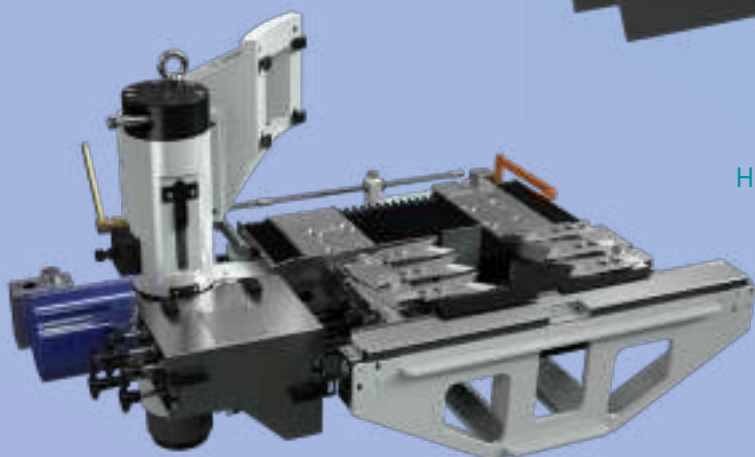
- Simultaneous cut for each gob
- Modular and independent gob guide system
- Easy maintenance
- Reduce inventory
- Reduced job change downtime
- Easy cam customization
- Constant cutting time at all machine speeds
- Reduced set up times
- More constant gob weight at high speed
- Increased carriage speed
- Presetting cutting cams
- Improved shear blade life

FEATURES

- Precise carriage guide
- Internal triple guide
- Additional external guide shaft to improve arm stability at high speed
- New modular gob guide for easy change
- Right shear arm with independent gob guides adjustment
- Left shear blades holder arm with adjusting system for blades tension
- Lateral support with magnetic lock for mechanism clamping in working position
- Safety shear arms opening with pneumatic cylinders
- Shears mechanism support with height adjustment and lateral centring system



HS Servo Parallel with carter



HS Servo Parallel without carter

The background of the page is a photograph of an industrial setting, likely a steel mill, showing molten metal being processed. A large blue diagonal shape is overlaid on the top right portion of the image, containing the text.

Forming Delivery

Gob Distributor

SGD 330

MAIN DATA

- Max. Speed = 220 cuts/min
- Min. motion time = 120 msec
- Max. jump = 40° (at max speed)

BENEFIT

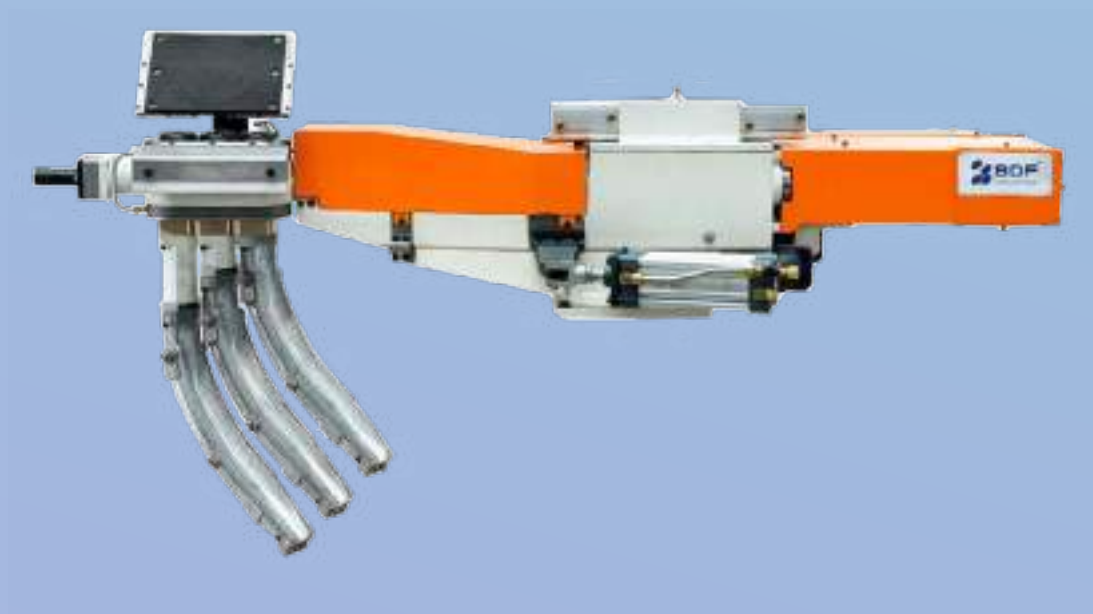
- No belt transmission
- Adjustable mechanical end-strokes
- Automatic scoops central positioning
- High rigidity and low inertia
- Very low vibrations at high speed
- High reliability
- Direct drive systems with planetary gearbox and ceramic ball screw

TECHNICAL FEATURES

- Interchangeable with the previous version
- Motion control with electronic cams
- Controlled by integrated or stand-alone system
- Interface with any type of machine
- Programming of the data by operator's computer or hand-terminal
- Easy and efficient trouble diagnostic
- 22° rotating in stand-by position

MECHANISM DESCRIPTION

- Motion control with standard brushless motor
- Coaxial epicyclic reduction gear
- Use of a ball screw for the linear motion of the scoops rack
- Double linear guides (rollers and bushings)
- Double pneumatic cylinders for the emergency central positioning
- Ball screw and guides in oil
- Proximity switch for the control of the working position
- Motor cooling with fan air
- Shock absorber for the inlet motion
- Emergency position for safety



MULTI DIRECT DRIVE GOB DISTRIBUTOR

Multi Direct Drive Gob Distributor
Increase Of Productivity
High Production Speed
High Efficiency
High Reliability
Fully Electronic Setup

NEW

MULTI DIRECT DRIVE X2 / X3 / X4

MAIN DATA

- Max. Speed = 240 cuts/min
- Min. motion time = 100 msec
- Min. waiting time = 150 msec
- Max. jump = 64°

BENEFIT

- Electronic independent position control for each scoop
- Possibility to align independently each scoop with trough
- Great improvement of gobs delivery on high production machines with multigobs delivery equipment
- High rigidity and low inertia for high performances
- Very low vibrations at high speed
- High dynamic response

TECHNICAL FEATURES

- Interchangeable with the previous version
- Motion control with independent electronic cams per gob

- Emergency with stand-by position out of the glass flow
- Controlled by electronic integrated or stand-alone system
- Interface with any type of machine;
- Programming of the data by operator's computer or hand-terminal
- Easy and efficient trouble diagnostic
- Local control panel with start, stop, manual MODE, jog, emergency, hand terminal connector

MECHANISM DESCRIPTION

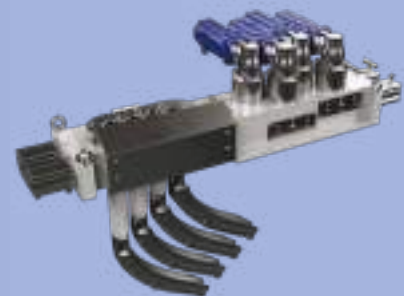
- Motion control with independent brushless motors for each scoop
- Coaxial planetary gearbox for each motor
- Direct drive system with pinion-rack for each scoop
- Pinions, racks and guides all in oil (scoop holder too)
- Pneumatic cylinders for the emergency central positioning
- Proximity switch for the control of the working position
- The mechanism, controlled by a pneumatic cylinder, has the possibility to rotate of 22° to put it in emergency position
- Motor cooling with fan air



Multi Direct Drive X2



Multi Direct Drive X3



Multi Direct Drive X4

NEW

MULTI DIRECT DRIVE SG-DG

MAIN DATA

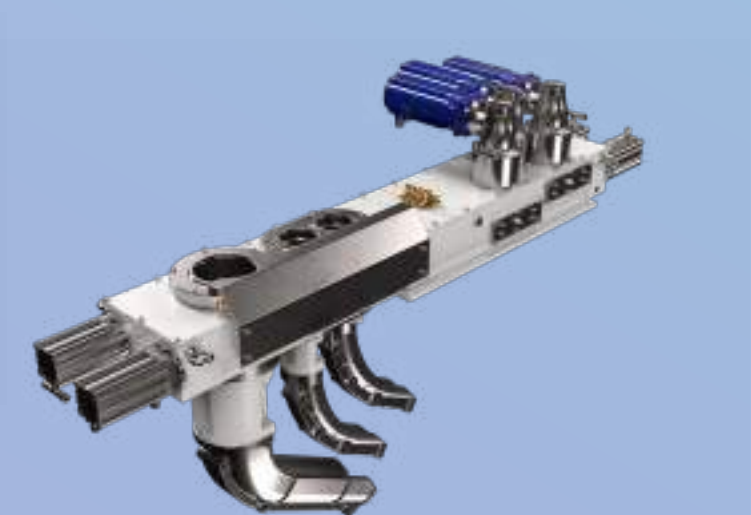
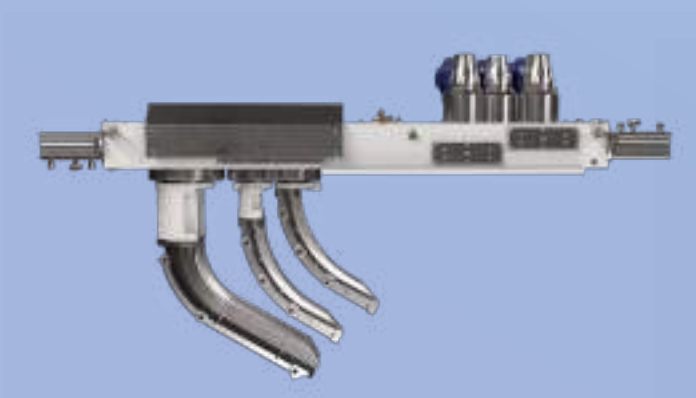
- Max. Speed = 240 cuts/min
- Min. motion time = 100 msec
- Min. waiting time = 150 msec
- Max. jump = 64°
- Max. Ø funnel on SG = 120mm
- Max. Ø funnel on DG = 76mm

BENEFIT

- Very low time changing in DG SG configuration thanks to displacement screw located in mechanism frame
- Electronic independent position control for each scoop
- Possibility to align independently each scoop with trough
- Great improvement of gobs delivery on high production machines with multigobs delivery equipment
- High rigidity and low inertia for high performances
- Very low vibrations at high speed
- High dynamic response
- High reliability

TECHNICAL FEATURES

- DG 76 mm and SG 120 mm heads integrated in the same mechanism
- Pneumatic cylinders for the emergency central positioning
- Proximity switch for the control of the working position
- Interchangeable with the previous version
- Motion control with independent electronic cams per gob
- Emergency with stand-by position out of the glass flow
- Controlled by electronic integrated or stand-alone system
- Interface with any type of machine
- Programming of the data by operator's computer or hand-terminal
- Easy and efficient trouble diagnostic
- Local control panel with start, stop, manual MODE, jog, emergency, hand terminal connector
- The mechanism, controlled by a pneumatic cylinder, has the possibility to rotate of 22



Multi Direct Drive SG-DG





Delivery & Handling
of a quad gob beer
bottle production



Forming Delivery

Gob Delivery

DELIVERY RANGE

TARGETS

Final glass container quality depends on a good gob delivery between scoop-trough and deflector-mould

- Deliver the gob to the machine with the fastest and most uniform flow
- Develop an easy installation and aligning design to reduce machine downtime
- Grant a high thermal homogeneity for final glass container's high quality
- Long life product and a less maintenance activity

SCOOPS

HIGH PRODUCTION QUALITY

- Improved gob delivery with new optimized scoop profile
- Perfect control of gob speed and centrifugal force
- Significant defectiveness reduction
- Available with both air ride or water cooling
- Available both made of aluminum alloy and stainless steel

LOW MAINTENANCE

- Increased life duration: aluminum alloy scoops available with LONG LIFE surface treatment

TIME SAVING

- Reduced machine downtime
- No need of coating with LONG LIFE and additional carbon plasma spray treatments

TROUGHS

HIGH PRODUCTION QUALITY

- Cast iron manufactured with excellent surface finishing
- High thermal inertia: reduced heat transmission between gob surface and trough
- Uniform gob flow with high gob thermal homogeneity

FLEXIBILITY

- U and V shape available
- Interchangeability

DEFLECTORS

HIGH PRODUCTION QUALITY

- Improved gob delivery with precise and repeatable positioning
- Uniform loading
- Optimized inertial diagram of the gob

FLEXIBILITY

- Interchangeability
- Both NAV and Easy Aligning versions available (cast iron manufactured)

TIME SAVING

- Improved efficiency and gob speed

Delivery Regulation System

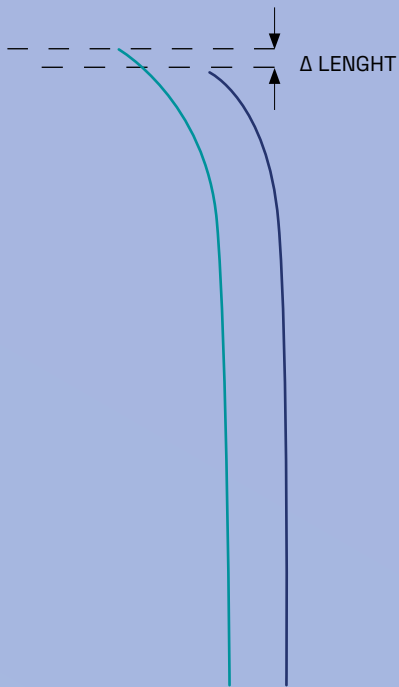


NEW CONSTANT ANGLE 30°

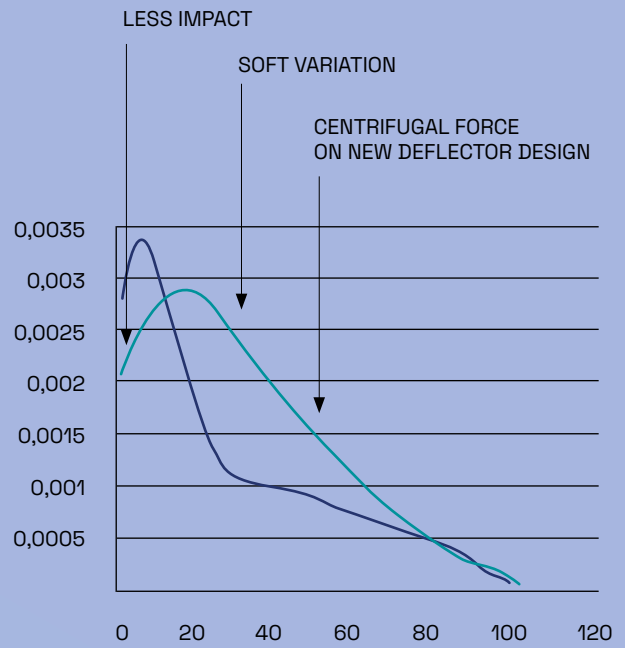


- 30° constant trough angle
- New deflector profile longer on trough side
- New deflector design and profile
- Higher gob speed
- Shorter contact time between gob and trough
- More soft centrifugal force variation
- Less deformation of the gob
- Strongly decreased the impact force between gob and trough
- Nullify centrifugal force at the end point of the deflector





■ TRADITIONAL DEFLECTOR PROFILE
■ NEW DEFLECTOR PROFILE



EASY ALIGNING DELIVERY SYSTEM

SUPPORT HOLDER

- Trough and deflector support design with spider support for a correct and precise trough\deflector alignment during the delivery adjustment
- Adjustable rigidity by belleville washers spring system
- Self-centering device for the support without pins
- Absence of vibration to achieve smooth landing
- Laser gauge for a precise set-up of the delivery

DEFLECTOR ADJUSTER

- New design deflector adjuster
- New and stronger anti-backlash deflector adjuster for SG-DG-TG
- Double linear guide for longitudinal adjustment
- Spline guides for transversal adjustment
- Quick change support
- Safety system design

Deflectors Adjuster



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