

Technical News Bulletin

December 2005

InVertiFlow Blank Mold Cooling 5" DG

The VertiFlow blank mold cooling system as introduced by EMHART GLASS in 1988 is a firmly established service-proven product and paved the way for enhanced productivity gains. These systems use plenum chambers on top of the blank molds, passing the air through vertical holes to the bottom of the blank molds. With the new **InVertiFlow** blank mold cooling system the airflow has been "inverted," passing the air from plenum chambers at the bottom – or lower end – to the top of the blank molds. This new cooling system offers additional benefits:

- Higher cooling efficiency
- Fumes and heat carried away
- Easier mold change
- No heat load on top of section
- Speed increase potential
- Improved operator environment
- Reduced down time
- Longer mechanism service life

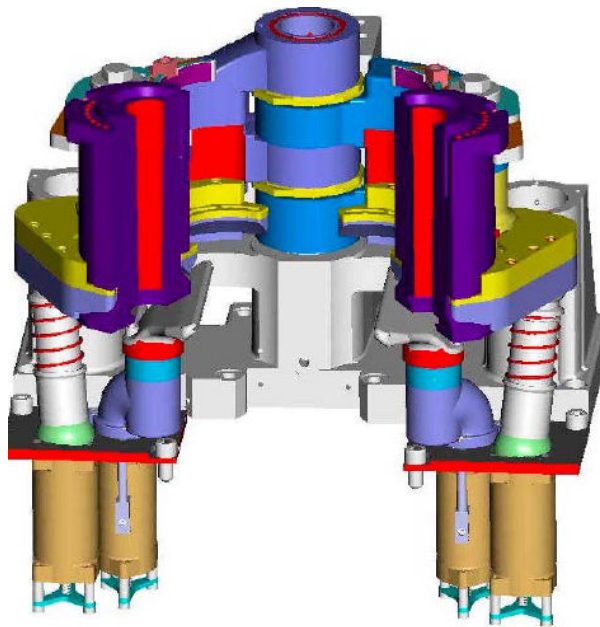


Figure 1 – InVertiFlow Blank Mold and Neck Ring Cooling System

System Description

The InVertiFlow cooling system is designed to accept, with some minor modifications, existing blank molds used with the double deck mounting assembly of the earlier VertiFlow cooling system. The system consists of the following main elements (refer to Figure 2).

- Universal mold holder arm
- Upper mold holder plates
- Plenum chambers with lower mold holder plate
- On/Off controls
- Neck ring cooling

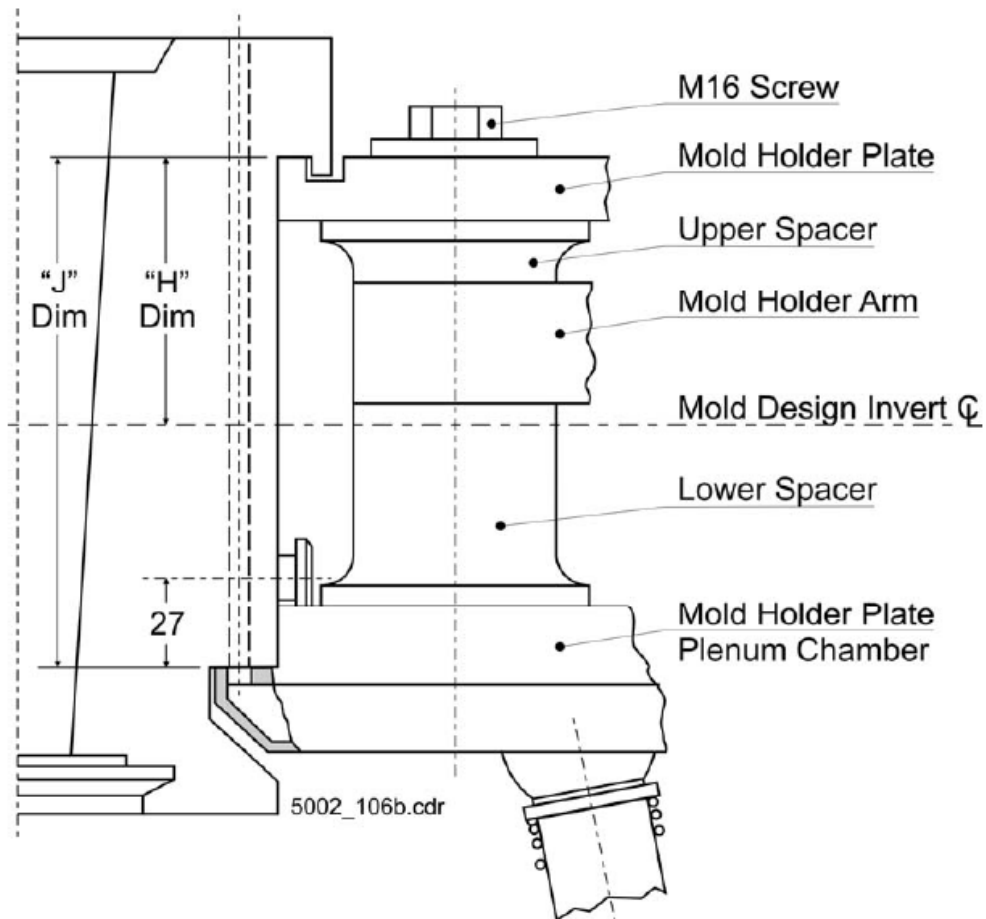


Figure 2 – InVertiFlow Mold Holder Set-up

The blank mold holder arm is a rigid design, which has, unlike conventional mold holder arms, single sprockets only. Spacers of different heights are used between the arm and the upper mold holder plates to obtain the required mounting positions or "H" dimensions.

The plenum chamber consists of two main parts, the upper plenum, which serves also as mold clamping plate, and the lower plenum, which is firmly attached to the underside of the upper plenum. The position of the plenum chamber is determined by individual spacers mounted between the mold holder arm and plenum chamber. The 6.35 mm ($\frac{1}{4}$ ") height increment of these spacers gives full flexibility to match the blank mold length and cooling requirements.

Upper mold holder plates, plenum chambers, and spacers are mounted to the blank mold holder arm by M16 screws of individual length, according to the spacer combination.

Pins in the arm and mold holder plates and corresponding notches in the spacers prevent the spacers from turning and thus limit the swiveling of the mold holder plates.

The On/Off control units have two damper valves each. One valve is for the cooling air supply to the blank molds. The second valve is for neck ring cooling air. The valves are air-operated for cooling ON and spring return for cooling OFF.

The cooling air supply from the section frame through the damper units to the plenum chambers is by means of telescopic tubes. The lower part of the tube is located in the damper unit by a spherical bearing. The upper tube is guided in the bore of the lower tube and its spherical end engages in a corresponding bearing in the plenum chamber. The contact between the spherical end of the upper tube and the bearing in the plenum chamber is maintained by the force of a compression spring. The upper tube is of variable length, depending on the height of the lower spacers used.

Specification

The InVertiFlow blank mold cooling system for the IS Type 5" DG machine will be available by January 2006.

Parts Specification InVertiFlow Cooling System 200-2042		
Part No.	Quantity	Description
200-2041-1	1	Blank Mold Holder Arm
200-2043-1	2	Mold Holder Plate
200-2044-1	1	On/Off Control RH
200-2047-1	1	On/Off Control LH
200-2046-1	1	Plenum Chamber LH
200-2039-1	1	Plenum Chamber RH
200-2049-1	1	Neck Ring Cooling RH
200-2049-2	1	Neck Ring Cooling LH
210-12251	2	Washer
200-2048-XX	X	Accessories *

* The accessories must be selected according to the "H" and "J" dimensions.

Mounting Assembly Configurations		
"H" Dimension	Min. "J" Dimension	"H" dimension corresponds to the following mold holders
69.85	88.9	No earlier equivalent
98.45	117.5	VertiFlow double deck mounting 191-9150-20

Media	Pressure	Consumption per Section Nm ³ /min	Remarks
Operating Air	2.1 bar	0.02	At 15 cycles/min
Cooling Air, Blank Molds	1000 mm H2O	10	At 360° cooling time
Cooling Air, Neck Rings	1000 mm H2O	6	At 240° cooling time
Lubrication	-	-	Through operating air

Installation

The installation of the InVertiFlow cooling system into existing section frames may require only some minor alteration.

Section frames delivered prior to 1995 require two additional operating air connections in the top plate for the neck ring cooling valve. Frames delivered after 1995 have these connecting holes already included.

The blank support bracket requires a slight machining to the casting in the area of the mold shaft supports to clear the plenum chambers in the open position.

Installation and Alteration Drawings	
Drawing No.	Description
200-10172	Frame Top Plate Modification
200-10920	Bracket Alteration

Ware Range and Mold Design

The ware range given below is based on the use of standard mold equipment as specified in the Type IS 5" DG Mold Design Data, Publication No. TW 1992/0104. For the blank mold design refer to Data Sheet IS-500-2-1051 in TW 1992 and to drawing 200-10926, Blank Mold, for the plenum chamber interface dimensions.

Ware Range	Process	
	Blow & Blow	Press & Blow
Max. Height under Finish	325	290
Min. Height under Finish	130	95
Min. Blank Glass Line	112	80
Max. Body Diameter	95	95
Max. Finish Diameter	48	83

Features and Benefits

- Predictable cooling → More consistent container quality
- Reduced cooling time → Potential for higher production speed
- Easier mold change → Reduced down time
- Fumes carried away → Provides better working environment
- No heat load on section → Prolonged mechanism life
- Conversion of VertiFlow molds → Use of existing mold stock