

## **VERTI-FLOW 9700 Series Blow Mold Cooling System**

# **For Uniform Glass Distribution**

- **Blow Mold Cooling with up to 50% Greater Airflow**
- **Greater Efficiency**
- **Lower Energy Consumption**
- **Less Noise**

**EMHART**GLASS

# The VERTI-FLOW Mold Cooling System - for Improved Container Strength and Shape

EMHART's successful introduction of the VERTI-FLOW Blow Mold Cooling System paved the way for enhanced productivity gains of conventional IS machines. The VERTI-FLOW principle now makes it possible to achieve more uniform temperature distribution on the mold surface for improved ware quality. Recent technological developments extend the benefits achieved on the blow side to the blank side. EMHART VERTI-FLOW Blank Side Cooling increases the average internal pressure resistance of the containers so that exacting quality requirements can be met. A more uniform temperature profile in the parison substantially improves glass distribution and leads to reduced stresses in the container body. The VERTI-FLOW Mold Cooling System represents a breakthrough for improving your production efficiency through:

## Increased Production Speed

- Notable production speed increases have been achieved using VERTI-FLOW. It has proven superior to systems with heavily finned and drilled molds with a standard combination of conventional cooling and compressed air cooling.

## Container Quality Improvements

- Greater uniformity in mold surface temperatures obtained with VERTI-FLOW results in less container shape deviation - an important aspect in view of lightweighting.

## Lower Energy Consumption

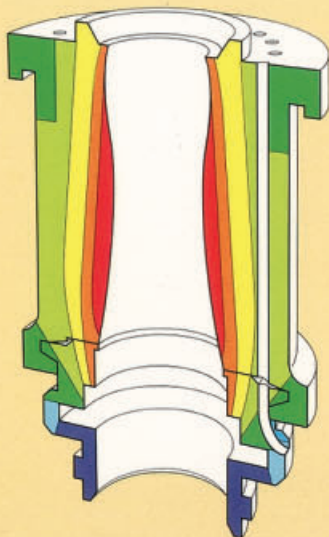
- Measurements indicate that cooling air consumption on machines equipped with VERTI-FLOW Blank and Blow Mold Cooling is reduced by roughly 65%. The EMHART Cooling Wind Controller together with an Inverter Drive System provides additional energy savings.

Features	Benefits
Less cooling air required	Substantial energy savings Less noise Greater operator convenience
Precise cooling application and control	Cooling factors are integrated in mold design
Optimized hanger setup No cooling stacks to convert	Reduced job-change time and inventory
More uniform mold temperature	Better glass distribution Lightweighting Higher average internal pressure
Reduced blank mold lubrication	Increased mold life Increased percent pack

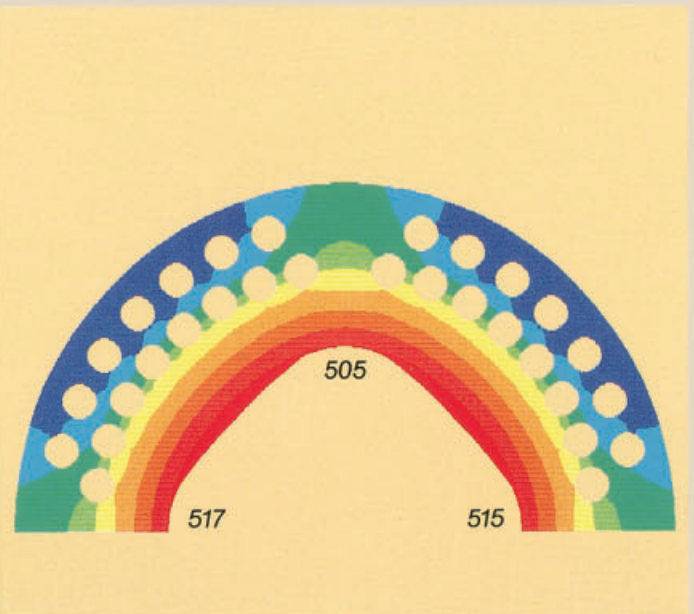
## Increased Percent Pack

- Hot spots on the blank molds are virtually eliminated, reducing the swabbing requirement and also prolonging mold life.

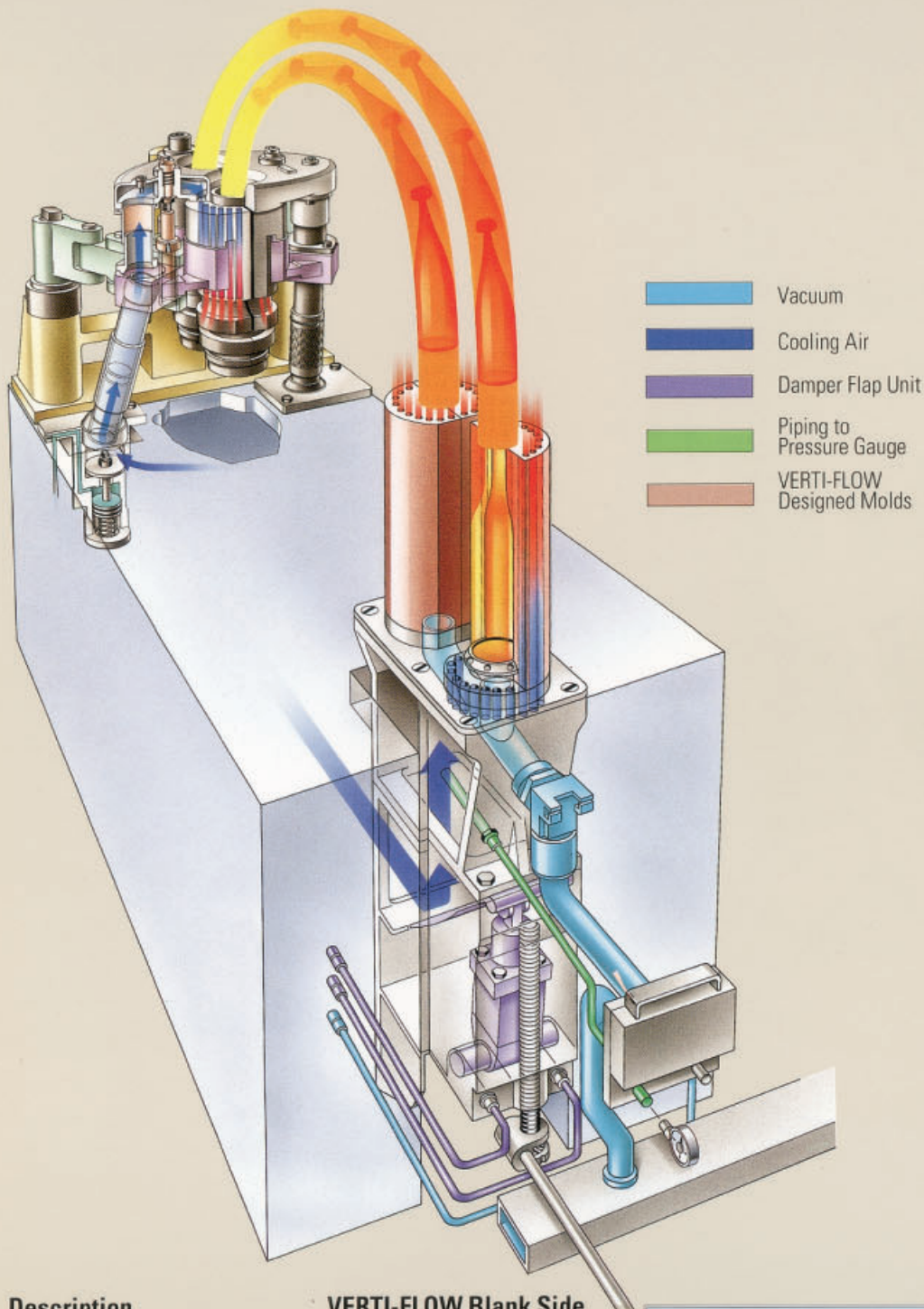
**The EMHART VERTI-FLOW Mold Cooling System for Controllable, Accurate and Efficient Mold Cooling**



Blank Mold Thermal Distribution  
(Isotherms at 25° C, computer-simulated)



Blow Mold Thermal Distribution  
(Isotherms at 10° C, computer-simulated)



### VERTI-FLOW 9700 Series With Increased Airflow

The VERTI-FLOW blow mold cooling system has been a service-proven industry standard for many years.

Further refinements in the design concept have now resulted in an airflow increase to the molds by as much as 50%, depending on the mechanism involved. This yields high mold cooling efficiency and permits the basis for higher section operating speeds.

The new VERTI-FLOW Series 9700 mechanisms feature two housing parts. Airflow is controlled by a pivoting damper flap in the lower housing part which accommodates virtually all center distance configurations and the full range of mechanisms. The system permits easy conversion from double gob to single gob or from double gob to triple gob operations and vice versa. The new design also ensures easy cleaning of the vacuum passages without disconnecting operating air supplies.

In keeping with modular design concepts, the equipment is such that the respective mechanisms for a given machine configuration are interchangeable without section frame modifications.

### Description

The VERTI-FLOW Mold Cooling System comprises three key elements: A set of vertical bores drilled in the mold, a plenum chamber to guarantee equal pressure for each cooling bore, and a damper valve for controlling cooling airflow. Low pressure fan air is channeled from the section frame via the damper valve to the plenum chamber and is forced through the cooling bores. The plenum chamber ensures uniform and measurable air pressure distribution at each bore entrance. Cooling conditions are thereby defined by air pressure, timing and the cooling bore configuration. Noise levels are also substantially reduced.

### VERTI-FLOW Blank Side Cooling

Using computer simulation to establish the required vertical temperature distribution in the blank mold, it became obvious that cooling air had to be applied to the top of the blank mold and routed downwards toward the bottom of the blank mold.

A two-section plenum chamber on top of the blank molds is connected to a damper valve located on each blank cooling outlet on the section frame. Exhaust air escapes via a groove machined around the blank above the neck-ring cutout. The cooling bore can be configured to vary cooling along the length of the blank. Unlike the blow side, cooling can be supplied during the entire cycle, if needed.

### Specifications

#### Blank Side

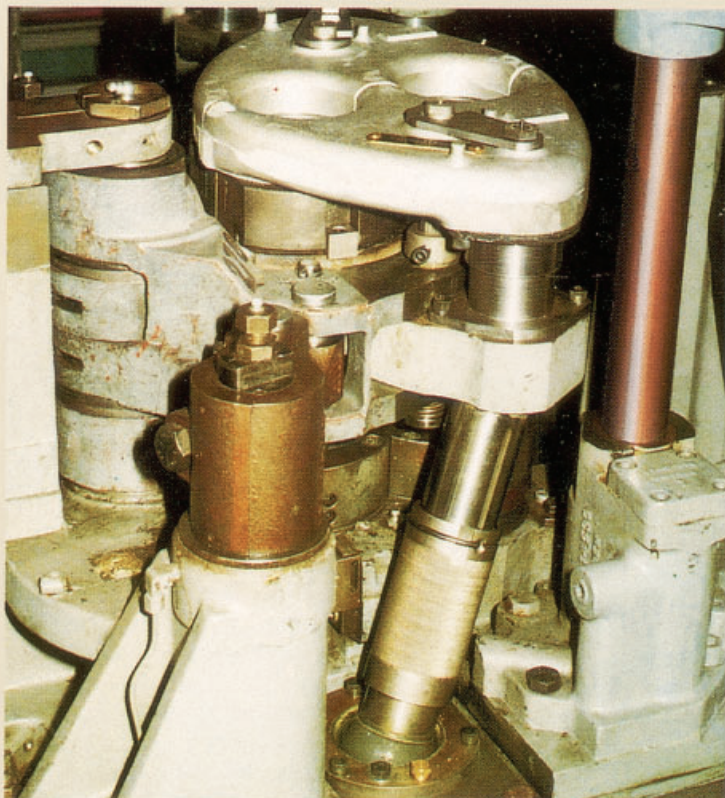
191-D-9170	Field Conversion Assembly
191-E-9145	DG 4 1/4" Blank Mold Cooling Mechanism
191-E-9172	DG 5" Blank Mold Cooling Mechanism
191-E-9173	DG 5 1/2" Blank Mold Cooling Mechanism
191-D-9175*	DG 6 1/4" Blank Mold Cooling Mechanism
191-E-9176 *	TG 4 1/4" Blank Mold Cooling Mechanism
191-E-9178 **	TG 4 1/4" Blank Mold Cooling Mechanism
191-D-9196**	DG 6 1/4" Blank Mold Cooling Mechanism

\* for Machine Type F  
\*\* for Machine Type AIS

#### Blow Side

191-E-9229	Field Conversion Assembly
191-D-9700	Blow Mold Cooling Mechanisms

# A Simple Answer is Often the Best Solution to a Complex Problem...



Many attempts have been made to improve conventional mold cooling systems used in IS glass container forming machines. The innovative VERTI-FLOW Mold Cooling System now provides accurate, controllable and efficient mold cooling using normal fan air. Although the technology behind VERTI-FLOW appears simple, it was developed using sophisticated computer technology to obtain a full understanding of mold cooling principles.

Cooling bores configured according to advanced computer models with predetermined diameters, combined with precisely channeled cooling air are the key to:

- Greater Energy Savings
- Enhanced Cooling Air Utilization
- Greater Noise Reduction
- Less Job-Change and Production Downtime
- Effective Production Speed Increase
- More Constant Mold Temperature
- Improved Operator Convenience

**VERTI-FLOW...  
Controlled Mold  
Cooling - A Further  
Step Towards Consistent  
Container Quality**

## Emhart Glass Worldwide Presence

Principal  
Emhart Glass SA  
Hinterbergstrasse 22  
CH-6330 Cham, Switzerland  
Telephone +41 (41) 749 42 00, Telefax +41 (41) 749 42 71  
[www.emhartglass.com](http://www.emhartglass.com)  
[info@emhartglass.com](mailto:info@emhartglass.com)

### GERMANY, NEUSS ◆■

Telephone +49 (2131) 3595 0, Telefax +49 (2131) 3595 125

### ITALY, DEGO (SAVONA) ◆■

Telephone +39 (019) 51 66 1, Telefax +39 (019) 51 66 302

### JAPAN, KAWASAKI ◆

Telephone +81 (44) 222 7371, Telefax +81 (44) 222 4868

### RUSSIA, MOSCOW ◆

Telephone +7 (095) 937 78 95, Telefax +7 (095) 937 78 40

### SINGAPORE ◆

Telephone +65 6778 1466, Telefax +65 6778 9433

### SPAIN, MADRID ◆

Telephone +34 (91) 883 6816, Telefax +34 (91) 883 2063

### SWEDEN, ÖREBRO ■

Telephone +46 (19) 307 500, Telefax +46 (19) 307 501

### SWEDEN, SUNDSVALL ■

Telephone +46 (60) 199 100, Telefax +46 (60) 199 261

### UK, DONCASTER ◆

Telephone +44 (1302) 347 700, Telefax +44 (1302) 327 810

### USA, ELMIRA, NY ■

Telephone +1 (607) 734 3671, Telefax +1 (607) 734 1245

### USA, ENFIELD, CT, ◆

Telephone +1 (860) 814 4010, Telefax +1 (860) 814 4170

### USA, OWENSVILLE, MO ■

Telephone +1 (573) 437 2132, Telefax +1 (573) 437 3146

◆ Sales Representative ■ Manufacturing Location