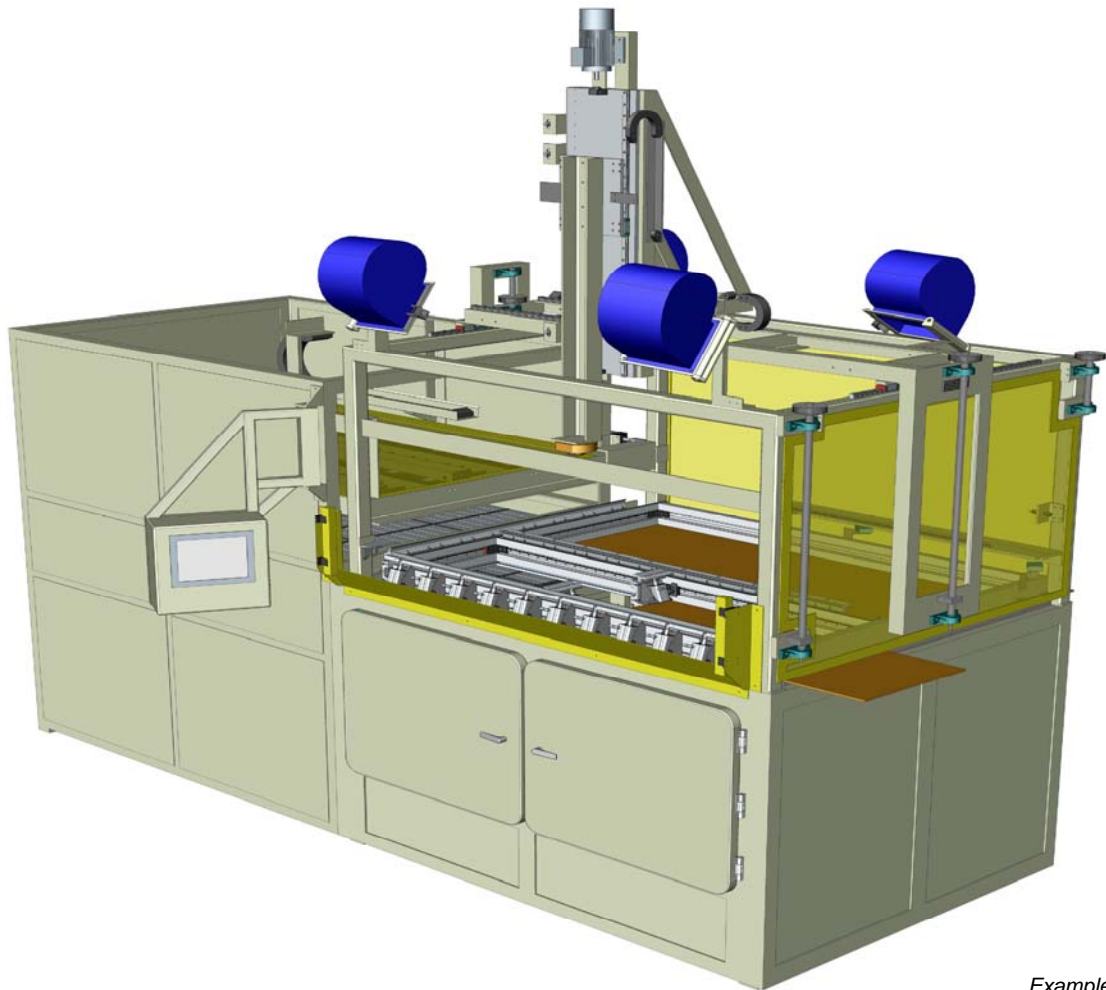




**ARMOUR**

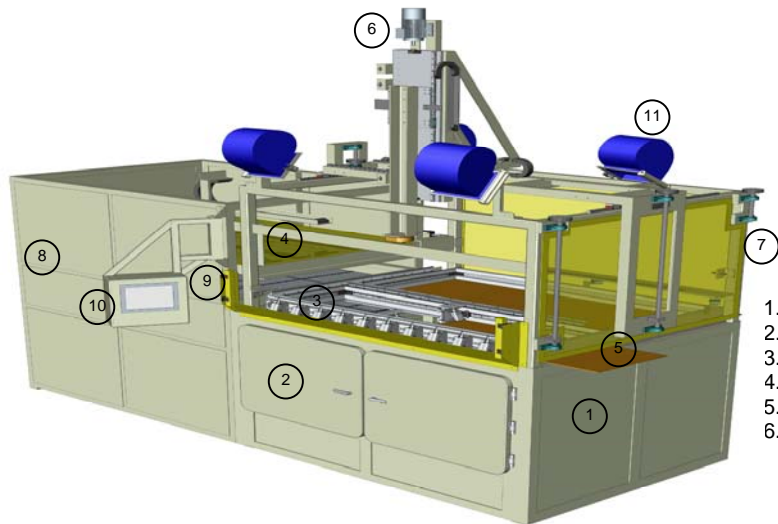
*~ engineering for plastics*

**HT-23-06  
HORIZONTAL THERMOFORMER**



*Example image only*

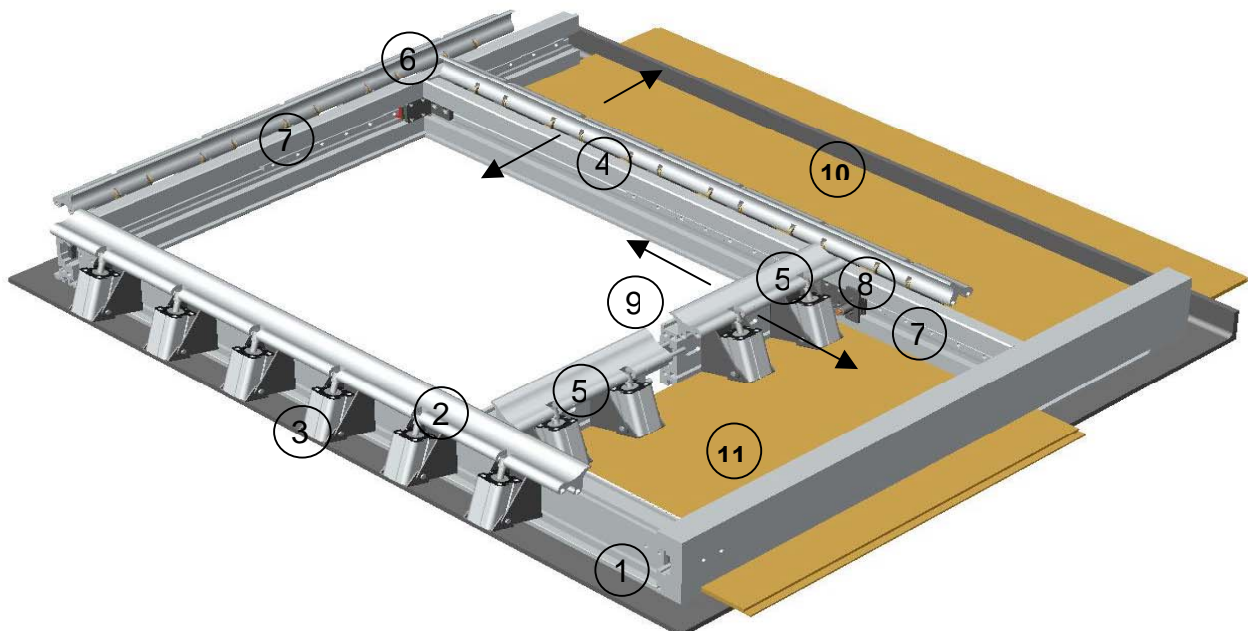
The HT-23 Series Horizontal Forming Machine provides a versatile solution for the needs of the General Vacuum Forming Industry. Designed to handle most major thermoforming applications it incorporates many unique features to make it one of the most advanced machines available. Individual machines can be built to specific customer requirements.



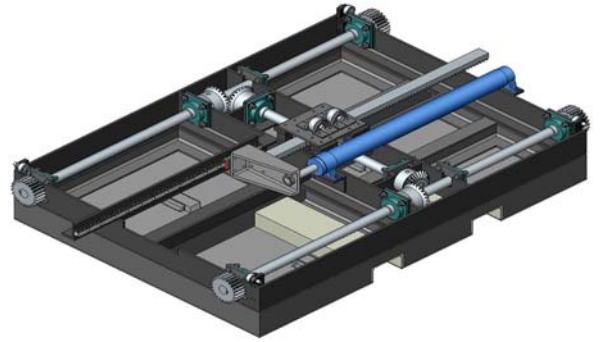
- |                          |                            |
|--------------------------|----------------------------|
| 1. Pressure cabinet      | 7. Fan frame               |
| 2. Mould loading doors   | 8. Heater retract position |
| 3. Clamping bars         | 9. Light guard             |
| 4. Heaters: Top & Bottom | 10. Control panel          |
| 5. Closing plates        | 11. Cooling fans           |
| 6. Plug assist           |                            |

All moulds datum to the front left corner of the machine, so it is easy for the operator to load plastic sheets into the clamp frame (3) that holds the sheet during the moulding process. The heaters (4) are mounted in two banks, top & bottom for dual sided heating. A pyrometer is fitted to the machine to monitor the actual sheet temperature during the heating process. The sheet is prevented from sagging under gravity by compressed air that is injected into the pressure cabinet (1) during the heating process. When the sheet has reached it's forming temperature the heaters switch off & retract to the standby position. The mould enters the sheet by means of the hydraulically operated table (if required the plastic can be pre-stretched to form a bubble by means of compressed air). The mould enters the plastic sheet and the vacuum is automatically applied. When required the electrically driven plug assist (6) enters the upper surface of the sheet to provide improved definition on the formed product. The fan frame (7) is mounted above the moulding area and carries the cooling fans (11). When the cooling cycle is completed the clamps open and the product can be removed. Operator safety is provided by the light guard (9).

The Armour clamping bars have been specially designed for ease of set-up and fast tool changes. Each clamping bar is comprised of two high precision aluminium extrusions, a fixed bar (1) and a hinging clamping bar (2), which is actuated via a series of pneumatic cylinders (3). The size of the forming aperture can be varied by moving the main sliding bar (4) and the adjustable bar (5). Both of these are mounted on linear guides (6), and slide on high precision rails (7), and are locked in position with a locking handle (8). The forming length is infinitely adjustable along the slide. The forming width requires loose pieces to make up any gap (9) between the two adjustable bars. These can be easily fitted and are bolted in place using a steel brace. The aperture is sealed with the unique Armour sliding closing plates (10 & (11)). The larger plate (10) is fixed to the main sliding bar and moves with it, covering the full width of the aperture, and (11) is made to suit the size of the mould. These plates can be made of high temperature plywood or aluminium. They seal automatically when the machine is operational by means of inflatable silicon seals that are fitted into the clamping bars.

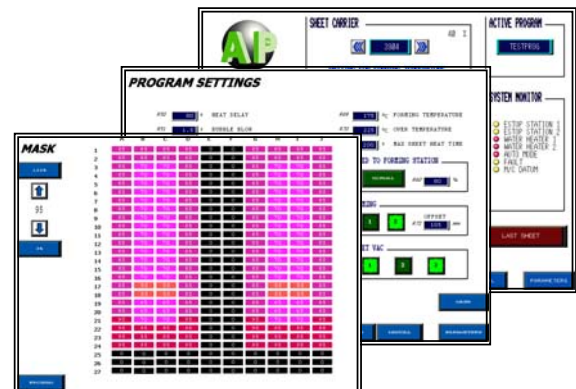


It is critical to the forming process that the progression of the mould into the sheet is smooth and controlled. Armour mould tables run on precision linear guides and rails, and are driven with hydraulic cylinders through large rack and pinion drive gears. Each machine is supplied with a self-contained hydraulic power pack incorporating an electrically driven hydraulic pump and oil reservoir, with solenoid valves controlling the cylinder movement. Variable table speed systems are also available as an option.



The top and bottom heater banks consist of a series of quartz infrared heating elements that are individually adjustable to allow complex heating patterns to be used. These heaters have a rapid response time and therefore energy is saved between cycles when the heaters switch off. The level of the acrylic sheet is maintained during the heating process by compressed air. The bottom heater bank is protected by ceramic glass.

Armour control systems use a Mitsubishi PLC to control the sequencing of the machine, and have a Proface touch screen as the user interface. Up to 1000 programs can be created and are stored on a Compact Flash card, allowing easy backup. Reporting facilities are available and .csv files can be exported for offline production analysis. The system is fitted with a modem to allow remote access by Armour Engineers for diagnostic checks and software upgrades. All machine software is written by Armour and therefore new versions and additional features can be developed.



## MACHINE SPECIFICATION

ELEMENT	SPECIFICATION														
Machine Capabilities	<table> <tr> <td>Maximum product size:</td> <td>2000 x 2000mm</td> </tr> <tr> <td>Maximum forming aperture:</td> <td>2014 x 2014mm</td> </tr> <tr> <td>Minimum forming aperture:</td> <td>711 x 500mm</td> </tr> <tr> <td>Maximum tool height:</td> <td>700mm</td> </tr> <tr> <td>Maximum tool push through:</td> <td>250mm</td> </tr> <tr> <td>Maximum sheet thickness:</td> <td>8mm</td> </tr> <tr> <td>Cycles per hour (4mm cast acrylic):</td> <td>12 cycles</td> </tr> </table>	Maximum product size:	2000 x 2000mm	Maximum forming aperture:	2014 x 2014mm	Minimum forming aperture:	711 x 500mm	Maximum tool height:	700mm	Maximum tool push through:	250mm	Maximum sheet thickness:	8mm	Cycles per hour (4mm cast acrylic):	12 cycles
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Machine Construction	Main frame: Casing: Paint finish:	Rolled steel sections – BS EN 10025 material Sheet steel – BS EN 10025 material Textured powder coating
Clamping Bars	Material: Adjustment:	Extruded aluminium profile – Armour design By precision linear slides & make up pieces
Heating System	Front & rear banks of quartz infra-red heating elements Element size: Element power: Total elements per heater bank: Element distribution: Number of heating zones: Zone control:  Maximum power rating:	247 x 62mm 400W 216 8 wide x 27 deep 216 (each containing 1 top & 1 bottom element) Software controlled Power: 0 – 100% in 5% increments 172.8kW
Mould Table Movement	By hydraulic power through mechanical gearing Power-pack motor rating: Maximum pressure:	3kW 3000psi
Vacuum System	Vacuum pump motor rating (when supplied): Vacuum pump flow rate:	5.5kW 250m <sup>3</sup> /hr
Product cooling	By cooling fans with directional adjustment Number of fans: Fan motor rating: Fan flow rate:	6 150W 425m <sup>3</sup> /hr
Mould Heating Facility	Power rating (when supplied): On/Off timer from control system	9kW
Control System	PLC controlled sequence. Touch screen user interface.  Modem for remote diagnostic interrogation.	
Compressed Air	Minimum pressure: Dry filtered supply	5.5 Bar
Electricity	3 Phase supply + Neutral + Earth: Maximum power consumption:	380/415V @ 50Hz 212kW

*example specification only - specification may be subject to change without notice*

*For further information contact*

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