

THE U-3 SYSTEM (PETZETAKIS FORK UNITS WITH RS PULLING UNITS)

- APPLICATION:** Automatic web-guiding system for Conventional lay-down slabstock foaming processes.
- ADVANTAGES:** Improves block yield up to 10 to 12% by weight.
No densification of any kind.
Return on Investment of less than six months on a 3,000-t/a plant.
- FEATURES:** Pre-assembled, pre-wired unit, complete with controls, specifically for retro-fit installation.
Comprehensive installation and running instructions included.
Maintenance free brush-less drive motors.
Gear boxes lubricated for life.
All machined steel parts are chromium-plated.
Anodised aluminium profiles with high precision/hardened steel guide rail system for length adjustment. □
- TECHNICAL DATA:** AC drive motors for pulling rollers, angle adjustment, height adjustment and optional length positioning.
Variable speed drive motor for roller speed running at synchronised speed with main conveyor □.
Variable speed control for Length positioning, adjustable between 0.2 and 8.0 m/min for optimum control over position during foaming □.
Pneumatic/electrical controls for automatic web-guiding.
Power supply: 220 Volt, 50-60 Hz. AC
or 2 X 110 Volt, 50-60 Hz. AC



THE U-3 SYSTEM

INTRODUCTION

The U-3 System was developed to reduce the dome of flexible foam blocks made by the Conventional Slabstock Process. Over the years the U-3 System has proven to give excellent results, especially with polyester foams, which cannot be squared by any other flattening process.

The complete U-3 System consist of a set of Petzetakis Forks (Mark-IV) with an RS-6 Pulling system. (further details in paragraph; "Description of the Equipment")



Figure 1, Conventional Lay-Down block, squared with the U3/Petzetakis System.

ADVANTAGES

- The U-3 system improves the yield of blocks poured with the Conventional process by about 10 to 12% by weight, by turning the domed top into a rectangular shaped block.
- No densification of any kind, as can occur easily on Top-Control systems.
- The return on Investment can be less than six months on a 3.000-t/a plant.
- Extra manpower is limited to two operators at start-up, after that the U-3 system requires little attention and can be operated by the regular crew.
- Clear instructions and drawings allow installation of the equipment within 1 week by the local Technical Department; no downtime is required for the installation.




NEW DESIGN

The complete U-3 System consist of a set of Petzetakis Forks (Mark-IV) with an RS-6 Pulling system.

Both components have been redesigned recently;

1. The new Fork unit (MARK-IV) is improved with respect to operator friendliness. Compared to its predecessors, the new Fork unit has the following improvements;
 - The height adjustment now takes place by means of a manual driven handwheel-gear box arrangement in stead of the weight lifting-method on the Unifoam design.
 - High precision guide rails are provided for easy and accurate positioning of the Petzetakis units.
 - All machined steel parts are chromium plated for durability and ease of cleaning.
2. The new RS-6 system is based on its predecessors RS-3 and RS-5 as supplied formerly by Unifoam AG. The experience of some 70 to 80 previously supplied RS-3 and RS-5 units guarantee the vast improvements in the newly designed RS-6 system. The RS-6 Mod-2001 design does away with all the disadvantages of the outdated "Unifoam RS-5" arrangement, (see also table on page 7) such as:
 - Synchronised pulling roller speed, following the conveyor speed automatically, with possibility for manual fine tuning. Even during formulation changes with different conveyor speeds, the film will not drop out of the pulling rollers.
 - High precision guiding rail system for horizontal positioning with adjustable (variable) speed control for the length adjustment. This enables for slow speed (min. 0.2m/min) length adjustments during foaming while in between runs adjustments at high speed can be made (max. 8.0m/min).
 - Increased working range of 440-mm, 520-mm or even up to 600-mm on the height adjustment compared to the 230-mm range on the old "Unifoam RS-5".
 - Remote controlled motorised height adjustment in stead of manual height adjustment with lever and hand-wheel.
 - Increased (adjustable) torque on the pulling rollers (now max. 20Nm available instead of 4Nm on the RS-5)
 - A telescoping guidance unit eliminates the problem of the toothed gear-rack dipping into the rising foam.
 - Chromium-plated steel parts for ease of cleaning and durability.
 - Anodised aluminium dual profile High Precision Guide Rail with hardened steel guiding parts.
 - Maintenance free, brush-less motors.
 - Gearboxes lubricated for life.

 Yield figures are based on weight percentages of test blocks of 50 cm block length, cutting off 12-mm of skin on each side, 18-mm of bottom skin and clearing the top skin marginally. Practical yield figures depend strongly on parameters like; block dimensions, foam grade, skills of operators, procedures in conversion etc. and may vary from plant to plant.



DESCRIPTION OF THE EQUIPMENT

As described in the Introduction, the U-3 System consists of the following components;

1. set of Petzetakis Forks (MARK-IV)

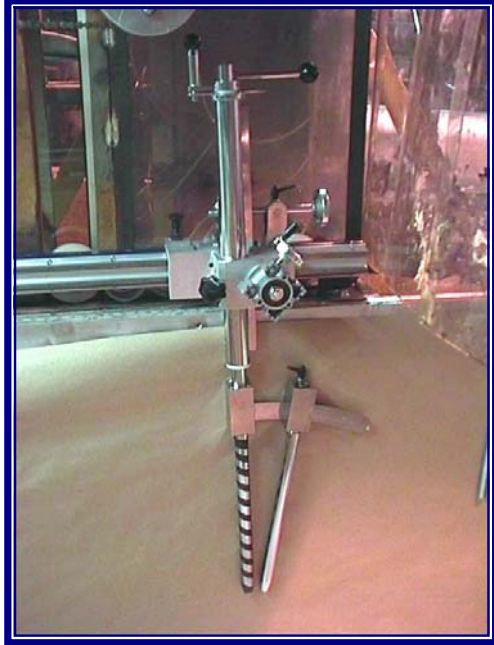


Figure 2, the Petzetakis Fork unit, Mark-IV

The Petzetakis Forks are supplied with a horizontal High Precision guide rail with a length of 5 metres (standard). The RS units use the same guide rail (see also next paragraph). This guide rail usually can be fitted relatively to the vertical columns carrying the sidewalls.

The Fork unit can be moved along the guide rail by hand and locked into position.

The height of the main fork can be adjusted with a gearbox/hand wheel arrangement.

The angle of the secondary fork can be adjusted.

Furthermore the main Fork can be rotated 180 degrees for ease of the start-up.

2. RS-6 pulling system

The RS-6 system is supplied as a complete set consisting of;

- Set of two pulling units, L+R, control panels, pressure reducer, airlines, installation drawings, etc. The RS units are mounted to the same rail as for the Petzetakis forks.
- Set of two universal polyethylene film unwind stations, L+R. (suitable for mounting outside the side walls only; other types can be designed to specification on request)

The main features of the RS-6 ^{Mod-2001} system are:

- Automatic synchronised pulling film speed, matching the conveyor speed at all times.
- Remote controlled height adjustment via a telescoping guidance unit.
- Fully automatic motorised angle adjustment by means of air sensors with the possibility to run the angle adjustment in manual mode. The film height sensing system is based on low pressure compressed air (low air consumption).
- Variable, adjustable speed control on the length adjustment. This feature allows low speed adjustments during production on the length setting, forward and backward, without disturbing the film tracking.

On request quotations can be made to customer requirement with fewer of the above features or even extra features.



THE PRINCIPLE

The principle of the U-3 System is based on the reduction or elimination of the friction created by the upward rise of the expanding foam against the 'horizontal' running side paper.

This is realised by feeding in an extra web of polyethylene at the sides of the bun, which is being lifted by power driven Pulling Rollers (RS-6) during the upward rise of the foam.

The polyethylene web is fed into the foaming machine near the mixing head and runs at the inner side of the side paper in horizontal direction during the first part of the rise and then travels upward at the same angle as the rising foam over the remaining part of the rise.

The travel of the polyethylene film is controlled by the Petzetakis Forks.

The settings of these Forks, the speed control of the RS-6 rollers, the position and the angle at which the RS-6 units are positioned, are the most important parameters of the U-3 system.

THE RESULTS

The total loss in trim waste of blocks poured on the Conventional Slabstock Process can be as high as 20 to 25 % by weight, mainly due to the inefficiency in the conversion of the domed top part of the buns.

This percentage depends on a number of variables such as; foam grade, block width, block height, skills of the operators and the method of determination.

Using the U-3 System a virtually flat top skin can be obtained, which reduces the trim loss to about 8-15 % by weight for the same grade of foam.

Depending on the annual tonnage, run length and foam types a pay-back time of less than 6 months can be achieved easily.

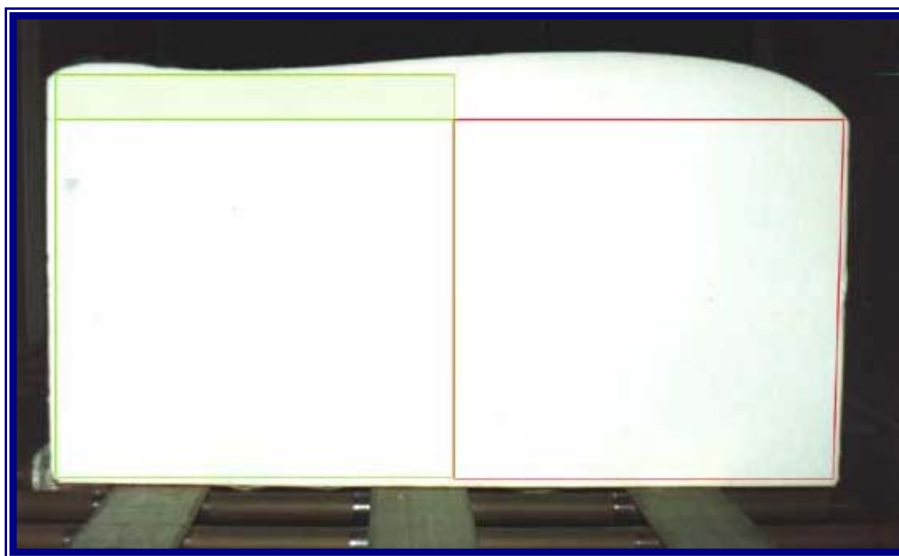


Figure 3, The LH side of this Conventional Lay-Down block was squared with the U-3 system. The other side still has the conventional dome.



THE INSTALLATION

The U-3 System comes as a complete pre-wired kit, including guide rails, universal film unwind stations, cables, air lines, high precision air reducer with automatic condensate drain, etc. Some brackets to fit the guide rails to the machine may have to be made locally in order to guarantee a perfect fit.

The installation instructions and drawing provide clear information for the mechanic/electrician to install the equipment in a relatively short time. The installation can be carried out in between production hours, without having any downtime in the foam production.

About three days for a mechanical engineer, plus three days for an electrician is in general sufficient for the complete installation.

THE COMMISSIONING

The delivery also includes detailed information about the commissioning and providing running instructions for a smooth start-up, as well as a trouble shooting guide. In general no further assistance is required.

In the unlikely case that further assistance is required, than FFS will provide trouble shooting advise by phone and fax. On request FFS can also provide professional help on site, should this be needed.

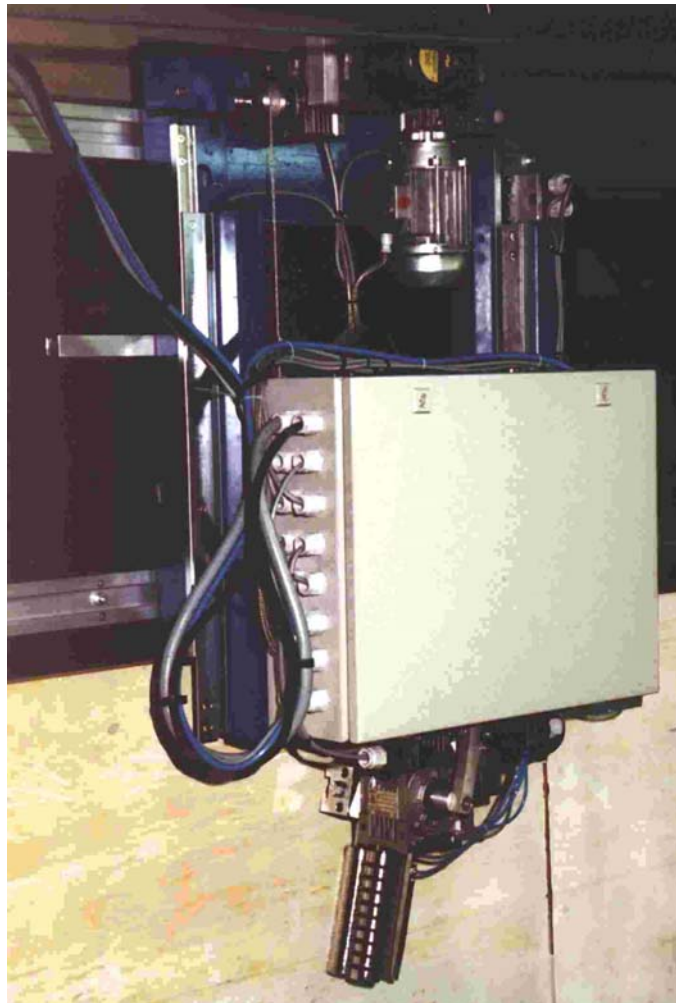


Figure 5, U-3 system



OVERVIEW OF THE FUNCTIONS OF THE RS-6 ^{Mod-2001} PULLING SYSTEM

	RS-5 Unifoam	RS-6 Model 2001
<u>Pulling Rollers</u>		
variable speed drive	Y	Y
Automatic synchronisation with conveyor	N	Y
fine tuning of synchronisation (overspeed)	n/a	Y
<u>Height adjustment</u>		
principle of adjustment	gerrack	telescopic
Motorised	N	Y
adjustment range in mm	230	440/520/600
<u>Angle adjustment</u>		
Motorised	Y	Y
Automatic mode	Y	Y
manual mode	Y	Y
<u>Length adjustment</u>		
Motorised	N	Y
Variable speed control on length adjustment (0.2 – 8.0m/min)	n/a	Y





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