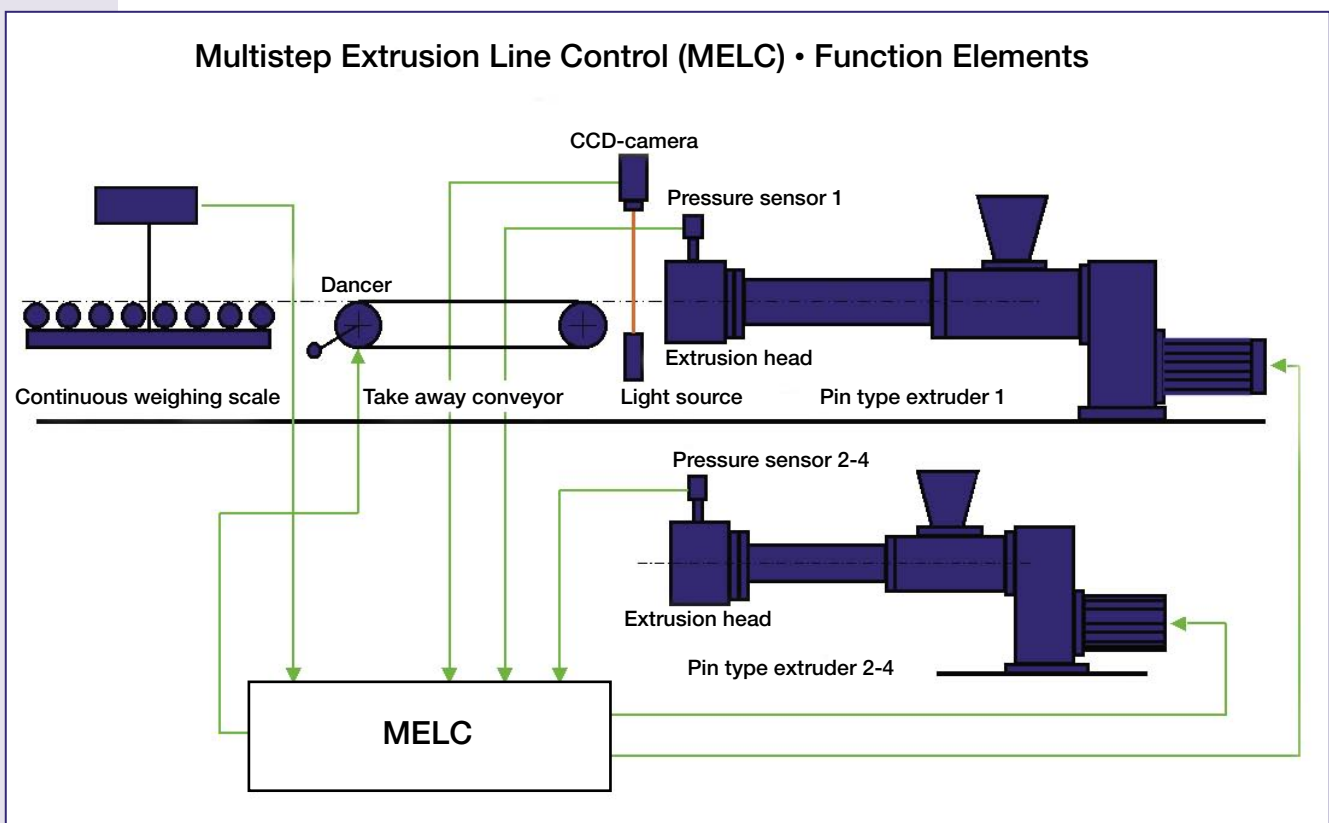


# Multistage Extrusion Line Control System



## The made-to-measure solution from Harburg-Freudenberger

Increased automobile manufacturers requirements to car part quality with regard to precision fitting, product characteristics and safety features have increased requirements to the machines and production lines needed to manufacture these components with regard to precision and uniformity.



In a series of tests carried out under production conditions, irregularities could be reduced by more than 50 % for the mentioned quality characteristics.

An additional desirable effect was that profiles manufactured with this control system held uniformity for a longer period of time when emptying the extruders e.g. during change of extrusion material.

Especially if frequent change of material is required, this will noticeably reduce scrap material and increase productivity of the extrusion line.

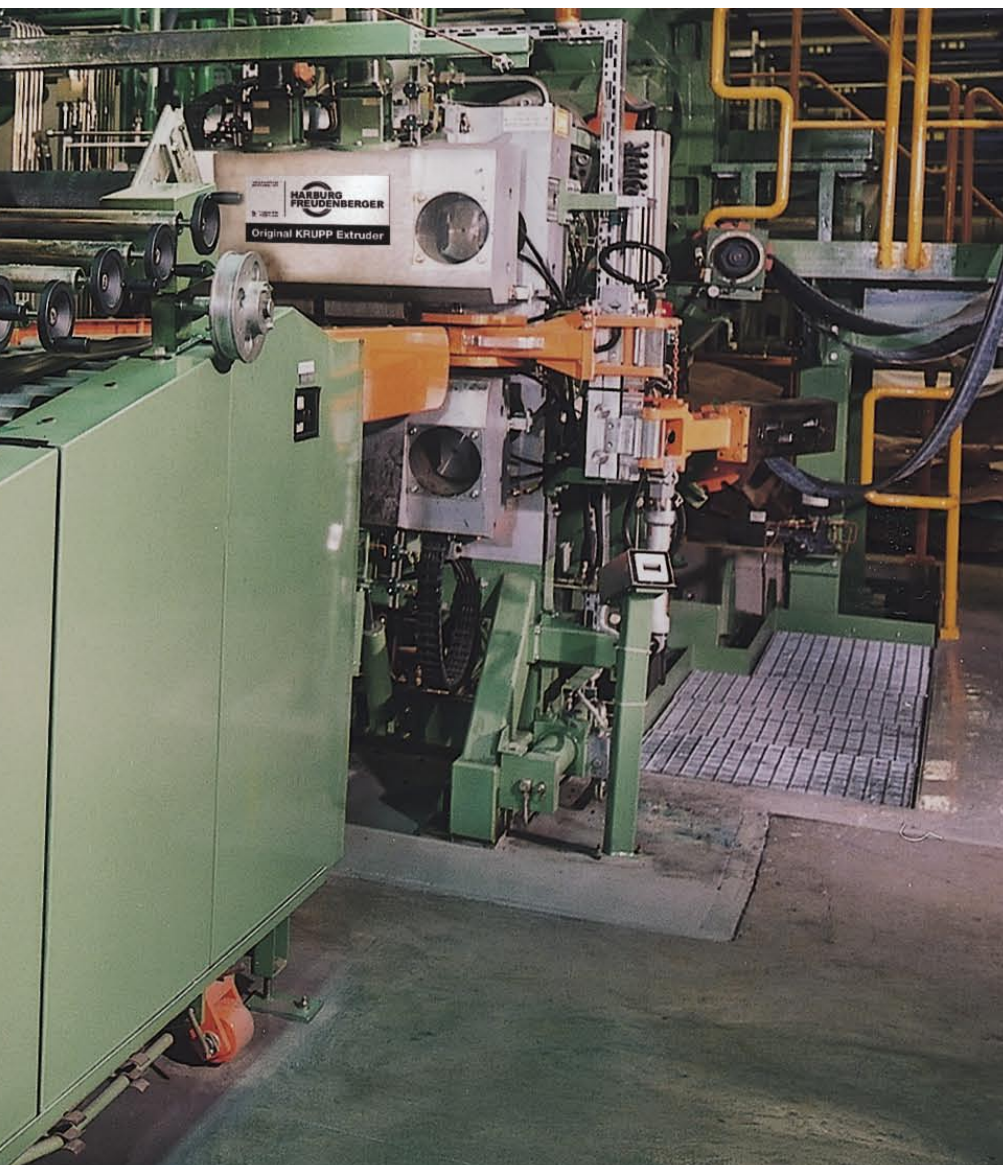
The system is not exclusively available for new extrusion lines, a retrofitting kit makes it easy to mount the system in existing production facilities as well.

The system, for which patents have been applied for, is suitable for multi-component extrusion lines with up to four extruders operating on a multi-component extrusion head.



### Design Features/Advantages

- Individual pressure depending regulation of screw speed for constant material output separately for each extruder
- Automatic line speed control depending on profile dimensions and continuous weight
- Special control data filters for individual recognition and separation of different disturbance variables
- Different control activities and feed back for compensation of product variations depending on variations of compound properties or feeding deviations
- Reduction of dimensional and continuous weight variations
- Improvement of product quality and process capability
- Constant component distribution in multi-component extrusion profiles
- Improvement of productivity by long time profile constancy even during emptying process



To fulfill these requirements when extruding tire components such as treads, sidewalls, etc., not only the characteristic features of the production line must be taken into account. To a considerable extent, the quality of the extruded profiles is determined by the characteristics of the processed rubber compounds, upon which suppliers normally have little influence.

Considerable effects on dimensions and continuous weight of the extruded profile must be taken into account due to permanent variations in process characteristics, especially when processing rubber compounds with large content of natural rubber. The same is true of irregularities in material feeding e.g. to irregular slab dimensions or other faults related to material feeding.

Harburg-Freudenberger has developed a multistage control system for multi-component extrusion lines which compensates the lack of uniformity in material feeding and process characteristics resulting from irregularities in the quality characteristics of the extruded material and which increases the product quality and the process capability of entire extrusion lines.



Comparabla influence on ectrusion parameters with/ without pressure control

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We develop, build and distribute machines, lines and systems across our three company divisions based on 150 years of company tradition.

### **Rubber mixing technology**

We provide the most comprehensive range of machines for the rubber and caoutchouc industry including all major preparation and processing stages.

- Complete mixing room systems
- Internal mixer
- Mixing mills
- Dump extruder

### **Caoutchouc technology**

Production machines and lines for the manufacture of tires and technical rubbergoods from raw material feeding to vulcanisation:

- Extruder
- Extrusion lines
- Tire building machines
- Curing presses

### **Edible Oil Technology**

Machines for processing oilseed, crude oils of vegetable origin and animal raw materials as well as screw presses for the dewatering of synthetic caoutchouc and similar products:

- Screw presses
- Extraction lines
- Refining lines
- Process engineering

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