

# ShapeFlex

## Customized non-contact flatness measurement

As the user of steel products is imposing increasing demands on material flatness, it has become essential for the flat product producer to decrease tolerances. At the same time, higher productivity demands are leading to a situation where the production of all metal products must be made more efficient. Shapeline can help you to meet the increasing demands in respect of these two properties.



A flatness measurement system based on the ShapeFlex concept can be integrated into any production line to suit all the customer's requirements for flatness and transverse bend measurement.

Through a flexible concept and carefully modelled optics and geometry, any flatness measurement application can be achieved using the ShapeFlex concept.

Any material width, measurement accuracy and point density can easily be modelled and customized for all customer requirements. Because width, format and position measurement can be carried out using the same equipment, you can ensure that your Shapeline ShapeFlex-system will be a

long time companion for improving quality and production on your production line.

#### Features:

- On-line measurement on any production line
- Immediate evaluation according to current flatness standard
- Width and position measurement
- Any point density or measurement accuracy
- I-unit profile for process control

The ShapeFlex concept is based on the same tried and tested laser measurement technology, as are the other flatness mea-

surement systems in the Shapeline family. Up to 500.000 measurement points per second can be accurately measured and evaluated. This means that every point of your material is inspected in real time, and even the smallest deviation from a perfect flat product is detected and reported according to your instructions. The measured data selection and statistics tools also help you to find sources of imperfection, eliminate them and develop the production process to perfection. The non-contact measurement method and ample stand-off distance also ensure a minimum of maintenance and problem-free operation.

## Benefits

100% production quality assurance

Enables elimination of complaints

Provides information for optimal cutting, slitting and grading

Possibilities to improve all process steps in terms of flatness

Systematic production follow-up

Measurement protocols for better customer support



## Typical applications

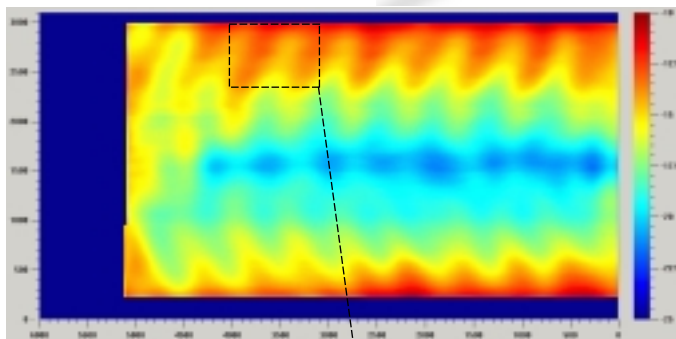
The ShapeFlex-system is designed and constructed for a wide variety of applications. However, typical installations include, but are not limited to: Leveller control applications, hardening lines, rolling mills, cutting, painting and coating lines, annealing lines, galvanizing lines and finishing lines. The applications are limited only by the imagination of the customers.

## Functionality

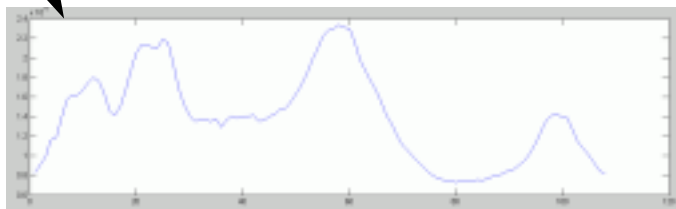
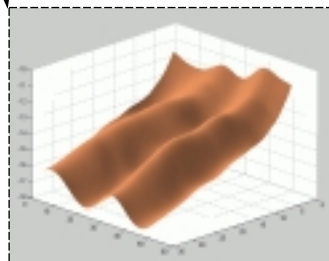
The functionality of the system can be configured for each specific user. Here is one example:  
A metal sheet is fed past the system on a

conveyor belt. The laser-based optical system captures the three-dimensional topography data as the sheet passes by. The material vibrates during the transfer movement due to conveying flaws and non-flat material, but the sophisticated frequency-analyzer eliminates the defective movement factor from the measured data. The sheet size is then measured, the topography evaluated according to the EN-10029 standard and possible errors reported via a network to the host computer. At the same time, an I-unit profile is computed and displayed. The I-unit profile is also sent to a control system that commands the downstream leveller to straighten the sheet efficiently. Another ShapeFlex-system

checks the sheet after levelling to verify the flatness. If the flatness is capable of further improvement it is sent to the leveller once more. Otherwise a report is printed out and the sheet is fed on to the plasma cutting and painting departments. The plasma cutter takes width and position information from the Shapeline system to optimize the cutting operation. The position information is also used to guide the sheet to be located into the center of the leveller. When the measurement data has been evaluated, statistical information is extracted and stored for later use by process development engineers. This data is saved together with the sheet identity for subsequent retrieval at any time.



*A topographical map of a steel sheet (upper picture) and a zoomed in detail enlarged (right picture). Also very small flatness variations are important to detect for high-quality production control. From the topographical map, an I-unit profile is computed (below). The I-unit profile tells the leveller where to elongate the sheet to make it flat.*



## Technical specifications

(The technical description is system-specific. Please ask Shapeline for further details)

FLATNESS RANGE: 10-500 mm

STAND-OFF DISTANCE: 100 mm - 2 m

ACCURACY (std.dev.): 5 mm - 0.5 mm depending on point resolution, speed etc.

MEASUREMENT FREQUENCY: Can be selected by the user over a wide range. The measurements can also be controlled by a pulse transducer.

INTERFACES: Ethernet, RS232, Parallel interface (printer), European modem, pulse transducer interface. For other interface options, contact us.

OPERATING CONDITIONS: 0-50 C. Humidity: 10-90%, non-condensing.

PHYSICAL SIZE: Varies with application, strip size and space available. Contact us for details.

POWER REQUIREMENTS: 220-240 VAC, 400 W max.

