

High-Speed In-line Inspection for Cast Extruded Film 100% Quality and Process Control



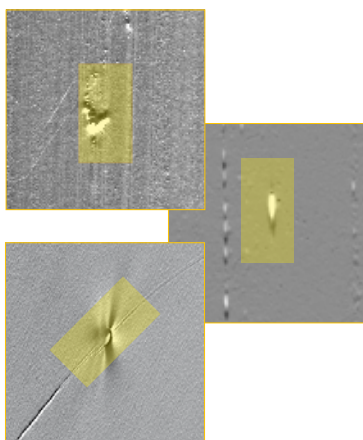
Dr. Schenk solution for film inspection

The combination of film extrusion with the cast step is one of the most versatile and prevalent film manufacturing methods. Particularly for sophisticated multi-layer films, cast extrusion is the method of choice. Converting steps, such as stretching, coating, sputtering and laminating, are frequently part of the production line, which commonly runs 24/7 with product changes performed on the fly. At the end of the line, prior to the winder and the automatic roll-cutting system, film inspection must continuously identify a variety of defects and feed this quality information back to each of the diverse production steps.

Dr. Schenk's customized hardware and software solutions combine defect detection and classification with quality monitoring for mass production.

Benefits of automated optical inspection and simultaneous monitoring of cast extrusion film material

The innovative optical inspection solutions EasyInspect and EasyMeasure allow complete quality control (ISO 9001) that matches the steep requirements of product liability particularly for the production of high-end materials. At the same time they help to reduce life-cycle costs caused by poor quality products and minimize material waste during production (ISO 14001).



*Typical defects to be detected and qualified in high-end films:
gel / fish-eye, die-line and scratch*

KEY FEATURES

- Advanced camera technology and multiple illumination concepts for highest contrast and optimized signal-to-noise ratio
- High defect sensitivity with multiple darkfield channels
- Reliable and accurate classification and qualification of defects
- Up to 320 MHz pixel frequency
Example: 2000 mm wide material at 200 m / min transport speed, 3x 8k cameras = 90 x 90 µm resolution
- Easy integration into production lines
- User-friendly interfaces (SEMI standards)
- Extended data storage function for quality evaluation and process optimization

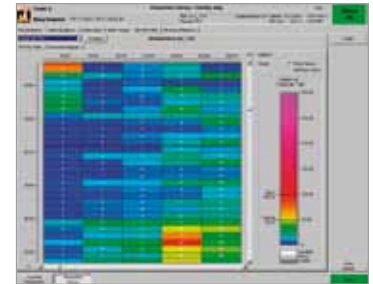
Ensure product quality and optimize optimize the stack composition process

EasyInspect identifies defects and irregularities that can occur at any step of cast extrusion film production. The system's innovative optical set-up and image processing and visualization software are adapted to the specific requirements of cast extrusion film production.

EasyMeasure option: 100% process control

The combination of EasyInspect with EasyMeasure allows full control over the extrusion, laminating and finishing processes and through this over the quality of the end product. At a glance it offers:

- 100 % coverage of the web material
- In-line monitoring of material properties with existing EasyInspect modules
- Industry proven design without moving parts
- Operator-friendly visualization and real time 2D map in machine and cross web direction



Images of defect map (above) and density map (below).

Typical defects in cast extrusion films detected with EasyInspect

Defect types	Possible causes
Gel & fish eye, black spots	Insufficiently controlled heating, uneven mixing of materials, dust and other particles
Pin holes	Contaminations in the bulk of the material
Scratches	Too intense corona/plasma treatment, mechanical pressure in web feed
Chatter marks	Roll slippage / roll contamination, extruder adjustment, gear pump, chill roll or other rolls' drives, e.g. roll marks
Die lines / Streaks / Melt lines	Uneven melt, sub-spec mixing quality, contaminations in the die
Z-folds	Insufficient film tension and feed control

KEY BENEFITS

- Optimize the production process through immediate feedback
- Create consistent quality standards and reduce costs by rejecting material with irregularities from further processing
- Improve yield by quickly identifying the defect source
- Gain in-depth knowledge of the production process through quality documentation, history and statistics reports
- Save money and secure your investment through downward compatible hardware and software

About Dr. Schenk

Dr. Schenk GmbH, established in 1985, is a globally active, innovative high-tech company based in Munich, Germany. For the third decade now Dr. Schenk offers comprehensive solutions for automated quality assurance and production process monitoring for the solar, flat glass, film and foil, converting, optical media and semiconductor industries.

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