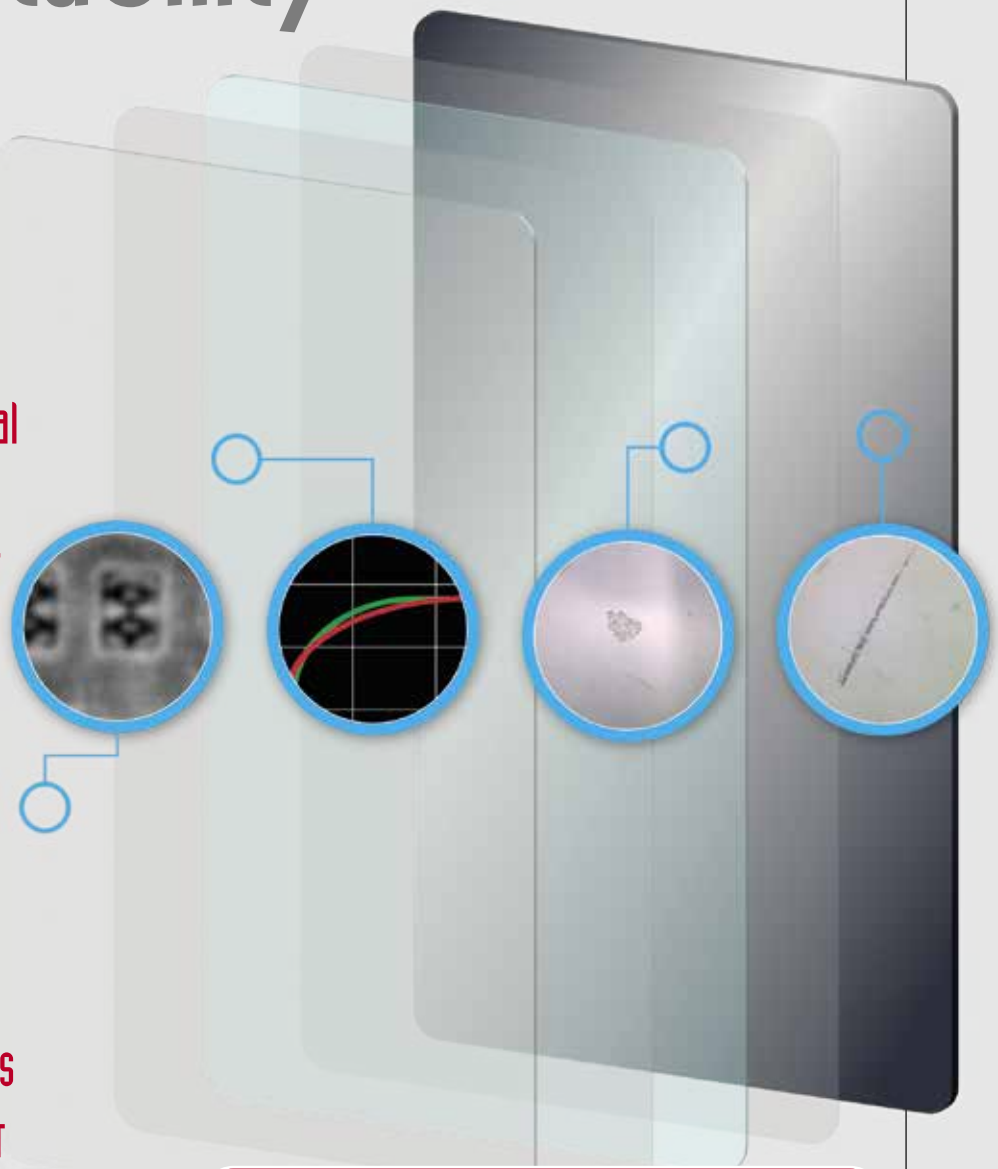
ISRA VISION: Inspection solutions ensuring quality and profitability

Ever thinner touchscreen displays in films, foils or finished products are accompanying both rising functionality and added optical quality requirements. These go hand-in-hand with greater vibrancy of quality as well as outlandish shapes and new applications. All this is testified by our daily interactions with such displays in operations with smartphones, coffee machines and ATMs - not to mention our cars and workplaces.



Defect detection from the raw material to the finished display - ©Isra Vision Ag

Deflectometric surface inspection of the end product - ©Isra Vision Ag

360° DEFECT DETECTION

Touch displays enable operations that are convenient and intuitive in both devices and machines. They are also robust and easy to clean. As such, they are becoming increasingly widespread in production plants, medical technology and other industrial application areas. Today the automotive industry is a trendsetter in this area with its introduction of pillar-to-pillar displays that span entire vehicle width in new vehicle generations. These furnish important cockpit functions, facilitating the operation of all car communication and infotainment systems. In addition, they are perfectly fitted and often feature curved shapes and integrated sensors. Going forward, this trend is expected to continue in other applications, which will require new procedures for glass processing and finishing as well as corresponding inspection processes during manufacturing. Such quality inspection is essential to meeting stringent requirements respecting robustness before mechanical loads as well as trouble-free functioning and operability, fit and optical quality.

QUALITY ASSURANCE ALREADY AT RAW MATERIAL STAGE

Whether they employ TFT or OLED technology, modern displays consist of many layers comprising different materials that are usually extremely thin. Optical films, thin-film and thin-glass in the actual TFT or OLED display and cover glass are all joined together during the production process, thereby achieving perfect union of form and function. However, even the smallest defects in one of the layers can compromise the properties and function of the display. For each single layer ISRA VISION is an industry leader both in optical inspection and defect detection. Its solutions identify and reject defective materials prior to installation, minimizing the number of imperfect end-products produced and increasing production profitability. As a system, ISRA VISION's SMASH inspects optical film surfaces, where it detects defects - including minute scratches, marks and production residue upon film materials as well as coatings on web materials. Line cameras guarantee a high inspection speed of up to 1000 metres per second while enabling the highest image resolution. At the same time, customized lighting supports the reliable detection and intelligent classification of defects that would be otherwise invisible to the naked eye. In turn, this allows conclusions to be drawn regarding causes or defective process parameters that can be continuously monitored and optimized.

RELIABILITY AND PRECISION: 100 PER CENT QUALITY CONTROL OF END PRODUCTS

The raw glass and foils are impeccable, with no flaws occurring at the adhering together of the parts, and the finished display is then fitted within the end product. At this point a fi-

ISRA VISION SMASH surface inspection system for plastic film material - ©Isra Vision Ag

ISRA VISION Flatpanel Master perform-ing thin glass surface inspection for dis-plays - ©Isra Vision Ag

nal check is performed to ensure the finished product remains fault-free and is of perfect appearance. Often this is performed still as a cosmetic inspection that's conducted manually with all its associated disadvantages, such as subjective judgment and dependency of the inspection result upon the person carrying out the test coupled with the general limitation of our human ability to recognize quality deviations only minimally. This final inspection has great influence upon production profitability: Minimal defects that are screened too strictly reduce profit whereas excessively relaxed quality inspection will lead to complaints and result in dissatisfied customers. Here a fast, fully automatic and 100 per cent optical inspection solution will solve the problem. This is easy to integrate while detecting such typical cosmetic defects as scratches, bubbles, indentations and polishing marks, and it delivers objective and reliable results. The SpecGAGE3D inspection system from ISRA VISION is used during the final control stage as well and it's ideally suited for the measurement and inspection of all transparent and reflective surfaces. Inspecting flat or curved displays, as well as 2D/3D cover glass, glass back panels of smartphones and other glossy housing parts is also possible with the inspection system. This system immediately decides how to sort goods, based upon pre-set tolerance ranges as well as automated defect classification.

CRYSTAL-CLEAR QUALITY THANKS TO END-TO-END PROCESS MONITORING

Increasingly larger and thinner glasses, flexible materials, and complex shapes begin to impose ever stricter requirements upon displays manufacturing. In order to meet these stringent standards and ensure the best possible quality while also achieving high productivity and process reliability, companies need end-to-end processes and quality control. These begin with the inspection of raw materials, accompanying the entire production process right through to the end product. When defects are detected during this process, their associated inspection solutions ideally facilitate a precise link to their cause during upstream production steps. This also enables the effects of parameter changes on all further processes to be tracked and monitored. ISRA VISION offers a broad portfolio of optical inspection solutions at every step of display manufacturing. Thanks to the inspection data gathered, plant operators can continuously optimize their processes - so achieving optimum product quality, production stability and, ultimately, profitability. As a result, they deliver flawless products and materials while delivering high customer satisfaction. Moreover, the deployment of fully automatic inspection systems in production plants ensures compliance with current and future quality standards - as required, for example, in the automotive industry.

Such 100 per cent optical inspection offers the further guarantee of also meeting future requirements during production as regards shape, appearance and display function. To this end, ISRA VISION collaborates closely with leading manufacturers and customer development departments within all key industries and can count upon a tight-knit network of experts and engineers, both in Asia and worldwide. Flanking their development, new materials, technologies, and applications necessitate further advancement in such inspection solutions, which typically finds ISRA VISION already at work on their implementation within existing and new quality assurance systems.

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