

Reduce waste by up to 40% on tubing lines

The production of glass tubes generates many faults and the only way to ensure the right quality is through sorting. This is wasteful, says Henrik Hegelund but a recently introduced cutting control system is said to improve the yield considerably.

JLI vision has developed glass tube inspection systems for 25 years and in co-operation with glassworks, has continuously improved the capabilities of its SK-3000 series of defect inspection systems for tubing lines.

SK-3000 systems can inspect tubes with diameters up to 80mm and with wall thicknesses up to 24% of the diameter. The fastest systems can inspect tubes with a line speed of up to 20m/ second. Operating at these line speeds requires cameras with a shutter speed of 1/54000 of a second. A very powerful light source is necessary to provide illumination to match this short exposure time. The design of the light units and drivers is a major challenge but with the use of specially designed light driver boards in combination with standard bulbs, the light units can run continuously if the bulbs are replaced every three-five years.

The tube inspection systems detect stones, knots and airlines and with the addition of extra cameras, they can also detect cord. Several models are available for different tube sizes and sensitivity. The most accurate inspection is required for pharmaceutical glass production, where the dual SK-3020D system is recommended because of its ability to detect airlines down to five microns in width.

Tube inspection systems from JLI vision are used by all major glass tube manufactures and more than 100 systems have been installed throughout the world.

CLEVER CUTTING CONTROL

The latest addition to the SK-3000 series includes software and interfaces to control cutting. Normally, cutting is performed by a simple rotating cutter, geared to the pulling machine. Thereby, any defect detected will result in a full length of tube being discarded. The principle of 'Clever Cutting' is to cut away only the sections of the tube containing the defect, instead of throwing a full length tube away. Depending on the physical cutter, cutting the tube in half, one third, one quarter or even one fifth of a full length tube is possible.

If the cutter is a traditional wheel running with a fixed rotation speed, by adding additional cutting devices to the same wheel, users can obtain the Clever Cutting software from JLI vision to control the individual cutting devices. This approach ensures that only shorter sections of the tube are rejected when defects are detected.

The cutter can also be a single cutting device on a servo motor. The speed of the servo motor is controlled

by the Clever Cutting software, so the time between two cuts matches the actual time needed just to cut away defective sections of the tube. A cutting machine that supports the system is available from Olivotto Glass Technologies.

Using five cutting devices or a servo motor-operated cutter, the reduction in the number of rejected tubes is up to 40%. If a glassworks currently rejects approximately 10% of its production because of stones, knots, airlines, outside diameter or wall thickness, with Clever Cutting they can pack an additional 4%. This will improve line efficiency from 90% to 94%, with no additional runtime costs.

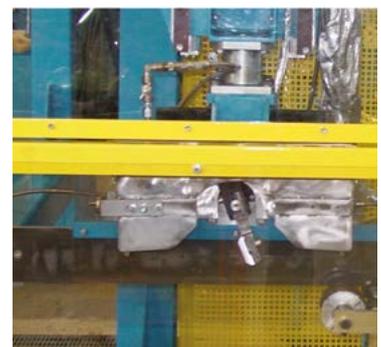
INTEGRATION WITH EXISTING GAUGES

The Clever Cutting software is integrated in the SK-3000 series systems, as this is the only device that can see the full range and sizes of the different defects and their location on the tube. Up to three external devices can be connected to the SK-3000 systems, including reject signals from existing outer diameter and wall thickness gauges.

The mechanics for discarding and guiding the tube to the transfer may need minor modifications to ensure that small lengths of tubes do not jam the handling equipment. With this solution, an important step has been taken to improve the yield of tubing lines. JLI vision can include this functionality on all glass tube inspection systems in the SK-3000 series and is also able to install Clever Cutting on existing SK-3000 installations. ■



The SK-3020 system from JLI vision.



Servo motor-controlled cutter from Olivotto.

Fixed Cutting



Clever Cutting (1/4)



Legend: OK (green), Defect (red), Rejected tube (red), Accepted tube (green), Cut (vertical line)

Diagram showing how Clever Cutting provides higher yields.

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