

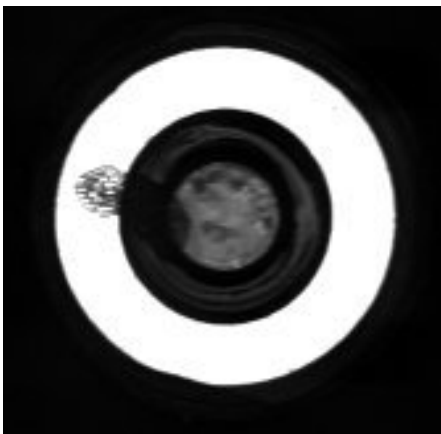
## Case study

### Leakage Inspection in the Beverage Industry

Vision systems are used for the automatic inspection of beer kegs



*Fitting: Part OK*



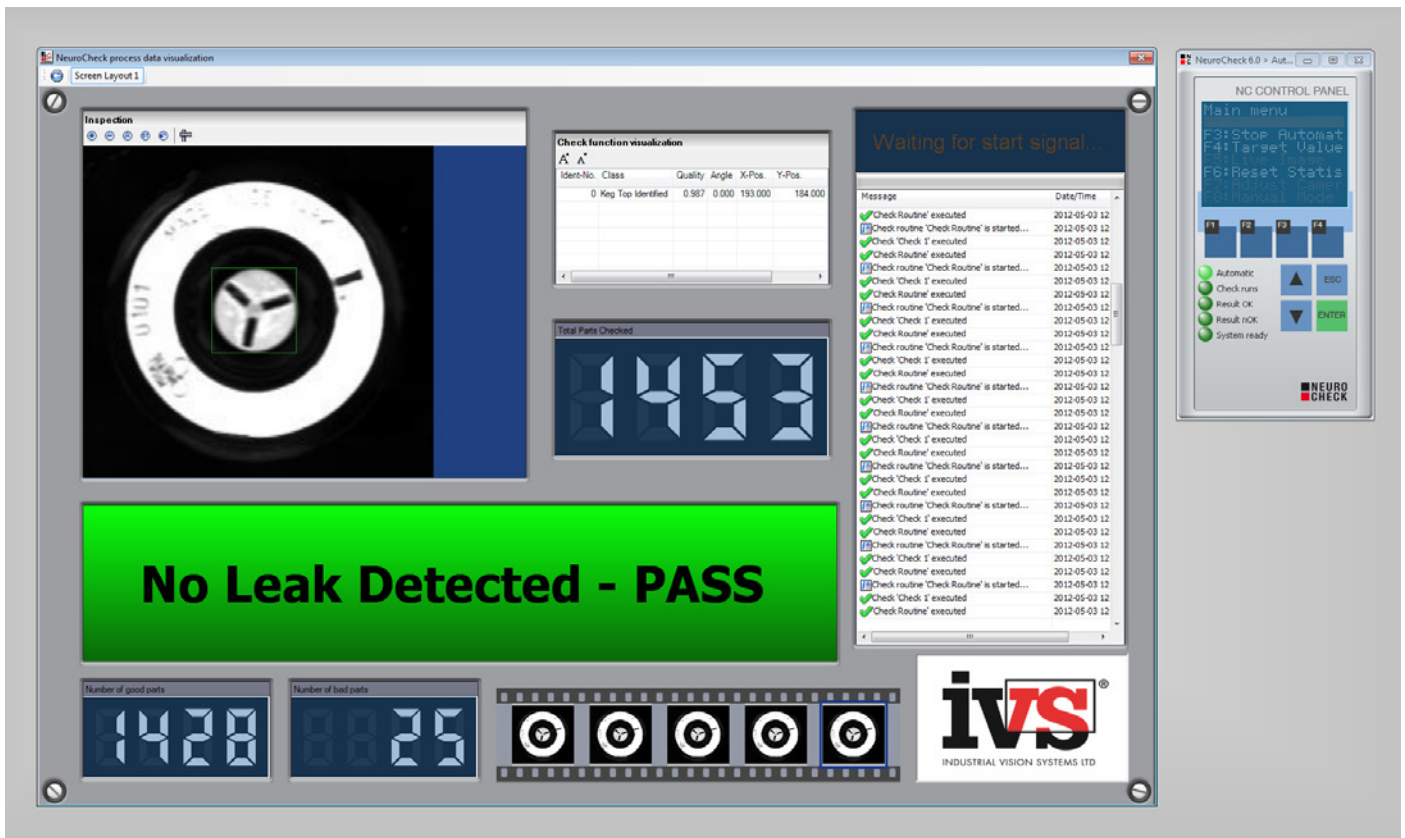
*Fitting: Part not OK*

IVS has been integrated into a modular image processing system "ImageKeg" as a software component. The ImageKeg system was developed for operation in the wet section of beverage filling machines with special regard to the great variety of keg and fitting types. The system is designed for a throughput of up to 1,400 kegs per hour which corresponds to a cycle time of less than 3 seconds. After the keg has been filled, the fitting has to be checked for leakage. Leaking fittings and insufficiently fastened valve systems can be detected because of the escaping foam.

However, minor damages of the fitting surface and condensate must not lead to a rejection if the fitting is tight. For this reason, the leakage inspection is geared especially towards foam structures. Typical beta risk values, i. e. frequency of the rejection of a tight keg, are around 0.2%. The rate of error is approximately 0.05%. Suitable arithmetic operators or multiple image capturing with different parameters provide sufficient contrast of the foam on the fitting.

Constant image quality is obtained by using a light protection tunnel and by monitoring the illumination. In addition, an ultrasonic bath can be installed before the camera system. The ultrasonic bath is a conveyor belt running through a water-filled tub incited by ultrasonic activators. This process increases the keg's internal pressure so that even minor fitting defects that would only cause a small amount of foam without the ultrasonic bath now lead to a considerable foam production. IVS reliably recognizes this error image. Inserting such an ultrasonic bath is by far the most successful and most reliable method to detect all defective kegs. The beta risk in this case is much smaller than 0.2%.

In addition, the option exists to keep error statistics. For each batch the total number of kegs checked and the number of leaking/tight kegs is counted and saved on the computer. Thus, automatic documentation of the quality of the fittings used is possible.



*IVS provides real time feedback of the leak condition allowing beer kegs to be automatically rejected in case of failure.*