APPLICATION ALERT

HK Instrument Systems

For more information contact:
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INDUSTRY: **DAIRY - PROCESS CHEESE PRODUCTION**

PRODUCT: **PROCESS CHEESE**

APPLICATION: **Measure the % Moisture of Process Cheese during the Blending Process.**

This is a Continuous Process with our system being used for Closed Loop Control and Visual Monitoring.

DESCRIPTION: After the manufacturer has made a final blend of the Ingredients, which will make up the final cheese product, they want to measure the amount of Moisture in the Finished Product.

BENEFITS: This is typically a measurement, which is made in a Pipe.

COST SAVINGS By controlling the Moisture Content of the Final Cheese Product, the Customer can save Money by producing a product, which has more moisture, but is still in Spec. Another way of selling more water.

The Final Product which is produced using an HK System for Control, has a much lower variability than if it was produced without Closed Loop Control.

This lower variability allows for better control of the Production Loop. This lower variability improves the efficiency of the Production Process.

QUALITY **By using the HK Microwave System to Control the Final Process Cheese Product, the Consistency of the Final Product is improved. This reduces the Variability of the Final Product and increases the Quality.**

REPEATABILITY +/- 0.3 % is possible with a very good Calibration Curve**.**

MEASURING RANGE 40% to 50% Moisture Content is Typical. The Measuring Range will vary as the type of Product varies.

HK EQUIPMENT: **HK1-M IN LINE WITH 3A SPOOL PIECE**

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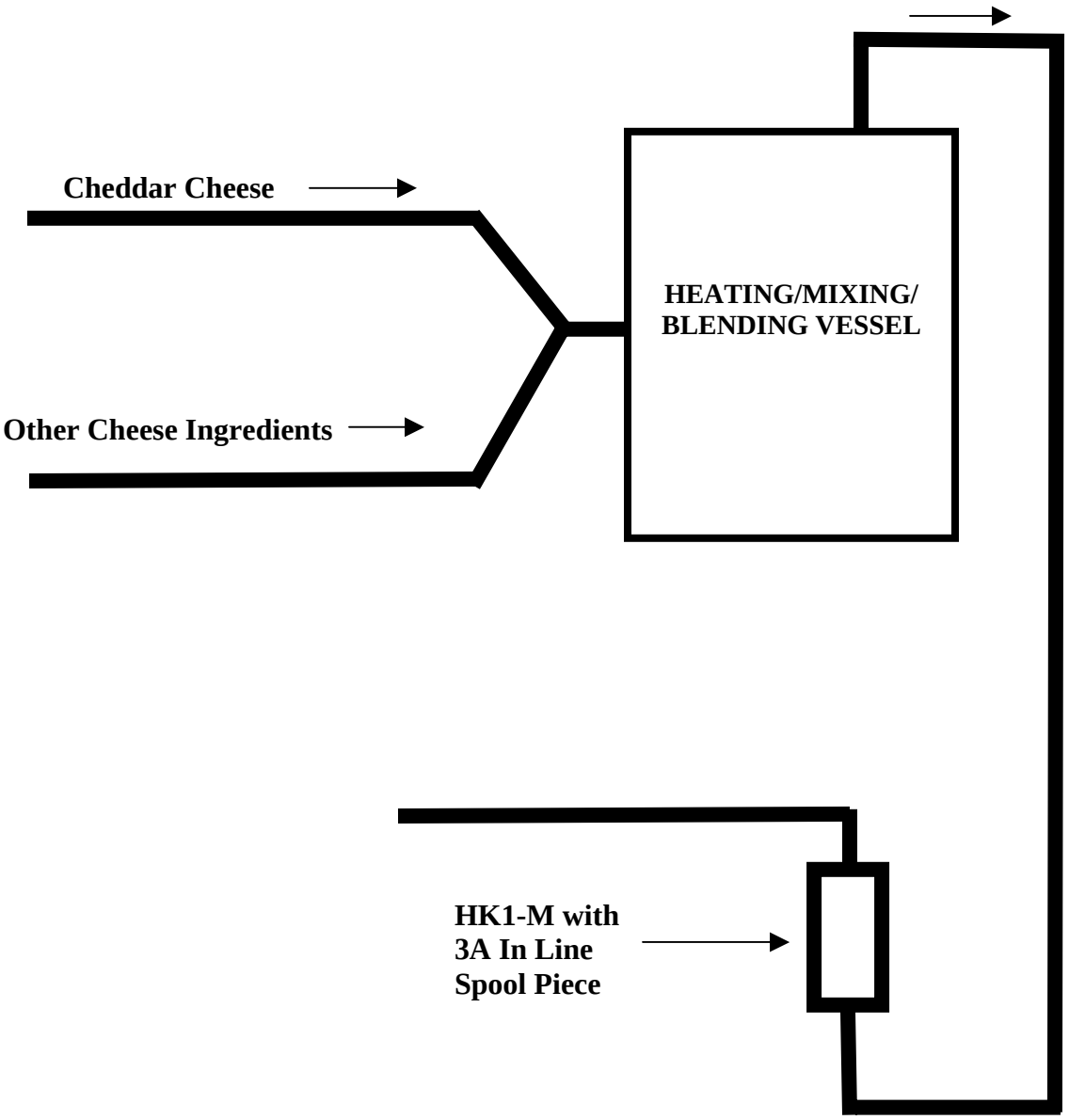


PROCESS CHEESE PRODUCTION 2-6-07

HK INSTRUMENT SYSTEMS

Pittsburgh, PA

PROCESS CHEESE PRODUCTION

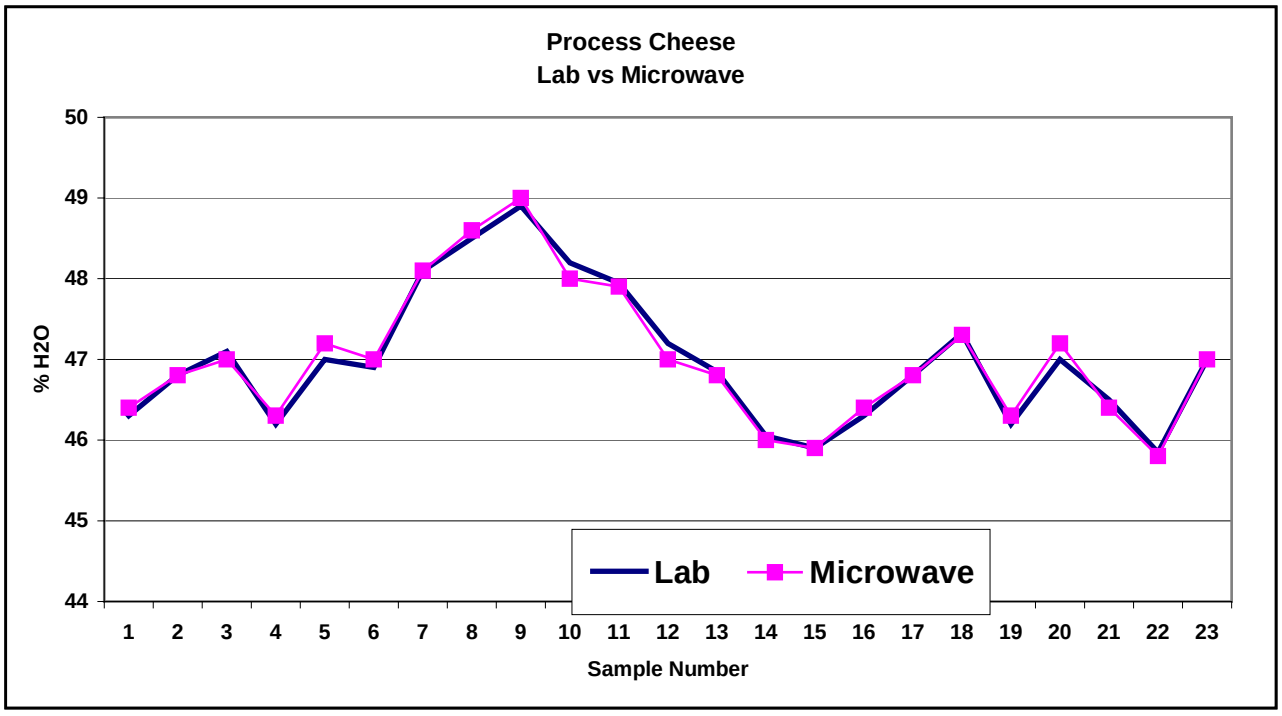
APPLICATION: TO MEASURE THE % MOISTURE OF A PROCESS CHEESE PRODUCT DURING PRODUCTION.

INSTALLATION: THE MICROWAVE SENSORS ARE ALWAYS INSTALLED WITH A **PROPRITARY 3A SANITARY SPOOL PIECE** WHICH WILL BE MOUNTED VERTICALLY. TEMPERATURE COMPENSATION WILL ALWAYS BE INSTALLED.

TESTING: A GRAPH OF LAB vs MICROWAVE READINGS IS PRESENTED BELOW. SAMPLES WERE COLLECTED AND DRIED IN A LAB OVEN TO DETERMINE % MOISTURE BY LOSS OF WEIGHT. READINGS OF THE HK-1 MICROWAVE INSTRUMENT SYSTEM WERE RECORDED EACH TIME A SAMPLE WAS COLLECTED.

RESULTS: CORRELATION BETWEEN LAB SAMPLES AND MICROWAVE READINGS IS EXCELLENT FOR THE ENTIRE MEASUREMENT RANGE. THE R-SQUARED VALUE IS 0.95.

LAB OVEN VS MICROWAVE



CONCLUSIONS: THE HK-1 MICROWAVE INSTRUMENT SYSTEM IS AN EXCELLENT TOOL THAT CAN BE USED TO MONITOR AND CONTROL THE % MOISTURE OF ANY PROCESS CHEESE PRODUCT.

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