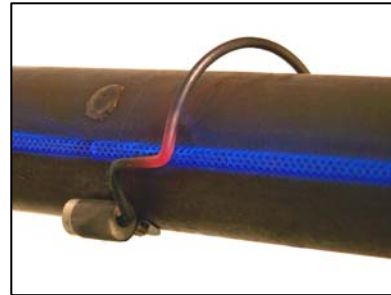


## ***Far Side Sensing***<sup>®</sup>

### **Introduction:**

**Banner-Day**, a leader in oven performance optimization, and **ERB-Ensign**, a leader in combustion technology, collaborated to develop ***Far Side Sensing***<sup>®</sup> which provides reliable flame detection on ribbon burners at the end of the burner opposite the ignition source.

As the next generation in flame detection, ***Far Side Sensing***<sup>®</sup> complies with regulations in locations that require opposite side flame sensing such as Canada, Europe and other markets.



The value of this feature for bakers in locations requiring opposite side flame sensing is that they can now fulfill this regulatory requirement and implement long desired improved temperature and lateral heat provisions in their ovens. This is an important advancement as it enables bakers in Canada, Europe and other markets to upgrade their existing ovens to meet CSA Code B149.3-00 Section A.4.6.12(a) and clears the way for implementation of measures to improve their bake productivity.

**Banner-Day** and **ERB-Ensign** anticipate similar regulatory opposite side sensing requirements to be imposed on the U.S. market in the future. B-D and ERB are uniquely positioned to provide an advanced solution to meet these expected U.S. market regulations when imposed.

***Far Side Sensing***<sup>®</sup> is a versatile burner enhancement with a robust design that can be incorporated into both OEM ovens and upgrade installations with existing or planned DSI systems and oven automation projects.

- A DSI system is a prerequisite to the installation of ***Far Side Sensing***<sup>®</sup>
- Requires no additional oven modification when replacing existing burners
- Easy to install

### **Field Test:**

The evaluation of ***Far Side Sensing***<sup>®</sup> included **ERB-Ensign** pipe ribbon burners fitted with this new remote flame sensing device. The burners were representative of those typically utilized in high production bakery ovens having a burner flame space 160" long, producing a maximum of 75,000 BTU's per hour and controlled by an FM approved **Banner-Day** DSI system including H-6E flame safety modules.

### **Test Oven:** Baker-Perkins 935, 5 Zone Bun Oven

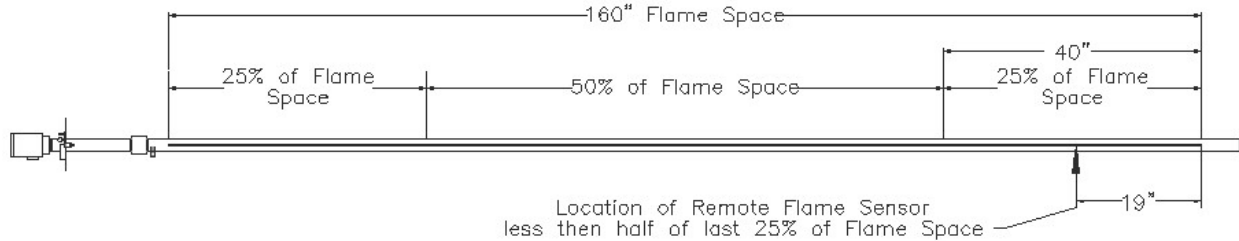
This Baker-Perkins oven is utilized to produce a full line of buns. As a result it requires multiple changes in recipes to accommodate the baking schedule. It also has a longer burner than either the 960 or 970 Baker-Perkins ovens (148" flame space). This longer **ERB-Ensign** burner provided a more robust test for the ***Far Side Sensing***<sup>®</sup> evaluation. The oven was equipped with a **Banner-Day** DSI system providing temperature and burner control.

**Burner Description:**

The ***Far Side Sensing***<sup>®</sup> burners evaluated were as follows:

- 4 New ***ERB-Ensign*** Burners, each with a 160" tri-zone flame space
- 3 Burners with ***Far Side Sensing***<sup>®</sup> flame sensor positioned 6" from the end of the flame space
- 1 Burner with ***Far Side Sensing***<sup>®</sup> flame sensor positioned near the mid-point of the opposite side zone section of the burner..... 19" from the end of the flame space

**Typical burner divided into three zones**



**Burner Locations in Oven:**

Burner locations provided an environment that was typical of this oven and a test environment consistent with standard baking operations.

**Testing Procedure:**

- Burners were automatically cycled 10 minutes on, then 30 seconds off when the main oven control panel called for a test burner to be ignited.
- Alternately, when the main oven control panel had the associated zone enabled, but did not call for the test burners to be ignited, the burners were automatically cycled 30 seconds on, then 10 minutes off.
- When the main oven control panel was not enabled, the burners were not lit.

**Data Collection Triggers:**

Data was collected any time one of the following triggers changed (either from on to off or from off to on).

- Burner On/Off: Command to turn the burner on or off
- Main Panel Zone Switch: Indicating a particular burner zone had been enabled for lighting.
- Main Panel Burner Call: Indicating the main control panel was calling for a specific test burner to be lit.
- Burner Alarm: Control module for a test burner is in the alarm state, indicating that the burner did not light, or failed to remain lit. The test control panel will attempt a relight until the burner fails.
- Burner Failed: Test burner has alarmed three consecutive times, indicating a burner failure.
- Auto Off: Test burner was turned off automatically as part of the cycling routine.
- Auto On: Test burner was turned on automatically as part of the cycling routine.

Test burners were cycled at a higher rate than normal to maximize the quantity and variation of test data while maintaining sensitivity to the baker's normal operation with typical bake conditions by keeping the cycles spread out as widely as possible.

The evaluation was conducted in a typical operating oven without disrupting normal operation. The evaluation was seamless to the bakery. No concerns or complaints were expressed by the bakery during the evaluation.

**Data Collected:**

Data was collected as follows based on triggers referenced above.

- Date and Time of the triggering event
- Status of all the triggers
- Air Header Pressure in the associated burner zone
- Each burner had approximately 20,000 complete on/off cycles.

Data Collection Device:

Data collection was managed, programmed and cycled by using a PLC based data collection system.

**Evaluation Results:**

During the course of testing the burners functioned consistently and reliably.

It was observed with the flame sensor placed at the end of the burner flame space, flame signal decay was experienced below 8" w.c. of air header pressure. Between 8" and 10" w.c. pressure, flame signal strength improved slightly but not to an acceptable level.

Results for the burner with the flame sensor placed 19" from the end of the burner flame space were significantly better and functioned equal to performance experienced with a typical near side sense burner, igniting and sensing reliably down to 4"-5" w.c. air header pressure. However, practical experience and observation suggests operating at 8" w.c. air header pressure and higher is desirable to achieve proper and repeatable lateral heat conditions.

The ***Far Side Sensing***<sup>®</sup> system reliably senses the flame with proper burner lateral heat function when air header pressures were above 8" w.c. This supports the Banner-Day assertion that air pressures below this are unacceptable, as lateral heat function degrades significantly.

**Conclusion:**

- ***Far Side Sensing***<sup>®</sup> works reliably. The optimal results are obtained when the flame sensor is moved toward the near side as allowable by code.
- ***Far Side Sensing***<sup>®</sup> has signaling capability comparable to near side sensing and meets all operational standards.

To learn more about how ***Far Side Sensing***<sup>®</sup> can improve your oven performance, contact:

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