



## Temperature & Pressure Measurement Technology for Flexible Films Packing Lines

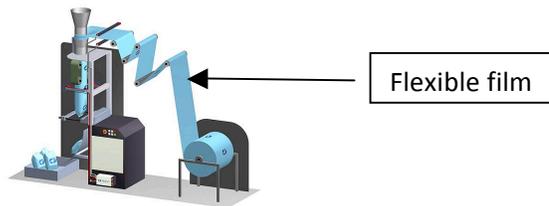
### Non-Confidential

#### Background:

P&G widely uses flexible film packing equipment to form and fill packages. We would like to better understand the quality of thermal sealing process on this equipment.

Since the quality of sealing is mainly driven by temperature, pressure, and time (the latter is easily measured), we are interested in robust, easy to use, cost effective, precise, pressure and temperature measurement technologies for use in flexible packing equipment used in manufacturing plant setting. A typical example of a packing line is shown below:

Vertical Form Fill Seal Equipment:



#### Need Description:

We are seeking any type of technologies that meet the technical requirements below, and can be temporarily integrated to the flexible film (i.e., adhered to film web) or the package line (i.e., placed over the sealing jaws). Examples of such technologies could be a consumable or reusable film with embedded ultra-thin pressure/temperature sensors which can either run as a normal film on the packing line or be attached to the flexible film web or placed over the seal jaws, a measuring device / probe attached to commercial film rolls which in turn is connected to a set of devices that record the pressure and temperature output, etc.

| <u>FEATURE</u>                  | <u>NEED</u>   |
|---------------------------------|---|
| Compatibility with packing line | Zero impact on packing line. Perform measurement without changing the condition. We are aware of “pressure paper” and “IR guns” for measuring pressure and temperature respectively, however they are either incompatible with our packing equipment and/or significant customization is needed for compatibility, and therefore eliminated from consideration. |
| Portability                     | Portable to move from plant to plant. Preferably in a hand carry case.  |
| Adaptability                    | Adaptable to all kinds of different packing equipment configuration currently used in our packing plants and by our film suppliers [e.g., sealing jaw texturing, contact surface (tape, coating, etc), friction, and packing  |

|  |   |
|--|---|
|  | equipment operating in continuous or intermittent modes]  |
| Easy to be attached                                      | Can be attached to film with thickness ranging from 15 micron to 300 micron   |
| Perform the measurement in the sealing processing window | Typical temperature range should be 80 to 200°C, and the pressure range should be 10 to 100 psi, line speed of the film around 2 to 20 meters per minute  |
| Measurement precision                                    | Temperature: + 1°C, pressure: +2psi   |
| Speed of data acquisition                                | Typical sealing duration is 0.1-1 seconds; therefore high speed acquisition is required.  |
| Storage/recording  | A peak temperature and pressure profile across the sealing jaw is needed. If the data could be generated as time dependent (i.e., throughout the sealing cycle time), that would be very helpful, but not required. Wireless data transfer is preferable (to eliminate interference). |
| Mechanical robustness                                    | Withstand the online sealing condition - web tension, pressure, line speed, etc.  |

**If you have any leads on such technologies, or companies/groups who may have such technologies, please contact Ravi Ranatunga, Global Business Development, P&G via (ranatunga.r@pg.com) by June 30, 2012.**

**Please note that only non-confidential information can be accepted for review.**