

D. R. Joseph, Inc.
LF-SIZER™ Frequently Asked Questions

1. What sort of layflat accuracy can I expect?

- A. The system improves long term layflat variation that occurs from the following:
 - i. Air leaking out of the bubble at the nips
 - ii. Air leaking out from small holes in the bubble
 - iii. Thermal air expansion that occurs at startup
 - iv. Ambient air changes that move the frost line up or down
 - v. Process changes that move the frost line up or down
- B. It does not improve layflat stability when unstable conditions occur:
 - i. Air ring not working properly
 - ii. Collapsing frame not set properly so bubble drags or catches on the frames
 - iii. Unstable melt pressure
 - iv. Unsteady nip speed.
- C. The bottom line is that if your bubble could hold +/- .125 inches if it weren't for the items described in item A above, then with the system, you will be able to hold +/- 0.125 inches. Likewise, if your system's best day is only +/- 0.25 inches excluding the item A issues, then your system will get +/- 0.25 inches when fitted with the **LF-SIZER** system from DRJ.

2. Does the system have trending and process control information?

- A. Yes, the system supports several layflat trends for the operator to review. A zoom feature allows X4 magnification of layflat variation. Trend times can go up to 12 hours maximum.
- B. Four trends also have the process tolerance limits displayed so you can see if the process stayed in control.
- C. The system also has a statistics screen that shows target layflat, minimum, maximum, standard deviation, 3 sigma, and a seven class frequency distribution of the layflat. These statistics automatically reset at each job change and also can be reset by the operator for a roll change.

3. Can you use the system if I don't have a sizing cage?

- A. Yes, with four sensors, the system can manage the bubble properly even if you do not have a sizing cage.
- B. The system cannot correct for improper air ring settings or improperly configured collapsing frames. These issues cause bubble instability that no control system can correct.

4. Can the system be integrated into our plant's shop floor data collection system?

- A. Yes, the system has an Ethernet port that allows a very wide range of communication interface possibilities. It communicates natively via Modbus/TCP but with protocol converters it can be connected to nearly

any non-proprietary network. OPC tools are also available that allow interface to the **LF-SIZER** system.

5. How much down time is involved with installing the equipment?

- A. If the sensors can be installed without stopping the line, then no downtime is required. Note if you can't mount the sensors without using a ladder near the bubble, you should stop the line to install the sensors. Typical installation time is less than one (1) hour if sensor supports do not need to be added.
- B. The main panel has a modular power plug that plugs into a standard 110VAC outlet so you don't need an electrician to connect power. Total load is roughly 2 amps.
- C. All wiring is provided with the system and all cables have connectors at both ends so there is no termination work required.
- D. Connect plant compressed air of at least 90 psi to the pneumatic control box and connect the control box to the die.

6. What is the accuracy and range of the ultrasonic sensors?

- A. The **LF-SIZER** system uses two different sensors depending on the range of Layflat required. The standard range sensors can handle a Layflat range (maximum Layflat minus minimum Layflat) of up to 100 inches. The sensing accuracy is 0.01 inches (0.25mm). The long range sensor can handle a layflat range of over 400 inches. The sensing accuracy of the long range sensor is 0.04 inches (1mm).
- B. The sensors also have a built in temperature compensation probe which eliminates the need to have a dedicated sensor to compensate for temperature changes.

7. Does the ultrasonic sensor have any external adjustments that operators can tamper with?

- A. No – there are no adjustments, no programming plugs, nothing that the operator can tamper with.
- B. All sensors are programmed by the **LF-SIZER** unit at power up. Any enhancements that are developed by DRJ are downloaded to the sensor as soon as the **LF-SIZER** system is updated. No operator intervention required.

8. What is the standard operating temperature range the sensors can handle?

- A. Both the standard and long range sensors can handle -20 to 65 degrees C
- B. Sensors have been run in blown film production environments with melt temperatures as high as 700 degrees F (370 Degrees C).

9. How do you get air into and out of the bubble?

- A. The standard configuration provides a 3 speed air flow control box.

- i. For quick startups and size changes, the first speed is a fixed rate high speed flow of roughly 46 SCFM when compressed air flow of at least 90psi is applied.
- ii. For attaining and maintaining the correct size, the second speed is an adjustable rate of 0-46 SCFM. Adjustment is possible both in terms of flow rate and duration.
- iii. Also for attaining and maintaining the correct size, the third speed is for removing air and has a flow rate of 0-13 SCFM. Because the vacuum generator has less flow capacity than the slow speed fill, the system automatically compensates and magnifies the duration for this function.

10. How many sensors are required?

- A. Standard is two sensors. This is adequate if you have a sizing cage holding the bubble and nothing rotates or oscillates.
- B. We recommend using four sensors if anything (die or haul-offs) oscillates or if you do not have a sizing cage.

11. How far above the frost line should the sensors be placed?

- A. Typically the sensors should be placed in a location that is roughly two times higher than the highest frost line you run. Other considerations may come into play if you are running very thick materials or very small bubbles.

12. Once the sensors are mounted, do they every need to be moved?

- A. No. The system uses fixed sensors that do not need to move in and out nor do they need to move up and down (unless you have frost line height changes that vary more than double the average frost line height).

13. How do I calibrate the system so it reads the proper layflat?

- A. When you start the line for the first time, simply measure the web down near the winder and enter that value into the system.
- B. If you have the optional Kundig flat width measuring bar mounted near the winder, then you only have to press the calibrate key on the touch screen.

14. Does the system have built in fault detection?

- A. Yes, the system records and maintains active and historical faults.
- B. The historical faults are maintained indefinitely, even if the power is turned off. This way, you always have a record of what occurred.

15. Does the system have built in maintenance tools?

- A. Yes, all DRJ systems have built in tools that allow maintenance personnel to troubleshoot the system. It has a tool to exercise the outputs, it has a

tool to monitor sensor communication, it also has built in help system for all adjustable parameters.

16. How does DRJ support the LF-SIZER?

- A. The LF-SIZER comes with an optional remote diagnostic modem. We can log in and monitor operations, provide updates, and even tune the system. Phone support is provided at no cost during the warranty period.

17. Is there any preventative maintenance required?

- A. Yes, every 6 weeks, the exhaust muffler (reduces noise levels when exhaust circuit is running) needs to be cleaned
- B. Every 6 months, the air output filter needs to be checked.
- C. Every 5 years the sensors need to be checked for proper operation.

18. Our bubble sucks in when air is put into the bubble too quickly, can the LF-SIZER inflate quickly without sucking in the bubble?

- A. Yes, a special brass nozzle is provided that distributes the air within the bubble without causing the venture effect which sucks the bubble in. This significantly improves startup particularly when using the fast fill option.

19. From how far away can I read the target and actual layflat?

- A. Yes, after 5 minutes of no one touching the touch screen, the system goes into screen saver mode which displays the target and actual in larger numbers so you can read it from 10-15 feet away (depending on your eyesight).
- B. System also has a feature to immediately go into screen saver mode for times when the operator needs to move away from the controls but still see the layflat data.
- C. The screen saver will also flash if the system has a fault making it easy for everyone to see if there is a problem with the system.

20. Does the system have any outputs for alarms?

- A. Yes, there are two outputs built in and several others that are optionally available
- B. Bubble break – DP4T relay to allow you both normally closed or normally open contacts to do things like stop the extruder, sound an audible alarm or visible alarm. Supervisor can set time delays before alarm occurs.
- C. Layflat Deviation – DP4T relay same as bubble break. Operator can set the limits. Supervisor can set time delays before alarm occurs.