Automatic Take Off Field Experiences
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A leading cause of poor teat end health and long milk out times are the automatic take off (ATO) settings. In the past, it was felt the drier a cow could be milked, the better the results. My field experience along with some new research clearly disputes this assumption and demonstrates that the shorter the milk out time, the better the final results.

There is very little information available on how ATO’s work or are adjusted plus there are lots of closed minds to changing standards that are older than time. When evaluating ATO’s, the key is to take enough samples to determine whether the cows are indeed milked out and not to make changes too quickly.

To determine whether cows are milked out properly, you must do strip yields immediately after the unit comes off. Your data will be inconsistent if you wait a few minutes after unit removal. Take a plastic kitchen measuring cup and strip the residual milk into it. Pay attention as to whether the milk is coming out evenly from all four quarters or mainly from one quarter. If the majority of the milk is coming from one quarter, you may want to address other issues such as unit alignment. While doing the strip yields, you can also pay attention to teat end health and how the cows behave while stripping the teats.

If the strip yields are less than 250 ml of milk left in the udder when the unit is removed, the cow is completely milked out and there will be no negative affects on the udder or milk quality/composition. You will be surprised to find many cows with less than 50ml of milk left in the udder at the end of milking. These cows tend to have more teat lesions and are very crabby when doing the strip yields. Your power of observation is very important.

Under normal conditions, the ATO setting are set to factory specifications without any adjustment for the number of milking per day or the milk production of the herd. Many of the ATO factory settings are typically set to have a 15 to 30 second delay time and an end of milk flow rate of 0.4 pounds. These settings are designed to milk the cows extremely dry and will extend machine on times causing discomfort to the cows.

New data from the University of Minnesota project have clearly shown taking the machines off sooner will generate a positive response. In order to make changes in ATO settings, it is very important to remember that the dairy must have excellent milking routines to maximize milk let downs and operate the milking systems with higher vacuum levels to promote faster milking. Changing the ATO settings without having a good milking routine or proper vacuum level will lead to problems. You must look at the total picture and make changes slowly. The following settings are suggested:
End of Milk Delay Flow Setting:  
- For 2X dairy: 0.8 to 1.6 pounds  
- For 3X dairy: 1.2 to 2.2 pounds

**REMEMBER:** Changes should be made slowly at 0.1 pound increments per week. Be sure to monitor the results of each change by doing strip yields. I have found it best to wait 36 hours before evaluating the changes. Some cows take a day to adjust to the new settings. Don’t assume a positive response because each herd is different.

Delay Time to Detachment:  
- For 2X dairy: 1 to 3 seconds  
- For 3X dairy: 1 to 3 seconds

**REMEMBER:** Changes need to be made slowly. I suggest cutting the delay time in half until you reach five seconds, then decrease 1 second per week until reach your final level. Again, be sure to monitor the response of each change by doing strip yields.

It is best not to make any changes yourself, but only make the suggestions on how the ATO’s can be adjusted. I would encourage you to work with their equipment dealer to make sure changes are made properly. I have included a partial list of different ATO’s adjustments to review. I would suggest for detailed information, request specific ATO operators manuals from each company you are interested in. Every dairy farm should have an operator manual for their specific automation used on the farm on file. Unfortunately, most do not! It is best to be conservative, not aggressive when dealing with ATO settings.

Every company has totally different ways to change their take off settings. Some are extremely easy and can be done through a central processor while other types of ATO’s have limitations and can changed very little. Some of the older model and lower cost models of ATO’s work on a resistance system so the only change is to decrease the resistance of each ATO. Unfortunately, this requires a little more guesswork than actual science. This is why it is so important to monitor every change.

**GERMANIA:** Only the delay time for detachment can be adjusted. Some older models need to replace the complete air chamber. Some of the newer models can be adjusted. The end of milk flow setting can not be adjusted.

**AFIKIM:** For the older models, there are two chips available. One chip is a 25/35 second delay chip while the other is a 18/22 second chip. On this system, the time is based on the time since the last meter dump. Each meter dump is 200 ml so you need to do the math to determine the end of milk flow rate. The company now has a “95mm” board that is completely adjustable. New chips can be custom made for the older style dairies.
DELAVAL: SST Systems: There are two adjustments available.
- End of Milk Flow: Pegs can be purchased ranging from 300 - 800 ml
- Delay Time: Lowest setting on new boards is 0 seconds and on older boards, 9 seconds is the lowest setting
- A new flow sensor is available for the SST system which allows for more flexibility in making adjustments.

ALPRO System: This system exists with meters and is computer operated.
- End of Milk Flow: Adjusts to 1 pound
- Delay Time: Adjusts to 1 second
New software is now available that will allow for more changes. The End of Milk Flow settings can be changed so it goes up to 3 pounds.

SURGE: These systems are difficult to set. They use different methods on measuring how wet or dry a cow milks. I recommend making one setting change at a time and monitoring the change. It is best to control ATO function via direct meter function rather than the Omni sensor. If no meters exist, then the Omni is the only adjustment. Most of their systems offer three end of milk flow settings; 0.25, 0.5, 0.75 pounds. The end of milk delays are in 0.5 second levels.

BOUMATIC: With the new meter system, the settings are completely adjustable. The setting are done on seconds and pounds of milk. With old systems or ATO’s without meters, they are adjusted by changing resistance. Changes can be made by 100-200 ohms at 6-7 day intervals. Typically, the resistance is set at 1500 ohms by the factory and many of my dairies are not set at 700 to 800 ohms.

WESTFALIA: They have two values to adjust. New software is now available to allow for more adjustments with their meter system.

81S: This is the time to fill a 6 ounce chamber in the meter. The normal setting is 30 seconds which is approximately 0.7 pounds. Many 2X herds are set at 7-10 seconds, while most 3X herds can be set to 5 seconds. The new software will now allow settings to be lowered to 0 seconds.

82S: Blink time or delay time; Lowest setting on the older systems is 5 seconds. The new software allows the blink time to be set to 0.

UNIVERSAL: Most of the old systems are adjusted via resistance. Changes of 50-100 ohms are possible. Their new systems are adjustable, especially those with meters. There new ATO called ECON is adjusted as follows: Delay time 2-30 seconds. End of milk flow range 1 to 8 dashes. (1 dash wettest, 8 dash driest)

This list is not a complete list and the only sure way to know how to adjust each ATO is to work with the equipment dealer AND refer to the Operators Manual.
The experience I have had on several hundred herds taking the units off sooner have been very rewarding. Cows are calmer in the parlor, the teat ends look better, and the milk quality has improved. Most importantly, the dairy owner is extremely pleased. I am not sure we really know at this time where the upper limit really is. On the extremely well managed dairies, the cows keep adjusting to the new setting and we need to continually fine tune the settings based on our strip yields.

By making the ATO changes, the milking routine changes, and having the right vacuum level in the claw at peak milk flow, the dairy farms are milking more cows in less time, have healthier teat ends, less clinical mastitis and lower SCC. By getting involved in ATO monitoring, you can have a huge economic impact on your farms.