

Using the TadiGuard™ with AMAT Precision5000 and Centura¹

The TadiGuard Process and Equipment Enhancer / Monitor / Analyzer, is a perfect match when installed onto the AMAT Precision-5000 and Centura CVD, PVD and Etching machines.

The Return-On-Investment of the TadiGuard is very fast. Normally, by minor modifications to the equipment based on the TadiGuard analysis, an increase in the performance will pay the TadiGuard back in a few months. Many times, **only one problem solved by the TadiGuard will pay back the entire investment.**

1. The basic use of the TadiGuard is as a permanently installed machine and process watchdog. Immediately after the initial installation the machine is analyzed and improved, thereby increasing its long-term performance, and thereafter the TadiGuard will monitor the machine and the process, and will inform in real-time on any deviation from optimal operation. At the same time, the TadiGuard will save the collected data for historical analysis, statistics and future problem solving.
2. Another use of the TadiGuard is in process and equipment problem solving. The ability to connect the TadiGuard to any available machine signal and to monitor the machine at relatively high rate enables the user to deeply analyze yield and equipment efficiency problems and point to the source of the problem faster than any other system.
3. The TadiGuard can also be used for combined applications, where known machines' deficiencies can be overcome by permanently adding the TadiGuard to the machine. An excellent example is the use of TadiGuard's sophisticated real-time capabilities to improve end-point detection, thereby increasing yield and machine efficiency.

TadiGuard's advantages are also in being totally objective and independent of the machine controller. The TadiGuard collects its information directly from the sensors, either the original machine sensors or by-the-users added-on sensors. As such, it is the perfect user's tool that enables the user to collect and interpret his own data rather than relying on the data collected by the machine controller.

TadiGuard has been able to resolve long-lasting process, yield and machine performance obstacles and problems in many applications and to avoid costly major crashes.

Here under are number of TadiGuard screens, when used with the AMAT P5000 Etcher and CVD. All data shown is from production machines.

Similar data can be shown for competitors' machines such as TEL, LAM Research, Tegal, Mattson², etc. and also for other process machines such as ion implanters, wet benches, etc.

¹ AMAT, Precision5000 and Centura are trade names of Applied Materials Inc.

² TEL, LAM Research, Tegal, Mattson are trade names of their respective owners.

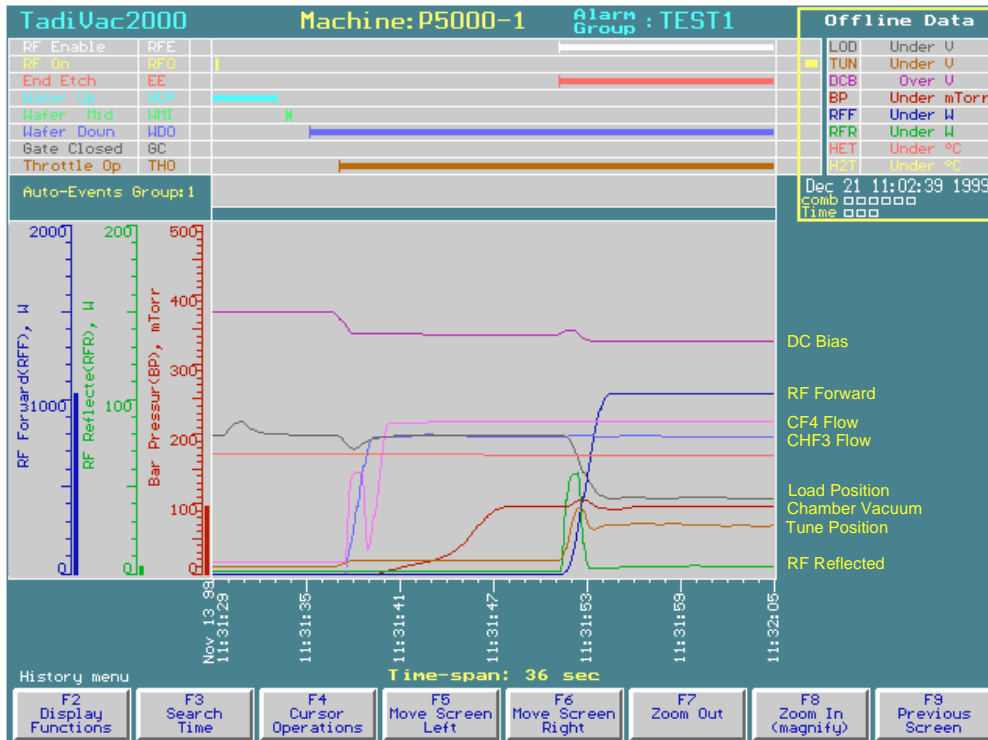


Figure 1 - Typical etch start signature

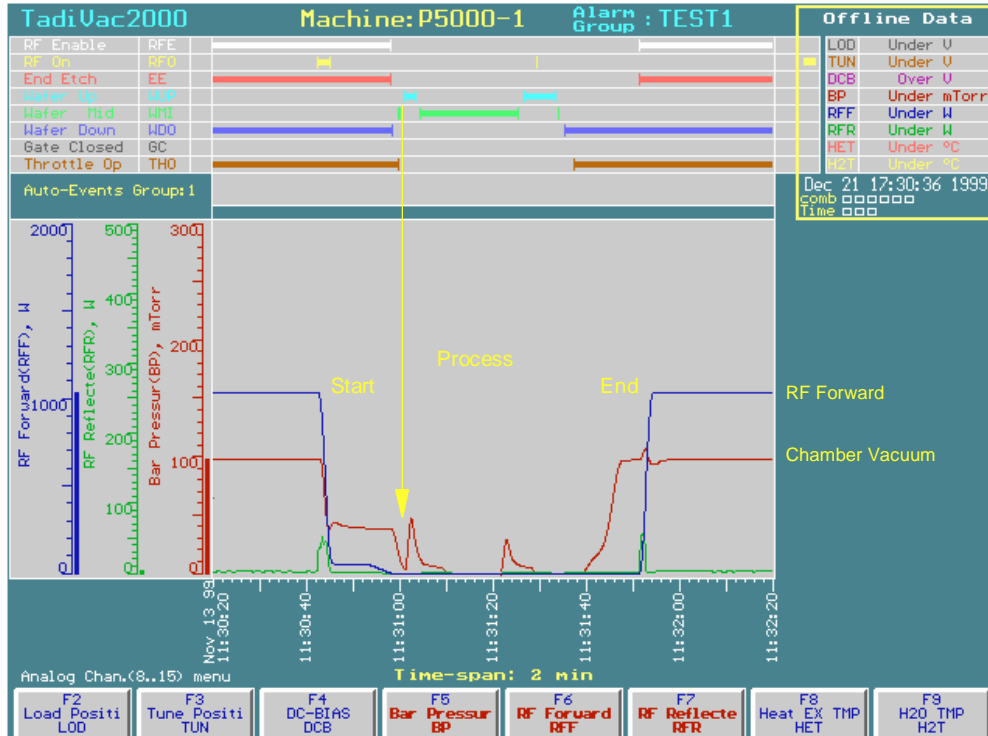


Figure 2 - Process End and Process Start.
 Note influence of pins Up / Down on vacuum. (Leak?)

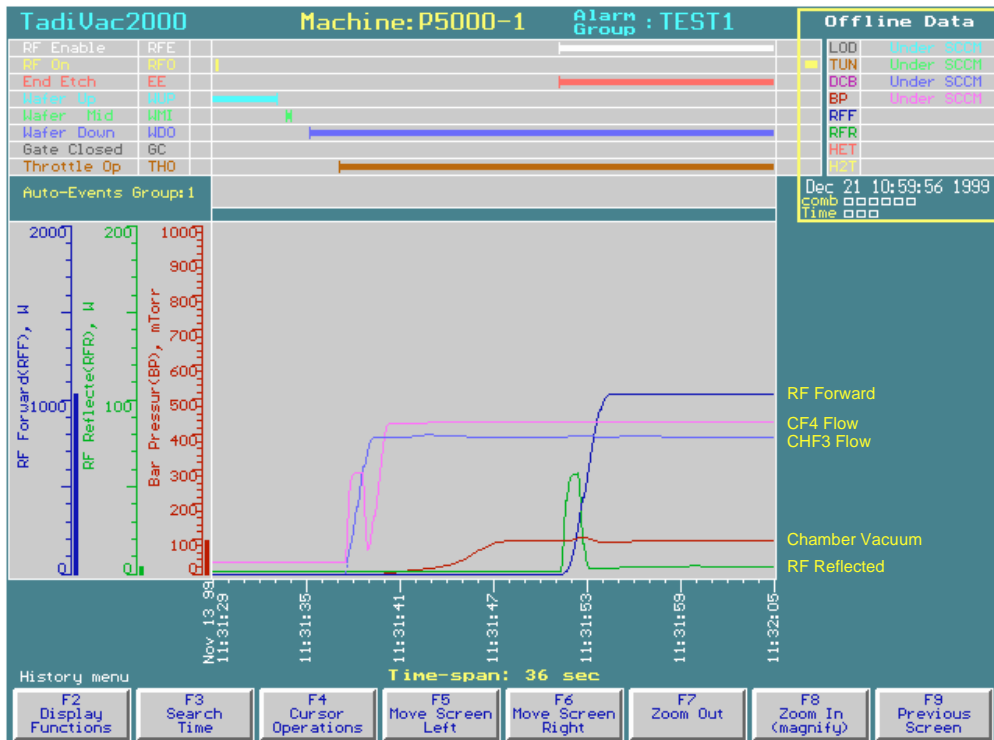


Figure 3 - Process start.
 Note CF4 MFC stabilization as compared to the CHF3 MFC.

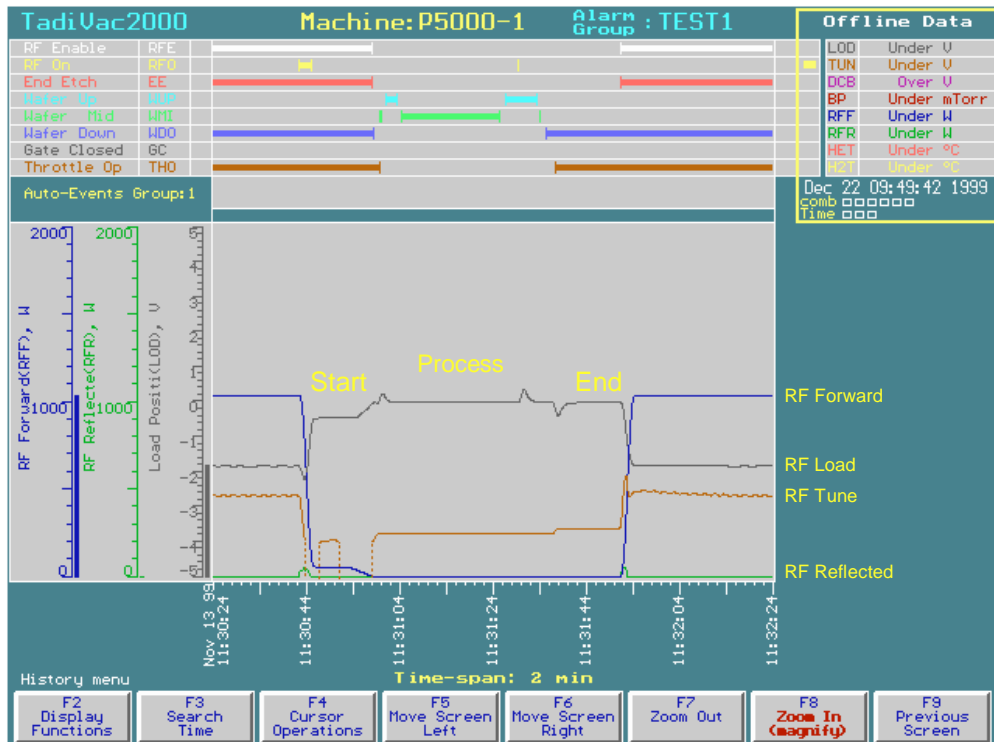


Figure 4 - RF Analysis: Showing RF Forward, RF Reflected, Tune and Load positions.
 In this example, the RF End and Start are in good control.

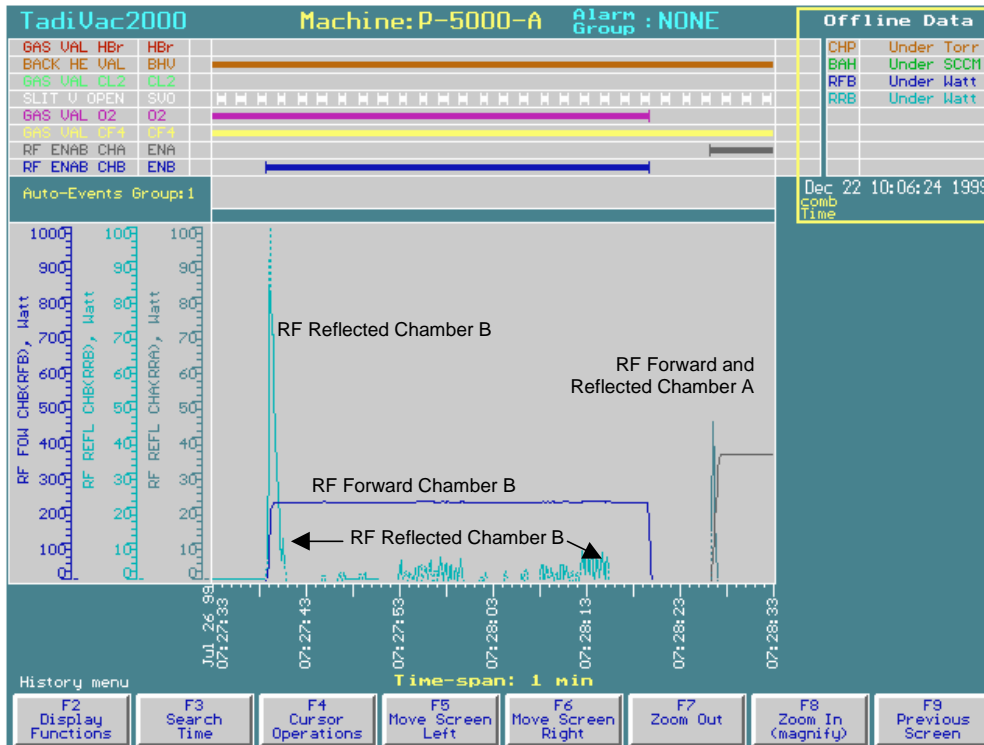


Figure 5 - RF for Chamber A and B.
 Note poor Chamber B Reflected. Indicates arcing (or bad contact).

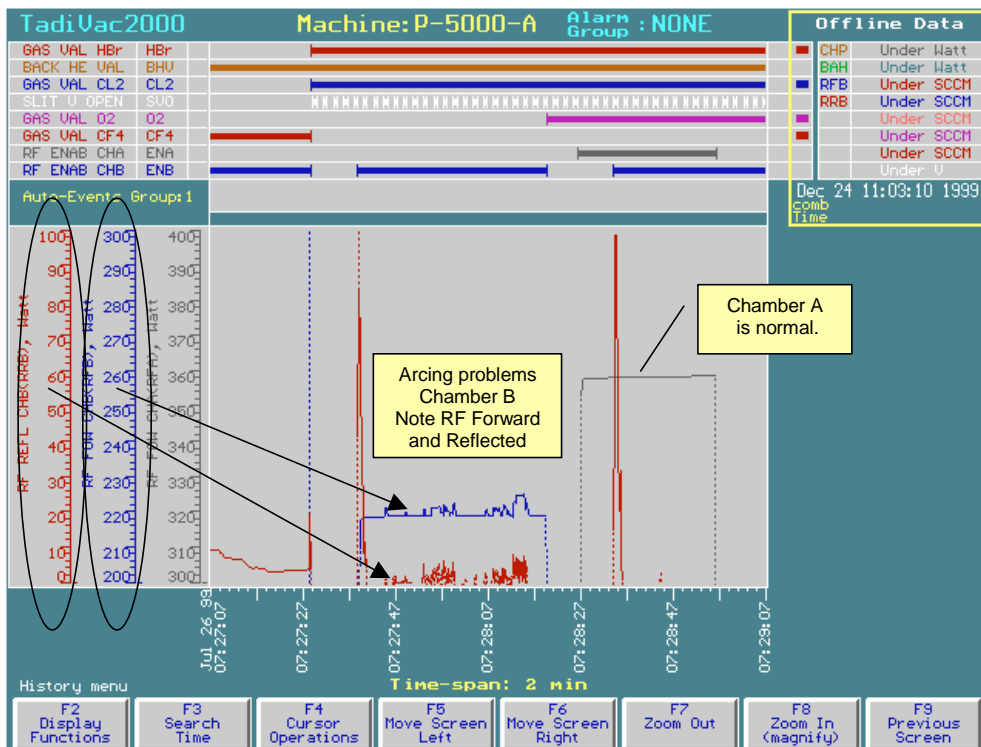


Figure 6 - Poor RF matching and Arcing in Chamber B.

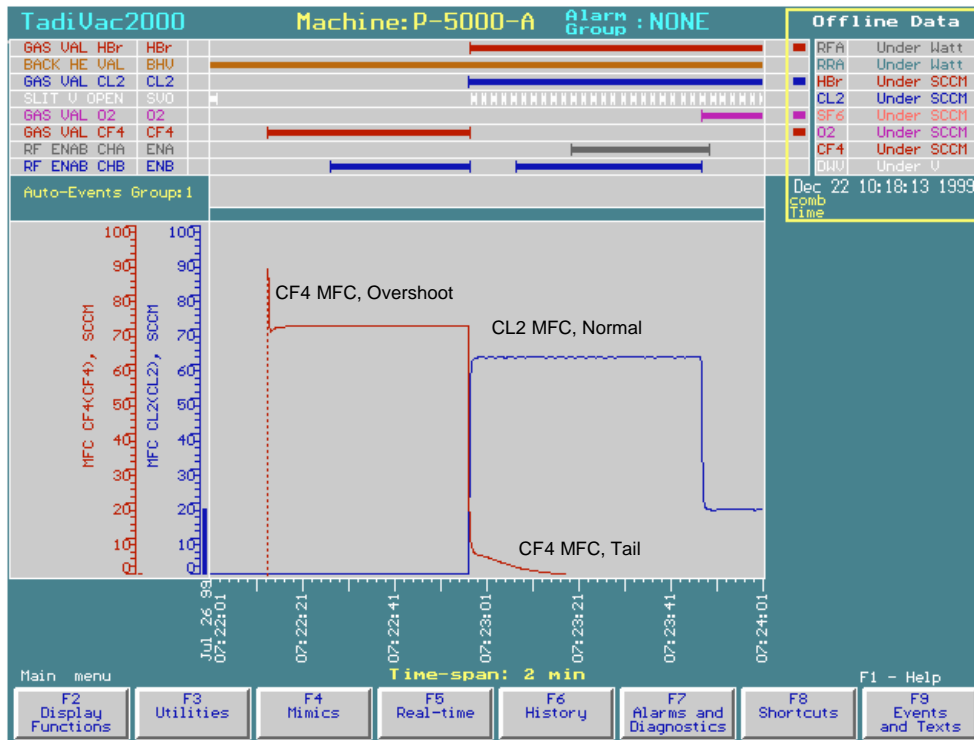


Figure 7 - MFC and gas flow Analysis:
Poor CF4 performance, indicates CF4 Supply Overpressure
Causes CF4 residues in CL2 process step

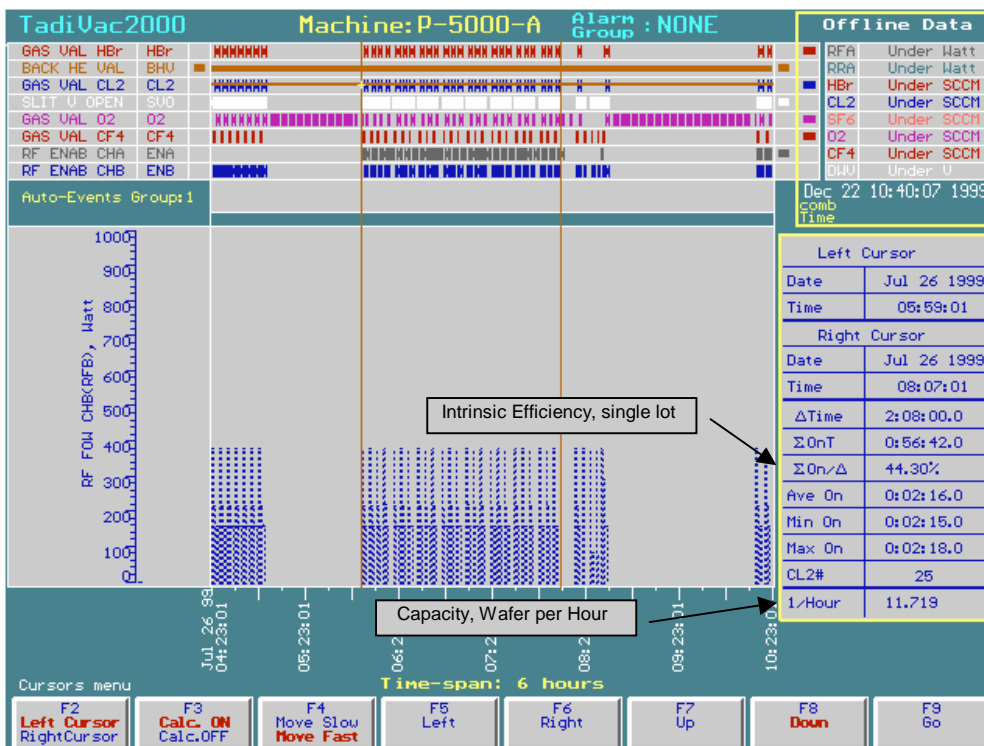


Figure 8 - Machine performance
Measuring Capacity and Intrinsic Efficiency