The RPX-540 from Integrated Surface Technologies (IST) delivers the lowest cost surface modification treatment system in the industry. The system deposits customized nano-composite structures with a hybrid ALD (Atomic Layer Deposition) /CVD (Chemical Vapor Deposition) process. Up to 5 precursors can be sequentially applied to create a variety of specialty films for each specific application. Vapors from heated precursors are precisely controlled and uniquely metered by IST’s Vaporrix injector. Control of the chemistry, temperature, injection timing, precursor stream, and chemical stream overlaps, allow for the creation of advanced nano-composite coatings.

The RPX-540 provides highly repeatable and guaranteed manufacturable processes for production. Positive process control ensures safety and quality during operations. Environmental moisture is removed in the temperature controlled, sub-atmospheric chamber, to eliminate undesirable process effects. The entire process is closed loop and is monitored by a National Instruments Labview Controller. With IST’s unique chemical cartridge design, no productivity is lost due to chemical replacement or conditioning. This allows the user to focus on manufacturing his products and not worry about chemical management or equipment maintenance.

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System Architecture

No Side Access Required
To make all maintenance functions possible from the front or rear of the system, IST placed the major electronics modules on slide-out trays behind doors. The system indicator LED’s can be viewed through the semi-transparent left door, making it simple to correlate software instructions with system functions.

Vaporrix™ Gas Delivery
Consistent vapor delivery requires accurate and consistent control over the thermal environment. IST accomplishes this in its Vaporrix system, by incorporating several key design features:
- Fire/smoke alarm for flammable precursors
- Adjustable flow channel
- Heated and insulated solid block gas lines
- Separate enclosure for flammable precursors
- On/off pneumatic valve
- Carrier gas
- Heated and insulated liquid cartridges
- Fire/smoke alarm

User Friendly Control
The RPX-540 Control Software is based on National Instruments Labview Controller, which puts the critical controls at the fingertips of the users and allows for extreme flexibility in recipe creation and management. The user can set and monitor the temperatures for each precursor in the Vaporrix vapor delivery system as well as for the chamber components. Operators can switch from the Process Mode or from Maintenance Procedures with simple pull-down menus. To help manage operator time, the system indicates the remaining time in each process step in the recipe. Safety alarms are also indicated, and the operator can stop operation from the screen or from the EMO button at the front of the system. Recipes can be managed and customized using a simple spreadsheet. Complete CRF-11 compliant data logs are generated by the controller.

The simplified schematic shows the system’s architecture which is designed not only for centralized control but also for distributed maintenance and operations control. The major modules are: the Chamber, Gas Enclosure A (Cartridge and Lines), Gas Enclosure B (Cartridges and Lines), and the Vacuum system. Each Vaporrix cartridge and line has independent temperature control, as do the top, bottom, and rear chamber walls and the door.