

The LSD-150 Scribe Dicing Machine

from  **LOOMIS**

The New Standard

Loomis Industries' LSD-150 automated scribe dicing machine introduces many new technical features, but more importantly it introduces a new standard in yield, throughput, and cost effectiveness.

The LSD-150 is already achieving industry-leading yields and throughput times in 24/7-production environments.

With minimal up-front investment and maximum throughput and yields, the LSD-150 is not just economically feasible - it's an economic necessity.

Reliable Process

Reduced yield is primarily attributable to worn diamond tools. It is not possible to gauge scribe point effectiveness by monitoring the scribe line - a test break is needed.

The LSD-150 alternates scribing and breaking to periodically monitor tool effectiveness. The integrity of the scribe tool is verified by breaking the scribe line immediately after it is formed. Other scribe dicing machines scribe the entire wafer before breaking and increase the likelihood of undetected tool failure and reduced yield. As much as an entire wafer can be lost by a different machine.

Exceptional Yield

Industry leading yields are being demonstrated in customer facilities. The narrowness of the scribe line and resulting fracture allow streets down to 25µm yielding more dice per wafer.

Scribe Tool Alignment

The LSD-150 holds the diamond tool in a mechanical assembly that has been developed and refined over a quarter century. This tool holder allows precision control over the position and angle of the tool.

A pneumatic actuator and digital pressure regulator precisely control pressure and compliance at the diamond/wafer junction. The combination produces a more reliable and repeatable scribe line than any other available technology.

Loomis polishes all of its diamonds in house with proprietary polishing tools and a unique facet configuration that is designed to compliment the Loomis tool holder.



Machine Precision

Servo-driven air-bearing slides eliminate vibration and waviness in the scribe line. The modularized motor controllers move the channel into position with sub-micron accuracy. Robust vision algorithms and automated backup strategies align the scribes to the streets with no operator intervention.

Controlled Strain Breaking

Breaking is achieved by applying tensile strain lateral to the scribe line. The Loomis LSD-150 uses a formed roller to bend the wafer over a precision ground mandrel. Ridges on the roller apply pressure only to adjoining streets to prevent contact with the active region of the die. The result is a more controlled fracture than is achieved from impulse or other techniques.

Clean and Efficient Die

Scribe dicing is a controlled fracture/cleaving process that cleanly singulates the dice without removing material unlike laser burning that is often associated with damaging debris generation, toxicity and associated cleaning and waste removal costs.

The LSD-150 requires only power and air to produce only clean separated dies. No vacuum or D.I. water is required, and no wastewater or gases are produced.

Ease of Operation

Nobody wants to face complex menus or to follow intricate procedures from the manual. The LSD-150 control program leads the operator through the various steps of setting up and running the machine. One operator can support up to 5 LSD-150 machines.

Key features and design specifications are provided on the next page.

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Specifications

LSD Chassis

Dimensions 28.0" H x 39.0" W x 27.0" D
(71.1, 99.0, 68.6) cm

Weight 147.0 lbs (68.2 kg)

Computer (standard)

Dimensions 16.5" H x 7.5" W x 17.0" D
(41.9, 19.1, 43.2) cm

Weight 30.1 lbs (13.7 kg)

Operating System Windows XP

Monitor (standard)

Dimensions 11.5" H x 13.5" W x 2.5" D
(29.2, 34.3, 6.4) cm

Weight 5.8 lbs (2.6 kg)

Electrical Specifications

Power Requirements 100-240 V, 50/60 Hz

Power Consumption 0.05 hp (35 W)

Pneumatic Specifications

Pressure Requirements 65 psi (455 kPa)

Vacuum Requirements none

Ratings: Inputs and Outputs

Operating Temperature Range Altitude to 2000m, 5-40°C

Max and Min humidity at temp. 80% at 31°C
50% at 40°C

Input voltage variance $\pm 10\%$ of nominal



Key Features

- Motorized Loomis diamond tool-holder with precise down-force and angle control
- Limited-contact roller breaker
- Saw Frame and Ring Pair Compatibility
- Servo-driven, air-bearing X- and Y-axis Control (with 0.5 micron resolution)
- Fully automated alignment and processing
- Wizard based operator assistance
- On-line documentation
- High-resolution digital camera with motorized focusing
- Windows XP based user interface
- Advanced machine vision algorithms for channel and angle alignment
- Modular construction and simplified maintenance
- Password protected access for operator, tech, and recipe editing
- Proprietary "On-The-Fly" alignment to maintain scribe centering without stopping

Substrate Compatibility

- Material: GaAs, Silicon, Sapphire, Glass InP, GaP, Quartz
- Diameter: 2"-6" (50-150mm)
- Thickness: 40 μ m-500 μ m (dependent on material and die size)
- Partial, square, and round wafers

Throughput

- Wafer load: 35 sec
- Angle align: 5 sec
- Channel align: .75 sec
- Wafer processing time depends on application. Call (707) 963-4111 for more information.