will give you the Advantage

Tape × Equipment 2023

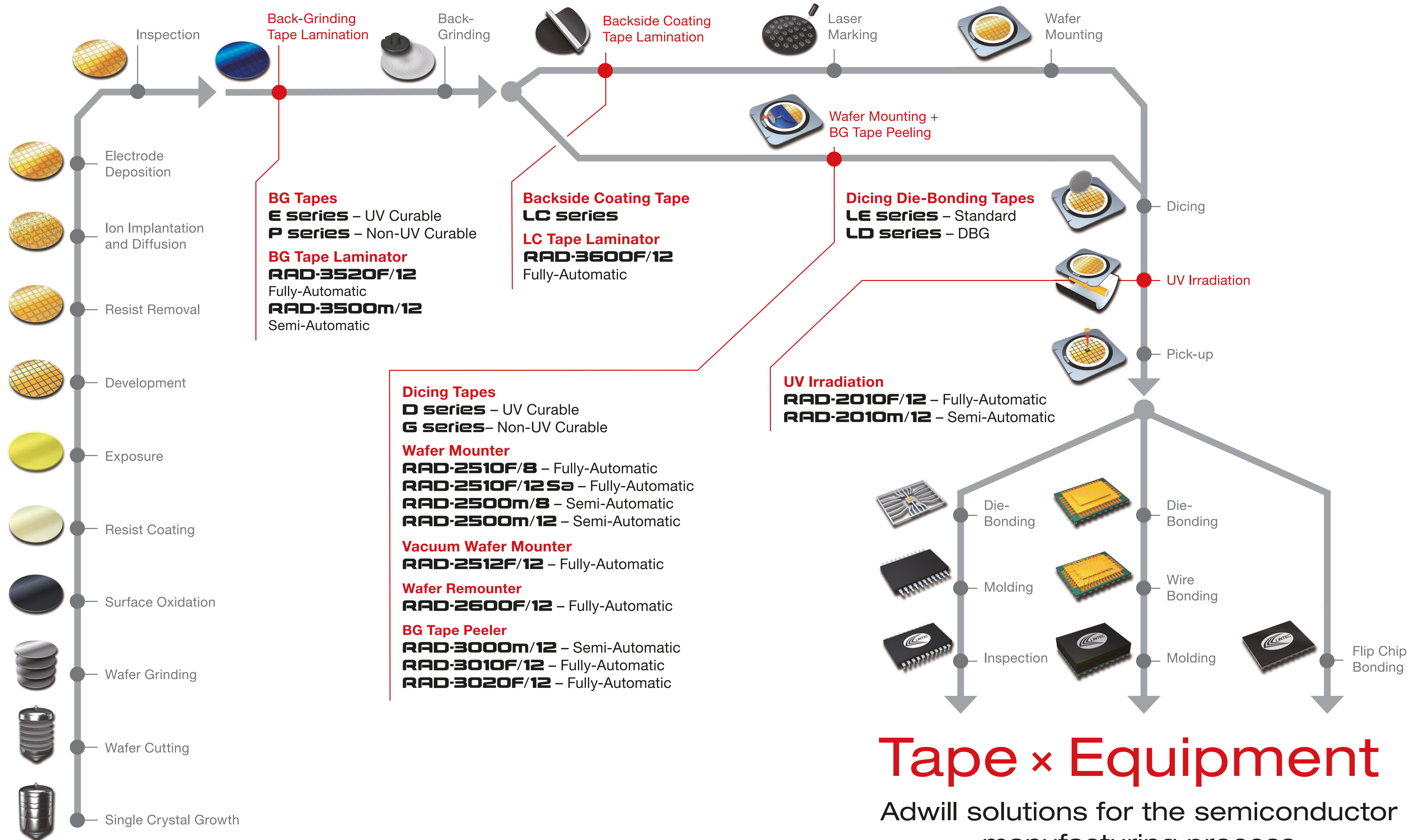
LINTEC Corporation *Linking your dreams*

The unique advantage of using Adwill products is the power to create comprehensive solutions by combining expertise in “**Tape x Equipment**”.

Adwill is LINTEC’s product series for semiconductor-related adhesive tapes and equipment.

The Adwill portfolio includes UV-curable dicing tapes, high performance back-grinding tapes, dicing die-bonding tapes, backside coating tapes and corresponding equipment.

Adwill Tape × Equipment



Tape × Equipment

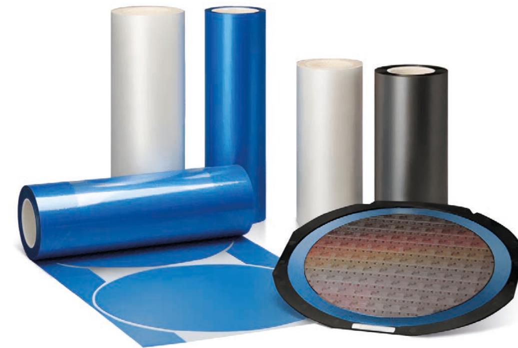
Adwill solutions for the semiconductor manufacturing process

Tapes Adwill series

D series UV Curable Dicing Tape

Adwill D-Series is an epoch-making line of UV curable dicing tapes whose features can be changed in accordance with operational processes. The tape's strong adhesion secures wafers during dicing and is then reduced by UV irradiation to facilitate pick-up. D-Series tape is essential for high quality full-cut wafer dicing and is fully applicable to dies of multiple sizes.

- Secures wafers with strong initial adhesion to ensure dicing without any slipping or peeling – even for small dies
- Supports instant control of adhesion by UV irradiation, allowing even large dies to be picked up easily
- Causes no contamination by metal ions or adhesive residues on the wafer backside surface, as well as no adverse UV irradiation effects on IC chips



Application	Feature	Base Material	Tape Name
Si Wafer	Standard	PVC	D-175D* / D-176D
Compound Semiconductor (SiC, GaN, etc.)		PO	D-489H / D-675(S) / D-686H / D-670(S)
	Antistatic	PVC	D-820
		PO	D-877H / D-850T(S) / D-830J / D-888H
	High Adhesion	PVC	D-171D
		PO	D-611 / D-611H
	RoHs 2 Compliant PVC Basefilm	PVC	D-171D / D-175D* / D-176D
Glass / Ceramics	Standard	PET	D-210N / D-241 / D-218 / D-203 (S)
		PO	D-841
Package Substrate	Standard	PO	D-510T(S)
	Antistatic	PO	D-825W / D-841 / D-847W
Stealth Dicing	Singulation by Expansion	PVC	D-176D
		PO	D-678
	Singulation by Expansion / Through Tape Laser	PVC PO	D-821HSD D-455H / D-458J
Laser Dicing	Full-Cut Laser	Special Elastomer	D-765
Wafer with LC Tape	Standard	PO	D-676(S) / D-676H(S) / D-686H
TAIKO Wafer	Standard	PVC	D-176D / D-171D
		PO	D-485H
Plasma Dicing	Standard	PO	D-485H / D-611 / D-611H / D-686H

G series Non-UV Curable Dicing Tape

The Adwill G-Series includes non-UV curable but easily removable dicing tapes. With this type of tape, adhesive strength remains stable after wafer mounting. Using a film with superb flexibility and expansion characteristics, the tape also has outstanding expandability. It can be used with dies of multiple sizes and is most reasonable in terms of cost-performance.

Application	Feature	Base Material	Tape Name
Si Wafer	Standard	PVC	G-260H
Compound Semiconductor (SiC, GaN, etc.)		PO	G-64 / G-64H
	Full-Cut Laser	Special Elastomer	G-967 / G-965
	RoHS 2 Compliant PVC Basefilm	PVC	G-11D / G-19D
	Antistatic	PO	G-89 / G-83H

E series UV Curable Back-Grinding Tape

The Adwill E-Series of UV curable back-grinding tapes prevents damage on the wafer surface during back-grinding and contamination caused by grinding fluid and/or debris. Adhesion of E-Series back-grinding tapes is substantially decreased by UV irradiation after grinding, allowing easy peeling without stress on the wafer. This feature makes the series suitable for the processing of thin wafers.

Process	Application	Base Material	Tape Name
Back-Grinding	Standard Grinding (wafer thickness after grinding >75μm)	PO	E-6142S(S) / E-6142A(S)
	Ultra Thin Grinding (wafer thickness after grinding >40μm)	Special Elastomer	E-8180HR
	Micro Bump (including ink dot)	PO	E-6142A(S) / E-6152B
	Medium Bump (height <150μm)	PO	E-4230BS
		Special Elastomer	E-8310LS342F
	High Bump (height <200μm)	Special Elastomer	E-9481G-A / E-9486
	Antistatic	PO	E-6130AS
	Compound Semiconductor (SiC, GaN, etc.)	PET Composite	E-3190U
		PO	E-4230BS
		Special Elastomer	E-9486
DBG (Dicing Before Grinding)	Standard		E-3000 series
SDBG (Stealth Dicing Before Grinding)	Flat Structure	PET Composite	E-3100UN
	Medium Bump (height <20μm)	PET Composite	E-3090V / E-3100V / E-3165KL
	High Bump (height <60μm)	PET Composite	E-3190U / E-3281B

Tapes Adwill series

P series — Non-UV Curable Back-Grinding Tape

Adwill P-Series of non-UV curable back-grinding tapes fully protects the wafer surface during grinding and prevents wafer surface contamination from infiltration of grinding fluid and/or debris.

P-Series tapes perform with virtually no residual adhesive after the tape is peeled off, while its highly precise tape thickness accuracy ensures uniform wafer thickness after back–grinding.

Process	Application	Base Material	Tape Name
Back-Grinding	Standard Si Grinding (wafer thickness after grinding >75μm)	PO	P-4130A / P-4140A / P-4205B / P-6130
	Thin Si Grinding (wafer thickness after grinding >40μm)	Special Elastomer	P-7125
	Compound Semiconductor (SiC, GaN, etc.)	PO	P-6130
		Special Elastomer	P-7181

LD Tape — Dicing Die Bonding Tape

LD series is Adwill's dicing die-bonding tape which is best suited for DBG (Dicing Before Grinding) processes. Highly precise separation of the die-attach layer is achieved by full-cut laser dicing and subsequent grinding.

- Easy pick-up for ultra-thin dies
- Suitable for high density and multi-stacked packages

Application	Adhesive Thickness Line-up	Type	Tape Name
DBG (Dicing Before Grinding) and Laser Dicing	7μm	Heat Curing	LD01D-7

LE Tape — Dicing Die Bonding Tape

Adwill LE Tape is a high value-adding tape, combining the functions of dicing tape and die bonding material. Other than die attach paste, it prevents adhesive bleed-out or uneven distribution by transferring the adhesive uniformly onto the backside of the die at pick-up. Adwill LE Tape is particularly suited for die bonding of thick stacked CSPs.

Processing is also simplified since the same tape can be used in the process from dicing to bonding. Three different types of LE Tape are available for the following applications:

- Die-to-die
- Die-to-substrate
- Die-to-die FOW (Film On Wire)

Application	Adhesive Thickness Line-up	Type	Tape Name
Die-to-die	10μm	Heat Curing	LE04-10
	20μm	Heat Curing	LE5000S
	20μm	No Heat Curing	LE4424
Die-to-substrate	20μm	Heat Curing	LE5000S
FOW (Film On Wire)	75μm	Heat Curing	LE4777H

LC Tape — Backside Coating Tape

Adwill LC Tape was developed as an alternative to liquid mold material. Its function is to protect and reinforce the die backside in applications like Flip Chip, in which the die is mounted onto a substrate from the circuit surface. While protecting and reinforcing the die backside, it also blocks light to minimize damage to the circuit surface. Unlike when coating with liquid mold material, this product is available as a tape, ensuring outstanding uniformity in thickness and allowing the simplification of conventional processes.

Featuring both high quality and stability, the tape has passed reliability tests in environments of high temperature and humidity.

LC Tape is suitable for back-side laser-marking and back-side chipping inspection through tape by using IR.

Marking LINTEC's newest development, latest LC Tape versions are also available in pre-cut format.

Application	Thickness Line-up	Type	Tape Name
IR-Shielding, high reliability	25μm, 40μm	Roll	LC88 Series
		Pre-Cut	LC88R Series
IR-Transmissive, high reliability	25μm, 40μm	Roll	LC28x6 Series
		Pre-Cut	LC86R Series
Stealth-Dicing, high reliability	25μm	Roll	LC87-25

Semi-Automatic

RAD-3500m/12

Semi-Automatic BG Tape Laminator

Compactly designed high-performance BG Tape laminator
Our laminator is suitable for small-lot production in the assembly process, as well as for usage in R&D environments. While capable of handling various wafers sizes up to 300 mm, the equipment's compact design also allows effective use of workspace.

Suitable for thin wafers
LINTEC's patented TTC* system enables back-grinding tape to be laminated on the wafer without applying stress. Hence, the laminator is able to process also thin wafers down to 300µm for 200 mm wafers and 400µm for 300 mm wafers.

Easy to operate semi-automatic process
Once the wafer is placed on the lamination table, back-grinding tape is automatically laminated and cut with simple control inputs.

*TTC (Tape Tension Control) System: The TTC is a cutting-edge system, in which a microcomputer controls tape tension. It enables the tape to be laminated according to the tape type and back-end processing conditions. On the fully-automatic type, tape application torque and torque curve can be set and registered with the equipment's touch screen.

Wafer Size	**300 mm, 200 mm, 150 mm**
Equipment Size	**830 mm** (W) x **1,042 mm** (D) x **1,350 mm** (H)

RAD-3000m/12

Semi-Automatic BG Tape Peeler

Compactly designed high-performance BG Tape peeler
Our BG Tape peeler is suitable for small-lot production in the assembly process, as well as for usage in R&D environments. While capable of handling various wafers sizes up to 300 mm, the equipment's compact design also allows effective use of workspace.
The equipment is able to process both bare wafers and wafers mounted to a ring-frame.

Stable removing of BG Tape
Similar to our fully-automatic peeling equipment, the peeling tape is thermocompression-bonded to the back-grinding tape within 3 mm of the wafer's periphery and then peeled from the wafer in an ideal 180-degree angle. This approach minimizes stress to the wafer and also allows processing of thin wafers down to 300µm for 200 mm wafers and 400µm for 300 mm wafers.

Easy to operate semi-automatic process
Once the wafer is set on the peeling table, peeling tape is applied and the back-grinding tape is removed automatically with simple control inputs.

Wafer Size	**300 mm, 200 mm, 150 mm**
Equipment Size	**915 mm** (W) x **1,080 mm** (D) x **1,350 mm** (H)

RAD-2500m series

Semi-Automatic Wafer Mounter

Semi-automatic mounting system for pre-cut tape
LINTEC's semi-automatic dicing tape mounter enables easy operation by the use of pre-cut tapes. By simply placing a wafer and frame on the equipment's table, dicing tape mounting is automatically performed.

Safety-ensured and easy to operate semi-automatic handling
Since our equipment uses no cutting blade, its handling is extremely safe.

Accurate and reliable tape mounting
The equipment's TTC system enables reliable tape mounting through prevention of air voids and application of controlled and individually adjustable tension for downstream back-end processes.

Reduced footprint and high performance
Achieving highest quality mounting results, LINTEC's semi-automatic mounter series accommodates the demand for equipment with reliable performance and reduced footprint.

RAD-2500m/Series can also be used to mount special package-substrates (*special specifications needed).

RAD-2500m/12	Wafer Size	**300 mm, 200 mm, 150 mm**
	Equipment Size	**671 mm** (W) x **950 mm** (D) x **527 mm** (H)
RAD-2500m/8	Wafer Size	**200 mm, 150 mm, 125 mm, 100 mm**
	Equipment Size	**568 mm** (W) x **850 mm** (D) x **527 mm** (H)

RAD-2010m/12

Semi-Automatic UV Irradiation System

High precision irradiation with constant illuminance
LINTEC's semi-automatic UV irradiation system offers highly precise and reliable UV-irradiation through optimized illuminance and UV-light intensity control.

Automatic feedback illuminance-control
A built-in sensor enables feedback-control to achieve and maintain constant and uniform UV-lighting output throughout the lamp's service life. The system therefore is highly suitable to match requirements for small to medium scale production.

Easy operation with just one button
Our equipment's central-loading approach greatly facilitates handling and process-stability, while significantly stepping up operational efficiency.

Quick and uniform irradiation of entire surface
Uniform irradiation of the entire surface is assured through utilization of a nitrogen-filled / oxygen-absent chamber. UV irradiation speed can be set individually and in accordance with requirements of the applied UV-sensitive tape.

Wafer Size	**300 mm, 200 mm, 150 mm**
Equipment Size	**870 mm** (W) x **1,080 mm** (D) x **1,185 mm** (H)

Equipment RAD series

Fully-Automatic

RAD-3520F/12

Fully-Automatic BG Tape Laminator

Unique tape lamination capabilities
LINTEC's latest generation BG Tape laminator is equipped with our patented TTC* system to prevent wafer bow or breakage. Capable of using high-precision tension-control during tape-lamination, the equipment substantially reduces stress to thin wafers after back grinding. Wafer-alignment is performed without contact to the wafer edges, thus reducing the risk of edge cracks.

*TTC (Tape Tension Control) System: The TTC is a cutting-edge system, in which a microcomputer controls tape tension. It enables the tape to be laminated according to the tape type and back-end processing conditions. On any fully-automatic equipment, tape application torque and torque-curve can be set and changed via the equipment's touch screen.

Use of a multi-joint robotic arm
Featuring a multi-joint robotic arm for wafer-handling and tape cutting along 3 axes within the laminator. High-precision cutting profiles can be adjusted to customer processes with accurate control of the cutting angle and can automatically be saved as recipe.

A wide variety of optional functions
RAD-3520F/12 can be equipped with a wide range of optional functions to match specific customer requirements:
- ESD countermeasures
- Various cleaning functions
- Automatic tape-cutter exchange to reduce machine downtime
- High-speed specification for increased throughput

Wafer Size	**300 mm, 200 mm,** 150 mm optional upon request
Equipment Size	**1,245 mm** (W)* x **1,850 mm** (D) x **1,920 mm** (H) *Excluding piping protrusions

RAD-3010F/12

Fully-Automatic BG Tape Peeler

Advanced tape peeling and elimination of damage to wafer circuit surface
The peeling tape is thermocompression-bonded to the back grinding tape within 3 mm of the wafer's periphery and then peeled from the wafer in an ideal 180-degree angle. This greatly reduces the occurrence of residual adhesive, as well as damage to the wafer surface which is usually caused during application of standard peeling-tape. LINTEC's approach also minimizes stress to the wafer and allows processing of thin wafers down to 200µm for 200 mm wafers and 300µm for 300 mm wafers.

Improved cost and peeling-tape usability
Economical use of peeling-tape consumption is guaranteed, as the same amount of peeling tape is used regardless of wafer size. Contrary to the conventional approach to use pressure-sensitive peeling-tape, LINTEC's idea to use thermal-compression for peeling-tape attachment ensures secure bonding with the back grinding tape regardless of presence of Silicon dust on the back grinding tape surface after grinding.

Automatic feedback illuminance-control
A built-in sensor enables feedback-control to achieve and maintain constant and uniform UV-lighting output throughout the lamp's service life. UV irradiation speed and intensity can be set individually, ensuring stable tape peeling in accordance with specific requirements of the applied UV-sensitive tape.

Wafer Size	**300 mm, 200 mm,** 150 mm optional upon request
Equipment Size	**1,380 mm** (W) x **1,790 mm** (D) x **1,788 mm** (H)

RAD-3020F/12

Fully-Automatic Non-Contact BG Tape Peeler

Minimized wafer stress through unique peeling method
A heat-seal peeling-tape is thermocompression-bonded to the back grinding tape within 3 mm of the wafer's periphery then peeled from the wafer in an ideal 180-degree angle. LINTEC's approach minimizes stress to the wafer and allows processing of thin wafers down to 200µm for 200 mm wafers and 300µm for 300 mm wafers, as well as handling of TAIKO wafers with ultra-thin membranes of down to 70µm for 300 mm wafers.

Non-contact back-grinding tape peeling
By using LINTEC's unique non-contact vacuum wafer table, TAIKO wafers are securely held in place during the peeling process on the wafers edge-exclusion area only. Back grinding tape peeling is therefore performed without any contact to the highly sensitive TAIKO wafer backside.

Non-contact wafer handling
LINTEC's non-contact wafer handling method eliminates contamination or damage on the wafer front and backside, usually caused during alignment, UV irradiation or back grinding tape peeling. This approach makes the RAD-3020F/12 highly suitable for any manufacturing process involving TAIKO-wafers, MEMS, wafers with sensitive front and backsides, power devices and TSVs.

Warpage-correction unit
Available as additional option, a warpage-correction unit supports handling of thin and warped wafers.

Wafer Size	**300 mm, 200 mm, or 150 mm**
Equipment Size	**1,440 mm** (W) x **2,105 mm** (D) x **1,800 mm** (H)

NEW MODEL

RAD-2510F/8

Fully-Automatic Wafer Mounter

High-speed operation
RAD-2510F/8 is a fully-automatic wafer mounter with a high processing capacity of 120 wafers/hour, 20% higher than that of its previous model. It is also equipped with an improved heating function that prevents decrease in productivity when the wafer on the attachment table is heated.

Advanced inline pre-cut system
A new and improved inline pre-cut system allows for a shortened tape pitch compared to the conventional method. The tape pitch is reduced from 10 mm to 2 mm, minimizing waste of material and ultimately leading to a decrease in production cost.

Supports warped wafer handling
The non-contact alignment system and transfer arm allows for the handling of warped wafers with up to 5 mm of warpage in 200 mm wafers.

Built-in vision system
The machine can optionally include a built-in vision system, which does not increase the footprint of the equipment.

Wafer Size	**200 mm, 150 mm, 125 mm, 100 mm**
Equipment Size	**1,360 mm** (W) x **1,830 mm** (D) x **1,800 mm** (H)

Equipment RAD series

Fully-Automatic

RAD-2510F/12Sa

Fully-Automatic Multifunction Wafer Mounter

Designed for ultra-thin wafer processing
RAD-2510F/12Sa is a multi-functional all in one tool, ideally suited for ultra-thin wafer manufacturing. All steps starting from UV irradiation after the back grinding process, followed by alignment, mounting on dicing tape, and peeling of back grinding tape are combined into one system.

Minimized wafer-handling contact and increased throughput
With only four consecutive wafer-handling steps inside the equipment, the risk of wafer damage is reduced to the utmost minimum. While unnecessary handling-contact with the wafer is avoided where possible, optimized transfer components enable higher throughput rates of up to 60% compared to other equipment concepts.

Heat-seal/adhesion peeling tape lamination
Depending on the physical properties of the back-grinding tape, the equipment is capable to use both heat-seal or pressure-sensitive tape (optional) for peeling of the back-grinding tape.

Supports DBG process
In addition to regular ring frame mounting with 300 mm / 200 mm wafers and removal of back-grinding tape, RAD-2510F/12Sa is also capable of supporting DBG processes, ideally suited for thin die fabrication.

Wafer Size	**300 mm, 200 mm**
Equipment Size	**2,165 mm** (W) x **3,090 mm** (D) x **1,800 mm** (H)

RAD-2512F/12

Fully-Automatic Vacuum Mounter

Patented non-contact vacuum wafer mounting
By using LINTEC's unique vacuum chamber and wafer holding table, the RAD-2512F/12 series enables wafer mounting to be performed without any contact to sensitive wafer backsides. Our patented vacuum tape mounting process provides for perfect embedding of critical wafer structures, where other standard mounting approaches using pressure-rollers fail.

Non-contact edge-clamp handling concept
By adopting a non-contact edge-clamp handling concept, contamination or wafer damage is eliminated and enables the customer to handle products with highly sensitive structure, e.g. MEMS, TAIKO-wafers and wafers with TSVs.

Wide variety of options for any process requirement
To provide a customized solution for any process requirement, RAD-2512F/12 is available with a wide variety of options:
- Table heating function to guarantee optimized mounting results
- Capability to handle both plastic and steel ring-frames
- In-line pre-cut unit for roll-type dicing tape
- Vision system with wafer-ID reader and barcode-label printing equipment
- Double FOUP-loader and double-unloader for reduced loading-time
- Bernoulli-handling for thin warped wafers

Wafer Size	**300 mm, 200 mm,** 150 mm optional upon request
Equipment Size	**2,203 mm** (W) x **3,092 mm** (D) x **1,800 mm** (H)

RAD-2010F/12

Fully-Automatic UV Irradiation System

High precision irradiation with constant illuminance
LINTEC's fully-automatic UV irradiation system offers highly precise and reliable UV-irradiation through optimized illuminance and UV-light intensity. Despite its compact design, high volume throughput is enabled by use of two handling lines inside the equipment.

Uniform irradiation of entire surface and automatic illuminance-control
Uniform irradiation of the entire surface is assured through utilization of a nitrogen-filled / oxygen-absent chamber. UV irradiation speed can be set individually and in accordance with respect to the applied UV-sensitive tape. A built-in sensor enables feedback-control to achieve and maintain constant and uniform UV-lighting output throughout the lamp's service life.

Smooth and safe operation
Our equipment's central-loading approach greatly facilitates handling and process-stability, while significantly stepping up operational efficiency. A large touch panel improves operability and ensures safety during operations and maintenance. RAD-2010F/12 is capable to realize full factory automation by integrating host communication and inline system functions.

Wafer Size	**300 mm, 200 mm**
Equipment Size	**1,650 mm** (W) x **1,200 mm** (D) x **1,735 mm** (H)

RAD-3600F/12

Fully-Automatic LC Tape Laminator

Special laminator for Adwill LC Tape (Backside Coating Tape)
Adwill LC Tape was developed to protect and reinforce the die backside in applications such as Flip Chip, where dies are mounted onto a substrate from the circuit surface. Unlike uneven liquid mold-material, LC Tape ensures outstanding thickness uniformity. Furthermore, LC Tape helps to prevent wafer chipping during dicing, blocks light to minimize damage to circuit surfaces and is suitable for laser marking on the tape backside.

In order to tap into the full potential of Adwill LC Tape, the unique LC Tape laminator RAD-3600F/12 was developed.

High performance lamination
RAD-3600F/12 is a unique system with specialized features to ideally meet the requirements needed for LC Tape lamination. After non-contact wafer alignment, LINTEC's high-precision handling-process ensures void-free LC Tape lamination. If required, a wafer heating function is available to enhance embedding of critical backside structures.

Wafer Size	**300 mm, 200 mm**
Equipment Size	**1,550 mm** (W) x **1,950 mm** (D) x **1,800 mm** (H)

Equipment RAD series

RAD-2600F/12

Fully-Automatic Wafer Remounter

Fully-automatic wafer remounter
RAD-2600F/12 is a revolutionary new concept developed by LINTEC Corporation. The fully-automatic wafer remounter was developed to safely remount wafers on a ring-frame.

Remounting process
The workpiece (wafer on tape and ring-frame) is loaded to RAD-2600F/12. In the first step, the workpiece is UV irradiated and aligned by use of a high-tech camera system. Afterwards, the workpiece is transferred to the attachment table where the cutting process is performed. Once the cutting of the initially mounted tape is completed, the ring-frame is removed and a new tape is mounted on the wafer. In the last step, the initially mounted tape is peeled off. After wafer-ID reading and bar-code labeling, the remounted workpiece is unloaded to the frame-cassette.

Using this method, even the most fragile material can be safely handled without contact to or damage of critical wafer-structures. In particular, several specific features of RAD-2600F/12 contribute to achieving the most secure wafer processing:

- Tape cutting with a high precision 6-axis robot
- Wafer-remounting on only one table - no transfer between tape cutting- and mounting unit
- Camera alignment function available in several modes (frame only, wafer centering only, wafer centering with V-notch orientation, pattern alignment)
- Mounting accuracy measurement system
- 300 mm and 200 mm frame handling, double-robot without end-effector change
- Supporting wafer thicknesses down to 40µm before or after die singulation (suitable for standard dicing, DBG, SDBG and PDBG)

Wafer Size	300 mm, 200 mm
Equipment Size	3,323 mm (W) x 3,828 mm (D) x 2,227 mm (H)

Adwill

LINTEC
Showroom in Munich

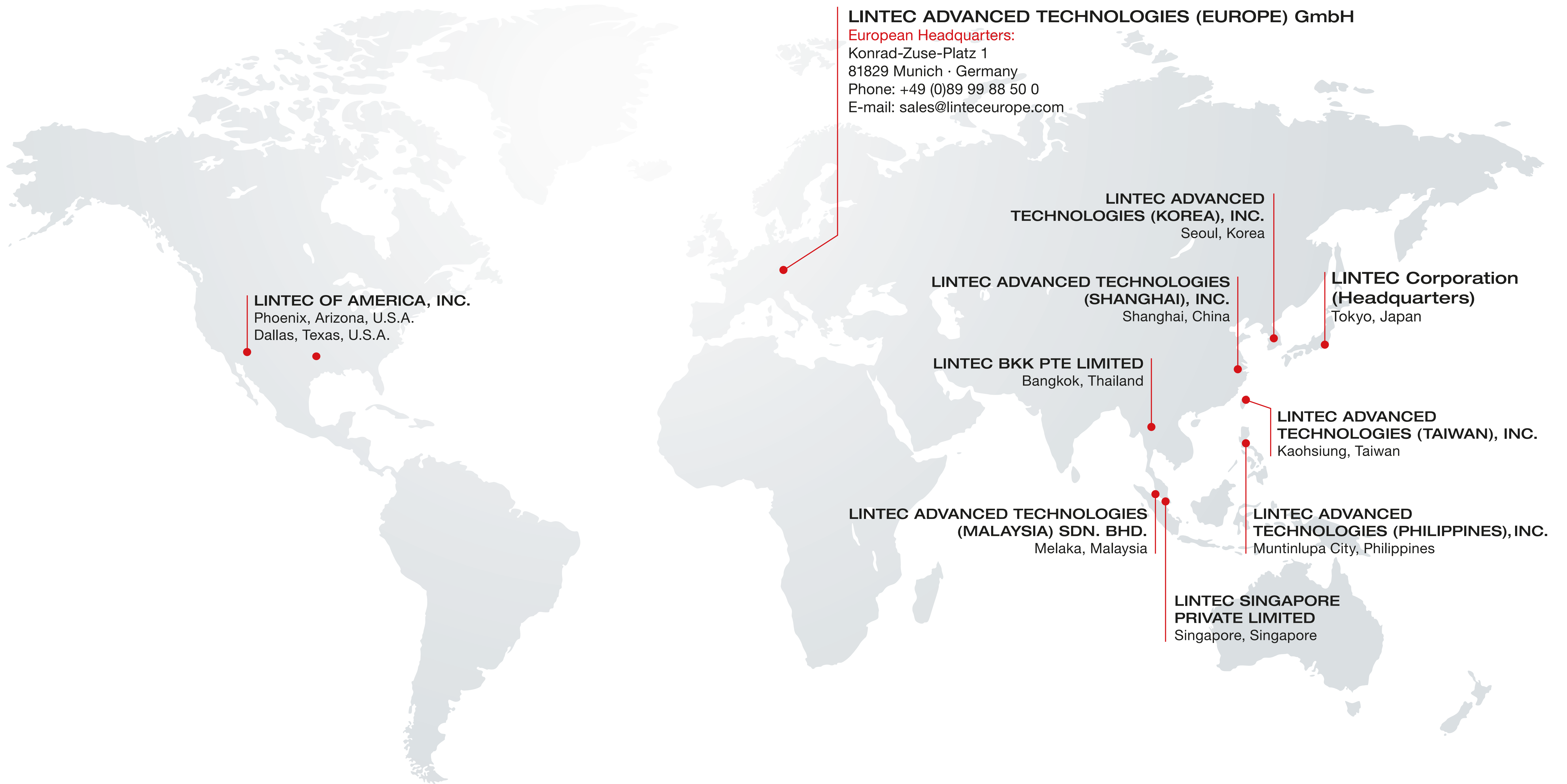
Let our product speak for itself.
A visit to LINTEC's Munich showroom is the best way to get hands-on with our products and to experience, understand and feel the quality of LINTEC tape and equipment.

Visits can be scheduled anytime by phone: +49 (0)89 99 88 50 0
or e-mail: sales@linteceurope.com

Equipment and tape application experts at your service to support customer trials.
A wide range of fully and semi-automatic equipment is available for evaluation and testing:

- Back-Grinding tape lamination
- Back-Grinding tape peeling
- Wafer-mounting on dicing-tape
- UV Irradiation
- Extensive variety of Adwill tape-samples in stock for testing

LINTEC Network – always close to you



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Adwill

Tape × Equipment

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