AP PLASMA

CE

ENERGY GLOBE AWARD

CE Certified

2006/42/EC
2014/35/EU
2014/30/EU

3D Air Buffing Tech

The Most Advanced Shoe Sole Bonding Solution

(Model：ATM3)

3D Air Aurora Machine

Making shoes with air.

V2

Bonding Reinvented

1. A revolutionary breakthrough with air-generated nano ions! This technology creates microscopic roughness on material surfaces, resulting in an astonishing 1000-fold increase in surface area. The outcome? Significantly enhanced bonding quality, all while cutting down on production costs.

2. Extreme lightweight design is now achievable! With non-contact air ion surface roughening, the barriers of traditional contact methods are shattered. This innovation strikes the perfect balance between strength and weight, delivering unmatched product advantages.

3. Safety taken to a whole new level! Air buffing generates no dust, completely eliminating the risk of dust explosions. This provides an unparalleled guarantee for production safety, ensuring both factory reliability and worker protection.

(Model：ATM3)

3D Air Aurora Machine

Making shoes with air.

AIR AURORA®

A.I.

LIGHT
-WEIGHT

INDUSTRIAL
SAFETY

THROUGHPUT
&YIELD RATE

SUSTAIN-
ABILITY

THE TOP CHOICE FOR LIGHTWEIGHT DESIGN AND SAFE PRODUCTION.

LIGHTWEIGHT

1. LIGHTWEIGHT SOLE TREND

As consumers focus more on lightweight comfort, "lightweight design" has become the new trend in shoe design. Sole designs are also shifting towards a "multi-piece" structure.

2. LIGHTWEIGHT SOLE EXAMPLES

3D Air Buffing easily handles "multi-piece outsoles" with a "non-contact" process. Unlike traditional mechanical buffing, it ensures uniform results without relying on worker skills.

3. APPLICABLE SOLE TYPES

3D air buffing is suitable for various soles, including but not limited to the following styles.

High sidewall

High toe cap & heel

Deep trench

4. APPLICABLE SOLE MATERIALS

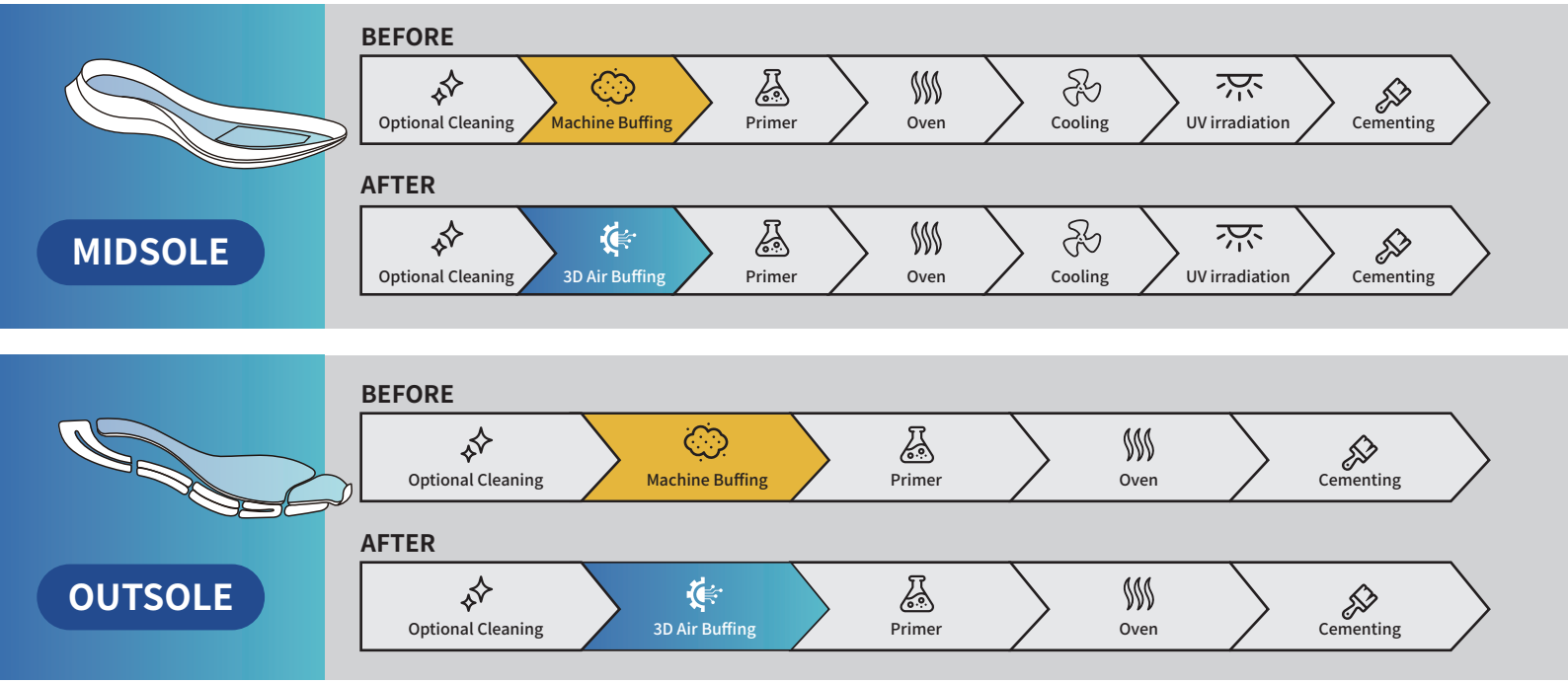
Rubber | TPU | PU | EVA | Nylon

INDUSTRIAL SAFETY

1. NO RISK OF DUST EXPLOSION

3D Air Buffing is a "dust-free" buffing technology, unlike mechanical buffing which produces a lot of dust and poses explosion risks.

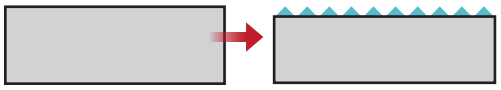
2. NEW DUST-FREE PROCESS



3. VERSATILE APPLICATION

3D Air Buffing is flexible—it can replace traditional buffing or enhance adhesion on specific areas, such as the outer edge, after mechanical buffing.

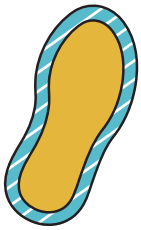
(1) FULLY REPLACE



raw material

3D Air Buffing (Fine)

(2) ENHANCE PERIMETER



raw material

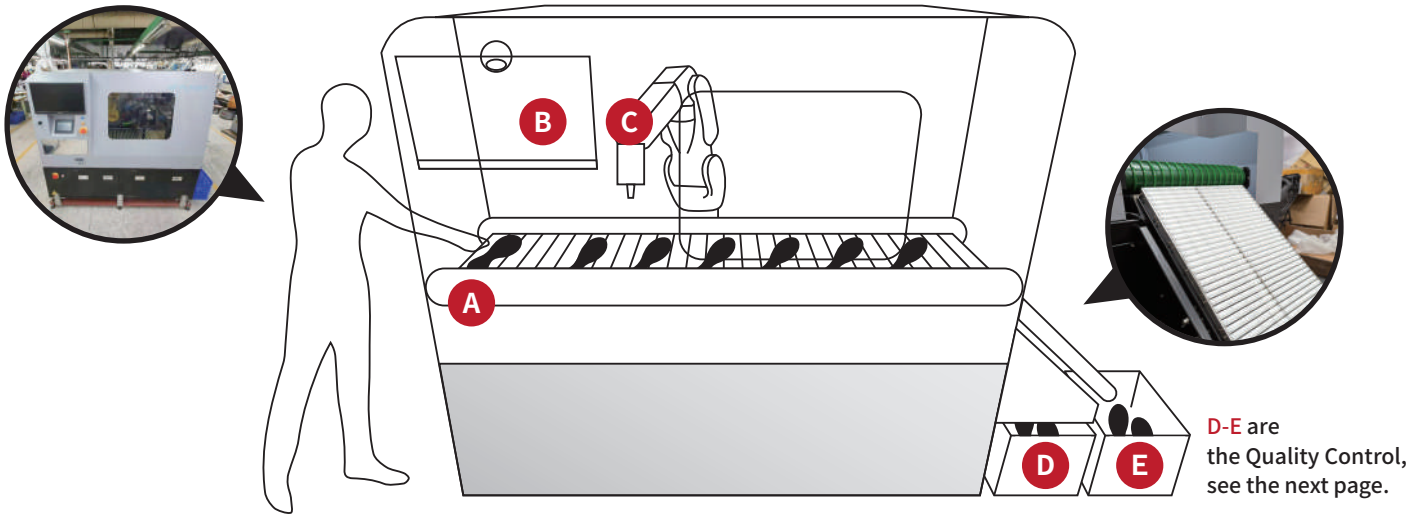
Mechanical Buffing (Rough)

3D Air Buffing (Fine)

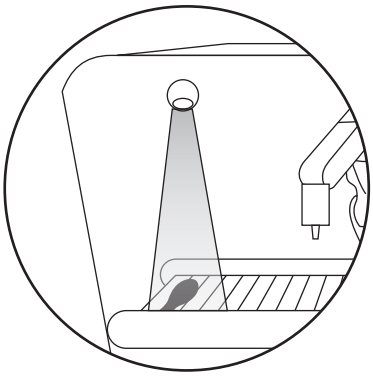
THROUGHPUT&YIELD RATE

1. SMART AND FAST

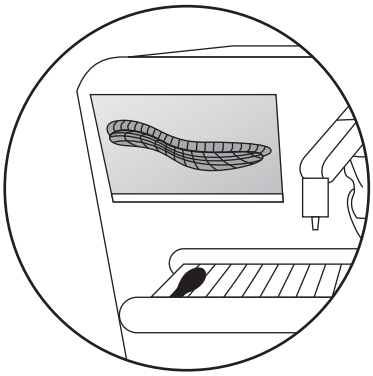
3D Air Buffing combines AI with an automated system to quickly process shoe soles, overcoming the challenges of soft, variable, and hard-to-standardize materials.



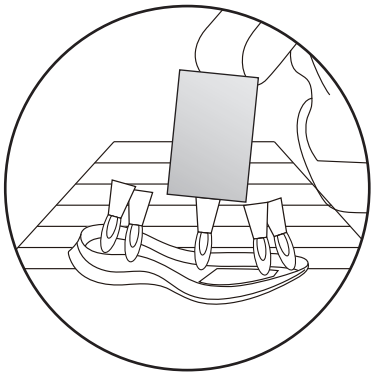
D-E are the Quality Control, see the next page.



A 3D CAMERA SENSING MATERIALS



B REAL-TIME CALCULATION OF PATH BY A.I.



C OPTIMIZED 3D BUFFING PATH

Time	Conventional Process	3D Air Buffing
One minute	1 piece	6 pieces (3 pairs)
One hour	60 pieces (30 pairs)	360 pieces (180 pairs)
One day (8 hours)	480 pieces (240 pairs)	2,880 pieces (1,440 pairs)
One month (25 days)	12,000 pieces (6,000 pairs)	72,000 pieces (36,000 pairs)
One year	144,000 pieces (72,000 pairs)	864,000 pieces (432,000 pairs)

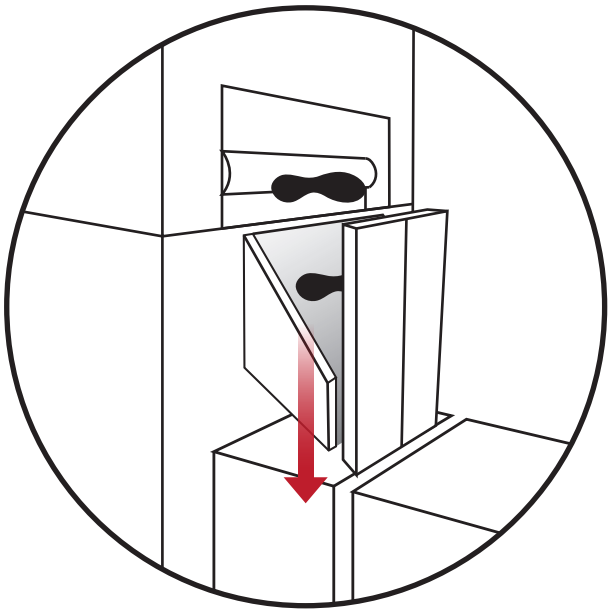
THROUGHPUT&YIELD RATE

2. ARE THERE ANY DEFECTIVE PRODUCTS?

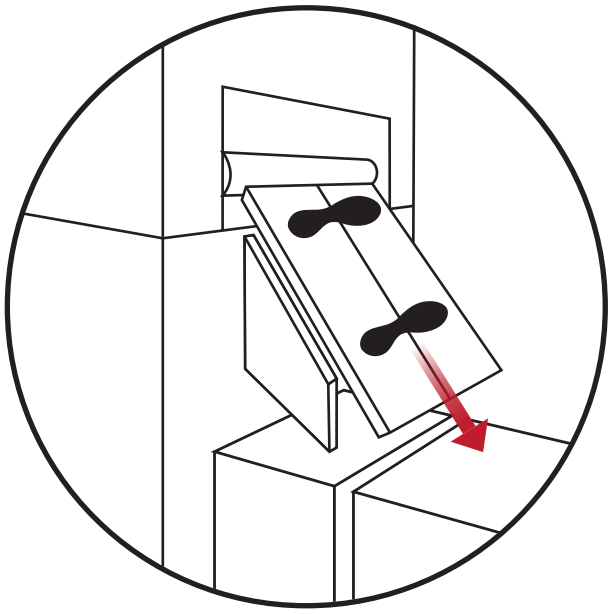
Common causes of non-conforming products are not related to 3D Air Buffing itself; they usually result from workers misplacing materials out of the visual recognition range.

3. HOW DO WE REMOVE THEM?

The 3D Air Buffing "Automatic QC System" removes non-conforming products. With high shoe production volumes, quality is crucial to prevent brand damage and consumer injuries.



D NON-CONFORMING PRODUCTS REJECTED



E QUALIFIED PRODUCTS GET PASS

4. HOW DO WE REPROCESS THEM?

The method for handling non-conforming products is very simple: just use water to restore the material surface (e.g., by spraying water), then perform 3D Air Buffing again. This process ensures no material is wasted.

SUSTAINABILITY

1. SUSTAINABILITY BENEFITS

2. SUSTAINABILITY COMPARISON TABLE

3D Air Buffing is about 6 times more productive than mechanical buffing, reducing equipment needs, saving energy, and cutting carbon emissions.

Benefits	Conventional Process	3D Air Buffing
1. Reduce pollution	Excessive dust	Dust Free
2. Save electricity (values for reference)	6KW*6=36KW	5KW*1=5KW
	Power saving: 36KW-5KW=31KW	
	31KW/36KW=Save 86.1% on electricity	
3. Save carbon (values for reference)	31KW*8hrs*25days*12months= Save 74,400 kWh/year	
	74,400 kWh * 0.494 kg CO2e/kWh = 36,754 kg CO2e	
	36,754 kg CO2e = 36.7 metric tons of CO2e saved per year	
Remarks	0.494 is the carbon emission factor for electricity in Taiwan(2023).	

BENEFIT SUMMARY

1. MEET YOUR NEEDS

3D Air Buffing offers multiple benefits, helping you comprehensively enhance business and brand competitiveness!

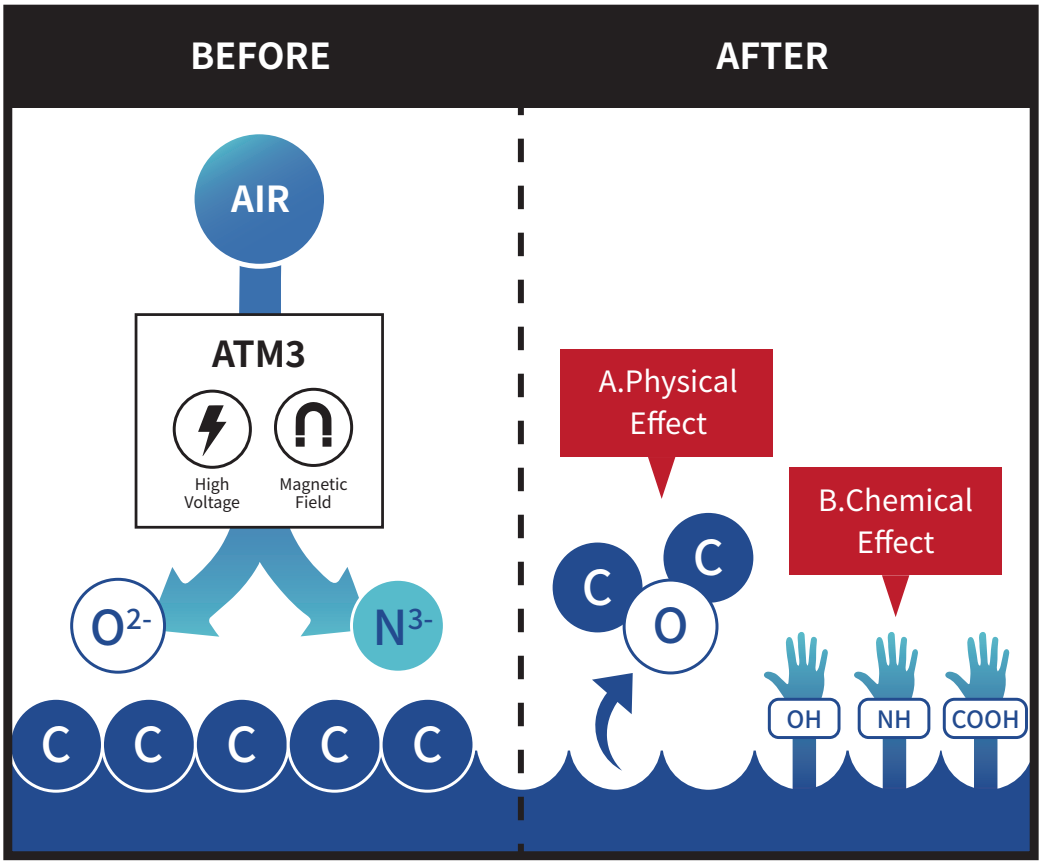
Benefits	Items	Conventional Process	3D Air Buffing
LIGHTWEIGHT	multi-piece soles	difficult to handle	easily handle
INDUSTRIAL SAFETY	dust explosion risk	risky	risk-free
THROUGHPUT & YIELD RATE	Increase efficiency by 6 times	~1 piece/60 seconds	~1 piece/10 seconds
	Increase per capita productivity	At least 6 people	One person
	Increase the yield rate to 100%	It depends on the situation	100%
	Improve processing uniformity	It depends on the situation	100%
SUSTAINABILITY	Reduce dust	Excessive dust	Dust Free
	Save 86.1% on electricity*	6KW*6=36KW	5KW*1=5KW
	Save 86.1% on carbon		Save 36.8 mt of CO2e saved per year*

*Remarks 1: 36KW-5KW=31KW · 31KW/36KW=86.1%
*Remarks 2:
31KW*8hrs*25days*12months=Save 74,400 kWh/year
74,400 kWh * 0.494 kg CO2e/kWh=36,754 kg CO2e=36.7 metric tons of CO2e saved per year

PRINCIPLE

1. WHAT IS AIR AURORA?

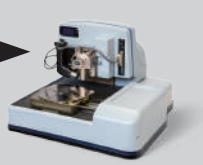
"Aurora" is a high-energy plasma state influenced by magnetic fields. When air's nitrogen and oxygen atoms enter this state, they effectively modify surface properties to enhance adhesion.

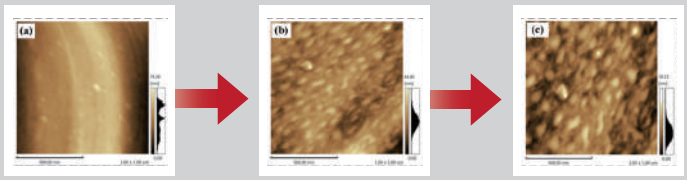


A. PHYSICAL EFFECT - NANO-LEVEL ROUGHNESS

Oxygen ions remove carbon, creating nanoscale pits without dust, increasing bonding area and adhesion.

Visible only under an AFM

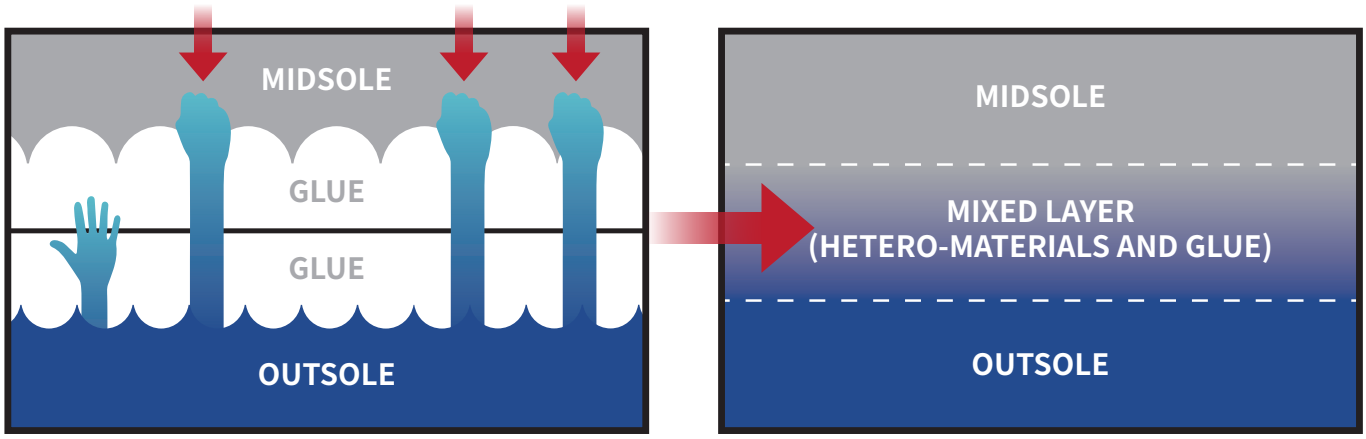




Untreated | Treated for 10 Seconds | Treated for 60 Seconds

B. CHEMICAL EFFECT - ENHANCE REACTIVITY

Nitrogen and oxygen ions form a reactive layer of functional groups, enhancing adhesion significantly.



(1) STRONG ADHESION

During bonding, reactive groups and glue graft with the material, forming covalent bonds.

(2) MATERIAL FUSION

Two materials fully fuse, becoming inseparable; pulling apart causes material breakage.

The material breakage photos are in p.13.
More test reports, please visit website.

2. BUFFING PURPOSE

Before bonding, shoe soles need a "Buffing" pre-treatment to remove oils, mold release agents, and increase bonding area. Mechanical buffing struggles with complex shapes and causes pollution, making Air Aurora a better alternative.

3. AIR AURORA LEADS

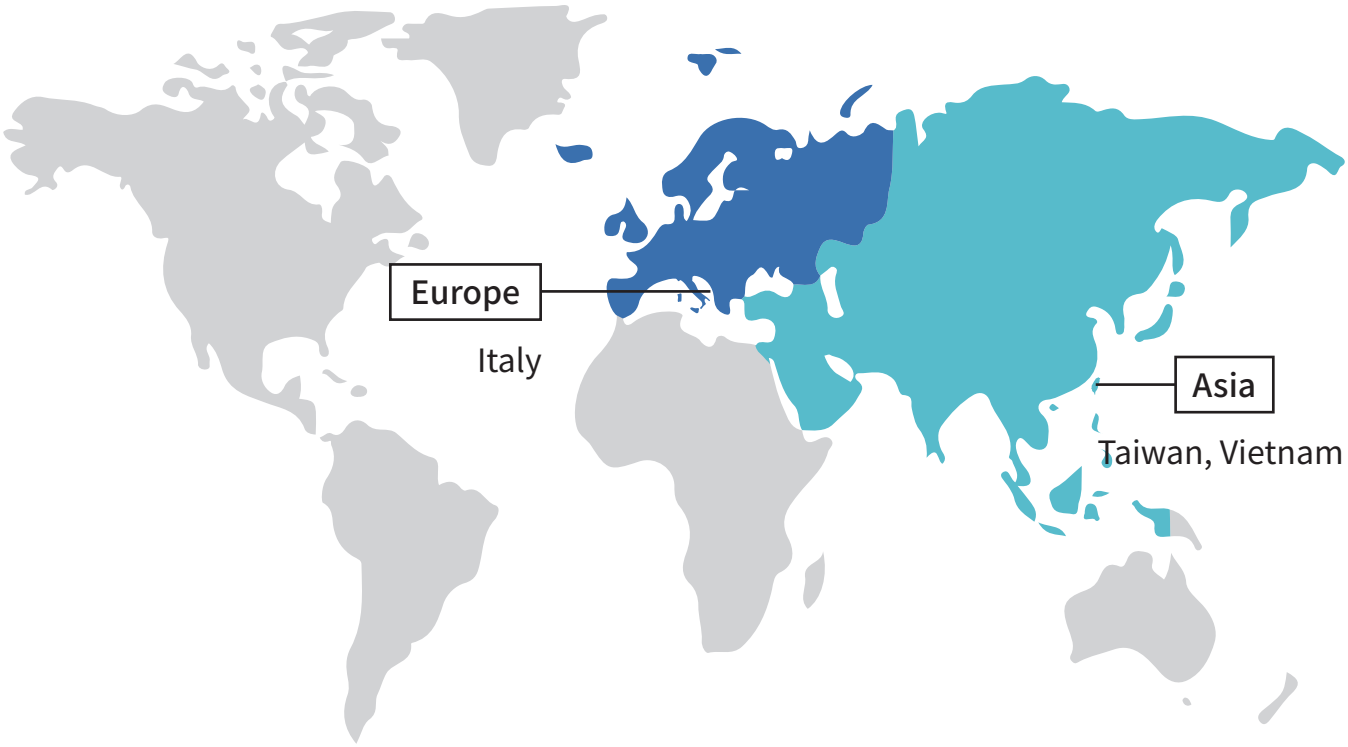
AIR AURORA is a plasma technology by AP PLASMA Corp. With a magnetic field added, it offers higher uniformity and stability, making it the only tech currently suitable for shoe sole bonding.

Name	Air Aurora	Plasma	Corona
Image			
concentration	High Win	Middle	Low
Uniformity	High Win	Middle	Low
Stability	High Win	Middle	Low

APPLICATION RESULTS

1. DEPLOYING INTERNATIONALLY

Deployments are mainly in East and Southeast Asia, with Vietnam as the primary market. In Europe, sales and service begin in Italy through our distributor, Design&Develop.



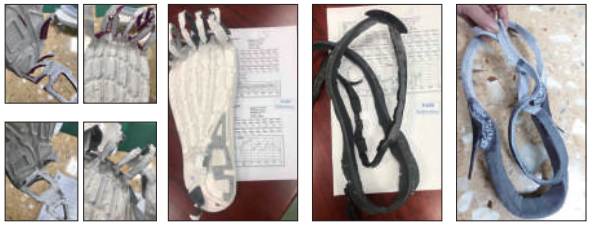
2. OUR CUSTOMERS

Representative customers: Fulgent Sun(Taiwan), Frasson(Italy), Feng Tay(Taiwan), Oriental Sports Industrial Vietnam, NAN YA Plastics(Taiwan)…Etc.◦

3. DEPLOYED TO MASS PRODUCTION

The 3D Air Aurora Machine was successfully deployed to the top three global shoe manufacturers in 2019 and is now in production. We have served over 30 international shoe brands.

3D Air Aurora Machine Operation Status (Mass Production Line)



More test reports, please visit our website.

(Model:ATM3)

3D Air Aurora Machine

CE Certified

Certificate Numbers: AVM1806CNF0621, AVM1810CNF0621
Standards: Conforms to directives 2006/42/EC, 2014/35/EU, 2014/30/EU
Certification Body: Vericert S.R.L.

Basic Information	Model	ATM3
	Dimension	1,900 mm*1,390 mm*2,260 mm
	Gross Weight	1,000 KG
	Capacity	~360 Pieces/hr
Equipped Specifications	Electricity	220V, 380V, 400V, and 415V are compatible. 3 phase, 50/60 Hz
	Power	5KW
	Compressed Air	40 SLM/CDA, 6 Bar (0.6MPa, 6.1Kgf/cm2)
	Aurora Beam	30 mm
	Aurora Nozzle	Standard is 30mm, 2mm-50mm options available
	LCD Dimension	22 inch /7 inch
	Computer (PC)	Industrial PC
	Robotic Arm	6 Axes with max. 7Kg Load
	Sensors & Monitors	3D Camera
Applicable Material Specifications	Suitable materials	RB、TPU、EVA、PU...Etc.
	Available dimension	400mm*200mm*50mm
	Infeed height limitation	Max. 64 mm
	high sidewall limitation.	15mm / 60°

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