



ANTIBACTERIAL ADDITIVE & MASTERBATCH FOR PLASTICS

About Us

N9 World Technology

is an innovative technology provider offering cutting-edge hygiene and wellness solutions using technologies that are safe and sustainable. N9 World Technology is a subsidiary of Resil chemicals.

Manufacturing Facility at Bangalore, India: Certified for ISO 9001, ISO 14001, ISO 18001, SA8000 standards.

Recognised by Department of Science and Industrial research (DSIR), Government of India.



Awards and achievements



National Innovation Award given to Resil by Nobel Laureate, Prof Sir Andre Geim - 2013



Resil featured in BBC Horizons - 2014



CII- IPR Award 2015



National Technology Award - 2016

Technology funded by DST- Nano Mission Government of INDIA

BACKGROUND :

ARCI Hyderabad and IIT Delhi jointly with RESIL CHEMICALS and funded by the DST NANO MISSION research programme developed and marketed novel Silver based antimicrobials for use in the textile industry as a functional technology.



Technology is patented by the **Indian Institute of Technology-Delhi** and **ARCI, Hyderabad jointly with RESIL.**



Most dominant bacteria found in the study

The most dominant bacterial genera that were present at all sampled sites were

- ***Staphylococcus***
- ***Propionibacterium***



Staphylococcus aureus

Because ***staphylococci*** can colonize commonly touched inanimate objects, it is feasible that plastic surfaces could serve as reservoirs for pathogenic staphylococci and may play an important role in human colonization and infection.



Propionibacterium

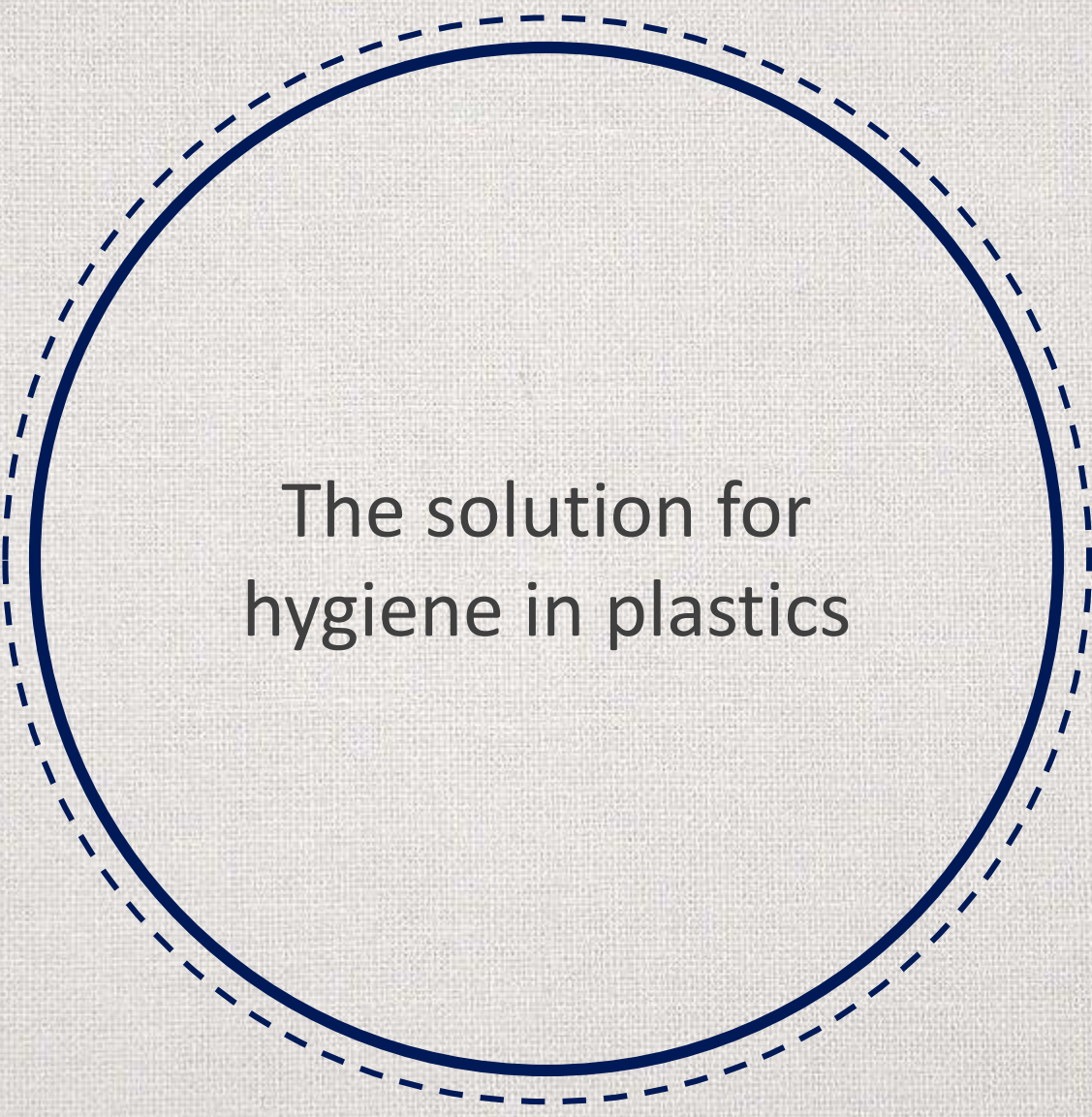
Propionibacteria have been implicated in acne and other skin conditions

Silver Technology : a safe and trusted antimicrobial solution

Silver has been extensively used across time, civilizations and geographies to promote healing and purification.



ANTI-MICROBIAL
SILVER

A large circular graphic consisting of a solid dark blue inner circle and a dashed dark blue outer circle, framing the central text.

The solution for
hygiene in plastics

is found to perform across various *health sensitive applications*



Water storage



Packaging for cosmetics and pharmaceuticals



PVC Vinyl



Healthcare



Food Packaging



Cutting Boards



Pharma & Cosmetics Packaging

N9 Plastix - All Segments



Mobile Panels

Toothbrushes



Automotive



Urinal Screen



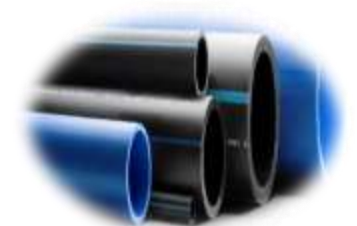
Toilet Seat Cover



Overhead Tanks



Sanitaryware



Water Pipes

What is ?



PREVENTIVE HYGIENE TECHNOLOGY

Silver-based technology that provides exceptional antimicrobial protection for plastics.

- ✓ Superior antimicrobial efficacy
- ✓ Controls bacterial growth effectively
- ✓ Non migrating
- ✓ Safe for food contact
- ✓ Easy to apply
- ✓ Environmentally friendly technology

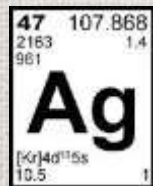


ANTIMICROBIAL
SILVER



Make a difference with N9 Plastix

- Low silver loading on plastics
- Bound to plastics through silicone silica matrix
- Non hazardous substances
- Slow and low silver ion emission
- Exceptionally safe
- Silver is In-Organic and it does not decompose and release any harmful chemical during processing and use of plastics to the environment
- Non migration of silver from plastic, hence Safe for the environment



Pure Silver



Safe

N9 Plastix



- Safe on skin and the environment:
 - Silver based technology
 - Non-leaching and non-migrating
 - Low silver loading



- Durable:
 - High performance
 - Long lasting activity
 - Effective against a broad spectrum of bacteria



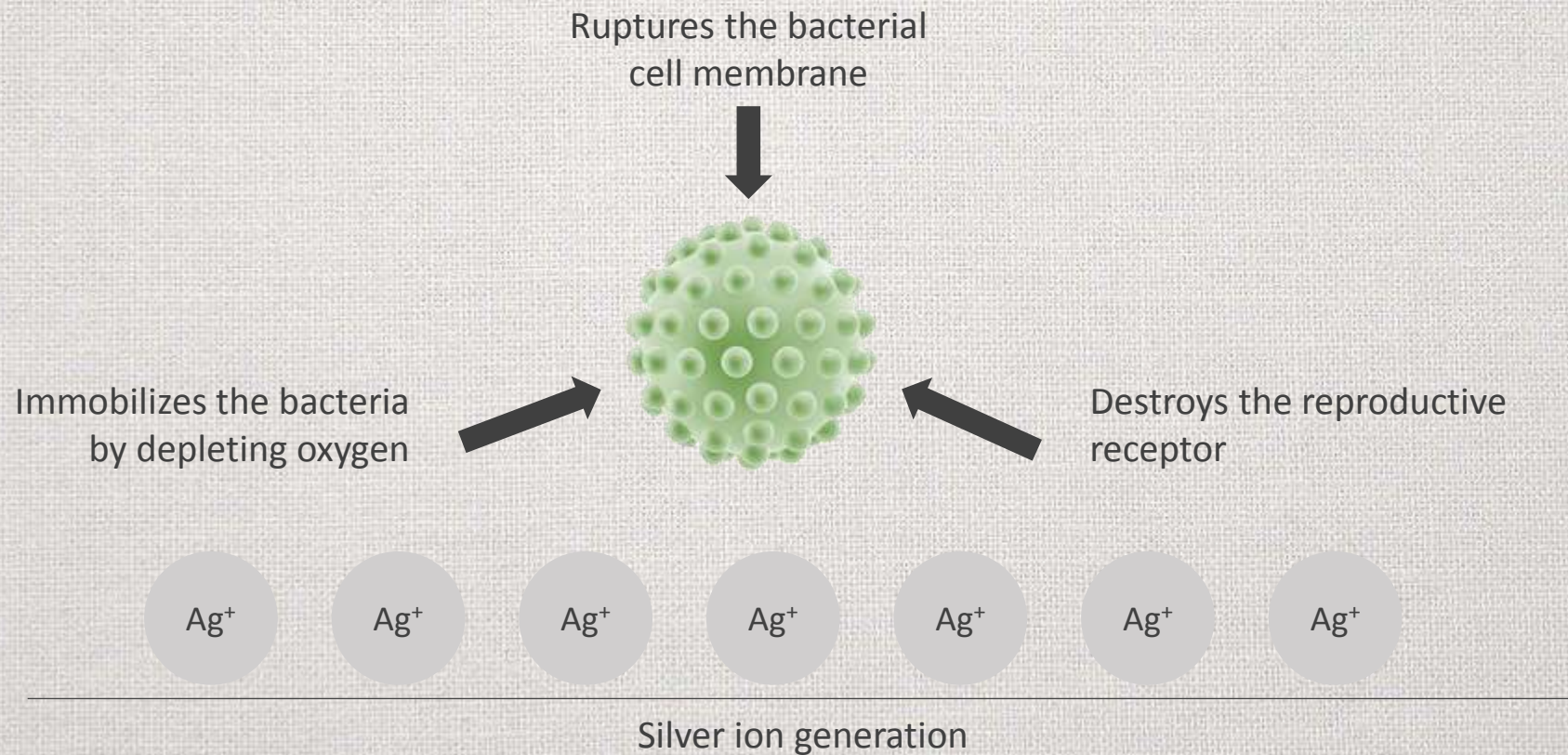
- Easy to apply:
 - Compatible with multiple processes, substrates and chemicals
 - Easy application through standard processes
 - Does not affect colour or texture

**High
performance**

Innovative

Sustainable

N9 Plastix attacks the bacteria in 3 ways



N9 PLASTIX MIS SPECIFICATIONS

S No	Parameters	Product Specification
1	Product Color	White Amorphous
2	Product form	Powder
3	Density (tapped)	0.4 – 0.6 g/cc
4	pH (5% dispersion in water)	6.0 – 8.0
5	Loss on drying (120 ⁰ C, 2hours)	Max 1.0%
6	Average particle size (By Malvern Instrument)	10-30 micron



N9 PLASTIX MIS AF SPECIFICATIONS

Sl. No.	Parameters	Product Specification
1	Product appearance	Amorphous white powder
2	Product nature	<i>Silver-Silicone oil-Silica Composite*</i>
3	Density (Tapped)	0.4 – 0.6
4	pH (in 5% Aqueous dispersion)	6.0 – 8.0
5	Loss on drying (120 ⁰ C, 2hours)	Max 1.0%
6	Typical application dosage	0.3 - 1% on weight of polymer



PROCESS FLOW CHART



EASY TO APPLY

- N9 Plastix can be added to a variety of plastics and polymers in master-batch form for uniform dispersion.
- Custom master batch polymers can be developed for specific requirements.
- Recommended dosage :
 - Typical dosage of N9 Plastix additive is 0.3% - 1.0% by weight of polymer
 - Typical dosage of N9 Plastix masterbatch is 1.5 – 5.0% by weight of polymer



S.No	Carrier	Product name
1	LDPE	N9 Plastix MIS 01
2	PP	N9 Plastix MIS 02
3	HDPE	N9 Plastix MIS 03
4	Polystyrene	N9 Plastix MIS 04
5	ABS	N9 Plastix MIS 05
6	TPE	N9 Plastix MIS 06
7	Nylon	N9 Plastix MIS 07





Testing & Validation

HIGH PERFORMANCE

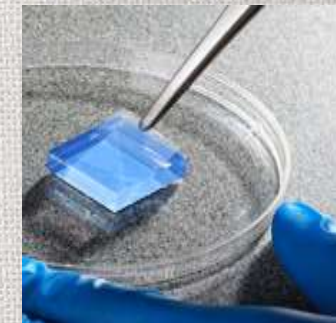
Antibacterial Test Method: JIS Z 2801:2010

Bacteriostatic and controls growth of bacteria on plastics.

A polymer sheet treated with N9 Plastix was tested by Intertek, an NABL accredited international laboratory.

As per the test, there is significant antibacterial activity with the test strains S.aureus and E.coli when compared to the untreated polymer sheet - the growth reduction efficacy is between 1 and 3 log reduction.

Product	Efficacy against E.coli	Efficacy against S.aureus
N9 Plastix MIS / MIS AF *(Typical value)	*2.80 (log reduction)	*3.4 (log reduction)
	>99% efficacy	>99% efficacy



Article treated with N9 Plastix shows excellent antibacterial efficacy

TESTING AND VALIDATION: SAFETY REPORT



Valued Quality. Delivered.

Intertek India Pvt. Ltd. (Food Services)

NABL Accreditation No. T-2052(Chemical) & T- 2053 (Biological) Validity 18.08.13

No. 68, Udyog Vihar Phase - 1,
Gurgaon - 122016
Haryana, India.
Email : food.gurgaon@intertek.com
Telephone : 0124 - 4840600
Fax : 0124 - 4147881
www.intertek.com

TEST RESULTS

Sr. No	Test Parameters	Units of Measurement	Result	Limit of detection	Method of testing
Chemical Parameter					
1.	Overall Migration for silver (in 10% Ethanol at 40 ⁰ C for 10 days)	mg/dm ²	Not detected	0.1	EU 10/2011
2.	Overall Migration for silver (in 3% Acetic acid at 40 ⁰ C for 10 days)	mg/dm ²	Not detected	0.1	EU 10/2011

Testing and validation: Non Migration Report IS 9833: 2014



Test Report No. BLR/H(FCM)/16/000072

Dated 22.02.2016

Applicant : RESIL CHEMICALS PRIVATE LIMITED
Address : #53-57, KIADB,
Bommasandra Industrial Area, Phase VI, Anekal Taluk,
Bangalore, Karnataka, India-560099.
Attention : Mr. Naveen J M
Tested Sample : Received on 14.01.2016
Test Period : 14.01.2016 to 17.02.2016
Sample Description : **N9 PLASTIX MIS**
Objectives of Examination : To test Colour Migration, Content of Heavy Metals, Primary Aromatic Amines, Polychlorinated biphenyl and Carcinogenic amine as requested by the applicant.

*Note: the submitted samples are Not Drawn by the Laboratory. *The test has been subcontracted to TUV-SUD other Lab.*

TESTING AND VALIDATION: SAFETY REPORT



Test Parameter	Simulant (Temp/ Time)	Amount of Extractives	Limits as per USFDA – 175.300	Test Method
		mg/in ²	mg/in ²	
Overall Migration Test	Distilled water (49°C/24 hrs)	0.06	18	USFDA – 175.300 1 st April 2011

*SV : SA = 1 ml : 1 cm²

Conclusion: The above tested sample conforms to Overall Migration Test specifications as per USFDA – 175.300 for intended contact with potable water at room temperature filling and storing.

Some examples of successful launches:

- Peter England
- Wrangler
- Lee Cooper
- Klenza
- Others





PROTEK.t
PETER ENGLAND

Take this off the shelf and wear it directly without any worries. because this has been treated with a special **PROTEK.t** formula that prevents the growth of mircobes and always keeps it fresh and hygienic.

No more giant laundry bills either, because this finish gives you the luxury of not having to wash it regularly. So less washing, more water saved, and a better environment.

POWERED BY  **n9**
pure silver

PROTEK.t
PETER ENGLAND

 ANTI MICROBIAL	 CONTROLS MALODOUR
 LONG LASTING FRESHNESS	 HYGIENIC
 LESS FREQUENT WASHING	 SAVES WATER

POWERED BY  **n9**
pure silver



Wrangler®

SILVER SHIELD

Denims with silver
for lasting freshness

Perfect for long rides and unending roads,
N9 pure silver actively protects your
denims from odour causing bacteria,
for freshness that lasts.

Powered by  pure silver



**SILVER
SHIELD**

APPAREL
WITH SILVER
FOR LASTING
FRESHNESS

Wrangler[®]
**DENIM
PERFORMANCE**



ODOUR FREE



LONG-LASTING
HYGIENE AND
FRESHNESS



SAFE ON SKIN



WEAR MORE
WASH LESS

Powered by



www.wrangler.in Follow us on      / [wranglerdenims](https://www.wranglerdenims.com)



NANO TECHNOLOGY



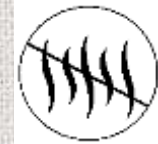
BRITISH FRAGRANCE



ANTIBACTERIAL AGENT



FRESHNESS



MALODOUR CONTROL



META SHIELD

WALK MORE TO BREATHE
MORE



SAY NO
TO ~~ALCOHOL~~
& YES TO
SAFE HYGIENE

OVER 3 HOURS*
OF PROTECTION
FROM GERMS

EXPERIENCE THE
GOODNESS OF SILVER⁺

RESIL
klenza
with Pure Silver



Finally, an alcohol-free hand sanitizer
that is enriched with pure Silver,
protecting your hands for over 3 hours* !
Discover the secret behind Klenza.



Klenza uses pure Silver, a natural substance, which controls the growth of germs without harmful chemicals such as Alcohol, Triclosan and Paraben !

Klenza's unique Silver technology* makes it a broad spectrum germicide, enabling it to actively shield your hand, long after most other hand sanitizers have stopped.



Silver's natural anti microbial properties have been known for millennia - from Silver containers to purify water in Persia, to Silver dishes to feed infants in India.

SUMMARY

- ✓ Safe chemistry – Silver Technology
- ✓ Excellent antimicrobial performance
- ✓ Highly effective against a broad spectrum of bacteria
- ✓ Non migrating technology
- ✓ Durable : Long lasting antibacterial efficacy
- ✓ Environmental friendly
- ✓ RoHS and Reach SVHC compliance



N9 Plastix is a revolutionary antimicrobial technology that neutralizes germs on contact. It works invisibly and provides long-lasting protection from germs, keeping plastic articles hygienic.



Loves plastic. Hates bacteria.

www.n9world.com/www.resil.com



Recommended benefits for silver protected plastic technology

- Silver protected packaging
- Reduces > 99% bacteria on plastics
- Reduces cross-contamination during usage: A cleaner product implies that there are a lower number of microbes that would be transferred, thereby reducing potential cross contamination.
- Products stay hygienic for longer:
Less microbes mean reduced potential for staining and unpleasant odours, therefore your product stays fresher for longer, increasing its functional life cycle.
- Easy to keep hygienically clean:
Round the clock protection against unseen microbes, permanently.