

NUVOLARI

C O N C E R I A



GRAPHENE LEATHER

HIGH RESISTANCE
ANTIBACTERIAL

VIEW A QUICK VIDEO



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GRAPHENE LEATHER®

**HIGH RESISTANCE
ANTIBACTERIAL**

- ANTIBACTERIAL 99.99%
- ANTI-STINK
 - ANTI-MILDEW
 - VERY HIGH ABRASION RESISTANCE
 - COLOR FASTNESS
 - GRAB STRENGHT
- SCRATCH RESISTANCE
 - HIGH CUTTING VALUE
- VERSATILE AND HIGHLY PERFORMING
- PATENT PENDING





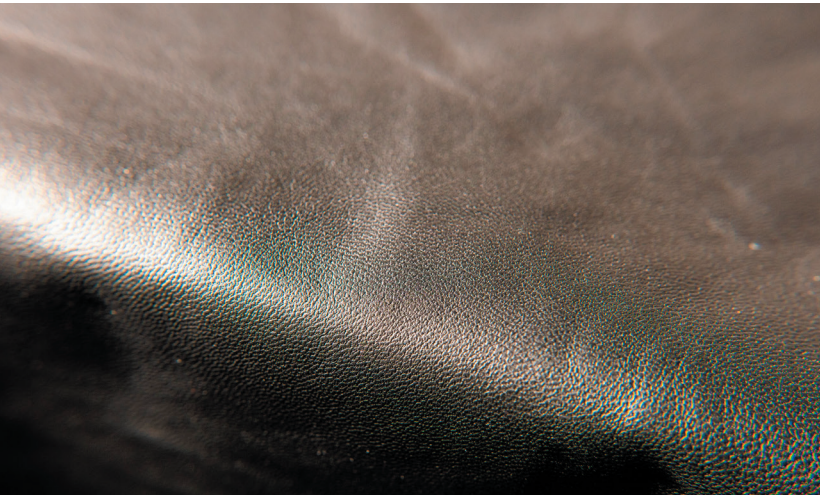
WHO WE ARE

Conceria Nuvolari is a family-owned company located in Monte Urano, Italy. The company is specialized in the production of high quality and exclusive leather.

The tannery offers a wide selection of leather types, including goatskins, cross-bred leather and sheep skin for shoes, clothing, soft & hard accessories. All the leathers are produced in conformity to the best protocols and leather regulations and Conceria Nuvolari is committed to invest in innovative technology to support sustainable developments while reducing its environmental impacts. Advanced technologies are utilised to provide develop sustainable products without compromising the high quality of the leather.

Thanks to its structured organization and highly skilled technicians, Conceria Nuvolari is well known for the reliability and consistency of its products. This allowed the tannery to build up a large portfolio of clients within the luxury segment of the fashion industry, including well-known medium and large brands.

Conceria Nuvolari, which is synonymus of exquisite taste, is driven by a strong wish to use leather to communicate emotions. "All the colours of the world in just one skin" is what Sara Santori, the tannery's dynamic and strong-willed C.E.O, focuses the company's strategy on, with sustainability being at its core.



— OUR SUSTAINABILITY AWARENESS

The themes of Sustainability, circular economy, social & environmental respect have become central key focuses in the current fashion & luxury sector.

Since 2015, Conceria Nuvolari has started his journey towards more sustainable processes, technologies and products with the aim to preserve natural resources while still offering first class products. The tannery focused its strategy on investing in R&D to address the social and environmental issues. The clear strategy and the tannery's internal expertise commitment allowed Conceria Nuvolari to establish itself as a pioneer in the development of alternative tanning techniques, which drastically reduce the amount of heavy metals and hexavalent Chromium in the leather.

Furthermore, for Conceria Nuvolari the environmental sustainability means to offer a more resistant leather, in order to give the final products a higher durability. Following this goal, Conceria Nuvolari realized Graphene Leather®, which achieved the standard requirements for abrasion resistance, colour fastness, dry and wet crocking, and grab strength for footwear and apparel needs.

Conceria Nuvolari constantly renews its wide range of colors adding the must-have trendy colors of the season.

Graphene Leather® can also be customized with finishes required by customers.



— GRAPHENE LEATHER®



HIGHLY RESISTANT

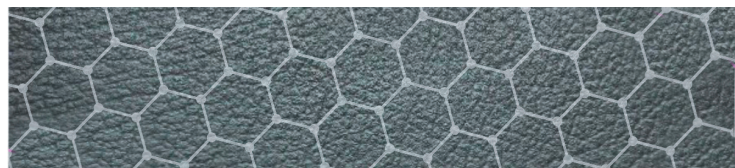
Graphene is a single layer of carbon atoms, tightly bound in a hexagonal honeycomb lattice. It is the thinnest compound known to man at one atom thick, the lightest material known (with 1 square meter weighing around 0.77 milligrams), the strongest compound discovered (between 100-300 times stronger than steel), the best conductor of heat at room temperature and also the best conductor of electricity known.

Graphene is a remarkable substance on its own, with a multitude of astonishing properties which repeatedly earn it the title “wonder material”.



ANTIBACTERIAL 99,99%

Graphene Leather® has been tested and showed an antibacterial activity equal to 99.99%



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#1 CHARACTERISTICS OF GRAPHENE LEATHER®



With reference to the results reported in our report RPT-SSCCP-200300 dated 29 June 2020, we declare that the sample Graphene Leather of Conceria Nuvolari showed an antibacterial activity equal to 99,99% respect the evaluated microorganisms

Head of the Area

Patrizia.Sadocco





QUANTITATIVE ANTIBACTERIAL ACTIVITY ACCORDING TO 20743:2013 "DETERMINATION OF ANTIBACTERIAL ACTIVITY OF TEXTILE PRODUCTS"

TEST REPORT RELATED TO:

S-SSCCP-2001074: Leather sample named "Graphene leather® lato fiore e lato carne".

Sampling, transport and delivery due to Customer.

Head of the Sector

Graziano Elegir



Head of the Area

Patrizia Sadocco



TEST CONDITIONS:

Microorganism: Staphylococcus aureus ATCC 6538, Klebsiella pneumoniae ATCC 4352

- Inoculum: 0,2 mL bacterial suspension, 1 x 10⁵ UFC/mL diluted in nutrient broth.
- Contact time: 24 hours at 37°C.
- Counting method: Plate count method.
- Neutralizing solution: 20 ml.

Number of total viable bacteria:

$$M = ZxRx20$$

where:

M= number of bacteria per specimen.

Z = average counted bacteria.

R = plated dilution factor.

The antibacterial activity of the samples is calculated as:

$$A = (\log C_t - \log C_0) - (\log T_t - \log C_0)$$

where:

C_t = average number of bacteria recovered from the reference sample after 24 hours contact.

C₀ = average number of bacteria recovered from the reference sample immediately after inoculum.

T_t = average number of bacteria recovered from the sample after 24 hours contact.

A = antibacterial activity.

RESULTS:

SAMPLE		STAPHYLOCOCCUS AUREUS ATCC 6538	
	UFC/ml inoculum T ₀	UFC/ml inoculum 24 h	A
UNTREATED COTTON REFERENCE	1,05 x 10 ⁵ 1,23 x 10 ⁵ 1,19 x 10 ⁵ Average 1,15 x 10 ⁵	1,18 x 10 ⁸ 9,40 x 10 ⁷ 1,76 x 10 ⁸ Average 1.29 x 10 ⁸	
GRAPHENE LEATHER® LATO FIORE		<20 <20 <20	Value included in the range: 6,8 - 8,1
GRAPHENE LEATHER® LATO CARNE		<20 <20 <20	Value included in the range: 6,8 - 8,1

TEST VALIDATION:

- At inoculation: $(L_{\max} - L_{\min}) < 1$

Where:

- L_{\max} = logarithm of the maximum counted bacteria at T0

- L_{\min} = logarithm of the minimum counted bacteria at T0

Obtained value: $(L_{\max} - L_{\min}) = 0,07 < 1$;

- At T₀ the number of bacteria on the untreated sample shall be 1×10^5 to 3×10^5 UFC/ml. Obtained average value $1,15 \times 10^5$ UFC/ml;

- The growth value obtained according to the following formula shall be > 1 :

$$F = (\log C_t - \log C_0)$$

Where:

C_t = is the average of the number of bacteria obtained from the reference sample after 24 contact hours.

C_0 = is the average of the number of bacteria obtained from the reference sample immediately after inoculation.

F = is the growth value on the control specimen.

F = 3,05 > 1 .

RESULTS:

SAMPLE		KLEBSIELLA PNEUMONIAE ATCC 4352	
	UFC/ml inoculum T ₀	UFC/ml inoculum 24 h	A
UNTREATED COTTON REFERENCE	1,20 x 10 ⁵ 1,16 x 10 ⁵ 1,10 x 10 ⁵ Average 1,15 x 10 ⁵	8,60 x 10 ⁸ 8,80 x 10 ⁸ 1,00 x 10 ⁹ Average 9,13 x 10 ⁸	
GRAPHENE LEATHER® LATO FIORE		<20 <20 <20	Value included in the range: 7,7 - 9,0
GRAPHENE LEATHER® LATO CARNE		<20 <20 <20	Value included in the range: 7,7 - 9,0

TEST VALIDATION:

- At inoculation: $(L_{\max} - L_{\min}) < 1$

Where:

- L_{\max} = logarithm of the maximum counted bacteria at T0

- L_{\min} = logarithm of the minimum counted bacteria at T0

Obtained value: $(L_{\max} - L_{\min}) = 0,04 < 1$;

- At T₀ the number of bacteria on the untreated sample shall be 1×10^5 to 3×10^5 UFC/ml. Obtained average value $1,15 \times 10^5$ UFC/ml;

- The growth value obtained according to the following formula shall be > 1 :

$$F = (\log C_t - \log C_0)$$

Where:

C_t = is the average of the number of bacteria obtained from the reference sample after 24 contact hours.

C_0 = is the average of the number of bacteria obtained from the reference sample immediately after inoculation.

F = is the growth value on the control specimen.

F = 3,90 > 1 .

TEST REPORT N°: S-SSCCP-2001074

Sample Type: Leather

Sample description: Leather sample named "Graphene leather® lato fiore e lato carne".

Sampling: Provided by customer

PHYSIOLOGICAL EFFECT. MEASUREMENTS OF WATER-VAPOUR RESISTANCE (RET)

ISO 11092:2014

TEST	RESULT	M.U.
N° SPECIMENS	4	
NUMBER OF MEASUREMENTS	1	
WATER-VAPOUR RESISTANCE (RET)	10.565	m ² Pa/W

Test are performed by placing the specimen with the side usually facing the human body placed in direct contact with the sweating guarded hot plate.

Test condition:

- T°= 35 °C +/- 0.1
- UR%= 40% +/- 3
- air flow= 1 m/s +/- 0.05

COLOUR FASTNESS TO DRY WASHING WITH PERCHLORETHYLENE

UNI EN ISO 105-D01:2010 *

TEST	RESULT	M.U.
ADJACENT FABRIC	Multifibre DW	
COLOUR CHANGE	4-5	index
STAINING ON WOOL	3-4	index
STAINING ON ACRYLIC	3-4	index
STAINING ON POLYESTER	3	index
STAINING ON POLYAMIDE	3	index
STAINING ON COTTON	4	index
STAINING ON ACETATE	3-4	index

(*) Grey scales index: Index 1 = minimum fastness - Index 5 = maximum fastness)

COLOUR FASTNESS TO DOMESTIC AND COMMERCIAL LAUDERING

UNI EN ISO 105 C06:2010 *

Test Number A1S

TEST	RESULT	M.U.
DETERGENT ECE		
NUMBER OF STEEL BALLS 10		index
ADJACENT FABRIC MULTIFIBRE DW		index
COLOUR CHANGE	4	index
STAINING ON WOOL	3	index
STAINING ON ACRYLIC	3	index
STAINING ON POLYESTER	3	index
STAINING ON POLYAMIDE	2-3	index
STAINING ON COTTON	1-2	index
STAINING ON ACETATE	3-4	index

(Grey scales index: Index 1 = minimum fastness - Index 5 = maximum fastness)

DETERMINATION OF FABRIC PROPENSITY TO SURFACE FUZZING AND TO PILLING - PART 2: MODIFIED MARTINDALE METHOD

UNI EN ISO 12945-2:2002 *

AREA OF THE TEST AS IT IS		
TOTAL CYCLES 500 CYCLES		
PILLING PROPENSITY	5	index
TOTAL CYCLES 1000 CYCLES		
PILLING PROPENSITY	5	index
TOTAL CYCLES 2000 CYCLES		
PILLING PROPENSITY	5	index
TOTAL CYCLES 5000 CYCLES		
PILLING PROPENSITY	5	index

- Index 5: no propensity to pilling
- Index 4: modest propensity to pilling
- Index 3: discrete propensity to pilling
- Index 2: strong propensity to pilling
- Index 1: very strong propensity to pilling

EXPOSURE TO LABORATORY LIGHT SOURCES - XENON-ARC LAMPS

ISO 105-B02:2013 *

INSTRUMENT:	Q-Sun Xe-2
LIGHT SOURCE:	N° 1 xeno lamp 1800W air cooled
FILTERS:	Windows Q
BLACK PANEL TEMPERATURE (°C):	45 ± 3
RELATIVE HUMIDITY IN THE CHAMBER (%)	45 ± 3
IRRADIANCE AT 420 NM (W/M² NM)	1.1
EXPOSURE CYCLE:	only light
TEST DURATION (HOURS)	96

DESCRIPTION OF THE AGING TREATMENT

ISO 17228:2015 *

Method ISO 17228:2015 MET 7A**Instrument** ACS 150

TEST	RESULT	M.U.
TESTING CYCLE		
STEP 1	50°C - 90%U.R.	

Total testing duration (h) 120

DETERMINATION OF THE ABRASION RESISTANCE OF FABRICS BY THE MARTINDALE**METHOD: DETERMINATION OF LOSS MASS**

UNI EN ISO 12947-3:2017 *

Applied pressure 12 kPa

**DETERMINATION OF THE ABRASION RESISTANCE OF FABRICS BY THE MARTINDALE
METHOD - PART 2: DETERMINATION OF SPECIMEN BREAKDOWN**

UNI EN ISO 12947-2:2017 *

Applied pressure 12 kPa
Test range (rubbings) 2000

Evaluation method:

- Specimen breakdown in orthogonal fabrics: when 2 separate threads are completely broken
- Specimen breakdown in knitted fabrics: when 1 thread is broken and causes a hole to appear
- Specimen breakdown in pile fabrics: when the pile is completely worn out
- Specimen breakdown in non-woven fabrics: when the first hole resulting from wear has a diameter of 0.5 mm

**DETERMINATION OF THE ABRASION RESISTANCE OF FABRICS BY THE MARTINDALE
METHOD: DETERMINATION OF LOSS MASS**

UNI EN ISO 12947-3:2017 *

NUMBER OF RUBBINGS	5000	cycles
MASS LOSS	0.0033	g

**DETERMINATION OF THE ABRASION RESISTANCE OF FABRICS BY THE MARTINDALE
METHOD - PART 2: DETERMINATION OF SPECIMEN BREAKDOWN**

UNI EN ISO 12947-2:2017 *

NUMBER OF RUBBINGS BETWEEN 6000 AND 8000 CYCLES		
CHANGE OF TONE	Superficial breaking and change of tone	index

Evaluation method:

- Specimen breakdown in orthogonal fabrics: when 2 separate threads are completely broken
- Specimen breakdown in knitted fabrics: when 1 thread is broken and causes a hole to appear
- Specimen breakdown in pile fabrics: when the pile is completely worn out
- Specimen breakdown in non-woven fabrics: when the first hole resulting from wear has a diameter of 0.5 mm

DETERMINATION OF THE ABRASION RESISTANCE OF FABRICS BY THE MARTINDALE**METHOD: DETERMINATION OF LOSS MASS**

UNI EN ISO 12947-3:2017 *

STANDARD DEVIATION	0.0008	g
NUMBER OF RUBBINGS	7500	cycles
MASS LOSS	0.0043	g
STANDARD DEVIATION	0.0003	g
NUMBER OF RUBBINGS	10000	cycles

The test results relate only to the sample tested.

When applicable, sample remnant is retained for a period of three months from the date of issue of the test report. The partial reproduction of this test report is allowed only after a written permission of the Laboratory Manager.

TEST	RESULT	M.U.
MASS LOSS	0.0116	g
STANDARD DEVIATION	0.0030	g
NUMBER OF RUBBINGS	15000	cycles
MASS LOSS	0.0151	g
STANDARD DEVIATION	0.0070	g

SAMPLE AFTER HEAT AGING TREATMENT**MAXIMUM FORCE AND ELONGATION AT MAXIMUM FORCE USING STRIP METHOD.**

UNI EN ISO 13934-1:2013 *

NUMBER OF TESTS	10	
MAXIMUM FORCE	73	N
COEFFICIENT OF VARIATION (CV)	43.4	%
ELONGATION AT BREAK	40.6	%
COEFFICIENT OF VARIATION (CV)	7.4	%

SAMPLE AFTER XENOTEST TREATMENT

MAXIMUM FORCE AND ELONGATION AT MAXIMUM FORCE USING STRIP METHOD

UNI EN ISO 13934-1:2013 *

NUMBER OF TESTS	10	
MAXIMUM FORCE	78.3	N
COEFFICIENT OF VARIATION (CV)	50.3	%
ELONGATION AT BREAK	41.3	%
COEFFICIENT OF VARIATION (CV)	7.9	%

SAMPLE AS IT IS

MAXIMUM FORCE AND ELONGATION AT MAXIMUM FORCE USING STRIP METHOD

UNI EN ISO 13934-1:2013 *

NUMBER OF TESTS	10	
MAXIMUM FORCE	78.1	N
COEFFICIENT OF VARIATION (CV)	37.8	%
ELONGATION AT BREAK	40.3	%
COEFFICIENT OF VARIATION (CV)	8.8	%

Laboratory Manager
Graziano Elegir



Head of Area
Patrizia Sadocco



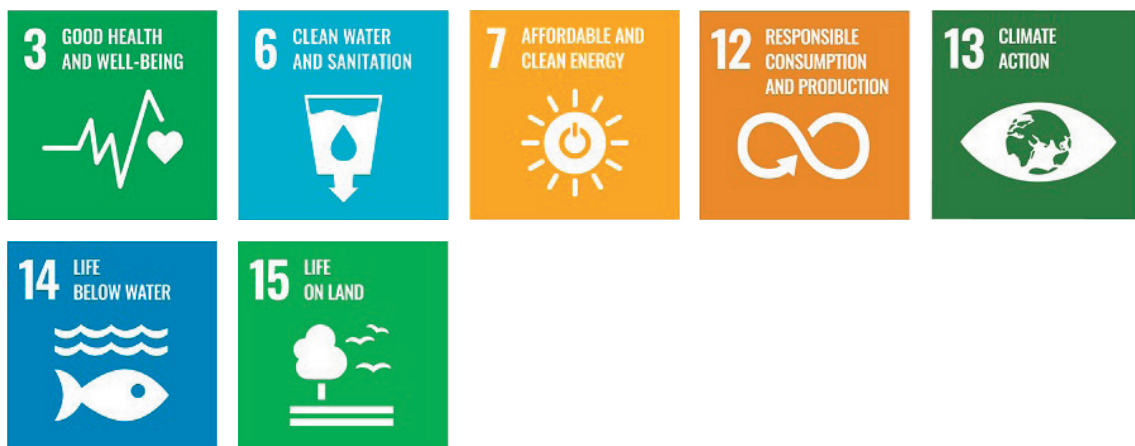
#2 OUR SUSTAINABLE DEVELOPMENT GOALS

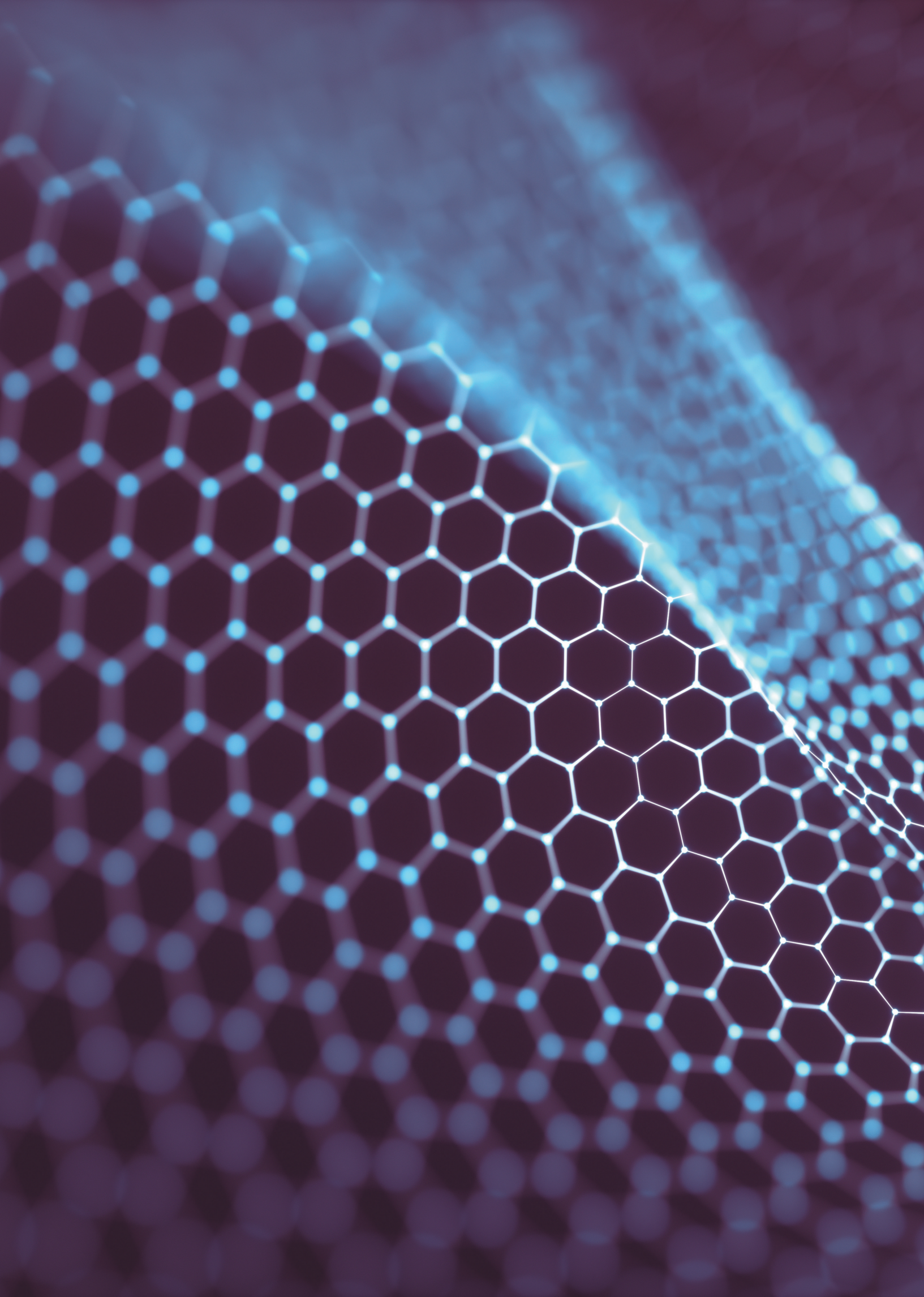
The Sustainable Development Goals are the blueprint to achieve a better and more sustainable future for all. They address the global challenges we face, including those related to poverty, inequality, climate change, environmental degradation, peace and justice. The 17 Goals are all interconnected, and in order to leave no one behind, it is important that we achieve them all by 2030.

The Sustainable Development Goals are vital for a recovery that leads to greener, more inclusive economies, and stronger, more resilient societies.



We are committed to achieve the following Sustainable Development Goals:





NUVOLARI
CONCERIA

CONCERIA NUVOLARI SRL

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VIRTUALTOUR

