

**TEST REPORT N° 23/28050**
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Mod.018 Rev .2 del 19.10.2021

Request Number	<b>81893</b>
Receipt Number	<b>23/27438</b>
Receipt date	<b>02/08/23</b>
Test begin - end date	<b>02/08/23 - 09/08/23</b>
Document issued on	<b>09/08/23</b>

Dear

**ABC INK s.r.l.**

DIV. ABC Ink

**Via Vincenzo Monti, 8  
20123 MILANO (MI)**
**SAMPLE IDENTIFICATION (#):**
**A POLYBIUS INK**
**THIS DOCUMENT CONTAINS THE FOLLOWING TESTS:**

Code	Test	Test Method
CE0038	Tattoos inks and PMU: determination of heavy metals (reg. UE 2020/2081)	MIP_CE0038_rev3:2021
CE0073 *	Tattoos Inks and PMU: determination of certain aromatic amines	MIP_CE0073_rev0:2021 - ref. Reg. (EU) 2020/2081
CE0082	Tattoo Inks, PMU and polymers: Determination of Polycyclic Aromatic Hydrocarbon	AfPS GS 2019:01

**General Remarks**

Results refer exclusively to the materials presented by the Client as received; TIL does not carry out withdrawals and / or samplings and, therefore, any representativeness of the analyzed material, also with respect to lots, is exclusive responsibility of the customer.

(#) Data provided by the Client. Moreover, when information is provided by the Client and can influence the validity of the results, the Laboratory declines all responsibilities.

The expanded uncertainty, available on request, is calculated with a coverage factor  $k=2$  for a confidence level of 95%.

For qualitative tests, or tests where final result is assessed by numerical indexes, the expanded uncertainty is not applicable.

Materials delivered to TIL will be kept available to the Customer for a period of 3 (three) months after completion of the Services; after this period all materials will be disposed of by TIL.

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**Decision rule**

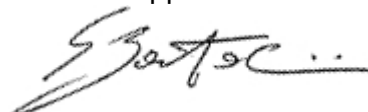
Unless otherwise requested by the customer, for physical-mechanical tests, flammability tests and fastness tests, Laboratory defines the Pass/Fail assessment not taking into account the uncertainty associated to the measurement result. Uncertainty of method is available on request.

For all other types of tests, where the decision rule is not defined within the test method, laboratory use a decision rule based on "guard band" approach. The rule is described in the "conformity analysis" procedure adopting a coverage factor  $K$  unilateral equal to 1,645 for a confidence level of 95%.

\* Test not accredited by ACCREDIA

**Technical Manager**

Giuseppe Bartolini


**TIL TEST & INNOVATION LAB S.r.l. with single shareholder company**

subject to the direction and coordination of KERING HOLLAND NV, company registered in the Netherlands with headquarters in Amsterdam

**Lab Headquarters**

Viale Montegrappa, 318-324 - 59100 – Prato (PO)  
T +39 0574 – 1770001 Fax +39 0574 – 1770019  
email: [info@labtil.com](mailto:info@labtil.com)

**Registered Offices**

Via Pantin, 1 - 50018 – Scandicci (FI)  
pec: [testinnovationlab@legalmail.it](mailto:testinnovationlab@legalmail.it)  
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*Summary Results Evaluation based on PRSL*

**Conformità inchiostri per tatuaggi e trucco permanente Reg. UE 2020/2081 - Reg. CE 1907/2006 (Reach)**

Rev. 2 del 21/03/2022

Item	Sample	Pass	Fail	Not applied
A	POLYBIUS INK	67 Pass	0 Fail	0 NA

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## Evaluation Results Sample POLYBIUS INK

Rev. 0 del 06/04/2020

Item	Test Method	Parameter	Limits	Value	P/F
CE0038	Tattoos inks and PMU: determination of heavy metals (reg. UE 2020/2081)	Antimony	<=0,5 mg/kg	Not Detectable	PASS
CE0038	Tattoos inks and PMU: determination of heavy metals (reg. UE 2020/2081)	Arsenic	<=0,5 mg/kg	Not Detectable	PASS
CE0038	Tattoos inks and PMU: determination of heavy metals (reg. UE 2020/2081)	Barium (soluble)	<=500 mg/kg	Not Detectable	PASS
CE0038	Tattoos inks and PMU: determination of heavy metals (reg. UE 2020/2081)	Cadmium	<=0,5 mg/kg	Not Detectable	PASS
CE0038	Tattoos inks and PMU: determination of heavy metals (reg. UE 2020/2081)	Chromium VI	<=0,5 mg/kg	Not Detectable	PASS
CE0038	Tattoos inks and PMU: determination of heavy metals (reg. UE 2020/2081)	Cobalt	<=0,5 mg/kg	Not Detectable	PASS
CE0038	Tattoos inks and PMU: determination of heavy metals (reg. UE 2020/2081)	Copper (soluble)	<=250 mg/kg	Not Detectable	PASS
CE0038	Tattoos inks and PMU: determination of heavy metals (reg. UE 2020/2081)	Lead	<=0,7 mg/kg	Not Detectable	PASS
CE0038	Tattoos inks and PMU: determination of heavy metals (reg. UE 2020/2081)	Mercury	<=0,5 mg/kg	Not Detectable	PASS
CE0038	Tattoos inks and PMU: determination of heavy metals (reg. UE 2020/2081)	Nickel	<=5 mg/kg	Not Detectable	PASS
CE0038	Tattoos inks and PMU: determination of heavy metals (reg. UE 2020/2081)	Organometallic tin	<=0,5 mg/kg	Not Detectable	PASS
CE0038	Tattoos inks and PMU: determination of heavy metals (reg. UE 2020/2081)	Selenium	<=2 mg/kg	Not Detectable	PASS
CE0038	Tattoos inks and PMU: determination of heavy metals (reg. UE 2020/2081)	Zinc (soluble)	<=2000 mg/kg	Not Detectable	PASS
CE0073	Tattoos Inks and PMU: determination of certain aromatic amines	2,4,5-trimethylaniline (as soluble)	<=5 mg/kg	Not Detectable	PASS
CE0073	Tattoos Inks and PMU: determination of certain aromatic amines	2,4-xylidine	<=5 mg/kg	Not Detectable	PASS
CE0073	Tattoos Inks and PMU: determination of certain aromatic amines	2,6-xylidine	<=5 mg/kg	Not Detectable	PASS
CE0073	Tattoos Inks and PMU: determination of certain aromatic amines	2-methyl-p-phenylenediamine (as soluble)	<=5 mg/kg	Not Detectable	PASS
CE0073	Tattoos Inks and PMU: determination of certain aromatic amines	2-naphtylamine (as soluble)	<=5 mg/kg	Not Detectable	PASS
CE0073	Tattoos Inks and PMU: determination of certain aromatic amines	3,3'-dichlorobenzidine (as soluble)	<=5 mg/kg	Not Detectable	PASS
CE0073	Tattoos Inks and PMU: determination of certain aromatic amines	3,3'-dimethoxybenzidine (as soluble)	<=5 mg/kg	Not Detectable	PASS
CE0073	Tattoos Inks and PMU: determination of certain aromatic amines	3,3'-dimethylbenzidine (as soluble)	<=5 mg/kg	Not Detectable	PASS
CE0073	Tattoos Inks and PMU: determination of certain aromatic amines	4,4'-diaminodiphenylmethane (as soluble)	<=5 mg/kg	Not Detectable	PASS
CE0073	Tattoos Inks and PMU: determination of certain aromatic amines	4,4'-methylene-bis-(2-chloro-aniline) (as soluble)	<=5 mg/kg	Not Detectable	PASS
CE0073	Tattoos Inks and PMU: determination of certain aromatic amines	4,4'-methylenedi-o-toluidine (as soluble)	<=5 mg/kg	Not Detectable	PASS
CE0073	Tattoos Inks and PMU: determination of certain aromatic amines	4,4'-oxydianiline (as soluble)	<=5 mg/kg	Not Detectable	PASS
CE0073	Tattoos Inks and PMU: determination of certain aromatic amines	4,4'-thiodianiline (as soluble)	<=5 mg/kg	Not Detectable	PASS
CE0073	Tattoos Inks and PMU: determination of certain aromatic amines	4-amino-3-fluorophenol (as soluble)	<=5 mg/kg	1,3 mg/kg	PASS

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T +39 0574 – 1770001 Fax +39 0574 – 1770019  
email: [info@labtil.com](mailto:info@labtil.com)

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CE0073	Tattoos Inks and PMU: determination of certain aromatic amines	4-aminoazobenzene (as soluble)	<=5 mg/kg	Not Detectable	PASS
CE0073	Tattoos Inks and PMU: determination of certain aromatic amines	4-aminobiphenyl (as soluble)	<=5 mg/kg	Not Detectable	PASS
CE0073	Tattoos Inks and PMU: determination of certain aromatic amines	4-chloroaniline (as soluble)	<=5 mg/kg	Not Detectable	PASS
CE0073	Tattoos Inks and PMU: determination of certain aromatic amines	4-chloro-o-toluidine (as soluble)	<=5 mg/kg	Not Detectable	PASS
CE0073	Tattoos Inks and PMU: determination of certain aromatic amines	4-methoxy-m-phenylenediamine (as soluble)	<=5 mg/kg	Not Detectable	PASS
CE0073	Tattoos Inks and PMU: determination of certain aromatic amines	4-methyl-m-phenylenediamine (as soluble)	<=5 mg/kg	1,1 mg/kg	PASS
CE0073	Tattoos Inks and PMU: determination of certain aromatic amines	5-nitro-o-toluidine (as soluble)	<=5 mg/kg	Not Detectable	PASS
CE0073	Tattoos Inks and PMU: determination of certain aromatic amines	6-amino-2-ethoxynaphthalene	<=5 mg/kg	Not Detectable	PASS
CE0073	Tattoos Inks and PMU: determination of certain aromatic amines	Aniline (as soluble)	<=5 mg/kg	Not Detectable	PASS
CE0073	Tattoos Inks and PMU: determination of certain aromatic amines	benzidine (as soluble)	<=5 mg/kg	Not Detectable	PASS
CE0073	Tattoos Inks and PMU: determination of certain aromatic amines	o-aminoazotoluene (as soluble)	<=5 mg/kg	Not Detectable	PASS
CE0073	Tattoos Inks and PMU: determination of certain aromatic amines	o-anisidine (as soluble)	<=5 mg/kg	Not Detectable	PASS
CE0073	Tattoos Inks and PMU: determination of certain aromatic amines	o-toluidine (as soluble)	<=5 mg/kg	Not Detectable	PASS
CE0073	Tattoos Inks and PMU: determination of certain aromatic amines	p-cresidine (as soluble)	<=5 mg/kg	Not Detectable	PASS
CE0073	Tattoos Inks and PMU: determination of certain aromatic amines	p-Phenylenediamine (as soluble)	<=5 mg/kg	Not Detectable	PASS
CE0073	Tattoos Inks and PMU: determination of certain aromatic amines	p-Toluidine (as soluble)	<=5 mg/kg	Not Detectable	PASS
CE0073	Tattoos Inks and PMU: determination of certain aromatic amines	sulfanilic acid (as soluble)	<=5 mg/kg	Not Detectable	PASS
CE0082	Tattoo Inks, PMU and polymers: Determination of Polycyclic Aromatic Hydrocarbon	Acenafteene	<=0,5 mg/kg	Not Detectable	PASS
CE0082	Tattoo Inks, PMU and polymers: Determination of Polycyclic Aromatic Hydrocarbon	Acenaphthylene	<=0,5 mg/kg	Not Detectable	PASS
CE0082	Tattoo Inks, PMU and polymers: Determination of Polycyclic Aromatic Hydrocarbon	Anthracene	<=0,5 mg/kg	Not Detectable	PASS
CE0082	Tattoo Inks, PMU and polymers: Determination of Polycyclic Aromatic Hydrocarbon	Benzo(a)Anthracene	<=0,5 mg/kg	Not Detectable	PASS
CE0082	Tattoo Inks, PMU and polymers: Determination of Polycyclic Aromatic Hydrocarbon	Benzo(a)Pyrene	<=0,005 mg/kg	Not Detectable	PASS
CE0082	Tattoo Inks, PMU and polymers: Determination of Polycyclic Aromatic Hydrocarbon	Benzo(g,h,i)Perylene	<=0,5 mg/kg	Not Detectable	PASS
CE0082	Tattoo Inks, PMU and polymers: Determination of Polycyclic Aromatic Hydrocarbon	Benzo[b]fluoranthene	<=0,5 mg/kg	Not Detectable	PASS
CE0082	Tattoo Inks, PMU and polymers: Determination of Polycyclic Aromatic Hydrocarbon	Benzo[e]Pyrene	<=0,5 mg/kg	Not Detectable	PASS
CE0082	Tattoo Inks, PMU and polymers: Determination of Polycyclic Aromatic Hydrocarbon	Benzo[k]fluoranthene	<=0,5 mg/kg	Not Detectable	PASS

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T +39 0574 – 1770001 Fax +39 0574 – 1770019  
email: [info@labtil.com](mailto:info@labtil.com)

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pec: [testinnovationlab@legalmail.it](mailto:testinnovationlab@legalmail.it)  
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CE0082	Tattoo Inks, PMU and polymers: Determination of Polycyclic Aromatic Hydrocarbon	Benzo[k]Fluoranthene	<=0,5 mg/kg	Not Detectable	PASS
CE0082	Tattoo Inks, PMU and polymers: Determination of Polycyclic Aromatic Hydrocarbon	Crysene	<=0,5 mg/kg	Not Detectable	PASS
CE0082	Tattoo Inks, PMU and polymers: Determination of Polycyclic Aromatic Hydrocarbon	Dibenzo(a,e)Pyrene	<=0,5 mg/kg	Not Detectable	PASS
CE0082	Tattoo Inks, PMU and polymers: Determination of Polycyclic Aromatic Hydrocarbon	Dibenzo(a,h) Anthracene	<=0,5 mg/kg	Not Detectable	PASS
CE0082	Tattoo Inks, PMU and polymers: Determination of Polycyclic Aromatic Hydrocarbon	Dibenzo(a,h)Pyrene	<=0,5 mg/kg	Not Detectable	PASS
CE0082	Tattoo Inks, PMU and polymers: Determination of Polycyclic Aromatic Hydrocarbon	Dibenzo(a,i)Pyrene	<=0,5 mg/kg	Not Detectable	PASS
CE0082	Tattoo Inks, PMU and polymers: Determination of Polycyclic Aromatic Hydrocarbon	Dibenzo(a,l)Pyrene	<=0,5 mg/kg	Not Detectable	PASS
CE0082	Tattoo Inks, PMU and polymers: Determination of Polycyclic Aromatic Hydrocarbon	Fluoranthene	<=0,5 mg/kg	Not Detectable	PASS
CE0082	Tattoo Inks, PMU and polymers: Determination of Polycyclic Aromatic Hydrocarbon	Fluorene	<=0,5 mg/kg	Not Detectable	PASS
CE0082	Tattoo Inks, PMU and polymers: Determination of Polycyclic Aromatic Hydrocarbon	Indeno(1,2,3-cd)Pyrene	<=0,5 mg/kg	Not Detectable	PASS
CE0082	Tattoo Inks, PMU and polymers: Determination of Polycyclic Aromatic Hydrocarbon	Naphtalene	<=0,5 mg/kg	Not Detectable	PASS
CE0082	Tattoo Inks, PMU and polymers: Determination of Polycyclic Aromatic Hydrocarbon	Perylene	<=0,5 mg/kg	Not Detectable	PASS
CE0082	Tattoo Inks, PMU and polymers: Determination of Polycyclic Aromatic Hydrocarbon	Phenanthrene	<=0,5 mg/kg	Not Detectable	PASS
CE0082	Tattoo Inks, PMU and polymers: Determination of Polycyclic Aromatic Hydrocarbon	Pyrene	<=0,5 mg/kg	Not Detectable	PASS

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T +39 0574 – 1770001 Fax +39 0574 – 1770019  
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Mod.018 Rev .2 del 19.10.2021

Begin of Test Report

CE0038 **Tattoos inks and PMU: determination of heavy metals (reg. UE 2020/2081)**

Test methods **MIP\_CE0038\_rev3:2021**

Rev. 0 del 06/04/2020

Testing conditions Total Metals: Acid digestion - microwave oven / Soluble metals: water extraction  
Testing equipment ICP-MS / HPLC-DAD  
Testing date 04/08/2023

Sample identification **POLYBIUS INK**

Heavy metals		Results mg/kg	LOQ -Limit of quantification mg/kg	Maximum allowed concentration Regulation UE 2020/2081 mg/kg
As	Arsenic	< LOQ	0,4	0,5
Ba	Barium (soluble)	< LOQ	0,4	500
Cd	Cadmium	< LOQ	0,4	0,5
Co	Cobalt	< LOQ	0,4	0,5
Cr6	Chromium VI	< LOQ	0,3	0,5
Cu	Copper (soluble)	< LOQ	0,4	250
Hg	Mercury	< LOQ	0,4	0,5
Ni	Nickel	< LOQ	0,4	5
Pb	Lead	< LOQ	0,4	0,7
Se	Selenium	< LOQ	0,4	2
Sb	Antimony	< LOQ	0,4	0,5
Sn	Organometallic tin	< LOQ	0,4	0,5
Zn	Zinc (soluble)	< LOQ	0,4	2000

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CE0073	<b>Tattoos Inks and PMU: determination of certain aromatic amines *</b>
Test methods	<b>MIP_CE0073_rev0:2021 - ref. Reg. (EU) 2020/2081</b>

Rev. 0 del 06/04/2020

Testing conditions Amines classified as soluble: methanol extraction / others: buffer extraction with ref. to ISO 14362-1 / ISO 17234-1 and reductive cleavage

Testing equipment GC-MSMS / LC-MSMS

Testing date 08/08/2023

Sample identification	<b>POLYBIUS INK</b>
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SUBSTANCE	CAS N.	Quantification Limit (LOQ)	Result
<i>p</i> -Phenylenediamine (as soluble)	106-50-3	1 mg/kg	< LOQ
2,4,5-trimethylaniline (as soluble)	137-17-7 / 21436-97-5	1 mg/kg	< LOQ
2,4-xylidine	95-68-1	1 mg/kg	< LOQ
2,6-xylidine	87-62-7	1 mg/kg	< LOQ
2-naphtylamine (as soluble)	91-59-8 / 553-00-4	1 mg/kg	< LOQ
3,3'-dichlorobenzidine (as soluble)	91-94-1	1 mg/kg	< LOQ
4,4'-methylenedi-o-toluidine (as soluble)	838-88-0	1 mg/kg	< LOQ
3,3-dimethylbenzidine (as soluble)	119-93-7	1 mg/kg	< LOQ
3,3'-dimethoxybenzidine (as soluble)	119-90-4	1 mg/kg	< LOQ
4-methyl-m-phenylenediamine (as soluble)	95-80-7	1 mg/kg	1,1 mg/kg
4,4'-methylene-bis-(2-chloro-aniline) (as soluble)	101-14-4	1 mg/kg	< LOQ
4,4'-oxydianiline (as soluble)	101-80-4	1 mg/kg	< LOQ
4,4'-thiodianiline (as soluble)	139-65-1	1 mg/kg	< LOQ
4-aminobiphenyl (as soluble)	92-67-1	1 mg/kg	< LOQ
4-aminoazobenzene (as soluble)	60-09-3	1 mg/kg	< LOQ
4-chloroaniline (as soluble)	106-47-8	1 mg/kg	< LOQ
4-chloro-o-toluidine (as soluble)	95-69-2 / 3165-93-3	1 mg/kg	< LOQ
4,4'-diaminodiphenylmethane (as soluble)	101-77-9	1 mg/kg	< LOQ
4-methoxy-m-phenylenediamine (as soluble)	615-05-4 / 39156-41-7	1 mg/kg	< LOQ
5-nitro-o-toluidine (as soluble)	99-55-8	1 mg/kg	< LOQ
Aniline (as soluble)	62-53-3	1 mg/kg	< LOQ
benzidine (as soluble)	92-87-5	1 mg/kg	< LOQ
o-aminoazotoluene (as soluble)	97-56-3	1 mg/kg	< LOQ
o-anisidine (as soluble)	90-04-0	1 mg/kg	< LOQ
o-toluidine (as soluble)	95-53-4	1 mg/kg	< LOQ
p-cresidine (as soluble)	120-71-8	1 mg/kg	< LOQ

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4-amino-3-fluorophenol (as soluble)	399-95-1	1 mg/kg	<b>1,3 mg/kg</b>
6-amino-2-ethoxynaphthalene	293733-21-8	1 mg/kg	<b>&lt; LOQ</b>
2-methyl-p-phenyldiamine (as soluble)	95-70-5	1 mg/kg	<b>&lt; LOQ</b>
sulfanilic acid (as soluble)	121-57-3	1 mg/kg	<b>&lt; LOQ</b>
p-Toluidine (as soluble)	106-49-0	1 mg/kg	<b>&lt; LOQ</b>

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CE0082	<b>Tattoo Inks, PMU and polymers: Determination of Polycyclic Aromatic Hydrocarbon</b>
Test methods	<b>AfPS GS 2019:01</b>

Rev. 0 del 06/04/2020

Testing conditions organic solvent extraction - ultrasonic bath  
Testing equipment GC-MSMS  
Testing date 09/08/2023

Sample identification	<b>POLYBIUS INK</b>
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SUBSTANCE	CAS N.	Quantification Limit (LOQ)	Result
Naphtalene	91-20-3	0,05 mg/kg	< LOQ
Acenaphthylene*	208-96-8	0,05 mg/kg	< LOQ
Acenaftene*	83-32-9	0,05 mg/kg	< LOQ
Fluorene*	86-73-7	0,05 mg/kg	< LOQ
Phenanthrene	85-01-8	0,05 mg/kg	< LOQ
Anthracene	120-12-7	0,05 mg/kg	< LOQ
Fluoranthene	206-44-0	0,05 mg/kg	< LOQ
Pyrene	129-00-0	0,05 mg/kg	< LOQ
Crysene	218-01-9	0,05 mg/kg	< LOQ
Benzo(a)Anthracene	56-55-3	0,05 mg/kg	< LOQ
Benzo[b]fluoranthene	205-99-2	0,05 mg/kg	< LOQ
Benzo[k]Fluoranthene	207-08-9	0,05 mg/kg	< LOQ
Benzo[e]Pyrene	192-97-2	0,05 mg/kg	< LOQ
Benzo(a)Pyrene	50-32-8	0,005 mg/kg	< LOQ
Perylene*	198-55-0	0,05 mg/kg	< LOQ
Indeno(1,2,3-cd)Pyrene	193-39-5	0,05 mg/kg	< LOQ
Dibenzo(a,h) Anthracene	53-70-3	0,05 mg/kg	< LOQ
Benzo(g,h,i)Perylene	191-24-2	0,05 mg/kg	< LOQ
Dibenzo(a,l)Pyrene	191-30-0	0,05 mg/kg	< LOQ
Dibenzo(a,e)Pyrene*	192-65-4	0,05 mg/kg	< LOQ
Dibenzo(a,i)Pyrene	189-55-9	0,05 mg/kg	< LOQ
Dibenzo(a,h)Pyrene*	189-64-0	0,05 mg/kg	< LOQ
Benzo[j]fluoranthene	205-82-3	0,05 mg/kg	< LOQ
Total amount *			< LOQ

\* Test not accredited by ACCREDIA

TIL TEST &amp; INNOVATION LAB S.r.l. with single shareholder company

subject to the direction and coordination of KERING HOLLAND NV, company registered in the Netherlands with headquarters in Amsterdam

Lab Headquarters  
Viale Montegrappa, 318-324 - 59100 – Prato (PO)  
T +39 0574 – 1770001 Fax +39 0574 – 1770019  
email: [info@labtil.com](mailto:info@labtil.com)

Registered Offices  
Via Pantin, 1 - 50018 – Scandicci (FI)  
pec: [testinnovationlab@legalmail.it](mailto:testinnovationlab@legalmail.it)  
Share Capital Euro 1.200.000,00 fully paid-in Company Register  
of Florence - Tax ID and VAT code nr 07010880487

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POLYBIUS INK



End of Test Report

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