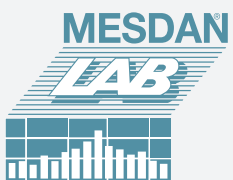


NEPS AND TRASH INDICATOR

NATI



COMPANY WITH
MANAGEMENT SYSTEM
CERTIFIED BY DNV GL
= ISO 9001 =
= ISO 14001 =

NATI

code 3280B

To determinate: neps in raw cotton - neps and trash in cotton sliver and roving - neps in synthetic and blended sliver - quality and efficiency of carding and combing operations

Description

NATI has been specifically designed to be fast, reliable, user-friendly, as well as easily transportable to the production floor for continuous testing and assessment of Neps and Trash at different process stages.

The Optoelectronic system, the waste box for fibres and for Trash are placed in the testing unit, that is equipped with an internal memory, a USB port (for data saving), and an easy-to-use digital touch screen display. Test results are available in excel format, and can be printed by the **Mini Thermal Printer**, Code 3280A.136 (available on demand).

The inbuilt microprocessor acquires and elaborates the testing results. It controls the correct functioning of NATI components and the testing progress. In case of anomaly functioning, the test is interrupted and codified error messages are displayed.

The blower unit contains a powerful brushless motor and an electronic system for setting and controlling negative pressure, which is necessary for testing.

The brushless motor and the enlarged waste box chamber allow frequent testing of large size samples, highly recommended especially in case of synthetic man-made and combed cotton slivers.



NATI Technology and Operation

After setting the test parameters, the sliver sample* is introduced into the feeder. By pressing the start key, the sliver is fed into an O.E. opening roller, where it is opened into fibres. The cotton - or synthetic - fibres are sucked into the Neps channel, where they are checked by an Optoelectronic system. The Trash particles go into the Trash channel by gravity, where they are counted and collected in the Trash box. The process automatically stops and, in case of multiple test selection, the next test is performed.

In addition to counting, NATI classifies Neps and Trash according to the size in the following classes: Neps $\geq 0,5$ mm - Neps $\geq 0,7$ mm - Neps ≥ 1 mm - Trash $\geq 0,25$ mm - Trash $\geq 0,5$ mm.

At the end of the test, the Neps and Trash content is divided in classes of different size and the relative statistics (mean, standard deviation and CV%) are displayed and can be printed, if the optional printer is connected.

Example of test parameters

Sample Name	MESDAN
Source of sample	Card
Length(cm)	10
No. of Tests	3
Test with pause	NO
<div style="display: flex; justify-content: space-around;"> Back Start Test </div>	

Example of displayed test results

Sample MESDAN		Test n. 1	
Trash		Neps	
>0.5	5	>1.0	0
>0.25	49	>0.7	3
Complete	>0.5	8	
<div style="display: flex; justify-content: space-around;"> Stop Test Next Test </div>			

* the transformation of raw cotton in sliver form can be performed by means of the "Raw Cotton Selector".

NATI Advantages

Fast in testing large size samples

NATI can perform a large number of tests on a big sample, in order to increase the statistical confidence of the results (NATI testing speed is 1cm/sec). A statistically significant sample of at least 2 g should be tested to reduce the variability of results, especially in case of good combed slivers or synthetic slivers with just few Neps/gram. It is obvious that a small sample of 0,5 g cannot be adequate.

High repeatability of results

The testing principle of NATI (and sample preparation with the "Raw Cotton Selector") prevents from data variability and results fluctuation, which are a common consequence of material handling and manual sample preparation. It is known that the preparation of the sample can lead to a big variability of results range of $\pm 25\%$ for sliver and $\pm 50\%$ for raw cotton.

Automatic execution of groups of tests

Only NATI can execute consecutive tests on the same sample without the operator attendance.

Compact and transportable

NATI has been conceived for testing in the carding department. It does not require compressed air or any particular installation: just plug the NATI in, and you are ready to test!

Very easy to operate

NATI does not require any particular skill or ability to be used. Hence it can be operated by any worker assigned to the carding process.

Important savings can be obtained by the constant use of NATI

Enabling a better quality of carding operation, a better planning of card clothing renewal and the reduction of defects in the final yarn.

NATI-REPORT

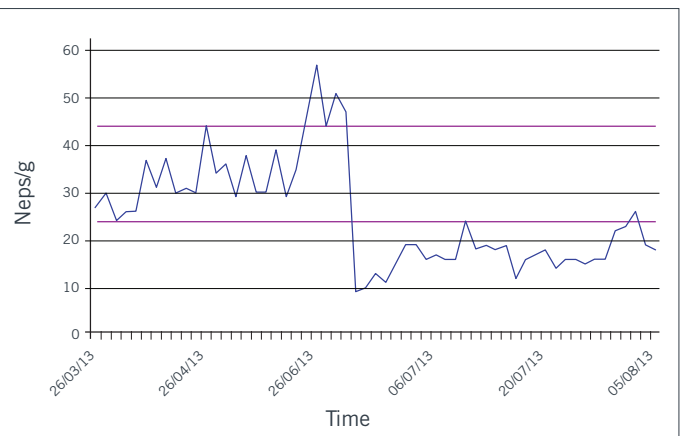
Mesdan S.p.A.
via Masserino 25080
Raffa di Puegnago (BS) ITALY

Sample name: Mesdan
Test time: 20/01/2017 11:15
Source of sample: Card
Length (cm): 10

Test No.	TRASH >...		NEPS >...		mm
	0.25	0.5	0.5	0.7	
1	12	1	23	7	0
2	15	6	24	8	1
3	8	4	15	2	0
4	14	4	17	5	2
5	16	6	20	7	0
MEAN	13.0	4.2	19.8	5.8	0.6
STD	3.2	2.0	3.8	2.4	0.9
CV%	24.30	48.78	19.35	41.17	150.00

Example of report:

NATI report referring to a group of 5 tests of 10 cm each and relative statistics.



This graph indicates the significant improvements on sliver quality achieved by a customer using NATI as a tool to monitor the quality of carding operations on cotton material on daily basis.

Applications

Measure of Neps in raw cotton

High repeatability of results can be obtained by the standardization of sample preparation by means of NATI optional accessories, such as the "Raw Cotton Selector" and the "Electronic balance", thus eliminating the influence of the personal ability on this preliminary operation. A unique key tool to monitor & compare the quality of cotton supplies, to optimise spinning process and to reduce maintenance cost. Hence, characterised by an extremely quick payback, if properly used.

3.5 times faster in testing large samples, NATI just takes 7 minutes to test, for example, 2 g of raw cotton. Even though 0,5 g of raw material cannot provide any reliable and statistically relevant information about the Neps content, this is the sample size which can be tested by other Neps testers available on the market.

Measure of Neps and Trash content in cotton slivers

A large number of tests on large size samples can be performed by NATI without the operator attendance, thanks to its automatism.

In the automatic modality, NATI can perform multiple tests of pre-set length without the operator attendance. The operator presence is required only to restart the instrument at the end of the test program, and to remove the tested fibres from the waste box after testing 6-7 metres of sliver (corresponding to about 30-35 grams, depending on the sliver count).

High repeatability of results is achieved by feeding NATI with the sliver directly coming from cards and combers, as no sample preparation is required.

Neps/gram & Trash/gram will be automatically obtained if the length of each test corresponds to one gram of sliver (the suitable length can be easily calculated based on the sliver count). Otherwise the counting of Neps and Trash will refer to the particular weight or length of the sample.

12 times faster in testing large size samples, NATI allows the constant monitoring of carding operations. The automatic testing of 2 g sliver takes less than 2 minutes with NATI; on the contrary, the other Neps testers require 25 minutes to prepare and execute 4 tests of 0,5 g, thus making the constant control of carding machinery not feasible.

Statistical relevance of results directly available on the production site allows the spinner to timely take corrective actions in order to optimise the process by changing the card settings by making the necessary mechanical adjustments, such as replacing damaged wires or re-clothing the card.

Measure of Neps content in synthetic and man-made slivers

The formation of Neps in synthetic and man-made fibres is due to the spinning process (primarily to carding operation). Therefore the constant monitoring of carding quality and efficiency is essential also for this type of fibres.

NATI is the only Neps tester that can determine the Neps content in synthetic and man-made short staple slivers as well as in blended slivers. Specific opening rollers are available. More detailed information is available in the section relative to NATI accessories.

Monitoring of carding quality and efficiency

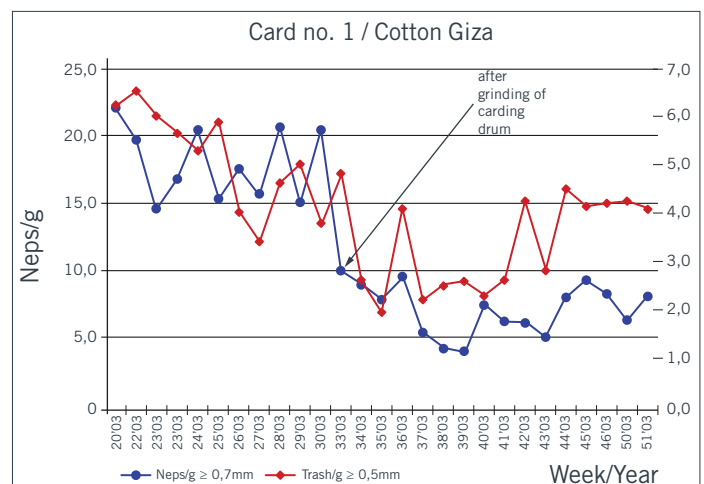
It is common knowledge that, if the Neps and Trash content is high after the carding process, the final spun yarn will also have a high content of Neps and Trash. Processing after carding can reduce these levels, but not to the purpose of a good quality carding. Therefore constant monitoring of carding quality and efficiency is extremely important. To this purpose, NATI fastness and accuracy is crucial to take timely corrective actions.

It is also true that, although it is possible to plan approximate grinding and renewal dates of card clothing, these plans can never give exact dates because the lifetime and grinding period depend on the manufacturer, wire type, fibre type, machine speed and settings.

NATI optimizes cards maintenance reducing loss of production and cost of card clothing renewal.

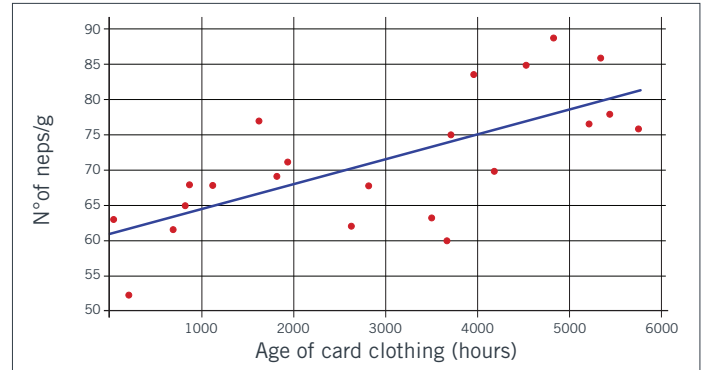
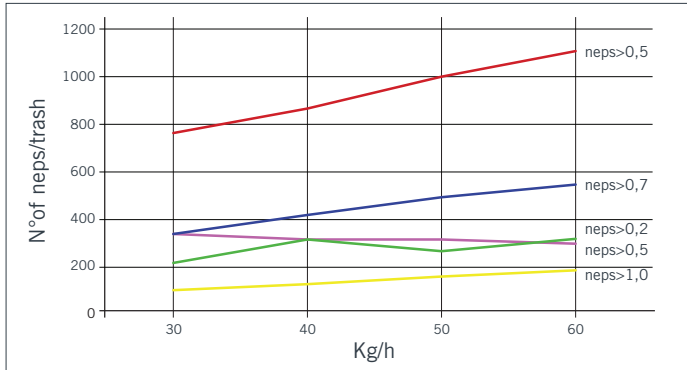
By entering the weekly reading of NATI in a database, it is possible to perform the necessary card grinding, re-clothing and setting as soon as the increasing tendency of Neps begins. If the test results increase not in one but in all cards, raw material or blow-room equipment should be checked.

The isolated or periodical increase of Neps level in some points of the sliver could indicate the presence of a specific problem in the card, such as a group of damaged wire teeth in the main carding drum, in one of the strippers or in any other working rollers (to this extent, it is convenient to inspect a certain length of sliver equal to the circumference of the carding drum by means of a multiple short test sequence, e.g. 25 tests of 20 cm each).



The graph shows the test results relative to a card running Giza 70 type of cotton before and after card grinding.

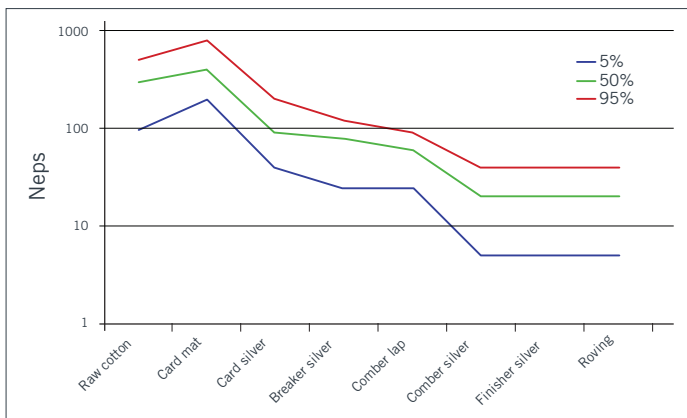
The graphs show the influence of card speed and of the wear of card clothing on the number of Neps in the sliver.



Reading of international statistics on Neps/gram

In case of reference to International Statistics, the number of NEPS/gram measured by NATI can be directly compared with the number of Neps/gram indicated for raw cotton and sliver at different stages of the spinning process.

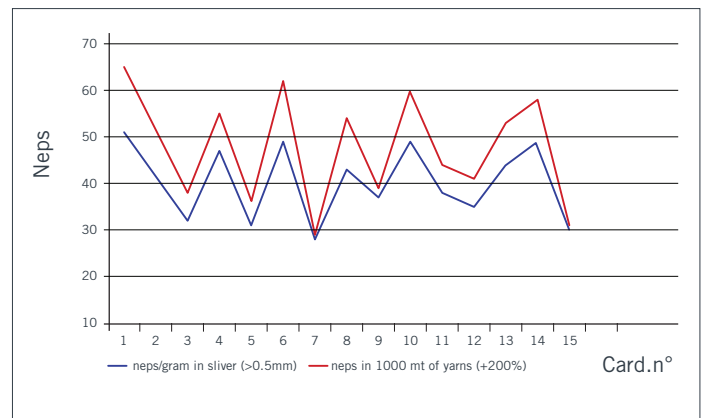
This graph is an example of the typical percentile block available in the International Statistics. It is evident that carding operation is primarily responsible of Neps removal.



Correlation between Neps in the sliver and in the yarn

Even if a clear mathematic relation between the Neps in the sliver and the remaining Neps in the yarn does not exist, NATI can help the spinner to predict (based on card sliver characteristics and spinning process technology) if the yarn that is going to produce will meet, or not, the yarn quality standard specification (i.e., maximum Neps admitted). The following graph shows, with reference to the production of Ne 16 OE cotton, that NATI results help to foresee the yarn quality with adequate accuracy.

Correlation between the Neps/g in card sliver and the Neps in 1000 m of sample of Ne 16 OE cotton yarn.



Trash analysis

The analysis of the sliver trash content is an essential parameter to measure the quality of the carding process. Particularly for compact, O.E. and knitting yarns.

Automatic counting and classification of Trash directly available in the carding department enables the operator to timely adjust the setting of combers and drawers. This is possible by means of NATI only.

After the sliver is opened into fibres, gravity drives the Trash particles into the Trash channel, where they are counted and classified by an Optoelectronic sensor.

Following to the optical analysis, the Trash particles are collected in the Trash box, where they can be easily gathered by the operator for further inspection and analysis (assessment of dust, seed coat, short fibres, etc).

Referring to raw cotton, NATI can give an indication on Trash content, but the most appropriate instrument for Trash analysis in raw cotton is MESDAN LAB **Trash Analyser**, Code 281C, which separates Lint from Trash and Dust content inside a sample of 100 g.



Accessories

Mini thermal printer, Code 3280A.136

NATI is equipped with a serial port for direct connection to the printer.

Power supply: 115 Vac or 230 Vac - 50Hz or 60Hz

Size: 14 cm x 15 cm x 11 cm

Paper rolls: thermal paper 8 cm width

Other printer models are not compatible.

Trolley, Code 3280.900

Compact and self-standing, it is equipped with four 360° rotating wheels and large handle. Useful tool compartment available.

Size: 50 cm x 47 cm x 130 cm

Weight: 30 kg

Opening rollers

They open the fed sliver into fibres without changing the content of Neps and Trash.

Opening roller suitable for 100% cotton sliver and blends with cotton prevalence (up to nominal 65%), Code 3280.168.

Opening roller suitable for 100% synthetic man-made short staple sliver and blends, Code 3280.169.

Easily interchangeable, they do not require any maintenance, as they are self-cleaning and not subject to wear.

One opening roller - at customer's choice - is already supplied with the instrument.

Electronic high precision balances for weighing raw cotton and trash waste.

Sartorius, 320 g capacity and 0.001 g accuracy, Code 165.704, equipped with round plate of Ø 115 mm and protection cover. It is recommended to determine the Trash percentage content.

Sartorius, 820 g capacity and 0.01 g accuracy, Code 165.708 equipped with round plate of Ø 150 mm. Protection cover not available.

It is adequate to weigh raw cotton samples to be tested.

They are equipped with serial port for PC connection, even though not necessary for NATI. Power supply: 100 up 230 Vac - 50/60 Hz

Raw Cotton Selector, Code 3282

The Raw Cotton Selector opens and parallelises the fibres transforming the raw cotton in a homogenous web sample ready for NATI analysis.

If manually operated, this preliminary operation can badly affect the repeatability of the results, as it will depend upon the operator ability.

Therefore the Raw Cotton Selector eliminates the influence of the operator and the possibility of human error. It also allows preparation of large size samples in a short time.

The Raw Cotton Selector can also be used to prepare samples for testing purposes other than Neps counting whenever the preparation of a uniform web sample is required.

Technical features:

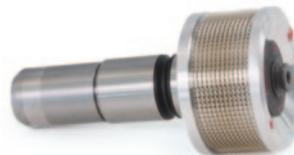
Size: 62 cm x 42 cm x 25 cm - Weight: 25 kg - Power supply: 115 Vac or 230 Vac - 50/60 Hz. Alternatively: 115 Vac - 50/60 Hz by means of an external transformer - Sample size: 2 g - 2,5 g - Drum diameter: 20 cm, equipped with special elastic gaskets - Rotation speed: 200 r.p.m. - Rotating drum equipped with safety cover.



Mini thermal printer, Code 3280A.136



Trolley, Code 3280.900



Opening roller



Sartorius, Code 165.704



Sartorius, Code 165.708



Raw Cotton Selector, Code 3282

How to use Raw Cotton Selector with NATI

After weighing 2,5 g of raw cotton with a high precision electronic balance and inserting the same into the Raw Cotton Selector, the operator can remove the obtained web by means of the special extractor, and pass it again a couple of times through the Raw Cotton Selector.

The cotton web is now ready to be rolled up by the operator in sliver form. After cutting the part of the sliver in excess of 2 g, the operator can insert the obtained sliver in the NATI and start the test. The illustrated preparation takes less than 7 minutes for a 2 g sample.



NATI Technical Features

Tested material	Cotton, synthetic and man-made short staple sliver - blended sliver - raw cotton material
Testing speed	1 cm/sec
Classes of Neps	≥0,5 mm - ≥0,7 mm - ≥1 mm
Classes of Trash	≥0,25 mm - ≥0,5 mm
Opening rollers	Interchangeable and suitable for cotton and for synthetic short staple fibres (optional - one is needed)
Testing mode	3 available testing modes, to be selected by the operator: <ul style="list-style-type: none">• cm/test, the operator just enters the number of tests and the unit length. This testing mode is recommended for testing slivers.• gram/test, the operator enters the count in grain of 6 yard of sliver, the number of tests and the unitary weight. The length of the sample is automatically calculated by NATI.• gram/sample, the operator enters the weight of the sample. This testing mode is recommended for testing raw cotton.
Printer connection	Serial port RS232, available for optional printer
Noise	< 70 dB (A)
Power supply	230 Vac - 50 or 60 Hz / 115 Vac 50 or 60 Hz, to be specified when ordering
Power absorption	1000 VA
USB port	Situated on the front side
Touch screen display	Wide colour user-friendly touch screen display
Air supply	Not required

NATI

DESCRIPTION / APPLICATIONS

Laboratory equipment for analysis of:

- Neps in raw cotton
- Neps and Trash in cotton sliver and roving
- Neps in synthetic and blended sliver
- Quality and efficiency of carding and combing operations

TECHNICAL FEATURES

- Tested material: cotton, synthetic and man-made short staple sliver, blended sliver, raw cotton material
- Testing speed: 1 cm/sec
- Classes of Neps: $\geq 0,5$ mm - $\geq 0,7$ mm - ≥ 1 mm
- Classes of Trash: $\geq 0,25$ mm - $\geq 0,5$ mm
- interchangeable opening rollers suitable for cotton and for synthetic short staple fibres (optional one is needed)
- Testing mode: 3, to be selected by the operator (cm/test - gram/test - gram/sample)
- Printer connection: serial port RS232 available for optional printer
- Power absorption: 1000 VA
- Noise: < 70 Db
- USB port
- User-friendly touch screen display
- Internal memory

ADVANTAGES

- Fast in testing large size samples
- High repeatability of results
- Automatic execution of groups of tests
- Compact and transportable
- Very easy to operate
- Important savings can be obtained by the constant use of NATI

ACCESSORIES

Mini thermal printer	code 3280A.136
Opening rollers, suitable for 100% cotton sliver and blends with cotton prevalence (up to nominal 65%)	code 3280.168
Opening rollers, suitable for 100% synthetic man-made short staple sliver and blends	code 3280.169
Trolley	code 3280.900
Electronic high precision Sartorius balance	code 165.704
Electronic high precision Sartorius balance	code 165.708
Raw cotton selector	code 3282

DIMENSIONS / POWER SUPPLY

Weight: 40 kg

Dimensions: (L) 400 x (W) 379 (H) 700 mm.

Power supply: 115 Vac or 230 Vac - 50 Hz or 60 Hz, to be specified when ordering

Air supply: not required

Photographs and descriptions of the present leaflet have to be considered as purely indicative and not binding
Ref. En 2017-02