NIR
Next Intelligent Research

NIR PROJECT STRENGHTS

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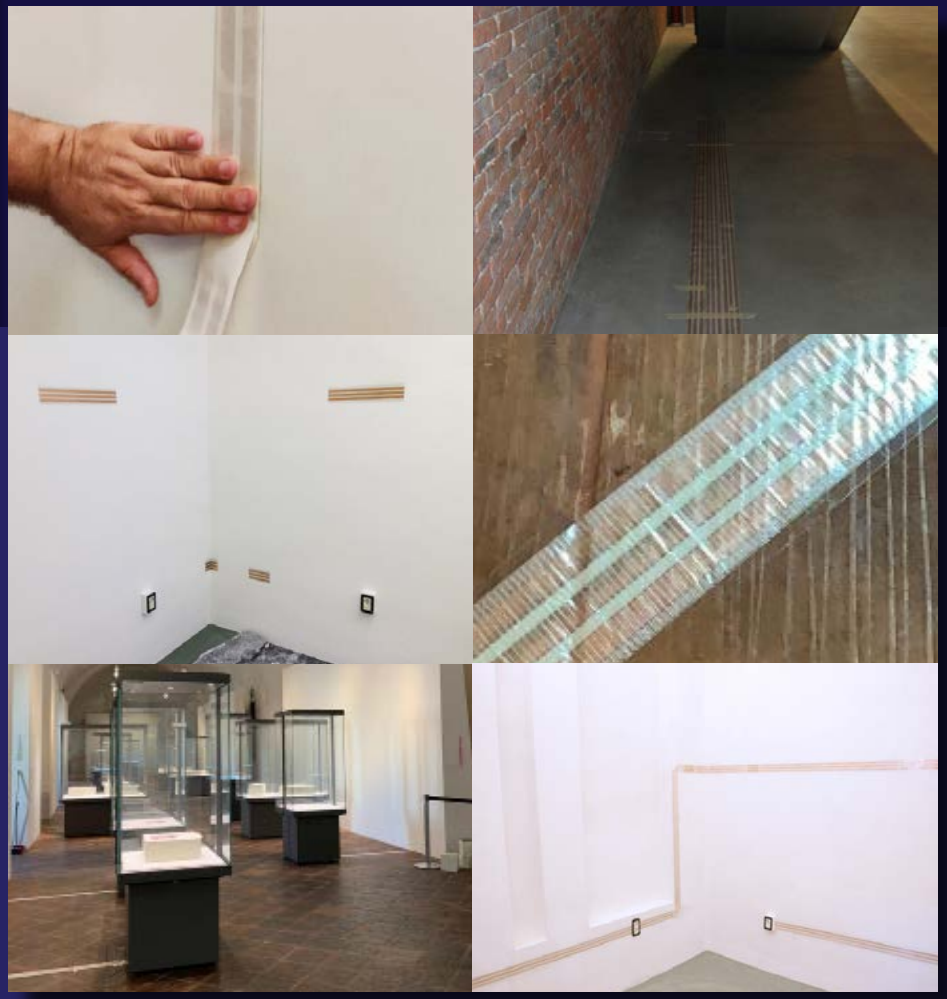
NIR OPENS TO REVOLUTIONIZE THE ENERGY MARKET: DISTRIBUTION MANAGEMENT DATA CONSUMPTION

YESTERDAY

the traditional electrical system

NEXT
New Energy Tape



TODAY

THE SOLUTION

NEXT
New Energy Tape

TODAY WE HAVE FIRST BUILT AND THEN BREAKED TO PASS THE SYSTEMS, OVERLOOKING THE CONCEPTS OF STRUCTURAL SOLIDITY, ACOUSTIC AND THERMAL EFFICIENCY.
THE LAST EARTHQUAKES HAVE MADE VISIBLE THE DISASTERS CAUSED BY THIS WAY OF BUILDING.
THE STRUCTURES WEAKEN BY THE BREAKS WERE THE FIRST TO GIVE OUT.

NIR EMBRACES A CONCEPT THAT BEFORE BEING ELECTRIC IS ABOVE ALL CONSTRUCTIVE. FOR THIS, IT TAKES A REVOLUTIONARY ACT IN THE WORLD OF THE THIRD MILLENNIUM INDUSTRY.

MANUFACTURERS 'ESTIMATES WORLDWIDE SHOW A TREND TO PREASSEMBLED OR DRY BUILDING. NIR IS THE SOLUTION TO THE SYSTEM SIMPLIFICATION, TO THE ACOUSTIC IMPROVEMENT AND TO THE SAVING OF RAW MATERIALS AND RESULTS, TO THE SEISMIC IMPROVEMENT OF BUILDINGS AND, IN THE ADDITION OF ALL THESE VALUES IN A REDUCTION OF THE CO2 EMITTED COMPARED TO THE TRADITIONAL 50% SYSTEM.

LA SOLUZIONE

NEXT
New Energy Tape

Next-Tape is the innovative flat electrical tape

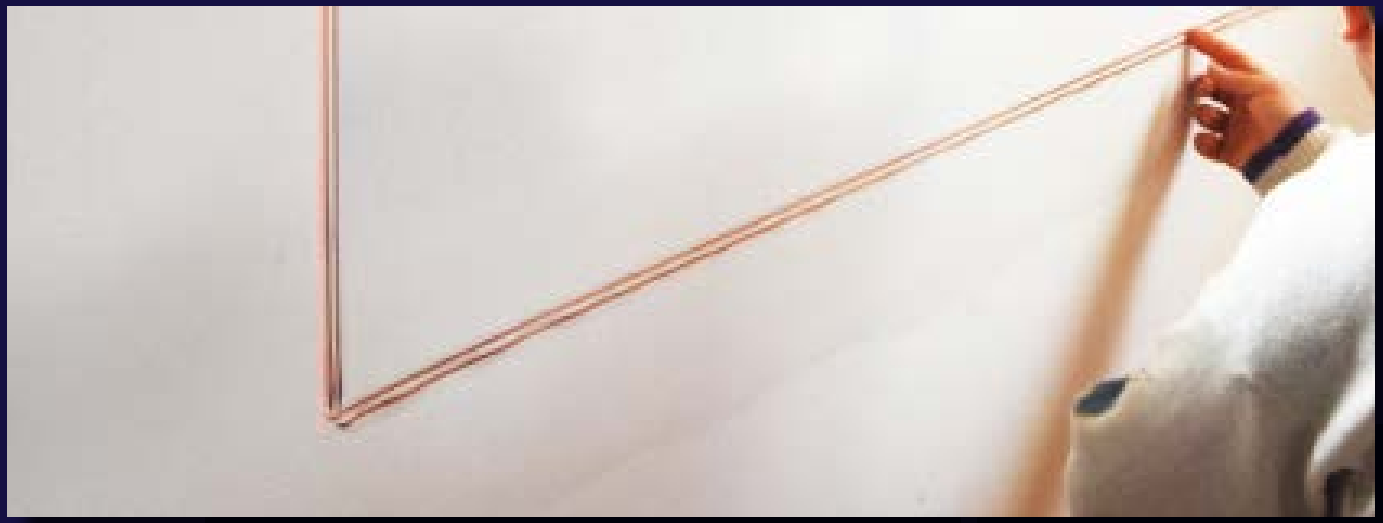
- foldable,
- surmountable,
- variable thickness from 0.25 to 0.31 mm,
- flame resistant (in continuity of the system for two hours at 850 °C on non-REI plasterboard walls)

Next-Tape guarantees maximum flexibility of use thanks to the rapid Adhesive Laying System, which does not require breakthroughs in the walls.

Next-Tape solves any kind of problem related to point-to-point displacement of sockets, lights, users in general.

Next-Tape represents the key element for the entire NIR industrial platform, necessary for the realization of the innovative AC/DC hybrid flat circuits, DueAnelli.DueCorrenti, for modernization and energy efficiency, home digitization and integrated, timely and data and energy device.

NEXT-TAPE: TECHNICAL CHARACTERISTICS



ELECTRICAL AND PHYSICAL CHARACTERISTICS OF THE ELECTRIC BELT

Nominal tension U_0: 450 V
Nominal tension U: 750 V
Nominal tension U_m: 1000 V
Current density: 9 A/mm² at +25 °C (T_{amb})
Test voltage: 5000 V
Breakdown voltage: 16000 V (Isolation test of the Polytechnic of Bari)
Maximum operating temperature: +85 °C
Minimum operating temperature: -10 °C

ENVIRONMENTAL FEATURES

Storage and transport temperature: from -10 °C to +50 °C
Ambient temperature during installation: from +5 °C to +55 °C
Maximum relative humidity at T_{amb}= + 25 °C: 100%
Maximum relative humidity at T_{amb}= + 20 °C: 95%
Maximum altitude of use: 5000 m

FIRE RESISTANT

The tapes have passed the tests required by current standards regarding compliance with the criteria of “FIRE RESISTANCE” and “NON PROPAGATION OF THE FLAME”:
CEI – EN – 60332/1 – 1
CEI – EN – 60332/1 – 2
CEI – EN – 69332/1 – 1
CEI – EN – 69332/1 – 2

FIRE RESISTANCE TEST (LAPI TEST): continuous fire resistance of the system for 77 minutes at a temperature of 983 ° C on non-REI walls

FIRE RESISTANCE TEST (LAPI TEST): fire resistance of 120 minutes at a temperature of 850 ° C on the direct belt in continuity of the system Emission of toxic and opaque fumes lower than the maximum limits allowed by the European regulation EU - 305/2011 for cables CPR.

TECHNICAL COMPARISON BETWEEN TRADITIONAL ELECTRIC CABLES AND NEXT-TAPE TAPES

From the document “TECHNICAL COMPARISON BETWEEN TRADITIONAL ELECTRIC CABLES AND NEXT-TAPE FOR RESIDENTIAL BUILDINGS” it is clear that the comparison between CONDUCTORS WITH PVC INSULATION FS17 TYPE 2.5 sq mm and Next-Tape NM3BT25 with polypropylene insulation 2.25 mmq, highlights two clearly different Iz, namely:

For cable NM3BT25 (3 x 2,25 mmq) Iz = 35 Ampere
For conductors FS17 di sezione 2,5 mmq Iz = 20,67 Ampere
(ambient temperature of 25°C)

The NM3BT25 cable (3 x 2.25 mmq) allows a higher range of about 79% compared to the line (3 x 1 x 2.5 mmq) made with FS17 conductors.

$Iz=I_0 \times K_u$ where
I_0: theoretical flow rate in steady state, at an ambient temperature of 30 ° C, taken from the Standard CEI – UNEL – 35024
K_u: correction coefficient given by $k_1 x k_2$ where
k_1: correction coefficient given by k1 x k2 where k1: correction factor to be applied if the ambient temperature is different from 30°C;
k_2 : correction factor for bundled or layered cables.

NEXT
New Energy Tape

WHY DOES NEXT-TAPE BRING MORE CURRENT?

BECAUSE NEXT-TAPE'S HEAT DISPOSAL CAPACITY IS AT LEAST TEN TIMES HIGHER THAN TRADITIONAL CABLE. IN PRACTICE, IT RESULTS IN LESS STRESS OF THE CABLE ITSELF, IN LESS HEAT PRODUCED, IN LESS LOSSES DUE TO THE JOULE EFFECT, AND IN A BETTER SYSTEM EFFICIENCY.

(The resistivity of the material increases with increasing temperature. At the same current we have temperatures at the copper surface even 20 ° C lower, precisely due to the type of contact laying and the flat dissipation surface)

REPORT
DC VOLTAGE DROP TESTS OF NIR CONDUCTOR TAPES

TEST BY THE POLYTECHNIC OF BARI REV. 2.0 - 2021.10.28

This report illustrates the results obtained from the tests carried out on the voltage drop of Next-Tape conductive tapes subjected to the passage of a direct current and their comparison with those obtained for traditional cables (with circular section). Specifically, NM3BT25 (tape 3 x 2.25 mm2) and NM3BT15 (tape 3 x 1.5 mm2) were tested and the results obtained were compared with those relating to flexible cables for fixed laying with PVC insulation respectively with cross-section circular S = 2.5 mm2 and S = 1.5 mm2. The test involved an NM3BT25 tape and a N07V-K cable with S = 2.5 mm2 of equal length L of about 10 m (L = 10.18 m) in the presence of an ambient temperature (Tamb) of about 23 ° C

NM3BT25

Politecnico di Bari

Test current – I_t [A] [A]	Test current – T_{cond} [° C]		Voltage drop in D.C. – ΔV/L [mV/m]	
	NM3BT25	N07V-K S = 2,5 mm²	NM3BT25	N07V-K S = 2,5 mm²
20,00	28,6	31,6	161,4	178,9
25,00	32,0	38,5	205,0	238,9

Table 1 - Comparison between the results obtained from the test on the voltage drop in D.C., evaluated per unit of length, for the NM3BT25 tape and the N07V-K cable with S = 2.5 mm2

NM3BT15

In this case, the test involved the NM3BT15 tape laid under the floor resin for about 2 m of its length (total length of the tested tape L = 2.73 m) and the N07V-K cable with S = 1.5 mm2 of equal length in contact with the resin surface (Figure 3). The measured ambient temperature was about 22.5 ° C (Table 2).

Politecnico di Bari

Test current – I_t [A] [A]	Conductor temperature – T_{cond} [° C]		Voltage drop in D.C. – ΔV/L [mV/m]	
	NM3BT15	No7V-K S = 1,5 mm²	NM3BT15	No7V-K S = 1,5 mm²
15,00	25,1	34,4	176,2	197,8
20,00	30,7	43,5	240,7	296,7

Table 2 - Comparison between the results obtained from the test on the voltage drop in D.C., evaluated per unit of length, relative to the NM3BT15 tape laid under the floor resin and to the N07V-K cable with S = 1,5mm2

FROM TABLE 2 IT IS POSSIBLE TO DEDUCE THAT THE LOWER TEMPERATURE REACHED BY THE NM3BT15 TAPE COMPARED TO THAT OF A COMMON CABLE WITH AN EQUIVALENT CIRCULAR SECTION, WITH THE SAME OPERATING CURRENT IT1 = 15A, **REDUCES THE VOLTAGE DROP** IN D.C. ΔV OF **10.9%** (REDUCTION IN ABSOLUTE TERMS EQUAL TO 21.6 MV/M).
IF THE CURRENT USED IS IT2 (20 A), THE REDUCTION OF THE VOLTAGE DROP IN D.C. ΔV REACHES A VALUE OF **14.2%** (REDUCTION IN ABSOLUTE TERMS OF 33.9 MV / M).

REPORT
DC VOLTAGE DROP TESTS OF NIR CONDUCTOR TAPES

TEST BY THE POLYTECHNIC OF BARI REV. 2.0 - 2021.10.28

CONCLUSIONS

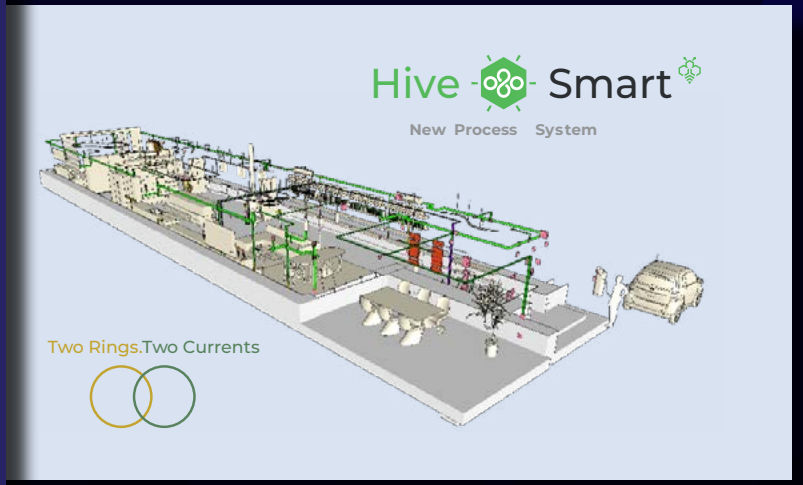
FROM THE PRELIMINARY RESULTS OBTAINED FROM THE TESTS DESCRIBED IN THIS REPORT, IT IS POSSIBLE TO OBSERVE HOW THE ABILITY OF THE NEXT-TAPE CONDUCTIVE TAPES TO DISSIPATE MORE THE HEAT PRODUCED BY THE PASSAGE OF CURRENT COMPARED TO THE EQUIVALENT EQUIVALENT CABLES WITH CIRCULAR SECTION, FAVORS A LOWER VOLTAGE DROP IN D.C. IN THEIR USE. IN TERMS OF VOLTAGE DROP, THE ADVANTAGES ARE MORE VISIBLE WITH THE USE OF HIGHER CURRENTS.

NEXT
New Energy Tape

WHY DOES NEXT-TAPE BECOME, BEYOND THE SINGLE SOLUTION TO THE PROBLEM, THE PILLAR ON WHICH THE ELECTRICAL SYSTEM OF THE FUTURE IS BASED?

INTERNATIONAL SCIENTIFIC REPORTS STATE THAT THE WORLD IS EVOLVING FROM ALTERNATING CURRENT TO DIRECT CURRENT (SEE THE REPORTS OF THE NAVIGANT RESEARCH - USA AND THE LAST IAQVEC 2019 CONFERENCE HELD IN BARI - ITALY). IT IS SIMPLY A CONCEPT OF PHYSICS, IT IS THE GREATER EFFICIENCY OF THE DIRECT CURRENT EQUIPMENT COMPARED TO THE ALTERNATING.

NIR MARRIED THIS CONCEPT AND PRESENTED THE 2-RINGS.2-CURRENTS HYBRID SYSTEM IN THE WORLD PREMIERE.



WHAT ADVANTAGES DOES THE DOUBLE RING GIVE COMPARED TO THE TRADITIONAL SYSTEM?

ANALYSIS OF THE CONSUMPTION OF A TRADITIONAL HOUSE SHOWS THAT THE MAJOR PART OF THE KWH CONSUMED DO NOT COME FROM THE POWER LOAD (EX. REFRIGERATOR 438 KWH, TV + STANDBY 120KWH, ETC.), APPLIANCES THAT CONSUME A MAXIMUM OF 50-60W, BUT FOR MANY HOURS A DAY (SEE ENEA REPORTS ON HOME CONSUMPTIONS).

IF IN THE 48V DC HYBRID RING WE CONCENTRATE THESE WEAK POWER LOADS (LIGHT, ALARM, TV - TV CC, BATTERY CHARGERS, INTERCOMS AND VIDEO DOOR PHONES, ROUTER WIFI, POINT MECHANICAL VENTILATION, ELECTRIC VACUUM SHUTTER MOTOR, PUMP OF THE KITCHEN AND BATHROOM HOODS, THERMOSTATS, RADIO, ETC.) WE SEE THAT OF THE 3500 KWH / YEAR TYPICAL OF THE HOUSE, 1500 KWH ARE GIVEN BY THE POWER LOAD (OVER 300 W UP TO 3000 W). THE REMAINING 2000W ARE DATA FROM WEAK LOADS THAT ARE NORMALLY POWERED IN DIRECT CURRENT VIA AN EXTERNAL OR INTERNAL POWER SUPPLY.

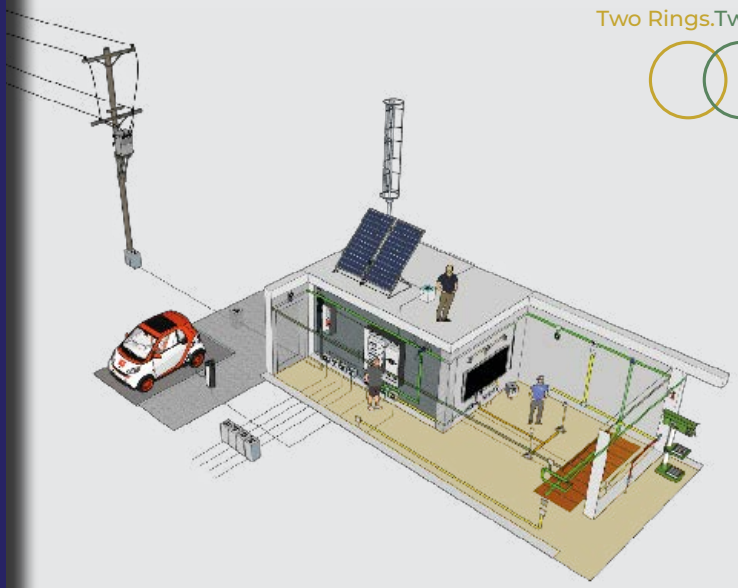
TWO RINGS.TWO CURRENTS

NIR IS ALREADY READY WITH THE 48 V DC, WITH THE LED LIGHTS, THE MOTORIZATIONS (SHUTTERS, VELUX, ALARM, ETC.), WHICH GO FROM THE CENTRALIZED MECHANICAL VENTILATION TO THE POINT-POINT VENTILATION (SEE NEXT-AIR), SO IT IS READY TO CONCENTRATE THE MOST OF THE LOAD IN THE UPPER RING, WHICH AMONG OTHER THINGS, CAN BE DIRECTLY POWERED BY ITS OWN PHOTOVOLTAIC WITH OR WITHOUT STORAGE, BRINGING THE SHARE OF THE SELF-CONSUMPTION, IN THE EVENT OF A RENEWABLE ENERGY SOURCE WITH STORAGE ADDITIONAL '85%. UN THINKING RESULT FOR TRADITIONAL PLANTS.

Hive Smart

New Process System

Two Rings.Two Currents



DOUBLE RING SYSTEM NIR (PATENT N. 102020000019156)

TOP RING SELV (Safety Extra Low-Voltage) 48V DC

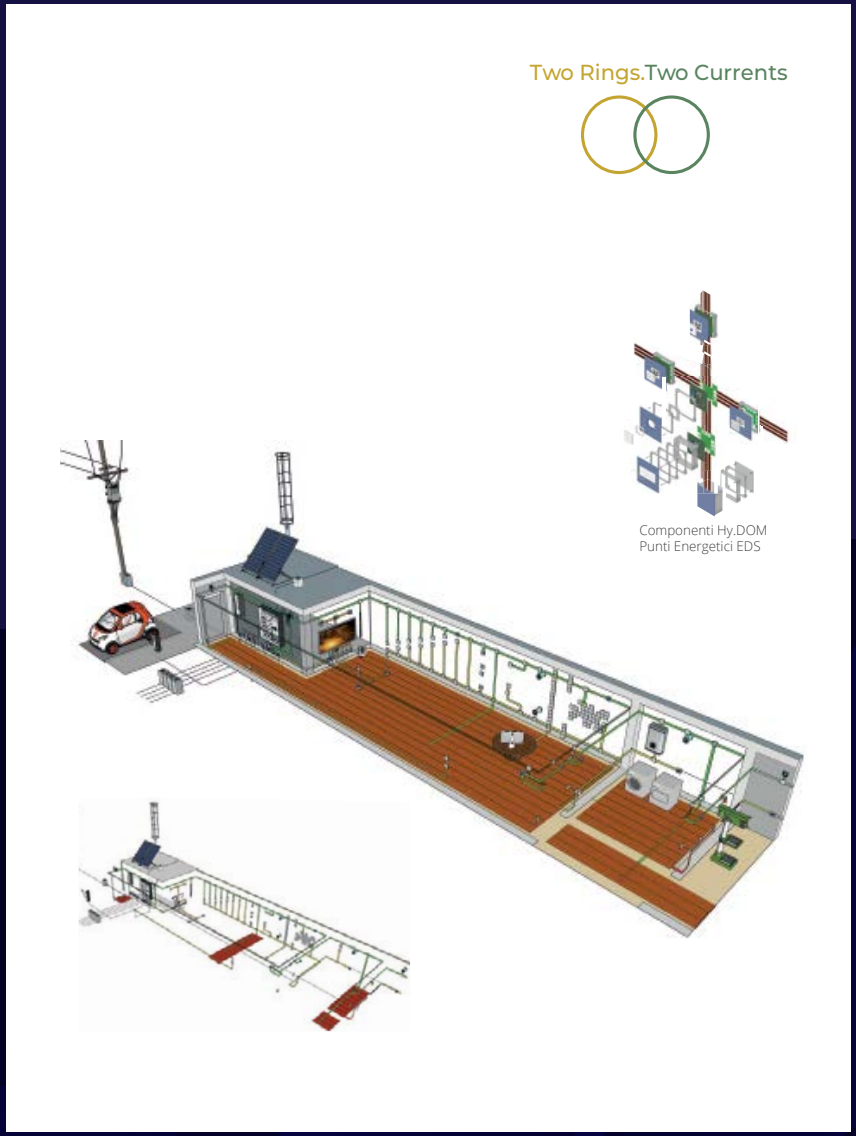
The NIR structured cabling system provides for the arrangement of 2 Next-Tape rings within the environment subject to the intervention. The definition of the upper ring (48V DC) can be described in this way: an uninterrupted line consisting of a 4-wire backbone, two of 2.25 sq. Mm power (positive and negative) and two of 0.5 sq. Mm data bus.

During the design phase, the drafting of the tape becomes very simplified, with a consequent reduction in the installed square footage. In fact, with only 40 meters of development, the entire perimeter of an ideal 10x10 meter house is covered.

Since the system works at a very low safety voltage, an adequate current capacity is required to power a certain number of loads on the entire line, and the Next-Tape, tested by the Polytechnic of Bari, reaches a capacity of over 35 Amps. (section 2.25 sq mm). Consequently, it is clear that the ring is able to support any present and future development of the sum of the individual loads, each below 300 Watts in 48V DC.

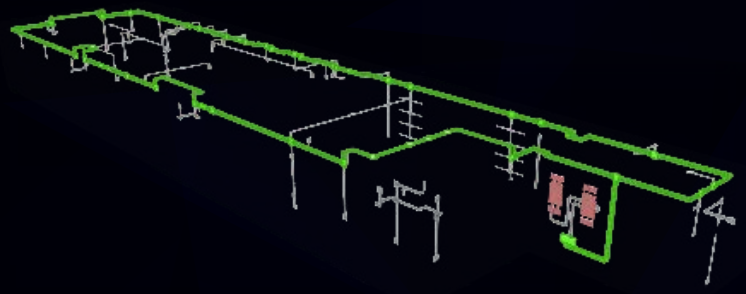
For example, each load on the upper backbone must be withdrawn through a circuit (precisely one of those to be made on the withdrawal bases) which not only monitors the extent of the load for accounting purposes, but enables it according to a priority algorithm and controls the quality and maximum withdrawable. Thus when certain criteria are exceeded (eg a certain load for a certain time) the load is either disconnected or, depending on the type of load, dimmed.

This prevents the short from spreading and therefore the other loads undergo discontinuity.



ADVANTAGES OF THE TOP RING 48 V DC

- VERY LOW SAFETY VOLTAGE THEREFORE NO DANGER O ELECTROCUTION;
- NO ELECTROMAGNETIC EMISSION;
- GREATER EFFICIENCY;
- NO PROPAGATION OF SMOKE DUE TO LACK OF PIPES;
- NO BREAKS IN THE MASONRY;
- SPEED OF CONSTRUCTION, TIMES REDUCED BY 50%;
- REDUCTION OF THE METRATURE OF TRADITIONAL MATERIAL (ROUND CABLES) UP TO 10 TIMES LOWER;
- POSSIBILITY OF EXECUTION OF WORKS WITHOUT THE NEED TO LEAVE OWNERSHIP;
- NO LOSS OF ACOUSTIC AND THERMAL PERFORMANCE;
- FULLY EDITABLE AT ANY TIME.



ADVANTAGES OF THE TOP RING 48 V DC

The advantages of direct power supply at 48V DC reside in the intrinsic safety of Next-Tape, in the ability to be easily powered by renewable sources and in storage, even disconnected from the grid.

The upper ring is not subject to high electromechanical stress in the event of a short circuit, because the currents that develop are at most in the order of 25% more than the maximum rated current of the power supply or DC/DC converter, against 2000/3000 Ampere of a short circuit in AC 230V.

The tape must simply be sized for the effective capacity of the load to be powered in DC, without worrying about the protection of the cable itself from short-circuit currents.

For example, to power the LED lamp in the living room from 100 Watt to 48 Volt (12000 Lumen emitted), the tape must be sized for a current of 100W / 48V = 2.1Ampere. It is therefore possible to power a light point with a 2x0.5 mmq and not with a 3x1.5 mmq, as required by the low voltage legislation.

Also in this case, the electronics distributed on the ring simplifies and decreases the number of meters of development leaving a freedom of intervention, even posthumously, impossible to obtain in traditional systems.

SAFETY FIRST OF ALL

Another clarifying example: if I have to power eight lamps outside a house applied to the walls of the four sides, I start with the four electronics decentralized on the perimeter with a total length of 20 meters of tape (instead of the general panel with a minimum length of cable). 100 meters, and with a cable section three times greater than that required in direct current).

THE SAVINGS ARE CALCULATED IN A HOUSE OF 20 KG OF COPPER AND 43 KG OF PLASTIC WITH THE SAME RESULT.

TRADITIONAL LINE FS17 (3x1x1,5 mm²) (PHASE - NEUTRAL - PE)

- Copper weight of the single conductor: 14,4 g/m
- Copper weight of the line: 43 g/m
- Insulation weight (PVC) of the single conductor: 6,6 g/m
- Insulating weight of the line: 20 g/m
- Weight (copper + insulation) of the line: 63 g/m
- Weight of the flexible tubing: 50 g/m–De = 20 mm
- Weight of the entire line
- (single-core conductors = flexible PVC tubing)
  P = 63 + 50 = 113 g.

NEXT-TAPE NM3BT15 (3x1,5 mm²) (PHASE - NEUTRAL - PE)

- Peso rame della linea: 43 g/m
- PP tape weight of the line: 10 g/m (x2) = 20 g
- Weight of the entire line (copper + PP tape)
  P = 43 + 20 = 63 g

P.N.: The weights listed vary by manufacturer.

Furthermore, the losses due to the Joule effect are considerably lower due to the lower development of linear meters.

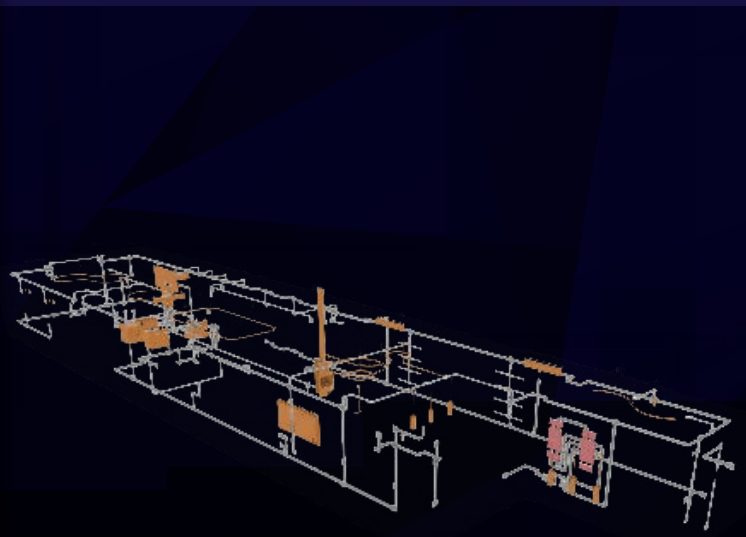
TOP RING 48 V DC

Finally, the ring greater than 48V DC, in the case in which sensor or fire protection devices feed, allows the continuity of power supply of these loads even in the event of disconnection of the mains line - if there is an upstream accumulation - thanks to the continuity (resistance of 2 hours at 850° - see LAPI test).

Please note that in the event of a fire, the greatest cause of death is due to the inhalation of fumes, normally transferred from the pipes from room to room, which is impossible in the Next-Tape installation system.

Furthermore, moving some loads on the 48V DC line allows a very important reduction of electromagnetic loads of the building.

In the development of the NIR project, the 230V AC power load part is powered only when there is a 230 AC load required and the lines are not live. Without actual load request, the ring is not under tension (a non-negligible value in green building and green architecture).



TOP RING 48 V DC

The further simplification of the system derives from the special battery-free radio switch, whose operation relies on the fact that the energy needed to create the radio signal is generated by an internal dynamo, which in addition to generating the pulse signal, charges a capacitor , which allows prolonged pressure on the button to activate light dimming functions.

With this innovative system it is no longer necessary to know where to put the switches for turning on the lights, nor the number, because you attach them where you want and program them with the receiver in the control unit (which once received the impulse distributes it on the remote outputs).

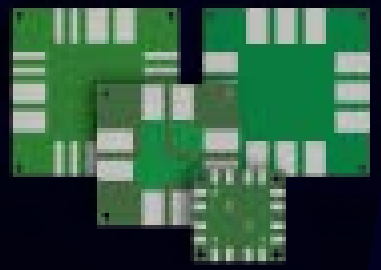
This simplification alone allows the saving of a few thousand meters of wire in a home, also making the control system completely modifiable at any time.

TOP RING 48 V DC

It is possible to attach a special base directly on the tape that takes voltage and bus and makes them available to the control electronics. The base has several freely programmable inputs and outputs, such as: lights; motor for roller shutters; punctual mechanical ventilation with heat recovery; and any sterilization filters using anions or ozone - see Next-Air; inputs for magnetic contacts or shutter contacts, etc.

A part of the board is designed for a special plug-in multisensor (under development and patented by NIR), in which there are 8 detection systems:

1. Light sensor
2. UV sensor
3. CO2 sensor
4. VOC sensor
5. Barometric or pressure sensor
6. Humidity sensor
7. Temperature sensor
8. 6-axis sensor.

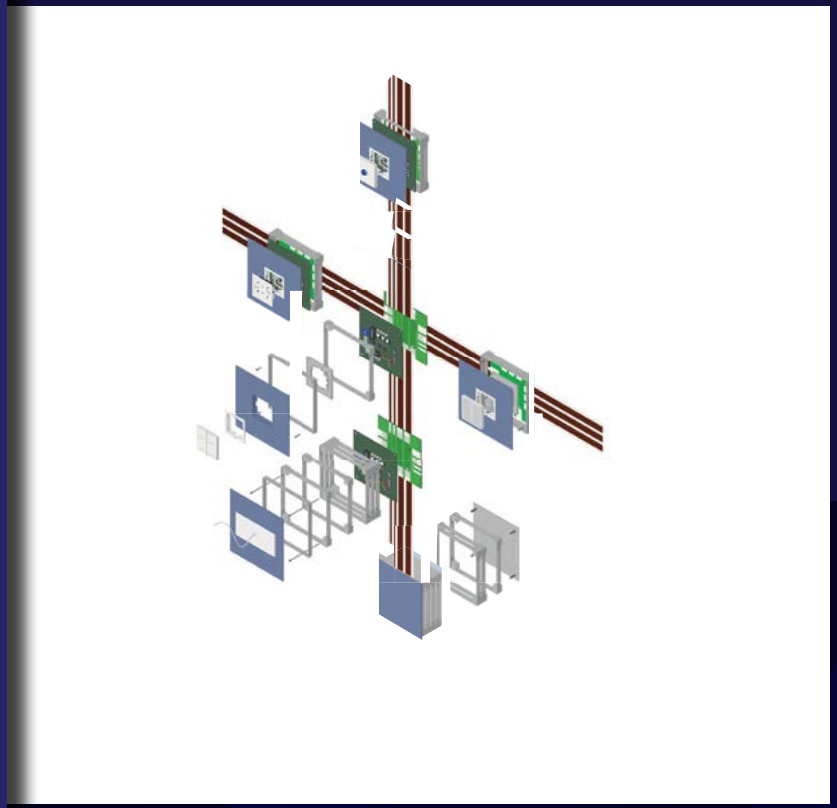


TOP RING 48 V DC

The IO intelligent remote card can be inserted in one or more rooms and, for example, in the case of humidity, let the VML (Local Mechanical Ventilation) work - see Next-Air - in a timely manner, both for maintaining the quality of the air, both for the elimination of unwanted humidity (produced by breathing or by the hob or by the washing machine/shower, etc.).

In this case, consumption is punctual and limited.

When the system identifies the need for a total change of the entire house, it will generate a total change of air by making the individual units work in the opposite way (for example, two suck and two eject).



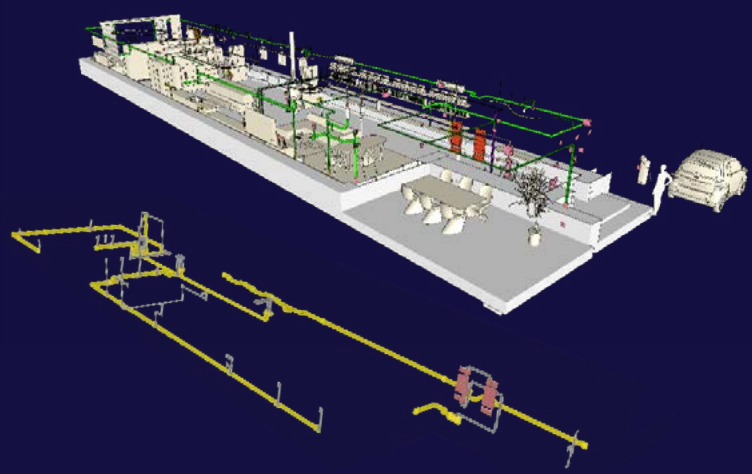
LOWER RING 230 V AC

The constructive hypothesis is based on a room-by-room distribution system on a single-phase line made using Next-Tape 3x2.25 sqmm NM3BT25. The distribution is ideally branched from a general panel towards the rooms, by means of a cable threaded into concealed pipes. The optimum is represented by floor distribution, because it is the type of installation that minimizes thermal bridges and is easier to implement. For all loads with a power greater than 300 Watts, the use of alternating current remains. For these loads it is sufficient to prepare room by room a ring of Next-Tape on which to connect the sockets.

The innovation proposed by NIR consists in proposing a low thickness extraction/gripping system (21-23 mm depending on world standards).

IN BRIEF, THE GRIPPERS WILL BE PLACED, EVEN AT THE REAR, AT ANY POINT OF THE FLAT TAPE BACK. THE LEVEL OF FREEDOM THAT ALLOWS THIS TYPE OF ASSEMBLY IS SUBMITTED.

It remains to consider the fact that for most of the domestic loads the belt current capacity allows to have a single room force line, or in the case of loads such as those of the kitchen (induction hob, food processor, microwave and oven) in the same tube there will be 4 protected lines.



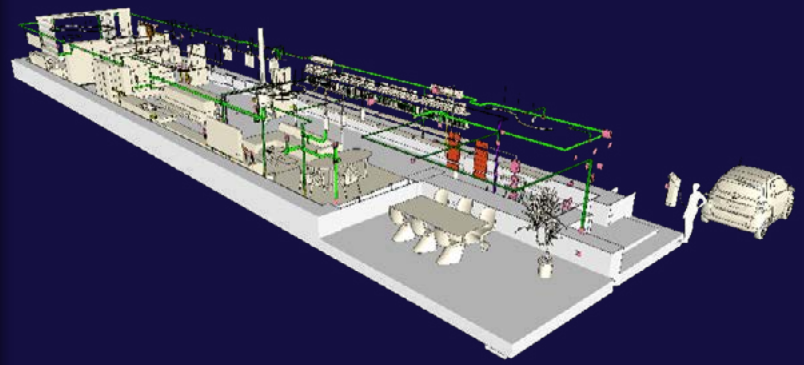
CONCLUSIONS

The NIR construction method provides for freeing itself from existing infrastructures, moving the current quickly, with intervention times less than 50%, %, without making noise, without producing aggregates (reducing by at least 80% the sending to disposal plants) and without worsening the energy performance of the building (given by the breakthroughs in the masonry), thus being able to carry out more jobs in the same unit of time.

The batteryless radio control system is an incredible system solution, which, combined with the NIR system and the Next-Tape flat electrical tape, revolutionizes the entire construction system of electrical systems, making them safer, more efficient from an energy point of view. , seismic and acoustic and less expensive.

Replacing an old electrical system with Next-Tape makes a building safer in terms of fire performance (see Report Lapi and Test TÜV Intercert 19-PPA-000000713-03-TIC).

The double-ring hybrid system provides for energy efficiency given by the reduction of energy conversions, by the lower development of cables (ratio from 1 to 10) and if powered by a renewable source and storage, it allows the energy produced to be efficiently self-consumed (less conversions give more energy produced, available for consumption). The entire system is covered by 8 registered patents, 6 of which are already in the international PCT extension phase and 2 in the analysis phase.



NIR PROPOSES ITSELF AS **THE HIGHWAY OF ENERGY AND DIGITIZATION OF TOMORROW**

NIR'S GREEN-LIVING VISION FINDS ITS MAXIMUM APPLICATION IN THE HOME UNIVERSE PROJECT.

The Home Universe offers an integrated and shared vision of all NIR systems, making the most of the concept of "dynamic management, generated and distributed of cooperative energy" up to the efficiency of the next green-towns with zero emissions.

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