

Innovation in advanced materials



CLEANTECH & BEYOND



Conductive Inks
Thermoresponsive Materials for Sensors

Digital Temperature Indicator Label

a-Series (aPXXNR)

Irreversible temperature label with visual and digital indication, integrated with passive RFID or NFC tag.

CleanTech DTI a-Series (30°C - 60°C)

aPXXNR is an irreversible temperature indicator label that enables temperature tracking at item-level and displays the device status in both visual and digital formats, termed a “Digital Temperature Indicator” or “DTI” label. For the visual indication, the color panel irreversibly changes from white to red when the device reaches a critical temperature. In parallel, the DTI status can also be detected via an RFID interrogator (for RFID version) or an NFC smartphone (for NFC version).

The DTI label technology is based on the physical transformation of our specially developed thermoresponsive materials at a particular temperature without any needs for a power source or battery. aPXXNR offers a cost - effective solution for an item-level temperature monitoring system in logistics and production. The advantages of the technology are compatible with existing RFID/NFC smart label production, RFID/NFC devices, standard, and infrastructures.

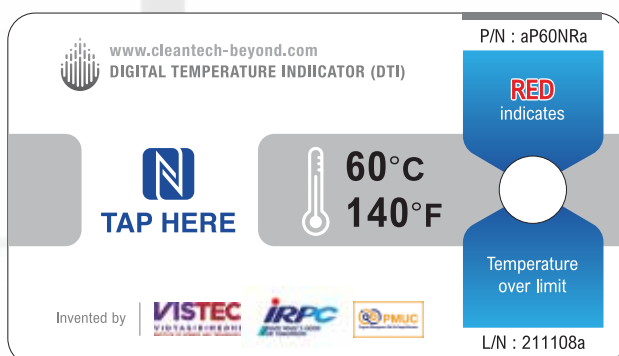
Applications

- Maintenance of electrical/electronic equipment
- Temperature monitoring of rotating machine parts
- Monitoring household items
- Solar panel temperature monitoring
- Quality control of paint drying

Key Benefits

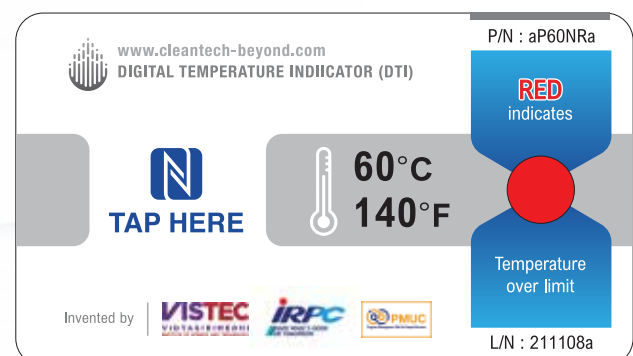
- Irreversible
- Battery-free device
- Low-cost suitable for item-level tracking
- Compatible with the existing RFID/NFC infrastructure

BEFORE



I/O_flag = True

AFTER



I/O_flag = Fales

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Product Selection Guide – a-Series (aP60NR, aP55NR, aP40NR, aP30NR)

Critical temperature	60°C	55°C	40°C	30°C
Device Accuracy	60° ± 2°C	55° ± 2°C	40° ± 2°C	30° ± 2°C
Visual indication (standard)	White to red	White to red	White to red	White to red
Response time	Within 3 minutes	Within 3 minutes	Within 3 minutes	Within 3 minutes
Storage condition	Less than 30°C/ 70%RH*	Less than 30°C/ 70%RH*	Less than 30°C/ 70%RH*	Less than 25°C/ 70%RH*
Shelf life *Guaranteed from date of shipment if maintained under storage condition	6 months*	6 months*	6 months*	6 months*
Water resistance	Up to 72 hours*	Up to 72 hours*	Up to 72 hours*	Up to 72 hours*
Chemical resistance	Up to 12 hours*	Up to 12 hours*	Up to 12 hours*	Up to 12 hours*
Output (customizable)	Visual, NFC, RFID	Visual, NFC, RFID	Visual, NFC, RFID	Visual, NFC, RFID

Other options (customizable)

Series	Part no.	Sensing Characteristic	From factor	Triggering temp. range (°C)	RFID Type				Visual indicator color			
					None	UHF	NFC T2	NFC TV	None	Red	Blue	Magenta
a-Series	aX00XX-00.000	Irreversible	Label	30-60	●	●	●	●	●	●	○	○
b-Series	bX00XX-00.000	Irreversible	Label	0-30	Under development (2023)							
z-Series	zX00XX-00.000	Special design, customized to user's specification										

● Available

○ Only Customization

Health and Safety

The products are intended for research and industrial use by trained personnel. It is important for workers to avoid overexposure to chemicals contained in these products. Always consult the Material Safety Data Sheet (MSDS) and product labels before use. Keep product container closed when not in use to prevent solvent evaporation and spilling hazard.

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IRPC
SHAPE WHAT'S GOOD
FOR TOMORROW