



# LASER MARKING SECURITY LABELS









Nippon Carbide Industries presents a special group of products in the Hi-S Cal range, called the **AX series**. These self-adhesive foils can be engraved by using sophisticated and state of the art laser technology. With this technology industries can create labels or stickers showing text and signs that remain flawless for many years, providing excellent durability.

#### DURABILITY AND SECURITY

The laser marking foils are often used when broadcasting messages or instructions are needed that may not fade and must remain visible and readable at all times.

The films can be transformed into "laser engraved stickers" that can be used for various purposes.

Hi-S Cal  
**AX**  
SERIES

SPECIALITY PLASTIC FILMS  
LASER ENGRAVING LABELS



# HI-S CAL AX SERIES FOUR FILM TYPES

## AX7416M

Black on white acrylic foil, for very detailed engraving, clearly visible information on various types of surfaces and products.



The **AX series** are brittle double layered acrylic films. The top layer of the material is made of acryl. The film is supplied on rolls and the self-adhesive film can be converted into different shapes of labels or stickers. The strong adhesive that carries the foil is made of a pressure sensitive acrylic which assures a permanent and secure bondage to a variety of carrier materials.

## AX7140M

White on black acrylic foil. When white color is the more favourable choice on a specific background.



## AX7S40M

Silver on black acrylic foil. Specially designed for blank or polished metal surfaces to blend in perfectly.



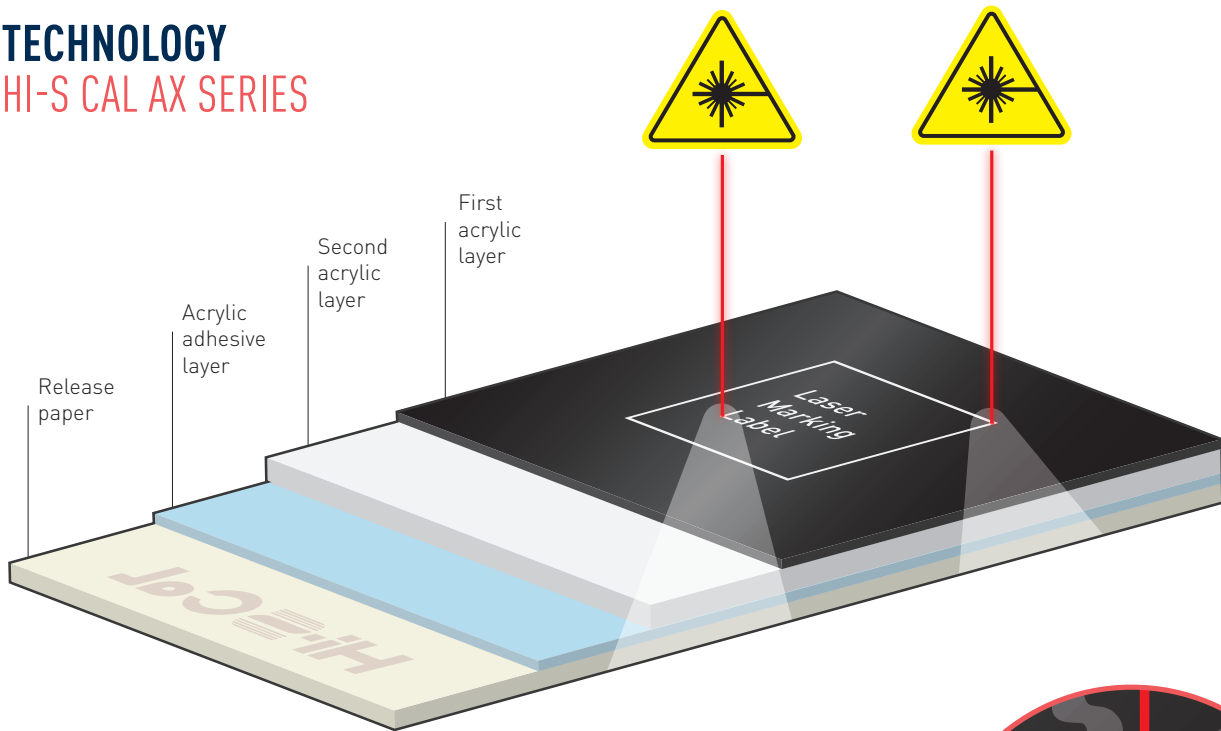
## AX5C10KY

Clear polyester coating over acrylic film containing pigment. Laser causes a photochemical reaction in the acrylic layer creating black color.



# TECHNOLOGY

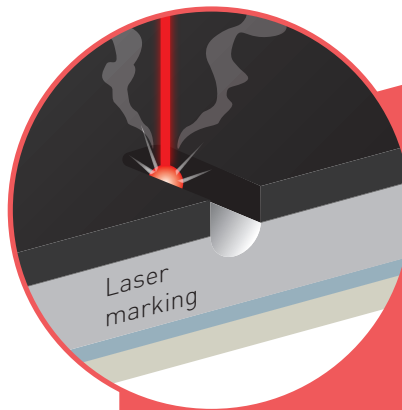
## HI-S CAL AX SERIES



### LASER MARKABLE LABELS

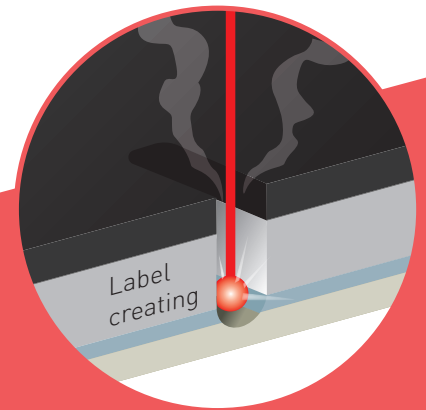
These labels use quality letter engraving techniques with no blurring or fading. The labels have an outstanding heat and chemical resistance and good durability. The self-adhesive labels can be used on a wide variety of industrial products. The labels are brittle to prevent peel-off and prevent counterfeiting. They self-destruct when trying to be removed and leave a fluorescent mark behind if this feature is required for the application.

Laser markable labels are highly weather resistant, including resistance to extreme heat and cold. Furthermore the labels are extremely stain resistant, and are able to withstand exposure to aggressive chemicals.



### LASER MARKING

The laser penetrates the top layer, exposing the second film in very fine detail. Within seconds custom made security stickers can be created.



### LABEL CREATING

The laser, at the same time, can also penetrate the second acrylic and adhesive layer creating a label that can be peeled off easily and fast.





# BENEFITS & SECURITY FEATURES

## HI-S CAL AX SERIES

Developed for and with customers in a wide variety of industries, NCI's Hi-S Cal AX Series deliver the precision, durability and security you desire. Find out more about the specific features below.



### PRECISION

Even the smallest letters or symbols can be engraved by the laser. Small bar codes or two dimensional codes (QR codes, Data matrixes) in small format can still be recognized by the human eye or scanning devices.



### BRITTLE ACRYLIC

Trying to remove the label will cause the label to break. The label will be destroyed if peeled off. Any remains proof that someone tampered with the label.



### DURABILITY

Labels withstand high temperatures. Their resistance to water and chemicals (e.g. solvents) make them ideal to be used under extreme circumstances and harsh environments.



### UV FOOTPRINT

If the label is removed the pigment which remains in the applied surface lights up by irradiation with ultraviolet light. This shows evidence of where the original label was attached before.



### ON DEMAND PRINTING

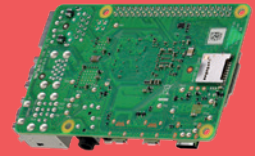
This gives the industry more flexibility. Laser markable labels are designed and produced on site. Labels show high contrast and resolution. Costs for these labels compared to printed labels or engraved metal plates are much lower.



### CUSTOMIZED DESIGN

Logos and watermarks can be embedded in the film. This warrants additional security if the customer desires this feature.

# APPLICATIONS & USAGE



## NOT 'JUST' AUTOMOTIVE...

Many other specific products can be equipped with AX series security labels. All types of devices that can come in contact with heat, water or chemicals, can benefit from these security marking foils.

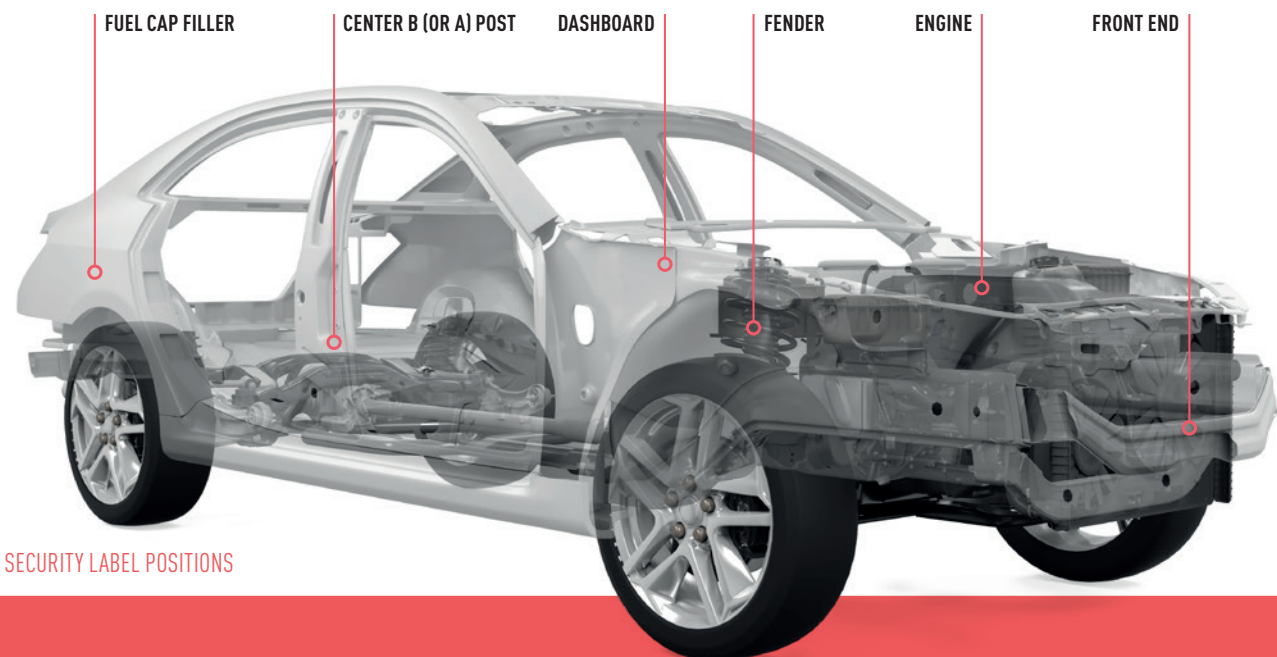


## MANUFACTURING OF HI-S CAL AX SERIES

Manufacturing of laser marking foils is done by NCI factories in Japan and China. In state of the art manufacturing facilities the various types of foils that can be used in combination with different laser techniques are manufactured in a highly automated and controlled production. These facilities comply with legal and customer specific regulations and demands. Also with those given and demanded by the automotive industry and their suppliers.

## APPEARANCE OF LASER MARKING LABELS

The AX labels are manufactured for each specific order from the client. Standardized products and some of the most commonly requested products are stored in the NCI distribution centre in The Netherlands, ready to be shipped out to customers in any country.



SECURITY LABEL POSITIONS

# TECHNICAL SPECIFICATIONS



An overview of features and specifications of NCI's Hi-S Cal AX Series.

	AX7416M	AX7140M	AX7S40M	AX5C10KY
<b>TYPE OF LASER ENGRAVING</b> *Not engraved, principle of color change	CO2, Nd:YAG, Yb:YAG, FAYb	CO2, Nd:YAG, Yb:YAG, FAYb	CO2, Nd:YAG, Yb:YAG, FAYb	*Nd:YAG, Yb:YAG, FAYb
<b>EXPLANATION LAYERS</b>	Black/White Acrylic	White/Black Acrylic	Silver/black Acrylic	Clear polyester/ Pigmented acrylic
<b>TOTAL THICKNESS</b> [µm] With PE laminated liner paper	215	235	235	295
<b>FILM THICKNESS</b> [µm] Face / second layer	15 / 60	15 / 80	15 / 80	50 / 30
<b>ADHESIVE THICKNESS</b> [µm]	Acrylic 30	Acrylic 30	Acrylic 30	Acrylic 38
<b>TENSILE STRENGTH</b> [N/10mm]	2	2	2	100
<b>ELONGATION AT BREAK</b> [%]	20	15	16	130
<b>ADHESIVE STRENGTH ON PAINTED PANEL</b> [N/10mm] <b>PEELING SPEED</b> 20 mm / min 300 mm / min	2 Broken	2 Broken	2 Broken	No data 9
<b>UV ADHESIVE TRACEABILITY</b>	Optional	Optional	Optional	-



### CAUTION: NCI ADVISES



According to the instruction manual of the laser engraving machine, install a controlled area and wear eyeglasses and protective equipment.



Use a dust collector with deodorizing because dust and odour are generated during laser engraving.



# TEST RESULTS



The Hi-S Cal AX Series are fully certified and guaranteed to withstand exposure to heat, water and chemicals as stated below.

	AX7416M	AX7140M	AX7S40M	AX5C10KY
<b>HEAT RESISTANCE</b> 80°C x 168 hr	✓	✓	✓	-
<b>HIGH TEMP. RESISTANCE</b> 150°C x 1000 hr 260°C x 10 min	✓	✓	✓	X
<b>COLD RESISTANCE</b> - 30°C x 6 hr -55°C x 100 hr	✓	✓	✓	-
<b>THERMAL CYCLE TEST</b> 1000 cycles (-40°C x 0.5 hr/85°C x 0.5hr)	✓	✓	✓	-
<b>HOT WATER IMMERSION TEST</b> 90°C x 15 min	✓	✓	✓	-
<b>WATER IMMERSION TEST</b> 40°C x 1000 hr	✓	✓	✓	-
<b>SALT WATER RESISTANCE</b> 5 % NaCl aq spray x 240 hr	✓	✓	✓	-
<b>OIL RESISTANCE</b> Gasoline immersion x 30 min at room temp. Diesel oil dripping 24 hr Engine oil immersion 30min at room temperature	✓	✓	✓	-
<b>CHEMICAL RESISTANCE</b> Apply 0.1 N H <sub>2</sub> SO <sub>4</sub> to the surface, after 24 hr Apply 0.1 NaOH to the surface, after 24 hr	✓	✓	✓	-
<b>WEATHERABILITY / UV TEST</b> S-WOM 3000 hr Florida exposure 24 months	✓	✓	✓	X



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## **LABORATORY, R&D AND QA CENTER HAYATSUKI JAPAN**

In 2016 NCI's state of the art R&D facility was opened in the city of Hayatsuki. Development and testing is done in-house in this NCI facility. With over 100 staff working on a daily basis to control, check and further develop our products, customers can rest assured that their demands and wishes will be met with the highest care and dedication.

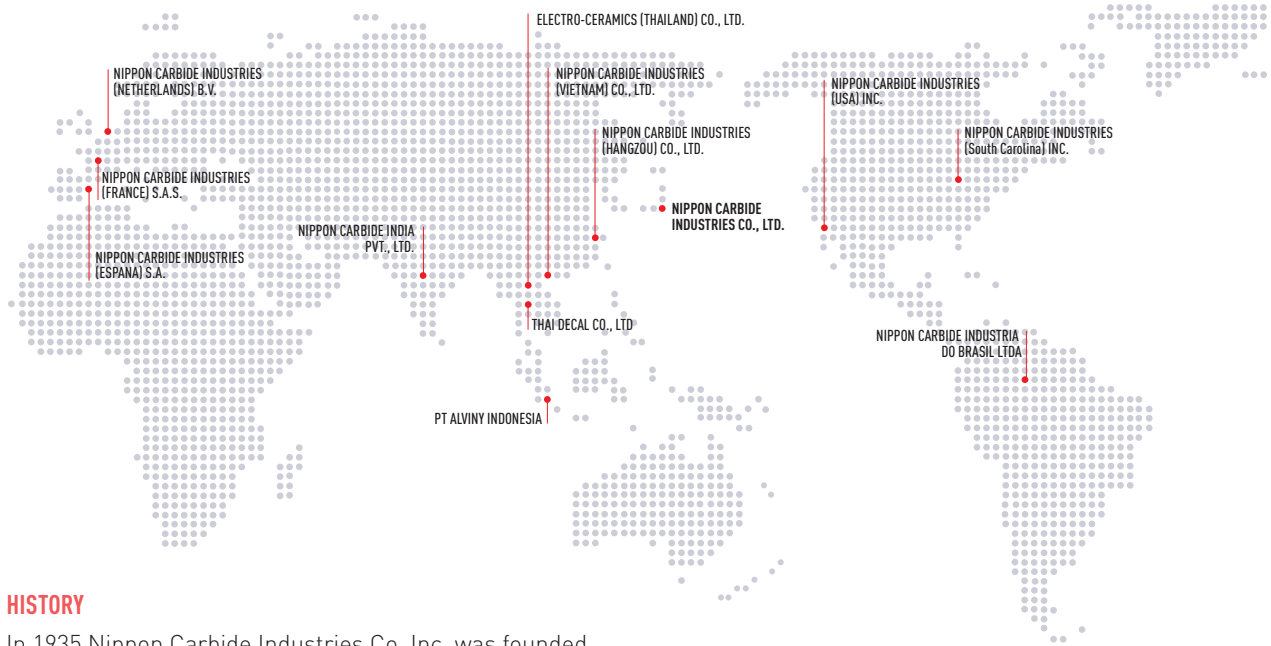
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# ABOUT NIPPON CARBIDE INDUSTRIES

Nippon Carbide Industries Co. Inc. (NCI) manufactures and provides high quality, extremely resistant, tamperproof laser labels and supplies them for industrial, domestic, automotive and security utilization to clients worldwide.

## LOCATIONS WORLDWIDE



## HISTORY

In 1935 Nippon Carbide Industries Co. Inc. was founded in the Japanese city of Toyama. The acetylene induction process using the element carbide as a raw material was a promising new chemical industry which NCI fully embraced.

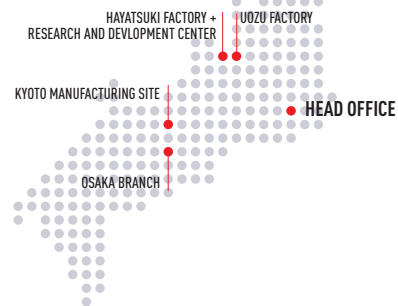
Throughout its existence NCI has expanded its expertise and operating base. Today NCI's core technology and product portfolio encompass resin polymerizing and plastic films and foils manufacturing as well as sintering. A wide variety of goods and services derive from this expertise, which are available to a multitude of industries worldwide.

NCI continues to strive for increased technical capabilities and the development of new products as well as updates to our existing products. Together with our stakeholders, customers and strategic partners we work towards added value for NCI, the society and the environment.

## WORLD PRESENCE

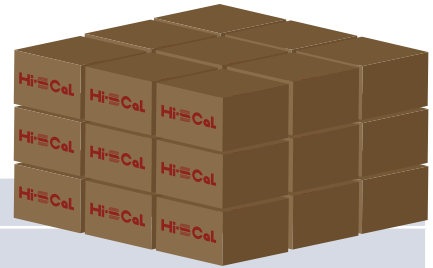
Since 1980 NCI operates worldwide. Its technologies and products are used by companies all over the world in a wide range of industries. NCI is focused on providing products to the global market, with full coherence to national and local government laws and regulations as well as certifications.

## LOCATIONS JAPAN



## JAPAN BASED

The NCI Head Office, Research and Development Centre as well as the Quality Assurance Centre can be found in Japan. The highly specialized facilities provide a strong backbone for the Asian and European market. Furthermore NCI continuously invests in the further development and engineering of all offered products and services.



### PRODUCT APPEARANCE

STANDARD REELS	+/- 120 mm width x 100 M length*
OUTSIDE DIAMETER	app. 195 mm
CORE	Recyclable carton paper core \ Diameter: app. 76 mm
BOX (STANDARD)	1 piece per box \ dimension box 340 x 340 x 170 mm \ weight net. 4 kg, gross 4.5 kg
PALLET (STANDARD)	9 boxes per row, three layers \ pallet size 1050 mm x 1050 mm \ weight pallet app. 140 kg
BOX LABELING	Product Name, Lot nr., Slit nr., Splice count, Size, Packed Date, Manufacturer name, and Country of origin
TRACEABILITY	Lot nr. and slit nr. on the inside of paper core and box
DELIVERY FROM STOCK	Orders processed within two working days
SHELF LIFE	12 months
STORING CONDITIONS	Products should be stored in the original box in a cool and dry place. No exposure to direct sunlight

Hi-S Cal	
Product Name	
Lot nr.	
Slit nr.	
Splice count	
Size	
Packed Date	
Manufacturer name	NIPPON CARBIDE INDUSTRIES CO., INC.

MADE IN JAPAN

\*Other dimensions on special demand

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