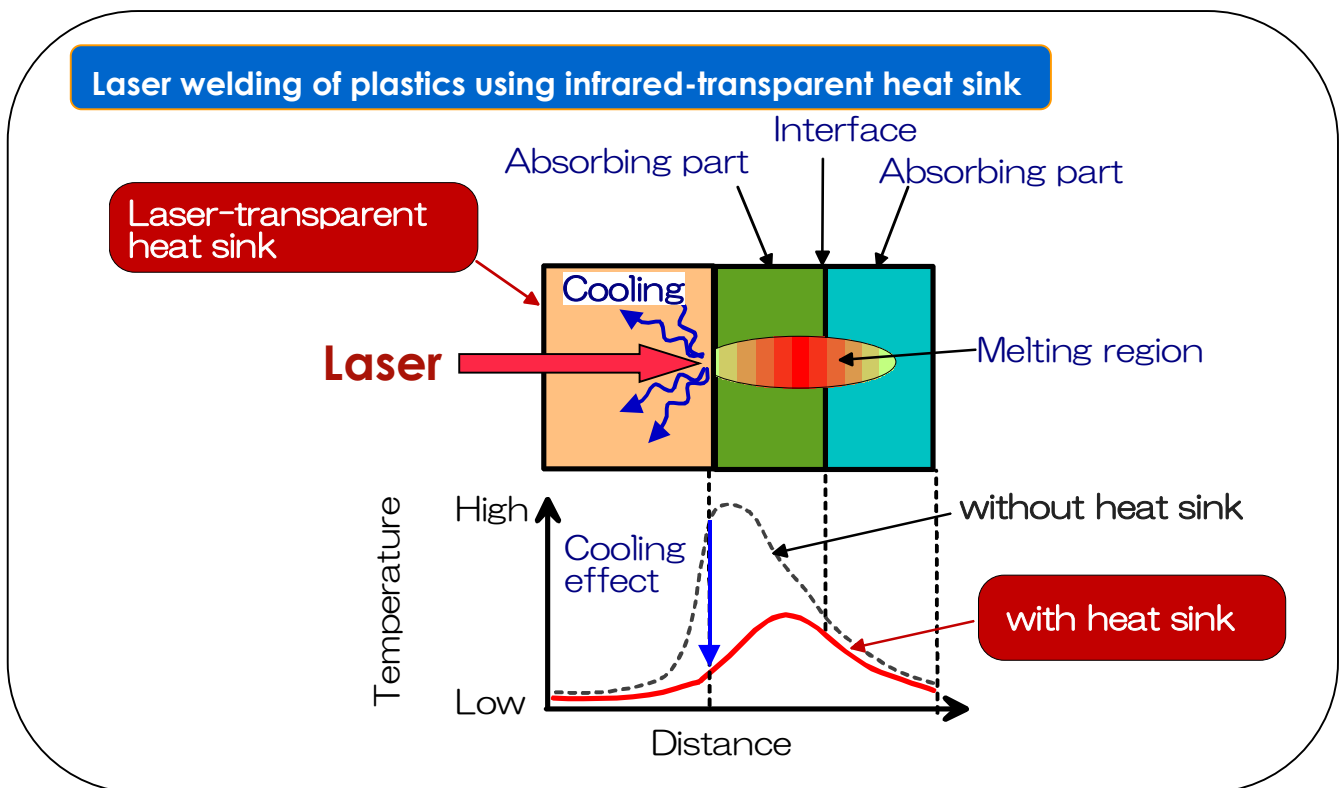


# Consortium on Development and Promotion for Laser Advanced Welding of Plastics

"A method of laser welding of plastics using infrared-transparent heat sink" invented by Prof. Yasuo Kurosaki (The university of Electro-communications, Japan) is expected to be applied in various fields. Based on this technology, **Consortium on Development and Promotion for Laser Advanced Welding of Plastics (LAWP consortium)** was instituted to collaborate on research activities for applications by the university and enterprises.



## ~Solution to the problems in laser welding of plastics~

Overlap welding applying a laser-transparent heat sink can prevent heat damage by overheating that occurred in the conventional irradiation methods.

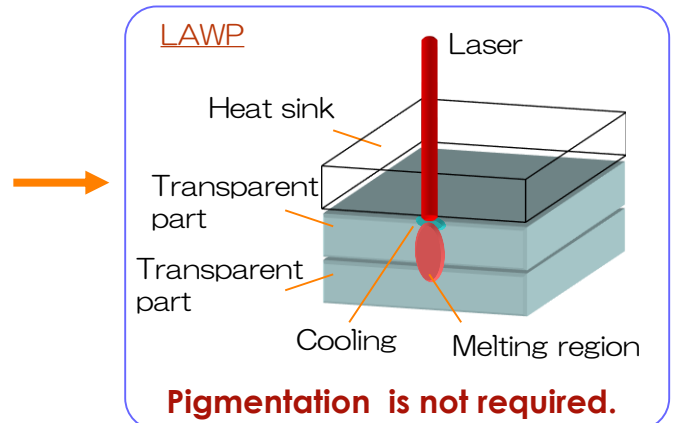
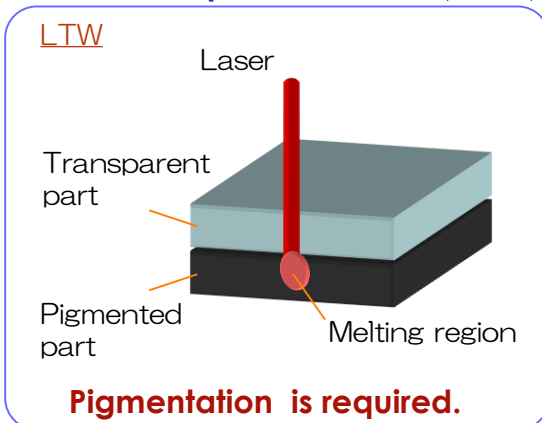
(Effect of the combination of heating due to penetrating laser and cooling due to thermal diffusion by heat sink.)

# Features of Laser welding of plastics using infrared-transparent heat sink

## By "Laser welding of plastics using infrared-transparent heat sink":

1. No pigmentation of thermoplastic parts is required using CO<sub>2</sub> laser\*<sup>1)</sup>.
2. Installing a solid body with high IR-transparent and high thermal conductivity.  
⇒ Heat around the surface of a work is diffused into heat sink, the maximum temperature appears inside and welds the interface.
3. By the effect of surface cooling, it is able to prevent blistering and gasification.

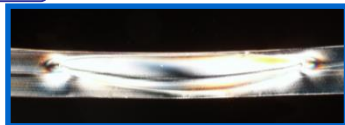
## Difference between "Laser transmission welding (LTW)" and "Laser welding using infrared-transparent heat sink (LAWP)"



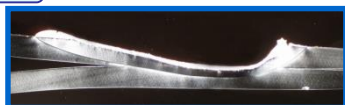
\* ) As well as using CO<sub>2</sub> laser, we apply CO laser, Er:YAG laser and Tm: fiber laser for various thermoplastics properly.

Example: PFA welding (t=0.25 x2 sheets)

With heat sink



Without heat sink



### ■ Weldable plastics:

Polyolefin, Polyfluorocarbon, etc.

### ■ Suitable for the production of the high-performance product

- Medical equipments
- Semiconductor equipments

### ■ Alternative technology for conventional one / Process innovation

Intensification of seal, Lightweighting, Process reduction, Harmful gas reduction, Yield improvement

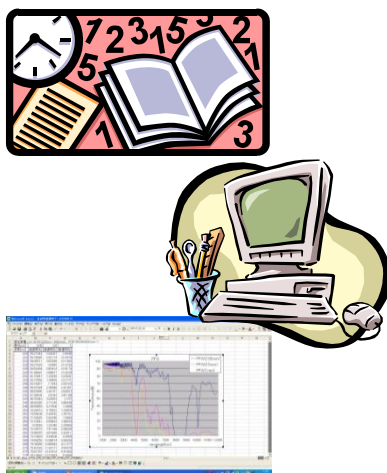
## Usage example

### Experimental instruments



Using the experimental instruments at the university for test data that is necessary for developments by research working group.

### Database



Referring of experimental / analytical data accumulated in the past.

### Engineering



The solution of the problems by the technology exchanges and past examples.

## Membership benefit

1. Promoting the development by co-operation with the advantage of each members .
2. Utilizing the knowledge of Prof. Kurosaki, the chief director, and some other researchers at university.
3. Using the experimental instruments at the university (Lasers, microscopes, spectrometers, etc. )
4. Referring of data of materials properties and processing conditions.
5. Giving the opportunity for communication among the engineers and the human resource development.

## **Research activity and events**

- Collaborative research (working group )
- Technology exchange fair (Tour of the plant and exhibition)
- Seminar for engineering resource development

etc.

## **Members**

SEIWA OPTICAL Co., Ltd.  
TOKYO KEISO Co., Ltd.  
DAIKIN INDUSTRIES, Ltd.  
UEDASEITAI Co., Ltd.  
MEIKO KOUGYO Co., Ltd.  
JAPAN FLUID Control Corporation Co., Ltd.  
NICHIAS Co., Ltd.  
CKD Corporation

**LAWP consortium** makes "survey of technical problems", "promotion of the collaborative research/development", "correspondence to the applied technology" and "standardization" of this technology.

**We act for the purpose of contributing to each industrial technology improvement.**

### **<Contact us>**

The secretariat of Consortium on Development and Promotion for Laser Advanced Welding of Plastics

### **Campus Create Co., Ltd.**

Cooperative Research Center,  
The University of Electro-communications  
1-5-1 Chofugaoka, Chofu, Tokyo, Japan

TEL:81-42-490-5736 FAX:81-42-490-5727

E-mail: [info@lawp.jp](mailto:info@lawp.jp)

WEB : <http://www.campuscreate.com/law/index.html>