

# Kelvion



Quick | Reliable | Sustainable

# CHARGE AIR COOLER REFURBISHMENT



Charge air coolers (CACs) perform heavy duties in marine, off-road and stationary diesel and gas engines. Over time pollutants in the combustion air and cooling circuit can cause corrosion and a build up of deposits in the fins and tubes. Regular servicing will prevent breakdown and avoid the danger of pressure loss. As the original equipment manufacturer, Kelvion offers a one-stop-shop for servicing. From a professional inspection of the unit to cleaning, refurbishing and testing, we provide expert and reliable repairs and modifications to keep our charge air coolers running smoothly and efficiently for our customers. Importantly, because we are able to check components based on new equipment standards and can verify if their quality is as good so it can be reused, the Kelvion Service is more sustainable and therefore better for the environment.

Whatever kind of damage your heat exchanger has, we can offer you exactly the right service that is needed. If, for example, cleaning the charge air cooler is no longer sufficient due to excessive fouling and corrosion, we can go straight to the next level and, for example, carry out any necessary retubing or replacement of parts.

## BASIC

**THE BASIC LEVEL** is designed to analyze the current status of the returned heat exchanger. It includes full visual and technical inspection.

# 1

LEVEL

### REASONS FOR LEVEL 1 | CLEANING AND REPAIR

- ▶ Heat exchange performance without doubts
- ▶ Pressure test passed
- ▶ General overhaul (Extend lifetime)

# 2

LEVEL

### REASONS FOR LEVEL 2 | RETUBING

- ▶ Loss of heat exchange capacity
- ▶ Pollution of inner cooler core
- ▶ Dissolved, dismantled, or loose fins
- ▶ Water leakages / Pressure test failed

# 3

LEVEL

### REASONS FOR LEVEL 3 | BUNDLE EXCHANGE

- ▶ Damaged outer parts (sidewalls, tube supports...)
- ▶ Plugged tubes
- ▶ Upgrade reasons

# 4

LEVEL

### REASONS FOR LEVEL 4 | EXCHANGE UNIT

- ▶ Start exchange program
- ▶ Inefficiency

# BASIC



LEAD TIME  
**2-5 DAYS**

## INSPECTION STANDARD

- ▶ Leak testing
- ▶ Examination and assessment (of fin side)
- ▶ Assessment of deposits or corrosion
- ▶ Visual inspection and documentation of results
- ▶ Repair/upgrade proposal

## OPTIONAL

- ▶ Analysis of water
- ▶ Investigation of corrosion problems
- ▶ Endoscopic examination of pollution, corrosion and erosion

## YOUR BENEFITS

- ▶ Prevent capex investments
- ▶ Report on the product's condition
- ▶ Plannable and scheduled predictive actions



# LEVEL 1



LEAD TIME  
**1-2 WEEKS**

Regular cleaning helps to avoid damaging build-up of deposits and avoids unscheduled downtime. Level 1 service also includes renewing corrosion protection and replacing wear and tear parts.

## CLEANING AND REPAIR

- ▶ Internal cleaning (tube side: at factory or on site, housing side: at factory)
- ▶ Cleaning (e.g high pressure) of Kelvion and non-Kelvion products
- ▶ Brush cleaning tube side
- ▶ Renewal of corrosion protection and exterior painting
- ▶ Change of worn gaskets, screws and other parts
- ▶ Documentation of results
- ▶ Pressure testing with 3.1 certificate

## YOUR BENEFITS

- ▶ Cost savings: up to 50 % less than buying new equipment
- ▶ Reusing parts is more environmentally friendly

# LEVEL 2



LEAD TIME  
**4-5 WEEKS**

Polluted cooler core, blocked tubes and leaking sealing surfaces affect the cooling capacity. For optimum efficiency and reliability Kelvions retubing offers many advantages instead of cleaning.

## RETUBING

- ▶ Visual inspection
- ▶ Disassembly of the cooler unit
- ▶ Manufacturing of tubes and fins & cooler unit
- ▶ Refurbishment of re-usable parts
- ▶ Replacement of screws and gaskets
- ▶ Water pressure test & final inspection with 3.1 certificate

## OPTIONAL

- ▶ External inspections (BV, GL)

## YOUR BENEFITS

- ▶ Extended life cycle
- ▶ Reusing parts is more environmentally friendly
- ▶ New gas side/fin side
- ▶ Cost savings: up to 30 % less than buying new equipment



## RETUBING VS CLEANING

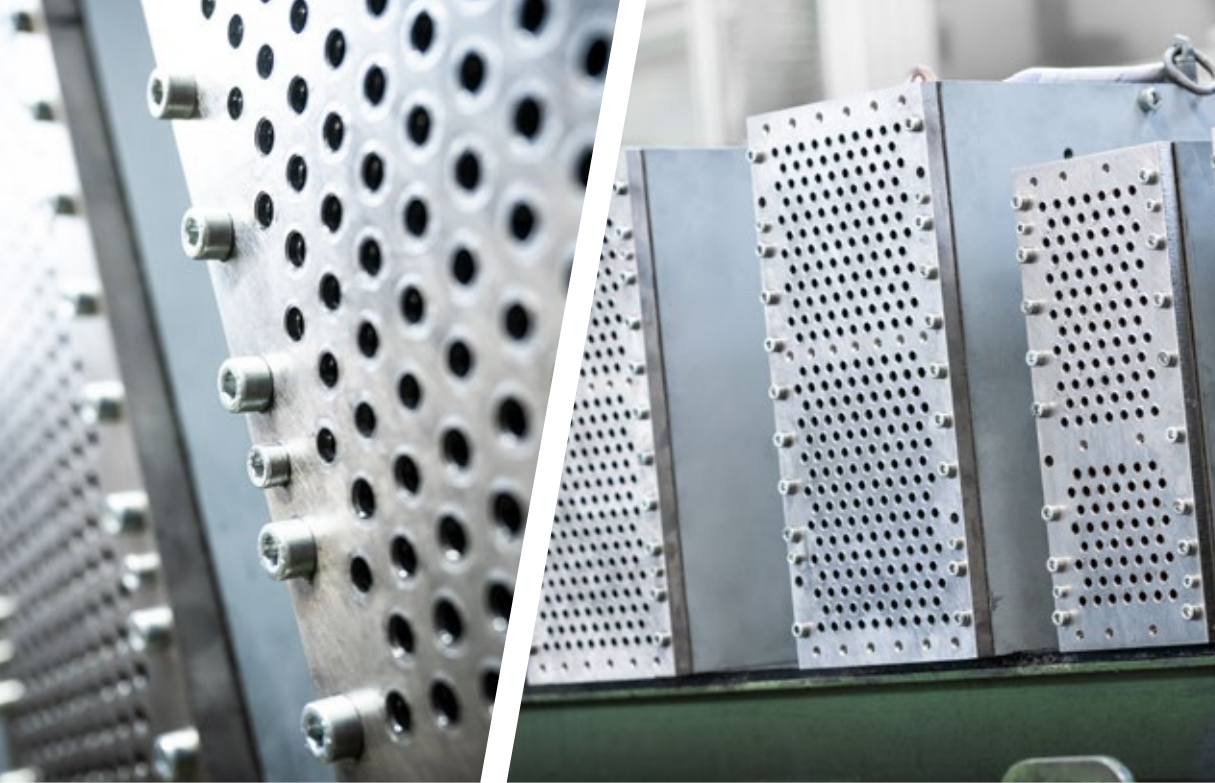
- ▶ Heat exchange performance can be ensured due to new fins and tubes
- ▶ New warranty
- ▶ Not only exterior cleaning / refurbishment
- ▶ No plugged tubes → heat transfer performance
- ▶ No pollution of inner cooler core
- ▶ No dissolved, dismantled, or loose fins → prevention of secondary failures
- ▶ No leakages due to dissolved gasket materials
- ▶ Tested mechanical connections by pressure test
- ▶ Tested equipment with certificates/reports

## RULE OF THUMB

**CLEANING HELPS AS A  
TEMPORARY SOLUTION**

**RETUBING HELPS AS A  
LONG-TERM SOLUTION**





## LEVEL 3

 LEAD TIME  
**5-6 WEEKS**

At Level 3 Kelvion will replace the whole inner core bundle, comprising tubes, fins, side walls and tube sheets.

### **BUNDLE EXCHANGE**

- ▶ Changing the cooler bundle of existing equipment
- ▶ Manufacturing of the cooler unit
- ▶ Replacement of screws and gaskets
- ▶ Water pressure test & final inspection with 3.1 certificate

### **OPTIONAL**

- ▶ External inspections (BV, GL)

### **YOUR BENEFITS**

- ▶ Extended life cycle & 100 % new gas side/fin side
- ▶ Pressure testing protocol
- ▶ Cost savings: up to 20 % less than buying new equipment

## LEVEL 4

 LEAD TIME  
**8-10 WEEKS**

Level 4 of the Kelvion Service covers the replacement of CACs when they reach the end of their useful life. Replacement units are manufactured to the highest standards and installed by our experts and thoroughly inspected to ensure a reliable and robust performance.

### **EXCHANGE UNIT**

- ▶ Plug and play installation
- ▶ Fully certified and inspected

### **YOUR BENEFITS**

- ▶ Replacement unit supports operational reliability

