

# Industrial cooling - Maintenance, repair and spare parts

Specialist system management to deliver high operating availability and efficiency

**Increasing cooling tower performance and decreasing energy consumption and overall maintenance requirements.**



## How Costain can help

Our expert engineering team can help increase your cooling tower performance, decrease energy consumption, and lower overall maintenance requirements.

We provide an unmatched level of quality advice on system management to deliver high operating availability and efficiency. Our specialist services include:

- Repairs
- Refurbishments and upgrades
- Spare parts

The Costain team conduct a technical study to measure and compare current performance of your cooling tower against the original design specification. This identifies levels of efficiency loss through incorrect usage or deterioration, and the measures required to restore or improve performance.

## Industry challenges

Our detailed studies encompass a full and thorough analysis of the following:

- Air flow and noise measurement
- Heat transfer effectiveness through thermal imaging
- Condenser coils and fins, obstructions, and cleanliness
- Motor ratings, gear ratios
- Fan configuration and settings
- Environmental factors such as wind shielding
- Energy consumption.

Process parameters are measured on site, including leak detection, and recalculated to identify any underperforming or defective components causing efficiency loss or other problems. The results of the survey can be the justification for corrective actions, with clients achieving performance increases.

## Services

- Condition monitoring including vibration testing, dynamic balancing, and laser alignment
- Planned shutdown repairs
- Emergency call out repair service
- Turnkey refurbishments and upgrades.

## Benefits

- Ensuring optimal operation and performance by extending asset life
- Effective refurbishment to limit outage possibilities therefore improve overall performance
- Increased cooling tower performance and efficiency
- Decreased energy consumption due to efficiencies
- Lowering overall maintenance requirements and cost



# Industrial cooling - Maintenance, repair and spare parts

We have also developed a secondary supply chain of quality manufacturers who can supply standard components, and precision engineers who manufacture and fabricate bespoke components such as:

- Gearboxes
- Fans and Blades
- Drive shafts
- Housings
- Motors and pumps
- Valves
- Fin fan bundles
- Packing
- Drift eliminators
- Pipework
- Fan stacks
- Louvres.

## Service summary

Costain provides a complete package of services, from annual cleaning through to fully comprehensive maintenance, designed to complement or completely replace in-house maintenance regimes.

### Maintenance and performance studies

A proactive maintenance approach prevents unexpected mechanical failures and improves overall plant availability and mean time between failures (MTBF).

Costain provides the following condition monitoring services to allow maintenance to be scheduled, or other actions to be taken to avoid the consequences of failure, before the failure occurs.

### Condition monitoring, vibration testing and analysis

The Costain team will detect any abnormal increase in vibration signals, weeks or even months before actual failure by using our vibration analysis hardware. The hardware takes measurements on machine bearing casings with seismic or piezoelectric transducers. This allows scheduled replacement before an actual failure and prevents much longer down-times.

### Dynamic balancing

Vibrations drastically reduce the life expectancy of all associated mechanical equipment. Causes for losing dynamic balance are:

- Dirt deposits on impeller - 90% of all vibration problems originate from the impeller unit
- Impeller wear and damage caused by erosion and corrosion
- A seal or sleeve that is not concentric to the shaft
- Hardware not balanced correctly at assembly
- The impeller has been altered and not re-balanced

Costain provide multi-plane or dynamic balancing as part of our mechanical services to ISI 1040/1 and American National Standard Mechanical Vibration: ANSI S2.19, 1975 specifications, ensuring that your fan operates without excessive vibrations, increasing the life of your mechanical equipment.

### Laser alignment

Misalignment of equipment can occur from vibration, thermal effects, poor foundations, equipment accidents or equipment overhauls. Correctly aligned equipment:

- Reduces vibration, stress and extends bearing and coupling life
- Reduces motor amps which can result in significant electricity savings
- Increases the mean time between failures (MTBF).

Costain provides an alignment system by means of a laser that is faster and more accurate than the traditional alignment methods. By using this laser alignment technique, problem analysis is simplified. Equipment can be accurately measured and aligned in a fraction of the time that it would take using other methods.

### Cooling tower repairs

A cooling tower's internal and external structure and its critical components should be periodically maintained and repaired or replaced, if necessary, to ensure optimal operation, and the best possible operational performance.

We offer a repair service for planned shutdowns and emergency call out repair service for unplanned breakdowns or failures. Costain will supply and repair or replace any cooling tower part whether they are structural, mechanical, or individual internal parts, including:

- Fans
- Gearboxes
- Motors
- Drive shafts
- Fan stacks
- Decking
- Cladding
- Internal structural members
- Drift eliminators
- Distribution parts
- Cooling medium
- Louvres
- Access facilities
- Timber, GRP, stainless steel

### Cooling tower refurbishments and upgrades

With over 40 years' experience in industry, the Costain team can supply innovative cost and time effective refurbishment and upgrade options, especially when outage possibilities are limited, ensuring plant assets are operational quickly.

Costain has completed refurbishments ranging from small package type cooling towers to large multi-cell induced and natural draught cooling towers on refineries and power stations.

### Parts and spares

With a spend of over £6 million per annum covering every type of cooling system, our established supply chain includes all the leading cooling system manufacturers including:

- Marley
- Bar Bac
- Hewitech
- Brentwood
- Carter
- Enexio
- Evapco
- GEA
- Hamon
- Mita
- Polycell

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We can supply and export components throughout Europe and the Middle East complete with all the necessary export documentation and logistics.

We also require our supply chain partners to maintain a stock of critical items for immediate delivery all of which combines to provide a first-class support service for clients and our own field-based engineers.

## Finned tube cleaning

Process and atmospheric contamination like dust, pollen and scaling can block finned tubes and significantly decrease performance. Traditional cleaning methods force dirt deeper. Costain has designed a high-pressure rig with unique cleaning heads to exactly match the bundle layout. This is semi-automatic and designed to suit each client's condenser to ensure 360° cleaning. The system leaves no area untouched, and airflow increases of 20% minimum have been achieved.

## Case study

### Refurbishment of wet cooling tower

#### Requirement

Design, modify, refurbish and install new internal components.

#### Solution

Costain was engaged to design a replacement support system that could be installed on a cellular basis avoiding the need to shut down the entire cooler. Costain's solution was to access the inside of each cell using suspended access techniques to replace each layer of packing. At the same time, new, specially designed stainless steel hanging straps were installed to support the lower pack.

The hyperbolic cooling tower was constructed of concrete and comprised of four quadrants each with a 1250m<sup>2</sup> of PVC packing

Our innovative approach enabled the tower to remain operational throughout, as each cell was refurbished on a rolling basis without affecting generating capacity. This approach was vital as the single cooling tower would otherwise have required a complete shutdown and loss of generating capacity.

#### Outcome

The project took 28 weeks to complete (compared to the industry average of 36 weeks), and the repair solution significantly enhanced operational life.

This is an example of one of many innovative solutions that Costain can apply to reduce maintenance costs and increase lifespan.

The site team received a commendation from the client and Costain has further developed this method of operation to minimise client outage and shutdown requirements.



## Contact



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#### Expertise:

- New or replacement cooling towers
- Complex programme delivery
- Air pollution control

- Decarbonisation of energy and industry
- Digital transformation of inspection and compliance documentation

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KEEPING WATER SYSTEMS SAFE

