# Air Compressor Heat Recovery to Water

Heat recoverable from an air compressor's oil and air coolers as hot water, the water flow for a temperature rise, and the fuel and cost it saves.

**Method:** Energy balances (definitions)

## Input parameters

Unit system: SI

| Parameter | Value | Unit |
|---|---|---|
| Compressor shaft power | 250.00 | kW |
| Share of shaft power recoverable | 75.000 | % |
| Water temperature rise | 40.000 | K |
| Efficiency of the heater it replaces (same GCV or NCV basis as the fuel cost) | 85.000 | % |
| Fuel cost per GJ of fuel heat<br>Per GJ on the same calorific basis (GCV or NCV) as the heater efficiency. | 500.00 | |
| Loaded hours per year | 6,000.0 | h |

## Calculated results

| Parameter | Value | Unit |
|---|---|---|
| Heat recovered | 187.50 | kW |
| Water heated | 4.0305 | t/h |
| Annual fuel cost saved | 2,382,353 | |

**Notes for this case**

- Almost all compressor power becomes heat; oil-injected screw compressors let 70–80 % be recovered as water at 60–80 °C.

## Formula and method

$$Q = f_r P, \quad \dot{m}_w = \frac{Q}{c_w \Delta T_w}, \quad C = \frac{Q}{\eta_b} t\, c_f$$

### Variables

| | | |
|---|---|---|
| $P$ | Compressor shaft power | W |
| $f_r$ | Share of shaft power recoverable | - |
| $\Delta T_w$ | Water temperature rise | K |
| $\eta_b$ | Efficiency of the heater it replaces | - |
| $c_f$ | Fuel cost per GJ, on the same GCV or NCV basis as $\eta_b$ | - |
| $c_w$ | specific heat of water, 4186.8 | J/(kg·K) |
| $t$ | Loaded hours per year | s |
| $Q$ | Heat recovered | W |
| $\dot{m}_w$ | Water heated | kg/s |
| $C$ | Annual fuel cost saved | - |

### Method and standards

Energy balance.

### Assumptions and limits

- Water c_p 4.1868 kJ/(kg·K).
- The recovered heat is assumed to be used in full during every loaded hour; if the hot-water demand is smaller or not coincident, the saving is smaller.

### References

- Energy balances (definitions)

## Report details

| | |
|---|---|
| Report reference | FCC-5CDB-MX6V (the same inputs always give the same reference) |
| Generated | 17 November 2026, 19:37 UTC |
| Calculator | Air Compressor Heat Recovery to Water |
| Method last reviewed | 13 November 2026 |
| Software release | FireCAD Calc, release of 17 November 2026 |
| Release checks | 2 reference cases of this calculator, computed independently, are checked on every release |

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

### This calculator online

https://calc.firecad.com/boilers-power-plant/hrsg-waste-heat/air-compressor-heat-recovery

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.