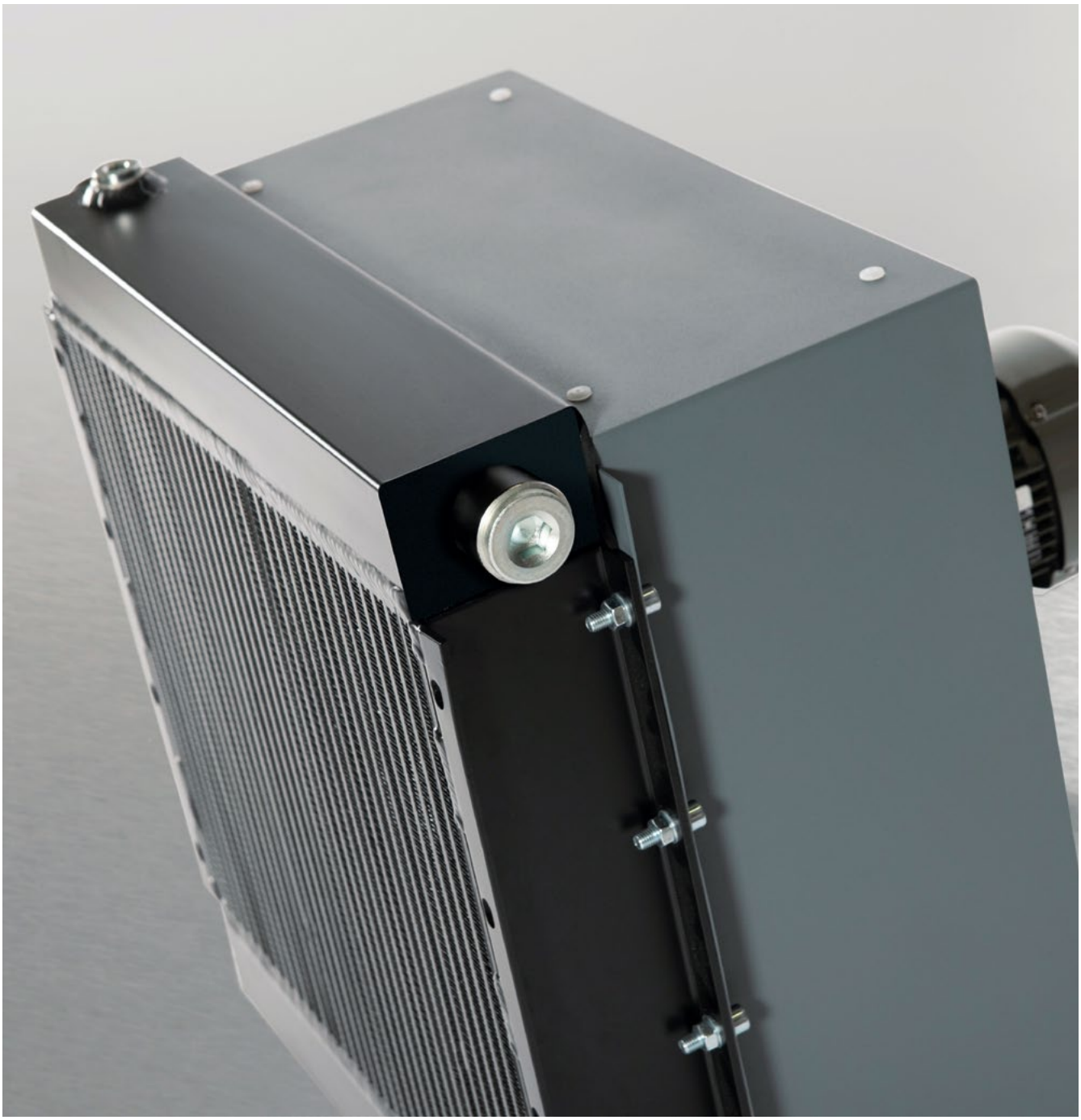
fluid
technology
solutions

UK Flowtechnik

Specialists in flow metering, pumps, couplings and process measurement equipment

Oil air cooler ACI

HBE hydraulic components



Oil air cooler
for industrial operation

SERIES ACI

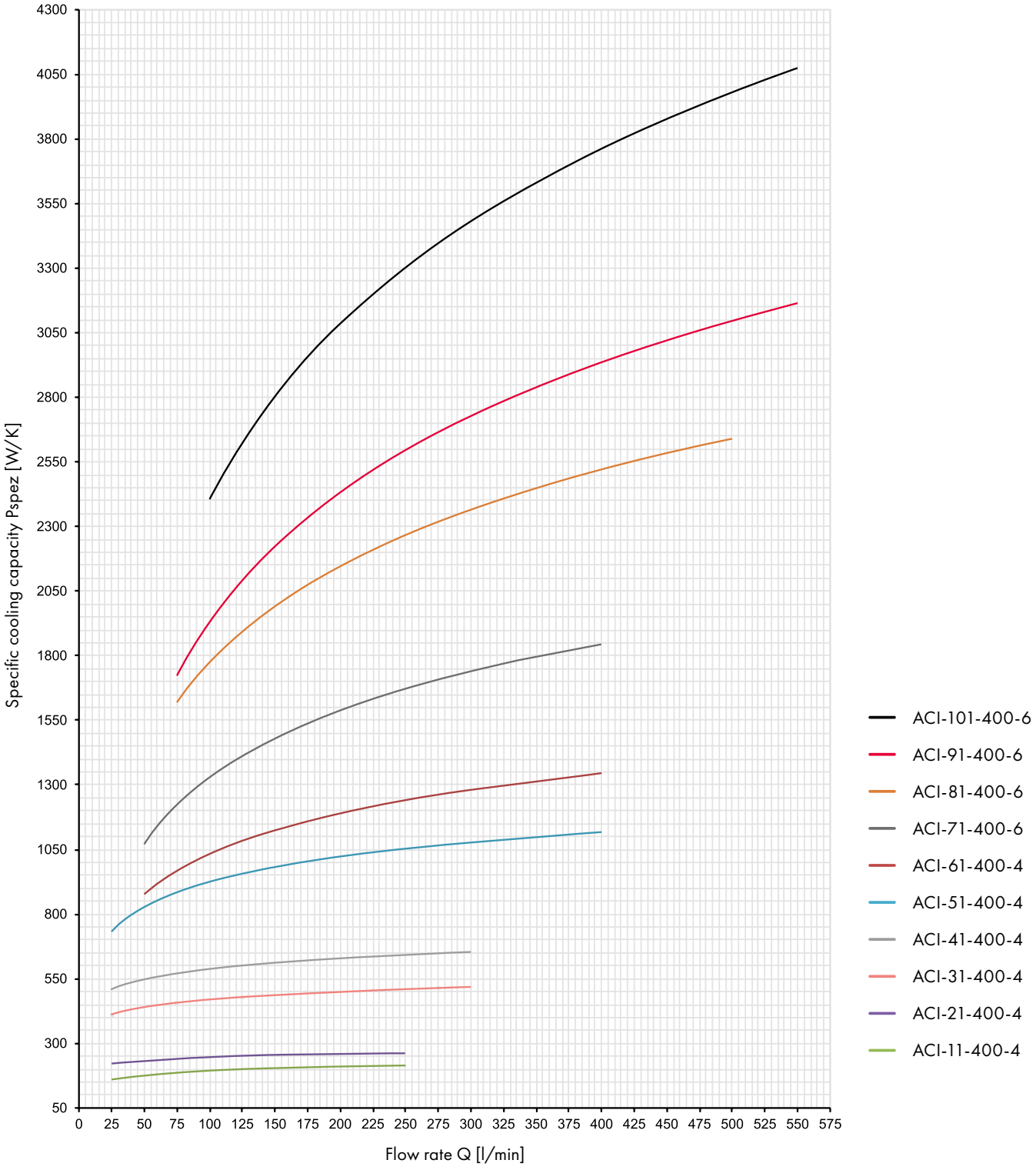
Product features

- Noise level reduction due to axial fan blades of the latest design
- Streamlined fan housing for optimisation of the air flow
- Air fins insensitive to contamination
- Static test pressure 25 bar according to DIN 50104
- Peak pressure resistance at 16 bar and 1 x 10^6 load cycles, f = 1Hz
- Operating pressure: 16 bar
- Max. operating temperature: 120°C
- Powder-coated housing
- Drive motor: 230 - 400V, 50Hz (DC version 12/24V on request)
- Operation with all common hydraulic fluids of different viscosities (oil, HFA, HFC, etc.)
- Cooling block also available in 2-way design or with internal bypass-valve on request

Materials

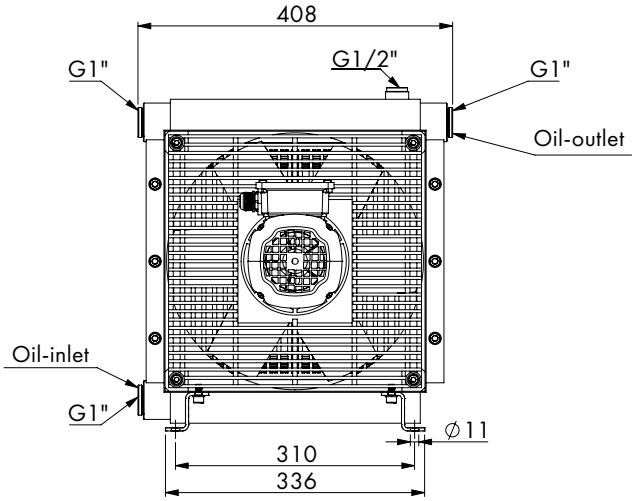
Component	Material	Surface
Cooler block	Aluminum	powder-coated according to RAL 9006
Fan housing	Steel	powder-coated according to RAL 7012
Axial-fan	Plastic (PAG)/Aluminium	
Protection grid	Steel	galvanized
Mounting feet	Steel	powder-coated according to RAL 7012

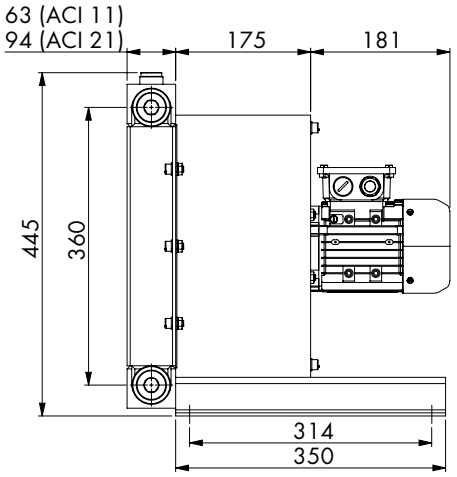
Cooling capacity



The specific cooling capacity indicated in the graph was determined on the test bench, test oil ISO VG 46, oil-inlet temperature 60°C. The actual cooling capacity may deviate by approx. ± 5 % depending on the installation site and other operating parameters.

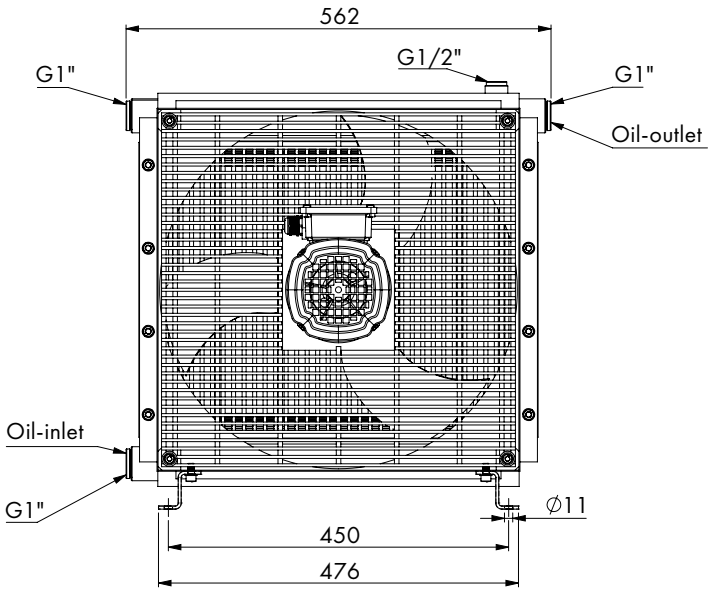
ACI-11/ACI-21

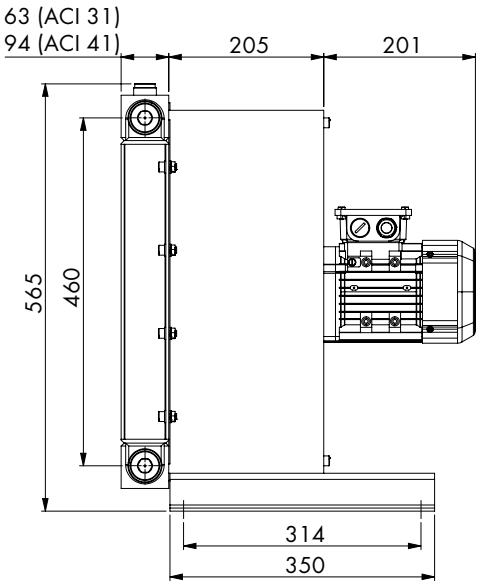




Cooler type	Motor power [kW]	Power consumption [A]	Rotation [1/min]	Air flow [m³/s]	Noise level [dB(A)]	Empty weight [kg]
ACI-11-400-4	0.18	0.58	1500	0.49	61	17
ACI-21-400-4	0.18	0.58	1500	0.5	62	20

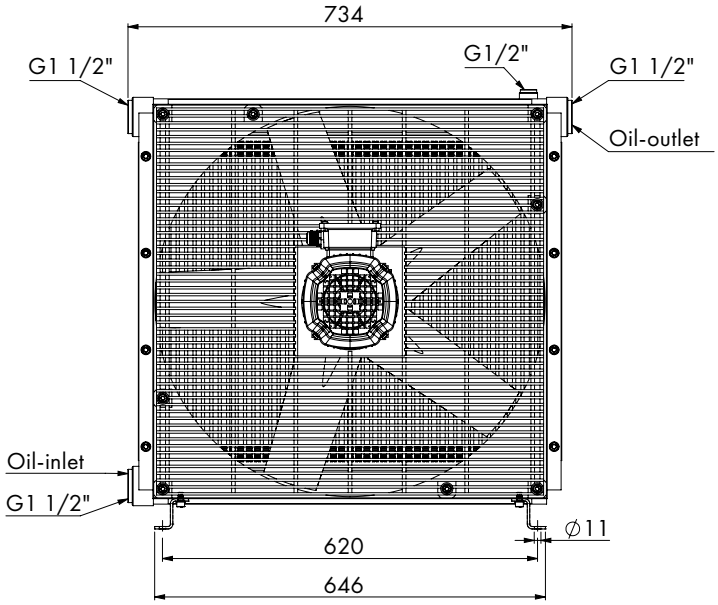
ACI-31/ACI-41

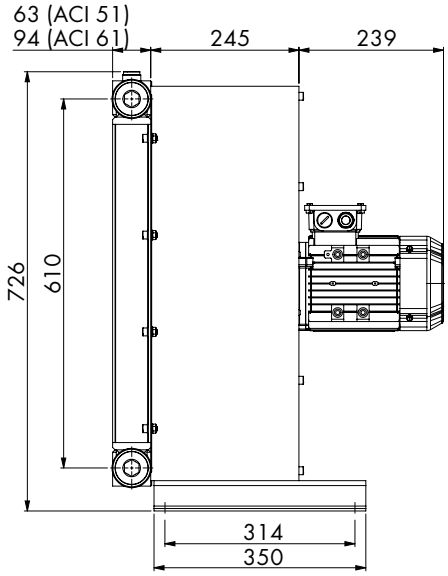




Cooler type	Motor power [kW]	Power consumption [A]	Rotation [1/min]	Air flow [m³/s]	Noise level [dB(A)]	Empty weight [kg]
ACI-31-400-4	0.37	0.89	1500	0.75	58	25
ACI-41-400-4	0.37	0.89	1500	0.76	62	32

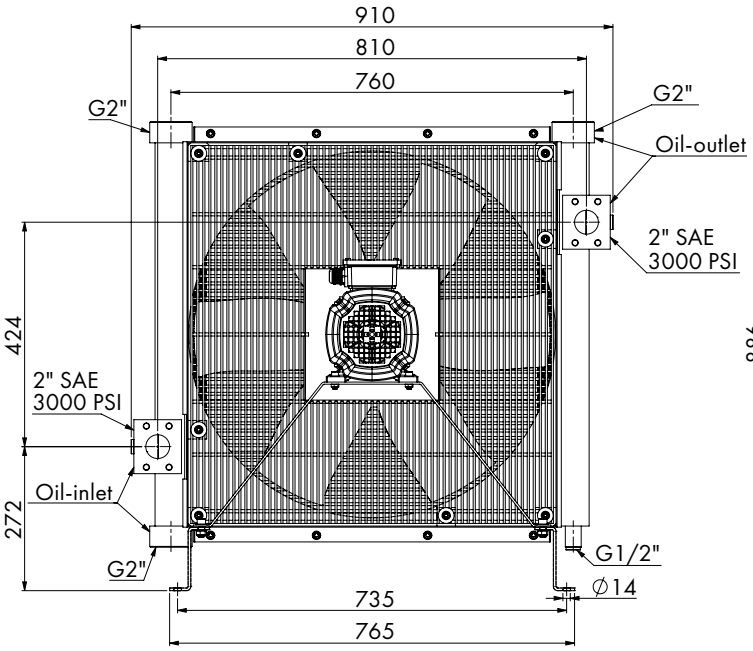
ACI-51/ACI-61

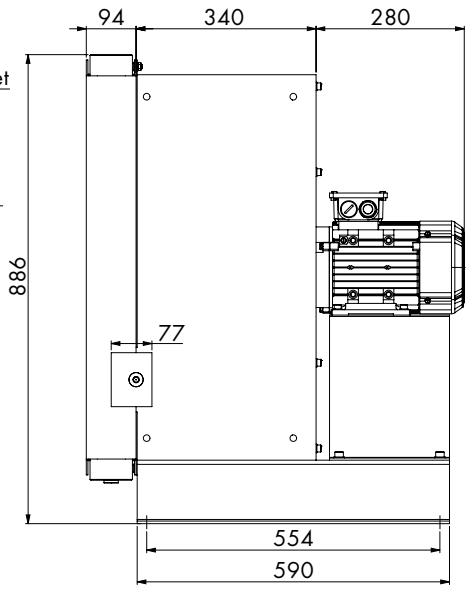




Cooler type	Motor power [kW]	Power consumption [A]	Rotation [1/min]	Air flow [m³/s]	Noise level [dB(A)]	Empty weight [kg]
ACI-51-400-4	0.75	1,71	1500	1.7	69	40
ACI-61-400-4	0.75	1,71	1500	1.5	69	49

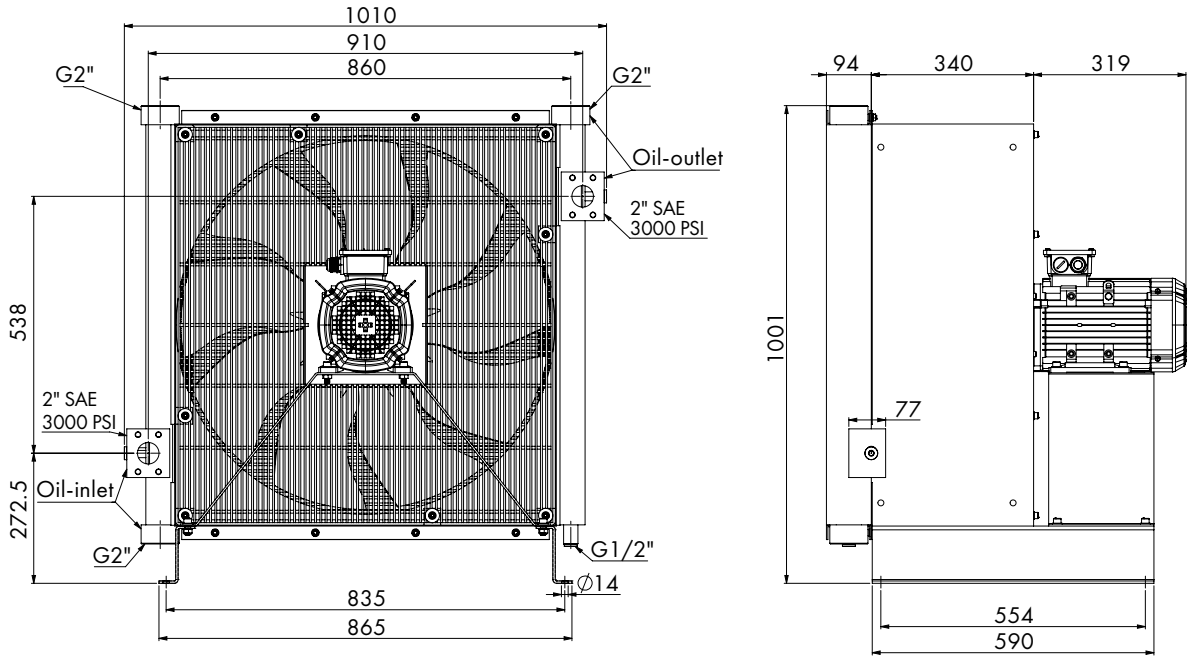
ACI-71





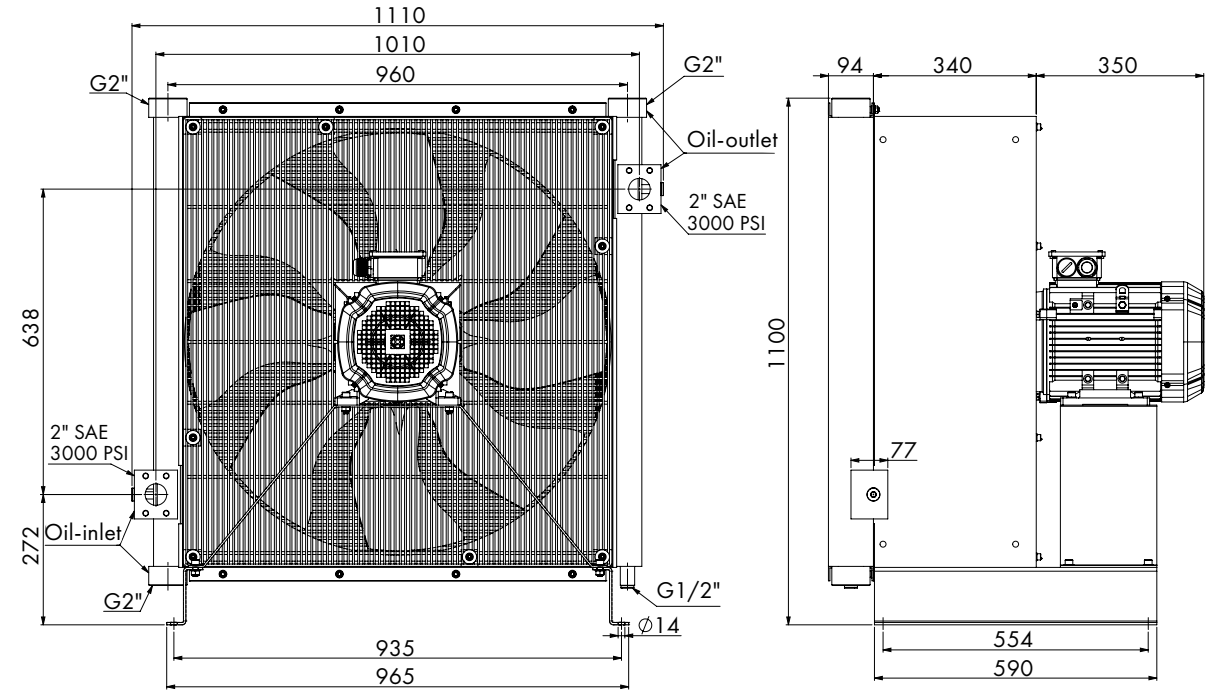
Cooler type	Motor power [kW]	Power consumption [A]	Rotation [1/min]	Air flow [m³/s]	Noise level [dB(A)]	Empty weight [kg]
ACI-71-400-6	1.1	2.55	1000	2.15	63	91

ACI-81



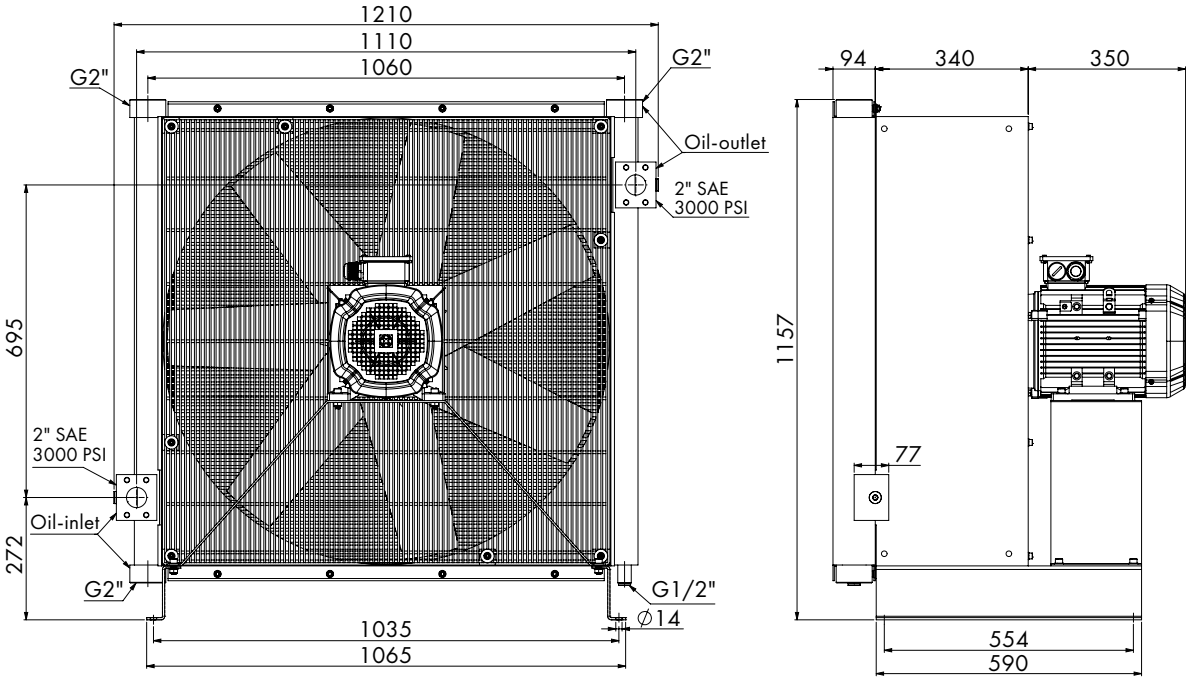
Cooler type	Motor power [kW]	Power consumption [A]	Rotation [1/min]	Air flow [m³/s]	Noise level [dB(A)]	Empty weight [kg]
ACI-81-400-6	1.5	3.77	1000	3.37	67	110

ACI-91



Cooler type	Motor power [kW]	Power consumption [A]	Rotation [1/min]	Air flow [m³/s]	Noise level [dB(A)]	Empty weight [kg]
ACI-91-400-6	3	7.1	1000	4.31	71	137

ACI-101



Cooler type	Motor power [kW]	Power consumption [A]	Rotation [1/min]	Air flow [m³/s]	Noise level [dB(A)]	Empty weight [kg]
ACI-101-400-6	3	7.1	1000	5.3	71	157

Ordering code ACI

ACI - 31 - 400 - 4 - 0 - 0 - 0 - 0

Cooler series
ACI = cooler for industrial application

Cooler size
1
2
3
4
5
6
7
8
9
10

Versions
1 = 1-pass
2 = 2-pass

Input voltage
400 = 400 Volt AC

Engine revolution
2 = 2 pole / 3,000 min^{-1}
4 = 4 pole / 1,500 min^{-1}
6 = 6 pole / 1,000 min^{-1}
8 = 8 pole / 750 min^{-1}

Mounting position of cooler block
0 = standard
1 = turned 90° clockwise*
2 = turned 180° clockwise

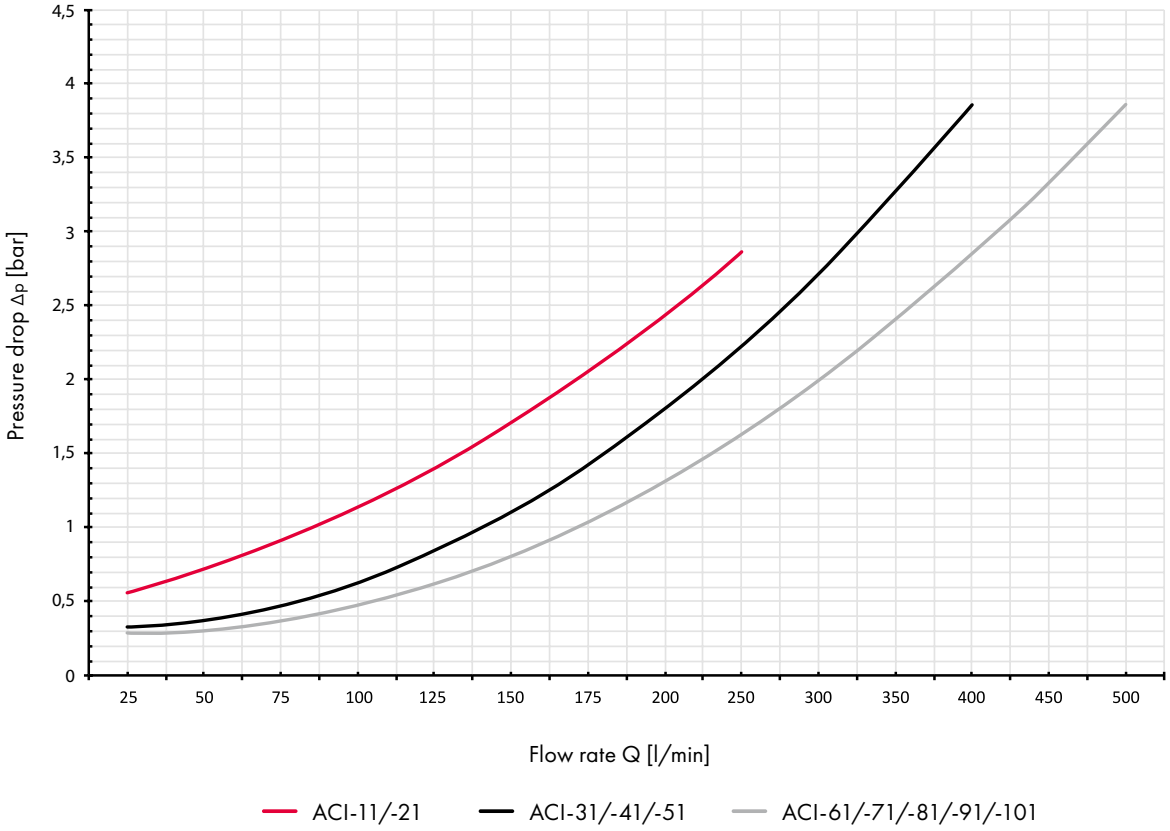
Air flow direction
0 = suction air flow
1 = blowing air flow

Mounting options
0 = standard: feet mounted
1 = horizontally mounted with special bracket

Additional options**
0 = without
1 = internal bypass-valve

* possible with ACI-71/-81/-91/-101 ** additional options on request

Pressure drop



Conversion factors viscosity

The correction factor has to be used for the calculation of the pressure drop for other viscosities:

$\Delta p_{Oil} = \Delta p_{46cSt} \times f$

Δp_{46cSt} as indicated in the graph.

Viscosity	Factor
ISO VG 22	0.7
ISO VG 32	0.8
ISO VG 46	**1**
ISO VG 68	1.2
ISO VG 100	1.5
ISO VG 150	1.7
ISO VG 220	2
ISO VG 320	2.5
ISO VG 460	2.9

Calculation of cooler selection

Example 1: Cooling capacity known

Cooling capacity	P	= 65 kW
Oil inlet temperature	T_{Oil}	= 70°C
Ambient temperature	T_{Air}	= 20°C
Oil flow	Q_{Oil}	= 300 l/min

Specific cooling capacity: $\frac{P}{T_{Oil} - T_{Air}}$

$= \frac{65\ kW}{70°C - 20°C}$

$= 1300\ W/K$

Selection of cooler type:
ACI-61-400-4

Calculation of temperature difference:

$\Delta T_{Oil} = \frac{36 \times P}{Q_{Oil}}$

$= \frac{36 \times 65\ kW}{300\ l/min}$

$= 7.8\ K$

Example 2: Cooling capacity unknown

The heattransfer to the oil is approx. 30%
of the motor power (diesel/electric motor)

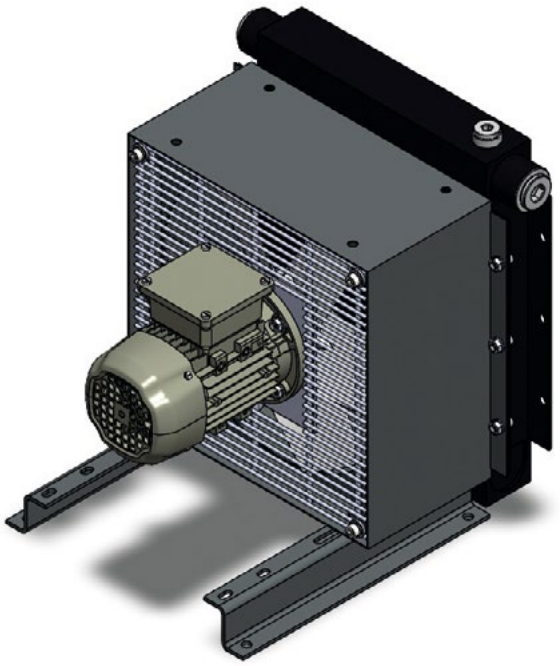
Motor power	P_{Motor}	= 45 kW
Cooling capacity	P	= 13.5 kW
Oil inlet temperature	T_{Oil}	= 50°C
Ambient temperature	T_{Air}	= 20°C
Oil flow	Q_{Oil}	= 200 l/min

Specific cooling capacity: $\frac{P}{T_{Oil} - T_{Air}}$

$= \frac{13.5\ kW}{50°C - 20°C}$

$= 450\ W/K$

Selection of cooler type:
ACI-31-400-4



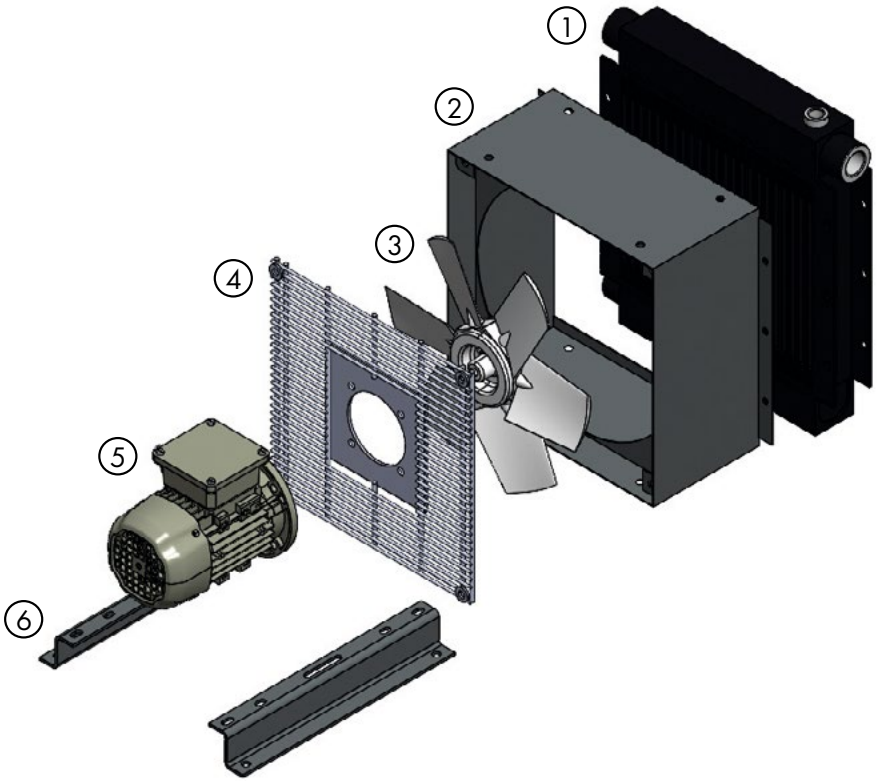
Installation instructions

If possible, the heat exchanger should be integrated into the system with suitable hydraulic hoses. In the case of rigid piping, compensators are one way of eliminating introduction of forces via the piping.

Pressure peaks in the system can lead to fatigue failure of the heat exchanger, even if they are below the permissible operating pressure. The frequency of the peaks is the influencing variable.

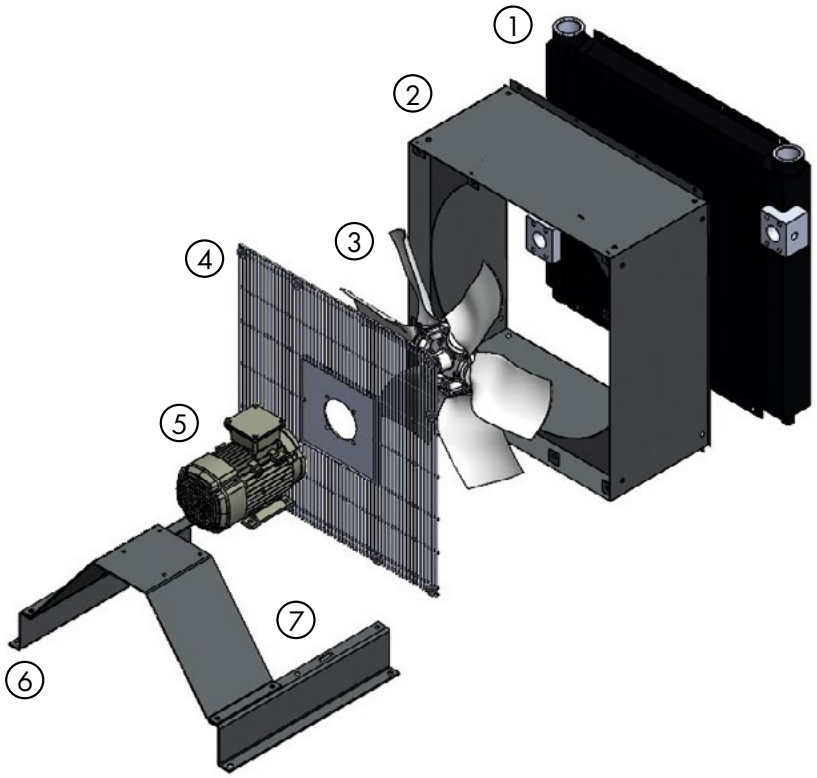
ACI-11 to ACI-61

1 Cooler block
2 Fan housing
3 Axial fan
4 Protection grid
5 Electric engine
6 Mounting brackets

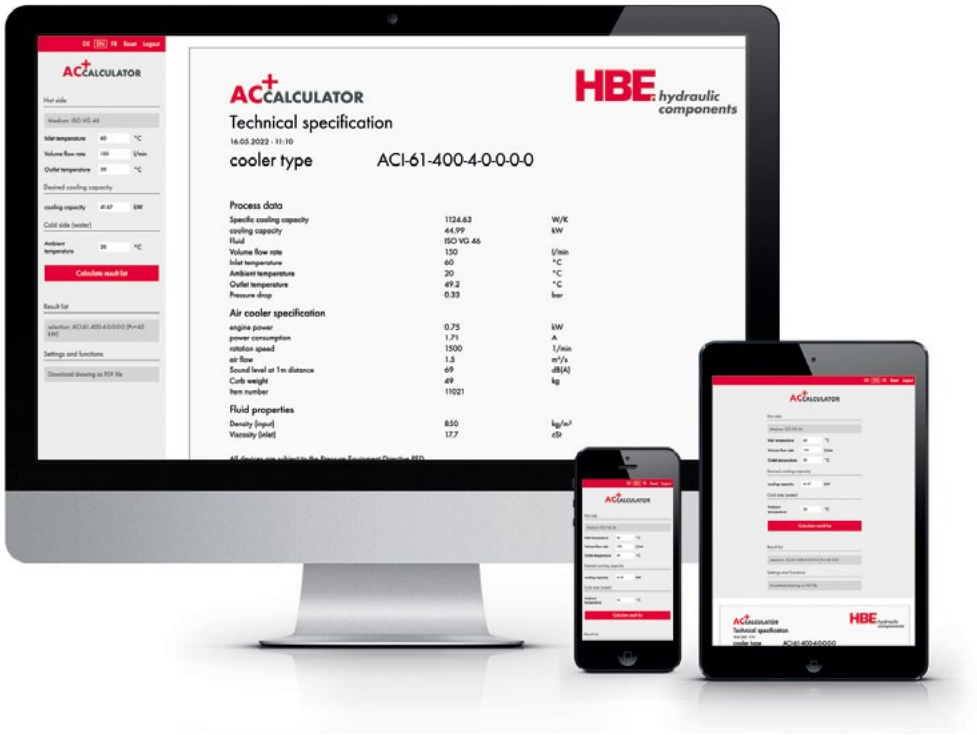


ACI-71 to ACI-101

1 Cooler block
2 Fan housing
3 Axial fan
4 Protection grid
5 Electric engine
6 Mounting brackets
7 Support of electric engine



Selection software

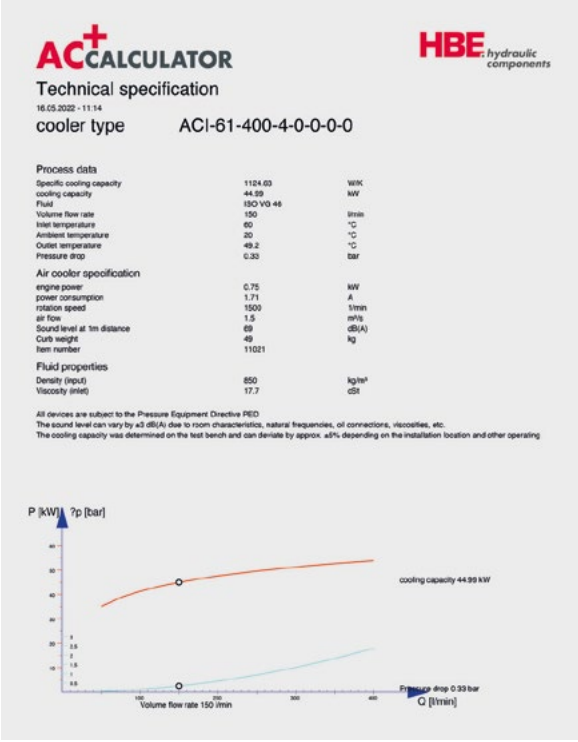


For the individual design of our ACI coolers we provide our customers with an easy to use online software. The AC+Calculator enables a quick and safe calculation of the suitable cooler.

- Flexible display for PC, tablet or smartphone
- Runs in every modern web browser
- Login with your HBE customer number
- Access to all HBE calculation programs with one registration
- Guest access possible
- Calculation of the required cooling capacity
- Design of suitable oil-air cooler
- Simple user interface for quick value adjustments
- Technical specification and dimension sheet as PDF download

To find under

https://login.hbe-hydraulics.com/



Example

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