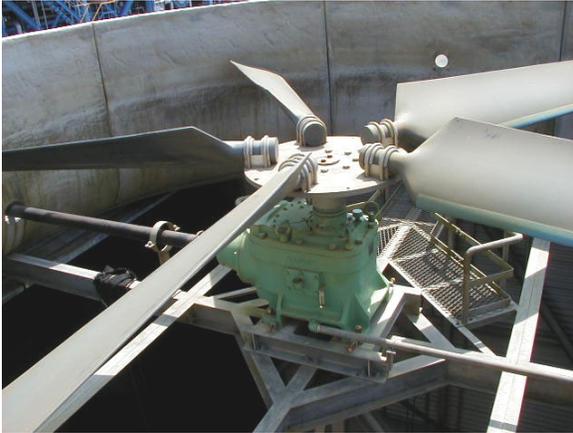


Paramax® SFC Series – Cooling Tower Drives



Cooling towers and condensers are used in both utility and industrial applications. Utilities include: power generation, geothermal and waste-to-energy plants; industrial applications include: chemicals, petrochemicals, pulp and paper, iron and steel and pharmaceutical plants. They are also used in buildings requiring large air-conditioning facilities.

The type of tower selected to cool a process system's water is determined by the economic and environmental considerations of a particular application. The three types that cover most applications are: wet, dry and hybrid cooling towers.

Each of these cooling tower systems utilize large fans and fan drives for which Sumitomo's line of Paramax parallel shaft and right angle speed reducers have proven to be consistently reliable, quiet and trouble-free.

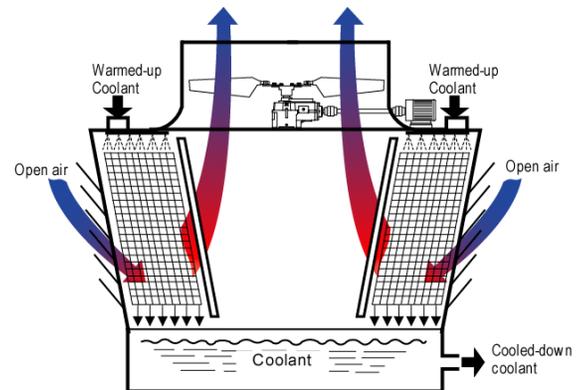
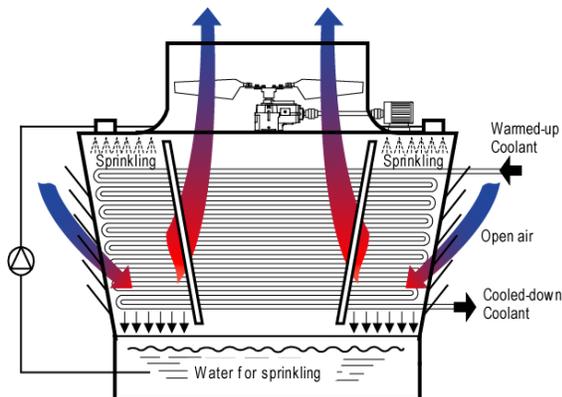
Sumitomo's Cooling Tower Fan Drives (SFC Drive) feature special vacuum degassed alloy steel helical gearing, protuberance hobbing to generate a tooth having increased helix and pressure angles and gas carburized heat treating and grinding to the highest quality standards. The result is greater capacity, smoother, quieter operation and longer, trouble-free life.

Cooling Towers

Cooling Towers are typically classified in two categories: open system and airtight system. The common part of systems is that the warm coolant is cooled down by open air taken through a ventilator. The difference is whether coolant is in direct contact with open air or not. Since the interior of the tower becomes very humid, the motor is installed outside of the tower.

Open-System

The cooling efficiency in this type of tower is very high because the coolant is in direct contact with the outside air. This system involves evaporation of some of the coolant. It may be necessary to replace or replenish the coolant after long periods because only the water is evaporate, which allows for impurities and toxic substances to build up in the coolant.



Airtight-System

In this system, the coolant is kept in a coil-shaped radiator so the coolant is not in direct contact with the open air. The cooling efficiency is about half that of the open-system type, however, this system is used frequently when trying to avoid dirty water—such as computer and semiconductor related facilities and also where the outside air is polluted (underground parking lots and volcanic ash areas).

Here is a summary of some of the advantages and disadvantages between the Cooling Tower and Air Cooled Condenser. Different industries require different methods of cooling.

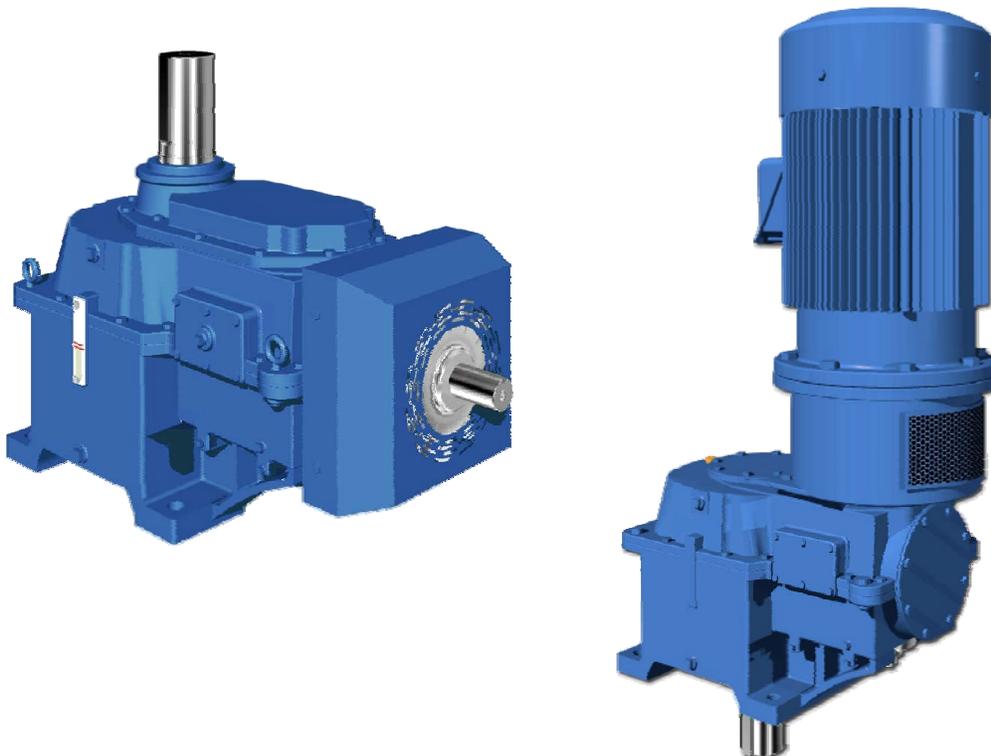
Method	Advantage	Disadvantage
Cooling Tower – Open System	High Efficiency	<ol style="list-style-type: none"> Mixing of impurities & toxins into coolant Producing plume in winter Drainage process may be costly
Cooling Tower – Airtight System	<ol style="list-style-type: none"> Coolant remains clean No condensate plume in winter No problems even in bad surrounding environment 	Device is larger than open system (not as compact)
Air Cooled Condenser	No water is required	Comparatively inefficient

CTI Standards (Cooling Tower Institute)

- The gear strength is calculated followed by AGMA6010-F97.
- Service factors of gear
 - Spiral Bevel gear SF=2.0 or more
 - Helical gear SF=2.0 or more
- Life-span of bearing
 - Input shaft, intermediate shaft bearings 50,000 hours or more (L10 life**)
 - Output shaft bearing 100,000 hours or more (L10 life**)

*** L10 life ...Basic rated life (When 90% of a group of identical bearings will exceed this life when rotated at the same speed and under the same load and operating conditions.)*

Optimal Designs for Cooling Towers:



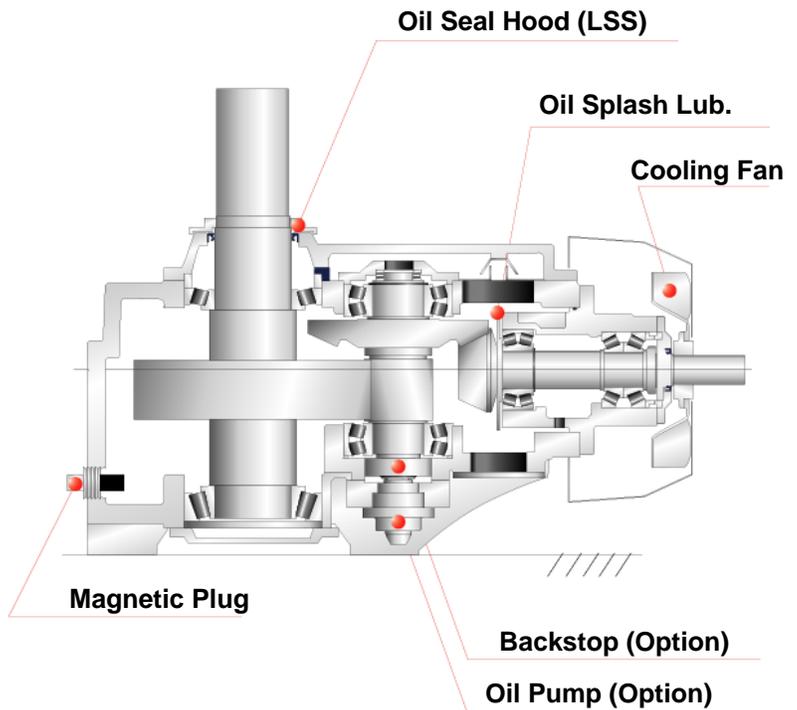
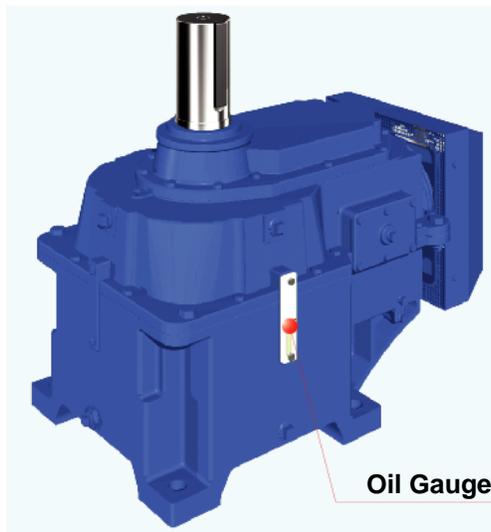
Selection Criteria:

Fan Diameter vs Motor Size

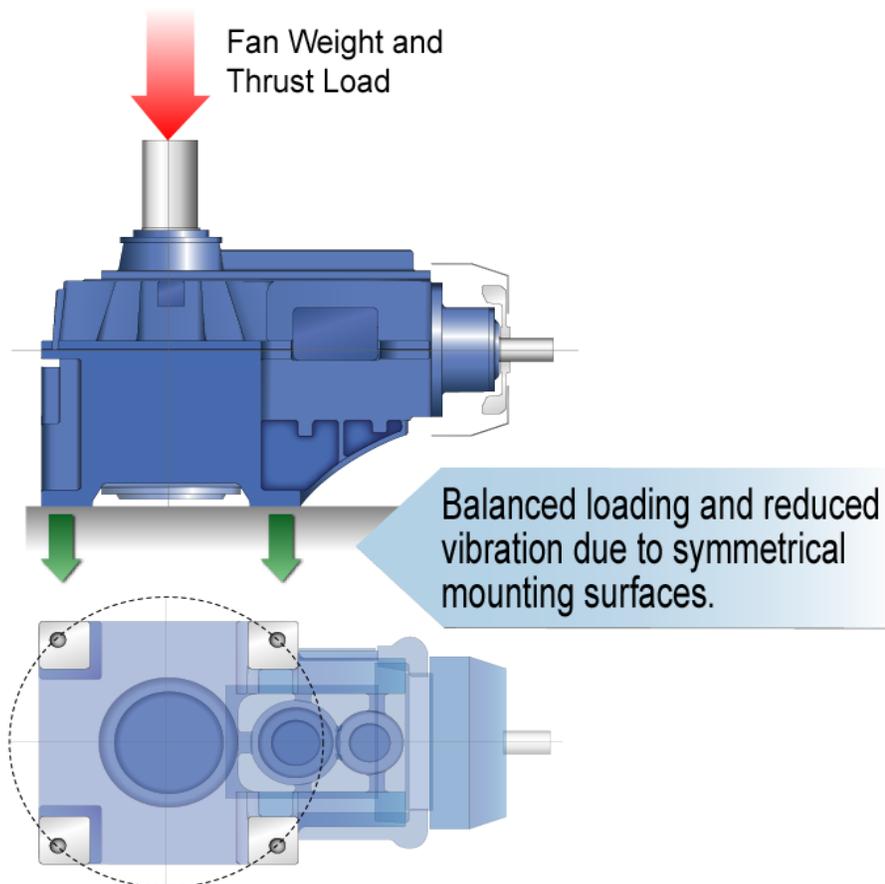
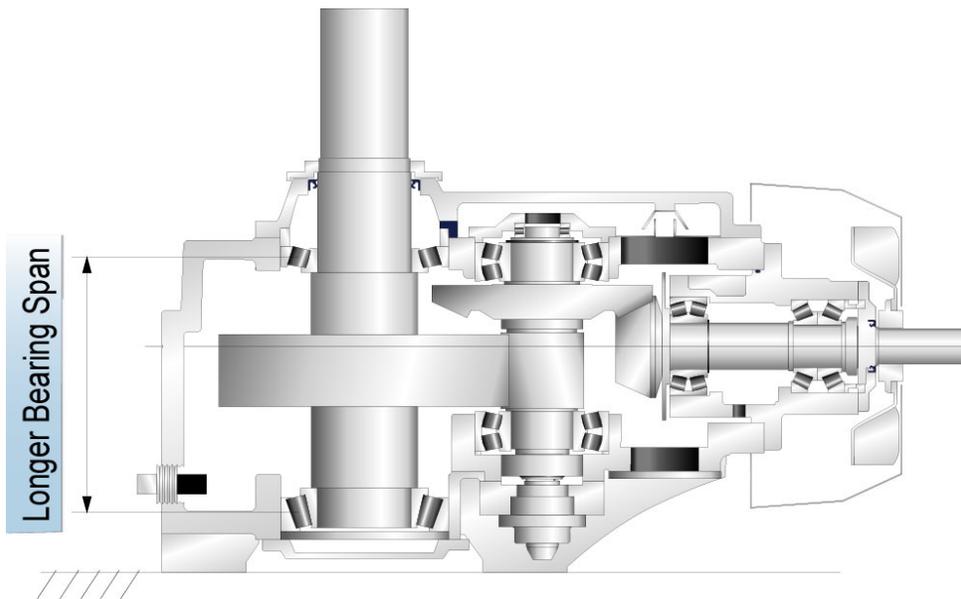
Fan Diameter	ft	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42
	m	3.94	4.59	5.25	5.91	6.56	7.22	7.87	8.53	9.19	9.84	10.50	11.15	11.81	12.47	13.12
Motor kW	37															
	55															
	75															
	90															
	110															
	132															
	160															
	200															
	250															
	280															

Gearbox Size SFC045 SFC055 SFC060 SFC065 SFC070 SFC075

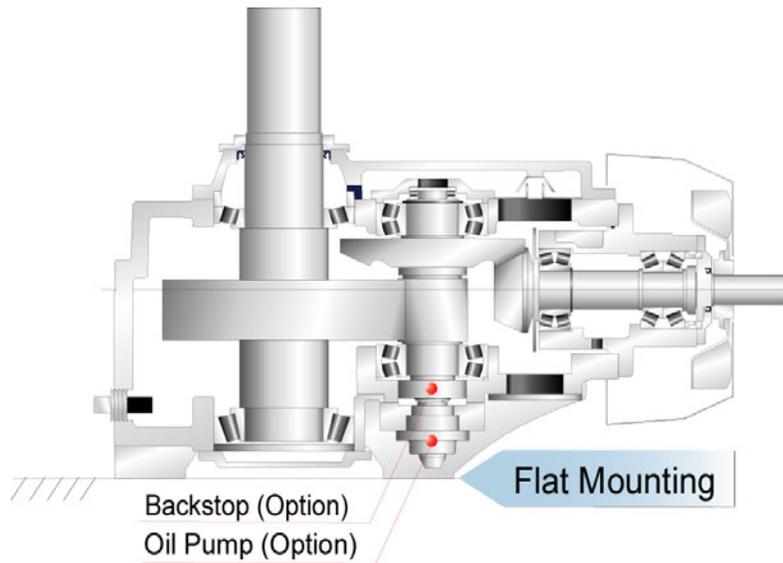
Designed Specially for Cooling Tower Drives:



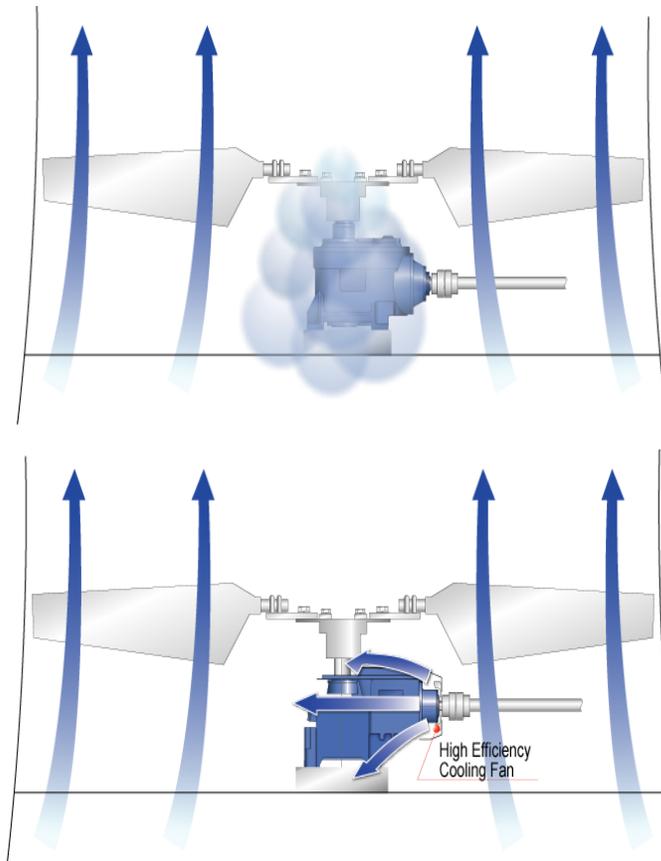
Features: (1) Low Vibration Design



Features: (2) Similar mounting base design



Features: (3) High Cooling Efficiency



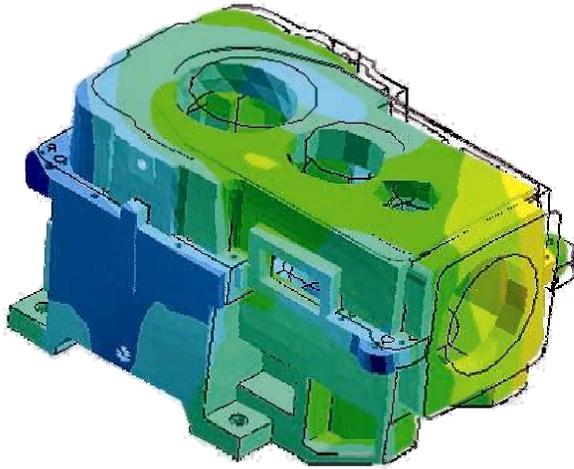
Airflow condition inside stack

- More effective air flow due to high efficiency cooling fan.
- More effective air flow around housing due to elevated fan position.

Features: (4) Low Noise Design

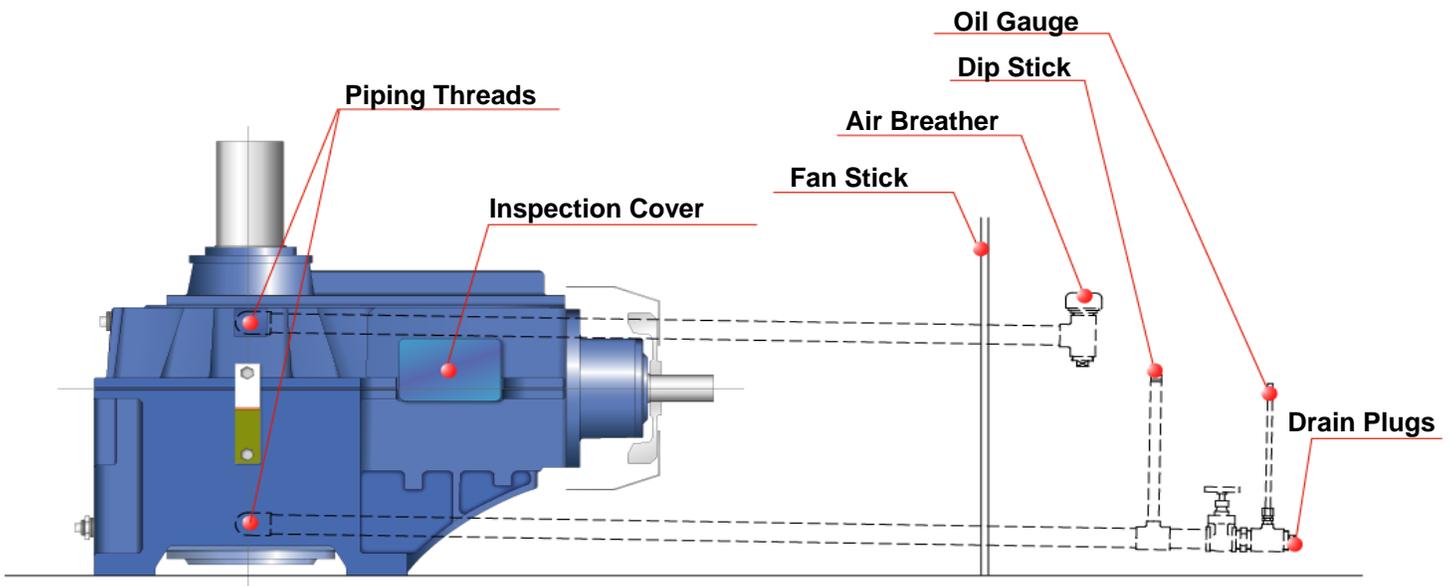
Minimized deflection under load using FEM analysis.

- Minimized resonance using modal analysis
- Optimum tooth mesh contact ensured by increased housing rigidity.



Features: (5) Ease of Maintenance

- One year maintenance free operation
- Gearbox is drilled and tapped for attaching external breather and oil fill/drain
- Internal gearbox inspection is possible without draining the oil because of the inspection cover that is located above the operating oil level
- For internal splash oil lubrication, the use of an oil pump and its periodic replacement is not required.



So whether you're looking for a Cooling Tower or an Air Cooled Condenser, think Sumitomo. Paramax SFC Series Cooling Tower and Air Cooled Condenser Drives are designed specifically for high performance in these specific applications and environments. With the same cost-saving features associated with the Paramax 9000 series, these drives will outperform competitor's products, even in the most demanding environments.

For more information, please contact Sumitomo Drive Technologies at 1-800-SM-CYCLO or email customercare@suminet.com.