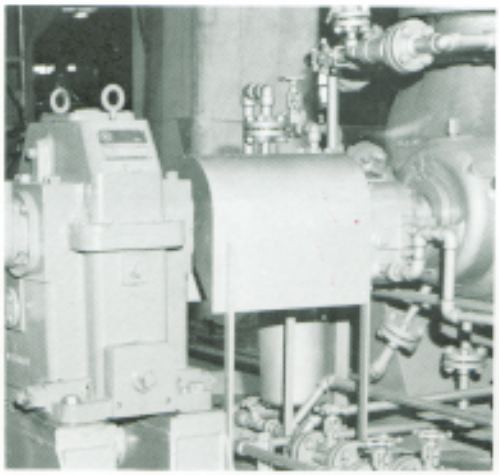
Bulletin H-41

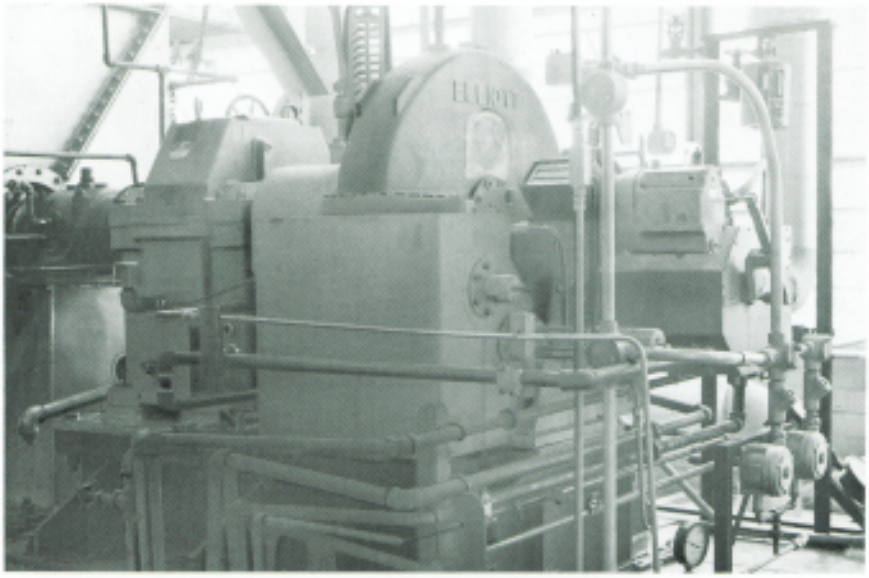
Elliott high-speed gears

Elliott gears have a reputation for efficiency, economy, durability.

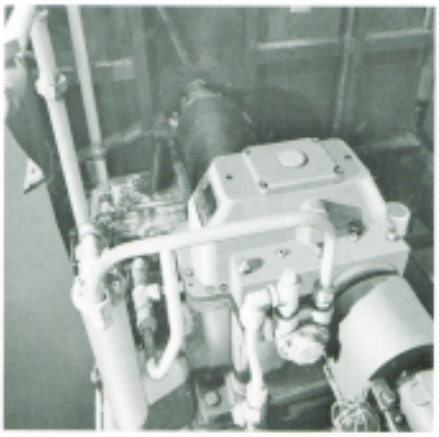


Dependable gears are essential to the cost-efficient operation of driven equipment in a wide range of industries. Elliott Company, a world leader in rotating machinery, has had an equally strong reputation for high quality gears since 1912. Gears are an integral part of the Elliott product line.

The Elliott design philosophy is one of downward meshing and double-helical construction. This assures long life, high efficiency, and quiet operation under the heaviest load conditions. There are eight frame sizes with mesh ratings of up to 14,000 HP (10 430 kW). Pre-engineered ratios allow Elliott to offer a quality designed gear with an optimum combination of cost and delivery. Custom ratios are also available for specific customer needs.



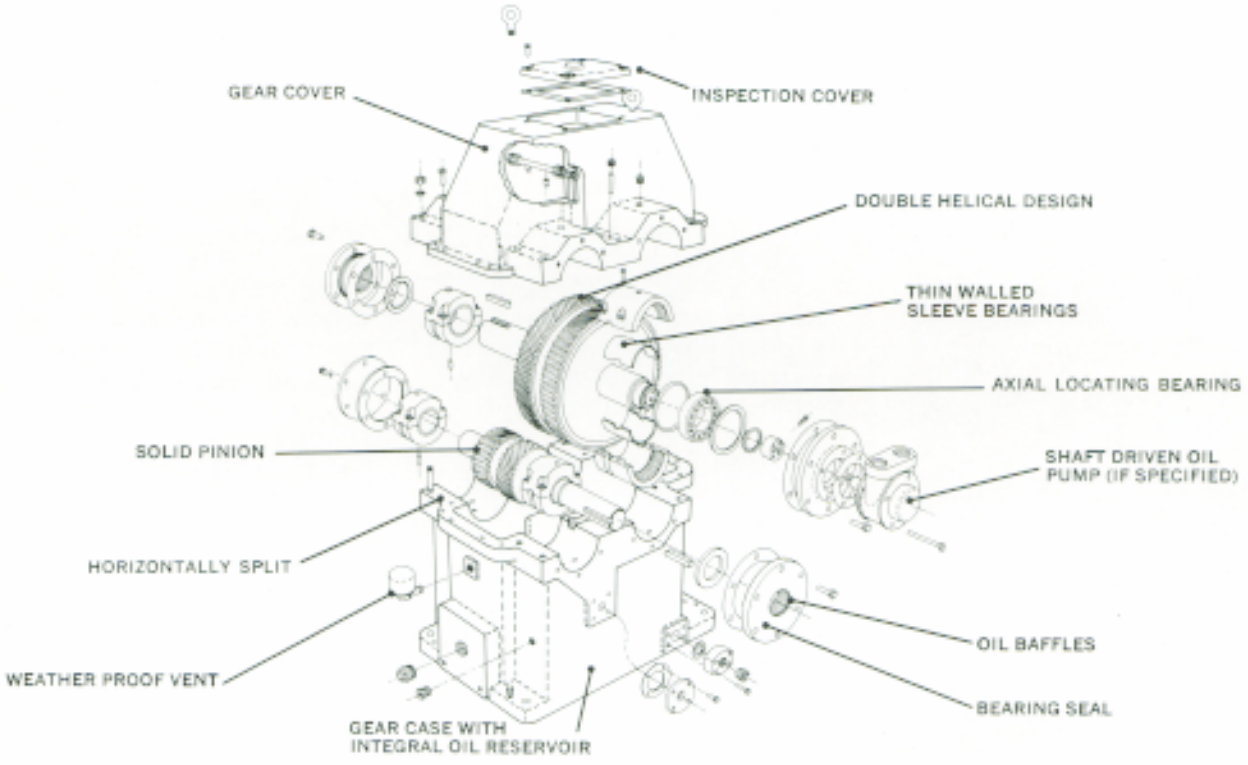
Elliott gears are engineered to increase the efficiency of driven equipment, as well as the driver. By purchasing selected options they comply with API-613 specifications.



Gear case is horizontally split for ready access to components.

Design Features

- Compact design saves space.
- Double-helical gear and pinion.
- Liner-type bearings are dependable, easy to replace.
- Both gear and pinion are dynamically balanced.
- Solid pinion forging.
- Increased efficiency of driven and driving equipment.
- Heavy wall cast iron casing.
- Rated per AGMA 421.06.
- Vibration guarantee of 2 mils (51 μm) below 4500 r/min. and 1.5 mils (38.1 μm) above 4500 r/min.
- Backed by world-wide service.
- Quiet operation.
- Efficiencies to 98%.
- Pressurized lubrication system is standard.

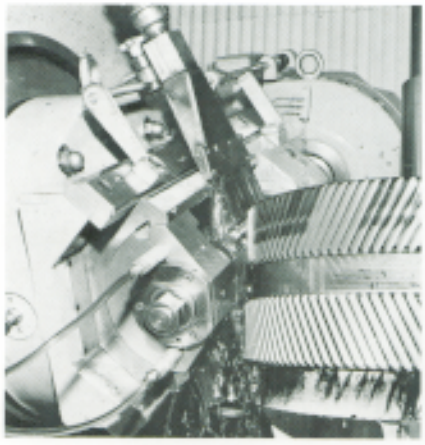


Material Specifications

Part	Commercial Specification	Description
Gear Case	ASTM A48-64, Class 30	Cast Iron
Gear Wheel Assembly		
Rim and Hub Integral (Sizes 1 thru 6)	AISI 4145H	Forged Alloy Steel
*Rim (Sizes 7 and 8)	AISI 4145H	Forged Alloy Steel
*Hub (Sizes 7 and 8)	ASTM A48-64, Class 30	Cast Iron
Shaft (Sizes 1 thru 8)	AISI 4145H	Forged Alloy Steel
Pinion/Shaft	AISI 4145H	Forged Alloy Steel
Bearings	SAE 12	Tin Based Babbitt

*Rim and hub are integral on C7R4 and C8R4 when pinion pitch line velocity is greater or equal to 12,500 ft/min (3800m/min)

Built for reliable service, designed for easy maintenance



Gears and pinions are precision-hobbed

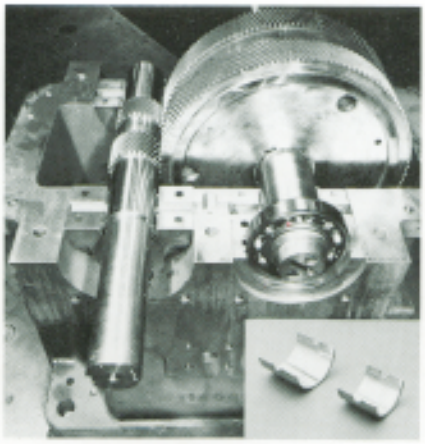
Elliott gears and pinions are precision-hobbed and lapped from steel forgings to assure long life, high efficiency and quiet operation.

Gear teeth are cut after the gear is shrunk, keyed to the shaft, and finish-turned. This assures concentricity between pitch circle and bearing journals.

The pinion is a solid single forging.

All components are heat-treated to normalize stress.

Both gear and pinion are dynamically balanced to precise engineering tolerances. The double-helical design balances axial thrust so that only a simple ball bearing is required for positioning.

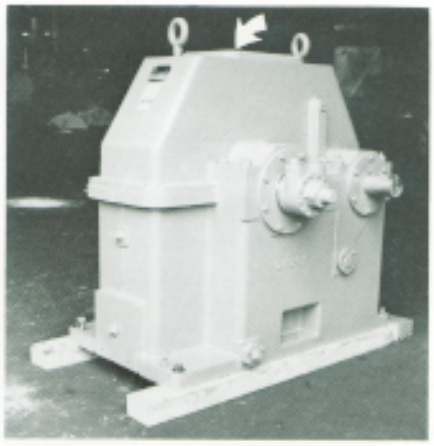


Sleeve bearings are liner-type

Liner-type sleeve bearings support gear and pinion. The liners are horizontally-split for easy, economical inspection and removal, if necessary. A ball bearing on the low-speed shaft locates the gear shaft.

Bearing liners snap and lock into place without hand-scraping or fitting.

For rapid heat transfer, bearings have a thin-wall steel shell with a bonded babbitt surface.



Gear case is cast iron

High-strength, heavy-duty cast iron construction maintains proper shaft alignment, prevents vibration and keeps gears and pinions precisely engaged, even under the heaviest loads.

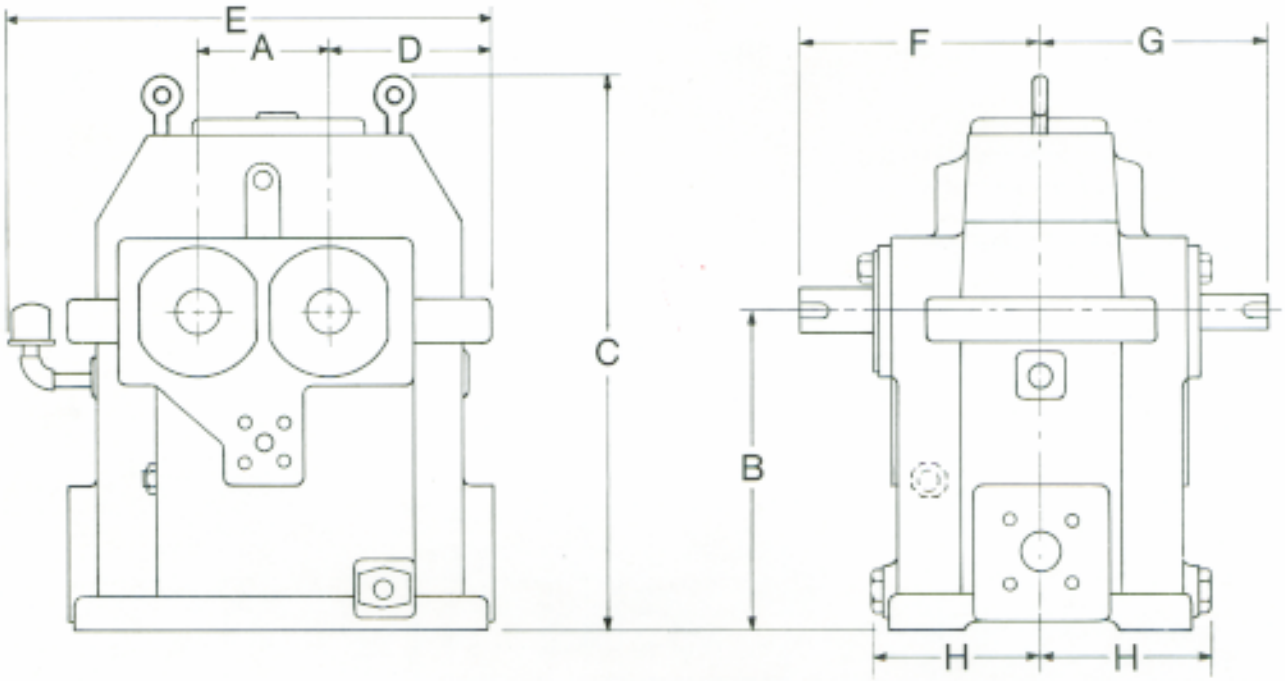
Oil seals on gear and pinion shafts keep oil inside the case, keep foreign matter out.

The horizontally-split case can be opened when necessary without disturbing piping or connections. With gear case closed, interior components can be readily checked through the inspection cover (arrow) on top half. It opens easily by removing four bolts.

Worldwide Service

All Elliott high speed gears are designed with the user in mind. They install quickly and they're easily maintained. Depending on customer requirements, installation, start-up, and individually-tailored planned maintenance programs are readily available from Elliott's worldwide service arm. Elliott service locations are staffed with expert engineers, parts specialists and service supervisors. They provide prompt, efficient service 'round the clock, seven days a week, anywhere in the world.

Dimensions and weights



		C1	C2	C3	C4	C5	C6	C7	C8
A	in.	7.087	8.661	10.236	12.205	14.173	16.535	18.898	21.260
	mm.	180	220	260	310	360	420	480	540
B	in.	16.94	21.44	21.44	21.46	24.00	26.00	27.75	30.12
	mm.	430	545	545	545	610	660	705	765
C	in.	29.54	34.64	37	39.74	44.50	50.00	53.94	59.06
	mm.	750	880	940	1010	1130	1270	1370	1500
D	in.	8.86	10.62	12.00	14.00	15.94	18.88	21.06	23.04
	mm.	225	270	305	355	405	480	535	585
E	in.	26.38	30.30	34.24	38.38	43.12	50.54	55.72	60.04
	mm.	670	770	870	975	1095	1285	1415	1525
F	in.	13.38	15.36	18.12	19.70	22.06	22.64	25.60	26.19
	mm.	340	390	460	500	560	575	650	665
G	in.	12.64	14.18	16.54	18.12	20.28	20.88	23.04	23.62
	mm.	320	360	420	460	515	530	585	600
H	in.	9.06	10.06	12.00	12.78	15.12	15.58	17.00	17.78
	mm.	230	256	305	325	384	396	432	452
Weights	lb.	750	1050	1800	2050	3000	4100	5000	6000
	kg.	340	477	816	930	1364	1860	2268	2721

Options available upon request

- API 613
- Load testing
- Vibration detectors
- Baseplates
- Kingsbury-type thrust bearings
- Special ratios.

Performance

How to use:

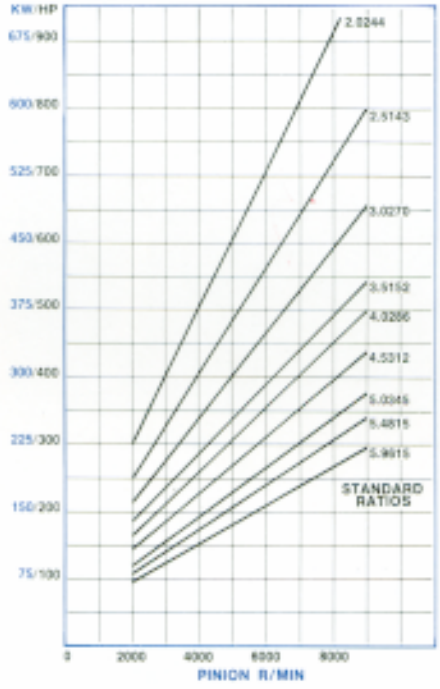
1. *Determine the service factor.* Power ratings in the adjacent curves are based on a service factor of 1.0. For any type of prime mover and driven machine combination, the power load must be modified by the appropriate service factor as listed by the American Gear Manufacturers Association.

2. *To determine the equivalent power.* Multiply the maximum power required by the applicable service factor.

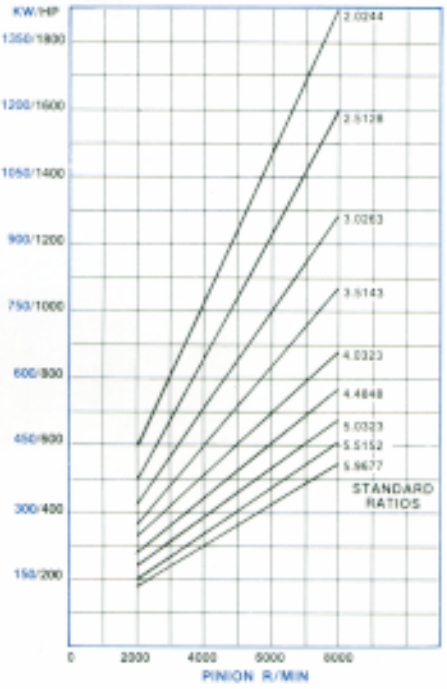
3. *To select the gear ratio.* Divide the higher speed by the lower speed.

4. *To select the gear frame.* On the curves, run a line upward from the pinion speed (higher speed) to the selected gear ratio. If the exact ratio is not available, the approximate power for intermediate ratios can be interpolated. Then follow a line horizontally to the power rating. If the power designated on the curve is lower than the equivalent power, refer to the next larger size gear and continue until the curve power is at least equal to the equivalent power.

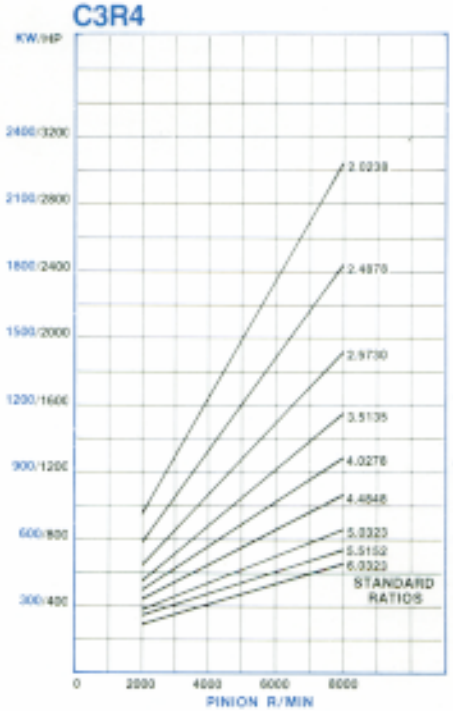
C1R4



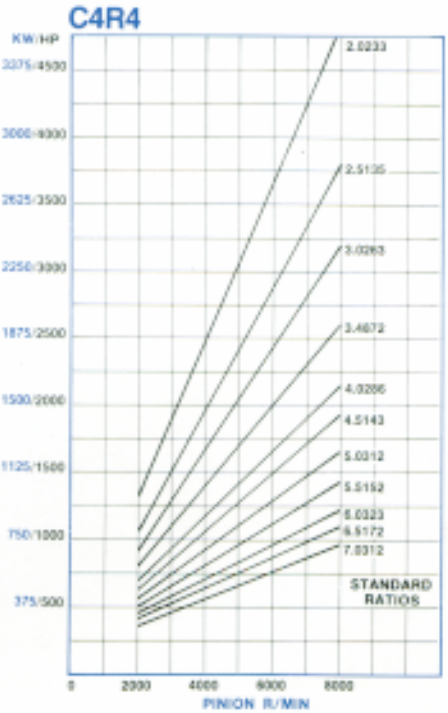
C2R4



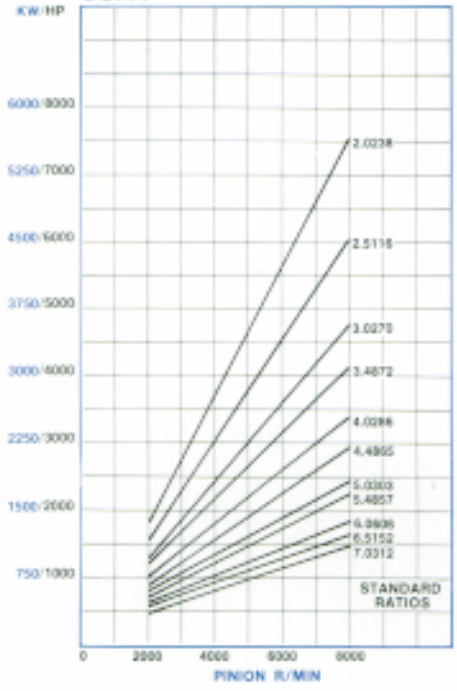
C3R4



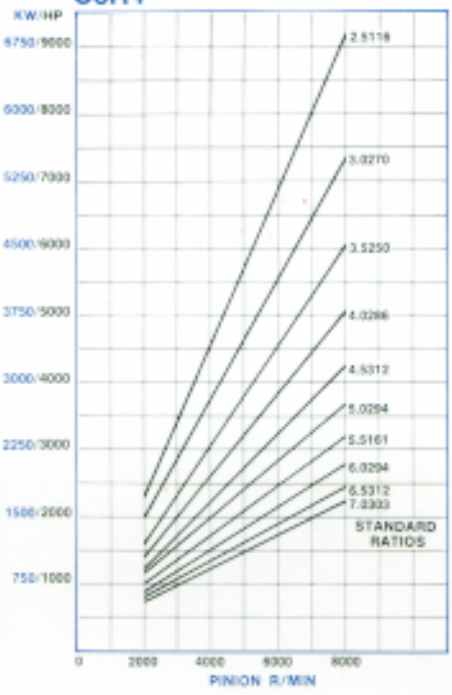
C4R4



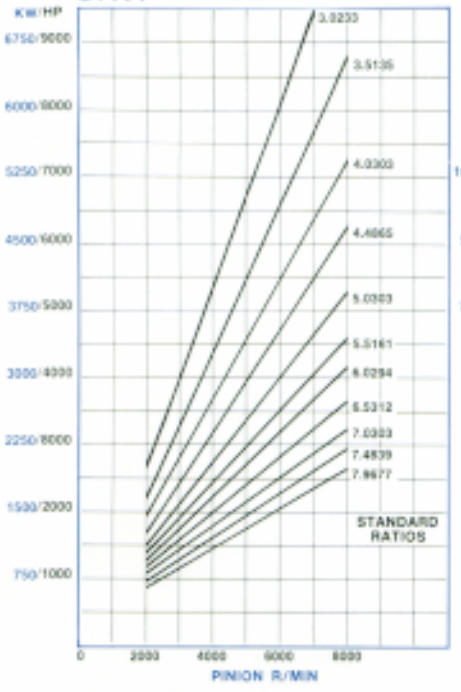
C5R4



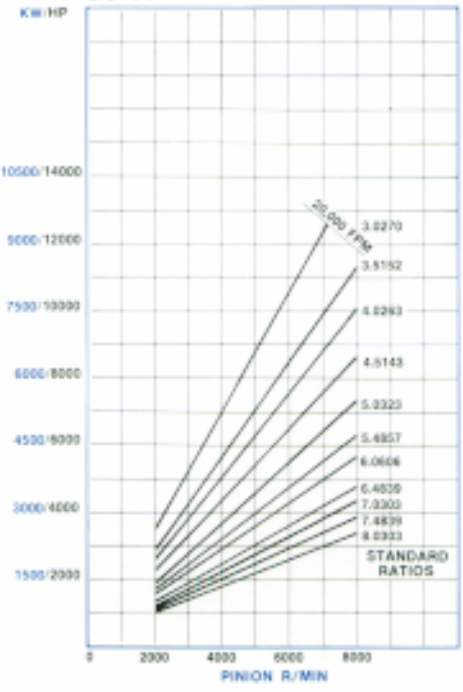
C6R4



C7R4



C8R4



Example:

Select a gear for a 335 HP (250 kW) turbine-driven forced draft fan at a speed of 1200 r/min.

1. The AGMA service factor for a turbine-driven forced draft fan is 1.6.
2. The equivalent power is 335 HP $\times$ 1.6 = 536 HP. (250 kW $\times$ 1.6 = 400 kW).
3. At a turbine speed of 4800 r/min., the ratio is 4800/1200 = 4.0.
4. Gear selection curves indicate that a C2 gear has the capability of 575 Hp(430 kW) against an equivalent power requirement of 536 HP (400 kW).

To find out how you can put Elliott's technologies to work for you, contact your nearest Elliott office or one of the following:

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Telex 866643

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Other products manufactured by Elliott Company are:

- Mechanical Drive Turbines
- Turbochargers
- Tube Expanders
- Water Blasters
- Air and Gas Compressors
- Tube Cleaners
- Roller Burnishers
- Machines and Systems

Elliott has manufacturing facilities in the U.S.A., Netherlands, Japan, Canada, and Mexico.

UNITED TECHNOLOGIES ELLIOTT

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Litho in U.S.A.