Treat Your Compressor Seals Right

► SHAFT SEALS on refrigeration compressors prevent leakage of (1) gas and oil out of the crankcase and (2) air into it. Seals on modern high-speed compressors are often the spring-loaded type, Fig. 1. Another popular design, Fig. 2, uses tempered-steel diaphragms. *In both, friction surface is much less than in a stuffing-box-type seal.* In Fig. 3, unit has a bellows element.

Coil Spring. *In this type,* Fig. 1, the entire seal assembly rotates with the compressor shaft. Contact between the seal-face surface and its mating stationary seal seat forms the running seal joint. Both surfaces are highly finished so they are smooth and flat.

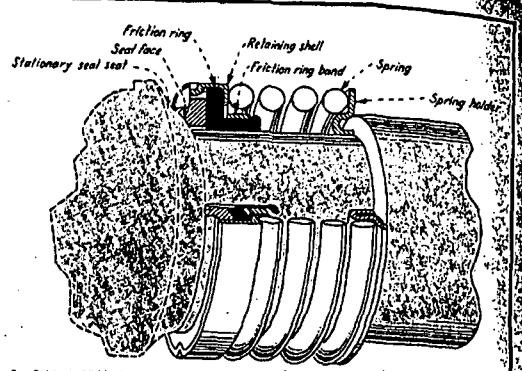
The seal face loosely encircles the shaft and is held tight against the stationary seat by the coil spring. Any gas or liquid pressure in the crankcase also acts on seal face, pressing it to the seat. But the spring furnishes main force.

Seal-face back contacts front of the resilient friction ring. This ring is closely fitted to shaft and prevents leakage *at this point.* Expansion of the ring is restricted by the friction-ring band, keeping seal tight at all times.

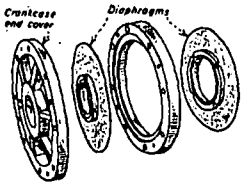
Diaphragms, Fig. 2, *give a positive* balance between internal crankcase pressure and external atmospheric pressure. Case-hardened steel collars *retain* the diaphragms, which are immersed in oil. Total friction surface is said to be less than 5% of the conventional stuffing-box-type seal.

Bellows. Seal nose, Fig. 3, carries a narrow ring with an accurately finished surface that is made to bear against a hardened-steel collar on the rotating shaft. Collar sealing surface is also highly polished. Flange mounts the seal assembly and the bellows provides a flexible and gas-tight connection between flange and seal nose. Spring maintains a firm contact between seal nose and shaft collar.

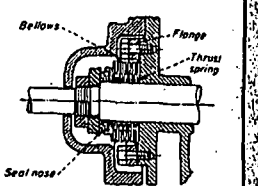
Leaks. *Shaft seals seldom develop* leaks if the compressor is run right. In good operation one of the most important *items is the right amount of lube oil* in the compressor crankcase. Keep the oil clean at all times and be sure it is the grade recommended by compressor manufacturer.



1 SHAFT SEAL fitted with coil spring to maintain pressure between rubbing, stationary faces. Friction ring, closely fitted to shaft, revolves with it



2 BALANCED packless shaft seal's two steel diaphragms run in oil



3 BELLOWS in shaft seal provides a flexible and gas-tight connection

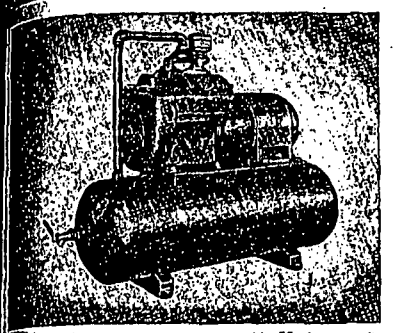
Once a week, during normal running, stop compressor and check seal for oil leaks. If much oil is found on seal exterior, test for refrigerant leaks, using a halide torch.

Seals like that in Fig. 1 may develop a slow leak when compressor is first started. Long storage or lack of oil between sealing surfaces is usually the cause. On most jobs, crankcase oil reaches the seal immediately after unit starts, establishes a tight seal again.

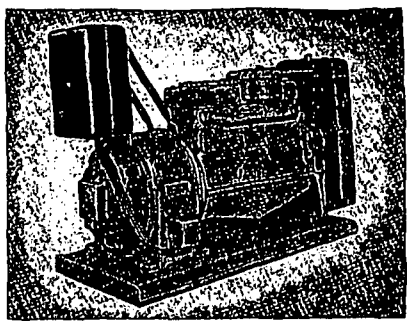
If leak doesn't stop within a short time after starting the compressor, shut the unit down and open seal for inspection. Handle its parts carefully because seal faces must be perfectly smooth to be effective. Deep scratches or grooves usually mean that seal must be replaced or reconditioned.

Choosing Seal. Life of a compressor *seal depends on the basic design, proper* finish of sealing surfaces and right installation. Seal must be suitable for shaft *speed because there may be many* variations in a unit suitable for 600 rpm and one built for 1200 rpm. So be most careful when replacing a seal to see that it is right for the speed, pressure, temperature, fluid conditions on your job.

Maintenance. Your first rule in caring for seals is cleanliness, just as it is for ball and roller bearings. Don't unwrap a new seal until you have your work area spotless. Store seals only in a clean, dry place. Once the seal is installed, check it every week for liquid and gas leaks. Seals require little attention other than this; they'll run for years without trouble if properly lubricated.



1 *Air-cooled garage-type compressor with 50-cfm capacity is easily installed, makes an ideal unit to be rented*



2 *Package-type compressor has motor, starter, radiator on one base, and is easy to install for short or long rental*

SAVE MONEY!
Rent an Air Compressor

By LESLIE B SCHRAMM, *Secretary, Schramm, Inc*

THERE ARE four reasons why you as operating engineer may want to rent an air compressor. *These are (1) to* get extra capacity during peak-load periods (2) to prove that type of unit you *have in mind is right* for the job (3) to maintain production while your regular compressors are down for maintenance or repairs, and (4) for certain test purposes.

Extra Capacity. Suppose you have a government or other short-run contract that probably won't be renewed, or a peak load once a year or at some other regular interval. Renting a compressor may save money because you won't have idle units for long periods.

Testing. If you're studying a new process or idea, purchasing one or more compressors may be a mistake until you decide on pressure, capacity, location, type. Either portable or stationary units are rented for production tests.

Production. Instead of losing all or part of your compressed-air capacity during maintenance or repair of your compressors, rent a unit. Either portable or *stationary, it will keep production* at normal while you or the manufacturer works on your regular units.

Tax Savings. Though the average operator doesn't have to worry much about taxes, he can help make savings. For example, monthly rental for a compressor can be charged off for taxes if *no resale of equipment is planned.*

Where to Rent. The idea of renting a compressor is fairly new. Usual procedure is to contact the local distributor for the make of unit you have in mind. Method of renting or leasing varies from one distributor to another.

Some distributors operate under a verbal agreement. Others use letter agreements covered by a purchase order from the user. But such systems have dangers for both user and distributor.

If user gets into money troubles, distributor may lose his ownership because the unit is bolted down in a bankrupt plant. Proof of ownership is extremely important in such instances.

To overcome this problem, many distributors use a retention-title contract. It is recorded in states requiring this, or other legal steps are taken, depending on local laws.

Besides recording *the title,* rental terms are stated, as is the percent of rent that can be applied toward purchase of *the compressor, if the buyer decides* he wants to keep the equipment.

Purchase. Most distributors establish a resale price when they rent. It is based on the use unit has had. If new, it carries the list price. If in rental service before, the price is less than for a new unit.

All calculations are based on the price established before the unit was delivered to the user. Usually about 80% of the rent paid may be applied toward purchase of the compressor. There is *usually a time* limit set after which the compressor may not be purchased with part of the rent paid on it.

Of course, if you rent a compressor for a *long period, there comes* a time when money spent for rent equals or is greater than the purchase price of the *machine.* So be sure to have competent legal advice before entering an agreement to rent an air compressor.

Maintenance. Agreement should define who is responsible for maintenance. Normally the user must maintain the unit at his own expense. But, of course, there is the normal guarantee period during which both the manufacturer and distributor give the usual service connected with this type of machine. Careless and wrong application by the user are his responsibility.

Types. You couldn't rent a compressor if units that are easy to install and remove had not been developed. Direct and V-belt-driven units from ½ to 150 hp lend themselves to rental. Most manufacturers have suitable units. Packaged *compressors,* Fig. 2, *are well* suited for rental.

Some builders have receiver, starter, *motor, compressor,* aftercoolers and separators all on a single base for easy handling. Garage compressors, Fig. 1, are often rented. Normal rating runs to 15 hp. They are easily shifted.

When renting, be careful to consider compressor's installation cost. If you spend a large sum on a setup, the advantages of renting may be wiped out.