

CPI Special Materials FAQ

CPI, part of the Howden group, calls it special materials polymer alloys why is this?

Traditionally the material used for non-lubricated compressors and some lubricated compressors was filled with PTFE. In this family of materials there is no chemical bonding between the fillers and the PTFE, the PTFE basically encapsulates the fillers to hold the material together. With CPI polymer alloys the situation is completely different. Chemical bonding does take place and in some of the grades that combine several different polymers, the polymers actually alloy together forming a completely different material that has a different chemical and physical characteristics from its constituent polymers.

Is it possible to have one CPI material that can be used in all non-lubricated compressors?

The answer is both yes and no. If the goal is to achieve the maximum life from the components, then there is no one material that will achieve this and each application will have to be studied and the optimum material selected. If operating life is not a concern, then it is possible to utilize one material for a broad range of applications. However, operating life is increasingly the compressor operator's main concern and consequently the application range of materials is narrowing with new materials being developed that are tuned to very specific applications.

In a non-lubricated compressor is it necessary to remove a previously established transfer film from a cylinder or piston rod when installing new components?

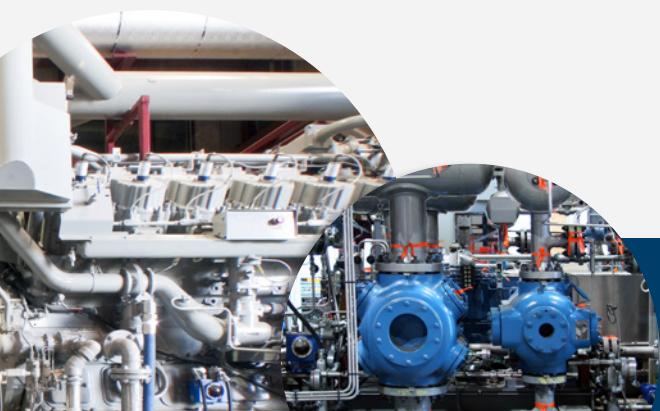
If the new piston rings, rider rings and piston rod packing being installed are the same material as those being removed and the transfer film has not been damaged in any way, then it is not necessary to remove it from the piston rod or cylinder liner. If over several years the transfer film has built up to a heavy thickness, it is a good idea to remove this and re-establish the surface finish using a glaze busting technique.

How does CPI decide on the formulation of its special materials?

CPI has its own research and development facility that can produce small test formulations of new materials. All CPI's materials are a product of this test program and are wear tested in a gas test environment prior to any field trials. The test formulations that CPI uses are based on field experience and data provided by the raw polymer manufacturers.

Does CPI supply filled PTFE materials?

Yes, CPI blends and molds its own formulations of carbon, glass, bronze, etc. filled PTFE materials and there is no doubt that this family of materials still is technically superior in several non-lubricated and lubricated compressor seal applications.



Can CPI polymer alloys be used for both lubricated and non-lubricated applications?

Some of CPI's polymer alloys such as CPI 192 can be used in both lubricated and non-lubricated service. Others such as CPI 184 should only be used in non-lubricated service.

Should the packing ring material be the same as the piston and rider ring materials in the same cylinder?

With the increasing demand to optimize the performance of reciprocating compressor cylinders in both lubricated and non-lubricated service, it is now common to have different packing ring and piston seal materials in the same cylinder.

What is the largest piston ring or rider ring that CPI can produce in its polymer alloys?

The largest polymer alloy piston and rider rings that CPI has produced today are 48". Our molding plants can produce raw material that will enable considerably larger piston and rider rings to be manufactured if the demand arises.

Are CPI polymer alloys abrasive?

All CPI polymers are essentially non-abrasive.

Are CPI raw materials available from any other company?

No, all CPI raw materials are produced in-house to proprietary formulations and are not available from other sources.

How long should piston rings, rider rings and piston rod packings in CPI polymer alloys last before they are changed, under normal operating conditions?

When CPI polymer alloys were introduced to the market in the early 80's, the target was to operate reliable for 8,000 hours in all non-lubricated gas services. Since then CPI's material development has continued partly encouraged by demands from compressor operators to further increase the life to 16,000 and even 24,000 hours. Today, many users of CPI polymer alloys are running 16,000 hours between planned maintenance overhauls and in some instances our materials last up to and in excess of 24,000 hours.

Are CPI polymer alloys used by compressor builders?

Yes, initially CPI polymer alloys were only used when the operators of reciprocating compressors specified them on their purchase orders for new compressors but today compressor builders are increasingly selecting CPI polymer alloys because of the improved consistent performance that they provide, significantly reducing warranty claims.

Can CPI develop materials for specific applications?

Yes, and in several very difficult applications this has been done.

Can polymer alloys be used for stretch-on rider rings?

Yes some can, but because of the high temperatures involved and the complex handling equipment needed for large diameter pistons it is preferable that this work is carried out by CPI manufacturing facilities. If the piston is of a multi-piece design where the rider ring can be stretched directly into the groove without having to pass over the piston OD then it is possible, with guidance from CPI, to fit stretch-on rings on site.

What is the smallest piston ring that CPI can produce in its polymer alloys?

The smallest piston ring CPI has produced in one of its polymer alloys is 10mm (0.394") diameter.

Are CPI polymer alloys always compatible with the full range of gases used in refining and petrochemical plants?

Apart from some very unusual gases CPI polymer alloys are chemically compatible with the full range of gases used in refining and petrochemical plants.

Can CPI polymer alloys be used for other applications such as pump bearings etc.?

CPI PUMPGUARD™ materials for pump wear parts have been successfully installed and operate in line shaft bearings, impeller wear rings, thrust washers on vertical pumps dash single or multi-stage barrel pumps, API, bearings on Archimedes screws and horizontal pumps.

Is the application of CPI polymer alloys covered by API 618?

No, the API 618 design guide only addresses the use of filled PTFE seals.

Are there any applications where CPI polymer alloys cannot be used?

The only gas that CPI polymer alloys cannot be used in is the compression of dry oxygen and for this application CPI has a number of filled PTFE materials which now includes CPI 138, a material that offers a lead-free alternative, developed to specifically maximize compressors up time for piston rings rider rings and packing.

Do the wear tests that CPI conduct in its R&D department mirror those experienced in the field?

Interpretation of data obtained on a controlled rapid wear test machine requires many years of test data for comparison. CPI has over 25 years of comparison test data and we can say that the wear test results obtained in our R&D department are generally consistent to those experienced in the field.

Is CPI continuing to develop new materials and are new materials necessary?

Yes, in order to continue to improve the reliability of reciprocating compressors by extending the life expectancy of the wear of components, increasing up-time of the equipment.

What are CPI polymer alloys made of?

All CPI materials are proprietary formulations and details of their make-up is not disclosed to any customers or consultants.

