



IPD TECH BULLETIN

Matching the proper rings to the piston

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Over the years there have been many changes made to the profile of piston rings. Examples of the most common changes have been from the rectangular to a keystone design, ring materials, and changes to the profile of the ring face. In this bulletin we discuss the changes to the width of the rings. This may seem like too obvious of a topic to be addressed in a Tech bulletin, but the problem tends to be raised fairly often and we've heard of a few instances where thinner ring designs have actually been installed into wide ring land pistons and put into service causing oil consumption, blow-by or in extreme cases, catastrophic failure.

Most of the time the mis-matched problem occurs when someone is reusing pistons or crowns (in the case of articulated, two-piece pistons) and can be traced back to updates in the pistons or cylinders kits. By now you may be thinking that this is old news and remembering back when popular 3304 & 3306 oil rings changed from .125" (3.175mm) to a wider .157" (4mm) width, but the situation continues far later. To attempt to list the part numbers and engines would not be practical, since updates often do not affect an entire engine series, cancellation of the older part number(s), and depending on application can require additional updates to other components.

Below are two examples to help demonstrate how updates can cause some confusion:

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- Example 1: An older piston part # 8N3102 piston updated to #1290338 and both of these pistons used a 2W1709 ring set. The 1290338 then updated to a 1654262 piston, but required a new 2114321 ring set. The difference between these two ring sets is the oil ring. The 2W1709 used a .125” and the 2114321 used a wider 4mm oil ring. Both ring sets are still available, but getting the correct rings depends on which piston you have in the engine and if you use an old parts book chances are you will order the older 2W1709 ring set and not know about the updates until you start to assemble the engine. Needless to say, if the engine is assembled with the narrower oil ring in a later wide ring land piston the engine will not perform properly with the .032” additional space.
- Example 2: The 1326664 articulated crown, 1476955 skirt, and rings that were used in select 3406E engines have been cancelled by the OE and replaced by an updated crown, skirt, and ring set. This means that if one of the components (crown, skirt or rings) needs to be replaced you will have to update all of the cylinder kits. The ring profile on the update is thinner than the original design and cannot be used with the older crowns. This may not be an expense the engine owner is prepared for, but since the original design is no longer available, there’s no other option but to update the engine.

There are many other examples of where an update to one component requires additional component updates, and what came out of the engine may not go back. Clearances between rings and piston ring land vary depending on application and design. Anything more than few thousandths’ or that looks abnormal should be questioned before being installed. Most updates are fairly obvious and an experienced technician will likely spot a fitment issue before a wrong part is installed, but the point of this bulletin is to stress the use of current parts and service information when repairing or supplying parts for an engine.

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