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**Reuse And Salvage Guidelines****Procedures and Specifications for Pistons{1214}**

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## Procedures and Specifications for Pistons{1214}

SMCS - 1214

**Engine:Commercial All****3044C (S/N: 3441-UP)****Engine:Truck All****Industrial Engine:with Turbochargers All****Machine Engines: All****Marine Engine:with Turbochargers All**

### Introduction

This Reuse and Salvage Guideline contains the necessary information in order to allow a dealer to establish a parts reusability program. Reuse and salvage information enables Caterpillar dealers and customers to benefit from cost reductions. Every effort has been made in order to provide the most current information that is known to Caterpillar. Continuing improvement and advancement of product design might have caused changes to your product which are not included in this publication. This Reuse and Salvage Guideline must be used with the latest technical information that is available from Caterpillar.

For additional information about this guideline, consult Repair Process Engineering of the Marketing & Product Support Division at 1 (309) 675-5434.

### Summary

This guideline can be used to determine if an old piston can be reused. The piston can expect to give normal performance if the piston meets the specifications in this guideline. The piston must also be used in the same application.

### Safety

**WARNING**

When replacement parts are required for this product Caterpillar recommends using Caterpillar replacement parts or parts with equivalent specifications including, but not limited to, physical dimensions, type, strength and material.

Failure to heed this warning can lead to premature failures, product damage, personal injury or death.

## References

**Reference**Catalog, GECJ0001-01-2, "Cat Shop Supplies and Hand Tools"

**Reference**Contamination Control Guideline, PEBJ0002, "CaterpillarDealer Contamination Control Guidelines"

**Reference**Reuse and Salvage Guidelines, SEBF8049, "Piston Visual Inspection"

**Reference**Reuse and Salvage Guidelines, SEBF8051, "Inspection and Measuring Procedures for Piston Pins"

**Reference**Special Instruction, SEHS8696, "Piston Cleaning Procedure"

**Reference**Specifications, SENR4620

**Reference**Specifications, SENR5189

**Reference**Specifications, SENR5538

**Reference**Specifications, SENR5588

**Reference**Service Magazine, SEPD0360

## Nomenclature

A piston with a coating that is graphite is normally 0.020 mm (0.0008 inch) thick, dull in appearance and dark gray in color. The top of some one-piece pistons have a hard anodized layer. This layer protects the top of the aluminum piston from the heat of combustion in high output engines. If the anodized layer is removed, the layer cannot be replaced. The anodized layer is not present on pistons that were manufactured after 1996. The crowns on two-piece pistons do not have the anodized layer. The oil passage, which is used for cooling, runs along the circumference of the crown. For the location of the oil passage, look for the holes in the bottom of the piston and the slot for lubricating the piston pin in each piston pin bore.

**Note:** During cleaning of the piston with glass beads, close all oil passages in order to keep debris out..

### One-Piece Pistons

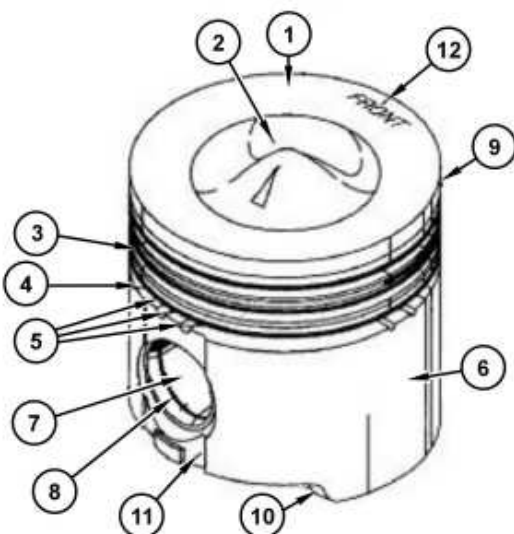


Illustration 1

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## Features of One-Piece Pistons

- (1) Crown
- (2) Crater
- (3) Ring band
- (4) Ring grooves
- (5) Ring lands
- (6) Skirt
- (7) Bore surface of piston pin
- (8) Snap ring groove
- (9) Top land
- (10) Relief for cooling jet
- (11) Side relief for piston
- (12) FRONT

**Graphite Coating**

Many of the new one-piece pistons have two important characteristics. The characteristics are graphite coating on the skirt and an oil passage inside the crown. Refer to Illustration 2. The graphite coating is not present on pistons that were manufactured after 1996.

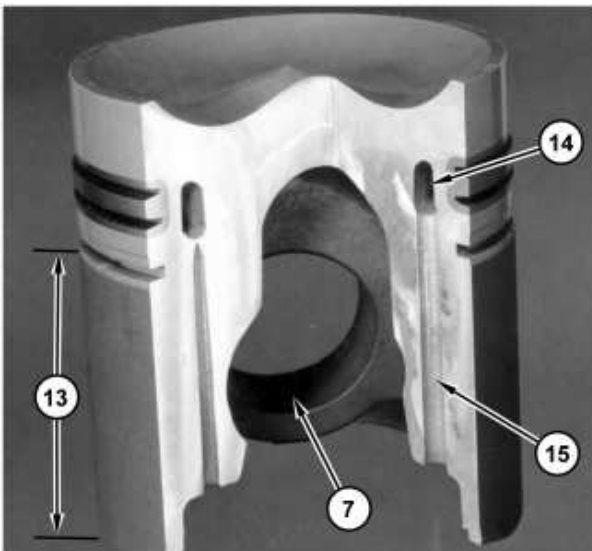


Illustration 2

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## A one-piece piston with a skirt of graphite coating

- (7) Bore surface of piston pin
- (13) Graphite coating

(14) Passage for oil cooling of crown

(15) Vertical oil passage

The graphite coating on the skirt helps to prevent scuffing and seizure at a cold start. A piston with a graphite coating is normally about 0.020 mm (0.0008 inch) thick, dull in appearance and dark gray in color. The graphite coating will eventually wear off the surface of the piston. Wear occurs at the location of contact of the piston and liner. The wear of graphite coating is normal. During cleaning, do not remove more graphite coating. The coating can be worn on any portion of the piston, but the piston skirt must be smooth with no deep scratches or the buildup of material.

### **Anodized Layers**

The top of some one-piece pistons have a hard anodized layer. This layer protects the top of the aluminum piston from the heat of combustion in high output engines. If the anodized layer is removed, the layer cannot be replaced. The anodized layer is not present on pistons that were manufactured after 1996. The crowns on two-piece pistons do not have the anodized layer.

### **Oil Passages**

The oil passage, which is used for cooling, runs along the circumference of the crown. For the location of the oil passage, look for the holes in the bottom of the piston and slot for lubricating the piston pin in each piston pin bore.

### **Steel Crown and Aluminum Skirt**

A steel crown can be bolted to an aluminum skirt. This is regarded as a one-piece piston assembly because the assembly should not be separated into two pieces. Do not separate the crown from the skirt.

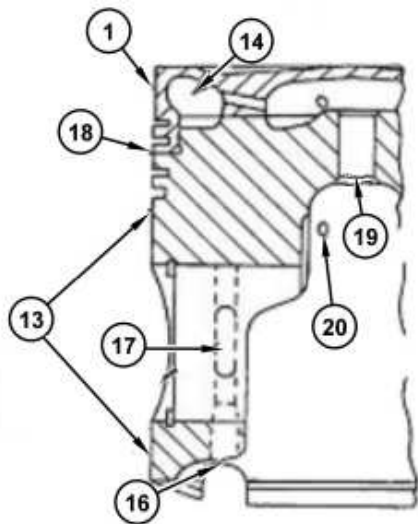


Illustration 3

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Section view of piston which identifies the crown, skirt and all oil passages

(1) Crown

(13) Graphite coating

(14) Passage for oil cooling of crown

(16) Passage for supply of cooling jet

- (17) Slot for lubrication of piston pin
- (18) Joint of crown and skirt
- (19) Passage for center oil return
- (20) Passage for lubrication of bottom oil ring

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### NOTICE

**Never disassemble the crown from the skirt. The pistons are assembled at the factory using special procedures and the crowns are matched with the skirts. This procedure cannot be duplicated in the field. Special procedures and tooling are required to tighten the bolts holding the crown to the skirt. Do not attempt to check or retighten the bolts.**

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### Forged Steel Pistons



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Illustration 4  
Forged Steel Piston with Single Piece

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### Two-Piece Pistons

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