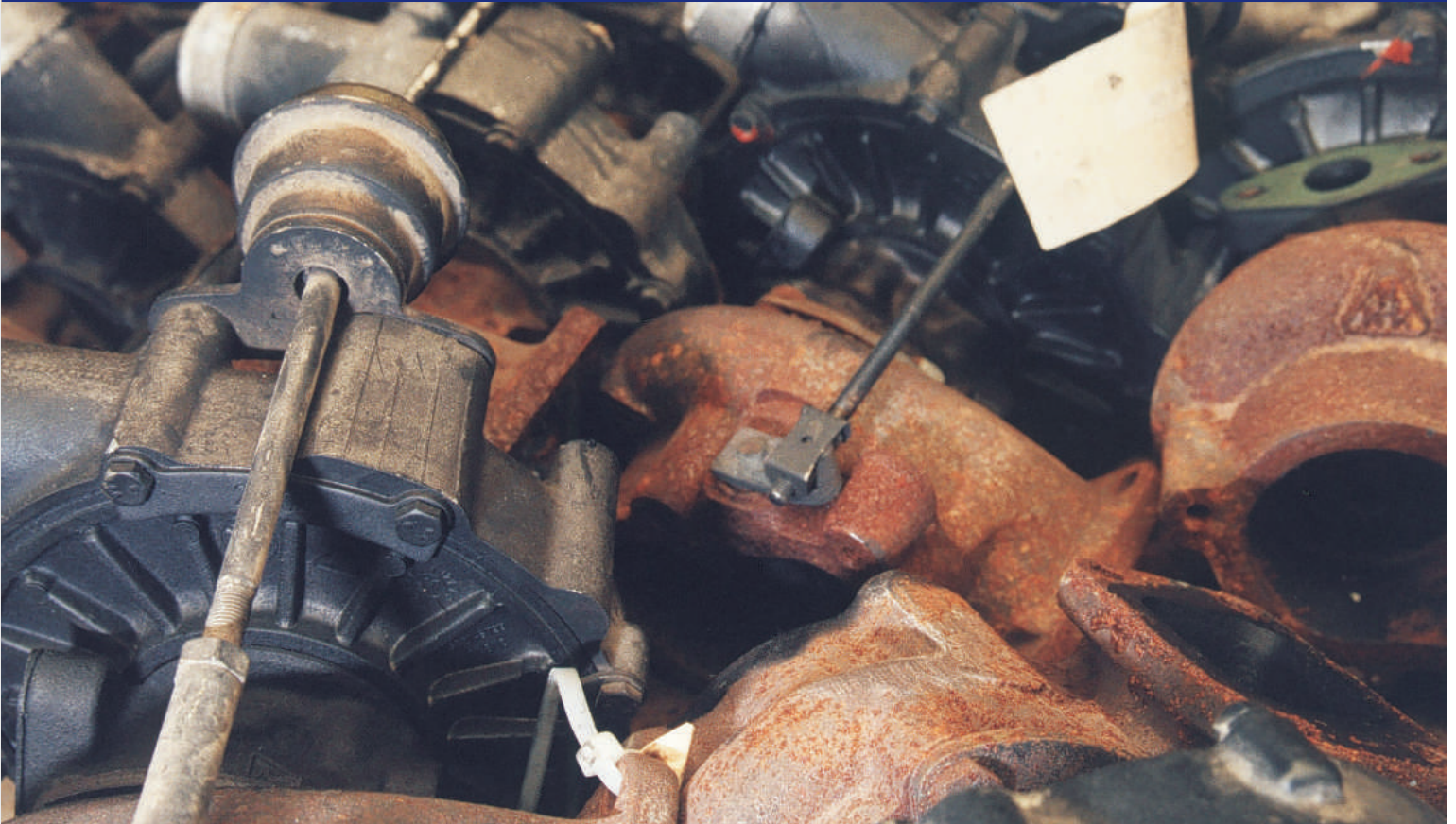


# Aftermarket Core Program Manual



Reman Turbochargers and Cartridges



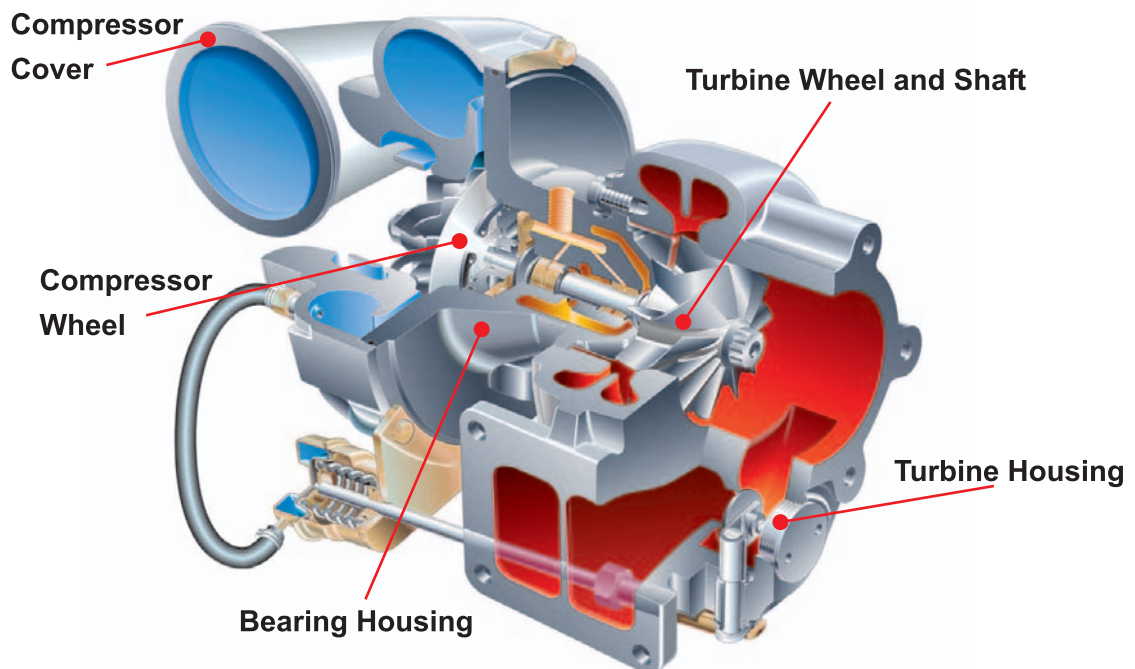
**BorgWarner**  
**Turbo Systems**

# Core Grading Procedures

## Table of Contents

Section	Content	Page(s)
Five Major Components	What parts make up the five major components	2
General	General procedures Core return form overview	3
Core Grading	Overview of core grading program (with illustrations)	5-10
Core Packaging	Packaging recommendations to insure undamaged cores shipped for grading	11

## Turbocharger Five Major Components



# Core Grading Procedures


## General

The distributor must grade their cores and record the condition of each core on the Core Return form prior to shipping to the designated receiving address. When cores are returned to BorgWarner, they will be received by an authorized BorgWarner representative who will inspect and assign a grade to the core. BorgWarner will have the final judgement on core conditions and values.

Please refer to the current BorgWarner Turbo Systems Aftermarket core policy guidelines for additional program details and core grade values.

## Core Return Form

The proper paper work must be completed and sent with every core shipment. Please use the correct core return form as your packing slip and retain a copy for your records. Use of any other document other than the authorized form can result in the delay or rejection of your core return shipment. Your Regional Sales Manager or authorized BorgWarner representative can provide the preprinted core return PDF template for your use.



Date \_\_\_\_\_

### CORE RETURN PACKING SLIP

Distributor \_\_\_\_\_  
 Street Address \_\_\_\_\_  
 City, State, Zip \_\_\_\_\_

Customer # \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

No. of Cores Ret'd \_\_\_\_\_  
 B/L Number \_\_\_\_\_  
 Carrier \_\_\_\_\_  
 No. of Containers \_\_\_\_\_ Lbs. \_\_\_\_\_

MODEL GROUP	MODELS NUMBERS	Distributor Assessment						BorgWarner Assessment																
		TURBOS			CARTRIDGES			TURBOS			CARTRIDGES													
		A	B	C	A	B	C	A	B	C	A	B	C											
T1	3LD, 3LDA, 3LJ, S100 <b>Total T1</b>																							
T2	3LM, 3LMC, 3LK, 3LKS, 3LKU <b>Total T2</b>																							
T3	S2, S2G, S200, S200A, S200G, S200S, S200W, S2A, S2ASL, S2B, S2BG, S2BS, S2BW, S2D, S2E, S2EGL, S2EL, S2ES, S2ESL, S2G <b>Total T3</b>																							
T4	T04B <b>Total T4</b>																							
T5	T04E <b>Total T5</b>																							
	E, 4LE, 4LH, F, 4LGZ, 4TF, F, _____, GK, 4LEK																							

Authorized shipping carriers and core collection locations can be found in the current BorgWarner Turbo Systems Aftermarket core policy document

### Turbochargers

#### Grade "A"

Turbo is complete and spins. Compressor or turbine wheel may have rubbed - no additional wheel damage present.

#### Grade "B"

Turbo is complete. At least one of the major components is undamaged

#### Grade "C"

Turbo is complete, but all five major components are damaged



### Cartridges

#### Grade "A"

Cartridge is complete and spins. Compressor or turbine wheel may have rubbed - no additional wheel damage present.

#### Grade "B"

Cartridge is complete. At least one of the major components is undamaged

#### Grade "C"

Cartridge is complete, but all three major components are damaged



## Turbochargers

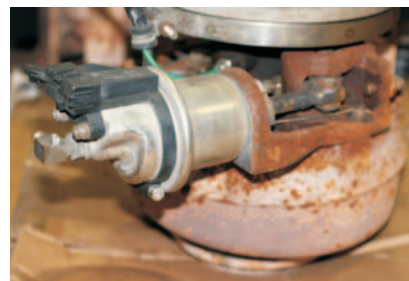
### Grade "A"

- ✓ Unit must be assembled in original factory form including all clamps, clamp plates, and bolts
- ✓ Rotor Group spins; turbine shaft intact
- ✓ Rubbing of compressor wheel and/or turbine wheel - no additional damage to wheels
- ✓ All five major components must be present (compressor wheel, turbine wheel & shaft, bearing housing, turbine housing, compressor housing)
- ✓ Actuator and speed sensor (if originally fitted) must be present

### Grade "A"



*Smart actuator must be present*



*Speed sensor must be present*

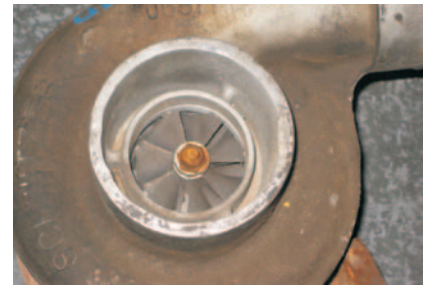
### Turbochargers

#### Grade "B"

- ✓ Unit must be assembled in original factory form including all clamps, clamp plates, and bolts
- ✓ At least one major component (compressor wheel, turbine wheel & shaft, bearing housing, turbine housing, compressor housing) is undamaged
- ✓ Actuator and speed sensor (if originally fitted) must be present

*Examples shown below include turbos where at least one major component could be salvaged. Please note, there may be internal bearing housing damage that is missed during core inspection. Please check the bearing housing cavity through the drain port for the possibility of additional unseen turbo damage.*

#### Grade "B"



Smart actuator must be present

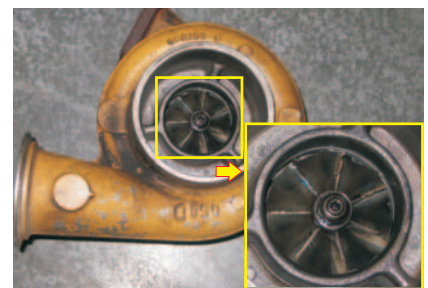
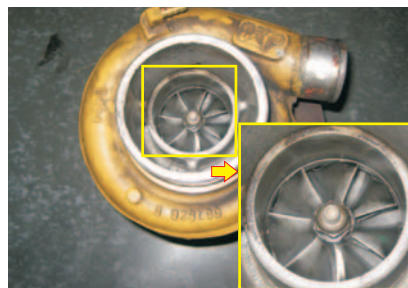
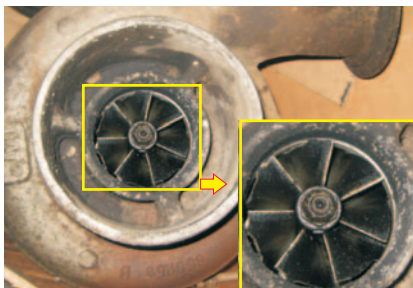
### Turbochargers

#### Grade "C"

- ✓ Unit must be assembled in original factory form including all clamps, clamp plates, and bolts
- ✓ Damage to all five major components

*Examples shown below include turbos where there is damage to all major components. Please note, there may be internal bearing housing damage that is missed during core inspection. Please check the bearing housing cavity through the drain port for the possibility of additional unseen turbo damage*

#### Grade "C"



The compressor wheels as pictured above are severely rubbed on the contour areas.



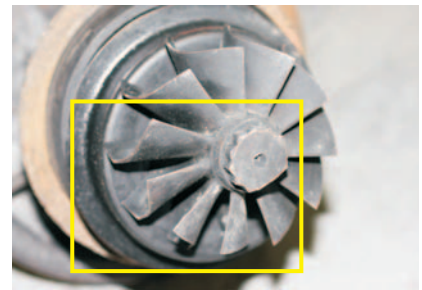
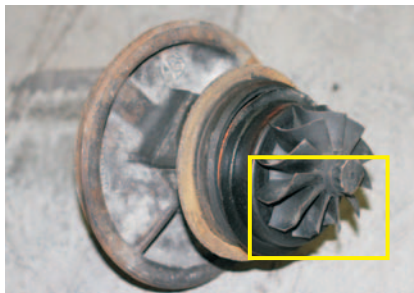
Turbine wheels have major damage.

### Cartridges

#### Grade "A"

- ✓ Unit must be assembled in original factory form
- ✓ Rotor Group spins; turbine shaft intact
- ✓ Rubbing of compressor wheel and/or turbine wheel - no additional damage to wheels
- ✓ All three major components must be present (compressor wheel, turbine wheel & shaft, bearing housing)

#### Grade "A"





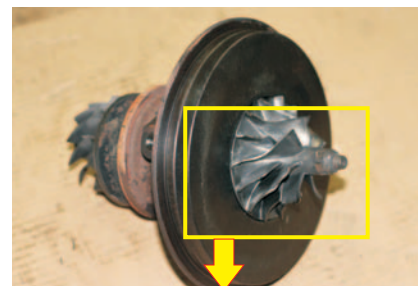
### Cartridges

#### Grade "B"

- ✓ Unit must be assembled in original factory form
- ✓ At least one major component (compressor wheel, turbine wheel & shaft, bearing housing) is undamaged

*Examples shown below include cartridges where all major components are damaged. Please note, there may be internal bearing housing damage that is missed during core inspection. Please check the bearing housing cavity through the drain port for the possibility of additional unseen cartridge damage*

#### Grade "B"



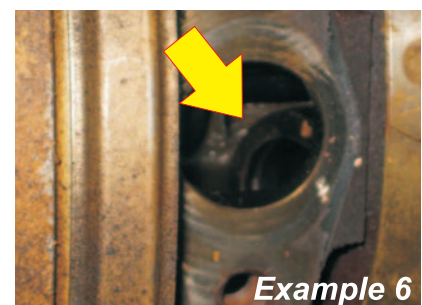
### Cartridges

#### Grade "C"

- ✓ Unit must be assembled in original factory form
- ✓ Damage to all five major components.  
Mixed model components will be rejected

*Examples shown below include cartridges where all major components are damaged. Please note, there may be internal bearing housing damage that is missed during core inspection. Please check the bearing housing cavity through the drain port for the possibility of additional unseen cartridge damage*

#### Grade "C"



*Examples shown above display parts from "C" cartridge cores. Example 6 shows a damaged bearing housing illustrated by the broken bearing carrier inside of the bearing housing cavity.*

## Core Grading Procedures

### Packaging

Cores should be shipped with appropriate packing material to avoid damage during shipment. Please follow the recommended packaging suggestions as illustrated below. If BorgWarner receives cores in damaged condition due to poor packaging, the core rating will be downgraded.

#### Bulk Packaging Examples



Pack core in original box or add cardboard dividers if necessary to prevent damage in-transit



Top and one side of Gaylord container removed for illustration purposes only.

#### Unacceptable Bulk Shipment Example



Cores were not segregated and were incomplete. Cores received additional damage as a result of packaging negligence

Please refer to the current BorgWarner core policy bulletin for details concerning the core return address and core grade values by model group

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