Demonstrate Inspecting and Servicing Various Bearing, Seal and Gasket Used in Heavy Equipment

Skill Number CO-OP15GN106

Full Name: Galen Rapay Rapan **No ID:** 07

Validation Date: 16 Februari 2016 **School:** SMKN 1 Singotan

PERFORMANCE TASK:

Given assorted bearings, seals and gaskets, the student is requested to perform the following tasks on the components:

- Removing
- Inspection
- Installing

The student must be able to perform the following task:

- Demonstrate removing, inspection and installing Bearing, Seals and Gasket.

It is recommended that assessor put questions to student regarding the findings of their inspections and subsequent report. Literature and measuring tools will be made available but will not be provided directly to the student.

Safety and Contamination Control must be always applied to this process.

Prerequisite	Yes	No	N/A	Hints
The student must complete the knowledge assessment. Minimum passing grade 80%.	✓			Score seal, bearing, gasket course or subject.

Tasks	Completed Yes	No	N/A	Observation / Hints
Preparation				
Prepare related literature	✓			Observe if the candidate is referring to the Manufacturer's Literature
Prepare required equipment	✓			Observe if the candidate is preparing bearings, seals, and gaskets
Prepare related tools	✓			Observe if the candidate is preparing related tools (e.g.: Hand tools, bearing puller, Bearing heater, Infrared Thermometer, etc.)
Prepare Safety & Contamination Control equipment	✓			Observe if the candidate is preparing related Safety & CC Equipment (e.g.: PPE, Blue Towel, Plastic Wrap, etc.)

Tasks	Completed Yes	No	N/A	Observation / Hints
Perform etiquette/manner when starting the job				
Meet the customer / assessor	✓			
Perform etiquette/manner when opening the interaction.	✓			• Perform smile & greetings. • Introduce Student's identity
Explain the purpose of Student's activity.	✓			
Ask permission to perform the job.	✓			

Tasks	Completed Yes	No	N/A	Observation / Hints
Remove, Inspect and Install Bearings, Seals and Gaskets				
1. Accessing Information	✓			Observe if the candidate is accessing information relating task from manufacturer's literature
2. Bearing, Seals & Gasket Removal	✓			Observe if the candidate is removing bearings, seals and gasket following instruction on manufacturer's literature
3. Determine bearing reusability of bearings, seals, and gasket	✓			Observe if the candidate is inspecting bearings, seals and gasket following instruction on manufacturer's literature
4. Bearing, Seals & Gasket Installation	✓			Observe if the candidate is installing bearings, seals and gasket following instruction on manufacturer's literature
5. Equipment and tooling are used in the correct way	✓			
6. Equipment and tooling are cleaned and returned to its correct location	✓			
Documentation:				
Take picture if needed				

Tasks	Completed			Observation / Hints
	Yes	No	N/A	
Perform close the job by ensuring all systems or conditions is in the standard condition				
Ensure all systems or conditions are in standard condition.	✓			• Find the improper condition. • Communicate the finding to the customer/assessor.

Tasks	Completed			Observation / Hints
	Yes	No	N/A	
Reporting				
All relevant documentation completed correctly and approved by customer (if required).	✓			• Completing the Task List • Completing Measurement Form/Related Check Sheet, if required • Create Service Report (SIMS), if required • Create SPR, if required • Documenting the failed or damaged parts, if required • Provide Technical Analysis Report/Failure Analysis Report, if required.

Tasks	Completed		Observation / Hints
	Yes	No	
Safety			
Using APD related to the job	✓		
Follows relevant Workplace Safety Guidelines (LOTO, Safety Equipment)	✓		• Comply with safety regulation that applied on the workplace
State and follow Safety Precautions	✓		• Create Job Safety Analysis • Student must follow safety procedure refer to service manual or SIS related to job
Serviceman completes job without accident due to incorrect procedure using hand tools.	✓		• Correct working position • Correct hand tool related to the job
Tasks completed without damage equipment and tools	✓		

Tasks	Completed		Observation / Hints
	Yes	No	
Contamination Control			
Environmental Practices & Housekeeping	✓		1. Waste is minimized, waste material, including sludge; solids and other wastes are sorted and stored in bins for recycling or disposal 2. Packaging of goods received is sorted and reused or disposed of by recycling 3. Materials that can be reused are cleaned and stored 4. Waste and scrap are removed following workplace procedures 5. All fluids are disposed of in accordance with enterprise policies and procedures

Tasks	Completed			Observation / Hints
	Yes	No	N/A	
Perform etiquette/manner after completing the job				
Perform etiquette/manner when closing the communication.	✓			• Perform smile & greetings. • Ask permission to leave or end the interaction.

General Comments

RESULT: **COMPETENT** ☑ **NOT YET COMPETENT** ☐ (please check (√))

	Name	Date	Signature
Student:	Galen Rapay Rapa.	16/2/2026	
Assessor:	Setiawan T.B	16/2/2026	
Supervisor:			
Data Recorded:			

Demonstrate Inspecting and Servicing Various Bearing, Seal and Gasket Used in Heavy Equipment

Skill Number CO-OP15GN106

Full Name: Eralen Karay Rapan **No ID:** 07

Validation Date: 16 Februari 2026 **School:** SMKN 1 Singosari

PERFORMANCE TASK:

Given assorted bearings, seals and gaskets, the student is requested to perform the following tasks on the components:

- Removing
- Inspection
- Installing

The student must be able to perform the following task:

- Demonstrate removing, inspection and installing Bearing, Seals and Gasket.

It is recommended that assessor put questions to student regarding the findings of their inspections and subsequent report. Literature and measuring tools will be made available but will not be provided directly to the student.

Safety and Contamination Control must be always applied to this process.

Prerequisite	Yes	No	N/A	Hints
The student must complete the knowledge assessment. Minimum passing grade 80%.	✓			

Tasks	Completed			Observation / Hints
	Yes	No	N/A	
Preparation				
Prepare related literature	✓			
Prepare required equipment	✓			
Prepare related tools	✓			
Prepare Safety & Contamination Control equipment	✓			

Tasks	Completed			Observation / Hints
	Yes	No	N/A	
Perform etiquette/manner when starting the job				
Meet the customer / assessor	✓			
Perform etiquette/manner when opening the interaction.	✓			
Explain the purpose of Student's activity.	✓			
Ask permission to perform the job.	✓			

Tasks	Completed			Observation / Hints
	Yes	No	N/A	
Remove, Inspect and Install Bearings, Seals and Gaskets				
1. Accessing Information	✓			
2. Bearing, Seals & Gasket Removal	✓			
3. Determine bearing reusability of bearings, seals, and gasket	✓			
4. Bearing, Seals & Gasket Installation	✓			
5. Equipment and tooling are used in the correct way	✓			
6. Equipment and tooling are cleaned and returned to its correct location	✓			
Documentation:				
Take picture if needed				

Tasks	Completed			Observation / Hints
	Yes	No	N/A	
Perform close the job by ensuring all systems or conditions is in the standard condition				
Ensure all systems or conditions are in standard condition.	✓			

Tasks	Completed			Observation / Hints
	Yes	No	N/A	
Reporting				
All relevant documentation completed correctly and approved by customer (if required).	✓			

Tasks	Completed		Observation / Hints
	Yes	No	
Safety			
Using APD related to the job	✓		
Follows relevant Workplace Safety Guidelines (LOTO, Safety Equipment)	✓		
State and follow Safety Precautions	✓		
Serviceman completes job without accident due to incorrect procedure using hand tools.	✓		
Tasks completed without damage equipment and tools	✓		

Tasks	Completed		Observation / Hints
	Yes	No	
Contamination Control			
Environmental Practices & Housekeeping	✓		

Tasks	Completed			Observation / Hints
	Yes	No	N/A	
Perform etiquette/manner after completing the job				
Perform etiquette/manner when closing the communication.	✓			

General Comments

RESULT: **COMPETENT** ☐ **NOT YET COMPETENT** ☐ (please check (√))

	Name	Date	Signature
Student:	Galen Kapay Papan	16/1/2026	
Assessor:	Ibrahim TB	16/1/2026	
Supervisor:			
Data Recorded:			

Trakindo CAT

Nomor Formulir / Form Number	SHE.SHE.FRM.005.R04

ANALISIS LINGKUNGAN KESELAMATAN KERJA / *JOB SAFETY ENVIRONMENT ANALYSIS*

Pekerjaan / Task	DA TURBOCHARGE	Nomor JSEA / JSEA Number		Halaman / Page	1	Dari / Of	

Tanggal Pembuatan JSEA / Date of JSEA	13 Februari 2026	Departemen / Dept	Service	Tempat Kerja / Work Location	Workshop TAB

Disusun Oleh / Compiled By	Galen	TTD / Sign		Review Oleh / Reviewed By		TTD / Sign		Atasan / Superior		TTD / Sign	

Apakah Anda sudah terlatih untuk melakukan pekerjaan ini ? / *Are you properly trained to complete these task ?* ☑ Ya / Yes ☐ Tidak / No

Apa yang Anda perlukan untuk memastikan bahwa pekerjaan selesai tanpa adanya kecelakaan kerja ? / *What do you need to ensure this job is completed incident free ?*

Tools yang digunakan sudah sesuai dengan Manual

Siapa yang bertanggung jawab untuk menghentikan pekerjaan jika terjadi perubahan pekerjaan atau gangguan kondisi lingkungan kerja ? / *Who is responsible for Stop Work Authority if change job or workplace distraction could ?*

ABCD-1 (Technician Leader) / Mr. X (Customer)

Apakah Anda memerlukan peralatan LOTO ? / *Are you need LOTO Equipments ?* ☑ Ya / Yes ☐ Tidak / No

Apakah Anda mengetahui ERP/MERP dari pekerjaan yang sedang dilakukan? ☑ Ya / Yes ☐ Tidak / No ***Jika tidak, silahkan tambahkan dalam urutan langkah tugas diawal***

Kondisi Lingkungan / *Environmental Conditions*	Normal	Cuaca / *Weather*	Hujan	Medan / *Terrain*	Rata

Pengendalian Sumber Bahaya / *Hazardous Energy Control*					
	☐ Listrik / *Electrical*	☑ Gravitasi (Benda jatuh,tertimpa) / *Gravitation (Falling objects, struck down)*	☐ Pneumatik / *Pneumatic*
	☐ Hidraulik / *Hydraulic*	☑ Mekanis / *Mechanical*	☐ Panas / *Thermal*

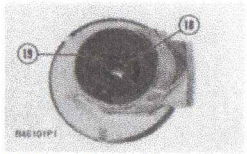
APD yang diperlukan / *Required PPE*			
☑ Helm / *Safety Helm*	☐ Pelindung Muka / *Face shield*	☑ Kacamata / *Safety Glass*	
☑ Sarung Tangan / *Hand Gloves*	☐ Pelindung Pernafasan / *Respiratory Protection*	☐ Perlindungan Kejatuhan / *Fall Protection*	
☑ Sepatu / *Safety Shoes*	☐ Pelindung Telinga / *Hearing Protection*	☐ Lain-Lain / *Other*	

Hal yang perlu dipertimbangan dalam mengidentifikasi bahaya / *These to consider in identify hazards* :

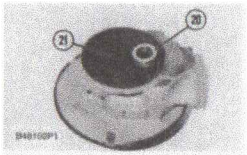
1. **Bahaya Keselamatan** : Kondisi tidak aman yang dapat menyebabkan injury atau kematian seperti terjepit, terpeleset/terjatuh, tertimpa dll.
   Safety Hazard : unsafe conditions that can cause injury or even death, such as spill/falls, pinch point, struck by, etc.
2. **Bahaya Fisik** : Listrik, Api/ledakan, Kebisingan, Radiasi, Panas, Tekanan, Terjepit, Tersandung/Terjatuh, Tertimpa, Getaran.
   Physical Hazards : Electrical, Fire/Explosion, Noise, Radiations, Thermal, Pressure, Pinch Point, Slips/Falls, Struck by, Vibration.
3. **Bahaya Kimia** : Terhirup, terkena kulit, injeksi, tertelan, terserap.
   Chemical Hazards : Inhalation, skin contact, injection, ingestion, absorption.
4. **Bahaya Biologi** : Patogen yang ditularkan melalui darah, jamur, tanaman/serangga/hewan.
   Biological Hazards : bloodbone pathogens, mold, Plant/Insect/Animals
5. **Bahaya Ergonomi** : Gerakan berulang-ulang, beban yang berlebihan, Postur Janggal, Durasi kerja, Desain area kerja.
   Ergonomic Hazards : Repetitions, Forcefull extention, Awkward Posture, Duration , Work area desain.
6. **Bahaya Organisasi** : stres atau bahaya terkait dengan masalah tempat kerja yang menyebabkan efek jangka panjang atau pendek, beban kerja yang berat dan kekerasan ditempat kerja.
   Organizational hazards: stressors or hazards associated with workplace issues that cause long or short term effects heavy workloads, stressful interactions and workplaces violence.

No	Urutan Dasar Langkah Tugas / *Job Steps* (* Maksimum 15 Langkah / *Maximum 15 Steps*)	Bahaya Yang Terkait / *Potential Hazard(s)*	Tindakan Perbaikan / *Recommended Action*
1	Walk Aromal Inspection	1.1 terbentur engine	1.1.1 Hati - hati saat berjalan
			1.1.2 perhatikan area sekitar
2.	Prepare tools	2.1 terjepit tool	2.1.1 perhatikan ~~kontak~~ titik sepit tool
			2.1.1 Gunakan safety Gloves
3.	Doing Disassemble turbocharge	3.1 tertimpa komponen	3.1.1 perhatikan kontak fisik terhadap komponen
			3.1.2 Gunakan safety shoes
		3.2 terjepit komponen	3.2.1 perhatikan titik jepit
			3.2.2 Gunakan safety Gloves.
		3.3 tergores komponen	3.3.1 Gunakan APD yang sesuai
4.	Doing Assemble turbocharge	4.1 kulit tergores komponen	4.1.1 perhatikan kontak terhadap komponen
			4.1.2 Gunakan safety Gloves.
		4.2 tertimpa komponen	4.2.1 pegang komponen dengan kuat
			4.2.2 angkat komponen dengan metode yang benar
			4.2.3 Gunakan APD lengkap
5.	House keeping	5.1 komponen berceceran	5.1.1 bersihkan dengan white towel
		5.2 fluida berceceran	5.2.1 bersihkan fluida dengan Absorbent pad.
		5.3 tools berceceran	5.3.1 tempatkan tool pada tempatnya .
		5.4 tools terkontaminasi	5.4.1 bersihkan tool menggunakan white towel

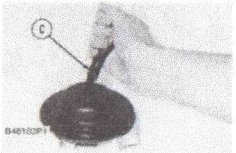
Bagian Dari / *Part Of*	SHE.SHE.SOP.003.R04



14. Use tool (C), and remove snap rings (18) and (19) from the cartridge housing.



15. Remove bearing (20) and washer (21) from the cartridge housing.



16. If necessary, use tool (C), and compress the end snap ring, and push it out of the bearing bore toward the compressor end of the cartridge housing to remove it.

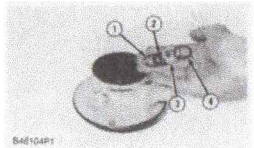
Assemble Turbochargers

Tools Needed		A	B	C	D
1P1853	Retaining Ring Pliers	1			
9S6343	Fixture Assembly		1		
8S2328	Dial Indicator Test Group			1	
9S6363	Turbocharger Fixture Group				1

1. Make sure all of the oil passages in the turbocharger cartridge housing, backplate assembly and bearings are clean and free of dirt and foreign material.

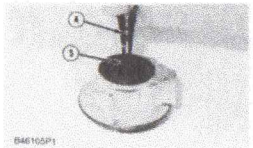
2. Put clean engine oil on all parts of the cartridge at assembly.

NOTE: Make sure the round edge on the outside diameter of the snap rings are toward the bearings when the snap rings are installed.

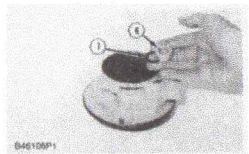


3. Use tool (A), and install snap ring (1) in the turbine end of the cartridge housing.

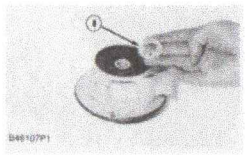
4. Install washer (2) and bearing (3). Use tool (A) to install snap ring (4) to hold the washer and bearing in position.



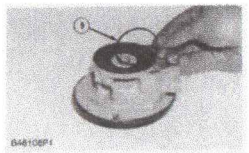
5. Use tool (A), and install snap ring (5) in the cartridge housing.



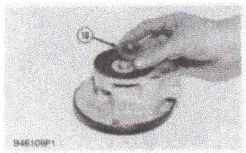
6. Install washer (7) and bearing (6) in the cartridge housing until washer (7) makes contact with snap ring (5).



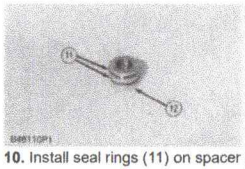
7. Install thrust bearing (8) over the dowels in the cartridge housing. Make sure the grooves in bearing (8) are toward th



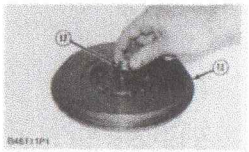
8. Install seal ring (9) in the groove of the cartridge housing.



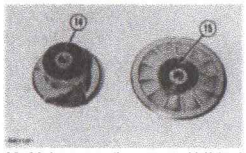
9. Put thrust collar (10) in position on the thrust bearing with the counterbore for the spacer up.



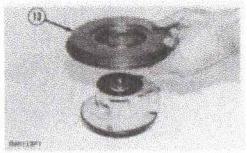
10. Install seal rings (11) on spacer (12) so the gaps in the rings are 180° apart.



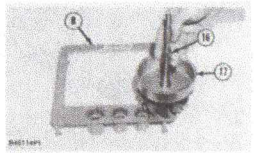
11. Install spacer (12) in backplate assembly (13).



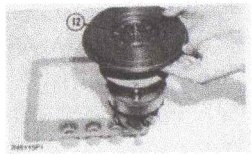
12. Make sure oil passage (14) in the cartridge housing and oil passage (15) in the backplate assembly are in alignmen assembly (13) in position on the cartridge housing. Make sure the spacer fits correctly in the counterbore of the thrust c



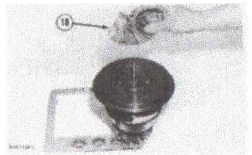
13. Install the locks and bolts to hold backplate assembly (13) to the cartridge housing. Tighten the bolts to a torque of **10 ± 1 N·m (7 ± 1 lb.ft.)**, and bend the tabs of the locks on the bolts.



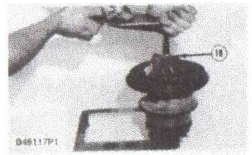
14. Put the turbine shaft in position in tooling (B). Put **6V2055 High Vacuum Grease** in the groove for seal ring (16). Make sure the grease fills the groove approximately one half or more of the groove depth for the complete circumference of the groove to help make a carbon dam under the seal ring. Install seal ring (16) and shroud (17) on the turbine shaft.



15. Install the cartridge housing on the turbine shaft while spacer (12) is held in position. Make sure the seal ring on the turbine is fitted correctly in the cartridge housing.



16. Put compressor wheel (18) in position on the turbine shaft.



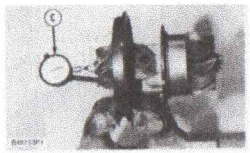
NOTICE

Do not put a side force on the turbine shaft when the nut is tightened or a bent shaft will be the result.

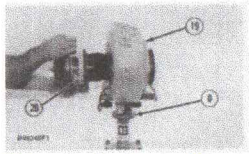
17. Put a small amount of oil on the turbine shaft threads and the compressor wheel face that will be under the nut. Install the nut, and tighten it to a torque of **17 N·m (150 lb.in.)** to push the compressor wheel (18) on the shaft. Loosen the nut, and tighten it again to **3.5 N·m (31 lb.in.)**. **Tighten the nut 120° of a turn more.**

18. Remove the nut from the turbine shaft, and put **6V1541 Quick Cure Primer** on the threads of the turbine shaft and nut.

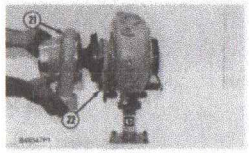
19. Put **9S3265 Retaining Compound** on the threads of the shaft and nut. Install the nut, and tighten to a torque of **3.5 N·m (31 lb.in.)**. **Tighten the nut an additional 120° of a turn.**



20. Put the cartridge housing in a vise as shown. Check the shaft end play with tool group (C). The shaft end play must **(.003 to .010 in.).**



21. Install turbine housing (19) on tool group (D) as shown. Put the cartridge and clamp (20) in position in turbine housi marks on the housing and cartridge are in alignment, and tighten clamp (20) to a torque of **14.0 ± 1.5 N·m (124 ± 13 lb around the clamp with a soft faced hammer. Tighten the clamp nut again to the same torque.**



22. Install clamp (22) and compressor housing (21) on the cartridge in the correct position. Move clamp (22) into positio to a torque of **14.0 +- 1.5 N·m (124 +- 13 lb.in.). Lightly hit all around the clamp with a soft faced hammer. Tighten to the same torque.**

End By:

a. install turbochargers (TW81, TW91)

SMCS - 1052

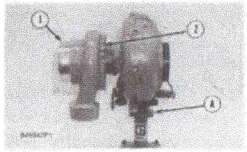
SENR23770033

Disassemble Turbochargers

Tools Needed		A	B	C
9S6363	Turbocharger Fixture Group	1		
9S6343	Fixture Assembly		1	
1P1853	Retaining Ring Pliers			1

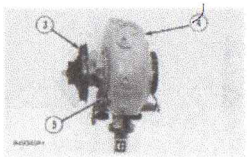
Start By:

a. remove turbochargers (TW81, TW91)

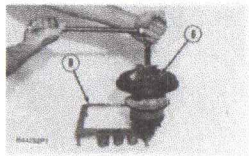


1. Put the turbocharger in position on tool group (A) as shown. Put alignment marks on the three housings of the turbocharger for correct installation and alignment at assembly.

2. Loosen clamp (2), and remove compressor housing (1) and the clamp from the cartridge assembly.



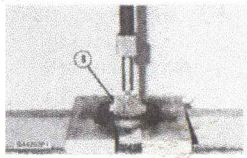
3. Loosen clamp (5), and remove cartridge assembly (3) from turbine housing (4).



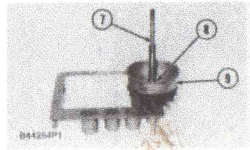
NOTICE

To prevent a bent shaft, do not put a side force on the turbine shaft when the compressor wheel nut is loosened.

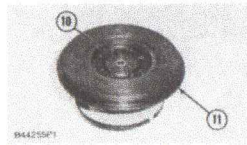
4. Put the end of the turbine shaft in tool (B). Use a universal joint and socket of the correct size to remove the nut that holds compressor wheel (6) on the turbine shaft.



5. Use a press, and push the turbine shaft out of compressor wheel (6) and the cartridge housing. Remove compressor wheel (6) from the cartridge housing.

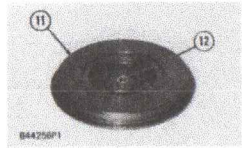


6. Remove seal ring (8) and shroud (9) from turbine shaft (7).

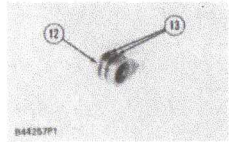


7. Bend the tabs of the locks from bolts (10), and remove the bolts.

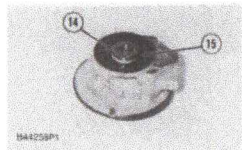
8. Remove backplate assembly (11) from the cartridge housing. Make a note of the position of the oil holes in the backp cartridge housing for correct alignment at assembly.



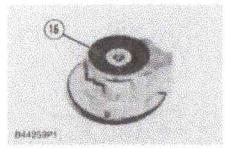
9. Remove spacer (12) from backplate assembly (11).



10. Remove seal rings (13) from spacer (12).

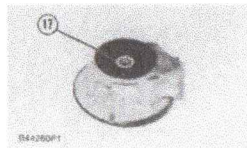


11. Remove thrust collar (14) and seal ring (15) from the cartridge housing.



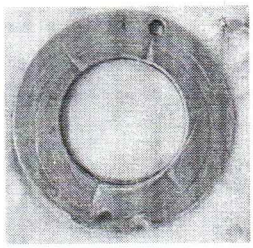
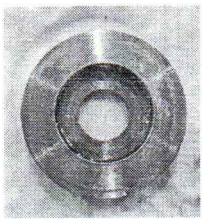
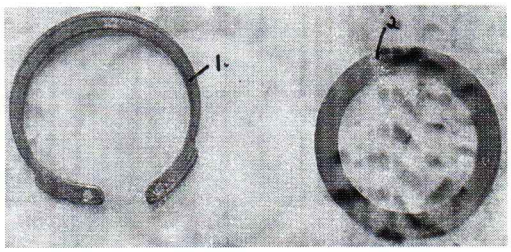
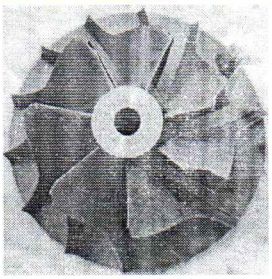
12. Remove thrust bearing (16) from the cartridge housing.

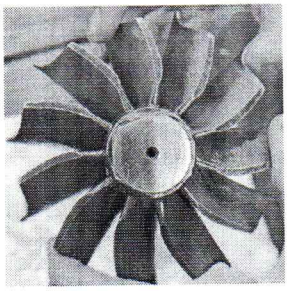
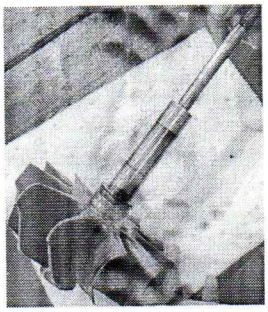
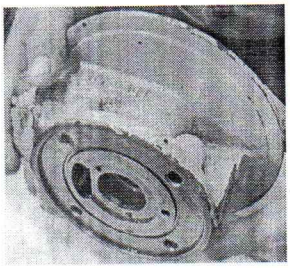
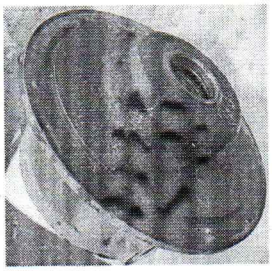
NOTE: If the bearings are to be used again, put identification marks on them as to their location for correct assembly.



13. Remove bearing (17) and the washer below the bearing from the cartridge housing.

Galen Rafay Rafan /07/XI TAB III 100-4095 CATRIDGE TURBOCHARGE

KOMPONEN	NAMA KOMPONEN
	Bearing - Thrust
	collar - Thrust
	~~Bearing - Radial~~ floating Bearing
	1. Ring - Retaining 2. wa
	wheel Compressor

 	Shaft AS - Turbine Wheel - Turbine
 	Housing AS - Bearing