Demonstrate Selecting the Correct Fasteners and Locking Application for Maintenance and Repair of Heavy Equipment

Skill Number CO-OP15GN107

Full Name: Merryana aderia chisty No ID: 11

Validation Date: 28-Februari-2026 School: SMKN 01 singosari

PERFORMANCE TASK:

Given several fasteners and the necessary tools, as listed:

- Castellated nut
- Circlips
- Clevis Pin
- Flat Washer
- Spring Washer
- Star Washers
- Self-tapping screw
- Stud
- Wing nut
- Woodruff key
- Lockwire
- Bolt
- Nut
- Thread Lubricant and other Adhesives

The student must identify and explain their function. Student will be required to answer questions on their findings. The student will also be required to complete relevant workplace documentation and is to always observe the correct safety procedures.

Students are required to fill out this form, in the appropriate place, indicating that an inspection of components has occurred and their decision, after inspection is recorded

The student must be able to perform the following task:

- Demonstrate identify and explain the function of provided fasteners and necessary tools.
- Perform communication & etiquette manner

Safety and Contamination Control must be always applied to this process. Literature and measuring tools will be made available but will not be provided directly to the student.

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

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

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

Tasks	Completed		Observation / Hints
	Yes	No	
Safety			
Using PPE 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.				

Tasks	Check			Observation / Hints
	Yes	No	N/A	
Identification				
1. Accessing Information	✓			
2. Castellated Nut	✓			
3. Circlip	✓			
4. Clevis Pin	✓			
5. Flat washer	✓			
6. Spring washer	✓			
7. Star washer	✓			
8. Self-tapping screw	✓			
9. Stud	✓			
10. Wing nut	✓			
11. Woodruff key	✓			
12. Lockwire	✓			
13. Thread Lubricant & other Adhesives	✓			

Tasks	Complete			Observation / Hints
	Yes	No	N/A	
Thread Identification				
UNC	✓			
UNF	✓			
Whitworth	✓			
Metric	✓			
AF	✓			
BSW	✓			

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 PPE 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
	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 (√))	
Student:	Merryana Name	28-02-2026 Date	 Signature	
Assessor:	Sefiawan Name	28/02/2026 Date	 Signature	
Supervisor:	Name	Date	Signature	
Data Recorded:	Name	Date	Signature	

Demonstrate Selecting the Correct Fasteners and Locking Application for Maintenance and Repair of Heavy Equipment

Skill Number CO-OP15GN107

Full Name: Merryana Aderia chisty **No ID:** 11

Validation Date: 28 - Februari **School:** SMKN 1 singosari

PERFORMANCE TASK:

Given several fasteners and the necessary tools, as listed:

- Castellated nut
- Circlips
- Clevis Pin
- Flat Washer
- Spring Washer
- Star Washers
- Self-tapping screw
- Stud
- Wing nut
- Woodruff key
- Lockwire
- Bolt
- Nut
- Thread Lubricant and other Adhesives

The student must identify and explain their function. Student will be required to answer questions on their findings. The student will also be required to complete relevant workplace documentation and is to always observe the correct safety procedures.

Students are required to fill out this form, in the appropriate place, indicating that an inspection of components has occurred and their decision, after inspection is recorded

The student must be able to perform the following task:

- Demonstrate identify and explain the function of provided fasteners and necessary tools.
- Perform communication & etiquette manner

Safety and Contamination Control must be always applied to this process. Literature and measuring tools will be made available but will not be provided directly to the student.

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

Tasks	Completed Yes	No	N/A	Observation
Preparation				
Prepare related literature	✓			Observe if the cand preparing Manufact literature related to
Prepare required equipment	✓			
Prepare related tools	✓			Observe if the cand preparing related to Thread Identificatio
Prepare Safety & Contamination Control equipment	✓			Observe if the cand preparing related S Equipment (e.g.: P Towel, Plastic Wra

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

Tasks	Complete			Observation / Hints
	Yes	No	N/A	
Thread Identification				
UNC				Determine thread size
UNF				Determine thread size
Whitworth				Determine thread size
Metric				Determine thread size
AF				Determine thread size
BSW				Determine thread size

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 PPE related to the job			
Follows relevant Workplace Safety Guidelines (LOTO, Safety Equipment)			• Comply with safety regulatio applied on the workplace
State and follow Safety Precautions			• Create Job Safety Analysis • Student must follow safety p refer to service manual or S to job
Serviceman completes job without accident due to incorrect procedure using hand tools.			• Correct working position • Correct hand tool related to
Tasks completed without damage equipment and tools			

Tasks	Completed		Observation / Hint
	Yes	No	
Contamination Control			
Environmental Practices & Housekeeping			1. Waste is minimized, waste including sludge; solids an wastes are sorted and stor recycling or disposal 2. Packaging of goods receiv and reused or disposed of 3. Materials that can be reuse cleaned and stored 4. Waste and scrap is remove workplace procedures 5. All fluids are disposed of in with enterprise policies and

Tasks	Completed			Observation
	Yes	No	N/A	
Perform etiquette/manner after completing the job				
Perform etiquette/manner when closing the communication.				▪ Perform smile & g ▪ Ask permission to the interaction.

Tasks	Check			Observation / Hints
	Yes	No	N/A	
Identification				
1. Accessing Information	✓			Observe if the candidate is accessing information relating task from manufacturer's literature
2. Castellated Nut	✓			Identify Name, Application and Part Number
3. Circlip	✓			Identify Name, Application and Part Number
4. Clevis Pin	✓			Identify Name, Application and Part Number
5. Flat washer	✓			Identify Name, Application and Part Number
6. Spring washer	✓			Identify Name, Application and Part Number
7. Star washer	✓			Identify Name, Application and Part Number
8. Self-tapping screw	✓			Identify Name, Application and Part Number
9. Stud	✓			Identify Name, Application and Part Number
10. Wing nut	✓			Identify Name, Application and Part Number
11. Woodruff key	✓			Identify Name, Application and Part Number
12. Lockwire	✓			Identify Name, Application and Part Number
13. Thread Lubricant & other Adhesives	✓			Explain the function, when and where it used.

Tasks	Complete			Observation /
	Yes	No	N/A	
Thread Identification				
UNC	✓			Determine thread si
UNF	✓			Determine thread si
Whitworth	✓			Determine thread si
Metric	✓			Determine thread si
AF	✓			Determine thread s
BSW	✓			Determine thread s

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 t customer/assessor.

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

General Comments

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

	Name	Date	Signature
Student:			
Assessor:			
Supervisor:			
Data Recorded:			

Tasks	Check			Observation
	Yes	No	N/A	
Identification				
1. Accessing Information				Observe if the canc accessing informat task from manufact literature
2. Castellated Nut				Identify Name, App Part Number
3. Circlip				Identify Name, App Part Number
4. Clevis Pin				Identify Name, App Part Number
5. Flat washer				Identify Name, Appl Part Number
6. Spring washer				Identify Name, Appl Part Number
7. Star washer				Identify Name, Appl Part Number
8. Self-tapping screw				Identify Name, Appl Part Number
9. Stud				Identify Name, Appl Part Number
10. Wing nut				Identify Name, Appli Part Number
11. Woodruff key				Identify Name, Appli Part Number
12. Lockwire				Identify Name, Appli Part Number
13. Thread Lubricant & other Adhesives				Explain the function, where it used.

Tasks	Completed Yes	Completed No	Observation / Hints
Safety			
Using PPE 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 Yes	Completed No	Observation / Hints
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 is removed following workplace procedures 5. All fluids are disposed of in accordance with enterprise policies and procedures

Tasks	Completed Yes	Completed No	Completed N/A	Observation / Hints
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

	Name	Date	Signature
Student:	Merryana	28-02-2026	
Assessor:	Setiawan	28/02-2026	
Supervisor:			
Data Recorded:			

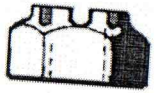
Tasks	Completed			Observation / Hints
	Yes	No	N/A	
Preparation				
Prepare related literature				Observe if the candidate is preparing Manufacturer's literature related to the task
Prepare required equipment				
Prepare related tools				Observe if the candidate is preparing related tools (e.g.: Thread Identification Kit, 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			Observation / Hints
	Yes	No	N/A	
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.				

Nama : Merryana Aderia Chisty

KEGIATAN 2: IDENTIFIKASI DAN PENGENCANGAN BAUT

2.1 Tuliskan nama setiap fastener di tempat yang disediakan untuk setiap gambar.



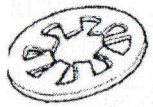
castellated nut

snap ring Internal snapring/circlip.

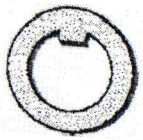
clevis pin .

Flat washer .

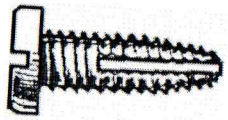
lock washer (spring washer.



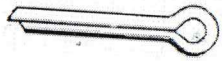
star washer Internal star lock washer.



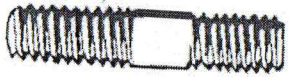
internal tab washer× (torque washer.



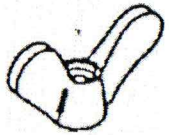
Self Tapping Screw.
thread forming screw (cutting screw)✓.



cotter pin (split pin).

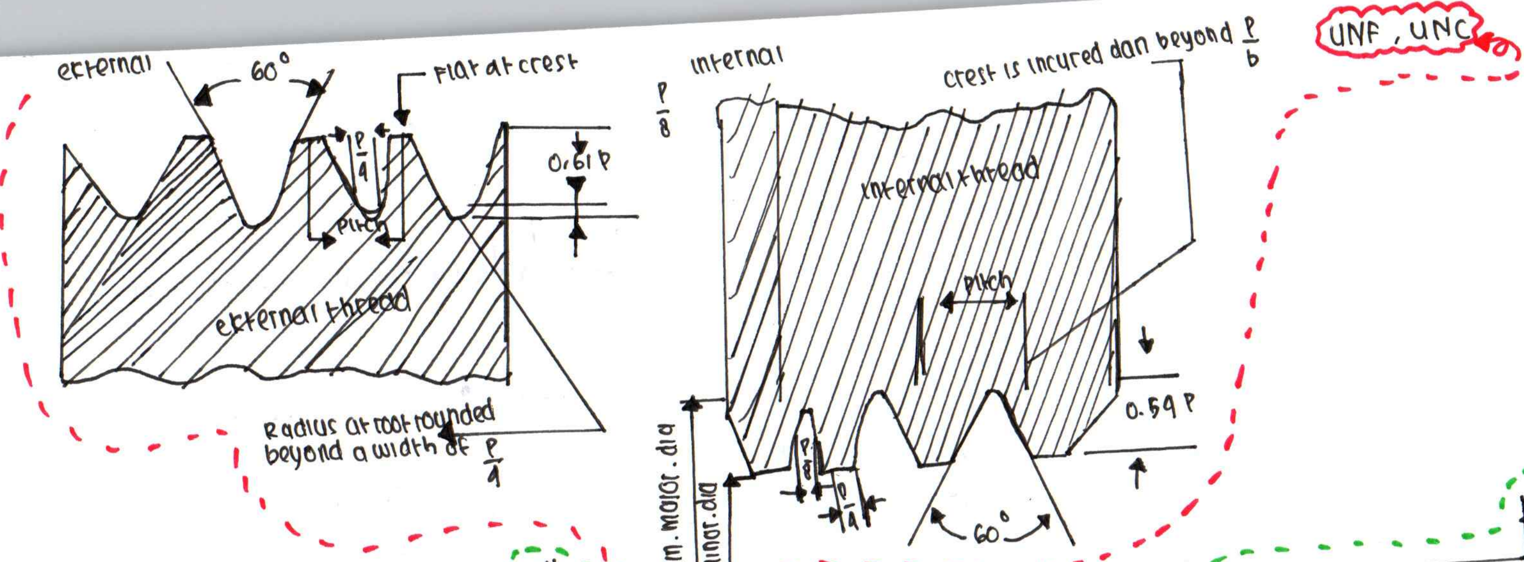


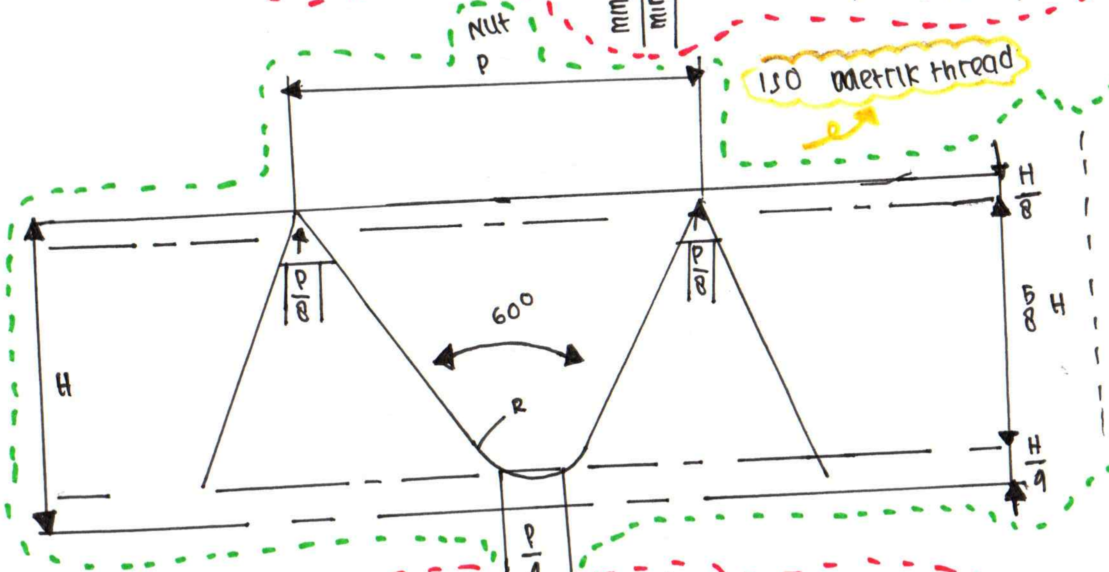
stud ✓

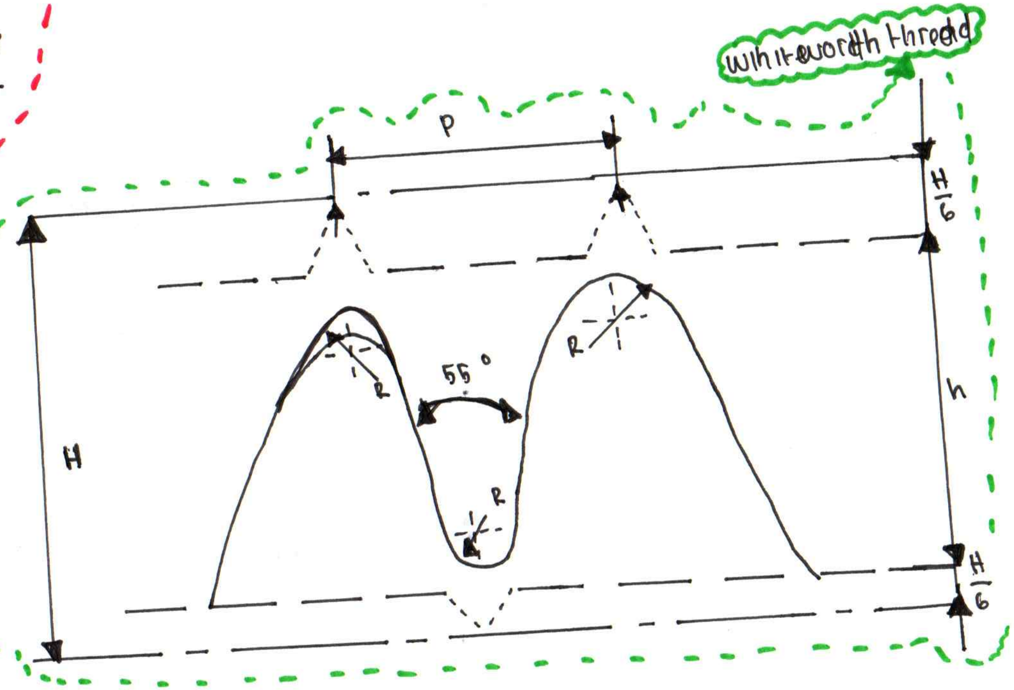


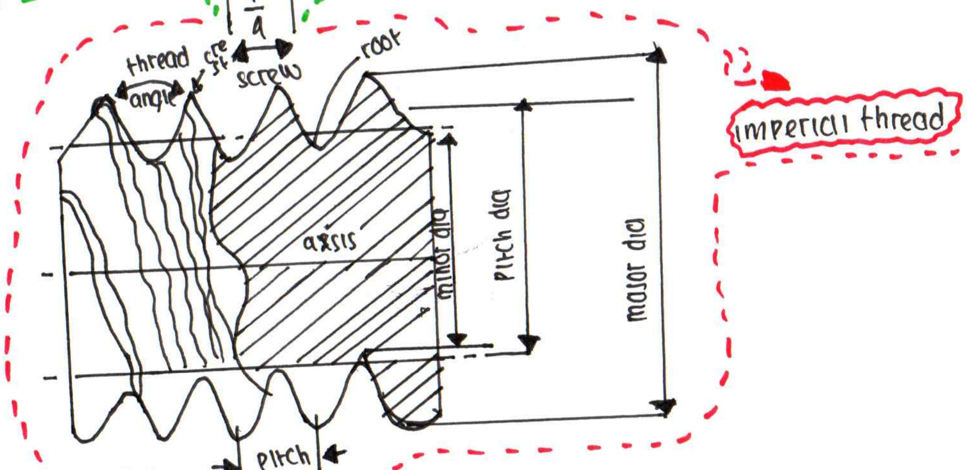
wing nut ✓ .

woodruf key ✓


UNF , UNC
external
60°
Flat at crest
P/4
0.61 P
Pitch
external thread
Radius at root rounded beyond a width of P/4
internal
P/8
crest is incured dan beyond P/b
internal thread
Pitch
0.54 P
min. major. dia
minor. dia
P/8
P/4
60°


Nut
P
ISO metric thread
H/8
P/8
P/8
60°
5/8 H
H
R
H/4
P/4


Whitworth thread
P
H/6
H
R
55°
h
R
R
H/6


imperial thread
thread angle
crest
screw
root
axis
minor dia
Pitch dia
major dia
Pitch

2.2. Dengan menggunakan daftar fastener pada Pertanyaan 1, isi tabel berikut dengan menuliskan huruf dan nama fastener di samping keterangan penggunaan yang sesuai.
Pilihan

Jika diinginkan, fasilitator dapat menambahkan sampai lima (5) rincian penggunaan fastener tambahan yang harus Anda identifikasi dengan nama fastener yang sesuai.

Penggunaan Fastener	Nama Fastener
Memasang dan seringkali digunakan untuk menahan pulley atau gear pada shaft.	bar key x (woodruff key).
Digunakan di belakang mur dan masuk dengan tepat ke dalam groove dalam baut atau shaft yang mencegahnya berputar.	castellated nut x (Torque washer).
Terdiri dari versi luar dan dalam dan digunakan untuk menciptakan tekanan di bawah mur untuk membentuk tahanan yang kencang.	square seat conical washer x (Star lock washer. Shakeproff washer.
Digunakan untuk menciptakan tekanan yang kuat pada mur dan baut untuk memastikan bahwa mur dan baut tetap kencang.	lock washer (spring washer).
Digunakan untuk menempatkan komponen pada shaft atau dalam recess dan pada saat yang sama membuat komponen berputar namun tidak bergerak secara aksial atau ke ujung	snap ring (circlip).
Memotong ulir sendiri dalam logam dan plastik	thread cutting screw (self tapping screw)
Dimasukkan melalui lubang dalam shaft atau baut untuk menahan dua bagian bersama-sama yang mungkin dapat menjadi longgar	cotterpin (split pin).
Digunakan dimana mur harus dapat dikencangkan dan dilonggarkan dengan tangan tanpa menggunakan perkakas	wing nut

2.3 Mengidentifikasi grade dan proof strength untuk setiap head bolt berikut:

Head bolt	Grade	Proof Strength (Mpa)
	8	828 ✓
	5.2	586 ✓
	5 5	556 ✓ 510
	8.2	828 ✓
	7	724 ✓

Trakindo CAT

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

ANALISIS LINGKUNGAN KESELAMATAN KERJA / JOB SAFETY ENVIRONMENT ANALYSIS

Pekerjaan / Task	RI cylinder head C.18	Nomor JSEA / JSEA Number		Halaman / Page	1	Dari / Of	2

Tanggal Pembuatan JSEA / Date of JSEA	28, Februari, 2026	Departemen / Dept		Tempat Kerja / Work Location	WORKSHOOP

Disusun Oleh / Compiled By	Merryana	TTD / Sign		Review Oleh / Reviewed By	SHE	TTD / Sign		Atasan / Superior		TTD / Sign	

Apakah Anda sudah teriatih 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*	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*
A	ERP/MERP		
	1. Saat pekerjaan terjadi gempa	tertimpa reruntuhan	1.1 Segera evakuasi menuju master point baru ditetapkan/ tempat terbuka 1.2 Melaporkan kejadian kepada atasan
	2. Saat pekerjaan ada teknisi yang pingsan	Cidera kepala, tangan tergores	2.1 Lakukan protokol P3K 2.2 Segera evakuasi korban menuju fasilitas kesehatan terdekat 2.3 Melaporkan kejadian kepada atasan
B	Langkah Pekerjaan		
1.	walk around inspection	1.1. komponen tercecer	1.1.1 memberrihkan komponen
		1.2. oli tercecer	1.1.2 mengelap oli menggunakan absorband pad
2.	prepare tools	2.1 tertimpa pallet	2.1.1 berhati-hati saat membawa pallet
		2.2 tersandung pallet engine	2.2.1 Focus saat bekerja
			2.2.2. berhati-hati saat prepare tools
3.	RI out exhaust	3.1 mata terkena nut, nut terpental	3.1.1 gunakan safety glass
			3.1.2 berhati-hati saat melepas nut
		3.2 [redacted] Fastener terkontaminasi	3.2.1 letakan fastener pada box
		3.3 tools terdapat debu	3.3.1 mengelap tools menggunakan white towel
4.	remove bushing	4.1 tangan tergores stud	4.1.1 tidak berguru
			4.1.2 berhati-hati saat melepas
			4.1.3 gunakan safety gloves

Trakindo CAT

Nomor Formulir / *Form Number*	SHE.SHE.FRM.005.R03

ANALISIS LINGKUNGAN KESELAMATAN KERJA / JOB SAFETY ENVIRONMENT ANALYSIS

Pekerjaan / *Task*		Nomor JSEA / *JSEA Number*		Halaman / *Page*		Dari / *Of*	

No	Urutan Dasar Langkah Tugas / *Job Steps*	Bahaya Yang Terkait / *Potential Hazard(s)*	Tindakan Perbaikan / *Recommended Action*
5.	remove exhaust	5.5 terjimpa exhaust	5.5.1 gunakan safety shoes 5.5.2 gunakan motode pengangkatan yang benar 5.5.3 angkat exhaust 2 orang.
6.	install exhaust	6.1 terjimpa exhaust 6.2 terjepit exhaust	6.1.1 berhati-hati saat remove exhaust 6.2.1 gunakan safety gloves
7.	install bushing	7.1 tangan tergores stud	7.1.1. gunakan safety gloves
8.	~~install nut~~	8.1 ~~tangan terjepit~~	
9.	housekeeping	9.1 terpeleset pallet	9.1.1 berhati-hati saat housekeeping

Bukti sosialisasi / *Evidence of socialization* :

No	Nama / *Name*	TTD / *Sign*
1		
2		
3		
4		
5		

No	Nama / Name	TTD / Sign

No	Nama / Name	TTD / Sign

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

03/23/2021 **Exhaust Manifold - Remove and Install (RENR8261-37)**

stud diameter : 9.2
thread = 1.5

SMCS - 1059 i08421130

Removal Procedure

Start By:

a. Remove the water temperature regulator housing. Refer to Disassembly and Assembly, "Water Temperature Regulator Housing - Remove and Install".

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting, and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, PERJ1017, "Dealer Service Tool Catalog" for tools and supplies suitable to collect and contain fluids on Cat® products.

Dispose of all fluids according to local regulations and mandates.

1. Drain the cooling system. Refer to Operation and Maintenance Manual, "Cooling System Coolant - Change".

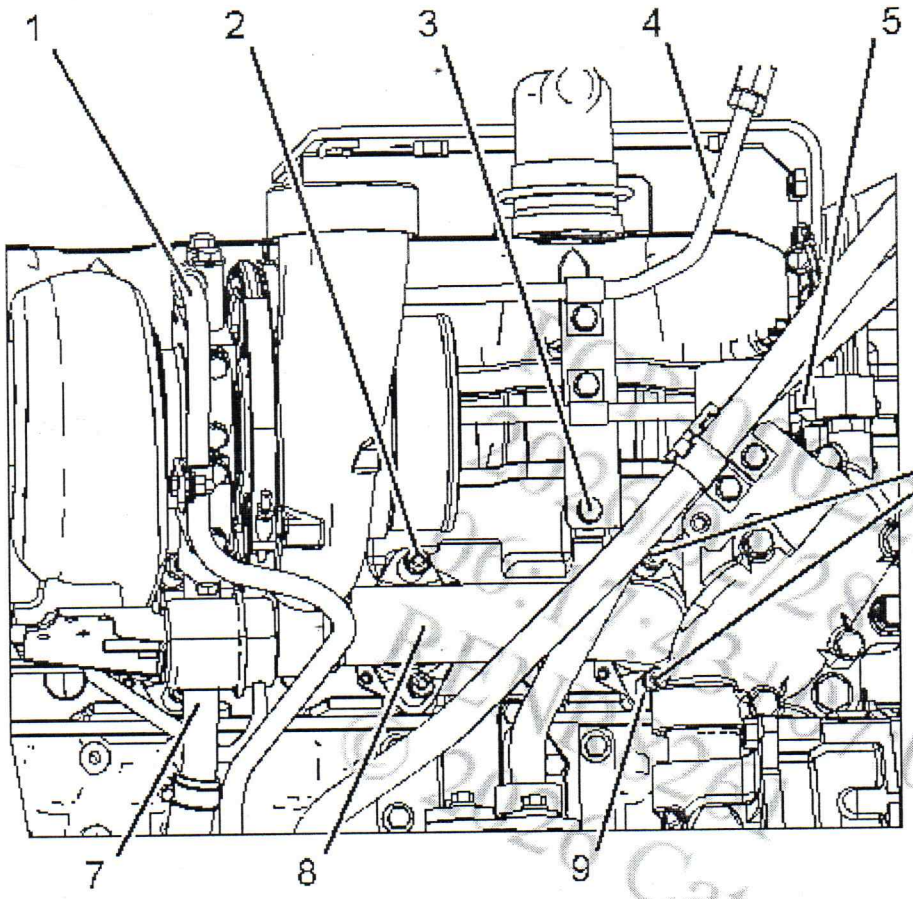


Illustration 1 g01115055

2. Disconnect tube assembly (1) and tube assembly (4).
3. Disconnect hose assembly (7).
4. Remove bolt (3).
5. Remove nuts (2), the washers, and spacers (9).
6. Remove two studs (6).
7. Disconnect tube assembly (5).
8. Attach a suitable lifting device to exhaust manifold (8). The weight of exhaust manifold (8) is approximately 57 kg (125 lb).
9. Remove exhaust manifold (8) and the sleeve assemblies.

Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty

A	-	Loctite C5-AAnti-Seize Compound (1)	-
	-	Loctite 8008Anti-Seize Compound	-
B	-	Loctite MR2000 High Temperature Sealer	-

(1) For use in North America only

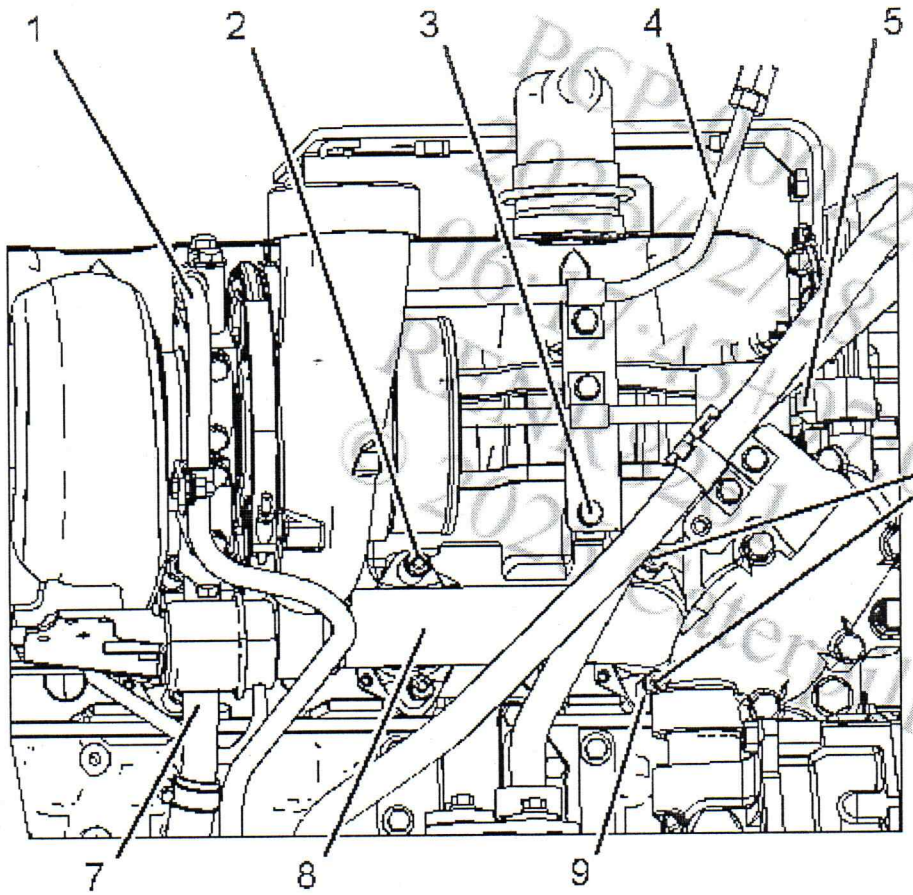


Illustration 2 g01115055

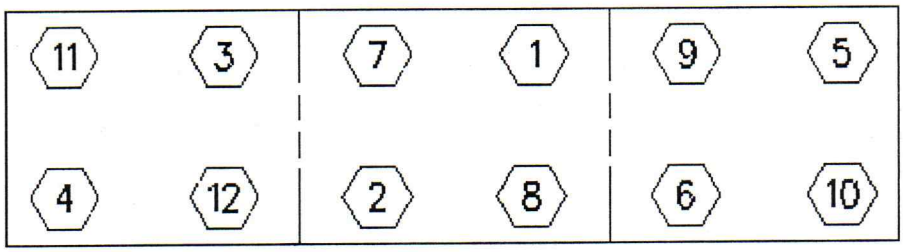


Illustration 3 g00566145

1. Apply Tooling (B) to the male and female ends of exhaust manifold (8) before assembly. Remove excess sealer from the assembled joint.
2. Apply Tooling (A) to two studs (6). Install two studs (6) and tighten to a torque of 35 ± 5 N·m (26 ± 4 lb ft).
3. Position the sleeve assemblies and install exhaust manifold (8). The weight of exhaust manifold (8) is approximately 57 kg (125 lb).

   Note: Discard the nuts after use. Use new nuts for installation.
4. Install spacers (9), the washers, and nuts (2). Tighten nuts (2) in the numerical sequence shown to a torque of 20 ± 3 N·m (177 ± 26 lb in). Tighten nuts (2) again in the numerical sequence shown to a torque of 50 ± 5 N·m (37 ± 4 lb ft).
5. Connect tube assembly (5).
6. Install bolt (3).
7. Connect hose assembly (7).
8. Connect tube assembly (1) and tube assembly (4).
9. Fill the cooling system. Refer to Operation and Maintenance Manual, "Cooling System Coolant - Change".

End By:

a. Install the water temperature regulator housing. Refer to Disassembly and Assembly, "Water Temperature Regulator Housing Remove and Install".

PCP-00022950
2026/02/28
06:17:34+07:00
i02017901