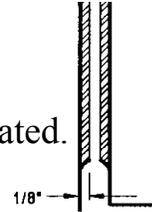


Repair Procedure

Boilermakers repair boilers, vessels, tanks, heat exchangers and other heavy-metal structures. Look at the Repair Procedure.

Task 1 Name 2 tools that could be used to make the cut in the tube.
Reading Text

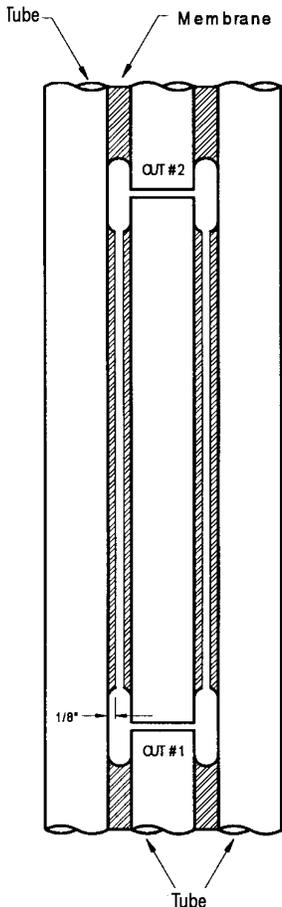
Task 2 Highlight, underline or circle the procedure that is illustrated.
Document Use



Task 3 What does the boilermaker need to do before removing the temporary dam?
Reading Text

Task 4 How does the boilermaker make sure of the correct heat number for the new tubing?
Reading Text

	Customer:		Job No.:		Sheet 1 of 1
	Plant / Location:				Repair Proc
	Prepared by:	R. Sundstrom	Date:		CIMS-RP11
	Approved by:		Date:		Rev.:
WATER WALL TUBE SECTION REPAIR PROCEDURE (CARBON STEEL MATERIAL)					



1. Verify tube section location, length (owner requirement), tube material specification and welding procedure specification (WPS) with supervisor.
2. Mark cut lines #1 and #2 and slot tube membrane material on either side of cut lines by air-arcing to facilitate tube cutting operation.
3. Cut membrane from cut #1 to cut #2 with air-arcing equipment or cutting torch, leaving a minimum 1/8" of the existing membrane on the adjacent tube.
4. Make lower tube cut (cut #1) with disk grinder or reciprocating saw.
5. Insert sheet metal blocking plate into cut #1 to prevent debris from entering system below.
6. Make upper tube cut (cut #2) with disk grinder, reciprocating saw or cutting torch.
7. Remove damaged tube section and insert **TEMPORARY DAM** (sponge) into lower tube opening or cover, to prevent entry of foreign material.
 - Note: (a) **Sponge(s) must be obtained from supervision / quality control and returned to same by the end of the shift.**
 - (b) **Sponge(s) must be signed out and signed back in on posted Sponge List by person performing the work.**
8. Prepare existing tube ends with milling machine or grinding equipment for bevel edge and, grind / buff adjacent area to clean metal for welding.
9. Prepare new tube material for welding. Confirm material specification and heat number markings with supervisor / quality control.
 - Note: (a) **Heat numbers must be visible on all tube material.**
10. **REMOVE TEMPORARY DAM (sponge) IN LOWER TUBE OPENING. Vacuum filings and debris from dam(s) prior to removal to prevent entry into the tube when the dam is pulled out.**
11. Purge new tube section and existing lower tube to header run in the presence of QC Inspector / Supervisor to verify that the system is clear prior to tube section fit-up and welding.
 - Note: (a) **Purge verification must be signed off by witnessing QC Inspector or Supervisor.**
 - (b) **Alternatives to purging prior to fit-up must be approved by mill owner and documented.**
12. Install water soluble dams in existing tube openings (as required) prior to fit-up in order to prevent drafts while welding.
13. Fit new tube section and tack weld in place. Obtain visual inspection by QCI / supervisor.
14. Weld out both joints and obtain visual inspection by QCI / Supervisor.
15. Perform non-destructive testing of welds (RT, UT, MPT, LPT) as required.
16. Fit and weld (both sides) new membrane material to seal repaired tube section and obtain visual inspection by QC Inspector / Supervisor.
17. Perform non-destructive testing of welds (MPT, LPT) as required.

Answer Key

Skill Level

Task 1

disk grinder, reciprocating saw

Integrated information located in different parts of the text. Located multiple pieces of information by making low-level inferences.

Reading
Text
Level ②

🔗 to see one way to get this answer:

Task 2

3. Cut membrane from cut #1 to cut #2 with air-arching equipment or cutting torch, leaving a minimum of 1/8" of the existing membrane on the adjacent tube.

See the Repair Procedure Task 2 answer page.

Located a single piece of information by matching ambiguous information.

Document
Use
Level ②

🔗 to see one way to get this answer:

Task 3

vacuum filings and debris from the dam(s)

Scanned a complex document and read the sentence with the required information

Reading
Text
Level ②

🔗 to see one way to get this answer:

Task 4

Check heat numbers on all tube materials. Confirm with the supervisor/quality control.

Located, compared information and made inferences to determine the required information.

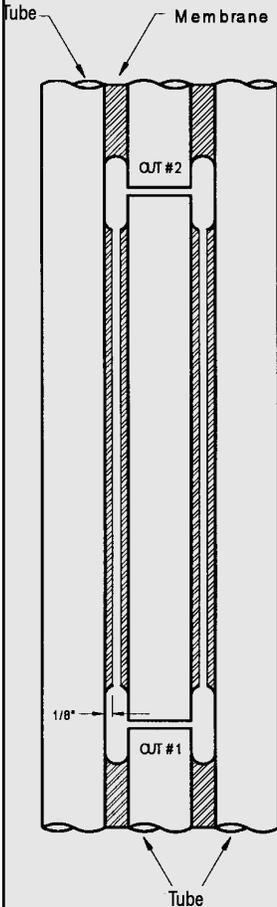
Reading
Text
Level ③

🔗 to see one way to get this answer:



Customer:		Job No.:		Sheet 1 of 1
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Repair Procedure

Boilermakers repair boilers, vessels, tanks, heat exchangers and other heavy-metal structures. Look at the Repair Procedure.

Task 1 Name 2 tools that could be used to make the cut in the tube.

Answer disk grinder, reciprocating saw

One way to get this answer

1. Scan the headings and page using keywords *tools* and *cut in the tube*.
2. Locate 4. *Make lower tube cut (cut #1) with disk grinder or reciprocating saw.*
3. Decide if there is a lower tube cut, there must be an upper tube cut.
4. Scan further and locate 6. *Make upper tube cut (cut #2) with disk grinder or reciprocating saw or cutting torch.*
5. Decide that the disk grinder and reciprocating saw are tools used to make both the lower and upper tube cut.

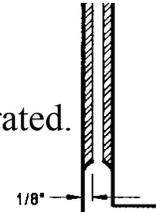
Level Reading Text, Level 2

CLB 5, 6 and 7 (estimated performance)

Repair Procedure

Boilermakers repair boilers, vessels, tanks, heat exchangers and other heavy-metal structures. Look at the Repair Procedure.

Task 2 Highlight, underline or circle the procedure that is illustrated.



Answer **3. Cut membrane from cut #1 to cut #2 with air-arching equipment or cutting torch, leaving a minimum of 1/8" of the existing membrane on the adjacent tube.**

See the Repair Procedure Task 2 answer page.

One way to get this answer

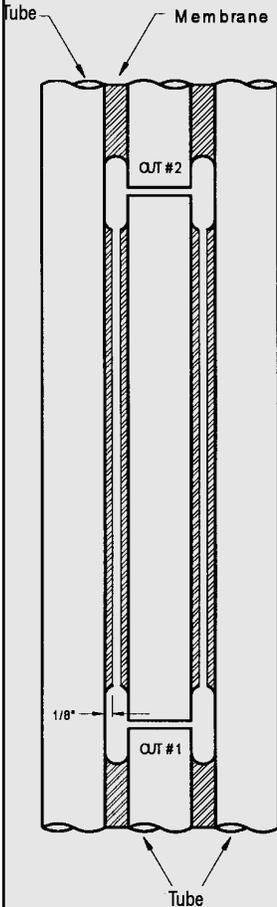
1. Compare the diagram in the Task to the diagram in the Repair Procedure.
2. Note the measurement $1/8''$.
3. Scan the headings and page using $1/8''$.
4. Locate 3. *Cut the membrane from cut # 1 to cut #2 ..., leaving a minimum 1/8" of the existing membrane on the adjacent tube.*
5. Decide that  is the membrane and $1/8''$  means the remaining membrane is 1/8" wide.
6. Decide that the drawing shows the cut in the membrane.

Level Document Use, Level 2
CLB 5 and 6 (estimated performance)



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Repair Procedure

Boilermakers repair boilers, vessels, tanks, heat exchangers and other heavy-metal structures. Look at the Repair Procedure.

Task 3 What does the boilermaker need to do before removing the temporary dam?

Answer vacuum filings and debris from the dam(s)

One way to get this answer

1. Scan the headings and page using keywords *removing* and *temporary dam*.
2. Locate *10. Remove temporary dam... . Vacuum filings and debris from dam(s) prior to removal to prevent entry into the tube....*
3. Decide that the boilermaker needs to vacuum the filings and debris before removing the temporary dam.

Level Reading Text, Level 2

CLB 5, 6 and 7 (estimated performance)

Repair Procedure

Boilermakers repair boilers, vessels, tanks, heat exchangers and other heavy-metal structures. Look at the Repair Procedure.

Task 4 How does the boilermaker make sure of the correct heat number for the new tubing?

Answer Check heat numbers on all tube materials. Confirm with the supervisor/quality control.

One way to get this answer

1. Scan the headings and page using keywords *correct heat number* and *new tubing*.
2. Locate 1. *Verify tube section location..., tube material specification ... with supervisor*.
3. Decide that heat number is a specification.
4. Scan further and locate 9. *Confirm material specification and heat number markings with supervisor/quality control. Note: (a) Heat numbers must be visible on all tube material*.
5. Decide that one way to make sure of the correct heat number is to confirm heat number markings with the supervisor/quality control.
6. Decide that another way to make sure of the correct heat number is to visually check the numbers on all tube materials.

Level Reading Text, Level 3
CLB 7, 8 and 9 (estimated performance)