Power factor warm-up: facilitator handout

A companion to the blank etos-pf-session-scorecard.csv file. Use both if you choose to run the existing 10-minute warm-up with a group and want to keep your own record of how it went. This is a free, original evaluation tool from Engineer Tsai Team. Using it is optional.

1. What you need

- A shared screen showing the public worked samples page (Texas Journeyman, Chapter 1, Question 8). Keep the solution closed until step 3.

https://www.tsaielectro.com/electrician-exam-book-worked-samples/

- The full facilitator card and self-checks are on the classroom and library evaluation guide. This handout summarizes them; the guide page is the reference.

https://www.tsaielectro.com/electrician-exam-books-classroom-library-guide/

- The blank etos-pf-session-scorecard.csv, saved on your own computer.

2. The example (supplied data, electrical theory, no Code lookup)

A single-phase load draws 10 A at 240 V, and a wattmeter reads 1,920 W. What is the power factor? Choices: A 0.75, B 0.80, C 0.85, D 1.25.

- Apparent power: 240 V x 10 A = 2,400 VA.

- Power factor: 1,920 W / 2,400 VA = 0.80. Answer B.

The values belong to this example only. They do not set the values for any other installation.

3. Suggested 10-minute sequence

The timings are a planning estimate, not a measured result. Adjust them to your group.

Time	Step
1 min	Set the context: supplied data and electrical theory. For code-specific study, check the regulator's current instructions for the exact exam and date.
2 min	Attempt first. Show the question with the solution closed. Each learner picks an answer.
2 min	Walk the setup: 240 V x 10 A = 2,400 VA, then 1,920 W / 2,400 VA = 0.80, choice B.
3 min	Self-checks (below), answered before the answers are shown.
1 min	The tempting wrong answer: why 1.25 fails.
1 min	Group record: fill one row of etos-pf-session-scorecard.csv (section 5).

4. Self-checks and correct answers

- **Which number is in watts (W) and which is in volt-amperes (VA)?** 1,920 W is the wattmeter reading, real power. 2,400 VA is apparent power, from 240 V x 10 A.

- **Why is 1.25 wrong?** 1.25 is 2,400 / 1,920, the ratio upside down. Power factor is real power divided by apparent power, 1,920 / 2,400 = 0.80, and it can never be above 1.

- **Which stated inputs does the answer need?** All three: 240 V, 10 A and 1,920 W. Voltage and current alone give only apparent power. Without the measured watts the power factor cannot be found.

5. Filling in etos-pf-session-scorecard.csv

Open the file in any spreadsheet program or text editor. Add **one row per session** under the header. The file comes with the header only. Record group totals, never individual people.

Column	What to enter
session_id	A label you choose, such as S01, S02. Do not use names, dates of birth, jobsite or employer names.
prep_minutes	Whole minutes you spent preparing this session (0 or more).
learners_present	Number of learners who took part (1 or more). This is the denominator for the count columns in that row.
completed_example	How many of those learners finished the attempt and the three self-checks. Between 0 and learners_present.
unclear_step	How many learners said at least one step was unclear. Between 0 and learners_present.
error_found	yes if anyone found an error in the sample itself (not a learner's mistake), otherwise no.
reuse_yes_no_maybe	Your own answer, as facilitator: would you use this warm-up again? yes, no or maybe.

Do not add columns for names, email addresses, jobsites or individual scores. Enter plain numbers and words; do not start a cell with =, +, - or @.

6. Adding up several sessions

State the denominator next to every figure, for example "41 of 52 learners across 4 sessions".

- **Completion share** = sum of completed_example / sum of learners_present.

- **Unclear-step share** = sum of unclear_step / sum of learners_present.

- **Sessions with a reported error** = rows with error_found = yes / number of rows.

- **Reuse** = count of yes, no and maybe, each / number of rows. Report all three.

- **Average prep time** = sum of prep_minutes / number of rows.

With only a few sessions, these figures describe your groups and nothing more. They do not show that the warm-up works or that anyone will pass an exam. Engineer Tsai Team makes no success claim for this warm-up.

7. Your data stays with you

Nothing in these files is sent or stored by us. There is no form, upload or tracking. If you want to share totals or report an error in the sample, you can write to the existing published address hello@tsaielectro.com. Whether you do is your choice. Send totals only, never learner lists or personal details.

8. What this tool is not

This handout and the blank scorecard cover one public example. They do not make the paid books free and grant no right to copy, print or distribute them. They are not continuing-education credit, a learning-management system, a licence, a discount or an agreement of any kind. The workbooks and website practice packs are separate, optional products.