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Ultrasonic technician performance test for boiler tube inspection

Scope

This procedure has been developed by a TAPPI Task Group to offer a basis for evaluating the skills of technicians who measure the thickness of boiler tubes from the external surface using manual instruments. The evaluation includes a background interview of each technician, as well as an operative test to objectively determine the technician's ability to accurately calibrate an ultrasonic thickness unit and measure a boiler tube test panel. This procedure is written for bare carbon steel tubes but can be applied to other materials if representative test panels are prepared (*e.g.* chromized, composite, thermal spray coated). Specialized ultrasonic test equipment, such as semi-automated scanners, could be addressed by appropriate modifications to this procedure.

Safety precautions

This performance test is designed for individuals expected to perform work in a boiler. This requires the following:

- Safe entry procedures, including maintaining air quality in the boiler spaces, following lockout/tagout procedures, and protection from falling material
- Use of required personal protective equipment
- Access platforms and scaffolding must conform to government and industry standards
- Functionality and proper use of electrical safety devices

Personnel

The personnel qualification and certification program of the contracting organization shall be in accordance with ASNT's SNT-TC-1A (latest edition) or CAN/CGSB's 48.9712. It is recommended that at a minimum, all ultrasonic thickness technicians be experienced and have training equivalent to that of an ASNT Level I ultrasonic technician. In addition, Level II or III technicians shall be on the job site to instruct, supervise, and verify appropriate performance by the Level I technicians. In addition to Level I certification, experience in actual boiler tube thickness measurement is important.

It is recommended that all ultrasonic thickness technicians be qualified by the mill through the testing procedure. The test should be conducted by a mill representative knowledgeable of ultrasonic testing. Qualification should be effective for one year providing the technician maintains employment with the same contractor and performs satisfactorily in the field. The mill should retest any technician whose performance is questionable, and revoke his/her qualification if warranted by either unacceptable test or field performance.

Fabrication of test panels

It is recommended that the test panels used in the evaluation of the technician be fabricated from tubes of the same thickness, diameter, and configuration as those in the boiler to be surveyed. In some cases, it may be more

completed within the five-minute time frame. Also, the actual time required to complete the thickness test portion of the examination should be recorded on the qualification form.

Scoring the performance test

The results should be scored as soon as possible following the examination.
The score should be calculated using the following format:

NUMBER OF READINGS: ("Key" is correct thickness)

≤0.127 mm (0.005 in) above or below Key: _____ x -1 = _____

> 0.127 to 0.254 mm (0.005-0.010 in.) above or below Key: _____ x 1 = _____

> 0.254 to 0.381 mm (0.010-0.015 in.) above or below Key: _____ x 3 = _____

> 0.381 mm (0.015 in.) above or below Key: _____ x 5 = _____

Correctly Identified As Defects: _____ x -2 = _____

TIME FACTOR:

Minutes Over 15: _____ x 1 = _____

SCORE = _____

Following is a suggestion for judging the performance of the technician:

The technician should be qualified if his/her score is 15 or below.

Should be required to retest on a different test panel if his/her score is 16 to 30.

At the mill's discretion, can be qualified to work on the current survey only, if the retest score is 16 to 30.

Should not be qualified to take ultrasonic readings in the boiler if his/her retest score is above 30.

Retesting should be administered after a review of the performance test results with the examiner, the contractor's supervisor and the technician. The purpose of the interview is to assure the technician has sufficient prior training and experience, and to pinpoint the specific cause of his/her failing grade (*e.g.*, faulty test equipment or test anxiety.)

Technicians who fail the retest should be disqualified from performing ultrasonic survey work at the mill until she/he has received additional formal training in ultrasonic testing.

After the test is scored the technician can be given a report of his or her score. However, no records of test data obtained by the technician should be taken away by the technician after the test.

Disposition of qualification forms:

For multi-facility corporations, it may be convenient for a central department to be assigned to maintain the test panels and a file of technician test results (pass or fail). A current listing of qualified technicians should be made available to all of the corporation's facilities to eliminate duplication of testing for those technicians who may work at more than one mill during the tenure of his/her qualification. This information also may become useful for the statistical evaluation of a contractor's overall performance. The information also may detect a flawed test panel or key sheet, if an inordinate number of technicians fail the test on one panel, but consistently do well when retested on other panels.

The test results should be discussed with the supervision of the contracting NDT Laboratory. However, copies of the test results should not be distributed. In addition, with the exception of the NDT Laboratory, there should be no discussion or distribution of test results outside the corporation.

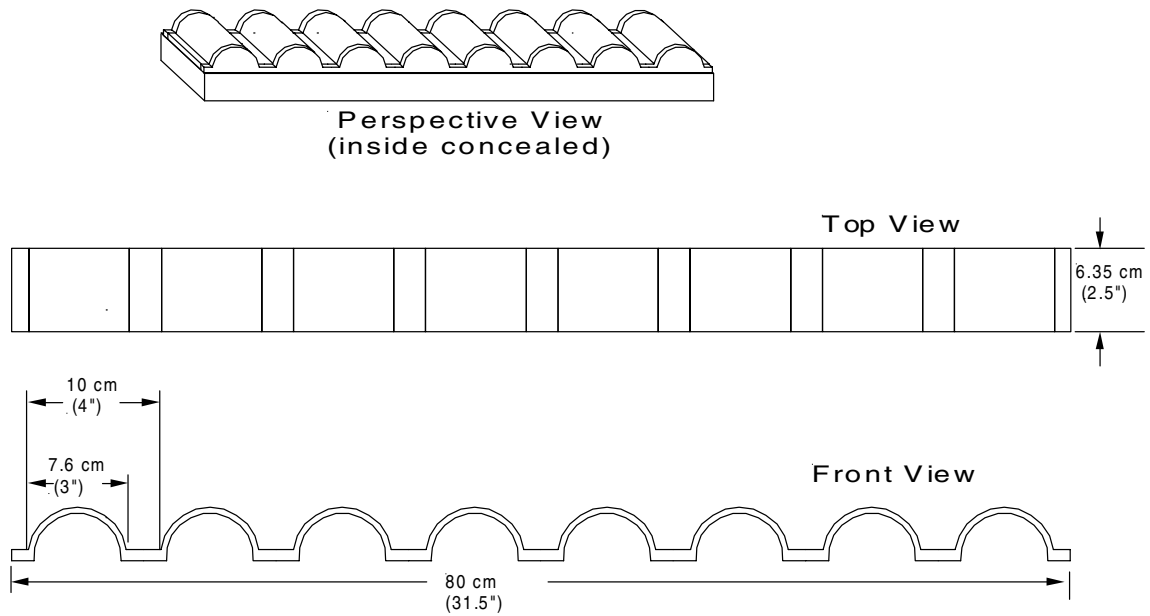


Figure 1. Boiler tube thickness test panel membrane wall construction.

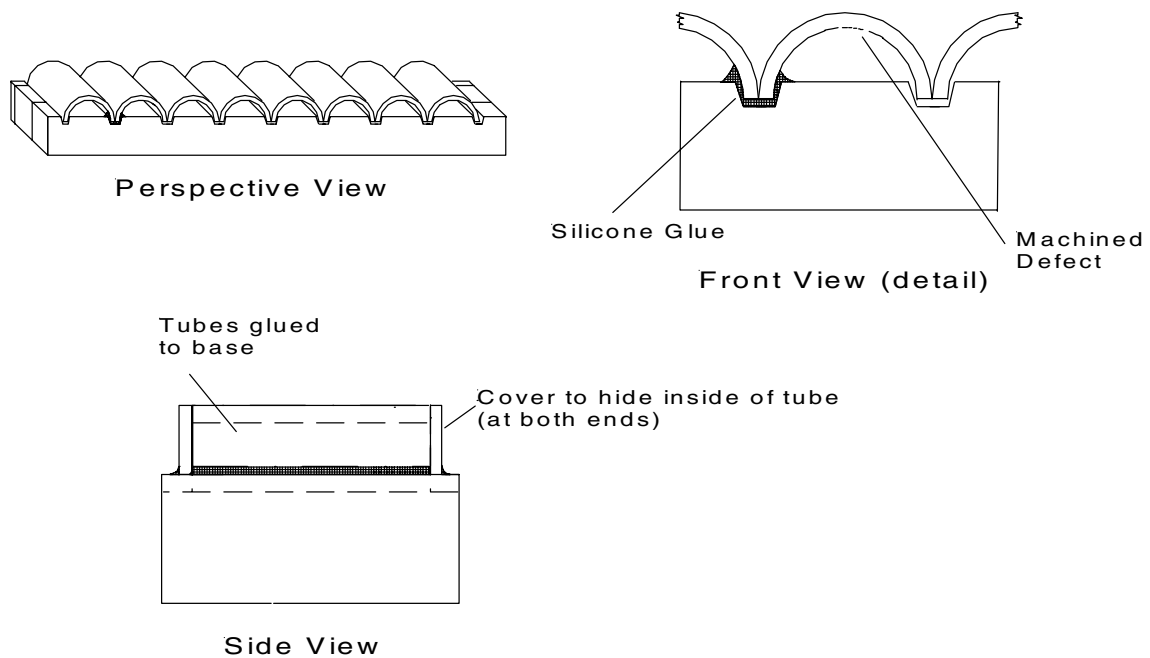


Figure 2. Boiler tube thickness test panel tangent tube construction.