

TENSILE STRENGTH RATIO CERTIFICATION

PROFICIENCY EXAMINATION

2022 – 2024

Applicant _____

Employer _____

TENSILE STRENGTH RATIO (TSR) TECHNICIAN CERTIFICATION PROFICIENCY CHECKLIST

AASHTO T 283

Revised: 03/22/2022

Trial#	1	2	R
Sample Preparation and Grouping:			
1. Obtained field-mixed asphalt mixture sample in accordance with AASHTO R97 with enough material to complete all tests.			
2. Compact ≥ 6 pucks to spec: 95 ± 5 mm thick and $7.0 \pm 0.5\%$ air voids.			
3. Determine specimen thickness (t)			
4. Obtain G_{mb} (bulk specific gravity) for each puck.			
5. Using an associated G_{mm} (Rice) using AASHTO T209, calculate % air voids for each puck.			
6. Sort into 2 groups of 3 pucks each so that <u>average air voids of each group</u> are approximately equal.			
“Dry” (Non-conditioned) Testing:			
7. Before proceeding, be sure pucks have air-dried for 24 ± 3 hrs. <u>after</u> G_{mb} determination.			
8. Place each dry puck in its own water-proof bag. Place bagged dry pucks in warm-water bath for 2 hrs. ± 10 min. with 1” of water above surface of specimens.			
9. Test each puck in indirect tension; record maximum load for each. Calculate tensile strength for each.			
10. <u>Calculate average tensile strength</u> for dry set of pucks (S_{dry}).			
“Wet” (Conditioned) Testing:			
11. Place puck in vacuum vessel with at least 1” of water below and above the puck; subject to vacuum saturation for 5-10 min. within specified vacuum range.			
12. Remove vacuum; keep puck submerged for another 5-10 min.			
13. Having already zeroed out a piece of plastic wrap on the balance, remove puck, quickly surface-dry it, and place it on the balance.			
14. Determine degree of saturation (i.e., is the weight displayed on the balance within the range needed?).			
15. If saturation $< 70\%$, repeat vacuum procedure using more time and/or vacuum.			
16. If saturation $> 80\%$, discard specimen.			
17. If degree of saturation is 70-80%, tightly wrap plastic film around puck, place sealed puck in plastic bag along with 10 ml water, seal outer bag and place in freezer for at least 16 hrs.			

18. Remove pucks from freezer and plastic bag; quickly place pucks into hot-water bath for 24 ± 1 hr. (1" of water above surface of specimens); remove plastic wrap as soon as possible.			
19. After 24 ± 1 hr. in hot-water bath, transfer pucks to warm-water bath for 2 hrs. ± 10 min.			
20. Obtain specimen thickness (t') then test each puck in indirect tension; record maximum load for each. Calculate tensile strength for each.			
21. <u>Calculate average tensile strength</u> for conditioned set of pucks ($S_{\text{conditioned}}$).			
22. Calculate TSR: $TSR = \frac{S_{\text{conditioned}}}{S_{\text{dry}}} \times 100\%$ (to nearest whole number)			
Pass?			
Fail?			

Examiner _____ Date _____

Reviewer _____ Date _____