Name of Test **Flexural Bending Beam Fatigue Test**	Developer(s) Monismith and co-workers University of California at Berkeley
Test Method(s) AASHTO T 321-17 / ASTM D8273-18	Adoption by Agencies California, Iowa, New Jersey
Description Beam specimen is held by four equally-spaced clamps and a sinusoidal controlled-deflection mode of loading is applied at the two inner clamps. The loading frequency is typically 10 Hz. The magnitude of the load applied by the actuator and the deflection measured at center of beam is recorded and used to calculate the flexural stiffness, cumulative dissipated energy, and the cycles to failure (i.e., the point at which the product of the specimen stiffness and loading cycles is a maximum). Multiple peak-to-peak strain levels are often used to characterize the fatigue behavior of asphalt mixtures.	Photographs/Illustrations 
Test Results Number of cycles to failure (fatigue life), N_f	Test Temperature(s) 20 ± 0.5°C

Equipment & Approximate Cost	
Loading device and data acquisition system	$50,000
Environmental chamber	$20,000
Beam fatigue device	$34,000
Slab compactor	$70,000
Saw for cutting specimens	$6,000

Specimen Fabrication Slab specimen, 4 cuts, gluing gage points (1 day)	Number of Replicate Specimens 3 specimens per strain level
Specimen Conditioning Conditioning for 2 hours at 20°C	Testing Time Hours to weeks depending on strain level and mix quality
Data Analysis Complexity Simple	Test Variability High (40-50% COV)
Field Validations Good (inputs to AI and AASHTOWare Pavement ME Design)	Overall Practicality for Mix Design and QA Fair for Mix Design Poor for QA

Key References

- Tayebali, A.A., J.A. Deacon, J.S. Coplantz, J.T. Harvey, and C.L. Monismith (1994). Fatigue Response of Asphalt-Aggregate Mixes, SHRP-A-404, National Research Council, Washington D.C.
- Prowell, B., E. Brown, R. Anderson, J. Daniel, A. Swamy, H. Quintus, S. Shen, S. Carpenter, S. Bhattacharjee, and S. Maghsoodloo (2010). Validating the Fatigue Endurance Limit for Hot Mix Asphalt, NCHRP Report 646, National Academies Press.