A laboratory study was undertaken to investigate the changes in performance grades of three selected asphalt binders that are commonly used in Oklahoma due to the addition of two selected anti-stripping additives. The asphalt binders were PG 70-28, PG 76-28 and PG 64-2 and the additives were Perma Tac Plus and Adhere HP-Plus. Each asphalt binder was mixed with different percentages of anti-stripping additives and tested in accordance with the Superpave testing protocols. Results from this study showed that PG 64-22 satisfied all the Superpave specified criteria within the selected percentages of Adhere HP-Plus. However, with 1.00% Perma Tac Plus the same binder did not pass the Superpave specified DSR criterion for an unaged asphalt binder. Comparing both anti-stripping additives, it was concluded that the grade changes are higher for Adhere HP-Plus than that for Perma Tac Plus. The optimum percentage of anti-stripping additives was determined to be 0.50% for both cases for this asphalt binder. For PG 70-28, the grade changes were relatively higher compared to PG 64-22. For PG 70-28, the use of both anti-stripping additives within the tested range is recommended based on the test results. The recommended optimum dosage level for Adhere HP-Plus, when used with PG 70-28, is found to be 0.50%. Comparing both anti-stripping additives at the same dosage level (0.50%), it was observed that the changes in high and low grading temperatures are higher for Adhere HP-Plus than for Perma Tac Plus. Similar to PG 70-28, PG 76-28 passed the specified criteria with both additives within the tested range. Test results indicated that the PG 76-28 used in this study satisfied even the grade requirements of a PG 82-28.