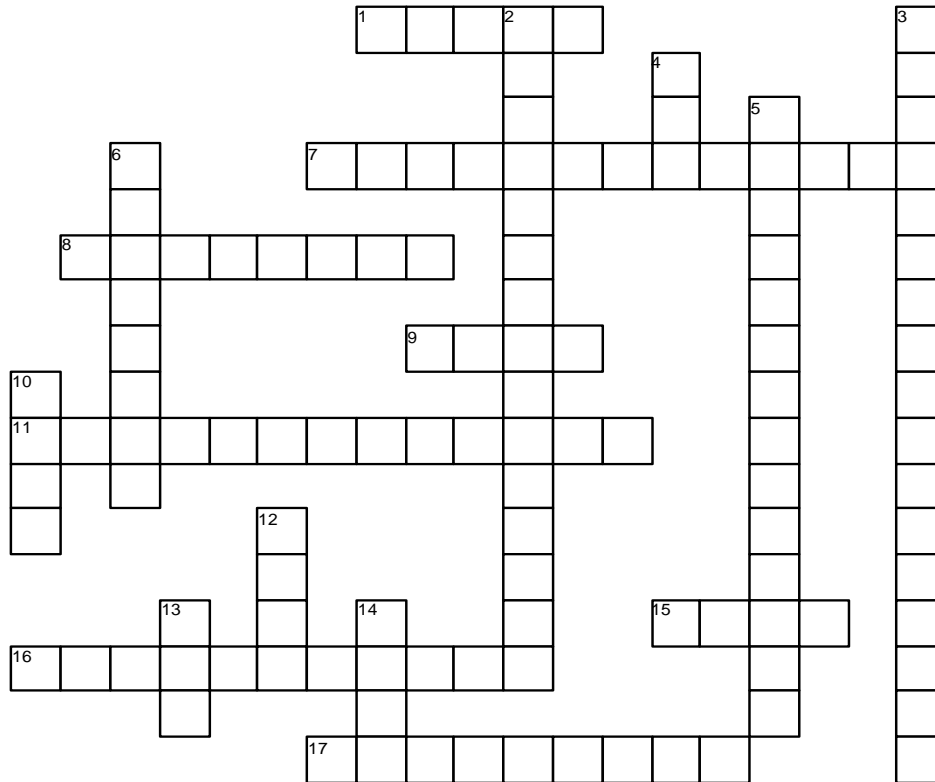


Engine Oil and Filters

Chapter 14



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ACROSS

- 1 The ____ developed an oil rating that consolidates the SAE viscosity rating and the API quality rating.
- 7 A ____ inhibits the action of water on ferrous metal such as steel.
- 8 Oils must also be ____, meaning they are capable of mixing with other oils without causing any problems such as sludge.
- 9 The ____ rates the oil according to A1-A5 for gasoline engines.
- 11 Many oil filters are equipped with an ____ valve that prevents oil from draining out of the filter when the engine is shut off.
- 15 The levels of phosphate and zinc, commonly referred to as ____, have been reduced because they can cause damage to the catalytic converter.
- 16 Either the engine or the filter is provided with a ____ that will allow the oil to go around the filter element.
- 17 The lowest temperature at which oil will pour is called its ____.

DOWN

- 2 An ____ is a number of chemicals that will help each other that can be used for each of the additive requirements.
- 3 The ____ institute, working with the engine manufacturers and oil companies, has established an engine oil performance classification.
- 4 The ____ performance or service classification and the SAE grade marking are the only information available to help determine which oil is satisfactory for use in an engine.
- 5 ____ improver modifies the viscosity of the base fluid so that it changes less as the temperature rises.
- 6 ____ are added to oil to prevent acid formation (corrosion) in the form of sludges, varnishes.
- 10 ACEA oil requires low levels of sulfated ash, phosphorous and sulfur, abbreviated ____.
- 12 ACEA oil has a high temperature/high shear rate viscosity, abbreviated ____.
- 13 Engine oils are sold with a ____ grade number, which indicates the viscosity range into which the oil fits.
- 14 The ____ tests use small Japanese engines, and their ratings require more stringent valve train wear standards than oil ratings in other countries.