

Harshness (NVH) .

Some other noises from the front of the engine (ticking, tapping or rattle) may be internal to the engine. Use the EngineEAR/ChassisEAR or stethoscope on the engine front cover to determine if the noise is internal to the engine. Removal of the engine front cover may be necessary to inspect internal engine components.

Rear of engine noise

A common source of noise from the rear of the engine (knocking) is the flywheel/flexplate. Inspection of the flywheel/flexplate will be necessary.

Some engines have timing drive components at the rear of the engine and may be the source of noise (ticking, knocking or rattle). Use the EngineEAR/ChassisEAR or stethoscope on the rear of the engine if the noise is suspected to be internal to the engine. Some disassembly of the engine may be required to inspect for damage or wear.

Turbocharger noise (Gasoline Turbocharged Direct Injection (GTDI) engine)

A common source of noise is the turbocharger. Some whine or air rush noise is an acceptable condition.

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After the noise is localized, note the characteristics of the noise, including type of noise, frequency and conditions when the noise occurs and GO to Symptom Chart - NVH .

DIAGNOSIS AND TESTING > ENGINE > SYMPTOM CHART - ENGINE PERFORMANCE

Symptom	Possible Sources	Action
Difficult starting	Inoperative or damaged ignition system Air or vacuum leak Inoperative or damaged fuel system Inoperative or damaged starting system	Refer to the appropriate Engine article for the procedure. Refer to ENGINE CONTROLS - POWERTRAIN DTC CHARTS & DESCRIPTIONS (EXCEPT DIESEL & HYBRID) .
	Damaged charging system/ battery	REFER to: Charging System - 2.7L EcoBoost (238kW/324PS) or REFER to: Charging System - 3.5L Duratec (209kW/284PS)/3.5L EcoBoost (272kW/370PS)/5.0L 32V Ti-VCT .
	Burnt valve	INSTALL a new cylinder head. TEST the system for normal operation after the repair.
	Worn piston	INSTALL a new piston. TEST the system for normal operation after the repair.

	Worn piston rings	INSTALL new piston rings. TEST the system for normal operation after the repair.
	Worn cylinder	INSTALL a new cylinder block. TEST the system for normal operation after the repair.
	Damaged head gasket	INSTALL a new cylinder head gasket. TEST the system for normal operation after the repair.
	Inoperative or damaged cooling system	Refer to the appropriate Engine article for the procedure.
	Fail-safe cooling invoked (if equipped)	Refer to ENGINE CONTROLS - POWERTRAIN DTC CHARTS & DESCRIPTIONS (EXCEPT DIESEL & HYBRID) .
Poor idling	Vacuum leaks Inoperative or damaged EGR system	Refer to the appropriate Engine article for the procedure. Refer to ENGINE CONTROLS - POWERTRAIN DTC CHARTS & DESCRIPTIONS (EXCEPT DIESEL & HYBRID) .
	Inoperative or damaged ignition system	Refer to the appropriate Engine article for the procedure.
	Inoperative or damaged cooling system Inoperative or damaged fuel system	Refer to the appropriate Engine article for the procedure.
	Fail-safe cooling invoked (if equipped)	Refer to ENGINE CONTROLS - POWERTRAIN DTC CHARTS & DESCRIPTIONS (EXCEPT DIESEL & HYBRID) .
	Incorrect valve clearance	ADJUST valve clearance. Refer to the appropriate Engine article for the procedure. TEST the system for normal operation after the repair.
	Incorrect valve-to-valve seat contact	INSTALL a new cylinder head. TEST the system for normal operation after the repair.
	Damaged head gasket	INSTALL a new cylinder head gasket. TEST the system for normal operation after the repair.
Engine runs rough	Inoperative or damaged fuel system Air or vacuum leaks	Refer to the appropriate Engine article for the procedure.

	EGR system fault Inoperative or damaged cooling system Inoperative or damaged ignition system	
	Fail-safe cooling invoked (if equipped)	Refer to ENGINE CONTROLS - POWERTRAIN DTC CHARTS & DESCRIPTIONS (EXCEPT DIESEL & HYBRID) .
	Burnt or sticking valve	INSTALL a new valve. TEST the system for normal operation after the repair.
	Weak or broken valve spring	INSTALL a new valve spring. TEST the system for normal operation after the repair.
	Carbon accumulation in combustion chamber	ELIMINATE carbon buildup. TEST the system for normal operation after the repair.
Excessive oil consumption	Leaking oil	REPAIR oil leakage. TEST the system for normal operation after the repair.
	Blocked or restricted turbocharger oil drain pipe	INSPECT the turbocharger drain pipe. REPAIR as necessary. TEST the system for normal operation after the repair.
	Damaged or collapsed air intake hoses and tubes	Tighten hoses clamps. INSPECT for damage and REPAIR as necessary. TEST the system for normal operation after the repair.
	Damaged exhaust or exhaust leaks at turbocharger housing or exhaust manifold.	INSPECT for leaks. Leaks can be detected audibility or visually, by a discoloration caused by escaping hot exhaust gases. REPAIR as necessary. TEST the system for normal operation after the repair.
	Turbocharger oil seals leaking	REFER to Turbocharger Internal Oil Leak Test. REFER to: Turbocharger - Turbocharger - 2.7L EcoBoost (238kW/324PS) or REFER to: Turbocharger - Turbocharger - 3.5L EcoBoost (272kW/370PS). TEST the system for normal operation after the repair.
	Inoperative PCV system	REPAIR or INSTALL new components as necessary. TEST

		the system for normal operation after the repair.
	Incorrect oil	CHANGE oil to correct specification. TEST the system for normal operation after the repair.
	Worn valve stem seal	INSTALL a new valve stem seal. TEST the system for normal operation after the repair.
	Worn valve stem or valve guide	INSTALL a new cylinder head. TEST the system for normal operation after the repair.
	Sticking piston rings	INSTALL new piston rings. TEST the system for normal operation after the repair.
	Worn piston ring groove	INSTALL a new piston and piston pin. TEST the system for normal operation after the repair.
	Worn piston or cylinder	INSTALL a new piston or cylinder block. TEST the system for normal operation after the repair.
Oil in coolant	Leaking head gasket Damaged cylinder block Damaged cylinder head	INSPECT the engine components. INSTALL new engine components as necessary. Refer to the appropriate Engine article for the procedure. TEST the system for normal operation after the repair.
	Leaking oil cooler	INSPECT the oil cooler and seal for damage. INSTALL new components as necessary. Refer to the appropriate Engine article for the procedure.
Coolant in oil	Leaking head gasket Damaged cylinder block Damaged cylinder head	INSPECT the engine components. INSTALL new engine components as necessary. Refer to the appropriate Engine article for the procedure. TEST the system for normal operation after the repair.
Insufficient power	Inoperative or damaged ignition system Air intake system blockage Lubrication system blockage Inoperative or damaged fuel system	Refer to the appropriate Engine article for the procedure. Refer to ENGINE CONTROLS - POWERTRAIN DTC CHARTS & DESCRIPTIONS (EXCEPT DIESEL & HYBRID) .

Turbocharger turbine or compressor wheel damage	INSPECT the turbocharger. REFER to the Check for Free Rotation- Off Vehicle. REFER to: Turbocharger - 2.7L EcoBoost (238kW/324PS) or REFER to: Turbocharger - Turbocharger - 3.5L EcoBoost (272kW/370PS). TEST the system for normal operation after the repair.
Damaged exhaust or exhaust leaks at turbocharger housing or exhaust manifold	INSPECT for leaks. Leaks can be detected audibility or visually, by a discoloration caused by escaping hot exhaust gases. REPAIR as necessary. TEST the system for normal operation after the repair.
Malfunctioning turbocharger bypass valve	Refer to ENGINE CONTROLS - POWERTRAIN DTC CHARTS & DESCRIPTIONS (EXCEPT DIESEL & HYBRID) .
Oil level too high	DRAIN oil to correct level.
Incorrect engine oil	INSTALL correct specification engine oil. TEST the system for normal operation after the repair.
Excessive accessory drive belt loading Inoperative or damaged cooling system	Refer to the appropriate Engine article for the procedure.
Fail-safe cooling invoked (if equipped)	Refer to ENGINE CONTROLS - POWERTRAIN DTC CHARTS & DESCRIPTIONS (EXCEPT DIESEL & HYBRID) .
Damaged or plugged exhaust system	INSPECT exhaust system. TEST the system for normal operation after the repair.
Incorrect tire size	REFER to: Suspension System .
Dragging brakes	REFER to: Brake System .
Slipping transmission	Refer to the appropriate Automatic Transmission article for the procedure.
Slipping clutch	Refer to the appropriate Manual Transmission, Clutch and Transfer Case article for the procedure.
Incorrect valve clearance	ADJUST valve clearance. Refer to the appropriate Engine article for the procedure. TEST the

		system for normal operation after the repair.
	Worn or damaged valve tappet	INSTALL a new valve tappet. TEST the system for normal operation after the repair.
	Damaged valve guide Compression leakage at valve seat Seized valve stem	INSTALL a new cylinder head assembly. TEST the system for normal operation after the repair.
	Weak or broken valve spring	INSTALL a new valve spring. TEST the system for normal operation after the repair.
	Worn or damaged cam	INSTALL a new camshaft. TEST the system for normal operation after the repair.
	Damaged head gasket	INSTALL a new head gasket. TEST the system for normal operation after the repair.
	Cracked or distorted cylinder head	INSTALL a new cylinder head assembly. TEST the system for normal operation after the repair.
	Damaged, worn or sticking piston ring(s)	INSTALL a new piston ring(s). TEST the system for normal operation after the repair.
	Worn or damaged piston	INSTALL a new piston and piston pin. TEST the system for normal operation after the repair.
Engine emits excessive black smoke (black/blue/white)	Clogged Air Cleaner (ACL) element	INSTALL a new ACL element. TEST the system for normal operation after the repair.
	Incorrect type or grade of oil	DRAIN and FILL with specified oil.
	Blocked or restricted turbocharger oil drain pipe	INSPECT the turbocharger oil drain pipe. REPAIR as necessary. TEST the system for normal operation after the repair.
	Damaged/restricted or leaking turbocharger intake tube assembly	REPAIR or INSTALL a new tube as necessary. TEST the system for normal operation after the repair.
	Engine wear (piston rings, valve guides)	REPAIR as necessary. TEST the system for normal operation after the repair.
	Plugged crankcase ventilation system	Visually INSPECT the crankcase ventilation system.