

Active Vibration Damper Sub (AVD™)



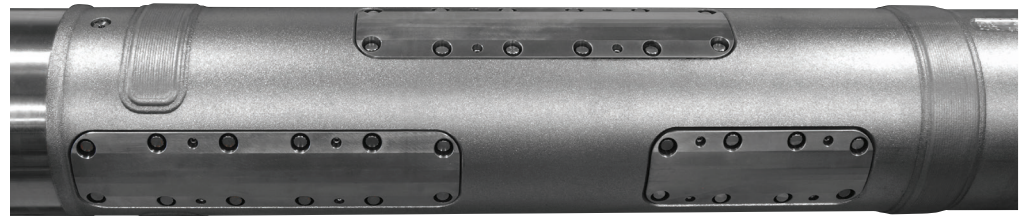
SureDrill-AVD™

APS's SureDrill™ Active Vibration Damper (AVD™)* is a standalone downhole tool that autonomously adapts to changing downhole BHA motion in real time to minimize axial, lateral and torsional drill string vibration. The AVD has demonstrated 50% improvements in rate of penetration (ROP) and doubling of bit life in the field due to reduced vibration. Other downhole drill string components, like MWD / LWD tools, also benefit from lower vibration.

Structurally, the AVD is similar to a shock-sub, with the addition of a damper section that has programmable stiffness. The damper chamber is filled with a magneto-rheological fluid that has electronically controlled viscosity. An integrated motion sensor measures displacement several times per second and changes the damping factor over a 7-to-1 range based on observed drilling conditions. By keeping tool string damping in the right range for current drilling conditions, the AVD significantly reduces vibration, maintaining the bit in better contact with the formation and increasing ROP.

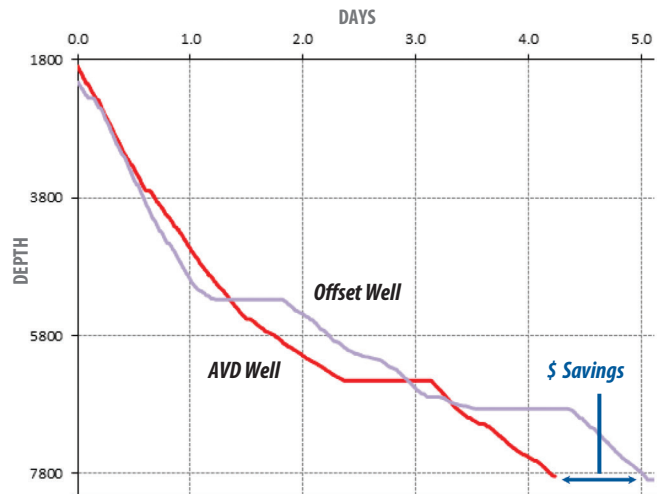
The AVD is a self-contained drilling tool with no calibration or other rig maintenance required. The AVD records vibration data for later download.

** U.S. Patents #6,257,356 B1; #7,219,752; and #7,377,339*



Downhole Intelligence Embedded in Control Electronics Hatches

Case Study: Days vs. Depth



Visit our website to find out how AVD helped create a 20% improvement in drilling efficiency.
<http://www.aps-tech.com/avd-case-study>

Active Vibration Damper Sub (AVD™)

Product Specifications

Mechanical		
Tool Size	6.75 in. / 7.00 in. (171 mm / 178 mm) O.D. 1.89 in. (48 mm) I.D.	9.50 in. (241 mm) O.D. 3.00 in. (76 mm) I.D.
API Connection	NC-50	7-5/8 Reg.
Length	32 ft (9.75 m) shoulder-to-shoulder	
Weight (approx.)	6.75 in. tool: 3,100 lb (1,406 kg) 7.00 in. tool: 3,395 lb (1,540 kg)	5,825 lb (2,642 kg)
Environmental		
Pressure	20 kpsi (137.9 MPa)	
Operating Temperature	68° to 302°F (20° to 150°C)	
Max. Overpull to Re-run	340,000 lb (154,221 kg)	570,000 lb (258,548 kg)
Overpull to Failure	745,000 lb (337,926 kg)	1,250,000 lb (566,990 kg)
Max. Operating Torque	26,500 ft*lb (35,929 N*m)	90,000 ft*lb (122,024 N*m)
Yield Torque	35,500 ft*lb (48,131 N*m)	120,000 ft*lb (162,698 N*m)
Dogleg Severity	Sliding: 18°/100 ft (18°/30 m) [†] Rotating: 13°/100 ft (13°/30 m) [†]	Sliding: 14°/100 ft (14°/30 m) Rotating: 8°/100 ft (8°/30 m)
Performance		
Power	Built-in turbine/alternator	
Max. Static WOB	52,250 lb (23,700 kg)	100,000 lb (45,359 kg)
Max. Instantaneous WOB	75,000 lb (34,020 kg)	165,000 lb (74,843 kg)
Maximum Shock Sensed	Lateral: 120 g Axial: 60 g	
Shock Resolution	0.2 g minimum	
Damping	1,000 - 6,000 lb*s/in. (18,000 - 107,000 kg*s/m)	
Dynamic Stiffness	15,000 - 150,000 lb/in. (2,680 - 26,800 kg/cm)	

[†] Based on 7.00 in. tool

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Specifications subject to change without notice.

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