



Data Sheet

AO 1.9.7

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Product name

DONAX ZB

Category

Automotive Fluids

Description

DONAX ZB is a high performance brake and clutch fluid with a minimum boiling point of 260°C [500°F], meeting or exceeding SAE J1704 and FMVSS Nr.116 DOT 5.1 specifications and ISO 4925 Class 5-1 specifications..

The brake fluid forms an essential component in the braking system of a car. In service, the brake fluid absorbs moisture which causes a significant reduction in the boiling point of the brake fluid, with a consequent risk of vapour lock. Use of brake fluids meeting DOT 4 standard limits the effect of water absorption on the brake fluid boiling point. Where the requirements for a safety margin are particularly stringent, use of a brake fluid with a higher boiling point, as required by the DOT 5.1 standard, should be considered.

DONAX ZB provides a high safety margin against vapour lock and particularly low cold-temperature viscosity. Other features are excellent corrosion protection and rubber seal compatibility.

Shell Brake Fluids are completely miscible with one another and are compatible with other approved DOT glycol ether and borate ester brake fluids. **They must not be mixed with silicone type or silicate ester type brake fluids.**

Physical properties

Property	Unit	Test method	Value
Appearance	-	Visual	Clear liquid
Colour Pt/Co	-	ASTM D1209	Typical 250
Density at 20 °C [68 °F]	g/ml	ASTM D4052	1.060-1.080
Water content	%(m/m)	ASTM D1364	max 0.20

Specifications & Typical Values

FMVSS 116 paragraph	Properties	Unit	DOT 5.1 Specification	Typical Value
5.1.1	Equilibrium Reflux Boiling Point (ERBP)	°C [°F]	260 [500] min	272 [522]
5.1.2	Wet Equilibrium Reflux Boiling Point (WERBP)	°C [°F]	180 [356] min	185 [365]
5.1.3	Kinematic viscosity At - 40 °C [-40 °F] At 100 °C [212 °F]	mm ² /s	900 max	715
		mm ² /s	1.5 min	2.1

**Specifications &
Typical Values
continued**

FMVSS 116 paragraph	Properties	Unit	DOT 5.1 Specification	Typical Value
5.1.4	pH (50% vol aqueous ethanol solution)		7.0–11.5 ¹	7.4
5.1.5	Fluid stability			
	(a) High temperature stability: ERBP change	°C [°F]	3.0 [5.4] max ^{2,3}	1 [1.8]
	(b) Chemical stability: ERBP change	°C [°F]	3.0 [5.4] max ^{2,3}	1 [1.8]
5.1.6	Corrosion, test strip weight change,			
	Tinned iron	mg/cm ²	0.2 max	0.01
	Steel	„	0.2 max	0.09
	Aluminium	„	0.1 max	<0.01
	Cast iron	„	0.2 max	0.03
	Brass	„	0.4 max	0.04
	Copper	„	0.4 max	0.02
	Pitting or etching		none	none
	Condition of fluid after test,			
	Gelling at 23 °C [73.4 °F]		none	none
	Deposit		not crystalline	none
	Sediment	%(v/v)	0.10 max	0.02
	pH		7.0–11.5	7.4
	Condition rubber cup after test			
	Disintegration		none	none
	Hardness decrease	IRHD	15 max	4
	Diameter increase	mm	1.4 max	0.06
5.1.7	Fluidity and appearance at low temperature			
	(a) At –40 °C [–40 °F]			
	Sludging, sedimentation, crystallisation or stratification		none	none
	Bubble flow time	s	10 max	2
	Appearance after warming to room temperature		as before test	pass
	(b) At – 50 °C [–58 °F]			
	Sludging, sedimentation, crystallisation or stratification		none	none
	Bubble flow time	s	35 max	4
	Appearance after warming to room temperature		as before test	pass
5.1.8	Reserved			

¹ Shell Sales Specification : 7.0-11.0

² + 0.05° for each degree that the ERBP exceeds 225°C [437 °F]

³ Shell Sales Specification : 3 °C [5.4 °F] max.

Specifications & Typical Values continued	FMVSS 116 paragraph	Properties	Unit	DOT 5.1 Specification	Typical Value
	5.1.9	Water tolerance (a) At -40 °C [-40 °F] Sludging, sedimentation, crystallisation or stratification Bubble flow time Appearance after warming to room temperature (b) At +60 °C [140 °F] Stratification Sedimentation	s	none 10 max as before test none 0.15 max ⁴	none 2 pass none <0.05
	5.1.10	Compatibility (a) At -40 °C [-40 °F] Sludging, sedimentation, crystallisation or stratification (b) At +60 °C [140 °F] Stratification Sedimentation	%(v/v)	none 0.05 max	none <0.05
	5.1.11	Resistance to oxidation Test strips Pitting or etching Gum deposit Weight change Aluminium Cast iron	mg/cm ² mg/cm ²	none trace only 0.05 max. 0.3 max	none pass 0.03 0.04
	5.1.12	Effect on SBR cups (a) 70hr at 70 °C [158 °F] Hardness decrease Appearance Base diameter increase (b) 70 hr at 120 °C [248 °F] Hardness decrease Appearance Base diameter increase	IRHD mm IRHD mm	0-10 no disintegration 0.15-1.40 0-15 no disintegration 0.15-1.40	6 none 0.38 9 none 0.60
	5.1.13	Stroking test properties		to pass	pass
Other Specifications	Specification clause	Properties	Unit	Specification	Typical Value
	SAE J1704	Effect on EPDM slab stock (a) 70 hr at 70 °C [158 °F] Hardness decrease Appearance Volume increase (b) 70 hr at 120 °C [248 °F] Hardness decrease Appearance Volume increase	IRHD % IRHD %	0-10 no disintegration 0-10 0-15 no disintegration 0-10	1 none <1 2 none 1

⁴ Shell Sales Specification: 0.05 %(v/v) max.

Safety data	Property	Unit	Test method	Typical value
	Flashpoint (PMCC)	°C [°F]	ASTM D93	129 [264]
	Auto Ignition Temperature	°C [°F]	ASTM E659	>300 [>572]
Test methods	<p>ASTM methods are published by the American Society for Testing and Materials, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, Pennsylvania, USA 19428-2959.</p> <p>SAE specifications are issued by the Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096, USA.</p> <p>The Department of Transportation Specifications DOT 3, DOT 4 and DOT 5.1 are described under the Code of Federal Regulations (United States) Motor Vehicle Safety Standard Nr. 116, Motor Vehicle Brake Fluids. Details are published in the Federal Register.</p> <p>ISO Standards are published under the supervision of the International Standards Organisation and are available from National Standards Institutes.</p> <p>SMS methods are issued by Shell International Chemicals B.V., Shell Research and Technology Centre, Amsterdam, The Netherlands, and are available through your local Shell Chemicals Company.</p> <p>The test methods mentioned above are not necessarily those used for quality control analysis, but such methods have been validated against them.</p>			
Storage and handling	<p>Care should be taken to avoid moisture pick up.</p> <p>Further advice on storage and handling may be obtained from your local Shell company. DONAX ZB is available from Shell in bulk and drums; details available on request.</p>			
Hazard Information	<p>Before handling the product please read the Safety Data Sheet of DONAX ZB carefully and follow the advice given.</p>			
Product Code	<p>U6120</p>			
	<p>DONAX is a Shell trade mark.</p> <p>The expression 'Shell Chemicals' refers to the companies of the Royal Dutch / Shell Group which are engaged in chemical businesses. Each of the companies which make up the Royal Dutch / Shell Group of companies is an independent entity and has its own separate identity.</p> <p>The information contained in this publication is to the best of our knowledge, true and accurate, but any recommendations or suggestions which may be made are without guarantee, since the conditions of use are beyond our control.</p> <p>Furthermore, nothing contained herein shall be construed as a recommendation to use any product in conflict with existing patents covering any material or its use.</p>			
	<p>The above typical values do not constitute a specification.</p>			