

## INDUBAL SELLING SPECIFICATION

Product: Hydraulic Brake & Clutch Fluid: 210 DOT 3

Specification No: OSS 1

Issue No: 4

Date: August 2014

The product shall fully meet the requirements of the latest issue of the US FMVSS 116 DOT 3, SAE J 1703 and ISO 4925 (Class 3) Specifications. The product shall also meet the following requirements:

Test	Units	Method	Specification
Equilibrium Reflux Boiling Point	°C.	FMVSS 116	210 Min.
Wet Equilibrium Boiling Point	°C.	FMVSS 116	140 Min.
Kinematic Viscosity at -40 °C.	cSt	ASTM D 445	1500 Max.

Orthene Brake Fluids also conform to many other international and manufacturers' standards. Details are available on request.



Test Required	Typical Results	Specification
Dry Equilibrium Reflux Boiling Point, °C	229	210 °C. Min.
Wet Equilibrium Reflux Boiling Point, °C	149	140 °C. Min.
Kinematic Viscosity @ -40 °C, cSt	1207	1500 cSt Max.
@ 100 °C, cSt	1.95	1.5 cSt Min.
pH	8.60	7 – 11.5
High Temperature Stability, °C	Nil	+/- 3.0 °C. Max
Chemical Stability, °C	+1	+/- 3.0 °C. Max
Evaporation, %w/w	70	80% Max
Fluidity & Appearance @ -40 °C	Pass, 2 seconds	No freezing, Bubble time 10 sec. Max
@ -50 °C	Pass, 4 seconds	No freezing, Bubble time 35 sec. Max
Water Tolerance @ -40 °C	Clear, 2 seconds	10 seconds Max
@ +60 °C	Clear, No sediment	Sediment not to exceed 0.05% v/v
Compatibility @ -40 °C	Clear, No stratification	No stratification
@ +60 °C	Clear, No sediment	Sediment not to exceed 0.05% v/v
Colour, visual	Straw	Water white to amber
Water Content, %	< 0.20	Not required
Density @ 20 °C, g/ml	1.03	Not required

### Corrosion Resistance

Tinned Iron	$\Delta$ mg/cm <sup>2</sup>	-0.02	0.2 Max
	Appearance	Good	No pitting or etching
Steel	$\Delta$ mg/cm <sup>2</sup>	+0.02	0.2 Max
	Appearance	Good	No pitting or etching
Aluminium	$\Delta$ mg/cm <sup>2</sup>	-0.01	0.1 Max
	Appearance	Good	No pitting or etching
Cast Iron	$\Delta$ mg/cm <sup>2</sup>	+0.02	0.2 Max
	Appearance	Good	No pitting or etching
Brass	$\Delta$ mg/cm <sup>2</sup>	-0.02	0.4 Max
	Appearance	Good	No pitting or etching
Copper	$\Delta$ mg/cm <sup>2</sup>	-0.04	0.4 Max
	Appearance	Good	No pitting or etching
Zinc	$\Delta$ mg/cm <sup>2</sup>	+0.01	0.4 Max
	Appearance	Good	No pitting or etching
Fluid Appearance		Pass	No crystallisation or gelling
Sediment %		< 0.05	< 0.1%
pH		8.47	7 – 11.5
Rubber Diameter Change mm		+0.19	+1.40 Max
Hardness Change °IRHD		-1	-15 °IRHD Max
Appearance		Pass	No sloughing, blistering or disintegration

### Oxidation Resistance

Cast Iron	$\Delta$ mg/cm <sup>2</sup>	+0.02	0.3 Max
	Appearance	Pass	No pitting or roughening
Aluminium	$\Delta$ mg/cm <sup>2</sup>	+0.01	0.05 Max
	Appearance	Pass	No pitting or roughening



## Effect on Rubber

SBR @ 70 °C	∅ change, mm	+0.50	0.15 to 1.40
	Δ hardness, IRHD	-3	0 to -10
	Δ volume, %	+5.04	1 to 16
	Appearance	Good	No blistering, sloughing or disintegration
SBR @ 120 °C	∅ change, mm	+0.65	0.15 to 1.40
	Δ hardness, IRHD	-5	0 to -15
	Δ volume, %	+7.47	1 to 16
	Appearance	Good	No blistering, sloughing or disintegration
EPDM @ 70 °C (as required by SAE J1703)	Δ hardness, IRHD	-1	0 to -10
	Δ volume, %	+1.30	0 to 10
	Appearance	Good	No blistering, sloughing or disintegration
EPDM @ 120 °C	Δ hardness, IRHD	-3	0 to -15
	Δ volume, %	+2.76	0 to 10
	Appearance	Good	No blistering, sloughing or disintegration
Natural @ 70 °C (as required by ISO 4925)	∅ change, mm	+0.33	0.15 to 1.40
	Δ hardness, IRHD	-3	0 to -10
	Δ volume, %	+3.91	1 to 16
	Appearance	Good	No blistering, sloughing or disintegration

