AMENDMENT NO. 1 MARCH 2010
TO
IS 2796 : 2008 MOTOR GASOLINE — SPECIFICATION

ANNEX F

(*Foreword*)

EURO IV/BHARAT STAGE IV EMMISSION NORMS COMPLIANT — SPECIFICATIONS FOR MOTOR GASOLINE (REQUIREMENTS)

Sl No.	*Characteristics*	*Requirements*		*Method of Test Ref to [P:] of IS 1448/ Annex of IS 2796/ISO/ Alternate Methods*
(1)	(2)	(3)	(4)	(5)
i)	Grade	MG 91	MG 95	
ii)	Colour, visual	As decided by Refiners/Marketers		—
iii)	Density @ 15°C, kg/m^3	720-775	720-775	[P : 16][1)]/ISO 3675/ASTM D 4052
iv)	Distillation:			[P : 18][1)]/ISO 3405/ASTM D 86
	a) Recovery up to 70°C (E-70), percent by volume	10-45	10-45	—
	b) Recovery up to 100°C (E-100), percent by volume	40-70	40-70	—
	c) Recovery up to 150°C (E-150), percent by volume, *Min*	75	75	—
	d) Final boiling point, °C, *Max*	210	210	—
	e) Residue, percent by volume, *Max*	2	2	—
v)	Research Octane Number (RON), *Min*	91	95	[P : 27]/ISO 5164/ASTM D 2699
vi)	Motor Octane Number (MON), *Min*	81	85	[P : 26]/ISO 5163/ASTM D 2700
vii)	Existent gum, g/m^3, *Max*	40	40	[P : 29]/ISO 6246/ASTM D 381
viii)	Sulphur, total, mg/kg, *Max*	50	50	[P : 34][1)]/[P : 83]/ISO 4260/ISO 14596/ISO 20847/ASTM D 1266/ D 2622/D 3120/D 5453
ix)	Lead content (as Pb), g/1, *Max*	0.005	0.005	[P : 80][1)]/IP 224/IP 352/ASTM D 5059
x)	Reid vapour pressure (RVP) at 38°C, kPa, *Max* (*see* Note 1)	60 (67)	60 (67)	[P : 39][1)] /ISO 3007/ASTM D 323 (Wet method)/D 5191(Dry method)/ EN 13016/Annex A (Dry method) (*see* Note 2)
xi)	Vapour Lock Index (VLI), (VLI = 10 RVP + 7E 70), *Max* (*see* Notes 1& 2):			
	a) Summer (*see* Note 3)	750 (900)	750 (900)	—
	b) Other Months	950 (1 050)	950 (1 050)	—
xii)	Benzene content, percent by volume, *Max*	1	1	ASTM D 3606 (*see* Note 4)/ ASTM D 5580/D 6277/D 6730
xiii)	Copper Strip Corrosion (for 3 h @ 50°C), *Max*	Not more than 1	Not more than 1	[P : 15]/ISO 2160/ASTM D 130
xiv)	Water tolerance of gasoline-alcohol blends, temperature for phase			Annex B

separation, °C, *Max*:			
a) Summer		10	10
b) Winter (*see* Note 5)		0	0

Sl No.	*Characteristics*	*Requirements*		*Method of Test Ref to [P:] of IS 1448/ Annex of IS 2796/ISO/ Alternate Methods*
(1)	(2)	(3)	(4)	(5)
xv)	Engine intake system cleanliness (*see* Note 6)	Report-MFA Used	Report-MFA Used	—
xvi)	Olefin content, percent by volume, *Max*	21	18	[P : 23] [1)]/ISO 3837/ASTM D 1319/ D 6730
xvii)	Oxidation stability, minutes, *Min*	360	360	[P : 28]/ISO 7536/ASTM D 525/IP 40
xviii)	Aromatic content, percent by volume, *Max*	35	35	[P : 23]/ISO 3837/ASTM D 1319/ D 6730/D 5580
xix)	Oxygen content, percent by mass, *Max*	2.7	2.7	EN 1601/IP 408/ASTM D 4815
xx)	Oxygenates, percent by volume, *Max*			ASTM D 4815/Annex C
	a) Methanol	Nil	Nil	
	b) Ethanol (*see* Note 7)	5	5	Annex E
	c) Iso-Propyl alcohol	10	10	
	d) Iso-butyl alcohol	10	10	
	e) Tertiary-butyl alcohol	7	7	
	f) Ethers containing 5 or more 'C' atoms per molecule	15	15	
	g) Other Oxygenates (*see* Note 8)	8	8	

NOTES

1 Limits given in ( ) shall be applicable to 5 percent (*v/v*) ethanol-blended gasoline only. Those areas where blending of ethanol in gasoline is compulsory the dosage of ethanol shall be 4.75 ± 0.25 percent (*v/v*).

2 For the gasoline-alcohol blends, the dry vapour test method given in Annex A shall be followed.

3 Summer shall be the period from May to July.

4 It is applicable only for non-alcoholic motor gasoline.

5 In winter it is expected that temperature may be lower than 0°C in the northern hilly region and hence phase separation shall not take place till -10°C.

6 Use of multifunctional additives (MFA) is a requirement for assuring adequate fuel system and intake system cleanliness performance in engines. Refiners/Marketers of motor gasoline have to ensure the MFA[2)] has proper credentials from internationally accepted test laboratories/authorities, of having passed a minimum of one of the tests in each of the two categories of deposit control performance indicated below:

	Deposit Type	*Test No.*	*Test Equipment*	*Test Method*	*Pass Limit (Average IVD (Weight)*
a)	Intake Valve Deposit (IVD)	1	BMW IVD Test	ASTM D 5500-97	100 mg/valve, *Max*
		2	MB M102E IVD	CEC F-05-A-93	50 mg/valve, *Max*
		3	FORD 2.3 Litre IVD	ASTM D 6201	90 mg/valve, *Max*

		4	MB M111-IVD Test	CEC F-20-A-98	50 mg/valve, *Max*
					Limit (% Injector Flow Loss)
					Pass Limit (% Injector Flow Loss)
b)	Port Fuel Injector Deposit (PFI)	1	Chrysler PFI Test	ASTM D 5598-95 A	5, *Max*
		2	PFI Deposit Rig	ASTM D 6421	10 percent, *Max*

Other performance tests may be added as and when they reach qualified/standard test status.

7 Stabilizing agents may be added. For determination of ethanol content ASTM D 5599 or ASTM D 4815 shall be employed. For routine analysis, Method ASTM D 5845 (FTIR) or/and Water extraction method may be employed (*see* Annex E).

8 Acetone is not permitted except when present as a by-product of the manufacture of certain oxygenate compounds and then only up to 0.8 percent (*v/v*).

Amend No. 1 to IS 2796 : 2008

9 All the test methods referred to in this standard include a precision statement. The Interpretation of results based on test method/Precision shall be used whenever applicable. In case of dispute the procedure described in ISO 4259 shall be used.

10 Type test for Phosphorus content in Motor Gasoline shall be introduced shortly.

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1) In case of dispute, this method shall be the referee method.

2) MFAs which are certified against National Generic Certification Option as per US EPA-97 final Rule (40 CFR Part 80 Certification Standards for Deposit Control Additives) can also be used by fuel refiners/Marketers at treatment levels not less than the Lower Additives Concentration (LAC) limits, as these MFAs meet the criteria for acceptance mentioned above.

(PCD 3)