

Short Report No. 379 of the Technical Test Stand at Oppau

Test of an anti-corrosion substance for fuel tanks.

The anti-corrosion substance "KSE Leuna" was examined as follows:

1. Corrosion
2. Residue Formation
3. Influence on the properties of the fuel
4. Behaviour in the engine.

Such substances are required to prevent the corrosion of tanks and containers, especially in the presence of the so-called sump water. Additions of 0.1% are prescribed.

1. Corrosion

The substance was examined in 0.1% solution of B.4 mixed with 10% water. The metal strips had dimensions 50 x 10 mm, the experimental temperature was 25°C, the strips were completely covered by the water. The following metals were used: Iron, galvanized iron and aluminium together, and iron, galvanized iron, aluminium, copper, tin, brass, electron metal and lead separately.

Results in gm/m² change of weight are shown in the following table. The time of the experiments was 430 hours.

Table I
Corrosion by B.4 and B.4 plus 0.1 KSE Leuna

Metal		gm/m ² after 430 hours for untreated B.4	B.4 plus 0.1% KSE Leuna
together	Fe	- 11.4	- 0.25
	Fe (galvanized)	- 17.4	- 2.1
	Al	plus 13.2	- 0.3
separately	Fe	- 14	- 0.4
	Fe (galvanized)	- 27	- 1.2
	Al	- 0.4	- 0.54
	Zn	- 20	- 0.9
	Cu	- 0.2	- 1.1
	Ms	- 0.2	- 0.5
	El	plus 1.1	- 1.1
	Pb	- 15	- 4.1

KSE thus considerably lessens corrosion, especially with Fe, Galv.Fe, and Zn. For the other metals no increased protection is given; a negative result is not found anywhere except for a somewhat greater attack of Cu. After some weeks the gasoline solutions become green from dissolved copper; this is not the case with gasoline without KSE.

2. Formation of Residues

Considering the amount added (1gm/litre), one may assume that the dish residues of the gasoline will be considerably increased. The residues amount to 30-40 mg. for KSE Leuna compared with 5.0 to 6.0 for pure gasoline.

3. Effect on the Properties of the Fuel

Aviation gasoline B.4 was examined as to a change in the octane number with and without additions after storing it for two months and after artificial ageing (4-hourly treatment with oxygen at 1000°C and 7 atm. excess pressure)

Octane Number

	Fresh	Stored	After Test
B.4 without additive	90.3	89.6	88.2
B.4 plus 0.1% KSE Leuna	90.3	89.3	89.1

The decrease for pure B.4 in this case is probably due to an irregularity of the test engine which may be explained by the time interval.

4. Behaviour in the Engine

On the basis of the high dish-test it was to be assumed that greater amounts of residue would be formed in the engine. Small increases in residue formation as compared with untreated gasoline were found for small engines in the stand, motor-cycle and autocar run over about 1000 Km. This increase in residue formation is larger when the load for the small and motor-cycle engine is larger. Engine trouble occurs in no case.

Summarizing, KSE Leuna may be considered to be an effective anti-corrosion substance for fuel containers made of iron, galvanized iron and also for zinc fittings. Apart from the high dish test and the somewhat larger depositions of residue, there are no objections to using the substance in additions of 0.1%.