

APPROVED

Senior Engineer of Tunnel Yard No. 14 of  
OJSC “Kyivmetrobud”  
(signature) P.G. Dymedenko

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Seal: Ukraine, Kyiv city, Opened Joint Stock  
Company “Kyivmetrobud”, Tunnel yard No.  
14, identification code 01387426

APPROVED

JSC “Eko-Avto-Titan”  
(signature) P.I. Liubenko  
12.11.2011

Seal: Ukraine, Kyiv region, Limited Liability  
Company Scientific-Production Firm “Eko-  
Avto-Titan”, Identification code 31909330

## PROTOCOL

of tests of the fuel filter-converter (FFC) on cars and special techniques of OJSC  
“Kyivmetrobud”

Beginning of tests 16.08.2001

End of tests 06.11.2001

Kyiv

For the purpose of execution of the Order of the Supreme Council of Ukraine of 05.03.98 No. 1888/98-BP, as well as the Orders of the Cabinet of Ministers of Ukraine of 06.04.98 No. 456, of 17.09.96 No. 1139 and of 21.08.2000 No. 1291, the Law of Ukraine “About making changes to certain legislative acts of Ukraine concerning regulation of car market in Ukraine” of 7.12.2000 No. 2134-III (the final provision, paragraph 3) OJSC “Kyivmetrobud” accepted for examination the proposal of JSC “Eko-Avto-Titan” (Ukrainian Ecological Academy of Sciences) (the letter No. 97/04-05 of 15.08.2001) about the implementation on all internal combustion engines of the fuel filters-converters FFC, about which certifies the Letter from OJSC “Kyivmetrobud” No. 772 of 15.08.2001.

### 1. Principles of act of FFC:

Fuel, passing through the FFC, is saturated with surface-active substances, which are placed in granules, undergoes catalytic influence, weakening intermolecular bonds of fuel, and after the homogenizer acquires a one-time, saturated structure.

The indicated changes in the physical-chemical composition give:

- decrease of toxicity of exhaust gases - not less than 30%;
- decrease of specific fuel consumption - to less than 5%;
- increase of compression in engine cylinders – the renewal to passport data of the engine;

These indices are given in TY.Y 24587493.001-99.

The novelty of this device is that the use of FFC gives the obtainment of these indices without changing the engine design.

### 2. Purpose of tests:

Check of FFC for the compliance with TY.Y 24587493.001-99.

- decrease of toxicity of exhaust gases.

### 3. Methods of tests:

- tests of FFC are executed according to the annex to TY.Y 24587493.001-99 the instruction K62.955.001 III.

### 4. Composition of the commission:

- Deputy-Chief on labour protection of the Tunnel Yard No. 14 of “Kyivmetrobud” – Savchuk V.F.
- Chief of the sector No. 1 of the Tunnel Yard No. 14 of “Kyivmetrobud” – Naumenko V.P.
- Mechanic of the section No. 1 – Yovenko K.M.

- Technical Director of JSC “Eko-Avto-Titan” – Kravchenko Iu.A.
- Commercial Director of JSC “Eko-Avto-Titan” – Kozub A.A.

### 5. Techniques involved in testing FFC:

- concrete mixer with diesel D-144;
- car ЗІІ-130 (gasoline engine).

The technique works in the underground tunnel, which is under construction - the station Svyatoshyyno – the station Paladina.

### 6. Results of tests:

- indices of toxicity CO, CH% and opacity:

	CO xx	CO 2000 r/min.	CH xx	CH 2000 r/min.	Opacity
ЗІІ-130 before installation of FFC	4,8	5,3	1400	1150	
ЗІІ-130 after installation of FFC	1,6	1,9	340	210	
Concrete mixer before installation of FFC					78,4
Concrete mixer after installation of FFC					27,1

### 7. Conclusions:

#### a) ЗІІ-130

CO at idling - the decrease in 3.0 times  
 CO at 2000 rpm - the decrease in 2.8 times  
 CH at idling - the decrease in 4.1 times  
 CH at 2000 rpm - the decrease in 5.4 times

#### b) Concrete mixer

Opacity at maximal rotations – the decrease in 2.9 times

### 8. Completion

FFC meets TY.Y 24587493.001-99

### Signatures

Deputy-Chief on labour protection of the Tunnel Yard No. 14 of “Kyivmetrobud” (signature) Savchuk V.F.

Technical Director of JSC “Eko-Avto-Titan” (signature) Kravchenko Iu.A.

Chief of the sector No. 1 of the Tunnel Yard No. 14 of “Kyivmetrobud” (signature) Naumenko V.P.

Commercial Director of JSC “Eko-Avto-Titan” (signature) Kozub A.A.

Mechanic of the section No. 1 of the Tunnel Yard No. 14 (signature) Yovenko K.M.