

Table 1-1 Analysis of the properties of the fuels used in the tests

Fuel properties			
Property	Units	Biodiesel fuel	Diesel fuel
Density at 15°C	g/cm ³	0.882	0.8285
Flashpoint (COC)	°C	192	106
Kinetic viscosity at 30°C	mm ² /s	5.381	3.869
Kinetic viscosity at 40°C	mm ² /s	4.302	—
Acid number	mg · KOH/g	0.12	0.05
Water content (KF)	Mass %	0.01	0.01
Pour point	°C	-12.5	-15
Cold filter plugging point	°C	-12	-8
Cetane index (JIS K2280)		—	59.5
Distillation			
10% v/v	°C	—	214.5
50% v/v	°C	—	287
90% v/v	°C	—	336.5
10% distilled carbon content	Mass %	—	0.01
Ash content	Mass %	0	0
Lubricity test (HFRR)	μ m	—	402
Elemental analysis			
K	Mass ppm	< 100	—
Na	Mass ppm	< 5	—
P	Mass ppm	< 10	—
Sulfur content	Mass ppm	< 10	7
C (Carbon)	Mass %	78.3	86.1
H (Hydrogen)	Mass %	12.3	13.8
O (Oxygen)	Mass %	8.8	—
Nitrogen content	Mass %	< 0.001	< 0.001

Peroxide number of fuels				
Peroxide number (mg/kg)	Biodiesel fuel		Diesel fuel	
	Before degradation	After degradation	Before degradation	After degradation
		57	32	0

Quantitative determination of methanol and glycerides	
	Biodiesel fuel
Methanol (ppm)	102.6
Free glycerin (ppm)	32.5
Monoglycerides (ppm)	515
Diglycerides (ppm)	100
Triglycerides (ppm)	ND

Table 1-2 Specs of diesel trucks used in biodiesel fuel tests

Designation	Category	Type of vehicle	Model year	Applicable regulations	Level	Combustion type	Engine capacity (liters)	Principal exhaust gas cleaning technology	Supercharger	Unladen weight	Transmission
Vehicle A	Diesel vehicle	Medium-weight truck	1998	1998	Compliant with long-term regulations	Diesel	4021	Distributor fuel injector pump, EGR	No	2325	Manual
Vehicle B	Diesel vehicle	Medium-weight truck	2003	2003	Compliant with new short-term regulations	Diesel	4777	Common rail, oxidation catalyst, EGR	No	2320	Manual
Vehicle C	Diesel vehicle	Medium-weight truck	2003	2003	Compliant with new short-term regulations	Diesel	4009	Common rail, continuous regeneration DPF, EGR	Yes	2150	Manual

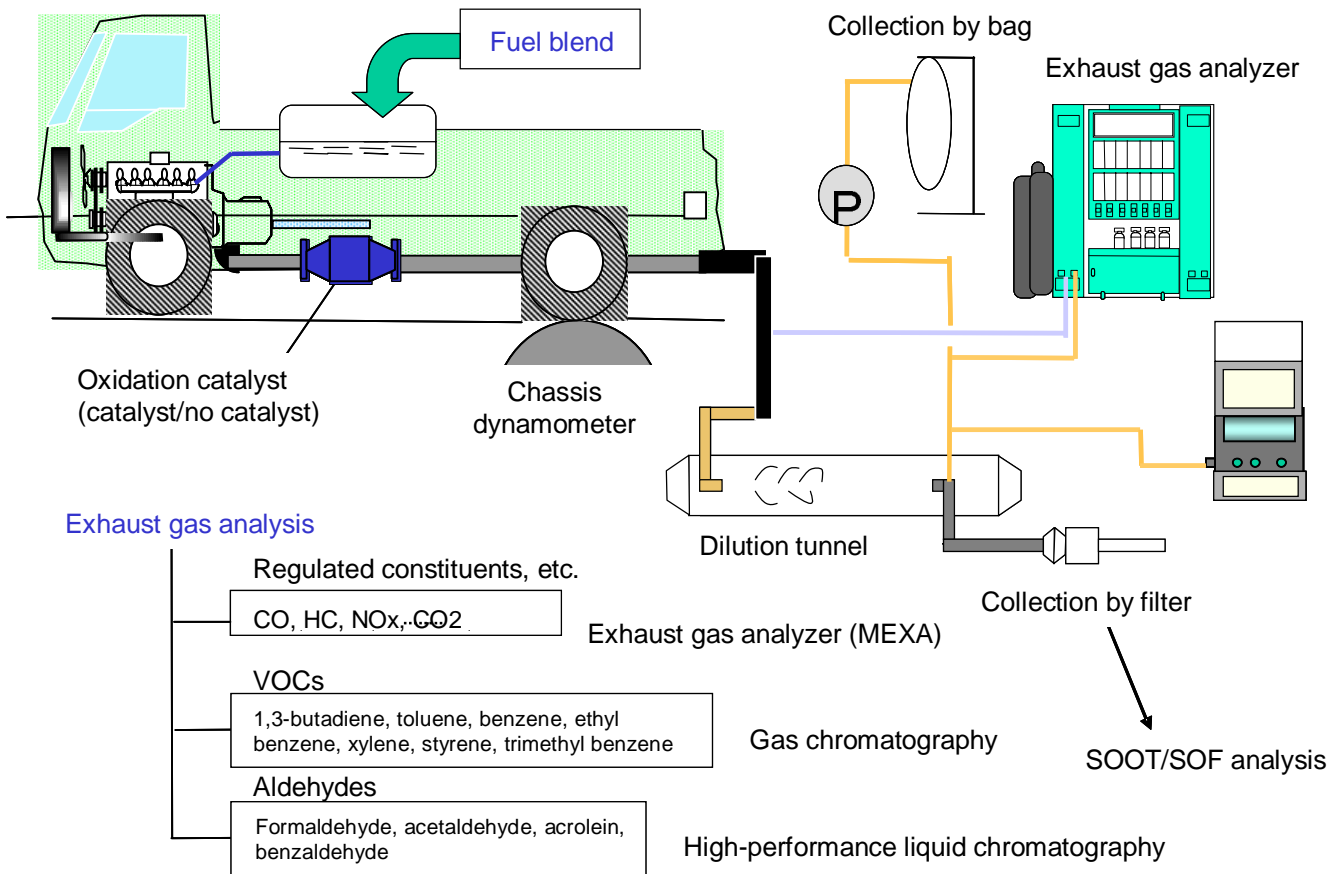


Figure 1-1 Configuration of test system



Figure 1-2 Vehicle A chassis dynamometer testing



Figure 1-3 Driving Vehicle A

Figure 1-4
Vehicle A steady state testing
(jig fixing accelerator pedal)





Figure 1-5 Vehicle B chassis dynamometer testing (from front)



Figure 1-6 Vehicle B testing (from rear)



Figure 1-7 Catalyst fitted as standard on Vehicle B

(weak-oxidation catalyst)



Figure 1-8 Replacing catalyst on Vehicle B



Figure 1-9 Replacement catalysts used on Vehicle B

(left: strong-oxidation catalyst, right: dummy catalyst)



Figure 1-10 Container for catalyst replacement tests on Vehicle B



Figure 1-11

Fitting a replacement catalyst into the container

Figure 1-12

Container with strong-oxidation catalyst installed under Vehicle B





Figure 1-13 Vehicle C chassis dynamometer testing (from front)



Figure 1-14 Vehicle C testing (from rear)



Figure 1-15

Vehicle C aftertreatment device and tank for supplying test fuels

Table 1-3 Specs of chassis dynamometer facilities used in testing

(1) Vehicles	
Type of vehicle	FF, FR type cars and trucks (fixed inertia + electrical inertia)
Vehicle mass	Max: 5,560 kg (using flywheel)
Vehicle lifting mechanism	Hydraulic (Max: 3 tons)
Vehicle securing mechanism	2,000 to 3,800 mm
Speed range	0 to 150 km/h
(2) Rollers	
Diameter	1,519 mm
Width	600 mm
Distance between roller centers	1,350 mm
Material	Aluminium
(3) Step-up drive	Hy-Vo chain, step-up ratio: 1:3
(4) Power absorption	
Model	DC dynamometer
Oscillation	Hydraulic support
Continuous rating	150 kW (absorption), 110 kW (drive)
Braking force measurement	Load cell: 0±10.9 kN
Drive force measurement	Load cell + inertial force: 0 to ±29.4 kN
(5) Flywheel	
Inertia setting range	900 to 5,560 kg in 50 kg steps



Figure 1-16 Chassis dynamometer control unit