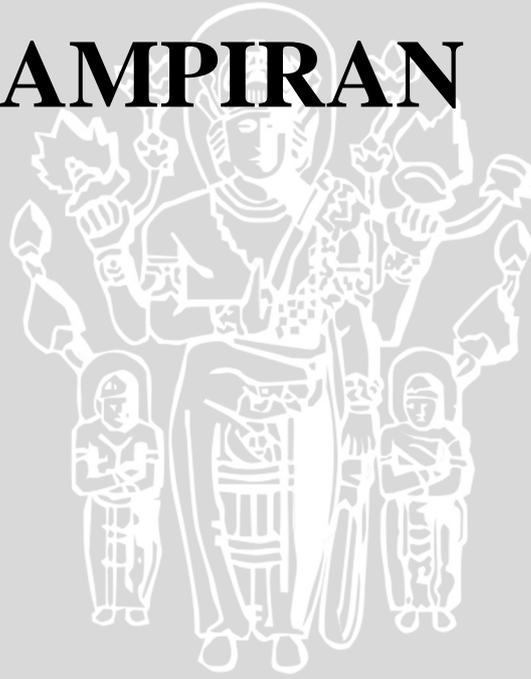


UNIVERSITAS BRAWIJAYA

LAMPIRAN



Lampiran 1. Data Gas Buang
Data Gas Buang Tanpa Perlakuan.
5500 rpm

EXHAUST GAS ANALYSIS

Serial no. 09299

DTC
 TYPE STARGAS 898
 DIML CLASS 0
 REPORT N
 545701ML/047PM
 1070772004

R P M	0	[1/min]
C O	1.800	[% vol]
C O 2	3.24	[% vol]
H C	143	[ppm vol]
O 2	14.08	[% vol]
N O	----	[ppm vol]
CO cor.	----	[% vol]
λ	2.699	[-]
TEMP.	---	[°C]

ENVIRONMENT CONDITIONS

Temperature 31 [°C]
 Pressure 945 [hPa]
 Rel. Humidity 60 [%RH]
 DATE: 03/11/2011
 TIME: 15:18

CAR DATA

FUEL: GASOLINE
 BRAND:
 MODEL:
 LIC. PLATE:
 CHASSIS:
 Km:

WORKSHOP

BRAWIJAYAUNIVERSITY
 TEKNIK MESIN
 JL. MT HARYONO 167
 MALANG

5700 rpm

EXHAUST GAS ANALYSIS

Serial no. 09299

DTC
 TYPE STARGAS 898
 DIML CLASS 0
 REPORT N
 545701ML/047PM
 1070772004

R P M	0	[1/min]
C O	1.984	[% vol]
C O 2	4.17	[% vol]
H C	156	[ppm vol]
O 2	12.99	[% vol]
N O	----	[ppm vol]
CO cor.	----	[% vol]
λ	2.728	[-]
TEMP.	---	[°C]

ENVIRONMENT CONDITIONS

Temperature 32 [°C]
 Pressure 948 [hPa]
 Rel. Humidity 55 [%RH]
 DATE: 20/10/2011
 TIME: 12:32

CAR DATA

FUEL: GASOLINE
 BRAND:
 MODEL:
 LIC. PLATE:
 CHASSIS:
 Km:

WORKSHOP

BRAWIJAYAUNIVERSITY
 TEKNIK MESIN
 JL. MT HARYONO 167
 MALANG

5900 rpm

EXHAUST GAS ANALYSIS

Serial no. 09299

DTC
 TYPE STARGAS 898
 DIML CLASS 0
 REPORT N
 545701ML/047PM
 1070772004

R P M	0	[1/min]
C O	2.448	[% vol]
C O 2	4.44	[% vol]
H C	165	[ppm vol]
O 2	15.11	[% vol]
N O	----	[ppm vol]
CO cor.	----	[% vol]
λ	2.301	[-]
TEMP.	---	[°C]

ENVIRONMENT CONDITIONS

Temperature 31 [°C]
 Pressure 945 [hPa]
 Rel. Humidity 59 [%RH]
 DATE: 03/11/2011
 TIME: 15:08

CAR DATA

FUEL: GASOLINE
 BRAND:
 MODEL:
 LIC. PLATE:
 CHASSIS:
 Km:

WORKSHOP

BRAWIJAYAUNIVERSITY
 TEKNIK MESIN
 JL. MT HARYONO 167
 MALANG



6100 rpm

```

    31
    EXHAUST
    Serial 09299
    TYPE STARGAS 898
    OIL CLASS 0
    REPORT N.
    545/OIL/04/RM
    10/07/2004

    R P M 0 [1/min]
    CO 2.05 [% vol]
    CO 2 4.6 [% vol]
    HC 138 [ppm vol]
    O 2 18.13 [% vol]
    NO --- [ppm vol]
    CO cor --- [% vol]
    X 2.047 [-]
    TEMP. --- [°C]

    ENVIRONMENT CONDITIONS
    Temperature 32 [°C]
    Pressure 946 [hPa]
    Rel. Humidity 59 [%HR]
    DATE: 03/11/2011
    TIME : 15:23

    CAR DATA
    FUEL: GASOLINE
    BRAND:
    MODEL:
    LIC.PLATE:
    CHASSIS:
    Km:

    WORKSHOP
    BRAWIJAYAUNIVERSITY
    TEKNIK MESIN
    JL. MT HARYONO 167
    MALANG
  
```

6300 rpm

```

    Serial nr. 09299
    OTC
    TYPE STARGAS 898
    OIL CLASS 0
    REPORT N.
    545/OIL/04/RM
    10/07/2004

    R P M 0 [1/min]
    CO 3.324 [% vol]
    CO 2 4.16 [% vol]
    HC 200 [ppm vol]
    O 2 11.51 [% vol]
    NO ---- [ppm vol]
    CO cor --- [% vol]
    X 1.807 [-]
    TEMP. --- [°C]

    ENVIRONMENT CONDITIONS
    Temperature 32 [°C]
    Pressure 946 [hPa]
    Rel. Humidity 59 [%HR]
    DATE: 03/11/2011
    TIME : 16:04

    CAR DATA
    FUEL: GASOLINE
    BRAND:
    MODEL:
    LIC.PLATE:
    CHASSIS:
    Km:

    WORKSHOP
    BRAWIJAYAUNIVERSITY
    TEKNIK MESIN
    JL. MT HARYONO 167
    MALANG
  
```

6500 rpm

```

    Serial nr. 09299
    OTC
    TYPE STARGAS 898
    OIL CLASS 0
    REPORT N.
    545/OIL/04/RM
    10/07/2004

    R P M 0 [1/min]
    CO 3.733 [% vol]
    CO 2 5.65 [% vol]
    HC 226 [ppm vol]
    O 2 8.94 [% vol]
    NO ---- [ppm vol]
    CO cor --- [% vol]
    X 1.440 [-]
    TEMP. --- [°C]

    ENVIRONMENT CONDITIONS
    Temperature 29 [°C]
    Pressure 949 [hPa]
    Rel. Humidity 60 [%HR]
    DATE: 20/10/2011
    TIME : 11:01

    CAR DATA
    FUEL: GASOLINE
    BRAND:
    MODEL:
    LIC.PLATE:
    CHASSIS:
    Km:

    WORKSHOP
    BRAWIJAYAUNIVERSITY
    TEKNIK MESIN
    JL. MT HARYONO 167
    MALANG
  
```



Data Gas Buang dengan Pemasangan *Convergent Grid* Posisi Belakang

5500 rpm

5700 rpm

5900 rpm

EXHAUST GAS ANALYSIS

Serial nr. 09299

OTC
TYPE STARGAS 898
DIML CLASS 0
REPORT N.
545/DIML/04/RM
10/07/2004

R P M 0 [1/min]
C O 0.688 [% vol]
C O 2 9.97 [% vol]
H C 115 [ppm vol]
O 2 11.87 [% vol]
N O ---- [ppm vol]
CO cor ---- [% vol]
λ 2.158 [-]
TEMP. --- [°C]

ENVIRONMENT CONDITIONS

Temperature 26 [°C]
Pressure 948 [hPa]
Rel. Humidity 65 [%RH]
DATE: 18/10/2011
TIME : 15:51

CAR DATA

FUEL: GASOLINE
BRAND:
MODEL:
LIC. PLATE:
CHASSIS:
Km:

WORKSHOP

BRAWIJAYAUNIVERSITY
TEKNIK MESIN
JL. MT HARYONO 167
MALANG

EXHAUST GAS ANALYSIS

Serial nr. 09299

OTC
TYPE STARGAS 898
DIML CLASS 0
REPORT N.
545/DIML/04/RM
10/07/2004

R P M 0 [1/min]
C O 1.946 [% vol]
C O 2 4.20 [% vol]
H C 132 [ppm vol]
O 2 13.95 [% vol]
N O ---- [ppm vol]
CO cor ---- [% vol]
λ 2.379 [-]
TEMP. --- [°C]

ENVIRONMENT CONDITIONS

Temperature 32 [°C]
Pressure 946 [hPa]
Rel. Humidity 60 [%RH]
DATE: 03/11/2011
TIME : 15:57

CAR DATA

FUEL: GASOLINE
BRAND:
MODEL:
LIC. PLATE:
CHASSIS:
Km:

WORKSHOP

BRAWIJAYAUNIVERSITY
TEKNIK MESIN
JL. MT HARYONO 167
MALANG

EXHAUST GAS ANALYSIS

Serial nr. 09299

OTC
TYPE STARGAS 898
DIML CLASS 0
REPORT N.
545/DIML/04/RM
10/07/2004

R P M 0 [1/min]
C O 2.252 [% vol]
C O 2 4.13 [% vol]
H C 151 [ppm vol]
O 2 14.04 [% vol]
N O ---- [ppm vol]
CO cor ---- [% vol]
λ 2.307 [-]
TEMP. --- [°C]

ENVIRONMENT CONDITIONS

Temperature 32 [°C]
Pressure 945 [hPa]
Rel. Humidity 59 [%RH]
DATE: 03/11/2011
TIME : 15:26

CAR DATA

FUEL: GASOLINE
BRAND:
MODEL:
LIC. PLATE:
CHASSIS:
Km:

WORKSHOP

BRAWIJAYAUNIVERSITY
TEKNIK MESIN
JL. MT HARYONO 167
MALANG



6100 rpm

EXHAUST GAS ANALYSIS

Serial nr. 09299

OTC
TYPE STARGAS 898
OIML CLASS 0
REPORT N.
545/OIML/04/RM
10/07/2004

R P M 0 [1/min]
C O 2.519 [% vol]
C O 2 4.92 [% vol]
H C 176 [ppm vol]
O 2 11.74 [% vol]
N O ---- [ppm vol]
CO cor - ---- [% vol]
λ 1.895 [-]
TEMP. --- [°C]

ENVIRONMENT CONDITIONS

Temperature 30 [°C]
Pressure 948 [hPa]
Rel. Humidity 59 [%RH]
DATE: 20/10/2011
TIME : 11:27

CAR DATA

FUEL: GASOLINE
BRAND:
MODEL:
LIC. PLATE:
CHASSIS:
Km:

WORKSHOP

BRAWIJAYAUNIVERSITY
TEKNIK MESIN
JL. MT HARYONO 167
MALANG

6300 rpm

24

EXHAUST GAS ANALYSIS

Serial nr. 09299

OTC
TYPE STARGAS 898
OIML CLASS 0
REPORT N.
545/OIML/04/RM
10/07/2004

R P M 0 [1/min]
C O 2.980 [% vol]
C O 2 5.23 [% vol]
H C 200 [ppm vol]
O 2 11.41 [% vol]
N O ---- [ppm vol]
CO cor - ---- [% vol]
λ 1.73 [-]
TEMP. --- [°C]

ENVIRONMENT CONDITIONS

Temperature 32 [°C]
Pressure 945 [hPa]
Rel. Humidity 50 [%RH]
DATE: 03/11/2011
TIME : 15:21

CAR DATA

FUEL: GASOLINE
BRAND:
MODEL:
LIC. PLATE:
CHASSIS:
Km:

WORKSHOP

BRAWIJAYAUNIVERSITY
TEKNIK MESIN
JL. MT HARYONO 167
MALANG

6500 rpm

EXHAUST GAS ANALYSIS

Serial nr. 09299

OTC
TYPE STARGAS 898
OIML CLASS 0
REPORT N.
545/OIML/04/RM
10/07/2004

R P M 0 [1/min]
C O 3.459 [% vol]
C O 2 5.40 [% vol]
H C 223 [ppm vol]
O 2 10.46 [% vol]
N O ---- [ppm vol]
CO cor - ---- [% vol]
λ 1.649 [-]
TEMP. --- [°C]

ENVIRONMENT CONDITIONS

Temperature 31 [°C]
Pressure 945 [hPa]
Rel. Humidity 59 [%RH]
DATE: 03/11/2011
TIME : 15:13

CAR DATA

FUEL: GASOLINE
BRAND:
MODEL:
LIC. PLATE:
CHASSIS:
Km:

WORKSHOP

BRAWIJAYAUNIVERSITY
TEKNIK MESIN
JL. MT HARYONO 167
MALANG



Data Gas Buang dengan Pemasangan Convergent Grid Posisi Depan

5500 rpm

5700 rpm

5900 rpm

```

EXHAUST GAS ANALYSIS
Serial no. 09299
OTC
TYPE STARGAS 898
OJAL CLASS A
REPORT N
5457010L/047PM
10/07/2004

R P M 0 [1/min]
C O 0.204 [% vol]
C O 2 6.00 [% vol]
H C 111 [ppm vol]
O 2 11.47 [% vol]
CO cor 0.493 [% vol]
x 2.232 [-]
TEMP. --- [°C]

ENVIRONMENT CONDITIONS
Temperature 32 [°C]
Pressure 947 [hPa]
Rel. Humidity 54 [%RH]
DATE: 20/10/2011
TIME : 12:38

CAR DATA
FUEL: GASOLINE
BRAND:
MODEL:
LIC. PLATE:
CHASSIS:
Km:

WORKSHOP
BRAWIJAYAUNIVERSITY
TEKNIK MESIN
JL. MT HARYONO 167
MALANG
    
```

```

EXHAUST GAS ANALYSIS
Serial no. 09299
OTC
TYPE STARGAS 898
OJAL CLASS A
REPORT N
5457010L/047PM
10/07/2004

R P M 0 [1/min]
C O 0.505 [% vol]
C O 2 5.56 [% vol]
H C 113 [ppm vol]
O 2 11.92 [% vol]
N O ---- [ppm vol]
CO cor ---- [% vol]
x 2.288 [-]
TEMP. --- [°C]

ENVIRONMENT CONDITIONS
Temperature 32 [°C]
Pressure 946 [hPa]
Rel. Humidity 59 [%RH]
DATE: 03/11/2011
TIME : 16:20

CAR DATA
FUEL: GASOLINE
BRAND:
MODEL:
LIC. PLATE:
CHASSIS:
Km:

WORKSHOP
BRAWIJAYAUNIVERSITY
TEKNIK MESIN
JL. MT HARYONO 167
MALANG
    
```

```

EXHAUST GAS ANALYSIS
Serial no. 09299
OTC
TYPE STARGAS 898
OJAL CLASS A
REPORT N
5457010L/047PM
10/07/2004

R P M 0 [1/min]
C O 0.519 [% vol]
C O 2 6.15 [% vol]
H C 114 [ppm vol]
O 2 11.37 [% vol]
N O ---- [ppm vol]
CO cor 1.167 [% vol]
x 2.115 [-]
TEMP. --- [°C]

ENVIRONMENT CONDITIONS
Temperature 31 [°C]
Pressure 947 [hPa]
Rel. Humidity 59 [%RH]
DATE: 28/10/2011
TIME : 16:23

CAR DATA
FUEL: GASOLINE
BRAND:
MODEL:
LIC. PLATE:
CHASSIS:
Km: 66260

WORKSHOP
SISATAMA 400 ISBUNX3
BRAWIJAYAUNIVERSITY
TEKNIK MESIN
JL. MT HARYONO 167
MALANG
    
```



6100 rpm

EXHAUST GAS ANALYSIS

Serial nr. 09299

OTC
TYPE STARGAS 898
OIML CLASS 0
REPORT N
545/OIML/04/RM
10/07/2004

R P M 0 [1/min]
C O 1.776 [% vol]
C O 2 8.52 [% vol]
H C 140 [ppm vol]
O 2 7.74 [% vol]
N O ---- [ppm vol]
CO cor 2.587 [% vol]
λ 1.426 [-]
TEMP. --- [°C]

ENVIRONMENT CONDITIONS

Temperature 28 [°C]
Pressure 948 [hPa]
Rel. Humidity 60 [%HR]
DATE: 18/10/2011
TIME : 16:01

CAR DATA

FUEL: GASOLINE
BRAND:
MODEL:
LIC. PLATE:
CHASSIS:
Km:

WORKSHOP

BRAWIJAYAUNIVERSITY
TEKNIK MESIN
JL. MT HARYONO 167
MALANG

6300 rpm

EXHAUST GAS ANALYSIS

Serial nr. 09299

OTC
TYPE STARGAS 898
OIML CLASS 0
REPORT N
545/OIML/04/RM
10/07/2004

R P M 0 [1/min]
C O 1.540 [% vol]
C O 2 7.95 [% vol]
H C 176 [ppm vol]
O 2 8.06 [% vol]
N O ---- [ppm vol]
CO cor 2.434 [% vol]
λ 1.492 [-]
TEMP. --- [°C]

ENVIRONMENT CONDITIONS

Temperature 28 [°C]
Pressure 949 [hPa]
Rel. Humidity 64 [%HR]
DATE: 17/10/2011
TIME : 15:46

CAR DATA

FUEL: GASOLINE
BRAND:
MODEL:
LIC. PLATE:
CHASSIS:
Km:

WORKSHOP

BRAWIJAYAUNIVERSITY
TEKNIK MESIN
JL. MT HARYONO 167
MALANG

6500 rpm

EXHAUST GAS ANALYSIS

Serial nr. 09299

OTC
TYPE STARGAS 898
OIML CLASS 0
REPORT N
545/OIML/04/RM
10/07/2004

R P M 0 [1/min]
C O 2.951 [% vol]
C O 2 6.55 [% vol]
H C 197 [ppm vol]
O 2 9.81 [% vol]
N O ---- [ppm vol]
CO cor 4.658 [% vol]
λ 1.543 [-]
TEMP. --- [°C]

ENVIRONMENT CONDITIONS

Temperature 28 [°C]
Pressure 949 [hPa]
Rel. Humidity 66 [%HR]
DATE: 17/10/2011
TIME : 15:41

CAR DATA

FUEL: GASOLINE
BRAND:
MODEL:
LIC. PLATE:
CHASSIS:
Km:

WORKSHOP

BRAWIJAYAUNIVERSITY
TEKNIK MESIN
JL. HARYONO 167
MALANG



Lampiran 3. Dokumentasi Penelitian



Motor Kharisma 125cc dengan pemasangan *mixer*



Peternakan Sapi



Kolam Keluaran (slurry)



Tempat pencampuran kotoran sapi dan air



Saluran menuju *anaerob digester*



anaerob digester



Pembuatan *Convergent Grid*