E9

Comunicación relativa a (1) / *Communication concerning the* (1):

- la concesión de homologación / *approval granted*
- ~~la extensión de homologación~~ / ~~*extension of approval*~~
- ~~la denegación de homologación~~ / ~~*refusal of approval*~~
- ~~la retirada de homologación~~ / ~~*approval withdrawn*~~
- ~~el cese definitivo de homologación~~ / ~~*production definitely discontinued*~~

De un motor ~~o una familia de motores~~ de conformidad con el Reglamento Nº 120.01 / *of an engine ~~or an engine family~~ pursuant to Regulation No. 120.01*

Nº de homologación / *Approval No.* : E9*120R01/00*1041*00
Nº de extensión / *Extension No.* : 00

1. Denominación comercial o marca del motor / *Trade name or mark of the engine:* CHANGCHAI

2. Denominación dada por el fabricante al motor de referencia y (si prodcede) a los tipos de motores de la familia / *Manufacturer's designation of the parent and (if applicable) of the family engine(s) type(s):* 4G33TC-75L

3. Código del tipo de motor asignado por el fabricante marcado en el motor o motores /*Manufacturer's type coding as marked on the engine(s)*: 4G33TC-75L

3.1 Ubicación / *Location*: Ver documentación técnica / *See technical documentation*

3.2 Método de fijación /*Method of affixing*: Ver documentación técnica / *See technical documentation*

4. Nombre y dirección del fabricante / *Manufacturer's name and address*:
Changchai Co., Ltd.
123 Huaide Road (M), Changzhou, Jiangsu 213002, China

4.1. En su caso, nombre y dirección del representante legal del fabricante / *If applicable, name and address of manufacturer's representative*:
TUV-WORLD ECC CERTIFICATION SERVICE SL
PASEO DE LA CASTELLANA, NUM. 114 PLANTA 6, PUERTA 6 28046

5. Ubicación, código y método de fijación del número de identificación del motor / *Location, coding and method of affixing of the engine identification number*:
Ver documentación técnica / *See technical documentation*

6. Servicio técnico encargado de los ensayos de homologación / *Technical service responsible for conducting approval tests*: IDIADA

7. Fecha del acta de ensayos emitida por este servicio / *Date of report issued by that service:* 09/02/2021

8. Número del acta de ensayos emitida por este servicio / *Number of report issued by that service:* CN20121099

(1) Tachar lo que no proceda / *Strike out what does not apply.*

E9

9. Ubicación y método de fijación de la marca de homologación CEPE / *Location and method of affixingof the ECE approval mark:* Ver documentación técnica / *See technical documentation*

10. Motivos de la extensión de la homologación (en su caso) / *Reason(s) for extension of approval (if applicable)*: ---

11. Especificaciones principales motor de combustión interna / *Main specification of internal combustion engine*

11.1 Datos aprobados / *Approved data*

11.1.1 Potencia neta nominal / *Rated net power*: 55.2 kW a/*at* 2300 min^{-1}

11.1.2 Potencia neta máxima / *Maximum net power*: 55.2 kW a/*at* 2300 min^{-1}

11.1.3 Par neto máximo / *Maximum net torque*: 382 Nm a/*at* 1380 min^{-1}

11.2. Características esenciales del tipo de motor / ~~tipo de motor de referencia~~ / *Essential characteristics of the engine type/ ~~parent engine type~~*: 4G33TC-75L

11.2.1 Principio de funcionamiento/*Operating principle*:

11.2.1.1. ~~Encendido positivo~~ / encendido por compresión /*~~Positive-ignition~~/compression-ignition*(1)

11.2.1.2. Cuatro tiempos/d~~os tiempos~~ (1)/*Four stroke/~~two stroke~~*(1)

11.2.2. Número, disposición y orden de encendido de los cilindros / *Number , layout and firing order of cylinders*: 4, en línea y 1-3-4-2/ *4,in line and 1-3-4-2*

11.2.3. Cilindrada / *Cylinder capacity*: 3260.6 cm^3

11.2.4. Modo de alimentación / *Fuel feed:* ~~carburador~~, ~~inyección indirecta~~, inyección directa(1)/*~~carburettor~~, ~~indirect injection~~, direct injection* (1)

11.2.5. Dispositivo de sobrealimentación / *Pressure-charger device:* sí/~~*no*~~, yes/~~*no*~~(1)

11.2.6. Dispositivo de postratamiento de escape / *Exhaust after-treatment device:* sí/~~*no*~~, yes/~~*no*~~(1)

11.3. Requisitos del combustible: ~~gasolina con plomo~~/~~gasolina sin plomo~~/gasóleo/~~GN/GLP~~ (1) /
Engine fuel requirements: ~~leaded petrol / unleaded petrol~~ / diesel fuel /~~NG / LPG~~ (1)

(1) Tachar lo que no proceda / *Strike out what does not apply.*

E9

11.4. Restricción de uso / *Restriction of use:*

11.4.1. Condiciones especiales que deberán respetarse en la instalación del (los) motor (es) en la máquina /*Particular conditions to be respected in the installation of the engine(s) on the machinery.*

11.4.1.1. Depresión máxima permisible de la admisión / *Maximum allowable intake depression* : 5.0 kPa

11.4.1.2. Máxima contrapresión admisible / *Maximum allowable back-pressure* : 22.0 kPa

11.4.2. Cualquier otro (si procede) / *Any other (if applicable)* : N/A

12. Especificaciones principales delos miembros de la familia / *Specification of engine type*:

Especificación / *Specification*	Motor de referencia /*Engine type*
Código del tipo asignado por el fabricante / *Manufacturer's type coding*	4G33TC-75L
Número de cilindros / *No. of cylinders*	4
Cilindrada del motor / *Engine capacity(cm³)*	3260.6
Potencia neta nominal / *Rated net power* (kW):	55.2
Régimen nomina/ *Rated speed (min-1)*	2300
Potencianetamáxima / *Maximum net power(kW)*	55.2
Régimen de potencia neta neta máxima / *Maximum net power speed (min-1)*	2300
Par neto máximo / *Maximum net torque (Nm)*	382
Régimen del par neto máximo /*Maximum net torque speed (min-1)*	1380
Regimen de relanti bajo/ *Low idle speed (min-1)*	850±10
Restricción de uso (Si/No)(1) / *Restriction of use (Yes/No) (1)*	No

13. Homologación concedida / ~~extendida~~ / ~~denegada~~ / ~~retirada~~ (1) / *Approval granted* / ~~*extended*~~ / ~~*refused*~~ / ~~*withdrawn*~~ (1)

14. Lugar / *Place:* Madrid

15. Fecha / *Date:* Ver firma electrónica / *See digital signature*

(1) Tachar lo que no proceda / *Strike out what does not apply.*

16. Firma / *Signature*:

EL SUBDIRECTOR GENERAL DE CALIDAD Y SEGURIDAD INDUSTRIAL
Resolución P.D. del DIRECTOR GENERAL DE INDUSTRIA Y DE LA PYME de 25-10-2012

17. Los documentos entregados con la solicitud de homologación o de la extensión, pueden obtenerse a petición del interesado / *The documents filed with the request for approval or extension may be obtained on request.*
- Informe de ensayos / *Test report*
- Documentación técnica / *Technical documentation*

(1) Tachar lo que no proceda / *Strike out what does not apply.*

China Office:

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INFORME / *REPORT* Nº CN20121099

REGLAMENTO Nº 120.01/00 RELATIVO A LA MEDICION DE LA POTENCIA MAXIMA, PAR MAXIMO Y EL CONSUMO ESPECIFICO DE COMBUSTIBLE/
REGULATION No. 120.01/00 ON THE MEASUREMENT OF THE NET POWER, NET TORQUE AND SPECIFIC FUEL CONSUMPTION

Solicitante / *Applicant*	: Changchai Co., Ltd. 123 Huaide Road (M), Changzhou, Jiangsu 213002, China
Nombre comercial o marca del motor / *Trade name or mark of engine*	: CHANGCHAI
~~Tipo de motor o~~ Familia del motor/ *Engine type ~~or Engine Family~~*	: 4G33TC-75L
Cilindrada/ *Capacity*	: 3260.6 cm³
Nombre y dirección del constructor / *Manufacturer's name and address*	: Changchai Co., Ltd. 123 Huaide Road (M), Changzhou, Jiangsu 213002, China
Lugar y fecha de emisión del informe/ *Place and date of test report issue*	: L'Albornar, Santa Oliva (Tarragona) 09/02/2021

CONCLUSIONES/*CONCLUSIONS*: Los resultados obtenidos de medición de la potencia máxima, par máximo y consumo específico de combustible no difieren significativamente de los valores nominales, según las tolerancias de medidas y prescripciones generales especificadas en el Reglamento nº 120.01/00 ECE. Los valores declarados son los siguientes / *The results obtained of measurement of the maximum power; maximum torque and specific fuel consumption are not significantly different from the nominal values according to general prescriptions of the Regulation no. 120.01/00 ECE. The declared values are the next ones*:

Potencia máxima declarada/ *Maximum declared power*	:	55.2 kW a/*at* 2300 min $^{-1}$
Par máximo declarado/ *Maximum declared torque*	:	382 Nm a/*at* 1380 min^{-1}

Realizado/ *Performed by* V. Bº./ *Revised by:*

Gang Li
INGENIERO DE HOMOLOGACIONES
HOMOLOGATION ENGINEER

Josep Masip Gomez
JEFE DE DEPARTAMENTO
DEPARTMENT MANAGER

ANEXO AL INFORME / *ANNEX TO THE REPORT*

1. IDENTIFICACIÓN DEL GRUPO MOTOPROPULSOR PRESENTADO AL ENSAYO / *IDENTIFICATION OF THE DRIVETRAIN SUBMITTED FOR TEST*

1.1. Motor ensayado / *Tested engine*

Marca / *Make*	:	CHANGCHAI
Número de serie del motor/*Engine Sr. No.*	:	C51605788A
Principio de funcionamiento / *Working principle*	:	4 tiempos, encendido por compresión/ *4-stroke, Compression ignition*
Cilindrada/ *Capacity*	:	3260.6 cm^3
Diámetro/ *Bore*	:	95 mm
Carrera/ *Stroke*	:	115 mm
Nº de cilindros/ *Number of cylinders*	:	4
Disposición de los cilindros / *Cylinder layout*	:	línea / *In-line*
Sistema de refrigeración / *Cooling system*	:	Por agua / *Liquid cooled*
Cuerpo del acelerador / *Throttle body*	:	N/A
Inyector / *Injector*	:	Jun Feng Electric Control Technology (Dalian) Co., Ltd. / XCI3
Regulador / *Regulator*	:	N/A
Centralita / *ECU*	:	Jun Feng Electric Control Technology (Dalian) Co., Ltd. / ECU15
Bobina / *Ignition coil*	:	N/A
Bujías / *Spark plugs*	:	N/A
Limitador / *Limiter*	:	N/A
Sistema de carga de presión / *Pressure charging device*	:	Si ~~/No~~ / *Yes~~/No~~*

1.2. Sistema de admisión / *Intake system*

Depresión entrada aire / *Air intake depression*	:	5.0 kPa

1.3. Sistema de escape / *Exhaust system*

Contrapresión de escape / *Exhaust back pressure*	:	22.0 kPa

2. EQUIPOS DE MEDIDA, COMBUSTIBLE Y LUBRICANTE/ *TEST EQUIPMENT, FUEL AND LUBRICANT*

Banco de ensayo / *Test bench*	:	AVL/INDYS22-2
Ventilación auxiliar en banco ensayo / *Bench test auxiliary fan*	:	No
Combustible / *Fuel*	:	Diesel
Lubricante / *Lubricant*	:	Mobil 10W-40

3. RESULTADOS DEL ENSAYO DE POTENCIA NETA / *NET POWER TEST RESULTS*

Se ha realizado una curva de potencia ascendente de forma continua entre los regímenes de 1100 min^{-1} y 2400 min^{-1} de acuerdo con las velocidades mínima y máxima recomendadas por el fabricante según el punto 5.2.2. del Reglamento CEPE 120.01/00 / *An upward power curve has been carried out in a continuous sequence between 1100 min^{-1} and 2400 min^{-1} according to the maximum and minimum speeds recommended by the manufacturer following point 5.2.2. of ECE Regulation 120.01/00.*

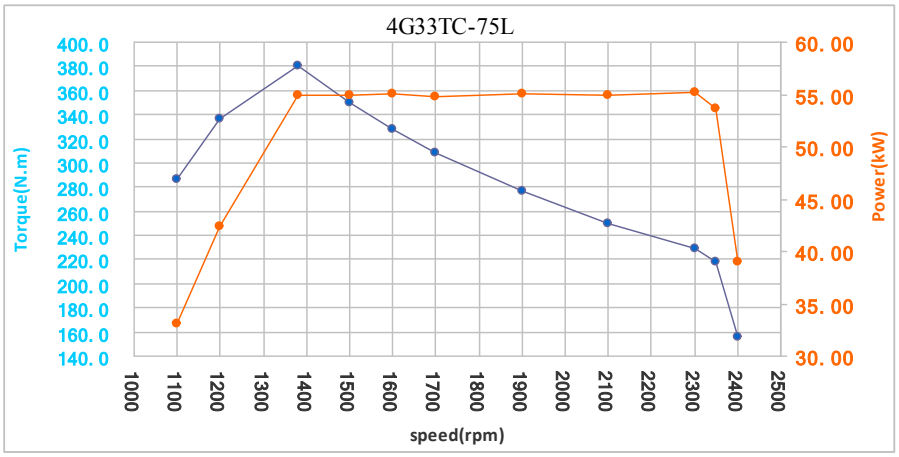
4. ESULTADOS DETALLADOS DE LAS MEDICIONES / *DETAILED RESULTS OF MEASUREMENTS*

Velocidad del motor / *Engine speed*, min^{-1}		2400	2350	2300	2100	1900	1700	1600	1500	1380	1200	1100
Par medido / *Measured torque*, Nm		156.5	219.5	230.4	250.8	277.9	310.1	330.7	351.4	382.3	339.7	288.9
Potencia medida / *Measured power*, kW		39.3	54.0	55.5	55.1	55.3	55.2	55.4	55.2	55.2	42.7	33.3
Caudal de combustible medido / *Measured fuel flow*, kg/h		9.97	12.41	12.56	12.03	11.72	11.47	11.42	11.35	11.44	8.94	6.89
Presión barométrica / *Barometric pressure*, kPa		101.1	101.1	101.1	101.1	101.1	101.1	101.1	101.1	101.1	101.1	101.1
Presión de vapor de agua / *Water vapour pressure*, kPa		1.27	1.26	1.27	1.27	1.27	1.26	1.27	1.28	1.27	1.26	1.26
Temperatura del aire de admisión / *Inlet air temperature*, K		295.0	294.3	295.4	295.8	295.8	294.8	294.8	295.4	296.1	295.5	295.0
Potencia que debe añadirse para tener en cuenta los accesorios no incluidos en el cuadro/ *Power to be added for auxiliaries in excess of Table 1, kW*	Nº 1 Nº 2 Nº 3 Total, kW	--- --- --- ---	--- --- --- ---	--- --- --- ---	--- --- --- ---	--- --- --- ---	--- --- --- ---	--- --- --- ---	--- --- --- ---	--- --- --- ---	--- --- --- ---	--- --- --- ---
Factor de corrección de la potencia / *Power correction factor*		0.9937	0.9927	0.9943	0.9949	0.9949	0.9933	0.9934	0.9944	0.9938	0.9917	0.9937
Poder corregido/ *Corrected power*, kW		39.1	53.6	55.2	54.9	55.0	54.8	55.0	54.9	54.9	42.3	33.1
Par corregido / *Corrected torque*, Nm		155.5	217.9	229.1	249.5	276.5	308.0	328.5	349.4	389.9	336.9	287.1
Consumo específico de combustible corregido / *Corrected specific fuel consumption* g/(kWh)(2)		255.2	231.3	227.6	219.2	213.1	209.1	207.4	206.8	208.3	211.2	208.3
Temperatura del líquido refrigerante en la salida / *Cooling liquid temperature at outlet*, K		353.8	354.2	354.7	353.3	353.0	352.5	352.5	352.5	352.4	352.2	351.4

Velocidad del motor / *Engine speed*, min^{-1}	2400	2350	2300	2100	1900	1700	1600	1500	1380	1200	1100
Temperatura del aceite lubricante en el punto de medición/ *Lubricating oil temperature t measuring point*, K	384.5	384.5	380.4	383.9	383.9	383.3	382.8	382.3	381.7	380.7	378.1
Temperatura del aire tras el sobrealimentador / *Air temperature after pressure-charger*, K(1)	399.2	404.3	404.8	403.5	403.6	401.2	400.5	400.0	398.6	383.3	371.6
Temperatura del combustible en la entrada de la bomba de inyección /*Fuel temperature at injection pump inlet*, K	312.1	312.7	312.6	312.6	312.8	312.5	312.4	312.4	312.3	311.9	311.6
Temperatura del aire tras el refrigerador del aire de sobrealimentación /*Air temperature after charge air cooler*, K(1)	323.0	323.1	322.6	323.0	323.0	323.1	323.1	323.0	322.5	320.7	319.3
Presión después del sobrealimentador / *Pressure after pressure-charger*, kPa	118.7	129.3	129.5	124.9	120.8	116.7	114.6	111.8	106.2	79.6	71.9
Presión tras el refrigerador del aire de sobrealimentación / *Pressure after charge air cooler*, kPa	118.3	128.8	129.1	124.5	120.3	116.3	114.1	111.0	105.6	79.6	71.0
Depresión de entrada / *Inlet depression*, kPa	4.8	4.9	4.9	4.6	4.3	4.1	4.0	3.9	3.7	3.4	3.5
Contrapresión de escape/ *Exhaust back-pressure*, kPa	20.3	22.0	21.8	18.5	16.8	14.9	13.7	12.6	11.0	8.1	7.6

Notas/ *Notes:*
(1) Tachar lo que no corresponda. / *Delete as appropriate.*
(2) Calculado con la potencia neta en el caso de motores de encendido por compresión y motores de encendido por chispa, y multiplicado, en este último caso, por el factor de corrección de la potencia. / *Calculated with the net power for compression-ignition and positive-ignition engines, in the latter case multiplied by the power correction factor*

POTENCIA Y PAR DE MOTOR/ *ENGINE POWER AND TORQUE*



5. RESULTADO FINAL / *FINAL RESULT*

Potencia neta evaluada probada / *Tested rated net power*	55.2 kW a/*at* 2300 min^{-1}
Potencia neta nominal declarada / *Declared rated net power*	55.2 kW a/*at* 2300 min^{-1}
Potencia máxima ensayada / *Maximum tested net power*	55.2 kW a/*at* 2300 min^{-1}
Potencia máxima declarada / *Maximum declared net power*	55.2 kW a/*at* 2300 min^{-1}
Par máximo ensayado / *Maximum tested torque*	379.9 Nm a/*at* 1380 min^{-1}
Par máximo declarado / *Maximum declared torque*	382.0 Nm a/*at* 1380 min^{-1}

Tolerancia / *Tolerance*: El par máximo y la potencia neta máxima del motor declarado, son inferiores a los valores especificados en el artículo 5.3. del reglamento R120.01/00 en comparación a los valores ensayados./ *The maximum torque and the maximum net power of the engine declared, differ by less than the values specified by the Article 5.3 of R120.01/00 from the tested ones.*

Lugar de ensayo / *Place of the test*: Changchai Co., Ltd. (JIANGSU, CHINA)
Fecha de ensayo / *Date of the test*: 15/09/2020

Gang Li
INGENIERO DE HOMOLOGACIONES
HOMOLOGATION ENGINEER

DOCUMENTACIÓN TÉCNICA /
TECHNICAL DOCUMENTATION

Annex 1

ESSENTIAL CHARACTERISTICS OF THE INTERNAL COMBUSTION ENGINE AND GENERAL INFORMATION CONCERNING THE CONDUCT OF TESTS

~~Parent engine~~/engine type [1/]: *4G33TC-75L*

1. General

1.1. Make (name of undertaking): *CHANGCHAI*

Trade mark:

1.2. Type and commercial description of the parent - and (if applicable) of the engine type[2/]

4G33TC-75L

1.3. Manufacturer's type coding as marked on the engine(s) [1/]: *4G33TC-75L*

1.4. Specification of machinery to be propelled by the engine [2/]: *Non-road mobile machinery*

1.5. Name and address of manufacturer: *Changchai Co., Ltd.*

123 Huaide Road (M), Changzhou, Jiangsu 213002, China

1.6. Name and address of manufacturer's authorized representative (if any):

Name: TUV-WORLD ECC CERTIFICATION SERVICE SL

Address: PASEO DE LA CASTELLANA, NUM. 114 PLANTA 6, PUERTA 6 28046

1.7. Location, coding and method of affixing of the engine identification:

Location: On the nameplate that is screwed or pasted on the cylinder cover

Method of affixing: Screw or Stickup (Paper nameplate with adhesive)

1.8. Location and method of affixing of the approval mark:

Location: On the nameplate that is screwed or pasted on the cylinder cover

Method of affixing: Screw or Stickup (Paper nameplate with adhesive)

1.9. Address (es) of assembly plant(s):

123 Huaide Road (M), Changzhou, Jiangsu 213002, China

2. Attachments

2.1. Essential characteristics of the parent engine(s) (see Appendix 1)

2.2. Essential characteristics of the engine family (see Appendix 2)

2.3. Essential characteristics of engine types within the family (see Appendix 3)

3. Characteristics of engine-related parts of the mobile machinery (if applicable)

4. Photographs of the parent engine

5. List of further attachments:

5.1. Appendix 1 / Appendix 2 / Appendix 3 [1/]

5.2. Declared power, torque and specific fuel consumption curves for engine/parent engine and engines within the family [1/]

5.3. Any further attachments, if any:

Annex 1 - Appendix 1

ESSENTIAL CHARACTERISTICS OF THE ENGINE ~~/ PARENT ENGINE~~ [1/]

1. DESCRIPTION OF ENGINE

1.1. Manufacturer: *CHANGCHAI*

1.1.2. Manufacturer's engine code: *4G33TC-75L*

1.1.3. Working principle: ~~positive ignition/~~compression-ignition, four-stroke/~~two stroke~~ [1/]

1.4. Bore [2]: *95 mm*

1.5. Stroke [2]: *115 mm*

1.6. Number, layout and firing order of cylinders: *Four cylinders, In-line.*

1.7. Engine capacity [3]: *3260.6 cm^3*

1.8. Volumetric compression ratio [4]: *18.5 ±0.3:1*

1.9. Combustion system description: *Compression ignition*

1.10. Drawing(s) of combustion chamber and piston crown: *See the attachment 2*

1.11. Minimum cross-sectional area of inlet and outlet ports:

Inlet: 973.4 mm^2; Outlet: 883.5 mm^2

1.12. Cooling system: liquid~~/air~~ [1/]

1.12.1. Liquid

1.12.1.1. Nature of liquid: *Antifreeze Fluid & water*

1.12.1.2. Circulating pump(s): yes~~/no~~ [1/]

1.12.1.3. Characteristics or make(s) and type(s) (if applicable):

Make: Longkou Longji Three Pumps Co., Ltd.

Type: 4G33TC-082000

1.12.1.4. Drive ratio(s) (if applicable): *1.38:1*

1.12.2. Air: *N/A*

1.12.2.1. Blower: ~~yes/~~no [1/]

1.12.2.2. Characteristics or make(s) and type(s) (if applicable): *N/A*

1.12.2.3. Drive ratio(s) (if applicable): *N/A*

1.13. Temperature permitted by the manufacturer

1.13.1. Liquid cooling: maximum temperature at outlet: *388 K*

1.13.2. Air cooling: reference point:

1.13.3. Maximum temperature at reference point: *N/A*

1.13.4. Maximum charge air outlet temperature at the inlet inter-cooler (if applicable): *323 K*

1.13.5. Maximum exhaust temperature at the point in the exhaust pipe(s) adjacent to the outer flange(s) of the exhaust manifold(s): *923 K*

1.13.6. Lubricant temperature: minimum: *243 K* maximum: *413 K*

1.14. Pressure charger: yes/~~no~~ 1/

1.14.1. Make: *Ningbo Weifu Tianli Turbocharging Technology Co., Ltd.*

1.14.2. Type: *HP55*

1.14.3. Description of the system (e.g. max. charge pressure, waste-gate, if applicable):

Max. Charge pressure is 260kPa.

1.14.4. Inter-cooler: yes/~~no~~ 1/

1.15. Intake system: maximum allowable intake depression at rated engine speed and at 100% load: *5 kPa*

1.16. Exhaust system: maximum allowable exhaust back-pressure at rated engine e speed and at 100 % load: *22 kPa*

2. Measures taken against air pollution

2.1. Device for recycling crankcase gases: yes/~~no~~ 1

2.2. Additional anti-pollution devices (if any, and if not covered by another heading)

2.2.1. Catalytic converter: yes/~~no~~ 1

2.2.1.1 Make(s): *Ningbo Kaishi Environmental Tech Co., Ltd.*

2.2.1.2. Type(s): *4G33TC-360000*

2.2.1.3. Number of catalytic converters and elements: *1, DOC; 1, DPF*

2.2.1.4. Dimensions-and volume of the catalytic converter(s):

1.8L; Dimensions refer to the drawing of Attachment 5

2.2.1.5. Type of catalytic action: *Diesel Oxidation Catalyst*

2.2.1.6. Total charge of precious metals: *1.876g*

2.2.1.7. Relative concentration: *Pt: Pd: Rh =2.2:1:0*

2.2.1.8. Substrate (structure and material): *honeycomb & silicon carbide*

2.2.1.9. Cell density: *300 cpsi*

2.2.1.10. Type of casing for the catalytic converter(s): *plug-in*

2.2.1.11. Location of the catalytic converter(s) (place(s) and maximum/minimum distance(s) from engine): *250±50mm after turbo charger*

2.2.1.12. Normal operating range (K): *433-923 K*

2.2.1.13. Consumable reagent (where appropriate): *N/A*

2.2.1.13.1. Type and concentration of reagent needed for catalytic action: *N/A*

2.2.1.13.2. Normal operational temperature range of reagent: *N/A*

2.2.1.13.3. International standard (where appropriate): *N/A*

2.2.1.14. NOx sensor: ~~yes/~~no[1]

2.2.2. Oxygen sensor: ~~yes/~~no [1]

2.2.2.1. Make(s): *N/A*

2.2.2.2. Type: *N/A*

2.2.2.3. Location: *N/A*

2.2.3. Air injection: ~~yes/~~no [1]

2.2.3.1. Type (pulse air, air pump, etc.): *N/A*

2.2.4. EGR: yes/~~no~~ [1]

2.2.4.1. Characteristics (cooled/uncooled, high pressure/low pressure, etc.):

Cooled & high pressure

2.2.5. Particulate trap: yes/~~no~~ [1]

2.2.5.1. Dimensions and capacity of the particulate trap:

2.4L; Dimensions refer to the drawing of Attachment 5

2.2.5.2. Type and design of the particulate trap: *Diesel Particulate Filter*

2.2.5.3. Location (place(s) and maximum/minimum distance(s) from engine):

352±50mm after turbo charger

2.2.5.4. Method or system of regeneration, description and/or drawing:

Infrequent regeneration (Active regeneration)

2.2.5.5. Normal operating temperature (K) and pressure (kPa) range: *823-973K; ≤30kpa*

2.2.6. Other systems: ~~yes/~~no[1]

2.2.6.1. Description and operation: *N/A*

3. FUEL FEED FOR COMPRESSION-IGNITION ENGINES

3.1. Feed pump

3.1.1. Pressure or characteristic diagram [4]: *Controlled by ECU*

3.2. Injection system

3.2.1. Pump

3.2.1.1. Make(s): *Jun Feng Electric Control Technology (Dalian) Co., Ltd.*

3.2.1.2. Type(s): *M600*

3.2.1.3. Maximum fuel delivery: *403±20* mm^3 [1/4] per stroke or cycle at full injection at pump speed of: ~~min^{-1} (rated)~~ and *690* min^{-1} (maximum torque) respectively, or characteristic diagram:

3.2.1.3.1. Mention the method used: ~~on engine/~~on pump bench [1/]

3.2.1.4. Injection advance

3.2.1.4.1. Injection advance curve [4]: *Refer to the drawing of Attachment 7*

3.2.1.4.2. Timing [4]: *Controlled by ECU*

3.2.2. Injection piping

3.2.2.1. Length: *257±2 mm*

3.2.2.2. Internal diameter: *Φ3±0.05 mm*

3.2.3. Injector(s)

3.2.3.1. Make(s): *Jun Feng Electric Control Technology (Dalian) Co., Ltd.*

3.2.3.2. Type(s): *XCI3*

3.2.3.3. Opening pressure or characteristic diagram [1/4]: *Controlled by ECU*

3.2.4. Governor

3.2.4.1. Make(s): *Jun Feng Electric Control Technology (Dalian) Co., Ltd. (Controlled by ECU)*

3.2.4.2. Type(s): *ECU15*

3.2.4.3. Speed at which cut-off starts under full load [4]: *2320 min^{-1}*

3.2.4.4. Maximum no-load speed [4]: *2484 min^{-1}*

3.2.4.5. Idling speed [4]: *850±10 min^{-1}*

3.3. Cold start system

3.3.1. Make(s): *Ningbo Xingci Thermal Electric Appliances Co., Ltd.*

3.3.2. Type(s): *2102-023000*

3.3.3. Description: *Preheating plugs*

3.3.4 Electronic Engine Management Control Unit

3.3.4.1. Make(s): *Jun Feng Electric Control Technology (Dalian) Co., Ltd.*

3.3.4.2. Type: *ECU15*

3.3.4.3. Emission related adjustment possibilities: *Impossible*

3.3.4.4. Further documentation:

Software calibration number: CC4G33TC-75L_55.2kW2300rpm_EU5

4. FUEL FEED FOR POSITIVE-IGNITION ENGINES

4.1. Carburettor

4.1.1. Make(s): *N/A*

4.1.2. Type(s): *N/A*

4.2. Port fuel injection: ~~single-point or multi-point~~ 1/

4.2.1. Make(s): *N/A*

4.2.2. Type(s): *N/A*

4.3. Direct-injection

4.3.1. Make(s): *N/A*

4.3.2. Type(s): *N/A*

4.4. Fuel flow [g/h] and air/fuel ratio at rated speed and wide open throttle: *N/A*

4.5 Electronic Engine Management Control Unit: *N/A*

4.5.1. Make(s): *N/A*

4.5.2. Type: *N/A*

4.5.3. Emission related adjustment possibilities: *N/A*

4.5.4. Further documentation: *N/A*

5. VALVE TIMING

5.1. Maximum lift and angles of opening and closing in relation to dead centers or equivalent data:

Maximum lift of inlet valve: 9.43 mm; Maximum lift of outlet valve: 9.43 mm;

Intake valve open: 6° BTDC; Intake valve close: 44° ABDC,

Exhaust valve open: 54° BBDC; Exhaust valve close: 10° ATDC

5.2. Reference and/or setting ranges 1/: *N/A*

5.3. Variable valve timing system (if applicable and where: intake and/or exhaust) 1/: *N/A*

5.3.1. Type: ~~continuous or on/off~~ 1/

5.3.2. Cam phase shift angle: *N/A*

6. PORTING CONFIGURATION

6.1. Position, size and number: *on cylinder head; 1 inlet: 42.5mm; 1 outlet: 38.5mm*

7. IGNITION SYSTEM

7.1. IGNITION COIL

7.1.1. Make(s): *N/A*

7.1.2. Type(s): *N/A*

7.1.3. Number: *N/A*

7.2. SPARK PLUG(S)

7.2.1. Make(s): *N/A*

7.2.2. Type(s): *N/A*

7.3. MAGNETO

7.3.1. Make(s): *N/A*

7.3.2. Type(s): *N/A*

7.4. IGNITION TIMING

7.4.1. Static advance with respect to Top Dead Center [crank angle degrees]: *N/A*

7.4.2. Advance curve, if applicable: *N/A*

8. Engine performance (declared by the manufacturer)

Rated speed (min^{-1})	2300
Maximum power speed (min^{-1})	2300
Maximum torque speed (min^{-1})	1380
Rated net power (kW)	55.2
Maximum net power (kW)	55.2
Maximum net torque (Nm)	382

Annex 1 - Appendix 2

ESSENTIAL CHARACTERISTICS OF THE ENGINE TYPE

1. COMMON PARAMETERS [1/]

1.1. Combustion cycle: *four stroke*

1.2. Cooling medium: *Antifreeze Fluid & water*

1.3. Method of air aspiration: *pressure charged with charge cooler*

1.4. Combustion chamber type/design: *open chamber*

1.5. Valve and porting [3/4] configuration, size and number:

On cylinder head; 1 inlet: 42.5mm; 1 outlet: 38.5mm

1.6. Fuel system: *Common rail*

1.7. Engine management systems Proof of identity pursuant to drawing number(s): *N/A*

1.7.1. Charge cooling system: *Yes*

1.7.2. Exhaust gas recirculation [2/]: *Yes*

1.7.3. Water injection/emulsion [2/]: *N/A*

1.7.4. Air injection [2/]: *N/A*

1.8. Proof of identical (or lowest for the parent engine) ratio: system capacity/fuel delivery per stroke, pursuant to diagram number(s) [3/]: *100%*

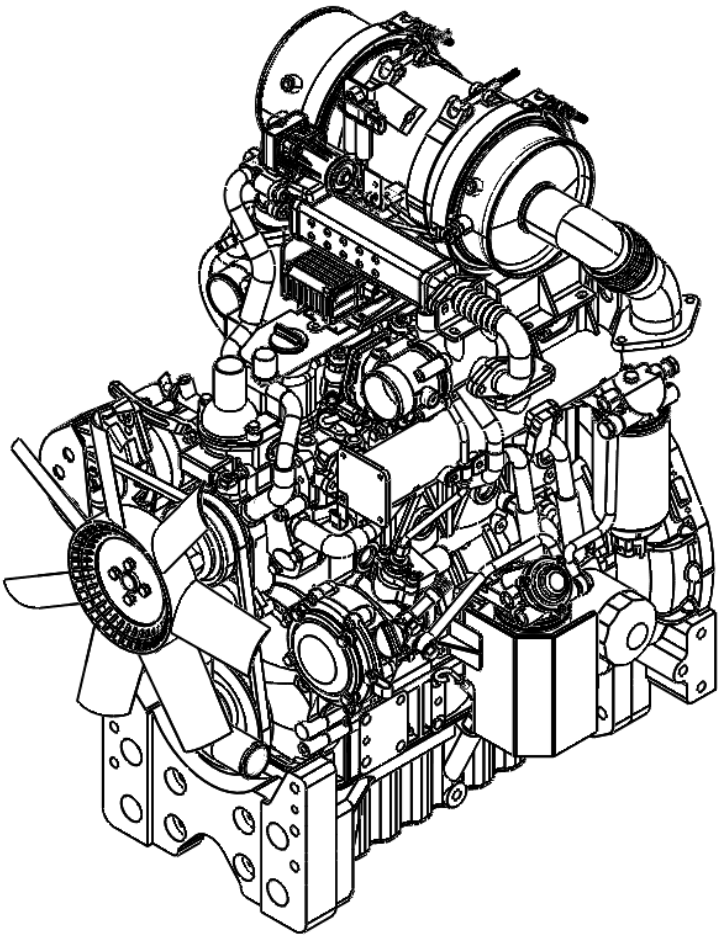
2. ENGINE FAMILY LISTING

2.1. Name of engine type: *4G33TC-75L*

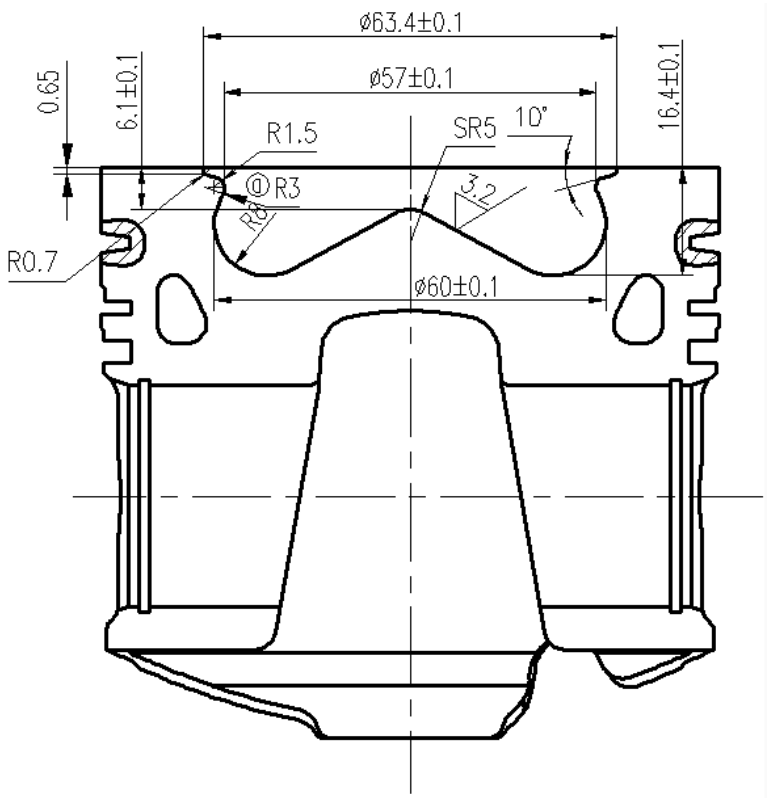
2.2. Specification of engine type:

Specification	Engine type 1/
Engine type	4G33TC-75L
No. of cylinders	4
Rated speed (min^{-1})	2300
Fuel delivery per stroke (mm^3) for compression-ignition engines, fuel flow (g/h) for positive-ignition engines	53
Rated net power (kW)	55.2
Maximum net power (kW)	55.2
Maximum power speed (min^{-1})	2300
Maximum torque speed (min^{-1})	1380
Fuel delivery per stroke (mm^3)	84
Maximum torque (Nm)	382
Low idle speed (min^{-1})	850
Cylinder displacement (in % of the largest one) (see Annex 5, Para. 1.3.)	100

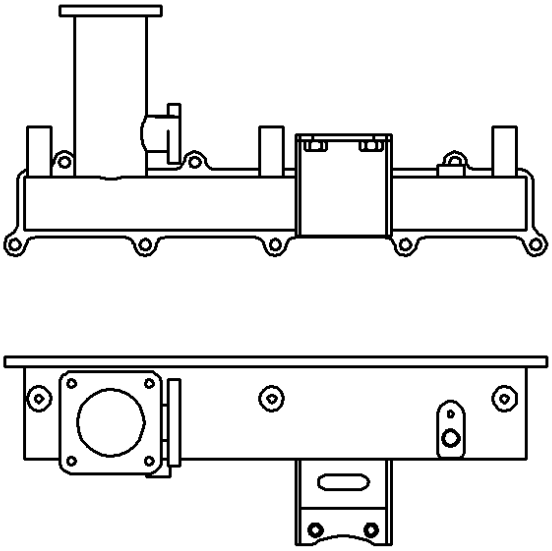
Attachment 1. Overview of the engine



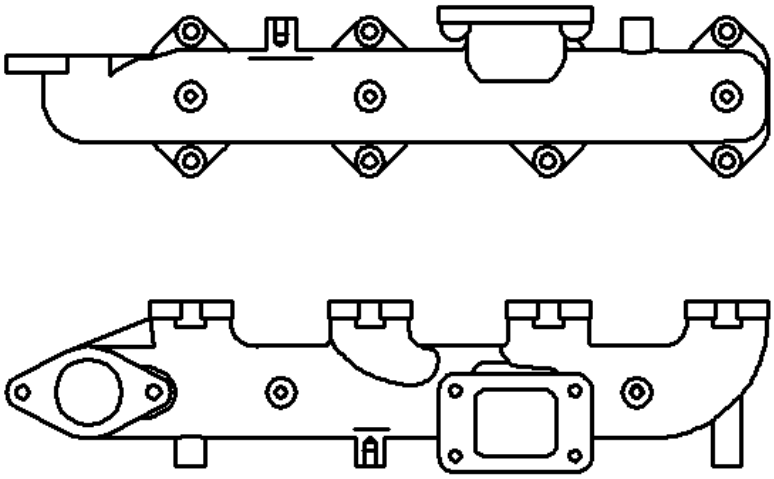
Attachment 2. The drawing of Combustion chamber and piston crown



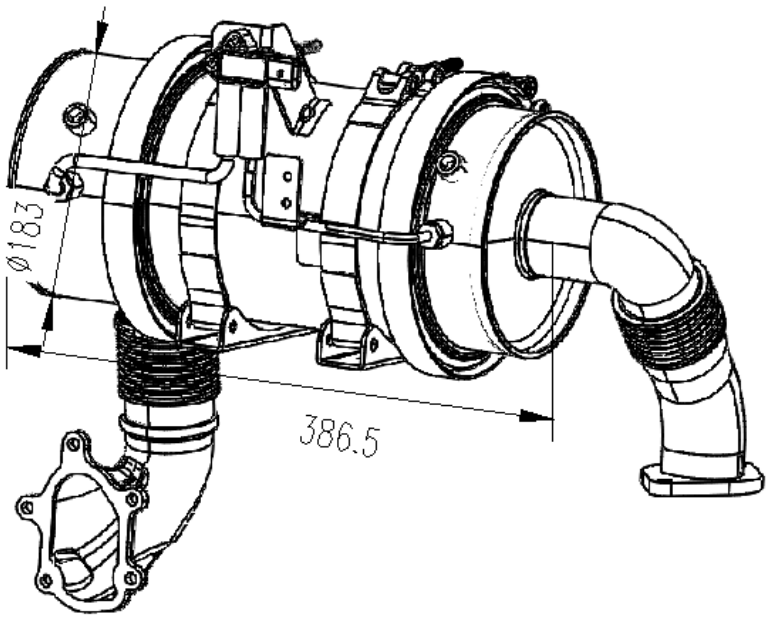
Attachment 3. The drawing of intake system



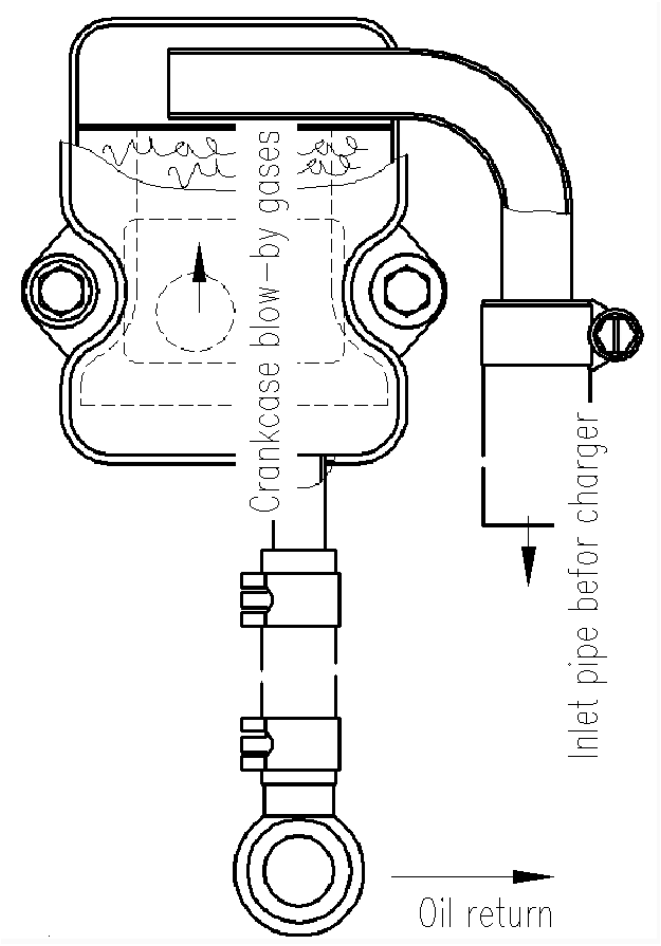
Attachment 4. The drawing of exhaust system



Attachment 5. Catalytic converter



Attachment 6. Drawings of device for recycling crankcase gases



Attachment 7. Injection timing