

## EU TYPE-APPROVAL CERTIFICATE

Communication concerning the:

- EU type-approval,
- ~~extension of EU type approval,~~
- ~~refusal of EU type approval,~~
- ~~withdrawal of EU type approval,~~

of an ~~engine type~~/engine family <sup>(1)</sup> with regard to gaseous and particulate pollutant emission pursuant to Regulation (EU) 2016/1628, as last amended by (Commission Delegated) <sup>(1)</sup> Regulation (EU) 2018/989 <sup>(1)(2)</sup> (of the European Parliament and of the Council) <sup>(1)</sup>

EU Type Approval No: e24\*2016/1628\*2018/989SHB1/P\*0359\*00

Reason for ~~extension/refusal/withdrawal~~ <sup>(1)</sup>:

- N/A

### SECTION I

- |       |   |  |
|-------|---|--|
| 1.1.  | Make (trade name(s) of manufacturer):   | <i>Nantian Industry &amp; trade</i>  |
| 1.2.  | Commercial name(s) (if applicable):   | <i>N/A</i>   |
| 1.3.  | Company name and address of manufacturer:   | <i>Yongkang Nantian industry and trade Co.,Ltd.<br/>NO.21 Jintong Road, Zhiying Phase II Industrial Zone, Zhiying Town, Yongkang City, Jinhua City, Zhejiang Province, China</i> |
| 1.4.  | Name and address of manufacturer's authorised representative (if any):                        | <i>VALEX S.p.A.<br/>Via Lago Maggiore,24-36015 Schio(VI)<br/>ITALY</i>   |
| 1.5.  | Name(s) and address(es) of assembly/manufacture plant(s):                                     | <i>Same as above 1.3</i>   |
| 1.6.  | <del>Engine type designation</del> /engine family designation/ <del>FT</del> <sup>(1)</sup> : | <i>Parent engine: NT1E48F<br/>Commercial names: N/A<br/>Engine within family: NT1E45F-1<br/>Commercial names: N/A</i>  |
| 1.7.  | Category and sub-category of the <del>engine type</del> /engine family <sup>(1)(4)</sup> :    | <i>Category: NRSh<br/>Sub-category: NRSh-v-1b</i>  |
| 1.8.  | Emissions durability period category:   | <i>Not Applicable/Cat 1/Cat 2/Cat 3 <sup>(1)</sup></i>   |
| 1.9.  | Emissions stage:  | <i>V/ SPE</i>  |
| 1.10. | Engine for snow throwers <sup>(5)</sup> :   | <i>Yes/No <sup>(1)</sup></i>   |



# NSAI

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## SECTION II

1. Technical service responsible for carrying out the tests: **TÜV SÜD Auto Service GmbH,  
Westendstraße 199,  
D-80686 München,  
Germany.**
2. Date(s) of test report(s): **27.01.2020**
3. Number(s) of test report(s): **20-00039-CX-SHA-00**

## SECTION III

The undersigned hereby certifies the accuracy of the manufacturer's description in the attached information document of the ~~engine type~~/engine family <sup>(1)</sup> described above, for which one or more representative samples, selected by the approval authority, have been submitted as prototypes and that the attached test results apply to the ~~engine type~~/engine family <sup>(1)</sup>.

1. The ~~engine type~~/engine family <sup>(1)</sup> meets/~~does not meet~~ <sup>(1)</sup> the requirements laid down in Regulation (EU) 2016/1628.
2. The approval is: ***granted/extended/refused/withdrawn*** <sup>(1)</sup>
3. The approval is granted in accordance with Article 35 of Regulation (EU) 2016/1628 and the validity of the approval is thus limited to dd/mm/yyyy <sup>(3)</sup> **N/A**
4. Restrictions to validity <sup>(3)</sup> <sup>(6)</sup>: **N/A**
5. Exemptions applied <sup>(3)</sup> <sup>(6)</sup>: **N/A**

Place: **Dublin.**

Date: **02<sup>nd</sup> March, 2020.**

Name and signature  
(or visual representation of an  
'advanced electronic signature'  
according to Regulation (EU)No 910/2014, including data for verification):

Attachments:

Information package

Test report(s)

Where applicable, the name(s) and specimen(s) of the signature(s) of the person(s) authorised to sign statement Of conformity and a statement of their position in the company Where applicable, a completed specimen of a statement of conformity

NB:

If this model is used for EU type-approval of an engine as an exemption for new technologies or new concepts, pursuant to Article 35(4) of Regulation (EU) 2016/1628, the heading of the certificate shall read 'PROVISIONAL EU TYPE-APPROVAL CERTIFICATE VALID ONLY ON THE TERRITORY OF ... <sup>(7)</sup>'.

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## Addendum

### PART A — CHARACTERISTICS OF THE ~~ENGINE TYPE~~/ENGINE FAMILY <sup>(1)</sup>

2. Common design parameters of the ~~engine type~~/engine family <sup>(1)</sup>
- 2.1. Combustion Cycle: *four stroke cycle/two stroke cycle/rotary  
other: (describe) <sup>(1)</sup>*
- 2.2. Ignition Type: *Compression ignition/spark ignition <sup>(1)</sup>*
- 2.3.1. Position of the cylinders in the block: *V/in-line/radial/other(Single) <sup>(1)</sup>*
- 2.6. Main Cooling medium: *Air/Water/Oil <sup>(1)</sup>*
- 2.7. Method of air aspiration: *naturally aspirated/pressurecharged/  
pressure charged with charge cooler <sup>(1)</sup>*
- 2.8.1. Fuel Type(s): *Diesel (non-road gas-oil)/Ethanol for  
dedicated-compression ignition engines  
(ED95)/Petrol (E10)/Ethanol(E85)/  
(Natural-gas/Biomethane)/Liquid  
Petroleum Gas (LPG) <sup>(1)</sup>*
- 2.8.1.1. Sub Fuel type (Natural gas/Biomethane only): *Universal fuel — high calorific fuel (H-  
gas) and low calorific fuel (L-gas)/  
Restricted fuel — high calorific fuel (H  
gas)/Restricted fuel — low calorific fuel  
(L-gas)/Fuel specific (LNG);*
- 2.8.2. Fuelling arrangement: *Liquid-fuel only/Gaseous-fuel only/Dual-  
fuel type 1A/Dual-fuel type 1B/Dual-fuel  
type 2A/Dual-fuel type 2B/Dual-fuel  
type 3B <sup>(1)</sup>*
- 2.8.3. List of additional fuels compatible with use by the engine declared by the manufacturer in accordance with point 1 of Annex I to Delegated Regulation (EU) 2017/654 (provide reference to recognised standard or specification): *N/A*
- 2.8.4. Lubricant added to fuel: *Yes/No <sup>(1)</sup>*
- 2.8.5. Fuel supply type: *Pump (high pressure) line and injector/in  
line pump or distributor pump/Unit  
injector/Common rail/Carburettor/port  
injector/direct injector/Mixing unit/  
other(specify) <sup>(1)</sup>*
- 2.9. Engine management systems: *mechanical/electronic control strategy <sup>(1)</sup>*



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2.10.	Miscellaneous devices:	
2.10.1.	Exhaust gas recirculation (EGR):	<del>Yes/No</del> <sup>(1)</sup>
2.10.2.	Water injection:	<del>Yes/No</del> <sup>(1)</sup>
2.10.3.	Air injection:	<del>Yes/No</del> <sup>(1)</sup>
2.10.4.	Others (specify):	N/A
2.11.	Exhaust after-treatment system:	<del>Yes/No</del> <sup>(1)</sup>
2.11.1.	Oxidation catalyst:	<del>Yes/No</del> <sup>(1)</sup>
2.11.2.	DeNOx system with selective reduction of NOx (addition of reducing agent):	<del>Yes/No</del> <sup>(1)</sup>
2.11.3.	Other DeNOx systems:	<del>Yes/No</del> <sup>(1)</sup>
2.11.4.	Three-way catalyst combining oxidation and NOx reduction:	<del>Yes/No</del> <sup>(1)</sup>
2.11.5.	Particulate after-treatment system with passive regeneration:	<del>Yes/No</del> <sup>(1)</sup>
2.11.6.	Particulate after-treatment system with active regeneration:	<del>Yes/No</del> <sup>(1)</sup>
2.11.7.	Other particulate after-treatment systems:	<del>Yes/No</del> <sup>(1)</sup>
2.11.8.	Other after-treatment devices (specify):	N/A
2.11.9.	Other devices or features that have a strong influence on emissions (specify):	N/A



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3. Essential characteristics of the engine type(s)

Item Number	Item Description	Parent Engine / Engine type	Engine types within the family (if applicable)
3.1.1.	Engine Type Designation:	<b>NT1E48F</b>	<b>NT1E45F-1</b>
3.1.2.	Engine type designation shown on engine mark: Yes/No <sup>(1)</sup>	<b>Yes</b>	<b>N/A</b>
3.1.3.	Location of the manufacturer's statutory marking:	<b>Refer to drawing No. 001</b>	<b>Refer to drawing No. 001</b>
3.2.1.	Declared rated speed (rpm):	<b>8500</b>	<b>8500</b>
3.2.1.2.	Declared rated net Power (kW):	<b>2.7</b>	<b>2.7</b>
3.2.2.	Maximum power speed (rpm):	<b>8500</b>	<b>8500</b>
3.2.2.2.	Maximum net power (kW):	<b>2.7</b>	<b>2.7</b>
3.2.3.	Declared maximum torque speed (rpm):	<b>6000</b>	<b>6500</b>
3.2.3.2.	Declared maximum torque (Nm):	<b>2.9</b>	<b>2.9</b>
3.6.3.	Number of Cylinders:	<b>1</b>	<b>1</b>
3.6.4.	Engine total swept volume (cm <sup>3</sup> ):	<b>61.5</b>	<b>55.7</b>
3.8.5.	Device for recycling crankcase gases: <del>Yes</del> /No <sup>(1)</sup>	<b>No</b>	<b>No</b>
3.11.3.12.	Consumable reagent: <del>Yes</del> /No <sup>(1)</sup>	<b>No</b>	<b>No</b>
3.11.3.12.1.	Type and concentration of reagent needed for catalytic action:	<b>N/A</b>	<b>N/A</b>
3.11.3.13.	NOx sensor(s): <del>Yes</del> /No <sup>(1)</sup>	<b>No</b>	<b>No</b>
3.11.3.14.	Oxygen sensor: <del>Yes</del> /No <sup>(1)</sup>	<b>No</b>	<b>No</b>
3.11.4.7.	Fuel borne catalyst (FBC): <del>Yes</del> /No <sup>(1)</sup>	<b>No</b>	<b>No</b>

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Particular conditions to be respected in the installation of the engine on non-road mobile machinery:

Item Number	Item Description	Parent Engine / Engine type	Engine types within the family (if applicable)
3.8.1.1.	Maximum allowable intake depression at 100 % engine speed and at 100 % load (kPa) with clean air cleaner:	<b>-1.9</b>	<b>-1.9</b>
3.8.3.2.	Maximum charge air cooler outlet temperature at 100 % speed and 100 % load (deg. C):	<i>N/A</i>	<i>N/A</i>
3.8.3.3.	Maximum allowable pressure drop across charge cooler at 100 % engine speed and at 100 % load (kPa) (if applicable):	<i>N/A</i>	<i>N/A</i>
3.9.3.	Maximum permissible exhaust gas backpressure at 100 % engine speed and at 100 % load (kPa):	<b>5.0</b>	<b>5.0</b>
3.9.3.1	Location of measurement:	<b><i>Inlet of muffler</i></b>	<b><i>Inlet of muffler</i></b>
3.11.1.2.	Maximum temperature drop from exhaust system or turbine outlet to first exhaust after-treatment system (deg. C) if stated:	<i>N/A</i>	<i>N/A</i>
3.11.1.2.1.	Test conditions for measurement:	<i>N/A</i>	<i>N/A</i>

## PART B — TEST RESULTS

3.8. Manufacturer intends to use ECU torque signal for in-service monitoring: ***Yes/No*** <sup>(1)</sup>

3.8.1. Dynamometer torque greater than or equal to  $0,93 \times$  ECU torque: ***Yes/No*** <sup>(1)</sup>

3.8.2. ECU torque correction factor in case that dynamometer torque less than  $0,93 \times$  ECU torque: ***N/A***

11.1. Cycle emissions results

Emissions	CO (g/kWh)	HC (g/kWh)	NOx (g/kWh)	HC+NOx (g/kWh)	PM (g/kWh)	PN #/kWh	Test Cycle <sup>(8)</sup>
NRSC final result with DF.	417.4	-*	-*	57.3	N/A	N/A	G3
NRTC Final test result with DF	-	-	-	-	-	-	-

(\* ***Optionally, as an alternative, any combination of values satisfying the equation  $(HC + NOx) \times CO^{0,784} \leq 8,57$  as well as the following conditions:  $CO \leq 20,6$  g/kWh and  $(HC + NOx) \leq 2,7$  g/kWh***

11.2. CO<sub>2</sub> result: ***1112 g/kWh***

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- 11.3. In service monitoring reference values <sup>(9)</sup>
- 11.3.1. Reference work (kWh): *N/A*
- 11.3.2. Reference CO<sub>2</sub> mass (g): *N/A*

Explanatory notes to Annex IV:

*(Footnote markers, footnotes and explanatory notes not to be stated on the EU type-approval certificate)*

- <sup>(1)</sup> Strike out the unused options, or only show the used option(s).
- <sup>(2)</sup> Indicate only the latest amendment in case of an amendment of one or more Articles of Regulation (EU) 2016/1628, according to the amendment applied for the EU type-approval.
- <sup>(3)</sup> Delete this entry when not applicable.
- <sup>(4)</sup> Indicate the applicable option for the category and sub-category in accordance with entry 1.7 of the information document set out in Part A of Appendix 3 to Annex I.
- <sup>(5)</sup> Indicate whether the approval is for a NRS (< 19 kW) engine family consisting exclusively of engine types for snow throwers.
- <sup>(6)</sup> Applicable only for EU type-approval of an engine type or an engine family as an exemption for new technologies or new concepts, pursuant to Article 35 of Regulation (EU) 2016/1628.
- <sup>(7)</sup> Indicate the Member State.
- <sup>(8)</sup> Indicate the test cycle in accordance with the fifth column of the Tables set out in Annex IV to Regulation (EU) 2016/1628.
- <sup>(9)</sup> Only applicable to engines of sub-categories NRE-v-5 and NRE-v-6 tested on NRTC.



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## **Index to the Information Package**

Date of issue:	<i>02<sup>nd</sup> March, 2020.</i>
Date of latest amendment:	<i>N/A</i>
Reason for extension/revision:	<i>N/A</i>
1. Additional conditions, and advisory notes on legal alternatives.	
2. Test report(s)	
- numbers(s):	<i>20-00039-CX-SHA-00</i>
- date of issue:	<i>27.01.2020</i>
- date of latest amendment:	<i>N/A</i>
3. Information document	
- number(s):	<i>NT1E48F-ext.00</i>
- date of issue:	<i>06.12.2019</i>
- date of latest amendment:	<i>N/A</i>
Documentation:	<i>54 pages</i>



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Appendix: **Additional conditions, and advisory notes on legal alternatives**

A: Additional conditions:

1. The attached technical report, with any of its attachments, forms part of this Type Approval certificate.
2. Each type from series production shall be to the measurements specified in the attached drawings, and shall be manufactured only from the materials specified in the Approval documents.
3. Changes in the type are permitted only with the explicit permission of NSAI. Breaches of this requirement will lead to a withdrawal of the Type Approval, and in addition may be subject to criminal prosecution.
4. At regular intervals, any tests or associated checks prescribed by the applicable legislation to verify continued conformity with the approved type shall be carried out. The manufacturer shall demonstrate compliance with this by submitting to NSAI evidence of adequate arrangements and documented control plans for each type approved.
5. Any set of samples or test pieces showing evidence of non-conformity shall give rise to further sampling and testing and all steps shall be taken to restore conformity of production.
6. This Type Approval will expire when it is surrendered by the holder, or withdrawn by NSAI, or when the approved type no longer conforms to legal requirements. The recall of the Type Approval can be issued by NSAI when the conditions required for the issuing or continuation of the Type Approval are no longer current, or when the Approval holder is in breach of the duties attached to the Type Approval, or when it is established that the approved type no longer meets the requirements of traffic safety.
7. Changes in the company name, address or manufacturing site, as well as in any of the sales or other agents specified in the issuing of the approval must immediately be notified to NSAI.
8. The duties imposed by the issuing of this certificate are not transferable. The legal protection of third parties is not affected by this certificate.
9. When the manufacture or sale of the system, component or separate technical unit has not been started within one year of the date of issue of this certificate, then NSAI is to be informed. This requirement also applies when the manufacture or sale has been halted for more than one year, or when it ought to have been halted for more than one year. The initial commencement of manufacture or sale, or the resumption of manufacture or sale, shall then be notified to NSAI within one month of commencement or resumption.

B: Legal Options:

Any objection to the requirements set out in this certificate shall be made within one month of the date of issue. The objection shall be made, in writing, to NSAI in Dublin.



Auto Service

Test report No.: 20-00039-CX-SHA-00  
Manufacturer: Yongkang Nantian Industry and Trade Co., Ltd.  
Type: NT1E48F

# TECHNICAL REPORT

## No.: 20-00039-CX-SHA-00

**Test in accordance with the regulation of the European Parliament and the Council on requirements**

**relating to gaseous and particulate pollutant emission limits and type-approval for internal combustion engines for non-road mobile machinery**

**Regulation (EU) 2016/1628** dated **14.09.2016**

Including all amendments of Commission Delegated/Implementing up to

**Regulation (EU) 2018/987** dated **27.04.2018**  
**Regulation (EU) 2018/988** dated **27.04.2018**  
**Regulation (EU) 2018/989** dated **18.05.2018**

Approval status	
<input checked="" type="checkbox"/>	Granting of a type approval : ---
<input type="checkbox"/>	Extension/correction to type approval no. : ---



Auto Service

Test report No.: 20-00039-CX-SHA-00  
Manufacturer: Yongkang Nantian Industry and Trade Co., Ltd.  
Type: NT1E48F

## 1. General information

- 1.1. Make (trade name(s) of manufacturer) : Nantian Industry & trade
- 1.2. Commercial name(s) (if applicable) : N/A
- 1.3. Company name and address of manufacturer : Yongkang Nantian Industry and Trade Co., Ltd.  
NO.21 Jintong Road, Zhiying Phase II Industrial Zone, Zhiying Town, Yongkang City, Jinhua City, Zhejiang Province, China
- 1.4. Name and address of manufacturer's authorised representative (if any) : VALEX S.p.A  
Via Lago Maggiore, 24-36015 Schio(VI) ITALY
- 1.5. Name(s) and address(es) of assembly/manufacture plant(s) : Same as above 1.3.
- 1.6. Name of technical service : TÜV SÜD Auto Service GmbH
- 1.7. Address of technical service : Westendstraße 199  
D-80686 München
- 1.8. Location of test : Nanjing Depurate Catalyst Co., Ltd.
- 1.9. Date of test : 24.12.2019 - 06.01.2020
- 1.10. Test report number : 20-00039-CX-SHA-00
- 1.11. Information document reference number (if available) : NT1E48F-ext.00
- 1.12. Test report type : Primary test/additional test/supplementary test
- 1.12.1. Description of the purpose of the test : New approval test

## 2. General engine information (test engine)

- 2.1. ~~Engine type designation~~/engine family designation/~~FF~~ : Parent engine: NT1E48F  
Commercial names: N/A  
Engine within family: NT1E45F-1  
Commercial names: N/A
- 2.2. Engine identification number : 19100028



Test report No.: 20-00039-CX-SHA-00  
Manufacturer: Yongkang Nantian Industry and Trade Co., Ltd.  
Type: NT1E48F

- 2.3. Engine Category and subcategory : Category: NRSh  
Sub-category: NRSh-v-1b
- 2.4. Worst Case Rationale : Test carried out on parent engine.

### 3. Documentation and information Check list (primary test only)

- 3.1. Engine mapping documentation reference : G3 cycle, tested at rated speed, manufacturer's declared rated power, rated speed checked before carrying out emission test, and the check results meet the relevant requirements in paragraph 5, annex VI, 2017/654/EU.
- 3.2. Deterioration factor determination documentation reference : See Annex 1
- 3.3. Infrequent regeneration factors determination documentation reference, where applicable : N/A
- 3.4. NO<sub>x</sub> control diagnostic demonstration documentation reference, where applicable : N/A
- 3.5. Particulate control diagnostic demonstration documentation reference, where applicable : N/A
- 3.6. For engine types and engine families that use an Electronic Control Unit (ECU) as part of the emission control system anti-tampering declaration documentation reference : N/A
- 3.7. For engine types and engine families that use mechanical devices as part of the emission control system anti-tampering and adjustable parameters declaration and demonstration documentation reference : Tamper-proof carburetor, the carburetor can't be adjusted by common tools, also it can't be broken with hands.
- 3.8. Manufacturer intends to use Electronic Control Unit (ECU) torque signal for in- : Yes/No

Test report No.: 20-00039-CX-SHA-00  
Manufacturer: Yongkang Nantian Industry and Trade Co., Ltd.  
Type: NT1E48F

service monitoring

- 3.8.1. Dynamometer torque greater than or equal to  $0.93 \times$  Electronic Control Unit (ECU) torque : Yes/No
- 3.8.2. Electronic Control Unit (ECU) torque correction factor in case that dynamometer torque less than  $0.93x$  Electronic Control Unit (ECU) torque : N/A

#### 4. Reference fuel(s) used for test (complete relevant subparagraph(s))

##### 4.1. Liquid fuel for spark-ignition engines

- 4.1.1. Make : Anhui Super Beauty Chemical Science Co., Ltd.
- 4.1.2. Type : E10
- 4.1.3. Octane number RON : 96.2
- 4.1.4. Octane number MON : 85.6
- 4.1.5. Ethanol content (%) : 9.7
- 4.1.6. Density at 15 Deg.C ( $\text{kg/m}^3$ ) : 753.1

##### 4.2. Liquid fuel for compression-ignition engines

- 4.2.1. Make : N/A
- 4.2.2. Type : N/A
- 4.2.3. Cetane number : N/A
- 4.2.4. Fame content (%) : N/A
- 4.2.5. Density at 15 Deg.C ( $\text{kg/m}^3$ ) : N/A

##### 4.3. Gaseous fuel – LPG

- 4.3.1. Make : N/A
- 4.3.2. Type : N/A
- 4.3.3. Reference fuel type : Fuel A/Fuel B
- 4.3.4. Octane number MON : N/A

##### 4.4. Gaseous fuel- Methane/biomethane

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 Manufacturer: Yongkang Nantian Industry and Trade Co., Ltd.  
 Type: NT1E48F

- 4.4.1. Reference fuel type:  $G_R/G_{23}/G_{25}/G_{20}$  : N/A
- 4.4.2. Source of reference gas : ~~specific reference fuel/pipeline gas with admixture~~
- 4.4.3. For specific reference fuel
  - 4.4.3.1. Make : N/A
  - 4.4.3.2. Type : N/A
- 4.4.4. For pipeline gas with admixture
  - 4.4.4.1. Admixture(s): : ~~Carbon dioxide/Ethane/Methane/Nitrogen/Propane~~
  - 4.4.4.2. The value of  $S\lambda$  for the resulting fuel blend: : N/A
  - 4.4.4.3. The Methane Number (MN) of the resulting fuel blend : N/A
- 4.5. *Dual fuel engine (in addition to relevant sections above)*
  - 4.5.1. Gas energy ratio on test cycle : N/A
- 5. Lubricant**
  - 5.1. Make(s) : Mobil
  - 5.2. Type(s) : 2T FD
  - 5.3. SAE viscosity : 5W/40
  - 5.4. Lubricant and fuel are mixed : ~~yes~~/no
  - 5.4.1. Percentage of oil in mixture : 1/40
- 6. Engine Speed**
  - 6.1. 100% speed (rpm) : 8500
    - 6.1.1. 100% speed determined by : ~~Declared rated speed/Declared MTS/Measured MTS~~
    - 6.1.2. Adjusted MTS if applicable (rpm) : N/A
  - 6.2. Intermediate speed (rpm) : N/A
    - 6.2.1. Intermediate speed determined by : ~~Declared intermediate speed/Measured~~

Test report No.: 20-00039-CX-SHA-00  
 Manufacturer: Yongkang Nantian Industry and Trade Co., Ltd.  
 Type: NT1E48F

intermediate speed/60% of 100%  
 speed/75% of 100% speed /85% of 100%  
 speed

6.3. Idle speed (rpm) : 3200

**7. Engine Power**

7.1. Engine driven equipment (if applicable)

7.1.1. ~~Power absorbed at indicated engine speeds by necessary auxiliaries for engine operation that cannot be fitted for the test (as specified by the manufacturer) to be shown in Table 1:~~

**Table 1**

Auxiliary type and identifying details	Power absorbed at indicated speed (kW) (complete relevant columns)						
	Idle	63%	80%	91%	Inter-mediate	Max-power	100%
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
Total (P <sub>ti</sub> ) (kW):	-	-	-	-	-	-	-

7.1.2. ~~Power absorbed at indicated engine speeds by auxiliaries linked with operation of the machine that cannot be removed for the test (as specified by the manufacturer) to be shown in Table 2:~~

**Table 2**

Auxiliary type and identifying details	Power absorbed at indicated speed (kW) (complete relevant columns)						
	Idle	63%	80%	91%	Inter-mediate	Max-power	100%
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
Total (P <sub>ti</sub> ) (kW):	-	-	-	-	-	-	-

7.2. Engine net power to be stated in Table 3

Test report No.: 20-00039-CX-SHA-00  
 Manufacturer: Yongkang Nantian Industry and Trade Co., Ltd.  
 Type: NT1E48F

**Table 3**

Condition	Power setting at indicated engine speed (kW) (complete relevant columns)		
	Intermediate	Max. power	100%
Maximum power measured at specified test speed ( $P_{m,i}$ ) (kW)	N/A	N/A	2.7
Total auxiliary power from table 1 ( $P_{f,i}$ )	N/A	N/A	N/A
Total auxiliary power from table 2 ( $P_{r,i}$ )	N/A	N/A	N/A
Net engine power (kW) $P_i = P_{m,i} - P_{f,i} + P_{r,i}$	N/A	N/A	2.7

**8. Conditions at test**

- 8.1.  $f_a$  within range 0.93 to 1.07 : Yes/No
- 8.1.1. If  $f_a$  is not within specified range state : N/A  
altitude of test facility and dry atmospheric pressure
- 8.2. Applicable intake air temperature range : Yes  
20 to 30/0 to -5(snow throwers only)/-5 to -15(snowmobiles only)/20 to 35(NRE greater than 560 kW only)

**9. Information concerning the conduct of the NRSC test:**

- 9.1 Cycle (mark cycle used with X)

**Table 4**

Cycle	C1	C2	D2	E2	E3	F	G1	G2	G3	H
Discrete mode	-	-	-	-	-	-	-	-	x	-
RMC	-	-	-	-	-	-	-	-	N/A	-

The length of each mode : 3 minutes

Sampling time for each mode : 2 minutes

- 9.2. Dynamometer setting (kW)

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**Table 5**

% Load at point or % of rated power (as applicable)	Dynamometer setting (kW) at indicated engine speed after adjustment for auxiliary power (complete relevant columns)					
	Idle	63%	80%	91%	Inter-mediate	100%
0%	0	-	-	-	-	N/A
5%	-	-	-	-	-	N/A
10%	-	-	-	-	-	N/A
25%	-	-	-	-	-	N/A
50%	-	-	-	-	-	N/A
75%	-	-	-	-	-	N/A
100%	-	-	-	-	-	2.7

9.3. NRSC Emission results

9.3.1. Deterioration Factor (DF): calculated/assigned

9.3.2. Specify the DF values and the cycle weighted emission results in the following table

Note: In the event that a discrete mode NRSC is run where the  $K_{ru}$  or  $K_{rd}$  factors have been established for individual modes then a table showing each mode and the applied  $K_{ru}$  or  $K_{rd}$  should replace the shown table

**Table 6**

DF	CO	HC	NO <sub>x</sub>	HC+NO <sub>x</sub>	PM	PN
mult/add	1.09	-*	-*	1.09	N/A	N/A
Emissions	CO (g/kWh)	HC (g/kWh)	NO <sub>x</sub> (g/kWh)	HC+NO <sub>x</sub> (g/kWh)	PM (g/kWh)	PN #/kWh
Test result with/without regeneration	381.91	49.44	3.00	52.44	N/A	N/A
$k_{ru}/k_{rd}$ mult/add	N/A	N/A	N/A	N/A	N/A	N/A
test result with IRAFs	N/A	N/A	N/A	N/A	N/A	N/A

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<b>Final test result with DF</b>	417.4	-*	-*	57.3	N/A	N/A
----------------------------------	-------	----	----	------	-----	-----

\* Separate DF for HC and NO<sub>x</sub> are not required for engine categories and sub-categories NRSh and NRS, except for NRS-v-2band NRS-v-3.

9.3.3. Cycle weighted CO<sub>2</sub> (g/kWh) : 1112

9.3.4. Cycle weighted NH<sub>3</sub> (ppm) : N/A

9.4. ~~Additional control area test points (if applicable)~~

**Table 7**

Emissions at test point	Engine Speed	Load (%)	CO (g/kWh)	HC (g/kWh)	NO <sub>x</sub> (g/kWh)	HC+NO <sub>x</sub> (g/kWh)	PM (g/kWh)	PN n/kWh
Test result 1	-	-	-	-	-	-	-	-
Test result 2	-	-	-	-	-	-	-	-
Test result 3	-	-	-	-	-	-	-	-

9.5. Sampling systems used for the NRSC test

9.5.1. Gaseous emissions : Sample system: HORIBA-CVS7100  
 Analyse system: MEXA-7200D  
 Dynamometer: HACD-3

9.5.2. PM : N/A

9.5.2.1. Method : single/multiple filter

9.5.3. Particle number : N/A

**10. Information concerning the conduct of the NRTC test (if applicable)**

10.1. ~~Cycle (mark cycle with X)~~

**Table 8**

NRTC	-
LSI-NRTC	-

10.2. ~~NRTC deterioration factors~~

10.2.1. ~~Deterioration Factor (DF) : calculated/fixed~~

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 Manufacturer: Yongkang Nantian Industry and Trade Co., Ltd.  
 Type: NT1E48F

10.2.2. DF values and the emissions results to be stated in Table 9 or in Table 10, as applicable (NRTC or LSI-NRTC):

10.3. NRTC emission results

**Table 9: Table for NRTC**

DF	CO	HC	NO <sub>x</sub>	HC+NO <sub>x</sub>	PM	PN
mult/add	-	-	-	-	-	-
Emissions	CO (g/kWh)	HC (g/kWh)	NO <sub>x</sub> (g/kWh)	HC+NO <sub>x</sub> (g/kWh)	PM (g/kWh)	PN #/kWh
Cold start	-	-	-	-	-	-
Hot start test result with/without regeneration	-	-	-	-	-	-
Weighted test result	-	-	-	-	-	-
$k_{ru}/k_{rd}$ mult/add	-	-	-	-	-	-
Weighted test result with IRAFs	-	-	-	-	-	-
<b>Final test result with DF</b>	-	-	-	-	-	-

10.3.1 Hot cycle CO<sub>2</sub> (g/kWh) ÷

10.3.2. Cycle weighted NH<sub>3</sub> (ppm) ÷

10.3.3. Cycle work for hot start test (kWh) ÷

10.3.4. Cycle CO<sub>2</sub> for hot start test (g) ÷

10.4. LSI-NRTC emission results

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**Table 10: Table for NRTC-LSI**

DF	CO	HC	NO <sub>x</sub>	HC+NO <sub>x</sub>	PM	PN
mult/add	-	-	-	-	-	-
Emissions	CO (g/kWh)	HC (g/kWh)	NO <sub>x</sub> (g/kWh)	HC+NO <sub>x</sub> (g/kWh)	PM (g/kWh)	PN #/kWh
test result with/without regeneration	-	-	-	-	-	-
$k_{ref}/k_{rd}$ mult/add	-	-	-	-	-	-
Weighted test result with IRAFs	-	-	-	-	-	-
<b>Final test result with DF</b>	-	-	-	-	-	-

- 10.4.1. Cycle CO<sub>2</sub> (g/kWh) ÷
- 10.4.2. Cycle NH<sub>3</sub> (ppm) ÷
- 10.4.3. Cycle work (kWh) ÷
- 10.4.4. Cycle CO<sub>2</sub> (g) ÷
- 10.5. Sampling system used for the NRTC test ÷
- 10.5.1. Gaseous emissions ÷
- 10.5.2. PM ÷
- 10.5.3. Particle number ÷

## 11. Final emission result

### 11.1 Cycle emissions results

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**Table 11**

Emissions	CO (g/kWh)	HC (g/kWh)	NO <sub>x</sub> (g/kWh)	HC+NO <sub>x</sub> (g/kWh)	PM (g/kWh)	PN #/kWh	Test Cycle <sup>(1)</sup>
NRSC final result with DF <sup>(2)</sup> .	417.4	-*	-*	57.3	N/A	N/A	G3
NRTC Final test result with DF <sup>(3)</sup>	-	-	-	-	-	-	-

\* Separate DF for HC and NO<sub>x</sub> are not required for engine categories and sub-categories NRSh and NRS, except for NRS-v-2band NRS-v-3.

- 11.2 CO<sub>2</sub> result (g/kWh)<sup>(4)</sup> : 1112  
 11.3. In service monitoring reference values<sup>(5)</sup> : N/A  
 11.3.1. Reference work (kWh)<sup>(6)</sup> : N/A  
 11.3.2. Reference CO<sub>2</sub> mass (g)<sup>(7)</sup> : N/A

**Emission limits**

	CO	HC	NO <sub>x</sub>	HC+NO <sub>x</sub>	PM	PN
NRSh-v-1a	805	-	-	50	-	-
NRSh-v-1b	603	-	-	72	-	-
NRS-vr-1a	610	-	-	10	-	-
NRS-vr-1b	610	-	-	8	-	-
NRS-vi-1a	610	-	-	10	-	-
NRS-vi-1b	610	-	-	8	-	-
NRS-v-2a	610	-	-	8	-	-
NRS-v-2b	4,40(*)	-	-	2,70(*)	-	-
NRS-v-3	4,40(*)	-	-	2,70(*)	-	-

(\*) Optionally, as an alternative, any combination of values satisfying the equation  $(HC + NO_x) \times CO^{0.784} \leq 8,57$  as well as the following conditions:  $CO \leq 20,6$  g/kWh and  $(HC + NO_x) \leq 2,7$  g/kWh



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12. Statement of conformity

The mentioned information folder and the type described therein are in accordance with the test basis mentioned above. The worst-case was selected in accordance with document "Requirements for Test Reports (AS-PB-T-02)".

The test report may be reproduced and published in full and by the client only. It can be reproduced partially with the written permission of the test laboratory only.

TUV SUD Auto Service GmbH is designated as Technical Service by:

Table with 3 columns: Approval authority, Country, Registration number. Rows include KBA (Germany), VCA (United Kingdom), RDW (The Netherlands), NSAI (Ireland), and SNCH (Luxembourg).

Handwritten signature and circular stamp of TUV SUD Auto Service GmbH, Technischer Dienst, 035.

München, 27.01.2020

Chongmin Zhao

- (1) For NRSC indicate the cycle noted in point 9.1 (Table 4); for transient test indicate cycle noted in point 10.1 (Table 8).
(2) Copy the "Final test result with DF" results from Table 6.
(3) Copy "Final test result with DF" results from Table 9 or 10, as applicable.
(4) For an engine type or engine family that is tested on both the NRSC and a transient cycle, indicate the hot cycle CO2 emissions values from the NRTC noted in point 10.3.4 or the CO2 emissions values from the LSI-NRTC noted in point 10.4.4. For an engine only tested on an NRSC indicate the CO2 emissions values given in that cycle noted in point 9.3.3.
(5) Only applicable to engines of sub-categories NRE-v-5 and NRE-v-6 tested on NRTC.
(6) Indicate the cycle work for hot start test value from the NRTC noted in point 10.3.3.
(7) Indicate the cycle CO2 for hot start test value from the NRTC noted in point 10.3.4.

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### Annex 1 Determination of deterioration factor

NT1E48F parent engine (engine No: 19100028)

	New stabilized engine	engine after 50 hours' aging cycle	DF
CO	381.91 g/kWh	417.41 g/kWh	1.09
HC	49.44 g/kWh	53.77 g/kWh	-*
NO <sub>x</sub>	3.00 g/kWh	3.48 g/kWh	-*
HC + NO <sub>x</sub>	52.44 g/kWh	57.25 g/kWh	1.09

\* Separate DF for HC and NO<sub>x</sub> are not required for engine categories and sub-categories NRSh and NRS, except for NRS-v-2band NRS-v-3.

#### Aging cycle (started at 27.12.2019) [only as sample, the complete file is available]

Date	Time (h)	Required Time	Engine Speed (min <sup>-1</sup> )	Actual Engine Power (kW)	Actual Torque (N.m)	Fuel Flow (kg/h)	Temperature of Spark Plug Washer (°C)	Barometric Pressure (kPa)	Ambient Temperature (°C)	Air Relative Humidity (%)
2019/12/27	1	08:00-09:00	8504	2.82	3.16	1.587	273.6	101.6	21.8	50.2
2019/12/27	2	09:00-10:00	8503	2.82	3.16	1.584	275.9	101.8	22.2	49.4
2019/12/27	3	10:00-11:00	8505	2.83	3.18	1.585	274.8	101.6	22.3	48.4
2019/12/27	4	11:00-12:00	8508	2.83	3.17	1.586	274.1	101.9	22.2	50.1
2019/12/27	5	12:00-13:00	8501	2.83	3.18	1.586	274.8	101.7	22.2	50.4
2019/12/27	6	13:00-14:00	8508	2.83	3.18	1.582	275.4	101.7	21.8	49.3
2019/12/27	7	14:00-15:00	8502	2.82	3.17	1.589	275.0	101.9	21.7	51.1
2019/12/27	8	15:00-16:00	8504	2.82	3.16	1.588	273.9	101.7	22.3	49.1
2019/12/27	9	16:00-17:00	8508	2.83	3.17	1.585	275.7	101.6	21.8	49.8
2019/12/27	10	17:00-18:00	8506	2.83	3.17	1.583	275.0	101.8	21.9	49.4
2019/12/27	11	18:00-19:00	8503	2.82	3.17	1.587	274.3	101.6	22.2	50.9
2019/12/27	12	19:00-20:00	8505	2.80	3.15	1.583	275.6	101.6	21.8	48.6
2019/12/27	13	20:00-21:00	8508	2.80	3.14	1.586	274.3	101.5	21.9	51.2
2019/12/27	14	21:00-22:00	8504	2.80	3.15	1.581	274.8	101.9	22.1	50.0
2019/12/27	15	22:00-23:00	8508	2.79	3.13	1.582	276.0	101.6	22.2	49.9
2019/12/27	16	23:00-00:00	8503	2.80	3.15	1.584	275.5	101.6	21.8	50.1
2019/12/28	17	00:00-01:00	8506	2.79	3.14	1.582	274.3	101.8	22.1	48.7
2019/12/28	18	01:00-02:00	8501	2.80	3.15	1.581	274.2	101.9	22.3	48.7
2019/12/28	19	02:00-03:00	8505	2.79	3.14	1.600	276.6	101.8	22.2	49.5
2019/12/28	20	03:00-04:00	8502	2.79	3.13	1.600	276.4	101.8	22.2	50.6
2019/12/28	21	04:00-05:00	8505	2.80	3.14	1.597	275.9	101.8	21.8	50.5
2019/12/28	22	05:00-06:00	8504	2.79	3.13	1.599	274.2	101.5	21.9	51.1
2019/12/28	23	06:00-07:00	8504	2.79	3.14	1.599	275.1	101.7	21.9	51.8
2019/12/28	24	07:00-08:00	8503	2.79	3.13	1.592	276.6	101.6	21.9	51.6
2019/12/28	25	08:00-09:00	8508	2.79	3.13	1.595	275.3	101.6	21.8	49.2
2019/12/28	/	09:00-10:00	Cleaning air filter and spark plug fouling. Changed spark plug if necessary							
2019/12/28	26	10:00-11:00	8505	2.80	3.15	1.598	275.4	101.6	21.8	50.1
2019/12/28	27	11:00-12:00	8501	2.80	3.15	1.592	275.1	101.6	21.8	50.7
2019/12/28	28	12:00-13:00	8503	2.80	3.15	1.598	274.9	101.9	21.8	49.3
2019/12/28	29	13:00-14:00	8506	2.78	3.12	1.580	274.7	101.6	22.0	51.4
2019/12/28	30	14:00-15:00	8507	2.77	3.11	1.584	274.6	101.6	21.7	51.6



Auto Service

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Type: NT1E48F

2019/12/28	31	15:00-16:00	8508	2.77	3.11	1.586	276.3	101.8	22.3	50.0
2019/12/28	32	16:00-17:00	8501	2.77	3.11	1.588	276.4	101.6	22.0	51.5
2019/12/28	33	17:00-18:00	8504	2.76	3.10	1.584	276.3	101.9	22.0	51.5
2019/12/28	34	18:00-19:00	8504	2.77	3.11	1.582	275.1	101.5	21.9	51.1
2019/12/28	35	19:00-20:00	8501	2.74	3.08	1.581	274.8	101.6	22.1	49.7
2019/12/28	36	20:00-21:00	8506	2.74	3.08	1.587	276.2	101.7	22.5	50.4
2019/12/28	37	21:00-22:00	8502	2.72	3.06	1.588	275.0	101.6	22.1	50.1
2019/12/28	38	22:00-23:00	8507	2.74	3.07	1.584	276.6	101.5	22.5	52.2
2019/12/28	39	23:00-00:00	8508	2.73	3.07	1.588	274.2	101.9	21.7	51.6
2019/12/29	40	00:00-01:00	8506	2.74	3.08	1.585	274.9	101.9	22.4	52.1
2019/12/29	41	01:00-02:00	8501	2.74	3.08	1.588	274.8	101.5	22.1	50.2
2019/12/29	42	02:00-03:00	8503	2.73	3.06	1.581	274.8	101.7	22.0	51.5
2019/12/29	43	03:00-04:00	8502	2.73	3.06	1.584	274.5	101.5	22.5	51.8
2019/12/29	44	04:00-05:00	8502	2.69	3.02	1.590	276.0	101.9	22.5	50.8
2019/12/29	45	05:00-06:00	8504	2.70	3.03	1.582	275.7	101.6	21.7	51.5
2019/12/29	46	06:00-07:00	8505	2.69	3.02	1.583	276.1	101.6	22.0	52.1
2019/12/29	47	07:00-08:00	8507	2.69	3.02	1.583	275.9	101.8	22.3	49.6
2019/12/29	48	08:00-09:00	8507	2.68	3.01	1.583	274.3	101.9	22.5	51.7
2019/12/29	49	09:00-10:00	8507	2.70	3.03	1.589	275.7	101.6	21.9	50.3
2019/12/29	50	10:00-11:00	8504	2.69	3.02	1.586	276.4	101.8	21.8	51.3
2019/12/29	/	11:00-12:00	Cleaning air filter and spark plug fouling. Changed spark plug if necessary							

# PARTIAL MODEL INFORMATION DOCUMENT

No.: NT1E48F-ext.00

## Nantian Industry & trade

Yongkang Nantian Industry and Trade Co., Ltd.

**ENGINE TYPE** : **NT1E48F**

**SUBJECT** : **NRMM EMISSION**

**LEGAL BASIS** : **2016/1628/EU**

Date : 2019-12-06<sub>[YYYY-MM-DD]</sub>

Approval : Runsheng Tie

**AMENDMENT**

Version	Approval No.	Modification / Correction	Date
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

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**Part A****1. General information**

- 1.1. Make (trade name(s) of manufacturer) : Nantian Industry & trade
- 1.2. Commercial name(s) (if applicable) : N/A
- 1.3. Company name and address of manufacturer : Yongkang Nantian Industry and Trade Co., Ltd.  
NO.21 Jintong Road, Zhiying Phase II Industrial  
Zone, Zhiying Town, Yongkang City, Jinhua City,  
Zhejiang Province, China
- 1.4. Name and address of manufacturer's  
authorised representative (if any) : VALEX S.p.A  
Via Lago Maggiore, 24-36015 Schio(VI) ITALY
- 1.5. Name(s) and address(es) of  
assembly/manufacture plant(s) : Same as above 1.3.
- 1.6. ~~Engine type designation/~~engine family : Parent engine: NT1E48F  
designations/~~FT~~ Commercial names: N/A  
Engine within family: NT1E45F-1  
Commercial names: N/A
- 1.7. Category and sub-category of the engine : Category: NRSh  
type/engine family Sub-category: NRSh-v-1b
- 1.8. Emissions durability period category : 50hCat 1 (Consumer products)
- 1.9. Emissions stage : ~~V/Special Purpose Engine (SPE)~~
- 1.10. In case of NRS <19 kW only, engine family : ~~Yes/No~~  
consisting exclusively of engine types for snow  
throwers
- 1.11. Reference power is : ~~rated net power/~~maximum net power
- 1.12. Primary NRSC test cycle : ~~C1/C2/D2/E2/E3/F/G1/G2/G3/H~~
- 1.12.1. In case of variable speed IWP category only, : Not applicable/~~E2/E3~~  
Additional propulsion test cycle
- 1.12.2. In case of IWP category only, additional : Not applicable/~~D2/C1~~  
auxiliary NRSC test cycle
- 1.13. Transient test cycle : Not applicable/~~NRTC/LSI-NRTC~~
- 1.14. Restrictions on use (if applicable) : N/A

**Part B****2. Common design parameters of engine family**

- 2.1. Combustion Cycle : ~~four stroke cycle~~/two stroke cycle/~~rotary~~/other  
(specify)
- 2.2. Ignition Type : ~~Compression ignition~~/spark ignition
- 2.3. Configuration of the cylinders**
- 2.3.1. Position of the cylinders in the block : Single//~~in-line~~/~~opposed~~/radial/other(specify)
- 2.3.2. Bore centre to centre dimension (mm) : N/A
- 2.4. Combustion chamber type/design**
- 2.4.1. Open chamber/divided : Hemispheric chamber  
chamber/other(specify)
- 2.4.2. Valve and porting configuration : Refer to drawing No. 002
- 2.4.3. Number of valves per cylinder : One in and one out
- 2.5. Range of swept volume per cylinder (cm<sup>3</sup>) : See item 3.6.4. in Part C
- 2.6. Main Cooling medium : Air//~~Water~~/~~Oil~~
- 2.7. Method of air aspiration : naturally aspirated/~~pressure-charged~~/~~pressure-  
charged with charge cooler~~
- 2.8. Fuel**
- 2.8.1. Fuel Type : ~~Diesel (non-road gas-oil)~~/Ethanol for dedicated-  
compression ignition engines (ED95)/Petrol  
(E10)/Ethanol (E85)/Natural-  
gas/Biomethane/Liquid Petroleum Gas (LPG)
- 2.8.1.1. Sub Fuel type (Natural gas/Biomethane only) : ~~Universal fuel – high calorific fuel (H-gas) and low-  
calorific fuel (L-gas)~~/~~Restricted fuel – high calorific-  
fuel (H-gas)~~/~~Restricted fuel – low calorific fuel (L-  
gas)~~/Fuel specific (LNG)
- 2.8.2. Fuelling arrangement : Liquid-fuel only/~~Gaseous fuel only~~/~~Dual-fuel type-  
1A~~/~~Dual-fuel type 1B~~/~~Dual-fuel type 2A~~/~~Dual-fuel-  
type 2B~~/~~Dual-fuel type 3B~~
- 2.8.3. list of additional fuels, fuel mixtures or : N/A  
emulsions suitable for use by the engine, as  
declared by the manufacturer in accordance  
with point 1.2.3 of Annex I to Delegated  
Regulation (EU) 2017/654 (provide reference  
to recognised standard or specification)
- 2.8.4. Lubricant added to fuel : Yes/No
- 2.8.4.1. Specification : 2T,FD
- 2.8.4.2. Ratio of fuel to oil : 40:1
- 2.8.5. Fuel supply type : Pump (high pressure) line and injector/~~in-line pump-  
or distributor pump~~/Unit injector/~~Common-  
rail~~/Carburettor/~~port injector~~/~~direct injector~~/~~Mixing-  
unit~~/other(specify):
- 2.9. Engine management systems : mechanical/~~electronic control strategy~~<sup>(2)</sup>
- 2.10. Miscellaneous devices**
- 2.10.1. Exhaust gas recirculation: Yes/No : No  
(if yes, complete section 3.10.1. and provide  
a schematic diagram of the location and

- order of the devices)
- 2.10.2. Water injection: Yes/No : No  
(if yes, complete section 3.10.2. and provide a schematic diagram of the location and order of the devices)
- 2.10.3. Air injection: Yes/No : No  
(if yes, complete section 3.10.3. and provide a schematic diagram of the location and order of the devices)
- 2.10.4. Others: Yes/No : No  
(if yes, complete section 3.10.4 and provide a schematic diagram of the location and order of the devices)
- 2.11. Exhaust after-treatment system** (if yes : **Yes/No**  
provide a schematic diagram of the location and order of the devices)
- 2.11.1. Oxidation catalyst : ~~Yes/No~~  
(if yes, complete section 3.11.2.)
- 2.11.2. DeNOx system with selective reduction of : ~~Yes/No~~  
NOx (addition of reducing agent)  
(if yes, complete section 3.11.3.)
- 2.11.3. Other DeNOx systems : ~~Yes/No~~  
(if yes, complete section 3.11.3.)
- 2.11.4. Three-way catalyst combining oxidation and : ~~Yes/No~~  
NOx reduction  
(if yes, complete section 3.11.3.)
- 2.11.5. Particulate after-treatment system with : ~~Yes/No~~  
passive regeneration  
(if yes, complete section 3.11.4.)
- 2.11.5.1. Wall-flow/non-wall-flow : N/A
- 2.11.6. Particulate trap with active regeneration : ~~Yes/No~~  
(if yes, complete section 3.11.4.)
- 2.11.6.1. Wall-flow/non-wall-flow : N/A
- 2.11.7. Other particulate after-treatment systems : ~~Yes/No~~  
(if yes, complete section 3.11.4.)
- 2.11.8. Other after-treatment devices (specify) : ~~Yes/No~~  
(if yes, complete section 3.11.5.)
- 2.11.9. Other devices or features that have a strong : ~~Yes/No~~  
influence on emissions  
(if yes, complete section 3.11.7.)

**Part C****3. Essential characteristics of the engine type(s)**

Item Number	Item Description	Test	Installation	Homologation	Parent engine/ engine type	Engine types within the engine family (if applicable)
						Type 1
<b>3.1</b>	<b>Engine Identification</b>					
3.1.1.	Engine type designation			X	NT1E48F	NT1E45F-1
3.1.2.	Engine type designation shown on engine marking:			X	Yes	Yes
3.1.3.	Location of the statutory marking:			X	Refer to drawing No. 001	Refer to drawing No. 001
3.1.4.	Method of attachment of the statutory marking:			X	By engraving and/or labelling	By engraving and/or labelling
3.1.5.	Drawings of the location of the engine identification number (complete example with dimensions):			X	Refer to drawing No. 001	Refer to drawing No. 001
<b>3.2.</b>	<b>Performance Parameters</b>					
3.2.1.	Declared rated speed (rpm):	X			8500	8500
3.2.1.1.	Fuel delivery/stroke (mm <sup>3</sup> ) for diesel engine, fuel flow (g/h) for other engines, at rated net power:			X	1600	1410
3.2.1.2.	Declared rated net power (kW):	X			2.7	2.7
3.2.2.	Maximum power speed(rpm):			X	Same as above 3.2.1.	Same as above 3.2.1.
3.2.2.1.	Fuel delivery/stroke (mm <sup>3</sup> ) for diesel engine, fuel flow (g/h) for other engines, at maximum net power			X	Same as above 3.2.1.1.	Same as above 3.2.1.1.
3.2.2.2.	Maximum net power (kW):	X		X	Same as above 3.2.1.2.	Same as above 3.2.1.2.
3.2.3.	Declared maximum torque speed (rpm):	X			6000	6500
3.2.3.1.	Fuel delivery/stroke (mm <sup>3</sup> ) for diesel engine, fuel flow (g/h) for other engines, at maximum torque speed:			X	1560	1400
3.2.3.2.	Declared maximum torque (Nm):	X			2.9	2.9

Item Number	Item Description	Test	Installation	Homologation	Parent engine/ engine type	Engine types within the engine family (if applicable)
						Type 1
3.2.4.	Declared 100% test speed:	X			Same as above 3.2.1.	Same as above 3.2.1.
3.2.5.	Declared Intermediate test speed:	X			N/A	N/A
3.2.6.	Idle speed (rpm)	X			3200	3200
3.2.7.	Maximum no load speed (rpm):	X			11500	11500
3.2.8.	Declared minimum torque (Nm)	X			N/A	N/A
<b>3.3.</b>	<b>Run-in procedure</b>					
3.3.1.	Run in time:	X			N/A	N/A
3.3.2.	Run-in cycle:	X			N/A	N/A
<b>3.4.</b>	<b>Engine test</b>					
3.4.1.	Specific fixture required: Yes/No	X			No	No
3.4.1.1.	Description, including photographs and/or drawings, of the system for mounting the engine on the test bench including the power transmission shaft for connection to the dynamometer:	X			N/A	N/A
3.4.2.	Exhaust mixing chamber permitted by manufacturer: Yes/No	X			No	No
3.4.2.1.	exhaust mixing chamber description, photograph and/or drawing:	X			N/A	N/A
3.4.3.	Manufacturers chosen NRSC: RMC/Discrete mode	X			Discrete mode	Discrete mode
3.4.4.	Additional NRSC: E2/D2/C1	X			N/A	N/A
3.4.5.	Number of pre-conditioning cycles prior to transient test	X			N/A	N/A
3.4.6.	Pre-conditioning for RMC NRSC: Steady-state operation/RMC	X			N/A	N/A

Item Number	Item Description	Test	Installation	Homologation	Parent engine/ engine type	Engine types within the engine family (if applicable)
						Type 1
3.4.6.1.	In case of RMC, number of pre-conditioning RMC prior to RMC NRSC test	X			N/A	N/A
<b>3.5.</b>	<b>Lubrication system</b>					
3.5.1.	<i>Lubricant temperature</i>					
3.5.1.1.	Minimum (deg. °C):	X			N/A	N/A
3.5.1.2.	Maximum (deg. °C):	X			N/A	N/A
<b>3.6.</b>	<b>Combustion Cylinder</b>					
3.6.1.	Bore(mm):			X	48	45
3.6.2.	Stroke(mm):			X	34	35
3.6.3.	Number of cylinders:			X	1	1
3.6.4.	Engine total swept volume (cm <sup>3</sup> ):			X	61.5	55.7
3.6.5.	Swept volume per cylinder as % of parent engine:			X	100%	90.6%
3.6.6.	Volumetric compression ratio:			X	8 :1	8.2 :1
3.6.7.	Combustion system description:			X	Spark ignition	Spark ignition
3.6.8.	Drawings of combustion chamber and piston crown:			X	Refer to drawing no. 002 and 003	Refer to drawing no. 002 and 003
3.6.9.	Minimum cross sectional area of inlet and outlet ports (mm <sup>2</sup> ):			X	Inlet 255.5 mm <sup>2</sup> , Outlet 266.8 mm <sup>2</sup>	Inlet 247.7 mm <sup>2</sup> , Outlet 244.7 mm <sup>2</sup>
3.6.10.	<i>Valve timing</i>					
3.6.10.1.	Maximum lift and angles of opening and closing in relation to dead centre or equivalent data:			X	Refer to drawing No. 005	Refer to drawing No. 005
3.6.10.2.	Reference and/or setting range:			X	N/A	N/A
3.6.10.3.	Variable valve timing system: Yes/No			X	No	No
3.6.10.3.1.	Type: continuous/(on/off)			X	N/A	N/A

Item Number	Item Description	Test	Installation	Homologation	Parent engine/ engine type	Engine types within the engine family (if applicable)
						Type 1
3.6.10.3.2.	Cam phase shift angle:			X	N/A	N/A
3.6.11.	Porting configuration					
3.6.11.1.	position, size and number:			X	Refer to drawing no. 002 and 003	Refer to drawing no. 002 and 003
<b>3.7.</b>	<b>Cooling system</b>					
3.7.1.	<i>Liquid cooling</i>				N/A	N/A
3.7.1.1.	Nature of liquid:			X	No	No
3.7.1.2.	Circulating pumps: Yes/No			X	N/A	N/A
3.7.1.2.1.	type(s):			X	N/A	N/A
3.7.1.2.2.	Drive ratio(s):			X	N/A	N/A
3.7.1.3.	Minimum coolant temperature at outlet (deg. °C):	X			N/A	N/A
3.7.1.4.	Maximum coolant temperature at outlet (deg. °C):	X				
3.7.2.	<i>Air cooling</i>					
3.7.2.1.	fan: Yes/No			X	Yes	Yes
3.7.2.1.1.	type(s):			X	N/A	N/A
3.7.2.1.2.	Drive ratio(s):			X	N/A	N/A
3.7.2.2.	Maximum temperature at reference point (deg. °C):			X	290	280
3.7.2.2.1.	Reference point location			X	Spark plug washer	Spark plug washer
<b>3.8.</b>	<b>Aspiration</b>					
3.8.1.	Maximum allowable intake depression at 100% engine speed and at 100% load (kPa)	X	X			
3.8.1.1.	With clean air cleaner:	X	X		-1.9	-1.9
3.8.1.2.	With dirty air cleaner:	X	X		-1.9	-1.9
3.8.1.3.	Location, of measurement:	X	X		Behind air filter	Behind air filter

Item Number	Item Description	Test	Installation	Homologation	Parent engine/ engine type	Engine types within the engine family (if applicable)
						Type 1
3.8.2.	Pressure charger(s): Yes/No			X	No	No
3.8.2.1.	Type(s):			X	N/A	N/A
3.8.2.2.	Description and schematic diagram of the system (e.g. maximum charge pressure, waste gate, VGT, Twin turbo, etc.):			X	N/A	N/A
3.8.3.	Charge air cooler: Yes/No	X	X		No	No
3.8.3.1.	Type: air-air/air-water/other(specify)			X	N/A	N/A
3.8.3.2.	Maximum charge air cooler outlet temperature at 100% speed and 100% load (deg. °C):	X	X		N/A	N/A
3.8.3.3.	Maximum allowable pressure drop across charge cooler at 100% engine speed and at 100% load (kPa):	X	X		N/A	N/A
3.8.4.	Intake throttle valve: Yes/No			X	Yes	Yes
3.8.5.	Device for recycling crankcase gases: Yes/No			X	No	No
3.8.5.1.	If yes, description and drawings:			X	N/A	N/A
3.8.5.2.	If no, compliance with paragraph 6.10 of Annex VI to Delegated Regulation (EU) 2017/654: Yes/No	X			N/A	N/A
3.8.6.	Inlet path					
3.8.6.1.	Description of inlet path, (with drawings, photographs and/or part numbers):			X	Refer to drawing No. 008	Refer to drawing No. 008
3.8.7.	Air filter			X	Yes	Yes
3.8.7.1.	Type:			X	43F	43F
3.8.8.	Intake air-silencer				N/A	N/A
3.8.1.1.	Type:			X	N/A	N/A

Item Number	Item Description	Test	Installation	Homologation	Parent engine/ engine type	Engine types within the engine family (if applicable)
						Type 1
<b>3.9.</b>	<b>Exhaust system</b>					
3.9.1.	Description of the exhaust system (with drawings, photos and/or part numbers as required):			X	Refer to drawing No. 007	Refer to drawing No. 007
3.9.2.	Maximum exhaust temperature (deg. °C):	X			650	650
3.9.3.	Maximum permissible exhaust backpressure at 100% engine speed and at 100% load (kPa):	X	X		5.0	5.0
3.9.3.1.	Location of measurement:	X	X		Inlet of muffler	Inlet of muffler
3.9.4.	Exhaust backpressure at loading level specified by manufacturer for variable restriction after-treatment at start of test (kPa):	X			N/A	N/A
3.9.4.1.	Location and speed/load conditions:	X			N/A	N/A
3.9.5.	Exhaust throttle valve: Yes/No			X	No	No
<b>3.10.</b>	<b>Miscellaneous devices: Yes/No</b>				No	No
3.10.1.	<i>Exhaust gas recirculation (EGR)</i>				N/A	N/A
3.10.1.1.	Characteristics: cooled/uncooled, high pressure/low pressure/other (specify):			X	N/A	N/A
3.10.2.	<i>Water injection</i>				N/A	N/A
3.10.2.1.	Operation principle:			X	N/A	N/A
3.10.3.	Air injection				N/A	N/A
3.10.3.1.	Operation principle:			X	N/A	N/A
3.10.4.	Other(s)				N/A	N/A
3.10.4.1.	Type(s):			X	N/A	N/A
<b>3.11.</b>	<b>Exhaust after-treatment system</b>					

Item Number	Item Description	Test	Installation	Homologation	Parent engine/ engine type	Engine types within the engine family (if applicable)
						Type 1
3.11.1.	<i>Location</i>		X		Inside the muffler	Inside the muffler
3.11.1.1.	Place(s) and maximum/minimum distance(s) from engine to first after-treatment device:		X		33mm/27mm	33mm/27mm
3.11.1.2.	Maximum temperature drop from exhaust or turbine outlet to first after-treatment device (deg. °C) if stated:	X	X		N/A	N/A
3.11.1.2.1.	Test conditions for measurement:	X	X		N/A	N/A
3.11.1.3.	Minimum temperature at inlet to first after-treatment device (deg. C), if stated:	X	X		N/A	N/A
3.11.1.3.1.	Test conditions for measurement:	X	X		N/A	N/A
3.11.2.	Oxidation catalyst					
3.11.2.1.	Number of catalytic converters and elements:			X	1	1
3.11.2.2.	Dimensions and volume of the catalytic converter(s):			X	Φ35*21mm, volume: 17.1cm <sup>3</sup>	Φ35*21mm, volume: 17.1cm <sup>3</sup>
3.11.2.3.	Total charge of precious metals:			X	50g/ft <sup>3</sup>	50g/ft <sup>3</sup>
3.11.2.4.	Relative concentration of each compound:			X	Pt/Pd/Rh=1/0/0	Pt/Pd/Rh=1/0/0
3.11.2.5.	Substrate (structure and material):			X	Honeycomb, 0Cr21A16	Honeycomb, 0Cr21A16
3.11.2.6.	Cell density:			X	400	400
3.11.2.7.	Type of casing for the catalytic converter(s):			X	Steel casing	Steel casing
3.11.3.	<i>Catalytic exhaust gas after treatment system for NO<sub>x</sub> or three way catalyst</i>					
3.11.3.1.	Type:			X	N/A	N/A
3.11.3.2.	Number of catalytic converters and elements:			X	N/A	N/A
3.11.3.3.	Type of catalytic action:			X	N/A	N/A
3.11.3.4.	Dimensions and volume of the catalytic converter(s):			X	N/A	N/A

Item Number	Item Description	Test	Installation	Homologation	Parent engine/ engine type	Engine types within the engine family (if applicable)
						Type 1
3.11.3.5.	Total charge of precious metals:			X	N/A	N/A
3.11.3.6.	Relative concentration of each compound:			X	N/A	N/A
3.11.3.7.	Substrate (structure and material):			X	N/A	N/A
3.11.3.8.	Cell density:			X	N/A	N/A
3.11.3.9.	Type of casing for the catalytic converter(s):			X	N/A	N/A
3.11.3.10.	Method of regeneration:	X		X	N/A	N/A
3.11.3.10.1.	Infrequent regeneration: Yes/No:	X			No	No
3.11.3.11.	Normal operating temperature range (deg. °C):	X	X		N/A	N/A
3.11.3.12.	Consumable reagent: Yes/No			X	No	No
3.11.3.12.1.	Type and concentration of reagent needed for catalytic action:			X	N/A	N/A
3.11.3.12.2.	Lowest concentration of the active ingredient present in the reagent that does not activate warning system ( $CD_{min}$ ) (%vol):			X	N/A	N/A
3.11.3.12.3.	Normal operational temperature range of reagent:		X		N/A	N/A
3.11.3.12.4.	International standard:		X	X	N/A	N/A
3.11.3.13.	NO <sub>x</sub> sensor(s): Yes/No			X	No	No
3.11.3.13.1.	Type:			X	N/A	N/A
3.11.3.13.2.	Location(s)			X	N/A	N/A
3.11.3.14.	Oxygen sensor(s): Yes/No			X	No	No
3.11.3.14.1.	Type:			X	N/A	N/A
3.11.3.14.2.	Location(s):			X	N/A	N/A
3.11.4.	<i>Particulate trap</i>				N/A	N/A

Item Number	Item Description	Test	Installation	Homologation	Parent engine/ engine type	Engine types within the engine family (if applicable)
						Type 1
3.11.4.1.	Type of filtration: through flow/partial flow/wall flow/other (specify)			X	N/A	N/A
3.11.4.2'	Make:			X	N/A	N/A
3.11.4.2.	Type:			X	N/A	N/A
3.11.4.3.	Dimensions and capacity of the particulate trap:			X	N/A	N/A
3.11.4.4.	Location place(s) and maximum and minimum distance(s) from engine:		X		N/A	N/A
3.11.4.5.	Method or system of regeneration, description and/or drawing:			X	N/A	N/A
3.11.4.5.1.	Infrequent regeneration: Yes/No			X	No	No
3.11.4.5.2.	Minimum exhaust gas temperature for initiating regeneration procedure (deg. °C):			X	N/A	N/A
3.11.4.6.	Catalytic coating: Yes/No			X	No	No
3.11.4.6.1.	Type of catalytic action:			X	N/A	N/A
3.11.4.7.	Fuel borne catalyst (FBC): Yes/No			X	No	No
3.11.4.8.	Normal operating temperature range (deg. °C):			X	N/A	N/A
3.11.4.9.	Normal operating pressure range (kPa)			X	N/A	N/A
3.11.4.10.	Storage capacity soot/ash [g]:			X	N/A	N/A
3.11.4.11.	Oxygen sensor(s): Yes/No			X	N/A	N/A
3.11.4.11.1.	Type:			X	N/A	N/A
3.11.4.11.2.	Location(s):			X	N/A	N/A
3.11.5.	<i>Other systems</i>				N/A	N/A
3.11.5.1.	Description and operation:			X	N/A	N/A

Item Number	Item Description	Test	Installation	Homologation	Parent engine/ engine type	Engine types within the engine family (if applicable)
						Type 1
3.11.6.	Infrequent Regeneration				N/A	N/A
3.11.6.1.	Number of cycles with regeneration	X			N/A	N/A
3.11.6.2.	Number of cycles without regeneration	X			N/A	N/A
3.11.7.	Other device(s) or feature(s)				N/A	N/A
3.11.7.1.	Type(s):			X	N/A	N/A
<b>3.12.</b>	<b>Fuel feed for liquid-fuelled CI or, where applicable, dual-fuel engines</b>					N/A
3.12.1.	<i>Feed pump</i>				N/A	N/A
3.12.1.1.	Pressure (kPa) or characteristic diagram:			X	N/A	N/A
3.12.2.	<i>Injection system</i>				N/A	N/A
3.12.2.1.	Pump				N/A	N/A
3.12.2.1.1.	Type(s):			X	N/A	N/A
3.12.2.1.2.	Rated pump speed (rpm):			X	N/A	N/A
3.12.2.1.3.	mm <sup>3</sup> per stroke or cycle at full injection at rated pump speed:			X	N/A	N/A
3.12.2.1.4.	Torque peak pump speed (rpm):			X	N/A	N/A
3.12.2.1.5.	mm <sup>3</sup> per stroke or cycle at full injection at torque peak pump speed			X	N/A	N/A
3.12.2.1.6.	Characteristic diagram:			X	N/A	N/A
3.12.2.1.7.	Method used: on engine/on pump bench			X	N/A	N/A
3.12.2.2.	Injection timing				N/A	N/A
3.12.2.2.1.	Injection timing curve:			X	N/A	N/A
3.12.2.2.2.	Static Timing:			X	N/A	N/A
3.12.2.3.	Injection piping				N/A	N/A

Item Number	Item Description	Test	Installation	Homologation	Parent engine/ engine type	Engine types within the engine family (if applicable)
						Type 1
3.12.2.3.1.	Length(s) (mm):			X	N/A	N/A
3.12.2.3.2.	Internal diameter (mm):			X	N/A	N/A
3.12.2.4.	Common rail: Yes/No			X	No	No
3.12.2.4.1.	Type:			X	N/A	N/A
3.12.3.	<i>Injector(s)</i>				N/A	N/A
3.12.3.1.	Type(s):			X	N/A	N/A
3.12.3.2.	Opening pressure (kPa):			X	N/A	N/A
3.12.4.	<i>Electronic control unit (ECU): Yes/No</i>			X	No	No
3.12.4.1.	Type(s):			X	N/A	N/A
3.12.4.2.	Software calibration number(s):			X	N/A	N/A
3.12.4.3.	Communication standard(s) for access to data stream information: ISO 27145 with ISO 15765-4 (CAN-based)/ISO 27145 with ISO 13400 (TCP/IP-based)/SAE J1939-73	X		X	N/A	N/A
3.12.5.	<i>Governor</i>				N/A	N/A
3.12.5.1.	Type(s):			X	N/A	N/A
3.12.5.2.	Speed at which cut-off starts under full load:			X	N/A	N/A
3.12.5.3.	Maximum no-load speed:			X	N/A	N/A
3.12.5.4.	Idle speed:			X	N/A	N/A
3.12.6.	<i>Cold-start system: Yes/No</i>			X	No	No
3.12.6.1.	Type(s):			X	N/A	N/A
3.12.6.2.	Description:			X	N/A	N/A
3.12.7.	Fuel temperature at the inlet to the fuel injection pump				N/A	N/A
3.12.7.1.	Minimum (deg. °C):	X			N/A	N/A

Item Number	Item Description	Test	Installation	Homologation	Parent engine/ engine type	Engine types within the engine family (if applicable)
						Type 1
3.12.7.2.	Maximum (deg. °C):	X			N/A	N/A
<b>3.13.</b>	<b>Fuel feed for liquid fuel spark ignition engine</b>					
3.13.1.	<i>Carburettor</i>				Refer to drawing No. 004	Refer to drawing No. 004
3.13.1.1.	Type(s):			X	WT966, MC16A-09, MC16E14-4	WT966, MC16A-09, MC16E14-4
3.13.2.	<i>Port fuel injection:</i>				N/A	N/A
3.13.2.1.	single-point / multi-point			X	N/A	N/A
3.13.2.2.	Make:			X	N/A	N/A
3.13.2.2.	Type(s):			X	N/A	N/A
3.13.3.	<i>Direct injection:</i>				N/A	N/A
3.13.3.1.	Type(s):			X	N/A	N/A
3.13.4.	<i>Fuel temperature at location specified by manufacturer</i>				N/A	N/A
3.13.4.1.	Location:	X			N/A	N/A
3.13.4.2.	Minimum (deg. °C)	X			N/A	N/A
3.13.4.3.	Maximum (deg. °C)	X			N/A	N/A
<b>3.14.</b>	<b>Fuel feed for gaseous fuel engines or where applicable, dual fuel engines (in the case of systems laid out in a different manner, supply equivalent information)</b>					
3.14.1.	<i>Fuel: LPG /NG-H/NG-L /NG-HL/LNG/Fuel specific LNG</i>	X		X	N/A	N/A
3.14.2.	<i>Pressure regulator(s)/vaporiser(s)</i>				N/A	N/A
3.14.2.1.	Type(s)			X	N/A	N/A
3.14.2.2.	Number of pressure reduction stages			X	N/A	N/A
3.14.2.3.	Pressure in final stage minimum and maximum. (kPa)			X	N/A	N/A
3.14.2.4.	Number of main adjustment points:			X	N/A	N/A

Item Number	Item Description	Test	Installation	Homologation	Parent engine/ engine type	Engine types within the engine family (if applicable)
						Type 1
3.14.2.5.	Number of idle adjustment points:			X	N/A	N/A
3.14.3.	<i>Fuelling system: mixing unit/gas injection/liquid injection/direct injection</i>			X	N/A	N/A
3.14.3.1.	Mixture strength regulation				N/A	N/A
3.14.3.1.1.	System description and/or diagram and drawings:			X	N/A	N/A
3.14.4.	<i>Mixing unit</i>				N/A	N/A
3.14.4.1.	Number:			X	N/A	N/A
3.14.4.2'.	Make:			X	N/A	N/A
3.14.4.2.	Type(s):			X	N/A	N/A
3.14.4.3.	Location:			X	N/A	N/A
3.14.4.4.	Adjustment possibilities:			X	N/A	N/A
3.14.5.	<i>Inlet manifold injection</i>				N/A	N/A
3.14.5.1.	Injection: single-point/multi-point			X	N/A	N/A
3.14.5.2.	Injection: continuous/simultaneously timed/ sequentially timed			X	N/A	N/A
3.14.5.3.	Injection equipment				N/A	N/A
3.14.5.3.1.	Type(s):			X	N/A	N/A
3.14.5.3.2.	Adjustment possibilities:			X	N/A	N/A
3.14.5.4.	Supply pump				N/A	N/A
3.14.5.4.1.	Type(s):			X	N/A	N/A
3.14.5.5.	Injector(s)				N/A	N/A
3.14.5.5.1.	Type(s):			X	N/A	N/A
3.14.6.	<i>Direct injection</i>				N/A	N/A

Item Number	Item Description	Test	Installation	Homologation	Parent engine/ engine type	Engine types within the engine family (if applicable)
						Type 1
3.14.6.1.	Injection pump/pressure regulator			X	N/A	N/A
3.14.6.1.1.	Type(s):			X	N/A	N/A
3.14.6.1.2.	Injection timing (specify):			X	N/A	N/A
3.14.6.2.	Injector(s)				N/A	N/A
3.14.6.2.1.	Type(s):			X	N/A	N/A
3.14.6.2.2.	Opening pressure or characteristic diagram :			X	N/A	N/A
3.14.7.	<i>Electronic Control Unit (ECU)</i>				N/A	N/A
3.14.7.1.	Type(s):			X	N/A	N/A
3.14.7.2.	Adjustment possibilities:			X	N/A	N/A
3.14.7.3.	Software calibration number(s):			X	N/A	N/A
3.14.8.	<i>Approvals of engines for several fuel compositions</i>				N/A	N/A
3.14.8.1.	Self-adaptive feature: Yes/No	X	X	X	No	No
3.14.8.2.	Calibration for a specific gas composition: NG-H/NG-L/NG-HL/ LNG/Fuel specific LNG	X	X	X	N/A	N/A
3.14.8.3.	Transformation for a specific gas composition: NG-HT/NG-LT/NG-HLT	X	X	X	N/A	N/A
3.14.9.	<i>Fuel temperature pressure regulator final stage</i>				N/A	N/A
3.14.9.1.	Minimum (deg. °C):	X			N/A	N/A
3.14.9.2.	Maximum (deg. °C):	X			N/A	N/A
<b>3.15.</b>	<b>Ignition system</b>					
3.15.1.	<i>Ignition coil(s)</i>					
3.15.1.1.	Type(s):			X	YD45BS, 43F	YD45BS, 43F
3.15.1.2.	Number:			X	1	1

Item Number	Item Description	Test	Installation	Homologation	Parent engine/ engine type	Engine types within the engine family (if applicable)
						Type 1
3.15.2.	<i>Spark plug(s)</i>					
3.15.2.1.	Type(s):			X	L7RTC, L7T, L8RTF, BPMR7A	L7RTC, L7T, L8RTF, BPMR7A
3.15.2.2.	Gap setting:			X	0.6±0.1mm	0.6±0.1mm
3.15.3.	<i>Magneto</i>			X	N/A	N/A
3.15.3.1.	Type(s):			X	N/A	N/A
3.15.4.	<i>Ignition timing control: Yes/No</i>			X	Yes	Yes
3.15.4.1.	Static advance with respect to top dead centre (crank angle degrees):			X	N/A	N/A
3.15.4.2.	Advance curve or map:			X	Refer to drawing No. 006	Refer to drawing No. 006
3.15.4.3.	Electronic control: Yes/No			X	No	No

**Attachment 1      Photographs of the engines**



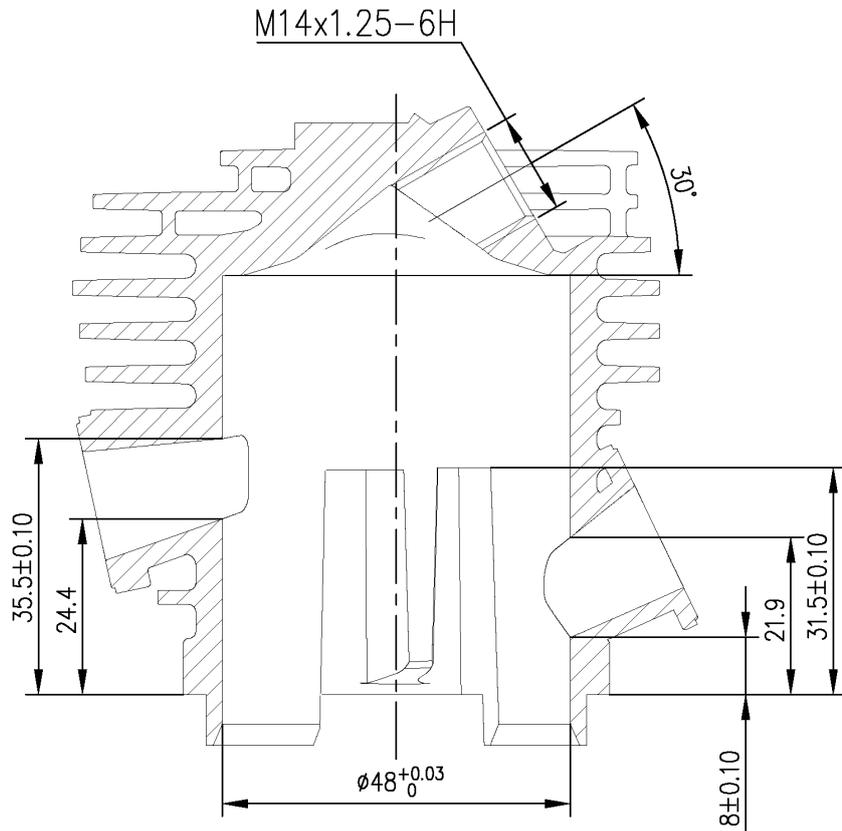
**Attachment 2 Drawings of the engines**



Trade name/Trade mark/Manufacturer name  
 Engine model  
 Engine identification number (engine production date inc.)  
 Approval No./Approval mark: e24\*2016/1628\*XXXXXXXX\*XXXX\*00 or  
 e24 XXXX/P V-XXXX

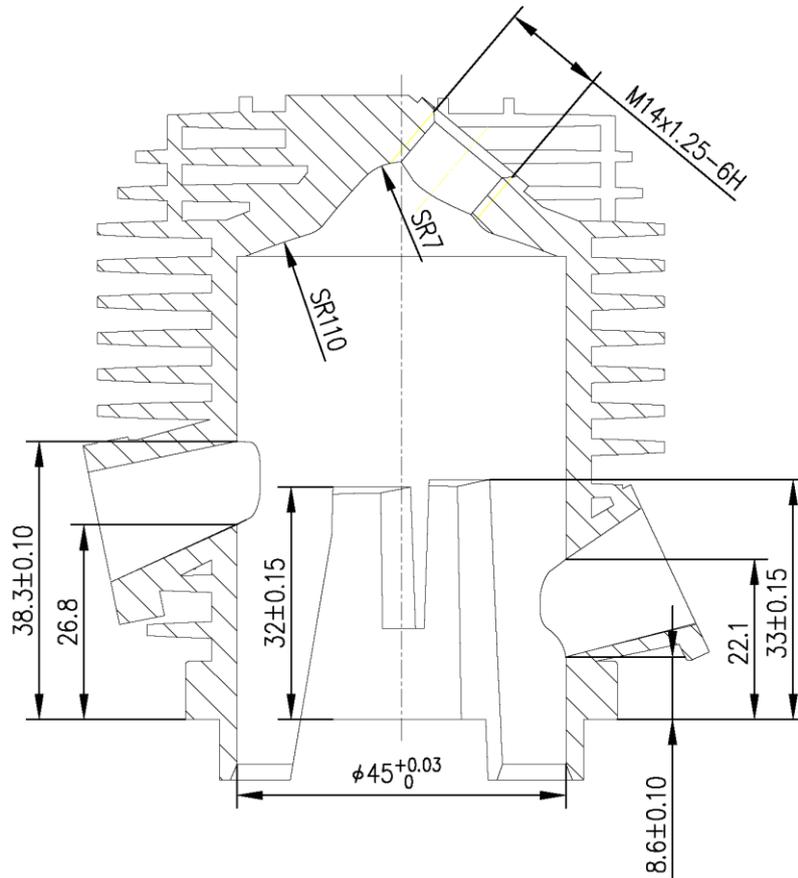
Remarks: this sample only shows the contents that need to be included on the engine marking, the actual layout may adjust according manufacturer's requirement.

Engine type	NT1E48F, NT1E45F-1
Position of statutory marking	
Position of engine identification number.	
Drawing No.	001



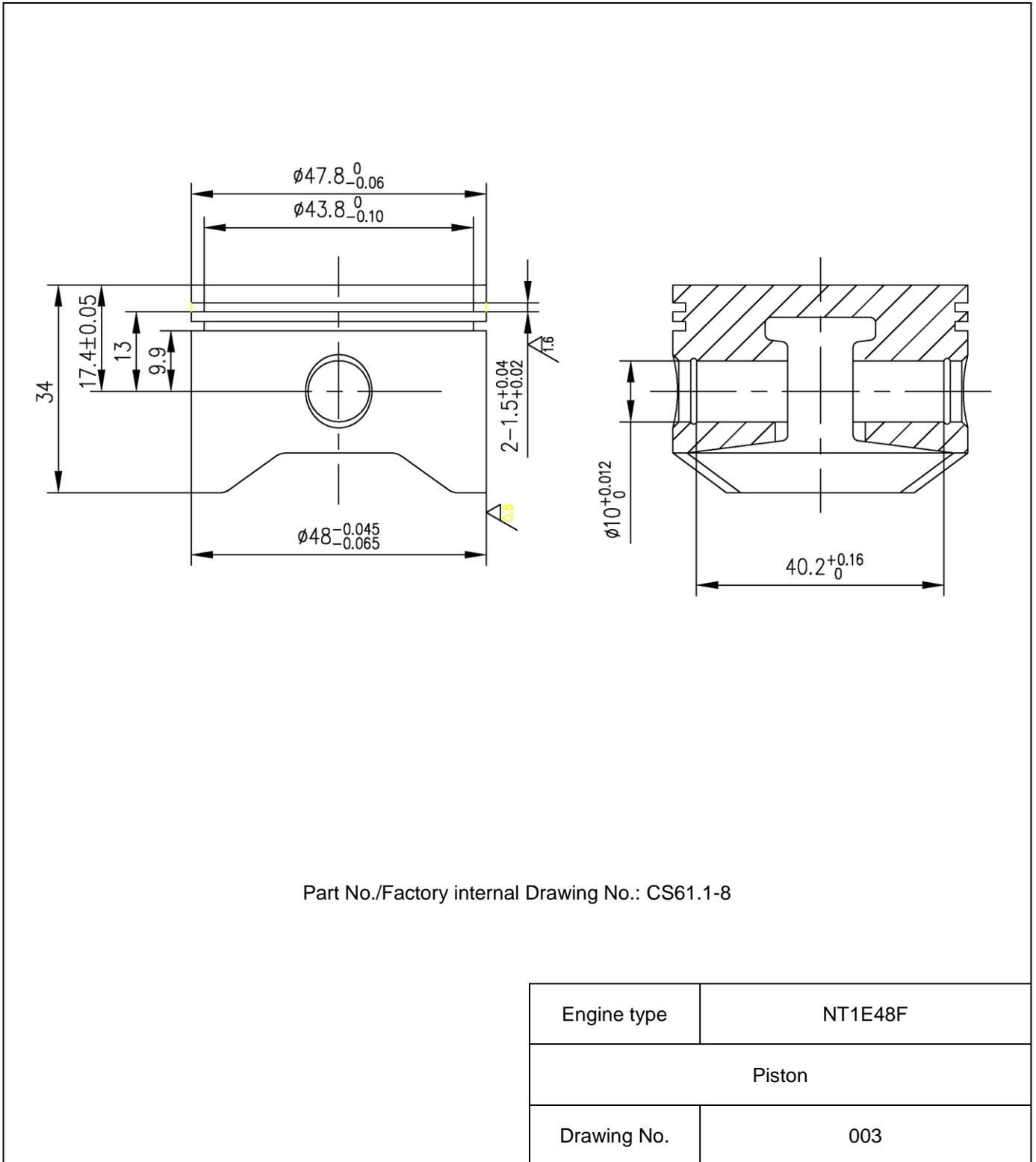
Part No./Factory internal Drawing No.: YD61.5E-3

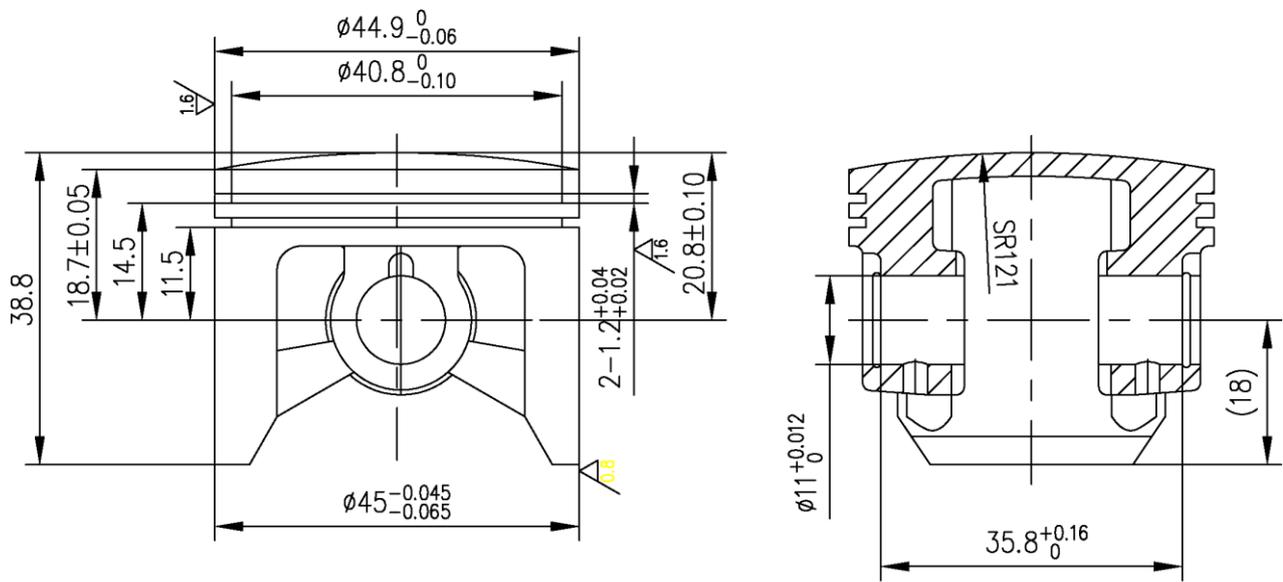
Engine type	NT1E48F
Combustion chamber	
Valve and port configuration	
Drawing No.	002



Part No./Factory internal Drawing No.: YD60E-3

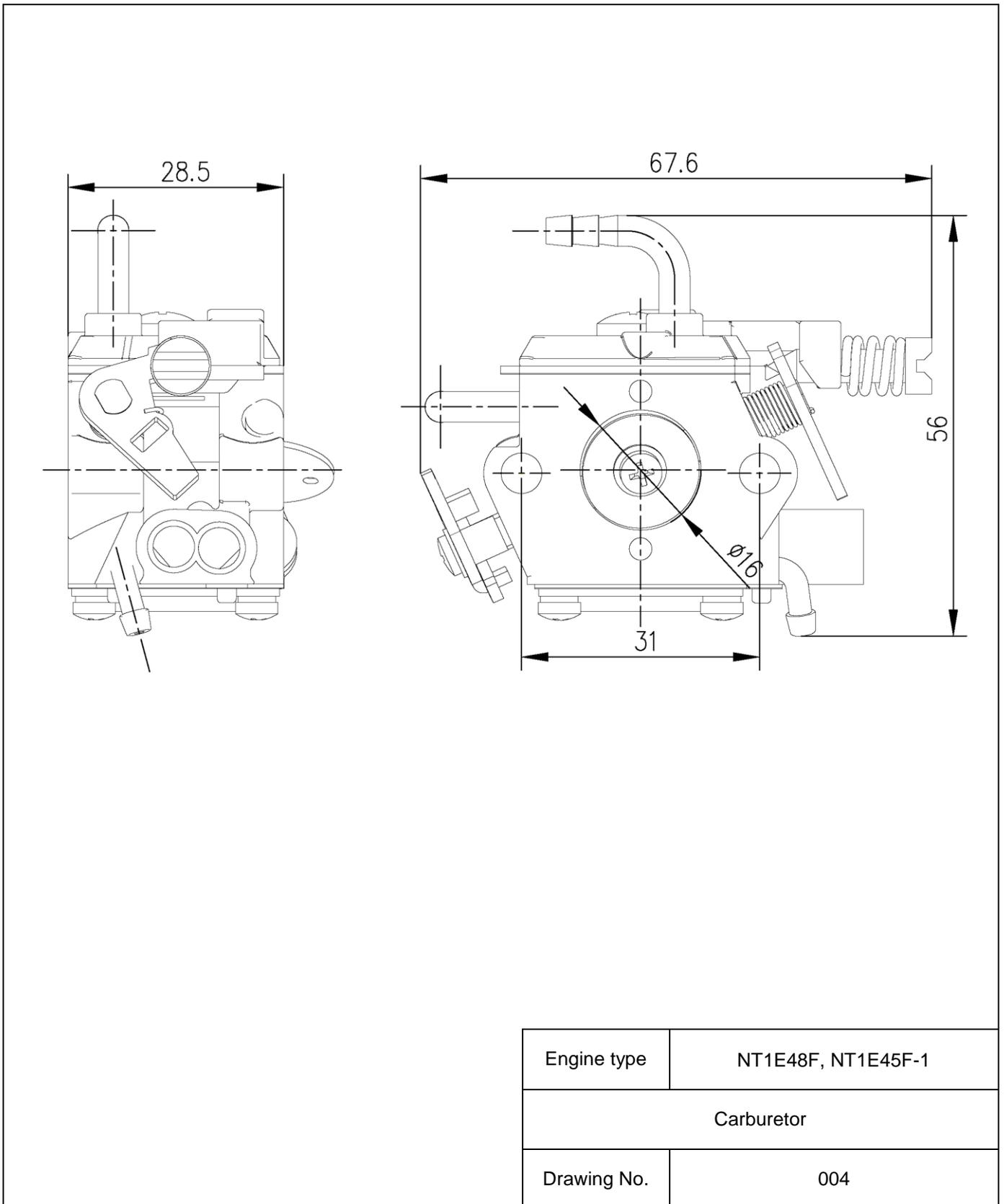
Engine type	NT1E45F-1
Combustion chamber	
Valve and port configuration	
Drawing No.	002



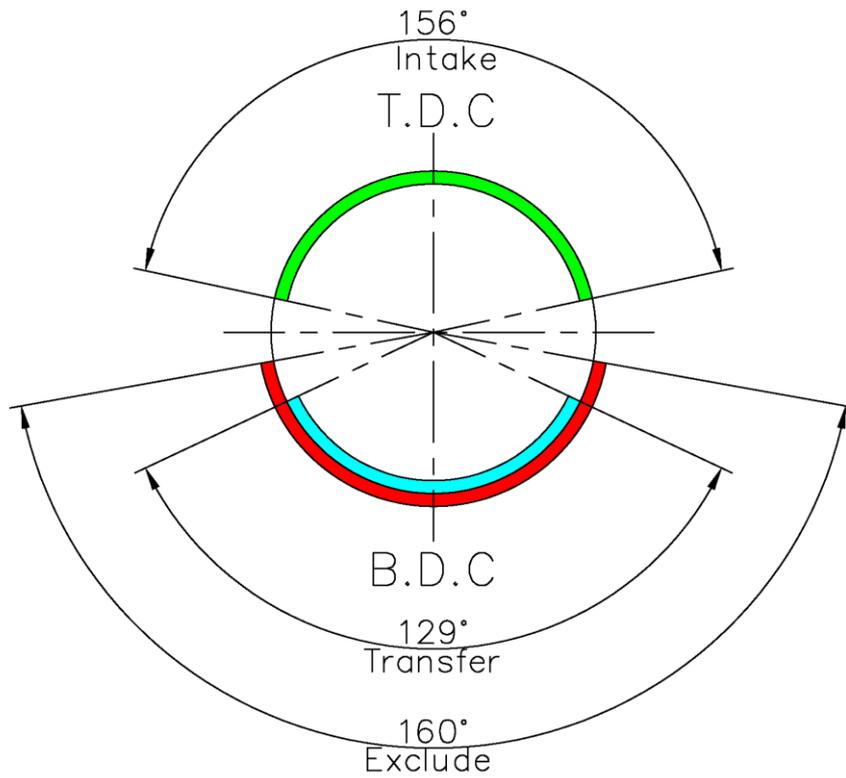


Part No./Factory internal Drawing No.: CS60.1-8

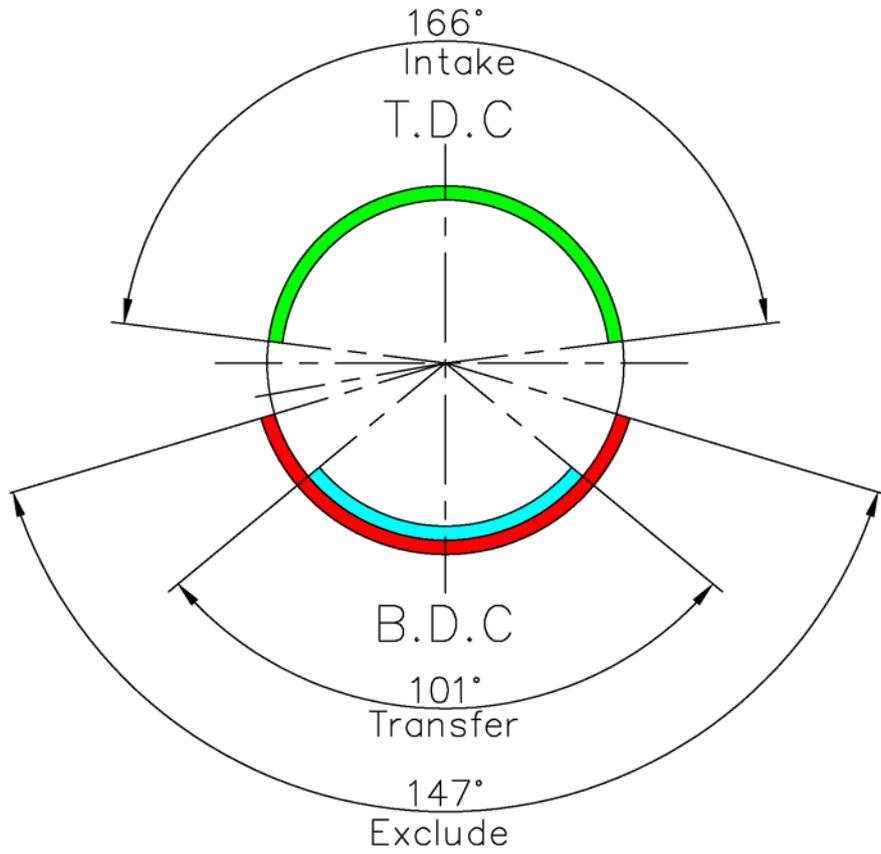
Engine type	NT1E45F-1
Piston	
Drawing No.	003



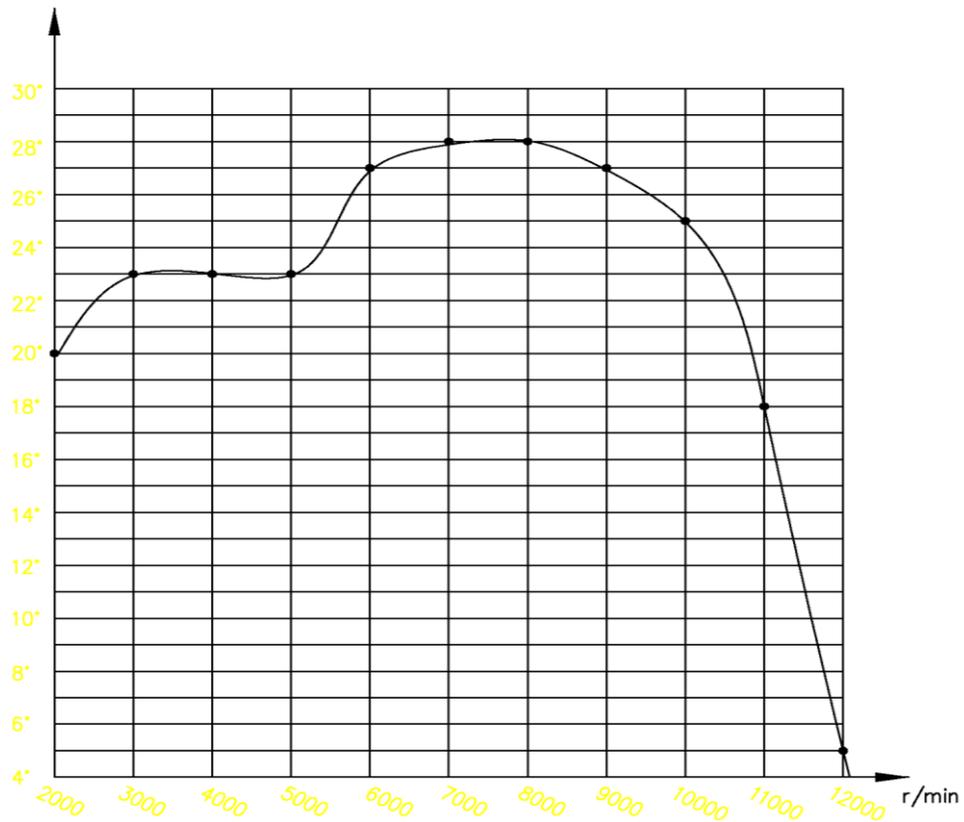
Engine type	NT1E48F, NT1E45F-1
Carburetor	
Drawing No.	004



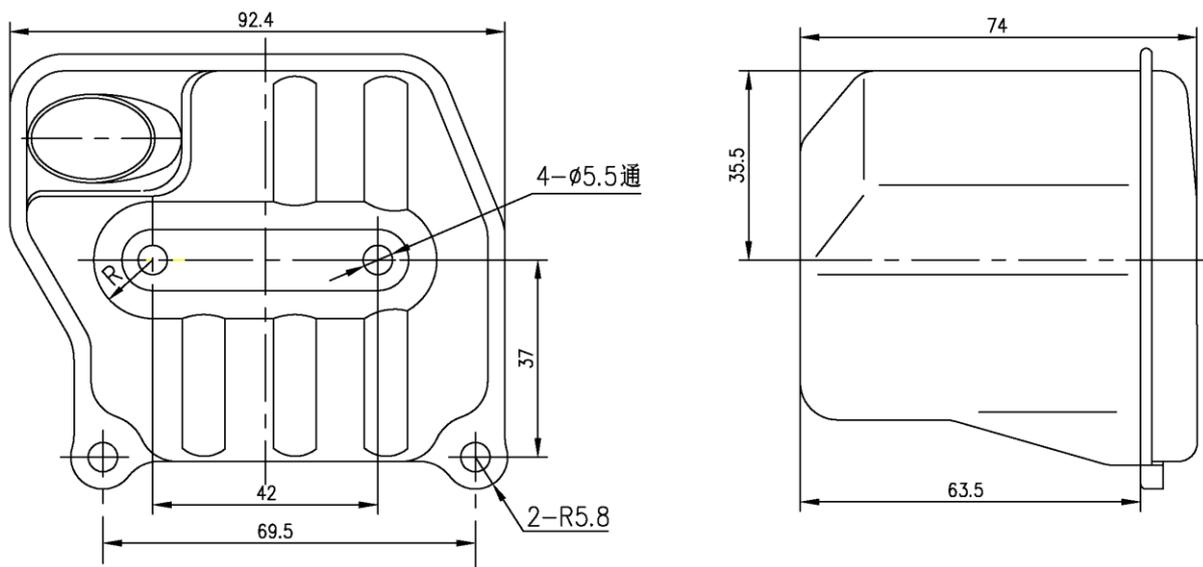
Engine type	NT1E48F
Valve timing	
Drawing No.	005



Engine type	NT1E45F-1
Valve timing	
Drawing No.	005

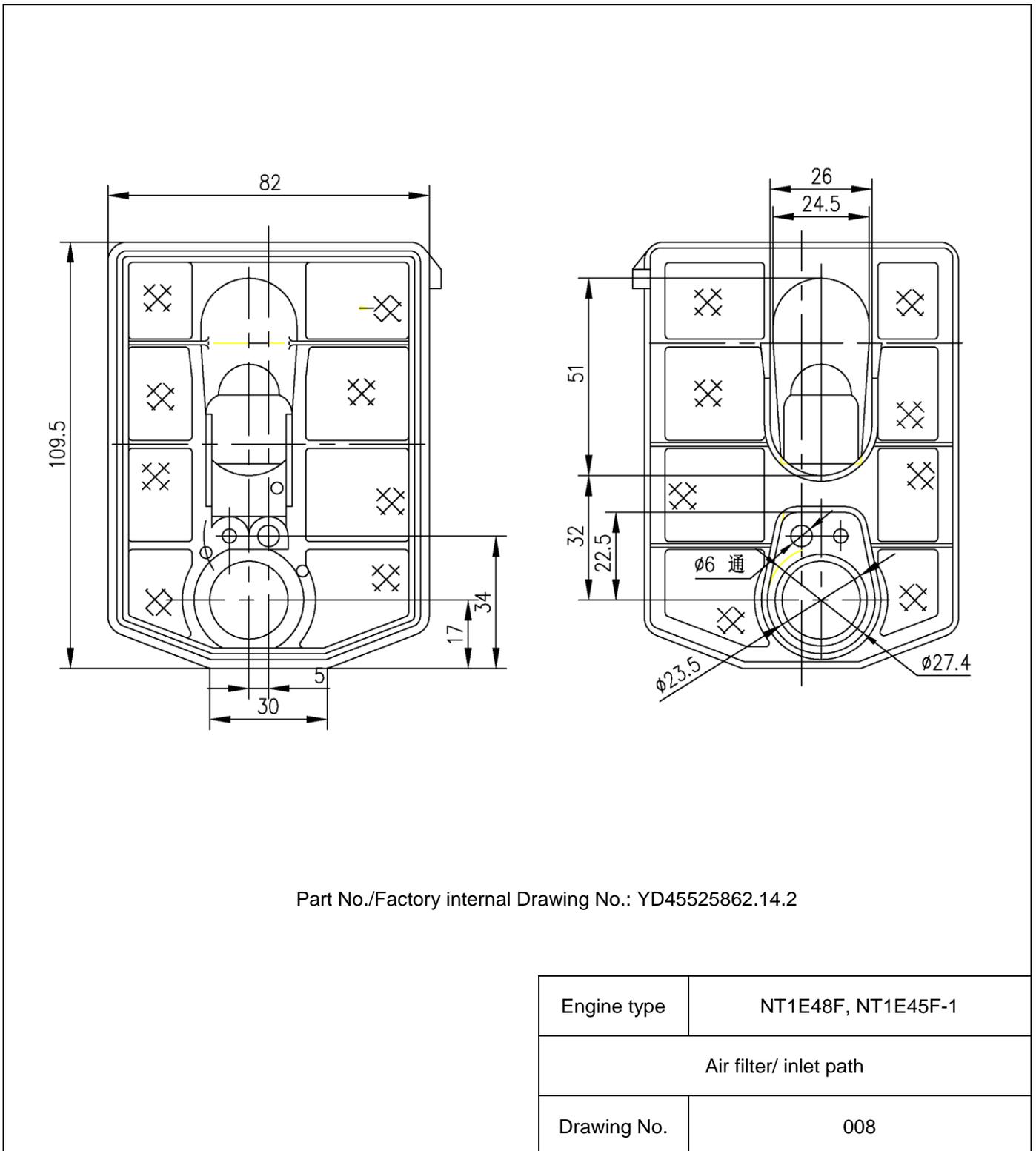


Engine type	NT1E48F, NT1E45F-1
Ignition advance curve	
Drawing No.	006

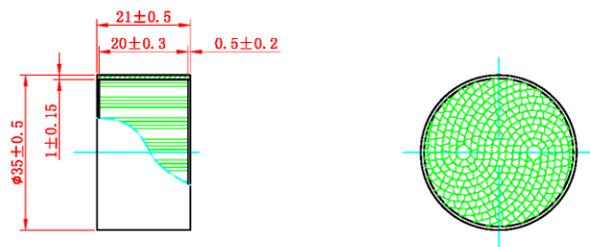


Part No./Factory internal Drawing No.: YD45/52/58/62.8

Engine type	NT1E48F, NT1E45F-1
Exhaust System	
Drawing No.	007



技术规格 Technical Specification		
催化剂内芯体积 Catalyst Honeycomb Volume (cm³)	17.10	
催化剂孔密度 Catalyst Cell Density (psi)	400	
贵金属含量 Noble Metals Contents	元素 Element	标称值 Nominal
	Pt (mg)	30.20
	Pd (mg)	0
	Rh (mg)	0
贵金属组成 Noble Metals Composition	Pt/Pd/Rh	1:0:0
贵金属总量 Noble Metals Density	标称值 (g/ft³) Nominal	50
	最小值 (g/ft³) Minimum	45
载体外壳材料 Shell Material	SUS444	
内芯材料 Honeycomb Material	0Cr21Al6	
厂家要求标识 Customer Required Identifier	/	
产品编码 Code	DP10292	



技术要求  
1、催化器性能应符合公司Q/DPRK002-2016标准。

Technical Requirement  
1、The performance of catalyst should be meet the Q/DPRK002-2016 Standard.

客户确认栏

技术部 (经理)		
采购部 (经理)		

					金属蜂窝催化器 Catalyst		图样标记			数量	重量	比例
标记	处数	分区	更改文件号	签字	日期	永康南天工贸		共 张		第 张		
设计			标准化			机型		标准				
校对			审定			1E45F&1E48F		标准				
审核			批准			机五						
工艺												

Engine type	NT1E48F, NT1E45F-1
Catalyst	
Drawing No.	009

**Attachment 3 Manufacturer's declaration on compliance with Regulation (EU) 2016/1628**

We, Yongkang Nantian Industry and Trade Co., Ltd., Hereby declares that the following ~~engine type~~/engine family complies in all respects with the requirements of Regulation (EU) 2016/1628 of the European Parliament and of the Council, Commission Delegated Regulation (EU) 2017/654, Commission Delegated Regulation (EU) 2017/655 and Commission Implementing Regulation (EU) 2017/656 and does not use any defeat strategy. All emission control strategies comply, where applicable, with the requirements for Base Emission Control Strategy (BECS) and Auxiliary Emission Control Strategy (AECS) set-out in section 2 of Annex IV to Delegated Regulation (EU) 2017/654, and have been disclosed in accordance with that Annex and with Annex I to Implementing Regulation (EU) 2017/656.

- 1.1. Make (trade name(s) of manufacturer) : Nantian Industry & trade
- 1.2. Commercial name(s) (if applicable) : N/A
- 1.3. Company name and address of manufacturer : Yongkang Nantian Industry and Trade Co., Ltd.  
NO.21 Jintong Road, Zhiying Phase II Industrial  
Zone, Zhiying Town, Yongkang City, Jinhua City,  
Zhejiang Province, China
- 1.4. Name and address of manufacturer's  
authorised representative (if any) : VALEX S.p.A  
Via Lago Maggiore, 24-36015 Schio(VI) ITALY
- 1.6. ~~Engine type designation~~/engine family  
designation/ET : Parent engine: NT1E48F  
Commercial names: N/A  
Engine within family: NT1E45F-1  
Commercial names: N/A

Place : Yongkang City

Date : 2019-12-06

Signature : Runsheng



**Attachment 4      Manufacturer's statement on compliance with the exhaust emission limits when use fuels  
other than the reference fuels**

N/A

**Attachment 5      Overview of the emission control strategy for electronically controlled engines**

N/A

**Attachment 6      The functional operational characteristics of the NOx control measures and inducement  
system**

N/A

**Attachment 7      The functional operational characteristics of the particulate control measures**

N/A

**Attachment 8 Manufacturer's declaration, and supporting test reports or data, on deterioration factors**

We, Yongkang Nantian Industry and Trade Co., Ltd., hereby declare that the EDP we chosen is most closely approximates the expected useful lives of the equipment into which the engines are expected to be installed. This conclusion is based on the surveys of the life spans of the equipment in which the subject engines are installed.

- 1.1. Make (trade name(s) of manufacturer) : Nantian Industry & trade
- 1.2. Commercial name(s) (if applicable) : N/A
- 1.3. Company name and address of manufacturer : Yongkang Nantian Industry and Trade Co., Ltd.  
NO.21 Jintong Road, Zhiying Phase II Industrial  
Zone, Zhiying Town, Yongkang City, Jinhua City,  
Zhejiang Province, China
- 1.4. Name and address of manufacturer's  
authorised representative (if any) : VALEX S.p.A  
Via Lago Maggiore, 24-36015 Schio(VI) ITALY
- 1.6. ~~Engine type designation/engine family~~  
designation/ET : Parent engine: NT1E48F  
Commercial names: N/A  
Engine within family: NT1E45F-1  
Commercial names: N/A
- 1.7. Category and sub-category of the engine  
type/engine family : Category: NRSh  
Sub-category: NRSh-v-1b
- 1.8. EDP hours : 50h (Cat 1 (Consumer products))

The EDP is carried out on parent engine, please refer TÜV SÜD's test report for details.

Place : Yongkang City

Date : 2019-12-06

Signature : Runsheng Tie



**Attachment 9      Manufacturer's declaration, and supporting test reports or data, of the infrequent  
regeneration adjustment factors**

N/A

**Attachment 10      The physical connector required to receive the torque signal from the engine Electronic  
control Unit (ECU) during the in-service monitoring test**

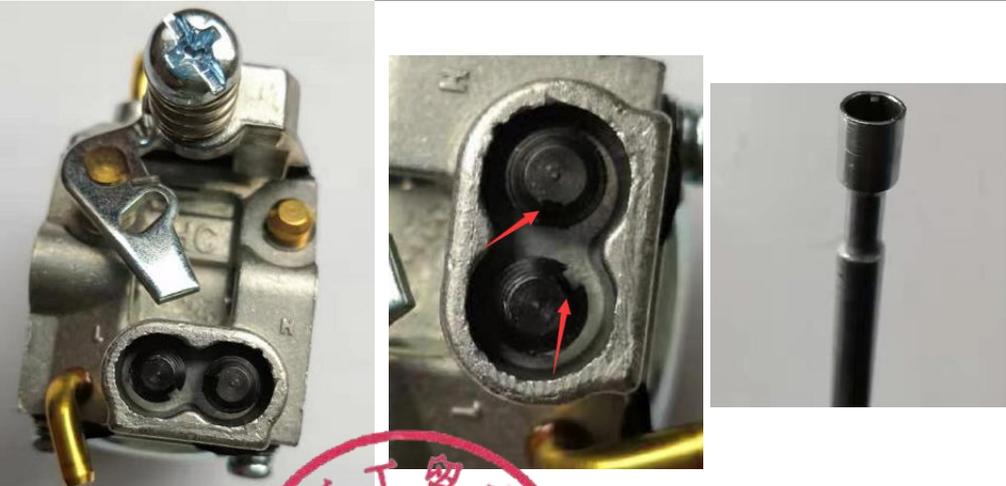
N/A

**Attachment 11 Manufacturer’s declaration and supporting data on tampering prevention for emission control systems**

We, Yongkang Nantian Industry and Trade Co., Ltd., Hereby declares that the emission control strategies of the following engine type/engine family fitted are designed in such a way as to prevent tampering to the extent possible, as referred to in Article 18(4) of Regulation (EU) 2016/1628 of the European Parliament and of the Council and Annex X of Commission Implementing Regulation (EU) 2017/656.

- 1.1. Make (trade name(s) of manufacturer) : Nantian Industry & trade
- 1.2. Commercial name(s) (if applicable) : N/A
- 1.3. Company name and address of manufacturer : Yongkang Nantian Industry and Trade Co., Ltd.  
 NO.21 Jintong Road, Zhiying Phase II Industrial Zone, Zhiying Town, Yongkang City, Jinhua City, Zhejiang Province, China
- 1.4. Name and address of manufacturer’s authorised representative (if any) : VALEX S.p.A  
 Via Lago Maggiore, 24-36015 Schio(VI) ITALY
- 1.6. Engine type designation/engine family designation/ET : Parent engine: NT1E48F  
 Commercial names: N/A  
 Engine within family: NT1E45F-1  
 Commercial names: N/A

Technical details :

	Photograph	Description
1		To keep from adjusting, a special screw is used, which can't be removed or adjusted with normal tool.

Place : Yongkang City

Date : 2019-12-10

Signature : Runsheng



**Attachment 12 List of scheduled for emission-related maintenance requirements**

Proper maintenance is essential for safe, economical and trouble-free operation. It also helps reduce air pollution. In order to keep your gasoline engine in good working condition, it must be periodically serviced. The following maintenance schedule and routine inspection procedures must be carefully followed.

Items		Frequency	Every time	First month or 10 hrs of operation	Thereafter, every 3 months or 30hrs of operation	Every 6 months or 50 hrs of operation	Every year or 100 hrs of operation
Engine oil	Check-Refill		√				
	Change			√	√		
Air filter element	Check		√				
	Clean				√		
	Change					√	
Spark plug	Clean-adjust					√ *	
Spark arrester	Clean					√	
Valve clearance**	Check-adjust				√		
Fuel hose	Check	Every 2 years (change if necessary)					
Cylinder head, Piston**	Remove carbon deposits	Every 50 hours					
* These items should be replaced by new ones if necessary.							
** These items should be serviced by a mechanically proficient person or by our authorized servicing dealer.							