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 [1] with regard to gaseous and particulate pollutant emission pursuant to Regulation (EU) 2016/1628, as last amended by (Commission Delegated) [1] Regulation (EU) 2022/992[1] [2] (of the European Parliament and of the Council) [1]

EU Type Approval No: ***e24*2016/1628*2022/992SHA1/P*0600*00***

Reason for ~~extension~~/~~refusal~~/~~withdrawal~~ [1]: ***- N/A***

SECTION I

1.1.	Make (trade name(s) of manufacturer):	***PATELO/RICHOPE/BLYT***
1.2.	Commercial name(s) (if applicable):	***N/A***
1.3.	Company name and address of manufacturer:	***TAIZHOU ZHONGCHENG MACHINERY TECHNOLOGY CO., LTD No.1333, Wanchang Middle Road, Chengdong Town, Wenling City, Zhejiang Province, 317500, China***
1.4.	Name and address of manufacturer's authorised representative (if any):	***RAKE FORESTER GMBH Andre-Citroen-Str.18, D51149 Cologne, Germany***
1.5.	Name(s) and address(es) of assembly/manufacture plant(s):	***Jinhua Bailin Yutai Tools Co., Ltd Hujia village, Bailongqiao Town, Wucheng District, Jinhua City, Zhejiang Province (2-1 building in the workshop of Zhejiang Julong Pipe Technology Co., Ltd), 321025, China***
1.6.	~~Engine type designation/engine family designation~~/FT ([1]):	***Parent engine: T CS1E45F Commercial name: T 1E45F Engine within family: T CS1E43F, T CS1E40.5F, T CS1E41F, T CS1E39F Commercial name: T 1E43F, T 1E40.5F, T 1E41F, T 1E39F***

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1.7.	Category and sub-category of the ~~engine type~~/engine family [1] [4]:	***Category: NRSh*** ***Sub-category: NRSh-v-1a***
1.8.	Emissions durability period category:	***~~Not Applicable~~/Cat 1/~~Cat 2~~/~~Cat 3~~*** [1]
1.9.	Emissions stage:	***V/ ~~SPE~~***
1.10.	Engine for snow throwers [5]:	***~~Yes~~/No*** [1]

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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):	***25.03.2023***
3.	Number(s) of test report(s):	***23-00062-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 (1) 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 (1).

1.	The ~~engine type~~/engine family (1) meets/~~does not meet~~ (1) the requirements laid down in Regulation (EU) 2016/1628.	
2.	The approval is:	***granted/~~extended/refused/withdrawn~~*** (1)
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 (3)	***N/A***
4.	Restrictions to validity (3) (6):	***N/A***
5.	Exemptions applied (3) (6):	***N/A***
	Place:	***Dublin.***
	Date:	***18th April, 2023***

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

NATIONAL STANDARDS AUTHORITY OF IRELAND
NSAI Certification
TRANSPORT DEPARTMENT

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 … (7)'.

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Addendum

PART A — CHARACTERISTICS OF THE ~~ENGINE TYPE~~/ENGINE FAMILY [(1)]

2.	Common design parameters of the ~~engine type~~/engine family [(1)]	
2.1.	Combustion Cycle:	***four stroke cycle/two stroke cycle/~~rotary~~ ~~other: (describe)~~*** [(1)]
2.2.	Ignition Type:	***~~Compression ignition~~/spark ignition*** [(1)]
2.3.1.	Position of the cylinders in the block:	***~~V/in-line/radial~~/other(Single)*** [(1)]
2.6	Main Cooling medium:	***Air/~~Water/Oil~~*** [(1)]
2.7.	Method of air aspiration:	***naturally aspirated/~~pressurecharged/ pressure charged with charge cooler~~*** [(1)]
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)~~*** [(1)]
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~~*** [(1)]
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~~*** [(1)] ***10W-30*** ***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)~~*** [(1)]
2.9.	Engine management systems:	***mechanical/~~electronic control strategy~~*** [(1)]

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2.10.	Miscellaneous devices:	~~***Yes***~~***/No*** [(1)]
2.10.1.	Exhaust gas recirculation (EGR):	~~***Yes***~~***/No*** [(1)]
2.10.2.	Water injection:	~~***Yes***~~***/No*** [(1)]
2.10.3.	Air injection:	~~***Yes***~~***/No*** [(1)]
2.10.4.	Others (specify):	***N/A***
2.11.	Exhaust after-treatment system:	***Yes/~~No~~*** [(1)]
2.11.1.	Oxidation catalyst:	***Yes/~~No~~*** [(1)]
2.11.2.	DeNOx system with selective reduction of NOx (addition of reducing agent):	~~***Yes***~~***/No*** [(1)]
2.11.3.	Other DeNOx systems:	~~***Yes***~~***/No*** [(1)]
2.11.4.	Three-way catalyst combining oxidation and NOx reduction:	~~***Yes***~~***/No*** [(1)]
2.11.5.	Particulate after-treatment system with passive regeneration:	~~***Yes***~~***/No*** [(1)]
2.11.6.	Particulate after-treatment system with active regeneration:	~~***Yes***~~***/No*** [(1)]
2.11.7.	Other particulate after-treatment systems:	~~***Yes***~~***/No*** [(1)]
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:	***CS1E45F***	*
3.1.2.	Engine type designation shown on engine mark: Yes/~~No~~ (1)	***Yes***	*
3.1.3.	Location of the manufacturer's statutory marking:	***Refer to drawing No. 001***	*
3.2.1.	Declared rated speed (rpm):	***8000***	*
3.2.1.2.	Declared rated net Power (kW):	***2.0***	*
3.2.2.	Maximum power speed (rpm):	***8000***	*
3.2.2.2.	Maximum net power (kW):	***2.0***	*
3.2.3.	Declared maximum torque speed (rpm):	***6500***	*
3.2.3.2.	Declared maximum torque (Nm):	***2.6***	*
3.6.3.	Number of Cylinders:	***1***	*
3.6.4.	Engine total swept volume (cm^3):	***49.3***	*
3.8.5.	Device for recycling crankcase gases: ~~Yes~~/ No (1)	***No***	*
3.11.3.12.	Consumable reagent: ~~Yes~~/No (1)	***No***	*
3.11.3.12.1.	Type and concentration of reagent needed for catalytic action:	***N/A***	*
3.11.3.13.	NOx sensor(s): ~~Yes~~/No (1)	***No***	*
3.11.3.14.	Oxygen sensor: ~~Yes~~/No (1)	***No***	*
3.11.4.7.	Fuel borne catalyst (FBC): ~~Yes/~~No (1)	***No***	*

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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:	***-0.8***	*
3.8.3.2.	Maximum charge air cooler outlet temperature at 100 % speed and 100 % load (deg. C):	***N/A***	*
3.8.3.3.	Maximum allowable pressure drop across charge cooler at 100 % engine speed and at 100 % load (kPa) (if applicable):	***N/A***	*
3.9.3.	Maximum permissible exhaust gas backpressure at 100 % engine speed and at 100 % load (kPa):	***4.1***	*
3.9.3.1	Location of measurement:	***Inlet of muffler***	*
3.11.1.2.	Maximum temperature drop from exhaust system or turbine outlet to first exhaust after-treatment system (deg. C) if stated:	***N/A***	*
3.11.1.2.1.	Test conditions for measurement:	***N/A***	*

(*) = For Essential characteristics of the engine type(s) within the engine family (if applicable), see Information document CS1E45F-ext.00 last dated 12.12.2022

PART B — TEST RESULTS

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

3.8.1. Dynamometer torque greater than or equal to 0,93 × ECU torque: ***~~Yes~~/No*** (1)

3.8.2. ECU torque correction factor in case that dynamometer torque less than 0,93 × 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 (8)
NRSC final result with DF.	128.6	-*	-*	35.2	N/A	N/A	G3
NRTC Final test result with DF	-	-	-	-	-	-	-

(*) Optionally, as an alternative, any combination of values satisfying the equation (HC + NOx) × CO0,784 ≤ 8,57 as well as the following conditions: CO ≤ 20,6 g/kWh and (HC + NOX) ≤ 2,7 g/kWh

11.2. CO_2 result: ***1283.4 g/kWh***

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11.3. In service monitoring reference values [9]

11.3.1. Reference work (kWh): ***N/A***

11.3.2. Reference CO_2 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)

(1) Strike out the unused options, or only show the used option(s).

(2) 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.

(3) Delete this entry when not applicable.

(4) 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.

(5) Indicate whether the approval is for a NRS (< 19 kW) engine family consisting exclusively of engine types for snow throwers.

(6) 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.

(7) Indicate the Member State.

(8) Indicate the test cycle in accordance with the fifth column of the Tables set out in Annex IV to Regulation (EU) 2016/1628.

(9) 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:	***18th April, 2023***
Date of latest amendment:	***N/A***
Reason for extension/revision:	***N/A***

1. Additional conditions, and advisory notes on legal alternatives.

2. Test report(s)

- numbers(s):	***23-00062-CX-SHA-00***
- date of issue:	***25.03.2023***
- date of latest amendment:	***N/A***

3. Information document

- number(s):	***CS1E45F-ext.00***
- date of issue:	***12.12.2022***
- date of latest amendment:	***N/A***
Documentation:	***59 pages***

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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.

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