

Notice of Compliance



Revised MARPOL Annex VI & NO_x Technical Code 2008 Engine Family 2-D5A-ATA/D7A-ATA/D7A-BTA-D2 Deutz AG

This is to State

That above-mentioned engine family has been established under the requirements of Technical Code 2008 on Control of Emission of Nitrogen Oxides from Marine Diesel Engines showing that all engines covered by the engine family comply with the emission limits of Regulation 13.4 of Revised MARPOL Annex VI.

This is to Note

1. That every member engine of the above-mentioned engine family shall be subject to pre-certification in accordance with the procedure established to the parent engine to verify that the member engine, as designed, equipped and adjusted, complies with the applicable regulation 13.4 of Revised Annex VI of the Convention; and
2. That this Notice of Compliance does not replace the EIAPP Certificate to be issued for each individual engine.

Specification of the Engine Family

Engine manufacturer	:	Deutz AG
Engine type(s)	:	Volvo Penta D7A-BTA, D7A-ATA
GL approval no.	:	17142-10 HH
Date of primary issue	:	2010-12-27
No. of cylinders	:	6
Power at speed	:	according to supplement
Test cycle(s)	:	D2
NO _x emission limit Tier II	:	7.8 g/kWh
Actual NO _x emission value	:	7.5 g/kWh

Specification of the Parent Engine

Parent engine type	:	D7A-ATA, Code I130/2
Parent engine no.	:	596747

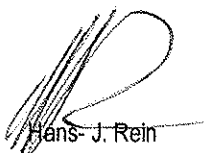
This is to Confirm

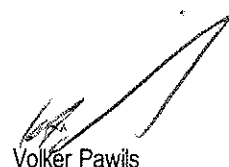
1. That the above-mentioned parent engine representing the above-mentioned engine family as specified in the document 'Technical File' has been approved in accordance with all requirements as applicable. The engine family will always represented by the parent engine, its approved Technical File and the family documentation; and
2. That the selection of the parent engine has been carried out on the basis of tests and engineering judgement in accordance with the applicable chapter of the NO_x Technical Code 2008 providing that the parent engine incorporates those features and/or characteristics which most adversely affect the NO_x emission level and result in the highest NO_x emission level among all of the engines in the family; and
3. That adequate arrangements have been made by the engine manufacturer to ensure effective control of the conformity of production for all member engines within the family.



Germanischer Lloyd

Issued at Hamburg, 2010-12-27 / Rev. 0


Hans-J. Rein


Volker Pawils

Notice of Compliance



Revised MARPOL Annex VI & NO_x Technical Code 2008
Engine Family 2-D5A-ATA/D7A-ATA/D7A-BTA-D2
Deutz AG

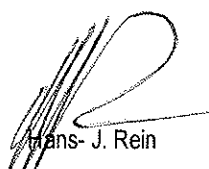
Supplement to the Notice of Compliance

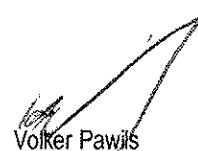
Specification of the Engine Group / Family, continue

Engine	Rated Power [kW]	Rated Speed [rpm]	Application
D7A-A TA			
Code I130/2	130	1500	D2
D7A-B TA			
Code D2OM139	139	1500	D2
Code D2OM148	148	1800	D2
Code D2OM153	153	1500	D2
Code D2OM163	163	1800	D2
Code D2OM146	146	1500	D2



Germanischer Lloyd
Issued at Hamburg, 2010-12-27 / Rev. 0


Hans-J. Rein


Volker Pawlis

INFORMATION DOCUMENT No.: 2298
Technical file
Revised MARPOL Annex VI & NOx Technical Code 2008

**VOLVO
PENTA**

manufactured by
DEUTZ AG

Engine family:
2 – D5A-A TA / D7A-A TA / D7A-B TA – D2

EIAPP

Technical file

acc.to

**Revised MARPOL Annex VI
&
NOx Technical Code 2008**

Family approval no.: 17142-10HH

Engine code: D7A-A TA Code I130/2

Rated power: 130 kW

Rated speed: 1500 rpm

Application/Test cycle: D2

Engine number: 596747

Production year: 2001



Abt.: VE-TZ, Hor
Datum: 18.02.2014

Auftrag Nr.: 2298
Folgeauftr.: 2698
ÄZ: 1
EIAPP Nr.: -

D7A-A TA Code I130/2
Stamm-Motor / Parent engine

1 / 1

INFORMATION DOCUMENT No.: 2298 Technical file Revised MARPOL Annex VI & NOx Technical Code 2008	VOLVO PENTA
Engine family: 2 – D5A-A TA / D7A-A TA / D7A-B TA – D2	manufactured by DEUTZ AG

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INFORMATION DOCUMENT No.: 2298 Technical file Revised MARPOL Annex VI & NOx Technical Code 2008	VOLVO PENTA manufactured by DEUTZ AG
Engine family: 2 – D5A-A TA / D7A-A TA / D7A-B TA – D2	

Engine variants

Data Set	Engine Code	Cylinder	Rated speed [rpm]	rated power [kW]	Parent engine	Test cycle
	D7A-B TA					
4700	D2OM139	6	1500	139		D2
4701	D2OM148	6	1800	148		D2
4441	D2OM153	6	1500	153		D2
4442	D2OM163	6	1800	163		D2
4841	D2OM146	6	1500	146		D2
	D7A-A TA					
2409	I130/2	6	1500	130	X	D2

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Engine family: 2 – D5A-A TA / D7A-A TA / D7A-B TA – D2	manufactured by DEUTZ AG

Anleitung zum On-Board Teilecheck zur Überprüfung der Übereinstimmung mit der vorliegenden Richtlinie/
System of on-board verification procedures to verify compliance with the listed rule.

1)

Teile-Nummern, die zur Feststellung der Übereinstimmung On-Board zu prüfen sind/
Identification Numbers which should be checked within the scope of on-board verification procedure.

2)

Darüber hinaus gehende Teileprüfungen sind sehr zeitaufwendig und erfordern umfangreiche Kenntnisse des Motors. Deshalb sollte eine Überprüfung dieser Teile nur durch qualifiziertes Personal und mit Spezialwerkzeug durchgeführt werden/
The check of the identification number of parts not listed above requires a serious expenditure of time and requires a good knowledge of the engine's construction. Therefore the check should be made by a qualified specialist with special tool equipment.

3)

Teilenummern die grau hinterlegt sind entsprechen den geprägten Registrierungscode auf dem Bauteil/
The tagged part numbers are the branded part registration code on component.

2014-03-10

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Engine family: 2 – D5A-A TA / D7A-A TA / D7A-B TA – D2	manufactured by DEUTZ AG

No.	Component	Specification		Place of registration	Remarks
		D7A-B TA	D7A-A TA		
1		D2OM148	I130/2		
		D2OM139			
		D2OM153			
		D2OM163			
		D2OM146			
2	piston	0429 5314 EZ	3311	see drawing below	2)
3	cylinder head	0425 8410 R			2)
4	injection pump	PFM 1 P 100 S 2005 (0211 2860 KZ)			1)
4.1	injection timing	2,0 °KW vor OT / °CA btdc	7-2 °KW vor OT / °CA btdc		1)
5	nozzle holder	0211 2957 KZ	0211 2633 KZ		2)
6	injection nozzle	DLLA 147P 1229 (0211 2959 KY)	(DLLA 151 P) 941 / (DLLA 158 P) 729		2)
7	charge air cooler	0425 9541 KZ	0425 9541 KZ/ 0422 9507 KZ		1)
8	turbocharger	S2BW-148E (0422 9685 KZ)			1)
9	camshaft	0420 2615 EA ww./ opt. 0451 3695 EA			2)

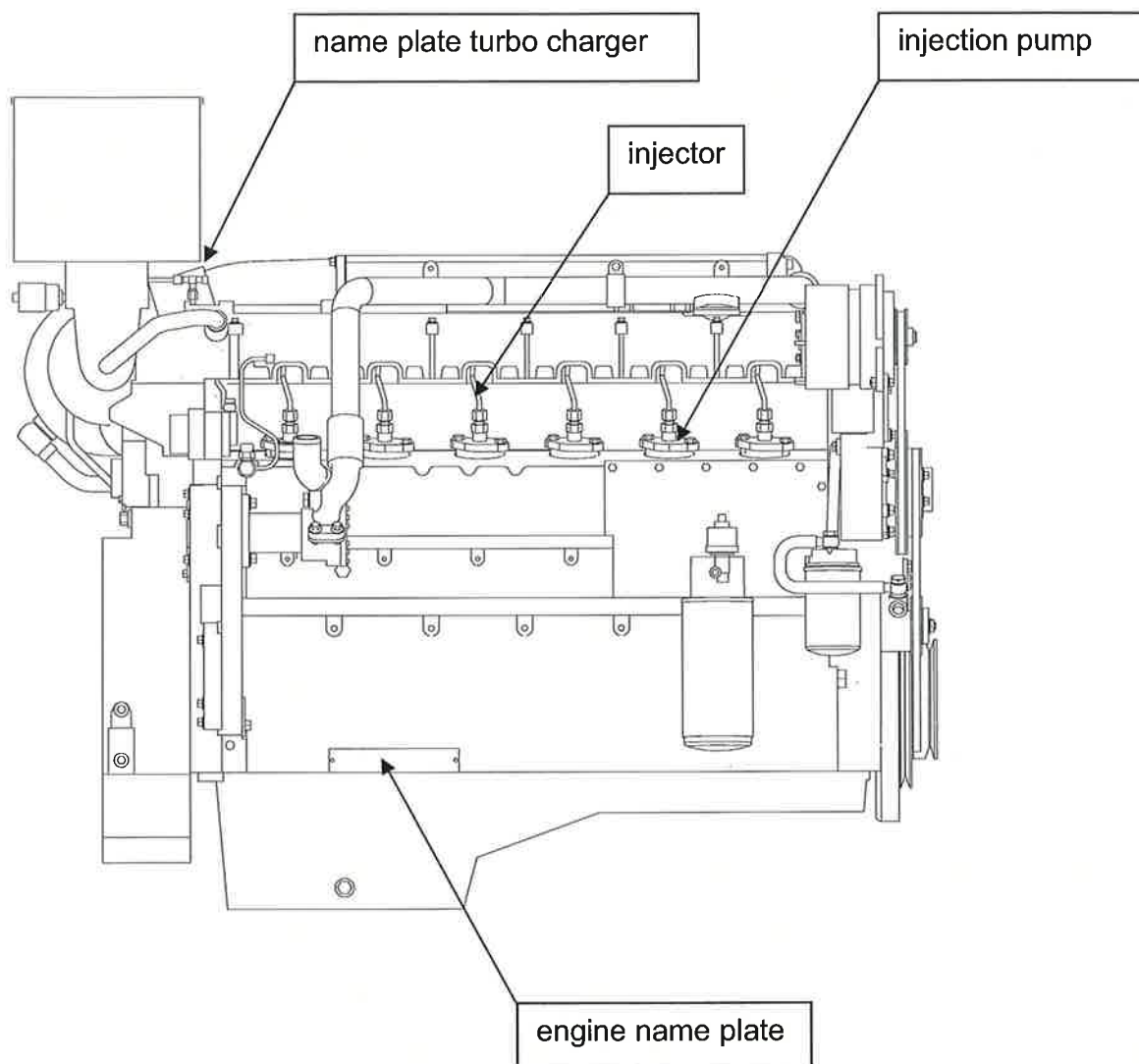
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Engine plate / Engine No.



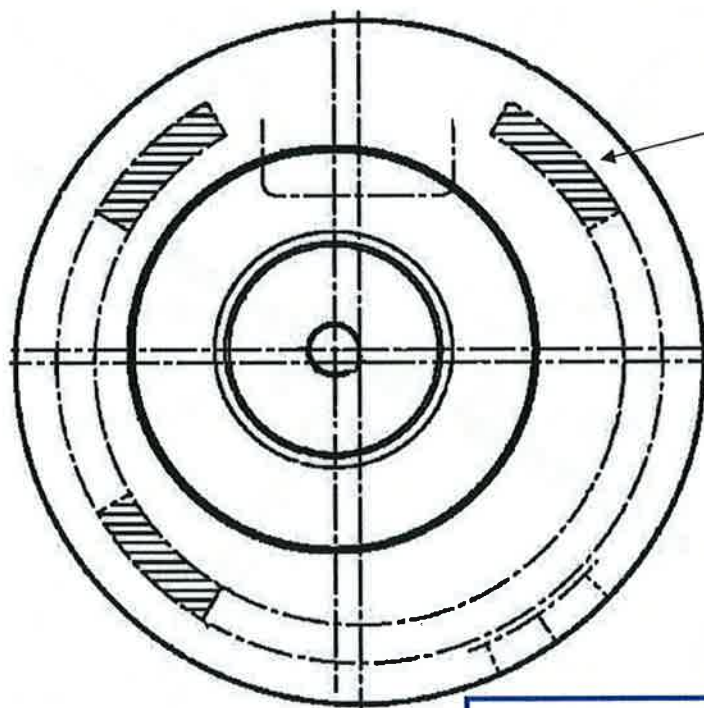
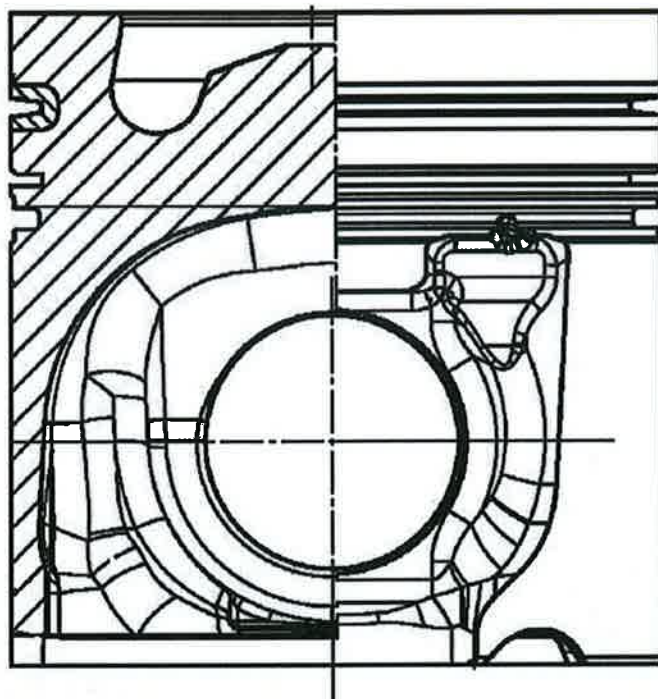
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Engine family:
2 – D5A-A TA / D7A-A TA / D7A-B TA – D2

2) Piston



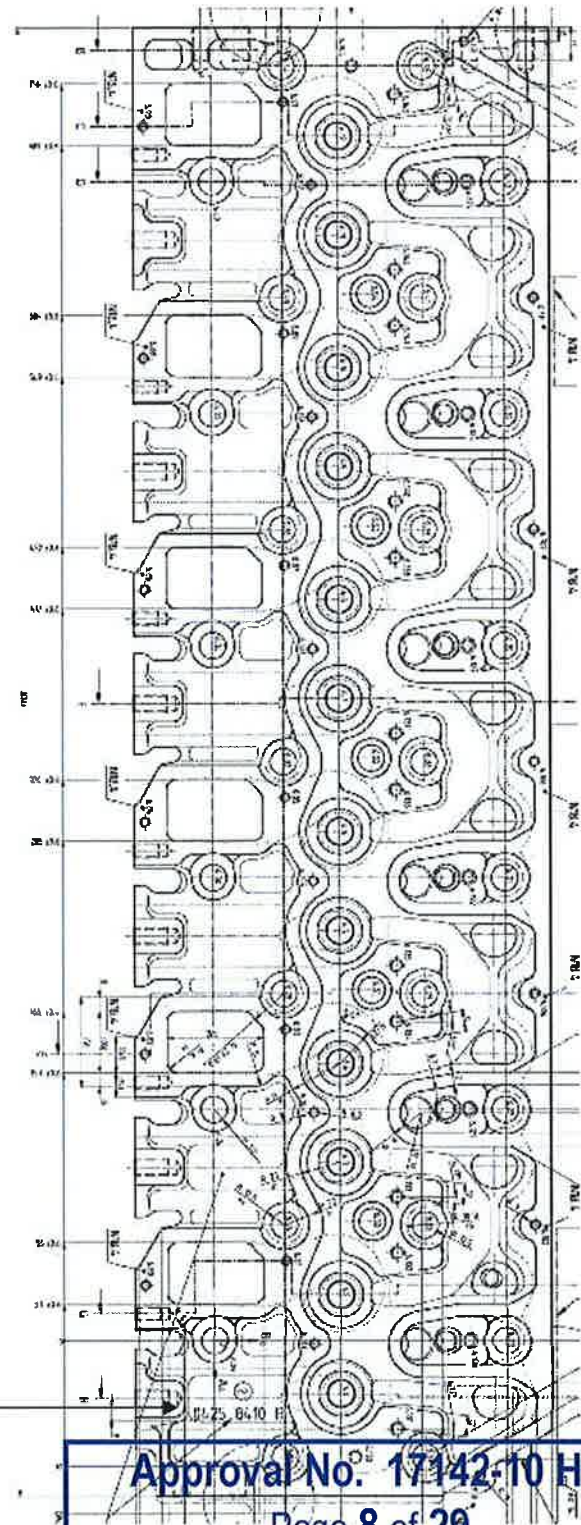
Kolben-Nr
Piston-No

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Engine family:
 2 – D5A-A TA / D7A-A TA / D7A-B TA – D2

3) Cylinder head



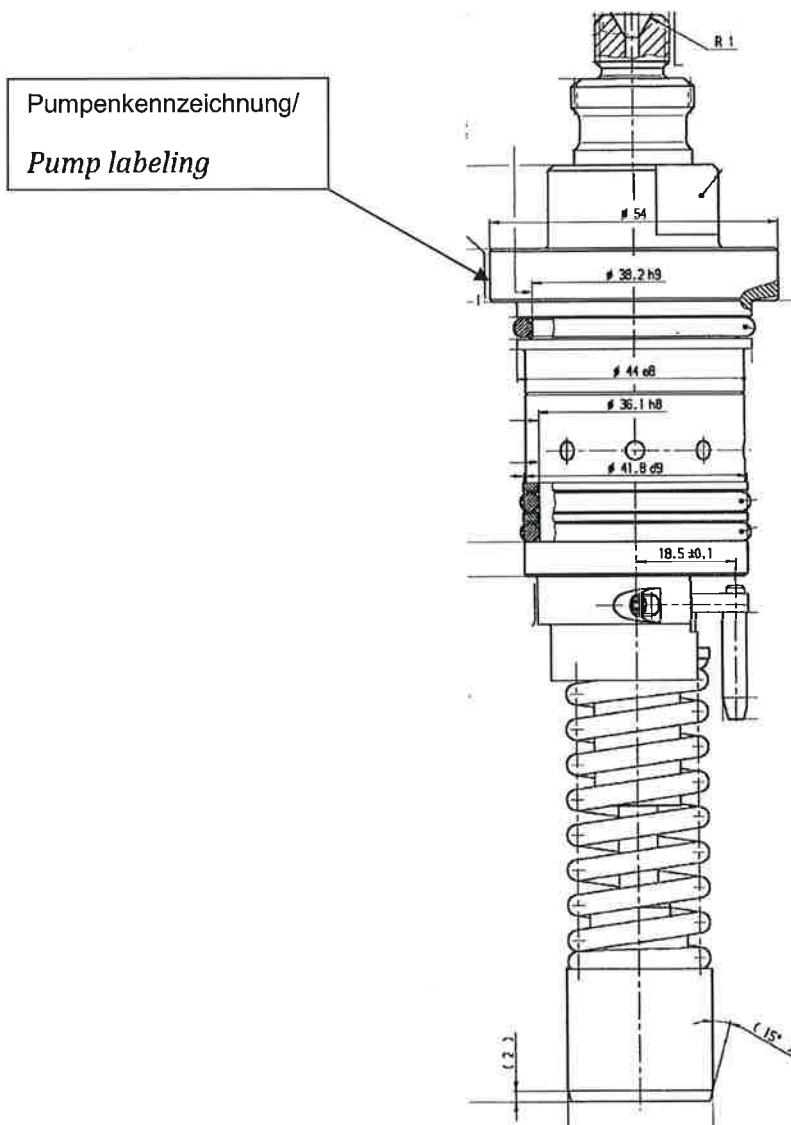
Zylinderkopf-Nr./
 Cylinder head
 No.

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Engine family:

2 – D5A-A TA / D7A-A TA / D7A-B TA – D2

4) Injection pump

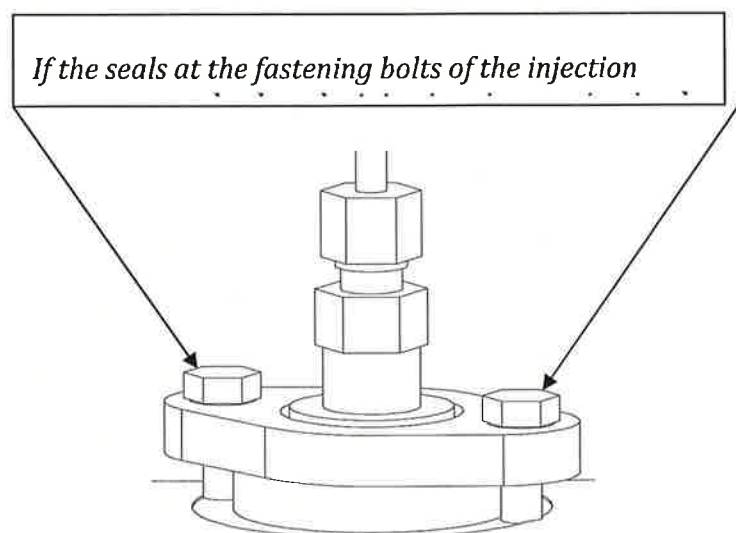
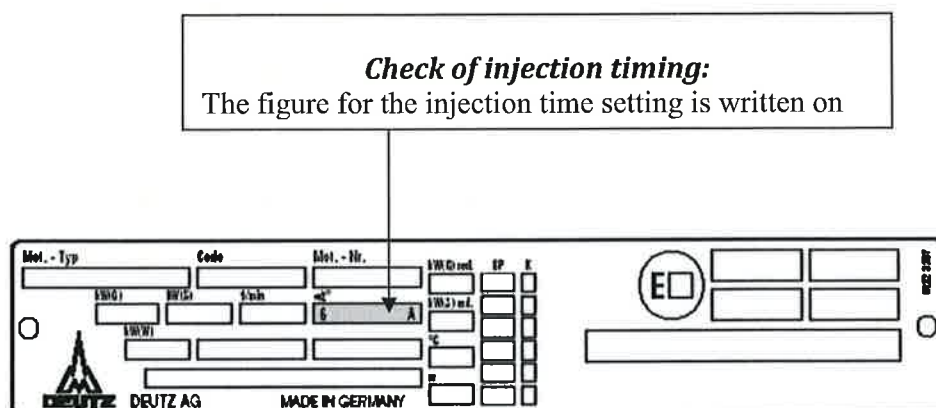


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Engine family: 2 – D5A-A TA / D7A-A TA / D7A-B TA – D2		

4.1) Injection timing



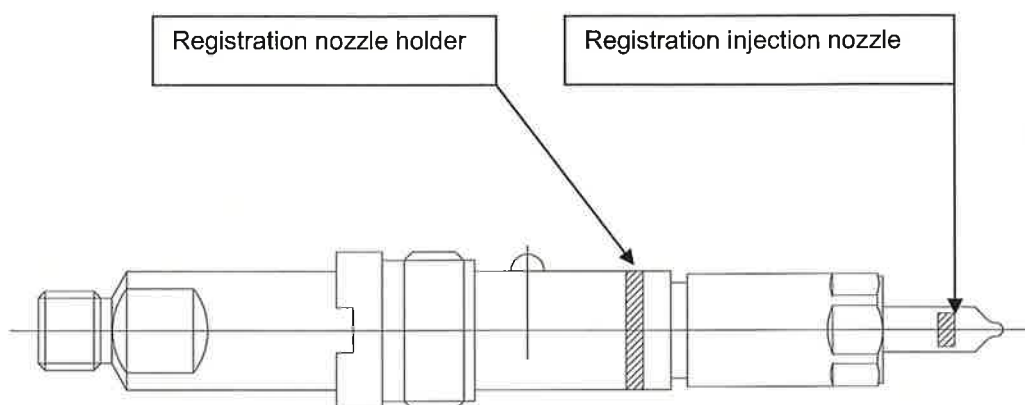
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Engine family: 2 – D5A-A TA / D7A-A TA / D7A-B TA – D2	

5) Nozzle holder Combination

6) Injection nozzle



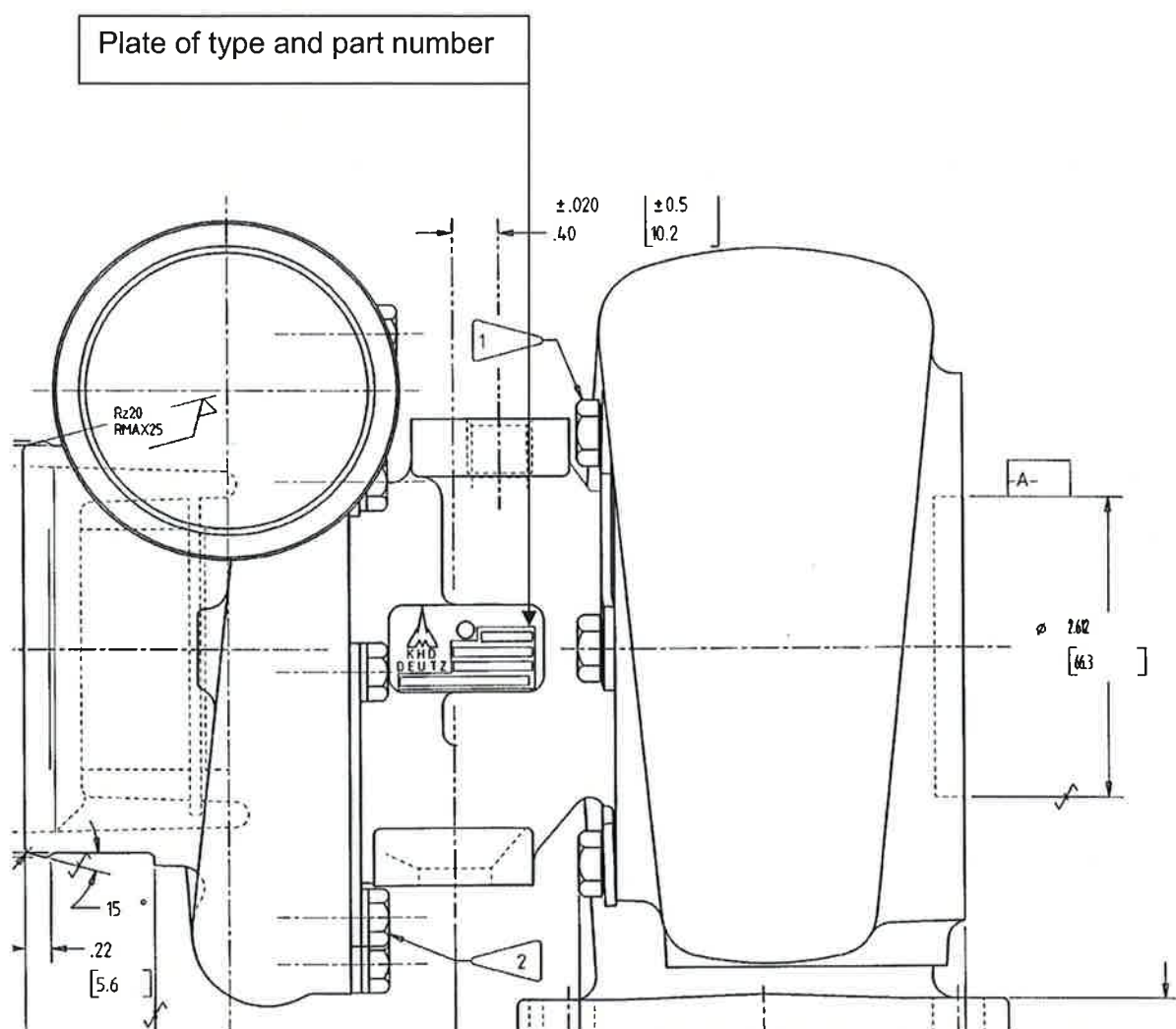
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Engine family:

2 – D5A-A TA / D7A-A TA / D7A-B TA – D2

8) Exhaust turbo charger

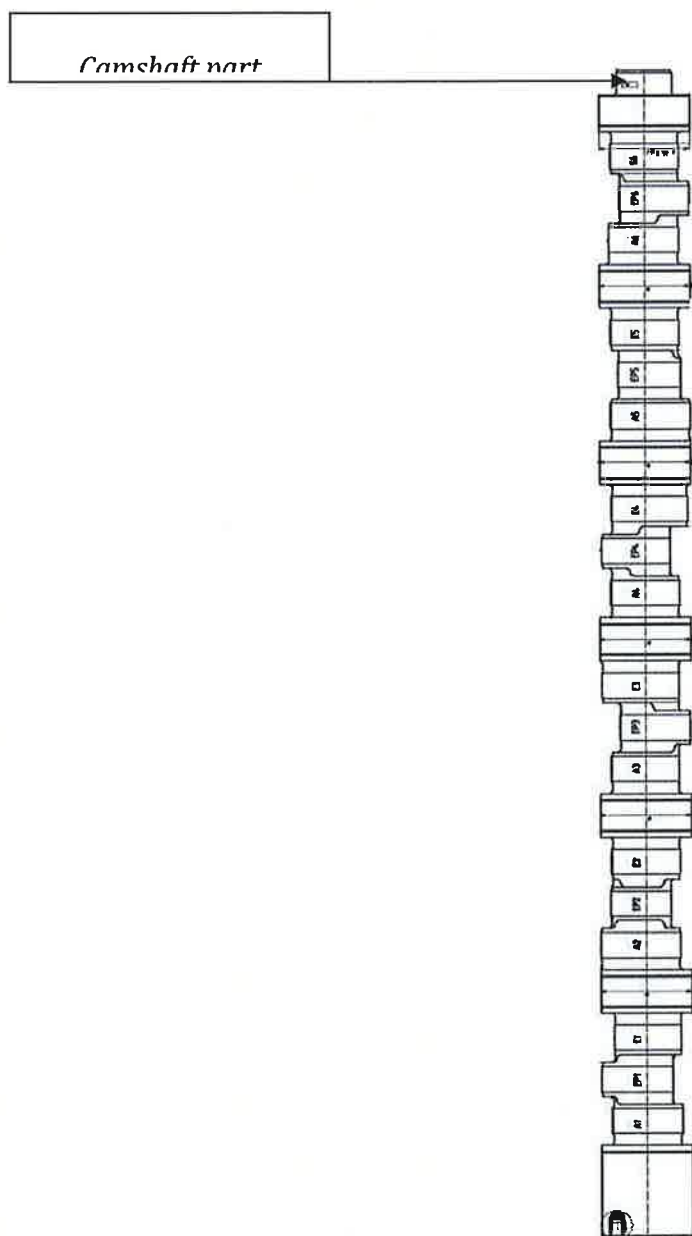


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9) Camshaft



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Engine family: 2 – D5A-A TA / D7A-A TA / D7A-B TA – D2	

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Engine family: 2 – D5A-A TA / D7A-A TA / D7A-B TA – D2	manufactured by DEUTZ AG

1.	General informations of the engine		
1.1.1	Manufacturer		DEUTZ AG
1.1.2	Engine type		D7A-A TA Code I130/2
1.1.3	Engine group / Engine family		D5A-A TA / D7A-A TA / D7A-B TA
1.1.4	Serial number	[No.]	596747
1.1.5	Rated speed	[rpm]	1500
1.1.7	Rated power	[kW]	130
1.1.8	Intermediate speed	[rpm]	<u>not applicable</u>
1.1.9	Maximum torque at intermediate speed	[Nm]	n.a.
1.1.10	Static injection timing	[deg CA btdc]	7 - 2 °CA btdc
1.1.11	Electronic injection control		n.a.
1.1.12	Variable injection timing		n.a.
1.1.13	Variable turbo charger geometrie		n.a.
1.1.14	Bore	[mm]	108
1.1.15	Stroke	[mm]	130

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Engine family: 2 – D5A-A TA / D7A-A TA / D7A-B TA – D2	manufactured by DEUTZ AG

1.1.16	Nominal compression ratio		1 : 17,5 ± 0.3
1.1.17	Mean effective pressure at rated speed	[bar]	14,6
1.1.18	Cylinder number and configuration		6, in line
1.1.19	Auxiliaries		n.a.

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Engine family: 2 – D5A-A TA / D7A-A TA / D7A-B TA – D2	manufactured by DEUTZ AG

1.2.		Specified ambient conditions	
1.2.1	Max. seawater temperatures	[°C]	32
1.2.2	Max. charge air temperature	[°C]	53
1.2.3	Cooling system spec.intermediate cooler		water to air
1.2.4	Cooling system spec.charge air stages		One stage
1.2.5	Max. temperature engine cooling system	[°C]	105
1.2.6	Max. inlet depression	[kPa]	3,0
1.2.7	Max. exhaust gas pressure	[kPa]	4,5
1.2.8	Fuel specification		EN 590
1.2.9	Fuel oil temperature	[°C]	38 +/- 5
1.2.10	Lubrication oil specification		Test oil No. 7 10W40
1.2.11	Application intended for		D2
1.2.12	Customer		n.a.
1.2.13	Final application / installation / ship		n.a.

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Engine family: 2 – D5A-A TA / D7A-A TA / D7A-B TA – D2	manufactured by DEUTZ AG

1.3. Emission test results

			Testzyklus/ Test cycle			
		Grenzwert/ Limits	E2	E3	C1	D2
1.3.1	CO [g/kWh]	n.a.	n.a.	n.a.	n.a.	1,60
1.3.2	HC [g/kWh]	n.a.	n.a.	n.a.	n.a.	0,51
1.3.3	NOx [g/kWh]	7,8	n.a.	n.a.	n.a.	7,54
1.3.4	Particulates [g/kWh]	n.a.	n.a.	n.a.	n.a.	0,171
1.3.5	Engine variant		n.a.	n.a.	n.a.	I130/2
1.3.5	Test identification					
1.3.6	Date		n.a.	n.a.	n.a.	18.07.2002
1.3.7	Time		n.a.	n.a.	n.a.	09:38
1.3.8	Test site		n.a.	n.a.	n.a.	Cologne Porz
1.3.9	Test bench		n.a.	n.a.	n.a.	E1
1.3.10	Test No.		n.a.	n.a.	n.a.	11
1.3.11	Surveyor		n.a.	n.a.	n.a.	Mr Henning
1.3.12	Place of report		n.a.	n.a.	n.a.	Cologne Porz
1.3.13	Date of report		n.a.	n.a.	n.a.	12.10.10
1.3.14	Signature					

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Engine family: 2 – D5A-A TA / D7A-A TA / D7A-B TA – D2	

1.4. Engine family information (common specifications)

1.4.1	Combustion cycle	4-stroke
1.4.2	Cooling medium	Water
1.4.3	Cylinder configuration	in-line– type
1.4.4	Method of aspiration	turbo charged with charge air cooler
1.4.5	Fuel type to be used on board	Diesel
1.4.6	Combustion chamber	open chamber
1.4.7	Valve port configuration	Cylinder head
1.4.8	Valve port size and number	n.z./ n.a.
1.4.9	Fuel system type	n.z./ n.a.

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Engine family: 2 – D5A-A TA / D7A-A TA / D7A-B TA – D2	manufactured by DEUTZ AG

1.5. Miscellaneous features

1.5.1	Exhaust gas recirculation	n.a
1.5.2	Water injection / emulsion	n.a
1.5.3	Air injection	n.a
1.5.4	Charge cooling system	Yes
1.5.5	Exhaust after treatment	n.a
1.5.6	Exhaust after treatment system	n.a
1.5.7	Dual fuel	n.a

1.6. Engine family information selection of parent engine

1.6.1	Criteria of the selection	highest NO _x emissions
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Engine family: 2 – D5A-A TA / D7A-A TA / D7A-B TA – D2	manufactured by DEUTZ AG

1.7.

Measurement equipment

	Measurement equipment	Manufacturer	Model	Measurement ranges	Calibration	
					Span gas conc.	Deviation %
1.7.1	Analyser	Hartmann & Braun	AMA No. 19			
1.7.2	NOx analyser	Hartmann & Braun	URAS 14	0-2500 ppm	961	0
1.7.3.1	CO analyser	Hartmann & Braun	URAS 14	0-2500 ppm	2452	0
1.7.3.2	O2 analyser	Hartmann & Braun	Magnos 4	0-25 %	20	0
1.7.4	HC analyser	Hartmann & Braun	FID 14	0-900 ppm	94,2	-0,11
1.7.5	Speed	Schenck	WT470	0-4000 rpm	-	0
1.7.6	Torque	Schenck	WT470	0-3000 Nm	-	0,17
1.7.7	Power, if applicable	n.a.	n.a.		-	-
1.7.8	Fuel flow	Seppeler	SVU3	250/500 ml	-	0,18
1.7.9	Air flow	Kromschroeder	BK6T	0,06-10 m³/h	-	2,1
1.7.10	Exhaust flow	n.a.	n.a.		-	-
1.7.12	Temperatures					
1.7.12.1	Coolant	Fluke	Helios 2289A	-100 - 1350 °C	-	-
1.7.12.2	Lubrication	Fluke	Helios 2289A	-100 - 1350 °C	-	-
1.7.12.3	Exhaust gas	Fluke	Helios 2289A	-100 - 1350 °C	-	-
1.7.12.4	Inlet air	Fluke	Helios 2289A	-100 - 1350 °C	-	-
1.7.12.5	Intercooler air	Fluke	Helios 2289A	-100 - 1350 °C	-	-
1.7.12.6	Fuel	Fluke	Helios 2289A	-100 - 1350 °C	-	-

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Engine family: 2 – D5A-A TA / D7A-A TA / D7A-B TA – D2	manufactured by DEUTZ AG

	Measurement equipment	Manufacturer	Model	Measurement ranges	Calibration	Deviation [%]
1.7.13	Pressures					
1.7.13.1	Exhaust gas	Schoppe&Faeser	15224	-50 up to 200 mbar		<0,5
1.7.13.2	Inlet manifold	Schoppe&Faeser	15224	25 up to –100 mbar		<0,5
1.7.13.3	Atmospheric	Multur	BI 1000	90-115 kPa		<1
1.7.13.4	Vapour pressure	n.a.	n.a.			-
1.7.13.5	Intake air	Schoppe&Faeser	15200	0 up to 10 bar		
1.7.14	Humidity					
1.7.14.1	Intake air	Testotherm	Hygrotest 602	0-100%		<2

1.8.	Test cell information					
1.8.1	Exhaust pipe					
1.8.1.1	Diameter	mm	75-150			
1.8.1.2	Length	mm	8700			
1.8.1.3	Insulation		partly			
1.8.1.4	Probe location	mm behind manifold / turbo charger	1500			
1.8.1.5	Remarks		n.a.			

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Engine family: 2 – D5A-A TA / D7A-A TA / D7A-B TA – D2	manufactured by DEUTZ AG

1.9. Test fuel characteristics

1.9.1	Fuel type		Destillate
1.9.2	Density		
1.9.2	D4052	[g/ml]	0,826
1.9.3	Viscosity (40°C)		
1.9.3	D445	[mm²/s]	3,88
1.9.4	Carbon	[%mass]	86,35
1.9.5	Hydrogen	[%mass]	13,64
1.9.6	Nitrogen	[%mass]	0
1.9.7	Oxygen	[%mass]	0,13
1.9.8	Sulphur	[mg/kg]	50
1.9.9	Net Calorific Value	[MJ/kg]	43,02

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Engine family: 2 – D5A-A TA / D7A-A TA / D7A-B TA – D2	manufactured by DEUTZ AG

2. Ambient and gaseous emission data, test cycle D2

Mode		1	2	3	4	5	6	7	8
Power / torque	[%]	100	75	50	25	10	-	-	-
Speed		Rated speed							
Time of beginning of mode		9:28	9:38	9:48	9:58	10:08			

Ambient data

Mode		1	2	3	4	5	6	7	8
Atmospheric pressure	[kPa]	101,1	101,1	101,1	101,1	101,1			
Intake air temperature	[°C]	25,0	25,0	25,0	25,0	25,0			
Intake air humidity	[%]	42,1	42,1	42,1	42,1	42,1			
Absolute humidity	[g/kg]	8,31	8,31	8,31	8,31	8,31			
Atmospheric factor fa	-	0,995	0,995	0,995	0,995	0,995			

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Engine family: 2 – D5A-A TA / D7A-A TA / D7A-B TA – D2	manufactured by DEUTZ AG

Gaseous emission data

Mode		1	2	3	4	5	6	7	8
NOx concentration dry	[ppm]	1028	952	822	483	307			
CO concentration dry	[ppm]	660,0	380,0	129,0	149,0	211,0			
CO2 concentration dry	[%]	9,3	8,5	6,9	4,5	2,7			
O2 concentration dry	[%]	7,78	8,97	11,02	14,25	16,87			
HC concentration wet	[ppm]	122,0	131,0	149,0	163,0	214,0			
NOx-humidity corr.factor	-	0,9640	0,9640	0,9694	0,9747	0,9775			
Fuel specific factor FFH	-	-	-	-	-	-			
Dry/wet corr.factor Kw	-	0,9150	0,9215	0,9346	0,9547	0,9703			
NOx mass flow	[g/h]	906,7	698,3	508,2	260,9	157,6			
CO mass flow	[g/h]	367,81	176,10	50,12	50,30	67,48			
CO2 mass flow	[g/h]	81389,55	61858,41	42096,40	23855,01	13560,73			
O2 mass flow	[g/h]	49505,70	47463,76	48884,08	54925,23	61606,19			
HC mass flow	[g/h]	36,85	32,67	30,71	28,58	34,98			
SO2 mass flow	[g/h]	-	-	-	-	-			
NOx specific	[g/kWh]	6,95	7,12	7,75	7,94	11,80			

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Engine Data

Mode		1	2	3	4	5	6	7	8
Speed	[rpm]	1500	1502	1503	1502	1501			
Auxiliary power	[kW]	-	-	-	-	-			
Dynamo meter setting	[kW]	130	97,5	65	32	13			
Power	[kW]	130,39	98,10	65,54	32,84	13,35			
Mean effective pressure	[bar]	14,60	10,92	7,34	3,68	1,49			
Fuel rack	[mm]	-	-	-	-	-			
spec.fuel consumption	[g/kWh]	200,93	188,09	204,85	232,73	327,63			
fuel flow	[kg/h]	26,20	18,45	13,43	7,64	4,37			
air flow, wet	[kg/h]	604,32	502,17	416,91	358,39	336,83			
Exhaust flow, wet	[kg/h]	630,52	520,62	430,34	366,03	341,20			
Exhaust temp.	[°C]	403	366	300	213	151			
Exhaust back pressure	[mbar]	17,12	9,62	4,5	1,12	-0,25			
Cylinder coolant temp. out	[°C]	84	82	80	79	70			
Cylinder coolant temp. in	[°C]	78	77	77	77	77			
Cylinder coolant pressure	[bar]	-	-	-	-	-			

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Mode		1	2	3	4	5	6	7	8
Temp. intercooler air (downstr.)	[°C]	54	49	44	40	37			
Charge air reference temp.	[°C]	51	46	43	41	39			
Charge air Pressure after turbo charger	[bar]	0,960	0,620	0,340	0,150	0,070			
Lubricant temperature	[°C]	93	91	89	86	84			
Lubricant pressure	[bar]	4,35	4,4	4,45	4,5	4,54			
inlet depression	[mbar]	-14,31	-10,62	-7,81	-6,31	-5,68			

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