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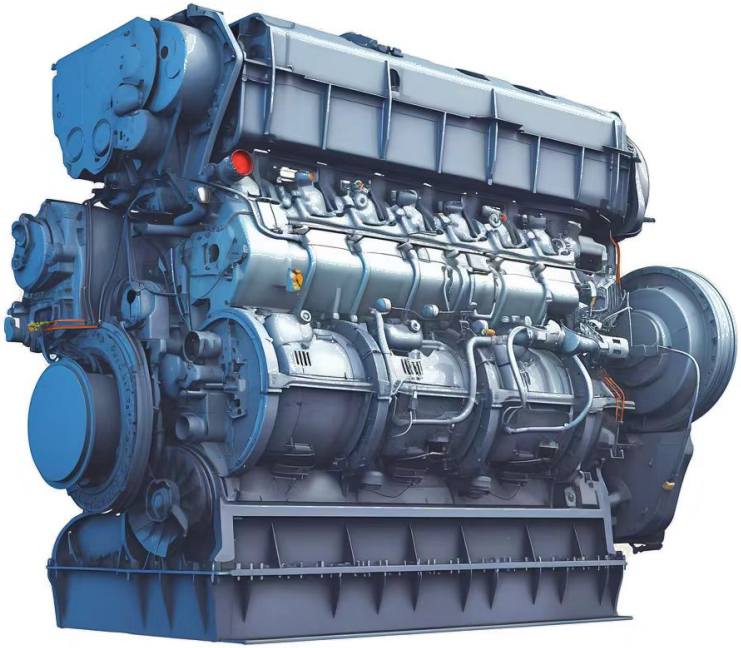

Diesel Engine Emission Test Report (NRSC)

Report - 202407JICHAI

Regulation：GB 20981-2014

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NRSC(5 Mode)

(GB 20981-2014)

Overall Test Data

operator	DezhongSun
test date	2024/7/8
testcell name	P003
project	20240708_NRSC
test serie	NRSC
testname	202407JICHAI

TEST IDENTIFICATION

start time of test	hhmmss	9:18:37 PM
end time of test	hhmmss	10:10:48 PM

ENGINE DATA

manufacturer	-	中国石油集团济柴动力有限公司	rated speed	rpm	1000
engine number	-	0	maximum engine speed	rpm	1150
engine family	-	L12V200ZL-2	idle speed	rpm	600
injection system	-	-	model year	-	2014
engine type	-	Diesel	number of cylinders	-	12
			engine displacement	dm3	96.130

FUEL DATA

fuel name	-	柴油	massfraction H	-	0.13010
fuel id	-	1	massfraction C	-	0.86980
fuel density	g/cm3	0.836	massfraction O	-	0.00000
molar mass fuel	-	13.980	massfraction W	-	0.00000
H/C ratio	-	1.7823	massfraction N	-	0.00000
stoechiometric factor	-	13.205	massfraction S	-	0.00000

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Emission limits - Phase III — Status: Passed

		Actual	Limit	Status
CO	g/kWh	0.930	3.50	Passed
NOx	g/kWh	-	-	-
THC	g/kWh	-	-	-
HC+NOx	g/kWh	6.239	6.40	Passed
PM	g/kWh	0.118	0.20	Passed
PN	#/kWh	-	-	-

Vaildation Limits — Status: Passed

		Lower limit	Upper limit	Min.	Mean	Max	Status
F - Factor	-	0.96	1.06	0.986	0.986	0.987	Passed
Temperature fuel	°C	33.00	43.00	39.4	39.86	40.4	Passed
Temperature cooling medium for charge air cooling	°C	20.00	-	25.05	25.05	25.05	Passed
deviation meas. - calc.	%	-5.00	5.00	-	-0.641	-	Passed

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Environment Data

operator	DezhongSun
test date	2024/7/8
testcell name	P003
project	20240708_NRSC
test serie	NRSC
testname	202407JICHAI

Testcell condition DATA

mode	-	1	2	3	4	5
temperature air testcell	℃	21.7	22.0	22.1	22.2	22.1
pressure air testcell	kPa	100.0	100.0	100.1	100.1	100.1
relative humidity of testcell	%	63.6	60.5	61.2	61.7	61.2
temperature of engine inlet air	℃	21.6	21.6	21.7	21.9	21.8
pressure air engine inlet	kPa	-4.6	-3.1	-1.7	-0.8	-0.5
relative humidity air engine inlet	%	63.6	60.5	61.2	61.7	61.2
absolute humidity	g/kg	9.117	8.670	8.771	8.843	8.771
fuel temperature	℃	39.4	39.5	39.8	40.2	40.4

ENGINE INFO

mode	-	1	2	3	4	5
actual speed	rpm	998	998	998	998	998
actual torque	Nm	13116.00	9829	6566.00	3273.00	1299.00
net power	kW	1370.66	1027.16	686.16	342.04	135.75
After Intercooler Temperature	℃	47.1	46.0	44.7	44.3	43.9
Before Intercooler Pressure	kPa	236.0	171.7	97.2	39.8	15.1
After Intercooler Pressure	kPa	235.6	170.9	97.1	39.5	14.6
Coolant Outlet Temperature	℃	80.2	80.0	80.2	79.9	79.7
Oil Temperature	℃	85.1	84.8	83.9	83.1	82.1
massflow exhaust raw	kg/h	10122.9	8238.7	5937.2	4057.2	3243.2

NRSC 5 MODE DMC specific data Status Passed

NRSC 5 MODE DMC demand values

Mode	[-]	1	2	3	4	5
Demand speed	[rpm]	1000.000	1000.000	1000.000	1000.000	1000.000
Max. measured speed	[rpm]	1000.031	1000.575	1000.227	1000.826	1000.615
Min. measured speed	[rpm]	997.831	997.454	997.874	997.226	997. 427
Limit deviation speed	[rpm]	10.000	10.000	10.000	10.000	10.000
Max. deviation speed	[rpm]	-2.169	-2.546	-2.126	-2.774	-2.573
Status	[-]	Passed	Passed	Passed	Passed	Passed
Demand torque	[Nm]	13131.250	9848.438	6565.625	3282.813	1313.125
Max. measured torque	[Nm]	13121.259	9850.392	6569.082	3290.361	1315.632
Min. measured torque	[Nm]	13110.179	9821.418	6564.556	3268.333	1289.448
Limit deviation torque	[Nm]	262.625	262.625	262.625	262.625	262.625
Max. deviation torque	[Nm]	-31.071	- 27.020	-3.457	-14.48	-23.677
100[%] torque at demand speed	[Nm]	13131.3	13131.3	13131.3	13131.3	13131.3
Status	[-]	Passed	Passed	Passed	Passed	Passed
Mode duration	[s]	620.0	620.0	620.0	620.0	620.0
Min. mode duration	[s]	600.000	600.000	600.000	600.000	600.000
Status	[-]	Passed	Passed	Passed	Passed	Passed

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NRSC(5 Mode)

(GB 20981-2014)

Tailpipe Gaseous

operator	DezhongSun
test date	2024/7/08
testcell name	P003
project	20240708_NRSC
test serie	NRSC
testname	202407JICHAI

CONCENTRATION VALUES

mode	-	1	2	3	4	5
sampletime - gaseous	-	180.000	180.000	180.000	180.000	180.000
Dry to wet correction factor	-	0.930	0.935	0.937	0.946	0.959
Humidity correction factor NOX	-	1.006	0.997	0.999	1.002	1.000
concentration tailpipe CO2(dry)	ppm	59720	55170	50710	39260	24110
concentration tailpipe CO(dry)	ppm	183.1	155	67.58	74.31	129.1
concentration tailpipe NOX(wet)	ppm	553.7	447.3	420	289.6	184.5
concentration tailpipe THC(wet)	ppm	84.298	89.535	103.203	122.541	152.679
concentration tailpipe NMHC*	ppm	82.67	88.69	102.1	121	150.3
concentration tailpipe CH4(wet)	ppm	1.38	1.32	1.42	1.72	2.49

MASSFLOW EMISSION VALUES

mode	-	1	2	3	4	5	Weighted average
Weighting factor	-	0.05	0.25	0.3	0.3	0.1	-
massflow CO2 tailpipe	g/h	853159.400	644851.600	428321.400	228691.900	113846.000	412359.460
massflow CO tailpipe	g/h	1664.600	1152.920	363.233	275.467	387.900	601.860
massflow NOX tailpipe	g/h	8952.200	5830.080	3955.033	1868.867	949.700	3747.270
massflow THC tailpipe	g/h	408.800	353.320	293.500	238.133	237.200	291.980
massflow NMHC* tailpipe	g/h	400.800	350.000	290.367	235.167	233.500	288.550
massflow CH4 tailpipe	g/h	6.600	5.200	4.033	3.333	3.900	291.980

BRAKE SPECIFIC EMISSION

mode	-	1	2	3	4	5	Weighted average
Weighting factor	-	0.05	0.25	0.3	0.3	0.1	-
CO2	g/kWh	622.381	627.776	624.193	668.494	838.336	636.937
CO	g/kWh	1.214	1.122	0.529	0.805	2.856	0.930
NOx	g/kWh	6.531	5.676	5.764	5.463	6.993	5.788
THC	g/kWh	0.298	0.344	0.428	0.696	1.747	0.451
NMHC*	g/kWh	0.292	0.341	0.423	0.687	1.719	0.446
CH4	g/kWh	0.005	0.005	0.006	0.101	0.029	0.451

FUEL CONSUMPTION

mode	-	1	2	3	4	5	Weighted average
Weighting factor	-	0.05	0.25	0.3	0.3	0.1	-
Massflow air engine inlet	kg/h	9847	8031	5796	3979	3202	5752.8
Fuel consumption mass measured	kg/h	275.900	207.740	141.210	78.240	39.01	135.466
Fuel consumption mass calculated	kg/h	278.325	210.420	140.138	75.026	37.404	134.811
fuel consumption measured	g/kWh	201.269	202.239	205.785	228.705	287.270	209.243
fuel consumption calculated	g/kWh	203.038	204.848	204.223	219.310	275.434	208.231
deviation meas. - calc.	%	0.879	1.290	-0.752	-4.108	-4.12	-0.6411

Engine performance

mode	-	1	2	3	4	5	Weighted average
Actual power	kW	1370.8	1027.2	686.2	342.1	135.8	647.41
Actual work	kWh	15.268	57.050	45.713	22.720	3.033	143.784

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NRSC(5 Mode)

(GB 20981-2014)

Validation

operator	DezhongSun
test date	2024/7/8
testcell name	P003
project	20240708_NRSC
test serie	NRSC
testname	202407JICHAI

Emission limits - Phase III — Status Passed

		Actual	Limit	Status
CO	[g/kWh]	0.930	3.500	Passed
NOX	[g/kWh]	5.788	-	-
THC	[g/kWh]	0.451	-	-
NOX+THC	[g/kWh]	6.239	-	-

Validation — Status Passed

	Status
Device internal leak check (Date and time)	NA
Leak check acc. regulation	NA
Range overflow check (limited components)	Passed
Drift check Passed	Passed

Settings — Status Passed

	Range	Concentration	Measurement base	Overflow	check Mode
CH4 [ppm]	6	500	wet	Passed	ALL
CO2 [ppm]	4	60000	dry	Passed	ALL
COL [ppm]	2	500	dry	Passed	ALL
NOx [ppm]	6	500	wet	Passed	ALL
THC [ppm]	6	500	wet	Passed	ALL

Drift check — Status Passed

Overall status (based on COL,THC,NOX) Passed

Drift check mode Before and after the test

	Limit	Zero drift	Span drift	Drift check range	Status
CH4 [%]	±2	0.007	0.113	6	Passed
CO2 [%]	±2	0.009	0.039	4	Passed
COL [%]	±2	0.025	-0.004	2	Passed
NOx [%]	±2	0.002	1.168	6	Passed
THC [%]	±2.	0.060	0.038	6	Passed

Information

Sample location	[-]	Tailpipe
Type	[-]	Horiba MEXAONE
Description	[-]	MEXA-ONE-RS
Bench serial number	[-]	1.18.0
Exhaustflow calculation method	[-]	

FID parameters

CH4 measurement method FID calibrated with NMC

Coefficients used for NMHC calculation

Methane efficiency (CH4-FID)	[-]	0.020
Ethane efficiency (CH4-FID)	[-]	1.000
CH4 response factor (THC-FID)	[-]	1.058

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NRSC(5 Mode)

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Particulate Data

operator	DezhongSun
test date	2024/7/8
testcell name	P003
project	20240708_NRSC
test serie	NRSC
testname	202407JICHAI

Results **Emission limits - Phase III** Status Passed

		Actual	Limit	Status
brake spec. PM emission	g/kWh	0.118	0.20	Passed

		Lower limit	Upper limit	Min.	Max.	Status
Temperature filter		42.000	52.000	45.997	47.598	Passed
Temperature dilution air	°C	20.000	30.000	25.142	25.379	Passed
Min. overall dilution ratio	-	4.000	-	5.9985	-	Passed
Filter pressure drop off	kPa	-	25.000	-	9.4458	Passed
Filter face velocity	cm/s	35.000	100.000	84.467	94.772	Passed

DEST DATA

filterpair ID	-	1
samplemass filter	mg	2.0748
particulate mass	g/test	16.463
MassFlow of particulate emissions	g/h	74.0838
brake spec. PM emission	g/kWh	0.11783
Leak check		Passed
Leak check acc. regulation		Passed

Particulate Sampling System Results

mode	-	1	2	3	4	5
dilution ratio	-	4.6591	5.7200	7.9272	11.5959	14.5048
Sample time	s	74.8	374.9	449.9	449.9	149.9
Min. sample time	s	60	60	60	60	60
Status	-	passed	passed	passed	passed	passed
weighting factor	-	0.050	0.250	0.300	0.300	0.100
weighting factor effective	-	0.0499	0.2500	0.3001	0.3001	0.1000
Status	-	passed	passed	passed	passed	passed
Temperature dilution air	℃	25.360	25.278	25.252	25.209	25.191
Temperature filter	℃	46.717	46.538	46.200	46.136	46.109
Temperature exhaust min.	℃	46.900	46.900	46.900	46.900	46.900
Temperature exhaust avg	℃	46.993	47.001	46.997	47.000	47.002
Temperature exhaust max.	℃	47.100	47.100	47.100	47.100	47.100
Differential filter pressure	mbar	91.743	92.172	92.154	92.193	91.998
Filter face velocity	cm/s	94.236	94.159	94.039	94.002	93.992
Massflow exhaust	kg/s	2.8119	2.2885	1.6492	1.1270	0.9009
Massflow sample from probe	g/s	0.2812	0.2289	0.1649	0.127	0.0901
Massflow through filter	g/s	1.3101	1.3090	1.3074	1.3069	1.3067
Mass exhaust	kg	210.331	857.969	741.985	507.037	135.032
Mass removed from probe	g	21.0331	85.796	74.198	50.704	13.503
Mass through filter	g	79.996	490.760	588.187	587.956	195.877
Sample ratio	%	0.010	0.010	0.010	0.010	0.010
Actual power	kW	1372.1	1028.3	686.9	342.4	135.9