M44 **Documents for the Approval of Reciprocating** (1982)**Internal Combustion Engines** (Rev.1 1983)

1. General

The approval of drawings and specifications is part of the certification scheme for reciprocating internal combustion engines (hereafter referred to as the "engine").

2. Scope

2.1 This UR is associated with IACS UR M87 and contains the requirements for the approval of drawings and specifications for engines and sub-systems. Nov 2003)

2.2 This UR describes the general requirements for the approval of drawings and specifications. Further requirements of the following URs apply, as applicable. - M78, Reciprocating Internal Combustion Engines Fuelled by Gases or Low-flashpoint Fuels.

3. Objectives

Mar 2015 Complete

Revision)

Dec 2015)

(Rev.9

(Corr.1

June

2016)

(Corr.2

Nov 2016) (Rev.10

Feb 2021) (Corr.1

(Rev.2

1984) (Rev.3

1986)

(Rev.4 1989)

(Rev.5 1992)

(Rev.6

(Rev.7

May

2004) (Rev.8

This UR specifies the following items:

- The documentation to be submitted for type approval or design evaluation of an engine design.
- The documentation to be submitted for use during manufacturing and installation.
- The documentation flow, to be provided, between the engine designer, classification society approval centre, engine manufacturer, and classification society surveyors, which to be provided, and
- The Documentation required for approval of sub-systems.

4. Definitions

The terms and definitions in Appendix 1 of M87 are apply to this UR. Feb 2022)

(Rev.11 Apr 2025

Complete Revision)

Notes:

- 1. The requirements of M44 Rev.8 and Rev.9 are to be uniformly implemented by IACS Societies for engines for which the date of an application for type approval certification is dated on or after 1 July 2016.
- 2. The "date of application for type approval" is the date of documents accepted by the Classification Society as request for type approval certification of a new engine type or of an engine type that has undergone substantive modifications in respect of the one previously type approved, or for renewal of an expired type approval certificate.
- 3. Engines with an existing type approval on 1 July 2016 are not required to be re-type approved in accordance with this UR until the current Type Approval becomes invalid. For the purpose of certification of these engines, the current type approval and related submitted documentation will be accepted in place of that required by this UR until the current type approval expires or the engine type has undergone substantive modifications.
- 4. The requirements of M44 Rev.10 are to be uniformly implemented by IACS Societies for engines for which the date of an application for type approval certification is dated on or after 1 July 2022.

M44 5. The requirements of M44 Rev.11 are to be uniformly implemented by IACS members for engines which the date of an application for type approval certification is dated on or after 01 January 2027.

5. Documentation required for Type Approval or Design Evaluation Certificate

(cont) 5.1 Document flow

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5.1.1 For the initial type approval of an engine, the engine designer is to prepare the documentation in accordance with the requirements in Tables 1 and 2 and forward to the Classification Society according to the agreed procedure for review.

5.1.2 Upon review and approval of the submitted documentation evidence of approval (incl. approval documents, stamped drawings) is returned to the engine designer.

5.1.3 A representative document flow process for obtaining a type approval certificate is shown in Appendix 1, Figure 1.

5.2 Documentation to be submitted

The documentation, as far as applicable to the type of engine, is to be submitted by the engine designer/licensor to the Classification Society is listed in Tables 1 and 2.

5.2.1 Documents for information Table 1

Table 1 lists basic descriptive information to provide the Classification Society an overview of the engine's design, engine characteristics and performance. Additionally, there are requirements related to auxiliary systems for the engine's design including installation arrangements, list of capacities, technical specifications and requirements, along with information needed for maintenance and operation of the engine.

5.2.2 Documents for approval Table 2

Table 2 lists the documents and drawings, which are to be approved by the Classification Society.

5.2.3 The assignment of documents for information (Table 1) does not preclude possible comments by the individual Classification Society.

5.2.4 Where considered necessary, the Classification Society may request further documents to be submitted. This may include details or evidence of existing type approval or proposals for a type testing programme in accordance with UR M71.

5.3 Submission format of documentation

The classification society determines the documentation format—electronic or paper. If submitted in paper format, the number of copies is specified by each society.

5.4 Design modifications

After the classification society has approved the engine type for the first time, only the documents listed in the tables that have undergone substantive changes need to be resubmitted for consideration by the classification society.

6. Documents required for Product Certificate

When the engine's design has been approved in the type approval process without any design modifications, the following procedures may be omitted. Upon request by the surveyor in charge of inspections, the documents in Table 3 are to be available during the inspection

process. For engines with substantive modifications, the documents are to be resubmitted for approval in accordance with M44 5.4.

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Note: When a licensor-licensee and joint venture agreement is in place, the terms 'engine designer' and 'engine manufacturer' may refer to the 'licensor' and 'licensee,' respectively. If the engine designer and manufacturer belong to the same company, they can be regarded as the design and manufacturing departments of that company.

6.1 Document flow for engine certificate

6.1.1 For engines to be installed in specific applications, the engine designer may need to modify the design or performance requirements. The modified drawings are then forwarded by the engine designer to the engine manufacturer to develop production documentation for use in engine manufacturing in accordance with Table 3.

6.1.2 For engines to be installed in specific applications, the engine manufacturer may modify the design and performance requirements or prepare their own production documentation. In such cases, the engine manufacturer is to develop a comparison list of the production documentation against the documentation listed in Tables 1 and 2. An example comparison list is provided in Appendix 3. If there are differences in the technical content of the manufacturer's production drawings/documents compared to the corresponding designer's drawings, the manufacturer must obtain agreement on such differences from the designer using the template in Appendix 4.

6.1.3 The engine manufacturer submits the comparison list and production documentation to the classification society in accordance with the agreed procedure for review and approval.

6.1.4 The classification society returns evidence of approval to the engine manufacturer. This documentation is intended for use by the engine manufacturer, their subcontractors, and the attending surveyors. As the attending surveyors may request the engine manufacturer or their subcontractors to provide the actual documents indicated in the list, it is necessary for these documents to be prepared and available for the surveyors.

6.1.5 A representative document flow process for obtaining an engine certificate is shown in Appendix 2, Figure 2, illustrating the document flows between the:

- engine designer,
- engine manufacturers,
- component manufacturers,
- Classification Society approval centre, and
- Classification Society site offices.

6.1.6 The documents listed in Table 3 may be submitted by:

- the engine designer,
- the engine manufacturer.

6.2 Documents to be submitted for inspection and testing

6.2.1 Prior to the start of the engine certification process, a drawings approval is to be obtained.

The engine designer reviews the documents listed in Tables 1 and 2 for the application and develops, if necessary, application specific documentation for the use of the engine manufacturer in developing engine specific production documents.

M44 If substantive changes have been made, the affected documents are to be resubmitted to the Classification Society as per 5.4.

6.2.2 Table 3 lists the production documents, which are to be submitted by the engine manufacturer to the Classification Society following acceptance by the engine designer. The Surveyor uses the information for inspection purposes during manufacture and testing of the engine and its components. See 6.1.2 to 6.1.4.

In addition to the documents listed in Table 3, the engine manufacturer is to be able to provide to the Surveyor performing the inspection upon request the relevant detail drawings, production quality control specifications and acceptance criteria. These documents are for supplemental purposes to the survey only.

6.2.3 Alteration execution

If there are differences in the technical content of the manufacturer's production drawings/documents compared to the corresponding designer's drawings, the manufacturer must provide the classification society approval centre with a "Confirmation of the Designer's Acceptance of Manufacturer's Modifications" approved by the designer and signed by both the manufacturer and the designer responsible for the type approval. Modifications made by the manufacturer must adhere to the appropriate quality requirements. See Appendix 4 for a sample format.

6.3 Submission format of documentation

The classification society determines the documentation format—electronic or paper. If documentation is submitted in paper format, the number of copies is determined by each society.

7. Documentation required for approval of sub-systems

7.1 Unless otherwise specified in other URs, due to the diversity of possible sub-systems, the following documents are typically to be submitted for information, in addition to the documents listed in Tables 1, 2, and 3:

- Product specification and/or references to design standards, regulations, etc.
- Description of the function and safety aspects of the sub-system.
- Relevant design drawings with specified materials, cataloges, data sheets, calculations, functional descriptions, component lists where necessary, and marking of the product.
- Proposed field of application and operational limitations.
- Risk assessment (FMEA or Qualitative Failure Analysis), when applicable.
- Test program, including a design verification test on a typical engine to demonstrate that the performance provisions of the specified standard(s) are fulfilled and that failure modes identified in the risk assessment are verified.
- Certificates and reports for relevant tests previously obtained.
- Quality specification of the manufacturer, where necessary.
- Any other information that the classification society considers necessary.

7.2 If the sub-system is either already certified for the relevant engine type or type approved by the classification society or has been applied and approved for another engine type, the documents normally required for submission in 7.1 can then be omitted at the discretion of each classification society, unless there are modifications.

8. Approval and Issuance of Approval Letter

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Upon completion of the design approval/review, and once the requirements in this UR and the related rules of the classification society have been satisfactorily met, a design approval document (an approval letter or certificate with an approved drawing list) may be issued at the discretion of each classification society.

In the case of modifications to an existing type approval, a design approval document may also be issued in lieu of reissuing the existing type approval certificate at the discretion of each classification society.

No.	Item							
1	Engine particulars (e.g. Data sheet with general engine information (see Appendix 2), Project Guide, Marine Installation Manual)							
2	Engine cross section							
3	Engine longitudinal section							
4	Bedplate and crankcase of cast design							
5	Thrust bearing assembly ¹							
6	Frame/framebox/gearbox of cast design ²							
7	Tie rod							
8	Connecting rod							
9	Connecting rod, assembly ³							
10	Crosshead, assembly ³							
11	Piston rod, assembly ³							
12	Piston, assembly ³							
13	Cylinder jacket/ block of cast design ²							
14	Cylinder cover, assembly ³							
15	Cylinder liner							
16	Counterweights (if not integral with crankshaft), including fastening							
17	Camshaft drive, assembly ³							
18	Flywheel							
19	Fuel injection pump							
20	Shielding and insulation of exhaust pipes and other parts of high temperature which may be impinged as a result of a fuel system failure, assembly							
	For electronically controlled engines, construction and arrangement of:							
21	Control valves							
22	High-pressure pumps							
23	Drive for high pressure pumps							
24	Operation and service manuals ⁴							
25	FMEA (for engine control system) ⁵							
26	Production specifications for castings and welding (sequence) ⁷							
27	Evidence of quality control system for engine design and in service maintenance ⁷							
28	Quality requirements for engine production ⁷							
29	Type approval certification for environmental tests, control components ^{6, 7}							
30	Any other information and documents that the Classification Society considers							
	necessary for sub-system ref. § 7.1.							

Table 1 Documentation to be submitted for information, as applicable

FOOTNOTES:

M44 (cont)

- 1. If integral with engine and not integrated in the bedplate.
- 2. Only for one cylinder or one cylinder configuration.
- 3. Including identification (e.g. drawing number) of components.
- 4. Operation and service manuals are to contain maintenance requirements (servicing and repair) including details of any special tools and gauges that are to be used with their fitting/settings together with any test requirements on completion of maintenance.
- 5. Where engines rely on hydraulic, pneumatic or electronic control of fuel injection and/or valves, a failure mode and effects analysis (FMEA) are to be submitted to demonstrate that failure of the control system will not result in the operation of the engine being degraded beyond acceptable performance criteria for the engine.
- 6. Tests are to demonstrate the ability of the control, protection and safety equipment to function as intended under the specified testing conditions per UR E10.
- 7. No. 26, 27, 28, and 29 may be common to different engine types and reviewed only once by the classification society accordingly.

No.	Item
1	Bedplate and crankcase of welded design, with welding details and welding instructions ^{1,2}
2	Thrust bearing bedplate of welded design, with welding details and welding instructions ¹
3	Bedplate/oil sump welding drawings ¹
4	Frame/framebox/gearbox of welded design, with welding details and instructions ^{1,2}
5	Engine frames, welding drawings ^{1,2}
6	Crankshaft, details, each cylinder No.
7	Crankshaft, assembly, each cylinder No.
8	Crankshaft calculations (for each cylinder configuration) according to the attached data sheet and UR M53
9	Thrust shaft or intermediate shaft (if integral with engine)
10	Shaft coupling bolts
11	Material specifications of main parts with information on non-destructive material
	tests and pressure tests ³
	Schematic layout or other equivalent documents on the engine of:
12	Starting air system
13	Fuel system
14	Lubricating oil system
15	Cooling water system
16	Hydraulic system
17	Hydraulic system (for valve lift)
18	Engine control and safety system
19	Shielding of high pressure fuel pipes, assembly ⁴
20	Construction of accumulators (for electronically controlled engine)
21	Construction of common accumulators (for electronically controlled engine)
22	Arrangement and details of the crankcase explosion relief valve (see UR M9) ⁵
23	Calculation results for crankcase explosion relief valves (see UR M9)
24	Details of the type test program and the type test report) ⁷
25	High pressure parts for fuel injection system ⁶
26	Oil mist detection and/or alternative alarm arrangements (see UR M10)
27	Details of mechanical joints of piping systems (see UR P2)
28	Documentation verifying compliance with inclination limits (see UR M46)
29	Documents as required in UR E22, as applicable

Table 2Documentation to be submitted for approval, as applicable

FOOTNOTES:

M44 (cont)

- 1. For approval of materials and weld procedure specifications. The weld procedure specification is to include details of pre and post weld heat treatment, weld consumables and fit-up conditions.
- 2. For each cylinder for which dimensions and details differ.
- 3. For comparison with Society requirements for material, NDT and pressure testing as applicable.
- 4. All engines.
- 5. Only for engines of a cylinder diameter of 200 mm or more or a crankcase volume of 0.6 m³ or more.
- 6. The documentation to contain specifications for pressures, pipe dimensions and materials.
- 7. The type test program may be submitted for approval before type test, and the type test report may be submitted shortly after the conclusion of the type test.

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Table 3 Documentation for the inspection of components and systems

- Special consideration will be given to engines of identical design and application

For engine applications refer to UR M72

No.	Item
1	Engine particulars as per data sheet in Appendix 2
2	Material specifications of main parts with information on non-destructive material tests and pressure tests ¹
3	Bedplate and crankcase of welded design, with welding details and welding instructions ²
4	Thrust bearing bedplate of welded design, with welding details and welding instructions ²
5	Frame/framebox/gearbox of welded design, with welding details and instructions ²
6	Crankshaft, assembly and details
7	Thrust shaft or intermediate shaft (if integral with engine)
8	Shaft coupling bolts
9	Bolts and studs for main bearings
10	Bolts and studs for cylinder heads and exhaust valve (two stroke design)
11	Bolts and studs for connecting rods
12	Tie rods
	Schematic layout or other equivalent documents on the engine of: ³
13	Starting air system
14	Fuel system
15	Lubricating oil system
16	Cooling water system
17	Hydraulic system
18	Hydraulic system (for valve lift)
19	Engine control and safety system
20	Shielding of high pressure fuel pipes, assembly ⁴
21	Construction of accumulators for hydraulic oil and fuel oil
22	High pressure parts for fuel oil injection system ⁵
23	Arrangement and details of the crankcase explosion relief valve (see UR M9) ⁶
24	Oil mist detection and/or alternative alarm arrangements (see UR M10)
25	Cylinder head
26	Cylinder block, engine block
27	Cylinder liner
28	Counterweights (if not integral with crankshaft), including fastening
29	Connecting rod with cap
30	Urossnead Distanced
31	Piston rod
32	Piston, assembly
33	Pision nead
34	Camshail drive, assembly
30	Arrangement of foundation (for main angines only)
30 27	Fuel injection nump
20	Fuer injection pullip Shielding and insulation of exhaust pines and other parts of high temperature which
30	Sinciding and insulation of exhaust pipes and other parts of high temperature which may be impired as a result of a fuel system failure, assembly
20	Construction and arrangement of dampers
40	For electronically controlled engines, assembly drawings or arrangements of: Control
-0	valves

ltem
High-pressure pumps
Drive for high pressure pumps
Valve bodies, if applicable
Operation and service manuals ⁸
Test program resulting from FMEA (for engine control system) ⁹
Production specifications for castings and welding (sequence)
Type approval certification for environmental tests, control components ¹⁰
Quality requirements for engine production

FOOTNOTES:

- 1. For comparison with Society requirements for material, NDT and pressure testing as applicable.
- 2. For approval of materials and weld procedure specifications. The weld procedure specification is to include details of pre and post weld heat treatment, weld consumables and fit-up conditions.
- 3. Details of the system so far as supplied by the engine manufacturer such as: main dimensions, operating media and maximum working pressures.
- 4. All engines.
- 5. The documentation to contain specifications for pressures, pipe dimensions and materials.
- 6. Only for engines of a cylinder diameter of 200 mm or more or a crankcase volume of 0.6 m³ or more.
- 7. Including identification (e.g. drawing number) of components.
- 8. Operation and service manuals are to contain maintenance requirements (servicing and repair) including details of any special tools and gauges that are to be used with their fitting/settings together with any test requirements on completion of maintenance.
- 9. Required for engines that rely on hydraulic, pneumatic or electronic control of fuel injection and/or valves.
- 10. Documents modified for a specific application are to be submitted to the Classification Society for information or approval, as applicable. See 6.1.1, Appendix 3 and Appendix 4.

M44 (cont)

UR M44 - APPENDIX 1 - REPRESENTATIVE DOCUMENT FLOW DIAGRAMS

The document flow diagrams in this appendix are provided as an aid to all parties involved in the engine certification process as to their roles and responsibilities. Variations in the document flow may vary in response to unique issues with regard to various factors related to location, availability of components and surveys. In any case, the text in the UR takes precedence over these flow diagrams.



* May also be produced by licensee







¹⁾ Class Site office with responsibility for engine builder and/or component manufacturers in different locations

²⁾ For alternative execution, see 5.3

Figure 2 Engine certificate document flow



M44 (cont)



M44 (cont)

UR M44 - APPENDIX 2 - Internal Combustion Engine Approval Application Form and Data Sheet

Class Application nur	Class Application number (if applicable): Engine Manufacturer's Application Identification Number:									
General Data			_							
Engine Designer:			Engir	e Manufacturer(s), Li	censee(s) and/or Ma	nufacturing Sites*Name				
Contact Person:					Country					
Address:										
1 Document purpose	(select options from eithe	er 1a or 1b)								
1a. Type Approval Apr	lication									
Service Reg	uested Required	activities [†]								
		CoP								
	roval CoPifu	design change then amen	ded or n	ew certificate process	s to be followed					
Amend Type App	roval • DA & C	oP Further TT if previous	lv annroi	ved engine has been	substantively modifie	d (as required by LIR M71)				
	• DA, TT,	applicable where designed	er does r	ot have production fa	cilities, Type Approv	al to be granted to specific				
Design Evaluation	n producti	ion facility once associate	d CoP h	as been completed		0 ,				
Update TA Supple	ement • Update	to Supplement, only for m	ninor cha	nges not affecting the	e Type Approval Cert	ificate				
Other	• e.g. Nat	ional/Statutory Administra	ation requ	uirements i.e. MSC.8	1(70), as amended, f	or emergency engines				
For TA Cert amendme	nts or									
what is to be changed:										
For 'Other', Details of t	he									
requirements to be con	nsidered:									
Tb. Addendum for Individual ongina	vidual Engine FAT and Cortifi	entification	formanc	o data for the ongine	being cortified differ	from the details provided				
on the original Tv	pe Approval Application.	cation, only where the per	nonnand		being certined differs					
Only section 3b re	equires completion. When	re changes to other sectio	ons are n	ecessary, a new Type	e Approval Applicatio	n may be required.				
Reference number of I	Internal Combustion Eng	ine Approval Application F	=orm							
previously submitted a	nd reference number of t	he Type Approval Certific	ate.	(Copy of original app	lication form to be at	tached to this document)				
2. Existing documentation	tion	1								
Previous Class Type A	Approval Certificate No.									
Formerly issued docur	nentation for engine	Issuing Body:		Docume	nt Type:	Document No.:				
(F a previous type tes	t reports in-service									
experience justification	reports, etc.)									
Existing Certification		Issuing Body:	ssuing Body:		nt Type:	Document No.:				
(E.g. Manufacturer's g	uality certification									
ISO 9001:2015 etc.)										
3. Design (mark all that	nt apply)									
3a. Engine Particulars:	:									
Engine Type			Numb	er of delivered marine	e engines‡:					
Manufactured Since [‡] :										
Application	Direct drive Propul	sion		Auxiliary		Emergency				
Application	(Single engine /	Multi-engine installation)	(Aux. Services / 🗌 El	ectric Propulsion)					
	2-stroke	4-stroke	🗌 In-	line 🗌 🗋	Vee (V-angle	°) 🗌 Other ()				
Mechanical Design	Cross-head	Trunk-piston								
	Cylinder bore(mm)		Length of piston stroke (mm)							
		With superchargin	ng							
Supercharging	supercharging	☐ Without charge air	arge air cooling							
			e charair	a system		sure charging system				
Valve operation	Cam control					see and ging by bloth				

M44 (cont)	Fuel Injection	Direct injection Indirect injection Cam controlled injection Electronically controlled injection										
	Fuel Types [§] (Classification according to ISO 8216-1:2017)	Marine liquid resi Marine liquid dist Marine liquid dist Low flashpoint lic Gases (specify g Other (specify) Dual Fuel	idual fuel illate fuel juid fuel (specify fuel type) as type)	cSt (M DMA, DMB, I DMX	Max. kinematic visco	osity at 50°C)						
	3b. Performance Data (Related to: Barometric pressure 1,000 mbar; Air temperature 45°C; Relative humidity 60%; Seawater temperature 32°C) Model reference No. (if applicable) Max. continuous rating kW/cyl											
	Max. continuous rating kW/cyl Rated speed 1/min Mean indicated pressure MPa											
	Mean effective pressure MPa Max. firing pressure MPa											
	Charge air pressure MPa Compression ratio - Mean piston speed m/s											
	3c. Crankshaft Design	Solid	Semi-built	Built								
	Method of Manufacture		☐ Forged ☐ Slab forged	Approved o	die forged	Continuous grain flow process						
	Is the crankshaft hardened by an approved process which includes the fillet radii of crankpins and journals?											
	Crankshaft material specification: U.T.S. (N/mm²) Yield strength (N/mm²) Hardness value (Brinell/Vickers) Elongation (%)											
	Dimensional Data If shrunk on webs, state	e shrinkage allowance	e (mm)	Yield stren	gth of crankweb ma	aterial (N/mm ²)						
	Centre of gravity of con Mass of each crankweb	necting rod from large o (kg)	e end centre (mm)	Radius of gyration of connecting rod (mm) Centre of gravity of web from journal axis (mm)								
	Axial length of main bea	aring (mm) /ing end (kg)		Centre of gravity of each counterweight from journal axis (mm) Main bearing working clearance (mm) Mass of flywheel at opposite end (kg)								
	Nominal alternating torsional stress in crankpin (N/mm²) Nominal alternating torsional stress in crank journal (N/mm²) Length between centres (Total length)(mm) Image of the window of the w											
	3d. Firing order		23456		14243144	A5 A6						
		counter clockwise	driving shaft flange	counter clockwis	See Clockwise	driving shaft flange						
	State numbering system Number of cylinders	m of cylinders from lef Clockwise firing orc	ft to right as per above diagra der	ams (as applic	able) Counter-clockwis	e firing order						

4. Engine Ancil	lary Systems/Sub-	systems								
4a. Turbocharg	ers	Fitted Not Fitted								
Turbocharger of	il supply by:	Engine lub.	oil system	TC internal lu						
No. of cvlinders	No. of aux blowers	No. of charge air coolers	No. of TC	TC manufacturer	& type	T C	C type approval ertificate No.			
					/					
					/					
					/					
					/					
					/					
4b. Speed governor					· ·	- 1				
Engine application (Main/Aux/Emergency)		Manufacturer /	[/] type	Mode of operat	ion	i ype approval (if electric / ele	cert. No. ectronic gov.)			
X .	0		/			`	0 /			
			/							
			/							
4c. Overspeed protection										
Independent overspeed protection available										
Manufacturer / type, if electronic: / Type approval certificate No.										
4d. Electronic systems										
Engine control and management system Note: use Remarks section to identify when a different engine control system will be used for Type Test										
Hardware: Manufacturer & Model: / Type approval certificate No.										
Software: Name & Version: / Software conformity certificate No.										
Additional electronic system 1: System function:										
Manufacturer & type: / Type approval certificate No.										
Additional electronic system 2: System function:										
Manufacturer & type: / Type approval certificate No.										
Additional electronic system 3: System function:										
Manufacturer & type: / Type approval certificate No.										
4e. Starting System										
Type:										
4f. Safety devices/functions										
A flame arresto	r or a bursting disl	k is installed bei	fore each starting	valve 🗌 Yes	🗆 No					
in the starting a	iir system:	in t	the starting air mar	nifold 🗌 Yes	🗆 No					
Crankcase relie	of valves available	🗌 Yes	🗌 No	Manufacturer	/ type: /					
Type approval certificate No.										
No. of cyl	Total crankcas	se gross	Type & size (mm) of relief valve	Relief area per relief	valve (mm ²)	No. of relief v			
	volume incl. at	tachments (m ³)								
				1						
				1						
				/						
Method used for detection of potentially explosive crankcase condition:										
Oil mist det	ector: Manufacture	r/type: /	٦	Type approval certific	ate No.					
Alternative	nethod:	crankcase pre	ssure monitoring	bearing temp	perature monitoring	other:				
(mark all that a	ylqq)	oil splash tem	perature monitorin	g [] recirculation	arrangements					
Cvlinder overp	essure warning de	evice available	Yes I No	5 —	<u>j</u>					
Type:	g			(bar).						
1 ypo.			oponing proceede	(501).						
Ag Sub-system	5									
	engine control sys	tem								
□Fuel injectio	on/admission syst	em								
	st age recirculation) system								
	si gas recirculation	i) bybloin								

Engine driven numps:							
Main lubricating ail			water pump		h analing water		
	pump				n cooling water	oump	
HI-fresh cooling wa	ater pump		ster pump		liic oli pump		er ()
Engine attached motor	driven pumps:						
Lubricating oil pump	0	Cooling fresh	hwater pump	Fuel oi	booster pump		
Hydraulic oil pump		Other ()				
Engine attached cooler	or heater:						
Lubricating oil coole	er	Lubricating of Contract Contract	oil heater	Fuel oil	valve cooler		
Hydraulic oil cooler		Cooling fresh	hwater cooler				
Engine attached filter:							
Lubricating oil filter	Single	Duplex	Automatic				
Fuel oil filter	Single	Duplex	Automatic				
5. Inclination limits				Athwar	tships	Fore-and-aft	
(engine operation is sai	feguarded under the fo	llowing limits)		Static	Dynamic	Static	Dynamic
Main & Auxiliary mach	inery			□ 15.0°	□ 22.5°	□ 5.0°	□ 7.5°
Emergency machinery				□ 22.5°	□ 22.5°	□ 10.0°	□ 10.0°
Emergency machinery	on ships for the carriag	e of liquefied gas and liquid chemicals		□ 30.0°	□ 30.0°		
6. Main engine emerge	ncy operation						
At failure of one auxiliar	y blower, engine can b	e started and operated	d at partial load		Yes No		
At failure of one turboch	harger, engine operatio	n can be continued		[Yes 🗌 No		
7. References: Addition	al Information Attached	d to Application					
Document Name/Numb	er	Summary of inform	ation contained in doc	cument			
	-						
8. Further Remarks:							

- * All parties that affect the final complete engine (e.g. manufacture, modify, adjust) are to be listed. All sites where such work is carried out may be required to complete CoP assessment.
- † DA = Design Appraisal, TT = Type Test, CoP = Assessment of Conformity of Production. See 'Definitions' at the end of this application form for more information.
- ‡ Only in case of TA Extension.
- § See 'Definitions' at the end of this application form for more information.

Completed By:					
Company:					

Signature:

Job Title: Date: Stamp:

Definitions:

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(cont)

Design Appraisal: Evaluation of all relevant plans, calculations and documents related to the design to determine compliance with the IACS and individual Societies' technical requirements. This includes requirements for all associated ancillary equipment and systems essential for the safe operation of the engine i.e. the Complete Engine. The Design Appraisal is recorded on a Supplement to the Type Approval Certificate.

Type Testing requires satisfactory completion of testing of the Complete Engine against the requirements of the Classification Societies' applicable engine Type Testing programme (based on minimum requirements of IACS Unified Requirement M71). Type testing is only applicable to the first in series; all engines are to complete factory acceptance and shipboard trials as defined by IACS Unified Requirement M51 and Society requirements.

Design Evaluation Certification may be granted upon satisfactory completion of Design Appraisal and Type Testing.

Assessment of Conformity of Production means the assessment of quality assurance, manufacturing facilities and processes and testing facilities, to confirm the manufacturer's capability to repeatedly produce the complete engine in accordance with the approved and type tested design.

Type Approval Certification will be granted upon satisfactory completion of Design Appraisal, Type Testing and assessment of Conformity of Production of the complete engine. The Type Approval Certificate will incorporate outputs from the Design Appraisal, the Type Test and the Assessment of Conformity of Production.

Complete Engine includes the control system and all ancillary systems and equipment referred to in the Rules that are used for safe operation of the engine and for which there are rule requirements, this includes systems allowing the use of different fuel types. The exact list of components/items that will need to be tested in together with the bare engine will depend on the specific design of the engine, its control system and the fuel(s) used but may include, but are not limited to, the following:

- (a) Turbocharger(s)
- (b) Crankcase explosion relief devices
- (c) Oil mist detection and alarm devices
- (d) Piping
- (e) Electronic monitoring and control system(s) software and hardware
- (f) Fuel management system (where dual fuel arrangements are fitted)
- (g) Engine driven pumps
- (h) Engine mounted filters

Fuel Types: All fuels that the engine is designed to operate with are to be identified on the application form as this may have impact on the requirements that are applicable for Design Appraisal and the scope of the tests required for Type Testing. Where the engine is to operate in a Dual Fuel mode, the combinations of fuel types are to be detailed. E.g. Natural Gas + DMA, Natural Gas + Marine Residual Fuel, the specific details of each fuel are to be provided as indicated in the relevant rows of the Fuel Types part of section 3a of this form.

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UR M44 - APPENDIX 3 - Tabular Listing of Designer's and Manufacturer's Drawing and Data

(cont)

Manufacturer:_____ Engine No. :_____ Designer:_____ Engine type:_____

		Designer			Manufacturer	Has De been mo Manufac	esign odified sturer?	If Yes, indicate following information		
No.	Components or System	Dwg. No. & Title	Rev. No.	Date of Class Approval or Review	Dwg. No.	Rev. No.	Yes	No	Identification of Alternative approved by Designer	Date of Class Approval or Review of Manufacturer Dwg.
1										
2										
3										
4										
5										
6										
7										
8										
9										

I attest the above information to be correct and accurate.

Person in Charge (Manufacturer):

Printed Name

Signature

Date:_____

Note: When a licensor-licensee agreement is applied, the "designer" and "manufacturer" could be regarded as the "licensor" and "licensee".

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UR M44 - APPENDIX 4 SAMPLE TEMPLATE FOR CONFIRMATION OF THE DESIGNER'S ACCEPTANCE OF MANUFACTURER'S MODIFICATIONS

(cont)

	Engine Manufacturer Proposed Alternative to Designer's Design									
			Manufacture	r informatio						
Designer:					Ref No	.:				
Description:).:							
Engine type:	Engine type: Main Section:									
Engine No.:					Plant lo	d.:				
Design Spec:	🗌 Gei	neral	Specific Nos:							
design:		State n Add an	elevant part or drawing. numbers. ny relevant information	Insert drawing clips	or pictures.	Manufac Alternativ	turer Proposed /e			
				 For example: Differences in geometry Differences in the functionality Material Hardness Surface condition Alternative standard Licensee production information introduced on the drawing Weldings or castings etc. 						
Manufacturer's production Sub-supplier's production Control Cost down Cost down Cost down Cost down			Interchangeability w. design	Non-conformity Report Research, Assessment, Evaluation			Certified by manufacturer: Initials: Date:			
Licensor comme	ents									
Accepted a (Designer under No objectio (Manufacturer under)	ecution Not acceptable	Approved Conditionally approved Rejected Certified by design Initials: Date:			Certified by designer: Initials: Date:					
Designer ref.:							Date:			
Manufacturer ref.:							Date:			

End of Document