# Compressed Air for Essential Services

**Object of Amendment**

Rules for the Survey and Construction of Steel Ships Part D
Guidance for the Survey and Construction of Steel Ships Part D

**Reason for Amendment**

IACS Unified Requirement (UR) M61 specifies requirements for the starting arrangements of internal combustion engines, and these include requirements related to the capacities of starting air reservoirs used for main engines, auxiliary engines and for other purposes. UR M61 has already been incorporated into the ClassNK Rules.

In recent years, the use of compressed air on board the ship other than starting prime movers (main engines, auxiliary engines, etc.) has been increasing, and this increased use has, in some cases, led to pneumatic piping systems being connected to the piping systems of the starting air reservoirs of prime movers, even in cases where the dedicated air compressors intended for that use are installed. The failure of such pneumatic piping systems, however, is a serious concern because such failures could possibly result in situations where compressed air capacities are insufficient for starting prime movers.

Therefore, to resolve such concerns, IACS adopted UR M84 and amended UR M61 in February 2024. UR M84 specifies new requirements for compressed air used for purposes other than starting prime movers, whereas UR M61(Rev.3) amends associated existing requirements to reflect the adoption of UR84.

Accordingly, relevant requirements are amended based on UR M84 and M61(Rev.3).

**Outline of the Amendment**

Stipulates requirements for compressed air used for essential services other than starting prime movers.

**Effective Date and application**

This draft amendment applies to ships for which the date of contract for construction is on or after 1 July 2025.

An asterisk (*) after the title of a requirement indicates that there is also relevant information in the corresponding Guidance.

ID: DD24-02

Amended-Original Requirements Comparison Table (Compressed Air for Essential Service)

| Amended | Original | Remarks |
|---|---|---|
| **RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS**<br><br>**Part D MACHINERY INSTALLATIONS** | **RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS**<br><br>**Part D MACHINERY INSTALLATIONS** | |
| **Chapter 2 RECIPROCATING INTERNAL COMBUSTION ENGINES** | **Chapter 2 RECIPROCATING INTERNAL COMBUSTION ENGINES** | |
| **2.5 Associated Installations** | **2.5 Associated Installations** | |
| **2.5.3 Starting Arrangements*** | **2.5.3 Starting Arrangements*** | |
| **2** Where main propulsion engines are arranged for starting by compressed air, at least two starting air reservoirs are to be provided. These reservoirs are to be connected so that usage can be readily switched from one to the other. In this case, the total capacity of the starting air reservoirs is to be sufficient to provide, without replenishment, the number of consecutive starts not less than that specified in **(1)**, **(2)** and **(3)** below. Where the arrangements of the main propulsion engines and shafting systems are other than shown below, the required number of starts is to be as deemed appropriate by the Society. When other consumers such as auxiliary machinery starting systems, pneumatic piping systems for essential services (refer to **13.13.6(2)**), control systems, whistles, etc. are to be connected to starting air reservoirs, their air consumption is also to be taken into account.<br>(1) For direct reversible engines | **2** Where main propulsion engines are arranged for starting by compressed air, at least two starting air reservoirs are to be provided. These reservoirs are to be connected so that usage can be readily switched from one to the other. In this case, the total capacity of the starting air reservoirs is to be sufficient to provide, without replenishment, the number of consecutive starts not less than that specified in **(1)**, **(2)** and **(3)** below. Where the arrangements of the main propulsion engines and shafting systems are other than shown below, the required number of starts is to be as deemed appropriate by the Society. When other consumers such as auxiliary machinery starting systems, control systems, whistles, etc. are to be connected to starting air reservoirs, their air consumption is also to be taken into account.<br>(1) For direct reversible engines | IACS UR M61(Rev.3) /M61.1.1.5 |

Amended-Original Requirements Comparison Table (Compressed Air for Essential Service)

| Amended | Original | Remarks |
|---|---|---|
| $Z = 12C$<br>where<br>$Z$ : Total number of starts of engine<br>$C$ : Constant determined by the arrangement of main propulsion engines and shafting systems, where the following values are to be referred to as the standard;<br>$C$ = 1.0 For single screw ships, where one engine is either coupled with the shaft directly or through reduction gears.<br>$C$ = 1.5 For twin screw ships, where two engines are either coupled with the shafts directly or through reduction gear. Or, for single screw ships, where two engines are coupled with the shaft through declutchable coupling provided between engine and reduction gear.<br>$C$ = 2.0 For single screw ships, where two engines are coupled with one shaft without any declutchable coupling between engine and reduction gear.<br>(2) For non-reversible type engines using a separate reversing gear or controllable pitch propeller, 1/2 of the total number of starts specified in **(1)** above may be accepted.<br>(3) For electric propulsion ships:<br>$Z = 6 + 3(k - 1)$<br>where<br>$Z$ : Total number of starts of engine<br>$k$ : Number of engines (In the case of more than 3 engines, the value of $k$ to be used is 3.) | $Z = 12C$<br>where<br>$Z$ : Total number of starts of engine<br>$C$ : Constant determined by the arrangement of main propulsion engines and shafting systems, where the following values are to be referred to as the standard;<br>$C$ = 1.0 For single screw ships, where one engine is either coupled with the shaft directly or through reduction gears.<br>$C$ = 1.5 For twin screw ships, where two engines are either coupled with the shafts directly or through reduction gear. Or, for single screw ships, where two engines are coupled with the shaft through declutchable coupling provided between engine and reduction gear.<br>$C$ = 2.0 For single screw ships, where two engines are coupled with one shaft without any declutchable coupling between engine and reduction gear.<br>(2) For non-reversible type engines using a separate reversing gear or controllable pitch propeller, 1/2 of the total number of starts specified in **(1)** above may be accepted.<br>(3) For electric propulsion ships:<br>$Z = 6 + 3(k - 1)$<br>where<br>$Z$ : Total number of starts of engine<br>$k$ : Number of engines (In the case of more than 3 engines, the value of $k$ to be used is 3.) | |

Amended-Original Requirements Comparison Table (Compressed Air for Essential Service)

| Amended | Original | Remarks |
|---|---|---|
| **Chapter 4 GAS TURBINES** | **Chapter 4 GAS TURBINES** | |
| **4.4 Associated Installations** | **4.4 Associated Installations** | |
| **4.4.3 Starting Arrangements*** | **4.4.3 Starting Arrangements*** | |
| **2** Where compressed air is used for starting, the starting arrangement is to comply with **13.13**, in addition to the following **(1)** to **(5)**:<br>(1) (Omitted)<br>(2) The arrangement for the air starting of main propulsion machinery is to be provided with at least two starting air reservoirs which may be used independently. The total capacity of the air reservoirs is to be sufficient to provide, without their being replenished, the number of consecutive starts of main propulsion machinery not less than the following **(a)** and **(b)**. Where the arrangements of the main propulsion machinery and shafting systems are other than those shown below, the required number of starts is to be as deemed appropriate by the Society. When other consumers such as auxiliary machinery starting systems, pneumatic piping systems for essential services (refer to **13.13.6(2)**), control systems, whistles, etc. are to be connected to starting air reservoirs, their air consumption is also to be taken into account.<br>(a) Ships other than electric propulsion ships<br>$Z = 6C$<br>where | **2** Where compressed air is used for starting, the starting arrangement is to comply with **13.13**, in addition to the following **(1)** to **(5)**:<br>(1) (Omitted)<br>(2) The arrangement for the air starting of main propulsion machinery is to be provided with at least two starting air reservoirs which may be used independently. The total capacity of the air reservoirs is to be sufficient to provide, without their being replenished, the number of consecutive starts of main propulsion machinery not less than the following **(a)** and **(b)**. Where the arrangements of the main propulsion machinery and shafting systems are other than those shown below, the required number of starts is to be as deemed appropriate by the Society. When other consumers such as auxiliary machinery starting systems, control systems, whistles, etc. are to be connected to starting air reservoirs, their air consumption is also to be taken into account.<br>(a) Ships other than electric propulsion ships<br>$Z = 6C$<br>where | Same as 2.5.3-2 above. |

Amended-Original Requirements Comparison Table (Compressed Air for Essential Service)

| Amended | Original | Remarks |
|---|---|---|
| *Z*: Total number of starts of gas turbines<br>*C*: Constant determined by the arrangement of gas turbines and shafting systems, where the following values are to be referred to as the standard<br>*C* = 1.0: Single screw ships, where one gas turbine is either coupled with the shaft directly or through reduction gears.<br>*C* = 1.5: Twin screw ships, where two gas turbines are either coupled with the shafts directly or through reduction gear, and for single screw ships, where two gas turbines are coupled with the shaft through declutchable coupling provided between gas turbines and reduction gear.<br>*C* = 2.0: Single screw ships, where two gas turbines are coupled with one shaft without any declutchable coupling between gas turbines and reduction gear.<br>(b) Electric propulsion ships<br>$Z = 6 + 3\ (k\text{-}1)$<br>where<br>*Z*: Total number of starts of gas turbines<br>*k*: Number of engines (In the case of more than three gas turbines, the value of *k* to be used need not exceed three.)<br>(3) (Omitted) | *Z*: Total number of starts of gas turbines<br>*C*: Constant determined by the arrangement of gas turbines and shafting systems, where the following values are to be referred to as the standard<br>*C* = 1.0: Single screw ships, where one gas turbine is either coupled with the shaft directly or through reduction gears.<br>*C* = 1.5: Twin screw ships, where two gas turbines are either coupled with the shafts directly or through reduction gear, and for single screw ships, where two gas turbines are coupled with the shaft through declutchable coupling provided between gas turbines and reduction gear.<br>*C* = 2.0: Single screw ships, where two gas turbines are coupled with one shaft without any declutchable coupling between gas turbines and reduction gear.<br>(b) Electric propulsion ships<br>$Z = 6 + 3\ (k\text{-}1)$<br>where<br>*Z*: Total number of starts of gas turbines<br>*k*: Number of engines (In the case of more than three gas turbines, the value of *k* to be used need not exceed three.)<br>(3) (Omitted) | |

Amended-Original Requirements Comparison Table (Compressed Air for Essential Service)

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|---|---|---|
| **Chapter 13 PIPING SYSTEMS** | **Chapter 13 PIPING SYSTEMS** | |
| **13.13 Pneumatic Piping Systems*** | **13.13 Pneumatic Piping Systems** | |
| **13.13.6 Pneumatic Piping Systems for Essential Services** | **（Newly added）** | IACS UR M84 |
| The following (1) and (2) requirements are to be applied to the supply of compressed air required by essential services on board ships other than the supply of compressed air for engine starting. | | IACS UR M84/1. |
| (1) The arrangements for the supply of compressed air to essential services are to ensure that sufficient compressed air to satisfy the total demand of the essential services is available at all times during normal operation, during maintenance, and in the event of a failure of the compressed air system. | | (1) IACS UR M84/2.1 |
| (2) Where compressed air is supplied from the engine starting air system, either continuously in normal operation, or periodically during maintenance or in the event of a failure of the compressed air system, the required compressed air demand is not to reduce the capacity and availability of the engine starting air required by **2.5.3-2** and **4.4.3-2**. | | (2) IACS UR M84/2.2 |
| EFFECTIVE DATE AND APPLICATION<br><br>**1.** The effective date of the amendments is 1 July 2025.<br>**2.** Notwithstanding the amendments to the Rules, the current requirements apply to ships for which the | | |

| Amended | Original | Remarks |
|---|---|---|
| date of contract for construction* is before the effective date.<br>* "contract for construction" is defined in the latest version of IACS Procedural Requirement (PR) No.29.<br><br>IACS PR No.29 (Rev.0, July 2009)<br><br>**1.** The date of "contract for construction" of a vessel is the date on which the contract to build the vessel is signed between the prospective owner and the shipbuilder. This date and the construction numbers (i.e. hull numbers) of all the vessels included in the contract are to be declared to the classification society by the party applying for the assignment of class to a newbuilding.<br>**2.** The date of "contract for construction" of a series of vessels, including specified optional vessels for which the option is ultimately exercised, is the date on which the contract to build the series is signed between the prospective owner and the shipbuilder.<br>For the purpose of this Procedural Requirement, vessels built under a single contract for construction are considered a "series of vessels" if they are built to the same approved plans for classification purposes. However, vessels within a series may have design alterations from the original design provided:<br>(1) such alterations do not affect matters related to classification, or<br>(2) If the alterations are subject to classification requirements, these alterations are to comply with the classification requirements in effect on the date on which the alterations are contracted between the prospective owner and the shipbuilder or, in the absence of the alteration contract, comply with the classification requirements in effect on the date on which the alterations are submitted to the Society for approval.<br>The optional vessels will be considered part of the same series of vessels if the option is exercised not later than 1 year after the contract to build the series was signed.<br>**3.** If a contract for construction is later amended to include additional vessels or additional options, the date of "contract for construction" for such vessels is the date on which the amendment to the contract, is signed between the prospective owner and the shipbuilder. The amendment to the contract is to be considered as a "new contract" to which **1.** and **2.** above apply.<br>**4.** If a contract for construction is amended to change the ship type, the date of "contract for construction" of this modified vessel, or vessels, is the date on which revised contract or new contract is signed between the Owner, or Owners, and the shipbuilder.<br><br>Note:<br>This Procedural Requirement applies from 1 July 2009. | | |

Amended-Original Requirements Comparison Table (Compressed Air for Essential Service)

| Amended | Original | Remarks |
|---|---|---|
| **GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS**<br><br>**Part D MACHINERY INSTALLATIONS**<br><br>**D13 PIPING SYSTEMS**<br><br>**D13.13 Pneumatic Piping Systems**<br><br>**D13.13.6 Pneumatic Piping Systems for Essential Services**<br>The wording "essential services" in **13.13.6(1), Part D of the Rules** means those services essential for propulsion and steering and safety of the ship as specified in **3.2.1-2, Part H of the Rules.**<br><br>EFFECTIVE DATE AND APPLICATION<br><br>**1.** The effective date of the amendments is 1 July 2025.<br>**2.** Notwithstanding the amendments to the Guidance, the current requirements apply to ships for which the date of contract for construction* is before the effective date.<br>* "contract for construction" is defined in the latest version of IACS Procedural Requirement | **GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS**<br><br>**Part D MACHINERY INSTALLATIONS**<br><br>**D13 PIPING SYSTEMS**<br><br>**（Newly added）** | |

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| (PR) No.29.<br><br>IACS PR No.29 (Rev.0, July 2009)<br><br>**1.** The date of "contract for construction" of a vessel is the date on which the contract to build the vessel is signed between the prospective owner and the shipbuilder. This date and the construction numbers (i.e. hull numbers) of all the vessels included in the contract are to be declared to the classification society by the party applying for the assignment of class to a newbuilding.<br>**2.** The date of "contract for construction" of a series of vessels, including specified optional vessels for which the option is ultimately exercised, is the date on which the contract to build the series is signed between the prospective owner and the shipbuilder.<br>For the purpose of this Procedural Requirement, vessels built under a single contract for construction are considered a "series of vessels" if they are built to the same approved plans for classification purposes. However, vessels within a series may have design alterations from the original design provided:<br>(1) such alterations do not affect matters related to classification, or<br>(2) If the alterations are subject to classification requirements, these alterations are to comply with the classification requirements in effect on the date on which the alterations are contracted between the prospective owner and the shipbuilder or, in the absence of the alteration contract, comply with the classification requirements in effect on the date on which the alterations are submitted to the Society for approval.<br>The optional vessels will be considered part of the same series of vessels if the option is exercised not later than 1 year after the contract to build the series was signed.<br>**3.** If a contract for construction is later amended to include additional vessels or additional options, the date of "contract for construction" for such vessels is the date on which the amendment to the contract, is signed between the prospective owner and the shipbuilder. The amendment to the contract is to be considered as a "new contract" to which **1.** and **2.** above apply.<br>**4.** If a contract for construction is amended to change the ship type, the date of "contract for construction" of this modified vessel, or vessels, is the date on which revised contract or new contract is signed between the Owner, or Owners, and the shipbuilder.<br><br>Note:<br>This Procedural Requirement applies from 1 July 2009. | | |