

Shipbuilding – Steel ladders and steel handrails

1. Scope This Japanese Industrial Standard specifies steel ladders (hereinafter referred to as “ladder”) and steel handrails (hereinafter referred to as “handrail”) mainly used for passageway in engine room.

2. Reference standards The following standards form part of this Standards when quoted. The latest edition of these standards shall be applied.

JIS G 3101 – Rolled steel for general structure

JIS G 3123 – Cold finished carbon steel bars

JIS G 3452 – Carbon steel pipes for ordinary piping

Reference: Steel vertical ladders, steel deck ladders, and handrail stanchions used in the outside of engine room are specified respectively in **JIS F 2602**, **JIS F 2603** and **JIS F 2607**.

3. Classification

3.1 Ladder The ladders shall be classified as given in **Table 1**.

Table 1

Class	Symbol
Inclined ladders with steps *	Type 1 A1
	Type 2 A2
Inclined ladder with rung	Type 1 B1
	Type 2 B2
Vertical ladder	Type 1 C1

Note: * In main passage way, inclined ladder with steps shall be used.

3.2 Handrail The handrails shall be classified as given in **Table 2**.

Table 2

Class	Symbol
Single handrail	R1
Double handrail	R2

4. Construction, shape and dimensions

4.1 Construction The construction of ladders and handrails shall be as follows

- The ladder shall be so constructed as to be free from troubles in use, even if a concentrated load of at least 980 N is applied.
- The handrail shall be so constructed as to be free from troubles in use, even if a concentrated load of at least 980 N is applied down ward or transversely.
- The ladder and handrail shall be fully vibration-resistant for shipboard use.

4.2 Shape and Dimensions The shape and dimensions of ladders and handrails shall, as a rule, be as shown in **Figs. 1 to 4**.

5. Materials

5.1 Ladder The materials of side plates of ladders shall be **JIS G 3101-SS400** or the equivalent tensile strength.

5.2 Handrail The materials of handrails shall be **JIS G 3101-SS400**, **JIS G 3123-SGD30-D**, **JIS G 3452-SGP** or the equivalent tensile strength.

Fig.1 Inclined ladder with steps

6. **Inspection** The construction, shape, dimensions and appearance shall be inspected, and all the parts shall be soundly finished and shall be free from detrimental defects for use.

7. **Designation** The ladders shall be designated by the class or JIS number, symbol, and nominal size. The handrails shall be designated by the class or JIS number and symbol.

Example: 1. Inclined ladder with steps, Type 1 400 or JIS F 7502-A1-400

2. Single handrail or JIS F 7502 R1.

Related Standard:

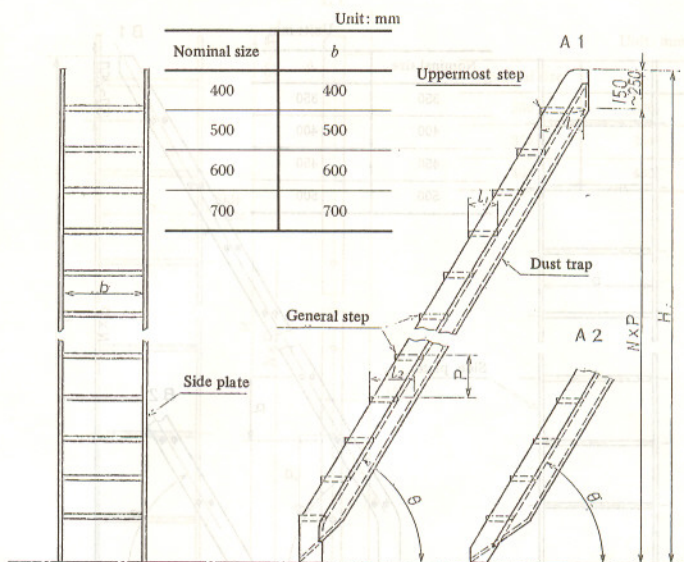
JIS F 2602 – Ships' steel vertical ladders

JIS F 2603 – Steel deck ladders

JIS F 2607 – Shipbuilding – Cargo ships - Guardrails

Table 1		Class	Symbol
Inclined ladders with steps *	Type 1	A1	
	Type 2	A2	
	Type 3	A3	
Inclined ladders with rungs	Type 1	B1	
	Type 2	B2	
Vertical ladders	Type 1	C1	
	Type 2	C2	

3.3. Handrails	The handrails shall be classified as given in Table 2.
Table 2	
Class	Symbol
Single handrail	R1
Double handrail	R2
4. Construction, shape and dimensions	
4.1. Construction	The construction of ladders and handrails shall be as follows:
a) The ladder shall be so constructed as to be free from tripping in use when it is subjected to a load of at least 900 N is applied.	
b) The handrail shall be so constructed as to be free from tripping in use when it is subjected to a load of at least 900 N is applied.	
c) The ladder and handrail shall be fully resistant to impact.	
4.2. Shape and dimensions	The shape and dimensions of ladders and handrails shall be as shown in Figs. 1 to 4.
4.3. Materials	
4.3.1. Ladder	The material of side plates of ladders shall be JIS G 3101 (S235) or the equivalent tensile strength.
4.3.2. Handrail	The material of handrails shall be JIS G 3101 (S235) or the equivalent tensile strength.



- Remarks:**
1. Pitch of the steps (P) shall, as a rule, be 250mm, and is recommended that it is within the range of 220 to 280mm.
 2. The length of upper most step (L) is recommended that it is within the range of 180 to 260mm, and the length of ordinary steps (L_1) within range of 150 to 190mm.
 3. The construction and shape of steps shall be specified by the purchaser.
 4. The inclination of ladder (θ) is recommended to be within the range of 55 to 65 degrees.
 5. Dust trap shall be fitted, if necessary.
 6. Where dust trap is fitted, the distance from fore end of step to dust trap (L_2) shall be 250mm or more.
 7. The size of side plate of ladder shall be specified by the purchaser taking its strength and vibration-resistant property into account corresponding to ladder's height.

Reference

Size of side plate mm		Max. height H_m	
		H_1 (*)	H_2 (*)
Flat steel	100×12	2.6	4.5
	125×12	2.8	6.0
Unequal angle steel	100×75×10	2.7	4.9
	125×75×10	3.0	6.6
	150×90×9	3.4	8.2
輕量形鋼	125×25×3.2	2.6	3.8
	125×50×20×3.2	2.8	5.7

Note: * H_1 denotes the maximum height based on the natural frequency, and it may be increased up to H_2 if suitable anti-vibration measures are taken.

Fig.1 Inclined ladder with steps