to function after it has been triggered until it is manually turned off or is temporarily interrupted by a message on the public address system.

7.2.1 2 The minimum sound pressure levels for the emergency alarm tone in interior and exterior spaces shall be 80 dB (A) and at least 10 dB (A) above ambient noise levels existing during normal equipment operation with the ship underway in moderate weather. In cabins without a loudspeaker installation, an electronic alarm transducer shall be installed, e.g. a buzzer or similar.

7.2.1.3 The sound pressure levels at the sleeping position in cabins and in cabin bathrooms shall be at least 75 dB (A) and at least 10 dB (A) above ambient noise levels.

7.2.2 **Public address system**

7.2.2.1 The public address system shall be a loudspeaker installation enabling the broadcast of messages into all spaces where crew members or passengers, or both, are normally present, and to muster stations. It shall allow for the broadcast of messages from the navigation bridge and such other places on board the ship as the Administration deems necessary. It shall be installed with regard to acoustically marginal conditions and not require any action from the addressee. It shall be protected against unauthorized use.

7.2.2.2 With the ship underway in normal conditions, the minimum sound pressure levels for broadcasting emergency announcements shall be:

.1 in interior spaces 75 dB (A) and at least 20 dB (A) above the speech interference level; and

.2 in exterior spaces 80 dB (A) and at least 15 dB (A) above the speech interference level.

第 38/2015 號行政長官公告

中華人民共和國於一九九九年十二月十三日以照會通知聯合國秘書長，經修訂的《1974年國際海上人命安全公約》自一九九九年十二月二十日起適用於澳門特別行政區；

國際海事組織海上安全委員會於二零一零年五月十四日透過第MSC.289（87）號決議通過了《原油油船貨油艙防腐保護替代方法性能標準》，該標準自二零一二年一月一日起適用於澳門特別行政區；

基於此，行政長官根據澳門特別行政區第3/1999號法律第六條第一款的規定，命令公佈包含上指標準的第MSC.289（87）號決議的中文及英文文本。

二零一五年四月二十一日發佈。

行政長官　崔世安

Aviso do Chefe do Executivo n.º 38/2015

Considerando que a República Popular da China, por nota datada de 13 de Dezembro de 1999, notificou o Secretário-Geral das Nações Unidas sobre a aplicação da Convenção Internacional para a Salvaguarda da Vida Humana no Mar de 1974, tal como emendada, na Região Administrativa Especial de Macau a partir de 20 de Dezembro de 1999;

Considerando igualmente que, em 14 de Maio de 2010, o Comité de Segurança Marítima da Organização Marítima Internacional, através da resolução MSC.289(87), adoptou a Norma de Desempenho para os Meios Alternativos de Protecção Contra a Corrosão para os Tanques de Carga de Hidrocarbonetos de Navios-Tanque de Petróleo Bruto, e que tal Norma é aplicável na Região Administrativa Especial de Macau desde 1 de Janeiro de 2012;

O Chefe do Executivo manda publicar, nos termos do n.º 1 do artigo 6.º da Lei n.º 3/1999 da Região Administrativa Especial de Macau, a resolução MSC.289(87), que contém a referida Norma, nos seus textos em línguas chinesa e inglesa.

Promulgado em 21 de Abril de 2015.

O Chefe do Executivo, *Chui Sai On*.

第 MSC.289（87）號決議

（2010 年 5 月 14 日通過）

原油油船貨油艙防腐保護替代方法性能標準

海上安全委員會，

憶及《國際海事組織公約》關於本委員會職能的第二十八條第（二）款，

注意到以第 MSC.291（87）號決議通過的關於原油油船貨油艙防腐保護替代方法的經修正的《1974 年國際海上人命安全公約》（《安全公約》）（下稱“公約”）第 II-1/3-11 條，

還注意到上述第 II-1/3-11 條規定，該條中所述防腐保護替代方法須符合《原油油船貨油艙防腐保護替代方法性能標準》（下稱“防腐保護替代方法性能標準”）的要求，

在其第 87 屆會議上，**審議了**《防腐保護替代方法性能標準》的建議文本，

1. **通過**《原油油船貨油艙防腐保護替代方法性能標準》，其正文載於本決議附件中；

2. **請**《公約》各締約政府注意，《防腐保護替代方法性能標準》將在《公約》第 II-1/3-11 條於 2012 年 1 月 1 日生效之時生效；

3. **注意到**，根據《安全公約》第 II-1/3-11.3.2 條的規定，《原油油船貨油艙防腐保護替代方法性能標準》的修正案須按照《公約》第 VIII 條關於公約附則除第 I 章外的適用修正程序予以通過、生效和實施；

4. **要求**秘書長將本決議副本和附件中《防腐保護替代方法性能標準》的核證無誤文本送發所有《公約》締約國政府；

5. **進一步要求**秘書長將本決議及其附件的副本送發本組織非《公約》締約國政府的所有會員國；

6. **請**各國政府鼓勵發展旨在作為替代系統的新穎技術，並隨時將任何有效結果通知本組織；

7. **決定**不斷審議《防腐保護替代方法性能標準》並根據應用中獲得的經驗做出必要修正。

附件

原油油船貨油艙防腐保護替代方法性能標準

1 目的

本標準規定了原油油船建造時貨油艙內使用除保護塗層外的其他防腐保護或使用耐腐蝕材料方法的最低標準的技術要求。

2 定義

2.1 *防腐保護替代方法*係指並非使用按照原油油船貨油艙保護塗層性能標準（第 MSC.288（87）號決議）塗裝保護塗層的方法。

2.2 *耐腐蝕鋼材*係指除符合其他相關船舶材料、結構和建造強度要求外，其位於內部貨油艙艙底或倉頂的性能，經試驗證明符合本標準要求的鋼材。

2.3 *目標使用壽命*係指防腐保護或使用耐腐蝕材料方法的設計壽命目標值，以年計。

3 適用

3.1 在本標準制定之日，就維持所要求的 25 年結構完整性的防腐保護或耐腐蝕材料使用而言，耐腐蝕鋼材是可替代保護塗層的唯一經認可的可能方法。如果使用耐腐蝕鋼材作為替代方法，須符合附件中所載性能標準。

3.2 如果研發出附件中的規定不適用的、經本組織認可的新穎類型替代方法，本組織應制定包括試驗程序在內的專門性能標準，作為本標準的新附件，並考慮到按照《安全公約》第 II-1/3-11.4 條進行新穎替代原型實地試驗所取得的經驗。

附件

耐腐蝕鋼材性能標準

1 目的

本標準規定了建造原油油船時用於貨油艙的耐腐蝕鋼材最低標準的技術要求。

2 通則

2.1 耐腐蝕鋼材達到其目標使用壽命的能力，有賴於鋼材的種類、應用和檢驗。所有這些方面均與耐腐蝕鋼材的良好性能相關。

2.2 技術檔案

2.2.1 第 2.2.3 和 2.2.4 段規定的文件和信息須記錄在技術檔案之中。技術檔案須經主管機關驗證。

2.2.2 技術檔案須保存於船上並在船舶整個壽命期間得到維護。

2.2.3 新建階段

技術檔案須至少包含與本標準相關並由船廠在新建階段提交的下列內容：

.1 形式認可證書的副本；

.2 技術數據，包括：

.2.1 經認可的焊接方法和焊料；及

.2.2 生產商推薦的修理方法（如有的話）；及

.3 應用記錄，包括：

.3.1 各艙室應用的實際處所和面積；及

.3.2 應用的產品及其厚度。

2.2.4 營運中的維護、修理和部分更換

營運中的維護、修理和部分更換活動須記錄在技術檔案中。

3 耐腐蝕鋼材標準

3.1 性能標準

本標準以擬提供 25 年目標使用壽命的規範和要求為根據，這一期限被認為是自初始應用開始，鋼材的厚度損耗擬為少於所允許的損耗及貨油艙水密完整性擬得以維持的期限。實際使用壽命將依據包括營運中遇到的實際條件在內的多種變數而不同。

3.2 標準的應用

原油油船建造期間，在貨油倉中第 3.4 段中規定的區域使用的耐腐蝕鋼材須至少符合本標準的要求，而且本標準應被視作最低標準。

3.3 特殊應用

3.3.1 本標準包括對船舶鋼結構的耐腐蝕鋼材要求。茲注意到艙中裝有其他獨立構件，對這些構件採取了防腐保護措施。

3.3.2 建議在實際可行的範圍內，對位於第 3.4 段規定的範圍內的檢驗通道，其非船體結構整體的部分，如扶手、獨立平台、梯子等，應用本標準或貨油艙保護塗層性能標準。對非船體結構整體的構件也可以使用其他等效防腐方法，只要這些方法對周圍結構的耐腐蝕鋼材

性能沒有影響。作為船體結構整體的通道，其佈置，如步道的縱向加強肋、縱樑等，如位於第 3.4 段規定的區域之內，須完全符合本標準或貨油艙保護塗層性能標準。

3.3.3 建議對管子、測量裝置等的支撐件，按照第 3.3.2 段所述對非結構整體構件的要求提供防腐保護。

3.4 應用區域

作為最低限度，下列區域須按照本標準加以保護：

.1 艙頂板及全部內部結構，包括與縱向和橫向隔艙壁連接的肘板。在具有環框縱樑構造的艙中，甲板下橫肋至上面板之下的第一防撓肘板須得到保護。

.2 縱向和橫向隔艙壁至最高檢驗通道的高度得到保護。最高檢驗通道及其支撐架全部得到保護。

.3 無最高檢驗通道的貨艙隔艙壁延伸至艙中線高度的 10%之處得到保護，但從甲板向下延伸無需超過 3 米。

.4 內平底和全部構件至內平底之上 0.3 米處得到保護。

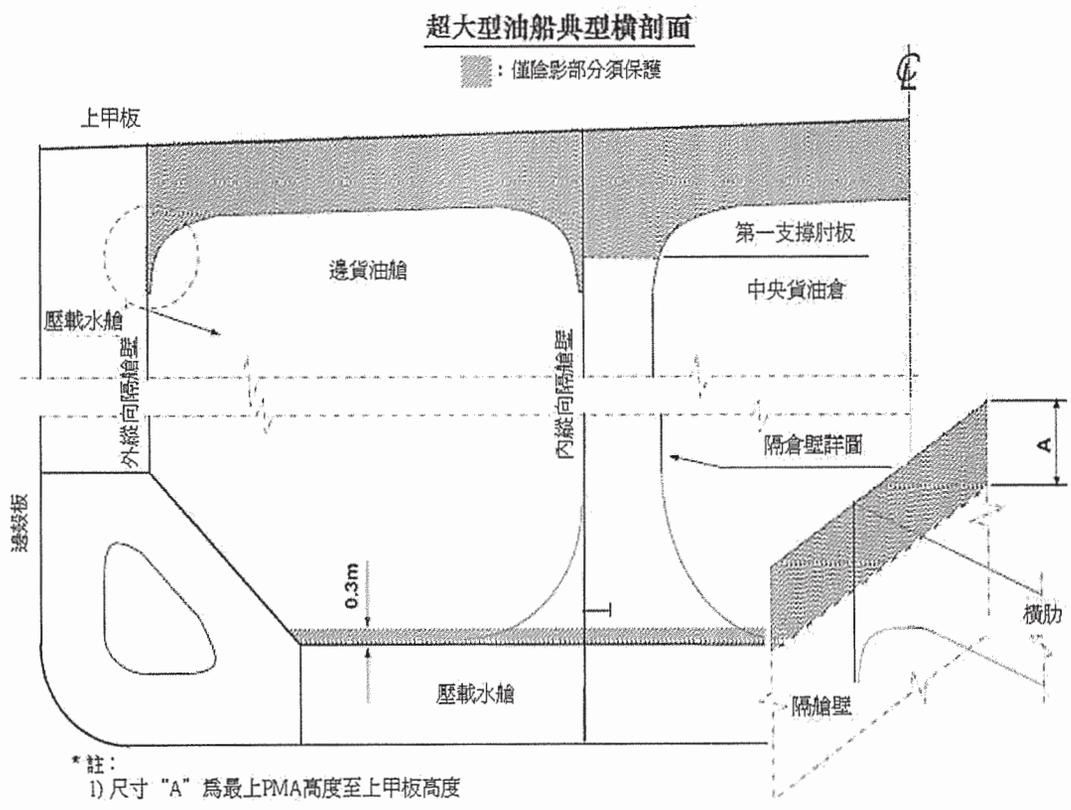

圖 1

3.5 基本要求

對於符合第 3.1 段性能標準、在船舶建造時用於貨油艙的耐腐蝕鋼材的要求是，使用按照形式認可證書中規定的條件和技術檔案認可的耐腐蝕鋼材，保護第 3.4 段中標明的應用部位。

4 認可

4.1 耐腐蝕鋼材須按照本附錄，或等效方法測試。在本標準生效前經過測試的耐腐蝕鋼材，只要是按照本附錄，或等效實驗程序測試的，可以接受。

4.2 耐腐蝕鋼材的合格試驗（4.1）結果須形成文件記錄，主管機關如對結果滿意，須簽發型式認可證書。

4.3 型式認可證書須包括下列信息：

.1 產品名稱和識別標記和（或）號碼；

.2 鋼材的材料、成分和耐腐蝕過程；

.3 鋼材的厚度；

.4 焊接方法和焊料；及

.5 應用區域（上頂板和（或）內底板）。

5 檢查和核實要求

為確保符合本標準，主管機關須在建造過程中進行檢驗並核實經認可的耐腐蝕鋼材已應用於所要求的區域。

附錄

原油油船貨油艙耐腐蝕鋼材合格試驗程序

1 範圍

本程序規定了本標準第 4.1 段中提及的測試程序的細節。

2 試驗

耐腐蝕鋼材須經下列實驗加以核實。

2.1 上甲板狀況模擬試驗

2.1.1 試驗條件

貨油艙上甲板狀況模擬試驗須滿足下列條件：

.1 耐腐蝕鋼材和常規鋼材須同時測試。

.2 常規鋼材的化學成分須符合表 1 的要求。試驗樣板的機械特性對於擬在船上應用中使用的鋼材，應具代表性。

表 1－常規鋼材的化學成分（%）

C	Mn	Si	P	S
0.13-0.17	1.00-1.20	0.15-0.35	0.010-0.020	0.002-0.008
Al（可溶酸 min）	Nb max.	V max	Ti max	Nb+V+Ti max
0.015	0.02	0.10	0.02	0.12

Cu max.	Cr max	Ni max	Mo max	其他 max
0.1	0.1	0.1	0.02	0.02（各項）

.3 對耐腐蝕鋼材的各項試驗須進行 21、49、77 和 98 天。對常規鋼材的試驗須進行 98 天。對焊縫的試驗須進行 98 天。

.4 每個試驗期須有五份試樣。

.5 每個試樣的尺寸是 25±1 mm × 60±1 mm × 5±0.5 mm。試樣的表面須用 600 號金剛砂紙拋光。焊縫試樣的尺寸是 25±1 mm × 60±1 mm × 5±0.5 mm，其中包括 15±5 mm 寬的焊接金屬部分。

.6 為避免影響試驗結果，試樣上除試驗表面外的其他表面須進行腐蝕環境防護。

.7 試驗設備由一個雙層倉構成，外倉溫度可以控制。

.8 試驗周期中使用蒸餾水和模擬貨油艙氣體（4±1%的 O_2-13±2% 的 CO_2-100±10 ppm 的 SO_2-500±50 ppm 的 H_2S-83±2%的 N_2），模擬上甲板的條件。試樣表面和蒸餾水之間要保持足夠的距離，避免蒸餾水濺潑。最低氣體流率為：開頭 24 小時內，每分鐘 100 cc，24 小時之後，每分鐘 20 cc。

.9 試樣須在 50±2°C 加熱 19±2 小時，在 25±2°C 加熱 3±2 小時，過渡時間至少為 1 小時。一個周期的時間為 24 小時。蒸餾水的溫度保持在不高於 36°C，試樣的溫度為 50°C。

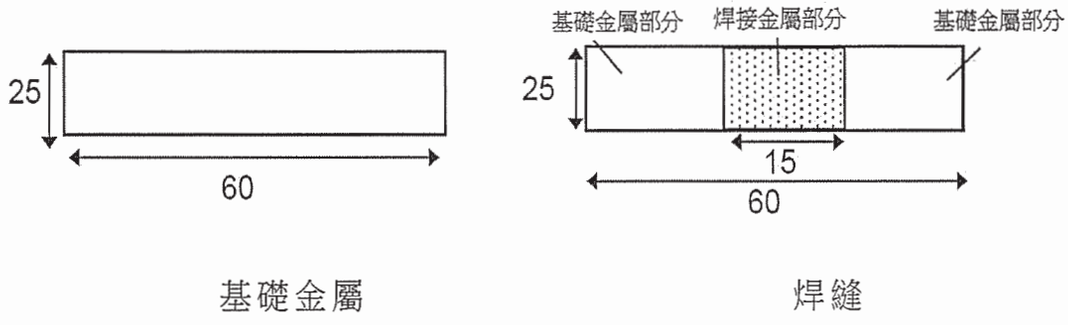

圖 1 － 本試驗試樣

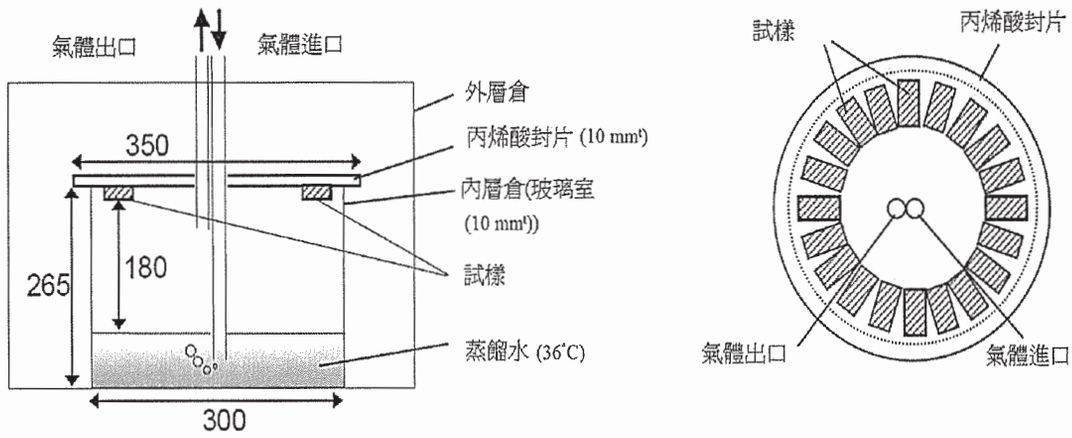

圖 2 － 上甲板模擬腐蝕試驗設備舉例

2.1.2 *基礎金屬試驗結果*

試驗前，須報告下列測得數據：

.1 試樣的尺寸和重量；

試驗後，須報告下列測得數據：

.2 常規鋼材（W_C）和耐腐蝕鋼材（W_{21}、W_{49}、W_{77}和 W_{98}）的重量損失（初始重量和試驗後重量之差）；

.3 常規鋼材（CL_C）和耐腐蝕鋼材（CL_{21}、CL_{49}、CL_{77}和 CL_{98}）的腐蝕損耗，按照下列公式計算：

$$CL_C(mm) = \frac{10 \times W_C}{S \times D}$$

$$CL_{21}(mm) = \frac{10 \times W_{21}}{S \times D}$$

$$CL_{49}(mm) = \frac{10 \times W_{49}}{S \times D}$$

$$CL_{77}(mm) = \frac{10 \times W_{77}}{S \times D}$$

$$CL_{98}(mm) = \frac{10 \times W_{98}}{S \times D}$$

式中：

W_C：常規鋼材（g）（五個試樣的平均）重量損失

W_{21}：耐腐蝕鋼材經過 21 天後的（g）（五個試樣的平均）重量損失

W_{49}：耐腐蝕鋼材經過 49 天後的（g）（五個試樣的平均）重量損失

W_{77}：耐腐蝕鋼材經過 77 天後的（g）（五個試樣的平均）重量損失

W_{98}：耐腐蝕鋼材經過 98 天後的（g）（五個試樣的平均）重量損失

S：表面面積（cm^2）

D：密度（g/cm^3）

如 CL_C 在 0.05 和 0.11（腐蝕率在 0.2 和 0.4 mm/年）之間，試驗應被視為正當完成。模擬貨油艙氣體中的 H_2S 可以為調整 CLC 而增加濃度；

.4 耐腐蝕鋼材的系數 A 和 B 用最小平方法根據 21、49、77 和 98 天的試驗結果計算出。

耐腐蝕鋼材的腐蝕損耗描述如下：

$$CL = A \times t^B$$

A（mm）和 B：系數

t： 試驗期（天）；

.5 25 年後的估計腐蝕損耗（ECL）按下列公式計算：

$$ECL（\text{mm}） = A \times （25 \times 365）^B.$$

2.1.3 *焊縫試驗結果*

基礎金屬和焊接金屬之間的表面邊界須使用顯微鏡放大 1,000 倍進行觀測。

2.1.4 *接受標準*

基於第 2.1.2 和 2.1.3 段規定的試驗結果須滿足下列標準：

.1 （對於基礎金屬）$ECL（mm）\leq 2$；及

.2 （對於焊縫）基礎金屬和焊接金屬之間沒有不連貫表面（如階梯狀）。

2.1.5 *試驗報告*

試驗報告須包括下列信息：

.1 生產商名稱；

.2 試驗日期；

.3 鋼材的化學成分和耐腐蝕的過程；

.4 按照第 2.1.2 和 2.1.3 段試驗的結果；及

.5 按照第 2.1.4 段作出的判定。

2.2 內底狀況模擬試驗

2.2.1 *試驗條件*

貨油艙（COT）內底狀況模擬試驗應滿足下列各項條件：

.1 基礎金屬試驗須進行 72 小時，焊縫試驗須進行 168 小時。

.2 基礎金屬和焊縫至少各有五個式樣。為了比較，至少五個常規鋼材式樣應在相同條件下進行試驗。

.3 每個僅為基礎金屬試樣的尺寸是 25±1 mm × 60±1 mm × 5±0.5 mm。帶有焊縫的試樣的尺寸是 25±1 mm × 60±1 mm × 5±0.5 mm，其中包括 15±5 mm 寬的焊接金屬部分如圖 3 所示。試樣的表面除懸吊孔之外須用 600 號金剛砂紙拋光。

.4 為避免裂隙狀和/（或）局部腐蝕，試樣用漁線（尼龍製，直徑 0.3 至 0.4 mm）懸吊於溶液之中。腐蝕試驗佈置範例見圖 4。

.5 試驗溶液含有為質量 10%的 NaCl，pH 值為 0.85，用 HCl 溶液調整。試驗溶液應每隔 24 小時更新一次，以盡力減少試驗溶液 pH 值變化。溶液容量大於 20 cc/cm^2（試樣表面面積）。試驗溶液溫度保持在 30±2°C。

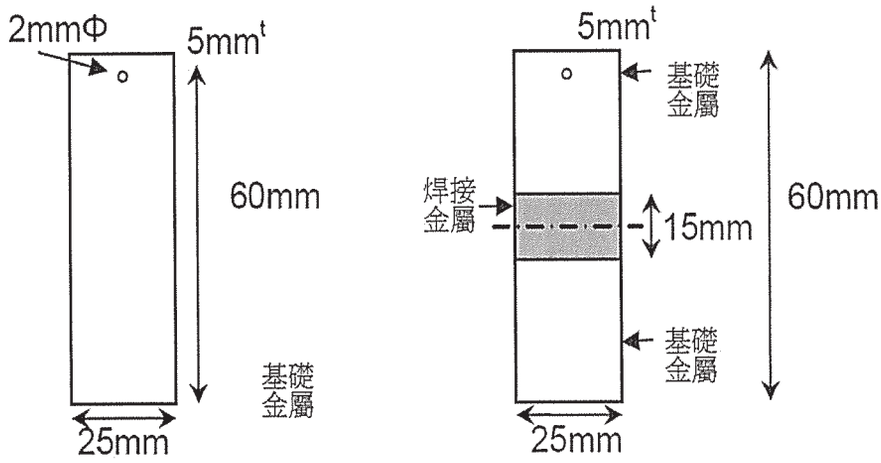

圖 3 － 本試驗的試樣

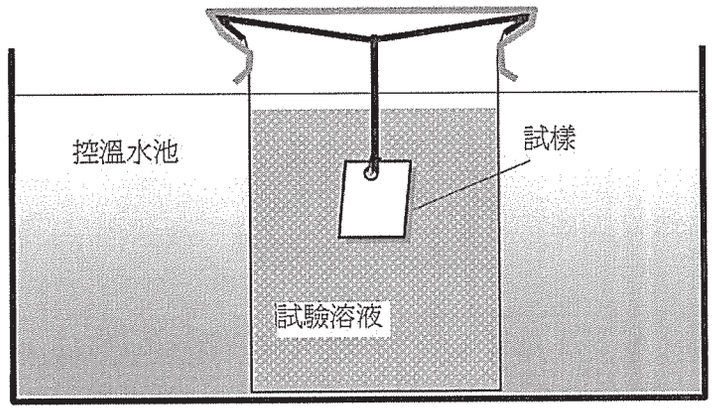

圖 4 － 內底模擬腐蝕試驗設備

2.2.2 *基礎金屬試驗結果*

試驗前須報告下列測得數據：

.1 試樣的尺寸和重量；

試驗後，須報告下列測得數據：

.2 重量損失（初始重量和試驗後重量之差）；

.3 按照下列公式計算出的腐蝕率（*C.R.*）：

$$C.R.(mm/年)=\frac{365(天)\times 24(小時)\times W\times 10}{S\times 72(小時)\times D}$$

式中：

W：重量損失（g），*S*：表面面積（cm^2），*D*：密度（g/cm^3）；

.4 為識別帶有裂隙狀和（或）局部腐蝕的試樣，將腐蝕率標繪在正常分佈統計圖上。偏離正常統計分佈的腐蝕率數據必須從試驗結果中排除。參見圖 5 中的舉例。

.5 計算平均腐蝕率數據（$C.R._{ave}$）：

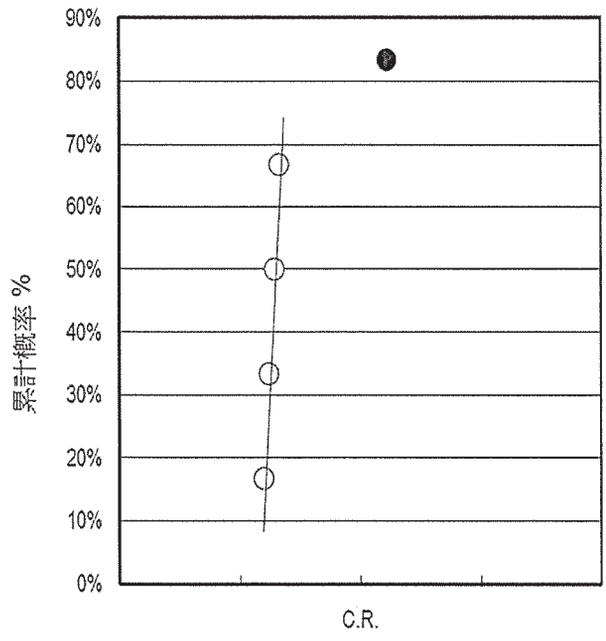

圖 5 — 將腐蝕率標繪在正常分佈圖上舉例

（例中的腐蝕率數據應放棄並排除。）

2.2.3 *焊縫試驗結果*

基礎金屬和焊接金屬之間的表面邊界須使用顯微鏡放大 1,000 倍進行觀測。

2.2.4 *接受標準*

基於第 2.2.2 和 2.2.3 段的試驗結果須滿足下列標準：

.1 （對於基礎金屬）$C.R._{ave}$（*mm/年*）≤1.0；及

.2 （對於焊縫）基礎金屬和焊接金屬之間沒有不連貫表面（如階梯狀）。

2.2.5 *試驗報告*

試驗報告須包括下列信息：

.1 生產商名稱；

.2 試驗日期；

.3 鋼材的化學成分和耐腐蝕的過程；

.4 按照第 2.2.2 和 2.2.3 段試驗的結果；及

.5 按照第 2.2.4 段作出的判定。

RESOLUTION MSC.289(87)
(adopted on 14 May 2010)

PERFORMANCE STANDARD FOR ALTERNATIVE MEANS OF CORROSION PROTECTION FOR CARGO OIL TANKS OF CRUDE OIL TANKERS

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

NOTING regulation II-1/3-11 of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended (hereinafter referred to as "the Convention") adopted by resolution MSC.291(87), concerning alternative means of corrosion protection for cargo oil tanks of crude oil tankers,

NOTING ALSO that the aforementioned regulation II-1/3-11 provides that the alternative means of corrosion protection referred to therein shall comply with the requirements of the Performance standard for alternative means of corrosion protection for cargo oil tanks of crude oil tankers (hereinafter referred to as "the Performance standard for alternative means of corrosion protection"),

HAVING CONSIDERED, at its eighty-seventh session, the text of the proposed Performance standard for alternative means of corrosion protection,

1. ADOPTS the Performance standard for alternative means of corrosion protection for cargo oil tanks of crude oil tankers, the text of which is set out in the Annex to the present resolution;

2. INVITES Contracting Governments to the Convention to note that the Performance standard for alternative means of corrosion protection will take effect on 1 January 2012 upon entry into force of SOLAS regulation II-1/3-11;

3. NOTES that, under the provisions of SOLAS regulation II-1/3-11.3.2, amendments to the Performance standard for alternative means of corrosion protection shall be adopted, brought into force and take effect in accordance with the provisions of article VIII of that Convention concerning the amendment procedure applicable to the annex to the Convention other than chapter I;

4. REQUESTS the Secretary-General to transmit certified copies of this resolution and the text of the Performance standard for protective coatings contained in the Annex to all Contracting Governments to the Convention;

5. FURTHER REQUESTS the Secretary-General to transmit copies of this resolution and the Annex to all Members of the Organization which are not Contracting Governments to the Convention;

6. INVITES Governments to encourage the development of novel technologies aimed at providing for alternative systems and to keep the Organization advised of any positive results;

7. RESOLVES to keep the Performance standard for alternative means of corrosion protection under review and amend it as necessary, in light of experience gained in its application.

ANNEX

PERFORMANCE STANDARD FOR ALTERNATIVE MEANS OF CORROSION PROTECTION FOR CARGO OIL TANKS OF CRUDE OIL TANKERS

1 PURPOSE

This Standard provides technical requirements for the minimum standard for means of corrosion protection or utilization of corrosion resistant material other than protective coating to be used for cargo oil tanks during construction of crude oil tankers.

2 DEFINITION

2.1 *Alternative means* is a means that is not a utilization of protective coating applied according to the Performance standard for protective coatings for cargo oil tanks of crude oil tankers (resolution MSC.288(87)).

2.2 *Corrosion resistant steel* is steel the corrosion resistance performance of which in the bottom or top of the internal cargo oil tank is tested and approved to satisfy the requirements in this Standard in addition to other relevant requirements for ship material, structure strength and construction.

2.3 *Target useful life* is the target value, in years, of the durability for which the means of corrosion protection or utilization of corrosion resistant material is designed.

3 APPLICATION

3.1 As of the date of the development of this Standard, corrosion resistant steel is the only recognized possible means for corrosion protection or utilization of corrosion resistant material to maintain the required structural integrity for 25 years, as an alternative to protective coating. If corrosion resistant steel is to be used as alternative means, it shall comply with the Performance Standard for corrosion resistant steel as set out in the annex.

3.2 When a novel type of alternative means to which the provisions in the annex are not applicable has been developed, and recognized by the Organization, a specific performance standard including testing procedure(s) should be developed by the Organization by adding a new annex to this Standard, taking into account experience gained through field tests for the novel prototype alternative conducted in accordance with SOLAS regulation II-1/3-11.4.

ANNEX

PERFORMANCE STANDARD FOR CORROSION RESISTANT STEEL

1 PURPOSE

This Standard provides technical requirements for the minimum standard for corrosion resistant steel to be used for cargo oil tanks during construction of crude oil tankers.

2 GENERAL PRINCIPLES

2.1 The ability of corrosion resistant steel to reach its target useful life depends on the type of steel, application and survey. all these aspects contribute to the good performance of corrosion resistant steel.

2.2 Technical File

2.2.1 Documents and information stipulated in 2.2.3 and 2.2.4 shall be documented in the Technical File. The Technical File shall be verified by the Administration.

2.2.2 The Technical File shall be kept on board and maintained throughout the life of the ship.

2.2.3 ***New construction stage***

The Technical File shall contain at least the following items relating to this Standard and shall be delivered by the shipyard at new ship construction stage:

.1 copy of a Type Approval Certificate;

.2 technical data, including:

.2.1 approved welding methods and welding consumables; and

.2.2 repairing methods recommended by the manufacturer (if any); and

.3 records of the application, including:

.3.1 applied actual space and area of each compartment; and

.3.2 applied product and its thickness.

2.2.4 ***In-service maintenance, repair and partial renewal***

In-service maintenance, repair and renewal activities shall be recorded in the Technical File.

3 CORROSION RESISTANT STEEL STANDARD

3.1 Performance standard

This Standard is based on specifications and requirements which intend to provide a target useful life of 25 years, which is considered to be the time period, from initial application, over which the thickness diminution of the steel is intended to be less than the diminution allowance and watertight integrity is intended to be maintained in cargo oil tanks. The actual useful life will vary, depending on numerous variables, including actual conditions encountered in service.

3.2 Standard application

Corrosion resistant steel for cargo oil tanks applied to the area specified in 3.4 during the construction of crude oil tankers shall at least comply with the requirements in this Standard and this should be considered as a minimum.

3.3 Special application

3.3.1 This Standard covers corrosion resistant steel requirements for ships' steel structures. It is noted that other independent items are fitted within the tanks to which measures are applied to provide protection against corrosion.

3.3.2 It is recommended that this Standard or the Performance standard for protective coatings for cargo oil tanks of crude oil tankers is applied, to the extent possible, to those portions of permanent means of access provided for inspection within the area specified in 3.4 that are not integral to the ship's structure, such as rails, independent platforms, ladders, etc. Other equivalent methods of providing corrosion protection for the non-integral items may also be used, provided they do not impair the performance of the corrosion resistant steel of the surrounding structure. Access arrangements that are integral to the ship structure, such as increased stiffener depths for walkways, stringers, etc., are to fully comply with this Standard or the Performance standard for protective coatings for cargo oil tanks of crude oil tankers, when located within the areas specified in 3.4.

3.3.3 It is also recommended that supports for piping, measuring devices, etc., be provided with corrosion protection in accordance with the non-integral items indicated in 3.3.2.

3.4 Area of application

The following areas are the minimum areas that shall be protected according to this Standard:

.1 Deckhead with complete internal structure, including brackets connecting to longitudinal and transverse bulkheads. In tanks with ring frame girder construction the underdeck transverse framing to be protected down to level of the first tripping bracket below the upper faceplate.

.2 Longitudinal and transverse bulkheads to be protected to the uppermost means of access level. The uppermost means of access and its supporting brackets to be fully protected.

.3 On cargo tank bulkheads without an uppermost means of access the protection to extend to 10% of the tanks height at centreline but need not extend more than 3 m down from the deck.

.4 Flat inner bottom and all structure to height of 0.3 m above inner bottom to be protected.

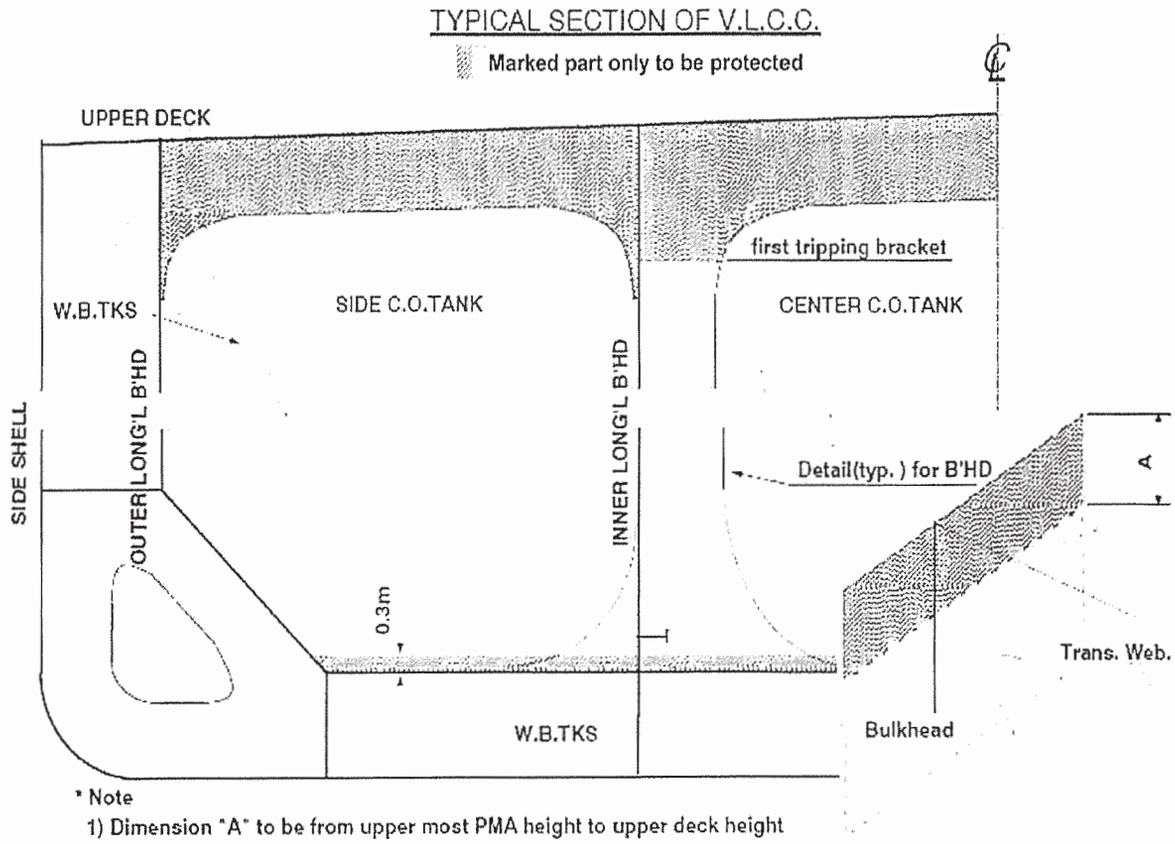

Figure 1

3.5 Basic requirements

The requirements for corrosion resistant steel to be applied at ship construction for cargo tanks in crude oil tankers meeting the performance standard specified in 3.1 are to use approved corrosion resistant steels according to the conditions specified in the Type Approval Certificate and the Technical File to protect the area of application indicated in 3.4.

4 APPROVAL

4.1 Corrosion resistant steel shall be tested according to the appendix, or equivalent, for approval. Corrosion resistant steel tested prior to entry into force of this Standard may be accepted, provided that the steel is tested according to the test procedure in the appendix, or equivalent.

4.2 Results from prequalification tests (4.1) of corrosion resistant steel shall be documented, and a Type Approval Certificate shall be issued if found satisfactory by the Administration.

4.3 The Type Approval Certificate shall include the following information:

.1 product name and identification mark and/or number;

.2 materials, components and corrosion resistance process of the steel;

.3 steel thickness;

.4 welding methods and welding consumables; and

.5 applicable area (upper and/or inner bottom plate).

5 INSPECTION AND VERIFICATION REQUIREMENTS

To ensure compliance with this Standard, the Administration shall carry out survey(s) during the construction process and verify that approved corrosion resistant steel has been applied to the area required.

APPENDIX

TEST PROCEDURES FOR QUALIFICATION OF CORROSION RESISTANT STEEL FOR CARGO TANKS IN CRUDE OIL TANKERS

1 Scope

These Procedures provide details of the test procedure referred to in 4.1 of this Standard.

2 Testing

Corrosion resistant steel shall be verified by the following tests.

2.1 *Test on simulated upper deck conditions*

2.1.1 *Test condition*

Tests on simulated upper deck conditions in cargo oil tank (COT) shall satisfy each of the following conditions:

.1 Corrosion resistant steel and conventional steel shall be tested at the same time.

.2 The chemical composition of conventional steel shall comply with the requirements of table 1. The mechanical properties of the test specimen should be representative of steel used in its intended shipboard application.

Table 1 – Chemical composition for conventional steel (%)

C	Mn	Si	P	S
0.13-0.17	1.00-1.20	0.15-0.35	0.010-0.020	0.002-0.008
Al(acid soluble min)	Nb max.	V max	Ti max	Nb+V+Ti max.
0.015	0.02	0.10	0.02	0.12
Cu max.	Cr max.	Ni max.	Mo max.	Others max.
0.1	0.1	0.1	0.02	0.02 (each)

.3 The tests for corrosion resistant steel shall be carried out for 21, 49, 77 and 98 days. The tests for conventional steel shall be carried out for 98 days. The tests for welded joints shall be carried out for 98 days.

.4 There are to be five test pieces for each test period.

.5 The size of each test piece is 25 ± 1 mm x 60 ± 1 mm x 5 ± 0.5 mm. The surface of the test piece shall be polished with an emery paper #600. The size of the test piece for a welded joint is 25 ± 1 mm x 60 ± 1 mm x 5 ± 0.5 mm, including 15 ± 5 mm width of the weld metal part.

.6 The surface of the test piece, except for the tested surface, shall be protected from corrosive environment in order not to affect the test results.

.7 The test apparatus consists of a double chamber, and the temperature of the outer chamber is to be controlled.

.8 Simulating the condition of the actual upper deck, the test cycle runs with distilled water and simulated COT gas (4 ± 1% O_2 - 13 ± 2% CO_2 - 100 ± 10 ppm SO_2 - 500 ± 50 ppm H_2S - 83 ± 2% N_2). A sufficient distance between the surface of the test piece and the distilled water is to be kept to avoid splashing of distilled water. The minimum gas flow rate is 100 cc per minute for the first 24 h and 20 cc per minute after 24 h.

.9 The test pieces shall be heated for 19 ± 2 h at 50 ± 2°C and 3 ± 2 h at 25 ± 2°C and the transition time is to be at least 1 h. The time for 1 cycle is 24 h. The temperature of the distilled water is to be kept at not higher than 36°C, while the temperature of the test pieces is 50°C.

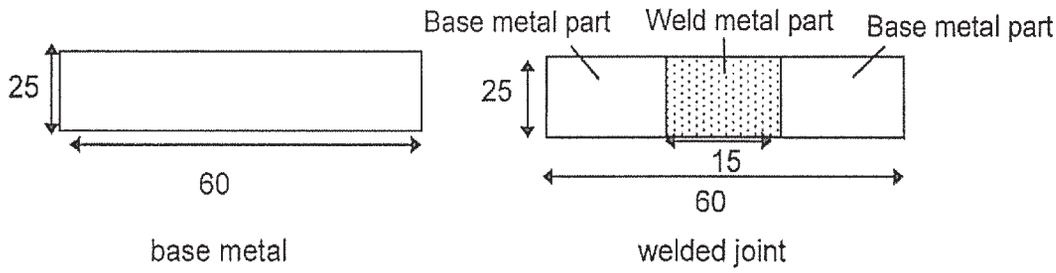

Figure 1 –Test piece of this test

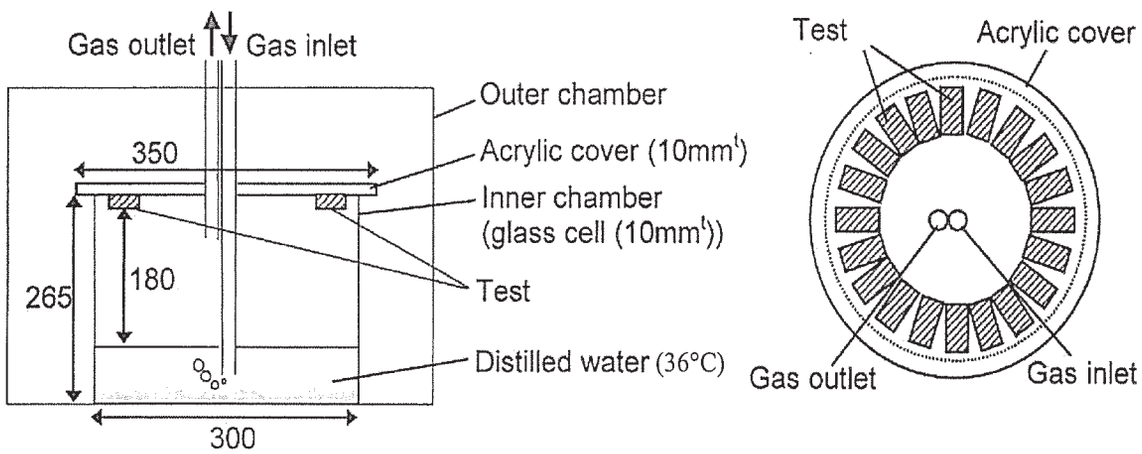

Figure 2 – An example of simulated corrosion test apparatus for upper deck

2.1.2 *Test results of base metal*

Prior to the testing, the following measured data shall be reported:

.1 size and weight of the test piece;

and, after the testing, the following measured data shall be reported:

.2 weight loss (difference between initial weight and weight after testing) of conventional steel (W_C) and corrosion resistant steel (W_{21}, W_{49}, W_{77} and W_{98});

.3 corrosion loss of conventional steel (CL_C) and corrosion resistant steel (CL_{21}, CL_{49}, CL_{77} and CL_{98}), calculated by the following formulae:

$$CL_C(mm) = \frac{10 \times W_C}{S \times D}$$

$$CL_{21}(mm) = \frac{10 \times W_{21}}{S \times D}$$

$$CL_{49}(mm) = \frac{10 \times W_{49}}{S \times D}$$

$$CL_{77}(mm) = \frac{10 \times W_{77}}{S \times D}$$

$$CL_{98}(mm) = \frac{10 \times W_{98}}{S \times D}$$

whereby:

W_C: weight loss of conventional steel (g) (average of five test pieces)

W_{21}: weight loss of corrosion resistant steel after 21 days (g) (average of five test pieces)

W_{49}: weight loss of corrosion resistant steel after 49 days (g) (average of five test pieces)

W_{77}: weight loss of corrosion resistant steel after 77 days (g) (average of five test pieces)

W_{98}: weight loss of corrosion resistant steel after 98 days (g) (average of five test pieces)

S: surface area (cm^2)

D: density (g/cm^3).

The test is considered to be carried out appropriately if CL_C is between 0.05 and 0.11 (corrosion rate is between 0.2 and 0.4 mm/year). The concentration of H_2S in simulated COT gas may be increased for adjusting CLC;

.4 coefficients A and B of corrosion resistant steel, calculated from the test results for 21, 49, 77 and 98 days by least square method.

Corrosion loss of corrosion resistant steel is described as follows:

$$CL = A \times t^B$$

A(mm) and B: coefficient
t: test period(days);

.5 estimated corrosion loss after 25 years (ECL) calculated by the following formula:

$$ECL(\text{mm}) = A \times (25 \times 365)^{B}.$$

2.1.3 *Test results of welded joint*

The surface boundary between base metal and weld metal shall be observed by microscope at 1,000 times magnification.

2.1.4 *Acceptance criteria*

The test results based on provisions of 2.1.2 and 2.1.3 shall satisfy the following criteria:

.1 $ECL(mm) \leq 2$ (for base metal); and

.2 no discontinuous surface (e.g., step) between the base metal and weld metal (for welded joint).

2.1.5 *Test report*

The test report shall include the following information:

.1 name of the manufacturer;

.2 date of tests;

.3 chemical composition and corrosion resistant process of steel;

.4 test results according to 2.1.2 and 2.1.3; and

.5 judgement according to 2.1.4.

2.2 *Test on simulated inner bottom conditions*

2.2.1 *Test condition*

Tests on simulated inner bottom conditions in cargo oil tanks (COT) should satisfy each of the following conditions:

.1 The test shall be carried out for 72 h for base metal, and 168 h for welded joint.

.2 There are to be at least five test pieces of corrosion resistant steel for base metal and welded joint, respectively. For comparison, at least five test pieces of base metal of conventional steel should be tested in the same condition.

.3 The size of each test piece is 25 ± 1 mm x 60 ± 1 mm x 5 ± 0.5 mm for a specimen with base metal only, and is 25 ± 1 mm x 60 ± 1 mm x 5 ± 0.5 mm for a specimen with welded joint including 15 ± 5 mm width of weld metal part as shown in figure 3. The surface of the test pieces shall be polished with an emery paper #600, except a hole for hanging.

.4 The samples are hung in a solution from a fishing line (0.3 mm to 0.4 mm in diameter, made of nylon) to avoid crevice-like and/or localized corrosion. An example of a corrosion test configuration is shown in figure 4.

.5 The test solution contains 10 mass% NaCl and its pH is 0.85 adjusted by HCl solution. The test solution should be changed to a new one every 24 h to minimize pH change of the test solution. The volume of the solution is more than 20 cc/cm^2 (surface area of test piece). The temperature of the test solution is to be kept at 30 ± 2°C.

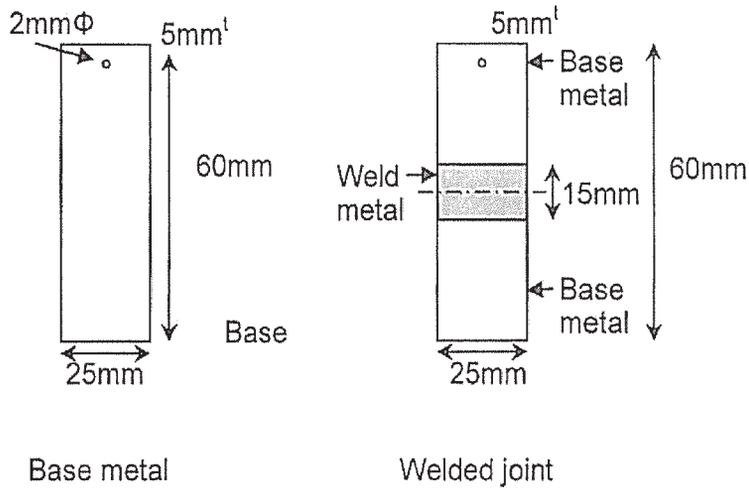

Figure 3 – Test piece for this test

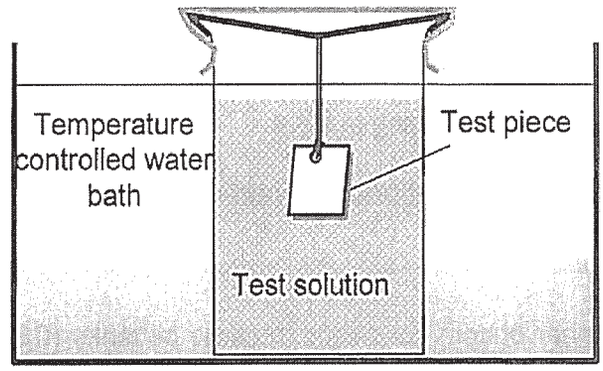

Figure 4 – Simulated corrosion test apparatus for inner bottom

2.2.2 *Test results of base metal*

Prior to the testing, the following data shall be measured and reported:

.1 size and weight of test piece;

and, after the testing, the following measured data shall be reported:

.2 weight loss (difference between initial weight and weight after testing);

.3 corrosion rate (*C.R.*) calculated by the following formula:

$$C.R.(mm/year) = \frac{365(days) \times 24(hours) \times W \times 10}{S \times 72(hours) \times D}$$

whereby:

W: weight loss(g), *S*: surface area(cm^2), *D*: density(g/cm^3);

.4 to identify specimen which hold crevice and/or localized corrosion, the C.R. is to be plotted on a normal distribution statistic chart. C.R. data which deviate from the normal statistical distribution must be eliminated from the test results. An example is shown in figure 5 for reference;

.5 calculation of average of *C.R.*'s data ($C.R._{ave}$):

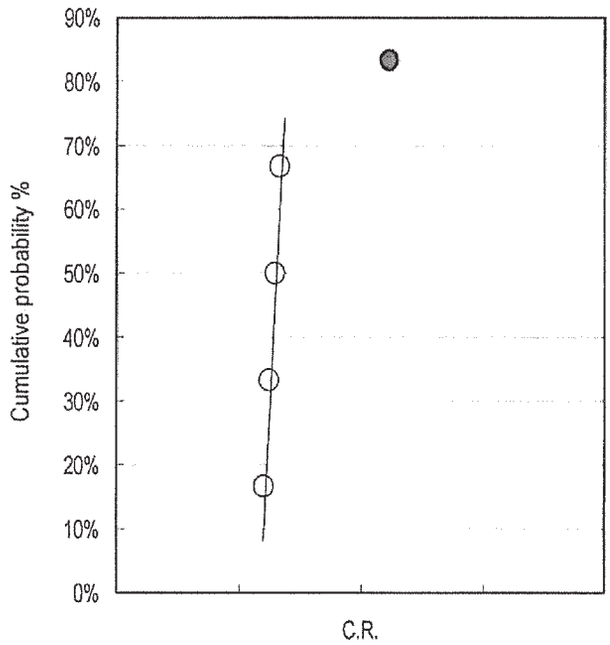

Figure 5 – An example of plot of C.R.s on a normal distribution chart (In this case C.R. data • should be abandoned and eliminated.)

2.2.3 *Test results of welded joint*

The surface boundary between base metal and weld metal shall be observed by microscope at 1,000 times magnification.

2.2.4 *Acceptance criterion*

The test results based on sections 2.2.2 and 2.2.3 shall satisfy the following criteria:

.1 $C.R._{ave}(mm/year) \leq 1.0$ (for base metal); and

.2 no discontinuous surface (e.g., step) between the base metal and weld metal (for welded joint).

2.2.5 *Test report*

The test report shall include the following information:

.1 name of the manufacturer;

.2 date of tests;

.3 chemical composition and corrosion resistant process of steel;

.4 test results according to 2.2.2 and 2.2.3; and

.5 judgement according to 2.2.4.

第 39/2015 號行政長官公告

中華人民共和國於一九九九年十二月十三日以照會通知聯合國秘書長，經修訂的《1974年國際海上人命安全公約》自一九九九年十二月二十日起適用於澳門特別行政區；

國際海事組織海上安全委員會於二零零六年十二月八日透過第MSC.222（82）號決議通過了《2000年國際高速船安全規則》（2000年HSC規則）的修正案，該修正案自二零零八年七月一日起適用於澳門特別行政區；

基於此，行政長官根據澳門特別行政區第3/1999號法律第六條第一款的規定，命令公佈包含上指修正案的第MSC.222（82）號決議的中文及英文文本。

二零一五年四月二十一日發佈。

行政長官　崔世安

Aviso do Chefe do Executivo n.º 39/2015

Considerando que a República Popular da China, por nota datada de 13 de Dezembro de 1999, notificou o Secretário-Geral das Nações Unidas sobre a aplicação da Convenção Internacional para a Salvaguarda da Vida Humana no Mar de 1974, tal como emendada, na Região Administrativa Especial de Macau a partir de 20 de Dezembro de 1999;

Considerando igualmente que, em 8 de Dezembro de 2006, o Comité de Segurança Marítima da Organização Marítima Internacional, através da resolução MSC.222(82), adoptou as emendas ao Código Internacional de Segurança para as Embarcações de Alta Velocidade, 2000 (Código HSC 2000), e que tais emendas são aplicáveis na Região Administrativa Especial de Macau desde 1 de Julho de 2008;

O Chefe do Executivo manda publicar, nos termos do n.º 1 do artigo 6.º da Lei n.º 3/1999 da Região Administrativa Especial de Macau, a resolução MSC. 222(82), que contém as referidas emendas, nos seus textos em línguas chinesa e inglesa.

Promulgado em 21 de Abril de 2015.

O Chefe do Executivo, *Chui Sai On*.