Painting Work Procedure

涂装施工工艺

1. Scope and purpose 范围及目的

The painting work procedure covers the requirements of the coatings application which has been recommended from Jotun Paints, in which it also describes the repair and touch-up methods of painting on the jobsite to ensure the coatings' performance and lay down a set of recommended practices required to obtain an optimal service life of coatings in corrosive environments. The painting work procedure shall not replace any current approved document and specification.

本施工工艺涵盖了佐敦油漆推荐的涂层系统施工的基本要求，也包括了现场的漆膜修补方法，以确保涂层的应用性能。它设定了一套推荐的施工方法以便于该涂料在腐蚀环境中能获得最佳的使用寿命。本涂装施工工艺不取代任何现行的正式文件或涂装规范。

2. Coating System 油漆配套

Surface Preparation 表面处理	Abrasive blast cleaning to ISO8501-1 Sa2[1]/2 or SSPC SP 6, obtain a sharp angular surface profile in 40-75 microns. 采用磨料喷砂处理至 ISO8501-1 Sa2.5 或 SSPC SP6，粗糙度达到 Rz=40-75 微米	
Coat No. 涂层道数	Product Name 产品名称	DFT Specified 设计干膜厚度（μm/微米）
Primer Coat 底漆	Solvent-free Epoxy Tank Coating Tankguard 412 无溶剂环氧饮水舱漆	125
Top Coat 面漆	Solvent-free Epoxy Tank Coating Tankguard 412 无溶剂环氧饮水舱漆	125
Total DFT 总干膜厚		250

3. Surface Preparation 表面处理

3.1 Steelwork preparation 钢结构处理

In order to provide surfaces which will ensure optimum paint performance, prior to blast cleaning, weld defects such as pinholes and discontinuities shall be repaired. Sharp edges and flame-cut edges shall be reduced by grinding. Welds shall be smooth and free of all weld slag and weld spatter.

为了保证钢结构表面能够使涂料发挥性能，在喷砂前对电焊缺陷，如气孔和非连续焊等要进行修正。锐边和火焰切割边缘要打磨光顺。焊缝要光顺无焊渣和飞溅等。

3.2 Degreasing 除油

Prior to blasting, all deposits of grease or oil or humectants caused by the NDT test shall be removed from the surface in accordance with SSPC-SP1 "Solvent Cleaning".

喷砂前，除去油脂或探伤拍片留下的润湿剂，按照 SSPC－1 "溶剂清洁" 标准执行。

3.3 Abrasives 磨料

Blasting abrasives shall be dry, clean，free from oil & grease and other contaminants, which will not be detrimental to the performance of the coating. Conductivity of aqueous extract should be lower than 300μs/cm. Beach sand shall not be used.

喷射用磨料要干燥，无油污，清洁无杂物，不能对涂料的性能有影响。磨料的导电率将不得到高于 300μs/cm。河砂将不得用于喷砂使用。

Size of abrasive particles for blast cleaning shall be such that the prepared surface profile

height (anchor pattern profile) is in accordance with the requirements for the applicable coating system. Steel grits and shots size should be 1.0-1.2mm. The surface profile shall be graded in accordance with ISO 8503.
磨料的大小要能够产生规定涂料系统要求的粗糙度。钢丸和钢砂的大小在 1.0-1.2mm。表面粗糙度级别根据 ISO8503 进行评估。
During the blasting operation care must be taken to prevent the possibility of oil and/or water to contaminate the blasted surface. Compressors must accordingly be fitted with efficient oil and water traps.
喷砂时注意防止油和 / 或水对喷砂后钢材表面的污渍。空压机必须安装油水分离器。

3.4 Blasting 喷砂

All steel surface shall be blasting cleaned to ISO 8501-1 Sa2 ½ or SSPC-SP6 with surface profile Rz 40-75μm.
钢材表面要求喷砂清理到 ISO 8501－1 Sa 2½ 或则 SSPC-SP6 等级，粗糙度达到 Rz 40－75 微米。
The surface to be coated shall be clean, dry, free from oil/grease, and have the specified roughness and cleanliness until the first coat is applied. All dust must be removed completely. The quantity of dust shall be less than "Rating 2" according to ISO 8502-3.
喷砂后准备涂漆的钢材表面要清洁、干燥，无油脂，保持粗糙度和清洁度直到第一度漆喷涂。所有灰尘要求彻底清理，根据 ISO8502－3 灰尘量要小于 2 级。
Coatings shall be applied within 4 hours of surface preparation and/or before rust bloom occurs. Should visible rusting occur or the cleaned surface becomes wet or otherwise contaminated, the surface shall be re-cleaned to the degree previously required.
表面处理后 4 个小时内，或在钢材表面返黄前，就要涂漆。如果钢材表面有可见返锈现象，变湿或者被污染，要求重新清理到前面要求的级别。

3.5 Stripe Coating 预涂

Stripe coating is an essential part of good working practice, Stripe coats are applied to areas where it is difficult to get the required coverage, including but not limited to:

- Plate edges
- Welds
- Pipes
- Ladders
- Difficult access areas

预涂是良好工作方法的重要部分,预涂一般在那些难以达到要求的覆盖处，包括但不仅限于下列部位：

- 自由边
- 焊缝
- 管路
- 梯子
- 难以触及的地方

4. Application of Tankguard 412 无溶剂环氧饮水舱漆施工

4.1 Mixing 混合

Mixing ratio: Part A : Part B = 2:1(by volume)

混合比例：A 组分 : B 组分＝2 : 1（体积比）

2 parts Comp A.(base) to be mixed thoroughly with 1 part Tankguard 412,Comp B(cuing agent).

将 2 份体积量的 A 组份（基料）与 1 份体积量的 B 组份（固化剂）完全混合均匀。

Induction time 熟化时间：10 minutes 10 分钟

Pot life 73℉(23℃) 混合后使用寿命（23℃）：

1 hour (Reduced at higher temperature)

1 小时（随着温度升高而缩短）

4.2 Cleaner 稀释剂/清洗剂

Flush the application equipment with Jotun Thinner No.28 proior to application.Use Jotun Thinner No.17 for cleaning equipment after application.

施工之前先用佐敦 28 号稀释剂冲洗施工设备；施工之后使用佐敦 17 号稀释剂清洗施工设备。

4.3 Guiding data airless spray 无气喷涂指导性数据

Pressure at nozzle：25 -35 MPa (3600 – 5000 p.s.i.)

喷嘴压力：25 -35 MPa (3600 – 5000 p.s.i.)

Nozzle tip：0.53 mm – 0.66 mm (0.021” – 0.026”)

喷嘴孔径：0.53 mm – 0.66 mm (0.021” – 0.026”)

Spray angle：40° - 80°

喷幅：40° - 80°

Filter：过滤器：

Filters shoule be removed,both in the pmp and the spray gun,due to the viscosity of the paint.Should,however,air bubbles in the paint be a problem a coarse filter may be employed.If used,check to ensure that filters are clean.

鉴于该涂料的黏度较高，喷涂时应卸下泵及喷枪进料口的滤网。不过，当漆膜中出现较多气泡时，则需考虑使用粗目滤网，但需经常检查并清洁滤网。

4.4 Drying time 干燥时间

Substrate temperature 底材温度	Surface dry 表干	Through dry 硬干	Cured 固化	Dry to recoat 覆涂间隔	
				Min 最短	Max 最长
10℃	15h 15 小时	30h 30 小时	15d 15 天	30h 30 小时	96h 96 小时
23℃	6h 6 小时	12h 12 小时	7d 7 天	12h 12 小时	48h 48 小时
40 ℃	1.5h 1.5 小时	4h 4 小时	4d 4 天	4h 4 小时	18h 18 小时

The given data must be considered as guidelines only.The actual drying time/times before recoating may be shorter or longer depending on film thickness,ventilation,humidity, underlying paint system,requirement for early handling and mechanical strength etc.A complete system can be described on a system sheet,where all parameters and special

conditions could be included.
上述数据仅供指导，实际干燥时间/覆涂前的时间隔时间可长可短，取决于漆膜厚度、通风状况、湿度，下层油漆、提前装卸需求和机械强度等等。完整的配套见相应的配套表，该配套表包括了所有参数和特殊条件。

5. Touch Up on site 现场修补

5.1 Touch-up on site shall be carried out on all damaged coating surface, including damages resulted from transportation, handling, erection, and welding, cutting and any other hot-work.
所有损伤的涂层都要在现场进行修补工作，包括运输、装卸、架设，电焊、切割以及其它所有的火工所造所的漆膜损伤。

5.2 Intact coating around damaged area must be feathered and slightly roughened the adjacent surface to ensure a smooth touch up coating surface.
损伤部位的周边完好涂层必须轻轻打毛，并打磨成平滑的过渡层，保证修补部位平滑过渡。

5.3 Prior to touch-up, damages assessment should be known then to get a touch-up plan. Touch-up should be carried out starting with the right damaged coat.
修补工作开始前，要先对漆膜损伤有一个评估然后做出修补计划。修补总是从损坏的那一涂层开始。

5.4 Touch-up 修补方案

- Topcoat damaged (intact primer)
  Sandpapering（80-100 mesh）or disc grinding, cleaned with Thinning then touched up with intermediated coat to reach specified DFT, followed with top coat.
  面漆损伤（底漆完整）
  用 80-100 目的砂纸打磨或砂轮片打磨，用稀释剂清洁表面后，修补中间漆至设计膜厚，再补涂面漆。
- Primer Damaged (no rust)
  Sandpapering（80－100 mesh）primer surface, touch up primer to reach specified DFT, followed with intermediated coat and top coat.
  底漆损伤（没有锈）
  用 80-100 目的砂纸打磨，修补底漆至设计膜厚，再修补中间漆和面漆。
- Damaged to steel surface or burn area (rust noticed)
  Disc Grinding to St3，cleaned with thinner and touched up with primer to reach specified DFT，followed with intermediated coat and top coat.
  损伤到钢板，漆膜烧坏部位（返锈）
  砂纸片打磨至 St3 级后，用底漆修补至设计干膜厚度，再修补中间漆和面漆。

5.5 Power tools can be used for grinding, rotary grinders, discs are recommended. However, rotary brush is not recommended because of its polishing tendency on steel surface to affect coating adhesion.
打磨时采用的动力工具，如旋转式打磨机，砂纸片等。然而，旋转钢丝刷不建议使用，因为它对钢板表面的抛光的作用而影响涂层附着力。

5.6 All climate control requirements should be same as it in new construction painting.
修补时期的气候条件控制相同于新建结构涂装时的要求。

5.7 Brush only used for small area, and more coat required to reach specified DFT. Airless spraying is recommended for big area touch-up.

刷涂仅限用于小范围修补，且修补必须达到规范所规定的设计干膜厚度。大面积修补时推荐使用无气喷涂。

5.8 During touch-up inside, sufficient ventilation and lighting must be provided.
内部修补时，要提供足够的通风和照明。

6. General Notes 概述

6.1 When temperature is lower than 5℃ or higher than 40℃, according measures must be taken to improve ambient weather condition to the acceptable range.

当温度低于 5℃或高于 40℃时，必须采用措施来提高气候条件到可以接受的范围。

6.2 No final blast-cleaning or coating application shall be done if the relative humidity is more than 85% and when the steel temperature is less than 3℃ above the dew point.

如果相对湿度超过 85%或者钢板温度低于露点 3℃，不要进行最终喷砂或涂漆施工。

6.3 Paint application is not allowed when raining, snowing, water or ice on the substrates, or heavy fog around.
当下雨下雪，表面有水有冰，或者大雾时，不能进行涂漆施工。

6.4 Wet Film Thickness 湿膜厚度测量

WFT must be measured immediately after application since evaporation of solvents will effect the reading if not performed at once. WFT measurements shall be performed in accordance with ISO 2801:1997 Method No 1 (Appendix I).
湿膜厚在施工后应当立即检测，因为若不及时执行，溶剂的挥发将影响到读数。湿膜厚的检测应当依据 ISO 2801:1997 方法 No1（附录 1）执行。

WFT measurements as specified to be carried out alongside with checking of paint consumption, taking into consideration specified dry film thickness and volume solids of the paint.
湿膜厚的检测可反映油漆用量的检查，同时也有助于控制规定的干膜厚和反映油漆的固体含量。

6.5 Dry Film Thickness 干膜厚度测量

Number of spot readings to be performed is decided from case to case since design of coated construction must be taken into consideration. One spot reading is the average of 3 readings made approximately 40mm apart.
读数点的数量应当根据不同的情况来执行，因为需要考虑到被涂装结构的不同设计。一点的读数应当是距其 40 毫米范围内其它三点的平均值。
Destructive methods to determine DFT of coating systems is not recommended but may be used if necessary to verify compliance with specifications.
不推荐使用破坏性方法测定干膜厚，但是为了检验是否符合配套而必须时也可使用。

DFT inspection should be carried out 90-10 rules, means 90% readings should be reach Specified DFT, and remaining 10% readings should reach 90% of specified DFT. DFT inspection will be carried out according SSPC PA 2.
干膜厚度的测量按照两个 90%执行，即 90%的测量点要达到规定的干膜的厚度，余下 10%的测

量点要达到规定膜厚度的 90%。干膜厚度的检查按照 SSPC PA2 执行。

6.6 Final Inspection 最终检验

Final coating surface should be clean, smooth, free of blistering, runs, pinholes, cracking, and drying spraying.

最终的漆膜表面应该清洁，平滑，无起泡，流挂，针孔，开裂和干喷等。