Jotun Protects Property

Application Guide for Internal Flow Efficiency Coating Jotapipe FC 400

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1.0 Product description

Jotapipe FC 400 (formerly Jotaguard 400 / Tankguard 412 Pipe Grade) is a solvent-free, two-component epoxy pipe coating designed as a single coat internal flow efficiency coating for gas transmission pipelines. Jotapipe FC 400, for non-corrosive service, is typically applied at a thickness of 100 microns DFT. Exact film thickness requirements will be determined by the client/project specification.

Jotapipe FC 400 meets the requirements of API RP 5L2 and ISO 15741 standards.

Jotun Technical Sales Support team is available to provide the necessary technical support including training, qualification and project follow-up to ensure that Jotapipe FC 400 is applied in full accordance with the instructions of this guide and any additional project specific requirements.

This application guide offers product details and recommended practices for the use of Jotapipe FC 400 and must be used in conjunction with the relevant technical data sheets and material safety data sheets.

2.0 Surface preparation and cleanliness

All steel surfaces should be clean, dry and free from contamination. The surface should be assessed and treated in accordance with ISO 8504.

2.1 Abrasive media quality

Abrasive media should be checked regularly to ensure no contamination by oil and that the quality of the media remains within the specification requirements.

2.2 Compressed air quality

It is important to control the air quality used in the abrasive blast cleaning process which should be checked in accordance to ASTM D4285.

To evaluate air quality a sheet of clean dry absorbent paper is held at a short distance from the drain reservoir located on the live air line. The drain valve is then slightly opened to allow the release of air from the line onto the paper.

There should be no visible evidence of water, oil or other contaminants on the paper.

2.3 Salt contamination

Salt levels should be evaluated according to the client's specification and the necessary steps taken to ensure compliance. A common practice to reduce salt contamination is the use of high pressure water washing.

2.4 Pre Heating prior to abrasive blast cleaning

The temperature of the steel substrate should be a minimum 10°C and at least 3°C above the dew point of the air temperature with the relative humidity measured in the vicinity of the substrate. Relative humidity in air should not exceed 85% during applicaiton. If need be, the pipes may be passed through an in line heating furnace such as direct flame or induction coil to raise the temperature up to a minimum temperature of 35-45°C.

2.5 Steel Profile and cleanliness

To achieve the recommended internal blast profile an auto blast cleaning method should be used for surface preparation. A constant blast cleaning speed and a controlled process is essential to obtain the desired profile. The final surface blast profile will influence the coating smoothness.

The quality of the blast and cleanliness of the pipe shall be to a minimum Sa 2.5 (ISO 8501-1:2007).

Typical blast profile will range from 35 to 50 µm Rz or as defined in the client specification.

2.6 Dust Contamination

All loose material (dirt, rust and flakes of mill scale) should be removed from the steel prior to blast-cleaning. Removal of dust after blast-cleaning is important as a layer of dust will lead to poor adhesion of the coating to the steel. The level of dust remaining on the blasted steel surface can be measured to ISO 85023.

3.0 Application conditions

For best performance at the recommended film thickness Jotapipe FC 400 requires strictly controlled conditions.

The temperature of the steel substrate should be a minimum 10°C and at least 3°C above the dew point of the air temperature with the relative humidity measured in the vicinity of the substrate being no higher than 85% RH.

4.0 Application method

To achieve optimum results, plural feed heated airless spray is the recommended application method. Dependent on the project specification and local conditions, pre-heating of the pipe prior to internal coating is permissible. Please contact the Jotun Technical Sales Support team for further advice.

The coating should be preheated to achieve a temperature between 35°C and 45°C at the spray tip nozzle. Care must be taken to monitor the temperatures of component A and B to maintain the correct nozzle tip temperature and maintain temperature stability. Elevated application temperatures will have the effect of a reduced pot life.

The application process can be carried out in two ways:

1) Rotation of the pipe where the speed of the rotation and travel of the pipe trolley control the wet film application.

2) Spin spraying where the spray lance rotates combined with a set speed of travel of the trolley through the pipe to control the wet film application.

The speed of coating for both methods is determined by the recommended coating film thickness. For equipment cleaning Jotun Thinner No. 17 may be employed.

5.0 Application control data

Table 1 Application data

Mixing ratio	2:1 by volume (Comp. A (base): Comp. B (curing agent))
Mixing	2 parts Comp. A (base) to be mixed thoroughly with 1 part Comp. B (curing agent)
Pot life (23°C)	60 min
Cleaner	Use Jotun Thinner No. 17 for cleaning equipment after application
Pressure at nozzle	2,600 – 4,300 psi (18 – 30 Mpa)
Nozzle tip	0.46 mm – 0.60 mm (0.018” - 0.024”)

Table 1 Application data (continued...)

Spray angle	60°- 120°
Filter	Min. 100 mesh recommended. Check to ensure that filters are clean

Table 2 Typical film thickness and coverage rates

	Minimum	Maximum	Typical
Dry film thickness (µm)	75	125	100
Wet film thickness (µm)	75	125	100
Theoretical coverage rate (m²/l)	13	8	10

Exact film thickness requirements will be determined by the client/project specification.

6.0 Drying times

Drying times are affected by air circulation, temperature, film thickness and the number of coats. The figures given in the table are typical assuming:

- Good ventilation (outdoor exposure or free circulation of air)
- Typical film thickness
- One coat on top of inert substrate

Table 3 Drying times

Substrate temperature	**10°C**	**23°C**	**40°C**
Surface dry	15 h	6 h	1.5 h
Hard dry	30 h	12 h	4 h
Full cure	15 d	7 d	4 d

The above data must be considered as a guideline only. Actual drying times may be shorter or longer depending on film thickness, ventilation, humidity and requirements for early handling.

To achieve the optimum performance of Jotapipe FC 400 application should be performed by qualified applicators. Jotun Technical Sales Support team are available to provide the necessary technical support including training, qualification and project follow-up to ensure that Jotapipe FC 400 is applied in full accordance with the requirements of the pertinent project specification.

7.0 Quality control data

Small variations in the application parameters may have significant impact on the finished result and it is therefore important to ensure stable application conditions. To determine the optimal data for a specific production plant it is essential to carry out a full scale plant evaluation. Test plates should be mounted on the pipe during the trial for further product testing.

Individual pipe coaters will have their own specific QA/QC testing procedures mostly in line with API or ISO pipeline qualifications or alternatively, may use the client's specification instructions.

Recording the main application parameters and results for each pipe during plant trials is important and these should be agreed and signed off by the plant supervisor, the Jotun representative and, if present, the clients representative.

8.0 Repair

Should small areas of the coating require repair then that area must be suitably cleaned and prepared by sanding or light blasting and ensuring thorough removal of dust and debris. Coating of the cleaned and prepared surface can be done by brushing Jotapipe FC 400 that has been thoroughly mixed in the specified mix ratio.

9.0 Summary

Internal pipe coating application is a highly specialized process and Jotapipe FC 400 has been developed to meet this end use.

It is important that the application is carried out in a controlled environment. A complete record should be made of all application parameters to ensure the correct settings for the particular steel pipe coating plant and pipe diameter.

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THIS APPLICATION GUDE SUPERSEDES ALL PREVIOUSLY ISSUED VERSIONS

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