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IGS

دستورالعمل

سیستم پوششی اپوکسی پودری داخلی برای خطوط لوله گاز طبیعی شیرین

Internal Fusion Bond Epoxy Coating System for Sweet Natural gas Pipelines

دفترمدیرعامل

شرکت ملی گازایران

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ابلاغ مصوبه هیأت مدیره

مدیر محترم پژوهش و فناوری

باسلام،

به استحضار می‌رساند در جلسه ۱۹۲۵ مورخ ۱۴۰۰/۰۳/۰۹ هیات مدیره، نامه شماره گ۹/۰۰۰/۲۳۲۱۰ مورخ ۱۴۰۰/۰۲/۲۸ مدیر پژوهش و فناوری درمورد تصویب نهایی مقررات فنی شرکت ملی گاز ایران به شرح زیر مطرح و مورد تصویب قرار گرفت.

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این مصوبه در حکم مصوبه مجمع عمومی شرکت‌های تابعه محسوب و برای کلیه شرکت‌های تابعه لازم الاجرا می‌باشد .

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Foreword

This standard specification is intended to be mainly used by N.I.G.C. and contractors, and has been prepared base on interpretation of recognized standards and technical documents, as well as knowledge, backgrounds and experiences in gas industries at national and international levels.

Iranian Gas Specification (IGS) are prepared, reviewed and amended by technical standard committees within NIGC standardization division of research and technology management and submitted to "the standards council of NIGC" for approval.

IGSs are subjected to revision, amendment or withdrawal, if required, and thus the latest edition of IGS shall be checked / inquired by NIGC'S users.

This standard must not be modified or altered by NIGC employees or its contractors. Any deviation or conflicts between this specification and other applicable standards, codes, procedure or well-known manufacturer's specifications must be resolved in writing by the user or its representative through Manager, Engineering Department or standardization division of NIGC.

The technical standard committee welcomes comments and feedbacks from concerned or interested corporate and individuals about this standard, and may revise this document accordingly based on the received feedbacks.

General Definitions

Throughout this standard the following definitions, where applicable, should be followed:

1- "STANDARDIZATION DIV." is organized to deal with all aspects of industry standards in NIGC. Therefore, all enquiries for clarification or amendments are requested to be directed to mentioned division.

2- "COMPANY": refers to National Iranian Gas Company (NIGC).

3- "SUPPLIER": refers to a firm who will supply the service, equipment or material to IGS specification whether as the prime producer or manufacturer or a trading firm.

4- "SHALL ": is used where a provision is mandatory.

5- "SHOULD": is used where a provision is advised only.

6- "MAY": is used where a provision is completely discretionary.

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Contents

Guidance for use of this specification:

The amendments/ supplements API 5L 7 SERIES 2015 given in this Specifications are directly equivalent sections or clauses in API 5L 7All other Paragraphs which are not amended by this supplementary shall remain valid as Written. The following annotations, as specified hereunder, have been used at the Beginning of each paragraph to indicate the type of change made to that paragraph of API 5L 7

Sub. (Substitution) "The paragraph in API 5L 7 shall be deleted and replaced By the new paragraph in this supplementary"

Del. (Deletion) "The paragraph in API 5L 7 shall be deleted without any Replacement"

Add. (Addition) "The new paragraph with the new number shall be added to The relevant section of API 5L 7 "

Mod. (Modification) "Part of the clause or paragraph in API 5L 7shall be modified and/or the new description and/or statement shall be added to that clause or paragraph as given in this supplementary.

1. SCOPE (Sub.)

1. This standard specification specifies the NIGC's requirements and recommendations for factory application of fusion bonded epoxy as internal coating for non-corrosive service (flow coat) to externally coated line pipes for use in single phase gas transmission pipelines with the objective of reducing surface roughness and pressure losses.

1.3 REFERENCED STANDARDS

TABLE 1.0(mod.)

REFERENCED STANDARDS

1.NACETM-1-75:	Nace Visual Standard	Latest Edition	4.ASTM 1002:	Test Method for Strength Proper-	Latest Edition
2.SSPC-Vis1-82T SP5:	Pictorial Surface Preparation Standards for painting Steel Surfaces	Latest Edition		ties of Adhesives in Shear by Tension Loading (Metal to Metal)	
			5. ASTMG17:	Test Method for Penetration	Latest Edition
3.SIS05-9-00 SA3:	Pictorial Surface Preparation Standards for Painting Steel Surfaces	Latest Edition		Resistance of Pipeline Coatings (Blunt Rod)	
			6. ASTMB117:	Method of Sal Spray (Fog) Testing	Latest Edition
			7. NACE TM 01-70:		Latest Edition

2. COATING MATERIAL SPECIFICATION

2.1 PURPOSE(mod.)

This Section describes material properties of coating materials to be applied under the intent of this Recommended Practice. It is the Applicator's responsibility to perform the tests referenced in this Section. The Purchaser may also perform any or all of the referenced tests as part of a quality assurance program.

3. LABORATORY COATING TESTING

3.1 PURPOSE (mod.)

This Section describes laboratory tests required to qualify coating materials. It is the responsibility of the coating Applicator to qualify the coating material prior to production. Once qualification is

established, further qualification testing is not required unless the coating material or formulation changes. The Supplier shall certify to the Purchaser the results of tests performed under Section 3 for each qualified material.

3.3 COATING OF TEST PANELS

3.3.2(mod.)

Thickness of coating on the completed test panel shall be 150 to 200 microns, measured by a coating thickness gauge calibrated per Par. 5.3.2.4.

3.4 PERFORMANCE OF LABORATORY COATED STEEL PANELS

3.4.2 Additional Tests(mod.)

Test	Value/Limits	Test Method
Abrasion	20 mg max.	Appendix 8
Adhesion	5000 psi [34.5 MPa] min, or 2500 psi [17.2 MPa] min. (The 2500 psi minimum applies only when Appendix 9 Test Method is used.)	ASTM D1002 or Appendix 9.
Coating roughness	maximum 5 µm	ISO 4287
Cathodic Disbondment*	0.31 in. [8 mm] maximum average radius	Appendix 11
Resistance to Chemicals -resistance to cyclohexane – resistance to 95% by volume diethylene glycol solution in water -resistance to hexane -resistance to methanol – resistance to toluene – resistance to lubricating oil (e.g. compressor oil)	the coating shall not show any blistering or appreciable softening	ISO 2812-1
Flexibility	3.75°/PD bend at OF [-18 C]	Appendix 13
Hot Water Soak	Maximum: Rating 3	Appendix 16
Impact	15 in.-lb. [1.70J], minimum	Appendix 14
Penetration	Less than 10%	ASTM G17 at 200 F
Salt Fog	No blistering; no loss of adhesion	ASTM B117 for 1000 hr.

*This is included as an adhesion test, not a service simulation.

4. APPLICATION PRACTICES

4.5.4 Surface Profile(mod.)

The surface profile shall be in accordance with the Supplier's recommendations. Typically coating systems will require a trough to peak height of at least 40 microns but not more than 100 microns when grit or slag is used.

4.6.4.1 cut back (add.)

The cutback length shall be maintained 80±10mm

4.6.4.2 Coating roughness(add.)

The final cured coating shall have a maximum surface roughness of 5 µm over the specified blast cleaned surface profile. The surface roughness shall be determined in accordance with ISO 4287.

4.7.2.1 Stripping and Recoating(mod.)

Coating shall be heated sufficiently to soften or-char coating to permit removal by abrasive blasting. Other methods of stripping may be used by agreement between Purchaser and Applicator.

5.3.2 In-line Inspection and Testing

5.3.2.4 Thickness Measurement(mod.)

The coating thickness will be determined at a minimum of three locations near the end of each pipe, using a coating thickness gauge approved by the Purchaser. Calibration of the gauge shall be checked at least once each shift with a thickness within 20% of the specified nominal thickness. The average coating thickness measured on each joint must fall within the limits specified by the Purchaser.

APPENDIX 10
AUTOCLAVE TEST METHOD(del.)

APPENDIX 12
CHEMICAL RESISTANCE TEST (del.)