Recommended Practice for Ancillary Equipment for Flexible Pipes and Subsea Umbilicals

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Introduction

This recommended practice (RP) is the result of a Joint Industry Project to develop a worldwide industry standard for the design, material selection, analysis, testing, manufacture, handling, transportation, installation, and integrity management of flexible pipe ancillary equipment. The objective of this RP is to provide an integrated approach, together with API 17B, API 17J, and API 17L1, to the design of flexible pipe systems. Therefore, it is intended that this RP be used in conjunction with these documents.

The majority of ancillary equipment is custom-built and can be designed and manufactured in a variety of methods. It is not the intent of this RP to discourage novel or new developments in ancillary equipment. On the contrary, it is recognized that a variety of designs and methods are possible. For this reason, some topics are presented in general terms to provide guidance to the user while still leaving open the possibility of using alternative approaches. The reader should be aware that ancillary equipment technology (concepts, design and analysis methodologies and criteria, components manufacturing and testing, operational roles and demands, maintenance and inspection, etc.) is in a state of rapid and continuing evolution. Therefore, potential users need to apply care in their application of the recommendations herein.

Systeme Internationale (SI) units are identified first when cited in the document. United States Customary (USC) units may be given in brackets after the SI units.

Recommended Practice for Ancillary Equipment for Flexible Pipes and Subsea Umbilicals

1 Scope

This RP provides guidelines for the design, materials selection, analysis, testing, manufacture, handling, transportation, installation, and integrity management of ancillary equipment for flexible pipes and umbilicals. It supplements API 17L1, which specifies minimum requirements for the design, material selection, manufacture, documentation, testing, marking, and packaging of the ancillary equipment.

This RP presents the current best practice for design and procurement of ancillary equipment and gives guidance on the implementation of the specification for standard ancillary products. In addition, this RP presents guidelines on the qualification of prototype products.

The applicability relating to a specific item of ancillary equipment within this RP is stated at the beginning of the section dedicated to that item of ancillary equipment.

This RP applies to the following ancillary equipment:

— bend stiffeners;

— bend restrictors;

— bellmouths;

— buoyancy modules and ballast modules;

— subsea buoys;

— tethers for subsea buoys and tether clamps;

— riser and tether bases;

— clamping devices;

— subsea buoy clamps

— piggy-back clamps;

— repair clamps;

— I/J-tube seals;

— pull-in heads/installation aids;

— connectors;

— load-transfer devices;

— mechanical protection;

— fire protection;

— VIV suppression strakes.

This document may be used for bonded flexible pipe ancillary equipment, though any requirements specific to these applications are not addressed.

Where relevant, the applicability of recommendations to umbilicals is indicated in the applicability section for the ancillary equipment in question.

This RP does not cover ancillary equipment for flexible pipes and umbilicals beyond the connector, with the exception of riser bases and load-transfer devices. Therefore, this document does not cover turret structures or I-tubes and J-tubes, for example. In addition, it does not cover flexible pipe or umbilical storage devices, for example reels.

This RP is intended to cover ancillary equipment made from several material types, including metallic, polymer and composite materials. It may also refer to material types for particular ancillary components that are not commonly used for such components currently but may be adopted in the future.

This RP applies to ancillary equipment used in association with the flexible pipe and umbilical applications listed in API 17B, API 17J, API 17E, and API 17K.

2 Normative References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

API Specification 2F, *Specification for Mooring Chain*

API Specification 9A, *Specification for Wire Rope*

API Recommended Practice 17A, *Design and Operation of Subsea Production Systems—General Requirements and Recommendations*

API Recommended Practice 17B, *Recommended Practice for Flexible Pipe*

API Specification 17J, *Specification for Unbonded Flexible Pipe*

API Specification 17K, *Specification for Bonded Flexible Pipe*

API Specification 17L1, *Specification for Ancillary Equipment for Flexible Pipe and Subsea Umbilicals*

DNVGL-OS-D301 [1] , *Fire Protection*

DNVGL-ST-F201., *Riser Systems*

DNVGL-ST-N001., *Marine Operations and Marine Warranty*

IAPSO [2] , *Standard Seawater*

3 Terms, Definitions, Abbreviations, and Symbols

3.1 Terms and Definitions

For the purposes of this document, the terms and definitions given in API 17B, API 17J, API 17K, API 17L1 and the following apply, many of which are repeated from API 17L1 for the convenience of the user.

[1] DNVGL - Veritasveien 1, 1363 Oslo, Norway, www.dnvgl.com.

[2] International Association for the Physical Sciences of the Oceans, http://iapso.iugg.org.