

API Specification

14L

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Lock Mandrels and Landing Nipples

ISO 16070:2001 (E)

5 Functional Specification

5.1 General

The user/purchaser shall prepare a functional specification for ordering products which conform with this International Standard and specify the following requirements and operating conditions, as applicable, and/or identify the supplier's/manufacture's specific product. These requirements and operating conditions may be conveyed by means of a dimensional drawing, data sheet or other suitable documentation.

5.2 Functional Characteristics of Lock Mandrels and Landing Nipples

The following functional characteristics shall be specified, as applicable, for lock mandrels and landing nipples:

- a. Conveyance method
- b. Locking mechanism
- c. No-go
- d. Selectivity
- e. Sealing device
- f. Dimensions
- g. Passage of lines (electrical and/or hydraulic) in the annulus (for landing nipples only)

5.3 Well Parameters

The following well parameters shall be specified, as applicable, for the lock mandrel and landing nipple:

- a. Size, mass¹, material and grade of the casing and tubing
- b. Well depth and angle from the vertical to the installed position
- c. Casing and tubing architecture, deviations, and restrictions through which the lock mandrel and/or landing nipple pass
- d. Anticipated loading conditions which might be applied to the lock mandrel and landing nipple

¹ The term "weight" is commonly incorrectly used to mean mass, but this practice is deprecated.

5.4 Operational Parameters

The following operational parameters shall be specified, as applicable, for the lock mandrel and landing nipple:

- a. Acidizing, including the acid composition, pressure, temperature, velocity, exposure time and any other chemicals used during the stimulation
- b. Fracturing, including proppant description, fracture fluid velocity, proppant-to-fluid ratio
- c. Sand consolidation operations
- d. Type of well intervention including service equipment such as electric line, slick line, braided line, coiled tubing, or snubbing equipment

5.5 Environmental Compatibility

The following shall be identified, as applicable, for the lock mandrel and landing nipple to ensure environmental compatibility:

- a. Production/injection fluid composition, mass, chemical and/or physical composition and the condition of the fluid and/or its components, being solid (e.g., sand production, scale, etc.), liquid and/or gaseous to which the lock mandrel and landing nipple is exposed during its full life cycle
- b. Both the minimum and the maximum anticipated values of the production/injection pressures, pressure differentials, temperatures and flow rates
- c. In cases where the user/purchaser has access to corrosion property historical data and/or research which is applicable to the functional specification, the user/purchaser should state to the manufacturer which material(s) has the ability to perform as required within the corrosion environment

5.6 Compatibility with the Related Well Equipment

5.6.1 Lock Mandrels

The following information shall be specified, as applicable, to ensure the compatibility of the lock mandrel with the related well equipment:

- a. Size and/or type of the lock mandrel required to position the flow control equipment in the landing nipple

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- b. Landing nipple size, model and type into which the lock mandrel is to be installed
- c. Size, type, material, configuration and interface dimensions of the connection between the flow control equipment and the lock mandrel
- d. Size, type and configuration of other products to be used with the lock mandrel

5.6.2

Landing Nipples

The following information shall be specified, as applicable, to ensure the compatibility of the landing nipples with the related well equipment:

- a. Top and bottom tubular connection(s), the material and dimensions of the landing nipple which is connected to the tubing
- b. Internal receptacle profile(s), sealing bore dimension(s), outside diameter, inside diameter and their respective locations
- c. Size, type and configuration of lock mandrels or other products to be used with the landing nipple

5.7

Quality Control

The quality control grade (i.e., Q1, Q2 or Q3 as given in 7.4) shall be specified by the user/purchaser.

5.8

Design Validation

The design validation grade (i.e., V1, V2 or V3 as given in 6.5) shall be specified by the user/purchaser. When requested by the user/purchaser, an operating envelope for the lock mandrel and sealing device validation grade V1 shall be supplied. An example of an operating envelope is shown in Annex A.