Publication Date: August 9, 2023

Affected Publication: API Specification 4F, Specification for *Drilling and Well Servicing Structures*, Fifth Edition, June 2020

Addendum 1

3.10: *The following term shall be added, and subsequent terms shall be renumbered.*

3.10
design pressure
Maximum allowable pressure that the cylinder is designed to withstand.

3.25: *The following term shall be added, and subsequent terms shall be renumbered.*

3.25
operating pressure
Pressure necessary to generate the required push and/or pull forces as defined by the rig designer.

8.1.5: *The section shall be updated to the following:*

8.1.5 Hydraulic Cylinders for Mast and Substructure Erection

8.1.5.1 Hydraulic cylinders that are used for mast and/or substructure erection shall be designed for the buckling, combined bending moments, axial loads, and internal pressure over the entire raising and lowering envelope.

8.1.5.2 The rig designer shall calculate the loads applied to the cylinder. These loads applied to the cylinder shall include, at a minimum, the effects of:

a) structural dead loads;
b) specified equipment and appurtenances that are supported by the mast and substructure during the raising and lowering condition;
c) wind loads acting on the structure as specified in 8.4;
d) allowable variation in cylinder mounting location during operation;
e) allowable extension offset and the resulting load variations that may occur between multiple cylinders that share a load;
f) other loads as agreed to between the rig designer and rig purchaser.

8.1.5.3 The rig designer shall supply the following information to the cylinder designer and cylinder manufacturer:

a) applied cylinder loads over the entire raising and lowering envelope;
b) angle between the longitudinal cylinder axis and a horizontal plane over the entire raising and lowering envelope;
c) drawing(s) showing cylinder mounting locations relative to structure and equipment;
d) allowable variation in cylinder mounting location during operation;
e) allowable extension offset and the resulting load variations that may occur between multiple cylinders that share a load;
f) ambient weather conditions.

8.1.5.4 The following shall be agreed upon by the rig designer and the cylinder designer/cylinder manufacturer:

a) cylinder physical mounting arrangement;
b) maximum cylinder operating pressure;

c) maximum cylinder design pressure;
d) maximum hydraulic flow rate into and out of each cylinder over the entire raising and lowering envelope.

8.1.5.5 The rig designer shall notify the cylinder designer and cylinder manufacturer of any changes in loading during the design process.

The rig manufacturer shall obtain a certificate of conformance from the cylinder designer/cylinder manufacturer that confirms the cylinder design according to the requirements, as below and within this specification.

The cylinder shall be designed for the following:

a) cylinder mounting conditions;
b) self-weight of the cylinder;
c) initial imperfections due to cylinder and cylinder bearing tolerances;
d) overlap between stage or stages in order to transmit bending moments;
e) a minimum factor-of-safety of 2.0 in buckling and for combined bending moments, axial loads, and load-induced internal pressure for all loading conditions and cylinder orientations provided by the rig manufacturer;
f) a minimum bursting factor-of-safety of 2.0 for cylinder walls at design pressure against the material yield strength;
g) a minimum factor-of-safety of 1.25 for piston or packing wear rings or other radial load-bearing components under any operating conditions.

11.8.4: *The section shall be updated to the following:*

11.8.4 Cylinders and Winches

Winches used for erection of masts or substructures shall be pressure tested to 1.5 times the design pressure. Cylinders used for erection of masts or substructures shall be pressure tested to 1.5 times the cylinder design pressure at full extension and at full retraction. The test pressure for winches and cylinders shall be maintained for a duration of 10 min. Criteria for a successful test shall be identified and agreed upon by the cylinder designer/cylinder manufacturer and rig designer.

Annex C: *The annex shall be replaced by the following:*

Annex C

The information in this annex has been intentionally removed.

See API Specification Q1 (Annex A) or the API website for information pertaining to the API Monogram Program and use of the API Monogram on applicable products.