Gas-Lift Document Scope Statements

API 19G1

This part of ISO 17078 provides requirements for side-pocket mandrels used in the petroleum and natural gas industry. This part of ISO 17078 includes specifying, selecting, designing, manufacturing, quality control, testing, and preparation for shipping of side-pocket mandrels.

This part of ISO 17078 does not address nor include requirements for end connections between the side-pocket mandrels and the well conduit. The installation and retrieval of side-pocket mandrels is outside the scope of this part of ISO 17078. Additionally, this part of ISO 17078 does not include specifications for centre-set mandrels, or mandrels that employ or support tubing-retrievable flow control devices.

This part of ISO 17078 does not include gas-lift or any other flow-control valves or devices, latches, and/or associated wire line equipment that can or cannot be covered in other ISO specifications.

The side-pocket mandrels to which this part of ISO 17078 refers are independent devices that can accept installation of flow-control or other devices down-hole.

API 19G2

This part of ISO 17078 provides requirements for subsurface flow-control devices used in side-pocket mandrels (hereafter called flow-control devices) intended for use in the worldwide petroleum and natural gas industry. This includes requirements for specifying, selecting, designing, manufacturing, quality-control, testing and preparation for shipping of flow-control devices. Additionally, it includes information regarding performance testing and calibration procedures.

The installation and retrieval of flow-control devices is outside the scope of this part of ISO 17078. Additionally, this part of ISO 17078 is not applicable to flow-control devices used in centre-set mandrels or with tubing retrievable applications.

This part of ISO 17078 does not include requirements for side-pocket mandrels, running, pulling, and kick-over tools, and latches that might or might not be covered in other ISO specifications. Reconditioning of used flowcontrol devices is outside of the scope of this part of ISO 17078.

API 19G3

This part of ISO 17078 provides requirements and guidelines for running tools, pulling tools, kick-over tools and latches used for the installation and retrieval of flow control and other devices to be installed in side-pocket mandrels for use in the petroleum and natural gas industries. This includes requirements for specifying, selecting, designing, manufacturing, quality control, testing and preparation for shipping of these tools and latches. Additionally, it includes information regarding performance testing and calibration procedures.

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The processes of installation, retrieval, maintenance and reconditioning of used running, pulling and kick-over tools and latches are outside the scope of this part of ISO 17078. Centre-set and tubing-retrievable mandrel applications are not covered.

**API 19G4**

This part of ISO 17078 provides informative documentation to assist the user/purchaser and the supplier/manufacturer in specification, design, selection, testing, calibration, reconditioning, installation and use of side-pocket mandrels, flowcontrol devices and associated latches and installation tools. The product-design and manufacturing-related requirements for these products are included within the other parts of ISO 17078.

The content and coverage of several industry documents are compiled and refined within ISO 17078 (all parts).

**API 11V5** (Doesn't even have a scope statement, this is from the introduction)

These recommended practices discuss continuous gas-lift with injection in the casing/tubing annulus and production up the tubing. Annular flow gas-lift (injection down the tubing and production up the annulus), dual gas-lift (two tubing strings in the same casing), and intermittent gas-lift are mentioned; however, most of the discussion focuses on “conventional” continuous gas-lift. Many of the recommended practices in this document may be pertinent to the other forms of gas-lift, but they should be considered and used with caution. Other recommended practices will address dual gas-lift (API 11V9) and intermittent gas-lift (API 11V10).

This document includes:
— Gas-lift Operating System Components and Potential Problems. Sections 1 through 11 describe the several components of an operating gas-lift system and discuss a number of problems that may be encountered and must be addressed to operate a gas-lift system effectively and efficiently. These sections are new to this edition of the document. A comprehensive checklist of system components is provided and associated problems are discussed. The list can be used when troubleshooting or de-bottlenecking a gas-lift system. These sections are recommended for use as:
  — part of a training course dealing with gas-lift system operation;
  — a review before beginning a major gas-lift system study;
  — a review before designing and/or modelling a gas-lift system;
  — a review before trying to troubleshoot difficult gas-lift system problems.

— Recommended Practices for Gas-lift Operation, Maintenance, Surveillance, and Troubleshooting. Sections 12 through 17 are revisions/upgrades of information that has been in existence since the first edition of this document. These sections contain recommended practices for common gas-lift operations:
  — initial unloading of the completion or workover fluid from the annulus of the gas-lift well;
  — re-starting or kick off after a period of downtime;
  — adjusting or fine-tuning the gas injection rate for optimum operation.

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These sections discuss commonly used gas-lift troubleshooting tools. They conclude with sections that review the potential locations of gas-lift problems, a table of possible causes and cures of some common gas-lift system problems, and a troubleshooting checklist.

These sections are recommended for use as:
— part of a training course dealing with gas-lift system operation;
— part of a training course dealing with gas-lift system maintenance;
— a review before trying to troubleshoot a difficult gas-lift operating problem.

API 11V6

This Recommended Practice is intended to set guidelines for continuous flow gas lift installation designs using injection pressure operated valves. The assumption is made that the designer is familiar with and has available data on the various factors that affect a design. The designer is referred to the API publication *Gas Lift*, (Book 6 of the Vocational Training Series, Third Edition, 1994) and to the various API 11V Recommended Practices on gas lift.

API 11V8 (Doesn’t even have a scope statement, this is from the foreword)

API RP 11V8 Recommended Practice for Gas Lift System Design and Performance Prediction provides two functions:
- A broad overview of gas lift systems and various major types of gas lift operations.
- Recommended practices for gas lift system design and for modeling methods used in performance prediction. All key system components are reviewed to provide guidance for engineers, technicians, well analysts, and operating personnel who are involved in gas lift system analysis, troubleshooting, design, and optimization.

The primary purpose of this API Recommended Practice (RP) is to emphasize gas lift as a system and to discuss methods used to predict its performance. Information must be gathered and models validated prior to a system design, which must precede wellbore gas lift mandrel and valve design. The subsurface and surface components of the system must be designed together to enhance the strengths of each and to minimize the constraints.

This recommended practice bridges and enhances the general information from the *API Gas Lift Manual* (Book 6 of the Vocational Training Series) and the technical details of other API Gas Lift RPs, each of which contain information on a specific subject or part of the overall gas lift system. The gas lift system designer or operator should have and become familiar with the full set of documents from the API (American Petroleum Institute), GPSA (Gas Processors Suppliers Association), and ISO (International Standards Organization) that relate to gas lift system components:
- **API Gas Lift Manual** (Book 6 of the Vocational Training Series)
- API Spec 11V1—Gas Lift Equipment
- API RP 11V2—Gas Lift Valve Performance Testing
- API RP 11V5—Operation, Maintenance, and Troubleshooting Gas Lift Installations
- API RP 11V6—Design of Continuous Flow Gas Lift Installations
- API RP 11V7—Repair, Testing, and Setting Gas Lift Valves
- API Spec 12GDU—Glycol-Type Gas Dehydration Units

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API Spec 12J—*Oil and Gas Separators*
API Std 617—*Centrifugal Compressors for General Refinery Service*
API Std 618—*Reciprocating Compressors for General Refinery Service*
GSPA—*Engineering Data Book*
ISO 17078—*Gas Lift Equipment Specifications*

**API 19G9**

This document provides recommended practices for the selection, design, operation, surveillance, optimization, automation and troubleshooting of dual gas-lift wells.

The purpose of this document is to present recommended practices, guidelines, and tools to help obtain optimum production from dual gas-lift wells. This document also contains practices that should be avoided to minimize problems, inefficiencies, and poor economics that may be associated with ineffective dual gas-lift operations. Compared to single completions, dual completions typically have a higher initial cost, have more operating problems, are more difficult and expensive to work over, and may produce less efficiently.

It is not the purpose of this document to recommend the practice of dual gas-lift. In some cases, dual gas-lift is problematic and often ineffective. Often it is difficult or even impossible to effectively produce both completions in a dual well using gas-lift, over the long term. Where there are other feasible alternatives to produce dual wells, they should be considered. However, many dually completed oil wells should be artificially lifted — initially, or after reservoir pressures have declined and/or water cuts have increased. In many cases, the only practical method of artificial lift for these wells is gas-lift. Therefore, every effort should be made to design and operate dual gas-lift systems as effectively as possible.

Annexes to this Recommended Practice include: a) an overview of dual gas-lift systems, b) dual gas-lift mandrel spacing designs, c) dual gas-lift unloading valve design for PPO valves, and d) dual gas-lift practices no recommended.

**API 11V10** (Doesn’t even have a scope statement, this is from Section 1 – Introduction and Organization of This Document)

This API document presents guidelines and recommended practices for the design and operation of intermittent, chamber, and plunger gas-lift systems.

**API 19G11**

This Recommended Practice (RP) provides guidance and background for the application and use of dynamic simulation of gas lift wells and their related systems. Discussion is included for use of steady-state, “pseudo” steady-state, and dynamic numerical models. Also presented are guidelines to facilitate
the application of these techniques to optimize well/system integrity, operations, life cycle design, and production. Additionally, a range of artificial lift and natural flowing systems and topics (e.g. gas well liquid loading) are addressed. The dynamic simulation recommendations (e.g. stable flow, hydrates, waxes, corrosion, liquid loading, and complex wells) can be implemented in other production systems (e.g. natural flowing wells).

This RP is designated for managers, production technologists, reservoir engineers, facilities engineers, production engineers, well testing engineers, well analysts, operators, and researchers who want to gain a general understanding of dynamic simulation, areas of application, added values, and benefits. The contents compare transient versus steady state techniques and provide readers with when and how each technique may be effectively applied.

Not included are technical requirements for the hardware of the dynamic simulation system, the specifics of the system calculations, the responses to the output of the dynamic simulation data output, and specifics of what actions are required after the provided data is considered.

An extensive bibliography is provided of documents for additional information on the topics included.