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1. Statement of Standard

Tab Data attributes serve as the primary means of communicating engineering data and ratings from Engineering to Field personnel. This document defines the required attributes and proper method by which these attributes are entered into an engineering record so that they will properly synchronize with OneCAT and display to Field personnel.

A proper naming convention allows for efficient searching within a PDM system that does not otherwise organize parts and drawings into an “intelligent” system. This can help reduce wasted engineering time searching for records and prevent part duplicates that cause unnecessary Sustaining efforts. This document defines a naming convention that maximizes this goal within GeMS.

2.0 Objective

This Standard defines a naming convention and standard attributes/input values established for Packer/Bridge Plug and Packer Accessory products. All top-level Packer/Bridge Plug or Packer Accessory assemblies require compliance with this Standard. These standard naming convention and attributes are in addition to the Completions Standard Required Attributes Tab Data and Syntax Structure (GeMS Document 100209963).

3.0 Scope

This standard applies to all assemblies and piece parts developed and maintained by the Packer Engineering group after the release of 100200505 Rev AK.

4.0 Implementation and Monitoring

The following procedures are to be followed when updating Description and Tab Data Attribute fields for all Packer/Bridge Plug and Packer Accessory products.

4.1 Definitions:

EOEC – Exclusive Of End Connections

GeMS – Global engineering Management in Schlumberger; Schlumberger Product Data

Management (PDM) system.

BDM – Business Development Manager

PM – Project Manager

QCP – Quality Control Plan

TDAS – Tubular Design and Analysis System

OneCAT – Schlumberger Online Catalog

4.2 Responsibilities:

Each Packer/Bridge Plug and Packer Accessory project team member that creates or revises a top-level assembly is responsible for adding or revising the description, required attributes, and associated input. All Project Team members that review/approve records in the Schlumberger PDM for prototyping or releasing any product(s) are responsible for ensuring the top-level assembly records contain the required Tab Data attributes.

4.3 Instructions:

## 4.3.1 Naming Convention

The naming conventions listed in Appendix A shall be used for Packer/Bridge Plug and Packer Accessory top-level assemblies and piece parts and applied in the GeMS Description field.

The format described in Appendix A is intended to convey the maximum amount of information regarding the part record to increase ease of searching in GeMS. This aids engineering in both finding necessary parts for new or updated designs and ensuring there are no part duplicates within GeMS.

## 4.3.2 Required Attributes for Packer/Bridge Plug and Packer Accessories

The list of attributes required for the Packer/Bridge Plug and Packer Accessories is listed in Appendix B, with descriptions and examples of syntax listed in Appendix C.

Those attributes checked as “ISO” are required to be provided on the data sheet for each respective assembly developed per ISO 14310 / API 11D1. Although ISO 14310 / API 11D1 does not explicitly require qualified casing I.D. to be listed on the product data sheet, validation grades V5 through V0 have dimensional restrictions for casing I.D. Additionally, the “ISO QUALIFIED CASING I.D.” attribute was created as part of the resolution for SQ 20081022232045 (also see 20110202190528). Therefore, it is mandatory that this attribute be included for ISO rated products. Any assemblies developed and rated per ISO 14310 / API 11D1 must also include the attributes in Appendix B marked for “Packer, Tubing Conveyed” or “Packer, Seal Bore” (depending on the type of Packer) in addition to the attributes noted under the “ISO” column.

Ensure that attributes are formatted properly. It is recommended to use the tab data validator (GeMS reference document 100867293) to verify proper formatting.

## 4.3.3 Attribute Calculations for Packer/Bridge Plug and Accessories

Strength and pressure ratings for Packers are based on tested values or calculated per Packer design guidelines. Strength and pressure ratings for accessories should be calculated at the working temperature (indicated after the rating in brackets []), with the safety factors contained in Document 100826233: Packer Safety Factor Standard.

## 4.3.4 Appending/Inputting Required Attributes in PDM

The project team members must copy the attributes from record templates linked to the Reference Callout of GeMS Document 100265538, Bridge Plug template 101913064 or the Packer Accessory Attribute Templates Index (GeMS Document 100265542) and paste the attributes into Tab Data attribute of the top-level Part SLB record. Do not copy or clone attributes from existing records as there is no provision that the attributes are current and correctly formatted. The project team is to collect all information necessary to populate each of the attributes with the correct syntax per Appendix C.

For any metal alloy or seal elastomer material attributes, use one of the descriptions from Appendix D and/or refer to CMS-00 if the appropriate material is not listed in Appendix D.

### General Input Rules for Tab Data Attributes

* For input, use only brackets []; do NOT use parenthesis (); do not precede [] with a space
* Do not use the unit in the input (i.e. no “ symbol or any form of inches)
* There must be a space before and after the “=” symbol. For example:  
  I.D. (IN) =4.125 WRONG  
  I.D. (IN) = 4.125 CORRECT
* If attribute is requiring a numeric input, only one value is acceptable:  
  I.D. (IN) = 2.375/2.390 WRONG  
  I.D. (IN) = 2.375 CORRECT

If input requires multiple inputs, then use a comma and a space as a delimiter:  
MATERIAL/ELASTOMERS = AFLAS, NITRILE CORRECT

* Follow the formatting examples shown in Appendix C. If a fraction is shown, no decimals are allowed for that attribute:

CASING SIZE (IN) = 9.625 WRONG  
CASING SIZE (IN) = 9-5/8 CORRECT

Similarly, if a decimal is shown in the example for an attribute in Appendix C, no fractions are allowed for that attribute:

O.D. (IN) = 4-3/8 WRONG

O.D. (IN) = 4.375 CORRECT

* No additional alpha characters are allowed in a numeric input field. If additional information is required to describe the input value, contact your BDM.  
  SHEAR RELEASE FORCE (LB) = 50,000 (10 SCREWS) WRONG  
  SHEAR RELEASE FORCE (LB) = 50000 CORRECT

## 4.3.5 Promoting Top-Level Records

The project team will approve only those top-level assemblies that include all required attributes per this document.

## 

## 4.3.6 Confirmation of Transfer of Attributes

If the top-level assembly is utilized in OneCAT (which in turn means TDAS and WellBuilder will be utilizing the attributes as well), then the BDM will ensure with a visual inspection that the attributes provided the project team have been inputted. If there are issues with the required attributes the BDM shall notify the project team and request a revision.

4.4. Documentation and Retention:

4.4.1 This Standard shall be reviewed for its continuing use, five years (maximum) from the date of release.

4.4.2 Documents generated by this Standard shall have a continuing use review period no longer than five years from their date of release.

5.0 References

5.1 Normative References

5.1.1 GeMS Document 100209963: REQUIRED ATTRIBUTES TAB DATA AND SYNTAX

STRUCTURE

5.2 Informative References

5.2.1 GeMS Document CMS-00: MDS TABLE

5.2.2 GeMS Document 100265538: PACKER ATTRIBUTE TEMPLATES INDEX

5.2.3 GeMS Document 100265542: PACKER ACCESSORY ATTRIBUTE TEMPLATES INDEX

5.2.4 GeMS Document 100826233: PACKER SAFETY FACTOR STANDARD

5.2.5 GeMS Reference Document 100867293: SHAREPOINT PAGE AND SCRIPTS TO VALIDATE TAB DATA TEXT VS STANDARDS

5.2.6 GeMS Document 101738357: PACKER/ BRIDGE PLUG/ PACKER ACCESSORIES OneCAT ATTRIBUTES- LIGHT DOCUMENT

5.2.7 GeMS Document 100203915: PKR, GUIDELINE, PACKER PRESSURE RATINGS,

CONDITIONS AND DEFINITIONS.

5.2.8 QUEST Meeting: 20150929151029, 20150929154855 Review of DN 100200505- Rev AK

1. Required Approvals: CPS\_Completions

Appendices

Appendix A: Packer/Bridge Plug & Packer Accessory Assembly & Piece Part Naming Convention

Appendix B: Packer/Bridge Plug & Packer Accessory Required Attributes

Appendix C: Packer/Bridge Plug & Packer Accessory Attribute Definitions & Examples

Appendix D: Material Descriptions for Attribute Entry

Appendix E: Seal Tube Calculations

Appendix F: Tool Lengths

Appendix G: Packer Pressure Ratings

Each box contains an element in the description to be added if applicable. Between the boxes, “X”, “(“, “)”, “,” represent those characters. “\_” represents a space.

The Piece Part naming convention especially contains a lot of fields that may or may not be applicable. The boxed items in **BOLD, RED** text denote items that are required for all piece parts. Information regarding the related product name, casing size, tubing size, etc. should only be added if they are applicable to only ONE product or size. For example, a Gauge Ring used on only one size of XMP Packer should contain the casing size and weight and product name (XMP) in the description. Conversely, a Ratchet Ring used in various XHP, XMP, and MRP assemblies across different sizes should not contain a casing size and weight or product name.

An example of a part that would contain a casing size and weight but not product name would be an element that is used on several different types of assemblies, but across all assemblies is only used in one size casing weight range.

For parts which have multiple materials listed in the bill of materials (primary, alternate material), only the primary material should be listed in the part description.

**Packer/Bridge Plug Assemblies**

**\_X\_**\_**X\_\_\_(),\_\_(),\_\_(),\_\_()\_,\_,\_,\_**

CASING SIZE

TUBING SIZE or

BORE SIZE

SECONDARY TUBING SIZE or

BORE SIZE

PROD NAME

CASING WEIGHT

FLOW WET MAT’L

YS

ELEMENT MAT’L

DURO

THD CONN SIZE

WT

TYPE

QCP

API MONO-GRAMMED

OTHER VARIANCE INFORMATION

Examples:

1. 9-5/8 X 5-1/2 XMP (47-53.5), 41XX (80), HNBR (90-80-90), 5-1/2 (20) VAM TOP HC, QCP-100632611, 2 THREAD RECUTS
2. 7 X 3-1/2 MRP-MP-SPR-P (26-29), SUPER 13CR (95), HNBR (90-70-90), 3-1/2 (9.2) VAM TOP
3. 9-5/8 X 6.000 QUANTUM MAX (53.5), 13CR (80), HNBR (90-80-90), 7.000-6 STUB ACME, GQCP-100408991
4. 9-5/8 X 3-1/2 X 2-3/8 MRP-ESP (47-53.5), 41XX (80), HNBR (90-80-90), 3-1/2 (9.3) EUE
5. 7-3/4 X 3-1/2 XHP (46.1) 6.500 SPECIAL DRIFT, SUPER 13CR (95), 718 (120), HNBR (90-70-90), 3-1/2 (10.2) VAM TOP

**Packer Accessory Assemblies, Bore\***

**\_X\_\_X\_\_, \_(),\_\_,\_\_()\_,\_,\_**

BORE SIZE

MINIMUM I.D.

MAKE UP LENGTH

PROD NAME

FLOW WET MAT’L

YS

SEAL MAT’L

SEAL CONFIG

THD CONN SIZE

WT

TYPE

QCP

OTHER VARIANCE INFORMATION

Examples:

1. 6.000 X 1.105 X 81 HIGH STRENGTH QUANTUM RETRIEVING TOOL, 41XX (110), 3.500 API IF
2. 6.000 X 4.740 X 55 SELF ALIGNING GUIDE SHOE WITH INNER SLEEVE, 13CR (80), 5.495 (20.22) SEAL-LOCK HT BOX, 2 THREAD RECUTS

**\*See Appendix B for definitions and product examples**

**Packer Accessory Assemblies, Casing\***

**\_X\_\_X\_\_,\_\_(),\_,\_,\_\_()\_,\_**

CASING SIZE

TUBING SIZE or

BORE SIZE

MAKE UP LENGTH

PROD NAME

FLOW WET MAT’L

YS

SEAL MAT’L

SEAL CONFIG

THD CONN SIZE

WT

TYPE

QCP

Examples:

1. 9-5/8 X 6.000 X 120 SEAL BORE EXTENSION, 41XX (80), 7.000-6 STUB ACME
2. 7-5/8 X 4.000 X 7 CONCENTRIC COUPLING ASSEMBLY, 41XX (110), 4.625-8 STUB ACME

**\*See Appendix B for definitions and product examples**

**Packer/Bridge Plug & Packer Accessories Piece Parts**

**,\_,\_\_X\_\_\_(),\_\_(),\_\_()\_,\_,\_**

**NOUN**

**ADJECTIVES**

CASING SIZE

TUBING SIZE or

BORE SIZE

PROD NAME

CASING WEIGHT

**MAT’L**

YS

or DURO

THD CONN SIZE

WT

TYPE

QCP

OTHER VARIANCE INFORMATION

Examples:

1. CONNECTOR, TAIL HOUSING, 5-1/2 X 3.000 QUANTUM MAX, 41XX (110)
2. THIMBLE, UPPER, 9-5/8 X 4-1/2 XMP (47-53.5), 41XX (80), QCP-100461942
3. MANDREL, UPPER, 9-5/8 X 4-1/2 XMP (53.5), 718 (120), 4-1/2 (12.6) VAM TOP
4. KEY, TORQUE, 41XX (110)

**Packer & Packer Accessories ProE Parts & Drawings**

ProE Part and Drawing records should match the related Part SLB record Descriptions without any variance information (such as material, variable premium end connections, etc.). The drawing should generally contain enough information to differentiate it from other, similar drawings, but one should keep in mind that MxPro has a 48 character check-in limit for Descriptions. If running out of room, product name and casing weight information should first be sacrificed to add information that uniquely identifies the drawing.

Examples:

Part SLB: MANDREL, UPPER, 9-5/8 X 4-1/2 XMP (53.5), 718 (120), 4-1/2 (12.6) VAM TOP

ProE Part/Drawing: MANDREL, UPPER, 9-5/8 X 4-1/2 XMP (53.5)

Part SLB: RING, RATCHET, 7-5/8 QUANTUM MAX, 41XX (110)

ProE Part/Drawing: RING, RATCHET, 7-5/8 QUANTUM MAX

**Purchased Parts (Design Responsibility = External)**

For commercial items purchased from external suppliers and without a Schlumberger-specified drawing, it is acceptable to deviate from the Piece Part naming convention specified in this document in order to mirror commercial item descriptions or comply with external standards.

The most frequent use of this clause within the Packer group is in regards to Socket Head Cap and Set Screws. ASME B18.3 contains a recommended naming convention for these types of parts, and following the ASME-specified naming convention will help prevent communication errors between Manufacturing and external suppliers.

Definitions:

CASING SIZE: Shall be fractional (e.g. 9-5/8).

TUBING SIZE: For tubing-conveyed Packers; the tubing size shall be fractional (e.g. 5-1/2).

BORE SIZE: For Seal Bore Packers; bore diameter shall be a decimal to three places (e.g. 4.750).

PROD NAME: Product names vary widely from product to product and a consistent, brief and accurate name is of primary importance. The product name is typically provided by the BDM in conjunction with the PM (examples: XMP; QUANTUM MAX; SEAL UNIT; MILLOUT EXTENSION).

CASING WEIGHT: Weight of casing in pounds per foot; no letters or symbols (“ppf” or “#”); use hyphen with no spaces in-between to signify a weight range if needed (e.g. 47-53.5).

FLOW WET MAT’L: Material of components that come in direct contact with the dynamic movement of well fluids in the flow stream.

YS: Minimum yield strength, expressed in thousands of pounds per square inch (ksi).

ELEMENT MAT’L: Elastomer compound of the Packer element (e.g. HNBR; AFLAS).

DURO: Durometer of the Packer element; list all durometers if multiple elements are used (e.g. 90-80-90).

THD CONN SIZE: Thread connection size.

WT: Weight of premium thread connection. For Stub Acme connections, list pitch instead of weight, and connect to the size with a hyphen instead of putting in parenthesis (e.g. 7 (26) VAM TOP; 7.188-6 STUB ACME).

TYPE: type of thread (e.g. VAM TOP HT, JFE BEAR, STUB ACME); do not list box or pin unless the upper and lower threads are of different type; if no threads cut, list as “BLANK”.

QCP: Required Customer Quality Control Plan along with the GeMS Document number (e.g. QCP-100408991, QCP-100461942); if default STD SLB, do not list.

API MONOGRAMMED: If applicable, then specify “API MONOGRAMMED”.

MINIMUM I.D.: Shall be a decimal to three places (e.g. 3.030).

MAKE UP LENGTH: Make-up length of the assembly in inches; shall be an integer, rounded to the nearest inch.

SEAL MAT’L: Elastomer compound of the bonded seals or v-seals; do not list material of o-rings.

SEAL CONFIG: Specifies whether bonded seals or v-seals are used for sealing on a seal unit (e.g. NITRILE BONDED; ATR V-SEALS).

NOUN, ADJECTIVES: Regarding a piece part description, the noun shall be listed first, followed by all adjectives (e.g. “RING, LOWER RATCHET”).

OTHER VARIANCE INFO: Any additional information describing differences in the part from other similar variances (e.g. “XYLAN COATED”; “2 THREAD RE-CUTS”).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| X | X | X | X | X | X | ACTIVE FLOW WETTED MATERIAL - YIELD STRENGTH (KSI) |
| X | X | X | X | X | X | APPROXIMATE WEIGHT (LBS) |
|  | O |  | X |  |  | BORE I.D. (IN) |
|  |  |  |  |  |  | CASING I.D. MAX.1 |
|  |  |  |  |  |  | CASING I.D. MIN.1 |
| X |  | X | X | X | X | CASING SIZE (IN) |
| X |  | X | X | X | X | CASING WEIGHT RANGE (PPF) |
|  |  | X | X | X | X | CERTIFICATION STATUS |
|  | O |  |  |  |  | CONFIGURATION |
|  |  | O |  |  |  | CONTROL LINE SET |
|  |  | X | X | X | X | CONVEYANCE METHOD |
|  | X |  |  |  |  | DIFFERENTIAL PRESSURE RATING - ACROSS SEALS (PSI) |
|  |  | X | X | X | X | DIFFERENTIAL PRESSURE RATING (PSI) |
|  |  |  |  |  | X | DIFFERENTIAL RATING ISOLATED (PSI): |
|  |  |  |  |  | X | DIFFERENTIAL RATING PLUGGED (PSI) |
|  |  |  |  |  | X | DIFFERENTIAL RATING UNPLUGGED (PSI) |
| X | X |  |  |  |  | EXTERNAL WORKING PRESSURE (PSI) - AT SPECIFIED TEMP (F) |
|  |  | X | X |  |  | EXTERNAL WORKING PRESSURE (PSI) - EOEC AT SPECIFIED TEMP (F) |
|  |  | O |  |  |  | FEED THROUGH |
|  | X |  |  |  |  | FITS PACKING BORE I.D. (IN) |
|  |  | O |  |  | O | H2S SERVICE4 |
|  | O |  |  |  |  | HYDRAULIC RELEASE PRESSURE (PSI) |
| X | X | X | X |  | X | I.D. - DRIFT (IN) |
|  |  | O |  |  |  | I.D. - DRIFT PRIMARY (IN) |
|  |  | O |  |  |  | I.D. - DRIFT SECONDARY (IN) |
| X | X | X | X |  |  | I.D. - MIN. (IN) |
|  |  | O |  |  |  | I.D. - PRIMARY (IN) |
|  |  | O |  |  |  | I.D. - PRIMARY MIN (IN) |
| O |  |  |  |  |  | I.D. - REF. (IN) |
|  |  | O |  |  |  | I.D. - SECONDARY (IN) |
|  |  | O |  |  |  | I.D. - SECONDARY MIN (IN) |
| X | X | X | X |  |  | I.D. (IN) |
| X | X |  |  |  |  | INTERNAL WORKING PRESSURE (PSI) - AT SPECIFIED TEMP (F) |
|  |  | X | X |  |  | INTERNAL WORKING PRESSURE (PSI) - EOEC AT SPECIFIED TEMP (F) |
|  |  |  |  |  | X | ISO QUALIFIED CASING ID |
|  |  | O |  |  |  | JAY TYPE3 |
|  | O |  |  |  |  | LATCH ANCHOR RATING COMPRESSION (LBS) - AT SPECIFIED TEMP (F) |
|  | O |  |  | 0 |  | LATCH ANCHOR RATING TENSION (LBS) - AT SPECIFIED TEMP (F) |
| X | X | X | X |  | X | LOWER THREAD CONNECTING - SIZE (IN), WT (PPF), TYPE, CONFIG |
|  |  | O |  |  |  | LOWER THREAD SECONDARY - SIZE (IN), WT (PPF), TYPE, CONFIG |
| X | X | X | X |  |  | MAKE-UP LENGTH (IN) |
|  |  | O |  |  |  | MAKE-UP LENGTH PRIMARY (IN) |
|  |  | O |  |  |  | MAKE-UP LENGTH SECONDARY (IN) |
|  | O |  |  |  |  | MAKE-UP/STACK-OUT LENGTH (IN) |
| X | X | X | X | X |  | MATERIAL/ELASTOMERS |
|  |  | X | X | X | X | MATERIAL/ELEMENTS |
|  |  | X | X | X | X | MATERIAL/NON FLOW WETTED |
| X | X | X | X | X | X | MATERIAL/O-RING(S) |
|  |  |  |  |  | X | MAX. CIRCULATION RATE PAST PACKER (BPM) |
|  |  |  |  |  | X | MAX. DELTA T (F) |
|  |  | O |  |  |  | MAX. HYDROSTATIC PRESSURE (PSI) – AT SPECIFIED TEMP (F) |
|  |  |  |  |  | X | MAX. RIH RATE (FPM) |
| X | X | X | X | X | X | MAX. WORKING TEMPERATURE (DEG.F) |
| X | X | X | X | X | X | MIN. WORKING TEMPERATURE (DEG.F) |
|  | O |  |  |  |  | NO-GO LOCATOR RATING COMPRESSION (LBS) - AT SPECIFIED TEMP (F) |
|  |  | O |  |  |  | O.D. – DRAG BLOCK EXPANDED (IN)3 |
| X | X | X | X | X | X | O.D. - MAX. (IN) |
| X | X | X | X | X |  | O.D. (IN) |
|  |  | O |  |  |  | OFFSET (IN) |
| O | O | X | X | X | X | OPERATIONS MANUAL |
| X | X | X | X | X | X | OVERALL LENGTH (IN) |
|  | O |  |  |  |  | PACKER CONNECTING THREAD - SIZE (IN), PITCH (INTEGER), TYPE |
|  |  |  |  |  | X | PACKER ENVELOPE POINTS ISOLATED - LOAD (LBS) |
|  |  |  |  |  | X | PACKER ENVELOPE POINTS ISOLATED - PRESSURE (PSI) |
|  |  |  |  |  | X | PACKER ENVELOPE POINTS PLUGGED - BELOW - LOAD (LBS) |
|  |  |  |  |  | X | PACKER ENVELOPE POINTS PLUGGED - BELOW - PRESSURE (PSI) |
|  |  |  |  |  | X | PACKER ENVELOPE POINTS UNPLUGGED - LOAD (LBS) |
|  |  |  |  |  | X | PACKER ENVELOPE POINTS UNPLUGGED - PRESSURE (PSI) |
|  |  |  |  | X | X | QUALITY CONTROL GRADE |
| X | X | X | X | X |  | QUALITY CONTROL PLAN – QCP |
|  | O |  |  |  |  | RELEASE STUD (LBS) |
|  |  | X | X | X | X | RETRIEVAL METHOD |
|  |  | X | X |  |  | SEAL DIAMETER (IN) |
|  | O |  |  |  |  | SEAL MAKE UP LENGTH (IN) |
| X | X | X | X | X | X | SERVICE NACE (YES/NO) |
|  |  | X | O |  | X | SETTING DIFFERENTIAL PRESSURE - RECOMMENDED (MIN)(PSI)2 |
|  |  |  | X | X |  | SETTING FORCE (LB)2 |
|  |  | O |  |  |  | SETTING MANDREL (PRIMARY/SECONDARY) |
|  |  | X | X | X | X | SETTING METHOD |
|  |  | X |  |  |  | SETTING PRESSURE 1ST SHEAR (PSI) |
|  |  | X |  |  |  | SETTING PRESSURE SLIP ENGAGEMENT (PSI) |
|  | O | O | O |  |  | SHEAR RELEASE FORCE (LB) |
|  | O |  |  |  |  | SNAP LATCH LOCATOR RATING COMPRESSION (LBS) - AT SPECIFIED TEMP (F) |
| X | X |  |  | O |  | TENSILE STRENGTH (LBS) - AT SPECIFIED TEMP (F) |
|  |  | X | X |  |  | TENSILE STRENGTH (LBS) - EOEC AT SPECIFIED TEMP (F) |
| X | X | X | X |  |  | TORQUE CAPACITY - EOEC (FT-LBS) |
| O | O | O | O |  |  | TORQUE SHEAR VALUE/RIGHT HAND TORQUE RELEASE (FT-LBS) |
|  |  | O | O |  |  | UPPER BORE I.D. (IN) |
| X | X | X | X | X | X | UPPER THREAD CONNECTING - SIZE (IN), WT (PPF), TYPE, CONFIG |
|  |  | O |  |  |  | UPPER THREAD SECONDARY - SIZE (IN), WT (PPF), TYPE, CONFIG |

X = Required

O = If applicable

1 CASING I.D. MAX and CASING I.D. MIN can be used in place of required attributes CASING SIZE (IN) and CASING WEIGHT RANGE (PPF)

2 With the exception of QUANTUM MAX and QUANTUM, Packers should have only SETTING DIFFERENTIAL PRESSURE – RECOMMENDED (MIN)(PSI) or SETTING FORCE (LB), not both. QUANTUM MAX and QUANTUM, however, will use both the SETTING DIFFERENTIAL PRESSURE – RECOMMENDED (MIN)(PSI) and the SETTING FORCE (LB) attributes (see Appendix C). Hydraulic, Hydrostatic, and Control Line Set Packers generally use DIFFERENTIAL PRESSURE – RECOMMENDED (MIN)(PSI), and Service Tool, Mechanical, and Wireline set Packers and Bridge Plugs generally use SETTING FORCE (LB).

3 JAY TYPE and O.D. - DRAG BLOCK EXPANDED (IN) attribute is only applicable to Mechanical Set Packers.

4 H2S SERVICE attribute is only applicable to XHP-BB Packers.

**Accessory, Casing:**

Packer Accessories designed to work with Packers fitted for a certain casing size.

Examples: Millout Extension, Seal Bore Extension, One Trip Seal Latch, Coupling for Seal Bore Extensions, Shearable Re-Entry Guide, Hydraulic Setting Module,

**Accessory, Bore:**

Packer Accessories and Seal Assembly Equipment design to work with Seal Bore Packers of a certain bore size.

Examples: Anchor Latch Locator, Snap Latch Locator, No Go Locator, Shear Release Anchor Latch Locator, Self Aligning Guide Shoe, Half Mule Shoe, Seal Unit Assembly, Spacer Tube, Packer Retrieving Tool, Packer Plug, RHR Stinger

**Packer, Tubing Conveyed:**

Packers that are conveyed to depth on the tubing string and generally set hydraulically or mechanically.

Examples: XMP, XHP, Fiber Optic Anchor, MRP, HDYRO-5, HYDRO-6, HYDRO-8, HYDRO-12, HSD-3, MP, MPD, QMP, OMEGAMATIC, SOT-1, SOT-2, CA-3, SA-3, HSP, NIS

**Packer, Seal Bore:**

Packers that contain a polished bore into which a seal assembly is run prior to production.

Examples: QUANTUM, QHS, QUANTUM MAX, QL

**Bridge Plug, Wireline Conveyed:**

Bridge Plugs have no through bore and are typically conveyed to depth and set on wireline or service tool.

Examples: WR Bridge Plug, Copperhead, Diamondback

|  |  |  |
| --- | --- | --- |
| **ACTIVE FLOW WETTED MATERIAL - YIELD STRENGTH (KSI)** | * Components that come in direct contact with the dynamic movement of well fluids in the flow stream. * In normal circumstances, this would be restricted to the inner Packer mandrel and the upper and lower couplings. * **Not to be confused with Type 1 components.** * Type 1 is defined in SERVICE NACE attribute description. * List multiple materials separated by a comma. * Reference IT #3859538 and GeMS #100209963. | 41XX[80]  SUPER 13CR[95], 718[120]  41XX[80, 95] |
| **APPROXIMATE WEIGHT (LBS)** | * Weight of the assembly in air. * Typically derived from the MODEL analysis in ProE; can be approximated as tubular volume X steel density. * Reference GeMS #100209963. | 275 |
| **BORE I.D. (IN)** | * Minimum ID of the sealing bore (where the seals sting into and seal). * Only required for Packers & Accessories with polished seal bores. * Show three decimals. | 6.000 |
| **CASING I.D. MAX.** | * Maximum casing I.D. a Packer can be set in. * For ISO 14310 V5-V0 rated Packers this is the I.D. of the casing the Packer was tested in. * For ISO 14310 V6 rated Packers this is the nominal I.D. of the casing weight the Packer is rated for. * For Packer Accessories, this is the maximum casing I.D. in which the tool can be run. * Show three decimals. | 6.380 |
| **CASING I.D. MIN.** | * Minimum casing I.D. a Packer can be set in. * For Packer Accessories, this is the minimum casing I.D. in which the tool can be run. * Show three decimals. | 6.187 |
| **CASING SIZE (IN)** | * Nominal completion casing size * Shown in fractions separated by a hyphen. * Multiple casing sizes separated by a comma and space. | 7  7-5/8  9-5/8, 10-3/4 |
| **CASING WEIGHT RANGE (PPF)** | * Nominal completion casing weights. * Maximum and minimum values separated by a hyphen. * Can be integer or decimal. * Special Casing Drift Requirements should be added as per project requirements. | 26-29  33.7-39  46.1 (SPECIAL DRIFT 6.500) |
| **CERTIFICATION STATUS** | * ISO 14310 V6-V0 design validation grade for Packers and Bridge Plugs. * If no testing exists, list as "NA". * This attribute is not applicable to Packer Accessories. * If multiple ISO 14310 validation grade tests (V0, V3) were conducted, separate PNs should be released, each documenting the individual Qualifying Validation grade. * A Part Number can have multiple temperature ranges for the same Validation Grade. | ISO-V0[40-250F]  ISO-V3[100-225F, 225-325F]  ISO-V6  NA |
| **CONFIGURATION** | * Intended for use with assemblies which have multiple configurations. * In RHR Stingers, used to indicate the run-in and pull-out configuration. | SNAP-IN/SNAP-OUT  SNAP-IN/ROTATE-OUT |
| **CONTROL LINE SET** | * Specifies whether or not a hydraulic set Packer is set via control line. * If so, the size of control line, connector type, and whether it is above or below the Packer must be specified. * Use fractions for control line size. | NO  3/8 HDMC BELOW  1/4 HDMC ABOVE |
| **CONVEYANCE METHOD** | * Describes the means by which the Packer/Bridge plug is deployed to setting depth. * “TUBING” for tubing mounted Packers such as the XHP and MRP, * “SERVICE TOOL” for gravel-pack Packers such as the QUANTUM MAX and QL. * If multiple methods are applicable, list each one, separated by a space and comma. | TUBING  SERVICE TOOL  WIRELINE |
| **DIFFERENTIAL PRESSURE RATING - ACROSS SEALS (PSI)** | * Maximum allowable pressure across the seal assembly at the maximum designed temperature rating. * This rating does not account for inclusion of tension and compression forces. | 10000 |
| **DIFFERENTIAL PRESSURE RATING (PSI)** | * This is the nominal Pressure rating for a Bridge Plug or Accessory. * For a Packer, this is the maximum Differential Pressure across the element (independent of applied loads). * Reference Appendix G and GeMS #100203915. * For Packer Accessories (e.g. Spacer Tubes, Seal Bore Extensions, Millout Extensions) the pressure rating would be the lower of the Burst or Collapse figures rounded to the required pressure rating. | 10000 |
| **DIFFERENTIAL RATING ISOLATED (PSI):** | * Rating of the Packer in the "Isolated” condition. * This is a calculated Rating Only except for Seal Bore Packers * Ref. Appendix G and GeMS #100203915. * For ISO 14310 V5-V0 rated Packers this is the pressure tested to or calculated. * For ISO 14310 V6 rated Packers this is the pressure rating tested to or calculated. This rating is the lesser of the upper or lower annulus pressures. * This rating does not account for inclusion of tension and compression forces. | 7500 |
| **DIFFERENTIAL RATING PLUGGED (PSI)** | * Rating of the Packer in the "Plugged Below” condition. * This is a calculated Rating Only * Ref. Appendix G and GeMS #100203915. * For ISO 14310 V5-V0 rated Packers this is the pressure tested to or calculated. * For ISO 14310 V6 rated Packers this is the pressure rating tested to or calculated. This rating is the lesser of the upper or lower annulus pressures. * This rating does not account for inclusion of tension and compression forces. | 7500 |
| **DIFFERENTIAL RATING UNPLUGGED (PSI)** | * Rating of the Packer in the “Unplugged” condition. * For ISO 14310 V5-V0 rated Packers this is the pressure tested to. * Ref. Appendix G and GeMS #100203915. * For ISO 14310 V6 rated Packers this is the pressure rating tested to or calculated. This rating is the lesser of the upper or lower annulus pressures. * This rating does not account for inclusion of tension and compression forces. | 10000 |
| **EXTERNAL WORKING PRESSURE (PSI) - AT SPECIFIED TEMP (F)** | * Same as below, but including end connection strength. * Applies specifically to accessories such as Spacer Tubes, Seal Unit Tubes and similar where end connections are typically Stub Acme threads and define the operating limits. * External (collapse) pressure for tubes is typically taken at the o-ring land "nose", as shown in Appendix E, unless otherwise validated by FEA or testing. | 7500[325] |
| **EXTERNAL WORKING PRESSURE (PSI) - EOEC AT SPECIFIED TEMP (F)** | * Maximum allowable external pressure (i.e. collapse) of the assembly at a specified temperature and excluding threaded end connections. * It is the lowest collapse pressure rating of the Packer in either the unset or set **DOWNHOLE** condition. * **THIS IS NOT SURFACE FAT PRESSURE.** * Rating does not account for inclusion of tension and compression forces. * This rating is based on the maximum temperature rating the Packer or Packer accessory was designed for (not necessarily the temperature the assembly was tested to). * Ref. GeMS #100209963 and #100203915. | 7500[325] |
| **FEED THROUGH** | * Number and size of control line and the connector type. * Use a comma and space for multiple sizes and/or connector types. * Use fractions for control line size. * The input would be in the following form: [No. of Control Lines] x [Size of Control Lines Feeding Through Packer] [Connector Type] | 2 X 1/4 HDMC, 3 X 3/8 HDMC  5 X 1/4 IDFC  3 X 3/8 NPT, 1 X 3/4 NPT |
| **FITS PACKING BORE I.D. (IN)** | * Sealing bore in which a Seal or Seal Assembly packs off. * A non-sealing assembly can also be designed to specifically go through the Sealing Bore and will therefore also have this attribute (e.g. Mule Shoe, SAGS). * Show three decimal places. | 2.688  4.000  4.750 |
| **H2S SERVICE** | * **This attribute is only applicable to XHP-BB Packers.** * This attribute is described based on the SERVICE NACE attribute of the XHP-BB Packer * If SERVICE NACE = NO, H2S SERVICE = UNPLUGGED ONLY * This is because the Housings are made of a non-NACE compliant material, but are not loaded by pressure or tension in the Unplugged Condition. * If SERVICE NACE = YES, H2S SERVICE = ALL CONDITIONS | UNPLUGGED ONLY  ALL CONDITIONS |
| **HYDRAULIC RELEASE PRESSURE (PSI)** | * Pressure required to release a tool from another tool (nominal value). * Originally requested for the Quantum HS Hydraulic Release that is used with the QHS Packer. | 5000 |
| **I.D. - DRIFT (IN)** | * Drift I.D. using standard API tubing drift measurements. Refer GeMS #100506740 * For Packers and Accessories with seal bores it is 0.005 under Min. I.D. * Show three decimal places. * Ref. GeMS #100506740 for Packer drift bar part numbers. | 2.347  5.995 |
| **I.D. - DRIFT PRIMARY (IN)** | * Primary Drift I.D. of the primary string as per I.D. - DRIFT (IN) above. * Show three decimal places. | 2.867 |
| **I.D. - DRIFT SECONDARY (IN)** | * Secondary Drift I.D., of the secondary string, as per I.D. - DRIFT (IN) above. * Show three decimal places. | 2.059 |
| **I.D. - MIN. (IN)** | * Minimum tolerance I.D. of the smallest I.D. part of the assembly. * Ref. GeMS #100209963. * Show three decimal places. | 2.911 |
| **I.D. - PRIMARY (IN)** | * Nominal I.D. of the primary string in the assembly. * Show three decimal places. | 2.992 |
| **I.D. - PRIMARY MIN (IN)** | * Minimum tolerance I.D. of the smallest I.D. part of the primary string in the assembly. * Show three decimal places. | 3.625 |
| **I.D. - REF. (IN)** | * References the BORE I.D. (IN) of the part or assembly to which it is assembled. * Typically used for Millout Extensions where the ID is larger than the Packer bore. * Show three decimal places. | 4.000 |
| **I.D. - SECONDARY (IN)** | * Nominal I.D. of the secondary string in the assembly. * Show three decimal places. | 2.080 |
| **I.D. - SECONDARY MIN (IN)** | * Minimum tolerance I.D. of the smallest I.D. part of the secondary string in the assembly. * Show three decimal places. | 2.911 |
| **I.D. (IN)** | * Nominal I.D. of the smallest I.D. part of the assembly. * Ref. GeMS #100209963. * Show three decimal places. | 2.944 |
| **INTERNAL WORKING PRESSURE (PSI) - AT SPECIFIED TEMP (F)** | * Same as below, but including end connection strength. * Applies specifically to accessories such as Spacer Tubes, Seal Unit Tubes and similar where end connections are typically Stub Acme threads and define the operating limits. * Internal (burst) pressure for tubes is typically taken at the o-ring land (or thread relief where o-rings are installed), as shown in Appendix E, unless otherwise validated by FEA or testing. | 5000[325] |
| **INTERNAL WORKING PRESSURE (PSI)  - EOEC AT SPECIFIED TEMP (F)** | * Maximum allowable internal pressure (i.e. burst) of the assembly at a specified temperature and excluding threaded end connections. * It is the lowest burst pressure rating once the Packer is set in **DOWNHOLE** condition. * **THIS IS NOT SURFACE TEST PRESSURE** * This is downhole tubing pressure test after the Packer is **SET.** * This rating does not account for inclusion of tension and compression forces. * This rating is based on the maximum temperature rating the Packer or Packer accessory was designed for (not necessarily the temperature the assembly was tested to). * Ref. GeMS #100209963 and #100203915. | 5000[325] |
| **ISO QUALIFIED CASING ID** | * Maximum I.D. allowed for listing the Packer ISO qualification based on the minimum I.D. of the test casing that the Packer was qualified in. * Note that ISO / API allows testing ±0.030 from the maximum API casing I.D. * If tested within ±0.030 of the maximum I.D. of the rated casing weight range, list “MAX API ID”. If not, list measured casing I.D. (or test casing drawing minimum I.D., if measured ID not available). | 8.805  MAX API ID |
| **JAY TYPE** | * Describes the setting/releasing mechanism and resulting tubing manipulation for a mechanical Packer. * “RH-AUTO”, “LH-MANUAL”, etc. is typical for single grip mechanical Packers (e.g. Omegamatic C, TXT) * “RH-SET/ RH-RELEASE” is typical for double grip mechanical Packers (e.g. M1-X, SOT) * “CONTINUOUS (LONG STROKE)” is typical for mechanical Packers set and released without rotation (e.g. Omegamatic Long Stroke) | RH-SET/ RH-RELEASE  RH-AUTO  LH-MANUAL  CONTINUOUS (LONG-STROKE) |
| **LATCH ANCHOR RATING COMPRESSION (LBS) - AT SPECIFIED TEMP (F)** | * Maximum allowable compression of the Anchor Latch Locator assembly at the maximum designed temperature rating. * The rating does not account for inclusion of pressure related forces acting on the Anchor Latch. | 276000[325] |
| **LATCH ANCHOR RATING TENSION (LBS) - AT SPECIFIED TEMP (F)** | * Maximum allowable tension of the Anchor Latch Locator assembly at the maximum designed temperature rating. * The rating does not account for inclusion of pressure related forces acting on the Anchor Latch Locator assembly. | 189000[325] |
| **LOWER THREAD CONNECTING - SIZE (IN), WT (PPF), TYPE, CONFIG** | * Threaded connection at the bottom of the Packer/Bridge Plug or Packer Accessory. * Ref. GeMS #100209963. * For Stub Acme or Square Threads, list pitch instead of weight. * Size must be in decimal form and shown to three decimal places. | 7.000, 26, VAM TOP, PIN  7.188, 6, STUB ACME, PIN  5.500, BLANK, BLANK, BLANK |
| **LOWER THREAD SECONDARY - SIZE (IN), WT (PPF), TYPE, CONFIG** | * Lower end thread connection of the assembly on the secondary side. * Typical of a dual string Packer which has primary and secondary tubing strings through it. * For Stub Acme or Square threads, list pitch instead of weight. * Size must be in decimal form and shown to three decimal places. | 2.375, 4.7, EUE, PIN |
| **MAKE-UP LENGTH (IN)** | * Nominal total length of the assembly excluding make-up length of the pin connection. * Make-Up Length is typically shorter than Overall Length. * Ref. GeMS #100209963 and Appendix F. * For Seal Bore Packers it is the distance from where the Seal Assembly Locator locates to the top of the pin. * Make-Up Length is independent of Make-Up/Stack-Out Length and Seal Make Up Length. * Required for all assemblies. * Round to nearest inch. | 89 |
| **MAKE-UP LENGTH PRIMARY (IN)** | * Nominal total length of the assembly on the primary string excluding make up length of the pin connection. * Make-Up Length is typically shorter than Overall Length. * Typical of a dual string Packer which has primary and secondary tubing strings through it. * For Seal Bore Packers it is the distance from where the Seal Assembly Locator locates to the top of the pin. * Round to nearest inch. | 89 |
| **MAKE-UP LENGTH SECONDARY (IN)** | * Nominal total length of the assembly on the secondary string excluding make up length of the pin connection. * Make-Up Length is typically shorter than Overall Length. * Typical of a dual string Packer which has primary and secondary tubing strings through it. * For Seal Bore Packers it is the distance from where the Seal Assembly Locator locates to the top of the pin. * Round to nearest inch. | 89 |
| **MAKE-UP/STACK-OUT LENGTH (IN)** | * The length from the top of the Seal Assembly Locator to the locating shoulder (what locates on the Packer or PBR). * This length does not include any length that may exist below the locating shoulder. * Ref. Appendix F. * For Seal Units there would be no MAKE-UP/STACK-OUT LENGTH (IN) as the Seal Unit is entirely inside of the Packer. * In general, this is the length of the Locator that would be seen in the completion string tally and is NOT “buried” inside the Packer or other seal bore. * Round to nearest inch. | 12 |
| **MATERIAL/ELASTOMERS** | * Elastomeric compound of all seals in the assembly (o-rings, elements, bonded seals, v-seals). * List all materials. * Do NOT list durometer. * Ref. GeMS #100209963. | VITON, HNBR, AFLAS |
| **MATERIAL/ELEMENTS** | * Element compound (ex. Aflas, HNBR). * Do NOT list durometer. | AFLAS |
| **MATERIAL/NON FLOW WETTED** | * Components not in direct contact with dynamic movement of well fluids in the flow stream. * For multiple materials, this would be the majority of the materials. * Do NOT list yield strength. | 4130/4140, 8320, DUCTILE CAST IRON |
| **MATERIAL/O-RING(S)** | * O-Ring compound (ex. Viton, Aflas). * Do NOT list durometer. | VITON |
| **MAX. CIRCULATION RATE PAST PACKER (BPM)** | * Maximum rated circulation rate (barrels per minute) of fluid past the Packer. * Determined by flow-by testing as outlined in GeMS #100857037 (Reference Document). * Can also be derived from Maximum Run-In-Hole rate. * Show one decimal place. | 3.5 |
| **MAX. DELTA T (F)** | * Maximum specified range of temperature fluctuation at which the product is designed to operate and qualified (temperature cycle range). * If two or more temperature cycle ranges have been tested to, list the maximum range. | 200 |
| **MAX. HYDROSTATIC PRESSURE (PSI) – AT SPECIFIED TEMP (F)** | * Maximum Hydrostatic Pressure Rating of an assembly at a specified temperature. * Applies to Packers and other assemblies with atmospheric chambers. * Does not include the pressure or shear rating of any rupture or shear disc that may be run with the assembly. | 5000[325] |
| **MAX. RIH RATE (FPM)** | * Maximum rated allowable run-in-hole rate (feet per minute) for Packers as determined by testing. * Can also be derived from Maximum Circulation Rate Past Packer. * Round to nearest integer. | 100 |
| **MAX. WORKING TEMPERATURE (DEG.F)** | * Maximum temperature. * For ISO 14310 V5-V0 rated Packers, maximum temperature Packer was tested to. * For ISO 14310 V6 rated Packers and products not under ISO 14310 (i.e. unqualified legacy products), maximum rated temperature of the elastomer (rated by Materials Engineering; GeMS #100271459). * Ref. GeMS #100209963. | 325 |
| **MIN. WORKING TEMPERATURE (DEG.F)** | * Minimum temperature. * For ISO 14310 V5-V0 rated Packers, this is the minimum temperature the Packer was tested to. * For ISO 14310 V6 rated Packers and products not under ISO 14310 (i.e. unqualified legacy products), minimum rated temperature of the elastomer (rated by Materials Engineering; GeMS #100271459). * Ref. GeMS #100209963. | 40 |
| **NO-GO LOCATOR RATING COMPRESSION (LBS) - AT SPECIFIED TEMP (F)** | * Maximum compression of the No-Go Locator at the maximum designed temperature rating. * The rating does not account for inclusion of pressure related forces acting on the No-Go Locator. | 276000[325] |
| **O.D. – DRAG BLOCK EXPANDED (IN)** | * Nominal O.D. of the Packer drag blocks in the installed and fully expanded condition. * Show three decimal places. | 5.344 |
| **O.D. - MAX. (IN)** | * Maximum tolerance O.D. of the largest **METAL** component of the assembly. * Ref. GeMS #100209963. * Show three decimal places. | 8.300 |
| **O.D. (IN)** | * Nominal O.D. of the largest O.D. part of the assembly. * Ref. GeMS #100209963. * Show three decimal places. | 8.295 |
| **OFFSET (IN)** | * Applies only to completion equipment whose outer dimensions are eccentric (e.g. XMP Packer, MRP-ESP Packer, etc.). * This is the NOMINAL distance the tool OD centerline is offset from the tubing centerline. * Show three decimal places. | 0.300 |
| **OPERATIONS MANUAL** | * InTouch Content ID # of the Operating or Maintenance Manual for the given tool assembly. | IT# 4011424 |
| **OVERALL LENGTH (IN)** | * Total length of the Packer or Packer Accessory. * Typically needed for shipping purposes. * Ref. GeMS #100209963. * Round to nearest inch. | 91 |
| **PACKER CONNECTING THREAD - SIZE (IN), PITCH (INTEGER), TYPE** | * Describes the Anchor/Latch thread on an Anchor Latch Locator assembly or Snap Latch Locator assembly. * Size must be in decimal form and shown to three decimal places. | 4.750, 4, LEFT HAND SQUARE |
| **PACKER ENVELOPE POINTS ISOLATED - LOAD (LBS)** | * Points that define the load when the Packer is isolated (so as to draw the Packer envelope). * Do not close the envelope by repeating the first envelope point. | 129599, 360000, 360000, 269551, 119658, -215000, -300000, -300000 |
| **PACKER ENVELOPE POINTS ISOLATED - PRESSURE (PSI)** | * Points that define the pressure when the Packer is isolated (so as to draw the Packer envelope). * Do not close the envelope by repeating the first envelope point. | -15000, -4474, 2770, 7500, 12500, 12500, 8156, 0 |
| **PACKER ENVELOPE POINTS PLUGGED - BELOW - LOAD (LBS)** | * Points that define the load when the Packer is plugged below (so as to draw the Packer envelope). * Do not close the envelope by repeating the first envelope point. | 129599, 360000, 360000, 269551, 119658, -215000, -300000, -300000 |
| **PACKER ENVELOPE POINTS PLUGGED - BELOW - PRESSURE (PSI)** | * Points that define the pressure when the Packer is plugged below (so as to draw the Packer envelope). * Do not close the envelope by repeating the first envelope point. | -15000, -4474, 2770, 7500, 12500, 12500, 8156, 0 |
| **PACKER ENVELOPE POINTS UNPLUGGED - LOAD (LBS)** | * Points that define the load when the Packer is unplugged (so as to draw the Packer envelope). * Do not close the envelope by repeating the first envelope point. | 129599, 360000, 360000, 269551, 119658, -215000, -300000, -300000 |
| **PACKER ENVELOPE POINTS UNPLUGGED - PRESSURE (PSI)** | * Points that define the pressure when the Packer is unplugged (so as to draw the Packer envelope). * Do not close the envelope by repeating the first envelope point. | -15000, -4474, 2770, 7500, 12500, 12500, 8156, 0 |
| **QUALITY CONTROL GRADE** | * Three levels of quality control are defined for a Packer per API 11D1 / ISO 14310, and one must be specified for all Packers developed to this standard. * Most Packers satisfy Quality Control Grade Q3 (those that follow QCP STD SLB). * In the case of Packers with higher quality control plans, Q2 or Q1 may apply. * Reference API 11D1 / ISO 14310. * **Note: Do not confuse with API Q1 Specification.** | Q3  Q2  Q1 |
| **QUALITY CONTROL PLAN - QCP** | * Required SLB or Customer Quality Control Plan. * List by QCP name (if available, ex: QCP-100408991) or GeMS number (ex: QCP-100461942). * If none specified, list "STD SLB" (Schlumberger default). * Ref. GeMS #100209963. | QCP-100461942  QCP-100408991  STD SLB |
| **RELEASE STUD (LBS)** | * Used to describe the tension required to part Release Studs. * Typically used in Wireline Adapter Kits. | 60000 |
| **RETRIEVAL METHOD** | * This described the means by which the Packer is released and removed from a completion. * “SHIFT-TO-RELEASE” for Packers such as the QUANTUM MAX which are retrieved by intervention with a retrieving tool. * “STRAIGHT-PULL-RELEASE” for Packers such as the MRP which are shear released by tubing upstrain. * “CUT-TO-RELEASE” for Packers such as the XMP or XHP which require an internal target to be cut via EJC or other means before retrieval. * “PERMANENT” for Packers such as the QL which can only be removed by milling. * If multiple methods are applicable, list each one, separated by a space and comma. | SHIFT-TO-RELEASE  STRAIGHT-PULL-RELEASE  CUT-TO-RELEASE  PERMANENT |
| **SEAL DIAMETER (IN)** | * Seal diameter is used in calculating piston effects for Packer envelope calculations, and by TDAS software. * For non-Seal Bore Packers this is the area pressure works on providing a force (defined for each specific product). * For Seal Bore Packers it is the BORE I.D. attribute which is the sealing bore of the Packer. * For Seal Bore Packers both SEAL DIAMETER and BORE I.D. are required Packer attributes; their dimensions will be the same. * Show three decimal places. | 4.000 |
| **SEAL MAKE UP LENGTH (IN)** | * For Seal Assembly Locators it is the distance from the locating shoulder down to the top of the bottom pin connection. * For Seal Units it is the top of the top box connection to the top of the bottom pin connection. * For Mule Shoes & Self Aligning Guide Shoes it is the top of the top box connection to the end of the Mule Shoe. * In general, this is the distance a Packer Accessory is contained within a seal bore and thus is “buried” and would not be seen in the completion string tally. * Round to 2 significant decimal places. | 2.96 |
| **SERVICE NACE (YES/NO)** | * A Packer or Packer Accessory whose Type 1 components are manufactured from material that comply with NACE MR0175. * Type 1- Component that isolates pressure and/or may be loaded in tension as the result of axial loads on the Packer or Bridge Plug during run in, setting, in-situ or retrieval. * Ref. IT #3859538 & GeMS #100209963. | YES  NO |
| **SETTING DIFFERENTIAL PRESSURE - RECOMMENDED (MIN)(PSI)** | * Minimum differential pressure required to set a Packer. * This applies to Packers that have integral hydraulic setting cylinders and are set with differential pressure (e.g. MRP, XHP, XMP). * Most Packers will have either SETTING DIFFERENTIAL PRESSURE -RECOMMENDED (MIN)(PSI) or SETTING FORCE (LB), not both. QUANTUM MAX and QUANTUM, however, will use both the SETTING DIFFERENTIAL PRESSURE -RECOMMENDED (MIN)(PSI) and the SETTING FORCE (LB) attributes. * For QUANTUM MAX and QUANTUM Packers list the pressure applied to the setting tool during setting and the nominal surface area over which it acts (see service tool manual for area). | 3500  SETTING TOOL[26.89IN^2]:1488 |
| **SETTING FORCE (LB)** | * The amount of setting force required to set a Packer/Bridge Plug. * Setting force can either be compression or tension loads transmitted to the Packer. * This applies to Packers/Bridge Plugs that are set with external setting tools or tubing force. * Most Packers will have either SETTING DIFFERENTIAL PRESSURE -RECOMMENDED (MIN)(PSI) or SETTING FORCE (LB), not both. Bridge Plugs will use SETTING FORCE (LB) only. QUANTUM MAX and QUANTUM, however, will use both the SETTING DIFFERENTIAL PRESSURE - RECOMMENDED (MIN)(PSI) and the SETTING FORCE (LB) attributes. * For QUANTUM MAX and QUANTUM Packers, subdivide SETTING FORCE (LB) into two components: 1) Force generated by the service tool due to pressure; 2) Any additional axial force put directly into the string while applying pressure to help during setting (note that all QUANTUM Packers and certain sizes of QUANTUM MAX Packers will not have any additional axial force). | 55000  SETTING TOOL:40000+AXIAL:20000  SETTING TOOL:40000+AXIAL:0 |
| **SETTING MANDREL (PRIMARY/SECONDARY)** | * Mandrel which when pressure is applied will cause the dual string Packer to set. * Typical of a dual string Packer which has primary and secondary strings through it. | PRIMARY |
| **SETTING METHOD** | * This describes the means by which the Packer/Bridge Plug is set after having been run to depth. * “HYDRAULIC” for conventional tubing mounted Packers actuated via tubing pressure such as the MRP or XHP. * “HYDROSTATIC” for Packers actuated via annular pressure such as the NIS. * “SERVICE TOOL” for Packers such as the QUANTUM or QUANTUM MAX which require an external service tool to set. * “CONTROL LINE” for certain models of XMP which are actuated via pressure delivered through a control line. * “MECHANICAL” for Packers such as the SOT or OMEGAMATIC which require mechanical manipulation of tubing to set. * If multiple methods are applicable, list each one, separated by a space and comma. | HYDRAULIC  HYDROSTATIC  SERVICE TOOL  CONTROL LINE  MECHANICAL |
| **SETTING PRESSURE 1ST SHEAR (PSI)** | * This applies to Packers with integral hydraulic setting cylinders. * Defined as the pressure when the first set of shear pins (at the minimum pressure value) shear when pressure is applied to set the Packer. * This is calculated using the minimum shear force (nominal minus tolerance) and maximum applicable piston area (nominal plus tolerance). | 1000 |
| **SETTING PRESURE SLIP ENGAGEMENT (PSI)** | * This applies to Packers with integral hydraulic setting cylinders. * Defined as the pressure required to shear the shear screws for the slips to fully engage with the casing. * The shear value used will be the nominal value of the shear screws and the nominal applicable piston area. * This value will always be greater than or equal to the SETTING PRESSURE 1ST SHEAR. If the value of SETTING PRESSURE SLIP ENGAGEMENT (PSI) is less than SETTING PRESSURE 1ST SHEAR (PSI), use the value of SETTING PRESSURE 1ST SHEAR (PSI). | 1500 |
| **SHEAR RELEASE FORCE (LB)** | * Nominal Shear force required to activate release mechanism on Packers & Packer Accessories. | 80000 |
| **SNAP LATCH LOCATOR RATING COMPRESSION (LBS) - AT SPECIFIED TEMP (F)** | * Maximum compression of the Snap Latch Locator assembly at the maximum designed temperature. * The rating does not account for inclusion of pressure related forces acting on the Snap Latch Locator assembly. | 276000[325] |
| **TENSILE STRENGTH (LBS) - AT SPECIFIED TEMP (F)** | * Same as below, but including end connection strength. * This rating does not include shear release devices such as shear screws. * Applies specifically to accessories such as Spacer Tubes, Seal Unit Tubes and similar where end connections are typically Stub Acme threads and define the operating limits. * The rating must be calculated both for conditions during service and during run-in-hole. The listed rating is the minimum of these two. | 175000[325] |
| **TENSILE STRENGTH (LBS) - EOEC AT SPECIFIED TEMP (F)** | * The maximum tension that can be pulled into a Packer or Packer Accessory before deformation/damage to the equipment occurs. * This rating does not account for the inclusion of pressure related forces acting on the equipment. * This rating does not include shear release devices such as shear screws. * This rating is also based on the maximum temperature rating the Packer or Packer Accessory was designed for (not necessarily the temperature the assembly was tested to). * The rating must be calculated both for conditions during service and during run-in-hole. The listed rating is the minimum of these two. * Note: This rating does not apply to a released Packer. | 276000[325] |
| **TORQUE CAPACITY - EOEC (FT-LBS)** | * Maximum amount of torque (excluding end connections) that can be transmitted through a Packer or Packer Accessory without damaging the assembly when the Packer or Packer Accessory is in the run in, unset condition. | 4500 |
| **TORQUE SHEAR VALUE/RIGHT HAND TORQUE RELEASE (FT-LBS)** | * Right hand torque required to shear the shear screws. * Originally requested for the secondary release of the Quantum HS Hydraulic Release. | 3000 |
| **UPPER BORE I.D. (IN)** | * Minimum I.D. of the Upper Sealing Bore (where the seals sting into & seal). * “Upper Bore I.D. (IN)” attribute only applies when there are two sealing bores. * The lower sealing bore is the Bore I.D. (IN). * These two attributes are typically displayed adjacent to each other in the display of product attributes. * Show three decimal places. | 4.750 |
| **UPPER THREAD CONNECTING - SIZE (IN), WT (PPF), TYPE, CONFIG** | * Threaded connection at the top of the Packer/Bridge Plug or Packer Accessory. * Ref. GeMS #100209963. * For Stub Acme or Square Threads, list pitch instead of weight. * Size must be in decimal form and shown to three decimal places. | 7.000, 26, VAM TOP, BOX  4.500, 4, LEFT HAND SQUARE, BOX  5.500, BLANK, BLANK, BLANK |
| **UPPER THREAD SECONDARY - SIZE (IN), WT (PPF), TYPE, CONFIG** | * Upper end thread connection of the assembly on the secondary side. * Typical of a dual string Packer, which has primary and secondary tubing strings through it. * Also used to define the lowermost upper threads in Wireline Adapter Kits. * For Stub Acme or Square Threads, list pitch instead of weight. * Size must be in decimal form and shown to three decimal places. | 2.375, 4.7, EUE, PIN |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Appendix D: Material Descriptions For Attribute Entry | | | | | |
| **SEAL MATERIALS** | **METAL ALLOYS** | | | | |
| AFLAS | 300 | 455 | 925 | J-55 | X-750 |
| CHEMRAZ | 304 | 464 | 10XX | L-80 | MP35N |
| HNBR | 316 | 625 | 41XX | N-80 | MONEL 400 |
| KALREZ | 400 | 675 | 4340 | P-110 | MONEL K500 |
| NITRILE | 410 | 718 | 8620 | 13CR | MONEL R405 |
| TEFLON | 420 | 725 | 410-12CR | 9CR-1MO |  |
| VITON | 440 | 825 | 410-13CR | SUPER 13CR |  |

Table D.1: Acceptable Material Descriptions for Tab Data Attribute Input

Appendix E: Seal Tube Calculations

Figure E.1: Seal Tube Burst and Collapse Calculations LocationsAppendix F: Tool Lengths

Figure F.1: Seal Bore Packer Lengths (Overall, Make-Up)

Figure F.2: Seal Assembly Locator Lengths (Overall, Make-Up/Stack-Out, Seal Make-Up) Appendix G: Packer Pressure Ratings

FIGURE G.1: Packer Envelope with Pressure Ratings

UNPLUGGED (TESTED)

ISOLATED (TESTED)

PLUGGED ABOVE (CALCULATED)

DIFFERENTIAL RATING UNPLUGGED (above) DRUa

DIFFERENTIAL RATING ISOLATED (above) DRIa

DIFFERENTIAL RATING PLUGGED (above) DRPa

DIFFERENTIAL RATING UNPLUGGED (below) DRUb

DIFFERENTIAL RATING ISOLATED (below) DRIb

DIFFERENTIAL RATING PLUGGED (below) DRPb

DIFFERENTIAL PRESSURE RATING (below) DPRb

DIFFERENTIAL PRESSURE RATING (above) DPRa

**- ABOVE DIFFERENTIAL PRESSURE (psi) + BELOW**

12,000

10,000

8,000

6,000

4,000

2,000

0

-2,000

-4,000

-6,000

-8,000

-10,000

-12,000

400,000

300,000

200,000

100,000

0

-100,000

-200,000

-300,000

-400,000

-500,000

-600,000

-700,000

DPRa = DPRb

DIFFERENTIAL PRESSURE

RATING = 10,000 psi

DRUa > DRUb

DIFFERENTIAL RATING UNPLUGGED = 7500 psi

DRIa = DRIb

DIFFERENTIAL RATING ISOLATED = 7500 psi

DRPa > DRPb

DIFFERENTIAL RATING PLUGGED = 4500 psi