|  |  |
| --- | --- |
| **HL7 Version 2.10 Chapters 13 and 2C** | |
| *Change Request ID:* | OO CR182-836 |
| *File Name:* | *OO-CRxxx-INV-EQU-and-tables.doc* |
| *Description:* | *Changes in segments INV and EQU, some messages, and some tables* |
| *Status:* | *New proposal* |
| *Sponsoring Person* |  |
| *Sponsoring Business Unit* |  |
| *Date Originated:* | *17 March 2015* |
| *Date HL7 approved:* |  |
| *Backward Compatible:* | *Yes* |
| *Forward Compatible:* | *No* |
| *HL7 Status & Date* |  |

# Justification Detail:

1. Because of backward compatibility guidelines, a new trigger event and a new message structure INR^U14^INR\_U14 shall be created instead of redefining INR^U06^INR\_U06.
2. The Inventory Detail Segment INV shall be usable not only for physical substances, but also for other types of inventory items like e.g. processing capacities and availability of tests.
3. In messages INR^U14 “Automated Equipment Inventory Request”, fields of the INV segment serve as filtering criteria. From the logical point of view, when no filtering on inventory item ID and/or inventory item status is desired, the corresponding fields INV‑1 and INV‑2 do not need to be populated. But currently they are required in HL7. It is proposed to make them conditional C(O/R), with the condition that MSH-9‑1 equals to “INR” and MSH‑9‑2 equals to “U14”.
4. Segment INV in INR^U14^INR\_U14 shall be optional in order to enable queries without filtering on particular inventory item attributes.
5. Some new equipment state codes shall be introduced for EQU‑3 (HL7 table 0365).
6. A new field in EQU is required for the predicted date/time of the next equipment status change (e.g. from “maintenance” back to “normal operation”).

# Open Issues:

None known.

# Change Request Impact:

None known.

# Documentation Changes:

|  |
| --- |
| Chapter 13, Section 13.3:   * add sub-section 13.3.14 |

**13.3.14 INR/ACK – Automated Equipment Inventory Request (Event U14)**

This message is used to request information about inventory items from one application to another (e.g., Laboratory Automation System to automated equipment). The equipment specified in the EQU segment should respond with the information about inventory item requested in the INV segment (or all items).

Compared to INR^U06, it declares INV as optional and does not require fields INV-1 and INV-2 there. In that way, it supports queries for all inventory items without filtering on any attributes.

INR^U14^INR\_U14: Inventory Request Message

| **Segments** | **Description** | **Status** | **Chapter** |
| --- | --- | --- | --- |
| MSH | Message Header |  | 2 |
| [{SFT}] | Software Segment |  | 2 |
| [UAC] | User Authentication Credential |  | 2 |
| [EQU](#EQU) | Equipment Detail |  | 13 |
| [{ [INV](#INV) }] | Inventory Detail |  | 13 |

ACK^U14^ACK: General Acknowledgment

| **Segments** | **Description** | **Status** | **Chapter** |
| --- | --- | --- | --- |
| MSH | Message Header |  | 2 |
| [{SFT}] | Software Segment |  | 2 |
| [UAC] | User Authentication Credential |  | 2 |
| MSA | Message Acknowledgment |  | 2 |
| [{ ERR }] | Error |  | 2 |

|  |
| --- |
| Chapter 13, Section 13.4.4 “INV – Inventory Detail Segment”:   * extend description of the segment |

The inventory detail segment is the data necessary to track the inventory of substances (e.g. reagent, tips, waste) and equipment state indicators (a special type of non-material inventory items) on equipment.

|  |
| --- |
| Chapter 13, Section 13.4.4 “INV – Inventory Detail Segment”   * in the Attribute Table: change optionality of INV-1 and INV-2 from “R” to “C” * in the Attribute Table: add fields INV-21 and INV-22 * change descriptions of INV-1, INV-2, INV-15 * add descriptions of the new fields INV-21 and INV-22   Please replace placeholders xxxx, yyyy1 and yyyy2 with proper values. |

HL7 Attribute Table – INV – Inventory Detail

| SEQ | LEN | C.LEN | DT | OPT | RP/# | TBL# | ITEM # | ELEMENT NAME |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 |  |  | CWE | ~~R~~ C |  | 0451 | 01372 | Substance Identifier |
| 2 |  |  | CWE | ~~R~~ C | Y | [0383](file:///C:\Users\rudd\AppData\Local\Temp\Temp1_HL7%20Messaging%20Version%202.8.1.zip\HL7%20Messaging%20Version%202.8.1\Word\V281_CH02C_CodeTables.doc#HL70383) | 01373 | Substance Status |
| 3 |  |  | CWE | O |  | [0384](file:///C:\Users\rudd\AppData\Local\Temp\Temp1_HL7%20Messaging%20Version%202.8.1.zip\HL7%20Messaging%20Version%202.8.1\Word\V281_CH02C_CodeTables.doc#HL70384) | 01374 | Substance Type |
| 4 |  |  | CWE | O |  | 9999 | 01532 | Inventory Container Identifier |
| 5 |  |  | CWE | O |  | 9999 | 01376 | Container Carrier Identifier |
| 6 |  |  | CWE | O |  | 9999 | 01377 | Position on Carrier |
| 7 |  | 10# | NM | O |  |  | 01378 | Initial Quantity |
| 8 |  | 10# | NM | O |  |  | 01379 | Current Quantity |
| 9 |  | 10# | NM | O |  |  | 01380 | Available Quantity |
| 10 |  | 10# | NM | O |  |  | 01381 | Consumption Quantity |
| 11 |  |  | CWE | O |  | 9999 | 01382 | Quantity Units |
| 12 |  |  | DTM | O |  |  | 01383 | Expiration Date/Time |
| 13 |  |  | DTM | O |  |  | 01384 | First Used Date/Time |
| 14 |  |  |  | W |  |  | 01385 | On Board Stability Duration |
| 15 |  |  | CWE | O | Y | 9999 | 01386 | Test/Fluid Identifier(s) |
| 16 |  | 200= | ST | O |  |  | 01387 | Manufacturer Lot Number |
| 17 |  |  | CWE | O |  | [0385](file:///C:\Users\rudd\AppData\Local\Temp\Temp1_HL7%20Messaging%20Version%202.8.1.zip\HL7%20Messaging%20Version%202.8.1\Word\V281_CH02C_CodeTables.doc#HL70385) | 00286 | Manufacturer Identifier |
| 18 |  |  | CWE | O |  | [0386](file:///C:\Users\rudd\AppData\Local\Temp\Temp1_HL7%20Messaging%20Version%202.8.1.zip\HL7%20Messaging%20Version%202.8.1\Word\V281_CH02C_CodeTables.doc#HL70386) | 01389 | Supplier Identifier |
| 19 |  |  | CQ | O |  |  | 01626 | On Board Stability Time |
| 20 |  |  | CQ | O |  |  | 01896 | Target Value |
| 21 |  |  | CWE | C |  | xxxx | yyyy1 | Equipment State indicator type code |
| 22 |  |  | CQ | C |  |  | yyyy2 | Equipment State indicator value |

13.4.4.0 INV Field Definitions

13.4.4.1 INV-1 Substance Identifier (CWE) 01372

Components: <Identifier (ST)> ^ <Text (ST)> ^ <Name of Coding System (ID)> ^ <Alternate Identifier (ST)> ^ <Alternate Text (ST)> ^ <Name of Alternate Coding System (ID)> ^ <Coding System Version ID (ST)> ^ <Alternate Coding System Version ID (ST)> ^ <Original Text (ST)> ^ <Second Alternate Identifier (ST)> ^ <Second Alternate Text (ST)> ^ <Name of Second Alternate Coding System (ID)> ^ <Second Alternate Coding System Version ID (ST)> ^ <Coding System OID (ST)> ^ <Value Set OID (ST)> ^ <Value Set Version ID (DTM)> ^ <Alternate Coding System OID (ST)> ^ <Alternate Value Set OID (ST)> ^ <Alternate Value Set Version ID (DTM)> ^ <Second Alternate Coding System OID (ST)> ^ <Second Alternate Value Set OID (ST)> ^ <Second Alternate Value Set Version ID (DTM)>

Definition: Unique identifier for the substance that is in inventory. This is a manufacturer-specific identifier. Refer to [*User-defined Table 0451 – Substance Identifier*](file:///C:\Users\rudd\AppData\Local\Temp\Temp1_HL7%20Messaging%20Version%202.8.1.zip\HL7%20Messaging%20Version%202.8.1\Word\V281_CH02C_CodeTables.doc#HL70451) in Chapter 2C, Code Tables, for suggested values.

This field is conditional. It is optional in queries INR^U14 and required in all other messages. Absence of this field in a query means that the result shall be not filtered on inventory item ID.

13.4.4.2 INV-2 Substance Status (CWE) 01373

Components: <Identifier (ST)> ^ <Text (ST)> ^ <Name of Coding System (ID)> ^ <Alternate Identifier (ST)> ^ <Alternate Text (ST)> ^ <Name of Alternate Coding System (ID)> ^ <Coding System Version ID (ST)> ^ <Alternate Coding System Version ID (ST)> ^ <Original Text (ST)> ^ <Second Alternate Identifier (ST)> ^ <Second Alternate Text (ST)> ^ <Name of Second Alternate Coding System (ID)> ^ <Second Alternate Coding System Version ID (ST)> ^ <Coding System OID (ST)> ^ <Value Set OID (ST)> ^ <Value Set Version ID (DTM)> ^ <Alternate Coding System OID (ST)> ^ <Alternate Value Set OID (ST)> ^ <Alternate Value Set Version ID (DTM)> ^ <Second Alternate Coding System OID (ST)> ^ <Second Alternate Value Set OID (ST)> ^ <Second Alternate Value Set Version ID (DTM)>

Definition: The status of the inventoried item. The status indicates the current status of the substance. Refer to[*HL7 Table 0383 – Substance Status*](file:///C:\Users\rudd\AppData\Local\Temp\Temp1_HL7%20Messaging%20Version%202.8.1.zip\HL7%20Messaging%20Version%202.8.1\Word\V281_CH02C_CodeTables.doc#HL70383) in Chapter 2C, Code Tables, for suggested values.

This field is conditional. It is optional in queries INR^U14 and required in all other messages. Absence of this field in a query means that the result shall be not filtered on inventory item status.

………………………………………..

13.4.4.15 INV-15 Test/Fluid Identifier(s) (CWE) 01386

Components: <Identifier (ST)> ^ <Text (ST)> ^ <Name of Coding System (ID)> ^ <Alternate Identifier (ST)> ^ <Alternate Text (ST)> ^ <Name of Alternate Coding System (ID)> ^ <Coding System Version ID (ST)> ^ <Alternate Coding System Version ID (ST)> ^ <Original Text (ST)> ^ <Second Alternate Identifier (ST)> ^ <Second Alternate Text (ST)> ^ <Name of Second Alternate Coding System (ID)> ^ <Second Alternate Coding System Version ID (ST)> ^ <Coding System OID (ST)> ^ <Value Set OID (ST)> ^ <Value Set Version ID (DTM)> ^ <Alternate Coding System OID (ST)> ^ <Alternate Value Set OID (ST)> ^ <Alternate Value Set Version ID (DTM)> ^ <Second Alternate Coding System OID (ST)> ^ <Second Alternate Value Set OID (ST)> ^ <Second Alternate Value Set Version ID (DTM)>

Definition: This field is the list of tests and body fluid that ~~apply~~ relate or correspond to this ~~substance~~ inventory tem. This is a repeating field. An empty field means that this ~~substance~~ inventory tem is not test specific, i.e., it applies to all tests.

………………………………………..

13.4.4.21 INV-21 Equipment State Indicator Type Code (CWE) yyyy1

<Alternate Identifier (ST)> ^ <Alternate Text (ST)> ^ <Name of Alternate Coding System (ID)> ^ <Coding System Version ID (ST)> ^ <Alternate Coding System Version ID (ST)> ^ <Original Text (ST)> ^ <Second Alternate Identifier (ST)> ^ <Second Alternate Text (ST)> ^ <Name of Second Alternate Coding System (ID)> ^ <Second Alternate Coding System Version ID (ST)> ^ <Coding System OID (ST)> ^ <Value Set OID (ST)> ^ <Value Set Version ID (DTM)> ^ <Alternate Coding System OID (ST)> ^ <Alternate Value Set OID (ST)> ^ <Alternate Value Set Version ID (DTM)> ^ <Second Alternate Coding System OID (ST)> ^ <Second Alternate Value Set OID (ST)> ^ <Second Alternate Value Set Version ID (DTM)>

Definition: The type code of an equipment state indicator. Refer to *HL7 Table xxxx – Equipment State Indicator Type Code* in Chapter 2C, Code Tables, for suggested values.

Due to its dynamic nature, an equipment state indicator is considered to be a [non-material] inventory item. Its value usually can be derived from the material inventory — in that way, a state indicator differs from static configuration parameters and master data stored on the equipment.

This field is conditional. It is optional when INV‑3 “Substance Type” is not populated and prohibited otherwise.

13.4.4.22 INV-22 Equipment State Indicator Value (CQ) yyyy2

Components: <Quantity (NM)> ^ <Units (CWE)>

Subcomponents for Units (CWE): <Identifier (ST)> & <Text (ST)> & <Name of Coding System (ID)> & <Alternate Identifier (ST)> & <Alternate Text (ST)> & <Name of Alternate Coding System (ID)> & <Coding System Version ID (ST)> & <Alternate Coding System Version ID (ST)> & <Original Text (ST)> & <Second Alternate Identifier (ST)> & <Second Alternate Text (ST)> & <Name of Second Alternate Coding System (ID)> & <Second Alternate Coding System Version ID (ST)> & <Coding System OID (ST)> & <Value Set OID (ST)> & <Value Set Version ID (DTM)> & <Alternate Coding System OID (ST)> & <Alternate Value Set OID (ST)> & <Alternate Value Set Version ID (DTM)> & <Second Alternate Coding System OID (ST)> & <Second Alternate Value Set OID (ST)> & <Second Alternate Value Set Version ID (DTM)>

Definition: The numeric value of the equipment state indicator specified in INV-21. The 1st component defines the number and the 2nd component the units of measurement.

This field is conditional. It is optional when INV‑21 “Equipment State Indicator Type Code” is populated and prohibited otherwise.

|  |
| --- |
| Chapter 13, section 13.5 “Notes Regarding Usage”:   * add new sub-section 13.5.6 describing the new features   Please replace the placeholder xxxx with a proper value, consistently with INV-21. |

**13.5.6 Working With Non-Substance Inventory Items**

This section provides examples of INV segments related to reporting and querying values of equipment state indicators (special non-material inventory items).

**Example 1: Reporting that all tests are available (in INU^U05):**

INV|NONE^^HL70451|OK^^HL70383|||||||||||||||||||TA^^HL7xxxx

**Example 2: Reporting that tests with LOINC codes 1492-8 and 1496-8 are available (in INU^U05):**

INV|NONE^^HL70451|OK^^HL70383|||||||||||||1492-8^^LN~1496-8^^LN ⮰  
 ||||||TA^^HL7xxxx

**Example 3: Reporting that the current instrument processing capacity is 42 % (in INU^U05):**

INV|NONE^^HL70451|OK^^HL70383|||||||||||||||||||IC^^HL7xxxx|42^%&&UCUM

**Example 4: Reporting that an output specimen buffer “Buffer1” is full (in INU^U05):**

INV|BufferId1^^HL70451|OK^^HL70383||||||||||||||||||| ⮰  
 OB^^HL7xxxx|0^%&&UCUM

**Example 5: Reporting that an emergency input specimen buffer “Buffer2” is empty (in INU^U05):**

INV|BufferId2^^HL70451|OK^^HL70383||||||||||||||||||| ⮰  
 EB^^HL7xxxx|100^%&&UCUM

**Example 6: Querying the current instrument processing capacity (in INR^U14):**

INV|||||||||||||||||||||IC^^HL7xxxx

**Example 7: Querying the current capacity of all regular specimen input buffers (in INR^U14):**

INV|||||||||||||||||||||IB^^HL7xxxx

**Example 8: Querying the current capacity of the regular specimen input buffer “Buffer3” (in INR^U14):**

INV|Buffer3^^HL70451||||||||||||||||||||IB^^HL7xxxx

|  |
| --- |
| Chapter 2 C, table 0384:   * change description of the code “CO” from “Control” to “Control Reagent” |

#### 2.C.2.309 0384 – Substance Type

Table Metadata

| Table | Steward | V3 Harmonization | V3 Equivalent | Where used | Status |
| --- | --- | --- | --- | --- | --- |
| 0384 | OO | TBD | TBD | INV-3 | Active |

HL7 Table 0384 – Substance Type

| Value | Description | Comment |
| --- | --- | --- |
| SR | Single Test Reagent |  |
| MR | Multiple Test Reagent | The consumption cannot be tied to orders for a single test |
| DI | Diluent |  |
| PT | Pretreatment |  |
| RC | Reagent Calibrator |  |
| CO | Control Reagent |  |
| PW | Purified Water |  |
| LW | Liquid Waste |  |
| SW | Solid Waste |  |
| SC | Countable Solid Item | E.g., Pipetting tip |
| LI | Measurable Liquid Item |  |
| OT | Other |  |

|  |
| --- |
| Chapter 2 C, table 0365:   * add codes * add comments |

#### 2.C.2.290 0365 – Equipment State

Table Metadata

| Table | Steward | V3 Harmonization | V3 Equivalent | Where used | Status |
| --- | --- | --- | --- | --- | --- |
| 0365 | OO | TBD | TBD | EQU-3 | Active |

HL7 Table 0365 – Equipment State

| Value | Description | Comment |
| --- | --- | --- |
| PU | Powered Up | Software and hardware are not yet ready |
| IN | Initializing | Software is ready, hardware not yet |
| ID | Idle | Successfully started, new orders can be accepted, currently no orders are present |
| CO | Configuring |  |
| OP | Normal Operation | Successfully started, new orders can be accepted |
| CL | Clearing |  |
| PA | Pausing |  |
| PD | Paused | User action is required to continue |
| ES | E-stopped | Error, remaining orders can be finished, new orders cannot be accepted |
| TS | Transport stopped |  |
| SS | Sampling stopped |  |
| SD | Shutting down |  |
| DI | Diagnose |  |
| MA | Maintenance |  |
| RS | Ready to start | Software and hardware are ready, but user action is required to start |
| FL | Failure | Failure, remaining orders are aborted, new orders cannot be accepted |
| UN | Unknown |  |
| LT | Limited test menu | For diagnostic instruments: some test types are unavailable |
|  | (null) No state change |  |

|  |
| --- |
| Chapter 2 C:   * add new section/new table.   Please replace placeholders ssss and xxxx with proper values, consistently with INV-21. |

#### 2.C.2.ssss xxxx – Equipment State Indicator Type Code

Table Metadata

| Table | Steward | V3 Harmonization | V3 Equivalent | Where used | Status |
| --- | --- | --- | --- | --- | --- |
| xxxx | OO | TBD | TBD | INV-21 | Active |

HL7 Table xxxx – Equipment State Indicator Type Code

| Value | Description | Comment |
| --- | --- | --- |
| IB | Current capacity of a regular input specimen buffer |  |
| EB | Current capacity of an emergency input specimen buffer |  |
| OB | Current capacity of an output specimen buffer |  |
| IC | Current processing capacity of the instrument |  |
| TA | Current test availability |  |

|  |
| --- |
| Chapter 13, Section 13.4.1   * add field EQU-6 in the HL7 attribute table of the segment EQU * add section 13.4.1.6   Please replace the placeholder yyyy3 with a proper value. |

HL7 Attribute Table – EQU – Equipment Detail

| **SEQ** | **LEN** | **C.LEN** | **DT** | **OPT** | **RP/#** | **TBL#** | **ITEM #** | **ELEMENT NAME** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 |  |  | EI | R | Y |  | 01479 | Equipment Instance Identifier |
| 2 |  |  | DTM | R |  |  | 01322 | Event Date/Time |
| 3 |  |  | CWE | C |  | [0365](file:///C:\Users\rnd\AppData\Local\Temp\V281_CH02C_CodeTables.doc#HL70365) | 01323 | Equipment State |
| 4 |  |  | CWE | O |  | [0366](file:///C:\Users\rnd\AppData\Local\Temp\V281_CH02C_CodeTables.doc#HL70366) | 01324 | Local/Remote Control State |
| 5 |  |  | CWE | O |  | [0367](file:///C:\Users\rnd\AppData\Local\Temp\V281_CH02C_CodeTables.doc#HL70367) | 01325 | Alert Level |
| 6 |  |  | DTM | O |  |  | yyyy3 | Expected date/time of the next status change |

……………

#### 13.4.1.6 EQU-6 Expected Date/Time of the Next Status Change (DTM) yyyy3

Definition: This field is the predicted date/time of the next equipment status change (e.g. from “maintenance” back to “normal operation”).