General Specifications Change Notification (GSCN)

Associated Work Request (WR) Number:

<table>
<thead>
<tr>
<th>WR #</th>
<th>GSCN Name</th>
<th>Ratification Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>21-318</td>
<td>Encoding Geocoordinates to support ship-to/deliver-to</td>
<td>Apr 2022</td>
</tr>
</tbody>
</table>

Background:

Large numbers of locations in the world do not have (useful/usable) addresses, but all locations in the world have unique and unambiguous geocoordinates. Industries such as freight transport, construction, agriculture, telecommunications and healthcare need to be able to identify locations that do not have an address.

To support location information, encoding geocoordinates as a data element for ship-to and deliver-to is an important characteristic to support delivery and delivery processes. Note that the highlighted sections indicate a proposed new section.

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Symbol size is determined by the amount of data and the number of rows and columns required encoding the data for the X-dimensions selected (see figures section 5.6.3.2). Consult GS1 symbol specification table 7, section 5.12.3.7, for minimum and maximum X-dimensions and other sizing requirements.

**Durable labelling and marking:**
For long distance scanning see section 5.12.3.13, GS1 symbol specification table 13.
For short distance scanning see section 5.12.3.9, GS1 symbol specification table 9 (assets) or section 5.12.3.4, GS1 symbol specification table 4 (trade items).

**Symbol placement**
General principles on placement of barcodes are described in section 6.
The majority of uses for these symbols will be on very small items with curved surfaces such as vials, ampoules and very small bottles. For guidance in locating these symbols on curved surfaces, refer to section 6.2.

**Unique application processing requirements for direct part marking**
See section 7 and section 5.12.4.3.

### 2.6.15 Encoding transport process information

**Introduction**
The global Transport & Logistics industry is experiencing exponential growth in freight volumes and becoming ever more open and competitive to support the growing needs. The increasing number of service providers (especially in Last Mile) and new entrants coming in from outside the traditional T&L environment causes challenges within the supply chain where parties involved in a supply chain at times don’t even know each other, let alone have integrated systems. The fragmented nature of the industry, connectivity limitations (e.g., internet access) and the need for redundancy (e.g., absence of advance information exchange) drives the need for greater interoperability and the ability to capture transport process information via barcode(s). Information such as ship-to / deliver-to address and other delivery information is encoded directly on the logistic label to support first/last mile and sortation processes.

**Note (informative):** For further guidance and supporting standards see the [GS1 Encoding Transport Process Information Implementation Guideline](#).

**Application description**
This application describes the creation of transport unit labels when using 2D barcodes to include necessary transport data on GS1 transport labels. The SSCC is the mandatory identifier required on all transport labels in a GS1-128 barcode and this application defines how it should be used together with optional attributes in 2D barcodes to support transport and logistic processes.

**GS1 Key**

**Required**
- SSCC

The GS1 Application Identifier for the SSCC is AI (00), see section 3.2.

**Rules**
All SSCC rules described in section 4.4.

**Attributes**

**Required**
Not applicable
Optional

To provide optional transport process information, see figure below for a listing of GS1 Application Identifiers. For all the GS1 Application Identifiers that may be used with an SSCC in support of encoding transport process information and their format, see section 3.2.

**Figure 2.6.15-1. Application Identifiers used to support the transport process**

<table>
<thead>
<tr>
<th>A1</th>
<th>Data Content</th>
<th>Permits Non-Latin Characters</th>
</tr>
</thead>
<tbody>
<tr>
<td>420</td>
<td>Ship-to / Deliver-to postal code with a single postal authority</td>
<td></td>
</tr>
<tr>
<td>4300</td>
<td>Ship-to / Deliver-to company name</td>
<td>X</td>
</tr>
<tr>
<td>4301</td>
<td>Ship-to / Deliver-to contact</td>
<td>X</td>
</tr>
<tr>
<td>4302</td>
<td>Ship-to / Deliver-to address line 1</td>
<td>X</td>
</tr>
<tr>
<td>4303</td>
<td>Ship-to / Deliver-to address line 2</td>
<td>X</td>
</tr>
<tr>
<td>4304</td>
<td>Ship-to / Deliver-to suburb</td>
<td>X</td>
</tr>
<tr>
<td>4305</td>
<td>Ship-to / Deliver-to locality</td>
<td>X</td>
</tr>
<tr>
<td>4306</td>
<td>Ship-to / Deliver-to region</td>
<td>X</td>
</tr>
<tr>
<td>4307</td>
<td>Ship-to / Deliver-to country code</td>
<td></td>
</tr>
<tr>
<td>4308</td>
<td>Ship-to / Deliver-to telephone number</td>
<td></td>
</tr>
<tr>
<td>4309</td>
<td>Ship-to / Deliver-to GEO location</td>
<td></td>
</tr>
<tr>
<td>4310</td>
<td>Return-to company name</td>
<td>X</td>
</tr>
<tr>
<td>4311</td>
<td>Return-to contact</td>
<td>X</td>
</tr>
<tr>
<td>4312</td>
<td>Return-to address line 1</td>
<td>X</td>
</tr>
<tr>
<td>4313</td>
<td>Return-to address line 2</td>
<td>X</td>
</tr>
<tr>
<td>4314</td>
<td>Return-to suburb</td>
<td>X</td>
</tr>
<tr>
<td>4315</td>
<td>Return-to locality</td>
<td>X</td>
</tr>
<tr>
<td>4316</td>
<td>Return-to region</td>
<td>X</td>
</tr>
<tr>
<td>4317</td>
<td>Return-to country code</td>
<td></td>
</tr>
<tr>
<td>4318</td>
<td>Return-to postal code</td>
<td></td>
</tr>
<tr>
<td>4319</td>
<td>Return-to telephone number</td>
<td></td>
</tr>
<tr>
<td>4320</td>
<td>Service code description</td>
<td>X</td>
</tr>
<tr>
<td>4321</td>
<td>Dangerous goods flag</td>
<td></td>
</tr>
<tr>
<td>4322</td>
<td>Authority to leave</td>
<td></td>
</tr>
<tr>
<td>4323</td>
<td>Signature required flag</td>
<td></td>
</tr>
<tr>
<td>4324</td>
<td>Not before delivery date time</td>
<td></td>
</tr>
<tr>
<td>4325</td>
<td>Not after delivery date time</td>
<td></td>
</tr>
<tr>
<td>4326</td>
<td>Release date</td>
<td></td>
</tr>
</tbody>
</table>

To encode non-Latin characters within the alphanumeric value, use percent-encoding as defined within [RFC 3986](https://tools.ietf.org/html/rfc3986). A space character should be encoded as a single plus symbol, +.

**Rules**

All transport process information rules see section 7.

For general human readable interpretation rules see section 4.15.
<table>
<thead>
<tr>
<th>AI</th>
<th>Data Content</th>
<th>Format</th>
<th>FNC1 count required</th>
<th>Data title</th>
</tr>
</thead>
<tbody>
<tr>
<td>422</td>
<td>Country of origin of a trade item: AI (422)</td>
<td>N3+N3</td>
<td>(FNC1)</td>
<td>ORIGIN</td>
</tr>
<tr>
<td>423</td>
<td>Country of initial processing: AI (423)</td>
<td>N3+N3+N..12</td>
<td>(FNC1)</td>
<td>COUNTRY - INITIAL PROCESS.</td>
</tr>
<tr>
<td>424</td>
<td>Country of processing: AI (424)</td>
<td>N3+N3</td>
<td>(FNC1)</td>
<td>COUNTRY - PROCESS.</td>
</tr>
<tr>
<td>425</td>
<td>Country of disassembly: AI (425)</td>
<td>N3+N3+N..12</td>
<td>(FNC1)</td>
<td>COUNTRY - DISASSEMBLY</td>
</tr>
<tr>
<td>426</td>
<td>Country covering full process chain: AI (426)</td>
<td>N3+N3</td>
<td>(FNC1)</td>
<td>COUNTRY - FULL PROCESS</td>
</tr>
<tr>
<td>427</td>
<td>Country subdivision of origin code for a trade item: AI (427)</td>
<td>N3+N..3</td>
<td>(FNC1)</td>
<td>ORIGIN SUBDIVISION</td>
</tr>
<tr>
<td>4300</td>
<td>Ship-to / Deliver-to Company name: AI (4300)</td>
<td>N4+X..35</td>
<td>(FNC1)</td>
<td>SHIP TO COMP</td>
</tr>
<tr>
<td>4301</td>
<td>Ship-to / Deliver-to contact name: AI (4301)</td>
<td>N4+X..35</td>
<td>(FNC1)</td>
<td>SHIP TO NAME</td>
</tr>
<tr>
<td>4302</td>
<td>Ship-to / Deliver-to address line 1: AI (4302)</td>
<td>N4+X..70</td>
<td>(FNC1)</td>
<td>SHIP TO ADD1</td>
</tr>
<tr>
<td>4303</td>
<td>Ship-to / Deliver-to address line 2: AI (4303)</td>
<td>N4+X..70</td>
<td>(FNC1)</td>
<td>SHIP TO ADD2</td>
</tr>
<tr>
<td>4304</td>
<td>Ship-to / Deliver-to suburb: AI (4304)</td>
<td>N4+X..70</td>
<td>(FNC1)</td>
<td>SHIP TO SUB</td>
</tr>
<tr>
<td>4305</td>
<td>Ship-to / Deliver-to locality: AI (4305)</td>
<td>N4+X..70</td>
<td>(FNC1)</td>
<td>SHIP TO LOC</td>
</tr>
<tr>
<td>4306</td>
<td>Ship-to / Deliver-to region: AI (4306)</td>
<td>N4+X..70</td>
<td>(FNC1)</td>
<td>SHIP TO REG</td>
</tr>
<tr>
<td>4307</td>
<td>Ship-to / Deliver-to country code: AI (4307)</td>
<td>N4+X2</td>
<td>(FNC1)</td>
<td>SHIP TO COUNTRY</td>
</tr>
<tr>
<td>4308</td>
<td>Ship-to / Deliver-to telephone number: AI (4308)</td>
<td>N4+X..30</td>
<td>(FNC1)</td>
<td>SHIP TO PHONE</td>
</tr>
<tr>
<td>4309</td>
<td>Ship-to / Deliver-to GEO location: AI (4309)</td>
<td>N4+N..20</td>
<td>(FNC1)</td>
<td>SHIP TO GEO</td>
</tr>
<tr>
<td>4310</td>
<td>Return-to company name: AI (4310)</td>
<td>N4+X..35</td>
<td>(FNC1)</td>
<td>RTN TO COMP</td>
</tr>
<tr>
<td>4311</td>
<td>Return-to contact name: AI (4311)</td>
<td>N4+X..35</td>
<td>(FNC1)</td>
<td>RTN TO NAME</td>
</tr>
<tr>
<td>4312</td>
<td>Return-to address line 1: AI (4312)</td>
<td>N4+X..70</td>
<td>(FNC1)</td>
<td>RTN TO ADD1</td>
</tr>
<tr>
<td>4313</td>
<td>Return-to address line 2: AI (4313)</td>
<td>N4+X..70</td>
<td>(FNC1)</td>
<td>RTN TO ADD2</td>
</tr>
<tr>
<td>4314</td>
<td>Return-to suburb: AI (4314)</td>
<td>N4+X..70</td>
<td>(FNC1)</td>
<td>RTN TO SUB</td>
</tr>
<tr>
<td>4315</td>
<td>Return-to locality: AI (4315)</td>
<td>N4+X..70</td>
<td>(FNC1)</td>
<td>RTN TO LOC</td>
</tr>
<tr>
<td>4316</td>
<td>Return-to region: AI (4316)</td>
<td>N4+X..70</td>
<td>(FNC1)</td>
<td>RTN TO REG</td>
</tr>
<tr>
<td>4317</td>
<td>Return-to country code: AI (4317)</td>
<td>N4+X2</td>
<td>(FNC1)</td>
<td>RTN TO COUNTRY</td>
</tr>
<tr>
<td>4318</td>
<td>Return-to postal code: AI (4318)</td>
<td>N4+X..20</td>
<td>(FNC1)</td>
<td>RTN TO POST</td>
</tr>
<tr>
<td>4319</td>
<td>Return-to telephone number: AI (4319)</td>
<td>N4+X..30</td>
<td>(FNC1)</td>
<td>RTN TO PHONE</td>
</tr>
<tr>
<td>4320</td>
<td>Service code description: AI (4320)</td>
<td>N4+X..35</td>
<td>(FNC1)</td>
<td>SRV DESCRIPTION</td>
</tr>
<tr>
<td>4321</td>
<td>Dangerous goods flag: AI (4321)</td>
<td>N4+N1</td>
<td>(FNC1)</td>
<td>DANGEROUS GOODS</td>
</tr>
<tr>
<td>4322</td>
<td>Authority to leave flag: AI (4322)</td>
<td>N4+N1</td>
<td>(FNC1)</td>
<td>AUTH LEAVE</td>
</tr>
<tr>
<td>4323</td>
<td>Signature required flag: AI (4323)</td>
<td>N4+N1</td>
<td>(FNC1)</td>
<td>SIG REQUIRED</td>
</tr>
<tr>
<td>4324</td>
<td>Not before delivery date/time: AI (4324)</td>
<td>N4+N10</td>
<td>(FNC1)</td>
<td>NBEF DEL DT</td>
</tr>
<tr>
<td>4325</td>
<td>Not after delivery date/time: AI (4325)</td>
<td>N4+N10</td>
<td>(FNC1)</td>
<td>NAFT DEL DT</td>
</tr>
<tr>
<td>4326</td>
<td>Release date: AI (4326)</td>
<td>N4+N6</td>
<td>(FNC1)</td>
<td>REL DATE</td>
</tr>
<tr>
<td>7001</td>
<td>NATO Stock Number (NSN): AI (7001)</td>
<td>N4+N13</td>
<td>(FNC1)</td>
<td>NSN</td>
</tr>
<tr>
<td>7002</td>
<td>UN/ECE meat carcasses and cuts classification: AI (7002)</td>
<td>N4+X..30</td>
<td>(FNC1)</td>
<td>MEAT CUT</td>
</tr>
<tr>
<td>7003</td>
<td>Expiration date and time: AI (7003)</td>
<td>N4+N10</td>
<td>(FNC1)</td>
<td>EXPIRY TIME</td>
</tr>
<tr>
<td>7004</td>
<td>Active potency: AI (7004)</td>
<td>N4+N..4</td>
<td>(FNC1)</td>
<td>ACTIVE POTENCY</td>
</tr>
<tr>
<td>7005</td>
<td>Catch area: AI (7005)</td>
<td>N4+X..12</td>
<td>(FNC1)</td>
<td>CATCH AREA</td>
</tr>
<tr>
<td>7006</td>
<td>First freeze date: AI (7006)</td>
<td>N4+N6</td>
<td>(FNC1)</td>
<td>FIRST FREEZE DATE</td>
</tr>
<tr>
<td>7007</td>
<td>Harvest date: AI (7007)</td>
<td>N4+N[+N6]+H</td>
<td>(FNC1)</td>
<td>HARVEST DATE</td>
</tr>
<tr>
<td>7008</td>
<td>Species for fishery purposes: AI (7008)</td>
<td>N4+X..3</td>
<td>(FNC1)</td>
<td>AQUATIC SPECIES</td>
</tr>
</tbody>
</table>
Hour and Minutes: the number of the hour and minutes based on a local 24-hour time (e.g., 6:30 p.m. = 1830). If it is not necessary to specify a time, these fields must be filled with nines.

**Note:** When it is not necessary to specify the day (the day field is filled with two zeroes), the resultant data string SHALL be interpreted as the last day of the noted month including any adjustment for leap years (e.g., "130200" is "2013 February 28", "160200" is "2016 February 29", etc.).

**Note:** This element string can only specify dates ranging from 49 years in the past to 50 years in the future. Determination of the correct century is explained in section 7.12.

The data transmitted from the barcode reader means that the element string denoting a not after delivery data/time has been captured. As this element string is an attribute to a logistic unit it must be processed together with the SSCC of the unit to which it relates (see section 4.14 Data relationships). When indicating this element string in the non-HRI text section of a barcode label, the following data title SHOULD be used: **NAFT DEL DT**.

### 3.7.46 Release date: AI (4326)

The GS1 Application Identifier (4326) indicates that the data fields contain the release for the logistic unit. This date indicates that the logistic unit can be released for delivery after the indicated date.

**Figure 3.7.46-1** Format of the element string

<table>
<thead>
<tr>
<th>GS1 Application Identifier</th>
<th>Release date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>YY</td>
</tr>
<tr>
<td>4326</td>
<td>N1</td>
</tr>
</tbody>
</table>

The structure is:

- **Year:** the tens and units of the year (e.g., 2007 = 07), which is mandatory
- **Month:** the number of the month (e.g., January = 01), which is mandatory
- **Day:** the number of the day of the relevant month (e.g., second day = 02), which is mandatory

The data transmitted from the barcode reader means that the element string denoting a release date has been captured. As this element string is an attribute to a logistic unit it must be processed together with the SSCC of the unit to which it relates (see section 4.14 Data relationships). When indicating this element string in the non-HRI text section of a barcode label, the following data title SHOULD be used: **REL DATE**.

### 3.7.47 Ship-to / Deliver-to GEO location: AI (4309)

The Application Identifier (4309) indicates that the GS1 Application Identifier data field contains a numeric string that can be converted to geocoordinates for the ship-to/deliver-to location.

The geocoordinate conversion algorithms are explained in section 7.13 and 7.14. The conversions, which must be carried out in the application software, can provide a latitude and longitude from a twenty-digit string associated with the ship-to/deliver-to location, see section 7.14. The process for converting a latitude and longitude into a twenty-digit string is shown in section 7.13.

**Figure 3.7.47-1.** Format of the element string

<table>
<thead>
<tr>
<th>GS1 Application Identifier</th>
<th>Ship-to / Deliver-to GEO location</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;- digits for latitude conversion-&gt;</td>
</tr>
<tr>
<td>4309</td>
<td>N1 N2 N3 N4 N5 N6 N7 N8 N9 N10 N11 N12 N13 N14 N15 N16 N17 N18 N19 N20</td>
</tr>
</tbody>
</table>

The data transmitted from the barcode reader means that the element string associated with the ship-to/deliver-to GEO location has been captured. As this element string is an attribute of a logistic unit, it must be processed together with the SSCC of the logistic unit to which it relates (see section 4.14.2 Mandator association of element strings).
When indicating this element string in the non-HRI text section of a barcode label, the following data title SHOULD be used: **SHIP TO GEO**
<table>
<thead>
<tr>
<th>If element string</th>
<th>Then mandatory associated element string</th>
<th>Rule</th>
</tr>
</thead>
</table>
| 392n              | 01 AND (30 XOR 31nn XOR 32nn XOR 35nn XOR 36nn *) | The applicable amount payable (single monetary area) SHALL occur in combination with the GTIN and either:  
- variable count of items; or  
- a trade measure.  
Note: The GTIN must relate to a variable measure trade item. |
| 393n              | 01 AND (30 XOR 31nn XOR 32nn XOR 35nn XOR 36nn *) | The applicable amount payable with ISO currency code SHALL occur in combination with the GTIN and either:  
- variable count of items; or  
- a trade measure.  
Note: The GTIN must relate to a variable measure trade item. |
| 394n              | 255 | The percentage of a coupon SHALL occur in combination with the Global Coupon Number. |
| 395n              | 01 AND (30 XOR 31nn XOR 32nn XOR 35nn XOR 36nn *) | The applicable amount payable per unit of measure (single monetary area) SHALL occur in combination with the GTIN and either:  
- variable count of items; or  
- a trade measure.  
Note: The GTIN must relate to a variable measure trade item. |
| 403               | 00 | The routing code SHALL occur in combination with an SSCC. |
| 415               | 8020 | The GLN of the invoicing party SHALL occur in combination with the payment slip reference number. |
| 422               | 01 XOR 02 XOR 8006 XOR 8026 *** | The country of origin SHALL occur in combination with:  
- a GTIN; or  
- a GTIN of contained trade items; or  
- an ITIP  
- an ITIP of contained trade item pieces |
| 423               | 01 XOR 02 | The country of initial processing SHALL occur in combination with:  
- a GTIN; or  
- a GTIN of contained trade items. |
| 424               | 01 XOR 02 | The country of processing SHALL occur in combination with:  
- a GTIN; or  
- a GTIN of contained trade items. |
| 425               | 01 XOR 02 | The country of disassembly SHALL occur in combination with:  
- a GTIN; or  
- a GTIN of contained trade items. |
| 426               | 01 XOR 02 | The country of full processing SHALL occur in combination with:  
- a GTIN; or  
- a GTIN of contained trade items. |
| 427               | (01 XOR 02) AND 422 | The country subdivision of origin SHALL occur in combination with the country of origin and:  
- a GTIN; or  
- a GTIN of contained trade items. |
| 430N              | 00 | Ship-to / Deliver-to address GS1 Application Identifiers SHALL occur in combination with an SSCC |
| 4303              | 4302 and 00 | Ship-to / Deliver-to address line 2 SHALL occur in combination with line 1 of a ship-to address and an SSCC |
| 4309              | 00 | Ship-to / Deliver-to GEO location SHALL occur in combination with an SSCC |
7.13 Conversion of latitude and longitude to twenty-digit string

A latitude and longitude (both expressed in decimal degrees using the WGS84 coordinate reference system) can be converted into two 10-digit fields, X and Y, as follows:

\[
X = 10,000,000 \times (\text{WGS84 latitude} + 90) \\
Y = 10,000,000 \times ((\text{WGS84 longitude} + 360) \mod 360)
\]

X and Y SHALL be integer values.

**Note:** The WGS84 latitude and longitude SHOULD be expressed with no more than 7 decimal places.

If the calculation of either X or Y results in fewer than 10 digits then the value must be left-padded with '0' to reach a total of 10 digits per value.

For GS1 AIs encoding geocoordinates, X and Y are concatenated into a single string of twenty digits. For example, Machu Picchu Antarctica Base's latitude (-62.0914152°) and longitude (-58.4702029°) would be converted to 0279085848 and 3015297971, resulting in a final data element of 02790858483015297971.
7.14 Conversion of twenty-digit string to latitude and longitude

A twenty digit geocode contains two ten-digit fields, X and Y, that can be converted to latitude and longitude values in the WGS84 coordinate reference system (expressed in decimal degrees) using the following calculations:

- X, the first 10 digits can be converted to WGS84 latitude using the following calculation:
  \[ \text{WGS84 latitude} = \left( \frac{X}{10,000,000} \right) - 90^\circ \]

- Y, the second group of 10 digits can be converted to WGS84 longitude using the following calculation:
  \[ \text{WGS84 longitude} = \left( \left( \frac{Y}{10,000,000} + 180 \right) \mod 360 \right) - 180^\circ \]