Guide for the Design of Aligned Trade Forms

For Paperless Trade

Guide for the Design of Aligned Trade Forms for Paperless Trade

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Foreword

Globalization is having a fundamental impact on how trade is organized and how economies work together. Today, traders all over the world are linked through a network of elaborate and competitive supply chain processes involving the exchange of goods and services in excess of USD 15 trillion annually.

In international trade transactions, huge numbers of trade documents such as certificates, licences, permits, Customs declarations, orders and invoices are exchanged every day. It is of the utmost importance for the efficiency and security of global trade that these different documents are harmonized so that the information is accepted and properly understood by all parties.

Over the years the United Nations Economic Commission for Europe (UNECE), through its Centre for Trade Facilitation and Electronic Business (UN/CEFACT), has developed a set of global standards and best practice which allow trade documents to be aligned to a common layout and data standard. Today this set of standards is widely used in international trade and has become a precondition for participating efficiently in global transactions. These standards also form an important step in the introduction of electronic documents and paperless trade.

UNECE and UNESCAP have now developed a *Guide for the Design of Aligned Trade Forms.* The guide offers practical help to traders and administrations in designing forms that are aligned with international standards and best practice. The *Guide* complements the UNECE/UNESCAP *Business Process Analysis Guide*, which is designed to assist governments and trade analysts and simplify the business processes that the documents are used for. We hope that, together, these Guides will provide a valuable service in simplifying business procedures and documentary requirements and help pave the way for paperless trade.

UNECE and UNESCAP would like to pay special tribute to the late Mr. Gösta Roos for his invaluable contribution to the development and revision of this *Guide*.

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Preface

The basic instruments for transmitting information in international trade are aligned trade documents based on internationally accepted standards and best practices. These play an important role in the efficiency and security of international trade transactions.

To simplify the documentary requirements for international trade, the United Nations developed the United Nations Layout Key for Trade and Transport Documents (UNLK) together with related standards that define the layout of trade documents, the presentation of data, the semantics of trade/data, and the related code lists. The UNLK is applicable to all trade forms used in the commercial transactions sector, in the payment sector, in the transport and related services sector such as forwarding and cargo handling, transport, insurance and in the official controls sector.

This *Guide* aims to support trade facilitators in developing aligned series of trade forms. The process described in the *Guide* facilitates later development of electronic documents for use in paperless trade and Single Window. The United Nations Economic Commission for Europe (UNECE) and the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) have developed a UN Trade Documents Toolkit[1], which complements this *Guide* and provides simple electronic tools to design aligned trade forms.

The *Guide* describes the design of paper trade documents aligned to international standards, with a view to later automation through electronic exchange of trade documents and automated information processing (paperless trade). Chapter 1 provides a short introduction into the history of the UNLK. Chapter 2 presents the formatting and physical design aspects of the UNLK. Chapter 3 details the functional design of forms, and the use of semantic repositories, code lists, and Box Completion Guidelines to develop an aligned and efficient system of trade documents. Finally, Chapter 4 gives an outlook on how aligned paper forms can be further enhanced to obtain electronic trade documents.

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[1]   http://unece.unog.ch/etrade/tkhome.aspx.

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1.   INTRODUCTION AND FORMAL BACKGROUND

In an international trade transaction, movement of goods in one direction and the movement of funds in the opposite direction between the buyer and the seller involve numerous commercial activities and formal interventions that call for a large amount of information/data.

Traditionally, such information and data have been completed and conveyed using paper documents, causing a great deal of delay, errors, and costs that impeded international trade. A cursory study conducted in 1960 revealed that, in the 20-odd documents required in a trade transaction, as much as 80 per cent of the data was repeated, appearing in different places in those documents, expressed in the same or different ways. On the basis of these findings, the United Nations Economic Commission for Europe (UNECE) agreed in 1960 on a basic list of data elements ("headings") and on a common layout, which could place the required data elements in identical positions in all documents required in both trade and transport documents. This resulted in agreement on what was termed the ECE Layout Key for Trade Documents (1963), which was adopted in 1965 as the "United Nations Layout Key for Trade Documents" (UNLK).

The UNLK provided a design tool enabling the redesigning of "international" trade by international organizations. Examples are:

- ICS Standard Bill of Lading (International Chamber of Shipping)

- CMR Road Consignment Note (Convention sur le contrat de transport international de marchandises par route)

- CIM International Rail Consignment Note (Convention internationale concernant le transport des marchandises par chemins de fer)

- IATA Air Waybill (International Air Transport Association)

- UPU Post Parcel Compendium documents (Universal Postal Union)

- CCC Customs Export, Import and Transit Declarations (Customs Co-operation Council, now World Customs Organization)

- FIATA Freight Forwarding documents (Fédération Internationale des Associations de Transitaires et Assimilés).

These developments came into being during the period 1963-1969, and involved an extensive number of international organizations.

With all essential information placed in identical positions in all the concerned documents, traders could produce a "Master", i.e. a database on paper including the relevant (variable) data for a specific trade transaction. The data required in a particular document could then be copied from the Master onto the relevant form by a selective copying method ("one-run system"). The benefits of this method were obvious: data was typed only once, it would be checked only once, it was transferred error-free to the individual documents, form sizes could be standardized, etc.

Another benefit was that in the UNLK, data was placed in "boxes" appearing in the same positions throughout the documents. Each box had a permanent heading and it did not matter which language this heading was expressed in. By comparing it with a similar form in the national or another language, the nature of the variable text in a box could be understood, as the text consisted mainly of names and figures and was thus generally language-independent. Very soon, it became common knowledge that, for example, the name and address figuring in the top left corner of the document were always those of the consignor.

During the initial period, paper documents were the only means for data transfer. As a logical continuation, the UNECE began examining the possibilities of "paperless" trade and the outcome was the emergence of Electronic Data Interchange (EDI). The original UNLK "headings" and all those of the international forms were recorded as the first contents of the Trade Data Elements Directory (UNTDED, ISO 7372), and a large number of elements were later added.

This method of aggregating and transmitting data elements led to the development of United Nations Electronic Data Interchange for Administration, Commerce and Transport (UN/EDIFACT), a syntax for EDI. The UNTDED has also been integrated into the latest Core Component Library of the UN Centre for Trade Facilitation and Electronic Business (UN/CEFACT). This Library is important for the design of electronic documents for international trade, for example in the World Customs Organization (WCO) Data Model.

Though trade is increasingly expected to move towards paperless trade, the UNLK will remain an important standard for both paper and electronic documents. First, the alignment of trade documents to the UNLK and the related international standard is an important prerequisite for automation of documents. In addition, although paper documents can be sent around the world in electronic format, there remains a need for visual presentation and printing out of documents. In this case, it is important that the data is visualized according to a common standard.

The formal basis for the work on alignment of trade documents as carried out within the United Nations is:

- UNECE Recommendation No. 1 on the "United Nations Layout Key for Trade Documents" adopted in March 1973 by the Working Party on Facilitation of International Trade Procedures (henceforth referred to as "WP.4").

- The "Guidelines for Application of the United Nations Layout Key for Trade Documents", adopted by the United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT) in March 2001 and published as document ECE/TRADE/270.

- The "Trade Data Elements Directory (TDED)", adopted as ISO 7372 standard and published as document ECE/TRADE/362.

Traditionally, forms were designed by trade facilitators using manual tools. The Guidelines and background documents on the UNLK still reflect this, for example by referring to the *Forms Design Sheet and Layout Chart* (ISO 3535). Today, electronic tools exist that simplify the design of forms. Some of these can link the electronic forms with XML data structures, making them practical tools for implementing paperless trade and electronic data exchange.

2. COMMON TECHNICAL BASES FOR UNLK ALIGNED FORMS AND DOCUMENTS

2.1 PAPER SIZES

A condition for the standardization and alignment of trade forms is that a common paper size is used. The international standard ISO 216 lays down the "A-series" of paper sizes. The most commonly used size of this series is A4, with the dimensions 210 x 297 mm. It is the national standard in a large number of countries, including most of Europe. However, in North America and in some other countries, the "commercial size", 8½ x 11 in (216 x 279 mm), is the prevailing standard, but sizes such as 8 x 12 in are also used. Any international application will therefore have to accommodate both the A4 and the US commercial size, in view of the importance of "non-A4" countries in world trade.

Besides the A4 size, the A5L size (210 x 148 mm = half A4) is used in some applications, e.g. forms for post parcel services.

For trade forms, the difference between the ISO and the US paper sizes was resolved by the agreement on a common "image area". The image area is the area on the form where document information can be printed. In both sizes, a top and left margin of 10 and 20 mm are used. the designer limits the usable area of the form for data entry to a horizontal area of 183 mm ($7\,^2/_{10}$ in) and a vertical area of 280 mm (11 in) (see image 1 below). When using standard photocopying equipment, the image area is copied between A4 and US paper sizes.

When trimming paper into A sizes, a tolerance is permitted of ± 1 mm ($^1/_{24}$ in). Paper, however, is subject to shrinking and expansion depending on the ambient humidity, and is known to deviate up to 3 mm from the height of an A4 paper (297 mm). This factor has to be taken into account when designing forms.

The greatest value of the A4 paper size is its widespread use. However, its irrational side relationship, 1:1.414, causes technical problems, particularly for the manufacturing of continuous stationery, where print cylinders of different circumferences are required for A4 size (vertical "portrait" size) and A4L (horizontal "landscape" size). The feed ("sprocket") holes used for feeding of continuous stationery are normally placed at ½ in (12.7 mm) distances, which means that perforations separating each A4 size do not occur halfway between the adjacent feed holes.

2.2 MARGINS

There is a need to provide text-free margins on A4 size forms for filing purposes and for gripper devices used in some printing machines. The international standard "Forms Design Sheet and Layout Chart" (ISO 3535) includes measurements for such margins, with a left side filing margin of 20 mm and a top ("gripper") margin of 10 mm. If feed ("sprocket") holes are needed for the feed of continuous stationery, normally an extra strip of paper ("stub") is added along the vertical sides of the A4 paper.

2.3   FORMS DESIGN SHEET

In order to design a form, one should consider the method that will be used for entering data on the form. When developing the UNLK standard it was found that typewriters and printers were commonly using $^1/_6$ in (4.2333 mm) as vertical distance between lines. As to the width spacing ("pitch"), the width of $^1/_{10}$ in (2.54 mm), commonly called "Pica", prevailed in computer printers and similar devices, but $^1/_{12}$ in (2.12 mm), called "Elite", was very common in typewriters, and there were also smaller sizes, such as $^1/_{15}$ in, used for special purposes.

The term "Pica" refers to a measure of type size, i.e. a unit of measurement for printing type, equal to 12 points or 0.422 cm/0.166 inch. It is a main measure in the Anglo-Saxon typographical measure system. The term "Elite" refers to a size of printing type: a 10-point type that has about 12 characters to the inch or just fewer than 5 characters to the centimetre. "Point" is a typographical measure of approximately 0.013737 in (0.35146 mm). 6 pica/inch = 23.305 mm.

The choice of $^1/_6$ in for line spacing was easily justified. As to the pitch, the $^1/_{10}$ in width spacing was chosen as it was predominant, particularly in computer printers. Within ISO it was agreed to establish a "Layout Chart", a sheet which was divided into a grid of *line spacings*, beginning at the top paper edge and placing horizontal lines at distances of $^1/_6$ in (4.233 mm) down the paper and *width spaces* from the left-hand paper edge at distances of $^1/_{10}$ in (2.54 mm) towards the right.
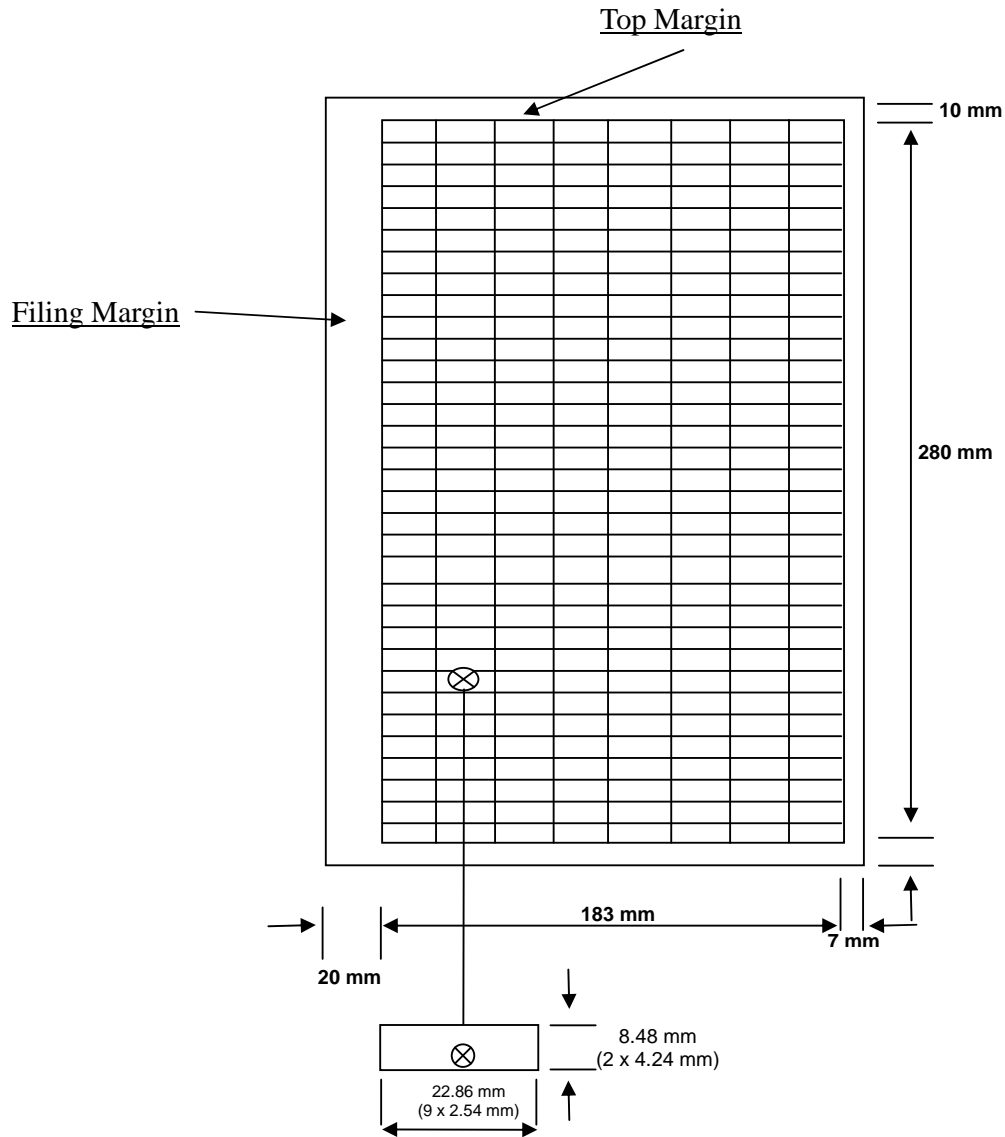
Against this background, it was agreed to divide the A4 image area into a grid using these measurements as the basis for a network of guiding lines, enabling the forms designer to place any pre-printed lines in positions suitable for the subsequent entering of data. It was found that the A4 form could accommodate 66 line spacings of $^1/_6$ in, conveniently expressed as 4.24 mm, leaving a bottom margin of 7 mm.

As to the width spacing, 72 "Pica" character spaces could be accommodated within the available image area, leaving a 7 mm outer margin. This number was very convenient because of its high divisibility. Dividing it into half gave a column width of 36 spaces suitable for address fields, for example. Further dividing into 18 and 9 spaces offered convenient "box" spaces, which could be used for standard tabulating positions. The smallest unit would be 3 spaces.

A design sheet reflecting these principles is embodied as international standard ISO 3535 and is used as the basis for all forms aligned to the UNLK. This form is commonly referred to as the Forms Design Sheet. It uses as a base a grid of "Standard Boxes" with each box measuring 9/10 in x 2/6 in, which provides space for two lines of nine characters.

The UNECE secretariat provided a specifically designed Forms Design Sheet in paper form, the Blue Forms Design Sheet. This form was used by trade facilitators before electronic form design tools came into use. Its grid lines are printed in pale blue. Forms designers would draw lines and boxes with black ink along the grid lines. When photocopied, the supporting blue grid lines are not visible and only the grid lines drawn with ink become visible, rendering the structure of the designed form.

The following graphic shows the margins and sizes used in an aligned trade document:

Top Margin

10 mm

280 mm

Filing Margin

183 mm

7 mm

20 mm

8.48 mm
(2 x 4.24 mm)

22.86 mm
(9 x 2.54 mm)

Measurements:			
Top margin:	10 mm	($^9/_{24}$ in)	
Image area:	280 mm	(11 in)	
Bottom margin:	7 mm	($^7/_{24}$ in)	
Total height:	**297mm**	**11**	**$^2/_3$ in**
Filing margin:	20 mm		$^8/_{10}$ in
Image area:	183 mm	7	$^2/_{10}$ in
Outer margin:	7 mm		$^3/_{10}$ in
Total width:	**210 mm**	**8**	**$^3/_{10}$ in**
66 x 8 Standard Boxes			

Image 1: Design Sheet

2.4   DESIGN OF ALIGNED TRADE FORMS AND PRESENTATION OF DATA

Traditionally, trade forms consisted of a continuous "running" text, leaving gaps for filling in variable data. As a means of rationalizing these forms, the variable data were placed in separate boxes, intended for the specific data items previously integrated into the text. The data to go into a particular box were identified by headings (or "guide words") indicating the nature of the data to be entered. This enabled a more efficient use of typewriters to fill in forms. This method is commonly referred to as "box design".

To provide for a heading and at least one line of data to be filled in a box, the smallest vertical line space is 8.48 mm ($^1/_3$ in). Deeper boxes are based on a multiple of such spaces, always with the first line space of 4.24 mm reserved for the box heading. Field headings are expressed in plain language, full or abbreviated. The type size for such headings should be as small as possible so as not to be confused with the related data entry. 6–8 points is an acceptable size. The choice of font is important; a Grotesk font is preferable to an Antikva font which is more difficult to read in small sizes.

A "Font" is a full set of printing type or of printed or screen characters of the same design, style, and size. The style of printed characters is called a typeface (e.g. Roman, Bold, Italics). The design of a typeface used in forms can belong to the commonly used "Grotesk" or "Antikva" families. The following examples of typefaces illustrate the difference between Antikva (suitable for longer texts but difficult to read in small sizes) and Grotesk (used for headings etc., but not suitable for longer texts):

Type of font	Example	Name of font
Antikva:	Printing	Times New Roman
	Printing	**Garamond**
Grotesk:	Printing	Futura
	Printing	Arial
	Printing	**Courier**

Image 2: Printing Style

The basic design sheet provides for data entries as follows:

- Two columns, each accommodating 35 "Pica" characters in four standard boxes, leaving the 36th character space as column divider, or

- Four columns, each accommodating 17 "Pica" characters in two standard boxes, or

- Eight columns, each accommodating 8 "Pica" characters in one standard box, or

- Combinations of these.

The space reserved for the column divider can be marked by a vertical line, or indicated by a space, as is often the case in the goods description area. Fine (thin) rule should be used for pre-printed lines and column dividers, while heavier (thicker) rule should be reserved for boxes intended for official use.

The vertical (depth) size of lines and boxes should be based on a multiple of 8.48 mm (1/3 in) spaces which will accommodate 1, 3, 5 or 7 data entry lines of 4.24 mm (1/6 in) for the boxes set out in the UNLK (or a larger number in fields not limited horizontally).

The Design Sheet (and hence the UNLK) was based, as regards the number of characters to be accommodated, on the "Pica" size $^1/_{10}$ in (2.54 mm), which was the only common and industry-wide character size at the time of the standard's creation, although typewriters using the "Elite" size $^1/_{12}$ in (2.12 mm) were also widespread. With more recent techniques, size of character and line spacing can vary and can be adjusted to particular needs. This makes it possible to fill in a larger number of characters in the standard columns and boxes.

In general terms, and as illustrated in image 3 below, in box-design forms, plain language (descriptive) data entries are placed under the field heading. If field headings are supported by field identifiers expressed as code (such as a field identification number), the code element should be placed in the same box, in the top right corner of the box. A short vertical line can separate the code data field from the rest of the box. In column type (multi-line) boxes such as *Goods description*", the coded data entries are placed in vertical order under the field heading.

The illustration below shows how field headings, field codes and data entries in plain language and in code should be placed in a box. Field headings and codes are printed in 8-point Futura typeface; for the data entries 11-point Times New Roman is used.

Field heading:

Date of document

Field code:

2

Descriptive entry:

5 February 2008

Coded data entry:

20080205

Final presentation in document:

2   Date of document   20080205
5 February 2008

Image 3: Example of a box in a trade document. Box No. 2 which gives the "Date of document" both as coded entry and in plain language

Check boxes should be placed at the left bottom corner of the box it refers to, or at one of the column positions envisaged in the Design Sheet. The letter "x" should be used to validate the applicable entry in a box. The check box should be placed before the alternative to which it refers and which it validates.

2.5   SIMULTANEOUS PRINTING OF FORMS AND DATA IN ELECTRONIC APPLICATIONS

Traditionally, stocks of forms were printed on paper in professional print shops. The blank forms, either as discrete or continuous forms, were then completed ("filled in") with relevant data on typewriters or – in the latter case – line printers. In sets of forms, it was a common practice to use different paper or print colours to designate the particular use of a copy, or the party for which it is intended.

In electronic applications it is now possible to produce complete documents by simultaneous printing of the forms image and the variable data directly onto blank paper. However, some technical limitations in commonly used printers should be taken into account when designing forms for such applications, in particular:

- Many printers can only print in black and this prevents the use of colours to designate the particular use or destination of a copy. If the form is printed on a monochrome printer it is possible to designate a particular copy by adding the name of the colour behind the form name, e.g. "CMR (red copy)", or to spell out the function, e.g. "Sender's copy".

- Sometimes information is printed vertically in the (left) filing margin. Few printers can print horizontal and vertical text on the same document. Vertical texts should therefore be avoided.

- Printers cannot print from the very top edge of the paper. The position where a printer can start printing depends on its particular configuration and technical parameters. If information has to be placed in the top and left margins of a form, it should be placed as close as possible to the image area, using small fonts.

2.6   UNITED NATIONS LAYOUT KEY FOR TRADE DOCUMENTS (UNLK)

The WP.4, at its first session in August 1961, agreed to develop a "model form" including data that was common for the majority of documents used in international trade. On the basis of a rather superficial study of existing documents, a list of 17 items was agreed on as a forerunner to the UNTDED.

Applying the common technical bases described above regarding paper sizes, design sheet, margins and presentation of data, it was also agreed to group the 17 items listed by broad function, such as parties, transport information, commercial data, and goods details.

The available image area therefore was divided into four main areas:

- The upper half into two parts, the left one reserved for parties (consignor, consignee, forwarder) and transport details, and the right part for the name of the buyer, if different from the consignee, dates and references, commercial data (terms of delivery and payment) and some statistical data (countries of origin and destination, etc.).

- The lower area (slightly larger than the upper area) was reserved for the goods details (shipping marks, number and kind of packages, goods description, their gross weight and volume) and (mainly for customs purposes) their commodity number, net quantity and value.

Statistics showed that a large majority of shipments consisted of only one or two items of goods but that in some cases, e.g. for automotive and other machine parts, one shipment could include a large number of items. It was therefore agreed not to limit the depth of the space for goods details in the Layout Key. In cases where the A4 size could not accommodate the entire list of goods items, it was recommended to use continuation sheets.

However, in addition to the agreed list of "common" data, there was a need to provide for many items of information specific uniquely to particular documents. For this reason, the lowest part of the image area was set aside as a "free disposal" area, separated from the goods field by an interrupted line to indicate that it was up to the designer of an aligned series of documents to decide on the exact delimitation of these two areas.

2.7   DESIGNING A SPECIFIC FORM ON THE BASIS OF THE UNLK

The UNLK is a generic format that will not directly meet the documentary requirements of a specific country or industry sector. It serves as the basis for deriving subsidiary national and international layout keys and ultimately aligned forms that can be used for business transactions. Such an aligned form specifies data elements of the UNLK in greater detail, adds other data elements required for a specific business process, or suppresses data elements that are not required. However, the three following rules should be observed in designing forms derived from the UNLK:

Rule 1

Data elements specified in the UNLK and that will be used in the derived form should be placed in the corresponding space in the aligned form.

Rule 2

Data elements not specified in the UNLK should be placed in the "free disposal" area of the derived form.

Rule 3

Data elements not required in the derived form can be disregarded. The corresponding space can be used for other purposes in the same way as the "free disposal" area.

Use full size (A4) illustration, as in the Guidelines to the United Nations Layout Key for Trade Documents.

LAYOUT KEY FOR TRADE DOCUMENTS

Consignor (Exporter)	Date; Reference No. etc.
Consignee	Buyer (if other than consignee) or other address
Notify or delivery address	Country whence consigned
	Country of origin
Transport details	Terms of delivery and payment

Shipping marks; Container No.	Number & kind of packages; Goods description	Commodity No.	Gross weight	Cube
			Net quantity	Value

Place and date of issue; Authentication

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Image 4: Example: UNLK Form

An example of a Sea Waybill designed in application of the UNLK.

Non Negotiable Sea Waybill

Cosignor (name, address, tax reference)	Shipper's reference	Bill of Lading number
	Forwarder's reference	
	Unique consignment reference	

Consignee (name, address, tax reference)	Carrier (name, address, tax reference)

Notify party (name, address, tax reference)	Additional notify party (name, address, tax reference)

Pre-carriage by	Place of receipt	
Vessel/voyage no	Port of loading	
Port of discharge	Final place of delivery by on-carrier	

Marks and numbers; transport unit ID	Number and kind of packages; shipping description of goods	Gross weight	Measurement

Container no(s) Seal no(s)	Freight details, charge etc.	Rate	Per	Prepaid	Collect

	Freight payable at	Carrier's name
	Number of original Bill of Lading	Place (+ ISO code) and date of issue (yyyy-mm-dd)
Received for carriage as above in apparent good order and condition, unless otherwise stated hereon,

The goods described in the above particulars | | Authenticating Signature |

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Image 5: Sea Waybill

2.8   ALIGNED MASTER FORMS FOR "ONE-RUN" SYSTEMS

The fact that, in documents aligned on the UNLK, the same type of information always appears in the same location is a great advantage, as it helps to find data quickly and also overcomes language difficulties. For example, the name found in the top left corner of the document is always that of the consignor.

The real benefit of alignment, however, is that aligned forms can be filled in using a Master Form in one operation. This is what is defined as a "one-run" application. All relevant data is recorded on a "Master" document from which the data required in a particular form is copied through a selective reproduction process.

The concept of the Master Form has its equivalent in the concept of a common Data Model, where the same data structures are used in different documents. It ensures that the same structure and semantic presentation is used for identical information required in different trade documents. Besides harmonizing the information requirements, this is crucial for the automation of information processing.

For designing of "in-house" series of aligned forms, there are few limitations as how to apply the UNLK. However, as soon as external forms are to be included in the series, the particular features of such forms have to be taken into account. If goods are to be shipped by sea, the aligned series would include a Bill of Lading or Sea Waybill, and these are often completed by the exporter. The data requirements of the ICS International Bill of Lading would therefore have to be reflected in the aligned series.

This hierarchy of internationally adopted forms and their relation to national mandatory forms is described in the UNLK Recommendation and in Chapters III and IV of the Guidelines for Application referred to above.

Image 6: Master Form

MASTER

Sender	Invoice date	Invoice No.
	Our order date	Our order No.
Agent in place of shipping	Your order date	Your order No.
Consignee	Buyer (if other than consignee)	
Notify address		
	Country of origin	Country of destination
Domestic carriage by from	Terms of delivery	
Pre-carriage by from	Time of delivery	
Main-carriage by Port of loading	Terms of payment	
On-carriage from Final destination	Insurance value	Insurance ☐ covered by us ☐ covered by you

Shipping marks, container Nr.	Number and kind of packages: goods description	Commodity No.	Quantity	Value
			Gross weight	Cube
Quantity ordered Item/Art. No.	Article	Quantity delivered	Unit price	Total amount

Freight payment		Docs. attached ☐ Export decl.	Costs	Included above	Not incl. above
Doc. sent to Banker	Buyer	Rec. spec. below	Packing		
Invoice Orig. Copy	Orig. Copy	Orig. Copy ☐ Invoice copy	Freight		
Bill of lading		☐ Invoice specific.	Insurance		
Ins.policy		☐ Freight doc.			
Certificate of origin		☐	Total invoice amount		
Additional receiver of documents					
Name of bank	Freight to be paid at				
Other information	No. of original Bs/L				

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3.   TRADE DATA ELEMENT DIRECTORY, CODE LISTS, AND BOX COMPLETION GUIDELINES

The UNLK was implemented by international organizations and in many countries during the period 1964–1979. At the time, the emphasis was on harmonizing the presentation of data in trade documents and on compatibility with typewriters and printing equipment. Although the focus was on the formal aspects of document and data representation, the UNLK and the international forms based on it, the data content of the documents was defined in terms of an internationally agreed dictionary, the United Nations Trade Data Elements Directory (UNTDED, ISO 7372). However, at the time, the definition of the data content was a minor task in the document alignment. Often, developing aligned documents was seen as nothing more than drawing up a paper form that met the UNLK requirements for size and margins and layout.

With the globalization of trade and the need to automate information flows, the task of precisely defining the document data content has become very important:

- Supply chains have become much more complex in the globalized economy. Information on the trade transaction is vital to reduce delays and costs. Nowadays, there is also the increased need of Governments to receive advance trade information for automated risk analysis. Document designers need to take into account these information requirements, expressed, for example, in the WCO Data Harmonization Initiative.

- The harmonization of processes and the simplification of cross-border procedures require clarity in the data required and provided. As documents are the main means of transferring data in international trade, the information in the trade document must be precisely defined.

- There is a growing need to automate trade documents and introduce paperless trade. A precise, unambiguous definition of the data content is a prerequisite for electronic trade documents.

To meet the requirements of modern trade, we suggest developing a simple specification of the required data, the Box Completion Guidelines (BCG). The BCG explain the information required and assist the user in filling in the document correctly. The BCG define the data requirements in terms of the UNTDED data elements and make reference to the recommended code lists where applicable.

The BCG are an important support tool for the development of electronic versions of a trade document, because they provide the data modeler with basic definitions of the data requirements.

3.1   BOX COMPLETION GUIDELINES (BCG)

Box Completion Guidelines are instructions and recommendations for entering data on the trade document. The BCG explain the role of the document in the business process. They set best practices for submitting trade information.

For each box in the form, the BCG provide a list of the mandatory or optional data elements (in terms of UNTDED data elements) and a link to the applicable code list. This specification is the basis for defining the electronic version of the document.

The BCG consist of two components: a form with numbered boxes and the text document describing the content of each box.

Below is an example of the BCG for the Sea Waybill:

Image 7: The Sea Waybill form with boxes numbered

Image 8: The Box Completion Guidelines for Box 01 (Consignor)

3.2   THE TRADE DATA ELEMENT DIRECTORY (UNTDED)

The UNLK recommends using the UNTDED to define the information in the trade document. The Directory is the core library for the definition of data objects (information) in international trade. In some areas more specialized data dictionaries may exist. For example, the WCO Data Harmonization Initiative has developed a sector-specific data element dictionary based on the UNTDED.

Defining the data content of a trade document using the terms of UNTDED has several advantages:

- It provides further clarification of the information requirements and the responsibilities of the parties. This reduces risks and ambiguities, increases transparency, and allows standardization and documentation of the business process.

- It provides a non-technical description of trade information. It is a method used to describe information requirements from the perspective of business or administrative experts. The definition is syntax neutral and provides the basis for a later automation of the document for paperless trade.

- By defining the data content in terms of the UNTDED, different trade documents become directly comparable. This helps identify duplication and reduce the number of documents to the strict minimum.

The definition of data objects based on an internationally accepted standard simplifies the cross-border exchange of data and harmonizes procedures.

The UNTDED is simple to use. Each element consists of a data element *tag* in the form of a four-digit number, a name (informative) and a description. In addition, the data element may have a reference to a UN-recommended code list.

Example of a UNTDED data element:

3420 Buyer's Bank

Desc: Bank employed by the buyer to make payment.

The above format is based on the second edition of UNTDED (ISO 7372:1993). The standard has since been revised to integrate the requirements of electronic business and paperless trade. The format of the UNTDED Revision 2005 (ISO 7372:2005) contains additional fields such as dictionary entry name for core component libraries. For the purpose of document alignment, it is recommended to use the Tag, the dictionary's old name or the business term and the description of the ISO 7372:2005 release when defining the BCG.

Image 9: Definition of TDED element 3420 in ISO 7372:2005

3.3   Using Code Lists for Trade Documents

The encoding of trade data is a very efficient and secure way to exchange information. Using code lists for trade data has several advantages:

- Information is precise, unambiguous, and language neutral;

- All partners in the supply chain use the same information;

- Code lists are important for automated data processing;

- Code lists are maintained by maintenance agencies, ensuring high quality.

The following list of commonly used names and abbreviations for the country *Germany* illustrates how multiple names and codes for the same country can cause problems, making it impossible to implement automated processing and checking of the country name:

Germany, GE, GER, Deutschland, D, DE, West-Deutschland, Bundesrepublik Deutschland, BRD, République Fédérale d'Allemagne, RFA.

UN/CEFACT Recommendation No. 3 advises using the ISO 3166 alpha 2 country code for the name of countries. For Germany, the ISO country code is "DE". Note that "GE" in the above example is the ISO country code of Georgia!

UNECE has developed a number of recommendations and code lists for the most important data elements in international trade such as country codes, currency codes, units of measurement, and codes for trade and transport locations:

UNECE Rec	ISO #	Name
3	3166	ISO Country Code for Representation of Names of Countries
5		Abbreviations of INCOTERMS
7	8601	Numerical Representation of Dates, Time and Periods of Time
9	4217	Alphabetic Code for the Representation of Currencies
16		LOCODE - Code for Trade and Transport (Ports and other) Locations
17		PAYTERMS - Abbreviations for Terms of Payment
19		Codes for Modes of Transport
20	1000	Codes for Units of Measurement used in International Trade
21		Codes for Types of Cargo, Packages and Packaging Materials
23		Freight Cost Code – FCC
24		Trade and Transport Status Codes
28		Codes for Types of means of transport

It is recommended to require the use of coded data elements wherever possible in trade documents.

4. OUTLOOK: DEVELOPING ELECTRONIC DOCUMENTS BASED ON ALIGNED PAPER DOCUMENTS

Standard aligned paper documents can be extended into electronic documents to implement Single Window concepts and paperless trade. The following is a short explanation of the steps to obtain an electronic document. It is not intended to serve as a guide but rather to help trade facilitators understand the process of developing electronic documents on the basis of the aligned paper forms.

4.1 STEP 1: DEVELOPING A DOCUMENT DATA MODEL

Electronic documents require precise definitions of the structure of the data. Based on the data requirements defined in the BCG, a detailed data model is developed based on the Core Component Library (CCL)[2]. The CCL is a syntax-neutral library of simple data structures used to build a trade document. This simplifies the development of the document data model.

For example, the BCG may contain a data element TDED 3002 Buyer "Name and address of a party to which merchandise or services are sold".

To be used in an electronic document, the data modeller defines the structure of this data element, specifying how long the name field is, whether there is a field for the ZIP code (or just one line of characters for ZIP code and location). The data modeller will aggregate basic elements to a data structure that will support the business requirement for TDED data element 3002 (Buyer) in an electronic data exchange.

The development of a good data model requires modelling expertise, knowledge of the business process, and the use of modelling tools. This *Guide* recommends the use of specialized tools for data modelling. These tools will simplify the task and ensure consistency and maintenance of the model, and are also helpful in visualizing and publishing the model. This is a very important aspect because it maintains communication between the data modeller as technical expert and the business experts.

The image below shows a screenshot of the core component data model of the *Buyer* field in the data model.

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[2]   http://www.unece.org/cefact/codesfortrade/unccl/CCL_index.htm.
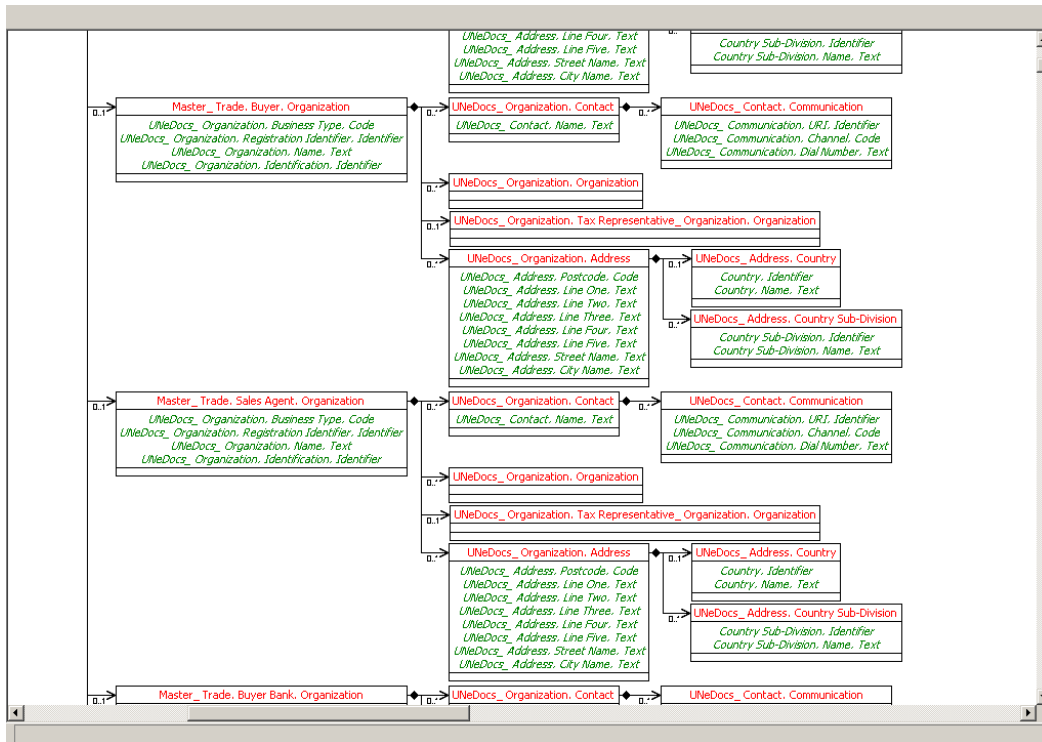
Image 10: The core component data model of the *Buyer* field in the data model

4.2   STEP 2: TRANSFERRING THE DOCUMENT DATA MODEL INTO AN ELECTRONIC SYNTAX

Once the document data model has been developed and approved, the development of an XML is a straightforward task. UN/CEFACT *XML Naming and Design Rules* provide the technical specification for the transformation of a data model into XML syntax. By using modelling tools that incorporate this specification, the data model can be directly exported into XML format. If no data modelling tool is used for the transformation from data objects into a syntax, it must be done manually.

The export of the data model generates an XML Schema, which can be used directly for electronic document interchange.

Image 11: XML schema generated by the export of the data model

4.3   STEP 3: FROM THE ELECTRONIC DOCUMENT BACK TO PAPER

Based on aligned trade forms, BCG style sheets can be developed that render the electronic XML document in PDF formats which meet the exact specification of the aligned document. A style sheet is a set of instructions that render the data in an XML into a specific format.

Note. That the development of EDIFACT messages from document data models requires a manual mapping between the data model and the EDIFACT message. This process requires more work than an automated export into XML but can be done with reasonable resource input.

Below is an example of an XML style sheet:

```
<?xml version="1.0" encoding="UTF-8" standalone="no" ?>
<!-- File: UNeNNSW.xsl  -->
<!-- 26Aug'03 The funtion in seller/buyer can now can print * for structured address as well.  -->
<!-- Printing party details perfectly 28 -->
<!-- MAx length to item desc shd be set to 175. Country of origin CODE shd be made mandatory. Additional Text 175Chars  -->
<!-- 27Aug'03 The item box or table was created today.  -->
<xsl:stylesheet xmlns:xsl="http://www.w3.org/1999/XSL/Transform" xmlns:fo="http://www.w3.org/1999/XSL/Format" version="1.0">
   <!-- Importing Layout setting(Layout) setting file  -->
   <xsl:import href="layoutInc.xsl" />
   <!-- Importing resuable types file  -->
   <xsl:import href="UNeDocsRT_0_1.xsl" />
   <!-- Importing the resouce file filelocation.xsl for a file locations  -->
   <xsl:import href="resourceloc.xsl" />
   <!-- Setting output method to xml for rendering XML to FO to PDF  -->
   <xsl:output method="xml" indent="yes" />
   <!-- output switch  -->
   <xsl:variable name="tag" select="'fo:block'" />
   <!-- Setting to template to root  -->
<xsl:template match="/">
   <!-- fo:root initialization  -->
   <fo:root>
      <!-- Master layout set to UN Layout key recommended page margins see file layoutInc.xsl -->
      <fo:layout-master-set>
         <fo:simple-page-master master-name="UNeNNSW" page-width="{$page-width}" page-height="{$page-height}" margin-bottom="{$margin-
            bottom}" margin-left="{$margin-left}" margin-right="{$margin-right}">
            <fo:region-body margin-top="{$margin-top}" background-image="{concat($imagefilepath,'specimen.jpg')}" />
            <fo:region-before extent="1cm" margin-top="20mm" />
         </fo:simple-page-master>
      </fo:layout-master-set>
      <!-- Creating page sequence for rendering the document  -->
      <fo:page-sequence master-reference="UNeNNSW">
         <!-- Setting Title for the document  -->
       + <fo:static-content flow-name="xsl-region-before">
         <!-- Rendering Document Header  -->
         <fo:flow flow-name="xsl-region-body">
            <!-- Constructing box 01 to 02  -->
            <fo:table table-layout="fixed" inline-progression-dimension="auto" border="0.015mm solid black">
               <fo:table-column column-width="{$colDivide}" />
               <fo:table-column column-width="{$colDivide}" />
               <fo:table-body>
                  <fo:table-row height="{concat($stdH * 3,'mm')}">
                     <fo:table-cell border-right-style="solid" border-right-width="0.015mm">
                        <fo:block xsl:use-attribute-sets="box-attrs">Consignor (name, address, tax reference)</fo:block>
                        <xsl:apply-templates select="/*/*/*/ConsignorParty" />
                     </fo:table-cell>
                     <fo:table-cell>
                        <!-- Construting box 02  -->
                        <fo:table table-layout="fixed" inline-progression-dimension="auto">
```

Image 12: Example of an XML style sheet

By opening the style sheet and the XML documents together, the document is visualized in the UNLK format.

Image 13:
Document visualized in the UNLK format by opening the style sheet and the XML documents together

When printed, the document is fully compliant with the UNLK.

Note. That the transformation from XML to PDF using a style sheet requires software. Different software is required for different output media (e.g. HTML, PDF). For rendering into HTML standard Web browsers can be used. To generate the above example in PDF format, UNECE used an open source product.

Guide for the design of Aligned Trade Forms

For Paperless Trade