

Standardized water level exchange format for Inland ENCs

version 0.3

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1.1. Introduction (Primary functions)

Depth information in Inland ENCs is referred to a reference water level. The depth values in the IENC have to be corrected to show the actual water depth at a specific point of time. As the longitudinal surface lines of a river at different water levels are not parallel to one another, but are influenced by the varying forms of the cross sections, a water level model is needed to provide the accurate correction values for various waterway distance points.

The R&D project COMPRIS of the European Union has shown, that it is not possible to define a standardized water level model, which can be used on all waterways. But this document provides a standardized data exchange format for the transmission of the correction values, which have been derived from a local water level model on shore, to the on-board applications.

The standardized data exchange format can also be used to transmit gauge readings or gauge forecasts. This option should not be used within Europe, where the Inland AIS standard and the Notices to Skippers standard are already providing standardized data exchange formats for gauge information. But this option might be used in other regions.

The standardized data exchange format provides also the possibility to transmit velocity information for display or voyage planning purposes.

1.2. Data standard

Water level information shall be provided according to Table 1, XML Message Specification.

The XML scheme of the standardized water level files is published at ienc.openecdis.org.

1.3. Structure of the XML files

The XML water level message for Inland ENCs consists of a header section and at least one waterway section or one gauge section. As gauge sections should not be used in Europe, European water level messages have to contain at least one waterway section. Each waterway section refers to one waterway section code and has to contain at least one time section. A time section can contain values, which are based on measurements or predictions.

The following naming is recommended for the standardized water level files:

Code of the waterway name and the lower distance (as recommended for Inland ENCs in Europe)_date/time.wlc

e.g. D1920_20080328110000.wlc

The special extension for water level files, “wlc” (for water level correction) allows software applications to identify water level files.

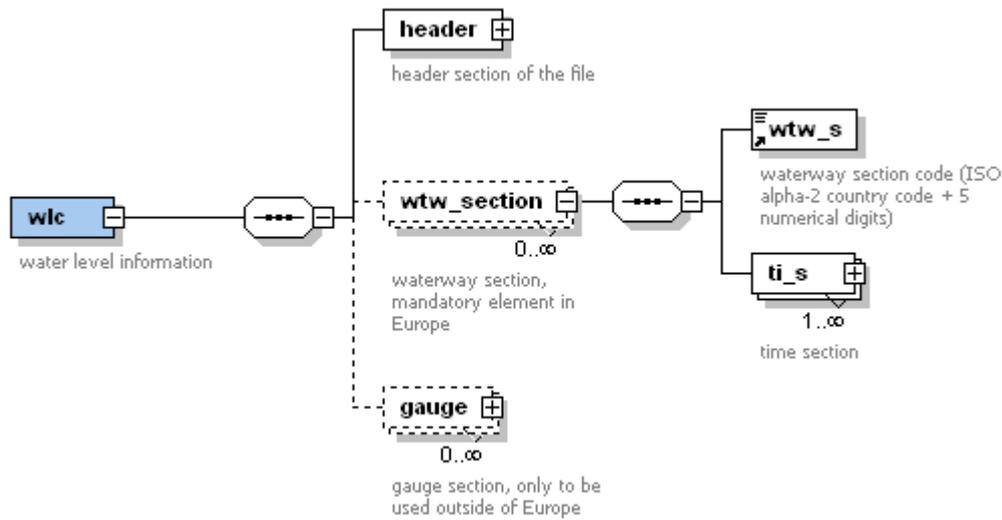


Figure 1, structure of the XML file

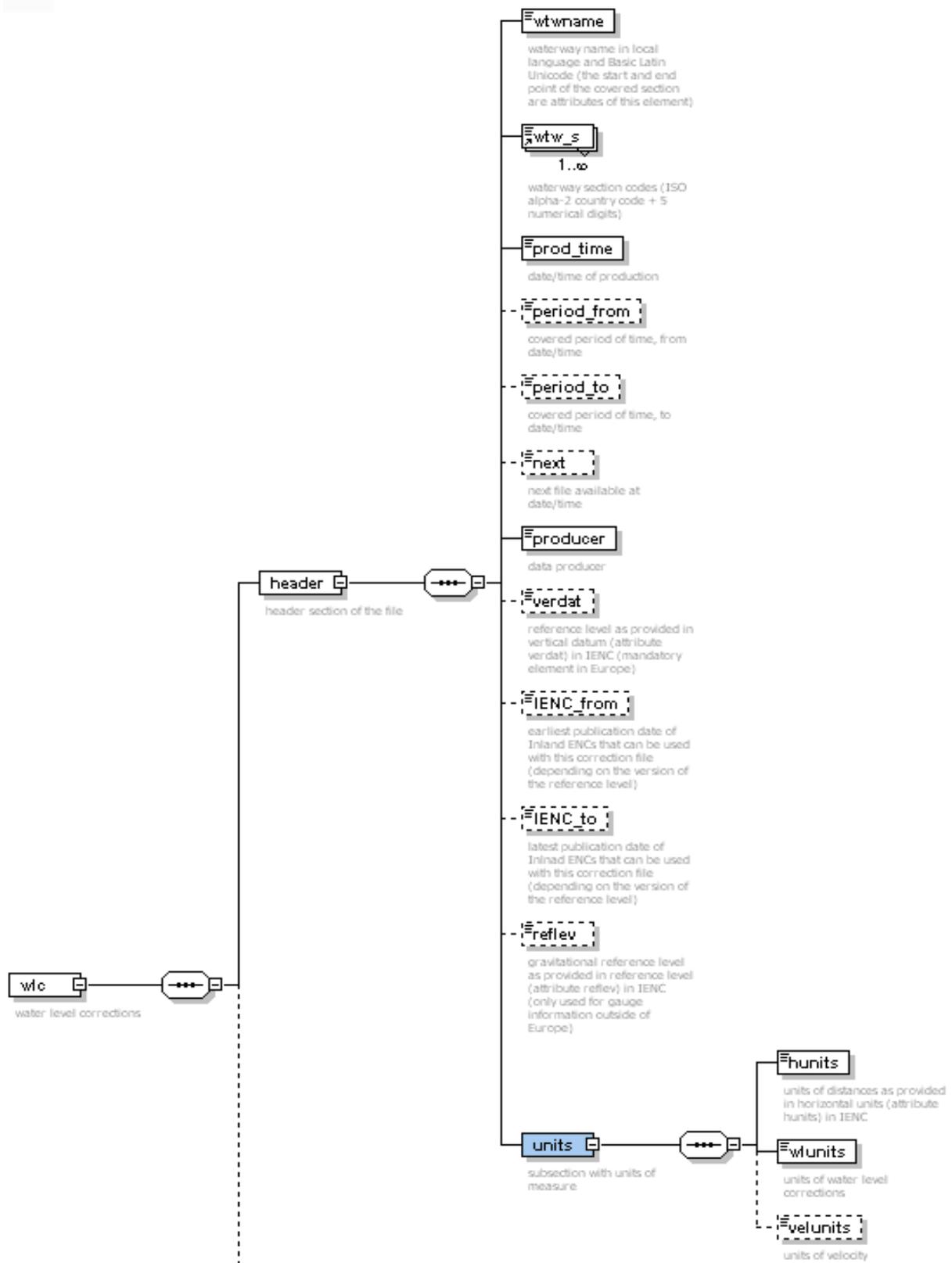


Figure 2, structure of the header section

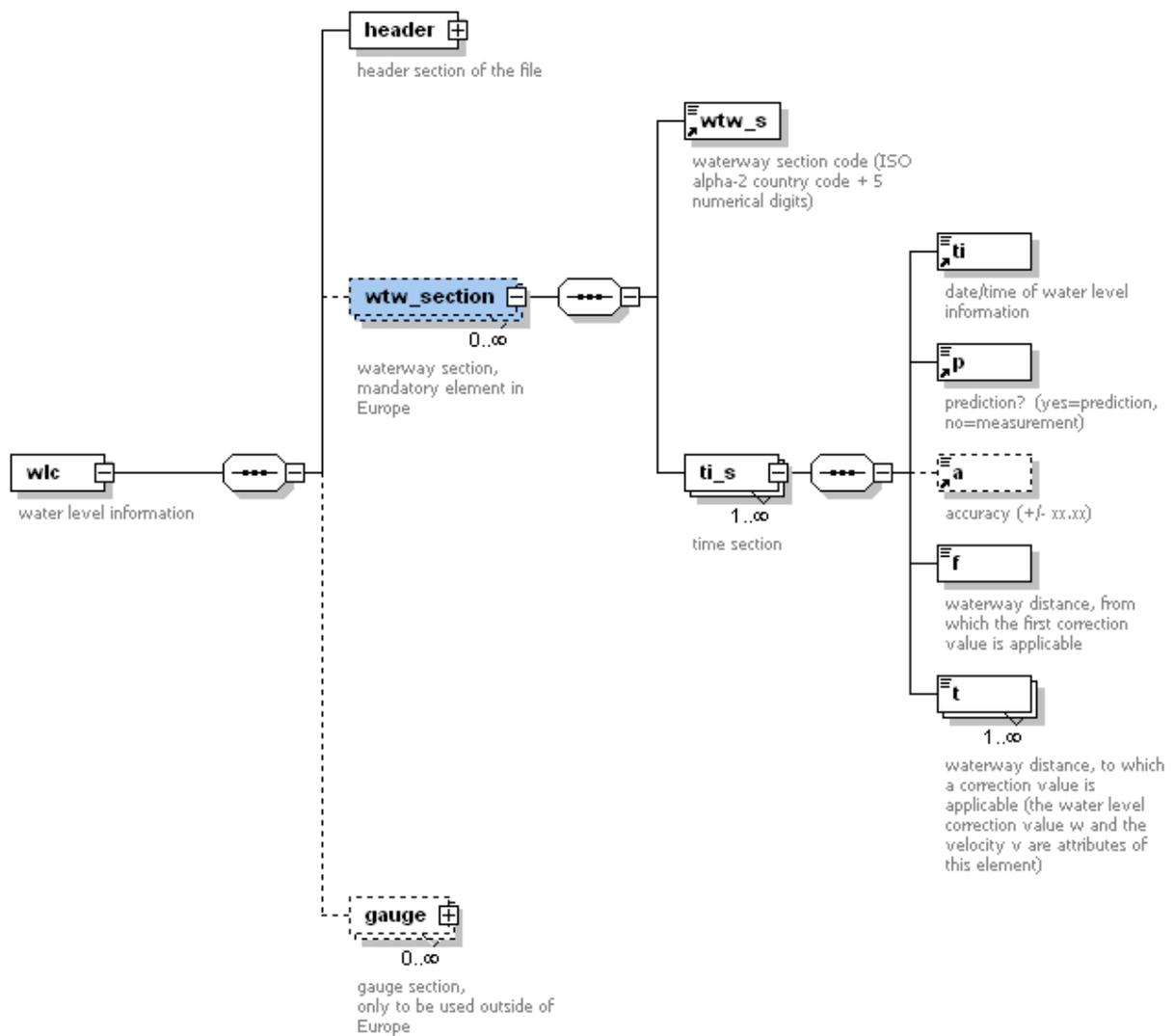


Figure 3, structure of the waterway section

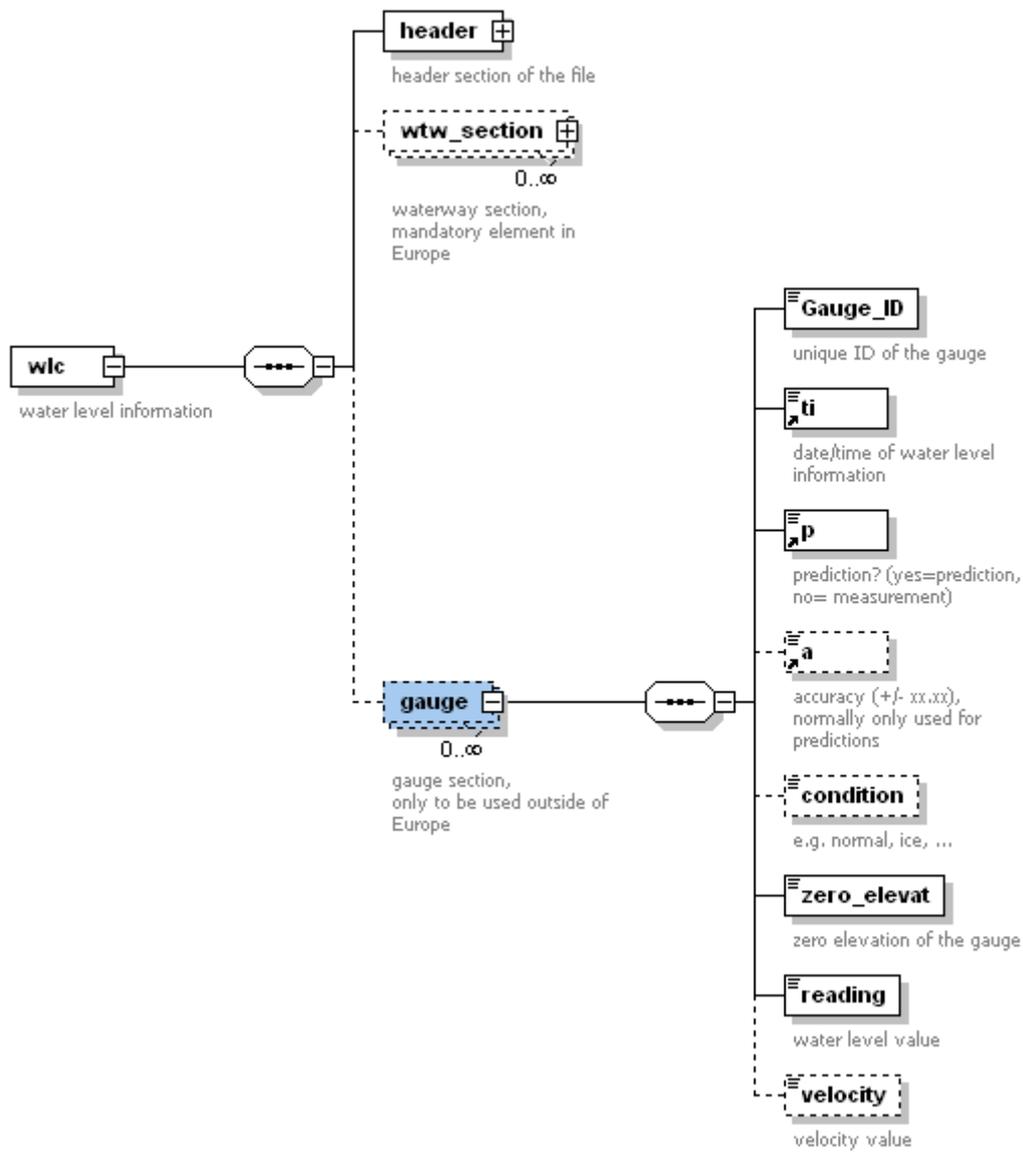


Figure 4, structure of the gauge section

Table 1, XML message specification

XML (with examples of content)	description	mandatory/optional
<code><?xml version="1.0" encoding="UTF-8"?></code>		1
<code><wlc></code>	water level correction file	1
<code><header></code>	header section of the file	1
<code><wtwname start="1920.0" end="1950.0">Donau</wtwname></code>	<p>waterway name in local language and Basic Latin Unicode as in Inland ENCs (the start and end point of the covered section are mandatory attributes of this element)</p> <p>the waterway name is included in the SEARE object in Inland ENCs (see D.1.3 of the Encoding Guide)</p>	1
<code><wtw_s>AT00001</wtw_s></code>	<p>waterway section codes (ISO alpha-2 country code + 5 numerical digits)</p> <p>waterway section codes are defined in the European standard for electronic reporting in inland navigation as part of the location code. Only 7 characters from the 20 digit location code are used. The ISO-Alpha 2 country codes are standardized. The numerical 5 digit code of the waterway section has to be assigned by the national authorities. It has to be unique within a country and is therefore unique on an international level in combination with the country code</p> <p>the location code is included in the wtware object in Inland ENCs (see L.3.1 of the Encoding Guide)</p> <p>one water level file can be connected to several waterway sections, all of them have to be listed in the file header</p> <p>a water level file does not have to cover the complete waterway sections, but might only cover small parts of the listed waterway sections</p>	1...∞
<code><prod_time>20080328T110000</prod_time></code>	date/time of production	1
<code><period_from>20080328T110000</period_from></code>	covered period of time, from date/time	0 or 1
<code><period_to>20080328T120000</period_to></code>	covered period of time, to date/time	0 or 1

<next>20080328T120000</next>	next file available at date/time	0 or 1
<producer>via donau</producer>	data producer	1
<verdat>36</verdat>	<p>reference level as provided in vertical datum (attribute verdat) in IENC (see C.1.4 of the Encoding Guide)</p> <p>Enumerations:</p> <ul style="list-style-type: none"> 12 (Mean lower low water) 31 (local low water reference level) 32 (local high water reference level) 33 (local mean water reference level) 34 (equivalent height of water (German GIW)) 35 (Highest Shipping Height of Water (German HSW)) 36 (reference low water level according to Danube Commission) 37 (highest shipping height of water according to Danube Commission) 38 (Dutch river low water reference level (OLR)) 39 (Russian project water level) 40 (Russian normal backwater level) 41 (Ohio River Datum) 	<p>0 or 1</p> <p>mandatory element in Europe</p>
<IENC_from>19960601</IENC_from>	earliest publication date of Inland ENC's that can be used with this correction file (depending on the version of the reference level)	<p>0 or 1</p> <p>has only to be used if there are Inland ENC's that use an older version of the reference level</p>
<IENC_to></IENC_to>	latest publication date of Inland ENC's that can be used with this correction file (depending on the version of the reference level)	<p>0 or 1</p> <p>has only to be used if there are Inland ENC's that use a newer version of the reference level</p>
<reflev>2</reflev>	gravitational reference level as provided in reference level (attribute reflev) in IENC (see I.3.4 of the Encoding Guide)	<p>0 or 1</p> <p>only used for gauge</p>

	<p>Enumerations: 1 (Baltic datum) 2 (Adriatic level) 3 (Amsterdam Ordinance Datum (NAP)) 4 (Mean sea level (NN)) 5 (other datum) 6 (National Geodetic Vertical Datum - NGVD29) 7 (North American Vertical Datum - NAVD88) 8 (Mean sea level 1912) 9 (Mean sea level 1929)</p>	information outside of Europe
<units>	units subsection	1
<hunits>3</hunits>	<p>units of distances as provided in horizontal units (attribute hunits) in IENC (see I.1.2 of the Encoding Guide)</p> <p>Enumerations: 3 (kilometres) 4 (hectometres) 5 (statute miles) 6 (nautical miles)</p>	1
<wlunits>cm</wlunits>	<p>units of water level corrections as provided in the “Units of Height Measurement” [HUNI] subfields in the “Data Set Parameter” [DSPM] field of the Inland ENC cell header (see 4.4 of the Inland ENC Product Specification)</p> <p>Enumerations: m (metres) cm (centimetres) ft (feet)</p>	1
<velunits>m/s</velunits>	<p>units of velocity</p> <p>Enumerations: m/s (metres per second) km/h (kilometres per hour) mph (statute miles per hour) knots (nautical miles per hour) ft/s (feet per second)</p>	0 or 1

<code></units></code>	end of units subsection	
<code></header></code>	end of the header section of the file	
<code><wtw_section></code>	waterway section of the file	0...∞ mandatory section in Europe
<code><wtw_s>AT00001</wtw_s></code>	<p>waterway section codes (ISO alpha-2 country code + 5 numerical digits)</p> <p>waterway section codes are defined in the European standard for electronic reporting in inland navigation as part of the location code. Only 7 characters from the 20 digit location code are used. The ISO-Alpha 2 country codes are standardized. The numerical 5 digit code of the waterway section has to be assigned by the national authorities. It has to be unique within a country and is therefore unique on an international level in combination with the country code</p> <p>the location code is included in the wtware object in Inland ENCs (see L.3.1 of the Encoding Guide)</p> <p>one waterway section of the file can only be connected to one waterway section code</p> <p>a waterway section of the file does not have to cover a complete waterway section, but might only cover a small part of a waterway section</p>	1
<code><ti_s></code>	time subsection	1...∞
<code><ti>20080328T110000</ti></code>	<p>date/time of water level information</p> <p>each time subsection provides values for a specific date/time</p>	1
<code><p>no</p></code>	<p>prediction?</p> <p>Enumerations of the Boolean element: yes (prediction) no (measurement)</p>	1
<code><a>10.00</code>	<p>accuracy of the water level correction values (+/- xx.xx)</p> <p>the unit of measure of the accuracy value is defined by the wlunits element in the header section of the file</p>	0 or 1

<code><f>1920.0</f></code>	waterway distance, from which the first correction value is applicable the unit of measure of the waterway distance is defined by the hunits element in the header section of the file	1
<code><t w="15" v="3">1921.5</t></code>	waterway distance, to which a correction value is applicable the water level correction value w is a mandatory attribute of this element the velocity v is an optional attribute of this element the unit of measure of the water level correction value is defined by the wlunits element in the header section of the file the unit of measure of the velocity is defined by the velunits element in the header section of the file	1...∞
<code></ti_s></code>	end of the time subsection	
<code></wtw_section></code>	end of the waterway section of the file	
<code><gauge></code>	gauge section of the file	0...∞ only to be used outside of Europe
<code><gauge_ID wtwdis="19235">AT00001</gauge_ID></code>	unique ID of the gauge	1
<code><ti>20080328T110000</ti></code>	date/time of water level information	1
<code><p>no</p></code>	prediction? Enumerations of the Boolean element: yes (prediction) no (measurement)	1
<code><a>10.00</code>	accuracy of the gauge readings (+/- xx.xx) the unit of measure of the accuracy value is defined by the wlunits element in the header section of the file normally only used for predictions	0 or 1
<code><condition>normal</condition></code>	e.g. normal, ice, ...	0 or 1
<code><zero_elevat>215</zero_elevat></code>	zero elevation of the gauge as provided in elevation (attribute ELEVAT) in	1

	IENC (see I.3.4 of the Encoding Guide) the unit of measure of the zero elevation is defined by the wlunits element in the header section of the file	
<reading>13</reading>	water level value at the gauge the unit of measure of the water level value is defined by the wlunits element in the header section of the file	1
<velocity>7</velocity>	velocity value the unit of measure of the velocity is defined by the velunits element in the header section of the file	0 or 1
</gauge>	end of the gauge section of the file	
</wlc>	end of the water level correction file	

