

Software for weighbridge pattern approval

Document preparation instruction guide

Company Name	
Software Name	
Software Version	
Date of preparation	
List of documents (Related to this information guide)	

Each module of documents shall contain the following information:

- *Title of the document*
- *Description and scope of the document*
- *Author*
- *Version*
- *Date of publish*
- *Changes history*

General notes:

- 1) Operations that are considered as legally relevant:
 - Data capturing from digital indicator.
 - Storing, retrieving and updating database.
 - Any checksum or encryption routine that realizes the protection of legally relevant software.
 - Any checksum or encryption routine that realizes the protection of legally relevant data inside database.
 - Any secret key and / or hidden polynomial values in the form of string, integer bytes etc. that realizing the checksum or encryption mention above.
 - Measuring algorithm (e.g. rounding, stabilization, price calculation).
 - Weight capturing screen.
 - Printing preparation function.
- 2) Legally relevant data is considered as:
 - gross, net, tare values.
 - decimal signs.
 - units.
 - measurement ID (e.g. ticket number, docket number etc.).
 - weighbridge ID.
 - indicator ID.
 - manual entry / automatic reading flag.
 - checksum / signature of the data set stored.
 - Any other data that critical to the weight and its traceability of measurement.
- 3) This document is intended to assist applicant in preparing technical documents for submission. Result from this document won't guarantee the overall pass/fail result of the final submission of pattern approval.
- 4) Review results are not final and subject to change from time to time.

Common errors self-check.

Item	Description	Answer
A.	The number decimal points / significant digit shall similar as displayed from the actual digital indicator and user's interface(s) in the software.	Choose an item.
B.	The number decimal points / significant digit shall consistent on every window/pages throughout the software and printed mediums.	Choose an item.
C.	The unit "kg" displayed on user's screen and on printed medium uses small letter for both "k" and "g". This applicable throughout the documents and software user interface.	Choose an item.
D.	The correct conversion for 1,000 kg is "tonne" or "metric ton" with the symbol "t". It is wrong to use "ton" as the unit of the measurement. Please make sure the unit used is correct throughout the software and printed medium is correct. <i>Notes:</i> <i>(US) 1 ton = 907.18474 kg</i> <i>(UK) 1 ton = 1,016.0469 kg</i> <i>1 t = 1000.00 kg</i>	Choose an item.
E.	Conversion value between "kg" and "tonne" shall maintain similar number of significant digits.	Choose an item.
F.	The word nett weight is commonly wrong-spelled as net weight.	Choose an item.
G.	Alphabetical characters are crucially case-sensitive when describing programming terms. Please be consistent and accurate in declaring programming matters (such as parameter, column name, variable, method name, string character, hexadecimal etc.) and also special names (such as ".NET", "C#", Windows etc.)	Choose an item.
H.	Screenshot, images, diagrams, flowcharts etc. shall be considerably sharp and readable.	Choose an item.
I.	Every description shall be in full detail as possible, clearly, precisely and well written. Please also consider to proof-read the documents before submission.	Choose an item.

Please fill-in all the information as required below.

INTRODUCTION AND GENERAL INFORMATION OF THE SOFTWARE.

No.	Information required	To be filled by applicant			To be filled by NMIM	
		Document ID & applicant comment	Page no.	Section	Reviewer's comment	Need correction?
1.	Introduction and description of the software including name, version as well as the developer name.					
	Overview of the intended business operation for the weighbridge software.					
	Description of software usage and functionality.					
	Purpose and objective of the software.					
	Working environment of the software.					
2.	Description of additional accessories/peripherals that might be used with the system (camera, sensors, barricade, signal lamp, siren, etc.)					
	Statement and declaration that the additional accessories shall not interfere with the measurement / metrological properties of the weighing system and software.					
3.	Screenshot of the splash screen,					

	main screen.					
4.	Description of hardware requirements for client PC (processor, RAM, Hard drive etc.)					
5.	Description of software requirements for client PC (Example: Windows XX, .NET framework XX, Java runtime version XX, etc.)					
6.	Description of hardware requirements for database server (If different from client).					
7.	Description of software requirements for database server (Example SQL Server XX).					
8.	Statement that the software supports whether local or remote database.					
9.	Network topology diagram depicting the database server and clients (if applicable) and/or interfacing with other external 3 rd party software framework system (such as SAP).					
10.	List of all user groups with its access levels.					
11.	Description in detail of each of user group access level. <i>Notes: Describe which user's group are logged in audit trail.</i>					
12.	Explanation on which user group can access to which functionality in the software.					
13.	List and description communication all interface supported by the software to the digital indicator (RS-232, Bluetooth).					
14.	Description on how to configure the communication parameters in the software for communication interface (COM port, baud rate etc.) <i>Notes: Changing the communication parameters shall be logged in audit trail.</i>					
	Description on who would be able to do the configuration and how the software restricts the configuration from being accessible to everybody.					

WEIGHING SCREEN, DISPLAYING SCREEN & PRINTING.

No.	Information required	To be filled by applicant			To be filled by NMIM	
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15.	<p>Description of weighing screen</p> <p><i>Notes:</i> Clearly explain each of the component/information/data inside the weighing screen.</p>					
	<p>Description of weighing screen has the highest priority among other windows.</p> <p><i>Notes:</i> Other windows shall not be able to overlap the weighing screen.</p>					
	<p>Screenshot of weighing screen. According to SI units.</p> <p><i>Please be sure that the word "kg" uses small letter.</i></p> <p><i>See Appendix B as the example of acceptable exclusive weighing indicator screen.</i> <i>See Appendix C as the example of acceptable mixed weighing screen.</i></p> <p><i>Notes:</i></p> <ul style="list-style-type: none"> The weighing screen must clearly indicate the real-time weight including the unit (kg, tonne, etc). If weight display is mixed with other complementary fields, the weight must be clearly obvious from the other. 					
16.	<p>Statement and description that the weighing screen is located inside the legally relevant library (DLL)*.</p> <p><i>*Please provide evidence at the programming functional level (source code is not necessary).</i></p> <p><i>Please give the control name if custom control is being used.</i></p> <p><i>Notes:</i> If exclusive weighing screen is used, the whole windows form must be located inside legally relevant library. Whereby if mixed indication screen is used, please provide evidence at the programming level that the weighing control is drawn/mapped/generated by the legally relevant library. The weighing screen/control can't be changed in the future.</p>					
17.	<p>Summary window that display the complete dataset of weighing shall contain weighing ID.</p>					
	<p>Statement that the weighing ID is accompanying the weighing data whenever it presented on any operators' screen or any printable medium.</p>					
	<p>Screenshot of weighing data retrieved from database that clearly shows all the related data</p>					

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	including weighing ID.					
	Screenshot of printed ticket/docket etc. or any printable medium that clearly shows the weighing data including the weighing ID.					
	If unit "tonne" is used to convert from original "kg" on the printed medium, the conversion formula shall be clearly specified.					
18.	<p>Statement that the weighing data captured can't be manipulated / modified by operator and will be automatically stored to database immediately after weight is captured.</p> <p><i>Notes:</i> <i>Weight data capturing and immediately storing to database routine shall be handled exclusively by legally relevant library without any interception by non-legally parts (EXE). EXE will take over again the operation after both operations completed.</i></p>					
	<p>Programming functional diagram that illustrate the data being captured from indicator handled by functions, displaying to user screen, prepare for checksum, and automatically post to database storage.</p> <p><i>Notes:</i></p> <ul style="list-style-type: none"> <i>The process is best described using UML diagram.</i> <i>Please state related functions and which library/file it resides.</i> 					
19.	<p>Description of weighing stabilization algorithm before weight data being captured.</p> <p><i>Notes:</i> <i>Weighing stabilization algorithm is considered as legally relevant. Please name the related function.</i></p>					
	<p>Description of rounding algorithm.</p> <p><i>Notes:</i> <i>Rounding algorithm is considered as legally relevant. Please name the related functions.</i></p>					
	<p>Description of price calculation.</p> <p><i>*The formula used to calculate final weight and price. This operation is considered as legally relevant. Please state the related functions.</i></p>					
20.	Statement that all the relevant data are stored to database and can be reconstructed back in the future.					
21.	Statement and description that the printing preparation function is					

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	located inside the legally relevant library (DLL)*. <i>*Please provide evidence at the programming functional level (source code is not necessary).</i>					
22.	Description on manual weighing data entry. (If applicable) <i>Notes: Manual data entry shall be logged in audit trail.</i>					
	Description of how the accessibility of manual data entry is being restricted and controlled. <i>Notes: Manual weighing shall not be accessible by anybody at any time).</i>					
	Description that the manual data entry is properly logged and trailed.					
	Description that the manual data inside the database is tagged / flagged and can be clearly distinguished between the automated one.					
	Screenshot of manual data inside database which depicts clearly the flag.					
	Description that the manual data is clearly marked during the operator's display screen and on every printed medium.					
	Screenshot of printed ticket/docket etc. or any printable medium that clearly shows the manual/automated reading mark.					
23.	Description on post data correction (editing) if mistake happened. <i>Notes: Post data editing shall be logged in audit trail.</i>					
	Description on how data editing is being restricted.					
	Description on who be able to perform data edit. <i>Notes: Manual data entry shall only be accessible only to certain group of users. Normally supervisor / administrator.</i>					

EXECUTABLE FILE AND RELEVANT LIBRARIES.

No.	Information required	To be filled by applicant	To be filled by NMIM
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		Document ID & applicant comment	Page no.	Section	Reviewer's comment	Need correction?
24.	Description of development environment and language used.					
25.	Name and version of the main executable file.					
26.	Typical installation path location of executable as well as the library (DLL).					
27.	Description of where the legally relevant library is reside. (whether the same location of main EXE)					
28.	List of each of the legally relevant library (DLL) including version and checksum (CRC32).					
29.	Description of purpose of each of the legally relevant library (DLL).					
30.	Diagrams depicting the relationship between legally relevant library (DLL), main executable, database, digital indicator, printer and network.					

PROGRAMMING FUNCTIONS/METHODS OF LEGALLY RELEVANT LIBRARIES.

No.	Information required	To be filled by applicant			To be filled by NMIM	
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31.	<p>Summary list of programming functions and methods inside the each of the legally relevant library (DLL).</p> <p>Notes:</p> <ul style="list-style-type: none"> Both returning value and non-returning value (void) functions shall be listed. Conveniently tabulate inside a table. 					
32.	<p>Detail programming reference for each of the functions/methods inside each of legally relevant library (DLL).</p> <p>See Appendix D on the example of programming reference to be declared.</p> <p>Notes:</p> <p>Both returning value and non-returning value (void) functions shall be provided..</p> <p>The programming reference* shall constitute the following:</p> <ul style="list-style-type: none"> The header of the function/method The parameters passed to the function including datatype. The definition of each of the parameters exchanged. The expected return datatype Description each of the purpose of each function/method. <p>*Source code is optional and not required.</p>					
33.	Any secret string, constant,					

	encryption key and secret bytes, secret hidden start vector address that realizing the hidden polynomial of checksum are considered as legally relevant parameters and shall reside inside the legally relevant library.					
34.	Statement that the legally relevant data is exchanged directly between legally relevant function and legally non-relevant function via callable functions/methods. Data is not exchanged via any other intermediate medium (such as text file).					
35.	Statement that no other module/library within the software that could influence the measurement data except the one that declared as legally relevant library.					
36.	Declaration that all the functions/methods is complete. No other legally relevant function exist (Statement of completeness)					

PROTECTION OF LEGALLY RELEVANT LIBRARIES

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37.	Description on how the software check its legally relevant library (DLL) during startup (must utilize checksum with hidden polynomial)					
	Each of legally relevant library shall check itself during its class initialization (normally during startup of program). The subroutine for checksum calculation and comparison shall reside in legally relevant library.					
38.	Statement that the software uses hidden polynomial method in the checksum calculation during self-check of legally relevant library.					
39.	Detail explanation on how the hidden polynomial technique is realized. <i>Notes:</i> <i>Hidden polynomial is realized by using either of the following approach:</i> <ul style="list-style-type: none"> • <i>secret bytes/string during checksum calculation</i> • <i>Use secret start vector during the calculation of checksum</i> • <i>encrypt the checksum value</i> 					
	Location of the pre-calculated checksum value is stored.					

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	Location of decryption key (if encryption method is used)					
	Location of secret key/bytes (if use checksum with hidden polynomial) or decryption key (if use encryption) must be in legally relevant library.					
40.	<p>Programming functional diagram of checksum checking routine during software start-up.</p> <p>Notes:</p> <ul style="list-style-type: none"> The process is best described using UML diagram. Please state related functions and which library/file it resides. 					
41.	Statement that the software stops loading if the DLL checksum check failed.					
	<p>Screenshot of the message box before the software stops loading when the checksum failed.</p> <p>See Appendix E on example of start-up checksum failed.</p>					

LEGAL INFORMATION WINDOW

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42.	<p>Step-by-step description on how to obtain the legal information window screen from user interface that shows the detail information of the software.</p> <p>Notes:</p> <p>The legal information screen shall consist of the following items:</p> <ul style="list-style-type: none"> Name of the software Version of the software (executable) list of all legally relevant library (DLL) with version and runtime checksum* Checksum of legally relevant library during pattern approved (optional) Legal statement (copyrights notice etc.) Pattern approval information (prepare field for approval number) <p>*Checksum displayed in this window shall be the real-time calculated (upon request) checksum and not predetermined. *Checksum here shall not utilize hidden polynomial. *Algorithm for checksum calculation shall be standard version and can be cross-checked with any standard 3rd party checksum calculator that available publicly.</p>					
43.	Screenshot of the legal information window screen.					

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	<i>See Appendix A as the example of acceptable legal information window.</i>					
44.	<p>Description that the legal information window is located inside the legally relevant library (DLL)*.</p> <p><i>*Please provide evidence at the programming functional level (source code is not necessary). Please provide the function name that trigger the legal information window as well as the form name itself.</i></p>					

DATABASE STORAGE

No.	Information required	To be filled by applicant			To be filled by NMIM	
		Document ID & applicant comment	Page no.	Section	Reviewer's comment	Need correction?
45.	Description of types of database used.					
46.	Statement that the storage capacity of database is adequate for weighing purpose.					
47.	Statement that the information stored to database contain all the legally relevant information to reconstruct and trace earlier weighing.					
48.	<p>Description of data loss prevention due to unforeseen circumstances to the storage system.</p> <p><i>Example:</i></p> <ul style="list-style-type: none"> • Backup • Failover • Relational database enforcement • Application validation 					
49.	Screenshot of table that contains the weighing data as well as other legally relevant data including checksum and weighing ID.					
50.	<p>List of table columns / data that are declared as legally relevant data* including data type of each of the column.</p> <p><i>*Legally relevant data are all the data required to trace and reconstruct earlier weighing. Refer to legally relevant information (item 3 in this table).</i></p> <p><i>Notes:</i> All legally relevant data shall be included in the checksum calculation.</p>					

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	Description and explanation of each of the legally relevant data (column).					
51.	Statement that the protection against unwanted changes at the database side uses checksum with hidden polynomial.					
	Detail description on the technique on how the hidden polynomial of the checksum is realized.					
	Description of location where the secret string/decryption keys that realize the hidden polynomial of the checksum is stored.					
52.	Programming functional diagram of data preparation including checksum calculation with hidden polynomial elements before pushing data into database. <i>Notes:</i> <ul style="list-style-type: none"> The process is best described using UML diagram. Please state related functions and which library/file it resides. 					
	Statement that the comparison routine is located inside legally relevant library.					
53.	Programming functional diagram of data retrieving from database including checksum calculation with hidden polynomial elements and comparing it with pre-calculated checksum at database. <i>Notes:</i> <ul style="list-style-type: none"> The process is best described using UML diagram. Please state related functions and which library/file it resides. 					
	Statement that data will be void if found to be failed in checksum calculation.					
54.	Statement that data will be void if found to be failed in checksum calculation.					
55.	Screenshot of data found to be void/failed in checksum calculation.					
	<i>See Appendix F as the example of invalid data.</i>					

AUDIT TRAIL

No.	Information required	To be filled by applicant			To be filled by NMIM	
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56.	Description of audit trail including the purpose.					
57.	Description of where the storage location of the audit trail (i.e. database).					

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58.	Description of how the audit trail storage record (data) is being protected.					
59.	Description of viewing and generating of audit trail report to which category of users.					
60.	List of events captured by audit trail. <i>Notes:</i> <i>Events that shall be logged shall include and are not limited to:</i> <ul style="list-style-type: none"> • <i>Logging of certain group of users</i> • <i>Modifying communication parameters</i> • <i>Modifying, altering, and deleting previous stored data</i> • <i>Errors and warnings</i> • <i>Cancelled transaction</i> • <i>Any other important events.</i> 					
61.	Details of item captured by audit trail.					
62.	Sample of report generated from audit trail.					
63.	Screenshot of audit trail screen.					

(This section is to be filled by NMIM)

Reviewed by:

Date of review:

General comment:

- 1.
- 2.