



National Marine Electronics Association

NMEA 2000® Certification Process Overview and License Agreement- Updated 2016

The purpose of this paper is to define general guidelines for developing and certifying an NMEA 2000® certified product, and to illustrate some of the different paths a manufacturer may follow, depending on their level of expertise and business strategies. The goal is to provide an initial checklist that can be used for NMEA 2000 product development planning.

General

The NMEA 2000® Standard is the primary and authoritative source of information on NMEA 2000®, and should be purchased from NMEA so that a manufacturer can develop a level of expertise related to NMEA 2000® requirements. The NMEA 2000® Standard should be supplemented by other materials as required and/or referenced from the NMEA 2000® document.

The NMEA 2000® Standard has been adopted by the IEC (International Electrotechnical Commission) and is designated as the following IEC document; 61162-3. The NMEA 2000 Standards Committee and TC80 Working Group 6 collaborated to assure that NMEA 2000 met the requirements necessary for SOLAS type vessel. The 61162-3 references NMEA 2000.

Further, Lloyd's has accepted the NMEA 2000 cable and connector and it has also been approved from the United States Coast Guard under 46CFR which is for small passenger vessels.

The NMEA 2000 Standards Committee is a consensus-based international committee that meets regularly to discuss new market technologies and new messages that may be presented by manufacturers. The development of new messages is a formal process with the NMEA 2000 Standards Committee. You can contact NMEA Director of Standards, Steve Spitzer, sspitzer@nmea.org if you would like to join the NMEA 2000 Standards Committee.

An NMEA 2000® Certified product is an electronic unit that has all of the following characteristics:

1. Has at least one independent interface that communicates using the hardware and higher level protocols established in the NMEA 2000® Standard for Serial Data Networking of Marine Electronic Devices.
2. Has demonstrated an established level of certification with the NMEA 2000® Standard by passing the hardware and software tests identified in Appendix C of the NMEA 2000® Standard.
3. Has had the results of the hardware and software tests submitted to and verified by NMEA, who will issue a product Certification upon payment of the required fees.



The manufacturer must ensure that they, or their agent;

1. Understand the NMEA 2000® requirements
2. Must attend to certain procedural issues associated with manufacturer and product identification and attendant fees
3. Must arrange for or perform NMEA 2000® Certification testing
4. Submit a certification package of test results to NMEA.
5. Must develop a product which does meet or exceed all specified NMEA 2000® requirements.

Product Development

To achieve an NMEA 2000® Certification, a product should provide the manufacturer's desired functionality and utilizes an NMEA 2000® interface to communicate with other NMEA 2000® products.

The NMEA 2000® Standard comprises the following documents:

- NMEA 2000® Main Document
- Appendix A – Parameter Group Definitions (Now included with Appendix B)
- Appendix B – PGN Database Reports (Data Format and Parameter Group Descriptions)
- Appendix C – Certification Criteria and Test Methods
- Appendix D – Application Notes
- Appendix E – ISO 11783-3 Data Link Layer
- Appendix F – ISO 11783-5 Network Management
- Appendix G – ISO 11898 Controller Area Network (CAN)
- Appendix H – Gateway Requirements
- Appendix I – Cable & Connector Requirements

While full understanding of the entire NMEA 2000® Standard is required to successfully develop an NMEA 2000® certified product, Appendices B and C provide critical information for product development planning.

Appendix B, Database Reports (Data Form and Parameter Group Descriptions); identifies the Parameter Groups that are defined by the NMEA 2000® Standard. Parameter Groups represent the fundamental information unit on the NMEA 2000® backbone, and are used to transmit information from one device to another. Parameter Group selection for the product will depend on the specific functionality desired, and may require development of new Parameter Groups and approval by the NMEA 2000® Working Group, particularly when the proposed functionality is new to NMEA 2000®.

Appendix C, Certification Criteria and Test Methods; is a good place to start when developing internal product requirement and test documentation as it itemizes the product characteristics that must be verified during the certification process. A thorough review of Appendix C will reveal certain requirements that must be implemented at the application level, even when using a third party network stack or gateway.



Manufacturer Registration and Product Code; uniquely identifies the product and distinguishes it from other NMEA 2000[®] products. NMEA administers and issues manufacturer and product codes based on application and a fee paid by the manufacturer. Application for these codes should be submitted to NMEA in a timely manner, well in advance of certification testing, as both the Manufacturer Registration and Product Code are used during operation for certain required NMEA 2000[®] messages and are required to be incorporated into the product design. Each product must have a separate product code. Valid code values are verified by NMEA during the certification file review process. Contact NMEA for applications.

For a Manufacturer Registration the following will be required:

1. Official Business Name (Brand Name of Product is required, if multiple brands exist)
2. Official Business Address
3. Official Website
4. Name of Main Contact Person
5. E-mail Address of Main Contact

For a Product Code application, contact info@nmea.org

License and Logo Usage



NMEA 2000[®] is a registered trademark. NMEA 2000 can only be used by authorized license holders. NMEA 2000 Standard is a Copyrighted Work and is protected under all of the copy right laws and treaties. There is a NMEA 2000 Pending Logo which may be used while products are under development. The time frame is 6 months for the “Pending” usage. Since the marine electronics industry has embraced “Certification,” the words NMEA 2000 compliant or works with NMEA 2000 will not be recognized as NMEA 2000 products.

Certification Testing

The NMEA 2000[®] Certification Test process has been conceived to ensure a high degree of confidence that all NMEA 2000[®] requirements are met without incurring the costs associated with mandated testing laboratories. This means that the manufacturer may elect to perform the certification testing in-house, or may retain any reputable party who has both the capability and tools required to perform the testing. This certification may not replace a performance standard for the SOLAS market. Certain additional testing is required by IEC 61162-3.

The marine electronics industry has embraced the concept of product certification. On some level, it assures the end user that the product has met an interoperability standard. The NMEA 2000 Certification does not certify data content. Data is the responsibility the respective manufacturer. NMEA certifies “behavior” of the product.

A key element of the Certification Test process is the NMEA 2000[®] Certification Test tool, which can be purchased from NMEA. The Certification Test tool consists of the software and



hardware necessary to connect to the products' NMEA 2000® interface to stimulate and test the products certification with all NMEA 2000® protocol requirements. The hardware consists of a CAN Bus interface on a USB Connecting Device and the software runs on a Windows based personal computer. A mandated Certification Test tool ensures that the tests are performed correctly, and that all test results are reported consistently. Test results are encrypted in a test data file that is sent to NMEA for validation.

Certification testing consists of two parts as detailed in Appendix C of the NMEA 2000® documentation. The first part is primarily focused on the physical and hardware requirements of NMEA 2000® and is accomplished with manual tests, while the second part is focused on required functionality and is accomplished using automatic tests incorporated in the Certification Test tool. The automatic tests are grouped in accordance with the certification level being sought for the specific product.

Hardware and software testing may be performed separately; however the hardware test results should be made available during the software testing so that the results can be entered when requested by the Certification Test tool.

The result for each applicable test criteria identified in Appendix C is recorded within the encrypted test file with one of the following status: "PASS", "FAIL", or "REQUIRES NMEA VERIFICATION". In addition, information regarding the test sequence and CAN bus responses is recorded to support analysis by NMEA. On completion of certification testing a certification package is submitted to NMEA. The certification package requires the following items:

1. Certification test file from the Certification Test tool
2. A detailed MS Word document with supporting technical information as required to substantiate or explain any test criteria with a "FAIL" or "REQUIRES NMEA VERIFICATION" status.
3. Product photographs showing all six sides of the product and the location of all connectors and conductive enclosure components. Close-ups of all connectors are also recommended.

Submission of the certification package requires payment of a certification fee to NMEA. NMEA may require further information if the certification package is not complete. Allow up to four weeks for certification result notification.



2016 Pricing and Timescale Summary

The following table represents pricing of NMEA 2000® documents and certification. It does not contain any other costs that may be associated with product development. All prices are subject to change. All pricing is in U.S. dollars. You should visit the NMEA website www.nmea.org for the latest updates on pricing.

Item Description	Price	Notes
Manufacturer Level 1, 2, or 3 Membership (required)	\$ see web	Annual fee
NMEA 2000 Full Standard (optional)	\$ 1,995.00	One-time fee
Certification Tool (optional)*	\$ 2,000.00	One-time fee
Manufacturer Code (one required per manufacturer)	\$ 1,200.00	One-time fee
Product Code (one required for each product being certified)***	\$ 450.00	One per product
Product Certification (required)**	\$ 850.00	One per product

*Purchasing the NMEA 2000 Product certification software tool is optional, as some companies contract third-parties to perform the NMEA 2000 product certification.

**If the product is already certified under a different brand name, the NMEA 2000 product certification cost is ½ off (\$425 USD). The manufacturer must provide to NMEA proof of certification by original equipment manufacturer. Brand and model names are required; NMEA will keep this information confidential

***Product Code & Family of Products

Defined as the same product function but different sizes.

For example a manufacturer family of displays (5", 7", 9", 12", 15"). A product code is required for each display size (\$450). The product certification cost is as follows:

Display 1- Certification \$850 + Product Code \$450 = \$1300

Display 2- Certification \$425 (50% off) + Product Code \$450 = \$875

Display 3- Certification \$425 (50% off) + Product Code \$450 = \$875

Display 4- Certification \$425 (50% off) + Product Code \$450 = \$875

The following table provides a conservative elongated timescale for NMEA 2000 milestones.

NMEA Events			
Manufacturer Code	4 weeks		
Product Code		1 week	
Product Certification			4 weeks

Once certified, the manufacturer:

- Shall permanently and prominently display its LEN number on the product. This allows installers to configure the electrical needs for the entire network. If this is not at all



possible because of the size of the product, the manufacturer shall publish the LEN on its website or in the owner's manual.

- Shall publish the transmit and receive list of its respective product PGNs. This could be on the website or in owner's manual. At a minimum the manufacturer shall list the PGN numbers. If the list is in electronic format, the manufacturer may link to the NMEA website for descriptions. If the manufacturer elects to publish a description of the PGN, the manufacturers shall not use any more than the PGN description as published on the NMEA website. NMEA 2000 Network PGNs are intellectual property of NMEA. Manufacturers shall not publish or redistribute any intellectual property other than what is described on the NMEA website.





NATIONAL MARINE ELECTRONICS ASSOCIATION



INTERNATIONAL MARINE ELECTRONICS ASSOCIATION

EFFECTIVE DATE AUGUST 1, 2012

END-USER LICENSE AGREEMENT FOR THE NMEA 2000® STANDARD

PLEASE READ THE FOLLOWING TERMS AND CONDITIONS CAREFULLY BEFORE DOWNLOADING, INSTALLING OR USING THE NMEA 2000® INTERFACE STANDARD FILES (INCLUDING THE APPENDICES), SOFTWARE AND ANY ACCOMPANYING DOCUMENTATION (ANY AND ALL OF THE FOREGOING, THE “NMEA 2000® STANDARD”). THE TERMS AND CONDITIONS OF THIS END-USER LICENSE AGREEMENT FOR THE NMEA 2000® STANDARD (“AGREEMENT”) GOVERN USE OF THE NMEA 2000® STANDARD.

National Marine Electronic Association (NMEA) / International Marine Electronic Association (IMEA) to license the NMEA 2000® Standard and **portions** thereof on the condition that licensee accepts the terms contained in this Agreement. For the purposes of this standard, NMEA will be used as the brand name for this standard with the understanding that NMEA and IMEA currently co-own this standard (see Section 14) For the purposes of this license agreement NMEA and IMEA are defined as NMEA. By clicking on the “I accept” button below or by downloading, installing or using the NMEA 2000® Standard, licensee is bound to this Agreement and accepts all of the terms. If this Agreement is accepted on behalf of a company or other legal entity, licensee represents and warrants they have the authority to bind the company or legal entity to the terms of this Agreement, and in such event, the “licensee” will be the company or other responsible legal entity. If licensee does not accept the terms of this Agreement, a license for the NMEA 2000® Standard will not be provided, and the Standard must be returned to NMEA for a full refund of relevant fees paid or, if NMEA has made the NMEA 2000® Standard available to licensee for evaluation, licensee must destroy all copies of the NMEA 2000® Standard in licensee’s possession and not transfer it to a third party or location.

1. Grant of License. Upon acceptance of the terms and conditions of this Agreement, NMEA grants a non-exclusive, non-transferable limited license (i) to make, develop or sell Marine Industry Products, utilizing the NMEA 2000® Standard (a) to develop NMEA 2000® Certified Product; or (b) to develop an NMEA 2000® Approved Application; or (ii) if not engaged in the activities in (i) to use the NMEA 2000® Standard for internal business purposes. As stated herein “*Marine Industry Product*” means a product designed, marketed, advertised or sold for use in the marine industry; “*NMEA 2000® Approved Application*” means a software application which has received NMEA approval in accordance with the NMEA’s current approval guidelines; “*NMEA 2000® Certified Product*” means a product which has received NMEA certification in accordance with the NMEA’s current internal testing procedures; and “*NMEA Marks*” means NMEA’s 2000® trademark or logos, including without limitation those that NMEA may, from time to time, provide and designate in writing for use in accordance with this Agreement

Developers seeking NMEA certification and approval may obtain guidance for submitting certification and approval applications to the NMEA at www.nmea.org

Licensees may make one copy of the NMEA 2000® Standard or any portion for backup purposes, providing that any copy retains the original NMEA 2000® Standard proprietary notices. NMEA reserves all rights of the NMEA 2000® Standard not expressly granted to licensee in this Agreement.

Without limiting other remedies, the NMEA may take actions it deems appropriate if NMEA determines that licensee has failed to comply with any provision of this Agreement, including, without limitation, using the NMEA 2000® Standard in violation of the license granted to licensee by the NMEA.

2. Restrictions. Except as expressly specified in this Agreement, licensee may not: (a) copy (except in the course of loading or installing) or modify the NMEA 2000® Standard, including but not limited to adding new features or otherwise making adaptations that alter the functioning of the NMEA 2000® Standard; (b) transfer, sublicense, lease, lend, rent or otherwise distribute the NMEA 2000® Standard to any third party; or (c) make the functionality of the NMEA 2000® Standard available to third parties through any means, including but not limited to uploading the NMEA 2000® Standard to a file-sharing service or through any hosting, application services provider, service bureau, software-as-a-service (SaaS) or any other type of services. Licensee acknowledges and agrees that **portions of the NMEA 2000® Standard**, including but not limited to the source code and the specific design and structure of individual modules or programs, constitute or contain trade secrets of NMEA and its licensors. Accordingly, licensee agrees to not disassemble, decompile or reverse engineer the NMEA 2000® Standard, in whole or in part, or permit or authorize a third party to do so, except to the extent such activities are expressly permitted by law notwithstanding this prohibition.

3. Ownership. The copy of the NMEA 2000® Standard is licensed, not sold. Licensee owns the media on which the NMEA 2000® Standard is recorded, but NMEA retains ownership of the copy of the NMEA 2000® Standard itself, including all intellectual property rights therein. The NMEA 2000® Standard is protected by United States copyright law and international treaties. Licensee will not delete or in any manner alter the copyright, trademark, and other proprietary rights notices or markings appearing on the NMEA 2000® Standard as delivered to licensee.

4. Term. The license granted under this Agreement remains in effect until terminated in accordance with this Agreement. Licensee may terminate the license at any time by destroying all copies of the NMEA 2000® Standard in licensee's possession or control. The license granted under this Agreement will automatically terminate, with or without notice from NMEA, if licensee breaches any term of this Agreement. Upon termination, at NMEA's option licensee must either promptly destroy or return to NMEA all copies of the NMEA 2000® Standard in licensee's possession or control.

5. Hazardous Activities. Licensee acknowledges that the NMEA 2000® Standard is not designed, intended or authorized for use in hazardous circumstances or for uses requiring fail-safe performance such as the operation of nuclear facilities, air traffic or weapons control systems, or where failure could lead to death, personal injury or environmental damage. Licensee shall not use the NMEA 2000® Standard for such purposes or circumstances.

6. Trademarks.

6.1 Use of the NMEA Marks. Upon certification or approval as an NMEA 2000® Approved Application or NMEA 2000® Certified Product, and in consideration of the rights granted under this Agreement, licensee agrees to use NMEA Marks in connection with licensee's marketing, promotion, sale and distribution of NMEA Approved Applications and NMEA 2000® Certified Products.

6.2 Grant of License. Following acceptance of the terms and conditions of this Agreement, NMEA hereby grants to licensee a non-exclusive, non-transferable limited license to use the NMEA Marks during the term of this Agreement solely to identify, market, and sell NMEA 2000® Approved Applications and NMEA 2000® Certified Products. Certified Products include those which use **any portions** of the NMEA 2000 Standards, including the NMEA Network Database messages known as PGNs. Licensee is granted no other right, title or license in or to the NMEA Marks. Licensee may not use the NMEA Marks except in accordance with the license granted herein. Licensee may not state or refer to products as "NMEA 2000® Certified", "NMEA 2000® Approved", "NMEA compatible", or "works with" or indicate the product or application meets the NMEA 2000® certification or

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6.3 Trademark Guidelines and Related Restrictions. Licensee agrees to use and display the NMEA Marks only in accordance with NMEA's trademark usage guidelines, as provided by NMEA from time to time. Licensee may not combine the NMEA Marks with any other marks, names or logos. Without limiting the foregoing, licensee shall display the NMEA Marks separately from licensee's own trademarks. Licensee agrees that if a mark, logo or other designation is used in addition to the NMEA Marks (an "*Additional Mark*") on NMEA 2000® Approved Applications or NMEA 2000® Certified Products, or in any marketing or advertising materials related thereto, licensee will ensure that each such Additional Mark does not create confusion with the NMEA 2000® Standard.

6.4 Compliance with Quality Standards. Licensee may use the NMEA Marks hereunder so long as licensee remains in compliance with obligations under this Agreement. Licensee expressly acknowledges and agrees that the NMEA 2000® Approved Application or NMEA 2000® Certified Products must at all times remain compliant with the NMEA 2000® Standard. In the event that NMEA determines that licensee is using NMEA Marks in a manner not in compliance with the provisions of this Agreement, NMEA will notify licensee to immediately correct or cease such use of the NMEA Marks. Upon NMEA's request, licensee will make available to an NMEA representative samples of printed materials bearing the NMEA Mark, and provide NMEA access to the NMEA 2000® Approved Application or NMEA 2000® Certified Product to enable NMEA to confirm that licensee is in compliance with the terms and conditions of this Agreement. If conditions of this agreement are breached, NMEA reserves the right to rescind NMEA 2000® certification from the offender's products.

6.5 Proprietary Rights. Licensee acknowledges that NMEA owns the NMEA Marks and agrees that licensee will do nothing inconsistent with such ownership and that use of any NMEA Marks by licensee, and goodwill arising out of such use, inures solely to NMEA's benefit. Licensee will give prompt notice to NMEA of any known or potential infringement of the NMEA Marks. Licensee will cooperate with reasonable requests by NMEA for the execution of any documents required to register the NMEA Marks or to record this Agreement with the appropriate authorities. Licensee agrees that nothing in this Agreement will give licensee any right, title, or interest in the NMEA Marks other than the right to use the NMEA Marks in accordance with this Agreement. Licensee will not challenge or aid in challenging the validity of the NMEA Marks or NMEA's ownership of the NMEA Marks, or take any action in derogation of NMEA's rights therein, including without limitation applying to register any trademarks, service marks, logos, trade names, or other designation that is confusingly similar to any NMEA Mark. If licensee acquires any rights in the NMEA Marks by operation of law or otherwise, licensees do hereby assign, and agree to assign, such rights to NMEA, at no expense to NMEA.

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9. Indemnity. Licensee agrees to defend, indemnify and hold the NMEA and its officers, directors, and employees harmless from and against any loss, liability, costs or expenses (including but not limited to reasonable attorneys' fees) arising from or incurred as a result of any third party claims, to the extent that such claims relate to or are based on licensee's breach of this Agreement or use of the NMEA 2000® Standard.

10. Export Regulations. Licensee agrees to comply fully with all U.S. export laws and regulations to ensure that neither the NMEA 2000® Standard nor any technical data related thereto nor any direct product thereof are exported or re-exported directly or indirectly in violation of, or used for any purposes prohibited by, such laws and regulations.

11. U.S. Government End Users. The NMEA 2000® Standard is a "commercial item" as that term is defined in FAR 2.101, consisting of "commercial computer software" and "commercial computer software documentation," respectively, as such terms are used in FAR 12.212 and DFARS 227.7202. If the NMEA 2000® Standard is being acquired by or on behalf of the U.S. Government, then, as provided in FAR 12.212 and DFARS 227.7202-1 through 227.7202-4, as applicable, the U.S. Government's rights in the NMEA 2000® Standard will be only those specified in this Agreement.

12. Governing Law. Any action related to this Agreement will be governed by Maryland law and controlling U.S. federal law. No conflict of laws rules or principles of any jurisdiction will apply.

13. Severability. If any provision of this Agreement is held to be unenforceable or invalid, that provision will be enforced to the maximum extent possible, and the other provisions will remain in full force and effect.

14. General. This Agreement is the parties' entire agreement relating to its subject matter. It supersedes all prior or contemporaneous oral or written communications, proposals, conditions, representations and warranties and prevails over any conflicting or additional terms of any quote, order, acknowledgment, or other communication between the parties relating to its subject matter during the term of this Agreement. No modification to this Agreement will be binding, unless in writing and signed by an authorized representative of each party. Licensee may not assign or transfer this Agreement or any rights granted hereunder, by operation of law or otherwise, without NMEA's prior written consent, and any attempt by licensee to do so, without such consent, will be void. Except as expressly set forth in this Agreement, the exercise by either party of any of its remedies under this Agreement will be without prejudice to its other remedies under this Agreement or otherwise. All notices or approvals required or permitted under this Agreement will be in writing and delivered by confirmed facsimile transmission, by overnight delivery service, or by certified mail, and in each instance will be deemed given upon receipt. All notices or approvals will be sent to the addresses set forth in the applicable ordering document or invoice or to such other address as may be specified by either party to the other in accordance with this section. The failure by either party to enforce any provision of this Agreement will not constitute a waiver of future enforcement of that or any other provision. This Agreement is the complete and exclusive understanding and agreement between the parties regarding its subject matter, and supersedes all proposals, understandings or communications between the parties, oral or written, regarding its subject matter, unless licensee and NMEA have executed a separate agreement. Any terms or conditions contained in licensee's purchase order or other ordering document that are inconsistent with or in addition to the terms and conditions of this Agreement are hereby rejected by NMEA and will be deemed null.

The International Marine Electronics Association (IMEA) is a sister company of the National Marine Electronics Association. IMEA is a U.S. non-profit organization organized under the U.S. tax codes of a 501 (c) (3). This permits IMEA to pursue alternative sources of revenue and to establish a Non-Profit Foundation. The National Marine Electronics Association (NMEA) / International Marine Electronics Association Interface Standards are intended to serve the public interest by facilitating interconnection and interchangeability of equipment, minimizing misunderstanding and confusion between manufacturers, and assisting purchasers in selecting compatible equipment.

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