1. **Revision Log**

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| Revision Log | | | | | |
| Revision Level | Revision Date | Section | Description | | Revised By |
| REL | 05112016 | ---- | Initial Release | | TC |
| A | 12152016 | MULTI | Remove Telesis Laser from Standard | | MJG |
| B | 05/1/2017 | ----- | Added Audit questions to document | | MJG |
| C | 4/26/19 |  | Mass updates, complete re-write to standard | | NT |
| D | 9/14/2021 | 5.1.1 & 5.4.1 | Added New MDX 2500 model and MDU 1000 (UV Laser) to standard | | MJG |
| E | 12/1/2023 | Header | Replaced GHSP logo with newer version | | BB |
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| Approval: | | CN: RS,HW | | MX: JY | |
| US: JA | | Other (as req’d): DRW | |

1. **Purpose:** 
   1. To define the global standard for the use of Lasers within GHSP manufacturing facilities.
2. **Scope:**
   1. This global standard applies to all GHSP manufacturing facilities.
3. **Definitions:** 
   1. ANSI – American National Standards Institute
      1. A private non-profit organization that oversees the development of voluntary consensus standards for products, services, processes, systems, and personnel in the United States.
   2. OSHA – Occupation Safety and Health Administration
      1. An agency of the United States Department of Labor, who’s mission is to assure safe and healthy working conditions for people by setting and enforcing standards.
   3. FDA – Federal Drug Administration
      1. An agency of the United States Department of Health and Human Services, who’s responsible for protecting and promoting [public health](https://en.wikipedia.org/wiki/Public_health) through control and supervision.
4. **References:**
   1. ANSI Z136.1 – Safe Use of Lasers
   2. ANSI Z136.9 – Safe Use of Lasers in Manufacturing Environments
   3. HHS Publication FDA 86-8260 CDMH – Compliance Guide for Laser Products
   4. CP-WI-MFG-X301 Global Standard Production Equipment Safety, Ergonomic, and Delivery Checklist
   5. CP-WI-MFG-X303 Global Standard Vision Systems
   6. CP-WI-MFG-X318 Global Standard Barcode Reader and Printer
   7. CP-WI-MFG-X327 Global Standard Assembly Equipment Manual
5. **Method:**
   1. **Laser selection**
      1. Preferred Brands

*Selection outside the preferred brand requires approval by the Advanced Process Engineer and Global Standards Team*

* Keyence
  + ~~MDX1500 series~~
  + MDX2500 Series
  + MDU1000 Series (UV Type Laser – Enhanced Plastics and electronics capability)
* ~~Amada Miyachi~~
  + ~~LMF50 series~~
* HANS
  + K20-CS series
    1. Laser Communication Selection

*Selection outside the preferred method requires approval by the Advanced Process Engineer and Global Standards Team*

* EtherNet/IP
  1. **Cable Management**
     1. Cable management is a requirement.
* See supplier recommendations for safe management of power and communications cables.
* Cable length is controlled in ordering “Please verify required length prior to release of PO”
  1. **Barcode Verification Systems**
     1. Installation of barcode scanner/vision into production environment with lasers requires barcode verification of compatibility with laser marking.
* Customer’s barcode must meet customer specific requirements.
  1. **Application Design Setup**
     1. Laser size should be as large as possible, based on the space available, per the application.
        + “Quiet Zone” should be 2x cell size, on all 4 sides.
        + If lasering on plastics with glass fibers, pre-etching (ghosting) may be required to improve visual contrast. The pre-etching area shall include the quiet zone perimeter area.
        + MDU1000 UV laser is recommended for enhanced plastics application on complex plastic products where color, material composition, size limitation etc. affect barcode quality or read capability. Product is also suitable for electronics circuit boards where higher precision and small barcodes are required.
  2. **Laser Setup and Programming**
     1. Dual channel set up shall be used for safety.
     2. Laser set up will require safety guarded installation to ensure no operator exposure to laser.
     3. Laser set up will include positioning of laser for ease of installation and maintenance.
        + Laser position shall follow OEM’s recommendation for location in relation to product being lasered.
        + Maintenance access, serviceability, or replacement to be less than 20 minutes (TPM-PM time cycle).
        + Proper air flow for cooling must be accounted for when locating the Laser Controller.
     4. Laser set up will include automated enclosure/guard, as required, to protect the lens from debris falling and resting on the lens.
     5. The PLC shall be used to control the marking.
     6. Programs will be developed with standard 2D barcode to customer specific requirements.
     7. Laser start up procedure to be turnkey and fully automated within equipment and tied to PLC system start up. No independent interface with laser controller will be required for normal start up or operation of equipment.
  3. **Laser Auxiliary Equipment**
     1. A proper Fume Extractor shall be used to reduce fumes/particles.

1. **Records:**
   1. Laser programs to be included in the Assembly Equipment Manual.
      1. Anytime a change to the laser program is made, a PCR must be written and approved.
   2. All laser programs must be stored on the facility server.