



Considerations for defining the dispense zone

Understanding the 3M™ Adhesive Mix Monitor and Sensor Response

The sensor response generated by the 3M™ Adhesive Mix Model can be interpreted to indicate two things: estimated mix ratio and adhesive cure. While actively dispensing adhesive, the sensor response indicates the estimated mix ratio. When you stop dispensing, the mixed adhesive will begin to cure, this will cause the sensor response to change based on the cure kinetics of the adhesive.

The mix ratio is expressed as a base part fraction, which indicates the proportion of Part B in the total mixture by volume. For instance, a 2:1 (B:A) mix ratio corresponds to a base part fraction (BPF) of 0.67. The formula for calculating the BPF for your mix ratio is as follows:

$$\text{Base Part Fraction (by volume)} = \frac{\text{Part B}}{(\text{Part B} + \text{Part A})}$$

Upon loading the adhesive model into the processing unit, the system manager displays the suggested mix ratio and sets default upper and lower limits. These upper and lower limits can be adjusted to best fit your dispensing process. When dispensing outside of these limits the processing unit LED will illuminate red, when dispensing adhesive inside of these limits the processing unit LED will illuminate green.

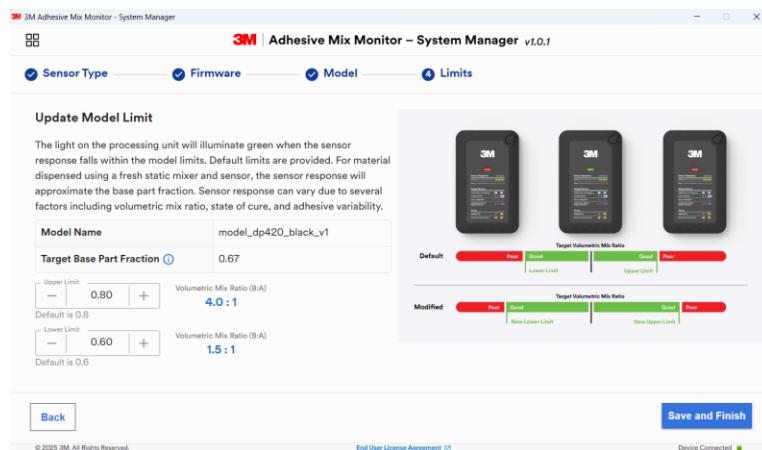


Figure 1: An example from System Manager that illustrates how a user can set the upper and lower limits of the sensor response.

Set your dispense zone limits based on the volumetric mix ratio

Pre-determined limits are based on material properties at different mix ratios tested by 3M and deemed reliable; their accuracy and completeness are not guaranteed.

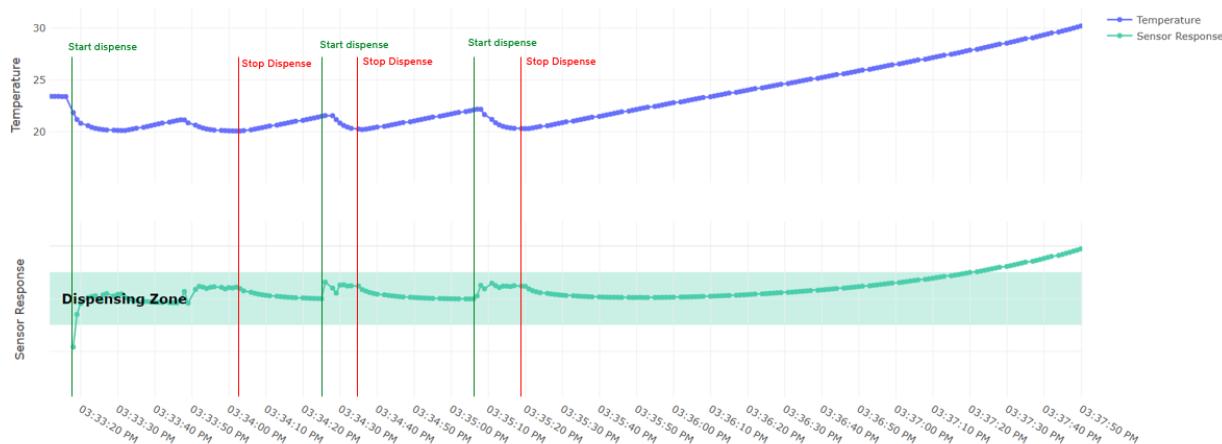
Additional factors, including application-specific details unknown to 3M, may necessitate different limits. To determine the proper limits of the dispense zone it is recommended to do quality assurance testing at different mix ratios to ensure that the upper and lower mix ratio limits meet the specified quality standards.

For example, if peel test performance is a critical quality metric, it would be recommended to conduct peel tests at the upper and lower bounds of the dispense zone and adjust the limits based on the test results.

Set your dispense zone limits based on purge guidance

The adhesive mix monitor can give you information about the cure kinetics of your adhesive once you have stopped dispensing. Depending on the type of adhesive being used, you may observe variations in the sensor response, either increasing or decreasing, as indicated by the raw data stream. Furthermore, for fast-curing adhesives, an increase in temperature can be detected from the exotherm of the reaction.

The example below shows a visual representation of what the raw data stream can look like once a user has stopped dispensing.



By performing additional dispensing tests, it is possible to identify the point at which the adhesive cures within the static mixer and sensor, rendering it no longer "dispensable." These tests can establish an upper or lower limit for the dispense zone. When this threshold is reached, the operator is alerted by a red LED indicator on the processing unit, signaling the need to purge the adhesive. The operator can then introduce fresh adhesive into the static mixer and sensor, effectively purging the system. This proactive approach helps minimize production downtime caused by clogged static mixers.

Product Selection and Use: Many factors beyond 3M's control and uniquely within user's knowledge and control can affect the use and performance of a 3M product in a particular application. As a result, customer is solely responsible for evaluating the product and determining whether it is appropriate and suitable for customer's application, including conducting a workplace hazard assessment and reviewing all applicable regulations and standards (e.g., OSHA, ANSI, etc.). Failure to properly evaluate, select, and use a 3M product in accordance with all applicable instructions and with appropriate safety equipment, or to meet all applicable safety regulations, may result in injury, sickness, death, and/or harm to property.

Warranty, Limited Remedy, and Disclaimer: Unless a different warranty is specifically stated on the applicable 3M product packaging or product literature (in which case such warranty governs), 3M warrants that each 3M product meets the applicable 3M product specification at the time 3M ships the product. 3M MAKES NO OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR ARISING OUT OF A COURSE OF DEALING, CUSTOM, OR USAGE OF TRADE. If a 3M product does not conform to this warranty, then the sole and exclusive remedy is, at 3M's option, replacement or repair of the 3M product or refund of the purchase price. Warranty claims must be made within one (1) year from the date of 3M's shipment.

Limitation of Liability: Except for the limited remedy stated above, and except to the extent prohibited by applicable law, 3M will not be liable for any loss or damage arising from or related to the 3M product, whether direct, indirect, special, incidental, or consequential (including, but not limited to, lost profits or business opportunity), regardless of the legal or equitable theory asserted, including, but not limited to, warranty, contract, negligence, or strict liability.

Disclaimer: 3M industrial and occupational products are intended, labeled, and packaged for sale to trained industrial and occupational customers for workplace use. Unless specifically stated otherwise on the applicable product packaging or literature, these products are not intended, labeled, or packaged for sale to or use by consumers (e.g., for home, personal, primary or secondary school, recreational/sporting, or other uses not described in the applicable product packaging or literature), and must be selected and used in compliance with applicable health and safety regulations and standards (e.g., U.S. OSHA, ANSI), as well as all product literature, user instructions, warnings, and other limitations, and the user must take any action required under any recall, field action or other product use notice. Misuse of 3M industrial and occupational products may result in injury, sickness, death, or property damage. For help with product selection and use, consult your on-site safety professional, industrial hygienist, or other subject matter expert.



Industrial Adhesives and Tapes Division
3M Center
St. Paul, MN 55144-1000
800-362-3550
www.3M.com/structuraladhesives

3M is a trademark of 3M Company.
© 3M 2025