

## Application Report

# Solar Manufacturing Solutions

Glass-to-glass Bonding/Inter-laminate Edge Seal



### Situation

The solar industry has numerous challenges to make it cost effective versus other energy alternatives. And, in addition to cost issues is the added challenge of maintaining or extending the longevity and durability of solar energy producing components. Materials used in solar panel assembly must meet certain criteria while also being cost effective to purchase and apply.

Some key characteristics include:

- providing a moisture barrier
- being UV stable with prolonged sun exposure
- resisting widely varying temperature cycles over 25+ year service life

So, identification of new materials and/or application processes that exhibit high performance more economically is a critical success factor for solar panel manufacture now and in the future.

Thin film solar panels tend to be less costly to produce in terms of the actual photovoltaic material, manufacturing efficiency/capacity and waste. However, they are newer technology than traditional crystalline solar panels so research and development to maximize power generation efficiency, durability and production continues.

One challenge is that thin film solar panels do not typically have a frame to provide added protection against water ingress. Additionally, traditional encapsulants such as ethylene vinyl acetate (EVA) and polyvinyl butyral (PVB) are not known as the best moisture barriers in thin film technology. So, thin film panels are often given an additional moisture barrier around the perimeter of the modules; this application is called edge seal or glass-to-glass bonding.

Solar-grade butyls are UV-stable material that provides an excellent moisture barrier for this application. It typically comes in a pre-extruded tape form which is applied either manually or using a

tape robot. Unfortunately, both these application techniques are inefficient and inconsistent. Butyl is, however, also available in bulk liquid form, so consistent butyl application for edge sealing can be accomplished via an automated, in-line process.

### Nordson Solution

With decades of experience dispensing high-viscosity materials in insulated glass and window production, as well as for automotive windshield installation, Nordson has the knowledge to efficiently and effectively process and apply butyl for solar panel manufacturing. The Nordson melter and application system delivers a constant and consistent amount of butyl in a rectangular bead pattern with a high degree of accuracy for edge definition.

Dual Nordson® VersaDrum® bulk melters are configured with auto changeover for uninterrupted material supply. The Nordson PS metering station acts as a booster to compensate for the high pressure/volume losses common with high viscosity materials such as butyls. The butyl is then fed to a Nordson VDK gear metering applicator positioned for precise point-of-application control.

This Nordson dispense system can be integrated into most production processes to provide a consistent material bead that offers squared corners and well-maintained bead dimensions.

### Benefits

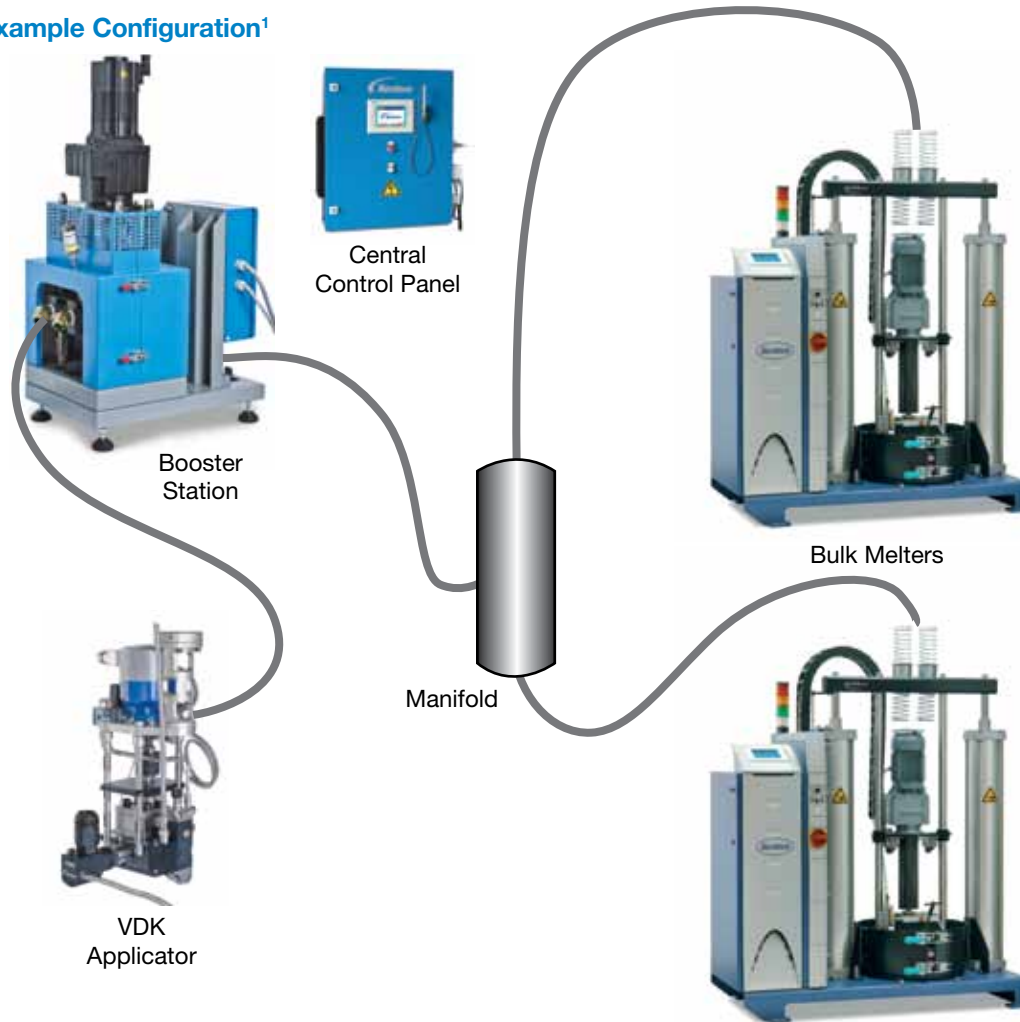
- Automated process eliminates application inconsistencies inherent with manual processes.
- In-line, liquid application of butyl replaces cumbersome and unwieldy tape rolls.
- Repeatable, consistent bead pattern dispensing delivers improved module durability.
- The Nordson solution supports use of cost-efficient, large bulk forms of butyl.
- The system produces well-defined rectangular beads with a high-degree of accuracy for edge definition, radius corners and knit line location.
- The gun and nozzle design allow for rapid, easy nozzle replacement to implement changing production requirements.



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## Example Configuration<sup>1</sup>



**For more information, speak with your Nordson representative or contact your Nordson regional office.**

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### Asia/Australia/ Latin America

Amherst, Ohio  
(440) 985-4797 **Phone**  
(440) 985-1096 **Fax**

	Dimensions (W x H x D)	Weight (empty)	Maximum System Capacity
<b>VersaDrum Bulk Melter</b>	1520 x 3010 x 740 mm (59.9 x 118.5 x 29.2 in.)	672 kg (1,482 lb)	39,000 watts
<b>PS Booster Station<sup>2</sup></b>	605 x 1090 x 405 mm (23.8 x 42.9 x 15.9 in.)	130 kg (287 lb)	8,800 watts
<b>VDK Applicator</b>	176 x 394 x 216 mm (6.9 x 15.5 x 8.5 in.)	15 kg (33 lb)	1,560 watts

<sup>1</sup> The Nordson system is flexible in layout so can be adapted to specific customer requirements, i.e., using two VDK applicators simultaneously.

<sup>2</sup> Specifications shown for PS Maxi 1x configuration.

## The Nordson Difference

Through our years of experience, Nordson has developed a worldwide support network. A locally-available, global team of highly-trained, knowledgeable engineers, service technicians and 24/7 support staff help you and/or your system integrator develop, install and maintain dispensing solutions for solar module assembly. Our people are supported by an infrastructure that includes research facilities, test laboratories and parts distribution warehouses in locations throughout Europe, Asia and the Americas.

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