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Installation and Inspection of Preformed Neoprene Compression Seal

STORAGE:

The Preformed Neoprene seal is delivered either in cardboard reel or large wooden cable reels. The proper storage of the cardboard reels requires the boxes to be protected from moisture to keep the cardboard from deteriorating. A tarpaulin to keep the seal clean and damage free should cover the large wooden cable reels. The lubricant/adhesive should be kept from freezing.

JOINT PREPARATION:

To form the joint, a two-stage sawing operation is performed. The first saw-cut is designed for controlling cracking. The second saw-cut will create the proper shape factor for the Preformed Neoprene seal. This saw-cut is made using a water-cooled diamond blade saw capable of holding a tolerance of $\pm 1/16$ ". The saw-cut is inspected for proper width, depth and the face of the joint must be at 90 degrees to the surface of the pavement. If spalling occurs due to the sawing operation, it must be repaired prior to seal installation. The longitudinal saw-cut operation is not performed until the pavement is determined to be level from one slab to the next. Any horizontal deviation greater than $1/16$ " from one slab to the next shall be corrected before sawing. If the horizontal deviation is not corrected, the installation machines may experience difficulty in installing the seal.

Once the secondary saw-cut is made, the joint is pressure washed with clean water and blown out with compressed air. Sandblasting will be needed if called for in the specification of the project.

The joint is now ready for installation of the Preformed Neoprene seal. There have been various types of installation machines used over the last 30 years. The installation machine should be capable of installing the seal at the specified depth without cutting, nicking or twisting the seal. The installation machine also must be capable of installing the seal with 3% or less stretch. The D. S. Brown Delastall[®] gasoline powered machine is capable of the lubricant/adhesive and a spool of seal. It has large, powered

compression wheels that deliver the Preformed Neoprene seal to the joint with minimal stretch, installing it to the proper depth (adjustable) while applying the lubricant/adhesive directly to the sides of the seal. Other installation machines on the market compress the seal by means of roller bearings. These roller bearings squeeze the neoprene ahead of the bearings and ultimately stretch the Preformed Neoprene, which results in poor performance and premature failure of the seal. Hand installation usually results in damage to the seal from the use of tools that puncture or stretch the seals to over 20% their original length.

LUBRICANT/ADHESIVES:

The lubricant/adhesive is used mainly to facilitate the installation of the Preformed Neoprene seal. The lubricant/adhesive must contain a minimum of 24% solids, be uniform, contain no lumps, have the correct viscosity and have a drying time between eight and twenty minutes.

The containers of lubricant/adhesive should be labeled with the manufacturer's name, catalog number, lot number and expiration date. Also, an MSDS must accompany all shipments for the safety of the user.

The lubricant/adhesive will begin thickening at 32°F. When sealing operations occur where the air temperature is below 32°F, the lubricant/adhesive should be stored in a heated warehouse until needed.

Cleaning of the equipment and tools in contact with the lubricant/adhesive is accomplished with the use of toluene or other applicable solvents. The empty lubricant/adhesive containers remaining from the use of the Preformed Neoprene seal system should be properly disposed of in a class II licensed landfill (check local RCRA division of the EPA for details).

INSTALLATION SEQUENCE:

The proper installation sequence for Preformed Neoprene seal is to install the longitudinal seal first. After allowing the glue to dry (approximately 20 minutes), the longitudinal seal is cut with a sharp blade at the intersection of the transverse joint. The transverse joint seal is then installed through the cut in the longitudinal seal to form a tight intersection. The transverse seal should be installed in one continuous piece. The transverse seal will exert outward force on the end cut of the longitudinal seal to form a tight intersection. In the event that field molded sealants are utilized in the longitudinal joints, the preformed neoprene seal shall be installed first followed by the placement of backer rod and the pourable sealant.

INSPECTION:

Stretching the seal during installation is the major cause of premature failure of the Preformed Neoprene seal. Inspecting for stretch should be done very early in the sealing process. The inspection involves loosely laying a piece of Preformed Neoprene seal the entire width of the pavement and cutting it at the exact width of the pavement. The seal is then installed in the joint. Any excess amount of seal remaining at the end of the joint is due to stretch. The length of this excess is measured and a stretch percentage is calculated by dividing the excess length by the original length. Stretch greater than 4% is unacceptable. Some projects specify stretch of 1% or less.

Proper depth of the seal is very important. If the seal is too deep, the joint will gather incompressible material and spall the concrete. If the seal is too shallow, the seal may receive abrasive wear from tire contact or be pulled out by snowplows. Therefore, it is recommended that the Preformed Neoprene seal be recessed 3/16" from the surface of the pavement $\pm 1/16"$. When beveled joints are being sealed, the top of the seal should be 1/16" to 3/16" below the bottom edge of the bevel.

Visual inspection for twists, cuts, pop-ups and separation of butt joints shall be performed. A rule-of-thumb is, any situation that causes the top outer edge of the seal from making contact with the face of the joint is unacceptable and must be repaired.

In the event of a damaged area, there are two ways of repairing the joint:

1. Splicing with Delastibond™ adhesive – 1521
Remove 1' of previously installed neoprene seal and allow seal to recover for approximately 2 minutes.
 - a) Cut neoprene utilizing a miter box with ribbon edge saw blade (or hacksaw) for a smooth, square edge.
 - b) Remove dust, grease, rust and other foreign matters from the bonding surfaces. Acetone soaked cloth is suitable for efficient cleaning.
 - c) Apply Cyanoacrylate adhesive to only one of the surfaces to be bonded. See that the tip directly contacts the surface. For best results, apply a smaller quantity than you would with other adhesives. Apply around all edges/walls and webs.
 - d) Immediately place the patch in contact with the treated surface. Carefully align the seal and apply slight manual pressure upon the mated surfaces to assure equal and effective spreading of the adhesive over the surfaces. Hold the 2 ends firm, about 5 to 10 seconds.
 - e) Setting time ranges from seconds to minutes depending on the type and surface condition of materials to be bonded. Several minutes suffice to ensure bond strength required for practical use. Maximum strength (over 400 psi) is reached after 12 hours.
 - f) Proceed with normal installation into the joint.
2. Remove 1 foot of the previously installed material along with the exposed or damaged material, then replace with backer rod and field molded sealant.

CONCLUSION:

Preformed Neoprene compression seals have been recognized by the F.H.W.A., Corps of Engineers and other agencies and consulting engineers as a long-lasting and effective concrete pavement joint seal. As joint seals receive increasing attention in the industry, the life-cycle value of the Preformed Neoprene compression seals becomes apparent. One of the benefits that accompanies the use of Preformed Neoprene compression seals is the ability to seal joints in "green" concrete where high moisture is present. Other benefits include speed of installation, cleanliness of product and the dramatic reduction in joint spalling when Preformed Neoprene seals are utilized.