

Comments on NECA/NEMA 605-201X, Standard for Installing Underground Nonmetallic Utility Duct

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Page	Line	Clause	E/G	Organization	Comment (rationale)	Proposed change (specific; add, delete. From-to)	Resolution (SME ONLY)
		4.1	G	IEC	Revise layout – picture in the middle of the text is difficult to read	No change in text	Agree
		4.2.1	G	IEC	The stack in the picture appears to exceed the 12' maximum height recommended in the text.	No change in text	Agree. Take new photo
		4.3.3	T	IEC	Manufacturer's recommendations should be followed		The handling of solvent products should be in accordance with ASTM F 402 <i>Standard Recommended Practice for Safe Handling of Solvent Cements Used for Joining Thermoplastic Pipe and Fittings, or according to the manufacturer's instructions.</i>
		5.1	T	IEC	Mandrels' should match raceway size	Reference Table 1 at 5.13	A raceway system is considered to be properly installed if the inside diameter of each raceway is adequate to allow free passage of the specified deflection mandrel <u>specified in Table 1.</u>
		5.5.3	T	IEC	May engineers specify staggering of joints in encased duct banks	Include staggering of joints as an option. I personally don't like it and feel the benefit is negligible at best.	No change. The guide does not prohibit staggering of joints.
		Table 1- Suggested Mandrel ODS for Various Conduits and Ducts		UL LLC	For NEMA TC-2 Schedule 40 Conduit the Mandrel OD for the 8 Trade size given in mm is 213.18.	The Mandrel OD for the 8 Trade size given in mm should be 213.11.	See response to comment below from Pete Jackson
		Table 1- Suggested Mandrel ODS for Various Conduits and Ducts		UL LLC	For NEMA TC-14 AG/TC 14 BG IPS Conduit Dimensions the Mandrel OD for the 2 thru 8 Trade sizes given in mm are: 51.09 76.81 99.67 122.83 146.42 191.86	For NEMA TC-14 AG/TC 14 BG IPS Conduit Dimensions the Mandrel OD for the 2 thru 8 Trade sizes given in mm should be: 51.05 76.71 99.57 122.94 146.30 191.77	See response to comment below from Pete Jackson

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		Section 5.13 Mandrel Table 1	T	Pete Jackson	Some of the mandrel sizes are larger than the conduit ID sizes. See the mandrel size listed for 8" Schedule 40 Conduit. The same condition occurs with the NEMA TC 6 & 8 & NEMA TC 14 Tables (various sizes).	The mandrel size should be smaller than the conduit ID. Table 1 should be checked for accuracy	Agree. Per practice of other pipe industries, mandrel diameters to be based on 85% of the Min ID, where: $\text{Min ID} = \text{Min OD} - 2 \times \text{max}_t$
		Foreword	E	Rebane	The Foreword states that this NEIS standard "define a minimum baseline of quality and workmanship." This being the objective, then there is no place for "should be" or "it is recommend that." Occurrences of this phrase should be restated so that the context becomes mandatory instead of being a recommendation.	Underground Nonmetallic Utility Duct should be performed in accordance with ...	Agree in principle. The document needs to be checked throughout for consistency.
		4.1 Handling	T	Rebane	I propose these corrections to remove tentative recommendations, and making them mandatory for reasons stated in the comments made in Foreword. The picture should be moved to the right or left margin so as not to split text. The meaning of "care should be exercised when handling thermoplastic raceways in temperatures below 0 deg C (32 deg F) begs for additional installation description, because "care" is required at all temperatures.	Abusive handling should be avoided.. <i>Replace with:</i> Avoid abusive handling. Units should not be dropped from ... <i>Replace with:</i> Units may not be dropped from ... Care should be taken to avoid damage during shipping. <i>Replace with:</i> Replace raceways that are damaged during shipping with new. I leave it to the writers to describe the "care" that shall be taken at the listed temperatures.	Agree in principle. Prolonged storage of shipments of raceways in closed vans should be avoided, since excessive weight and elevated temperature may cause ovality on the bottom raceways. Care should be exercised <u>in particular</u> when handling thermoplastic raceways in temperatures below 0° C (32 °F), and when handling RTRC in temperatures below -40° C (-40 °F). Agree with other proposed changes.

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		4.2.3 Bulk Storage	T	Rebane	Make statements specific. State a time limit when these requirements apply – “when stored for 2 days or longer.” Define the surface as part of the storage requirements	<p>“... stacking height should be limited to ...” <i>Replace with:</i> “... limit stacking height to ...”</p> <p>“The bottom row of raceway should be laid on as level a surface as possible.” <i>Replace with:</i> “The bottom rows of raceway storage stacks shall be on flat stabilized compacted earth, free of stones and gravel 25 mm (1 in) or larger.”</p>	<p>Accept in part.</p> <p>Loose raceways shall should be stacked in a parallel manner. To avoid excessive ovality on the bottom row, <u>limit</u> the stacking height should be limited to 1.2 m (4 ft) for EB duct and 1.5 m (5 ft) for DB duct. The bottom rows of raceway <u>storage racks shall should</u> be laid on as level a surface as possible. Supports shall should not be placed under the raceway, as excessive deflection and sagging could result. <u>Additional recommendations from the manufacturer shall also be followed.</u></p>
			E	Rebane	Make statement specific	<p><i>Replace with:</i> Elbows and sweeps may be stored outdoors on flat stabilized compacted earth, free of stones and gravel 25 mm (1 in) or larger. Check with the manufacturer for additional storage requirements and procedures.</p>	<p>Elbows and sweeps may can be stored outdoors on flat ground. <u>Additional requirements from the manufacturer shall also be followed.</u></p>
		5.1 Proper Installation	E	Rebane	Match nomenclature and requirements of 5.13 Mandrelling.	<p>... if the inside diameter of each raceway is adequate to allow free passage of the specified deflection mandrel.</p> <p><i>Replace with:</i> ... if the inside diameter of each raceway allows free passage of a mandrel meeting the requirements of 5.3 Mandrelling.</p>	<p>Agree</p>

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		5.2.1 Trench Wall; 5.3.1 Raceway Supports; 5.3.5 Considerations for Specifiers.	T	Rebane	<p>The statement “the design engineer is responsible” has to be clarified. There should be an article that might be titled “Engineering Requirements” which would be a collection of issues which require plans and specifications prepared by an engineer. This article should require that installation shall not start until the engineering documents are at hand.</p> <p>Engineering documents shall address Issues, such as geotechnical subsurface investigation, structural recommendation for trench wall and trench bottom, dewatering, testing of trench bottom soil to be sure it meets structural requirements, concrete compression strength and slump; concrete tests during pours, surveying during construction, and similar issues.</p>		Agree in principle. NEMA would welcome a proposal to amend the document to address these issues.
		5.5.2 Spacers	T	Rebane	<p>The statement “... consistent with the owner/engineer ...” should be deleted and this issue be added to the “Engineering Requirements” discussed in the preceding comment.</p>		Agree in principle. NEMA would welcome a proposal to amend the document with new “Engineering Requirements.”

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	5.5.7 Concrete Pour	T	Rebane	<p>This paragraph is clearly advisory in nature, and should be moved to an Appendix to this standard.</p> <p>As currently written it is difficult to determine which requirements are mandatory, which are recommendations relating to good workmanship and which are recommended techniques of installation that will make the job go faster without affecting quality.</p> <p>For this standard to be effective, mandatory requirement must be clearly stated and not be mixed up with other issues that are not minimum requirements.</p>		<p>Typically, a concrete pour begins at a manhole and works down the duct bank towards the next manhole. The concrete used shall should have a compression strength and slump specified by the engineer.</p> <p>Note: Typically, slump is specified to be 177.8 mm (7 in.) to 228.6 mm (9 in.) to assure proper distribution of the concrete around the raceways. Higher slumps, or more fluid concrete, may create adverse flotation or buoyancy forces.</p> <p>The recognized maximum aggregate size shall should be one-half or less of the minimum clear space between the raceways. Care shall should be taken to limit the fall of the concrete to a minimum height from the chute to the top tier of raceways to minimize flotation effects.</p>
	7.8 “No Grout” and “Blown Sand” Applications	T	Rebane	<p>Add definition to the statement “... it may be necessary to derate the power cables.” Make it a requirement that engineering documents shall show when and where derating has to be applied, and the engineer shall establish the amount of derating.</p>		<p>Agree in principle.</p> <p>“... it may be necessary, <u>in the judgement of the engineer</u>, to derate the power cables.”</p>
	8.1 To Prime or not to Prime	T	Rebane	<p>It is not clear whether this Standard requires priming under certain circumstances.</p> <p>“Extreme cold weather” is not specific enough.</p>		<p>Comment noted. 4.1 directs the use to consult with the manufacturer’s instructions and recommendations.</p>
	10.3 Mechanical Fittings. The comment also applies, in different degrees, to all of the fittings paragraphs.	T	Rebane	<p>The statement “PPI recommends that ...” is inadequate. There should be a statement about installer training in the use of mechanical fittings, or this statement should be deleted or moved to an Appendix.</p>		<p>PPI recommends that the user be well informed about See the manufacturer’s recommended joining procedure, as well as any performance limitations, for the particular mechanical connector being used.</p>

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6			G	ARCOM	Photo seems superfluous.	Delete photo.	The intent of the photo is to illustrate an installation employing duct spacers. A replacement photo will be provided with the following caption: “Typical installation using duct spacers”
9		1.1	E	ARCOM	Rigid is both capitalized and not capitalized. If it is to be capitalized, suggest capitalizing Nonmetallic and Conduit as well.	Maintain consistently with product description.	Rigid with lower case “r”
11		4.1	G	ARCOM	Photo is splitting text.	Move photo.	Agree
14		4.2.7 & 4.3.4	G	ARCOM	Same recommendation in two places.	Remove inventory recommendation from 4.3.	Agree in Part. Delete 4.3.4 however the recommendation is appropriate for 4.2.7.
17		Figure 1	E	ARCOM	Consider revising illustrations – illustrations do not show end bells, so if conduits with end bells will be attached to the conduits in the spacers, some spacers may not fit the end bells or break because of the larger diameter of the end bell. Also, most engineers recommend staggering joints for rows of ductbank and no less than six inches between a joint and near spacer.	Revise illustration.	No change. It is not appropriate to install an end bell into a spacer.
Forward		Photo			The photo provided shows a rather large rock. As these can cause damage, and should not be allowed in the backfill per Section 5.2.2.	This rock should not be in the photo without a disclaimer that this should be removed prior to backfill.	Agree. A replacement photo will be provided.
Scope		Section 1.3			The NEC reference provided is ANSI/NFPA 70. I see no reference to ANSI in the authorship of the NEC.	Change reference to NFPA 70.	Agree. Remove ANSI
11		Section 4.1			The text wraps around the truck photo. This makes reading the paragraph difficult, slightly confusing.	Suggest the phot be placed below section 4.1 paragraph	Agree. See comments above

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13		Section 4.2			Outdoor storage of materials isn't addressed. Some of the material do degrade with UV over long periods of time and become brittle.	Suggest we build on Section 4.2.7 or add new Section 4.8 to address outdoor storage per the manufacturer's recommendation to UV exposure. Language proposed could be "It is recommended to consult with the manufacturer to limit where necessary outdoor storage regarding the allowable sunlight exposure due to potential ultraviolet light damage. Install covers or store indoors as recommended."	No change. 4.2.7 as written addresses the potential for damage due to UV exposure, temperature changes or other environmentally adverse conditions.
14		Section 4.3			The handling section doesn't address the possibility that varmints or insects can take up residence inside conduit ducts in storage.	Suggest adding new section 4.3.5 addressing Varmints and Insects to say "After lengthy storage, varmints, snakes, and insects can take up residence inside open conduit ducts. Inspect for these prior to handling."	No change. The proposal is outside the scope of the standard.
19		Section 5.5.1			When laying a duct, a slight slope can prevent water build-up in the conduit and allow water to drain to the next manhole. Not allowing the water to drain in soils with a high water table can keep cables submerged longer than necessary.	Add to section 5.5.1 "In soils with a high water table or areas with heavy rain, consider sloping the conduit duct "sweep" from manhole to manhole or a highpoint between manholes to allow water to more easily drain. A minimal slope of 1 inch per 100 ft is all that is needed.	No change. The proposal is outside the scope of the standard.
43		Section 8.6			<i>In rainy seasons and where high water tables exists, sometimes the trench must be pumped out to continue construction, there needs to be a note about joint cement and duct dryness.</i>	Suggest adding, "Use cement on dry conduit only per the manufacturer's instructions."	No change. Addressed in 8.4.