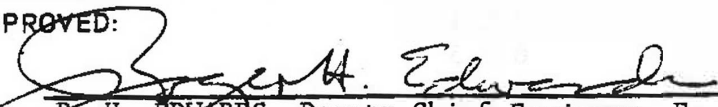


TO:		ENGINEERING INSTRUCTION	
SUPERSEDED BY EB 97-039 EFFECTIVE 7/1/97		NEW YORK STATE DEPARTMENT OF TRANSPORTATION	
		SUBJECT: MANNINGS "n" VALUES FOR SMALL DIAMETER HELICAL CORRUGATED METAL PIPES.	
		Subject Code: 7.26-2-08.03.02 F	
Distribution:		Code: 84-30	
☒ Main Office ☒ Regions ☒ Special		Date: 4-19-84	
APPROVED:		Supersedes:	
 R. H. EDWARDS, Deputy Chief Engineer, Fac. Design Div.			

EI 74-93 Roughness Coefficients for Corrugated Metal Pipes establishes a policy on what Manning's Coefficients to use. These are the "n" values associated with circumferentially corrugated riveted pipes prevalent in the past. Modern pipe is now almost exclusively helically corrugated and for at least some of the smaller sizes has a lower "n" coefficient. Quoting from the FHWA Division Administrator's 1-25-84 memorandum to me on the subject.

"From time to time, we receive reports that certain metal pipe vendors are promoting the use of lower roughness coefficients ("n" values) in the hydraulic design of highway culverts. These vendors claim that helically corrugated pipe has lower flow resistance than pipe which is fabricated with annular corrugations.

Several years ago, the FHWA's Office of Research and Development studied this allegation, as indicated in the attachment, and concluded that ' . . . the reduced ("n") values are only applicable to certain specific cases of full flow in small sized helically corrugated metal pipes, up to twenty-four inches in diameter. Sufficient information is not presently available for extrapolation to larger pipe sizes, and it is recommended that in most applications the resistance factors for pipe with annular corrugations should be used for hydraulic design of helically corrugated pipes.' This is to advise you that our position has not changed."

PREL.	DESIGN	FINAL	LANDSCAPE
RECEIVED		FACILITIES DESIGN DIVISION	
JUN 18 1984			
CIRC.	FILE		

Since smaller sized pipes, designed to flow full, are encountered in closed storm drain systems, and since the capacity of a given pipe is directly related to the Manning's n, we have decided to establish a limited series of pay items requiring helically corrugated pipe. The table below indicates "n" values which may be used when designing this pipe. The new pay items will include sizes up to 24" diameter, inclusive, will be M.O. inserted, and will have the same pay item generally as the standard item but with a "15" prefix added. The "n" values given below are applicable for both 2 2/3 X 1/2 helically corrugated steel or aluminum pipe and represent the higher value reported for either the steel pipe or aluminum pipe increased by 6% to account for rerolling the ends as required under the AASHTO pipe specs.

Subject: MANNINGS "n" VALUES FOR SMALL DIAMETER HELICAL CORRUGATED METAL PIPES

Manning's "n" Values	
Helically Corrugated (2 2/3 x 1/2) Pipe	
Diameter	Manning's n
12"	0.012
15"	0.014
18"	0.015
21"	0.017
24"	0.018

1. new specification is available for immediate use.

15603.05xx CORRUGATED STEEL PIPE (2-2/3 BY 1/2 INCH HELICAL CORRUGATIONS)
 15603.06xx CORRUGATED STEEL PIPE PAVED INVERT (2-2-2/3 BY 1/2 INCH HELICAL CORRUGATIONS)
 15603.40xx ROUND CORRUGATED ALUMINUM PIPE (2-2-2/3 BY 1/2 INCH HELICAL CORRUGATIONS)

The specifications of Section 603 - Culverts and Storm Drains shall apply except only helically corrugated pipe will be acceptable under these items.

Payment will be made under:

ITEM NO.	ITEM	PAY UNIT
15603.0516	CORRUGATED STEEL PIPE (2-2/3 BY 1/2 INCH HELICAL CORRUGATIONS) 18 INCH DIAMETER, 12 GAUGE	LF
15603.0519	CORRUGATED STEEL PIPE (2-2/3 BY 1/2 INCH HELICAL CORRUGATIONS) 21 INCH DIAMETER, 12 GAUGE	LF
15603.0522	CORRUGATED STEEL PIPE (2-2/3 BY 1/2 INCH HELICAL CORRUGATIONS) 24 INCH DIAMETER, 12 GAUGE	LF
15603.0523	CORRUGATED STEEL PIPE (2-2/3 BY 1/2 INCH HELICAL CORRUGATIONS) 24 INCH DIAMETER, 10 GAUGE	LF
15603.060880	CORRUGATED STEEL PIPE PAVED INVERT (2-2/3 BY 1/2 INCH HELICAL CORRUGATIONS) 12 INCH DIAMETER, 18 GAUGE	LF
15603.0609	CORRUGATED STEEL PIPE PAVED INVERT (2-2/3 BY 1/2 INCH HELICAL CORRUGATIONS) 12 INCH DIAMETER, 16 GAUGE	LF
15603.0610	CORRUGATED STEEL PIPE PAVED INVERT (2-2/3 BY 1/2 INCH HELICAL CORRUGATIONS) 12 INCH DIAMETER, 14 GAUGE	LF
15603.061080	CORRUGATED STEEL PIPE PAVED INVERT (2-2/3 BY 1/2 INCH HELICAL CORRUGATIONS) 15 INCH DIAMETER, 18 GAUGE	LF
15603.0611	CORRUGATED STEEL PIPE PAVED INVERT (2-2/3 BY 1/2 INCH HELICAL CORRUGATIONS) 15 INCH DIAMETER, 16 GAUGE	LF
15603.0612	CORRUGATED STEEL PIPE PAVED INVERT (2-2/3 BY 1/2 INCH HELICAL CORRUGATIONS) 15 INCH DIAMETER, 14 GAUGE	LF
15603.061380	CORRUGATED STEEL PIPE PAVED INVERT (2-2/3 BY 1/2 INCH HELICAL CORRUGATIONS) 18 INCH DIAMETER, 18 GAUGE	LF
15603.0614	CORRUGATED STEEL PIPE PAVED INVERT (2-2/3 BY 1/2 INCH HELICAL CORRUGATIONS) 18 INCH DIAMETER, 16 GAUGE	LF
15603.0615	CORRUGATED STEEL PIPE PAVED INVERT (2-2/3 BY 1/2 INCH HELICAL CORRUGATIONS) 18 INCH DIAMETER, 14 GAUGE	LF

15603.0616	CORRUGATED STEEL PIPE PAVED INVERT (2-2/3 BY 1/2 INCH HELICAL CORRUGATIONS) 18 INCH DIAMETER, 12 GAUGE	LF
15603.061680	CORRUGATED STEEL PIPE PAVED INVERT (2-2/3 BY 1/2 INCH HELICAL CORRUGATIONS) 21 INCH DIAMETER, 18 GAUGE	LF
15603.0617	CORRUGATED STEEL PIPE PAVED INVERT (2-2/3 BY 1/2 INCH HELICAL CORRUGATIONS) 21 INCH DIAMETER, 16 GAUGE	LF
15603.0618	CORRUGATED STEEL PIPE PAVED INVERT (2-2/3 BY 1/2 INCH HELICAL CORRUGATIONS) 21 INCH DIAMETER, 14 GAUGE	LF
15603.0619	CORRUGATED STEEL PIPE PAVED INVERT (2-2/3 BY 1/2 INCH HELICAL CORRUGATIONS) 21 INCH DIAMETER, 12 GAUGE	LF
15603.0619.03	CORRUGATED STEEL PIPE PAVED INVERT (2-2/3 BY 1/2 INCH HELICAL CORRUGATIONS) 24 INCH DIAMETER, 18 GAUGE	LF
15603.0620	CORRUGATED STEEL PIPE PAVED INVERT (2-2/3 BY 1/2 INCH HELICAL CORRUGATIONS) 24 INCH DIAMETER, 16 GAUGE	LF
15603.0621	CORRUGATED STEEL PIPE PAVED INVERT (2-2/3 BY 1/2 INCH HELICAL CORRUGATIONS) 24 INCH DIAMETER, 14 GAUGE	LF
15603.0622	CORRUGATED STEEL PIPE PAVED INVERT (2-2/3 BY 1/2 INCH HELICAL CORRUGATIONS) 24 INCH DIAMETER, 12 GAUGE	LF
15603.0623	CORRUGATED STEEL PIPE PAVED INVERT (2-2/3 BY 1/2 INCH HELICAL CORRUGATIONS) 24 INCH DIAMETER, 10 GAUGE	LF
15603.400103	ROUND CORRUGATED ALUMINUM PIPE 12 INCH DIAMETER, 12 GAUGE (2-2/3 x 1/2 INCH HELICAL CORRUGATIONS)	LF
15603.400104	ROUND CORRUGATED ALUMINUM PIPE 12 INCH DIAMETER, 14 GAUGE (2-2/3 x 1/2 INCH HELICAL CORRUGATIONS)	LF
15603.400105	ROUND CORRUGATED ALUMINUM PIPE 12 INCH DIAMETER, 16 GAUGE (2-2/3 x 1/2 INCH HELICAL CORRUGATIONS)	LF
15603.400203	ROUND CORRUGATED ALUMINUM PIPE 15 INCH DIAMETER, 12 GAUGE (2-2/3 x 1/2 INCH HELICAL CORRUGATIONS)	LF
15603.400204	ROUND CORRUGATED ALUMINUM PIPE 15 INCH DIAMETER, 14 GAUGE (2-2/3 x 1/2 INCH HELICAL CORRUGATIONS)	LF
15603.400205	ROUND CORRUGATED ALUMINUM PIPE 15 INCH DIAMETER, 16 GAUGE (2-2/3 x 1/2 INCH HELICAL CORRUGATIONS)	LF
15603.400303	ROUND CORRUGATED ALUMINUM PIPE 18 INCH DIAMETER, 12 GAUGE (2-2/3 x 1/2 INCH HELICAL CORRUGATIONS)	LF
15603.400304	ROUND CORRUGATED ALUMINUM PIPE 18 INCH DIAMETER, 14 GAUGE (2-2/3 x 1/2 INCH HELICAL CORRUGATIONS)	LF

15603.400305	ROUND CORRUGATED ALUMINUM PIPE 18 INCH DIAMETER, 16 GAUGE (2-2/3 x 1/2 INCH HELICAL CORRUGATIONS)	LF
15603.400403	ROUND CORRUGATED ALUMINUM PIPE 21 INCH DIAMETER, 12 GAUGE (2-2/3 x 1/2 INCH HELICAL CORRUGATIONS)	LF
15603.400404	ROUND CORRUGATED ALUMINUM PIPE 21 INCH DIAMETER, 14 GAUGE (2-2/3 x 1/2 INCH HELICAL CORRUGATIONS)	LF
15603.400405	ROUND CORRUGATED ALUMINUM PIPE 21 INCH DIAMETER, 16 GAUGE (2-2/3 x 1/2 INCH HELICAL CORRUGATIONS)	LF
15603.400503	ROUND CORRUGATED ALUMINUM PIPE 24 INCH DIAMETER, 12 GAUGE (2-2/3 x 1/2 INCH HELICAL CORRUGATIONS)	LF
15603.400504	ROUND CORRUGATED ALUMINUM PIPE 24 INCH DIAMETER, 14 GAUGE (2-2/3 x 1/2 INCH HELICAL CORRUGATIONS)	LF
15603.400505	ROUND CORRUGATED ALUMINUM PIPE 24 INCH DIAMETER, 16 GAUGE (2-2/3 - 1/2 INCH HELICAL CORRUGATIONS)	LF