

**KDOT POLICY ON THE USE OF ZINC COATED AND
ALUMINUM COATED CORRUGATED STEEL PIPE; AND POLYETHYLENE AND
POLYVINYL CHLORIDE PIPE**

The Kansas Department of Transportation establishes the following guidelines on the use of zinc coated (galvanized) and aluminum coated (aluminized) corrugated steel pipe (CSP); and polyethylene (PE) and polyvinyl chloride (PVC) pipe as Department policy. This policy is established to provide guidance in identifying the prohibited and/or restricted uses of CSP, PE and PVC for the purpose of preparing project plans. This policy is intended to be used in conjunction with Table 1 in Section 1901 of the KDOT Standard Specifications (also see Attachment No. 3 of this policy, pg 5). The previous policies dated 2-18-91, 11-1-93, 8-3-00 and 11-20-01 shall be void on the effective date of this policy.

1. **All installations** - Prohibit the use of all galvanized and aluminized CSP for all applications in the following counties:

- 1.1. Cherokee
- 1.2. Crawford
- 1.3. Labette

2. **Crossroad installations**

- 2.1. Prohibit the use of galvanized CSP, aluminized CSP, PE pipe and PVC pipe for crossroad installations (including median drains and ramps) on;
 - 2.1.1. All freeway and expressway routes.
 - 2.1.2. All other routes where the current annual average daily traffic exceeds 3000 vehicles per day.
- 2.2. Prohibit the use of galvanized CSP on all routes in the 70 counties identified in attachment 1 (all of districts 1,2,4,5 and Ford and Stanton Counties in district 6).
- 2.3. Prohibit the use of aluminized CSP pipe for crossroad installations (including median drains and ramps) on all routes in those counties identified in the table in attachment 1, where site specific testing is required (35 counties) and such testing indicates that the service life of the pipe will be less than 50 years (see attachment 2).

3. **Storm sewer installations**

- 3.1. Prohibit the use of galvanized CSP for all storm sewers.
- 3.2. Prohibit the use of Aluminized CSP for storm sewer;
 - 3.2.1. When located under the paved traveled way,
 - 3.2.2. And elsewhere in those 35 counties where site specific testing indicates that its use as crossroad pipe is prohibited. (See attachments)
- 3.3. Prohibit the use of PE and PVC pipe for storm sewer located under the paved traveled way on all freeway and expressway routes and located under the paved traveled way all other routes where the current annual average daily traffic exceeds 3000 vehicles per day

4. **Sideroad and entrance installations**

- 4.1. Prohibit the use of galvanized CSP for sideroads and entrances in those 70 counties where galvanized CSP is prohibited for crossroad installations.

5. **Site Specific Installations**

- 5.1. Prohibit the use of galvanized and aluminized CSP for median drains, near feedlots and coal mine areas and at other locations where the specific site conditions indicate that abrasive or corrosive runoff may shorten service life.
- 5.2. In those counties and on routes where the use of aluminized CSP, PE and PVC pipe is otherwise prohibited, the use of aluminized CSP, PE and PVC pipe will be permitted when the designer deems the use necessary for the following special situations:
 - 5.2.1. When broken back pipe is required
 - 5.2.2. When pipe grades are 6% or greater
 - 5.2.3. When tight clearance problems preclude the use of alternate types of pipe
 - 5.2.4. When other unforeseen conditions may exist

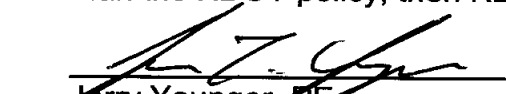
6. **CSP Gauge Requirements**

- 6.1. The minimum gauge thickness of galvanized and aluminized CSP will comply with the current KDOT Road Design Standard Drawings for metal pipe and end section gauge and pipe corrugation requirements.
- 6.2. The pipe thickness and corrugation requirements (when other than minimum) will be listed on the plans.
- 6.3. For entrance and sideroad installations 24" in diameter and less, where galvanized CSP use is permitted by this policy, 16 gage aluminized CSP may be substituted for 14 gage galvanized CSP.

This policy shall become effective upon the date of issuance. This policy does not require that plan changes be made on projects where drainage design work has already started.

Note 1: **Designer Responsibility** - If an application is not prohibited for a specific pipe type, designers should not feel compelled to allow that pipe type if there are extenuating circumstances that would favor other types of pipe. For example, when aluminized CSP is permitted for storm sewer; driveway pavement, sidewalks, high fills, and structures placed above such storm sewer might be cause for the designer to consider the benefits and risks of the application and such analysis could warrant the selection of alternate pipe types.

Note 2: **Local Public Authority Policies** – "On non-State highway systems, maintained by local governments, they may elect to use a pipe material differing from KDOT's policy. However, if it is on a project with Federal Aid involved, and is more restrictive than the KDOT policy, then KDOT must approve. "



 Jerry Younger, PE
 Assistant Secretary and
 State Transportation Engineer

Date 5/17/07

ATTACHMENT NO. 1

CORRUGATED STEEL CROSSROAD PIPE USAGE CHART

CSP may be considered for use in crossroad installations under non-freeway and non-expressway routes when design traffic levels are 3000 or less vehicles per day. Such use is limited in accordance with the following table.

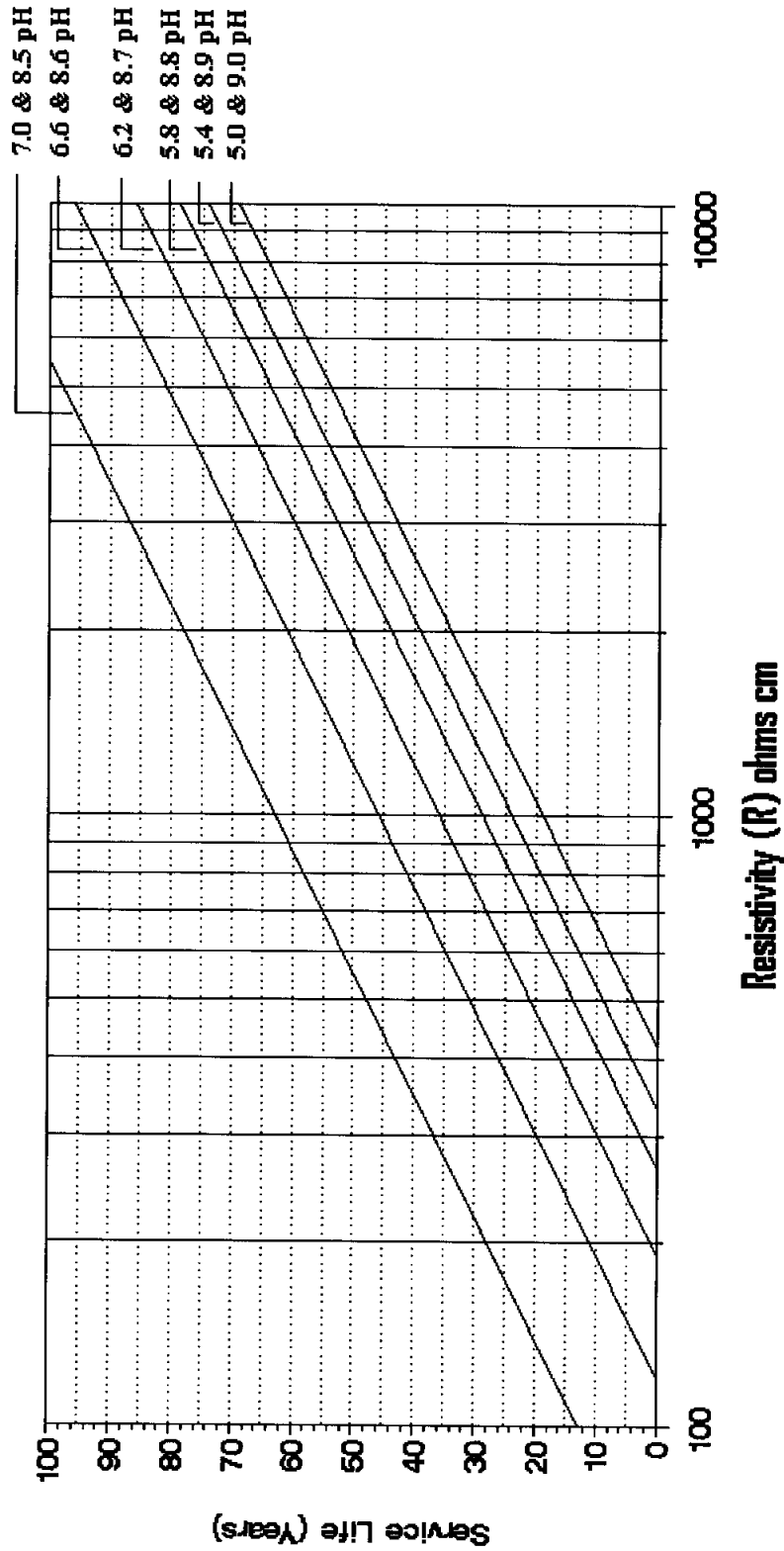
DISTRICT	COUNTY	GALVANIZED	ALUMINIZED	TESTING REQUIRED (Note 3)
1	Atchison	No	Yes	Yes
	Jackson	No	Yes	Yes
	Jefferson	No	Yes	Yes
	Marshall	No	Yes	Yes
	Nemaha	No	Yes	Yes
	Osage	No	Yes	Yes
	Pottawatomie	No	Yes	Yes
	All Others	No	Yes	No
2	Clay	No	Yes	Yes
	Cloud	No	Yes	Yes
	Jewell	No	Yes	Yes
	Lincoln	No	Yes	Yes
	McPherson	No	Yes	Yes
	Ottawa	No	Yes	Yes
	Republic	No	Yes	Yes
	All Others	No	Yes	No
3	All Counties	Yes	Yes	No
4	Cherokee	No	No	NA
	Coffey	No	Yes	Yes
	Crawford	No	No	NA
	Labette	No	No	NA
	Neosho	No	Yes	Yes
	Woodson	No	Yes	Yes
		All Others	No	Yes
5	Cowley	No	Yes	Yes
	Harvey	No	Yes	Yes
	Pratt	No	Yes	Yes
	Sedgwick	No	Yes	Yes
	Sumner	No	Yes	Yes
	All Others	No	Yes	No
6	Ford	No	Yes	Yes
	Stanton	No	Yes	Yes
		All Others	Yes	Yes

Note 3: When there is a yes in this column, site-specific investigations for soil resistivity and pH, and water resistivity and pH, are required at each probable crossroad pipe location. The data must indicate that the estimated design service life equals or exceeds fifty years as determined using the nomograph in attachment 2 in order for the pipe to be acceptable for use. The geotechnical consultant or the KDOT Geotechnical Unit will perform testing as a preliminary survey activity. The results will be provided to the Bureau of Design with other geotechnical information.

Attachment No. 2

1. Use the lowest soil or water resistivity value measured on the project for the x-axis value.
2. Calculate the soil and water pH value that is exceeded by 90% of the project sample data (for large numbers of samples this value is approximately 1.3 standard deviations less than the mean value). Use the calculated soil or water pH value; whichever yields the lower service life, to select the appropriate pH line. Interpolate between lines as necessary or use the appropriate equation shown below the nomograph.
3. Select the service life from the y-axis.

Estimated Service Life Based on pH and Resistivity for 16 Gauge Aluminized CSP



For $5 < \text{pH} < 7$, $SL = 50 [\log_{10}(R) - \log_{10}(2160 - 2490 (\log_{10}(\text{pH})))]$
 For $7 < \text{pH} < 8.5$, $SL = 50 [\log_{10}(R) - 1.746]$
 For $8.5 < \text{pH} < 9$, $SL = 50 [\log_{10}(R) - \log_{10}(2160 - 2490 (\log_{10}(7 - 4 (\text{pH} - 8.5))))]$

Attachment No. 3

		Permitted Pipe Material Usage Application Table																							
District	County	Reinforced Concrete				Galvanized				Aluminized				Corrugated Aluminum				Polyethylene Pipe				Polyvinyl Chloride Pipe			
		Cross-road	Storm - Sewer	Side-roads		Cross-road	Storm - Sewer	Side-roads		Cross-road	Storm - Sewer	Side-roads		Cross-road	Storm - Sewer	Side-roads		Cross-road	Storm - Sewer	Side-roads		Cross-road	Storm - Sewer	Side-roads	
1	Atchison	X	X	X		2	2,3	X		X		X		X	1	X		X	1	X		X	1	X	
	Jackson	X	X	X		2	2,3	X		X		X		X	1	X		X	1	X		X	1	X	
	Jefferson	X	X	X		2	2,3	X		X		X		X	1	X		X	1	X		X	1	X	
	Marshall	X	X	X		2	2,3	X		X		X		X	1	X		X	1	X		X	1	X	
	Nemaha	X	X	X		2	2,3	X		X		X		X	1	X		X	1	X		X	1	X	
	Osage	X	X	X		2	2,3	X		X		X		X	1	X		X	1	X		X	1	X	
	Pottawatomie	X	X	X		2	2,3	X		X		X		X	1	X		X	1	X		X	1	X	
	All others	X	X	X		X	3	X		X		X		X	1	X		X	1	X		X	1	X	
2	Clay	X	X	X		2	2,3	X		X		X		X	1	X		X	1	X		X	1	X	
	Cloud	X	X	X		2	2,3	X		X		X		X	1	X		X	1	X		X	1	X	
	Jewell	X	X	X		2	2,3	X		X		X		X	1	X		X	1	X		X	1	X	
	Lincoln	X	X	X		2	2,3	X		X		X		X	1	X		X	1	X		X	1	X	
	McPherson	X	X	X		2	2,3	X		X		X		X	1	X		X	1	X		X	1	X	
	Ottawa	X	X	X		2	2,3	X		X		X		X	1	X		X	1	X		X	1	X	
	Republic	X	X	X		2	2,3	X		X		X		X	1	X		X	1	X		X	1	X	
	All others	X	X	X		X	3	X		X		X		X	1	X		X	1	X		X	1	X	
3	All counties	X	X	X	1	X	3	X		X		X		X	1	X		X	1	X		X	1	X	
4	Cherokee	X	X	X																					
	Coffey	X	X	X		2	2,3	X		X		X		X	1	X		X	1	X		X	1	X	
	Crawford	X	X	X																					
	Labette	X	X	X																					
	Neosho	X	X	X		2	2,3	X		X		X		X	1	X		X	1	X		X	1	X	
	Woodson	X	X	X		2	2,3	X		X		X		X	1	X		X	1	X		X	1	X	
	All others	X	X	X		2	2,3	X		X		X		X	1	X		X	1	X		X	1	X	
5	Cowley	X	X	X		2	2,3	X		X		X		X	1	X		X	1	X		X	1	X	
	Harvey	X	X	X		2	2,3	X		X		X		X	1	X		X	1	X		X	1	X	
	Pratt	X	X	X		2	2,3	X		X		X		X	1	X		X	1	X		X	1	X	
	Sedgwick	X	X	X		2	2,3	X		X		X		X	1	X		X	1	X		X	1	X	
	Sumner	X	X	X		2	2,3	X		X		X		X	1	X		X	1	X		X	1	X	
	All others	X	X	X		X	3	X		X		X		X	1	X		X	1	X		X	1	X	
6	Ford	X	X	X		2	2,3	X		X		X		X	1	X		X	1	X		X	1	X	
	Stanton	X	X	X		2	2,3	X		X		X		X	1	X		X	1	X		X	1	X	
	All others	X	X	X	1	X	3	X		X		X		X	1	X		X	1	X		X	1	X	

1 Allowed only for non-freeway and non-expressway routes where ADT is less than 3000 VPD.
 2 Allowed when site specific testing indicates the service life of the pipe will exceed 50 years.
 3 Allowed only when installation is not located under travelway.
 Note: See current pipe policy for further site specific or design considerations.