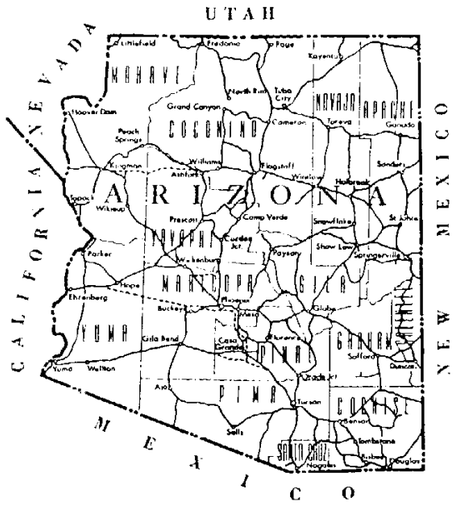


# STATE OF ARIZONA
# DEPARTMENT OF TRANSPORTATION
# HIGHWAYS DIVISION
# PLANS SERVICES

# ROADWAY STANDARDS

## FOR USE IN

# OFFICE AND FIELD

"D"

1978

HIGHWAY PLANS SERVICES

# ROADWAY STANDARDS
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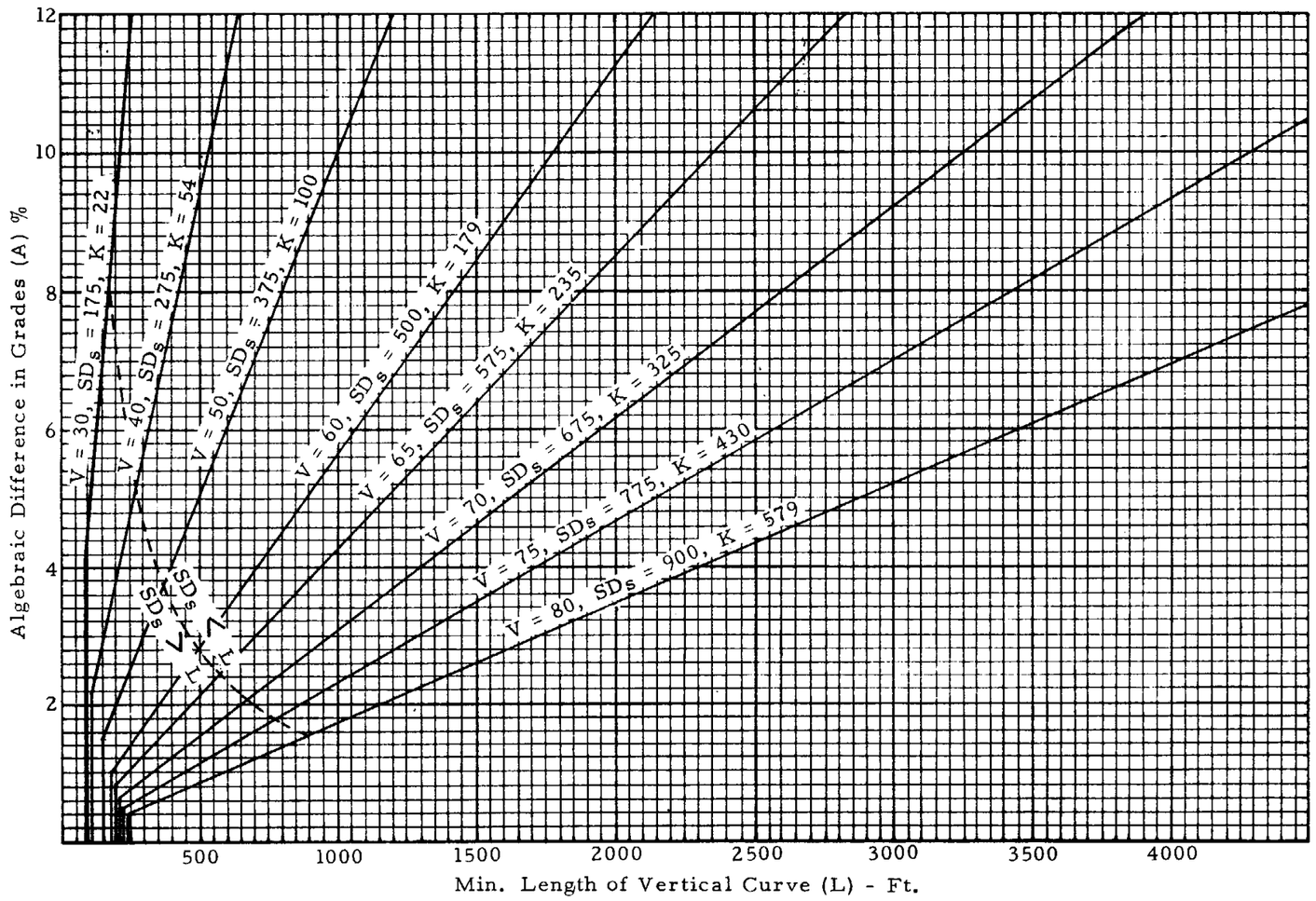
| Design Speed | Assumed Speed For Wet Pvmt. Condition | Perception & Brake Reaction | | Coefficient of Friction | Braking Distance on Level | Safe Stopping Distance ($SD_S$) | |
|---|---|---|---|---|---|---|---|
| | | Time | Distance | | | Computed | Rounded |
| M.P.H. | M.P.H. | Sec. | Ft. | f | Ft. | Ft. | Ft. |
| 30 | 28 | 2.5 | 103 | .36 | 73 | 176 | 175 |
| 40 | 36 | 2.5 | 132 | .33 | 131 | 263 | 275 |
| 50 | 45 | 2.5 | 165 | .31 | 218 | 383 | 375 |
| 60 | 54 | 2.5 | 198 | .30 | 324 | 522 | 500 |
| 65 | 58 | 2.5 | 213 | .30 | 374 | 587 | 575 |
| 70 | 63 | 2.5 | 231 | .29 | 456 | 687 | 675 |
| 75 | 67 | 2.5 | 246 | .28 | 534 | 780 | 775 |
| 80 | 72 | 2.5 | 264 | .27 | 640 | 904 | 900 |

Note: Applicable only to essentially level roadways. See Sec. 7-09 of Geometric Design Manual for maximum grade rates as related to design speed.

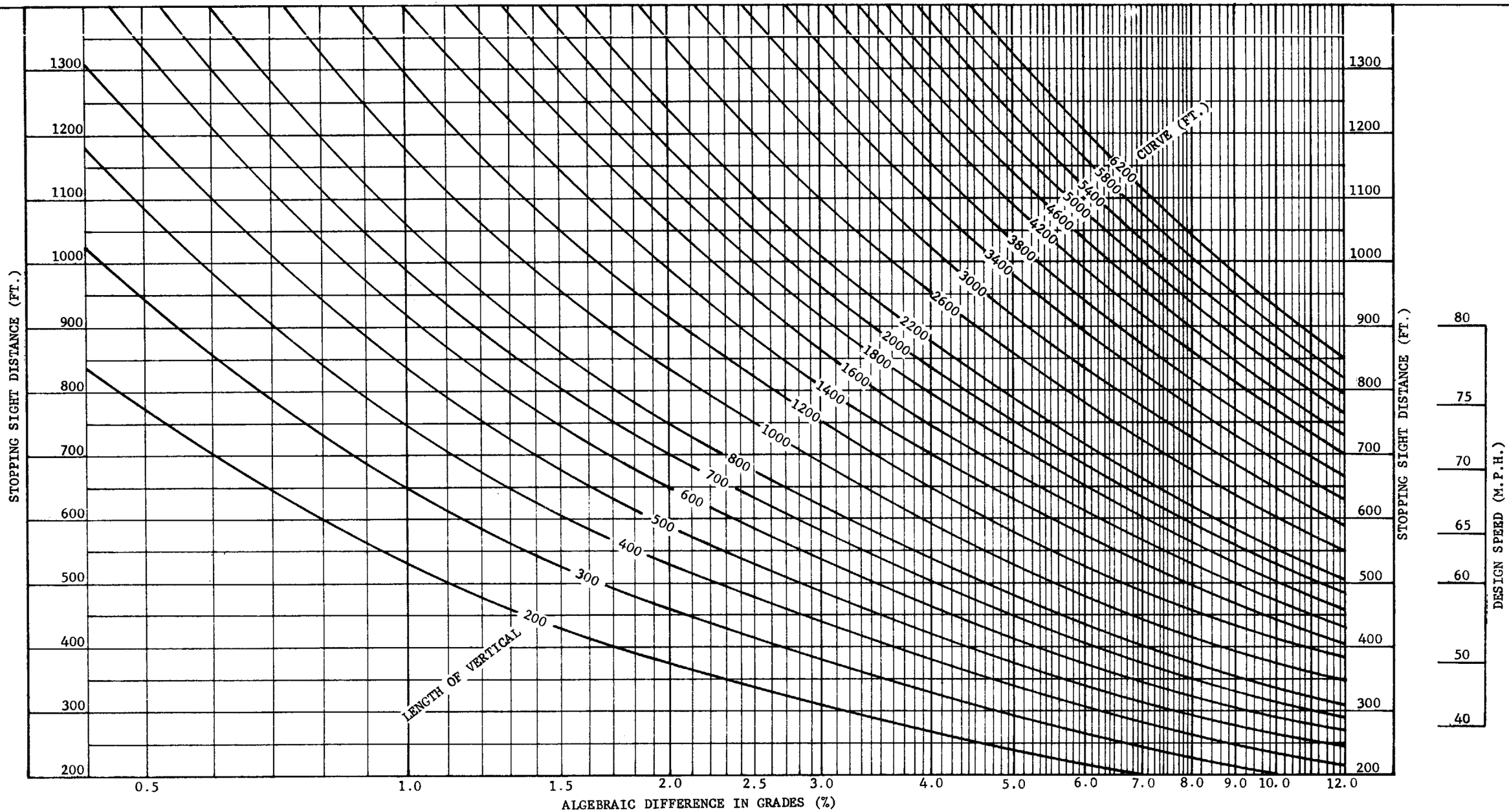
| DESIGN APPROVED | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD PLANS | REV. DATE 4/78 |
|---|---|---|
| APPROVED FOR DISTRIBUTION | STOPPING DISTANCE | PLAN NO. D-51.10 |




Height of Eye = 3.75'
Height of Object = 0.5'
V = Design Speed - M.P.H.
$SD_s$ = Safe Stopping Distance - Ft.
K = Length of Vertical Curve per % of A - Ft.
$L = A(SD_s)^2/1398$ - Ft.
L = KA - Ft.
L (min.) = 800' for primary and secondary highways;
3V for all other highways.

For $SD_s$ values when L and A are given, see Std. D-1.03

| DESIGN APPROVED | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD PLANS | REV. DATE 4/78 |
|---|---|---|
| APPROVED FOR DISTRIBUTION | LENGTH STANDARDS CREST VERTICAL CURVES | PLAN NO. D-51.20 |

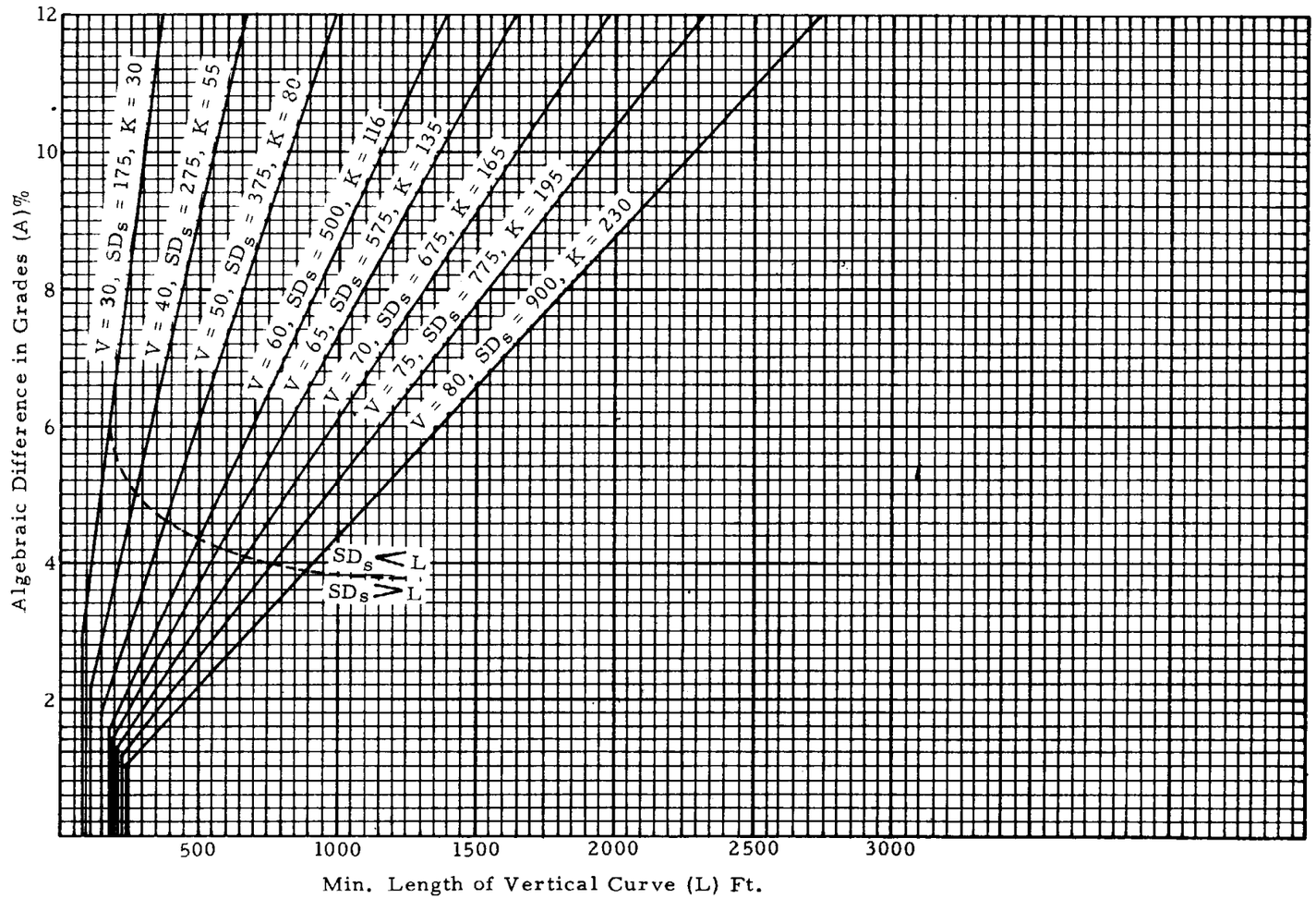



$SD_s = \sqrt{1398L/A}$

L (min.) = 1000' for interstate highways;
800' for primary and secondary highways;
3V for all other highways.

Note: This Chart Valid Only For L < S

| DESIGN APPROVED | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD PLANS | REV. DATE 4/78 |
|---|---|---|
| APPROVED FOR DISTRIBUTION | STOPPING SIGHT DISTANCE CREST VERTICAL CURVES | PLAN NO. D-51.30 |




V = Design Speed - M.P.H.

$SD_s$ = Safe Stopping Distance - Ft.

= Light Beam Distance - Ft.

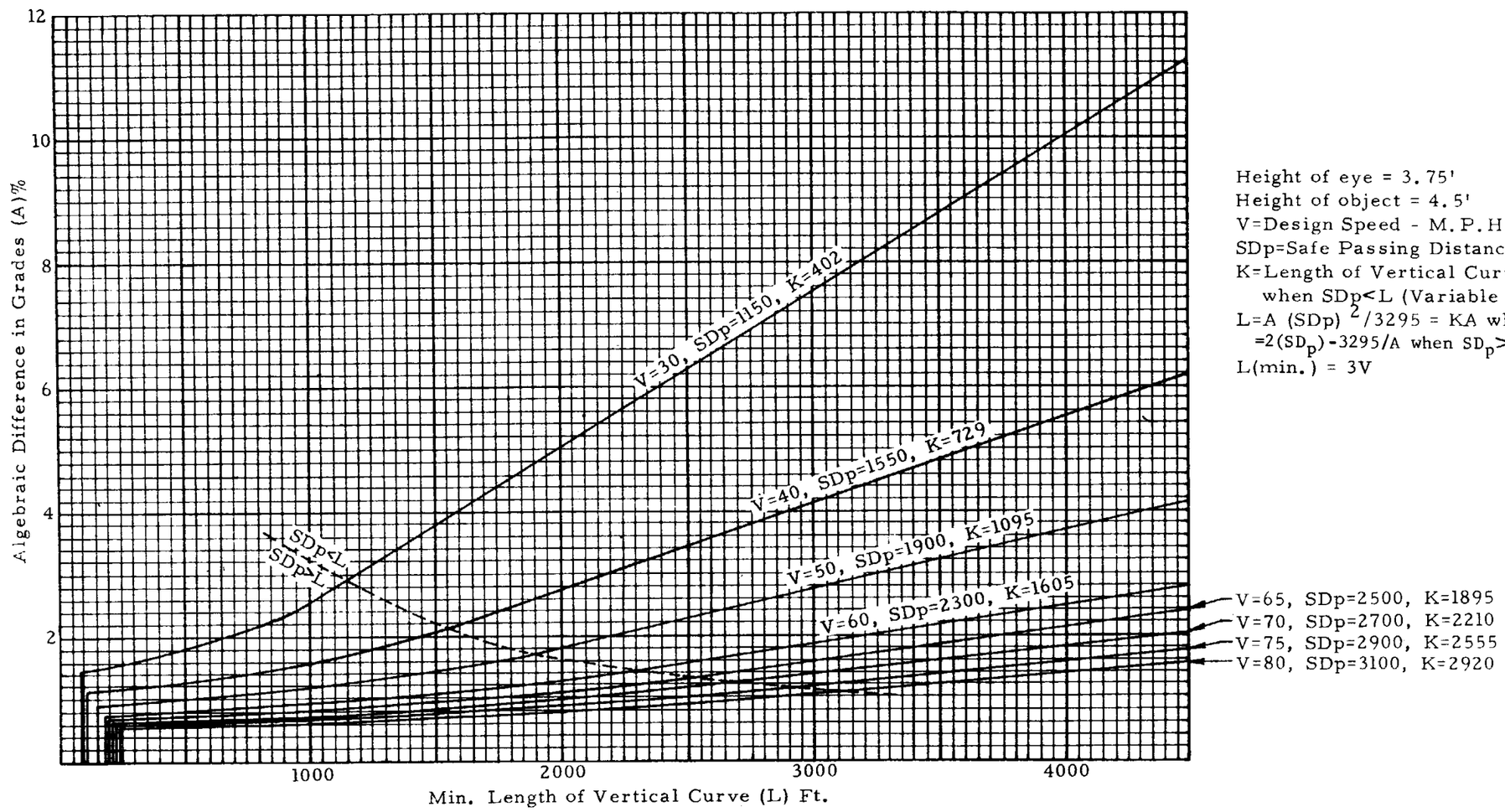
K = Length of Vertical Curve per % of A - Ft.

$$L = \frac{A(SD_s)^2}{400 + 3.5\,SD_s} \text{ - Ft.}$$

L = KA

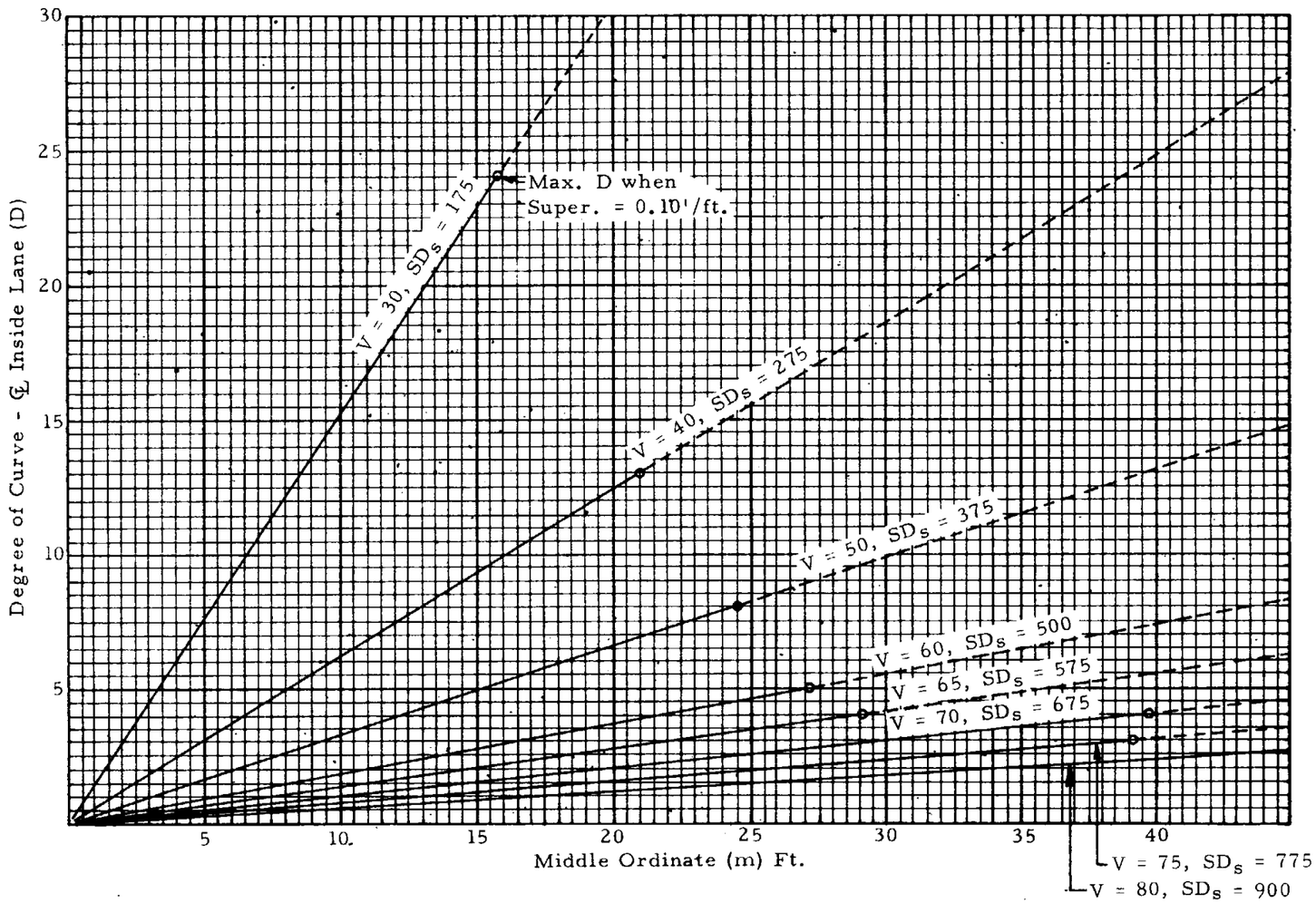
L (min.) = 1000' for Interstate Highways;
800' for primary and secondary highways;
3V for all other highways.

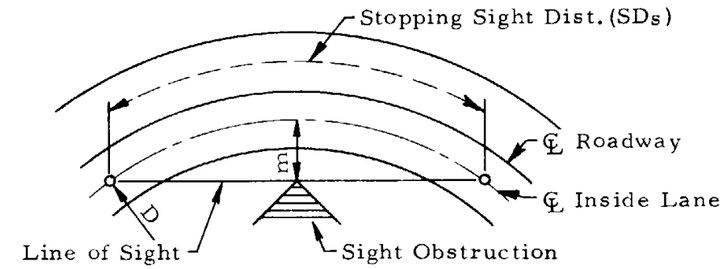
| DESIGN APPROVED | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD PLANS | REV. DATE 4/78 |
|---|---|---|
| APPROVED FOR DISTRIBUTION | LENGTH STANDARDS SAG VERTICAL CURVES | PLAN NO. D-51.40 |




Height of eye = 3.75'
Height of object = 4.5'
V=Design Speed - M.P.H.
SDp=Safe Passing Distance - Ft.
K=Length of Vertical Curve per % of A when SDp<L (Variable when SDp>L)
$L=A\,(SDp)^2/3295 = KA$ when SDp<L
$=2(SD_p)-3295/A$ when $SD_p>L$
L(min.) = 3V

| DESIGN APPROVED | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD PLANS | REV. DATE 4/78 |
|---|---|---|
| APPROVED FOR DISTRIBUTION | PASSING SIGHT DISTANCE CREST VERTICAL CURVES | PLAN NO. D-51.50 |

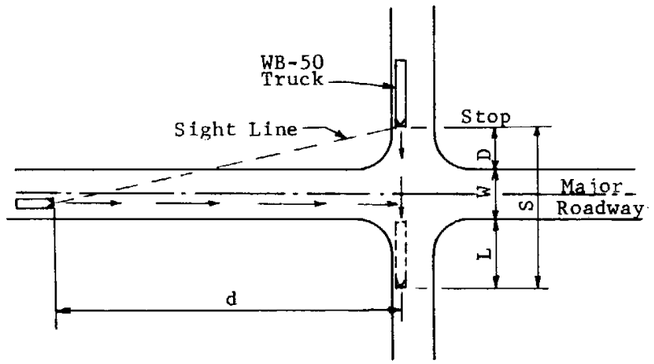



$$m = \frac{5730}{D} \text{ vers } \frac{SD_s\ D}{200}$$

V=Design Speed M.P.H.

| | | |
|---|---|---|
| DESIGN APPROVED | ARIZONA<br>DEPARTMENT OF TRANSPORTATION<br>HIGHWAYS DIVISION<br>STANDARD PLANS | REV. DATE<br>4/78 |
| APPROVED FOR DISTRIBUTION | STOPPING SIGHT DISTANCE<br>HORIZONTAL CURVES | PLAN NO.<br>D-51.60 |



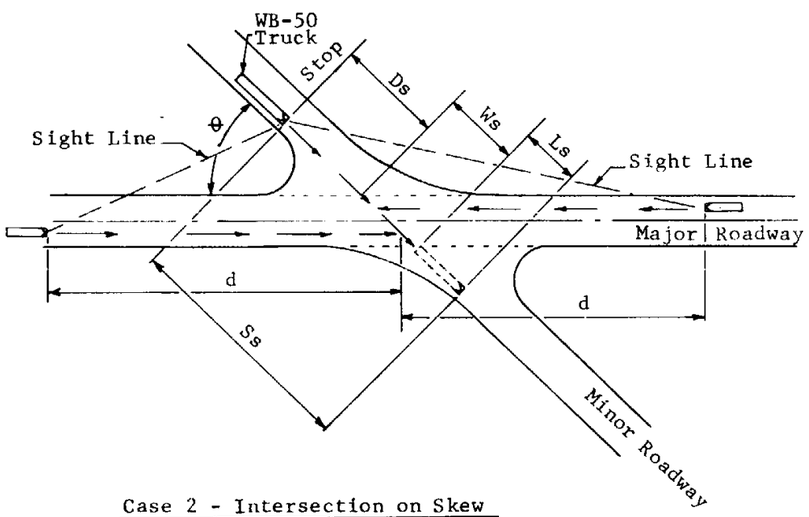

Case 1 - Normal Intersection

Case 1:
d= 1.47V(2+4.8+0.065)

ta adjustment for grade effect

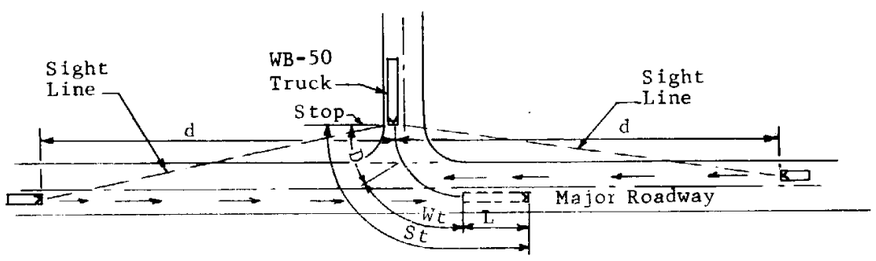
| Grade, % | -4 | -2 | 0 | +2 | +4 |
|---|---|---|---|---|---|
| Factor | 0.8 | 0.9 | 1.0 | 1.2 | 1.7 |

TABLE 1




Case 2 - Intersection on Skew

Case 2:
d= 1.47V(2+4.8+0.06 Ss/sin θ)




Case 3 - "T" or Ramp-Crossroad Intersection

Case 3:
d= 1.47V(2+4.8+0.06 St)

## FORMULA

Basic formula: d=1.47V(J+ta)

d= min. sight distance along major roadway, ft., based on 3.75 ft. eye height and 4.5 object height.

D,Dt= distance from front of stopped vehicle to edge of traffic lane, ft. = 6

Ds= 10/sinθ.

J= sum of perception and gear shifting time for stopped vehicle preparing to enter or cross major roadway, sec.= 2

L,Lt= overall length of WB-50 truck, ft.=55

Ls= 55/sinθ

S= D+W+L, ft.

Ss= Ds+Ws+Ls, ft.

St=D+Wt+L, ft.

*ta= time for stopped vehicle to accelerate and traverse an S distance, sec. =0.06S,Ss or St+4.8

V= design speed of major roadway, mph

W= major roadway width, ft.

Ws= major roadway width/sin θ, ft.

Wt= distance traveled by stopped vehicle within major roadway width when left turning into major roadway and beginning entrance to traffic lane, ft.=1.18W

*See Table 1 for ta adjustment for grade effect.

## DESIGN NOTE

Sight line should be free of obstructions such as buildings, bridge superstructures, underpass columns or cut slopes. In addition, any major roadway horizontal or vertical curvature should provide the required unobstructed sight distance.

Where any restriction in the required sight distance or any obstruction in the sight line cannot be eliminated through design, additional traffic control is required.

For additional data see Section 9-03.7 of Geometric Design Manual.

| DESIGN APPROVED | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD PLANS | REV.DATE 4/78 |
|---|---|---|
| APPROVED FOR DISTRIBUTION | SIGHT DISTANCE STOP INTERSECTION | PLAN NO. D-51.70 |

## BASIC PROCEDURE

GIVEN: Terrain Class, Design Speed, ADT (Average Daily Traffic), K (Design Hour Factor), T (% Trucks & Recreation Vehicle) and D (% Directional Distribution Factor) or % Passing Sight Distance > 1500 Ft.

FIND: The geometric design standard (roadway with the minimum cross section) that satisfies the given criteria.

## STEPS

1. Compute DHV in 100's = ADT x K x 0.01
2. Enter the table in the appropriate terrain class column.
3. Within the terrain class column find the appropriate T (% Trucks) column.
4. Within the appropriate D or % Passing Sight Distance column find the range of smallest DHV values which will satisfy the value for DHV as computed in Step 1. Note that both given design speed and either D or % Passing Sight Distance must be satisfied.
5. The minimum geometric design standard is indicated by the "R" number associated with the result of Step 4.
6. The details of the geometric design standard found in Step 5 are shown on Std. D-52.20

Note: All DHV's computed in these procedures are two-way.

## EXAMPLE NO. 1

GIVEN: Terrain = Rolling, Design Speed = 60 mph, ADT = 6000, K = 8%, T = 5%, Passing Sight Distance = 60% > 1500 Feet.

Solution:

1. DHV = 6000 x 0.08 x 0.01 = 4.8
2. Enter "Rolling" terrain class column.
3. Within the above column find the T% column group which contains the given value of 5% (0% to 9% group).
4. Within the column group found in Step 3 find that column which contains the % passing sight distance value of 60%.
5. Within the above column find the range of smallest DHV which contains the value 4.8 (from Step 1).
6. The "R" number to the left is found to be R3, the geometrics for which may be found on Std. D-52.20

Comment:

It will be noticed that cross section R5 will also satisfy the DHV criteria if a 50 mph design speed is permissable. A re-evaluation of the basic criteria may find such a revision advisable.

## MULTI-LANE

| | Terrain | | Level | | | | | | | | | Rolling | | | | | | | | | Mountainous | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | % Trucks (T) | Max | 9 | | | 15 | | | 20 | | | 9 | | | 15 | | | 20 | | | 9 | | | 15 | | | 20 | | |
| | | Min | 0 | | | 10 | | | 16 | | | 0 | | | 10 | | | 16 | | | 0 | | | 10 | | | 16 | | |
| | % Directional Distribution D | Max | 60 | 70 | 80 | 60 | 70 | 80 | 60 | 70 | 80 | 60 | 70 | 80 | 60 | 70 | 80 | 60 | 70 | 80 | 60 | 70 | 80 | 60 | 70 | 80 | 60 | 70 | 80 |
| | | Min | 50 | 61 | 71 | 50 | 61 | 71 | 50 | 61 | 71 | 50 | 61 | 71 | 50 | 61 | 71 | 50 | 61 | 71 | 50 | 61 | 71 | 50 | 61 | 71 | 50 | 61 | 71 |
| R1 | Design Speed | | 80 mph (Level of Service B) | | | | | | | | | 70 mph (Level of Service B) | | | | | | | | | 60 mph (Level of Service C) | | | | | | | | |
| R1 | DHV Range (100's) | Max | 32 | 27 | 24 | 29 | 24 | 21 | 28 | 24 | 20 | 31 | 26 | 22 | 25 | 21 | 18 | 23 | 19 | 17 | 21 | 18 | 15 | 13 | 11 | 10 | 11 | 9 | 8 |
| R1 | | Min | 23 | 20 | 17 | 22 | 19 | 16 | 21 | 18 | 15 | 20 | 17 | 15 | 16 | 14 | 12 | 14 | 12 | 11 | 10 | 9 | 8 | 9 | 8 | 7 | 8 | 7 | 6 |
| R2 | Design Speed | | 70 mph (Level of Service B) | | | | | | | | | 60 mph (Level of Service B) | | | | | | | | | 50 mph (Level of Service C) | | | | | | | | |
| R2 | DHV Range (100's) | Max | 22 | 19 | 16 | 21 | 18 | 15 | 20 | 17 | 14 | 19 | 16 | 14 | 15 | 13 | 11 | 13 | 11 | 10 | 17 | 14 | 12 | 10 | 8 | 7 | 8 | 6 | 5 |
| R2 | | Min | 17 | 14 | 12 | 16 | 13 | 12 | 15 | 13 | 11 | 12 | 10 | 9 | 11 | 9 | 8 | 10 | 8 | 7 | 8 | 7 | 6 | 6 | 5 | 5 | 5 | 5 | 4 |

## 2-LANE

| | Terrain | | Level | | | | | | | | | Rolling | | | | | | | | | Mountainous | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | % Trucks (T) | Max | 9 | | | 15 | | | 20 | | | 9 | | | 15 | | | 20 | | | 9 | | | 15 | | | 20 | | |
| | | Min | 0 | | | 10 | | | 16 | | | 0 | | | 10 | | | 16 | | | 0 | | | 10 | | | 16 | | |
| R3 | % Passing Sight Dist. | | 100 | 80 | 60 | 100 | 80 | 60 | 100 | 80 | 60 | 80 | 60 | 40 | 80 | 60 | 40 | 80 | 60 | 40 | 60 | 40 | 20 | 60 | 40 | 20 | 60 | 40 | 20 |
| R3 | Design Speed | | 70 mph (Level of Service B) | | | | | | | | | 60 mph (Level of Service B) | | | | | | | | | 50 mph (Level of Service C) | | | | | | | | |
| R3 | DHV Range (100's) | Max | 7.5 | 7.0 | 6.5 | 6.5 | 6.0 | 5.5 | 6.2 | 5.5 | 5.2 | 6.0 | 5.1 | 4.1 | 4.2 | 3.5 | 2.9 | 3.6 | 3.1 | 2.5 | 8.0 | 6.4 | 4.7 | 4.2 | 3.4 | 2.5 | 3.2 | 2.6 | 1.9 |
| R3 | | Min | 6.0 | 5.5 | 5.0 | 5.5 | 5.2 | 4.7 | 5.2 | 4.6 | 4.4 | 3.9 | 3.4 | 2.7 | 3.3 | 2.8 | 2.3 | 3.0 | 2.6 | 2.0 | 3.9 | 3.2 | 2.3 | 3.0 | 2.4 | 1.8 | 2.6 | 2.1 | 1.5 |
| R4 | % Passing Sight Dist. | | 100 | 80 | 60 | 100 | 80 | 60 | 100 | 80 | 60 | 80 | 60 | 40 | 80 | 60 | 40 | 80 | 60 | 40 | 40 | 20 | 0 | 40 | 20 | 0 | 40 | 20 | 0 |
| R4 | Design Speed | | 70 mph (Level of Service B) | | | | | | | | | 60 mph (Level of Service B) | | | | | | | | | 50 mph (Level of Service C) | | | | | | | | |
| R4 | DHV Range (100's) | Max | 7.2 | 6.7 | 6.1 | 6.4 | 5.9 | 5.4 | 6.0 | 5.6 | 5.0 | 5.5 | 4.7 | 3.7 | 4.1 | 3.5 | 2.8 | 3.5 | 3.1 | 2.4 | 5.4 | 4.0 | 2.6 | 3.2 | 2.4 | 1.5 | 2.5 | 1.9 | 1.2 |
| R4 | | Min | 5.7 | 5.3 | 4.8 | 5.4 | 5.0 | 4.5 | 5.0 | 4.7 | 4.3 | 3.6 | 3.1 | 2.5 | 3.1 | 2.7 | 2.2 | 2.8 | 2.4 | 2.0 | 3.0 | 2.2 | 1.4 | 2.3 | 1.7 | 1.1 | 2.0 | 1.5 | 1.0 |
| R5 | % Passing Sight Dist. | | 100 | 80 | 60 | 100 | 80 | 60 | 100 | 80 | 60 | 80 | 60 | 40 | 80 | 60 | 40 | 80 | 60 | 40 | 40 | 20 | 0 | 40 | 20 | 0 | 40 | 20 | 0 |
| R5 | Design Speed | | 60 mph (Level of Service B) | | | | | | | | | 50 mph (Level of Service C) | | | | | | | | | 40 mph (Level of Service D) | | | | | | | | |
| R5 | DHV Range (100's) | Max | 5.4 | 4.7 | 4.0 | 4.7 | 4.1 | 3.6 | 4.5 | 3.9 | 3.4 | 6.9 | 6.2 | 5.0 | 5.1 | 4.5 | 3.7 | 4.5 | 4.0 | 3.2 | 5.6 | 4.4 | 2.4 | 3.0 | 2.3 | 1.3 | 2.3 | 1.8 | 1.0 |
| R5 | | Min | 4.3 | 3.7 | 3.2 | 4.0 | 3.5 | 3.0 | 3.8 | 3.3 | 2.8 | 4.6 | 4.1 | 3.3 | 4.0 | 3.6 | 2.9 | 3.6 | 3.2 | 2.6 | 2.7 | 2.1 | 1.1 | 2.1 | 1.6 | 0.9 | 1.8 | 1.4 | 0.7 |

## EXAMPLE NO. 2

GIVEN: Terrain = Rolling, Design Speed = 70 mph, ADT = 22000, K = 11%, T = 8%, D = 55%.

Solution:

1. DHV = 22000 x 0.11 x 0.01 = 24
2. Enter "Rolling" terrain class column.
3. Within the above column find the T% column group which contains the given value of 8% (0% - 9% group).
4. Within the column group found in Step 3 find that column which contains the D value of 55% (50% - 60% column).
5. Within the above column find the range of smallest DHV which contains the value 24 (from Step 1).
6. The "R" number to the left is found to be R1, the geometrics for which may be found on Std. D-52.20

## GENERAL NOTES

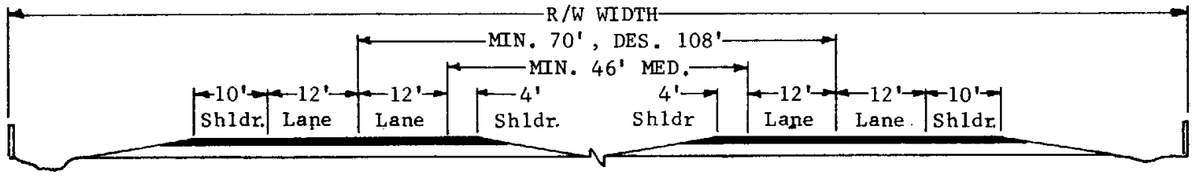
The procedures will in some instances yield results which can be satisfied by more than one design standard. Final selection will require careful consideration of factors such as operation, economics, local influences, etc.

Note that multi-lane vs. 2-lane standards are differentiated by directional distribution vs. % passing sight distance > 1500 feet.

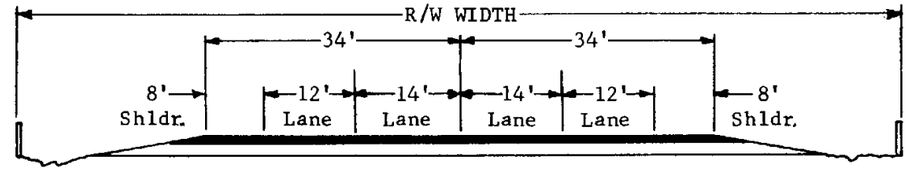
All DHV's computed in these procedures are two-way.

RURAL & RURAL CHARACTER HIGHWAYS

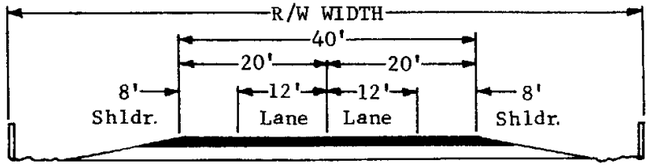
| DESIGN APPROVED | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD PLANS | REV. DATE 4/78 |
|---|---|---|
| APPROVED FOR DISTRIBUTION | GEOMETRIC DESIGN SELECTION TABLE & PROCEDURES | PLAN NO. D-52.10 |



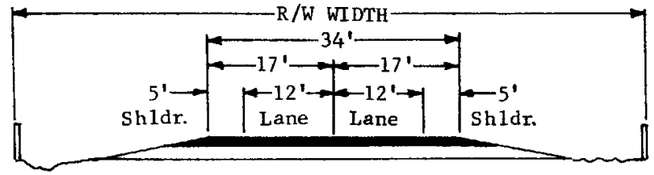

R1



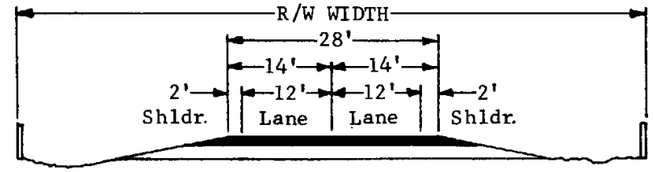

R2




R3




R4




R5

| Design Cross Section | R1 | | | R2 | | | R3 | | | R4 | | | R5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of Traffic Lanes | 4-DIVIDED | | | 4-UNDIVIDED | | | 2 | | | 2 | | | 2 | | |
| Terrain | LEVEL | ROLL. | MTN. | LEVEL | ROLL. | MTN. | LEVEL | ROLL. | MTN. | LEVEL | ROLL. | MTN. | LEVEL | ROLL. | MTN. |
| Median Width & Roadway Width | See Cross Sections Above and Sections 8-11 and 8-12 of Design Manual | | | | | | | | | | | | | | |
| Design Speed - m.p.h. | 80 | 70 | 60 | 80 | 70 | 60 | 70 | 60 | 50 | 70 | 60 | 50 | 60 | 50 | 40 |
| Maximum Curvature - Degrees | See Standards D-6.04, 6.05 & 6.06 | | | | | | | | | | | | | | |
| Desirable Maximum Curvature - Degrees | 1 | 2 | 4 | 1 | 2 | 4 | 2 | 4 | 6 | 2 | 4 | 6 | 6 | 8 | 14 |
| Minimum Stopping Sight Distance - Eye to 6" Object | 900 | 675 | 500 | 900 | 675 | 500 | 675 | 500 | 375 | 675 | 500 | 375 | 500 | 375 | 275 |
| Passing Sight Distance - Eye to Eye | - | - | - | 3100 | 2700 | 2300 | 2700 | 2300 | 1900 | 2700 | 2300 | 1900 | 2300 | 1900 | 1550 |
| Maximum Grade - % | 3 | 4 | 6 | 3 | 4 | 6 | 3 | 4 | 6 | 4 | 6 | 8 | 4 | 6 | 8 |
| Desirable Maximum Grade - % | 2 | 3 | 4 | 2 | 3 | 4 | 3 | 4 | 4 | 3 | 5 | 6 | 3 | 5 | 7 |
| Minimum R/W Width - Ft. | 260 | 260 | 260 | 200 | 200 | 200 | 200 | 200 | 200 | 100 | 100 | 100 | 100 | 100 | 100 |
| Desirable Minimum R/W Width - Ft. | 308 | 308 | 308 | 250 | 250 | 250 | 250 | 250 | 250 | 200 | 200 | 200 | - | - | - |

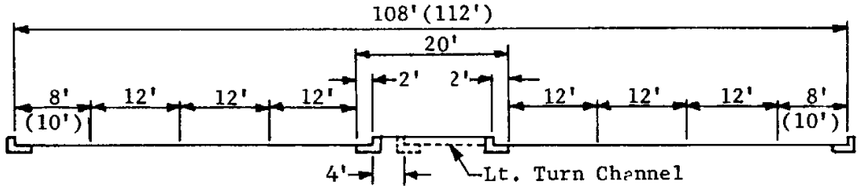
## GENERAL NOTES

LEVEL TERRAIN: Any combination of geometric design elements that permits trucks to maintain speeds that equal or approach speeds of passenger cars.
ROLLING TERRAIN: Any combination of geometric design elements that causes trucks to reduce speed substantially below that of passenger cars on some sections of the highway but which does not involve sustained crawl speeds by trucks for any substantial distance.
MOUNTAINOUS TERRAIN: Any combination of geometric design elements that will cause trucks to operate at crawl speed for considerable distances or at frequent intervals.
DESIRABLE is the standard to be attained if physical features permit.
PASSING SIGHT DISTANCES less than those tabulated are permitted but are to be avoided if possible.
ROADWAY WIDTH on structures shall be increased by two feet on each side for geometric design standards R1 through R4. For geometric design standard R5 the structure width may be greater than the approach roadway, but in no case shall it be less.
CURVE SUPERELEVATION shall be in accordance with standards D-56.10 through D-56.40.

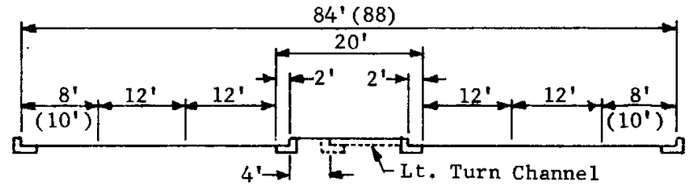
For Geometric Design Standard Selection Procedure, see Standard D-52.10.

RURAL & RURAL CHARACTER HIGHWAYS

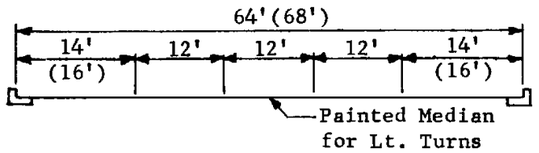
| | | |
|---|---|---|
| DESIGN APPROVED | STATE OF ARIZONA<br>DEPARTMENT OF TRANSPORTATION<br>DIVISION OF HIGHWAYS<br>STANDARD DRAWINGS | REV. 4/78 |
| APPROVED FOR DISTRIBUTION | GEOMETRIC DESIGN STANDARDS | DRAWING NO. D-52.20 |



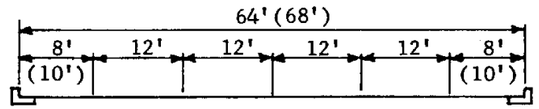

U1



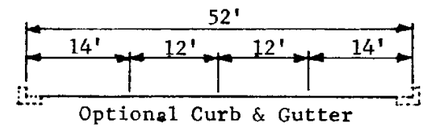

U2




U3




U4




U5

| Design Cross Section | U1 | | U2 | | U3 | | U4 | | U5 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Location | Urban | Suburban | Urban | Suburban | Urban | Suburban | Urban | Suburban | Urban | Suburban |
| Number of Traffic Lanes | 6 | 6 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| Traffic Lane Width - Ft. | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| Median Width - Ft. | 20 | 20 | 20 | 20 | 12 | 12 | - | - | - | - |
| Minimum Outer Lane Width - Ft. | 8 | 8 | 8 | 8 | 14 | 14 | 8 | 8 | 14 | 14 |
| Minimum Desirable Outer Lane Width - Ft. | 10 | 10 | 10 | 10 | 16 | 16 | 10 | 10 | 14 | 14 |
| Minimum Roadway Width Incl. Paved Shoulders - Ft. | 108 | 108 | 84 | 84 | 64 | 64 | 64 | 64 | 52 | 52 |
| Minimum Desirable Roadway Width Incl. Paved Shoulders - Ft. | 112 | 112 | 88 | 88 | 68 | 68 | 68 | 68 | 52 | 52 |
| Design Speed - mph | 30-50 | 40-60 | 30-50 | 40-60 | 30-50 | 40-60 | 30-50 | 40-60 | 30-50 | 40-60 |
| Maximum Curvature - Degrees | 8 | 6 | 8 | 6 | 8 | 6 | 8 | 6 | 8 | 6 |
| Desirable Maximum Curvature - Degrees | 7 | 5 | 7 | 5 | 7 | 5 | 7 | 5 | 7 | 5 |
| Minimum Curb Return Radius - Ft. | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 |
| Minimum Stopping Sight Distance - Eye to 6" Object | 375 | 500 | 375 | 500 | 375 | 500 | 375 | 500 | 375 | 500 |
| Maximum Grade - % | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| Desirable Maximum Grade - % | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| Minimum R/W Width - Ft. | 135 | 135 | 100 | 100 | 90 | 90 | 90 | 90 | 80 | 80 |
| Desirable Minimum R/W Width - Ft. | 300 | 300 | 250 | 250 | 200 | 200 | 200 | 200 | 190 | 190 |

DESIRABLE is the standard to be attained if physical features permit.
ROADWAY WIDTH on structures shall match that of approach roadway.
CURVE SUPERELEVATION shall be in accordance with standards D-56.10 through D-56.40 subject to adjustments necessary to assuring reasonable ingress and egress to adjacent properties.

For Geometric Design Standard Selection Procedure, see Standard D-52.30.

URBAN & SUBURBAN HIGHWAYS

| | | |
|---|---|---|
| DESIGN APPROVED | STATE OF ARIZONA<br>DEPARTMENT OF TRANSPORTATION<br>DIVISION OF HIGHWAYS<br>STANDARD DRAWINGS | REV. 4/78 |
| APPROVED FOR DISTRIBUTION | GEOMETRIC DESIGN STANDARDS | DRAWING NO D-52.40 |

| | Location | Urban (30-50 mph) | | | | | | | | | Suburban (40-60 mph) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | % Trucks | 0 - 5 | | | 6 - 10 | | | 11 - 15 | | | 0 - 5 | | | 6 - 10 | | | 11 - 15 | | |
| | Directional | 50 | 61 | 71 | 50 | 61 | 71 | 50 | 61 | 71 | 50 | 61 | 71 | 50 | 61 | 71 | 50 | 61 | 71 |
| | | to | to | to | to | to | to | to | to | to | to | to | to | to | to | to | to | to | to |
| | Distribution | 60 | 70 | 80 | 60 | 70 | 80 | 60 | 70 | 80 | 60 | 70 | 80 | 60 | 70 | 80 | 60 | 70 | 80 |
| U1 | Turn & Park Criteria | 60% Green Time, Lt. Turn Arrow, Turns: 10% Lt., 10% Rt. No Parking in Outer Lanes. Distress Only. | | | | | | | | | | | | | | | | | |
| | Design Hourly | 40 | 32 | 28 | 37 | 31 | 26 | 35 | 28 | 25 | 37 | 31 | 26 | 35 | 28 | 24 | 33 | 27 | 23 |
| | | to | to | to | to | to | to | to | to | to | to | to | to | to | to | to | to | to | to |
| | Volume (100's) | 32 | 27 | 24 | 29 | 25 | 22 | 27 | 24 | 21 | 29 | 25 | 22 | 28 | 24 | 21 | 26 | 23 | 20 |
| U2 | Turn & Park Criteria | 60% Green Time, Lt. Turn Arrow, Turns: 10% Lt., 10% Rt. No Parking in Outer Lanes. Distress Only. | | | | | | | | | | | | | | | | | |
| | Design Hourly | 31 | 25 | 22 | 30 | 24 | 21 | 28 | 23 | 20 | 30 | 24 | 21 | 28 | 23 | 20 | 27 | 22 | 19 |
| | | to | to | to | to | to | to | to | to | to | to | to | to | to | to | to | to | to | to |
| | Volume (100's) | 25 | 21 | 19 | 24 | 20 | 18 | 22 | 19 | 17 | 24 | 20 | 18 | 22 | 19 | 17 | 21 | 18 | 16 |
| U3 | Turn & Park Criteria | 60% Green Time, Lt. Turn Arrow, Turns: 10% Lt., 10% Rt. No Parking in Outer Lanes, Distress Only. | | | | | | | | | | | | | | | | | |
| | Design Hourly | 26 | 22 | 19 | 25 | 20 | 17 | 23 | 19 | 16 | 25 | 20 | 17 | 23 | 19 | 17 | 22 | 18 | 16 |
| | | to | to | to | to | to | to | to | to | to | to | to | to | to | to | to | to | to | to |
| | Volume (100's) | 21 | 18 | 16 | 20 | 17 | 15 | 18 | 16 | 14 | 20 | 17 | 15 | 19 | 16 | 14 | 17 | 15 | 13 |
| U4 | Turn & Park Criteria | 50% Green Time, Turns: 10% Lt., 10% Rt. Parking in Outer Lanes. | | | | | | | | | | | | | | | | | |
| | Design Hourly | 17 | 14 | 12 | 16 | 13 | 11 | 15 | 13 | 11 | 16 | 13 | 11 | 15 | 13 | 11 | 15 | 12 | 10 |
| | | to | to | to | to | to | to | to | to | to | to | to | to | to | to | to | to | to | to |
| | Volume (100's) | 14 | 12 | 10 | 13 | 11 | 10 | 12 | 11 | 9 | 13 | 11 | 10 | 12 | 11 | 9 | 12 | 10 | 9 |
| U5 | Turn & Park Criteria | 50% Green Time, Turns: 10% Lt., 10% Rt. No Parking in Outer Lanes. | | | | | | | | | | | | | | | | | |
| | Design Hourly | 18 | 15 | 13 | 17 | 14 | 12 | 16 | 13 | 11 | 17 | 14 | 12 | 16 | 13 | 11 | 15 | 13 | 11 |
| | | to | to | to | to | to | to | to | to | to | to | to | to | to | to | to | to | to | to |
| | Volume (100's) | 14 | 12 | 11 | 14 | 12 | 10 | 13 | 11 | 10 | 14 | 12 | 10 | 13 | 11 | 10 | 12 | 11 | 9 |

## PROCEDURE

**GIVEN:** Design Speed, ADT (Average Daily Traffic), K (Design Hour Factor), T (% Trucks), D (Directional Distribution) and whether classified as Urban or Suburban.

**FIND:** The Geometric Design Standard (roadway with the minimum cross section) that satisfies the given criteria

## STEPS

1. Compute DHV in 100's
   = ADT x K x 0.01.
2. Enter the table in the appropriate urban or suburban column.
3. Within the location class column find the appropriate T (% Trucks) column.
4. Within the appropriate D (% Directional Distribution) column, find the range of smallest DHV values which will satisfy the DHV value computed in Step 1. Note that the given design speed must be satisfied.
5. The minimum Geometric Design Standard is indicated by the "U" number associated with the results of Step 4.
6. The details for the Geometric Design Standard found in Step 5 are shown in Standard D-52.40.

**Note:**
All DHV's computed in these procedures are two-way.

## EXAMPLE

**GIVEN:** Location Class = Suburban
Design Speed = 55 mph
ADT = 18,500
K = 12%
T = 7%
D = 55%

1. DHV = 18,500 x 12 x 0.01 = 22
2. Enter Suburban column.
3. Within the above column, find the T% group which contains the given T value (6% to 10% column).
4. Within the column group found in Step 3 find the column which contains the D value of 55% (50% to 60% column).
5. Within the above column group, find the smallest DHV range which contains the value 22 (from Step 1).
6. The "U" number to the left is found to be U3, the geometrics for which may be found on Standard D-52.40.

## GENERAL NOTES

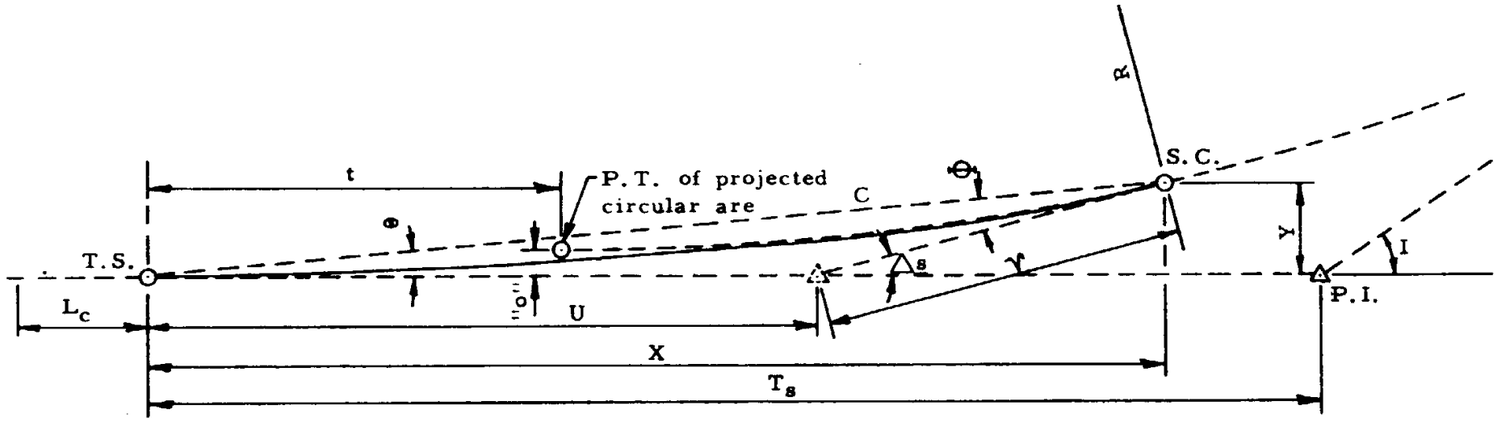
The procedures may in some instances yield results which can be satisfied by more than one geometric standard. Final selection will require careful consideration of factors such as operation, economics, local influences, etc.

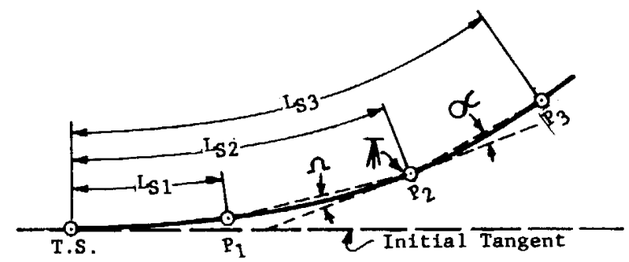
A capacity analysis should be performed in those instances where the variables (% green time, % turning movements, etc.) are known to differ appreciably from the average values tabulated.

Standard U5 may be modified to serve in situations where it appears that two through traffic lanes would be adequate into the near future and it has been determined that on street parking would be temporarily acceptable. Under these conditions the cross section would be composed of two 16 foot traffic lanes with two 10 foot parking lanes. Traffic carrying capability would be determined by multiplying the appropriate U5 tabular design hourly volume by 65%.

URBAN & SUBURBAN HIGHWAYS

| | | |
|---|---|---|
| DESIGN APPROVED | STATE OF ARIZONA<br>DEPARTMENT OF TRANSPORTATION<br>DIVISION OF HIGHWAYS<br>STANDARD DRAWINGS | REV. 4/78 |
| APPROVED FOR DISTRIBUTION | GEOMETRIC DESIGN SELECTION TABLE & PROCEDURES | DRAWING NO. D-52.30 |




$$\alpha = \tfrac{1}{2} a L_{S2}(L_{S3}-L_{S2}) + 1/6a(L_{S3}-L_{S2})^2$$

$$\Omega = \tfrac{1}{2} a L_{S2}(L_{S2}-L_{S1}) - 1/6a(L_{S2}-L_{S1})^2$$

DEFLECTION ANGLE FORMULAE FOR SET-UP AT POINT ON SPIRAL

Determine values of $L_s$ and a, for design speed and D, from Drwg. Nos. D-6.05 through D-6.11. These values may be checked by the following applicable formulae.

$L_s$(sta.)= Spiral distance from T.S. to S.C.=D/a

a(degrees)=Rate of change in degree of curvature per 100' of spiral=$D/L_s$

D(degrees)=Degree of curvature of circular curve $=aL_s=5729.58/R$

R(ft.)=Radius of circular curve=5729.58/D

"o"(ft.)=Radial offset=$0.0727aL_s^3$

t(ft.)=$50L_s-0.000127a^2L_s^5$

$\Delta_s$(degrees)=Full spiral deviation angle=$\tfrac{1}{2}aL_s^2$ $=\tfrac{1}{2}DL_s=\tfrac{1}{2}(D^2/a)=L_s/2(D)$

$\Theta$(degrees)=Full spiral deflection angle at T. S. $=(1/3\Delta_s)^{①}=1/6aL_s^{2①}=1/6DL_s^{①}=1/6D^2/a^{①}$

$\Phi$(degrees)=Full spiral deflection angle at S.C. $=\Delta_s-\Theta$

C(ft.)=$100\ L_s-0.00034a^2L_s^5$

V(ft.)=$C\sin\Theta/\sin\Delta_s$

U(ft.)=$C\sin\Phi/\sin\Delta_s$

X(ft.)=$C\cos\Theta$

Y(ft.)=$C\sin\Theta$

$T_s$(ft.)= $[(\tan\tfrac{1}{2}I)(R+\text{"o"})]+t$

SPIRAL FORMULAE

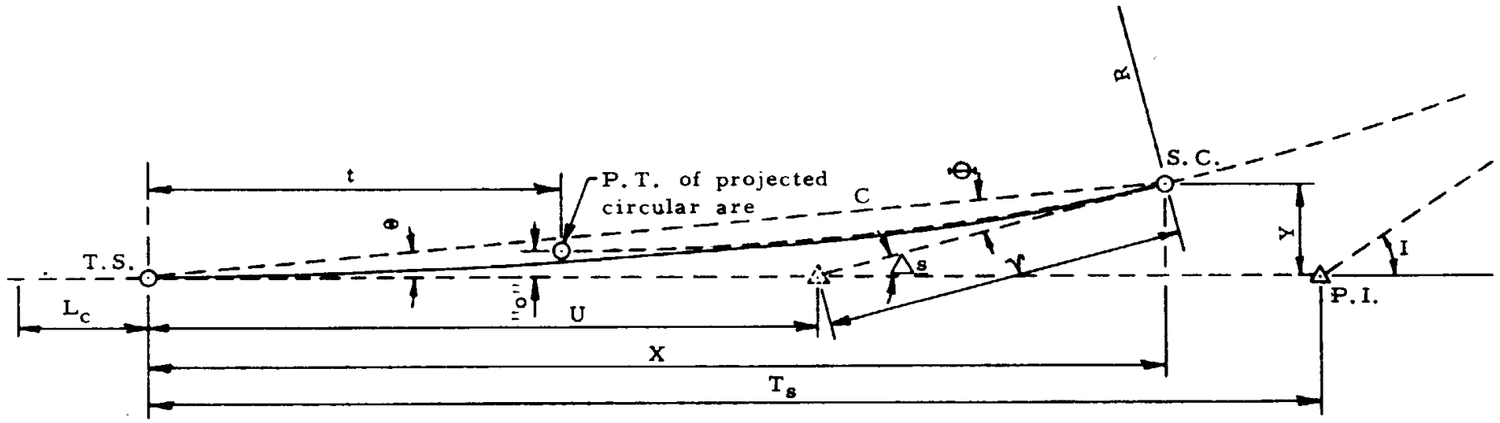
Reduce $\Theta$ formulae values by $C_n$ according to the following table:

| $\Delta_s$ | $C_n$ | $\Delta_s$ | $C_n$ | $\Delta_s$ | $C_n$ |
|---|---|---|---|---|---|
| 16° | 0.2' | 31° | 1.6' | 46° | 5.1' |
| 17 | 0.3 | 32 | 1.7 | 47 | 5.5 |
| 18 | 0.3 | 33 | 1.9 | 48 | 5.8 |
| 19 | 0.4 | 34 | 2.1 | 49 | 6.2 |
| 20 | 0.4 | 35 | 2.3 | 50 | 6.6 |
| 21 | 0.5 | 36 | 2.5 | 51 | 7.0 |
| 22 | 0.6 | 37 | 2.7 | 52 | 7.4 |
| 23 | 0.6 | 38 | 2.9 | 53 | 7.9 |
| 24 | 0.7 | 39 | 3.1 | 54 | 8.3 |
| 25 | 0.8 | 40 | 3.4 | 55 | 8.8 |
| 26 | 0.9 | 41 | 3.6 | 56 | 9.3 |
| 27 | 1.0 | 42 | 3.9 | 57 | 9.8 |
| 28 | 1.2 | 43 | 4.2 | 58 | 10.3 |
| 29 | 1.3 | 44 | 4.5 | 59 | 10.8 |
| 30 | 1.4 | 45 | 4.8 | 60 | 11.4 |

① VALUES OF $C_n$ IN $\Theta$ DETERMINATION FORMULAE

($C_n$ is negligible and may be ignored for $\Delta_s$ values less than 16°.)

| DESIGN APPROVED | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD PLANS | REV. DATE 4/78 |
|---|---|---|
| APPROVED FOR DISTRIBUTION | FULL TRANSITION SPIRAL | PLAN NO. D-55.10 |




Determine values of $L_s$ and a, for design speed and D, from Drwg. Nos. D-6.05 through D-6.11. These values may be checked by the following applicable formulae.

$L_s$(sta.)= Spiral distance from T.S. to S.C.=D/a

a(degrees)=Rate of change in degree of curvature per 100' of spiral=$D/L_s$

D(degrees)=Degree of curvature of circular curve $=aL_s=5729.58/R$

R(ft.)=Radius of circular curve=5729.58/D

"o"(ft.)=Radial offset=$0.0727aL_s^3$

t(ft.)=$50L_s-0.000127a^2L_s^5$

$\Delta_s$(degrees)=Full spiral deviation angle=$\frac{1}{2}aL_s^2$ $=\frac{1}{2}DL_s=\frac{1}{2}(D^2/a)=L_s/2(D)$

$\Theta$(degrees)=Full spiral deflection angle at T. S. $=(1/3\Delta_s)^{①}=1/6aL_s^{2①}=1/6DL_s^{①}=1/6D^2/a^{①}$

$\Phi$(degrees)=Full spiral deflection angle at S.C. $=\Delta_s-\Theta$

C(ft.)=$100\ L_s-0.00034a^2L_s^5$

V(ft.)=$C\sin\Theta/\sin\Delta_s$

U(ft.)=$C\sin\Phi/\sin\Delta_s$

X(ft.)=$C\cos\Theta$

Y(ft.)=$C\sin\Theta$

$T_s$(ft.)= $[(\tan\frac{1}{2}I)(R+\text{"o"})]+t$

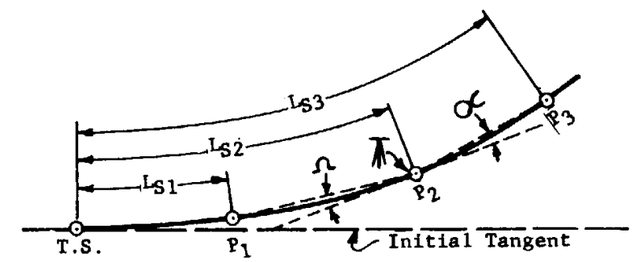
SPIRAL FORMULAE

Reduce $\Theta$ formulae values by $C_n$ according to the following table:

| $\Delta_s$ | $C_n$ | $\Delta_s$ | $C_n$ | $\Delta_s$ | $C_n$ |
|---|---|---|---|---|---|
| 16° | 0.2' | 31° | 1.6' | 46° | 5.1' |
| 17 | 0.3 | 32 | 1.7 | 47 | 5.5 |
| 18 | 0.3 | 33 | 1.9 | 48 | 5.8 |
| 19 | 0.4 | 34 | 2.1 | 49 | 6.2 |
| 20 | 0.4 | 35 | 2.3 | 50 | 6.6 |
| 21 | 0.5 | 36 | 2.5 | 51 | 7.0 |
| 22 | 0.6 | 37 | 2.7 | 52 | 7.4 |
| 23 | 0.6 | 38 | 2.9 | 53 | 7.9 |
| 24 | 0.7 | 39 | 3.1 | 54 | 8.3 |
| 25 | 0.8 | 40 | 3.4 | 55 | 8.8 |
| 26 | 0.9 | 41 | 3.6 | 56 | 9.3 |
| 27 | 1.0 | 42 | 3.9 | 57 | 9.8 |
| 28 | 1.2 | 43 | 4.2 | 58 | 10.3 |
| 29 | 1.3 | 44 | 4.5 | 59 | 10.8 |
| 30 | 1.4 | 45 | 4.8 | 60 | 11.4 |

① VALUES OF $C_n$ IN $\Theta$ DETERMINATION FORMULAE

($C_n$ is negligible and may be ignored for $\Delta_s$ values less than 16°.)




$$\alpha=\tfrac{1}{2}aL_{S2}(L_{S3}-L_{S2})+1/6a(L_{S3}-L_{S2})^2$$

$$\Omega=\tfrac{1}{2}aL_{S2}(L_{S2}-L_{S1})-1/6a(L_{S2}-L_{S1})^2$$

DEFLECTION ANGLE FORMULAE FOR SET-UP AT POINT ON SPIRAL

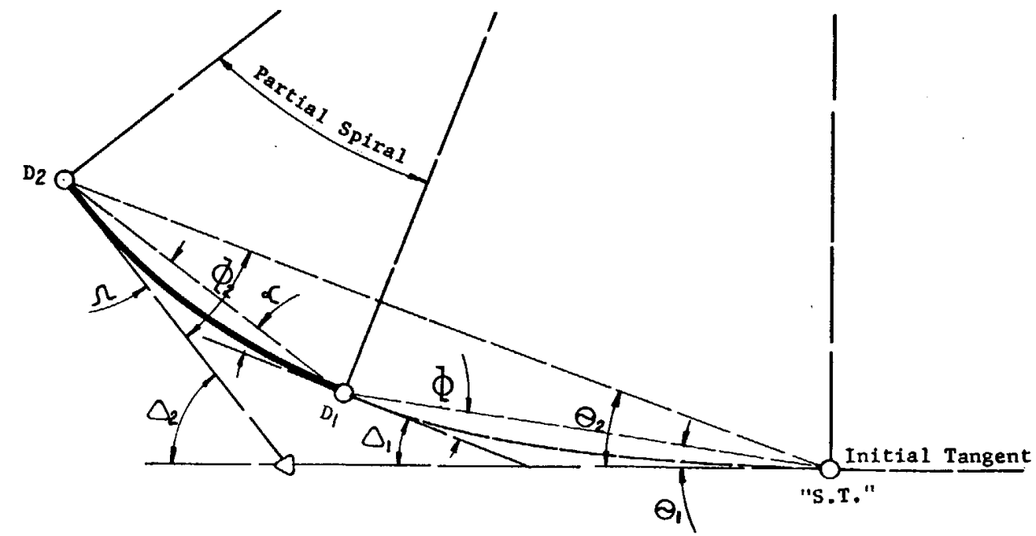
| DESIGN APPROVED | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD PLANS | REV. DATE 4/78 |
|---|---|---|
| APPROVED FOR DISTRIBUTION | FULL TRANSITION SPIRAL | PLAN NO. D-55.10 |

Select $L_s$ and a from Drwg. No. D-6.05 through D-6.11 for the specified design speed and $D=D_2$. These values may be checked by the applicable following formulae.

$L_s$(sta.)=Length of spiral from $D_2$ to S.T.=$D_2/a$
a(degrees)=Rate of change in degree of curvature per 100' of spiral=$D_1/L_1=D_2/L_s$
$\Theta$(degrees)=Deflection for spiral having values of a and $L_s-L_1=1/6a(L_s-L_1)^2$
$L_1$(sta.)=Length of spiral from $D_1$ to S.T.=$D_1/a$
$L_s-L_1$(sta.)=Length of spiral from $D_2$ to $D_1=D_2-D_1/a$
$D_1$(degrees)=Culminating degree of curvature at $D_1=aL_1=D_2-a(L_s-L_1)$
$D_2$(degrees)=Culminating degree of curvature at $D_2=aL_s=D_1+a(L_s-L_1)$

$$\alpha(\text{degrees})=\tfrac{1}{2}aL_1(L_s-L_1)+1/6a(L_s-L_1)^2=\tfrac{1}{2}D_1\left[\frac{D_2-D_1}{a}\right]+1/6a\left[\frac{D_2-D_1}{a}\right]^2=\tfrac{1}{2}D\ (L_s-L_1)+\Theta$$

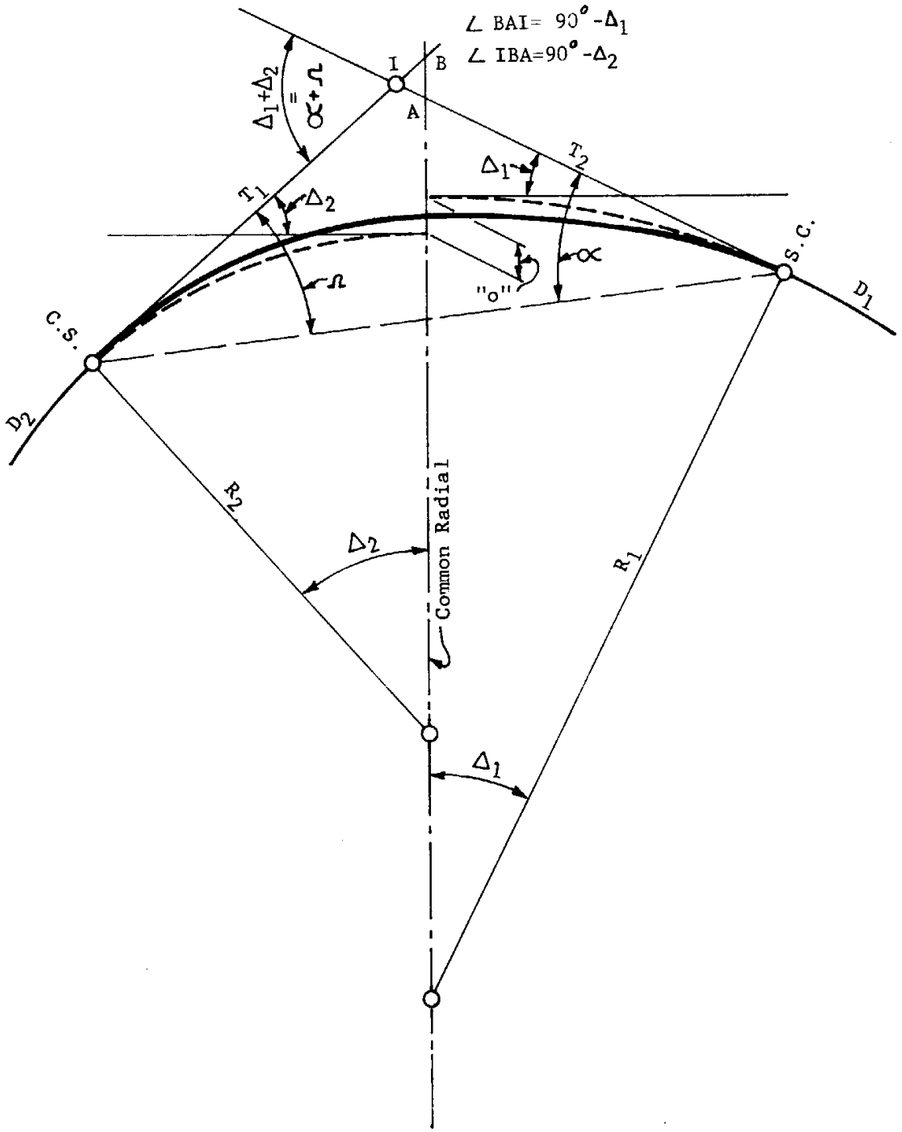
$$\Omega(\text{degrees})=\tfrac{1}{2}aL_s(L_s-L_1)-1/6a(L_s-L_1)^2$$
$$=\tfrac{1}{2}D_2\left[\frac{D_2-D_1}{a}\right]-1/6a\left[\frac{D_2-D_1}{a}\right]^2$$
$$=\tfrac{1}{2}D_2(L_s-L_1)-\Theta$$




**Example:**
Given: $D_1=2^\circ$, $D_2=3^\circ$ and design speed = 70 M.P.H.
Find: Length of partial spiral $(L_s-L_1)$, $\Theta$ and $\Omega$.

**Solution:**
From Drwg. No. D-6.10; L =3.5 and a=0 51'25"=0.857 .
$L_s-L_1=3-2/0.857=1.1669$
$L_1=2/0.857=2.3331$
$L_s=2.3331+1.1669=3.5$ (check).
$\alpha=\tfrac{1}{2}(0.857)(3.3331)(1.1669)+1/6(0.857)(1.1669)^2=1.3616=1^\circ 21'42''$.
$\Omega=\tfrac{1}{2}(0.857)(3.5)(1.1669)-1/6(0.857)\left[\frac{3-2}{0.857}\right]^2=1.5555=1^\circ 33'20''$

| DESIGN APPROVED | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD PLANS | REV. DATE 4/78 |
|---|---|---|
| APPROVED FOR DISTRIBUTION | PARTIAL TRANSITION SPIRAL | PLAN NO. D-55.20 |




Intermediate Spiral Transition is basically the same as Partial Transition Spiral illustrated by Drwg. No. D-6.02.

Select $L_s$ and a from Drwg. No. D-6.05 through Drwg. No. D-6.11 for design speed and $D=D_1-D_2$. These values are applied throughout the following formulae.

$L_s$(sta.)$=(D_2-D_1)/a$

a(degrees)$=(D_2-D_1)L_s$

$D_p$(sta.)=Degree of curvature at any point on spiral.
$=D_2-(a)$(distance in sta. from C.S. to point).
$=D_1+(a)$(distance in sta. from S.C. to point).

"o" (ft.)$=0.0727(D_2-D_1)\left(\frac{D_2-D_1}{a}\right)^2$

$\Omega$ (degrees)$=1/2\ D_2\left(\frac{D_2-D_1}{a}\right)-1/6\ a\left(\frac{D_2-D_1}{a}\right)^2$

$\alpha$ (degrees)$=1/2\ D_1\left(\frac{D_2-D_1}{a}\right)+1/6a\left(\frac{D_2-D_1}{a}\right)^2$

To calculate deflections and spiral distance to any point on spiral, substitute $D_p$ for $D_1$ or $D_2$

$\Delta_1$ = (degrees)$=D_1(L_s/2)$
$\Delta_2$ = (degrees)$=D_2(L_s/2)$
AB$=R_2$ in feet (exsec. $\Delta_2$)$-R_1$ in feet (exsec. $\Delta_1$)-"O"

AI (ft)$=AB\left[\frac{\cos\Delta_2}{\sin(\Delta_1+\Delta_2)}\right]$

BI(ft.)$=AB\left[\frac{\cos\Delta_1}{\sin(\Delta_1+\Delta_2)}\right]$

$T_1$(ft.)$=R_1$in feet ($\tan\Delta_1$) + AI

$T_2$(ft.)$=R_2$in feet ($\tan\Delta_2$) - BI

| DESIGN APPROVED | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD PLANS | REV. DATE 4/78 |
|---|---|---|
| APPROVED FOR DISTRIBUTION | SPIRAL TRANSITION COMPOUND CURVES | PLAN NO. D-55.30 |

| | V=30 | | | | V=40 | | | | V=50 | | | | V=60 | | | | V=65 | | | | V=70 | | | | V=80 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D | e | a | Lc | Ls | e | a | Lc | Ls | e | a | Lc | Ls | e | a | Lc | Ls | e | a | Lc | Ls | e | a | Lc | Ls | e | a | Lc | Ls |
| 0-15 | NC | - | 0 | 0 | NC | - | 0 | 0 | NC | - | 0 | 0 | NC | - | 0 | 0 | NC | - | 0 | 0 | NC | - | 0 | 0 | RC | 1/8 | 100 | 200 |
| 0-30 | NC | - | 0 | 0 | NC | - | 0 | 0 | NC | - | 0 | 0 | RC | 1/3 | 75 | 150 | RC | 1/3 | 75 | 100 | RC | 1/3 | 75 | 150 | .023 | 1/4 | 100 | 200 |
| 0-45 | NC | - | 0 | 0 | NC | - | 0 | 0 | RC | 1/2 | 50 | 150 | .021 | 1/2 | 75 | 150 | .023 | 1/2 | 75 | 150 | .026 | 1/2 | 75 | 150 | .033 | 1/3 | 100 | 225 |
| 1-00 | NC | - | 0 | 0 | RC | 1 | 50 | 100 | .020 | 2/3 | 50 | 150 | .027 | 2/3 | 75 | 150 | .029 | 1/2 | 75 | 200 | .033 | 1 | 75 | 200 | .041 | 1/3 | 100 | 300 |
| 1-30 | RC | 1 1/2 | 50 | 100 | .020 | 1 1/2 | 50 | 100 | .028 | 1 | 50 | 150 | .036 | 1 | 75 | 150 | .040 | 3/4 | 75 | 200 | .044 | 3/4 | 75 | 200 | .053 | 1/2 | 100 | 300 |
| 2-00 | RC | 2 | 50 | 100 | .026 | 2.0 | 50 | 100 | .035 | 1 1/3 | 50 | 150 | .044 | 1 | 75 | 200 | .048 | 1 | 75 | 200 | .052 | 1 | 75 | 200 | .059 | 2/3 | 100 | 300 |
| 2-30 | .020 | 2 1/2 | 50 | 100 | .031 | 2 1/2 | 50 | 100 | .040 | 1 2/3 | 50 | 150 | .050 | 1 1/4 | 75 | 200 | .053 | 1 1/4 | 75 | 200 | .057 | 1 | 75 | 250 | .060 | 2/3 | 100 | 375 |
| 3-00 | .023 | 3 | 50 | 100 | .035 | 2 1/2 | 50 | 120 | .044 | 2 | 50 | 150 | .054 | 1 1/2 | 75 | 200 | .057 | 1 1/4 | 75 | 240 | .060 | 1 | 75 | 300 | | | | |
| 3-30 | .026 | 3 1/2 | 50 | 100 | .038 | 2 1/2 | 50 | 140 | .048 | 2 | 50 | 175 | .057 | 1 2/3 | 75 | 210 | .059 | 1 1/4 | 75 | 280 | | | | | | | | |
| 4-00 | .029 | 4 | 50 | 100 | .041 | 2 2/3 | 50 | 150 | .051 | 2 | 50 | 200 | .059 | 1 2/3 | 75 | 240 | .060 | 1 1/3 | 75 | 300 | | | | | | | | |
| 5-00 | .034 | 5 | 50 | 100 | .046 | 3 1/3 | 50 | 150 | .056 | 2 1/2 | 50 | 200 | .060 | 2 | 75 | 250 | | | | | | | | | | | | |
| 6-00 | .038 | 6 | 50 | 100 | .050 | 4 | 50 | 150 | .059 | 3 | 50 | 200 | | | | | | | | | | | | | | | | |
| 7-00 | .041 | 7 | 50 | 100 | .054 | 4 2/3 | 50 | 150 | .060 | 3 1/2 | 50 | 200 | | | | | | | | | | | | | | | | |
| 8-00 | .043 | 8 | 50 | 100 | .056 | 5 | 50 | 160 | | | | | | | | | | | | | | | | | | | | |
| 9-00 | .046 | 7 1/2 | 50 | 120 | .058 | 5 | 50 | 180 | | | | | | | | | | | | | | | | | | | | |
| 10-00 | .048 | 6 2/3 | 50 | 150 | .059 | 5 | 50 | 200 | | | | | | | | | | | | | | | | | | | | |
| 11-00 | .050 | 6 7/8 | 50 | 160 | .060 | 5 1/2 | 50 | 200 | | | | | | | | | | | | | | | | | | | | |
| 12-00 | .052 | 7 1/2 | 50 | 160 | | | | | | | | | | | | | | | | | | | | | | | | |
| 13-00 | .053 | 8 1/8 | 50 | 160 | | | | | | | | | | | | | | | | | | | | | | | | |
| 14-00 | .055 | 8 3/4 | 50 | 160 | | | | | | | | | | | | | | | | | | | | | | | | |
| 16-00 | .058 | 10 | 50 | 160 | | | | | | | | | | | | | | | | | | | | | | | | |
| 18-00 | .059 | 10 | 50 | 180 | | | | | | | | | | | | | | | | | | | | | | | | |
| 20-00 | .060 | 10 | 50 | 200 | | | | | | | | | | | | | | | | | | | | | | | | |

D max. = 20°

D max. = 11°

D max. = 7°

D max. = 5°

D max. = 4°

D max. = 3°

D max. = 2° 30'

Use spirals below heavy line, circular curves above.

NOTE: Tabular Lc and Ls values are for a 1 or 2 lane roadway with the axis of rotation at the construction ℄ or either edge.

For Lc and Ls values for other lane multiples and for super distribution data, see Std. D-6.02

Interpolate for values not shown.

Use judgment combined with local climatic information in the choice of a maximum superelevation for borderline roadway elevations.

a = Increase in degree of curvature per 100' of spiral
D = Degree of curvature
e = Superelevation in ft./ft.
Lc = Normal crown runoff in feet
Ls = Superelevation runoff in feet
NC = Maintain normal crown
RC = Remove adverse crown and superelevate to normal crown slope

For elevations over 6000'
Definite Snow & Ice Conditions
Max. Super. = 0.06 ft/ft.

| DESIGN APPROVED | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD PLANS | REV. DATE 4/78 |
|---|---|---|
| APPROVED FOR DISTRIBUTION | CURVATURE, SUPERELEVATION & SUPERELEVATION TRANSITION | PLAN NO. D-56.10 |

| | V=30 | | | | V=40 | | | | V=50 | | | | V=60 | | | | V=65 | | | | V=70 | | | | V=80 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D | e | a | Lc | Ls | e | a | Lc | Ls | e | a | Lc | Ls | e | a | Lc | Ls | e | a | Lc | Ls | e | a | Lc | Ls | e | a | Lc | Ls |
| 0-15 | NC | - | 0 | 0 | NC | - | 0 | 0 | NC | - | 0 | 0 | NC | - | 0 | 0 | NC | - | 0 | 0 | NC | - | 0 | 0 | RC | 1/4 | 100 | 200 |
| 0-30 | NC | - | 0 | 0 | NC | - | 0 | 0 | NC | - | 0 | 0 | RC | 1/3 | 75 | 150 | RC | 1/3 | 75 | 150 | RC | 1/3 | 75 | 150 | .024 | 1/3 | 100 | 200 |
| 0-45 | NC | - | 0 | 0 | NC | - | 0 | 0 | RC | 1/2 | 50 | 150 | .022 | 1/2 | 75 | 150 | .025 | 1/2 | 75 | 150 | .029 | 1/2 | 75 | 150 | .036 | 1/3 | 100 | 225 |
| 1-00 | NC | - | 0 | 0 | RC | 1 | 50 | 100 | .021 | 2/3 | 50 | 150 | .029 | 2/3 | 75 | 150 | .033 | 2/3 | 75 | 150 | .038 | 2/3 | 75 | 150 | .047 | 1/3 | 100 | 300 |
| 1-30 | RC | 1-1/2 | 50 | 100 | .021 | 1-1/2 | 50 | 100 | .030 | 1 | 50 | 150 | .040 | 1 | 75 | 150 | .046 | 1 | 75 | 150 | .053 | 1 | 75 | 150 | .065 | 1/2 | 100 | 300 |
| 2-00 | RC | 2 | 50 | 100 | .027 | 2 | 50 | 100 | .038 | 1-1/3 | 50 | 150 | .051 | 1-1/3 | 75 | 150 | .057 | 1 | 75 | 200 | .065 | 1 | 75 | 200 | .076 | 2/3 | 100 | 300 |
| 2-30 | .021 | 2-1/2 | 50 | 100 | .033 | 2-1/2 | 50 | 100 | .046 | 1-2/3 | 50 | 150 | .060 | 1-1/4 | 75 | 200 | .066 | 1-1/4 | 75 | 200 | .073 | 1 | 75 | 250 | .080 | 2/3 | 100 | 375 |
| 3-00 | .025 | 3 | 50 | 100 | .038 | 2-1/2 | 50 | 120 | .053 | 2 | 50 | 150 | .067 | 1-1/2 | 75 | 200 | .073 | 1-1/3 | 75 | 225 | .078 | 1 | 75 | 300 | | | | |
| 3-30 | .028 | 3-1/2 | 50 | 100 | .043 | 2-1/2 | 50 | 140 | .058 | 2 | 50 | 175 | .073 | 1-2/3 | 75 | 210 | .077 | 1-1/4 | 75 | 280 | .080 | 1 | 75 | 350 | | | | |
| 4-00 | .032 | 4 | 50 | 100 | .047 | 3-1/3 | 50 | 140 | .063 | 2 | 50 | 200 | .077 | 1-2/3 | 75 | 240 | .079 | 1-1/3 | 75 | 300 | | | | | | | | |
| 5-00 | .038 | 5 | 50 | 100 | .055 | 3-1/3 | 50 | 150 | .071 | 2-1/2 | 50 | 200 | .080 | 1-2/3 | 75 | 300 | .080 | 1-2/3 | 75 | 300 | | | | | | | | |
| 6-00 | .043 | 5 | 50 | 120 | .061 | 3-3/4 | 50 | 160 | .077 | 3 | 50 | 200 | | | | | | | | | | | | | | | | |
| 7-00 | .048 | 5 | 50 | 140 | .067 | 4 | 50 | 175 | .079 | 3-1/3 | 50 | 210 | | | | | | | | | | | | | | | | |
| 8-00 | .052 | 5-1/3 | 50 | 150 | .071 | 4 | 50 | 200 | .080 | 3-1/3 | 50 | 240 | | | | | | | | | | | | | | | | |
| 9-00 | .056 | 6 | 50 | 150 | .075 | 4-1/2 | 50 | 200 | | | | | | | | | | | | | | | | | | | | |
| 10-00 | .059 | 6-1/4 | 50 | 160 | .077 | 5 | 50 | 200 | | | | | | | | | | | | | | | | | | | | |
| 11-00 | .063 | 6-7/8 | 50 | 160 | .079 | 5 | 50 | 220 | | | | | | | | | | | | | | | | | | | | |
| 12-00 | .066 | 7-1/2 | 50 | 160 | .080 | 5 | 50 | 240 | | | | | | | | | | | | | | | | | | | | |
| 13-00 | .068 | 6-1/2 | 50 | 200 | | | | | | | | | | | | | | | | | | | | | | | | |
| 14-00 | .070 | 7 | 50 | 200 | | | | | | | | | | | | | | | | | | | | | | | | |
| 16-00 | .074 | 8 | 50 | 200 | | | | | | | | | | | | | | | | | | | | | | | | |
| 18-00 | .077 | 9 | 50 | 200 | | | | | | | | | | | | | | | | | | | | | | | | |
| 20-00 | .079 | 10 | 50 | 200 | | | | | | | | | | | | | | | | | | | | | | | | |
| 22-00 | .080 | 10 | 50 | 220 | | | | | | | | | | | | | | | | | | | | | | | | |

D max. = 22°

D max. = 12°

D max. = 8°

D max. = 5°

D max. =5°

D max. = 3°-30'

D max. = 2°-30'

Use spirals below heavy line, circular curves above.

NOTE: Tabular Lc and Ls values are for a 1 or 2 lane roadway with the axis of rotation at the construction ℄ or either edge.

For Lc and Ls values for other lane multiples and for super distribution data, see Std. D-6.02

Interpolate for values not shown.

Use judgment combined with local climatic information in the choice of a maximum superelevation for borderline roadway elevations.

a = Increase in degree of curvature per 100' of spiral
D = Degree of curvature
e = Superelevation in ft./ft.
Lc = Normal crown runoff in feet
Ls = Superelevation runoff in feet
NC = Maintain normal crown
RC = Remove adverse crown and superelevate to normal crown slope

For elevations from 4000' to 6000'
Possible Snow & Ice Conditions
Max. Super. - 0.08 ft/ft.

| DESIGN APPROVED | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD PLANS | REV. DATE 4/78 |
|---|---|---|
| APPROVED FOR DISTRIBUTION | CURVATURE, SUPERELEVATION & SUPERELEVATION TRANSITION | PLAN NO. D-56.20 |

| | V=30 | | | | V=40 | | | | V=50 | | | | V=60 | | | | V=65 | | | | V=70 | | | | V=80 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D | e | a | Lc | Ls | e | a | Lc | Ls | e | a | Lc | Ls | e | a | Lc | Ls | e | a | Lc | Ls | e | a | Lc | Ls | e | a | Lc | Ls |
| 0-15 | NC | - | 0 | 0 | NC | - | 0 | 0 | NC | - | 0 | 0 | NC | - | 0 | 0 | NC | - | 0 | 0 | NC | - | 0 | 0 | RC | 1/4 | 100 | 200 |
| 0-30 | NC | - | 0 | 0 | NC | - | 0 | 0 | NC | - | 0 | 0 | RC | 1/2 | 75 | 150 | RC | 1/3 | 75 | 150 | RC | 1/3 | 75 | 150 | .024 | 1/3 | 100 | 200 |
| 0-45 | NC | - | 0 | 0 | NC | - | 0 | 0 | RC | 1/2 | 50 | 150 | .024 | 2/3 | 75 | 150 | .027 | 1/2 | 75 | 150 | .029 | 1/2 | 75 | 150 | .036 | 1/3 | 100 | 225 |
| 1-00 | NC | - | 0 | 0 | RC | 1 | 50 | 100 | .023 | 2/3 | 50 | 150 | .032 | 2/3 | 75 | 150 | .035 | 2/3 | 75 | 150 | .039 | 2/3 | 75 | 150 | .048 | 1/3 | 100 | 300 |
| 1-30 | RC | 1 1/2 | 50 | 100 | .021 | 1-1/2 | 50 | 100 | .033 | 1 | 50 | 150 | .046 | 1 | 75 | 150 | .052 | 1 | 75 | 150 | .058 | 3/4 | 75 | 200 | .071 | 1/2 | 100 | 300 |
| 2-00 | RC | 2 | 50 | 100 | .028 | 2 | 50 | 100 | .042 | 1-1/3 | 50 | 150 | .058 | 1-1/4 | 75 | 160 | .066 | 1 | 75 | 200 | .074 | 1 | 75 | 200 | .089 | 2/3 | 100 | 300 |
| 2-30 | .021 | 2-1/2 | 50 | 100 | .034 | 2-1/2 | 50 | 100 | .051 | 1-2/3 | 50 | 150 | .069 | 1-1/4 | 75 | 200 | .077 | 1 | 75 | 250 | .086 | 1 | 75 | 250 | .099 | 2/3 | 100 | 375 |
| 3-00 | .025 | 3 | 50 | 100 | .040 | 2-1/2 | 50 | 120 | .059 | 2 | 50 | 150 | .079 | 1-1/2 | 75 | 200 | .087 | 1 | 75 | 300 | .094 | 1 | 75 | 300 | .100 | 2/3 | 100 | 450 |
| 3-30 | .029 | 3-1/2 | 50 | 100 | .046 | 2-1/2 | 50 | 140 | .067 | 2 | 50 | 175 | .087 | 1-1/4 | 75 | 280 | .093 | 1 | 75 | 350 | .099 | 2/3 | 75 | 375 | | | | |
| 4-00 | .033 | 4 | 50 | 100 | .051 | 3-1/3 | 50 | 140 | .073 | 2 | 50 | 200 | .093 | 1-1/3 | 75 | 300 | .098 | 1 | 75 | 400 | .100 | 1 | 75 | 400 | | | | |
| 5-00 | .040 | 5 | 50 | 100 | .061 | 3-1/3 | 50 | 150 | .084 | 2-1/2 | 50 | 200 | .099 | 1-2/3 | 75 | 300 | .100 | 1 | 75 | 500 | | | | | | | | |
| 6-00 | .046 | 5 | 50 | 120 | .070 | 3-3/4 | 50 | 160 | .092 | 2-1/2 | 50 | 240 | .100 | 1-2/3 | 75 | 360 | | | | | | | | | | | | |
| 7-00 | .053 | 5 | 50 | 140 | .077 | 4 | 50 | 175 | .098 | 2-1/2 | 50 | 280 | | | | | | | | | | | | | | | | |
| 8-00 | .059 | 5-1/3 | 50 | 150 | .084 | 4 | 50 | 200 | .100 | 2-1/2 | 50 | 320 | | | | | | | | | | | | | | | | |
| 9-00 | .064 | 6 | 50 | 150 | .089 | 4-1/2 | 50 | 200 | | | | | | | | | | | | | | | | | | | | |
| 10-00 | .068 | 6-1/4 | 50 | 160 | .093 | 5 | 50 | 200 | | | | | | | | | | | | | | | | | | | | |
| 11-00 | .073 | 6-7/8 | 50 | 160 | .097 | 5 | 50 | 220 | | | | | | | | | | | | | | | | | | | | |
| 12-00 | .077 | 7-1/2 | 50 | 160 | .099 | 5 | 50 | 240 | | | | | | | | | | | | | | | | | | | | |
| 13-00 | .080 | 6-1/2 | 50 | 200 | .100 | 5 | 50 | 260 | | | | | | | | | | | | | | | | | | | | |
| 14-00 | .083 | 7 | 50 | 200 | | | | | | | | | | | | | | | | | | | | | | | | |
| 16-00 | .089 | 8 | 50 | 200 | | | | | | | | | | | | | | | | | | | | | | | | |
| 18-00 | .093 | 9 | 50 | 200 | | | | | | | | | | | | | | | | | | | | | | | | |
| 20-00 | .097 | 10 | 50 | 200 | | | | | | | | | | | | | | | | | | | | | | | | |
| 22-00 | .099 | 10 | 50 | 220 | | | | | | | | | | | | | | | | | | | | | | | | |
| 24-00 | .100 | 10 | 50 | 240 | | | | | | | | | | | | | | | | | | | | | | | | |
| 25-00 | .100 | 10 | 50 | 250 | | | | | | | | | | | | | | | | | | | | | | | | |

D max. = 25°

D max. = 13°

D max. = 8°

D max. = 6°

D max. = 5°

D max. = 4°

D max. = 3°

Use spirals below heavy line, circular curves above.

NOTE: Tabular Lc and Ls values are for a 1 or 2 lane roadway with the axis of rotation at the construction ℄ or either edge.

For Lc and Ls values for other lane multiples and for super distribution data, see Std. D-6.02

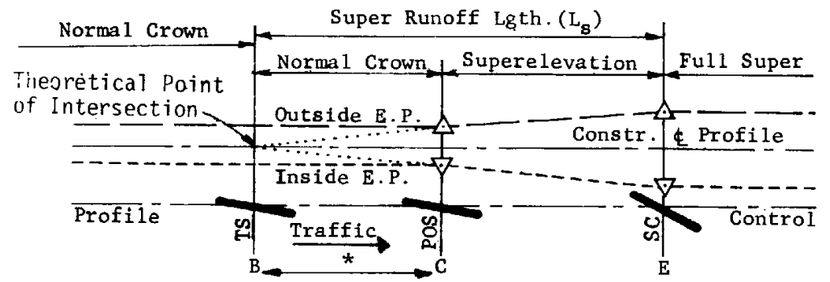
Interpolate for values not shown.

Use judgment combined with local climatic information in the choice of a maximum superelevation for borderline roadway elevations.

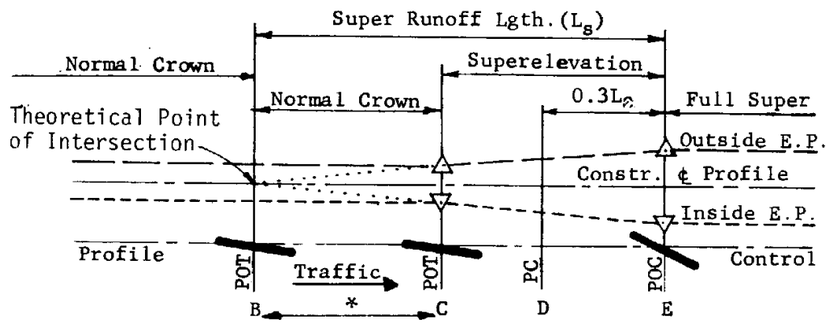
a = Increase in degree of curvature per 100' of spiral
D = Degree of curvature
e = Superelevation in ft./ft.
Lc = Normal crown runoff in feet
Ls = Superelevation runoff in feet
NC = Maintain normal crown
RC = Remove adverse crown and superelevate to normal crown slope

For elevations under 4000'
No Snow & Ice Conditions
Max. Super. = 0.10 ft/ft.

| DESIGN APPROVED | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD PLANS | REV. DATE 4/78 |
|---|---|---|
| APPROVED FOR DISTRIBUTION | CURVATURE, SUPERELEVATION & SUPERELEVATION TRANSITION | PLAN NO. D-56.30 |

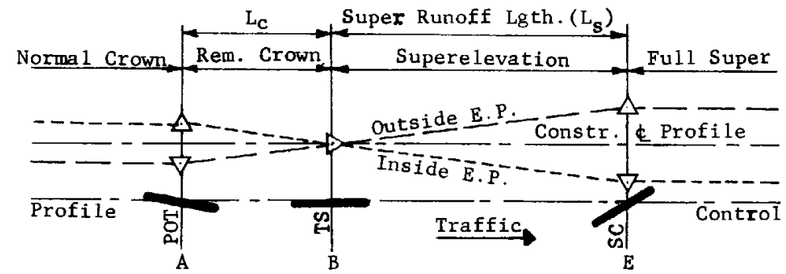



Spiral Curve Transition

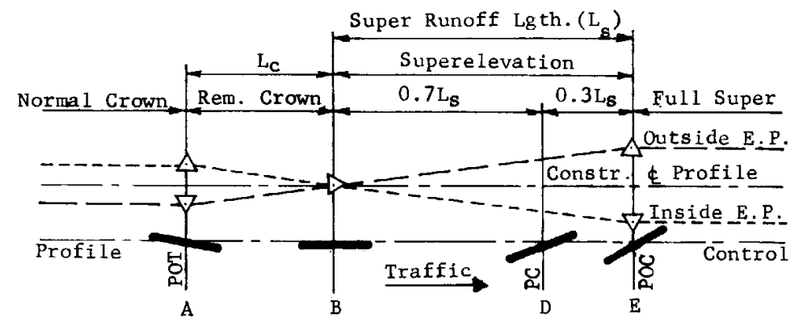



Circular Curve Transition

1-WAY RDWY. AXIS OF ROTATION AT CONSTR. ℄
HIGH POINT OF NORMAL CROWN ON OUTSIDE OF CURVE
RIGHT TURNING ROADWAY

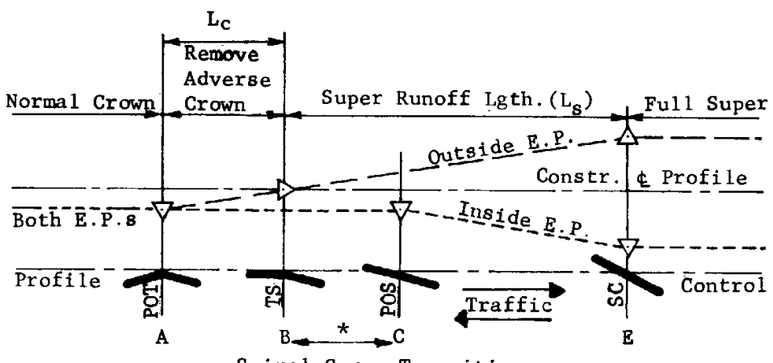



Spiral Curve Transition

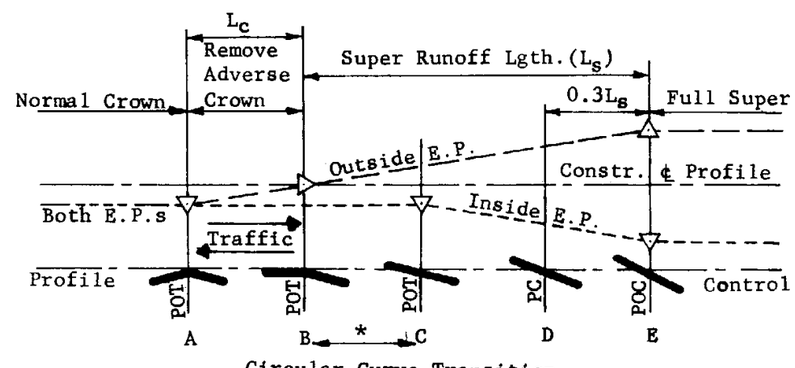



Circular Curve Transition

1-WAY RDWY. AXIS OF ROTATION AT CONSTR. ℄
HIGH POINT OF NORMAL CROWN ON INSIDE OF CURVE
LEFT TURNING ROADWAY




Spiral Curve Transition




Circular Curve Transition

2-WAY RDWY. AXIS OF ROTATION AT ℄
(FOR OPPOSITE DEFLECTING CURVE, E.P. PROFILES ARE REVERSED)

A is point at which adverse crown removal begins.

B is point at which superelevation transition begins.

C is point of equality between superelevation and normal crown.

D is P.C. location for circular curve transition.

E is the point at which full superelevation is reached.

GENERAL NOTES

Round edge profile intersections with vertical curves having length in feet equal to V in m.p.h.

For main roadway curves without spirals, $L_c$ and $L_s$ are the same as for spiraled curves but with 0.7 $L_s$ on tangent and 0.3 $L_s$ on curve.

For other single axis main roadway widths, modify Std. D-6.04 and D-6.05 tabular $L_c$ and $L_s$ values as follows:

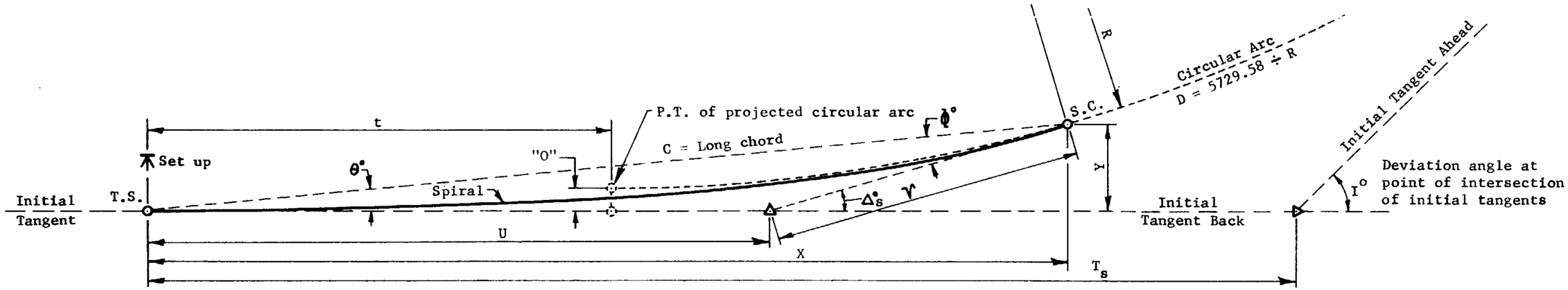
3-lanes, increase 20% to nearest 25'.
4-lanes, " 50% " " " .
6-lanes, " 100% " " " .

For ramps, reduce Std. D-6.04, D-6.05 and D-6.06 $L_c$ and $L_s$ values by 30% to nearest 10'

For modified values, compute spiral variables using Std. D-6.01 formulae.

*Distance BC = $(NC)(L_s)/e$

| DESIGN APPROVED | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD PLANS | REV. DATE 4-78 |
|---|---|---|
| APPROVED FOR DISTRIBUTION | SUPERELEVATION DISTRIBUTION | PLAN NO. D-56.40 |




| $L_s$ | D | R | "O" | t | $\Delta_s^\circ$ | $\theta^\circ$ | $\Phi^\circ$ | $\nu$ | U | C | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00-00-00 | 00.00 | 0.00 | 0.00 | 00-00-00 | 00-00-00 | 00-00-00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 25 | 0- 1-53 | 183346.49 | 0.00 | 12.50 | 0- 0-14 | 0- 0- 5 | 0- 0- 9 | 8.33 | 16.67 | 25.00 | 25.00 | 0.00 |
| 50 | 0- 3-45 | 91673.25 | 0.00 | 25.00 | 0- 0-56 | 0- 0-19 | 0- 0-37 | 16.67 | 33.33 | 50.00 | 50.00 | 0.00 |
| 75 | 0- 5-38 | 61115.50 | 0.00 | 37.50 | 0- 2- 7 | 0- 0-42 | 0- 1-24 | 25.00 | 50.00 | 75.00 | 75.00 | 0.02 |
| 100 | 0- 7-30 | 45836.62 | 0.01 | 50.00 | 0- 3-45 | 0- 1-15 | 0- 2-30 | 33.33 | 66.67 | 100.00 | 100.00 | 0.04 |
| 125 | 0- 9-23 | 36669.30 | 0.02 | 62.50 | 0- 5-52 | 0- 1-57 | 0- 3-54 | 41.67 | 83.33 | 125.00 | 125.00 | 0.07 |
| 150 | 0-11-15 | 30557.75 | 0.03 | 75.00 | 0- 8-26 | 0- 2-49 | 0- 5-38 | 50.00 | 100.00 | 150.00 | 150.00 | 0.12 |
| 175 | 0-13- 8 | 26192.36 | 0.05 | 87.50 | 0-11-29 | 0- 3-50 | 0- 7-39 | 58.33 | 116.67 | 175.00 | 175.00 | 0.19 |
| 200 | 0-15- 0 | 22918.31 | 0.07 | 100.00 | 0-15- 0 | 0- 5- 0 | 0-10- 0 | 66.67 | 133.33 | 200.00 | 200.00 | 0.29 |

GENERAL NOTES

For definitions of spiral values and their applicable formulae, see Std. D-55.10.

For deflection angle formulae for an instrument set-up at a point on spiral, see Std. D-55.10.

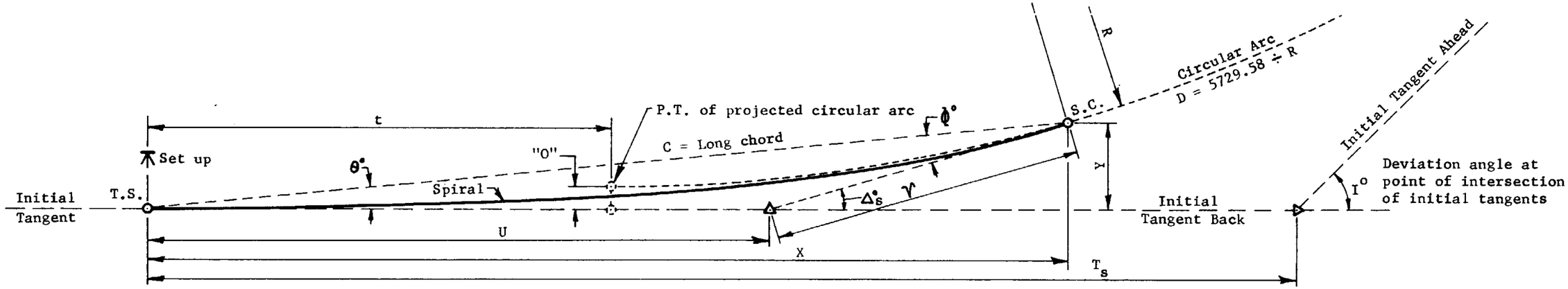
For partial transition spiral formulae, see Std. D-55.20.

For spiral transition between compound curves, see Std. D-55.30.

For curvature, superelevation and superelevation transition standards, see Std. D-6.04, D-6.05 and D-6.06.

For superelevation distribution, see Std. D-6.07.

| | | |
|---|---|---|
| DESIGN APPROVED | ARIZONA<br>DEPARTMENT OF TRANSPORTATION<br>HIGHWAYS DIVISION<br>STANDARD PLANS | REV. DATE<br>4/78 |
| APPROVED FOR DISTRIBUTION | TRANSITION SPIRAL TABLE<br>FOR a=1/8 | PLAN NO.<br>D-57.05 |




| $L_s$ | D | R | "O" | t | $\Delta^\circ_s$ | $\theta^\circ$ | $\phi^\circ$ | $\nu$ | U | C | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00-00-00 | 00.00 | 0.00 | 0.00 | 00-00-00 | 00-00-00 | 00-00-00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 25 | 0- 3-45 | 91673.25 | 0.00 | 12.50 | 0- 0-28 | 0- 0- 9 | 0- 0-19 | 8.33 | 16.67 | 25.00 | 25.00 | 0.00 |
| 50 | 0- 7-30 | 45836.62 | 0.00 | 25.00 | 0- 1-53 | 0- 0-38 | 0- 1-15 | 16.67 | 33.33 | 50.00 | 50.00 | 0.01 |
| 75 | 0-11-15 | 30557.75 | 0.01 | 37.50 | 0- 4-13 | 0- 1-24 | 0- 2-49 | 25.00 | 50.00 | 75.00 | 75.00 | 0.03 |
| 100 | 0-15- 0 | 22918.31 | 0.02 | 50.00 | 0- 7-30 | 0- 2-30 | 0- 5- 0 | 33.33 | 66.67 | 100.00 | 100.00 | 0.07 |
| 125 | 0-18-45 | 18334.65 | 0.04 | 62.50 | 0-11-43 | 0- 3-54 | 0- 7-49 | 41.67 | 83.33 | 125.00 | 125.00 | 0.14 |
| 150 | 0-22-30 | 15278.87 | 0.06 | 75.00 | 0-16-53 | 0- 5-38 | 0-11-15 | 50.00 | 100.00 | 150.00 | 150.00 | 0.25 |

**GENERAL NOTES**

For definitions of spiral values and their applicable formulae, see Std. D-55.10.

For deflection angle formulae for an instrument set-up at a point on spiral, see Std. D-55.10.

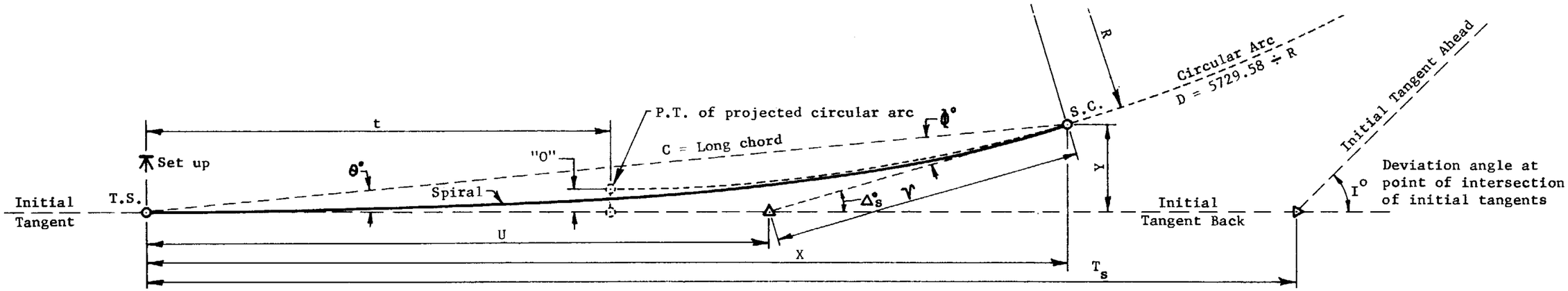
For partial transition spiral formulae, see Std. D-55.20.

For spiral transition between compound curves, see Std. D-55.30.

For curvature, superelevation and superelevation transition standards, see Std. D-6.04, D-6.05 and D-6.06.

For superelevation distribution, see Std. D-6.07.

| DESIGN APPROVED | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD PLANS | REV. DATE 4/78 |
|---|---|---|
| APPROVED FOR DISTRIBUTION | TRANSITION TABLE FOR a=1/4 | PLAN NO. D-57.10 |




| $L_s$ | D | R | "O" | t | $\Delta^\circ_s$ | $\theta^\circ$ | $\phi^\circ$ | $\nu$ | U | C | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00-00-00 | C0.00 | 0.00 | 0.00 | 00-00-00 | 00-00-00 | 00-00-00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 25 | 0- 5- 0 | 68754.94 | 0.00 | 12.50 | 0- 0-37 | 0- 0-12 | 0- 0-25 | 8.33 | 16.67 | 25.00 | 25.00 | 0.00 |
| 50 | 0-10- 0 | 34377.47 | 0.00 | 25.00 | 0- 2-30 | 0- 0-50 | 0- 1-40 | 16.67 | 33.33 | 50.00 | 50.00 | 0.01 |
| 75 | 0-15- 0 | 22918.31 | 0.01 | 37.50 | 0- 5-37 | 0- 1-52 | 0- 3-45 | 25.00 | 50.00 | 75.00 | 75.00 | 0.04 |
| 100 | 0-20- 0 | 17188.73 | 0.02 | 50.00 | 0-10- 0 | 0- 3-20 | 0- 6-40 | 33.33 | 66.67 | 100.00 | 100.00 | 0.10 |
| 125 | 0-25- 0 | 13750.99 | 0.05 | 62.50 | 0-15-37 | 0- 5-12 | 0-10-25 | 41.67 | 83.33 | 125.00 | 125.00 | 0.19 |
| 150 | 0-30- 0 | 11459.16 | 0.08 | 75.00 | 0-22-30 | 0- 7-30 | 0-15- 0 | 50.00 | 100.00 | 150.00 | 150.00 | 0.33 |
| 175 | 0-35- 0 | 9822.13 | 0.13 | 87.50 | 0-30-37 | 0-10-12 | 0-20-25 | 58.33 | 116.67 | 175.00 | 175.00 | 0.52 |
| 200 | 0-40- 0 | 8594.37 | 0.19 | 100.00 | 0-40- 0 | 0-13-20 | 0-26-40 | 66.67 | 133.33 | 200.00 | 200.00 | 0.78 |
| 225 | 0-45- 0 | 7639.44 | 0.28 | 112.50 | 0-50-37 | 0-16-52 | 0-33-45 | 75.00 | 150.00 | 225.00 | 225.00 | 1.10 |
| 250 | 0-50- 0 | 6875.49 | 0.38 | 125.00 | 1- 2-30 | 0-20-50 | 0-41-40 | 83.34 | 166.67 | 250.00 | 249.99 | 1.52 |
| 275 | 0-55- 0 | 6250.45 | 0.50 | 137.50 | 1-15-37 | 0-25-12 | 0-50-25 | 91.67 | 183.34 | 274.99 | 274.99 | 2.02 |
| 300 | 1- 0- 0 | 5729.58 | 0.65 | 150.00 | 1-30- 0 | 0-30- 0 | 1- 0- 0 | 100.01 | 200.01 | 299.99 | 299.98 | 2.62 |
| 325 | 1- 5- 0 | 5288.84 | 0.83 | 162.49 | 1-45-37 | 0-35-12 | 1-10-25 | 108.34 | 216.68 | 324.99 | 324.97 | 3.33 |
| 350 | 1-10- 0 | 4911.07 | 1.04 | 174.99 | 2- 2-30 | 0-40-50 | 1-21-40 | 116.68 | 233.35 | 349.98 | 349.96 | 4.16 |
| 375 | 1-15- 0 | 4583.66 | 1.28 | 187.49 | 2-20-37 | 0-46-52 | 1-33-45 | 125.02 | 250.02 | 374.97 | 374.94 | 5.11 |
| 400 | 1-20- 0 | 4297.18 | 1.55 | 199.99 | 2-40- 0 | 0-53-20 | 1-46-40 | 133.36 | 266.69 | 399.96 | 399.91 | 6.20 |
| 425 | 1-25- 0 | 4044.41 | 1.86 | 212.48 | 3- 0-37 | 1- 0-12 | 2- 0-25 | 141.71 | 283.37 | 424.95 | 424.88 | 7.44 |
| 450 | 1-30- 0 | 3819.72 | 2.21 | 224.97 | 3-22-30 | 1- 7-30 | 2-15- 0 | 150.05 | 300.05 | 449.93 | 449.84 | 8.83 |
| 475 | 1-35- 0 | 3618.68 | 2.60 | 237.47 | 3-45-37 | 1-15-12 | 2-30-25 | 158.40 | 316.73 | 474.91 | 474.80 | 10.39 |
| 500 | 1-40- 0 | 3437.75 | 3.03 | 249.96 | 4-10- 0 | 1-23-20 | 2-46-40 | 166.76 | 333.42 | 499.88 | 499.74 | 12.12 |
| 525 | 1-45- 0 | 3274.04 | 3.51 | 262.44 | 4-35-37 | 1-31-52 | 3- 3-45 | 175.12 | 350.11 | 524.85 | 524.66 | 14.03 |
| 550 | 1-50- 0 | 3125.22 | 4.03 | 274.93 | 5- 2-30 | 1-40-50 | 3-21-40 | 183.48 | 366.80 | 549.81 | 549.57 | 16.12 |
| 575 | 1-55- 0 | 2989.35 | 4.61 | 287.41 | 5-30-37 | 1-50-12 | 3-40-25 | 191.85 | 383.50 | 574.76 | 574.47 | 18.42 |
| 600 | 2- 0- 0 | 2864.79 | 5.23 | 299.89 | 6- 0- 0 | 2- 0- 0 | 4- 0- 0 | 200.23 | 400.21 | 599.71 | 599.34 | 20.93 |

**GENERAL NOTES**

For definitions of spiral values and their applicable formulae, see Std. D-55.10.

For deflection angle formulae for an instrument set-up at a point on spiral, see Std. D-55.10.

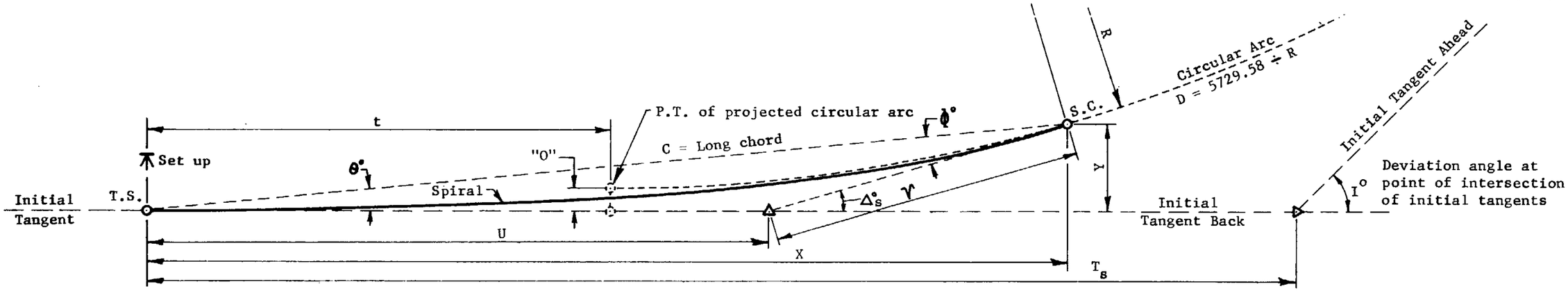
For partial transition spiral formulae, see Std. D-55.20.

For spiral transition between compound curves, see Std. D-55.30.

For curvature, superelevation and superelevation transition standards, see Std. D-6.04, D-6.05 and D-6.06.

For superelevation distribution, see Std. D-6.07.

| DESIGN APPROVED | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD PLANS | REV. DATE 4/78 |
|---|---|---|
| APPROVED FOR DISTRIBUTION | TRANSITION SPIRAL TABLE FOR a=1/3 | PLAN NO. D-57.12 |




| $L_s$ | D | R | "O" | t | $\Delta_s°$ | θ° | φ° | ν | U | C | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00-00-00 | 00.00 | 0.00 | 0.00 | 00-00-00 | 00-00-00 | 00-00-00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 25 | 0- 7-30 | 45836.62 | 0.00 | 12.50 | 0- 0-56 | 0- 0-19 | 0- 0-37 | 8.33 | 16.67 | 25.00 | 25.00 | 0.00 |
| 50 | 0-15- 0 | 22918.31 | 0.00 | 25.00 | 0- 3-45 | 0- 1-15 | 0- 2-30 | 16.67 | 33.33 | 50.00 | 50.00 | 0.02 |
| 75 | 0-22-30 | 15278.87 | 0.02 | 37.50 | 0- 8-26 | 0- 2-49 | 0- 5-38 | 25.00 | 50.00 | 75.00 | 75.00 | 0.06 |
| 100 | 0-30- 0 | 11459.16 | 0.04 | 50.00 | 0-15- 0 | 0- 5- 0 | 0-10- 0 | 33.33 | 66.67 | 100.00 | 100.00 | 0.15 |
| 125 | 0-37-30 | 9167.32 | 0.07 | 62.50 | 0-23-26 | 0- 7-49 | 0-15-37 | 41.67 | 83.33 | 125.00 | 125.00 | 0.28 |
| 150 | 0-45- 0 | 7639.44 | 0.12 | 75.00 | 0-33-45 | 0-11-15 | 0-22-30 | 50.00 | 100.00 | 150.00 | 150.00 | 0.49 |
| 175 | 0-52-30 | 6548.09 | 0.19 | 87.50 | 0-45-56 | 0-15-19 | 0-30-37 | 58.33 | 116.67 | 175.00 | 175.00 | 0.78 |
| 200 | 1- 0- 0 | 5729.58 | 0.29 | 100.00 | 1- 0- 0 | 0-20- 0 | 0-40- 0 | 66.67 | 133.34 | 200.00 | 199.99 | 1.16 |
| 225 | 1- 7-30 | 5092.96 | 0.41 | 112.50 | 1-15-56 | 0-25-19 | 0-50-38 | 75.00 | 150.00 | 225.00 | 224.99 | 1.66 |
| 250 | 1-15- 0 | 4583.66 | 0.57 | 125.00 | 1-33-45 | 0-31-15 | 1- 2-30 | 83.34 | 166.67 | 249.99 | 249.98 | 2.27 |
| 275 | 1-22-30 | 4166.97 | 0.76 | 137.50 | 1-53-26 | 0-37-49 | 1-15-37 | 91.68 | 183.34 | 274.99 | 274.97 | 3.02 |
| 300 | 1-30- 0 | 3819.72 | 0.98 | 149.99 | 2-15- 0 | 0-45- 0 | 1-30- 0 | 100.02 | 200.01 | 299.98 | 299.95 | 3.93 |
| 325 | 1-37-30 | 3525.89 | 1.25 | 162.49 | 2-38-26 | 0-52-49 | 1-45-37 | 108.36 | 216.69 | 324.97 | 324.93 | 4.99 |
| 350 | 1-45- 0 | 3274.04 | 1.56 | 174.98 | 3- 3-45 | 1- 1-15 | 2- 2-30 | 116.70 | 233.37 | 349.96 | 349.90 | 6.23 |
| 375 | 1-52-30 | 3055.77 | 1.92 | 187.48 | 3-30-56 | 1-10-19 | 2-20-38 | 125.05 | 250.05 | 374.94 | 374.86 | 7.67 |
| 400 | 2- 0- 0 | 2864.79 | 2.33 | 199.97 | 4- 0- 0 | 1-20- 0 | 2-40- 0 | 133.40 | 266.73 | 399.91 | 399.80 | 9.31 |
| 425 | 2- 7-30 | 2696.27 | 2.79 | 212.46 | 4-30-56 | 1-30-19 | 3- 0-37 | 141.76 | 283.42 | 424.88 | 424.74 | 11.16 |
| 450 | 2-15- 0 | 2546.48 | 3.31 | 224.94 | 5- 3-45 | 1-41-15 | 3-22-30 | 150.12 | 300.11 | 449.84 | 449.65 | 13.25 |
| 475 | 2-22-30 | 2412.45 | 3.90 | 237.42 | 5-38-26 | 1-52-49 | 3-45-37 | 158.49 | 316.81 | 474.79 | 474.54 | 15.58 |
| 500 | 2-30- 0 | 2291.83 | 4.54 | 249.90 | 6-15- 0 | 2- 5- 0 | 4-10- 0 | 166.87 | 333.52 | 499.73 | 499.40 | 18.17 |

**GENERAL NOTES**

For definitions of spiral values and their applicable formulae, see Std. D-55.10.

For deflection angle formulae for an instrument set-up at a point on spiral, see Std. D-55.10.

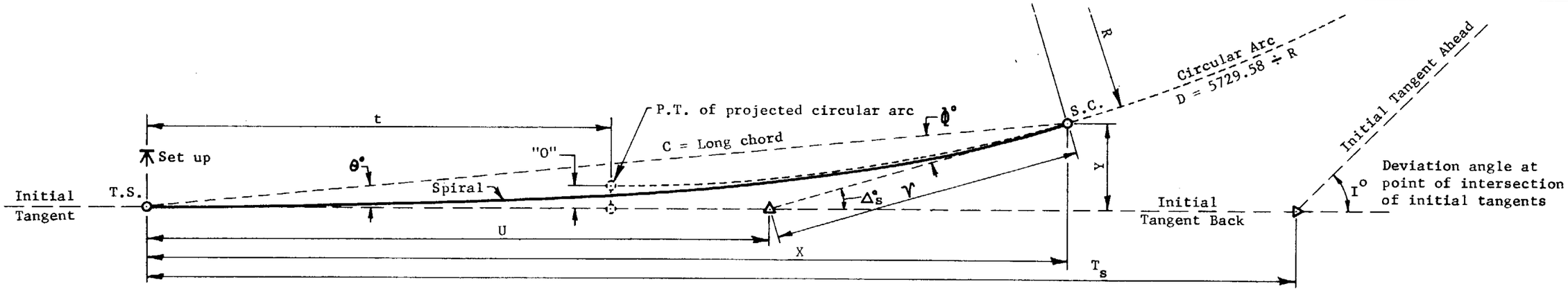
For partial transition spiral formulae, see Std. D-55.20.

For spiral transition between compound curves, see Std. D-55.30.

For curvature, superelevation and superelevation transition standards, see Std. D-6.04, D-6.05 and D-6.06.

For superelevation distribution, see Std. D-6.07.

| DESIGN APPROVED | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD PLANS | REV DATE 4/78 |
|---|---|---|
| APPROVED FOR DISTRIBUTION | TRANSITION SPIRAL TABLE FOR a=1/2 | PLAN NO. D-57.15 |




| $L_s$ | D | R | "O" | t | $\Delta_s°$ | θ° | Φ° | ν | U | C | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00-00-00 | 00.00 | 0.00 | 0.00 | 00-00-00 | 00-00-00 | 00-00-00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 25 | 0-10- 0 | 34377.47 | 0.00 | 12.50 | 0- 1-15 | 0- 0-25 | 0- 0-50 | 8.33 | 16.67 | 25.00 | 25.00 | 0.00 |
| 50 | 0-20- 0 | 17188.73 | 0.01 | 25.00 | 0- 5- 0 | 0- 1-40 | 0- 3-20 | 16.67 | 33.33 | 50.00 | 50.00 | 0.02 |
| 75 | 0-30- 0 | 11459.16 | 0.02 | 37.50 | 0-11-15 | 0- 3-45 | 0- 7-30 | 25.00 | 50.00 | 75.00 | 75.00 | 0.08 |
| 100 | 0-40- 0 | 8594.37 | 0.05 | 50.00 | 0-20- 0 | 0- 6-40 | 0-13-20 | 33.33 | 66.67 | 100.00 | 100.00 | 0.19 |
| 125 | 0-50- 0 | 6875.49 | 0.09 | 62.50 | 0-31-15 | 0-10-25 | 0-20-50 | 41.67 | 83.33 | 125.00 | 125.00 | 0.38 |
| 150 | 1- 0- 0 | 5729.58 | 0.16 | 75.00 | 0-45- 0 | 0-15- 0 | 0-30- 0 | 50.00 | 100.00 | 150.00 | 150.00 | 0.65 |
| 175 | 1-10- 0 | 4911.07 | 0.26 | 87.50 | 1- 1-15 | 0-20-25 | 0-40-50 | 58.34 | 116.67 | 175.00 | 174.99 | 1.04 |
| 200 | 1-20- 0 | 4297.18 | 0.39 | 100.00 | 1-20- 0 | 0-26-40 | 0-53-20 | 66.67 | 133.34 | 200.00 | 199.99 | 1.55 |
| 225 | 1-30- 0 | 3819.72 | 0.55 | 112.50 | 1-41-15 | 0-33-45 | 1- 7-30 | 75.01 | 150.01 | 224.99 | 224.98 | 2.21 |
| 250 | 1-40- 0 | 3437.75 | 0.76 | 124.99 | 2- 5- 0 | 0-41-40 | 1-23-20 | 83.34 | 166.68 | 249.99 | 249.97 | 3.03 |
| 275 | 1-50- 0 | 3125.22 | 1.01 | 137.49 | 2-31-15 | 0-50-25 | 1-40-50 | 91.69 | 183.35 | 274.98 | 274.95 | 4.03 |
| 300 | 2- 0- 0 | 2864.79 | 1.31 | 149.99 | 3- 0- 0 | 1- 0- 0 | 2- 0- 0 | 100.03 | 200.03 | 299.96 | 299.92 | 5.24 |
| 325 | 2-10- 0 | 2644.42 | 1.66 | 162.48 | 3-31-15 | 1-10-25 | 2-20-50 | 108.38 | 216.71 | 324.95 | 324.88 | 6.66 |
| 350 | 2-20- 0 | 2455.53 | 2.08 | 174.97 | 4- 5- 0 | 1-21-40 | 2-43-20 | 116.73 | 233.39 | 349.92 | 349.82 | 8.31 |
| 375 | 2-30- 0 | 2291.83 | 2.56 | 187.46 | 4-41-15 | 1-33-45 | 3- 7-30 | 125.09 | 250.08 | 374.89 | 374.75 | 10.22 |
| 400 | 2-40- 0 | 2148.59 | 3.10 | 199.94 | 5-20- 0 | 1-46-40 | 3-33-20 | 133.45 | 266.78 | 399.85 | 399.65 | 12.40 |
| 425 | 2-50- 0 | 2022.20 | 3.72 | 212.42 | 6- 1-15 | 2- 0-25 | 4- 0-50 | 141.83 | 283.48 | 424.79 | 424.53 | 14.88 |
| 450 | 3- 0- 0 | 1909.86 | 4.42 | 224.90 | 6-45- 0 | 2-15- 0 | 4-30- 0 | 150.22 | 300.20 | 449.72 | 449.37 | 17.66 |
| 475 | 3-10- 0 | 1809.34 | 5.19 | 237.36 | 7-31-15 | 2-30-25 | 5- 0-50 | 158.62 | 316.93 | 474.63 | 474.18 | 20.76 |

**GENERAL NOTES**

For definitions of spiral values and their applicable formulae, see Std. D-55.10.

For deflection angle formulae for an instrument set-up at a point on spiral, see Std. D-55.10.

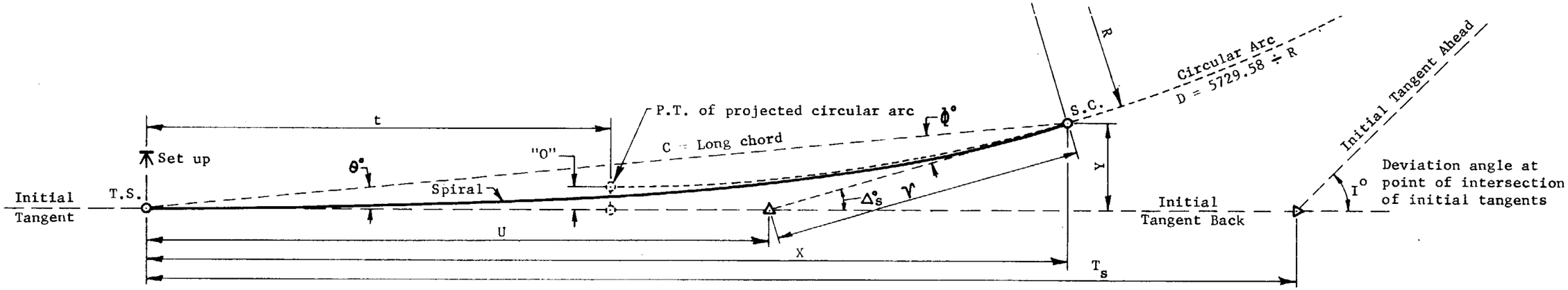
For partial transition spiral formulae, see Std. D-55.20.

For spiral transition between compound curves, see Std. D-55.30.

For curvature, superelevation and superelevation transition standards, see Std. D-6.04, D-6.05 and D-6.06.

For superelevation distribution, see Std. D-6.07.

| DESIGN APPROVED | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD PLANS | REV. DATE 4/78 |
|---|---|---|
| APPROVED FOR DISTRIBUTION | TRANSITION SPIRAL TABLE FOR a=2/3 | PLAN NO. D-57.17 |




| $L_s$ | D | R | "O" | t | $\Delta^\circ_s$ | $\theta^\circ$ | $\Phi^\circ$ | $\nu$ | U | C | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00-00-00 | 00.00 | 0.00 | 0.00 | 00-00-00 | 00-00-00 | 00-00-00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 25 | 0-11-15 | 30557.75 | 0.00 | 12.50 | 0- 1-24 | 0- 0-28 | 0- 0-56 | 8.33 | 16.67 | 25.00 | 25.00 | 0.00 |
| 50 | 0-22-30 | 15278.87 | 0.01 | 25.00 | 0- 5-38 | 0- 1-53 | 0- 3-45 | 16.67 | 33.33 | 50.00 | 50.00 | 0.03 |
| 75 | 0-33-45 | 10185.92 | 0.02 | 37.50 | 0-12-39 | 0- 4-13 | 0- 8-26 | 25.00 | 50.00 | 75.00 | 75.00 | 0.09 |
| 100 | 0-45- 0 | 7639.44 | 0.05 | 50.00 | 0-22-30 | 0- 7-30 | 0-15- 0 | 33.33 | 66.67 | 100.00 | 100.00 | 0.22 |
| 125 | 0-56-15 | 6111.55 | 0.11 | 62.50 | 0-35- 9 | 0-11-43 | 0-23-26 | 41.67 | 83.33 | 125.00 | 125.00 | 0.43 |
| 150 | 1- 7-30 | 5092.96 | 0.18 | 75.00 | 0-50-38 | 0-16-53 | 0-33-45 | 50.00 | 100.00 | 150.00 | 150.00 | 0.74 |
| 175 | 1-18-45 | 4365.39 | 0.29 | 87.50 | 1- 8-54 | 0-22-58 | 0-45-56 | 58.34 | 116.67 | 175.00 | 174.99 | 1.17 |
| 200 | 1-30- 0 | 3819.72 | 0.44 | 100.00 | 1-30- 0 | 0-30- 0 | 1- 0- 0 | 66.67 | 133.34 | 199.99 | 199.99 | 1.75 |

**GENERAL NOTES**

For definitions of spiral values and their applicable formulae, see Std. D-55.10.

For deflection angle formulae for an instrument set-up at a point on spiral, see Std. D-55.10.

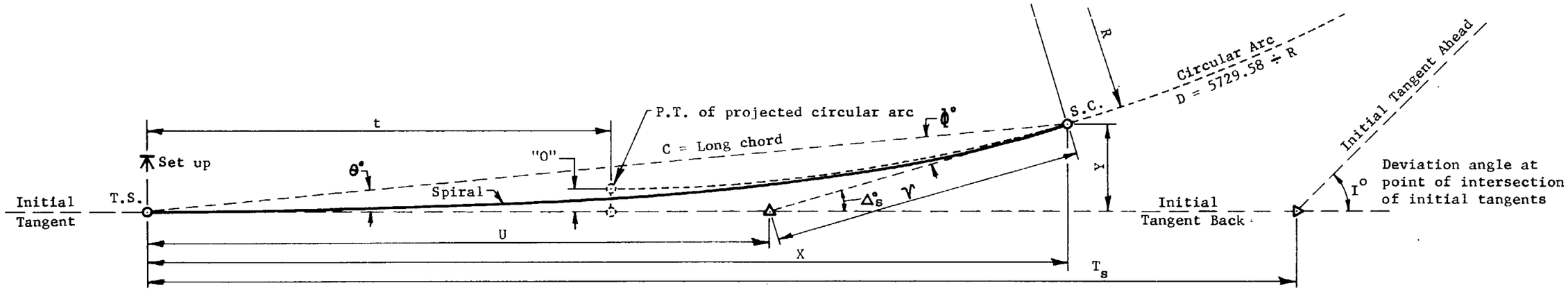
For partial transition spiral formulae, see Std. D-55.20.

For spiral transition between compound curves, see Std. D-55.30.

For curvature, superelevation and superelevation transition standards, see Std. D-6.04, D-6.05 and D-6.06.

For superelevation distribution, see Std. D-6.07.

| | | |
|---|---|---|
| DESIGN APPROVED | ARIZONA<br>DEPARTMENT OF TRANSPORTATION<br>HIGHWAYS DIVISION<br>STANDARD PLANS | REV DATE<br>4/78 |
| APPROVED FOR DISTRIBUTION | TRANSITION SPIRAL TABLE<br>FOR a=3/4 | PLAN NO.<br>D-57.20 |




| $L_s$ | D | R | "O" | t | $\Delta^\circ_s$ | $\theta^\circ$ | $\Phi^\circ$ | Y | U | C | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00-00-00 | CC.00 | 0.00 | 0.00 | 00-00-C0 | 00-00-00 | 00-00-C0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 25 | 0-15- 0 | 22918.31 | 0.00 | 12.50 | 0- 1-53 | 0- 0-38 | 0- 1-15 | 8.33 | 16.67 | 25.00 | 25.00 | 0.00 |
| 50 | 0-30- 0 | 11459.16 | 0.01 | 25.00 | 0- 7-30 | 0- 2-30 | 0- 5- 0 | 16.67 | 33.33 | 50.00 | 50.00 | 0.04 |
| 75 | 0-45- 0 | 7639.44 | 0.03 | 37.50 | 0-16-53 | 0- 5-38 | 0-11-15 | 25.00 | 50.00 | 75.00 | 75.00 | 0.12 |
| 100 | 1- 0- 0 | 5729.58 | 0.07 | 50.0C | 0-30- 0 | 0-10- 0 | 0-20- 0 | 33.33 | 66.67 | 100.00 | 100.00 | 0.29 |
| 125 | 1-15- 0 | 4583.66 | 0.14 | 62.50 | 0-46-53 | 0-15-38 | 0-31-15 | 41.67 | 83.33 | 125.00 | 125.00 | 0.57 |
| 150 | 1-30- 0 | 3819.72 | 0.25 | 75.00 | 1- 7-30 | 0-22-3C | 0-45- 0 | 50.0C | 100.00 | 150.00 | 149.99 | 0.98 |
| 175 | 1-45- 0 | 3274.04 | 0.39 | 87.50 | 1-31-53 | 0-30-38 | 1- 1-15 | 58.34 | 116.67 | 174.99 | 174.99 | 1.56 |
| 200 | 2- 0- 0 | 2864.79 | 0.58 | 1C0.00 | 2- 0- 0 | 0-40- 0 | 1-20- 0 | 66.68 | 133.34 | 199.99 | 199.98 | 2.33 |
| 225 | 2-15- 0 | 2546.48 | 0.83 | 112.49 | 2-31-53 | 0-50-38 | 1-41-15 | 75.02 | 150.01 | 224.98 | 224.96 | 3.31 |
| 250 | 2-30- 0 | 2291.83 | 1.14 | 124.99 | 3- 7-30 | 1- 2-30 | 2- 5- 0 | 83.36 | 166.69 | 249.97 | 249.93 | 4.54 |
| 275 | 2-45- 0 | 2083.48 | 1.51 | 137.48 | 3-46-53 | 1-15-38 | 2-31-15 | 91.71 | 183.37 | 274.95 | 274.88 | 6.05 |
| 300 | 3- 0- 0 | 1909.86 | 1.96 | 149.97 | 4-30- 0 | 1-30- 0 | 3- 0- 0 | 100.06 | 200.06 | 299.92 | 299.81 | 7.85 |
| 325 | 3-15- 0 | 1762.95 | 2.50 | 162.45 | 5-16-53 | 1-45-38 | 3-31-15 | 108.43 | 216.76 | 324.88 | 324.72 | 9.98 |
| 350 | 3-30- 0 | 1637.02 | 3.12 | 174.93 | 6- 7-30 | 2- 2-30 | 4- 5- 0 | 116.80 | 233.46 | 349.82 | 349.60 | 12.46 |
| 375 | 3-45- 0 | 1527.89 | 3.83 | 187.41 | 7- 1-53 | 2-20-38 | 4-41-15 | 125.20 | 250.18 | 374.75 | 374.43 | 15.33 |
| 400 | 4- 0- 0 | 1432.39 | 4.65 | 199.87 | 8- 0- 0 | 2-40- 0 | 5-20- 0 | 133.60 | 266.92 | 399.65 | 399.22 | 18.59 |
| 425 | 4-15- 0 | 1348.14 | 5.58 | 212.32 | 9- 1-53 | 3- 0-38 | 6- 1-15 | 142.03 | 283.67 | 424.53 | 423.94 | 22.30 |

**GENERAL NOTES**

For definitions of spiral values and their applicable formulae, see Std. D-55.10.

For deflection angle formulae for an instrument set-up at a point on spiral, see Std. D-55.10.

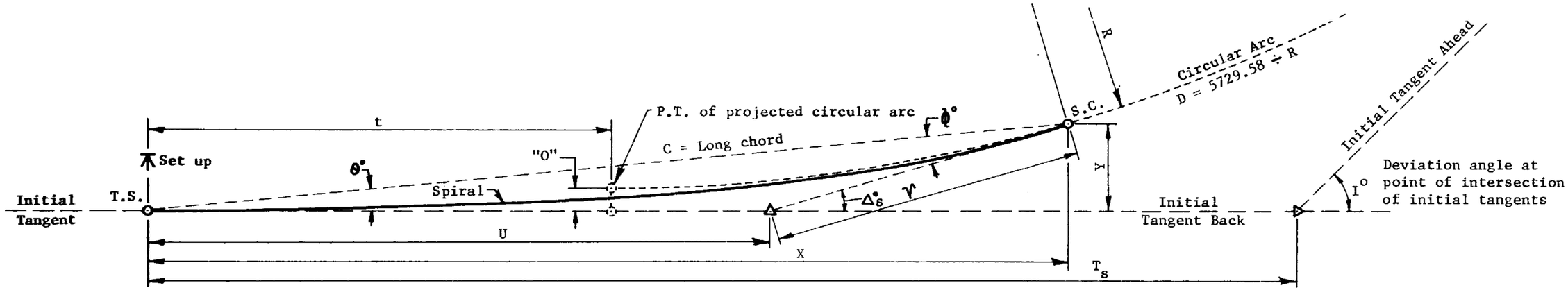
For partial transition spiral formulae, see Std. D-55.20.

For spiral transition between compound curves, see Std. D-55.30.

For curvature, superelevation and superelevation transition standards, see Std. D-6.04, D-6.05 and D-6.06.

For superelevation distribution, see Std. D-6.07.

| | | |
|---|---|---|
| DESIGN APPROVED | ARIZONA<br>DEPARTMENT OF TRANSPORTATION<br>HIGHWAYS DIVISION<br>STANDARD PLANS | REV. DATE<br>4/78 |
| APPROVED FOR DISTRIBUTION | TRANSITION SPIRAL TABLE<br>FOR a=1 | PLAN NO.<br>D-57.22 |




| $L_s$ | D | R | "O" | t | $\Delta_s°$ | θ° | φ° | ν | U | C | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00-00-00 | 00.00 | 0.00 | 0.00 | 00-00-00 | 00-00-00 | 00-00-00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 10 | 0- 7-30 | 45836.62 | 0.00 | 5.00 | 0- 0-22 | 0- 0- 8 | 0- 0-15 | 3.33 | 6.67 | 10.00 | 10.00 | 0.00 |
| 20 | 0-15- 0 | 22918.31 | 0.00 | 10.00 | 0- 1-30 | 0- 0-30 | 0- 1- 0 | 6.67 | 13.33 | 20.00 | 20.00 | 0.00 |
| 30 | 0-22-30 | 15278.87 | 0.00 | 15.00 | 0- 3-22 | 0- 1- 8 | 0- 2-15 | 10.00 | 20.00 | 30.00 | 30.00 | 0.01 |
| 40 | 0-30- 0 | 11459.16 | 0.01 | 20.00 | 0- 6- 0 | 0- 2- 0 | 0- 4- 0 | 13.33 | 26.67 | 40.00 | 40.00 | 0.02 |
| 50 | 0-37-30 | 9167.32 | 0.01 | 25.00 | 0- 9-23 | 0- 3- 8 | 0- 6-15 | 16.67 | 33.33 | 50.00 | 50.00 | 0.05 |
| 60 | 0-45- 0 | 7639.44 | 0.02 | 30.00 | 0-13-30 | 0- 4-30 | 0- 9- 0 | 20.00 | 40.00 | 60.00 | 60.00 | 0.08 |
| 70 | 0-52-30 | 6548.09 | 0.03 | 35.00 | 0-18-22 | 0- 6- 8 | 0-12-15 | 23.33 | 46.67 | 70.00 | 70.00 | 0.12 |
| 80 | 1- 0- 0 | 5729.58 | 0.05 | 40.00 | 0-24- 0 | 0- 8- 0 | 0-16- 0 | 26.67 | 53.33 | 80.00 | 80.00 | 0.19 |
| 90 | 1- 7-30 | 5092.96 | 0.07 | 45.00 | 0-30-22 | 0-10- 8 | 0-20-15 | 30.00 | 60.00 | 90.00 | 90.00 | 0.27 |
| 100 | 1-15- 0 | 4583.66 | 0.09 | 50.00 | 0-37-30 | 0-12-30 | 0-25- 0 | 33.33 | 66.67 | 100.00 | 100.00 | 0.36 |
| 110 | 1-22-30 | 4166.97 | 0.12 | 55.00 | 0-45-22 | 0-15- 8 | 0-30-15 | 36.67 | 73.33 | 110.00 | 110.00 | 0.48 |
| 120 | 1-30- 0 | 3819.72 | 0.16 | 60.00 | 0-54- 0 | 0-18- 0 | 0-36- 0 | 40.00 | 80.00 | 120.00 | 120.00 | 0.63 |
| 130 | 1-37-30 | 3525.89 | 0.20 | 65.00 | 1- 3-22 | 0-21- 8 | 0-42-15 | 43.33 | 86.67 | 130.00 | 130.00 | 0.80 |
| 140 | 1-45- 0 | 3274.04 | 0.25 | 70.00 | 1-13-30 | 0-24-30 | 0-49- 0 | 46.67 | 93.34 | 140.00 | 139.99 | 1.00 |
| 150 | 1-52-30 | 3055.77 | 0.31 | 75.00 | 1-24-23 | 0-28- 8 | 0-56-15 | 50.00 | 100.00 | 150.00 | 149.99 | 1.23 |
| 160 | 2- 0- 0 | 2864.79 | 0.37 | 80.00 | 1-36- 0 | 0-32- 0 | 1- 4- 0 | 53.34 | 106.67 | 159.99 | 159.99 | 1.49 |
| 170 | 2- 7-30 | 2696.27 | 0.45 | 85.00 | 1-48-22 | 0-36- 8 | 1-12-15 | 56.67 | 113.34 | 169.99 | 169.98 | 1.79 |
| 180 | 2-15- 0 | 2546.48 | 0.53 | 90.00 | 2- 1-30 | 0-40-30 | 1-21- 0 | 60.01 | 120.01 | 179.99 | 179.98 | 2.12 |
| 190 | 2-22-30 | 2412.45 | 0.62 | 95.00 | 2-15-22 | 0-45- 8 | 1-30-15 | 63.34 | 126.68 | 189.99 | 189.97 | 2.49 |
| 200 | 2-30- 0 | 2291.83 | 0.73 | 99.99 | 2-30- 0 | 0-50- 0 | 1-40- 0 | 66.68 | 133.35 | 199.98 | 199.96 | 2.91 |
| 210 | 2-37-30 | 2182.70 | 0.84 | 104.99 | 2-45-22 | 0-55- 8 | 1-50-15 | 70.02 | 140.02 | 209.98 | 209.95 | 3.37 |
| 220 | 2-45- 0 | 2083.48 | 0.97 | 109.99 | 3- 1-30 | 1- 0-30 | 2- 1- 0 | 73.35 | 146.69 | 219.97 | 219.94 | 3.87 |
| 230 | 2-52-30 | 1992.90 | 1.11 | 114.99 | 3-18-22 | 1- 6- 8 | 2-12-15 | 76.69 | 153.36 | 229.97 | 229.92 | 4.42 |
| 240 | 3- 0- 0 | 1909.86 | 1.26 | 119.98 | 3-36- 0 | 1-12- 0 | 2-24- 0 | 80.03 | 160.03 | 239.96 | 239.91 | 5.03 |
| 250 | 3- 7-30 | 1833.46 | 1.42 | 124.98 | 3-54-23 | 1-18- 8 | 2-36-15 | 83.37 | 166.70 | 249.95 | 249.88 | 5.68 |
| 260 | 3-15- 0 | 1762.95 | 1.60 | 129.98 | 4-13-30 | 1-24-30 | 2-49- 0 | 86.72 | 173.38 | 259.94 | 259.86 | 6.39 |
| 270 | 3-22-30 | 1697.65 | 1.79 | 134.97 | 4-33-22 | 1-31- 8 | 3- 2-15 | 90.06 | 180.05 | 269.92 | 269.83 | 7.15 |
| 280 | 3-30- 0 | 1637.02 | 1.99 | 139.97 | 4-54- 0 | 1-38- 0 | 3-16- 0 | 93.40 | 186.73 | 279.91 | 279.79 | 7.98 |

**GENERAL NOTES**

For definitions of spiral values and their applicable formulae, see Std. D-55.10.

For deflection angle formulae for an instrument set-up at a point on spiral, see Std. D-55.10.

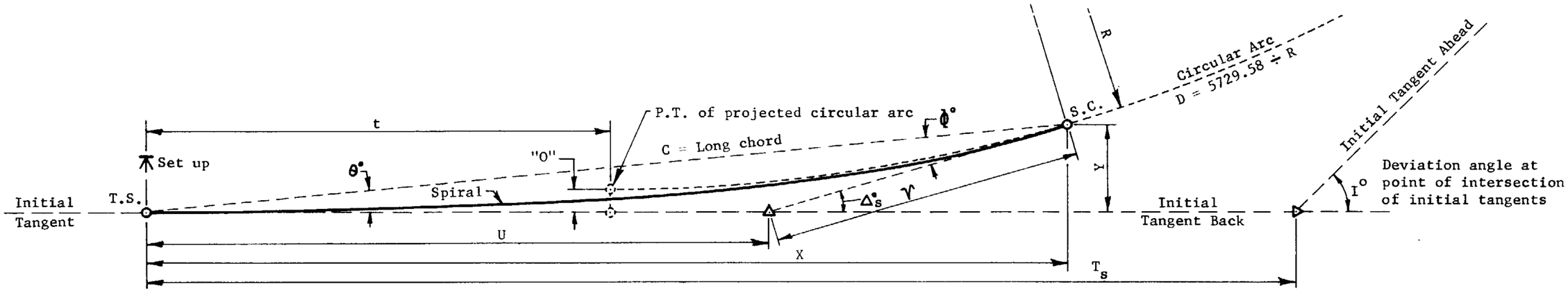
For partial transition spiral formulae, see Std. D-55.20.

For spiral transition between compound curves, see Std. D-55.30.

For curvature, superelevation and superelevation transition standards, see Std. D-6.04, D-6.05 and D-6.06.

For superelevation distribution, see Std. D-6.07.

| DESIGN APPROVED | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD PLANS | REV. DATE 4/78 |
|---|---|---|
| APPROVED FOR DISTRIBUTION | TRANSITION SPIRAL TABLE FOR a=1-1/4 | PLAN NO. D-57.25 |




| $L_s$ | D | R | "O" | t | $\Delta^\circ_s$ | $\theta^\circ$ | $\phi^\circ$ | $\nu$ | U | C | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00-00-00 | 00.00 | 0.00 | 0.00 | 00-00-00 | 00-00-00 | 00-00-00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 25 | 0-20- 0 | 17188.74 | 0.00 | 12.50 | 0- 2-30 | 0- 0-50 | 0- 1-40 | 8.33 | 16.67 | 25.00 | 25.00 | 0.01 |
| 50 | 0-40- 0 | 8594.37 | 0.01 | 25.00 | 0-10- 0 | 0- 3-20 | 0- 6-40 | 16.67 | 33.33 | 50.00 | 50.00 | 0.05 |
| 75 | 1- 0- 0 | 5729.58 | 0.04 | 37.50 | 0-22-30 | 0- 7-30 | 0-15- 0 | 25.00 | 50.00 | 75.00 | 75.00 | 0.16 |
| 100 | 1-20- 0 | 4297.18 | 0.10 | 50.00 | 0-40- 0 | 0-13-20 | 0-26-40 | 33.33 | 66.67 | 100.00 | 100.00 | 0.39 |
| 125 | 1-40- 0 | 3437.75 | 0.19 | 62.50 | 1- 2-30 | 0-20-50 | 0-41-40 | 41.67 | 83.33 | 125.00 | 125.00 | 0.76 |
| 150 | 2- 0- 0 | 2864.79 | 0.33 | 75.00 | 1-30- 0 | 0-30- 0 | 1- 0- 0 | 50.00 | 100.00 | 150.00 | 149.99 | 1.31 |
| 175 | 2-20- 0 | 2455.53 | 0.52 | 87.50 | 2- 2-30 | 0-40-50 | 1-21-40 | 58.34 | 116.67 | 174.99 | 174.98 | 2.08 |
| 200 | 2-40- 0 | 2148.59 | 0.78 | 99.99 | 2-40- 0 | 0-53-20 | 1-46-40 | 66.68 | 133.35 | 199.98 | 199.96 | 3.10 |
| 225 | 3- 0- 0 | 1909.86 | 1.10 | 112.49 | 3-22-30 | 1- 7-30 | 2-15- 0 | 75.03 | 150.02 | 224.97 | 224.92 | 4.42 |
| 250 | 3-20- 0 | 1718.87 | 1.51 | 124.98 | 4-10- 0 | 1-23-20 | 2-46-40 | 83.38 | 166.71 | 249.94 | 249.87 | 6.06 |
| 275 | 3-40- 0 | 1562.61 | 2.02 | 137.46 | 5- 2-30 | 1-40-50 | 3-21-40 | 91.74 | 183.40 | 274.90 | 274.79 | 8.06 |
| 300 | 4- 0- 0 | 1432.39 | 2.62 | 149.95 | 6- 0- 0 | 2- 0- 0 | 4- 0- 0 | 100.11 | 200.11 | 299.85 | 299.67 | 10.46 |
| 325 | 4-20- 0 | 1322.21 | 3.33 | 162.42 | 7- 2-30 | 2-20-50 | 4-41-40 | 108.50 | 216.82 | 324.78 | 324.51 | 13.30 |
| 350 | 4-40- 0 | 1227.77 | 4.16 | 174.88 | 8-10- 0 | 2-43-20 | 5-26-40 | 116.91 | 233.56 | 349.68 | 349.29 | 16.61 |
| 375 | 5- 0- 0 | 1145.92 | 5.11 | 187.33 | 9-22-30 | 3- 7-30 | 6-15- 0 | 125.35 | 250.32 | 374.55 | 373.99 | 20.42 |

**GENERAL NOTES**

For definitions of spiral values and their applicable formulae, see Std. D-55.10.

For deflection angle formulae for an instrument set-up at a point on spiral, see Std. D-55.10.

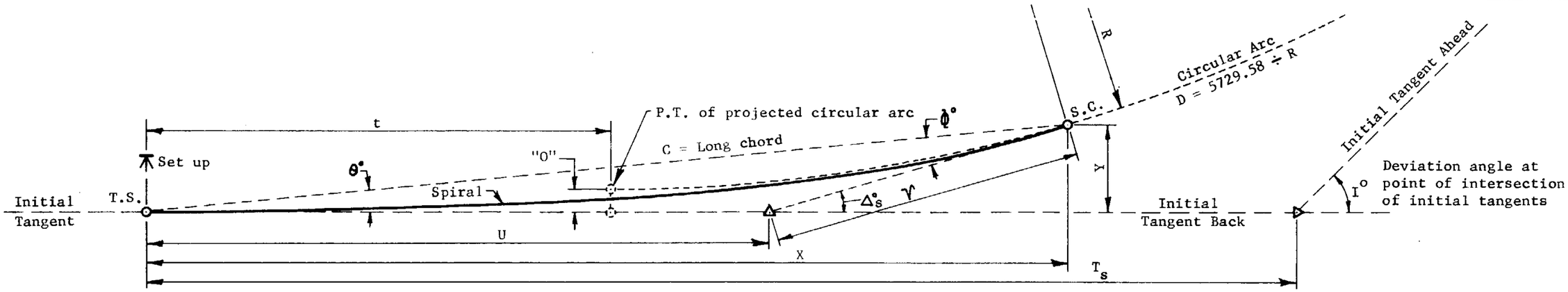
For partial transition spiral formulae, see Std. D-55.20.

For spiral transition between compound curves, see Std. D-55.30.

For curvature, superelevation and superelevation transition standards, see Std. D-6.04, D-6.05 and D-6.06.

For superelevation distribution, see Std. D-6.07.

| | | |
|---|---|---|
| DESIGN APPROVED | ARIZONA<br>DEPARTMENT OF TRANSPORTATION<br>HIGHWAYS DIVISION<br>STANDARD PLANS | REV. DATE<br>4/78 |
| APPROVED FOR DISTRIBUTION | TRANSITION SPIRAL TABLE<br>FOR a=1-1/3 | PLAN NO.<br>D-57.27 |




| $L_s$ | D | R | "O" | t | $\Delta^\circ_s$ | $\theta^\circ$ | $\Phi^\circ$ | $\nu$ | U | C | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00-00-00 | CC.00 | 0.00 | C.CC | 00-CC-00 | 00-00-00 | 00-00-00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 25 | 0-22-30 | 15278.87 | 0.00 | 12.5C | 0- 2-49 | 0- 0-56 | 0- 1-53 | 8.33 | 16.67 | 25.00 | 25.00 | 0.01 |
| 50 | 0-45- 0 | 7639.44 | 0.01 | 25.0C | 0-11-15 | 0- 3-45 | 0- 7-30 | 16.67 | 33.33 | 50.00 | 50.0C | 0.05 |
| 75 | 1- 7-30 | 5092.96 | 0.05 | 37.50 | C-25-19 | 0- 8-26 | 0-16-53 | 25.00 | 50.00 | 75.00 | 75.00 | 0.18 |
| 100 | 1-30- 0 | 3819.72 | 0.11 | 50.0C | 0-45- 0 | 0-15- 0 | 0-30- 0 | 33.33 | 66.67 | 100.00 | 100.00 | 0.44 |
| 125 | 1-52-30 | 3055.77 | 0.21 | 62.50 | 1-10-19 | 0-23-26 | 0-46-53 | 41.67 | 83.34 | 125.00 | 124.99 | 0.85 |
| 150 | 2-15- 0 | 2546.48 | 0.37 | 75.CC | 1-41-15 | 0-33-45 | 1- 7-30 | 50.CC | 100.00 | 149.99 | 149.99 | 1.47 |
| 175 | 2-37-30 | 2182.70 | 0.58 | 87.5C | 2-17-49 | 0-45-56 | 1-31-53 | 58.34 | 116.68 | 174.99 | 174.97 | 2.34 |
| 200 | 3- 0- 0 | 1909.86 | 0.87 | 99.99 | 3- 0- 0 | 1- 0- 0 | 2- 0- 0 | 66.69 | 133.35 | 199.98 | 199.95 | 3.49 |

GENERAL NOTES

For definitions of spiral values and their applicable formulae, see Std. D-55.10.

For deflection angle formulae for an instrument set-up at a point on spiral, see Std. D-55.10.

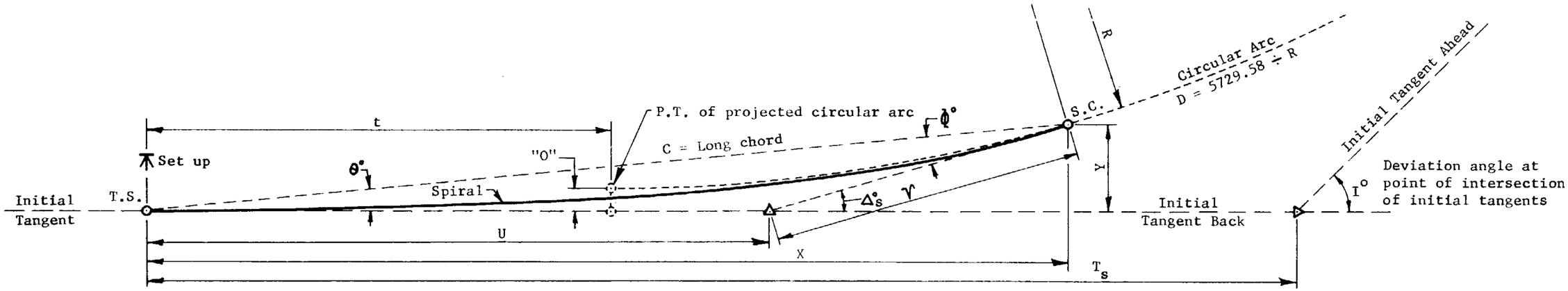
For partial transition spiral formulae, see Std. D-55.20.

For spiral transition between compound curves, see Std. D-55.30.

For curvature, superelevation and superelevation transition standards, see Std. D-6.04, D-6.05 and D-6.06.

For superelevation distribution, see Std. D-6.07.

| DESIGN APPROVED | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD PLANS | REV. DATE 4/78 |
|---|---|---|
| APPROVED FOR DISTRIBUTION | SPIRAL TRANSITION TABLE FOR a=1-1/2 | PLAN NO. D-57.30 |




| $L_s$ | D | R | "O" | t | $\Delta^\circ_s$ | $\theta^\circ$ | $\Phi^\circ$ | Y | U | C | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00-00-00 | 00.00 | 0.00 | 0.00 | 00-00-00 | 00-00-00 | 00-00-00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 10 | 0-10- 0 | 34377.48 | 0.00 | 5.00 | 0- 0-30 | 0- 0-10 | 0- 0-20 | 3.33 | 6.67 | 10.00 | 10.00 | 0.00 |
| 20 | 0-20- 0 | 17188.74 | 0.00 | 10.00 | 0- 2- 0 | 0- 0-40 | 0- 1-20 | 6.67 | 13.33 | 20.00 | 20.00 | 0.00 |
| 30 | 0-30- 0 | 11459.16 | 0.00 | 15.00 | 0- 4-30 | 0- 1-30 | 0- 3- 0 | 10.00 | 20.00 | 30.00 | 30.00 | 0.01 |
| 40 | 0-40- 0 | 8594.37 | 0.01 | 20.00 | 0- 8- 0 | 0- 2-40 | 0- 5-20 | 13.33 | 26.67 | 40.00 | 40.00 | 0.03 |
| 50 | 0-50- 0 | 6875.50 | 0.02 | 25.00 | 0-12-30 | 0- 4-10 | 0- 8-20 | 16.67 | 33.33 | 50.00 | 50.00 | 0.06 |
| 60 | 1- 0- 0 | 5729.58 | 0.03 | 30.00 | 0-18- 0 | 0- 6- 0 | 0-12- 0 | 20.00 | 40.00 | 60.00 | 60.00 | 0.10 |
| 70 | 1-10- 0 | 4911.07 | 0.04 | 35.00 | 0-24-30 | 0- 8-10 | 0-16-20 | 23.33 | 46.67 | 70.00 | 70.00 | 0.17 |
| 80 | 1-20- 0 | 4297.19 | 0.06 | 40.00 | 0-32- 0 | 0-10-40 | 0-21-20 | 26.67 | 53.33 | 80.00 | 80.00 | 0.25 |
| 90 | 1-30- 0 | 3819.72 | 0.09 | 45.00 | 0-40-30 | 0-13-30 | 0-27- 0 | 30.00 | 60.00 | 90.00 | 90.00 | 0.35 |
| 100 | 1-40- 0 | 3437.75 | 0.12 | 50.00 | 0-50- 0 | 0-16-40 | 0-33-20 | 33.33 | 66.67 | 100.00 | 100.00 | 0.48 |
| 110 | 1-50- 0 | 3125.23 | 0.16 | 55.00 | 1- 0-30 | 0-20-10 | 0-40-20 | 36.67 | 73.33 | 110.00 | 110.00 | 0.65 |
| 120 | 2- 0- 0 | 2864.79 | 0.21 | 60.00 | 1-12- 0 | 0-24- 0 | 0-48- 0 | 40.00 | 80.00 | 120.00 | 119.99 | 0.84 |
| 130 | 2-10- 0 | 2644.42 | 0.27 | 65.00 | 1-24-30 | 0-28-10 | 0-56-20 | 43.34 | 86.67 | 130.00 | 129.99 | 1.07 |
| 140 | 2-20- 0 | 2455.53 | 0.33 | 70.00 | 1-38- 0 | 0-32-40 | 1- 5-20 | 46.67 | 93.34 | 139.99 | 139.99 | 1.33 |
| 150 | 2-30- 0 | 2291.83 | 0.41 | 75.00 | 1-52-30 | 0-37-30 | 1-15- 0 | 50.01 | 100.01 | 149.99 | 149.98 | 1.64 |
| 160 | 2-40- 0 | 2148.59 | 0.50 | 80.00 | 2- 8- 0 | 0-42-40 | 1-25-20 | 53.34 | 106.67 | 159.99 | 159.98 | 1.99 |
| 170 | 2-50- 0 | 2022.20 | 0.60 | 84.99 | 2-24-30 | 0-48-10 | 1-36-20 | 56.68 | 113.34 | 169.99 | 169.97 | 2.38 |
| 180 | 3- 0- 0 | 1909.86 | 0.71 | 89.99 | 2-42- 0 | 0-54- 0 | 1-48- 0 | 60.01 | 120.01 | 179.98 | 179.96 | 2.83 |
| 190 | 3-10- 0 | 1809.34 | 0.83 | 94.99 | 3- 0-30 | 1- 0-10 | 2- 0-20 | 63.35 | 126.68 | 189.98 | 189.95 | 3.32 |
| 200 | 3-20- 0 | 1718.87 | 0.97 | 99.99 | 3-20- 0 | 1- 6-40 | 2-13-20 | 66.69 | 133.35 | 199.97 | 199.93 | 3.88 |
| 210 | 3-30- 0 | 1637.02 | 1.12 | 104.99 | 3-40-30 | 1-13-30 | 2-27- 0 | 70.03 | 140.03 | 209.96 | 209.91 | 4.49 |
| 220 | 3-40- 0 | 1562.61 | 1.29 | 109.98 | 4- 2- 0 | 1-20-40 | 2-41-20 | 73.37 | 146.70 | 219.95 | 219.89 | 5.16 |
| 230 | 3-50- 0 | 1494.67 | 1.47 | 114.98 | 4-24-30 | 1-28-10 | 2-56-20 | 76.71 | 153.38 | 229.94 | 229.86 | 5.90 |
| 240 | 4- 0- 0 | 1432.40 | 1.68 | 119.97 | 4-48- 0 | 1-36- 0 | 3-12- 0 | 80.06 | 160.05 | 239.92 | 239.83 | 6.70 |
| 250 | 4-10- 0 | 1375.10 | 1.89 | 124.97 | 5-12-30 | 1-44-10 | 3-28-20 | 83.40 | 166.73 | 249.91 | 249.79 | 7.57 |
| 260 | 4-20- 0 | 1322.21 | 2.13 | 129.96 | 5-38- 0 | 1-52-40 | 3-45-20 | 86.75 | 173.41 | 259.89 | 259.75 | 8.52 |
| 270 | 4-30- 0 | 1273.24 | 2.38 | 134.95 | 6- 4-30 | 2- 1-30 | 4- 3- 0 | 90.10 | 180.10 | 269.86 | 269.70 | 9.54 |
| 280 | 4-40- 0 | 1227.77 | 2.66 | 139.94 | 6-32- 0 | 2-10-40 | 4-21-20 | 93.46 | 186.78 | 279.84 | 279.64 | 10.63 |
| 290 | 4-50- 0 | 1185.43 | 2.96 | 144.93 | 7- 0-30 | 2-20-10 | 4-40-20 | 96.82 | 193.47 | 289.81 | 289.57 | 11.81 |
| 300 | 5- 0- 0 | 1145.92 | 3.27 | 149.91 | 7-30- 0 | 2-30- 0 | 5- 0- 0 | 100.18 | 200.16 | 299.77 | 299.49 | 13.08 |
| 310 | 5-10- 0 | 1108.95 | 3.61 | 154.90 | 8- 0-30 | 2-40-10 | 5-20-20 | 103.54 | 206.86 | 309.73 | 309.39 | 14.43 |
| 320 | 5-20- 0 | 1074.30 | 3.97 | 159.88 | 8-32- 0 | 2-50-40 | 5-41-20 | 106.91 | 213.56 | 319.68 | 319.29 | 15.86 |
| 330 | 5-30- 0 | 1041.74 | 4.35 | 164.86 | 9- 4-30 | 3- 1-30 | 6- 3- 0 | 110.29 | 220.27 | 329.63 | 329.17 | 17.40 |
| 340 | 5-40- 0 | 1011.10 | 4.76 | 169.84 | 9-38- 0 | 3-12-40 | 6-25-20 | 113.67 | 226.97 | 339.57 | 339.04 | 19.02 |
| 350 | 5-50- 0 | 982.21 | 5.20 | 174.81 | 10-12-30 | 3-24-10 | 6-48-20 | 117.05 | 233.69 | 349.50 | 348.89 | 20.74 |
| 360 | 6- 0- 0 | 954.93 | 5.65 | 179.79 | 10-48- 0 | 3-36- 0 | 7-12- 0 | 120.44 | 240.41 | 359.43 | 358.72 | 22.57 |

**GENERAL NOTES**

For definitions of spiral values and their applicable formulae, see Std. D-55.10.

For deflection angle formulae for an instrument set-up at a point on spiral, see Std. D-55.10.

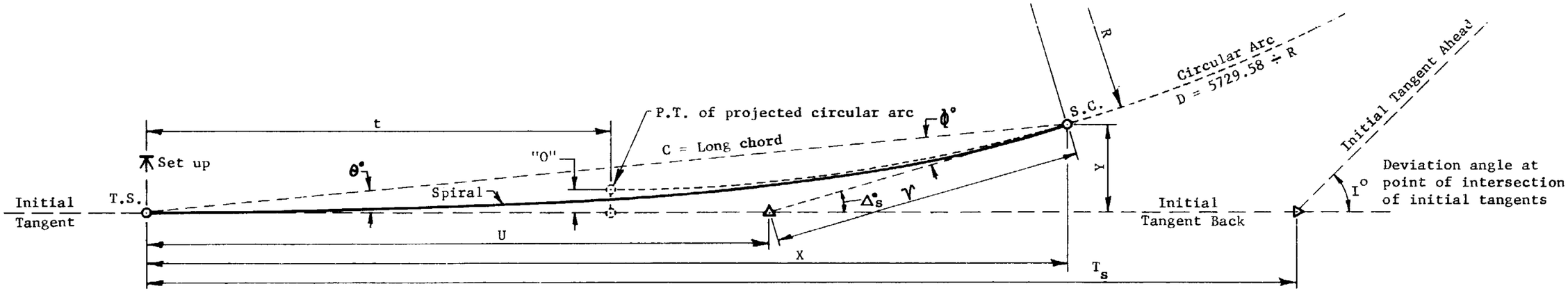
For partial transition spiral formulae, see Std. D-55.20.

For spiral transition between compound curves, see Std. D-55.30.

For curvature, superelevation and superelevation transition standards, see Std. D-6.04, D-6.05 and D-6.06.

For superelevation distribution, see Std. D-6.07.

| DESIGN APPROVED | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD PLANS | REV DATE 4/78 |
|---|---|---|
| APPROVED FOR DISTRIBUTION | SPIRAL TRANSITION TABLE FOR a=1-2/3 | PLAN NO. D-57.32 |




| $L_s$ | D | R | "O" | t | $\Delta^\circ_s$ | $\theta^\circ$ | $\phi^\circ$ | $\nu$ | U | C | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00-00-00 | 00.00 | 0.00 | 0.00 | 00-00-00 | 00-00-00 | 00-00-00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 25 | 0-30- 0 | 11459.16 | 0.00 | 12.50 | 0- 3-45 | 0- 1-15 | 0- 2-30 | 8.33 | 16.67 | 25.00 | 25.00 | 0.01 |
| 50 | 1- 0- 0 | 5729.58 | 0.02 | 25.00 | 0-15- 0 | 0- 5- 0 | 0-10- 0 | 16.67 | 33.33 | 50.00 | 50.00 | 0.07 |
| 75 | 1-30- 0 | 3819.72 | 0.06 | 37.50 | 0-33-45 | 0-11-15 | 0-22-30 | 25.00 | 50.00 | 75.00 | 75.00 | 0.25 |
| 100 | 2- 0- 0 | 2864.79 | 0.15 | 50.00 | 1- 0- 0 | 0-20- 0 | 0-40- 0 | 33.33 | 66.67 | 100.00 | 100.00 | 0.58 |
| 125 | 2-30- 0 | 2291.83 | 0.28 | 62.50 | 1-33-45 | 0-31-15 | 1- 2-30 | 41.67 | 83.34 | 125.00 | 124.99 | 1.14 |
| 150 | 3- 0- 0 | 1909.86 | 0.49 | 75.00 | 2-15- 0 | 0-45- 0 | 1-30- 0 | 50.01 | 100.01 | 149.99 | 149.98 | 1.96 |
| 175 | 3-30- 0 | 1637.02 | 0.78 | 87.49 | 3- 3-45 | 1- 1-15 | 2- 2-30 | 58.35 | 116.68 | 174.98 | 174.95 | 3.12 |
| 200 | 4- 0- 0 | 1432.39 | 1.16 | 99.98 | 4- 0- 0 | 1-20- 0 | 2-40- 0 | 66.70 | 133.36 | 199.96 | 199.90 | 4.65 |
| 225 | 4-30- 0 | 1273.24 | 1.66 | 112.47 | 5- 3-45 | 1-41-15 | 3-22-30 | 75.06 | 150.06 | 224.92 | 224.82 | 6.62 |
| 250 | 5- 0- 0 | 1145.92 | 2.27 | 124.95 | 6-15- 0 | 2- 5- 0 | 4-10- 0 | 83.44 | 166.76 | 249.87 | 249.70 | 9.08 |
| 275 | 5-30- 0 | 1041.74 | 3.02 | 137.42 | 7-33-45 | 2-31-15 | 5- 2-30 | 91.83 | 183.49 | 274.79 | 274.52 | 12.09 |
| 300 | 6- 0- 0 | 954.93 | 3.93 | 149.88 | 9- 0- 0 | 3- 0- 0 | 6- 0- 0 | 100.26 | 200.24 | 299.67 | 299.26 | 15.68 |
| 325 | 6-30- 0 | 881.47 | 4.99 | 162.32 | 10-33-45 | 3-31-15 | 7- 2-30 | 108.72 | 217.02 | 324.51 | 323.89 | 19.93 |
| 350 | 7- 0- 0 | 818.51 | 6.23 | 174.73 | 12-15- 0 | 4- 5- 0 | 8-10- 0 | 117.22 | 233.85 | 349.29 | 348.40 | 24.87 |
| 375 | 7-30- 0 | 763.94 | 7.67 | 187.12 | 14- 3-45 | 4-41-15 | 9-22-30 | 125.78 | 250.73 | 373.99 | 372.74 | 30.56 |

**GENERAL NOTES**

For definitions of spiral values and their applicable formulae, see Std. D-55.10.

For deflection angle formulae for an instrument set-up at a point on spiral, see Std. D-55.10.

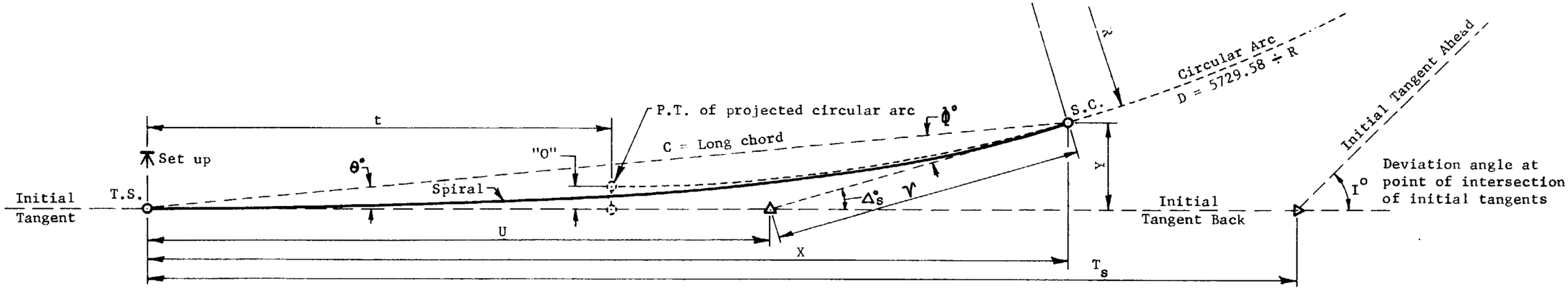
For partial transition spiral formulae, see Std. D-55.20.

For spiral transition between compound curves, see Std. D-55.30.

For curvature, superelevation and superelevation transition standards, see Std. D-6.04, D-6.05 and D-6.06.

For superelevation distribution, see Std. D-6.07.

| | | |
|---|---|---|
| DESIGN APPROVED | ARIZONA<br>DEPARTMENT OF TRANSPORTATION<br>HIGHWAYS DIVISION<br>STANDARD PLANS | REV DATE<br>4/78 |
| APPROVED FOR DISTRIBUTION | SPIRAL TRANSITION TABLE<br>FOR a=2 | PLAN NO.<br>D-57.35 |




| $L_s$ | D | R | "O" | t | $\Delta_s°$ | θ° | φ° | ν | U | C | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00-00-00 | CC.00 | 0.00 | C.CC | 00-00-00 | 00-00-00 | 00-00-00 | 0.C0 | 0.00 | C.00 | 0.00 | 0.00 |
| 10 | 0-15- 0 | 22918.31 | 0.00 | 5.00 | 0- 0-45 | 0- 0-15 | 0- 0-30 | 3.33 | 6.67 | 10.00 | 10.00 | 0.00 |
| 20 | 0-30- 0 | 11459.16 | 0.00 | 10.00 | 0- 3- 0 | 0- 1- 0 | 0- 2- 0 | 6.67 | 13.33 | 2C.00 | 20.00 | 0.01 |
| 30 | 0-45- 0 | 7639.44 | 0.00 | 15.0C | 0- 6-45 | 0- 2-15 | 0- 4-30 | 10.00 | 20.00 | 30.00 | 30.00 | 0.02 |
| 40 | 1- 0- 0 | 5729.58 | 0.01 | 2C.CC | 0-12- 0 | 0- 4- 0 | 0- 8- 0 | 13.33 | 26.67 | 40.0C | 40.00 | 0.05 |
| 50 | 1-15- 0 | 4583.66 | 0.02 | 25.0C | 0-18-45 | 0- 6-15 | 0-12-30 | 16.67 | 33.33 | 50.00 | 50.00 | 0.09 |
| 60 | 1-30- 0 | 3819.72 | 0.04 | 30.CC | 0-27- 0 | 0- 9- 0 | 0-18- 0 | 20.00 | 40.00 | 60.00 | 60.00 | 0.16 |
| 70 | 1-45- 0 | 3274.04 | 0.06 | 35.00 | 0-36-45 | 0-12-15 | 0-24-30 | 23.33 | 46.67 | 70.00 | 70.00 | 0.25 |
| 80 | 2- 0- 0 | 2864.79 | 0.09 | 40.00 | 0-48- 0 | 0-16- 0 | 0-32- 0 | 26.67 | 53.33 | 80.00 | 80.00 | 0.37 |
| 90 | 2-15- 0 | 2546.48 | 0.13 | 45.0C | 1- 0-45 | 0-20-15 | 0-40-30 | 30.00 | 60.00 | 90.00 | 90.00 | 0.53 |
| 100 | 2-30- 0 | 2291.83 | 0.18 | 50.00 | 1-15- 0 | 0-25- 0 | 0-50- 0 | 33.33 | 66.67 | 100.00 | 100.00 | 0.73 |
| 110 | 2-45- 0 | 2083.48 | 0.24 | 55.00 | 1-30-45 | 0-30-15 | 1- 0-30 | 36.67 | 73.34 | 110.00 | 109.99 | 0.97 |
| 120 | 3- 0- 0 | 1909.86 | 0.31 | 60.00 | 1-48- 0 | 0-36- 0 | 1-12- 0 | 40.00 | 80.00 | 119.99 | 119.99 | 1.26 |
| 130 | 3-15- 0 | 1762.95 | 0.40 | 65.00 | 2- 6-45 | 0-42-15 | 1-24-30 | 43.34 | 86.67 | 129.99 | 129.98 | 1.60 |
| 140 | 3-30- 0 | 1637.02 | 0.50 | 70.00 | 2-27- 0 | 0-49- 0 | 1-38- 0 | 46.68 | 93.34 | 139.99 | 139.97 | 2.00 |
| 150 | 3-45- 0 | 1527.89 | 0.61 | 74.99 | 2-48-45 | 0-56-15 | 1-52-30 | 50.01 | 100.01 | 149.98 | 149.96 | 2.45 |
| 160 | 4- 0- 0 | 1432.39 | 0.74 | 79.99 | 3-12- 0 | 1- 4- 0 | 2- 8- 0 | 53.35 | 106.68 | 159.98 | 159.95 | 2.98 |
| 170 | 4-15- 0 | 1348.14 | 0.89 | 84.99 | 3-36-45 | 1-12-15 | 2-24-30 | 56.69 | 113.35 | 169.97 | 169.93 | 3.57 |
| 180 | 4-30- 0 | 1273.24 | 1.06 | 89.99 | 4- 3- 0 | 1-21- 0 | 2-42- 0 | 60.03 | 120.03 | 179.96 | 179.91 | 4.24 |
| 190 | 4-45- 0 | 1206.23 | 1.25 | 94.98 | 4-30-45 | 1-30-15 | 3- 0-30 | 63.37 | 126.70 | 189.95 | 189.88 | 4.99 |
| 200 | 5- 0- 0 | 1145.92 | 1.45 | 99.97 | 5- 0- 0 | 1-40- 0 | 3-20- 0 | 66.72 | 133.38 | 199.93 | 199.85 | 5.81 |
| 210 | 5-15- 0 | 1091.35 | 1.68 | 104.97 | 5-30-45 | 1-50-15 | 3-40-30 | 70.07 | 140.06 | 209.91 | 209.81 | 6.73 |
| 220 | 5-30- 0 | 1041.74 | 1.94 | 109.96 | 6- 3- 0 | 2- 1- 0 | 4- 2- 0 | 73.42 | 146.75 | 219.89 | 219.75 | 7.74 |
| 230 | 5-45- 0 | 996.45 | 2.21 | 114.95 | 6-36-45 | 2-12-15 | 4-24-30 | 76.77 | 153.43 | 229.86 | 229.69 | 8.84 |
| 240 | 6- 0- 0 | 954.93 | 2.51 | 119.94 | 7-12- 0 | 2-24- 0 | 4-48- 0 | 80.13 | 160.12 | 239.83 | 239.62 | 10.04 |
| 250 | 6-15- 0 | 916.73 | 2.84 | 124.92 | 7-48-45 | 2-36-15 | 5-12-30 | 83.49 | 166.82 | 249.79 | 249.53 | 11.35 |
| 260 | 6-30- 0 | 881.47 | 3.19 | 129.91 | 8-27- 0 | 2-49- 0 | 5-38- 0 | 86.86 | 173.51 | 259.75 | 259.43 | 12.76 |
| 270 | 6-45- 0 | 848.83 | 3.58 | 134.89 | 9- 6-45 | 3- 2-15 | 6- 4-30 | 90.24 | 180.22 | 269.70 | 269.32 | 14.29 |
| 280 | 7- 0- 0 | 818.51 | 3.99 | 139.86 | 9-48- 0 | 3-16- 0 | 6-32- 0 | 93.62 | 186.93 | 279.63 | 279.18 | 15.93 |
| 290 | 7-15- 0 | 79C.29 | 4.43 | 144.84 | 10-30-45 | 3-30-15 | 7- 0-30 | 97.00 | 193.65 | 289.56 | 289.02 | 17.70 |
| 300 | 7-30- 0 | 763.94 | 4.91 | 149.81 | 11-15- 0 | 3-45- 0 | 7-30- 0 | 100.40 | 200.37 | 299.48 | 298.84 | 19.59 |
| 310 | 7-45- 0 | 739.30 | 5.41 | 154.77 | 12- 0-45 | 4- 0-15 | 8- 0-30 | 103.81 | 207.10 | 309.39 | 308.64 | 21.60 |
| 320 | 8- 0- 0 | 716.20 | 5.96 | 159.73 | 12-48- 0 | 4-16- 0 | 8-32- 0 | 107.22 | 213.85 | 319.29 | 318.40 | 23.75 |
| 330 | 8-15- 0 | 654.49 | 6.53 | 164.69 | 13-36-45 | 4-32-15 | 9- 4-30 | 110.65 | 220.60 | 329.17 | 328.14 | 26.04 |
| 340 | 8-30- 0 | 674.07 | 7.14 | 169.64 | 14-27- 0 | 4-49- 0 | 9-38- 0 | 114.08 | 227.36 | 339.03 | 337.84 | 28.47 |
| 350 | 8-45- 0 | 654.81 | 7.79 | 174.58 | 15-18-45 | 5- 6-15 | 10-12-30 | 117.54 | 234.14 | 348.88 | 347.50 | 31.04 |
| 360 | 9- 0- 0 | 636.62 | 8.48 | 179.52 | 16-12- 0 | 5-24- 0 | 10-48- 0 | 121.00 | 240.93 | 358.72 | 357.12 | 33.76 |

GENERAL NOTES

For definitions of spiral values and their applicable formulae, see Std. D-55.10.

For deflection angle formulae for an instrument set-up at a point on spiral, see Std. D-55.10.

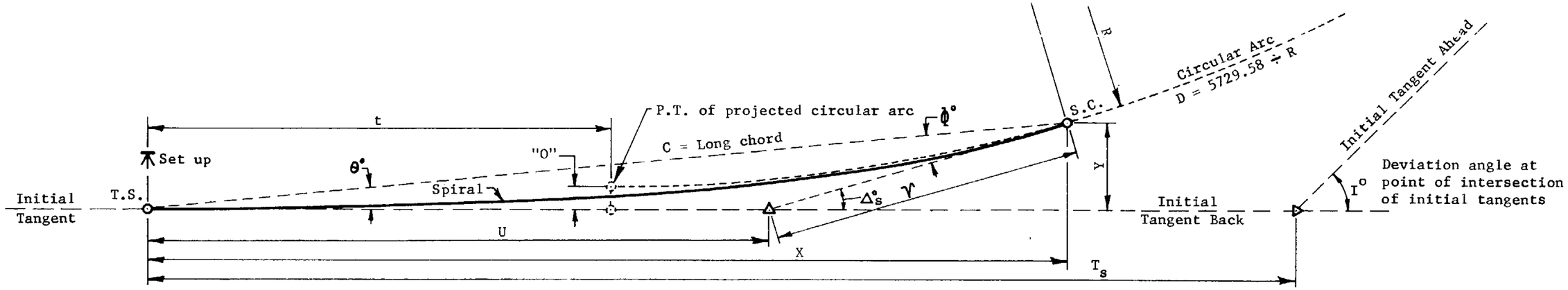
For partial transition spiral formulae, see Std. D-55.20.

For spiral transition between compound curves, see Std. D-55.30.

For curvature, superelevation and superelevation transition standards, see Std. D-6.04, D-6.05 and D-6.06.

For superelevation distribution, see Std. D-6.07.

| DESIGN APPROVED | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD PLANS | REV. DATE 4/78 |
|---|---|---|
| APPROVED FOR DISTRIBUTION | SPIRAL TRANSITION TABLE FOR a=2-1/2 | PLAN NO. D-57.37 |




| $L_s$ | D | R | "O" | t | $\Delta_s°$ | θ° | Φ° | ν | U | C | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00-00-00 | 00.00 | 0.00 | 0.00 | 00-00-00 | 00-00-00 | 00-00-00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 25 | 0-40- 0 | 8594.37 | 0.00 | 12.50 | 0- 5- 0 | 0- 1-40 | 0- 3-20 | 8.33 | 16.67 | 25.00 | 25.00 | 0.01 |
| 50 | 1-20- 0 | 4297.18 | 0.02 | 25.00 | 0-20- 0 | 0- 6-40 | 0-13-20 | 16.67 | 33.33 | 50.00 | 50.00 | 0.10 |
| 75 | 2- 0- 0 | 2864.79 | 0.08 | 37.50 | 0-45- 0 | 0-15- 0 | 0-30- 0 | 25.00 | 50.00 | 75.00 | 75.00 | 0.33 |
| 100 | 2-40- 0 | 2148.59 | 0.19 | 50.00 | 1-20- 0 | 0-26-40 | 0-53-20 | 33.34 | 66.67 | 100.00 | 99.99 | 0.78 |
| 125 | 3-20- 0 | 1718.87 | 0.38 | 62.50 | 2- 5- 0 | 0-41-40 | 1-23-20 | 41.67 | 83.34 | 124.99 | 124.98 | 1.51 |
| 150 | 4- 0- 0 | 1432.39 | 0.65 | 74.99 | 3- 0- 0 | 1- 0- 0 | 2- 0- 0 | 50.01 | 100.01 | 149.98 | 149.96 | 2.62 |

GENERAL NOTES

For definitions of spiral values and their applicable formulae, see Std. D-55.10.

For deflection angle formulae for an instrument set-up at a point on spiral, see Std. D-55.10.

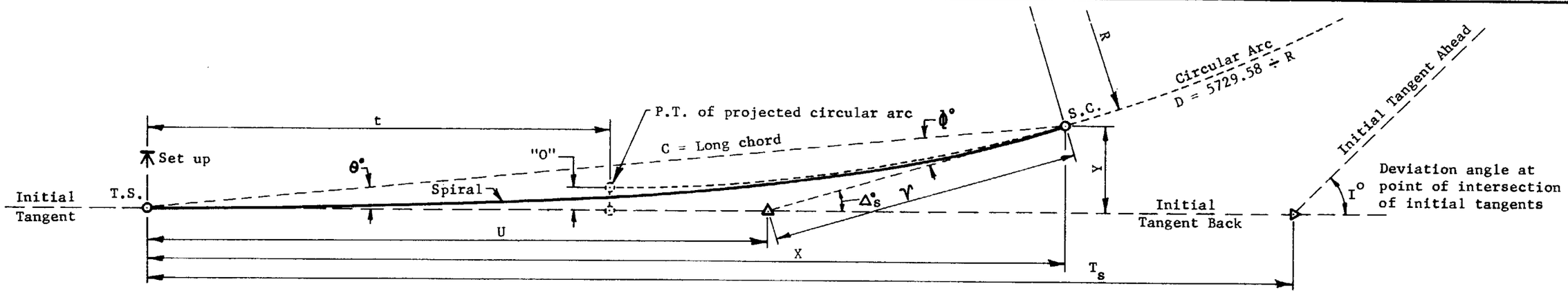
For partial transition spiral formulae, see Std. D-55.20.

For spiral transition between compound curves, see Std. D-55.30.

For curvature, superelevation and superelevation transition standards, see Std. D-6.04, D-6.05 and D-6.06.

For superelevation distribution, see Std. D-6.07.

| | | |
|---|---|---|
| DESIGN APPROVED | ARIZONA<br>DEPARTMENT OF TRANSPORTATION<br>HIGHWAYS DIVISION<br>STANDARD PLANS | REV. DATE<br>4/78 |
| APPROVED FOR DISTRIBUTION | SPIRAL TRANSITION TABLE<br>FOR a=2-2/3 | PLAN NO.<br>D-57.40 |




| $L_s$ | D | R | "O" | t | $\Delta_s^\circ$ | $\theta^\circ$ | $\phi^\circ$ | $\nu$ | U | C | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00-00-00 | 00.00 | 0.00 | 0.00 | 00-00-00 | 00-00-00 | 00-00-00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 25 | 0-45- 0 | 7639.44 | 0.00 | 12.50 | 0- 5-38 | 0- 1-53 | 0- 3-45 | 8.33 | 16.67 | 25.00 | 25.00 | 0.01 |
| 50 | 1-30- 0 | 3819.72 | 0.03 | 25.00 | 0-22-30 | 0- 7-30 | 0-15- 0 | 16.67 | 33.33 | 50.00 | 50.00 | 0.11 |
| 75 | 2-15- 0 | 2546.48 | 0.09 | 37.50 | 0-50-38 | 0-16-53 | 0-33-45 | 25.00 | 50.00 | 75.00 | 75.00 | 0.37 |
| 100 | 3- 0- 0 | 1909.86 | 0.22 | 50.00 | 1-30- 0 | 0-30- 0 | 1- 0- 0 | 33.34 | 66.67 | 100.00 | 99.99 | 0.87 |
| 125 | 3-45- 0 | 1527.89 | 0.43 | 62.50 | 2-20-38 | 0-46-53 | 1-33-45 | 41.67 | 83.34 | 124.99 | 124.98 | 1.70 |
| 150 | 4-30- 0 | 1273.24 | 0.74 | 74.99 | 3-22-30 | 1- 7-30 | 2-15- 0 | 50.02 | 100.02 | 149.98 | 149.95 | 2.94 |
| 175 | 5-15- 0 | 1091.35 | 1.17 | 87.48 | 4-35-38 | 1-31-53 | 3- 3-45 | 58.37 | 116.70 | 174.95 | 174.89 | 4.68 |
| 200 | 6- 0- 0 | 954.93 | 1.74 | 99.96 | 6- 0- 0 | 2- 0- 0 | 4- 0- 0 | 66.74 | 133.40 | 199.90 | 199.78 | 6.98 |

**GENERAL NOTES**

For definitions of spiral values and their applicable formulae, see Std. D-55.10.

For deflection angle formulae for an instrument set-up at a point on spiral, see Std. D-55.10.

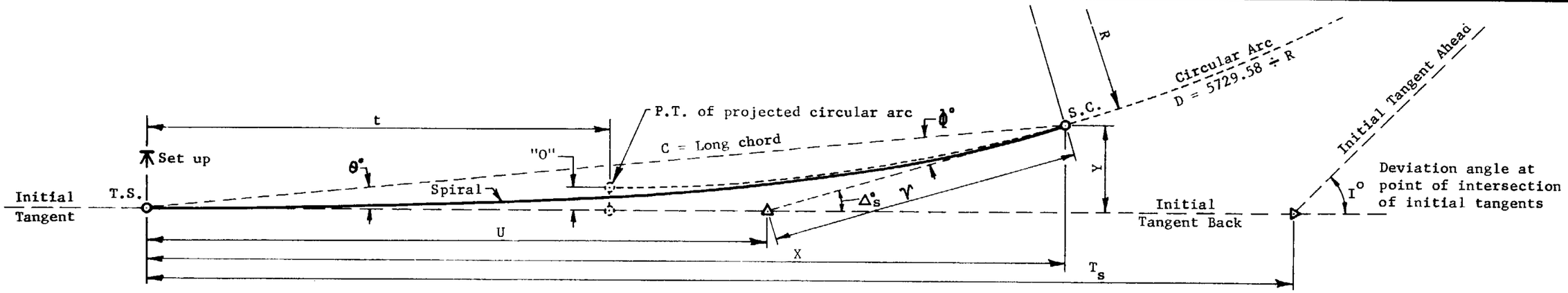
For partial transition spiral formulae, see Std. D-55.20.

For spiral transition between compound curves, see Std. D-55.30.

For curvature, superelevation and superelevation transition standards, see Std. D-6.04, D-6.05 and D-6.06.

For superelevation distribution, see Std. D-6.07.

| DESIGN APPROVED | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD PLANS | REV. DATE 4/78 |
|---|---|---|
| APPROVED FOR DISTRIBUTION | SPIRAL TRANSITION TABLE FOR a=3 | PLAN NO. D-57.42 |




| $L_s$ | D | R | "O" | t | $\Delta^\circ_s$ | $\theta^\circ$ | $\Phi^\circ$ | $\nu$ | U | C | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00-00-00 | 00.00 | 0.00 | 0.00 | 00-00-00 | 00-00-00 | 00-00-00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 10 | 0-20- 0 | 17188.74 | 0.00 | 5.00 | 0- 1- 0 | 0- 0-20 | 0- 0-40 | 3.33 | 6.67 | 10.00 | 10.00 | 0.00 |
| 20 | 0-40- 0 | 8594.37 | 0.00 | 10.00 | 0- 4- 0 | 0- 1-20 | 0- 2-40 | 6.67 | 13.33 | 20.00 | 20.00 | 0.01 |
| 30 | 1- 0- 0 | 5729.58 | 0.01 | 15.00 | 0- 9- 0 | 0- 3- 0 | 0- 6- 0 | 10.00 | 20.00 | 30.00 | 30.00 | 0.03 |
| 40 | 1-20- 0 | 4297.18 | 0.02 | 20.00 | 0-16- 0 | 0- 5-20 | 0-10-40 | 13.33 | 26.67 | 40.00 | 40.00 | 0.06 |
| 50 | 1-40- 0 | 3437.75 | 0.03 | 25.00 | 0-25- 0 | 0- 8-20 | 0-16-40 | 16.67 | 33.33 | 50.00 | 50.00 | 0.12 |
| 60 | 2- 0- 0 | 2864.79 | 0.05 | 30.00 | 0-36- 0 | 0-12- 0 | 0-24- 0 | 20.00 | 40.00 | 60.00 | 60.00 | 0.21 |
| 70 | 2-20- 0 | 2455.53 | 0.08 | 35.00 | 0-49- 0 | 0-16-20 | 0-32-40 | 23.33 | 46.67 | 70.00 | 70.00 | 0.33 |
| 80 | 2-40- 0 | 2148.59 | 0.12 | 40.00 | 1- 4- 0 | 0-21-20 | 0-42-40 | 26.67 | 53.33 | 80.00 | 80.00 | 0.50 |
| 90 | 3- 0- 0 | 1909.86 | 0.18 | 45.00 | 1-21- 0 | 0-27- 0 | 0-54- 0 | 30.00 | 60.00 | 90.00 | 89.99 | 0.71 |
| 100 | 3-20- 0 | 1718.87 | 0.24 | 50.00 | 1-40- 0 | 0-33-20 | 1- 6-40 | 33.34 | 66.67 | 100.00 | 99.99 | 0.97 |
| 110 | 3-40- 0 | 1562.61 | 0.32 | 55.00 | 2- 1- 0 | 0-40-20 | 1-20-40 | 36.67 | 73.34 | 109.99 | 109.99 | 1.29 |
| 120 | 4- 0- 0 | 1432.39 | 0.42 | 60.00 | 2-24- 0 | 0-48- 0 | 1-36- 0 | 40.01 | 80.01 | 119.99 | 119.98 | 1.68 |
| 130 | 4-20- 0 | 1322.21 | 0.53 | 64.99 | 2-49- 0 | 0-56-20 | 1-52-40 | 43.34 | 86.68 | 129.99 | 129.97 | 2.13 |
| 140 | 4-40- 0 | 1227.77 | 0.66 | 69.99 | 3-16- 0 | 1- 5-20 | 2-10-40 | 46.68 | 93.35 | 139.98 | 139.95 | 2.66 |
| 150 | 5- 0- 0 | 1145.92 | 0.82 | 74.99 | 3-45- 0 | 1-15- 0 | 2-30- 0 | 50.02 | 100.02 | 149.97 | 149.94 | 3.27 |
| 160 | 5-20- 0 | 1074.30 | 0.99 | 79.99 | 4-16- 0 | 1-25-20 | 2-50-40 | 53.36 | 106.70 | 159.96 | 159.91 | 3.97 |
| 170 | 5-40- 0 | 1011.10 | 1.19 | 84.98 | 4-49- 0 | 1-36-20 | 3-12-40 | 56.71 | 113.37 | 169.95 | 169.88 | 4.76 |
| 180 | 6- 0- 0 | 954.93 | 1.41 | 89.97 | 5-24- 0 | 1-48- 0 | 3-36- 0 | 60.06 | 120.05 | 179.93 | 179.84 | 5.65 |
| 190 | 6-20- 0 | 904.67 | 1.66 | 94.97 | 6- 1- 0 | 2- 0-20 | 4- 0-40 | 63.41 | 126.73 | 189.91 | 189.79 | 6.65 |
| 200 | 6-40- 0 | 859.44 | 1.94 | 99.95 | 6-40- 0 | 2-13-20 | 4-26-40 | 66.76 | 133.42 | 199.88 | 199.73 | 7.75 |
| 210 | 7- 0- 0 | 818.51 | 2.24 | 104.94 | 7-21- 0 | 2-27- 0 | 4-54- 0 | 70.12 | 140.11 | 209.85 | 209.65 | 8.97 |
| 220 | 7-20- 0 | 781.31 | 2.58 | 109.93 | 8- 4- 0 | 2-41-20 | 5-22-40 | 73.48 | 146.81 | 219.81 | 219.56 | 10.31 |
| 230 | 7-40- 0 | 747.34 | 2.95 | 114.91 | 8-49- 0 | 2-56-20 | 5-52-40 | 76.85 | 153.51 | 229.76 | 229.45 | 11.78 |
| 240 | 8- 0- 0 | 716.20 | 3.35 | 119.89 | 9-36- 0 | 3-12- 0 | 6-24- 0 | 80.23 | 160.22 | 239.70 | 239.33 | 13.38 |
| 250 | 8-20- 0 | 687.55 | 3.79 | 124.86 | 10-25- 0 | 3-28-20 | 6-56-40 | 83.62 | 166.93 | 249.63 | 249.17 | 15.12 |
| 260 | 8-40- 0 | 661.11 | 4.26 | 129.83 | 11-16- 0 | 3-45-20 | 7-30-40 | 87.01 | 173.66 | 259.55 | 258.99 | 17.00 |
| 270 | 9- 0- 0 | 636.62 | 4.77 | 134.80 | 12- 9- 0 | 4- 3- 0 | 8- 6- 0 | 90.42 | 180.39 | 269.46 | 268.79 | 19.03 |
| 280 | 9-20- 0 | 613.88 | 5.32 | 139.76 | 13- 4- 0 | 4-21-20 | 8-42-40 | 93.84 | 187.13 | 279.35 | 278.54 | 21.22 |
| 290 | 9-40- 0 | 592.72 | 5.91 | 144.71 | 14- 1- 0 | 4-40-20 | 9-20-40 | 97.27 | 193.89 | 289.23 | 288.26 | 23.56 |
| 300 | 10- 0- 0 | 572.96 | 6.54 | 149.66 | 15- 0- 0 | 5- 0- 0 | 10- 0- 0 | 100.71 | 200.66 | 299.08 | 297.94 | 26.07 |
| 310 | 10-20- 0 | 554.48 | 7.22 | 154.60 | 16- 1- 0 | 5-20-20 | 10-40-40 | 104.18 | 207.45 | 308.92 | 307.58 | 28.74 |
| 320 | 10-40- 0 | 537.15 | 7.94 | 159.53 | 17- 4- 0 | 5-41-20 | 11-22-40 | 107.65 | 214.25 | 318.73 | 317.16 | 31.59 |
| 330 | 11- 0- 0 | 520.87 | 8.71 | 164.45 | 18- 9- 0 | 6- 3- 0 | 12- 6- 0 | 111.15 | 221.07 | 328.52 | 326.69 | 34.62 |
| 340 | 11-20- 0 | 505.55 | 9.52 | 169.36 | 19-16- 0 | 6-25-20 | 12-50-40 | 114.67 | 227.91 | 338.28 | 336.16 | 37.84 |
| 350 | 11-40- 0 | 491.11 | 10.39 | 174.26 | 20-25- 0 | 6-48-20 | 13-36-40 | 118.22 | 234.77 | 348.02 | 345.56 | 41.24 |

**GENERAL NOTES**

For definitions of spiral values and their applicable formulae, see Std. D-55.10.

For deflection angle formulae for an instrument set-up at a point on spiral, see Std. D-55.10.

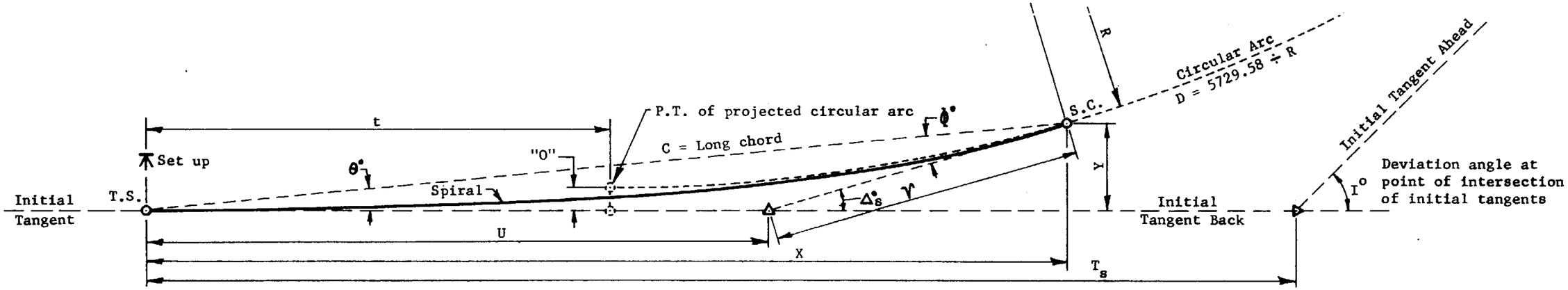
For partial transition spiral formulae, see Std. D-55.20.

For spiral transition between compound curves, see Std. D-55.30.

For curvature, superelevation and superelevation transition standards, see Std. D-6.04, D-6.05 and D-6.06.

For superelevation distribution, see Std. D-6.07.

| DESIGN APPROVED | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD PLANS | REV. DATE 4/78 |
|---|---|---|
| APPROVED FOR DISTRIBUTION | SPIRAL TRANSITION TABLE FOR a=3-1/3 | PLAN NO. D-57.45 |




| $L_s$ | D | R | "O" | t | $\Delta_s°$ | θ° | φ° | ν | U | C | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0C | 00-00-00 | 00.00 | 0.00 | 0.00 | 00-00-00 | 00-00-00 | 00-00-00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 25 | 0-52-30 | 6548.09 | 0.00 | 12.50 | 0- 6-34 | 0- 2-11 | 0- 4-22 | 8.33 | 16.67 | 25.00 | 25.00 | 0.02 |
| 50 | 1-45- 0 | 3274.04 | 0.03 | 25.00 | 0-26-15 | 0- 8-45 | 0-17-30 | 16.67 | 33.33 | 50.00 | 50.00 | 0.13 |
| 75 | 2-37-30 | 2182.70 | 0.11 | 37.50 | 0-59- 4 | 0-19-41 | 0-39-23 | 25.00 | 50.00 | 75.00 | 75.00 | 0.43 |
| 100 | 3-30- 0 | 1637.02 | 0.25 | 50.00 | 1-45- 0 | 0-35- 0 | 1-10- 0 | 33.34 | 66.67 | 100.00 | 99.99 | 1.02 |
| 125 | 4-22-30 | 1309.62 | 0.50 | 62.50 | 2-44- 4 | 0-54-41 | 1-49-22 | 41.68 | 83.34 | 124.99 | 124.97 | 1.99 |
| 150 | 5-15- 0 | 1091.35 | 0.86 | 74.99 | 3-56-15 | 1-18-45 | 2-37-30 | 50.02 | 100.02 | 149.97 | 149.93 | 3.44 |

**GENERAL NOTES**

For definitions of spiral values and their applicable formulae, see Std. D-55.10.

For deflection angle formulae for an instrument set-up at a point on spiral, see Std. D-55.10.

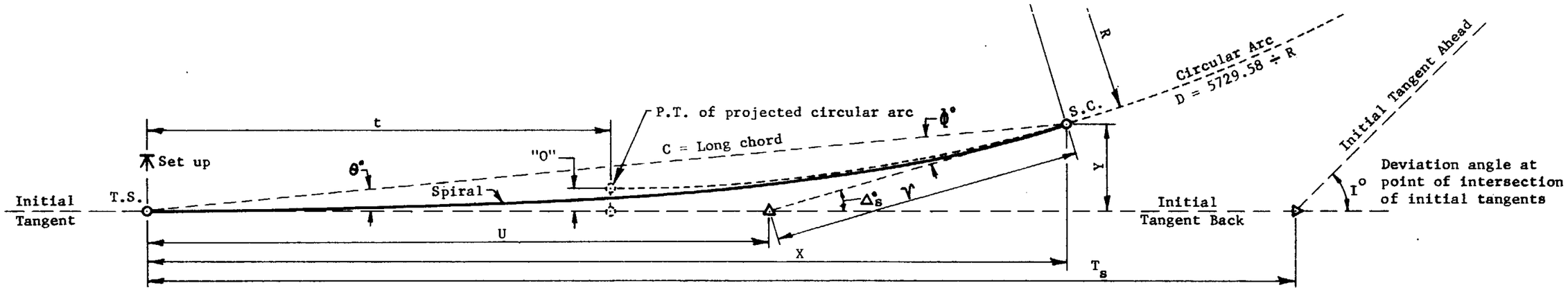
For partial transition spiral formulae, see Std. D-55.20.

For spiral transition between compound curves, see Std. D-55.30.

For curvature, superelevation and superelevation transition standards, see Std. D-6.04, D-6.05 and D-6.06.

For superelevation distribution, see Std. D-6.07.

| DESIGN APPROVED | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD PLANS | REV. DATE 4/78 |
|---|---|---|
| APPROVED FOR DISTRIBUTION | SPIRAL TRANSITION TABLE FOR a=3-1/2 | PLAN NO. D-57.47 |




| $L_s$ | D | R | "O" | t | $\Delta^\circ_s$ | $\theta^\circ$ | $\phi^\circ$ | $\nu$ | U | C | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0C | 00-00-00 | 00.00 | 0.00 | 0.00 | 00-00-00 | 00-00-00 | 00-00-00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 25 | 0-52-30 | 6548.09 | 0.00 | 12.50 | 0- 6-34 | 0- 2-11 | 0- 4-22 | 8.33 | 16.67 | 25.00 | 25.00 | 0.02 |
| 50 | 1-45- 0 | 3274.04 | 0.03 | 25.00 | 0-26-15 | 0- 8-45 | 0-17-30 | 16.67 | 33.33 | 50.00 | 50.00 | 0.13 |
| 75 | 2-37-30 | 2182.70 | 0.11 | 37.50 | 0-59- 4 | 0-19-41 | 0-39-23 | 25.00 | 50.00 | 75.00 | 75.00 | 0.43 |
| 100 | 3-30- 0 | 1637.02 | 0.25 | 50.00 | 1-45- 0 | 0-35- 0 | 1-10- 0 | 33.34 | 66.67 | 100.00 | 99.99 | 1.02 |
| 125 | 4-22-30 | 1309.62 | 0.50 | 62.50 | 2-44- 4 | 0-54-41 | 1-49-22 | 41.68 | 83.34 | 124.99 | 124.97 | 1.99 |
| 150 | 5-15- 0 | 1091.35 | 0.86 | 74.99 | 3-56-15 | 1-18-45 | 2-37-30 | 50.02 | 100.02 | 149.97 | 149.93 | 3.44 |

**GENERAL NOTES**

For definitions of spiral values and their applicable formulae, see Std. D-55.10.

For deflection angle formulae for an instrument set-up at a point on spiral, see Std. D-55.10.

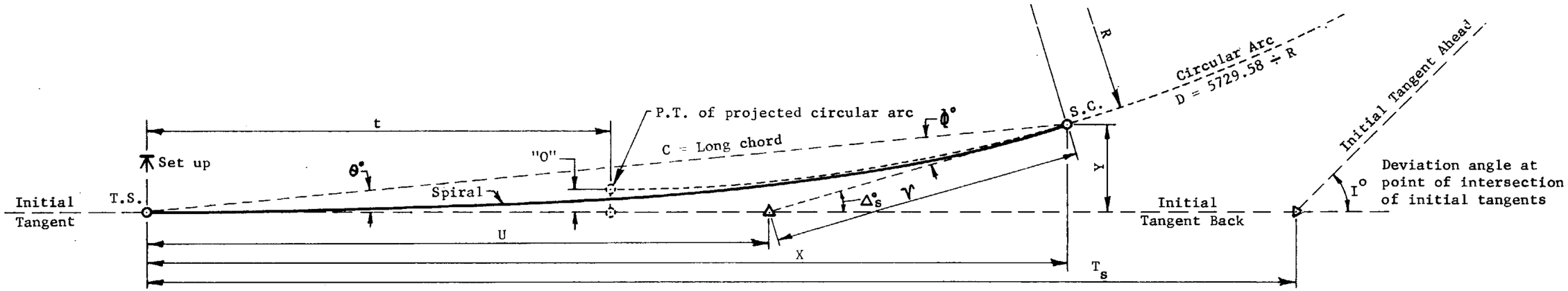
For partial transition spiral formulae, see Std. D-55.20.

For spiral transition between compound curves, see Std. D-55.30.

For curvature, superelevation and superelevation transition standards, see Std. D-6.04, D-6.05 and D-6.06.

For superelevation distribution, see Std. D-6.07.

| DESIGN APPROVED | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD PLANS | REV. DATE 4/78 |
|---|---|---|
| APPROVED FOR DISTRIBUTION | SPIRAL TRANSITION TABLE FOR a=3-1/2 | PLAN NO. D-57.47 |




| $L_s$ | D | R | "O" | t | $\Delta_s°$ | θ° | φ° | ν | U | C | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00-00-00 | 00.00 | 0.00 | 0.00 | 00-00-00 | 00-00-00 | 00-00-00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 10 | 0-22-30 | 15278.87 | 0.00 | 5.00 | 0- 1- 7 | 0- 0-23 | 0- 0-45 | 3.33 | 6.67 | 10.00 | 10.00 | 0.00 |
| 20 | 0-45- 0 | 7639.44 | 0.00 | 10.00 | 0- 4-30 | 0- 1-30 | 0- 3- 0 | 6.67 | 13.33 | 20.00 | 20.00 | 0.01 |
| 30 | 1- 7-30 | 5092.96 | 0.01 | 15.00 | 0-10- 7 | 0- 3-23 | 0- 6-45 | 10.00 | 20.00 | 30.00 | 30.00 | 0.03 |
| 40 | 1-30- 0 | 3819.72 | 0.02 | 20.00 | 0-18- 0 | 0- 6- 0 | 0-12- 0 | 13.33 | 26.67 | 40.00 | 40.00 | 0.07 |
| 50 | 1-52-30 | 3055.77 | 0.03 | 25.00 | 0-28- 8 | 0- 9-23 | 0-18-45 | 16.67 | 33.33 | 50.00 | 50.00 | 0.14 |
| 60 | 2-15- 0 | 2546.48 | 0.06 | 30.00 | 0-40-30 | 0-13-30 | 0-27- 0 | 20.00 | 40.00 | 60.00 | 60.00 | 0.24 |
| 70 | 2-37-30 | 2182.70 | 0.09 | 35.00 | 0-55- 7 | 0-18-23 | 0-36-45 | 23.33 | 46.67 | 70.00 | 70.00 | 0.37 |
| 80 | 3- 0- 0 | 1909.86 | 0.14 | 40.00 | 1-12- 0 | 0-24- 0 | 0-48- 0 | 26.67 | 53.33 | 80.00 | 80.00 | 0.56 |
| 90 | 3-22-30 | 1697.65 | 0.20 | 45.00 | 1-31- 7 | 0-30-23 | 1- 0-45 | 30.00 | 60.00 | 90.00 | 89.99 | 0.80 |
| 100 | 3-45- 0 | 1527.89 | 0.27 | 50.00 | 1-52-30 | 0-37-30 | 1-15- 0 | 33.34 | 66.67 | 100.00 | 99.99 | 1.09 |
| 110 | 4- 7-30 | 1388.99 | 0.36 | 55.00 | 2-16- 7 | 0-45-23 | 1-30-45 | 36.67 | 73.34 | 109.99 | 109.98 | 1.45 |
| 120 | 4-30- 0 | 1273.24 | 0.47 | 60.00 | 2-42- 0 | 0-54- 0 | 1-48- 0 | 40.01 | 80.01 | 119.99 | 119.97 | 1.88 |
| 130 | 4-52-30 | 1175.30 | 0.60 | 64.99 | 3-10- 7 | 1- 3-23 | 2- 6-45 | 43.35 | 86.68 | 129.98 | 129.96 | 2.40 |
| 140 | 5-15- 0 | 1091.35 | 0.75 | 69.99 | 3-40-30 | 1-13-30 | 2-27- 0 | 46.69 | 93.35 | 139.97 | 139.94 | 2.99 |
| 150 | 5-37-30 | 1018.59 | 0.92 | 74.99 | 4-13- 8 | 1-24-23 | 2-48-45 | 50.03 | 100.03 | 149.96 | 149.92 | 3.68 |
| 160 | 6- 0- 0 | 954.93 | 1.12 | 79.98 | 4-48- 0 | 1-36- 0 | 3-12- 0 | 53.37 | 106.70 | 159.95 | 159.89 | 4.47 |

**GENERAL NOTES**

For definitions of spiral values and their applicable formulae, see Std. D-55.10.

For deflection angle formulae for an instrument set-up at a point on spiral, see Std. D-55.10.

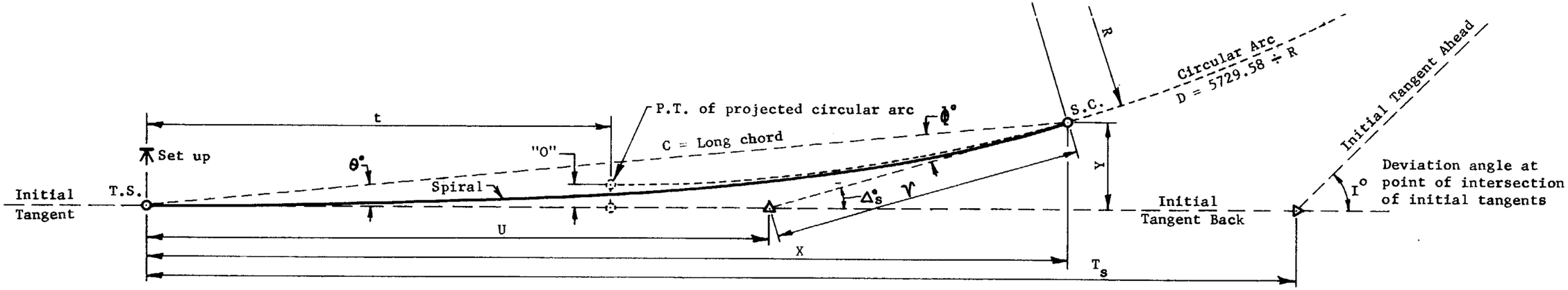
For partial transition spiral formulae, see Std. D-55.20.

For spiral transition between compound curves, see Std. D-55.30.

For curvature, superelevation and superelevation transition standards, see Std. D-6.04, D-6.05 and D-6.06.

For superelevation distribution, see Std. D-6.07.

| DESIGN APPROVED | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD PLANS | REV. DATE 4/78 |
|---|---|---|
| APPROVED FOR DISTRIBUTION | TRANSITION SPIRAL TABLE FOR a=3-3/4 | PLAN NO. D-57.50 |




| $L_s$ | D | R | "O" | t | $\Delta^\circ_s$ | $\theta^\circ$ | $\Phi^\circ$ | $\nu$ | U | C | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00-00-00 | 00.00 | 0.00 | 0.00 | 00-00-00 | 00-00-00 | 00-00-00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 25 | 1- 0- 0 | 5729.58 | 0.00 | 12.50 | 0- 7-30 | 0- 2-30 | 0- 5- 0 | 8.33 | 16.67 | 25.00 | 25.00 | 0.02 |
| 50 | 2- 0- 0 | 2864.79 | 0.04 | 25.00 | 0-30- 0 | 0-10- 0 | 0-20- 0 | 16.67 | 33.33 | 50.00 | 50.00 | 0.15 |
| 75 | 3- 0- 0 | 1909.86 | 0.12 | 37.50 | 1- 7-30 | 0-22-30 | 0-45- 0 | 25.00 | 50.00 | 75.00 | 75.00 | 0.49 |
| 100 | 4- 0- 0 | 1432.39 | 0.29 | 50.00 | 2- 0- 0 | 0-40- 0 | 1-20- 0 | 33.34 | 66.67 | 99.99 | 99.99 | 1.16 |
| 125 | 5- 0- 0 | 1145.92 | 0.57 | 62.49 | 3- 7-30 | 1- 2-30 | 2- 5- 0 | 41.68 | 83.35 | 124.98 | 124.96 | 2.27 |
| 150 | 6- 0- 0 | 954.93 | 0.98 | 74.98 | 4-30- 0 | 1-30- 0 | 3- 0- 0 | 50.03 | 100.03 | 149.96 | 149.91 | 3.93 |
| 175 | 7- 0- 0 | 818.51 | 1.56 | 87.47 | 6- 7-30 | 2- 2-30 | 4- 5- 0 | 58.40 | 116.73 | 174.91 | 174.80 | 6.23 |
| 200 | 8- 0- 0 | 716.20 | 2.33 | 99.93 | 8- 0- 0 | 2-40- 0 | 5-20- 0 | 66.80 | 133.46 | 199.83 | 199.61 | 9.30 |

**GENERAL NOTES**

For definitions of spiral values and their applicable formulae, see Std. D-55.10.

For deflection angle formulae for an instrument set-up at a point on spiral, see Std. D-55.10.

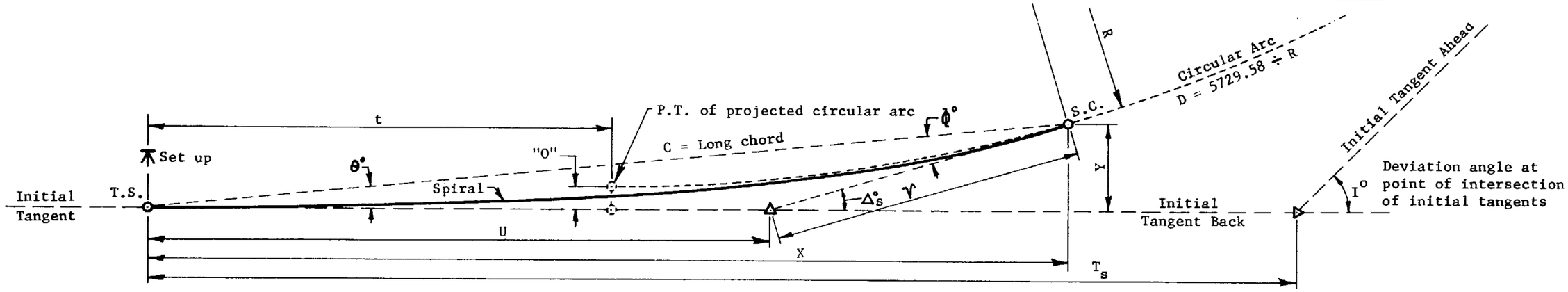
For partial transition spiral formulae, see Std. D-55.20.

For spiral transition between compound curves, see Std. D-55.30.

For curvature, superelevation and superelevation transition standards, see Std. D-6.04, D-6.05 and D-6.06.

For superelevation distribution, see Std. D-6.07.

| | | |
|---|---|---|
| DESIGN APPROVED | ARIZONA<br>DEPARTMENT OF TRANSPORTATION<br>HIGHWAYS DIVISION<br>STANDARD PLANS | REV. DATE<br>4/78 |
| APPROVED FOR DISTRIBUTION | TRANSITION SPIRAL TABLE<br>FOR a=4 | PLAN NO.<br>D-57.52 |




| $L_s$ | D | R | "O" | t | $\Delta^\circ_s$ | $\theta^\circ$ | $\Phi^\circ$ | $\nu$ | U | C | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00-00-00 | 00.00 | 0.00 | 0.00 | 00-00-00 | 00-00-00 | 00-00-00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 25 | 1- 7-30 | 5092.96 | 0.01 | 12.50 | 0- 8-26 | 0- 2-49 | 0- 5-38 | 8.33 | 16.67 | 25.00 | 25.00 | 0.02 |
| 50 | 2-15- 0 | 2546.48 | 0.04 | 25.00 | 0-33-45 | 0-11-15 | 0-22-30 | 16.67 | 33.33 | 50.00 | 50.00 | 0.16 |
| 75 | 3-22-30 | 1697.65 | 0.14 | 37.50 | 1-15-56 | 0-25-19 | 0-50-38 | 25.00 | 50.00 | 75.00 | 75.00 | 0.55 |
| 100 | 4-30- 0 | 1273.24 | 0.33 | 50.00 | 2-15- 0 | 0-45- 0 | 1-30- 0 | 33.34 | 66.67 | 99.99 | 99.98 | 1.31 |
| 125 | 5-37-30 | 1018.59 | 0.64 | 62.49 | 3-30-56 | 1-10-19 | 2-20-38 | 41.68 | 83.35 | 124.98 | 124.95 | 2.56 |
| 150 | 6-45- 0 | 848.83 | 1.10 | 74.98 | 5- 3-45 | 1-41-15 | 3-22-30 | 50.04 | 100.04 | 149.95 | 149.88 | 4.42 |
| 175 | 7-52-30 | 727.57 | 1.75 | 87.46 | 6-53-26 | 2-17-49 | 4-35-38 | 58.42 | 116.75 | 174.89 | 174.75 | 7.01 |
| 200 | 9- 0- 0 | 636.62 | 2.62 | 99.92 | 9- 0- 0 | 3- 0- 0 | 6- 0- 0 | 66.84 | 133.49 | 199.78 | 199.51 | 10.46 |

**GENERAL NOTES**

For definitions of spiral values and their applicable formulae, see Std. D-55.10.

For deflection angle formulae for an instrument set-up at a point on spiral, see Std. D-55.10.

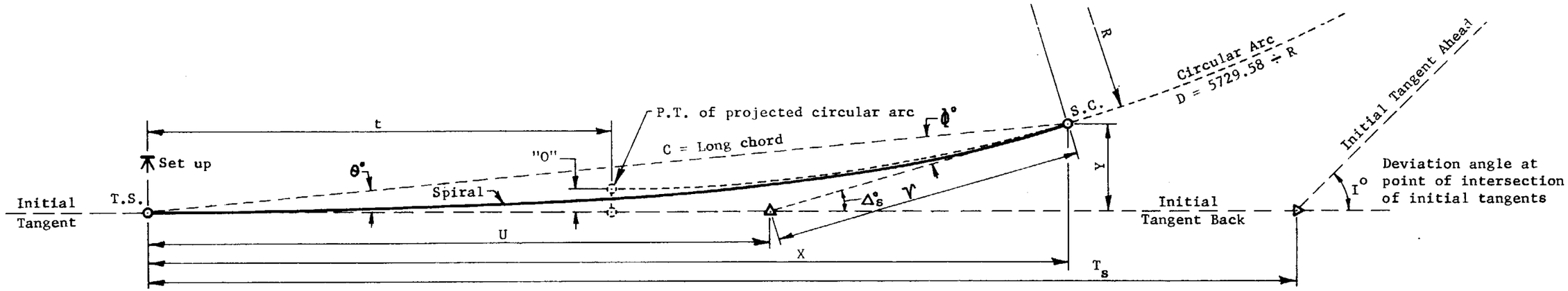
For partial transition spiral formulae, see Std. D-55.20.

For spiral transition between compound curves, see Std. D-55.30.

For curvature, superelevation and superelevation transition standards, see Std. D-6.04, D-6.05 and D-6.06.

For superelevation distribution, see Std. D-6.07.

| DESIGN APPROVED | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD PLANS | REV. DATE 4/78 |
|---|---|---|
| APPROVED FOR DISTRIBUTION | TRANSITION SPIRAL TABLE FOR a=4-1/2 | PLAN NO. D-57.55 |




| $L_s$ | D | R | "O" | t | $\Delta^\circ_s$ | $\theta^\circ$ | $\Phi^\circ$ | $\nu$ | U | C | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00-00-00 | 00.00 | 0.00 | 0.00 | 00-00-00 | 00-00-00 | 00-00-00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 25 | 1-10- 0 | 4911.07 | 0.01 | 12.50 | 0- 8-45 | 0- 2-55 | 0- 5-50 | 8.33 | 16.67 | 25.00 | 25.00 | 0.02 |
| 50 | 2-20- 0 | 2455.53 | 0.04 | 25.00 | 0-35- 0 | 0-11-40 | 0-23-20 | 16.67 | 33.33 | 50.00 | 50.00 | 0.17 |
| 75 | 3-30- 0 | 1637.02 | 0.14 | 37.50 | 1-18-45 | 0-26-15 | 0-52-30 | 25.00 | 50.00 | 75.00 | 75.00 | 0.57 |
| 100 | 4-40- 0 | 1227.77 | 0.34 | 50.00 | 2-20- 0 | 0-46-40 | 1-33-20 | 33.34 | 66.67 | 99.99 | 99.98 | 1.36 |
| 125 | 5-50- 0 | 982.21 | 0.66 | 62.49 | 3-38-45 | 1-12-55 | 2-25-50 | 41.68 | 83.35 | 124.98 | 124.95 | 2.65 |
| 150 | 7- 0- 0 | 818.51 | 1.15 | 74.98 | 5-15- 0 | 1-45- 0 | 3-30- 0 | 50.04 | 100.04 | 149.94 | 149.87 | 4.58 |

GENERAL NOTES

For definitions of spiral values and their applicable formulae, see Std. D-55.10.

For deflection angle formulae for an instrument set-up at a point on spiral, see Std. D-55.10.

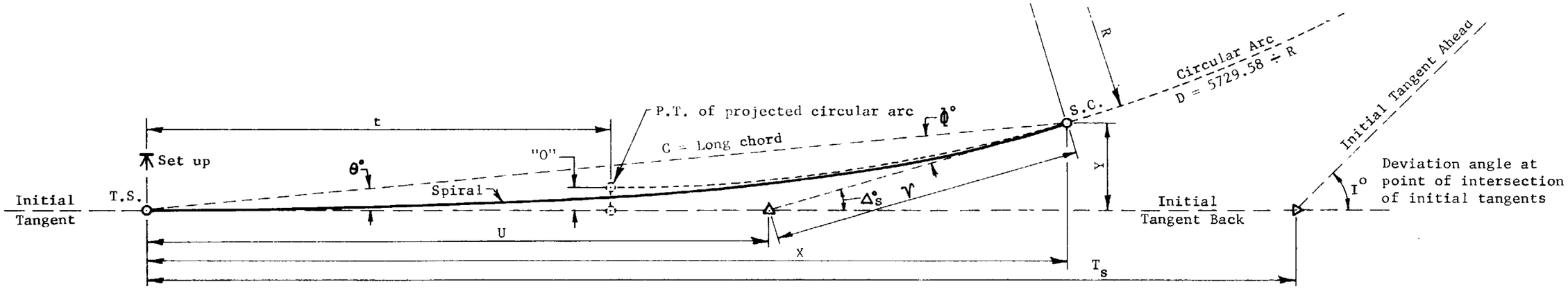
For partial transition spiral formulae, see Std. D-55.20.

For spiral transition between compound curves, see Std. D-55.30.

For curvature, superelevation and superelevation transition standards, see Std. D-6.04, D-6.05 and D-6.06.

For superelevation distribution, see Std. D-6.07.

| DESIGN APPROVED | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD PLANS | REV. DATE 4/78 |
|---|---|---|
| APPROVED FOR DISTRIBUTION | TRANSITION SPIRAL TABLE FOR a=4-2/3 | PLAN NO. D-57.57 |




| $L_s$ | D | R | "O" | t | $\Delta^\circ_s$ | $\theta^\circ$ | $\Phi^\circ$ | $\nu$ | U | C | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00-00-00 | 00.00 | 0.00 | 0.00 | 00-00-00 | 00-00-00 | 00-00-00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 10 | 0-30- 0 | 11459.16 | 0.00 | 5.00 | 0- 1-30 | 0- 0-30 | 0- 1- 0 | 3.33 | 6.67 | 10.00 | 10.00 | 0.00 |
| 20 | 1- 0- 0 | 5729.58 | 0.00 | 10.00 | 0- 6- 0 | 0- 2- 0 | 0- 4- 0 | 6.67 | 13.33 | 20.00 | 20.00 | 0.01 |
| 30 | 1-30- 0 | 3819.72 | 0.01 | 15.00 | 0-13-30 | 0- 4-30 | 0- 9- 0 | 10.00 | 20.00 | 30.00 | 30.00 | 0.04 |
| 40 | 2- 0- 0 | 2864.79 | 0.02 | 20.00 | 0-24- 0 | 0- 8- 0 | 0-16- 0 | 13.33 | 26.67 | 40.00 | 40.00 | 0.09 |
| 50 | 2-30- 0 | 2291.83 | 0.05 | 25.00 | 0-37-30 | 0-12-30 | 0-25- 0 | 16.67 | 33.33 | 50.00 | 50.00 | 0.18 |
| 60 | 3- 0- 0 | 1909.86 | 0.08 | 30.00 | 0-54- 0 | 0-18- 0 | 0-36- 0 | 20.00 | 40.00 | 60.00 | 60.00 | 0.31 |
| 70 | 3-30- 0 | 1637.02 | 0.12 | 35.00 | 1-13-30 | 0-24-30 | 0-49- 0 | 23.33 | 46.67 | 70.00 | 70.00 | 0.50 |
| 80 | 4- 0- 0 | 1432.39 | 0.19 | 40.00 | 1-36- 0 | 0-32- 0 | 1- 4- 0 | 26.67 | 53.34 | 80.00 | 79.99 | 0.74 |
| 90 | 4-30- 0 | 1273.24 | 0.26 | 45.00 | 2- 1-30 | 0-40-30 | 1-21- 0 | 30.00 | 60.00 | 89.99 | 89.99 | 1.06 |
| 100 | 5- 0- 0 | 1145.92 | 0.36 | 50.00 | 2-30- 0 | 0-50- 0 | 1-40- 0 | 33.34 | 66.67 | 99.99 | 99.98 | 1.45 |
| 110 | 5-30- 0 | 1041.74 | 0.48 | 54.99 | 3- 1-30 | 1- 0-30 | 2- 1- 0 | 36.68 | 73.34 | 109.99 | 109.97 | 1.94 |
| 120 | 6- 0- 0 | 954.93 | 0.63 | 59.99 | 3-36- 0 | 1-12- 0 | 2-24- 0 | 40.02 | 80.02 | 119.98 | 119.95 | 2.51 |
| 130 | 6-30- 0 | 881.47 | 0.80 | 64.99 | 4-13-30 | 1-24-30 | 2-49- 0 | 43.36 | 86.69 | 129.97 | 129.93 | 3.19 |
| 140 | 7- 0- 0 | 818.51 | 1.00 | 69.98 | 4-54- 0 | 1-38- 0 | 3-16- 0 | 46.70 | 93.37 | 139.95 | 139.90 | 3.99 |
| 150 | 7-30- 0 | 763.94 | 1.23 | 74.98 | 5-37-30 | 1-52-30 | 3-45- 0 | 50.05 | 100.05 | 149.94 | 149.86 | 4.91 |
| 160 | 8- 0- 0 | 716.20 | 1.49 | 79.97 | 6-24- 0 | 2- 8- 0 | 4-16- 0 | 53.40 | 106.73 | 159.91 | 159.80 | 5.95 |
| 170 | 8-30- 0 | 674.07 | 1.79 | 84.95 | 7-13-30 | 2-24-30 | 4-49- 0 | 56.76 | 113.42 | 169.88 | 169.73 | 7.14 |
| 180 | 9- 0- 0 | 636.62 | 2.12 | 89.94 | 8- 6- 0 | 2-42- 0 | 5-24- 0 | 60.12 | 120.12 | 179.84 | 179.64 | 8.47 |
| 190 | 9-30- 0 | 603.11 | 2.49 | 94.92 | 9- 1-30 | 3- 0-30 | 6- 1- 0 | 63.50 | 126.82 | 189.79 | 189.53 | 9.96 |
| 200 | 10- 0- 0 | 572.96 | 2.91 | 99.90 | 10- 0- 0 | 3-20- 0 | 6-40- 0 | 66.88 | 133.53 | 199.73 | 199.39 | 11.61 |
| 210 | 10-30- 0 | 545.67 | 3.37 | 104.87 | 11- 1-30 | 3-40-30 | 7-21- 0 | 70.27 | 140.25 | 209.65 | 209.22 | 13.44 |
| 220 | 11- 0- 0 | 520.87 | 3.87 | 109.84 | 12- 6- 0 | 4- 2- 0 | 8- 4- 0 | 73.67 | 146.98 | 219.56 | 219.02 | 15.44 |
| 230 | 11-30- 0 | 498.22 | 4.42 | 114.80 | 13-13-30 | 4-24-30 | 8-49- 0 | 77.09 | 153.73 | 229.45 | 228.77 | 17.64 |
| 240 | 12- 0- 0 | 477.46 | 5.03 | 119.75 | 14-24- 0 | 4-48- 0 | 9-36- 0 | 80.53 | 160.49 | 239.32 | 238.48 | 20.03 |
| 250 | 12-30- 0 | 458.37 | 5.68 | 124.69 | 15-37-30 | 5-12-30 | 10-25- 0 | 83.98 | 167.27 | 249.17 | 248.14 | 22.62 |
| 260 | 13- 0- 0 | 440.74 | 6.39 | 129.62 | 16-54- 0 | 5-38- 0 | 11-16- 0 | 87.45 | 174.06 | 258.99 | 257.74 | 25.42 |
| 270 | 13-30- 0 | 424.41 | 7.15 | 134.54 | 18-13-30 | 6- 4-30 | 12- 9- 0 | 90.95 | 180.88 | 268.78 | 267.27 | 28.45 |
| 280 | 14- 0- 0 | 409.26 | 7.98 | 139.45 | 19-36- 0 | 6-32- 0 | 13- 4- 0 | 94.48 | 187.73 | 278.54 | 276.73 | 31.69 |
| 290 | 14-30- 0 | 395.14 | 8.87 | 144.35 | 21- 1-30 | 7- 0-30 | 14- 1- 0 | 98.03 | 194.60 | 288.26 | 286.10 | 35.17 |
| 300 | 15- 0- 0 | 381.97 | 9.81 | 149.23 | 22-30- 0 | 7-30- 0 | 15- 0- 0 | 101.62 | 201.50 | 297.93 | 295.39 | 38.89 |

GENERAL NOTES

For definitions of spiral values and their applicable formulae, see Std. D-55.10.

For deflection angle formulae for an instrument set-up at a point on spiral, see Std. D-55.10.

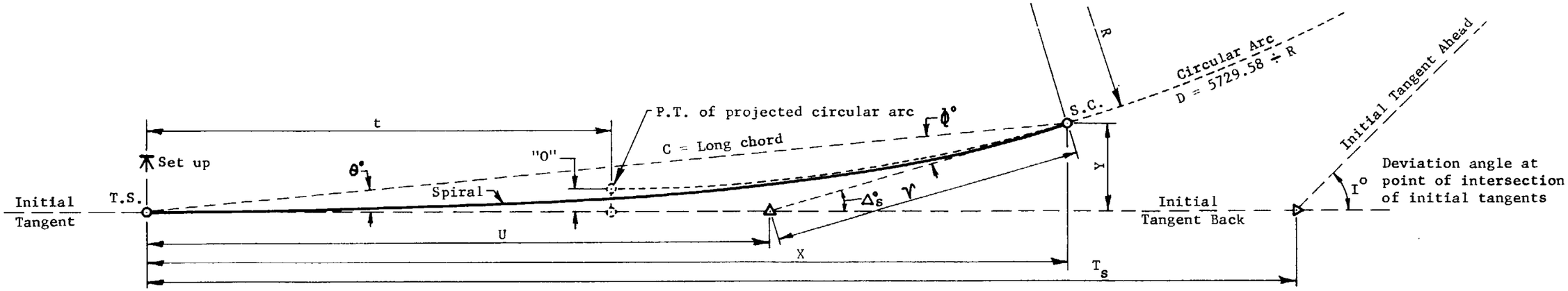
For partial transition spiral formulae, see Std. D-55.20.

For spiral transition between compound curves, see Std. D-55.30.

For curvature, superelevation and superelevation transition standards, see Std. D-6.04, D-6.05 and D-6.06.

For superelevation distribution, see Std. D-6.07.

| DESIGN APPROVED | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD PLANS | REV. DATE 4/78 |
|---|---|---|
| APPROVED FOR DISTRIBUTION | TRANSITION SPIRAL TABLE FOR a=5 | PLAN NO. D-57.60 |




| $L_s$ | D | R | "O" | t | $\Delta_s^\circ$ | $\theta^\circ$ | $\Phi^\circ$ | $\Upsilon$ | U | C | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00-00-00 | 00.00 | 0.00 | 0.00 | 00-00-00 | 00-00-00 | 00-00-00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 25 | 1-20- 0 | 4297.18 | 0.01 | 12.50 | 0-10- 0 | 0- 3-20 | 0- 6-40 | 8.33 | 16.67 | 25.00 | 25.00 | 0.02 |
| 50 | 2-40- 0 | 2148.59 | 0.05 | 25.00 | 0-40- 0 | 0-13-20 | 0-26-40 | 16.67 | 33.33 | 50.00 | 50.00 | 0.19 |
| 75 | 4- 0- 0 | 1432.39 | 0.16 | 37.50 | 1-30- 0 | 0-30- 0 | 1- 0- 0 | 25.00 | 50.00 | 75.00 | 74.99 | 0.65 |
| 100 | 5-20- 0 | 1074.30 | 0.39 | 50.00 | 2-40- 0 | 0-53-20 | 1-46-40 | 33.34 | 66.67 | 99.99 | 99.98 | 1.55 |
| 125 | 6-40- 0 | 859.44 | 0.76 | 62.49 | 4-10- 0 | 1-23-20 | 2-46-40 | 41.69 | 83.35 | 124.97 | 124.93 | 3.03 |
| 150 | 8- 0- 0 | 716.20 | 1.31 | 74.97 | 6- 0- 0 | 2- 0- 0 | 4- 0- 0 | 50.06 | 100.05 | 149.93 | 149.84 | 5.23 |

GENERAL NOTES

For definitions of spiral values and their applicable formulae, see Std. D-55.10.

For deflection angle formulae for an instrument set-up at a point on spiral, see Std. D-55.10.

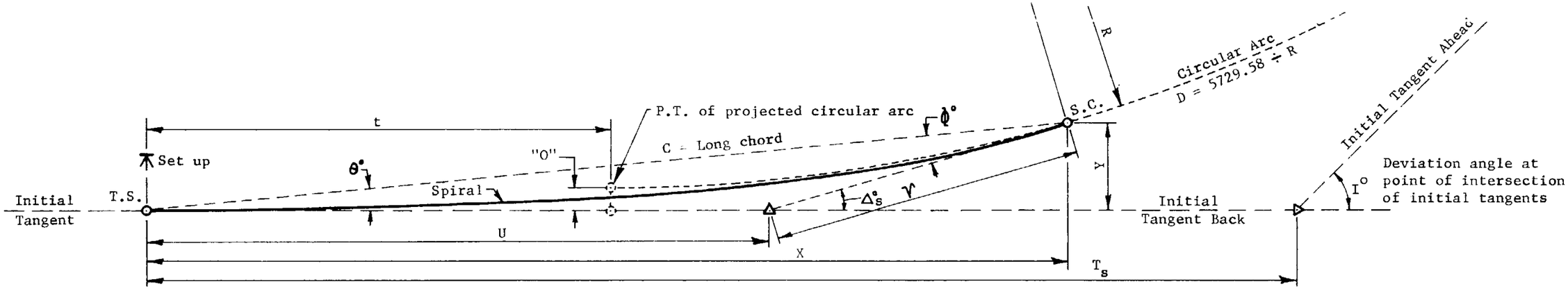
For partial transition spiral formulae, see Std. D-55.20.

For spiral transition between compound curves, see Std. D-55.30.

For curvature, superelevation and superelevation transition standards, see Std. D-6.04, D-6.05 and D-6.06.

For superelevation distribution, see Std. D-6.07.

| DESIGN APPROVED | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD PLANS | REV. DATE 4/78 |
|---|---|---|
| APPROVED FOR DISTRIBUTION | TRANSITION SPIRAL TABLE FOR a=5-1/3 | PLAN NO. D-57.62 |




| $L_s$ | D | R | "O" | t | $\Delta^\circ_s$ | $\theta^\circ$ | $\phi^\circ$ | $\nu$ | U | C | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00-00-00 | 00.00 | 0.00 | 0.00 | 00-00-00 | 00-00-00 | 00-00-00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 25 | 1-22-30 | 4166.97 | 0.01 | 12.50 | 0-10-19 | 0- 3-26 | 0- 6-52 | 8.33 | 16.67 | 25.00 | 25.00 | 0.02 |
| 50 | 2-45- 0 | 2083.48 | 0.05 | 25.00 | 0-41-15 | 0-13-45 | 0-27-30 | 16.67 | 33.33 | 50.00 | 50.00 | 0.20 |
| 75 | 4- 7-30 | 1388.99 | 0.17 | 37.50 | 1-32-49 | 0-30-56 | 1- 1-53 | 25.00 | 50.00 | 75.00 | 74.99 | 0.67 |
| 100 | 5-30- 0 | 1041.74 | 0.40 | 50.00 | 2-45- 0 | 0-55- 0 | 1-50- 0 | 33.34 | 66.67 | 99.99 | 99.98 | 1.60 |
| 125 | 6-52-30 | 833.39 | 0.78 | 62.49 | 4-17-49 | 1-25-56 | 2-51-52 | 41.69 | 83.36 | 124.97 | 124.93 | 3.12 |
| 150 | 8-15- 0 | 694.49 | 1.35 | 74.97 | 6-11-15 | 2- 3-45 | 4- 7-30 | 50.06 | 100.06 | 149.92 | 149.82 | 5.40 |
| 175 | 9-37-30 | 595.28 | 2.14 | 87.44 | 8-25-19 | 2-48-26 | 5-36-52 | 58.46 | 116.79 | 174.83 | 174.62 | 8.56 |
| 200 | 11- 0- 0 | 520.87 | 3.20 | 99.88 | 11- 0- 0 | 3-40- 0 | 7-20- 0 | 66.92 | 133.57 | 199.67 | 199.26 | 12.77 |

GENERAL NOTES

For definitions of spiral values and their applicable formulae, see Std. D-55.10.

For deflection angle formulae for an instrument set-up at a point on spiral, see Std. D-55.10.

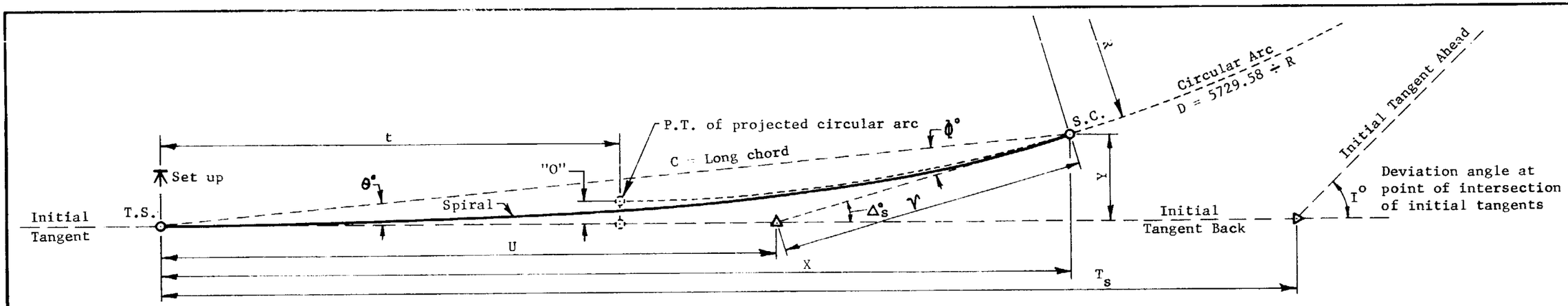
For partial transition spiral formulae, see Std. D-55.20.

For spiral transition between compound curves, see Std. D-55.30.

For curvature, superelevation and superelevation transition standards, see Std. D-6.04, D-6.05 and D-6.06.

For superelevation distribution, see Std. D-6.07.

| DESIGN APPROVED | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD PLANS | REV. DATE 4/78 |
|---|---|---|
| APPROVED FOR DISTRIBUTION | TRANSITION SPIRAL TABLE FOR a=5-1/2 | PLAN NO. D-57.65 |




| $L_s$ | D | R | "O" | t | $\Delta_s^\circ$ | $\theta^\circ$ | $\Phi^\circ$ | $\nu$ | U | C | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00-00-00 | 00.00 | 0.00 | 0.00 | 00-00-00 | 00-00-00 | 00-00-00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 25 | 1-30- 0 | 3819.72 | 0.01 | 12.50 | 0-11-15 | 0- 3-45 | 0- 7-30 | 8.33 | 16.67 | 25.00 | 25.00 | 0.03 |
| 50 | 3- 0- 0 | 1909.86 | 0.05 | 25.00 | 0-45- 0 | 0-15- 0 | 0-30- 0 | 16.67 | 33.33 | 50.00 | 50.00 | 0.22 |
| 75 | 4-30- 0 | 1273.24 | 0.18 | 37.50 | 1-41-15 | 0-33-45 | 1- 7-30 | 25.00 | 50.00 | 75.00 | 74.99 | 0.74 |
| 100 | 6- 0- 0 | 954.93 | 0.44 | 50.00 | 3- 0- 0 | 1- 0- 0 | 2- 0- 0 | 33.34 | 66.68 | 99.99 | 99.97 | 1.75 |
| 125 | 7-30- 0 | 763.94 | 0.85 | 62.49 | 4-41-15 | 1-33-45 | 3- 7-30 | 41.70 | 83.36 | 124.96 | 124.92 | 3.41 |
| 150 | 9- 0- 0 | 636.62 | 1.47 | 74.97 | 6-45- 0 | 2-15- 0 | 4-30- 0 | 50.07 | 100.07 | 149.91 | 149.79 | 5.89 |

GENERAL NOTES

For definitions of spiral values and their applicable formulae, see Std. D-55.10.

For deflection angle formulae for an instrument set-up at a point on spiral, see Std. D-55.10.

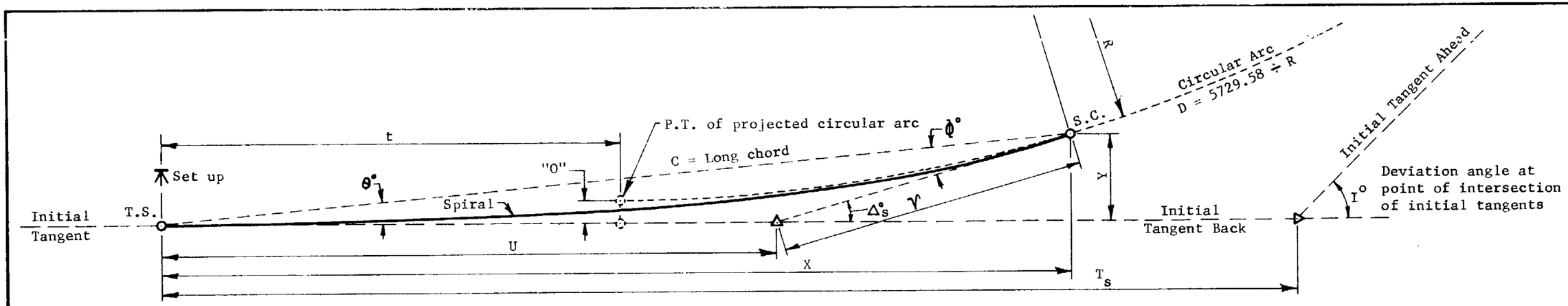
For partial transition spiral formulae, see Std. D-55.20.

For spiral transition between compound curves, see Std. D-55.30.

For curvature, superelevation and superelevation transition standards, see Std. D-6.04, D-6.05 and D-6.06.

For superelevation distribution, see Std. D-6.07.

| DESIGN APPROVED | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD PLANS | REV. DATE 4/78 |
|---|---|---|
| APPROVED FOR DISTRIBUTION | TRANSITION SPIRAL TABLE FOR a=6 | PLAN NO. D-57.67 |




| $L_s$ | D | R | "O" | t | $\Delta_s°$ | θ° | Φ° | ν | U | C | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00-00-00 | C0.00 | 0.00 | 0.0C | 00-00-00 | 00-00-00 | 00-00-00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 10 | 0-37-30 | 9167.32 | 0.00 | 5.00 | 0- 1-52 | 0- 0-38 | 0- 1-15 | 3.33 | 6.67 | 10.00 | 10.00 | 0.00 |
| 20 | 1-15- 0 | 4583.66 | 0.00 | 10.0C | 0- 7-30 | 0- 2-30 | 0- 5- 0 | 6.67 | 13.33 | 2C.00 | 20.00 | 0.01 |
| 30 | 1-52-30 | 3C55.77 | 0.01 | 15.CC | 0-16-52 | 0- 5-38 | 0-11-15 | 10.00 | 20.00 | 30.00 | 30.00 | 0.05 |
| 40 | 2-30- 0 | 2291.83 | 0.03 | 20.0C | 0-30- 0 | 0-10- 0 | 0-20- 0 | 13.33 | 26.67 | 40.00 | 40.00 | 0.12 |
| 50 | 3- 7-30 | 1833.46 | 0.06 | 25.0C | 0-46-53 | 0-15-38 | 0-31-15 | 16.67 | 33.33 | 5C.00 | 50.00 | 0.23 |
| 60 | 3-45- 0 | 1527.89 | 0.10 | 30.CC | 1- 7-30 | 0-22-30 | 0-45- 0 | 20.00 | 40.00 | 60.00 | 60.00 | 0.39 |
| 7C | 4-22-30 | 1309.62 | 0.16 | 35.0C | 1-31-52 | 0-30-38 | 1- 1-15 | 23.34 | 46.67 | 70.00 | 69.99 | 0.62 |
| 80 | 5- 0- 0 | 1145.92 | 0.23 | 40.0C | 2- 0- 0 | 0-40- 0 | 1-20- 0 | 26.67 | 53.34 | 8C.00 | 79.99 | 0.93 |
| 90 | 5-37-30 | 1018.59 | 0.33 | 45.C0 | 2-31-52 | 0-50-38 | 1-41-15 | 30.01 | 60.01 | 89.99 | 89.98 | 1.33 |
| 100 | 6-15- 0 | 916.73 | 0.45 | 50.00 | 3- 7-30 | 1- 2-30 | 2- 5- 0 | 33.34 | 66.68 | 99.99 | 99.97 | 1.82 |
| 110 | 6-52-30 | 833.39 | 0.6C | 54.99 | 3-46-52 | 1-15-38 | 2-31-15 | 36.68 | 73.35 | 109.98 | 109.95 | 2.42 |
| 120 | 7-30- 0 | 763.94 | 0.79 | 59.99 | 4-30- 0 | 1-30- 0 | 3- 0- 0 | 40.03 | 80.02 | 119.97 | 119.93 | 3.14 |
| 130 | 8- 7-30 | 705.18 | 1.00 | 64.98 | 5-16-52 | 1-45-38 | 3-31-15 | 43.37 | 86.70 | 129.95 | 129.89 | 3.99 |
| 140 | 8-45- 0 | 654.81 | 1.25 | 69.97 | 6- 7-30 | 2- 2-30 | 4- 5- 0 | 46.72 | 93.38 | 139.93 | 139.84 | 4.99 |
| 150 | 9-22-30 | 611.15 | 1.53 | 74.96 | 7- 1-53 | 2-20-38 | 4-41-15 | 50.08 | 100.07 | 149.9C | 149.77 | 6.13 |
| 160 | 10- 0- 0 | 572.96 | 1.86 | 79.95 | 8- 0- 0 | 2-40- 0 | 5-20- 0 | 53.44 | 106.77 | 159.86 | 159.69 | 7.44 |

**GENERAL NOTES**

For definitions of spiral values and their applicable formulae, see Std. D-55.10.

For deflection angle formulae for an instrument set-up at a point on spiral, see Std. D-55.10.

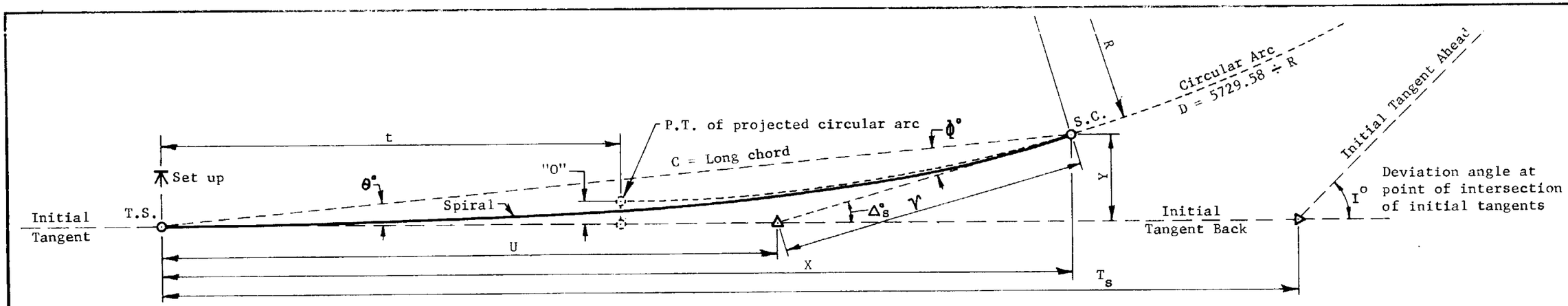
For partial transition spiral formulae, see Std. D-55.20.

For spiral transition between compound curves, see Std. D-55.30.

For curvature, superelevation and superelevation transition standards, see Std. D-6.04, D-6.05 and D-6.06.

For superelevation distribution, see Std. D-6.07.

| DESIGN APPROVED | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD PLANS | REV. DATE 4/78 |
|---|---|---|
| APPROVED FOR DISTRIBUTION | TRANSITION SPIRAL TABLE FOR a=6-1/4 | PLAN NO. D-57.70 |




| $L_s$ | D | R | "O" | t | $\Delta_s°$ | θ° | Φ° | ν | U | C | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00-00-00 | C0.00 | 0.00 | C.CC | 00-00-00 | 00-00-00 | 00-00-00 | 0.00 | 0.00 | C.00 | 0.00 | 0.00 |
| 25 | 1-37-30 | 3525.89 | 0.01 | 12.50 | 0-12-11 | 0- 4- 4 | 0- 8- 7 | 8.33 | 16.67 | 25.00 | 25.00 | 0.03 |
| 50 | 3-15- 0 | 1762.95 | 0.06 | 25.C0 | 0-48-45 | 0-16-15 | 0-32-30 | 16.67 | 33.33 | 5C.00 | 50.00 | 0.24 |
| 75 | 4-52-30 | 1175.30 | 0.2C | 37.50 | 1-49-41 | 0-36-34 | 1-13- 8 | 25.00 | 50.00 | 75.00 | 74.99 | 0.80 |
| 100 | 6-30- 0 | 881.47 | 0.47 | 49.99 | 3-15- 0 | 1- 5- 0 | 2-10- 0 | 33.34 | 66.68 | 99.99 | 99.97 | 1.89 |
| 125 | 8- 7-30 | 705.18 | 0.92 | 62.48 | 5- 4-41 | 1-41-34 | 3-23- 7 | 41.70 | 83.36 | 124.96 | 124.90 | 3.69 |
| 150 | 9-45- 0 | 587.65 | 1.59 | 74.96 | 7-18-45 | 2-26-15 | 4-52-30 | 50.08 | 100.08 | 149.89 | 149.76 | 6.37 |
| 175 | 11-22-30 | 5C3.70 | 2.53 | 87.41 | 9-57-11 | 3-19- 4 | 6-38- 7 | 58.52 | 116.84 | 174.76 | 174.47 | 10.11 |
| 200 | 13- 0- 0 | 440.74 | 3.78 | 99.83 | 13- 0- 0 | 4-20- 0 | 8-40- 0 | 67.02 | 133.66 | 199.54 | 198.97 | 15.08 |

GENERAL NOTES

For definitions of spiral values and their applicable formulae, see Std. D-55.10.

For deflection angle formulae for an instrument set-up at a point on spiral, see Std. D-55.10.

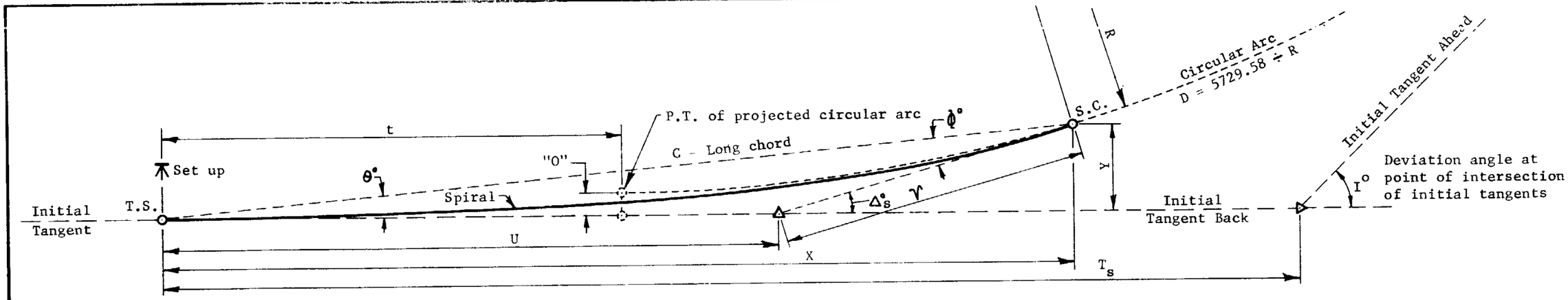
For partial transition spiral formulae, see Std. D-55.20.

For spiral transition between compound curves, see Std. D-55.30.

For curvature, superelevation and superelevation transition standards, see Std. D-6.04, D-6.05 and D-6.06.

For superelevation distribution, see Std. D-6.07.

| DESIGN APPROVED | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD PLANS | REV. DATE 4/78 |
|---|---|---|
| APPROVED FOR DISTRIBUTION | TRANSITION SPIRAL TABLE FOR a=6-1/2 | PLAN NO. D-57.72 |




| $L_s$ | D | R | "O" | t | $\Delta_s°$ | θ° | φ° | ν | U | C | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00-00-00 | 00.00 | 0.00 | 0.00 | 00-00-00 | 00-00-00 | 00-00-00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 25 | 1-40- 0 | 3437.75 | 0.01 | 12.50 | 0-12-30 | 0- 4-10 | 0- 8-20 | 8.33 | 16.67 | 25.00 | 25.00 | 0.03 |
| 50 | 3-20- 0 | 1718.87 | 0.06 | 25.00 | 0-50- 0 | 0-16-40 | 0-33-20 | 16.67 | 33.33 | 50.00 | 50.00 | 0.24 |
| 75 | 5- 0- 0 | 1145.92 | 0.20 | 37.50 | 1-52-30 | 0-37-30 | 1-15- 0 | 25.00 | 50.00 | 75.00 | 74.99 | 0.82 |
| 100 | 6-40- 0 | 859.44 | 0.48 | 49.99 | 3-20- 0 | 1- 6-40 | 2-13-20 | 33.35 | 66.68 | 99.98 | 99.97 | 1.94 |
| 125 | 8-20- 0 | 687.55 | 0.95 | 62.48 | 5-12-30 | 1-44-10 | 3-28-20 | 41.70 | 83.37 | 124.95 | 124.90 | 3.79 |
| 150 | 10- 0- 0 | 572.96 | 1.64 | 74.96 | 7-30- 0 | 2-30- 0 | 5- 0- 0 | 50.09 | 100.08 | 149.89 | 149.74 | 6.54 |

GENERAL NOTES

For definitions of spiral values and their applicable formulae, see Std. D-55.10.

For deflection angle formulae for an instrument set-up at a point on spiral, see Std. D-55.10.

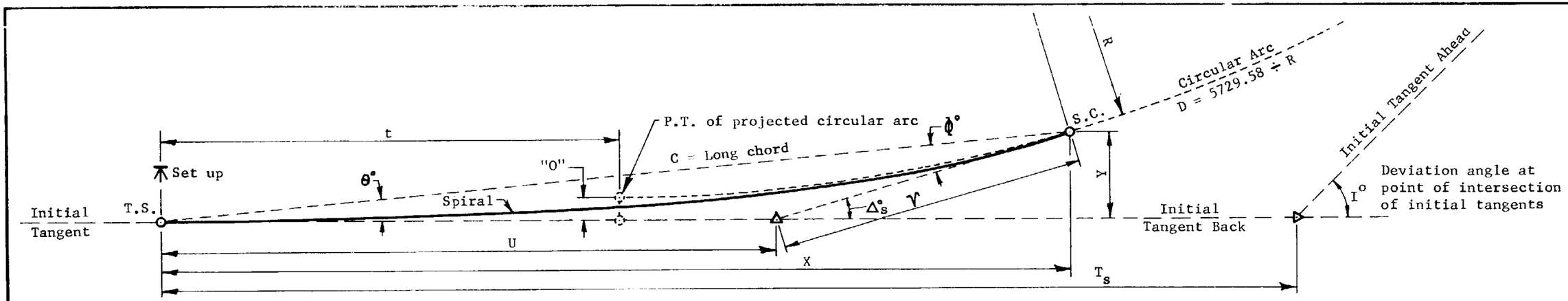
For partial transition spiral formulae, see Std. D-55.20.

For spiral transition between compound curves, see Std. D-55.30.

For curvature, superelevation and superelevation transition standards, see Std. D-6.04, D-6.05 and D-6.06.

For superelevation distribution, see Std. D-6.07.

| | | |
|---|---|---|
| DESIGN APPROVED | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD PLANS | REV DATE 4/78 |
| APPROVED FOR DISTRIBUTION | TRANSITION SPIRAL TABLE FOR a=6-2/3 | PLAN NO. D-57.75 |




| $L_s$ | D | R | "O" | t | $\Delta^\circ_s$ | $\theta^\circ$ | $\Phi^\circ$ | $\nu$ | U | C | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00-00-00 | 00.00 | 0.00 | 0.00 | 00-00-00 | 00-00-00 | 00-00-00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 10 | 0-41-15 | 8333.93 | 0.00 | 5.00 | 0- 2- 4 | 0- 0-41 | 0- 1-22 | 3.33 | 6.67 | 10.00 | 10.00 | 0.00 |
| 20 | 1-22-30 | 4166.97 | 0.00 | 10.00 | 0- 8-15 | 0- 2-45 | 0- 5-30 | 6.67 | 13.33 | 20.00 | 20.00 | 0.02 |
| 30 | 2- 3-45 | 2777.98 | 0.01 | 15.00 | 0-18-34 | 0- 6-11 | 0-12-22 | 10.00 | 20.00 | 30.00 | 30.00 | 0.05 |
| 40 | 2-45- 0 | 2083.48 | 0.03 | 20.00 | 0-33- 0 | 0-11- 0 | 0-22- 0 | 13.33 | 26.67 | 40.00 | 40.00 | 0.13 |
| 50 | 3-26-15 | 1666.79 | 0.06 | 25.00 | 0-51-34 | 0-17-11 | 0-34-22 | 16.67 | 33.33 | 50.00 | 50.00 | 0.25 |
| 60 | 4- 7-30 | 1388.99 | 0.11 | 30.00 | 1-14-15 | 0-24-45 | 0-49-30 | 20.00 | 40.00 | 60.00 | 60.00 | 0.43 |
| 70 | 4-48-45 | 1190.56 | 0.17 | 35.00 | 1-41- 4 | 0-33-41 | 1- 7-22 | 23.34 | 46.67 | 70.00 | 69.99 | 0.69 |
| 80 | 5-30- 0 | 1041.74 | 0.26 | 40.00 | 2-12- 0 | 0-44- 0 | 1-28- 0 | 26.67 | 53.34 | 79.99 | 79.99 | 1.02 |
| 90 | 6-11-15 | 925.99 | 0.36 | 45.00 | 2-47- 4 | 0-55-41 | 1-51-22 | 30.01 | 60.01 | 89.99 | 89.98 | 1.46 |
| 100 | 6-52-30 | 833.39 | 0.50 | 49.99 | 3-26-15 | 1- 8-45 | 2-17-30 | 33.35 | 66.68 | 99.98 | 99.96 | 2.00 |
| 110 | 7-33-45 | 757.63 | 0.67 | 54.99 | 4- 9-34 | 1-23-11 | 2-46-22 | 36.69 | 73.35 | 109.97 | 109.94 | 2.66 |
| 120 | 8-15- 0 | 694.49 | 0.86 | 59.99 | 4-57- 0 | 1-39- 0 | 3-18- 0 | 40.03 | 80.03 | 119.96 | 119.91 | 3.45 |
| 130 | 8-56-15 | 641.07 | 1.10 | 64.98 | 5-48-34 | 1-56-11 | 3-52-22 | 43.38 | 86.71 | 129.94 | 129.87 | 4.39 |
| 140 | 9-37-30 | 595.28 | 1.37 | 69.97 | 6-44-15 | 2-14-45 | 4-29-30 | 46.73 | 93.40 | 139.91 | 139.81 | 5.48 |
| 150 | 10-18-45 | 555.60 | 1.69 | 74.95 | 7-44- 4 | 2-34-41 | 5- 9-23 | 50.09 | 100.09 | 149.88 | 149.73 | 6.74 |
| 160 | 11- 0- 0 | 520.87 | 2.05 | 79.94 | 8-48- 0 | 2-56- 0 | 5-52- 0 | 53.46 | 106.79 | 159.83 | 159.62 | 8.18 |

GENERAL NOTES

For definitions of spiral values and their applicable formulae, see Std. D-55.10.

For deflection angle formulae for an instrument set-up at a point on spiral, see Std. D-55.10.

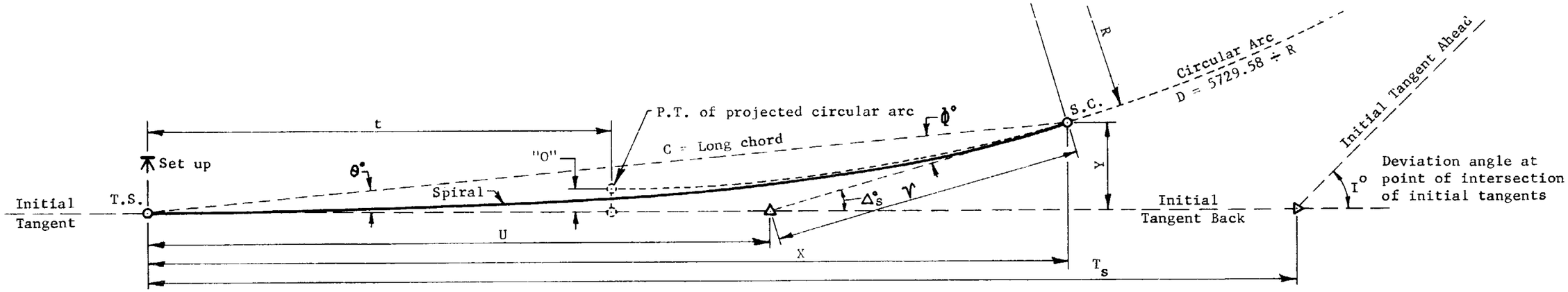
For partial transition spiral formulae, see Std. D-55.20

For spiral transition between compound curves, see Std. D-55.30.

For curvature, superelevation and superelevation transition standards, see Std. D-6.04, D-6.05 and D-6.06.

For superelevation distribution, see Std. D-6.07.

| | | |
|---|---|---|
| DESIGN APPROVED | ARIZONA<br>DEPARTMENT OF TRANSPORTATION<br>HIGHWAYS DIVISION<br>STANDARD PLANS | REV DATE<br>4/78 |
| APPROVED FOR DISTRIBUTION | TRANSITION SPIRAL TABLE<br>FOR a=6-7/8 | PLAN NO.<br>D-57.77 |




| $L_s$ | D | R | "O" | t | $\Delta^\circ_s$ | $\theta^\circ$ | $\Phi^\circ$ | $\nu$ | U | C | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00-00-00 | 00.00 | 0.00 | 0.00 | 00-00-00 | 00-00-00 | 00-00-00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 25 | 1-45- 0 | 3274.04 | 0.01 | 12.50 | 0-13- 8 | 0- 4-23 | 0- 8-45 | 8.33 | 16.67 | 25.00 | 25.00 | 0.03 |
| 50 | 3-30- 0 | 1637.02 | 0.06 | 25.00 | 0-52-30 | 0-17-30 | 0-35- 0 | 16.67 | 33.33 | 50.00 | 50.00 | 0.25 |
| 75 | 5-15- 0 | 1091.35 | 0.21 | 37.50 | 1-58- 8 | 0-39-23 | 1-18-45 | 25.00 | 50.00 | 75.00 | 74.99 | 0.86 |
| 100 | 7- 0- 0 | 818.51 | 0.51 | 49.99 | 3-30- 0 | 1-10- 0 | 2-20- 0 | 33.35 | 66.68 | 99.98 | 99.96 | 2.04 |
| 125 | 8-45- 0 | 654.81 | 0.99 | 62.48 | 5-28- 8 | 1-49-23 | 3-38-45 | 41.71 | 83.37 | 124.95 | 124.89 | 3.97 |
| 150 | 10-30- 0 | 545.67 | 1.72 | 74.95 | 7-52-30 | 2-37-30 | 5-15- 0 | 50.10 | 100.09 | 149.87 | 149.72 | 6.86 |
| 175 | 12-15- 0 | 467.72 | 2.73 | 87.40 | 10-43- 8 | 3-34-23 | 7- 8-45 | 58.55 | 116.86 | 174.73 | 174.39 | 10.89 |
| 200 | 14- 0- 0 | 409.26 | 4.07 | 99.80 | 14- 0- 0 | 4-40- 0 | 9-20- 0 | 67.08 | 133.72 | 199.47 | 198.81 | 16.23 |

GENERAL NOTES

For definitions of spiral values and their applicable formulae, see Std. D-55.10.

For deflection angle formulae for an instrument set-up at a point on spiral, see Std. D-55.10.

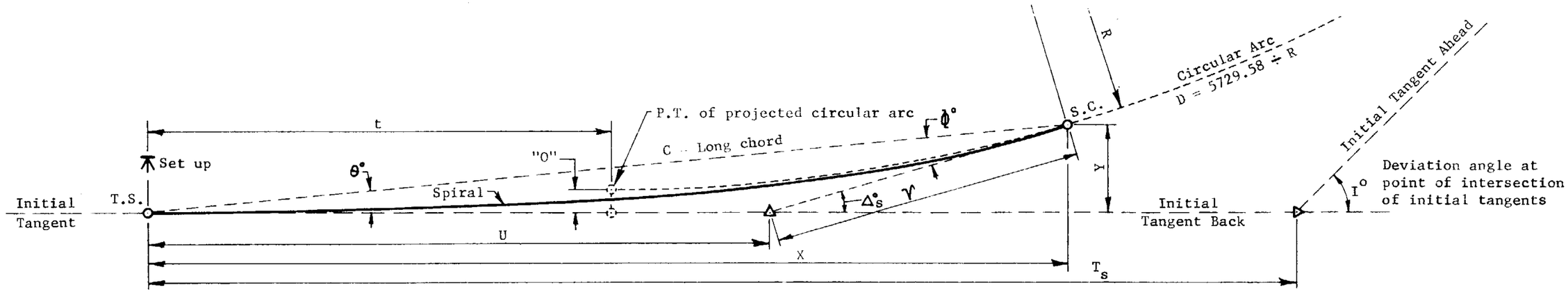
For partial transition spiral formulae, see Std. D-55.20.

For spiral transition between compound curves, see Std. D-55.30.

For curvature, superelevation and superelevation transition standards, see Std. D-6.04, D-6.05 and D-6.06.

For superelevation distribution, see Std. D-6.07.

| DESIGN APPROVED | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD PLANS | REV. DATE 4/78 |
|---|---|---|
| APPROVED FOR DISTRIBUTION | TRANSITION SPIRAL TABLE FOR a=7 | PLAN NO. D-57.80 |




| $L_s$ | D | R | "O" | t | $\Delta^\circ_s$ | $\theta^\circ$ | $\phi^\circ$ | $\nu$ | U | C | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00-00-00 | 00.00 | 0.00 | 0.00 | 00-00-00 | 00-00-00 | 00-00-00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 10 | 0-45- 0 | 7639.44 | 0.00 | 5.00 | 0- 2-15 | 0- 0-45 | 0- 1-30 | 3.33 | 6.67 | 10.00 | 10.00 | 0.00 |
| 20 | 1-30- 0 | 3819.72 | 0.00 | 10.00 | 0- 9- 0 | 0- 3- 0 | 0- 6- 0 | 6.67 | 13.33 | 20.00 | 20.00 | 0.02 |
| 30 | 2-15- 0 | 2546.48 | 0.01 | 15.00 | 0-20-15 | 0- 6-45 | 0-13-30 | 10.00 | 20.00 | 30.00 | 30.00 | 0.06 |
| 40 | 3- 0- 0 | 1909.86 | 0.03 | 20.00 | 0-36- 0 | 0-12- 0 | 0-24- 0 | 13.33 | 26.67 | 40.00 | 40.00 | 0.14 |
| 50 | 3-45- 0 | 1527.89 | 0.07 | 25.00 | 0-56-15 | 0-18-45 | 0-37-30 | 16.67 | 33.33 | 50.00 | 50.00 | 0.27 |
| 60 | 4-30- 0 | 1273.24 | 0.12 | 30.00 | 1-21- 0 | 0-27- 0 | 0-54- 0 | 20.00 | 40.00 | 60.00 | 60.00 | 0.47 |
| 70 | 5-15- 0 | 1091.35 | 0.19 | 35.00 | 1-50-15 | 0-36-45 | 1-13-30 | 23.34 | 46.67 | 70.00 | 69.99 | 0.75 |
| 80 | 6- 0- 0 | 954.93 | 0.28 | 40.00 | 2-24- 0 | 0-48- 0 | 1-36- 0 | 26.67 | 53.34 | 79.99 | 79.99 | 1.12 |
| 90 | 6-45- 0 | 848.83 | 0.40 | 45.00 | 3- 2-15 | 1- 0-45 | 2- 1-30 | 30.01 | 60.01 | 89.99 | 89.97 | 1.59 |
| 100 | 7-30- 0 | 763.94 | 0.55 | 49.99 | 3-45- 0 | 1-15- 0 | 2-30- 0 | 33.35 | 66.68 | 99.98 | 99.96 | 2.18 |
| 110 | 8-15- 0 | 694.49 | 0.73 | 54.99 | 4-32-15 | 1-30-45 | 3- 1-30 | 36.69 | 73.36 | 109.97 | 109.93 | 2.90 |
| 120 | 9- 0- 0 | 636.62 | 0.94 | 59.98 | 5-24- 0 | 1-48- 0 | 3-36- 0 | 40.04 | 80.03 | 119.95 | 119.89 | 3.77 |
| 130 | 9-45- 0 | 587.65 | 1.20 | 64.97 | 6-20-15 | 2- 6-45 | 4-13-30 | 43.39 | 86.72 | 129.93 | 129.84 | 4.79 |
| 140 | 10-30- 0 | 545.67 | 1.50 | 69.96 | 7-21- 0 | 2-27- 0 | 4-54- 0 | 46.75 | 93.41 | 139.90 | 139.77 | 5.98 |
| 150 | 11-15- 0 | 509.30 | 1.84 | 74.95 | 8-26-15 | 2-48-45 | 5-37-30 | 50.11 | 100.10 | 149.85 | 149.67 | 7.35 |
| 160 | 12- 0- 0 | 477.46 | 2.23 | 79.93 | 9-36- 0 | 3-12- 0 | 6-24- 0 | 53.49 | 106.81 | 159.80 | 159.55 | 8.92 |

## GENERAL NOTES

For definitions of spiral values and their applicable formulae, see Std. D-55.10.

For deflection angle formulae for an instrument set-up at a point on spiral, see Std. D-55.10.

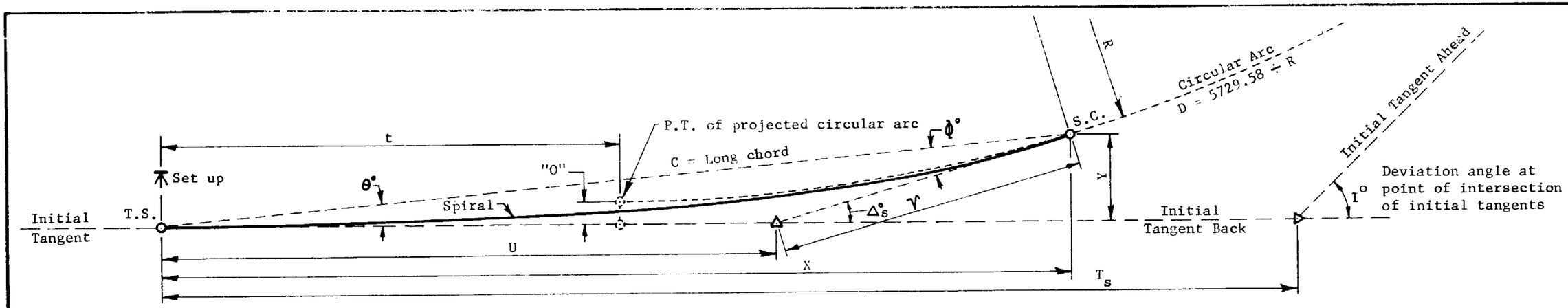
For partial transition spiral formulae, see Std. D-55.20.

For spiral transition between compound curves, see Std. D-55.30.

For curvature, superelevation and superelevation transition standards, see Std. D-6.04, D-6.05 and D-6.06.

For superelevation distribution, see Std. D-6.07.

| | | |
|---|---|---|
| DESIGN APPROVED | ARIZONA<br>DEPARTMENT OF TRANSPORTATION<br>HIGHWAYS DIVISION<br>STANDARD PLANS | REV. DATE<br>4/78 |
| APPROVED FOR DISTRIBUTION | TRANSITION SPIRAL TABLE<br>FOR a=7-1/2 | PLAN NO.<br>D-57.82 |




| $L_s$ | D | R | "O" | t | $\Delta^\circ_s$ | $\theta^\circ$ | $\phi^\circ$ | $\nu$ | U | C | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00-00-00 | 00.00 | 0.00 | 0.00 | 00-00-00 | 00-00-00 | 00-00-00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 25 | 2- 0- 0 | 2864.79 | 0.01 | 12.50 | 0-15- 0 | 0- 5- 0 | 0-10- 0 | 8.33 | 16.67 | 25.00 | 25.00 | 0.04 |
| 50 | 4- 0- 0 | 1432.39 | 0.07 | 25.00 | 1- 0- 0 | 0-20- 0 | 0-40- 0 | 16.67 | 33.33 | 50.00 | 50.00 | 0.29 |
| 75 | 6- 0- 0 | 954.93 | 0.25 | 37.50 | 2-15- 0 | 0-45- 0 | 1-30- 0 | 25.00 | 50.00 | 74.99 | 74.99 | 0.98 |
| 100 | 8- 0- 0 | 716.20 | 0.58 | 49.99 | 4- 0- 0 | 1-20- 0 | 2-40- 0 | 33.35 | 66.68 | 99.98 | 99.95 | 2.33 |
| 125 | 10- 0- 0 | 572.96 | 1.14 | 62.48 | 6-15- 0 | 2- 5- 0 | 4-10- 0 | 41.72 | 83.38 | 124.93 | 124.85 | 4.54 |
| 150 | 12- 0- 0 | 477.46 | 1.96 | 74.94 | 9- 0- 0 | 3- 0- 0 | 6- 0- 0 | 50.13 | 100.12 | 149.83 | 149.63 | 7.84 |
| 175 | 14- 0- 0 | 409.26 | 3.12 | 87.37 | 12-15- 0 | 4- 5- 0 | 8-10- 0 | 58.61 | 116.92 | 174.64 | 174.20 | 12.44 |
| 200 | 16- 0- 0 | 358.10 | 4.65 | 99.74 | 16- 0- 0 | 5-20- 0 | 10-40- 0 | 67.21 | 133.84 | 199.30 | 198.44 | 18.53 |

GENERAL NOTES

For definitions of spiral values and their applicable formulae, see Std. D-55.10.

For deflection angle formulae for an instrument set-up at a point on spiral, see Std. D-55.10.

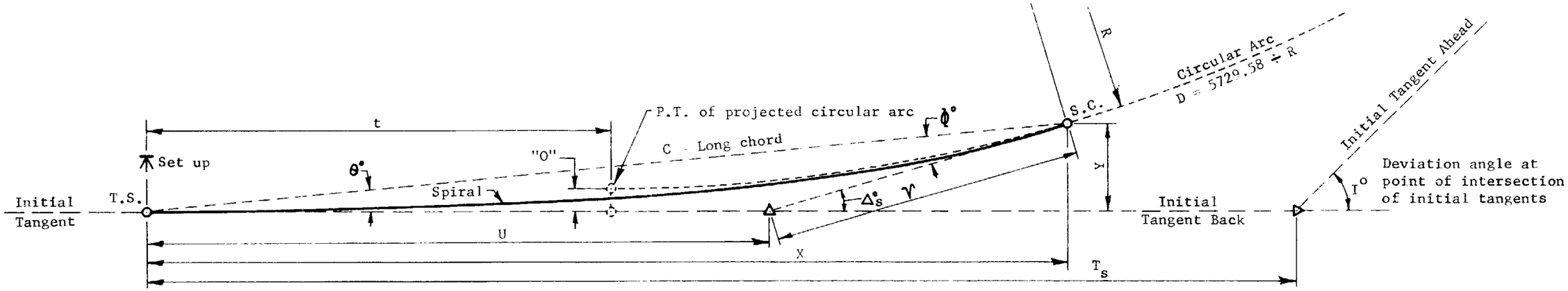
For partial transition spiral formulae, see Std. D-55.20.

For spiral transition between compound curves, see Std. D-55.30.

For curvature, superelevation and superelevation transition standards, see Std. D-6.04, D-6.05 and D-6.06.

For superelevation distribution, see Std. D-6.07.

| DESIGN APPROVED | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD PLANS | REV. DATE 4/78 |
|---|---|---|
| APPROVED FOR DISTRIBUTION | TRANSITION SPIRAL TABLE FOR a=8 | PLAN NO. D-57.85 |




| $L_s$ | D | R | "O" | t | $\Delta^\circ_s$ | $\theta^\circ$ | $\Phi^\circ$ | $\nu$ | U | C | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00-00-00 | 00.00 | 0.00 | 0.00 | 00-00-00 | 00-00-00 | 00-00-00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 10 | 0-48-45 | 7051.79 | 0.00 | 5.00 | 0- 2-26 | 0- 0-49 | 0- 1-37 | 3.33 | 6.67 | 10.00 | 10.00 | 0.00 |
| 20 | 1-37-30 | 3525.89 | 0.00 | 10.00 | 0- 9-45 | 0- 3-15 | 0- 6-30 | 6.67 | 13.33 | 20.00 | 20.00 | 0.02 |
| 30 | 2-26-15 | 2350.60 | 0.02 | 15.00 | 0-21-56 | 0- 7-19 | 0-14-37 | 10.00 | 20.00 | 30.00 | 30.00 | 0.06 |
| 40 | 3-15- 0 | 1762.95 | 0.04 | 20.00 | 0-39- 0 | 0-13- 0 | 0-26- 0 | 13.33 | 26.67 | 40.00 | 40.00 | 0.15 |
| 50 | 4- 3-45 | 1410.36 | 0.07 | 25.00 | 1- 0-56 | 0-20-19 | 0-40-37 | 16.67 | 33.33 | 50.00 | 50.00 | 0.30 |
| 60 | 4-52-30 | 1175.30 | 0.13 | 30.00 | 1-27-45 | 0-29-15 | 0-58-30 | 20.00 | 40.00 | 60.00 | 60.00 | 0.51 |
| 70 | 5-41-15 | 1007.40 | 0.20 | 35.00 | 1-59-26 | 0-39-49 | 1-19-37 | 23.34 | 46.67 | 70.00 | 69.99 | 0.81 |
| 80 | 6-30- 0 | 881.47 | 0.30 | 40.00 | 2-36- 0 | 0-52- 0 | 1-44- 0 | 26.67 | 53.34 | 79.99 | 79.98 | 1.21 |
| 90 | 7-18-45 | 783.53 | 0.43 | 45.00 | 3-17-26 | 1- 5-49 | 2-11-37 | 30.01 | 60.01 | 89.99 | 89.97 | 1.72 |
| 100 | 8- 7-30 | 705.18 | 0.59 | 49.99 | 4- 3-45 | 1-21-15 | 2-42-30 | 33.35 | 66.68 | 99.98 | 99.95 | 2.36 |
| 110 | 8-56-15 | 641.07 | 0.79 | 54.99 | 4-54-56 | 1-38-19 | 3-16-37 | 36.69 | 73.36 | 109.96 | 109.92 | 3.14 |
| 120 | 9-45- 0 | 587.65 | 1.02 | 59.98 | 5-51- 0 | 1-57- 0 | 3-54- 0 | 40.04 | 80.04 | 119.94 | 119.87 | 4.08 |
| 130 | 10-33-45 | 542.45 | 1.30 | 64.97 | 6-51-56 | 2-17-19 | 4-34-37 | 43.40 | 86.73 | 129.92 | 129.81 | 5.19 |
| 140 | 11-22-30 | 503.70 | 1.62 | 69.95 | 7-57-45 | 2-39-15 | 5-18-30 | 46.76 | 93.42 | 139.88 | 139.73 | 6.48 |
| 150 | 12-11-15 | 470.12 | 1.99 | 74.94 | 9- 8-26 | 3- 2-49 | 6- 5-38 | 50.13 | 100.12 | 149.83 | 149.62 | 7.96 |
| 160 | 13- 0- 0 | 440.74 | 2.42 | 79.91 | 10-24- 0 | 3-28- 0 | 6-56- 0 | 53.52 | 106.84 | 159.76 | 159.47 | 9.66 |

GENERAL NOTES

For definitions of spiral values and their applicable formulae, see Std. D-55.10.

For deflection angle formulae for an instrument set-up at a point on spiral, see Std. D-55.10.

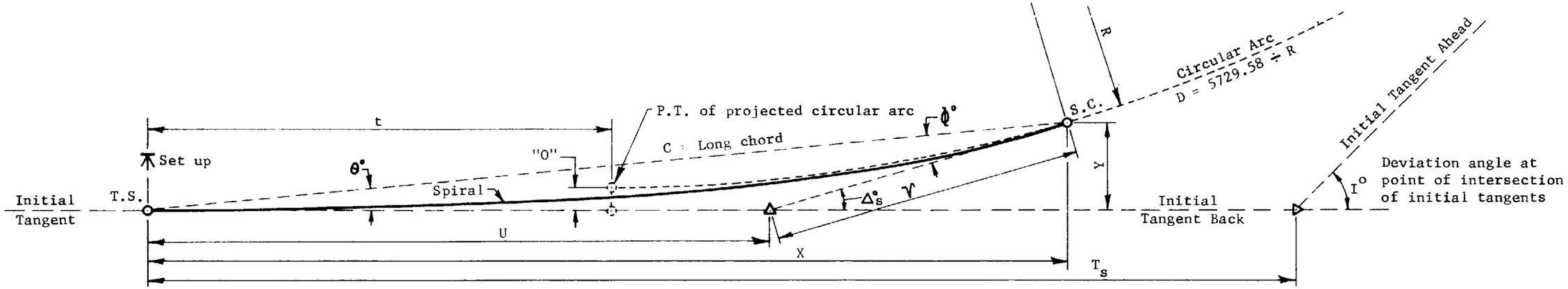
For partial transition spiral formulae, see Std. D-55.20.

For spiral transition between compound curves, see Std. D-55.30.

For curvature, superelevation and superelevation transition standards, see Std. D-6.04, D-6.05 and D-6.06.

For superelevation distribution, see Std. D-6.07.

| DESIGN APPROVED | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD PLANS | REV. DATE 4/78 |
|---|---|---|
| APPROVED FOR DISTRIBUTION | TRANSITION SPIRAL TABLE FOR a=8-1/8 | PLAN NO. D-57.87 |




| $L_s$ | D | R | "O" | t | $\Delta_s°$ | θ° | ϕ° | ν | U | C | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00-00-00 | 00.00 | 0.00 | 0.00 | 00-00-00 | 00-00-00 | 00-00-00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 10 | 0-52-30 | 6548.09 | 0.00 | 5.00 | 0- 2-37 | 0- 0-53 | 0- 1-45 | 3.33 | 6.67 | 10.00 | 10.00 | 0.00 |
| 20 | 1-45- 0 | 3274.04 | 0.01 | 10.00 | 0-10-30 | 0- 3-30 | 0- 7- 0 | 6.67 | 13.33 | 20.00 | 20.00 | 0.02 |
| 30 | 2-37-30 | 2182.70 | 0.02 | 15.00 | 0-23-37 | 0- 7-53 | 0-15-45 | 10.00 | 20.00 | 30.00 | 30.00 | 0.07 |
| 40 | 3-30- 0 | 1637.02 | 0.04 | 20.00 | 0-42- 0 | 0-14- 0 | 0-28- 0 | 13.33 | 26.67 | 40.00 | 40.00 | 0.16 |
| 50 | 4-22-30 | 1309.62 | 0.08 | 25.00 | 1- 5-38 | 0-21-53 | 0-43-45 | 16.67 | 33.33 | 50.00 | 50.00 | 0.32 |
| 60 | 5-15- 0 | 1091.35 | 0.14 | 30.00 | 1-34-30 | 0-31-30 | 1- 3- 0 | 20.00 | 40.00 | 60.00 | 60.00 | 0.55 |
| 70 | 6- 7-30 | 935.44 | 0.22 | 35.00 | 2- 8-37 | 0-42-53 | 1-25-45 | 23.34 | 46.67 | 70.00 | 69.99 | 0.87 |
| 80 | 7- 0- 0 | 818.51 | 0.33 | 40.00 | 2-48- 0 | 0-56- 0 | 1-52- 0 | 26.67 | 53.34 | 79.99 | 79.98 | 1.30 |
| 90 | 7-52-30 | 727.57 | 0.46 | 44.99 | 3-32-37 | 1-10-53 | 2-21-45 | 30.01 | 60.01 | 89.98 | 89.97 | 1.86 |
| 100 | 8-45- 0 | 654.81 | 0.64 | 49.99 | 4-22-30 | 1-27-30 | 2-55- 0 | 33.35 | 66.69 | 99.97 | 99.94 | 2.54 |
| 110 | 9-37-30 | 595.28 | 0.85 | 54.98 | 5-17-37 | 1-45-53 | 3-31-45 | 36.70 | 73.36 | 109.96 | 109.91 | 3.39 |
| 120 | 10-30- 0 | 545.67 | 1.10 | 59.98 | 6-18- 0 | 2- 6- 0 | 4-12- 0 | 40.05 | 80.05 | 119.94 | 119.85 | 4.39 |
| 130 | 11-22-30 | 503.70 | 1.40 | 64.96 | 7-23-37 | 2-27-53 | 4-55-45 | 43.41 | 86.74 | 129.90 | 129.78 | 5.59 |
| 140 | 12-15- 0 | 467.72 | 1.75 | 69.95 | 8-34-30 | 2-51-30 | 5-43- 0 | 46.78 | 93.43 | 139.86 | 139.69 | 6.97 |
| 150 | 13- 7-30 | 436.54 | 2.15 | 74.93 | 9-50-38 | 3-16-53 | 6-33-45 | 50.15 | 100.14 | 149.80 | 149.56 | 8.57 |
| 160 | 14- 0- 0 | 409.26 | 2.61 | 79.90 | 11-12- 0 | 3-44- 0 | 7-28- 0 | 53.55 | 106.86 | 159.73 | 159.39 | 10.40 |

GENERAL NOTES

For definitions of spiral values and their applicable formulae, see Std. D-55.10.

For deflection angle formulae for an instrument set-up at a point on spiral, see Std. D-55.10.

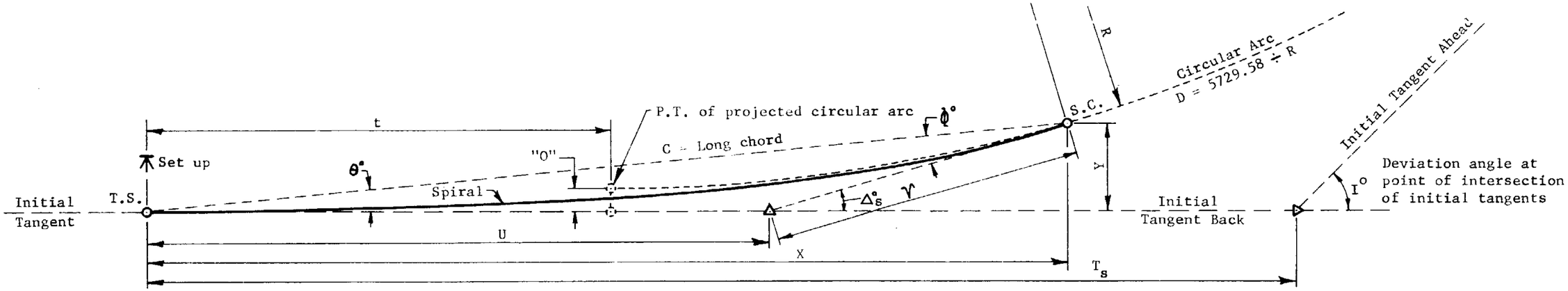
For partial transition spiral formulae, see Std. D-55.20.

For spiral transition between compound curves, see Std. D-55.30.

For curvature, superelevation and superelevation transition standards, see Std. D-6.04, D-6.05 and D-6.06.

For superelevation distribution, see Std. D-6.07.

| DESIGN APPROVED | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD PLANS | REV. DATE 4/78 |
|---|---|---|
| APPROVED FOR DISTRIBUTION | TRANSITION SPIRAL TABLE FOR a=8-3/4 | PLAN NO. D-57.90 |




| $L_s$ | D | R | "O" | t | $\Delta^\circ_s$ | $\theta^\circ$ | $\phi^\circ$ | $\nu$ | U | C | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00-00-00 | 00.00 | 0.00 | 0.00 | 00-00-00 | 00-00-00 | 00-00-00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 25 | 2-15- 0 | 2546.48 | 0.01 | 12.50 | 0-16-53 | 0- 5-38 | 0-11-15 | 8.33 | 16.67 | 25.00 | 25.00 | 0.04 |
| 50 | 4-30- 0 | 1273.24 | 0.08 | 25.00 | 1- 7-30 | 0-22-30 | 0-45- 0 | 16.67 | 33.33 | 50.00 | 50.00 | 0.33 |
| 75 | 6-45- 0 | 848.83 | 0.28 | 37.50 | 2-31-53 | 0-50-38 | 1-41-15 | 25.01 | 50.00 | 74.99 | 74.99 | 1.10 |
| 100 | 9- 0- 0 | 636.62 | 0.65 | 49.99 | 4-30- 0 | 1-30- 0 | 3- 0- 0 | 33.35 | 66.69 | 99.97 | 99.94 | 2.62 |
| 125 | 11-15- 0 | 509.30 | 1.28 | 62.47 | 7- 1-53 | 2-20-38 | 4-41-15 | 41.73 | 83.39 | 124.92 | 124.81 | 5.11 |
| 150 | 13-30- 0 | 424.41 | 2.21 | 74.92 | 10- 7-30 | 3-22-30 | 6-45- 0 | 50.16 | 100.15 | 149.79 | 149.53 | 8.82 |
| 175 | 15-45- 0 | 363.78 | 3.51 | 87.33 | 13-46-53 | 4-35-38 | 9-11-15 | 58.68 | 116.99 | 174.55 | 173.99 | 13.98 |
| 200 | 18- 0- 0 | 318.31 | 5.23 | 99.67 | 18- 0- 0 | 6- 0- 0 | 12- 0- 0 | 67.35 | 133.97 | 199.12 | 198.03 | 20.81 |

**GENERAL NOTES**

For definitions of spiral values and their applicable formulae, see Std. D-55.10.

For deflection angle formulae for an instrument set-up at a point on spiral, see Std. D-55.10.

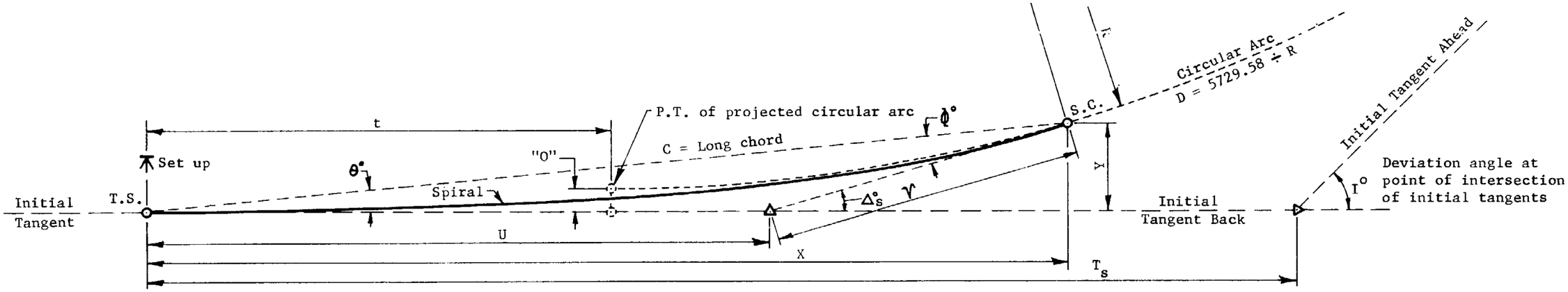
For partial transition spiral formulae, see Std. D-55.20.

For spiral transition between compound curves, see Std. D-55.30.

For curvature, superelevation and superelevation transition standards, see Std. D-6.04, D-6.05 and D-6.06.

For superelevation distribution, see Std. D-6.07.

| DESIGN APPROVED | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD PLANS | REV. DATE 4/78 |
|---|---|---|
| APPROVED FOR DISTRIBUTION | TRANSITION SPIRAL TABLE FOR a=9 | PLAN NO. D-57.92 |




| $L_s$ | D | R | "O" | t | $\Delta^\circ_s$ | $\theta^\circ$ | $\phi^\circ$ | $\nu$ | U | C | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 00-00-00 | INFINITY | 0.00 | 0.00 | 00-00-00 | 00-00-00 | 00-00-00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 10 | 1-00-00 | 5,729.58 | -- | 5.00 | 0-03-00 | 0-01-00 | 0-02-00 | 3.33 | 6.67 | 10.00 | 10.00 | -- |
| 20 | 2-00-00 | 2,864.79 | .01 | 10.00 | 0-12-00 | 0-04-00 | 0-08-00 | 6.67 | 13.33 | 20.00 | 20.00 | .02 |
| 30 | 3-00-00 | 1,909.86 | .02 | 15.00 | 0-27-00 | 0-09-00 | 0-18-00 | 10.00 | 20.00 | 30.00 | 30.00 | .08 |
| 40 | 4-00-00 | 1,432.40 | .05 | 20.00 | 0-48-00 | 0-16-00 | 0-32-00 | 13.33 | 26.67 | 40.00 | 40.00 | .19 |
| 50 | 5-00-00 | 1,145.92 | .09 | 25.00 | 1-15-00 | 0-25-00 | 0-50-00 | 16.67 | 33.33 | 50.00 | 50.00 | .36 |
| 60 | 6-00-00 | 954.93 | .16 | 30.00 | 1-48-00 | 0-36-00 | 1-12-00 | 20.00 | 40.00 | 60.00 | 60.00 | .63 |
| 70 | 7-00-00 | 818.51 | .25 | 35.00 | 2-27-00 | 0-49-00 | 1-38-00 | 23.33 | 46.67 | 69.99 | 69.98 | 1.00 |
| 80 | 8-00-00 | 716.20 | .37 | 40.00 | 3-12-00 | 1-04-00 | 2-08-00 | 26.68 | 53.35 | 79.99 | 79.98 | 1.49 |
| 90 | 9-00-00 | 636.62 | .53 | 45.00 | 4-03-00 | 1-21-00 | 2-42-00 | 30.01 | 60.02 | 89.98 | 89.96 | 2.12 |
| 100 | 10-00-00 | 572.96 | .73 | 49.99 | 5-00-00 | 1-40-00 | 3-20-00 | 33.36 | 66.69 | 99.97 | 99.93 | 2.91 |
| 110 | 11-00-00 | 520.87 | .97 | 54.98 | 6-03-00 | 2-01-00 | 4-02-00 | 36.71 | 73.38 | 109.95 | 109.88 | 3.87 |
| 120 | 12-00-00 | 477.47 | 1.26 | 59.97 | 7-12-00 | 2-24-00 | 4-48-00 | 40.07 | 80.07 | 119.92 | 119.81 | 5.02 |
| 130 | 13-00-00 | 440.74 | 1.60 | 64.95 | 8-27-00 | 2-49-00 | 5-38-00 | 43.43 | 86.75 | 129.87 | 129.71 | 6.38 |
| 140 | 14-00-00 | 409.26 | 1.99 | 69.93 | 9-48-00 | 3-16-00 | 6-32-00 | 46.81 | 93.47 | 139.82 | 139.59 | 7.96 |
| 150 | 15-00-00 | 381.97 | 2.45 | 74.90 | 11-15-00 | 3-45-00 | 7-30-00 | 50.20 | 100.19 | 149.75 | 149.43 | 9.79 |
| 160 | 16-00-00 | 358.10 | 2.97 | 79.87 | 12-48-00 | 4-16-00 | 8-32-00 | 53.61 | 106.92 | 159.64 | 159.20 | 11.88 |
| 170 | 17-00-00 | 337.03 | 3.56 | 84.82 | 14-27-00 | 4-49-00 | 9-38-00 | 57.04 | 113.68 | 169.52 | 168.92 | 14.23 |
| 180 | 18-00-00 | 318.31 | 4.24 | 89.76 | 16-12-00 | 5-24-00 | 10-48-00 | 60.50 | 120.46 | 179.36 | 178.56 | 16.88 |
| 190 | 19-00-00 | 301.56 | 4.99 | 94.68 | 18-03-00 | 6-01-00 | 12-02-00 | 63.99 | 127.27 | 189.16 | 188.12 | 19.83 |
| 200 | 20-00-00 | 286.48 | 5.82 | 99.59 | 20-00-00 | 6-40-00 | 13-20-00 | 67.52 | 134.13 | 198.92 | 197.57 | 23.09 |
| 210 | 21-00-00 | 272.84 | 6.73 | 104.48 | 22-03-00 | 7-21-00 | 14-42-00 | 71.09 | 141.01 | 208.61 | 206.90 | 26.69 |
| 220 | 22-00-00 | 260.44 | 7.74 | 109.35 | 24-12-00 | 8-04-00 | 16-08-00 | 74.71 | 147.94 | 218.25 | 216.09 | 30.63 |
| 230 | 23-00-00 | 249.11 | 8.84 | 114.18 | 26-27-00 | 8-49-00 | 17-38-00 | 78.39 | 154.93 | 227.81 | 225.12 | 34.92 |
| 240 | 24-00-00 | 238.73 | 10.05 | 118.99 | 28-48-00 | 9-36-00 | 19-12-00 | 82.14 | 161.99 | 237.29 | 233.97 | 39.57 |
| 250 | 25-00-00 | 229.18 | 11.35 | 123.76 | 31-15-00 | 10-25-00 | 20-50-00 | 85.98 | 169.11 | 246.68 | 242.61 | 44.60 |
| 260 | 26-00-00 | 220.37 | 12.78 | 128.49 | 33-48-00 | 11-16-00 | 22-32-00 | 89.90 | 176.32 | 255.96 | 251.03 | 50.01 |
| 270 | 27-00-00 | 212.21 | 14.31 | 133.18 | 36-27-00 | 12-09-00 | 24-18-00 | 93.92 | 183.63 | 265.12 | 259.18 | 55.80 |
| 280 | 28-00-00 | 204.63 | 15.96 | 137.81 | 39-12-00 | 13-04-00 | 26-08-00 | 98.21 | 191.05 | 274.15 | 267.05 | 62.07 |

GENERAL NOTES

For definitions of spiral values and their applicable formulae, see Std. D-55.10.

For deflection angle formulae for an instrument set-up at a point on spiral, see Std. D-55.10.

For partial transition spiral formulae, see Std. D-55.20.

For spiral transition between compound curves, see Std. D-55.30.

For curvature, superelevation and superelevation transition standards, see Std. D-6.04, D-6.05 and D-6.06.

For superelevation distribution, see Std. D-6.07.

| DESIGN APPROVED | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD PLANS | REV. DATE 4/78 |
|---|---|---|
| APPROVED FOR DISTRIBUTION | TRANSITION SPIRAL TABLE FOR a=10 | PLAN NO. D-57.95 |