

Flexible Pavement Design, R-Value Method

Ver. 1.2

For Bituminous Pavement With Aggregate Base

Inputs

20 Yr Design Lane BESALs =

2,266,000

Design R-value =

10.0

Project Number

Hoffman Road - Heavy-Duty Pavement

Designer

Alec W. Pietz, P.E.

Date

5/25/2023

GE Values from R-Value Chart

Minimum Bit (GE) = 12.07

Min. Agg. Base (GE) = 6.00

Total Required GE = 36.90



Calculated Pavement Thickness to Meet GE Requirement				
		Thickness (in)	GE	Layer GE
(2360) Wearing Course		4.00	2.25	9.00
(2360) Non-wearing Course		1.36	2.25	3.07
Bituminous Total		5.36	2.25	12.07
		Thickness (in)	GE	Layer GE
Aggregate Base	Class 5, 5Q or 6	6.00	1.00	6.00
Sub Base	Class 3 or 4	12.00	0.75	9.00
Select Granular		19.67	0.50	9.83
	Total	43.03	Total	36.90
	Required*	30.00	Required	36.90

Proposed Pavement Thickness				
New Bituminous		Thickness (in)	GE	Layer GE
Wearing Course	Superpave HMA [2360]	▼ 1.5	2.25	3.38
Non-wearing Course	Superpave HMA [2360]	▼ 4.0	2.25	9.00
New Bituminous Total		5.5		12.38
Left In-place Bituminous *1		Thickness (in)	GE	Layer GE
In-Place Bituminous	Plant Mix HMA [2350(HV & MV)]	▼	2.00	0.00
Condition *2	Good	▼		
	Class	Thickness (in)	GE	Layer GE
Aggregate Layer 1	Aggregate Base (Cl. 5,5Q & 6)	▼ 18.0	1.00	18.00
Aggregate Layer 2	Select Granular	▼ 12.0	0.50	6.00
Aggregate Layer 3	Multiaxial Geogrid *8	▼ 1.0	2.00	2.00
Select Granular			0.50	0.00
Aggregate Total		31.0		26.00
	Total	36.50	Total	38.38
			Required	36.90
Messages				
Total GE: GOOD				
Bituminous Thickness: GOOD				
Total Aggregate Base Thickness: GOOD				

Last Edited 6/5/19

State Aid 10 Ton ESAL Traffic Forecast Calculator

This ESAL calculator is for use with **default Heavy Commercial Traffic values**; click "User Defined Traffic Values" sheet below if you wish to enter your own Heavy Commercial Traffic values.

Instructions: All yellow boxes require an input value.

Dropdown choices are provided for Base Year (C18), Number of Lanes (C19), and Urban or Rural (C21).

You must click on cells C18, C19, and C21 to access the dropdown choices.

General Information

Date

Forecast Performed by

Name of County or City

Project Number

Project Description

Route Number

Base Year (i.e. opening to traffic)

Number of Lanes (total both directions)

Current AADT

Urban or Rural

Historical AADT (enter a minimum of two years)

Enter oldest traffic data here

Enter second oldest traffic data here

Enter third oldest traffic data here

Enter fourth oldest traffic data here

Base Year AADT

20-Year AADT

35-Year AADT

Growth Rate

Hoffman Road - Heavy-Duty Pavement

2024
1 = single lane
9,000
Urban

Year	AADT
2022	9,000
2023	9,000

2024	9,000
2044	9,000
2059	9,000
	0.00%

Vehicle Type	Vehicle Class %	ESAL Factors	
		Flexible	Rigid
2AX-6TIRE SU	1.45%	0.25	0.24
3AX+SU	0.09%	0.58	0.85
3AX TST	0.12%	0.39	0.37
4AX TST	0.24%	0.51	0.53
5AX+TST	1.76%	1.13	1.89
TR TR, BUSES	0.64%	0.57	0.74
TWIN TRAILERS	0.00%	2.40	2.33
Total	4.29%	NA	NA

20-Year Flexible Forecast (10 Ton) =	2,266,000
20-Year Rigid Forecast (10 Ton) =	3,392,000
35-Year Flexible Forecast (10 Ton) =	3,885,000
35-Year Rigid Forecast (10 Ton) =	5,815,000

Note: This ESAL Calculator provides reasonable estimation of ESAL's based on accurate AADT values. It is limited to an AADT value of 20,000. For roadways exceeding an AADT of 20,000, it is recommended to use the MnDOT ESAL Forecasting Tool found on MnDOT's Pavement Design web page at:

<http://www.dot.state.mn.us/materials/pvmtdesign/software.html>