

2.2E Grade Parallam® PSL vs 24F-V4 and V8 DF/DF Glue Laminated Beams

Benefits of specifying 2.2E Parallam PSL beams:

- Higher F_b , F_v , E allowable design stresses
- Zero camber with no structural 'up or down': No potential mis-installation that can happen with glue laminated beams (GLB)
- No additional tension laminations as required for a custom order, fire-rated GLB. See paragraph below
- No need to specify special order V8 layup for continuous or cantilever span applications
- ForteWEB™ software available to design horizontal and vertical holes and for custom ripped depths (stresses are uniform through the section); and for Special Seismic Overstrength design
- 2.2E grade readily available in the Southwest and Northwest regions. For availability of 20" to 24" deep beams, contact Weyerhaeuser

See Table 1 for a comparison of design stresses. See Table 2 for proposed size substitutions.

Table 1 - Design Stress Comparisons

Product	$E_{(true)} \times 10^6$ (psi)	$E_{(Apparent)} \times 10^6$ (psi)	Species	$F_b(Tension)$ (psi)	$F_b(Compression)$ (psi)	$F_{C_{perp}}$ (psi)	F_v (psi)	Density (lbs/ft ³)
2.2E Parallam® PSL	2.2	-	DF	2900		625	290	45
24F-V4 DF/DF GLB	1.9	1.8	DF	2400	1850	650	265	35
24F-V8 DF/DF GLB	1.9	1.8	DF	2400	2400	650	265	35

- Refer to ICC-ES ESR-1387 for Parallam PSL beams and NDS Supplement for Glued Laminated Beams for complete table of values.
- Design stresses based on 12 in. depth. Use manufacturer's depth adjustment factors to F_b when needed.

As with any proposed material substitution, always seek approval from the project owner and their consulting team.

Fire design of exposed Parallam PSL beams may be calculated in accordance with chapter 16 of the National Design Specification (NDS) as stated in Parallam PSL code evaluation report, ICC-ES ESR-1387. Technical Report 10 (TR10) from American Wood Council (AWC) summarizes the results of fire-resistance tests of exposed structural composite lumber beams which demonstrate that a nominal char rate of 1½" per hour, commonly used for sawn lumber and GLB, is appropriate for Parallam PSL. Therefore, the char depth and effective char depths shown in NDS Table 16.2.1A apply to Parallam PSL. Strength adjustment factors shown in NDS Table 16.2.2 also apply. No special order Parallam PSL is required unlike GLB which require additional tension laminations to replace core laminations when a fire-rated beam is needed. Furthermore, Parallam PSL of equivalent sizes to that of sawn lumber may be substituted for sawn lumber in fire resistance rated floor and roof assemblies as specified in Table 721.1(3) of the IBC.

For more information, see our Pacific Coast & Northwest *Beams, Headers, and Columns* Specifier's Guide TJ-9020 and *Fire-Rated Assemblies and Sprinkler Systems* Guide TJ-1500.

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(SW-N137)

Table 2 – GLB to 2.2E Parallam PSL Conversions

GLB 24F V4 or V8 DF		Proposed 2.2E Parallam PSL Depth (Inches)		
Width (Inches)	Depth (Inches)	3.5" wide	5.25" wide	7" wide
3.125	9	9.5	9.5	9.5
3.125	10.5	11.875	9.5	9.5
3.125	12	11.875	11.875	9.5
3.125	13.5	14	11.875	11.875
3.125	15	14	14	11.875
3.125	16.5	16	14	14
3.125	18	18	16	14
3.125	19.5	18	16	16
3.125	21	20	18	16
3.125	22.5	22	20	18
3.125	24	22	20	18
3.5	9	9.5	9.5	9.5
3.5	10.5	11.875	9.5	9.5
3.5	12	11.875	11.875	9.5
3.5	13.5	14	11.875	11.875
3.5	15	16	14	11.875
3.5	16.5	16	14	14
3.5	18	18	16	14
3.5	19.5	20	18	16
3.5	21	20	18	16
3.5	22.5	22	20	18
3.5	24	24	20	20
5.125	9	14	9.5	9.5
5.125	10.5	14	11.875	9.5
5.125	12	18	11.875	11.875
5.125	13.5	20	14	11.875
5.125	15	22	16	14
5.125	16.5	24	16	16
5.125	18	NA	18	16
5.125	19.5	NA	20	18
5.125	21	NA	20	20
5.125	22.5	NA	22	20
5.125	24	NA	24	22
5.5	9	14	9.5	9.5
5.5	10.5	16	11.875	9.5
5.5	12	18	11.875	11.875
5.5	13.5	20	14	11.875
5.5	15	22	16	14
5.5	16.5	24	16	16
5.5	18	NA	18	16
5.5	19.5	NA	20	18
5.5	21	NA	22	20
5.5	22.5	NA	22	20
5.5	24	NA	24	22
6.75	9	16	11.875	9.5
6.75	10.5	20	14	11.875
6.75	12	22	16	11.875
6.75	13.5	24	16	14
6.75	15	NA	18	16
6.75	16.5	NA	20	16
6.75	18	NA	22	18
6.75	19.5	NA	24	20
6.75	21	NA	NA	20
6.75	22.5	NA	NA	22
6.75	24	NA	NA	24
8.75	9	22	14	11.875
8.75	10.5	24	16	14
8.75	12	NA	20	14
8.75	13.5	NA	22	16
8.75	15	NA	24	18
8.75	16.5	NA	NA	20
8.75	18	NA	NA	22
8.75	19.5	NA	NA	24
8.75	21	NA	NA	NA
8.75	22.5	NA	NA	NA
8.75	24	NA	NA	NA

Table General Notes:

- The designer of record shall verify all substitutions. Beam cross section sizes shown were checked for equal or greater moment, shear, & stiffness (EI) only.
- NA - not applicable. Required depth exceeds 24"
- Other Parallam PSL sizes may be possible based on specific application, spans, loads and unique design analysis.
- Simple span beams, dry-service conditions were assumed. Parallam PSL shall be used in dry service conditions only. GLB sizes are based on a span to depth (L/d) ratio of 21. When L/d>21, sizes should be verified by calculations.