

**Appendix 3: Computation of weighting factor for L40 stage based on similarity with L110 stage;  $c_j=1$ ,  $k_{1j}=0.8$ ,  $k_{2j}=1.2$**

Sl. No.	SRIFs	Similarity Class	$w_{ij}$	$ws_j$	Rationale for the Weighting index
<b>Engine Design features</b>					
1	Engine combustion cycles	I	1	0.8	Both engines work with same combustion cycle
2	Engine Start/Shut-off transient hazards	I	1	0.8	The shut off transients are similar, with either command cut off or U- depletion
3	Propellant specific hazards; and Engine derating / uprating;	I	1	0.8	Same propellant used. Both engines operate at same thrust level.
4	Vehicle and Engine Interface & Interface hazards	II	0.8	0.572	Differences related to twin engine configuration
5	Design Method/Philosophy	II	0.8	0.572	Overall engine configuration is same. Stage engineered with twin engine configuration, and double ply throat insert. Design methodology same.
6	Environment (Temp, Load, Pressure, Vibration, shock, acoustic etc.)	I	1	0.8	Environments are likely to be of the same order, as both experience similar lift off environments.
7	Modelling/Analysis Method	I	1	0.8	Similar
8	Margin of safety	I	1	0.8	Minimum margin of safety for structures, pressure ratings, flexible hoses, plumbing are and other engine subsystems are same.
9	Total No. of subsystems	II	0.8	0.572	No. of components are marginally higher.
10	Burn duration	III	0.4	0.051	Engine burn duration is 200 secs as compared to 160 secs of L40.
11	Overall Dimensional similarity of critical components	III	0.4	0.051	Changes due to stage systems being different and twin engine configuration
<b>Materials and Manufacturing</b>					
12	Materials used	I	1	0.8	Identical
13	Material Property Evaluation Method/Approach	I	1	0.8	Identical
14	Manufacturing Method used	II	0.8	0.572	Minor difference
<b>Quality Aspects</b>					
15	Extent of QA coverage	I	1	0.8	Identical
16	Extent of QC coverage	I	1	0.8	Identical

17	No. of qualification tests conducted	I	1	0.8	Comparable
18	Matching of qualification test results with analytical prediction	I	1	0.8	Identical
19	NC management approach	I	1	0.8	Identical
20	No. of major NCs	I	1	0.8	Similar
Sum of values of criticality parameters ( $\sum c_i$ )		Sum of Weighting Score ( $\sum ws_j$ )		Weighting factor wf = $(\sum ws_j) / (\sum c_j)$	
20		13.592		0.68	

Note:  $c_j = 1$ ;  $k_{1j} = 0.8$ , and  $k_{2j} = 1.2$  for all SRIFs

$ws_j$  computed for each SRIF using equation (5)