

**TORQUES with
MIXED GRADE AND
WEIGHT RULES**

Mixed weight and/or mix grade torque determination

Scope of application :

1) Connections

APPLICABLE ONLY FOR

- VAM TOP casing (>4 1/2"),
- NEW VAM (tubing and casing),
- VAM ACE (tubing and casing),
- VAM HWST for mixed grade only
- VAM FJL for mixed grade only

2) Grade and weight differences

Grade difference (KSI)		0	10	20	30
Weight difference (1)					
0					
1					
2					
3					



Cross-over highly recommended



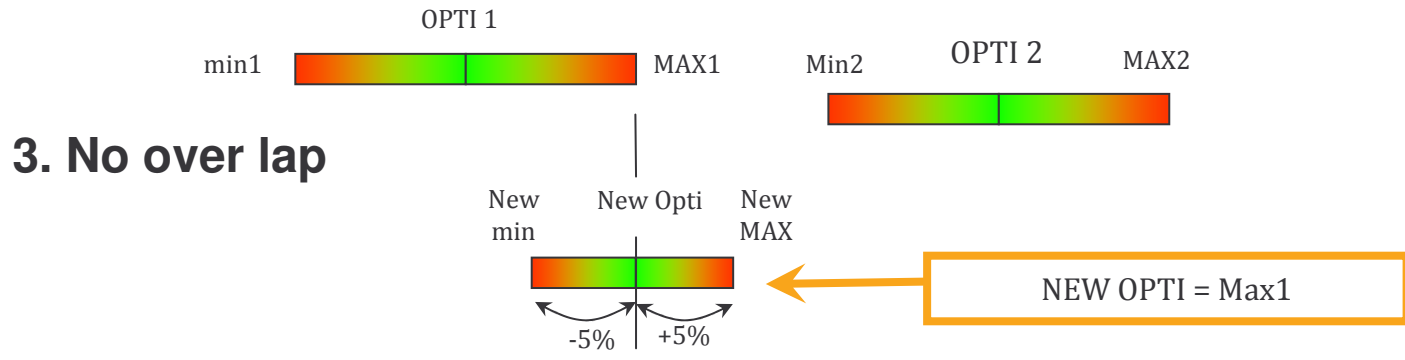
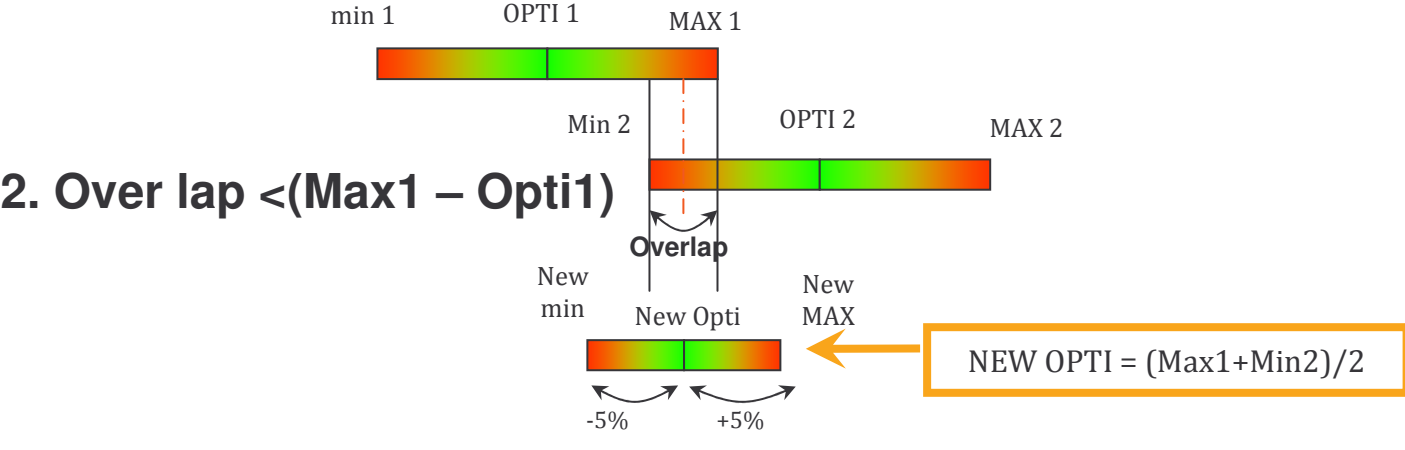
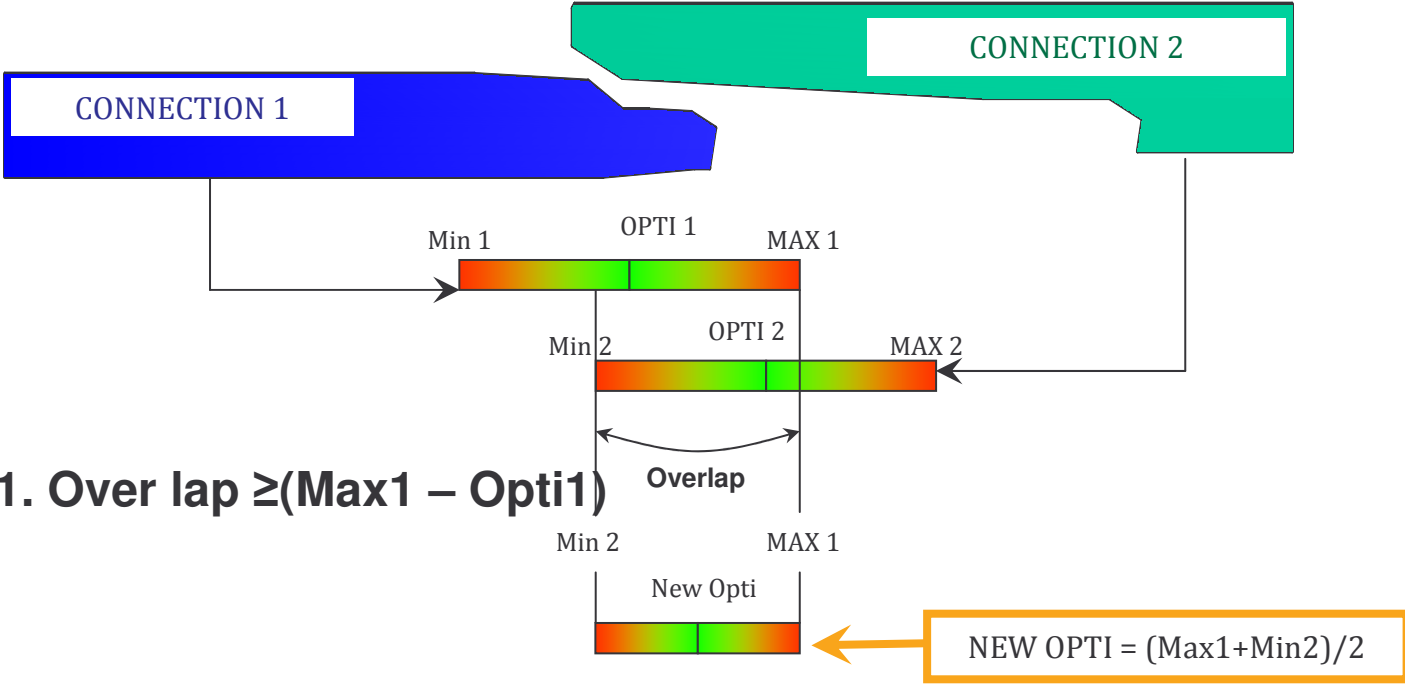
See table 1 for Torque determination

(1) See numerical application on next page

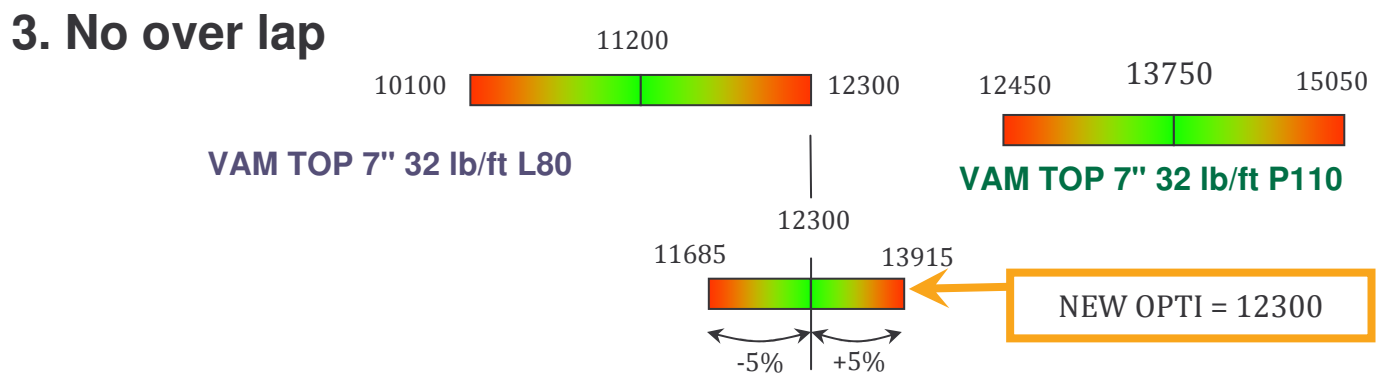
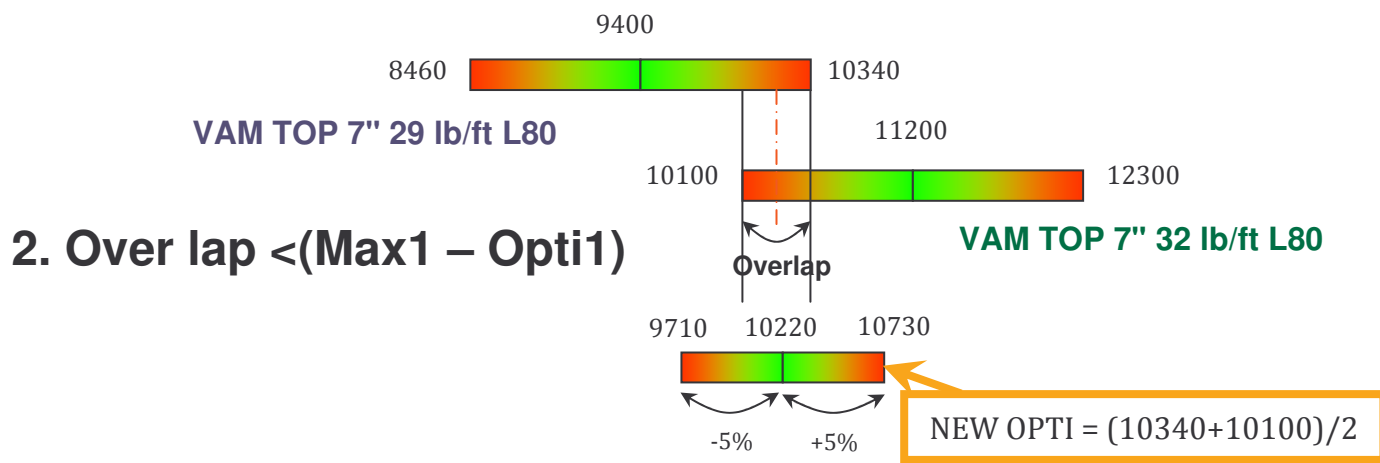
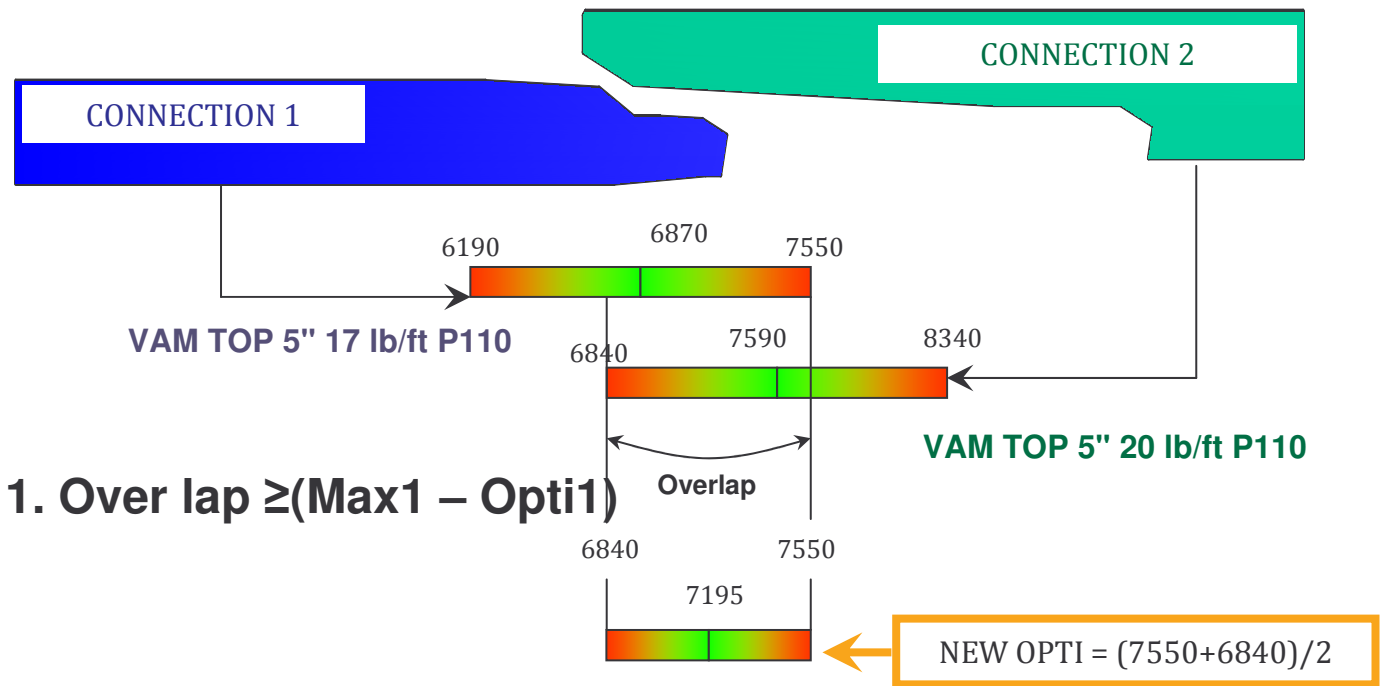
When mixing weights there is a step between D1 and D2

For other configurations a cross over is mandatory (in case of doubt contact VAM Services)

TABLE 1



NUMERICAL APPLICATION



Mixed connection and/or mixed grade ,weight torque determination

Scope of application :

1) Connections

APPLICABLE ONLY FOR

- VAM TOP casing ($\geq 4 \frac{1}{2}$ "),
- VAM TOP HC
- VAM TOP HT

2) Grade and weight differences

Grade difference (KSI) Weight difference (weight range)	0	10	20	30
0	Green	Green	Green	Orange
1	Green	Green	Green	Orange
2	Green	Green	Orange	Orange
3	Orange	Orange	Orange	Orange

 Cross-over highly recommended

 Follow table 1

When mixing weights there is a step between D1 and D2

For other configurations a cross over is mandatory (in case of doubt contact VAM Services)

Informative table

Resulting performances when mixing connection : NOT FOR CALCULATION (1)

PIN BOX	VAM TOP	VAM TOP HC	VAM TOP HT
VAM TOP	T=100% (2) C=60%	T=100% C=60%	T=100% C=60% NO LINER TORQUE
VAM TOP HC	T=100% C=60%	T=100% C=100%	T=100% C=80% NO LINER TORQUE
VAM TOP HT	T=100% C=60% NO LINER TORQUE	T=100% C=80% NO LINER TORQUE	T=100% C=80% LINER TORQUE

(2) In % of the performances of the most critical connection of the assembly

T=tension



Folow table 1 for torque figures (standard rule)

C=compression



Folow table 1 for torque figures using field values for VAM TOP HT(standard rule)



Contact VAM Services for torque figures

(1) For actual performances, contact VAM Services.

NO LINER TORQUE

Size (O.D)	Nominal Weight	Wall Thickness	65 ksi						
			Field			Mill & license			
			Tubing + Liner		Tubing max.	Liner Max.	min.	max.	
in. mm	lb/ft	in. mm	min.	opti.	max.	ft.lb.	N.m.	min.	max.
4 1/2 114.30	10.50	0.224	2220	2460	2700	2700	2750	3020	
		5.69	3000	3330	3660	3700	3750	4100	
	11.60	0.25	2800	3110	3420	3470	3570	3810	
		6.35	3900	4220	4640	4700	4710	5190	
	12.60	0.271	3060	3400	3740	3800	3830	4210	
		6.88	4150	4610	5070	5200	5200	5700	
	13.50	0.290	3450	3830	4210	4400	4410	4850	
		7.37	4700	5200	5700	6000	6000	6600	
	15.10	0.337	4300	4770	5240	5500	5500	6050	
		8.56	5900	6500	7200	7500	7500	8300	
17.00	0.38	5220	5790	6360	6600	6650	7310		
	9.65	7000	7800	8600	9000	9000	9900		
17.70	0.402	5670	6290	6910	7200	7230	7950		
	10.21	7600	8500	9400	9800	9800	10800		

Weight difference example

Size (OD)	Nominal weight	Wall thickness		API Drift Diameter	Spec Drift D
		inch	mm		
7	23.00	0.317	8.05	6.250 A	
177.80	26.00	0.362	9.19	6.151	6.12
	29.00	0.408	10.36	6.059	
	32.00	0.453	11.51	6.000 A	6.00
	35.00	0.498	12.65	5.879	
	38.00	0.540	13.72	5.795	

} 2 weights
 } 1 weight

Guideline to select the grade of a cross-over

