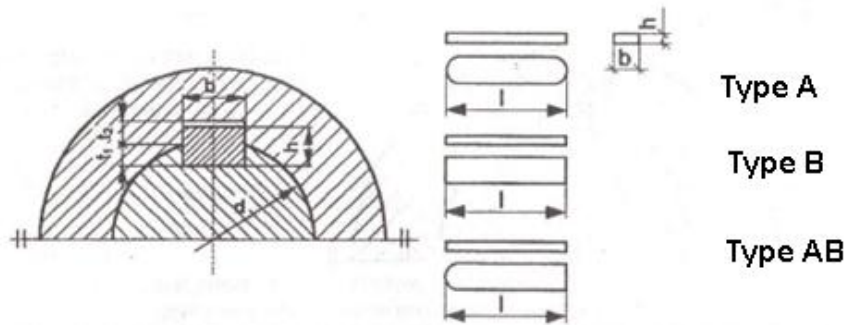Problem:1   Name: Badiane Lamine

Design a key joint for a shaft with a diameter 30 mm if the key is made of S235 steel (k_o=90[MPa], k_t=50[MPa]), and the torque is 190 Nm.

Type A

Type B

Type AB

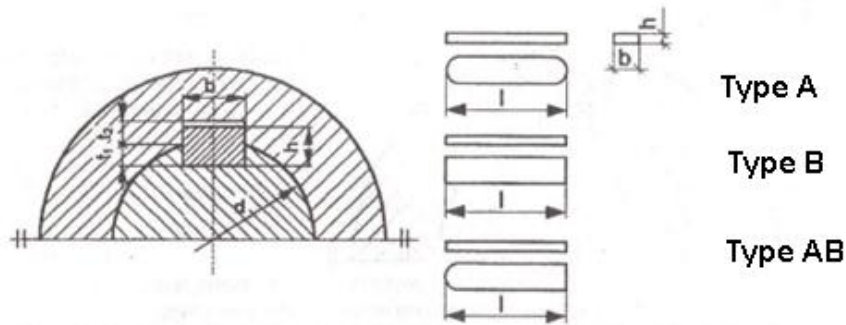| shaft - d [mm]		key	keyway [mm]		length range [mm]	
over	to	$b \times h$ [mm]	t_1	t_2	od	do
6	8	2 x 2	1,2	1,0	6	20
8	10	3 x 3	1,8	1,4	6	36
10	12	4 x 4	2,5	1,8	8	45
12	17	5 x 5	3,0	2,3	10	56
17	22	6 x 6	3,5	2,8	14	70
22	30	8 x 7	4,0	3,3	18	90
30	38	10 x 8	5,0	3,3	22	110
38	44	12 x 8	5,0	3,3	28	140
44	50	14 x 9	5,5	3,8	36	160
50	58	16 x 10	6,0	4,3	45	180
58	65	18 x 11	7,0	4,4	50	200
65	75	20 x 12	7,5	4,9	56	220
75	85	22 x 14	9,0	5,4	63	250
85	95	25 x 14	9,0	5,4	70	280
95	110	28 x 16	10	6,4	80	320
110	130	32 x 18	11	7,4	90	360
130	150	36 x 20	12	8,4	100	400
150	170	40 x 22	13	9,4	100	400
170	200	45 x 25	15	10,4	110	450

standarized lengths: 6 - 22 every 2mm, 25, 28, 32, 36, 40, 45, 50, 56, 63, 70, 80, 90, 100, 110, 125, 140, 160, 180, 200, 220, 250, 280, 320, 360, 400, 500mm

Allowable key lengths

Problem:2   Name: Kamiloğlu Eylül Bahar
Design a key joint for a shaft with a diameter 34 mm if the key is made of S235 steel
(k_o=90[MPa], k_t=50[MPa]), and the torque is 280 Nm.

Type A

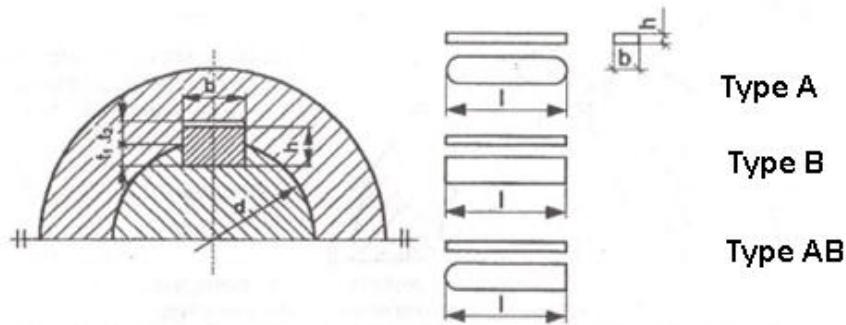Type B

Type AB

shaft - d [mm]		key	keyway [mm]		length range [mm]	
over	to	b x h [mm]	t_1	t_2	od	do
6	8	2 x 2	1,2	1,0	6	20
8	10	3 x 3	1,8	1,4	6	36
10	12	4 x 4	2,5	1,8	8	45
12	17	5 x 5	3,0	2,3	10	56
17	22	6 x 6	3,5	2,8	14	70
22	30	8 x 7	4,0	3,3	18	90
30	38	10 x 8	5,0	3,3	22	110
38	44	12 x 8	5,0	3,3	28	140
44	50	14 x 9	5,5	3,8	36	160
50	58	16 x 10	6,0	4,3	45	180
58	65	18 x 11	7,0	4,4	50	200
65	75	20 x 12	7,5	4,9	56	220
75	85	22 x 14	9,0	5,4	63	250
85	95	25 x 14	9,0	5,4	70	280
95	110	28 x 16	10	6,4	80	320
110	130	32 x 18	11	7,4	90	360
130	150	36 x 20	12	8,4	100	400
150	170	40 x 22	13	9,4	100	400
170	200	45 x 25	15	10,4	110	450

standarized lengths: 6 - 22 every 2mm, 25, 28, 32, 36, 40, 45, 50, 56, 63, 70, 80, 90, 100, 110, 125, 140, 160, 180, 200, 220, 250, 280, 320, 360, 400, 500mm

Allowable key lengths

Problem:3   Name: Mohamed Mohanad Adel Abdelazeem
Design a key joint for a shaft with a diameter 38 mm if the key is made of S275 steel
(k_o=110[MPa], k_t=65[MPa]), and the torque is 450 Nm.

Type A

Type B

Type AB

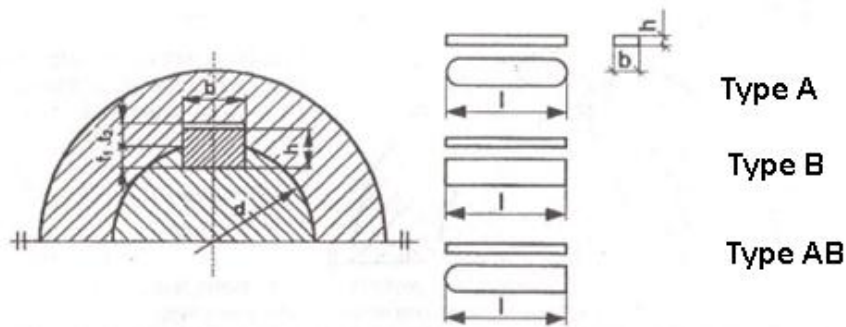| shaft - d [mm]		key	keyway [mm]		length range [mm]	
over	to	b x h [mm]	t_1	t_2	od	do
6	8	2 x 2	1,2	1,0	6	20
8	10	3 x 3	1,8	1,4	6	36
10	12	4 x 4	2,5	1,8	8	45
12	17	5 x 5	3,0	2,3	10	56
17	22	6 x 6	3,5	2,8	14	70
22	30	8 x 7	4,0	3,3	18	90
30	38	10 x 8	5,0	3,3	22	110
38	44	12 x 8	5,0	3,3	28	140
44	50	14 x 9	5,5	3,8	36	160
50	58	16 x 10	6,0	4,3	45	180
58	65	18 x 11	7,0	4,4	50	200
65	75	20 x 12	7,5	4,9	56	220
75	85	22 x 14	9,0	5,4	63	250
85	95	25 x 14	9,0	5,4	70	280
95	110	28 x 16	10	6,4	80	320
110	130	32 x 18	11	7,4	90	360
130	150	36 x 20	12	8,4	100	400
150	170	40 x 22	13	9,4	100	400
170	200	45 x 25	15	10,4	110	450

standarized lengths: 6 - 22 every 2mm, 25, 28, 32, 36, 40, 45, 50, 56, 63, 70, 80,
90, 100, 110, 125, 140, 160, 180, 200, 220, 250, 280, 320, 360, 400, 500mm

Allowable key lengths

Problem:4   Name: Muhala Norman Tawanda

Design a key joint for a shaft with a diameter 28 mm if the key is made of S235 steel (k_o=90[MPa], k_t=50[MPa]), and the torque is 150 Nm.

Type A

Type B

Type AB

shaft - d [mm]		key	keyway [mm]		length range [mm]	
over	to	b x h [mm]	t_1	t_2	od	do
6	8	2 x 2	1,2	1,0	6	20
8	10	3 x 3	1,8	1,4	6	36
10	12	4 x 4	2,5	1,8	8	45
12	17	5 x 5	3,0	2,3	10	56
17	22	6 x 6	3,5	2,8	14	70
22	30	8 x 7	4,0	3,3	18	90
30	38	10 x 8	5,0	3,3	22	110
38	44	12 x 8	5,0	3,3	28	140
44	50	14 x 9	5,5	3,8	36	160
50	58	16 x 10	6,0	4,3	45	180
58	65	18 x 11	7,0	4,4	50	200
65	75	20 x 12	7,5	4,9	56	220
75	85	22 x 14	9,0	5,4	63	250
85	95	25 x 14	9,0	5,4	70	280
95	110	28 x 16	10	6,4	80	320
110	130	32 x 18	11	7,4	90	360
130	150	36 x 20	12	8,4	100	400
150	170	40 x 22	13	9,4	100	400
170	200	45 x 25	15	10,4	110	450

standarized lengths: 6 - 22 every 2mm, 25, 28, 32, 36, 40, 45, 50, 56, 63, 70, 80, 90, 100, 110, 125, 140, 160, 180, 200, 220, 250, 280, 320, 360, 400, 500mm

Allowable key lengths

Problem:5   Name: Naili Amin

Design a key joint for a shaft with a diameter 40 mm if the key is made of S275 steel (k_o=110[MPa], k_t=65[MPa]), and the torque is 450 Nm.
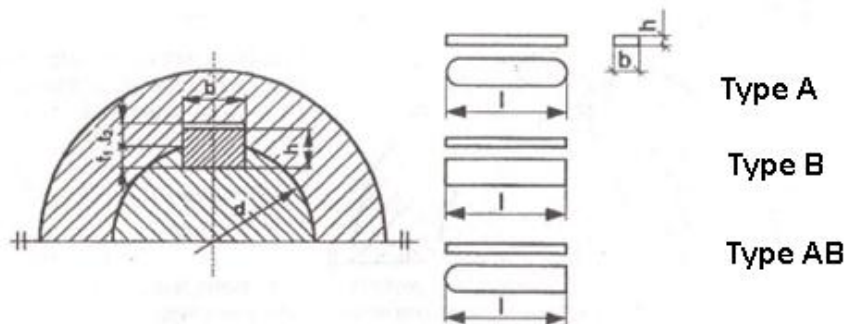

Type A

Type B

Type AB

shaft - d [mm]		key	keyway [mm]		length range [mm]	
over	to	b x h [mm]	t_1	t_2	od	do
6	8	2 x 2	1,2	1,0	6	20
8	10	3 x 3	1,8	1,4	6	36
10	12	4 x 4	2,5	1,8	8	45
12	17	5 x 5	3,0	2,3	10	56
17	22	6 x 6	3,5	2,8	14	70
22	30	8 x 7	4,0	3,3	18	90
30	38	10 x 8	5,0	3,3	22	110
38	44	12 x 8	5,0	3,3	28	140
44	50	14 x 9	5,5	3,8	36	160
50	58	16 x 10	6,0	4,3	45	180
58	65	18 x 11	7,0	4,4	50	200
65	75	20 x 12	7,5	4,9	56	220
75	85	22 x 14	9,0	5,4	63	250
85	95	25 x 14	9,0	5,4	70	280
95	110	28 x 16	10	6,4	80	320
110	130	32 x 18	11	7,4	90	360
130	150	36 x 20	12	8,4	100	400
150	170	40 x 22	13	9,4	100	400
170	200	45 x 25	15	10,4	110	450

standarized lengths: 6 - 22 every 2mm, 25, 28, 32, 36, 40, 45, 50, 56, 63, 70, 80, 90, 100, 110, 125, 140, 160, 180, 200, 220, 250, 280, 320, 360, 400, 500mm

Allowable key lengths

Problem:6   Name: Tawfik Abdulrahman

Design a key joint for a shaft with a diameter 44 mm if the key is made of S235 steel (k_o=90[MPa], k_t=50[MPa]), and the torque is 470 Nm.

Type A

Type B

Type AB

shaft - d [mm]		key	keyway [mm]		length range [mm]	
over	to	b x h [mm]	t_1	t_2	od	do
6	8	2 x 2	1,2	1,0	6	20
8	10	3 x 3	1,8	1,4	6	36
10	12	4 x 4	2,5	1,8	8	45
12	17	5 x 5	3,0	2,3	10	56
17	22	6 x 6	3,5	2,8	14	70
22	30	8 x 7	4,0	3,3	18	90
30	38	10 x 8	5,0	3,3	22	110
38	44	12 x 8	5,0	3,3	28	140
44	50	14 x 9	5,5	3,8	36	160
50	58	16 x 10	6,0	4,3	45	180
58	65	18 x 11	7,0	4,4	50	200
65	75	20 x 12	7,5	4,9	56	220
75	85	22 x 14	9,0	5,4	63	250
85	95	25 x 14	9,0	5,4	70	280
95	110	28 x 16	10	6,4	80	320
110	130	32 x 18	11	7,4	90	360
130	150	36 x 20	12	8,4	100	400
150	170	40 x 22	13	9,4	100	400
170	200	45 x 25	15	10,4	110	450

standarized lengths: 6 - 22 every 2mm, 25, 28, 32, 36, 40, 45, 50, 56, 63, 70, 80, 90, 100, 110, 125, 140, 160, 180, 200, 220, 250, 280, 320, 360, 400, 500mm
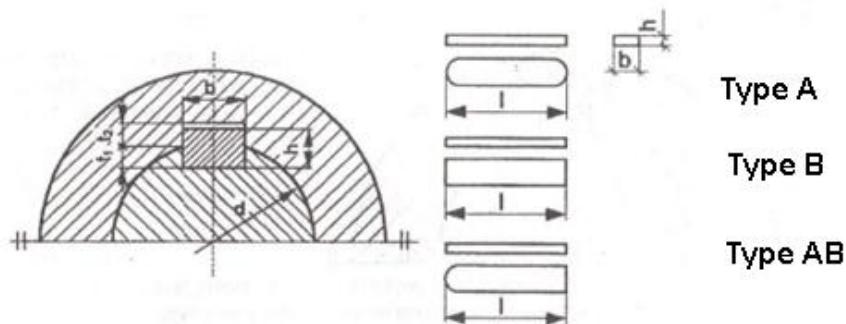
Allowable key lengths

l =	6,	8,	10, 12,	14, 16,	b=2 → 18, 20,	22, 25,	28, 32,
	b=2,3	b=4	b=5	b=6	b=8	b=10	b=12

	b=3	b=4		b=5		b=6		b=8		
l =	36, (40)	45,	50,	56,	63,	70,	80,	90,	100,	
	b=14	b=16	b=18	b=20	b=22	b=25	b=28	b=32	b=36 b=40	

	b=10		b=12	b=14	b=16	b=18	b=20	b=22
l =	110,	125,	140,	160,	180,	200,	220,	250, ...
	b=45	b=50	b=56	b=63	b=70	b=80		

Problem:7   Name: Hachem Boushaba

Design a key joint for a shaft with a diameter 60 mm if the key is made of S275 steel (k_o=110[MPa], k_t=65[MPa]), and the torque is 1120 Nm.

Type A

Type B

Type AB

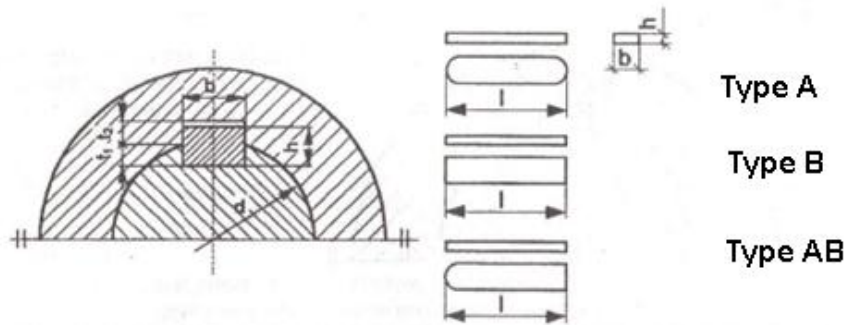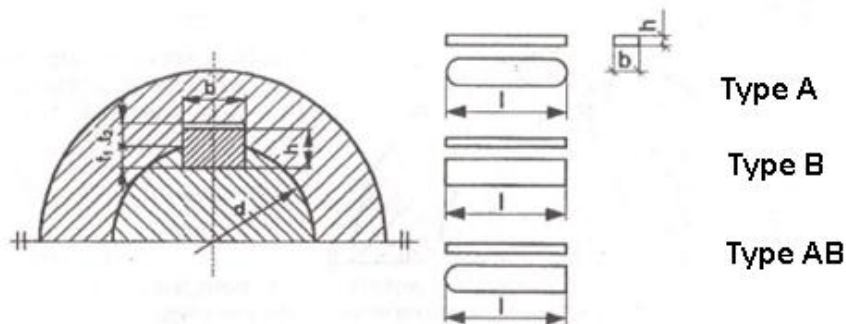| shaft - d [mm]		key	keyway [mm]		length range [mm]	
over	to	b x h [mm]	t_1	t_2	od	do
6	8	2 x 2	1,2	1,0	6	20
8	10	3 x 3	1,8	1,4	6	36
10	12	4 x 4	2,5	1,8	8	45
12	17	5 x 5	3,0	2,3	10	56
17	22	6 x 6	3,5	2,8	14	70
22	30	8 x 7	4,0	3,3	18	90
30	38	10 x 8	5,0	3,3	22	110
38	44	12 x 8	5,0	3,3	28	140
44	50	14 x 9	5,5	3,8	36	160
50	58	16 x 10	6,0	4,3	45	180
58	65	18 x 11	7,0	4,4	50	200
65	75	20 x 12	7,5	4,9	56	220
75	85	22 x 14	9,0	5,4	63	250
85	95	25 x 14	9,0	5,4	70	280
95	110	28 x 16	10	6,4	80	320
110	130	32 x 18	11	7,4	90	360
130	150	36 x 20	12	8,4	100	400
150	170	40 x 22	13	9,4	100	400
170	200	45 x 25	15	10,4	110	450

standarized lengths: 6 - 22 every 2mm, 25, 28, 32, 36, 40, 45, 50, 56, 63, 70, 80, 90, 100, 110, 125, 140, 160, 180, 200, 220, 250, 280, 320, 360, 400, 500mm

Allowable key lengths

Problem:8   Name: Khiter Abdennour

Design a key joint for a shaft with a diameter 50 mm if the key is made of E335 steel (k_o=130[MPa], k_t=90[MPa]), and the torque is 990 Nm.

Type A

Type B

Type AB

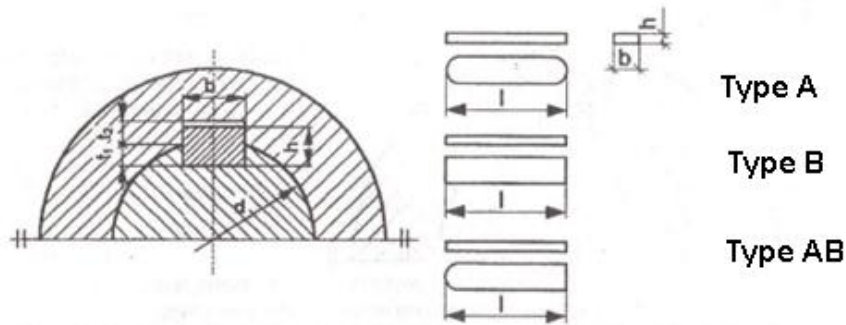| shaft - d [mm]		key	keyway [mm]		length range [mm]	
over	to	b x h [mm]	t_1	t_2	od	do
6	8	2 x 2	1,2	1,0	6	20
8	10	3 x 3	1,8	1,4	6	36
10	12	4 x 4	2,5	1,8	8	45
12	17	5 x 5	3,0	2,3	10	56
17	22	6 x 6	3,5	2,8	14	70
22	30	8 x 7	4,0	3,3	18	90
30	38	10 x 8	5,0	3,3	22	110
38	44	12 x 8	5,0	3,3	28	140
44	50	14 x 9	5,5	3,8	36	160
50	58	16 x 10	6,0	4,3	45	180
58	65	18 x 11	7,0	4,4	50	200
65	75	20 x 12	7,5	4,9	56	220
75	85	22 x 14	9,0	5,4	63	250
85	95	25 x 14	9,0	5,4	70	280
95	110	28 x 16	10	6,4	80	320
110	130	32 x 18	11	7,4	90	360
130	150	36 x 20	12	8,4	100	400
150	170	40 x 22	13	9,4	100	400
170	200	45 x 25	15	10,4	110	450

standarized lengths: 6 - 22 every 2mm, 25, 28, 32, 36, 40, 45, 50, 56, 63, 70, 80, 90, 100, 110, 125, 140, 160, 180, 200, 220, 250, 280, 320, 360, 400, 500mm

Allowable key lengths

Problem:9   Name: Bachir Salah Eddine

Design a key joint for a shaft with a diameter 58 mm if the key is made of E295 steel (k_o=120[MPa], k_t=80[MPa]), and the torque is 1350 Nm.

Type A

Type B

Type AB

shaft - d [mm]		key	keyway [mm]		length range [mm]	
over	to	b x h [mm]	t_1	t_2	od	do
6	8	2 x 2	1,2	1,0	6	20
8	10	3 x 3	1,8	1,4	6	36
10	12	4 x 4	2,5	1,8	8	45
12	17	5 x 5	3,0	2,3	10	56
17	22	6 x 6	3,5	2,8	14	70
22	30	8 x 7	4,0	3,3	18	90
30	38	10 x 8	5,0	3,3	22	110
38	44	12 x 8	5,0	3,3	28	140
44	50	14 x 9	5,5	3,8	36	160
50	58	16 x 10	6,0	4,3	45	180
58	65	18 x 11	7,0	4,4	50	200
65	75	20 x 12	7,5	4,9	56	220
75	85	22 x 14	9,0	5,4	63	250
85	95	25 x 14	9,0	5,4	70	280
95	110	28 x 16	10	6,4	80	320
110	130	32 x 18	11	7,4	90	360
130	150	36 x 20	12	8,4	100	400
150	170	40 x 22	13	9,4	100	400
170	200	45 x 25	15	10,4	110	450

standarized lengths: 6 - 22 every 2mm, 25, 28, 32, 36, 40, 45, 50, 56, 63, 70, 80, 90, 100, 110, 125, 140, 160, 180, 200, 220, 250, 280, 320, 360, 400, 500mm

Allowable key lengths

Problem:10   Name: Salma Rhayate

Design a key joint for a shaft with a diameter 52 mm if the key is made of E295 steel (k_o=120[MPa], k_t=80[MPa]), and the torque is 1020 Nm.

Type A

Type B
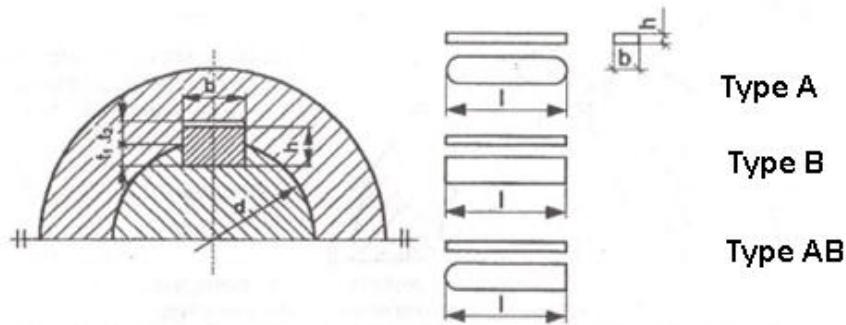
Type AB

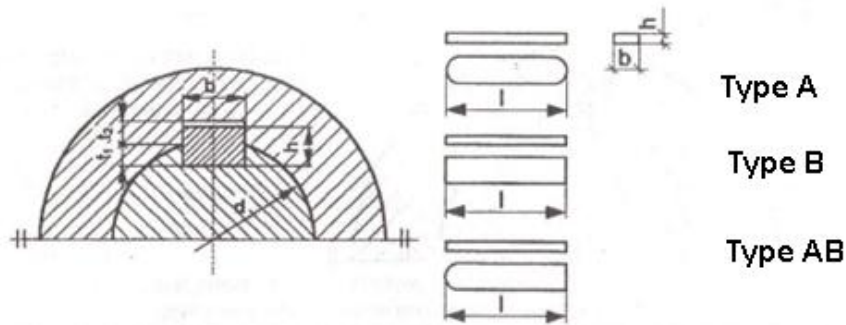| shaft - d [mm]		key	keyway [mm]		length range [mm]	
over	to	$b \times h$ [mm]	t_1	t_2	od	do
6	8	2 x 2	1,2	1,0	6	20
8	10	3 x 3	1,8	1,4	6	36
10	12	4 x 4	2,5	1,8	8	45
12	17	5 x 5	3,0	2,3	10	56
17	22	6 x 6	3,5	2,8	14	70
22	30	8 x 7	4,0	3,3	18	90
30	38	10 x 8	5,0	3,3	22	110
38	44	12 x 8	5,0	3,3	28	140
44	50	14 x 9	5,5	3,8	36	160
50	58	16 x 10	6,0	4,3	45	180
58	65	18 x 11	7,0	4,4	50	200
65	75	20 x 12	7,5	4,9	56	220
75	85	22 x 14	9,0	5,4	63	250
85	95	25 x 14	9,0	5,4	70	280
95	110	28 x 16	10	6,4	80	320
110	130	32 x 18	11	7,4	90	360
130	150	36 x 20	12	8,4	100	400
150	170	40 x 22	13	9,4	100	400
170	200	45 x 25	15	10,4	110	450

standarized lengths: 6 - 22 every 2mm, 25, 28, 32, 36, 40, 45, 50, 56, 63, 70, 80, 90, 100, 110, 125, 140, 160, 180, 200, 220, 250, 280, 320, 360, 400, 500mm

Allowable key lengths

					b =2				
l =	6,	8,	10, 12,	14, 16,	18, 20,	22, 25,	28, 32,		
	b=2, 3	b=4	b=5	b=6	b=8	b=10	b=12		

	b=3	b=4		b=5		b=6		b=8		
l =	36, 40,	45,	50,	56,	63,	70,	80,	90,	100,	
	b=14	b=16	b=18	b=20	b=22	b=25	b=28	b=32	b=36	
									b=40	

	b=10		b=12	b=14	b=16	b=18	b=20	b=22
l =	110,	125,	140,	160,	180,	200,	220,	250, ...
	b=45	b=50	b=56	b=63	b=70	b=80		

Problem:11   Name: Zarat Anis
Design a key joint for a shaft with a diameter 62 mm if the key is made of E295 steel
(k_o=120[MPa], k_t=80[MPa]), and the torque is 1700 Nm.

Type A

Type B

Type AB

shaft - d [mm]		key	keyway [mm]		length range [mm]	
over	to	b x h [mm]	t_1	t_2	od	do
6	8	2 x 2	1,2	1,0	6	20
8	10	3 x 3	1,8	1,4	6	36
10	12	4 x 4	2,5	1,8	8	45
12	17	5 x 5	3,0	2,3	10	56
17	22	6 x 6	3,5	2,8	14	70
22	30	8 x 7	4,0	3,3	18	90
30	38	10 x 8	5,0	3,3	22	110
38	44	12 x 8	5,0	3,3	28	140
44	50	14 x 9	5,5	3,8	36	160
50	58	16 x 10	6,0	4,3	45	180
58	65	18 x 11	7,0	4,4	50	200
65	75	20 x 12	7,5	4,9	56	220
75	85	22 x 14	9,0	5,4	63	250
85	95	25 x 14	9,0	5,4	70	280
95	110	28 x 16	10	6,4	80	320
110	130	32 x 18	11	7,4	90	360
130	150	36 x 20	12	8,4	100	400
150	170	40 x 22	13	9,4	100	400
170	200	45 x 25	15	10,4	110	450

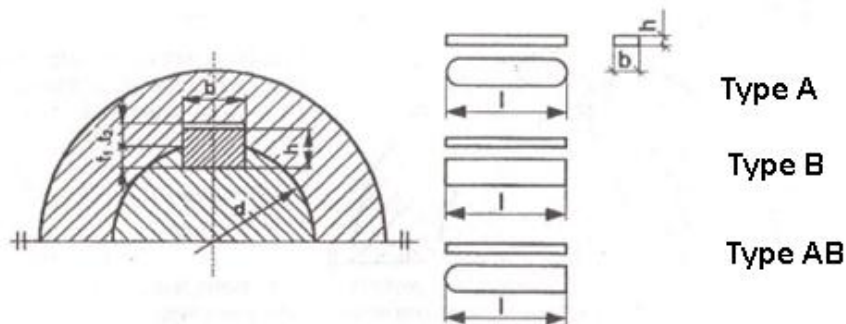standarized lengths: 6 - 22 every 2mm, 25, 28, 32, 36, 40, 45, 50, 56, 63, 70, 80,
90, 100, 110, 125, 140, 160, 180, 200, 220, 250, 280, 320, 360, 400, 500mm

Allowable key lengths

Problem:12   Name: Belaid Yanis

Design a key joint for a shaft with a diameter 85 mm if the key is made of S275 steel (k_o=110[MPa], k_t=65[MPa]), and the torque is 3800 Nm.

Type A

Type B

Type AB

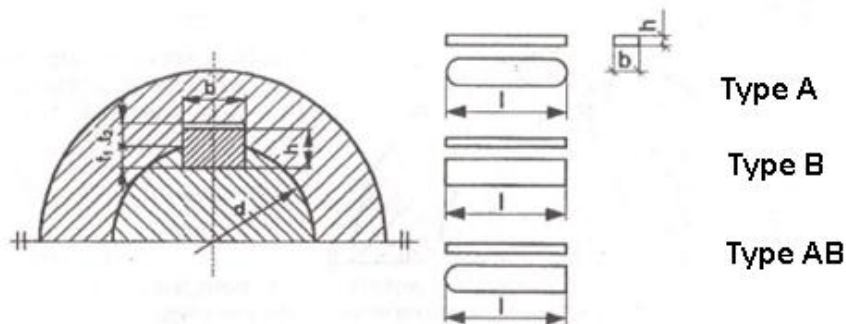| shaft - d [mm]		key	keyway [mm]		length range [mm]	
over	to	b x h [mm]	t_1	t_2	od	do
6	8	2 x 2	1,2	1,0	6	20
8	10	3 x 3	1,8	1,4	6	36
10	12	4 x 4	2,5	1,8	8	45
12	17	5 x 5	3,0	2,3	10	56
17	22	6 x 6	3,5	2,8	14	70
22	30	8 x 7	4,0	3,3	18	90
30	38	10 x 8	5,0	3,3	22	110
38	44	12 x 8	5,0	3,3	28	140
44	50	14 x 9	5,5	3,8	36	160
50	58	16 x 10	6,0	4,3	45	180
58	65	18 x 11	7,0	4,4	50	200
65	75	20 x 12	7,5	4,9	56	220
75	85	22 x 14	9,0	5,4	63	250
85	95	25 x 14	9,0	5,4	70	280
95	110	28 x 16	10	6,4	80	320
110	130	32 x 18	11	7,4	90	360
130	150	36 x 20	12	8,4	100	400
150	170	40 x 22	13	9,4	100	400
170	200	45 x 25	15	10,4	110	450

standarized lengths: 6 - 22 every 2mm, 25, 28, 32, 36, 40, 45, 50, 56, 63, 70, 80, 90, 100, 110, 125, 140, 160, 180, 200, 220, 250, 280, 320, 360, 400, 500mm

Allowable key lengths

Problem:13   Name: Labrach Alaa Lamisse M H

Design a key joint for a shaft with a diameter 20 mm if the key is made of S235 steel (k_o=90[MPa], k_t=50[MPa]), and the torque is 60 Nm.

Type A

Type B

Type AB

shaft - d [mm]		key	keyway [mm]		length range [mm]	
over	to	b x h [mm]	t_1	t_2	od	do
6	8	2 x 2	1,2	1,0	6	20
8	10	3 x 3	1,8	1,4	6	36
10	12	4 x 4	2,5	1,8	8	45
12	17	5 x 5	3,0	2,3	10	56
17	22	6 x 6	3,5	2,8	14	70
22	30	8 x 7	4,0	3,3	18	90
30	38	10 x 8	5,0	3,3	22	110
38	44	12 x 8	5,0	3,3	28	140
44	50	14 x 9	5,5	3,8	36	160
50	58	16 x 10	6,0	4,3	45	180
58	65	18 x 11	7,0	4,4	50	200
65	75	20 x 12	7,5	4,9	56	220
75	85	22 x 14	9,0	5,4	63	250
85	95	25 x 14	9,0	5,4	70	280
95	110	28 x 16	10	6,4	80	320
110	130	32 x 18	11	7,4	90	360
130	150	36 x 20	12	8,4	100	400
150	170	40 x 22	13	9,4	100	400
170	200	45 x 25	15	10,4	110	450

standarized lengths: 6 - 22 every 2mm, 25, 28, 32, 36, 40, 45, 50, 56, 63, 70, 80, 90, 100, 110, 125, 140, 160, 180, 200, 220, 250, 280, 320, 360, 400, 500mm

Allowable key lengths

Problem:14   Name: Kadid Abdelrrahim
Design a key joint for a shaft with a diameter 24 mm if the key is made of S235 steel
(k_o=90[MPa], k_t=50[MPa]), and the torque is 100 Nm.

Type A

Type B

Type AB

shaft - d [mm]		key	keyway [mm]		length range [mm]	
over	to	$b \times h$ [mm]	t_1	t_2	od	do
6	8	2 x 2	1,2	1,0	6	20
8	10	3 x 3	1,8	1,4	6	36
10	12	4 x 4	2,5	1,8	8	45
12	17	5 x 5	3,0	2,3	10	56
17	22	6 x 6	3,5	2,8	14	70
22	30	8 x 7	4,0	3,3	18	90
30	38	10 x 8	5,0	3,3	22	110
38	44	12 x 8	5,0	3,3	28	140
44	50	14 x 9	5,5	3,8	36	160
50	58	16 x 10	6,0	4,3	45	180
58	65	18 x 11	7,0	4,4	50	200
65	75	20 x 12	7,5	4,9	56	220
75	85	22 x 14	9,0	5,4	63	250
85	95	25 x 14	9,0	5,4	70	280
95	110	28 x 16	10	6,4	80	320
110	130	32 x 18	11	7,4	90	360
130	150	36 x 20	12	8,4	100	400
150	170	40 x 22	13	9,4	100	400
170	200	45 x 25	15	10,4	110	450

standarized lengths: 6 - 22 every 2mm, 25, 28, 32, 36, 40, 45, 50, 56, 63, 70, 80,
90, 100, 110, 125, 140, 160, 180, 200, 220, 250, 280, 320, 360, 400, 500mm

Allowable key lengths