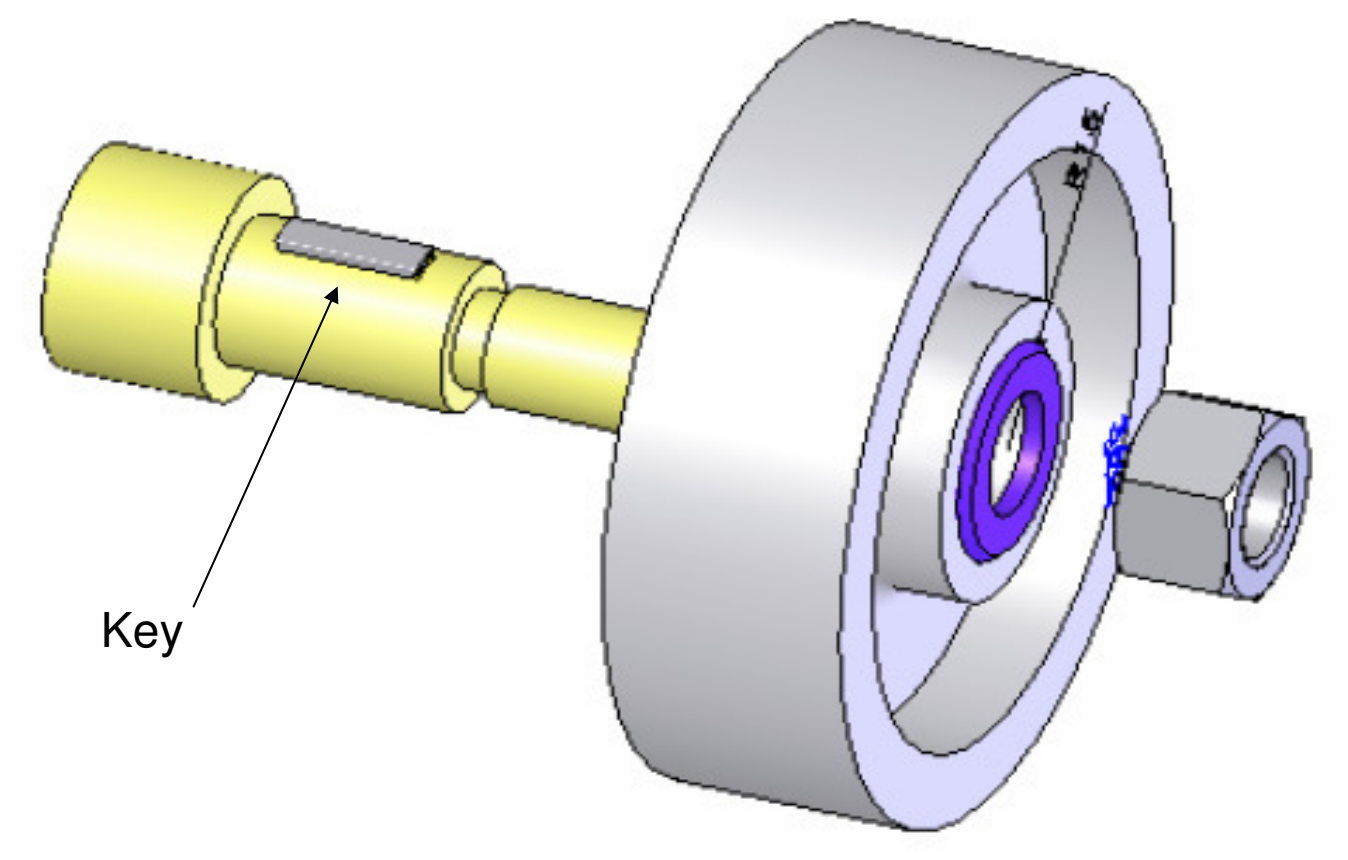
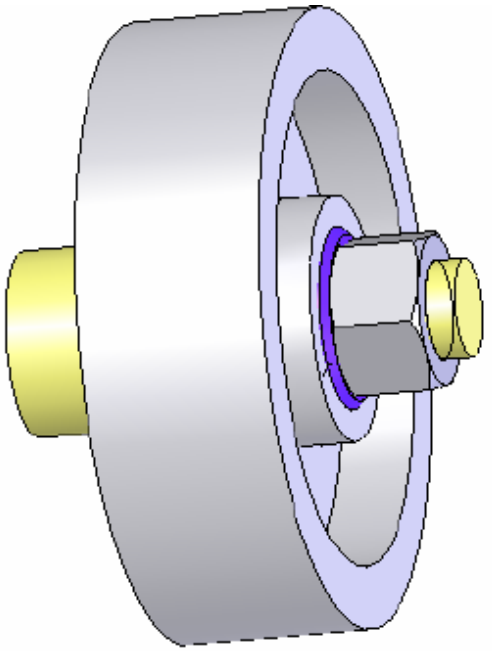
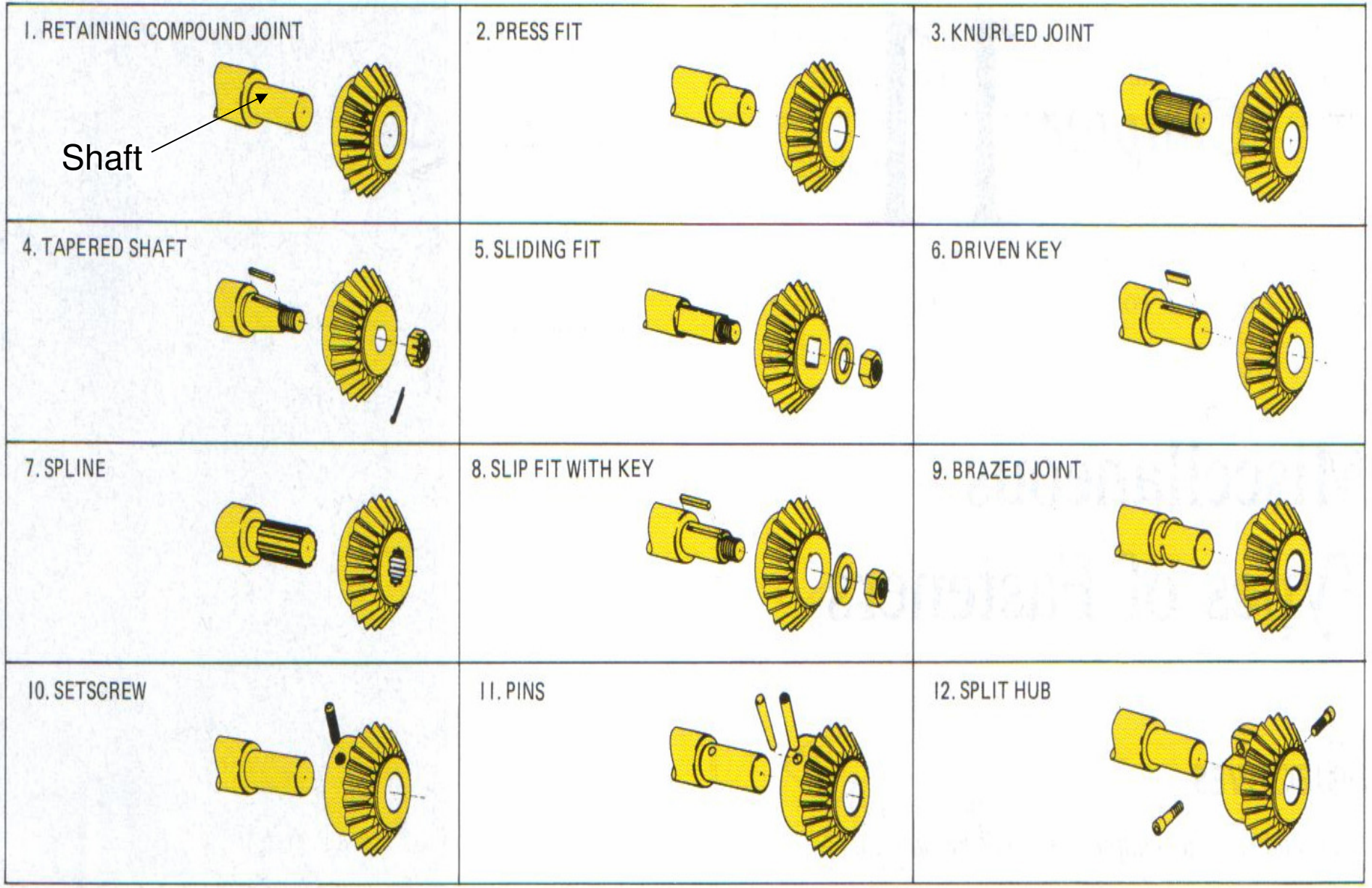
KEYs

KAMAlar





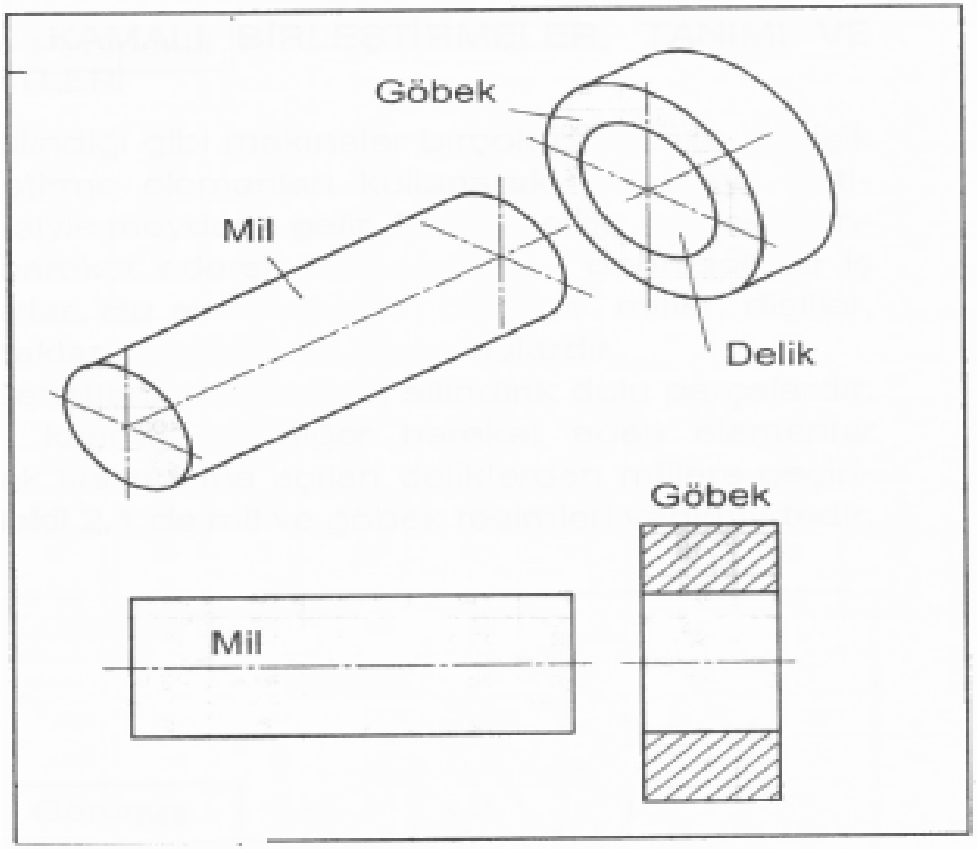


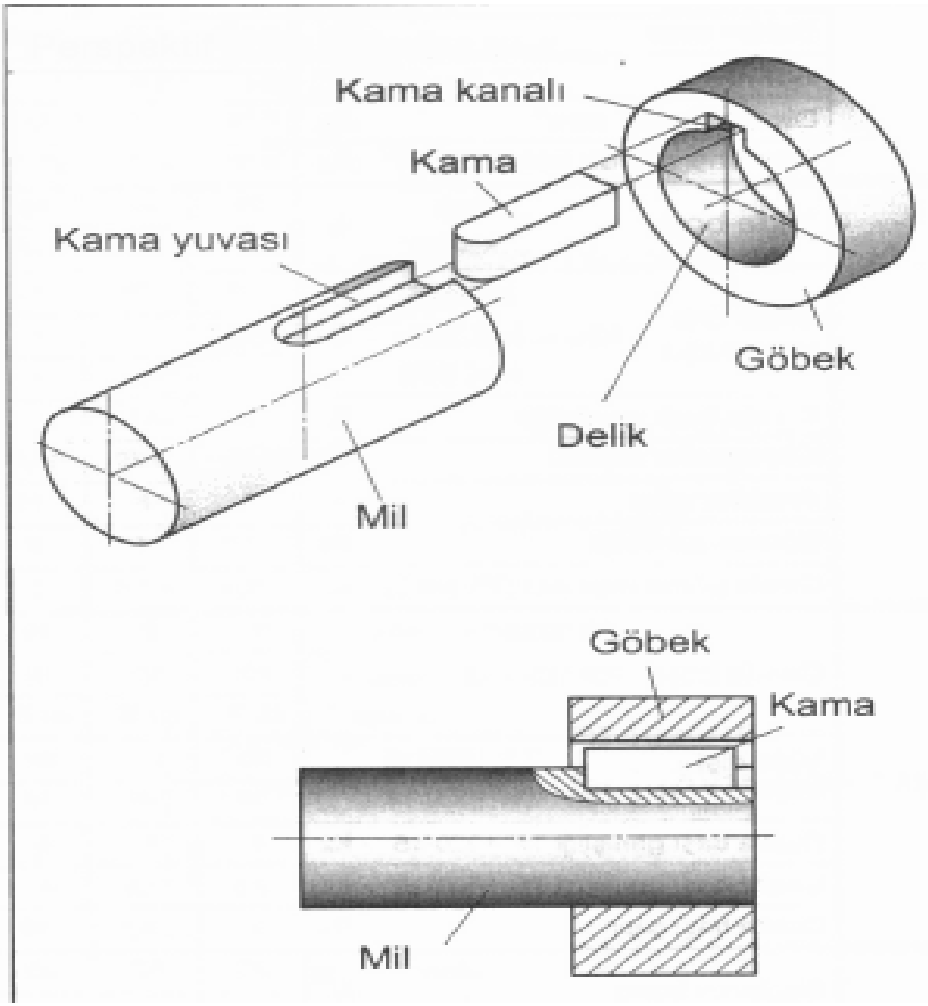
Miscellaneous types of fasteners.

Keys

A **key** is a piece of steel lying partly in a groove in the shaft and extending into another groove in the hub. The groove in the shaft is referred to as a **keyseat**, and the groove in the hub or surrounding part is referred to as a **keyway**

A key is used to secure gears, pulleys, cranks, handles, and similar machine parts to shafts, so that the motion of the part is transmitted to the shaft, or the motion of the shaft to the part, without slippage. The key may also act in a safety capacity; its size can be calculated so that when overloading takes place, the key will shear or break before the part or shaft breaks or deforms.


Göbek
Mil
Delik
Göbek
Mil


Kama kanalı
Kama
Kama yuvası
Göbek
Delik
Mil
Göbek
Kama
Mil

There are many kinds of keys.

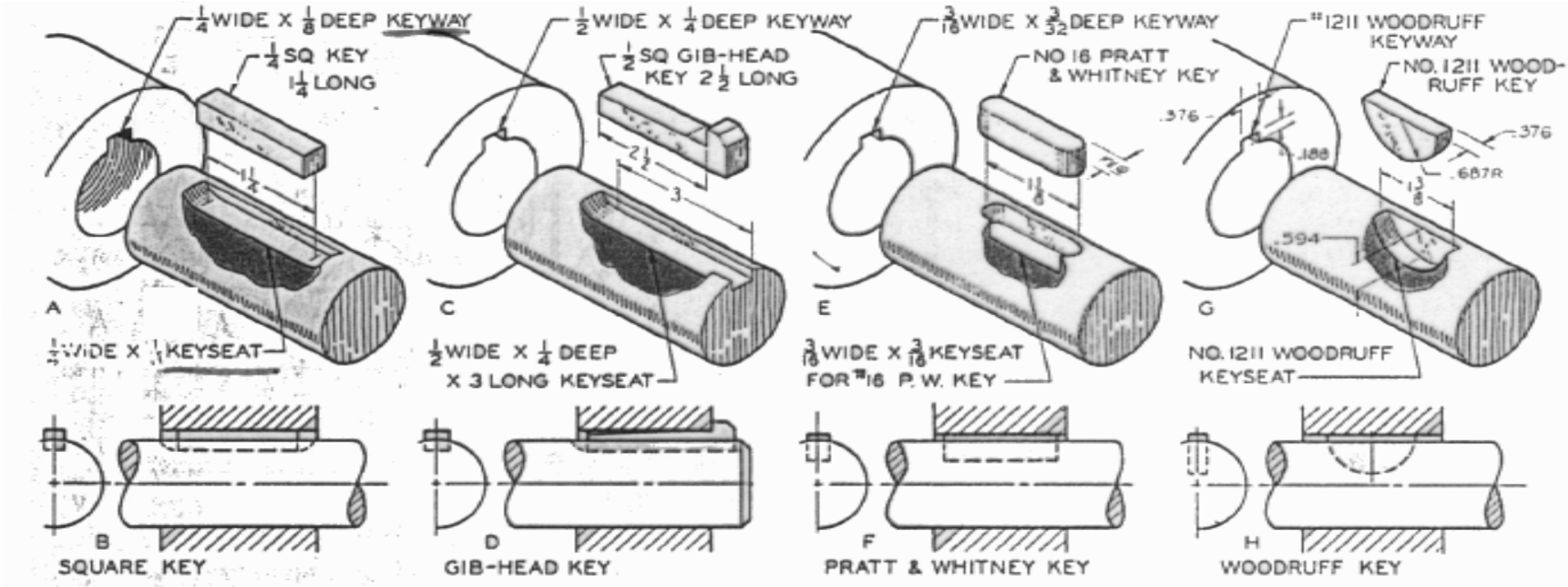
Square and flat keys are widely used in all sorts of mechanical devices. The width of the square and flat key should be approximately one-quarter the shaft diameter,

These keys are also available with a 1:100 taper on their top surfaces and are then known as *square-tapered* or *flat-tapered* keys. The keyway in the hub is tapered to accommodate the taper on the key.

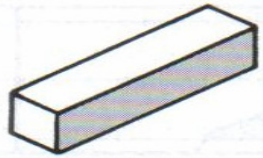
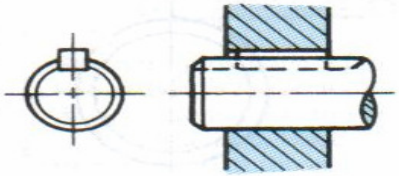
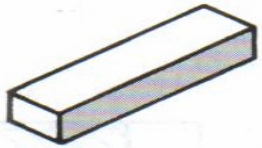
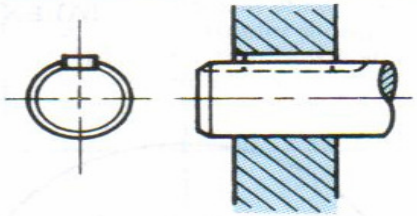
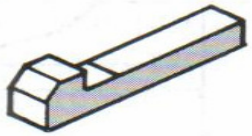
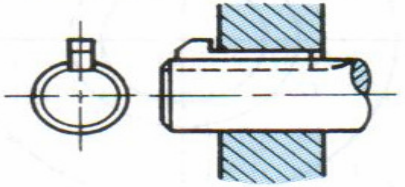
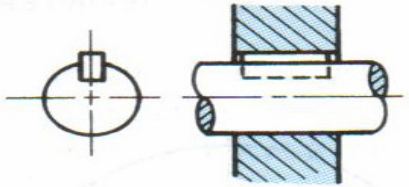
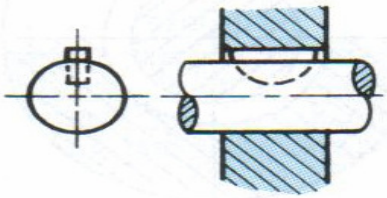
The gib-head key is the same as the square- or flat-tapered key but has a head added for easy removal.

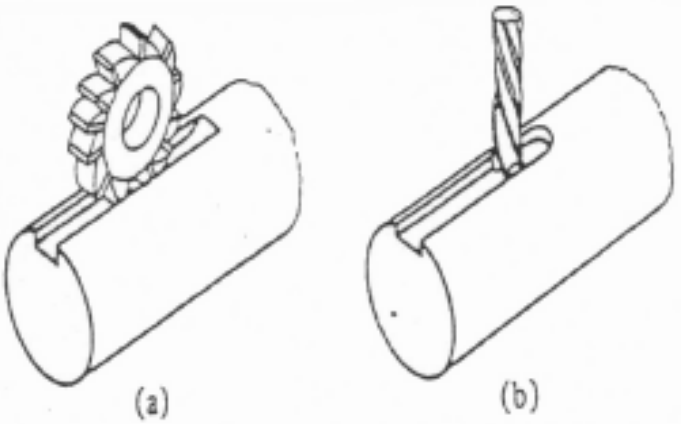
The Pratt and Whitney key is rectangular with rounded ends. Two-thirds of this key sits in the shaft; one-third sits in the hub.

The Woodruff key is semicircular and fits into a semicircular keyseat in the shaft and a rectangular keyway in the hub.

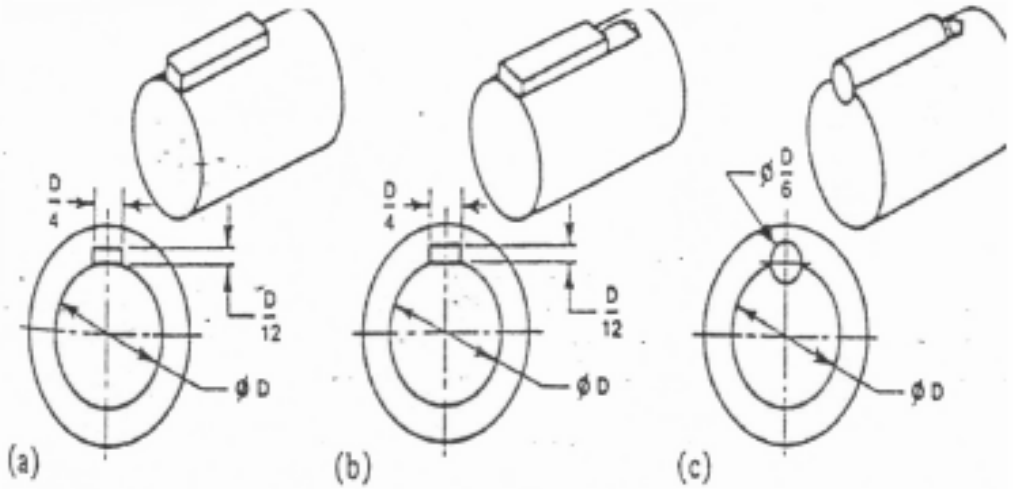


Standard keys used to hold parts on a shaft.

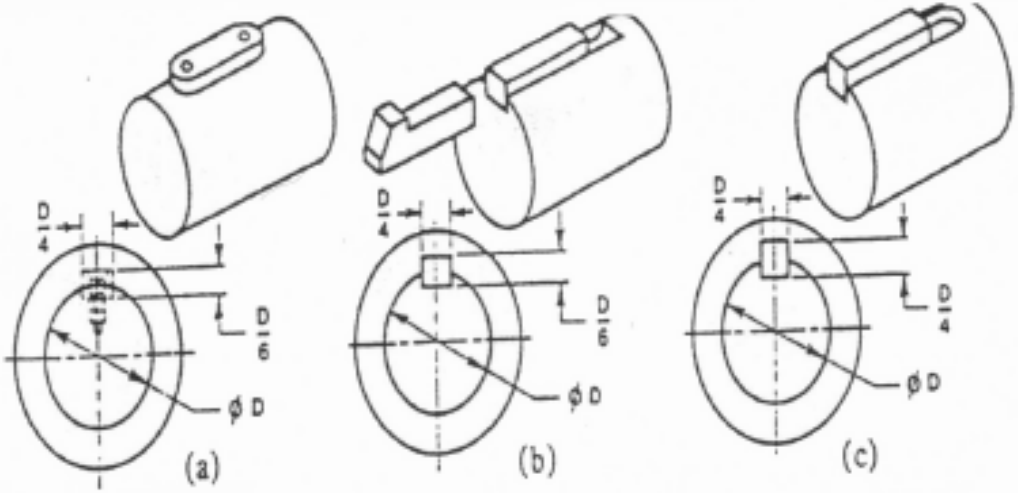
TYPE OF KEY	ASSEMBLY SHOWING KEY, SHAFT, AND HUB
SQUARE  .25 SQUARE KEY, I.25 LG OR .25 SQUARE TAPERED KEY, I.25 LG	
FLAT  .I88 X .I25 FLAT KEY, I.00 LG OR .I88 X .I25 FLAT TAPERED KEY, I.00 LG	
GIB-HEAD  .375 SQUARE GIB-HEAD KEY, 2.00 LG	
 NO. I5 PRATT AND WHITNEY KEY	
 NO. I2I0 WOODRUFF KEY	



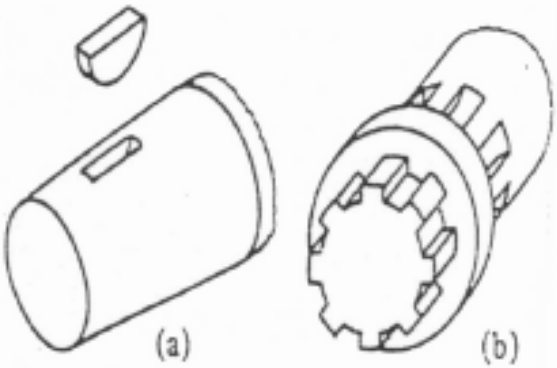
Keyways milled (a) horizontally, (b) vertically



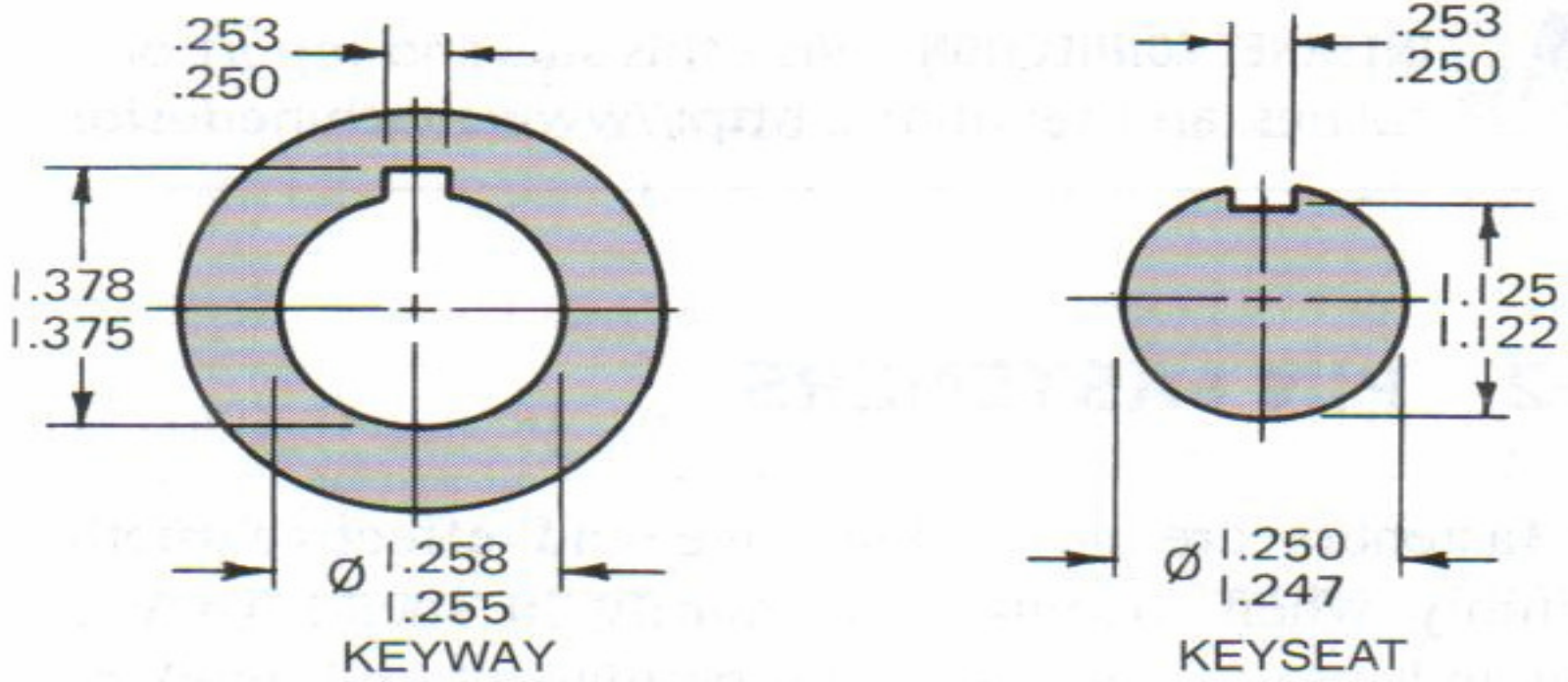
(a) Hollow saddle key, (b) flat saddle key, and (c) round key



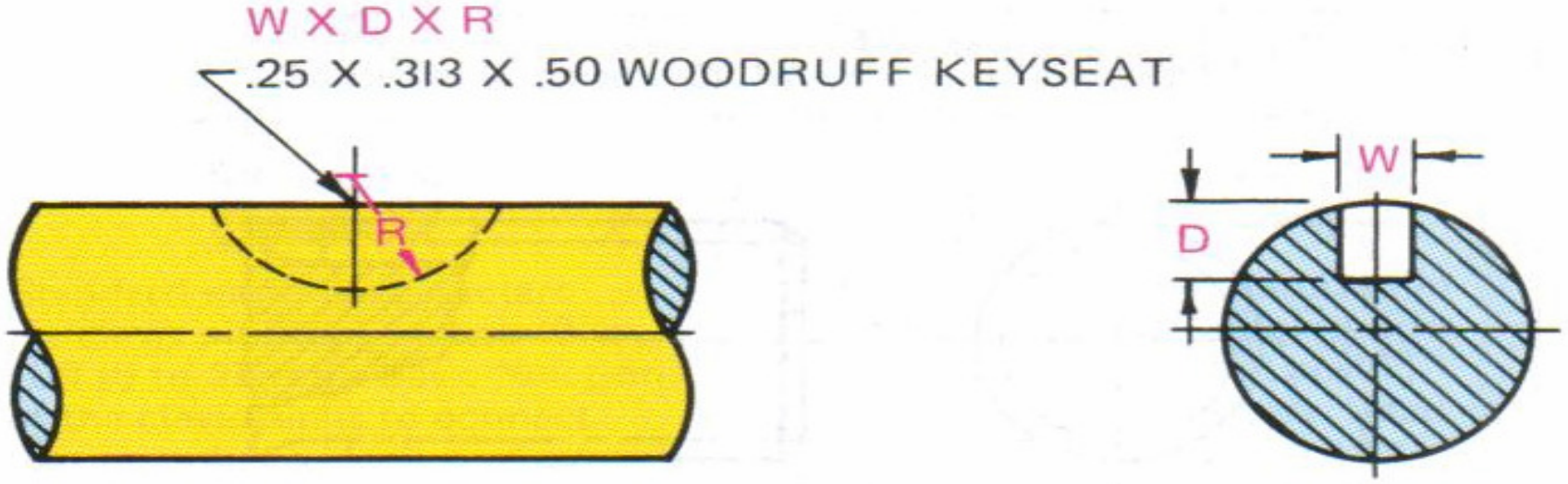
(a) Feather key, (b) rectangular key, and (c) square key

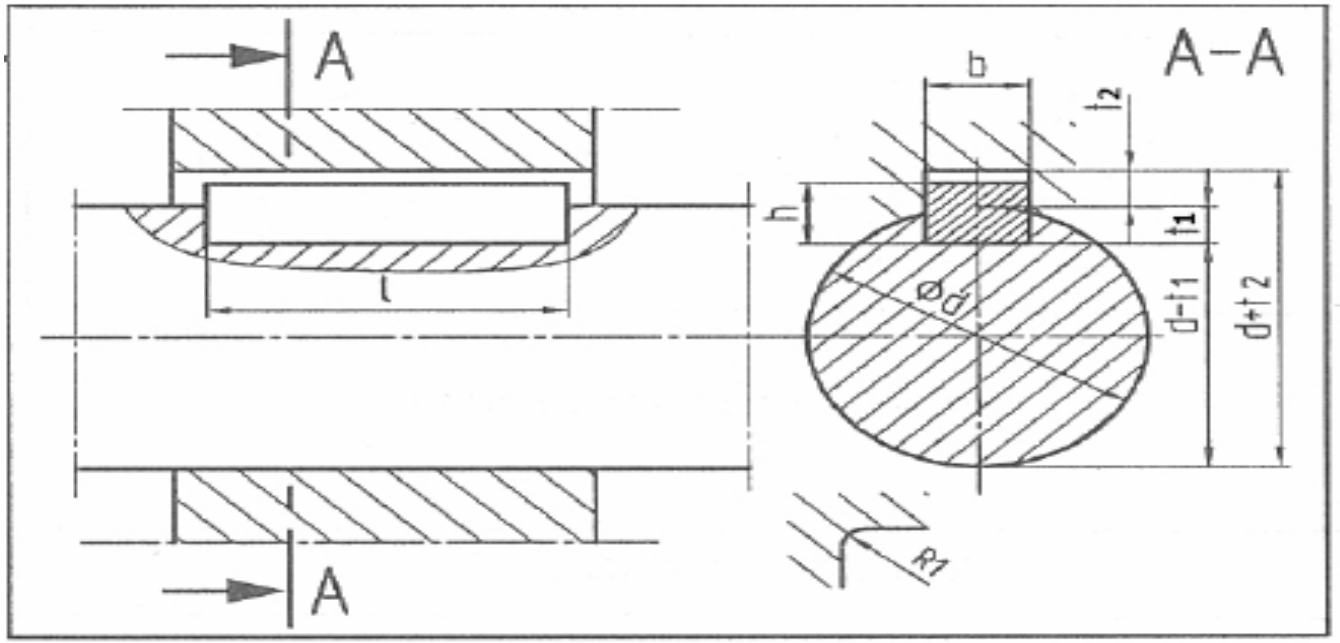


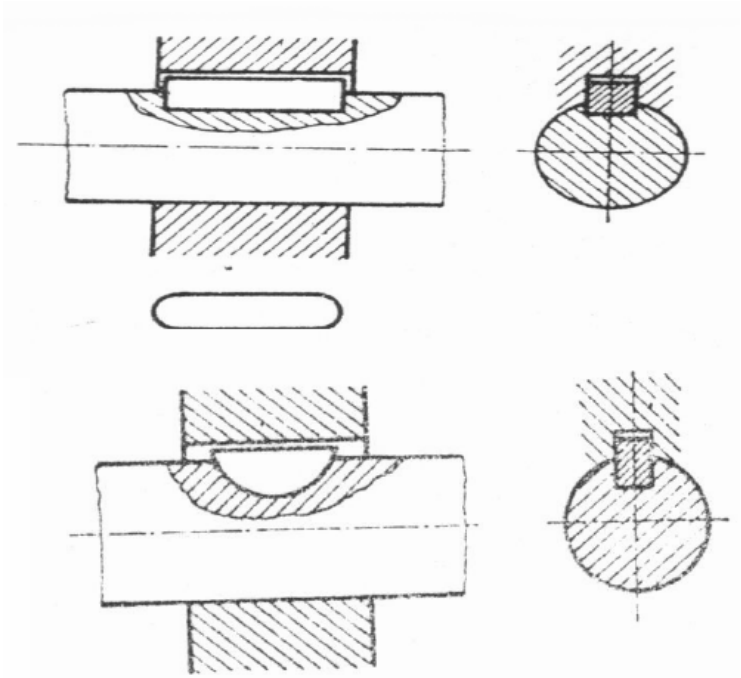
(a) Woodruff key, (b) splined shaft, and

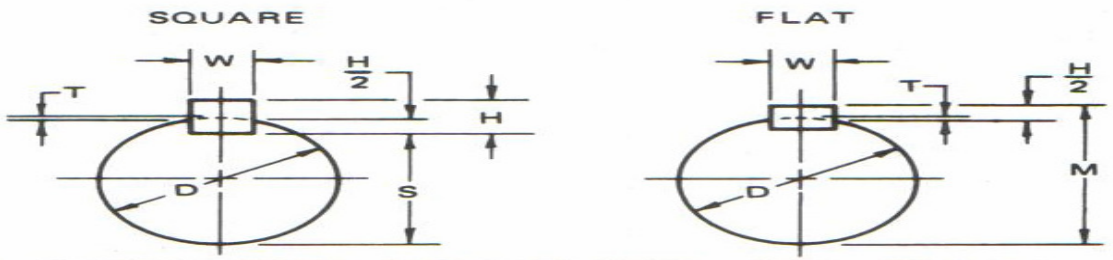


Dimensioning keyseats.




A
A–A
b
t2
h
t1
l
Ød
d–t1
d+t2
R1
A





C = ALLOWANCE FOR PARALLEL KEYS = .005 in. OR 0.12 mm

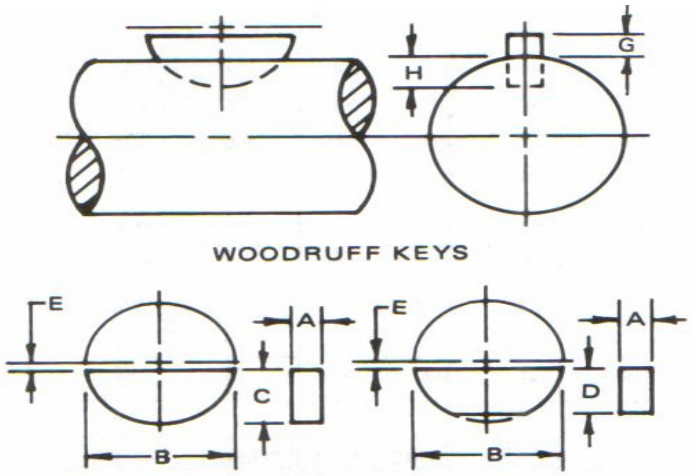
$$S = D - \frac{H}{2} - T = \frac{D - H + \sqrt{D^2 - W^2}}{2} \qquad T = \frac{D - \sqrt{D^2 - W^2}}{2}$$

$$M = D - T + \frac{H}{2} + C = \frac{D + H + \sqrt{D^2 - W^2}}{2} + C$$

W = NOMINAL KEY WIDTH (INCHES OR MILLIMETERS)

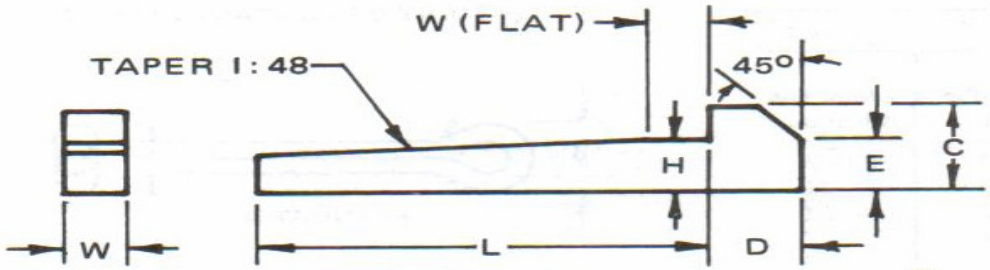
Square and flat stock keys.

U.S. CUSTOMARY (INCHES)						METRIC (MILLIMETERS)					
Diameter of Shaft		Square Key Nominal Size		Flat Key Nominal Size		Diameter of Shaft		Square Key Nominal Size		Flat Key Nominal Size	
From	To	W	H	W	H	Over	Up To	W	H	W	H
.500	.562	.125	.125	.125	.094	6	8	2	2		
.625	.875	.188	.188	.188	.125	8	10	3	3		
.938	1.250	.250	.250	.250	.188	10	12	4	4		
1.312	1.375	.312	.312	.312	.250	12	17	5	5		
1.438	1.750	.375	.375	.375	.250	17	22	6	6		
1.812	2.250	.500	.500	.500	.375	22	30	7	7	8	7
2.375	2.750	.625	.625			30	38	8	8	10	8
2.875	3.250	.750	.750			38	44	9	9	12	8
3.375	3.750	.875	.875			44	50	10	10	14	9
3.875	4.500	1.000	1.000			50	58	12	12	16	10



Woodruff keys.

U.S. CUSTOMARY (INCHES)							METRIC (MILLIMETERS)						
Nominal Size	Key			Keyseats		Key No.	Nominal Size	Key			Keyseats		
A × B	E	C	D	H	G		A × B	E	C	D	H	G	
.062 × .500	.047	.203	.194	.167	.037	204	1.6 × 12.7	1.5	5.1	4.8	4.24	0.94	
.094 × .500	.047	.203	.194	.151	.053	304	2.4 × 12.7	1.3	5.1	4.8	3.84	1.35	
.094 × .625	.062	.250	.240	.198	.053	305	2.4 × 15.9	1.5	6.4	6.1	5.03	1.35	
.125 × .500	.049	.203	.194	.136	.069	404	3.2 × 12.7	1.3	5.1	4.8	3.45	1.75	
.125 × .625	.062	.250	.240	.183	.069	405	3.2 × 15.9	1.5	6.4	6.1	4.65	1.75	
.125 × .750	.062	.313	.303	.246	.069	406	3.2 × 19.1	1.5	7.9	7.6	6.25	1.75	
.156 × .625	.062	.250	.240	.170	.084	505	4.0 × 15.9	1.5	6.4	6.1	4.32	2.13	
.156 × .750	.062	.313	.303	.230	.084	506	4.0 × 19.1	1.5	7.9	7.6	5.84	2.13	
.156 × .875	.062	.375	.365	.292	.084	507	4.0 × 22.2	1.5	9.7	9.1	7.42	2.13	
.188 × .750	.062	.313	.303	.214	.100	606	4.8 × 19.1	1.5	7.9	7.6	5.44	2.54	
.188 × .875	.062	.375	.365	.276	.100	607	4.8 × 22.2	1.5	9.7	9.1	7.01	2.54	
.188 × 1.000	.062	.438	.428	.339	.100	608	4.8 × 25.4	1.5	11.2	10.9	8.61	2.54	
.188 × 1.125	.078	.484	.475	.385	.100	609	4.8 × 28.6	2.0	12.2	11.9	9.78	2.54	
.250 × .875	.062	.375	.365	.245	.131	807	6.4 × 22.2	1.5	9.7	9.1	6.22	3.33	
.250 × 1.000	.062	.438	.428	.308	.131	808	6.4 × 25.4	1.5	11.2	10.9	7.82	3.33	



L (MIN) = 4W
L (MAX) = 16W

Square and flat gib-head keys.

U.S. CUSTOMARY (INCHES)										
Shaft Diameter	Square Type					Flat Type				
	W	H	C	D	E	W	H	C	D	E
.500–.562	.125	.125	.250	.219	.156	.125	.094	.188	.125	.125
.625–.875	.188	.188	.312	.281	.219	.188	.125	.250	.188	.156
.938–1.250	.250	.250	.438	.344	.344	.250	.188	.312	.250	.188
1.312–1.375	.312	.312	.562	.406	.406	.312	.250	.375	.312	.250
1.438–1.750	.375	.375	.688	.469	.469	.375	.250	.438	.375	.312
1.812–2.250	.500	.500	.875	.594	.625	.500	.375	.625	.500	.438
2.312–2.750	.625	.625	1.062	.719	.750	.625	.438	.750	.625	.500
2.875–3.250	.750	.750	1.250	.875	.875	.750	.500	.875	.750	.625

METRIC (MILLIMETERS)										
Shaft Diameter	Square Type					Flat Type				
	W	H	C	D	E	W	H	C	D	E
12–14	3.2	3.2	6.4	5.4	4	3.2	2.4	5	3.2	3.2
16–22	4.8	4.8	10	7	5.4	4.8	3.2	6.4	5	4
24–32	6.4	6.4	11	8.6	8.6	6.4	5	8	6.4	5
34–35	8	8	14	10	10	8	6.4	10	8	6.4
36–44	10	10	18	12	12	10	6.4	11	10	8
46–58	13	13	22	15	16	13	10	16	13	11
60–70	16	16	27	19	20	16	11	20	16	13
72–82	20	20	32	22	22	20	13	22	20	16

Pratt and Whitney keys.

METRIC (MILLIMETERS)				
Key No.	L	W	H	D
2	12	2.4	3.6	2.4
4	16	2.4	3.6	2.4
6	16	4	6	4
8	20	4	6	4
10	22	4	6	4
12	22	6	8.4	7
14	25	6	8.4	6
16	28	5	7	5
18	28	6.4	10	6.4
20	32	7	8	5
22	35	6.4	10	6.4
24	38	6.4	10	6.4
26	50	5	7	5
28	50	8	12	8
30	75	10	14	10
32	75	12	20	12
34	75	16	24	16

L (MIN) = 2W

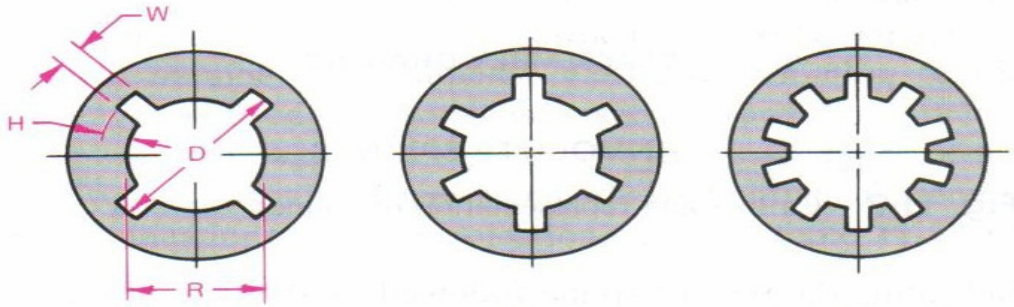
U.S. CUSTOMARY (INCHES)				
Key No.	L	W	H	D
2	.500	.094	.141	.094
4	.625	.094	.141	.094
6	.625	.156	.234	.156
8	.750	.156	.234	.156
10	.875	.156	.234	.156
12	.875	.234	.328	.219
14	1.00	.234	.328	.234
16	1.125	.188	.281	.188
18	1.125	.250	.375	.250
20	1.250	.219	.328	.219
22	1.375	.250	.375	.250
24	1.50	.250	.375	.250
26	2.00	.188	.281	.188
28	2.00	.312	.469	.312
30	3.00	.375	.562	.375
32	3.00	.500	.750	.500
34	3.00	.625	.938	.625

Splines

A **splined shaft** is a shaft having multiple grooves, or key-seats, cut around its circumference for a portion of its length, in order that a sliding engagement may be made with corresponding internal grooves of a mating part.

Splines are capable of carrying heavier loads than keys, permit lateral movement of a part, parallel to the axis of the shaft, while maintaining positive rotation, and allow the attached part to be indexed or changed to another angular position.

Splines have either straight-sided teeth or curved-sided teeth. The latter type is known as an *involute spline*.

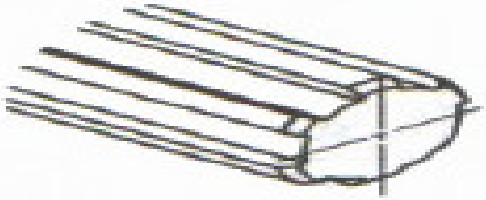


NUMBER OF SPLINES	W FOR ALL FITS	PERMANENT FIT		TO SLIDE WITHOUT LOAD		TO SLIDE UNDER LOAD	
		H	R	H	R	H	R
4	0.241 D	0.075 D	0.85 D	0.125 D	0.75 D		
6	0.250 D	0.050 D	0.90 D	0.075 D	0.85 D	0.100 D	0.80 D
10	0.156 D	0.045 D	0.91 D	0.070 D	0.86 D	0.095 D	0.81 D
16	0.098 D	0.045 D	0.91 D	0.070 D	0.86 D	0.095 D	0.81 D

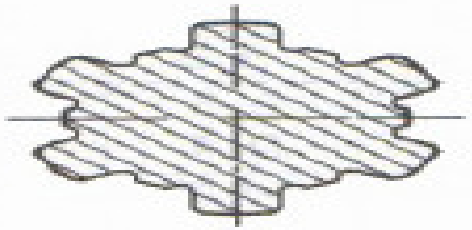
Sizes of SAE parallel-side splines.

KAMALI MİLİN GÖSTERİLMESİ
TS EN ISO 6413 / Şubat 1999

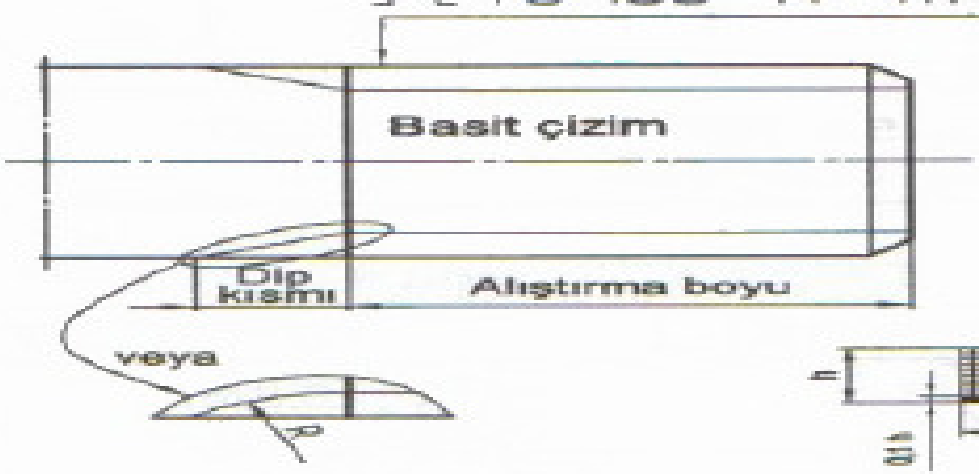
Perspektif görünüş

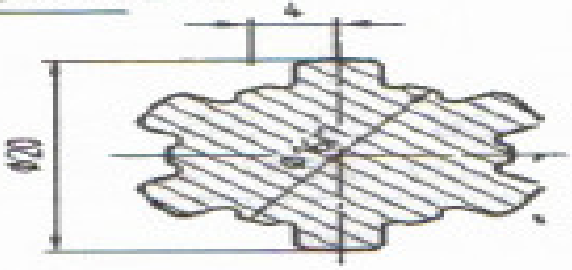


Gerçek görünüş



TS ISO 14-4x16f7x20





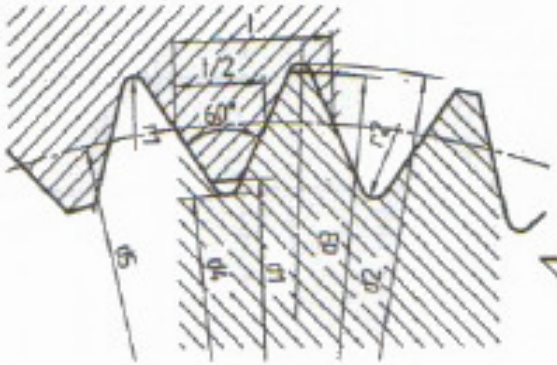
TS ISO 14-4x16f7x20 ⇐ Sembolik Gösterme

- Dış çap D1
- İç çap d ve tolerans
- Kanal sayısı
- Standart numarası
- Profil şekli

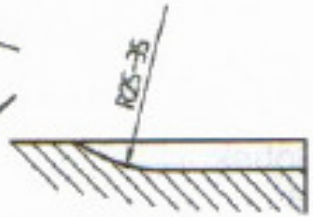
KERTİK DİŞLİ MİLLER

DIN 5481

Göbek profili

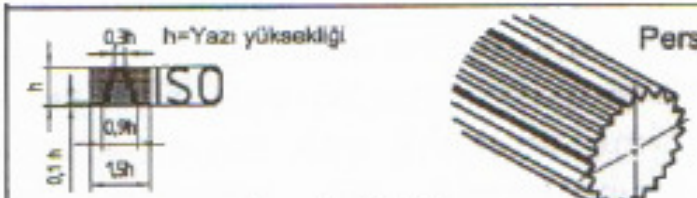


Mil profili



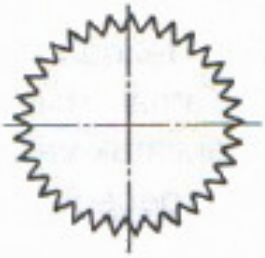
Diş bitimi

Ölçüler	Anma Ölçüsü =d1xd3							
	10x12	12x14	15x17	17x20	21x24	26x30	30x34	36x40
d1 A11	10,1	12	14,9	17,3	20,8	26,5	30,5	36
d2	12	14,18	17,28	20	23,76	30,06	34,17	40,16
d3	12	14,2	17,2	20	23,9	30	34	39,9
d4	10,2	12,06	14,91	17,37	20,76	26,40	30,38	35,95
d5	11	13	16	18.5	22	28	32	38
r1	0,1	0,1	0,15	0,15	0,15	0,25	0,3	0,5
t	1,152	1,317	1,571	1,761	2,033	2,513	2,792	3,226
Diş sayısı	30	31	32	33	34	35	36	37

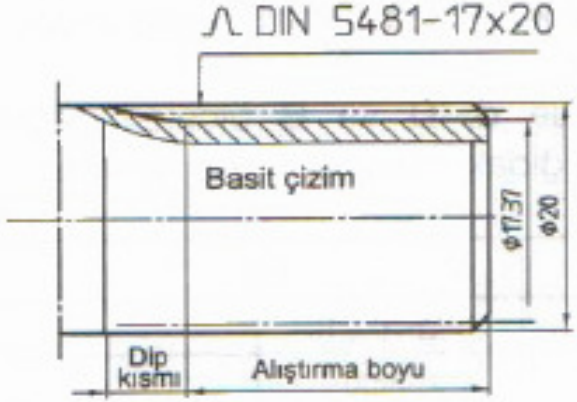


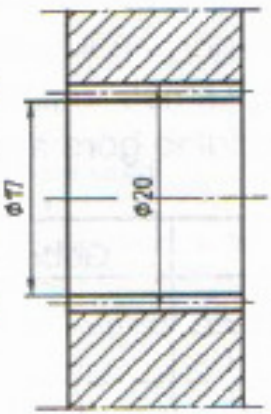
Perspektif görünüş

Gerçek görünüş



DIN 5481-17x20





DIN 5481-17x20 ⇐ Sembolik Gösterme

- Mil dış çapı - d2
- Delik iç çapı -d1
- Standart numarası
- Profil şekli