Couplings | Falk™ Torus® Elastomer Couplings

(English–Inch)

REXNORD

Torus...the tough coupling that's easy

easy to install...easy to maintain...easy on the connected equipment

Laboratory tests and over 20 years of proven experience have shown the Falk Torus coupling to be softer and more flexible than most other elastomer couplings on the market. Torus's unique inverted tire construction combined with the flexible characteristics of the elastomer element protect your equipment in two ways:

1. Torus accommodates misalignment without imposing high reaction forces on the coupled equipment.

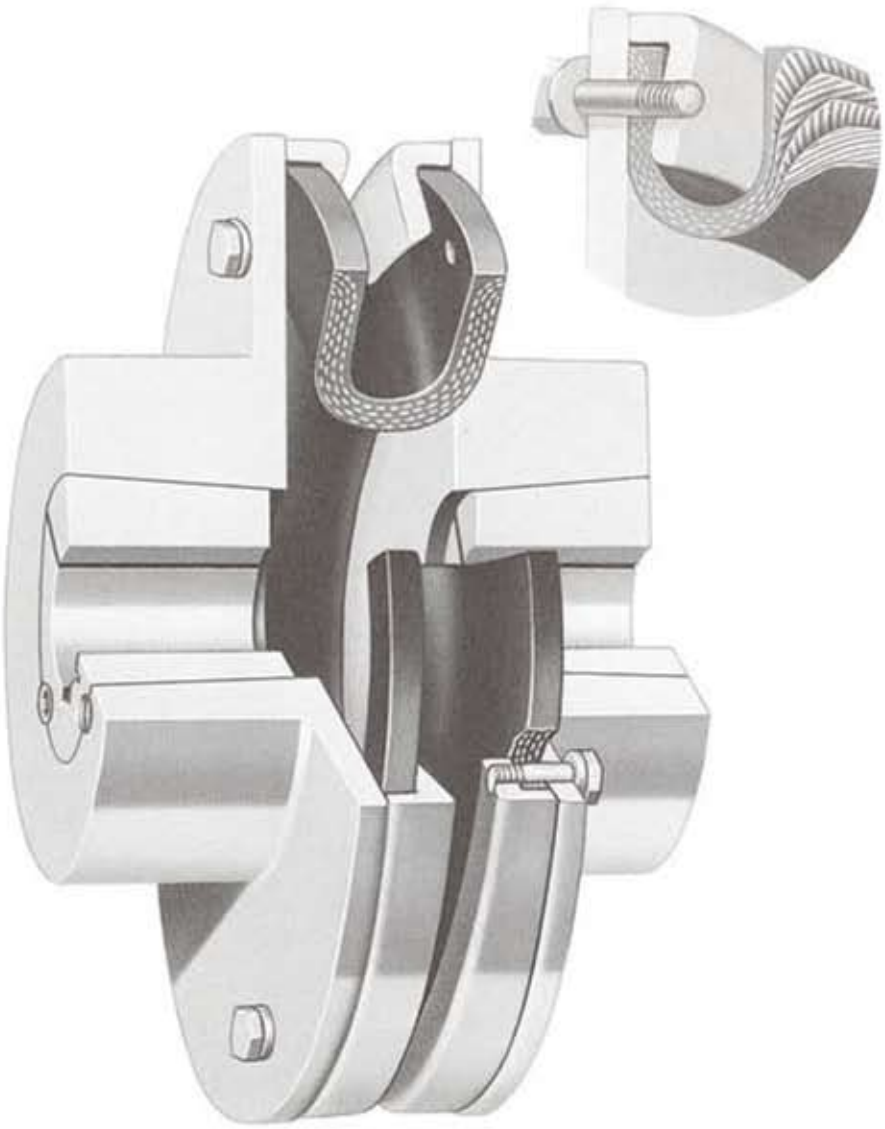
2. Torus damps out torsional vibrations, protecting the coupled equipment.

Unique element design
Torus owes both its toughness and its softness to the construction of the flexible connecting element. Alternating layers of nylon cord and natural rubber are vulcanized to form a multi-ply sandwich that is both strong and flexible ... soft and resilient. The inverted tire configuration shrouds and protects the element, while minimizing reaction forces on the coupled equipment. This tough element is capable of operating in ambient temperatures from −40°F to +150°F (−40°C to +66°C).

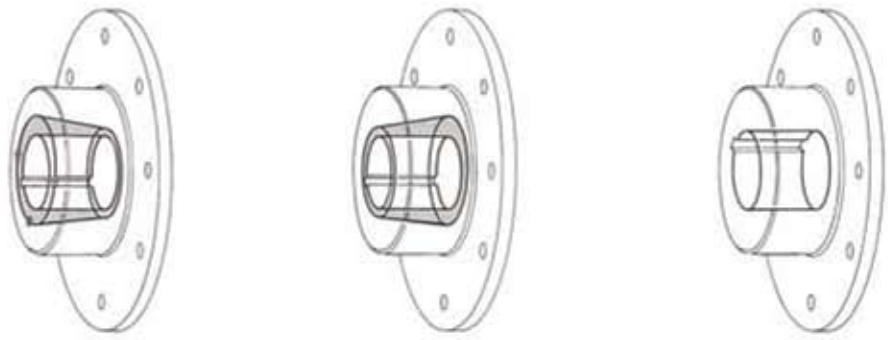
Large bore capacity
Machined steel hubs have a large shank for increased bore capacity. This usually eliminates the need to select a larger coupling just to accommodate shaft sizes. The result is the torque rating you need in a smaller, less expensive size coupling.

Bushed or straight bored hubs
Torus is available with Taper-Lock® bushings or with straight bores. Bushed hubs are available in two styles to permit the bushing to be inserted from either shank or gap end. Long steel hubs are offered for mill motors, other tapered shafts, and for overhanging hubs.

Clamp rings
The patented clamp ring design secures the flexible element to the coupling hubs. High strength bolts pass through the hub flanges and element into the clamp ring. The clamp ring pinches the element against the hub, effectively transferring torque yet preventing the element from tearing away from the hub.



Hub types

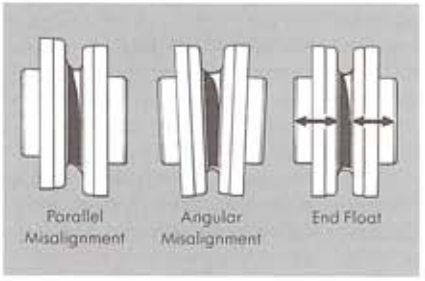


Taper Bored Shank End

Taper Bored Gap End

Straight Bored

Handles misalignment with minimum loading on the coupled equipment
A soft, natural rubber element handles misalignment without imposing high shaft and bearing loads.

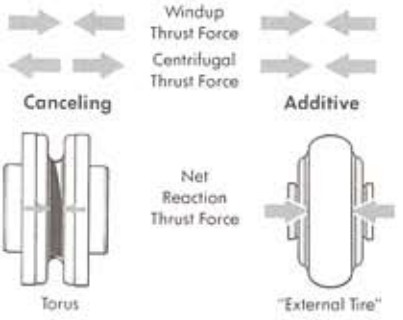


Reduces shock and vibration
Torus's high torsional flexibility can significantly damp shock loads and torsional vibrations, protecting connected equipment.

No lubrication required
No lubrication required, ever. No O-rings or seals to leak. No messy grease.

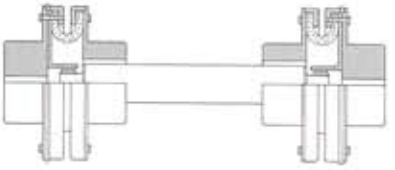
Easy to install
Torus is quick and easy to install . . . mount the hubs, set the gap, align, and install the element. Alignment is easier because of the machined steel hub surfaces.

Simple to maintain.
Changing the rubber element is as simple as unbolting the old element and bolting up the new. No need to disturb the hubs. Even periodic alignment is easy . . . the inverted tire configuration means alignment can be checked without removing the element.

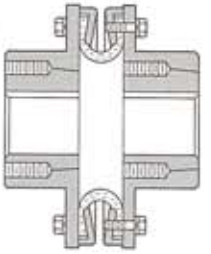


Less damaging reaction thrust force than external tire types
With the inverted tire design of Torus, axial thrust force due to wind up opposes thrust force due to centrifugal effect . . . they cancel each other, reducing or eliminating overall reaction thrust force on the connected equipment. In external tire designs, these two forces are additive, producing high reaction thrust forces that can damage the bearing and seals on coupled equipment.

Piloted coupling with floating shaft
A special piloted version of the Torus coupling is available for floating shaft configurations. Refer to your Falk Sales Office for complete details.



Elastomer element is protected from environment
The Torus elastomer element is shrouded by the clamp rings and hubs, protecting the element from both environmental damage and physical damage due to contact with hot slag, coupling guards, etc.



Available when you need them
Like all Falk couplings, Torus is available in North America from over 600 distributor outlets that are backed by four regional distribution centers.

Contents

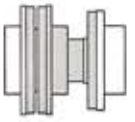
All dimensions presented in this bulletin are for reference only and are subject to change without notice unless certified.

Standard coupling solutions for all your special applications

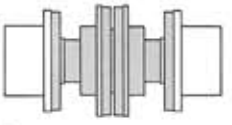
Type WA21
General Purpose Coupling
Use for most close coupled applications. Type WA21 is simple to install and easy to maintain. Just mount the hubs . . . straight bored or bushed . . . align,

and install the element/clamp ring assembly. This assembly pivots into position for easy installation and maintenance. See Pages 8 and 9.

Type WA37 — Half Spacer Coupling
Ideal for ANSI process pumps or for any application, horizontal or vertical, where it is undesirable to move the connected equipment for servicing. The WA37 half spacer provides the smaller range of standard and special BE (between shaft ends) dimensions. The removable portion of the coupling is shown above. See Pages 10 and 11.



Type WA33 — Full Spacer Coupling
Like the half spacer, the WA33 full spacer coupling is ideal for pumps and other equipment that requires a large space between shaft ends for servicing. The full spacer Torus coupling allows for longer BE dimensions. The removable portions of this coupling is also shown above. See Pages 12 and 13.



Type WA90
Flywheel Adapter Coupling
Provides a compact coupling arrangement that helps to damp engine vibrations. The Torus flywheel adapter coupling consists of an adapter plate that is bolted to the engine flywheel. One side of the standard flexible element is fastened to the adapter plate and the other side to the standard hub on the driven shaft. See Pages 14 and 15.

Quick selection method

1. Determine service factor
For electric motor or turbine driven applications select a service factor from Table 3 on Page 6. For engine driven applications use Tables 3 and 4 on Page 6. If you cannot find a service factor for your application contact Falk Engineering.

For BRAKING and HIGH PEAK LOAD applications use the Formula Selection Method on Page 7.

2. Determine equivalent horsepower
Refer to Table 1. Opposite the service factor selected in Step 1 and under the motor or prime mover HP, read the equivalent HP.

3. Select coupling size
Refer to Table 2. Trace across from the required speed to a value equal to or larger than the equivalent HP. Read the coupling size at the top of the column. If the required speed is not shown, use the next lowest speed listed, or interpolate between those listed.

4. Select coupling type
Use Type WA21 for close-coupled applications, Types WA33 or WA37 for applications requiring a spacer coupling, or Type WA90 for flywheel or engine mount applications.

5. Check bores and envelope dimensions

Refer to the dimension pages. Check to be certain that the shaft diameters of the equipment to be coupled falls within the minimum and maximum hub bore size for the coupling size you have selected. If the shafts exceed the maximum bore, select the next largest coupling size, or use a rectangular key per Table 7.

Also check to determine if the coupling will fit into the space envelope available. If the distance between shaft ends is greater than the maximum coupling gap, refer to "Overhanging Hubs" on Page 17. Where the actual shaft gap is less than the coupling gap, the connected shafts may protrude under the element.

Example of quick selection method

Select a coupling to connect a 10 HP, 1750 RPM motor to a high speed shaft of a speed reducer that is driving a bucket conveyor. The diameter of both the motor shaft and the reducer input shaft is 1.375 inches.

Selection:

1. From Table 3, the service factor is 1.25.

2. From Table 1, equivalent HP is 12.5.

3. From Table 2, the correct coupling size is the 1020, which rates 15.0 HP at 1750 RPM.

4. This is a close coupled application; therefore, use a Type WA21 coupling.

5. From Page 8, the maximum Taper-Lock® bore of the 1020WA21 is 1.625 inches and the allowable speed is 5000 RPM. Therefore the 1020WA21 is the correct selection. This bushed hub would require a No. 1610 Taper-Lock® bushing.

Table 1 Equivalent Horsepower = Motor hp x Service Factor

Service Factor	Motor HP																									
	¾	1	1½	2	3	5	7½	10	15	20	25	30	40	50	60	75	100	125	150	200	250	300	350	400	450	500
1.0	.75	1.0	1.5	2.0	3.0	5.0	7.5	10	15	20	25	30	40	50	60	75	100	125	150	200	250	300	350	400	450	500
1.25	.94	1.25	1.9	2.5	3.8	6.3	9.4	12.5	19	25	31	38	50	63	75	94	125	156	188	250	312	375	438	500	563	625
1.5	1.1	1.5	2.3	3.0	4.5	7.5	11.3	15	23	30	38	45	60	75	90	113	150	188	225	300	375	450	525	600	675	750
1.75	1.3	1.8	2.6	3.5	5.3	8.8	13.1	18	26	35	44	53	70	88	105	131	175	219	262	350	438	525	613	700	787	875
2.0	1.5	2.0	3.0	4.0	6.0	10.0	15.0	20	30	40	50	60	80	100	120	150	200	250	300	400	500	600	700	800	900	1000
2.5	1.9	2.5	3.8	5.0	7.5	12.5	18.8	25	38	50	63	75	100	125	150	187	250	312	375	500	625	750	875	1000	1125	1250
3.0	2.3	3.0	4.5	6.0	9.0	15.0	22.5	30	45	60	75	90	120	150	180	225	300	375	450	600	750	900	1050	1200	1350	1500
3.5	2.6	3.5	5.3	7.0	10.5	17.5	26.2	35	52	70	87	105	140	175	210	262	350	437	525	700	875	1050	1225	1400	1575	1750

Table 2 Coupling Selection . . . Based on Equivalent hp Ratings from Table 1

Speed rpm*	Coupling Size														
	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160
5000	42.8	59.5	89.3												
3550	30.4	42.2	63.4	106	152	228									
2900	24.9	34.5	51.8	87.0	124	186	248								
1750	15.0	20.8	31.2	52.5	75.0	112	150	250	417	610	875	1390			
1430	12.2	17.0	25.5	42.9	61.3	91.9	123	204	340	500	715	1135	1590	2430	
1170	10.0	13.9	20.9	35.1	50.1	75.2	100	167	278	408	585	930	1300	1990	2630
870	7.45	10.4	15.5	26.1	37.3	55.9	74.5	124	207	304	435	690	965	1480	1960
720	6.17	8.57	12.9	21.6	30.8	46.3	61.7	103	171	251	360	570	800	1225	1620
650	5.57	7.74	11.6	19.5	27.8	41.8	55.7	92.8	155	227	325	515	725	1105	1460
580	4.97	6.90	10.4	17.4	24.8	37.3	49.7	82.8	138	202	290	460	645	985	1305
520	4.46	6.19	9.28	15.6	22.3	33.4	44.6	74.3	124	181	260	412	580	885	1170
420	3.60	5.00	7.50	12.6	18.0	27.0	36.0	60.0	100	147	210	333	465	715	945
350	3.00	4.17	6.25	10.5	15.0	22.5	30.0	50.0	83.3	122	175	278	390	595	785
280	2.40	3.33	5.00	8.40	12.0	18.0	24.0	40.0	66.6	97.6	140	222	311	475	630
230	1.97	2.74	4.11	6.90	9.85	14.8	19.7	32.8	54.7	80.2	115	182	255	391	520
190	1.63	2.26	3.39	5.70	8.14	12.2	16.3	27.1	45.2	66.3	95.0	151	211	323	425
155	1.33	1.84	2.77	4.65	6.64	10.0	13.3	22.1	36.9	54.1	77.5	123	172	263	350
125	1.07	1.49	2.23	3.75	5.36	8.03	10.7	17.9	29.8	43.6	62.5	99.0	139	212	280
100	.86	1.19	1.79	3.00	4.28	6.43	8.57	14.3	23.8	34.9	50.0	79.3	111	170	225
84	.72	1.00	1.50	2.52	3.60	5.40	7.20	12.0	20.0	29.3	42.0	66.6	93.3	143	190
68	.58	.81	1.21	2.04	2.91	4.37	5.83	9.71	16.2	23.7	34.0	53.9	75.5	116	153
56	.48	.67	1.00	1.68	2.40	3.60	4.80	8.00	13.3	19.5	28.0	44.4	62.2	95.2	125
45	.39	.54	.80	1.35	1.93	2.90	3.86	6.43	10.7	15.7	22.5	35.7	50.0	76.5	101
37		.44	.66	1.11	1.59	2.38	3.17	5.28	8.81	12.9	18.5	29.4	41.1	62.9	83.0
30		.36	.54	.90	1.29	1.93	2.57	4.28	7.14	10.5	15.0	23.8	33.3	51.0	67.0
25			.45	.75	1.07	1.61	2.14	3.57	5.95	8.71	12.5	19.8	27.8	42.5	56.0
20			.36	.60	.86	1.28	1.71	2.86	4.76	6.97	10.0	15.9	22.2	34.0	45.0
16.5				.49	.71	1.06	1.41	2.36	3.93	5.76	8.25	13.1	18.3	28.0	37.0
13.5				.40	.58	.87	1.16	1.93	3.22	4.71	6.75	10.7	15.0	23.0	30.0
11.0				.33	.47	.71	.94	1.57	2.62	3.84	5.50	8.73	12.2	18.7	25.0
9.0				.27	.39	.58	.77	1.28	2.14	3.14	4.50	7.14	10.0	15.3	20.0
7.5				.22	.32	.48	.64	1.07	1.79	2.62	3.75	5.95	8.33	12.7	17.0

* If required speed is not shown, use next lower speed listed or interpolate between those listed.
If required speed is under 7.5 rpm, refer to FORMULA method of selection.

Table 3 Type WA Torus Coupling Service Factors†▲

Service factors listed are typical values based on normal operation of the drive systems.
For repetitive high peak load applications, utilize the coupling selection procedure and formulas given on Page 7.

Alphabetical listing of industries

	Service Factor
Aggregate processing, cement, mining kilns; tube, rod and ball mills	
Direct or on L.S. shaft of Reducer, with final drive:	
Machined Spur Gears	2.0
Single Helical or Herringbone Gears	1.75
Conveyors, Feeders, Screens, Elevators	See General Listing
Crushers, Ore or Stone	2.5
Dryer, Rotary	1.75
Grizzly	2.0
Hammermill or Hog	1.75
Tumbling Mill or Barrel	1.75
Brewing and distilling	
Bottle and Can Filling Machines	1.0
Brew Kettle	1.0
Cookers, Continuous Duty	1.25
Lauter Tub	1.5
Mash Tub	1.25
Scale Hopper, Frequent Peaks	1.75
Clay working industry	
Brick Press, Briquette Machine, Clay Working Machine, Pug Mill	1.75
Dredges	
Cable Reel	1.75
Conveyors	1.25
Cutter Head, Jig Drive	2.0
Maneuvering Winch	1.5
Pumps (uniform load)	1.5
Screen Drive, Stacker	1.75
Utility Winch	1.5
Food industry	
Beet Slicer	1.75
Bottling, Can Filling Machine	1.0
Cereal Cooker	1.25
Dough Mixer, Meat Grinder	1.75
Lumber	
Band Resaw	1.5
Circular Resaw, Cut-off	1.75
Edger, Head Rig, Hog	2.0
Gang Saw (Reciprocating)	Refer to Factory
Log Haul	2.0
Planer	1.75
Rolls, Non-Reversing	1.25
Rolls, Reversing	2.0
Sawdust Conveyor	1.25
Slab Conveyor	1.75
Sorting Table	1.5
Trimmer	1.75
★Metal rolling mills	
Coilers (Up or Down) Cold Mills only	1.5
Coilers (Up or Down) Hot Mills only	2.0
Coke Plants	
Pusher Ram Drive	2.5
Door Opener	2.0
Pusher or Larry Car Traction Drive	3.0
Cold Mills — Strip Mills, Temper Mills	Refer to Factory
Cooling Beds	1.5
Drawbench	2.0
Feed Rolls — Blooming Mills	3.0
Furnace Pushers	2.0
Hot and Cold Saws	2.0
Hot Mills — Strip or Sheet Mills, Reversing Blooming or Slabbing Mills, Edger Drives	Refer to Factory
Ingot Cars	2.0
Manipulators	3.0
Merchant Mills	Refer to Factory
Mill Tables	
Roughing Breakdown Mills	3.0
Hot Bed or Transfer, non-reversing	1.5
Runout, reversing	3.0
Runout, non-reversing, non-plugging	2.0
Reel Drives	1.75
Rod Mills	Refer to Factory
Screwdown	2.0
Seamless Tube Mills Piercer	3.0
Thrust Block	2.0
Tube Conveyor Rolls	2.0
Reeler	2.0
Kick Out	2.0
Sideguards	3.0
Skelp Mills	Refer to Factory
Slitters, Steel Mill only	1.75
Soaking Pit Cover Drives — Lift	1.0
Travel	2.0
Straighteners	2.0
Unscramblers (Billet Bundle Busters)	2.0
Wire Drawing Machinery	1.75
Oil industry	
Chiller	1.25
Oilwell Pumping (not over 150% peak torque)	2.0
Paraffin Filter Press	1.5
Rotary Kiln	2.0
Paper mills	
Barker Auxiliary, Hydraulic	2.0
Barker, Mechanical	2.0
Barking Drum L.S. shaft of reducer with final drive — Helical or Herringbone Gear	2.0
Machined Spur Gear	2.5
Cast Tooth Spur Gear	3.0
Beater & Pulper	1.75
Bleachers, Coaters	1.0
Calender & Super Calender	1.75
Chipper	2.5
Converting Machine	1.25
Couch	1.75
Cutter, Felt Whipper	2.0
Cylinder, Dryer	1.75
Felt Stretcher	1.25
Fourdrinier	1.75
Jordan	2.0
Log Haul	2.0
Line Shaft	1.5
Press	1.75
Pulp Grinder	1.75
Reel, Rewinder, Winder	1.5
Stock Chest, Washer, Thickener	1.5
Stock Pumps, Centrifugal Constant Speed	1.0
Frequent Speed Changes Under Load	1.25
Suction Roll	1.75
Rubber industry	
Calender	2.0
Cracker, Plasticator	2.5
Extruder	1.75
Intensive or Banbury Mixer	2.5
Mixing Mill, Refiner or Sheeter One or two in line	2.5
Three or four in line	2.0
Five or more in line	1.75
Tire Building Machine	2.5
Tire & Tube Press Opener (Peak Torque)	1.0
Tuber, Strainer, Pelletizer	1.75
Warming Mill One or two Mills in line	2.0
Three or more Mills in line	1.75
Washer	2.5
Sewage disposal equipment	
Bar Screen, Chemical Feeders, Collectors, Dewatering Screen, Grit Collector	1.0
Sugar industry	
Cane Carrier & Leveler	1.75
Cane Knife & Crusher	2.0
Mill Stands, Turbine Driven with all helical or herringbone gears	1.5
Electric Drive or Steam Engine Drive with Helical, Herringbone, or Spur Gears with any Prime Mover	1.75
Textile industry	
Batcher	1.25
Calender, Card Machine	1.5
Cloth Finishing Machine	1.5
Dry Can, Loom	1.5
Dyeing Machinery	1.25
Knitting Machine	Refer to Factory
Mangle, Napper, Soaper	1.25
Spinner, Tenter Frame, Winder	1.5

Alphabetical listing of applications

	Service Factor
Aerator	2.0
Agitators	
Vertical and Horizontal Screw, Propeller, Paddle	1.0
Barge haul puller	1.5
Blowers	
Centrifugal	1.0
Lobe or Vane	1.25
Car dumpers	2.5
Car pullers	1.5
Clarifier or classifier	1.0
Compressors	
Centrifugal	1.0
Rotary, Lobe or Vane	1.25
Rotary, Screw	1.0
Reciprocating	
Direct Connected	Refer to Factory
Without Flywheels	Refer to Factory
✱With Flywheel and Gear between Compressor and Prime Mover	
1 cylinder, single acting	3.0
1 cylinder, double acting	3.0
2 cylinders, single acting	3.0
2 cylinders, double acting	3.0
3 cylinders, single acting	3.0
3 cylinders, double acting	2.0
4 or more cyl., single act	1.75
4 or more cyl., double act	1.75
▲Conveyors	
Apron, Assembly, Belt, Chain, Flight, Screw	1.0
Bucket	1.25
Live Roll, Shaker and Reciprocating	3.0
▲★Cranes and hoist	
Main Hoist	1.75▲
Skip Hoist	1.75▲
Slope	1.5
Bridge, Travel or Trolley	1.75
Dynamometer	1.0
Elevators	
Bucket, Centrifugal Discharge	1.25
Freight or Passenger	Not Approved
Gravity Discharge	1.25
Escalators	Not Approved
Exciter, generator	1.0
Extruder, plastic	1.5
Fans	
Centrifugal	1.0
Cooling Tower	2.0
Forced Draft — Across the Line start	1.5
Forced Draft Motor Driven thru fluid or electric slip clutch	1.0
Gas Recirculating	1.5
Induced Draft with damper control or blade cleaner	1.25
Induced Draft without controls	2.0
Feeders	
Apron, Belt, Disc, Screw	1.0
Reciprocating	2.5
Generators	
Even Load	1.0
Hoist or Railway Service	1.5
Welder Load	2.0
Hammermill	1.75
Laundry washer or tumbler	2.0
Line shafts	
Any Processing Machinery	1.5
Machine tools	
Auxiliary and Traverse Drive	1.0
Bending Roll, Notching Press, Punch Press, Planer, Plate Reversing	1.75
Main Drive	1.5
Man lifts	Not Approved
Metal forming Machines	
Draw Bench Carriage and Main Drive	2.0
Extruder	2.0
Forming Machine and Forming Mills	2.0
Slitters	1.0
Wire Drawing or Flattening	1.75
Wire Winder	1.5
Coilers and Uncoilers	1.5
Mixers (see Agitators)	
Concrete	1.75
Muller	1.5
Press, printing	1.5
Pug mill	1.75
Pulverizers	
Hammermill and Hog	1.75
Roller	1.5
Pumps	
Centrifugal — Constant Speed	1.0
Frequent Speed Changes under Load	1.25
Descaling, with accumulators	1.25
Gear, Rotary, or Vane	1.25
Reciprocating	
1 cyl., single or double act.	3.0
2 cyl., single acting	2.0
2 cyl., double acting	1.75
3 or more cylinders	1.5
Screens	
Air Washing	1.0
Grizzly	2.0
Rotary Coal or Sand	1.5
Vibrating	2.5
Water	1.0
Ski tows & lifts	Not Approved
Steering gear	1.0
Stoker	1.0
Tumbling barrel	1.75
Winch, maneuvering	
Dredge, Marine	1.5
Windlass	1.5
Woodworking machinery	1.0
Work lift platforms	Not Approved

† For engine drives, refer to Table 4.
For applications with sleeve bearing motors, or machines that require limited end float, refer to the Factory for special installation instructions.
For motors with brakes, use Formula Selection Method on Page 7.
✱ For balanced opposed design, refer to Factory.

Table 4♦ Engine Drive Service Factors

Service factors for engine drives are those required for applications where good flywheel regulation prevents torque fluctuations greater than ±20%. For drives where torque fluctuations are greater or where the operation is near a serious critical or torsional vibration, a mass elastic study is necessary.

No. of Cylinders	4 or 5♦					6 or more♦				
Table 3 Service Factor	1.0	1.25	1.5	1.75	2.0	1.0	1.25	1.5	1.75	2.0
Engine Service Factor	2.0	2.25	2.5	2.75	3.0	1.5	1.75	2.0	2.25	2.5

♦ To use Table 4, first determine application service factor from Table 3. Use that factor to determine ENGINE Service Factor from Table 4. When service factor from Table 3 is greater than 2.0, refer complete application details to the Factory for engineering review.

★ For high peak load applications (such as Metal Rolling Mills) refer to Formula Method on Page 7.
▲ If people are occasionally transported, refer to Factory for the selection of the proper size coupling.

Formula selection method

1. Determine service factor
For motor, turbine, or engine driven applications refer to Tables 3 and 4 on Page 6. For BRAKE or HIGH PEAK LOAD applications refer to Step 2 below.

2. Calculate require rating
The coupling rating either in HP per 100 RPM or in torque must equal or exceed the application requirements. Determine the required coupling rating using the formula shown below for normal service, brake applications, or high peak load applications.

Normal service:

$$\text{HP per 100 RPM} = \frac{\text{transmitted HP} \times 100 \times \text{S.F.}}{\text{RPM}}$$

or

$$\text{Torque (lb.-in.)} = \frac{\text{Transmitted HP} \times 63{,}000 \times \text{S.F.}}{\text{RPM}}$$

Transmitted HP equals the measured HP or, if not available, the motor or turbine rated HP, except for brake or high peak load applications.

Brake applications: Use the brake HP in the above formula if it exceeds the prime mover HP rating.

High peak load applications: When using motors with torque characteristics that are higher than normal, or when selecting for applications with intermittent operation, shock loading, inertia effects due to starting and stopping, and/or system induced repetitive high peak torques, use one of the following formulas. The term "System Peak Torque" is the maximum torque that can exist in the system at any time.

FOR OCCASIONAL PEAK LOADS (reversing or non-reversing but less than 1000 peak load repetitions per coupling lifetime):

Required coupling torque rating = 0.5 x system peak torque

FOR NON-REVERSING SERVICE (1000 or more peak load repetitions per coupling lifetime):

Required coupling torque rating = system peak torque

FOR REVERSING SERVICE (1000 or more peak load repetitions per coupling lifetime):

Required coupling torque rating = 2 x system peak torque

3. Select coupling size
Refer to Table 5. Trace horizontally from "HP per 100 RPM" or "Torque" to a value that is equal to or greater than the calculated value. Read coupling size at the top of the column.

4. Select coupling type
Use Type WA21 for close-coupled applications, Types WA33 or WA37 for applications requiring a spacer coupling, or Type WA90 for flywheel or engine mount applications.

5. Check bores, speeds, and envelope dimensions
Refer to the dimension pages. Check to be certain that the shaft diameters of the equipment to be coupled falls within the maximum and minimum hub bore size for the coupling size you have selected. If the shafts exceed the maximum bore, select the next largest coupling size or use a rectangular key per Table 7.

Check the maximum rated speed of the selected coupling. If the application speed is greater, consult Falk Engineering.

Also check to determine if the coupling will fit into the space envelope available. If the distance between shaft ends is greater than the maximum coupling gap, refer to "Overhanging hubs" on Page 17. Where the actual shaft gap is less than the coupling gap, the connected shafts may protrude under the element.

Example of formula selection method

Select a coupling to connect a 15 HP, 1170 RPM motor to the high speed shaft of a speed reducer driving a hammermill requiring 19 HP. The motor shaft diameter is 1.875 inches and reducer shaft diameter is 1.500 inches.

Selection:

1. From table 3, the service factor is 1.75.

2. Calculate equivalent HP per 100 PRM

$$\text{HP/100 RPM} = \frac{19 \times 100 \times 1.75}{1170} = 2.84$$

3. From Table 5 the size 1050 rates 3.00 HP per 100 RPM.

4. This is a close coupled application; therefore, use a Type WA21 coupling.

5. From the dimension pages, the 1050WA21 coupling has a maximum RPM of 4500 which exceeds the application requirement of 1170. The maximum bore size for the 1050WA21 coupling is 2.500 inches, larger than either of the shaft sizes. Therefore, the 1050WA21 coupling is suitable, and would require a No. 2517 Taper-Lock® bushing.

Table 5 Horsepower and Torque Ratings at Unity (1.00) Service Factor

Coupling Size	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160
Torque—lb-in.	540	750	1,125	1,890	2,700	4,050	5,400	9,000	15,000	22,000	31,500	50,000	70,000	107,100	141,800
HP per 100 rpm	.86	1.19	1.79	3.00	4.28	6.43	8.57	14.3	23.8	34.9	50.0	79.3	111.0	170.0	225.0

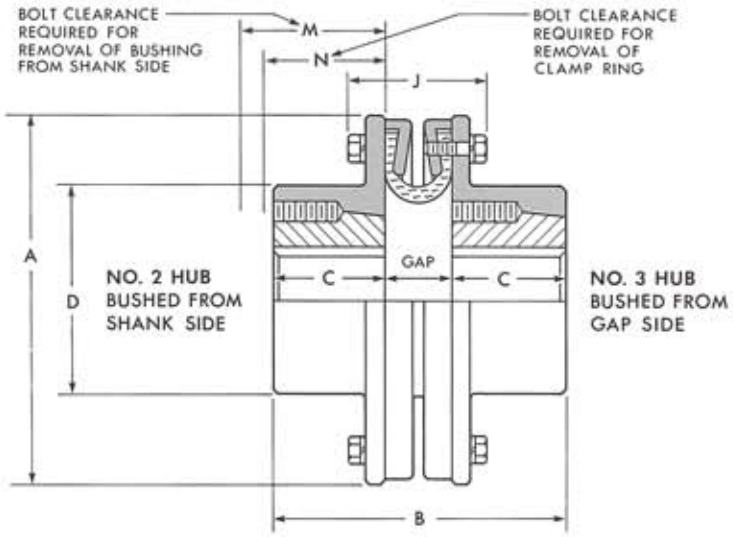
WA21

General purpose coupling

For standard close coupled applications. Available with Taper-Lock® bushings, or with standard or long length hubs for straight or tapered bores.

When ordering specify:
1. Coupling size
2. Type of hubs
3. Bore and keyway sizes

Unless otherwise specified, size 1020 through 1090 are furnished with clearance fit bores, and larger sizes are furnished with interference fit bores.



WA21 Selection Data and Dimensions

Size	HP per 100 rpm	Torque Rating (lb-in.)	Allow. Speed rpm	Coupling Bores—Inches						Dimensions—Inches		
				No. 1 Hub		No. 2 or 3 Hubs with Taper-Lock® Bushing		No. 6 Hub	Bushing No.	A	B	
				Min	Max	Min	Max	Max				
1020	0.86	540	5000	.500	1.500	.500	1.625	2.125	1610	5.41	3.15	
1030	1.19	750	5000	.500	1.625	.500	1.625	2.500	1610	5.91	3.50	
1040	1.79	1,125	5000	.500	1.875	.500	2.000	2.750	2012	6.79	3.74	
1050	3.00	1,890	4500	.625	2.500	.500	2.500	3.125	2517	7.56	5.00	
1060	4.28	2,700	4000	.625	2.625	.500	2.500	3.625	2517	8.62	5.26	
1070	6.43	4,050	3600	.875	3.000	.875	3.000	4.000	3020	9.54	5.86	
1080	8.57	5,400	3000	.875	3.250	.875	3.000	4.500	3020	10.86	6.63	
1090	14.3	9,000	2800	.875	3.500	.875	3.000	5.000	3020	12.22	7.36	
1100	23.8	15,000	2400	1.125	4.750	1.188	3.938	5.750	3535	14.04	9.62	
1110	34.9	22,000	2200	1.500	5.500	1.438	4.438	6.250	4040	15.46	11.24	
1120	50.0	31,500	2000	1.500	6.000	1.938	4.938	6.375	4545	16.94	12.68	
1130	79.3	50,000	1850	1.500	6.500	1.938	4.938	6.750	4545	18.54	13.12	
1140	111.0	70,000	1600	1.750	7.000	1.938	4.938	7.000	4545	20.06	15.82	
1150	170.0	107,100	1500	1.875	7.500	2.438	5.000	7.500	5050	22.68	17.00	
1160	225.0	141,800	1400	2.000	8.000	2.438	5.000	8.000	5050	24.28	18.55	

WA21 Component Part Weights and Inertias (WR²)

Size	Weight—lbs				Inertia (WR²)—lb-in²			
	Per Hub with Maximum Bore or Bushing with Maximum Bore			Clamp Ring Assembly (2 clamp rings, 1 flexible element, and 1 set of hardware)	Per Hub with Maximum Bore or Bushing with Maximum Bore			Clamp Ring Assembly (2 clamp rings, 1 flexible element, and 1 set of hardware)
	No. 1	No. 2 or 3	No. 6		No. 1	No. 2 or 3	No. 6	
1020	3.3	3.1	4.9	2.4	9.1	8.9	13.2	10.6
1030	4.3	4.2	6.8	2.4	13.7	13.6	21.5	15.6
1040	6.3	6.2	10.6	2.8	26.6	26.3	43.5	25.2
1050	9.2	9.2	14.6	5.5	46	46	73	56
1060	13.3	13.6	19.5	7.8	88	88	131	106
1070	18.8	18.5	24	8.9	167	165	210	128
1080	25	26	33	11.5	246	246	341	300
1090	39	40	56	19.6	490	490	740	535
1100	68	73	82	32	1,205	1,230	1,515	1,295
1110	76	85	89	46	1,575	1,630	1,865	2,030
1120	82	93	96	60	1,930	2,000	2,190	2,840
1130	96	113	120	72	2,810	2,950	3,310	4,110
1140	123	150	138	86	4,245	4,500	4,550	5,830
1150	160	196	168	146	7,190	7,560	7,400	12,680
1160	195	244	209	173	10,330	10,890	10,690	16,930

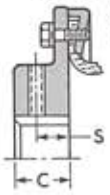
WA21 Selection Data and Dimensions
- GAP is the required distance between hub faces, and normally, between shaft ends.

▲Grade 8, zink plated cap screws.

WA21 Component Part Weights and Inertias (WR²)
Example: 1080WA21 with No. 1 hub on one side and No. 6 hub on other side.
Weight = No. 1 hub + clamp ring assembly + No. 6 hub
= 25 + 11.5 + 33 = 69.5 lbs.
Inertia = 246 +300 + 341 = 887 lb-in²

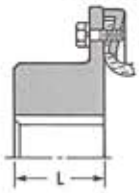
OPTIONAL HUBS

NO. 1 HUB



STRAIGHT OR SPECIAL BORE

NO. 6 LONG HUB



FOR EXTRA BORE CAPACITY, OVERHUNG HUBS OR TAPER BORES

	Dimensions—Inches (cont.)								Clamp Ring Fastener Information ▲			
Size	C	D	J	L	M	N	S	GAP •	Bolt Circle Diameter (Inches)	Size (Inches)	Length (Inches)	No. per Flange
1020	1.06	3.38	2.04	2.54	2.68	1.30	.78	1.03	4.312	.25-20	.75	6
1030	1.22	3.69	2.07	3.38	2.84	1.30	1.00	1.06	4.814	.25-20	.75	6
1040	1.31	4.44	2.13	3.32	3.31	1.30	1.03	1.12	5.684	.25-20	.75	6
1050	1.81	4.94	2.48	3.94	3.68	1.40	1.31	1.38	6.220	.3125-18	.875	8
1060	1.88	5.69	2.68	3.94	3.75	1.60	1.48	1.50	7.158	.3125-18	1.00	8
1070	2.12	6.00	3.22	3.94	4.81	2.10	1.62	1.62	8.064	.3125-18	1.25	8
1080	2.44	7.00	2.81	4.50	5.13	1.60	1.62	1.75	9.140	.3125-18	1.00	10
1090	2.62	8.25	3.37	5.18	5.31	2.00	1.62	2.12	10.220	.375-16	1.25	10
1100	3.56	9.88	3.96	5.12	6.94	2.30	...	2.50	11.660	.438-14	1.50	10
1110	4.12	9.88	4.67	5.76	8.24	2.70	...	3.00	12.880	.500-13	1.75	12
1120	4.56	10.00	5.17	5.88	8.94	2.60	...	3.56	14.320	.500-13	1.75	12
1130	4.56	10.50	5.81	6.50	8.94	3.00	...	4.00	15.940	.500-13	2.00	14
1140	5.60	10.70	6.67	6.62	9.98	3.40	...	4.62	17.440	.500-13	2.25	16
1150	6.00	11.20	7.49	6.62	11.25	4.10	...	5.00	19.560	.625-11	2.75	16
1160	6.40	11.80	8.44	7.26	12.40	4.40	...	5.75	21.200	.625-11	3.00	18

WA37

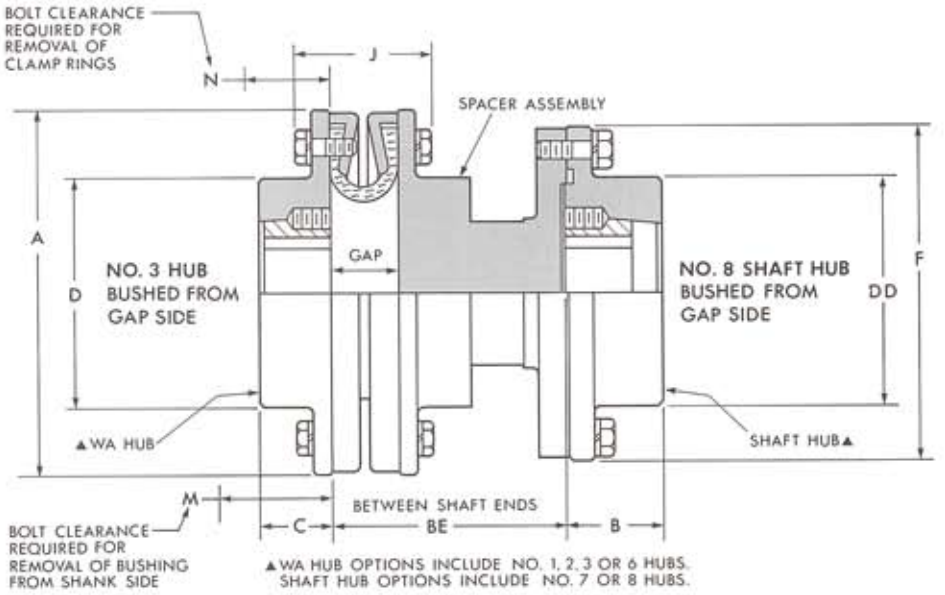
Half spacer coupling

For most ANSI process pump applications. Center section of coupling between WA hub and shaft hub is removable to allow easy servicing of the connected equipment. Both hubs are available with Taper-Lock® bushings or with straight bores; WA hub also available for tapered bores.

When ordering specify:

1. Coupling size
2. Type of hubs
3. Bore and keyway sizes
4. Distance between shaft ends (BE)

Unless otherwise specified, size 1020 through 1090 are furnished with clearance fit bores, and larger sizes are furnished with interference fit bores.



WA37 Selection Data and Dimensions

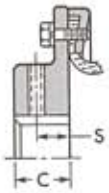
Size	HP per 100 rpm	Torque Rating (lb-in.)	Max Speed rpm	WA Hub Bores—Inches							Shaft Hub Bores—Inches		
				No. 1 Hub			No. 2 or 3 Hubs with Taper-Lock® Bushing			No. 6 Hub	No. 7 Hub		
				Min	Max	S	Min	Max	Bushing	Max	Min	Max	S
1020	0.86	540	3600	.500	1.500	0.78	.500	1.625	1610	2.125	.500	2.375	1.60
1030	1.19	750	3600	.500	1.625	1.00	.500	1.625	1610	2.500	.500	2.375	1.60
1040	1.79	1,125	3600	.500	1.875	1.03	.500	2.000	2012	2.750	.500	2.375	1.60
1050	3.00	1,890	3600	.625	2.500	1.31	.500	2.500	2517	3.125	.500	2.375	1.60
1060	4.28	2,700	3100	.625	2.625	1.48	.500	2.500	2517	3.625	1.062	3.500	1.96
1070	6.43	4,050	2800	.875	3.000	1.62	.875	3.000	3020	4.000	1.062	3.500	1.96
1080	8.57	5,400	2600	.875	3.250	1.62	.875	3.000	3020	4.500	1.062	3.500	1.96
1090	14.3	9,000	2100	.875	3.500	1.62	.875	3.000	3020	5.000	1.062	3.500	1.96
1100	23.8	15,000	1840	1.125	4.750	...	1.188	3.938	3535	5.750	1.500	4.750	...
1110	34.9	22,000	1750	1.500	5.500	...	1.438	4.438	4040	6.250	1.500	4.750	...
1120	50.0	31,500	1600	1.500	6.000	...	1.938	4.938	4545	6.375	1.500	4.750	...
1130	79.3	50,000	1450	1.500	6.500	...	1.938	4.938	4545	6.750	1.500	4.750	...

WA37 Component Part Weights and Inertias (WR^2)

Size	Weight—lbs								Inertia (WR^2)—lb-in^2							
	Per Hub with Maximum Bore or Bushing with Maximum Bore					Clamp Ring Assembly (2 clamp rings, 1 flexible element, and 1 set of hardware)	Basic Spacer	Weight per Inch of BE	Per Hub with Maximum Bore or Bushing with Maximum Bore					Clamp Ring Assembly (2 clamp rings, 1 flexible element, and 1 set of hardware)	Basic Spacer	WR^2 per Inch of BE
	No. 1	No. 2 or 3	No. 6	No. 7	No. 8				No. 1	No. 2 or 3	No. 6	No. 7	No. 8			
1020	3.3	3.1	4.9	4.2	5.6	2.4	3.5	1.01	9.1	8.9	13.2	11.8	12	10.6	14.7	.56
1030	4.3	4.2	6.8	4.2	5.6	2.4	4.5	1.01	13.7	13.6	21.5	11.8	12	15.6	19.2	.56
1040	6.3	6.2	10.6	4.2	5.6	2.8	6.7	1.01	26.6	26.3	43.5	11.8	12	25.2	32	.56
1050	9.2	9.2	14.6	4.2	5.6	5.5	10.3	1.01	46	46	73	11.8	12	56	53	.56
1060	13.3	13.6	19.5	11.5	15.2	7.8	12.2	2.73	88	88	131	66	77	106	117	4.14
1070	18.8	18.5	24	11.5	15.2	8.9	18.0	2.73	167	165	210	66	77	128	197	4.14
1080	25	26	33	11.5	15.2	11.5	25	2.73	246	246	341	66	77	300	277	4.14
1090	39	40	56	11.5	15.2	19.6	38	2.73	490	490	740	66	77	535	522	4.14
1100	68	73	82	26	31	32	58	6.73	1205	1230	1515	320	345	1295	1300	25.2
1110	76	85	89	26	31	46	68	6.73	1575	1630	1865	320	345	2030	1695	25.2
1120	82	93	96	26	31	60	77	6.73	1930	2000	2190	320	345	2840	2085	25.2
1130	96	113	120	26	31	72	93	6.73	2810	2950	3310	320	345	4110	3015	25.2

OPTIONAL HUBS

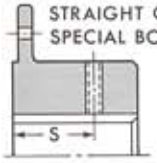
NO. 1 HUB
STRAIGHT OR SPECIAL BORE



NO. 2 HUB
BUSHED FROM SHANK SIDE

NO. 6 LONG HUB
FOR EXTRA BORE CAPACITY, OVERHUNG HUBS OR TAPER BORES

NO. 7 SHAFT HUB
STRAIGHT OR SPECIAL BORE



Size	Shaft Hub Bores—Inches (cont.)			Dimensions—Inches										
	No. 8 Hub with Taper-Lock® Bushing			A	B	C	D	DD	F	J	L	M	N	GAP ●
	Min	Max	Bushing											
1020	.500	1.625	1615	5.41	2.38	1.06	3.38	3.44	4.94	2.04	2.54	2.68	1.30	1.03
1030	.500	1.625	1615	5.91	2.38	1.22	3.69	3.44	4.94	2.07	3.38	2.84	1.30	1.06
1040	.500	1.625	1615	6.79	2.38	1.31	4.44	3.44	4.94	2.13	3.32	3.31	1.30	1.12
1050	.500	1.625	1615	7.56	2.38	1.81	4.94	3.44	4.94	2.48	3.94	3.68	1.40	1.38
1060	.750	2.500	2525	8.62	3.50	1.88	5.69	4.81	7.00	2.68	3.94	3.75	1.60	1.50
1070	.750	2.500	2525	9.54	3.50	2.12	6.00	4.81	7.00	3.22	3.94	4.81	2.10	1.62
1080	.750	2.500	2525	10.86	3.50	2.44	7.00	4.81	7.00	2.81	4.50	5.13	1.60	1.75
1090	.750	2.500	2525	12.22	3.50	2.62	8.25	4.81	7.00	3.37	5.18	5.31	2.00	2.12
1100	1.188	3.938	3535	14.04	3.56	3.56	9.88	6.75	9.88	3.96	5.12	6.94	2.30	2.50
1110	1.188	3.938	3535	15.46	3.56	4.12	9.88	6.75	9.88	4.67	5.76	8.24	2.70	3.00
1120	1.188	3.938	3535	16.94	3.56	4.56	10.00	6.75	9.88	5.17	5.88	8.94	2.60	3.56
1130	1.188	3.938	3535	18.54	3.56	4.56	10.50	6.75	9.88	5.81	6.50	8.94	3.00	4.00

WA37 Selection Data and Dimensions

● GAP is the required distance between hub faces, and normally, between shaft ends.

See Pages 9 and 13 for coupling and spacer hub fastener information.

WA37 Component Part Weights and Inertias (WR^2)

Example: 1060WA37 with 5" BE and No. 3 hub on WA side and No. 8 hub on shaft hub side.

Weight = No. 3 hub + clamp ring assembly + basic spacer + 5 x weight per inch of BE + No. 8 hub
= 13.6 + 7.8 + 12.2 + 5 (2.73) + 15.2 = 62.45 lbs.

Inertia = 88 + 106 + 117 + 5 (4.14) + 77 = 408.7 lb-in²

WA37 Standard BE Spacer Lengths

▲If smaller BE dimension is required, consult factory.

WA37 Standard BE Spacer Lengths—Inches

Size	Min BE▲	Standard BE Spacers					Max BE
		3.5	4.38	5	7	10	
1020	2.75	●	●	●	●		7.00
1030	2.75	●	●	●	●		7.00
1040	3.00	●	●	●	●		7.00
1050	3.50	●	●	●	●		7.00
1060	4.37		●	●	●	●	10.00
1070	5.00			●	●	●	10.00
1080	5.00			●	●	●	10.00
1090	5.00			●	●	●	10.00
1100	7.00				●	●	10.00
1110	7.00				●	●	10.00
1120	9.06					●	10.00
1130	9.50					●	10.00

WA33

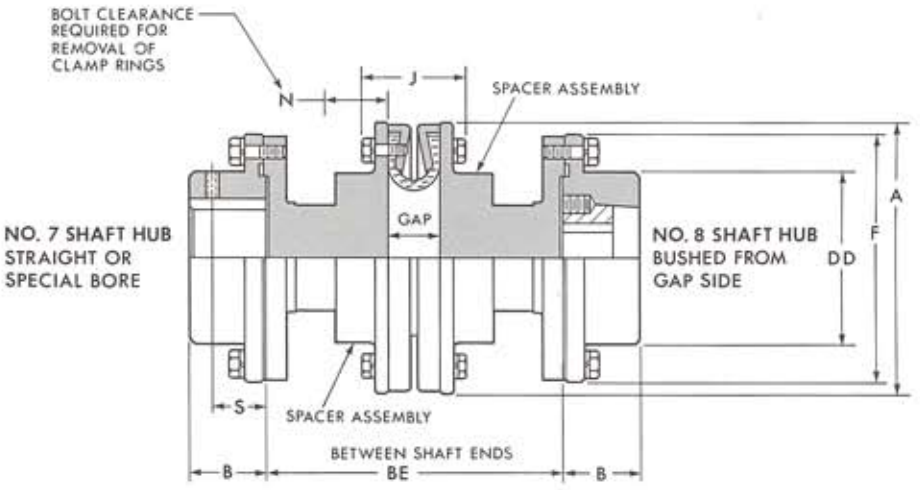
Full spacer coupling

Center section of coupling between shaft hubs is removable to allow easy servicing of the connected equipment. Shaft hubs are available with Taper-Lock® bushings or with straight bores.

When ordering specify:

1. Coupling size
2. Type of hubs
3. Bore and keyway sizes
4. Distance between shaft ends (BE)

Unless otherwise specified, size 1020 through 1090 are furnished with clearance fit bores, and larger sizes are furnished with interference fit bores.



WA33 Selection Data and Dimensions

Size	HP per 100 rpm	Torque Rating (lb-in.)	Max Speed rpm	Shaft Hub Bores—Inches					Dimensions—Inches			
				No. 7 Hub		No. 8 Hub with Taper-Lock® Bushing			A	B	BE	
				Min	Max	Min	Max	Bushing			Min	Max
1020	0.86	540	3600	.500	2.375	.500	1.625	1615	5.41	2.38	4.47	12.97
1030	1.19	750	3600	.500	2.375	.500	1.625	1615	5.91	2.38	4.44	12.94
1040	1.79	1,125	3600	.500	2.375	.500	1.625	1615	6.79	2.38	4.88	12.88
1050	3.00	1,890	3600	.500	2.375	.500	1.625	1615	7.56	2.38	5.62	12.62
1060	4.28	2,700	3100	1.062	3.500	.750	2.500	2525	8.62	3.50	7.24	18.50
1070	6.43	4,050	2800	1.062	3.500	.750	2.500	2525	9.54	3.50	8.38	18.38
1080	8.57	5,400	2600	1.062	3.500	.750	2.500	2525	10.86	3.50	8.25	18.25
1090	14.3	9,000	2100	1.062	3.500	.750	2.500	2525	12.22	3.50	7.88	17.88
1100	23.8	15,000	1840	1.500	4.750	1.188	3.938	3535	14.04	3.56	11.50	17.50
1110	34.9	22,000	1750	1.500	4.750	1.188	3.938	3535	15.46	3.56	11.00	17.00
1120	50.0	31,500	1600	1.500	4.750	1.188	3.938	3535	16.94	3.56	14.56	16.44
1130	79.3	50,000	1450	1.500	4.750	1.188	3.938	3535	18.54	3.56	15.00	16.00

WA33 Component Part Weights and Inertias (WR^2)

Size	Weight—lbs					Inertia (WR^2)—lb-ft²				
	Per Hub with Maximum Bore or Bushing with Maximum Bore		Clamp Ring Assembly (2 clamp rings, 1 flexible element, and 1 set of hardware)	Basic Spacer	Weight per Inch of BE	Per Hub with Maximum Bore or Bushing with Maximum Bore		Clamp Ring Assembly (2 clamp rings, 1 flexible element, and 1 set of hardware)	Basic Spacer	WR^2 per Inch of BE
	No. 7	No. 8				No. 7	No. 8			
1020	4.2	5.6	2.4	3.5	1.01	11.8	12	10.6	14.7	.56
1030	4.2	5.6	2.4	4.5	1.01	11.8	12	15.6	19.2	.56
1040	4.2	5.6	2.8	6.7	1.01	11.8	12	25.2	32	.56
1050	4.2	5.6	5.5	10.3	1.01	11.8	12	56	53	.56
1060	11.5	15.2	7.8	12.2	2.73	66	77	106	117	4.14
1070	11.5	15.2	8.9	18.0	2.73	66	77	128	197	4.14
1080	11.5	15.2	11.5	25	2.73	66	77	300	277	4.14
1090	11.5	15.2	19.6	38	2.73	66	77	535	522	4.14
1100	26	31	32	58	6.73	320	345	1295	1300	25.2
1110	26	31	46	68	6.73	320	345	2030	1695	25.2
1120	26	31	60	77	6.73	320	345	2840	2085	25.2
1130	26	31	72	93	6.73	320	345	4110	3015	25.2

WA33 Selection Data and Dimensions

- GAP is the required distance between hub faces, and normally, between shaft ends.

▲Grade 5 cap screws.

WA33 Component Part Weights and Inertias (WR^2)

Example: 1050WA33 with 7" BE and No. 7 hubs.

Weight = No. 7 hub + basic spacer + clamp ring assembly + basic spacer + 7 x weight per inch of BE + No. 7 hub

= 4.2 + 10.3 + 5.5 + 10.3 + 7 (1.01) + 4.2 = 41.57 lbs.

Inertia = 11.8 + 53 + 56 + 53 + 7 (.56) + 11.8 = 189.52 lb-in²

	Dimensions—Inches (cont.)						Spacer Hub Fastener Information ▲			
Size	DD	F	J	N	S	GAP ●	Bolt Circle Diameter (Inches)	Size (Inches)	Length (Inches)	No. per Flange
1020	3.44	4.94	2.04	1.30	1.60	1.03	4.250	.3125-18	.875	8
1030	3.44	4.94	2.07	1.30	1.60	1.06	4.250	.3125-18	.875	8
1040	3.44	4.94	2.13	1.30	1.60	1.12	4.250	.3125-18	.875	8
1050	3.44	4.94	2.48	1.40	1.60	1.38	4.250	.3125-18	.875	8
1060	4.81	7.00	2.68	1.60	1.96	1.50	6.000	.500-13	1.25	12
1070	4.81	7.00	3.22	2.10	1.96	1.62	6.000	.500-13	1.25	12
1080	4.81	7.00	2.81	1.60	1.96	1.75	6.000	.500-13	1.25	12
1090	4.81	7.00	3.37	2.00	1.96	2.12	6.000	.500-13	1.25	12
1100	6.75	9.88	3.96	2.30	...	2.50	8.500	.75-10	1.75	12
1110	6.75	9.88	4.67	2.70	...	3.00	8.500	.75-10	1.75	12
1120	6.75	9.88	5.17	2.60	...	3.56	8.500	.75-10	1.75	12
1130	6.75	9.88	5.81	3.00	...	4.00	8.500	.75-10	1.75	12

WA90

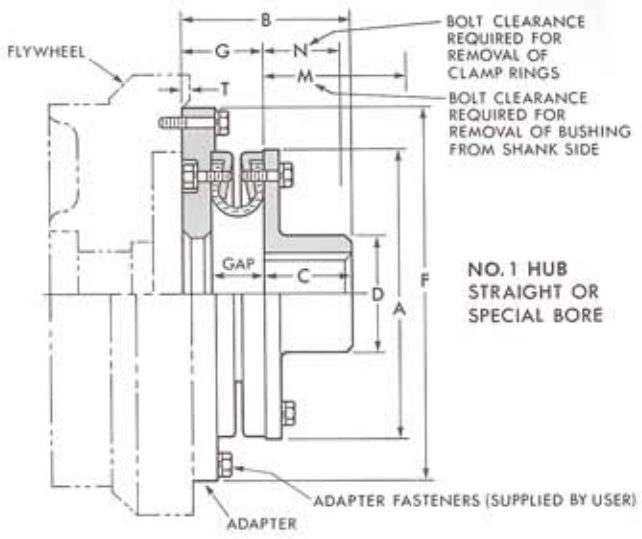
Flywheel adapter coupling

Convenient, compact connection for a shaft to an engine flywheel. One side of coupling is an adapter that bolts to flywheel; the other side has a standard hub that accepts the driven shaft. Hub is available with Taper-Lock® bushing or with straight or tapered bore.

When ordering specify:

1. Coupling size
2. Type of hub
3. Bore and keyway size
4. Adapter diameter (F)
5. Nominal clutch diameter
6. SAE housing number

Unless otherwise specified, all WA90 couplings are furnished with an interference fit bore.



WA90 Selection Data and Dimensions

Size	HP per 100 rpm	Torque Rating (lb-in.)	Allow. Speed rpm	Coupling Hub Bores—Inches						Dimensions—Inches		
				No. 1 Hub		No. 2 or 3 Hubs with Taper-Lock® Bushing		No. 6 Hub	Bushing No.	A	B	C
				Min	Max	Min	Max	Max				
1040	1.79	1,125	5000	.500	1.875	.500	2.000	2.750	2012	6.78	2.90	1.31
1050	3.00	1,890	4500	.625	2.500	.500	2.500	3.125	2517	7.56	3.72	1.81
1060	4.28	2,700	4000	.625	2.625	.500	2.500	3.625	2517	8.62	3.97	1.88
1070	6.43	4,050	3600	.875	3.000	.875	3.000	4.000	3020	9.54	4.54	2.12
1080	8.57	5,400	3000	.875	3.250	.875	3.000	4.500	3020	10.86	4.73	2.44
1090	14.3	9,000	2800	.875	3.500	.875	3.000	5.000	3020	12.22	5.37	2.62
1100	23.8	15,000	2400	1.125	4.750	1.188	3.938	5.750	3535	14.04	6.80	3.56
1110	34.9	22,000	2200	1.500	5.500	1.438	4.438	6.250	4040	15.46	7.97	4.12
1120	50.0	31,500	2000	1.500	6.000	1.938	4.938	6.375	4545	16.94	8.91	4.56
1130	79.3	50,000	1850	1.500	6.500	1.938	4.938	6.750	4545	18.54	9.48	4.56
1140	111.0	70,000	1600	1.750	7.000	1.938	4.938	7.000	4545	20.06	11.26	5.60
1150	170.0	107,100	1500	1.875	7.500	2.438	5.000	7.500	5050	22.68	12.26	6.00
1160	225.0	141,800	1400	2.000	8.000	2.438	5.000	8.000	5050	24.28	13.51	6.40

WA90 Component Part Weights and Inertias (WR^2)

Size	Nominal Clutch Diameter	SAE Housing No.	F +.000 −.005	Weight—lbs					Inertia (WR^2)—lb-in²				
				Adapter	Clamp Ring Assembly (2 clamp rings, 1 flexible element, and 1 set of hardware)	Per Hub with Maximum Bore or Bushing with Maximum Bore			Adapter	Clamp Ring Assembly (2 clamp rings, 1 flexible element, and 1 set of hardware)	Per Hub with Maximum Bore or Bushing with Maximum Bore		
						No. 1	No. 2 or 3	No. 6			No. 1	No. 2 or 3	No. 6
1040	6.5 7.5	6, 5 6, 5	8.500 9.500	6.4 8.5	2.8	6.3	6.2	10.6	70 112	25.2	26.6	26.3	43.5
1050	7.5 8	6, 5 4, 3	9.500 10.375	9.3 11.6	5.5	9.2	9.2	14.6	126 183	56	46	46	73
1060	8 10	4, 3 4, 3, 2, 1	10.375 12.375	11.7 18.4	7.8	13.3	13.6	19.5	194 410	106	88	88	131
1070	10 11.5	4, 3, 2, 1 3, 2, 1, 0	12.375 13.875	22.6 30	8.9	18.8	18.5	24	530 860	128	167	165	210
1080	11.5	3, 2, 1, 0	13.875	16.6	11.5	25	26	33	455	300	246	246	341
1090	14	1, 0, 00	18.375	35	19.6	39	40	56	1,615	535	490	490	740
1100	14 16	1, 0, 00 0, 00	18.375 20.375	41 52	32	68	73	82	1,940 2,910	1,295	1,205	1,230	1,515

WA90 Selection Data and Dimensions

• GAP is the required distance between hub faces, and normally, between shaft ends.

▲Grade 8, zink plated cap screws.

WA90 Component Part Weights and Inertias (WR^2)

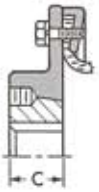
Example: 1070WA90 coupling with 10" nominal clutch diameter and No. 2 hub.

Weight = adapter + clamp ring assembly + No. 2 hub = 22.6 + 8.9 + 18.5 = 50 lbs.

Inertia =530 + 128 + 165 = 823 lb-in²

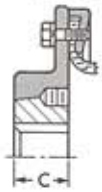
OPTIONAL HUBS

NO. 2 HUB



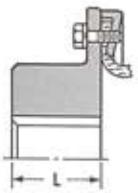
BUSHED FROM SHANK SIDE

NO. 3 HUB



BUSHED FROM GAP SIDE

NO. 6 LONG HUB



FOR EXTRA BORE CAPACITY, OVERHUNG HUBS OR TAPER BORES

	Dimensions—Inches (cont.)							Clamp Ring Fastener Information ▲			
Size	D	G	L	M	N	T Max	GAP ●	Bolt Circle Diameter (Inches)	Size (Inches)	Length (Inches)	No. per Flange
1040	4.44	1.59	3.32	3.31	1.30	.06	1.12	5.684	.25-20	.75	6
1050	4.94	1.91	3.94	3.68	1.40	.06	1.38	6.220	.3125-18	.875	8
1060	5.69	2.09	3.94	3.75	1.60	.06	1.50	7.158	.3125-18	1.00	8
1070	6.00	2.42	3.94	4.81	2.10	.12	1.62	8.064	.3125-18	1.25	8
1080	7.00	2.29	4.50	5.13	1.60	.12	1.75	9.140	.3125-18	1.00	10
1090	8.25	2.75	5.18	5.31	2.00	.12	2.12	10.220	.375-16	1.25	10
1100	9.88	3.24	5.12	6.94	2.30	.12	2.50	11.660	.438-14	1.50	10
1110	9.88	3.85	5.76	8.24	2.70	.12	3.00	12.880	.500-13	1.75	12
1120	10.00	4.35	5.88	8.94	2.60	.20	3.56	14.320	.500-13	1.75	12
1130	10.50	4.92	6.50	8.94	3.00	.20	4.00	15.940	.500-13	2.00	14
1140	10.70	5.66	6.62	9.98	3.40	.20	4.62	17.440	.500-13	2.25	16
1150	11.20	6.26	6.62	11.25	4.10	.20	5.00	19.560	.625-11	2.75	16
1160	11.80	7.11	7.26	12.40	4.40	.20	5.75	21.200	.625-11	3.00	18

WA90 Component Part Weights and Inertias (WR^2) (cont.)

Size	Nominal Clutch Diameter	SAE Housing No.	F +.000 −.005	Weight—lbs					Inertia (WR^2)—lb-in^2				
				Adapter	Clamp Ring Assembly (2 clamp rings, 1 flexible element, and 1 set of hardware)	Per Hub with Maximum Bore or Bushing with Maximum Bore			Adapter	Clamp Ring Assembly (2 clamp rings, 1 flexible element, and 1 set of hardware)	Per Hub with Maximum Bore or Bushing with Maximum Bore		
						No. 1	No. 2 or 3	No. 6			No. 1	No. 2 or 3	No. 6
1110	14 16 18	1, 0, 00 0, 00 0, 00	18.375 20.375 22.500	46 58 71	46	76	85	89	2,230 3,300 4,840	2,030	1,575	1,630	1,865
1120	16 18 21	0, 00 0, 00 00	20.375 22.500 26.500	51 70 86	60	82	93	96	2,930 4,210 7,830	2,840	1,930	2,000	2,190
1130	18 21 24	0, 00 00 00	22.500 26.500 28.875	71 99 119	72	96	113	120	5,080 9,370 13,020	4,110	2,810	2,950	3,310
1140	21 24	00 00	26.500 28.875	112 134	86	123	150	138	10,760 14,860	5,830	4,245	4,500	4,550
1150	21 24	00 00	26.500 28.875	135 161	146	160	196	168	12,640 17,270	12,680	7,190	7,560	7,400
1160	24	00	28.875	173	173	195	244	209	20,270	16,930	10,330	10,890	10,690

How to order

The following information is necessary to supply a WA coupling to your exact requirements. Prompt service is assured if this information is given on your inquiry or order.

1. Coupling type
Indicate if the Torus coupling desired is Type WA21 for general purpose applications, Types WA33 or WA37 for spacer applications, or Type WA90 for flywheel applications.

2. Coupling size
Select a coupling size using the "Quick selection method" on Page 4 or the "Formula selection method" on Page 7. If you have any questions regarding size selection, contact your local Falk Sales Office or supply the following information with your order.
a. Type of driver (electric motor, diesel engine, number of cylinders, etc.)
b. Type of driven machine (see Page 6)
c. Maximum operating speed (RPM)
d. Normal or maximum HP or torque (lb-in)

3. Coupling bores
a. No. 1, 6, or 7 hubs—Specify straight bore size and keyway. Unless otherwise specified, **clearance fit bores** with a set screw over the keyway will be supplied for coupling sizes 1020 through 1090; **interference fit bores** without a set screw will be supplied for coupling sized 1100 and larger. All type WA90 couplings will be supplied with interference fit bores because of the high vibration levels generally experienced in engine applications. Refer to Table 8 for recommended key sizes.
b. No. 2, 3, or 8 hubs—These hubs are bushed. Specify bore size and keyway.
c. Taper bored hubs—Taper bores require a No. 6 hub. See Table 12 for taper and counterbore limitations. Supply complete dimensions of shafting or provide a certified motor print or the motor frame size and manufacturer's name.

4. Dimensions
Furnish dimensions as follows (in inches)
For straight shafts:

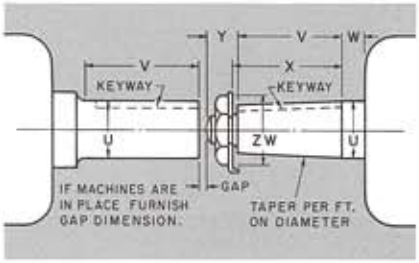
Driving shaft:	**Driven shaft:**
Dia. U_____	Dia. U_____
Length V_____	Length V_____
Keyway_____	Keyway_____

For taper shafts: key assumed to be parallel to bore.

Dia. U_____	Across flats_____
Length V_____	Corners ZW_____
Length W_____	Taper per ft._____
Length X_____	Keyway_____
Length Y_____	

Table 6 Recommended Bores for Falk Steel Coupling Hubs—Inches

Shaft Dia	Clearance Fit		Interference Fit	
	Hub Bore	Clearance	Hub Bore	Interference
+.0000 −.0005	+.0020 −.0000	.0000 .0025	+.0008 −.0000	.0000 .0013
.5000	.5000		.4987	
.5625	.5625		.5612	
.6250	.6250		.6237	
.6875	.6875		.6862	
.7500	.7500		.7487	
.8125	.8125		.8112	
.8750	.8750		.8737	
.9375	.9375		.9362	
1.0000	1.0000		.9987	
1.0625	1.0625		1.0612	
1.1250	1.1250		1.1237	
1.1875	1.1875		1.1862	
1.2500	1.2500		1.2487	
1.3125	1.3125		1.3112	
1.3750	1.3750		1.3737	
1.4375	1.4375		1.4362	
1.5000	1.5000		1.4987	
+.0000 −.0005	+.0020 −.0000	.0000 .0025	+.0008 −.0000	.0002 .0015
1.5625	1.5625		1.5610	
1.6250	1.6250		1.6235	
1.6875	1.6875		1.6860	
1.7500	1.7500		1.7485	
1.8125	1.8125		1.8110	
1.8750	1.8750		1.8735	
1.9375	1.9375		1.9360	
2.0000	2.0000		1.9985	
2.0625	2.0625		2.0610	
2.1250	2.1250		2.1235	
2.1875	2.1875		2.1860	
+.0000 −.0005	+.0020 −.0000	.0000 .0025	+.0010 −.0000	.0005 .0020
2.2500	2.2500		2.2480	
2.3125	2.3125		2.3105	
2.3750	2.3750		2.3730	
2.4375	2.4375		2.4355	
2.5000	2.5000		2.4980	
2.5625	2.5625		2.5605	
2.6250	2.6250		2.6230	
2.6875	2.6875		2.6855	
2.7500	2.7500		2.7480	
2.8125	2.8125		2.8105	
2.8750	2.8750		2.8730	
2.9375	2.9375		2.9355	



Shaft Dia	Clearance Fit		Interference Fit	
	Hub Bore	Clearance	Hub Bore	Interference
+.0000 −.0010	+.0020 −.0000	.0000 .0030	+.0010 −.0000	.0005 .0025
3.0000	3.0000		2.9980*	
3.0625	3.0625		3.0600	
3.1250	3.1250		3.1225	
3.1875	3.1875		3.1850	
3.2500	3.2500		3.2475	
3.3125	3.3125		3.3100	
3.3750	3.3750		3.3725	
3.4375	3.4375		3.4350	
3.5000	3.5000		3.4975	
3.5625	3.5625		3.5600	
3.6250	3.6250		3.6225	
3.6875	3.6875		3.6850	
3.7500	3.7500		3.7475	
3.8125	3.8125		3.8100	
3.8750	3.8750		3.8725	
3.9375	3.9375		3.9350	
4.0000	4.0000		3.9975	

Shaft Dia	Interference Fit	
	Hub Bore	Interference
+.0000 −.0010	+.0015 −.0000	.0010 .0035
4.0625	4.0590	
4.1250	4.1215	
4.1875	4.1840	
4.2500	4.2465	
4.3125	4.3090	
4.3750	4.3715	
4.4375	4.4340	
4.5000	4.4965	
4.5625	4.5590	
4.6250	4.6215	
4.6875	4.6840	
4.7500	4.7465	
4.8125	4.8090	
4.8750	4.8715	
4.9375	4.9340	
5.0000	4.9965	
5.0625	5.0585	.0015
5.1250	5.1210	.0040
5.1875	5.1835	
5.2500	5.2460	
5.3125	5.3085	
5.3750	5.3710	
5.4375	5.4335	
5.5000	5.4960	
5.5625	5.5585	
5.6250	5.6210	
5.6875	5.6835	
5.7500	5.7460	
5.8125	5.8085	
5.8750	5.8710	
5.9375	5.9335	
6.0000	5.9955	.0020
6.2500	6.2455	.0045
6.5000	6.4955	
6.7500	6.7455	
7.000	6.9950	.0025
7.250	7.2450	.0050
7.500	7.4950	
7.750	7.7450	
8.000	7.9945	.0030
8.250	8.2445	.0055

* For 2.9980 bore, interference fit is .0000 to .0020.

Table 7 Bore Range with Square and Rectangular Keys—Inches

Size	Min Bore	One Square Key			One Rectangular Key					
		Max Bore	Y = X		Max Bore	Y = X		Max Bore	Y = W/2▲	
			W	X		W	X		W	X
No. 1 Hubs										
1020	0.500	1.500	0.375	0.188	1.500	0.375	0.125	1.500	0.375	0.062
1030	0.500	1.625	0.375	0.188	1.750	0.375	0.125	1.750	0.375	0.062
1040	0.500	1.875	0.500	0.250	1.875	0.500	0.188	1.875	0.500	0.125
1050	0.625	2.500	0.625	0.312	2.500	0.625	0.218	2.500	0.625	0.125
1060	0.625	2.625	0.625	0.312	2.625	0.625	0.218	2.625	0.625	0.125
1070	0.875	3.000	0.750	0.375	3.000	0.750	0.250	3.000	0.750	0.125
1080	0.875	3.250	0.750	0.375	3.500	0.875	0.312	3.500	0.875	0.188
1090	0.875	3.500	0.875	0.483	3.750	0.875	0.312	3.750	0.875	0.188
1100	1.125	4.750	1.250	0.625	5.000	1.250	0.438	5.000	1.250	0.250
1110	1.500	5.500	1.250	0.625	5.750	1.500	0.500	5.750	1.500	0.250
1120	1.500	6.000	1.500	0.750	6.500	1.500	0.500	6.500	1.500	0.250
1130	1.500	6.500	1.500	0.750	6.750	1.750	0.750	For bores over 6.500 inches Y = X		
1140	1.750	6.750	1.750	0.875	7.000	1.750	0.750			
1150	1.875	7.250	1.750	0.875	7.500	1.750	0.750			
1160	2.000	7.500	1.750	0.875	8.000	2.000	0.750			
No. 6 Hubs										
1020	0.500	2.125	0.500	0.250	2.250	0.500	0.188	2.375	0.625	0.125
1030	0.500	2.500	0.625	0.312	2.625	0.625	0.218	2.750	0.625	0.125
1040	0.500	2.750	0.625	0.312	2.875	0.750	0.250	3.000	0.750	0.125
1050	0.625	3.125	0.750	0.375	3.500	0.875	0.312	3.750	0.875	0.188
1060	0.625	3.625	0.875	0.438	4.000	1.000	0.375	4.125	1.000	0.250
1070	0.875	4.000	1.000	0.500	4.125	1.000	0.375	4.500	1.000	0.250
1080	0.875	4.500	1.000	0.500	5.000	1.250	0.438	5.250	1.250	0.250
1090	0.875	5.000	1.250	0.625	5.500	1.250	0.438	6.000	1.500	0.250
1100	1.125	5.750	1.500	0.750	6.250	1.500	0.500	6.500	1.500	0.250
1110	1.500	6.250	1.500	0.750	6.500	1.500	0.500			
1120	1.500	6.375	1.500	0.750	6.500	1.500	0.500	For bores over 6.500 inches Y = X		
1130	1.500	6.500	1.500	0.750	6.750	1.750	0.750			
1140	1.750	6.750	1.750	0.875	7.000	1.750	0.750			
1150	1.875	7.250	1.750	0.875	7.500	1.750	0.750			
1160	2.000	7.500	1.750	0.875	8.000	2.000	0.750			
No. 7 Hubs										
1020 1030 1040 1050	0.500	2.375	0.625	0.312	2.500	0.625	0.218	2.625	0.625	0.125
1060 1070 1080 1090	1.062	3.500	0.875	0.438	3.750	0.875	0.312	3.875	1.000	0.250
1100 1110 1120 1130	1.500	4.750	1.250	0.625	5.000	1.250	0.438	5.250	1.250	0.250

▲ Shaft keyway depth "Y" equals one-half of square key W. Check key stresses.
Shaded area indicates maximum bores for standard keys recommended in Table 8.

Table 9 Optional Hub Puller Bolt Holes—Inches

Coupling Size	No. 1 and No. 6 Hubs		No. 7 Hub	
	B.C.	Tap Size—UNC	B.C.	Tap Size—UNC
1020	2.750	0.3125-18x0.44	2.812	0.250-20x0.38
1030	3.000	0.3125-18x0.50	2.812	0.250-20x0.38
1040	3.625	0.375 -16x0.62	2.812	0.250-20x0.38
1050	4.125	0.375 -16x0.62	2.812	0.250-20x0.38
1060	4.875	0.375 -16x0.62	4.062	0.375-16x0.62
1070	5.250	0.375 -16x0.62	4.062	0.375-16x0.62
1080	6.000	0.500 -13x0.88	4.062	0.375-16x0.62
1090	7.250	0.500 -13x0.88	4.062	0.375-16x0.62
1100	8.875	0.500 -13x0.88	5.750	0.625-11x1.12
1110	8.875	0.500 -13x1.00	5.750	0.625-11x1.12
1120	8.750	0.625 -11x1.12	5.750	0.625-11x1.12
1130	9.000	0.750 -10x1.25	5.750	0.625-11x1.12
1140	8.875	0.750 -10x1.30	...	...
1150	9.375	0.875 - 9x1.50	...	...
1160	9.875	0.875 - 9x1.50	...	...

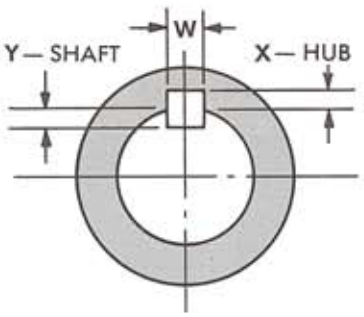
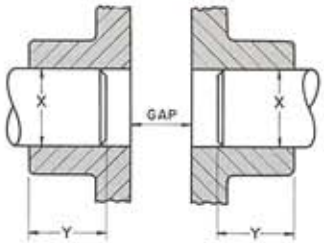


Table 8
Recommended Commercial Keys for Bores with One Key—Inches

Shaft Diameter		One Key
Over	Thru	
.438	.562	.125x .125
.562	.875	.188x .188
.875	1.250	.250x .250
1.250	1.375	.312x .312
1.375	1.750	.375x .375
1.750	2.250	.500x .500
2.250	2.750	.625x .625
2.750	3.250	.750x .750
3.250	3.750	.875x .875
3.750	4.500	1.000x1.000
4.500	5.500	1.250x1.250
5.500	6.500	1.500x1.500
6.500	7.500	1.750x1.500
7.500	9.000	2.000x1.500
9.000	11.000	2.500x1.750
11.000	13.000	3.000x2.000

Overhanging hubs

Hubs may be overhung on the shafting provided there is more than one shaft diameter of hub/shaft engagement for clearance fits or more than 0.75 times shaft diameter hub/shaft engagement for interference fits. If hub engagement is less than what is required, use a No. 6 hub, or submit application details to Falk Engineering. CAUTION: The effect of open keyways on coupling balance should always be considered. Also check key stresses.



Dimension Y must be equal to or greater than Dimension X for clearance fits, or greater than Dimension X times .75 for interference fits. **Example:** X = 4" ; the Y must be 4" or more for clearance fits or 3" or more for interference fits.

Table 10 Maximum Operational Misalignment—Inches

Coupling Size	Angular Misalignment (X—Y)	Parallel Misalignment (P Max)
1020	.030	.020
1030	.030	.020
1040	.030	.020
1050	.030	.020
1060	.062	.031
1070	.062	.031
1080	.062	.031
1090	.062	.031
1100	.094	.047
1110	.094	.047
1120	.094	.047
1130	.120	.062
1140	.120	.062
1150	.120	.062
1160	.120	.062

Table 11 Standard AISE AC and DC Mill Motor Coupling Selections

Mill Motor Frame Size			Coupling Size ★	Mill Motor Frame Size			Coupling Size ★
2 602	802 A, B & C	AC 1, 2 & 4	1050 1060 1070 1080 1090	610	810	AC-18	1100 1110 1120 1130 1140 1150
603 604	803 804		1060 1070 1080 1090 1100 1110	612	812	AC 25 & 30	1110 1120 1130 1140 1150 1160
606	806	AC 8 & 12	1080 1090 1100 1110 1120	614	814	AC 40 & 50	1120 1130 1140 1150 1160
608	808		1090 1100 1110 1120 1130	616	816		1140 1150 1160

★ Check coupling rating for all selections—minimum size is based on bore capacity.

Table 12 Type WA21 Taper and Counterbore Limitations—Inches

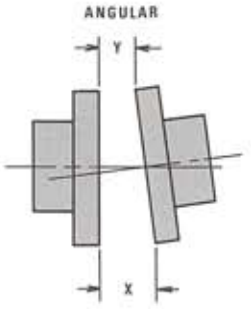
Coupling Size	L Max	R	Z Max	ZD Max	UH Max	Keyway (max bore)
1050	3.94	0.125	3.250	1.500	2.188	0.500x0.250
1060	3.94	0.125	3.500	1.500	2.500	0.625x0.312
1070	3.94	0.125	3.750	1.500	3.000	0.750x0.375
1080	4.50	0.125	4.375	1.500	3.500	0.875x0.438
1090	5.18	0.125	5.000	1.500	4.000	1.000x0.500
1100	5.12	0.125	6.250	1.500	5.000	1.250x0.625
1110	5.76	0.125	6.750	1.500	5.500	1.250x0.625
1120	5.88	0.125	7.500	1.500	6.000	1.500x0.750
1130	6.50	0.125	8.000	1.625	6.500	1.500x0.750
1140	6.62	0.125	8.562	1.625	7.000	1.750x0.750
1150	6.62	0.125	8.781	1.750	7.500	1.750x0.750
1160	7.26	0.125	9.516	1.750	8.000	2.000x0.750

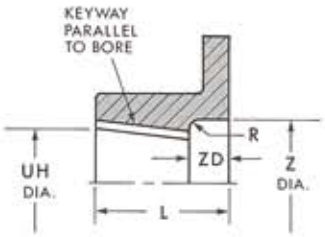
Coupling Misalignment

Under operating conditions, Torus couplings will accommodate the "Maximum Operational Misalignment" shown in Table 10. **Maximum life for both the coupling and the connected machinery will result only if the coupling is accurately aligned.** Therefore, the installation instructions recommend initial alignment to tighter tolerances.

Angular misalignment is expressed in degrees and as the difference between the value of X minus Y, as illustrated (approx. ¼°).

Parallel misalignment is the distance P between shaft centerlines as shown.





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