

Welker Bearing Company's friction rollers are powdered metal components designed for economy, long life and maintenance-free performance. There are two configurations: a one piece roller and a 3 piece roller assembly.

The one piece system runs the hardened roller on a hardened shaft. The roller is generally positioned on the shaft with set collars or spacers.

The three piece design eliminates the roller riding directly on the shaft, allowing the use of soft shafting. The roller is positioned by pinning the flange and collar to the shaft. The larger roller I.D. provides greater driving force than a one piece roller. The three piece roller maintains a more constant drive force throughout its life. Three piece rollers are specifically recommended for inclined sections and areas where pallet acceleration from stops is critical.

One piece and three piece rollers can be used on the same line where different amounts of drive force are needed.

Protection from marking of machined surfaces can be addressed in two ways:

1. Urethane can be cast to the O.D. of any roller for handling sensitive parts, unless chips are present to embed in the urethane.
2. Centerless grinding the O.D. has been very effective where machining chips are present.

The rule-of-thumb friction formula was determined by empirical testing. It is useful for comparing rollers, although Welker does not guarantee its accuracy for any specific application.

The following assumptions apply:

1. Environmental dependence of coefficient of friction " μ ".
 μ wet = .06 (includes washers, machining coolant, transmission fluid, honing oil, etc.)
 μ dry = .18 (applies where no additional liquids are present.)
2. The formula is considered independent of roller length.
3. The number of active rollers = 1/2 the rollers under the pallet.
4. Weight per roller = $\frac{\text{Weight of pallet and part}}{\text{Number of active rollers}}$
5. Force F (lbs) = Horizontal driving force per roller = $\frac{[\text{Weight per roller}] \times \mu \times [\text{Roller I.D.}]}{\text{Roller O.D.}}$

EXAMPLE: 300 lb pallet, dry conditions, eight rollers under pallet
Compare relative drive force between WFR-250 AND WR-250Z.

$$\text{Weight per roller} = \frac{300 \text{ lbs}}{8 \text{ Rollers} \times 1/2} = \frac{300}{4} = \frac{75 \text{ lbs}}{\text{Roller}}$$

For WFR-250 three piece assembly:

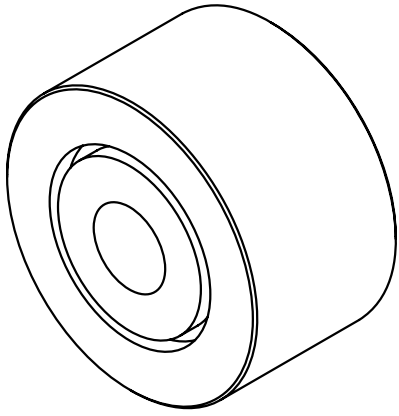
$$F = \frac{W \times \mu \times \text{I.D.}}{\text{O.D.}} = \frac{75 \text{ lb} \times .18 \times 1.5 \text{ in}}{2.5 \text{ in}} = \frac{8.1 \text{ lb}}{\text{Roller}}$$

For WR-250Z one piece roller:

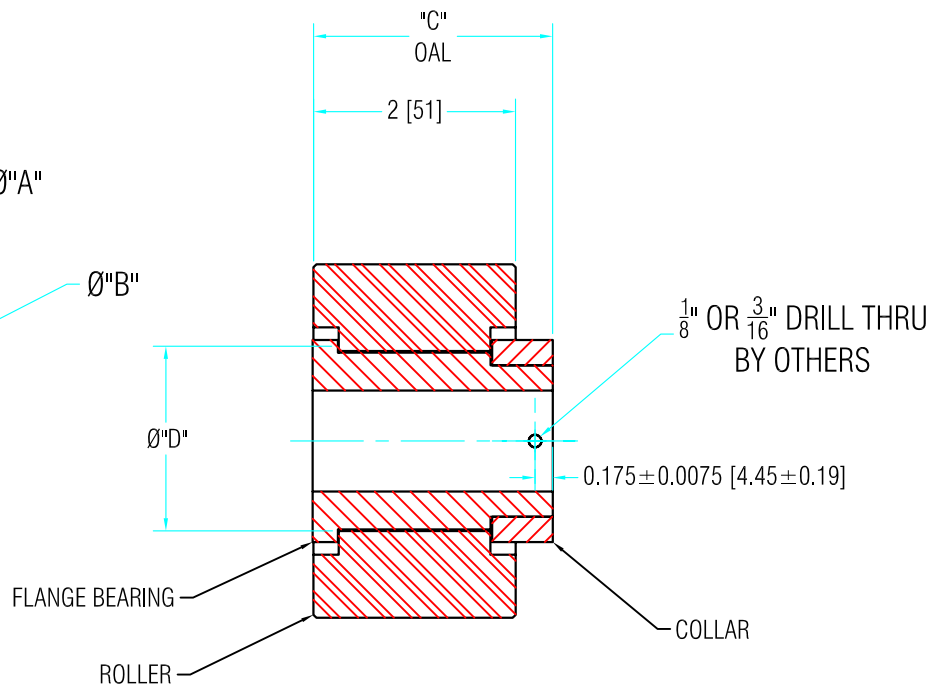
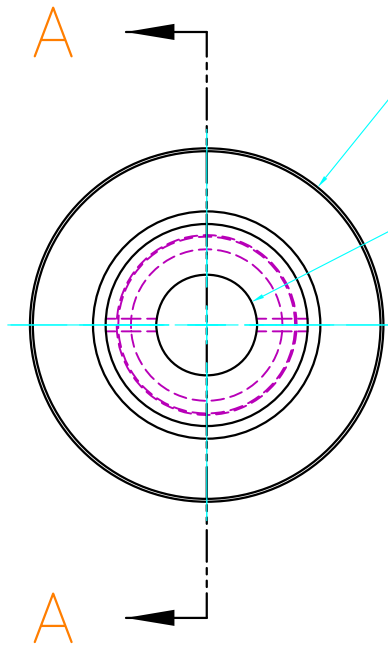
$$F = \frac{W \times \mu \times \text{I.D.}}{\text{O.D.}} = \frac{75 \text{ lb} \times .18 \times 1.0 \text{ in}}{2.5 \text{ in}} = \frac{5.4 \text{ lb}}{\text{Roller}}$$

Drive force on pallet assuming 1/2 rollers are actively driving:

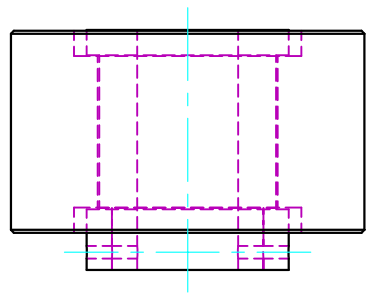
WFR-250: 4 Rollers x 8.1 lbs = 32.4 lbs.
WR-250Z: 4 Rollers x 5.4 lbs = 21.6 lbs.



Roller Assembly				
Part No.	"A"	"B"	"C"	"D"
WFR-250-1	2.50	1.001/1.006	2.38	1.50
WFR-275-1	2.75	1.001/1.006	2.38	1.50
WFR-300-1	3.00	1.001/1.006	2.38	1.50
WFR-325-1	3.25	1.251/1.256	2.38	1.75
WFR-325-1A	3.25	1.001/1.006	2.38	1.75
WFR-350-1	3.50	1.251/1.256	2.38	1.75
WFR-350-1A	3.50	1.001/1.006	2.38	1.75
WFR-250-3	2.50	7/8 HEX	2.38	1.50
WFR-275-3	2.75	7/8 HEX	2.38	1.50
WFR-300-3	3.00	7/8 HEX	2.38	1.50



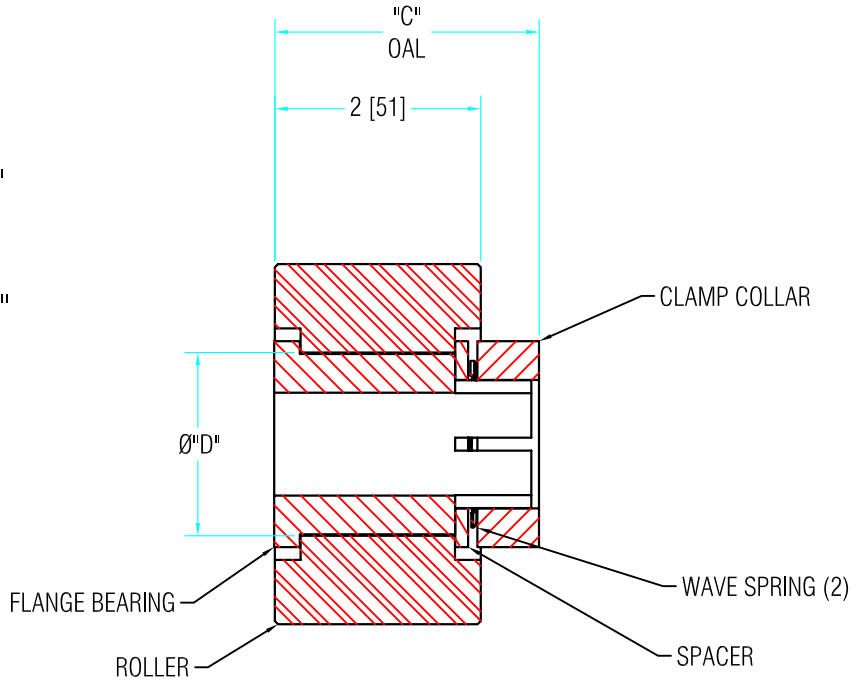
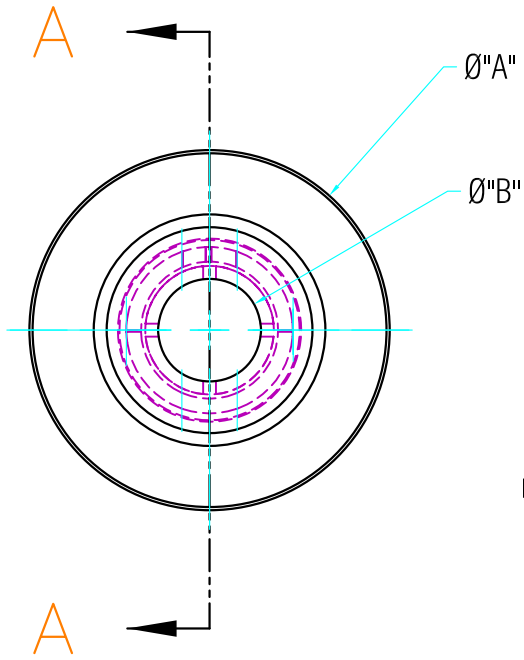
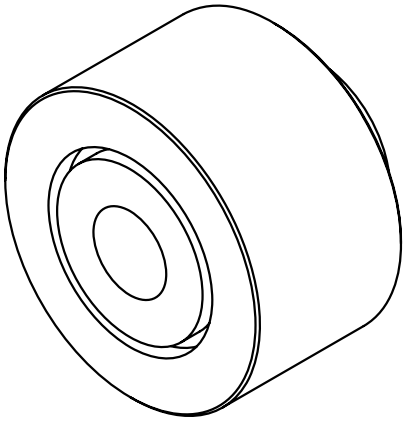
SECTION A-A



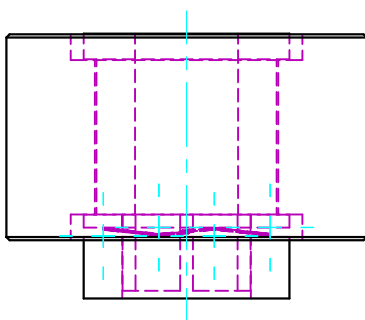
ROLLER ASSEMBLY WFR-XXX-X
W/ FLANGE, BUSHING & COLLAR

WEKER BEARING COMPANY			
TOOL NAME WFR Roller with flange bushing and collar			
TEMPLATE			
DRAWN BY RCA	DATE 2/1/2005	CHECKED BY DAG	ENG. APPROVAL
Date 2/2/2005	Status Released	SCALE Half	FILE NAME WFR-XXX-1.dwg

Roller Assembly				
Part No.	"A"	"B"	"C"	"D"
WFR-250-2	2.50	1.001/1.006	2.56	1.50
WFR-275-2	2.75	1.001/1.006	2.56	1.50
WFR-300-2	3.00	1.001/1.006	2.56	1.50



SECTION A-A

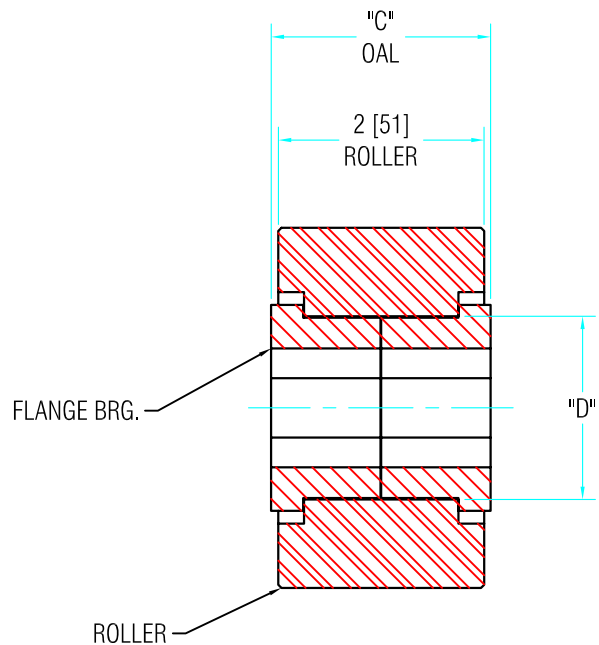
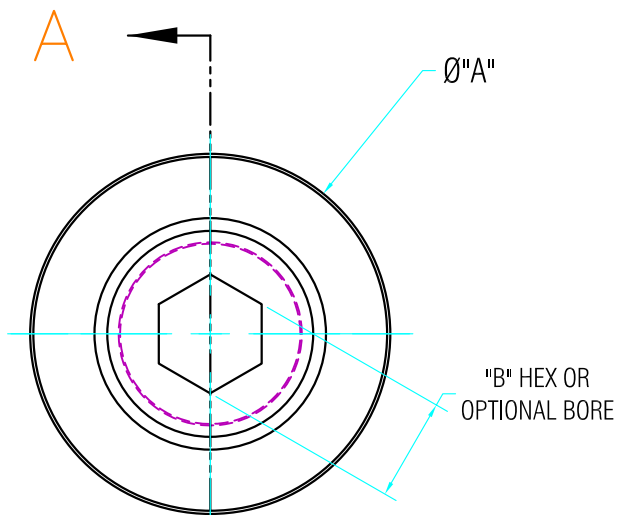
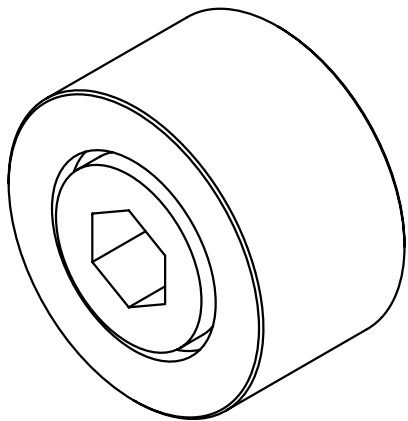


ROLLER ASSEMBLY WFR-XXX-X
W/ FLANGE, BUSHING, COLLAR, & SPRING

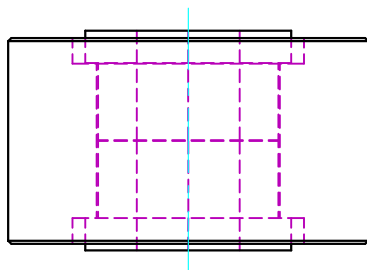
<small>TOOL NAME</small> WFR Roller with flange bushing and collar			
TEMPLATE			
<small>DRAWN BY</small> RCA	<small>DATE</small> 2/1/2005	<small>CHKD BY</small> DAG	<small>ENG APPROVAL</small>
<small>Date</small> 2/2/2005	<small>Status</small> Released	<small>SCALE</small> Half	<small>FILE NAME</small> WFR-XXX-2.dwg

ROLLER ASSY

Part No.	"A"	"B"	"C"	"D"
WFR-250-3A	2.50	11/16 HEX	2.00	1.50
WFR-250-3B	2.50	7/8 HEX	2.00	1.50
WFR-250-3C	2.50	1" W/1/4" KEY WAY	2.00	1.50
WFR-275-3A	2.75	11/16 HEX	2.00	1.50
WFR-275-3B	2.75	7/8 HEX	2.00	1.50
WFR-275-3C	2.75	1" W/1/4" KEY WAY	2.00	1.50
WFR-300-3A	3.00	11/16 HEX	2.00	1.50
WFR-300-3B	3.00	7/8 HEX	2.00	1.50
WFR-300-3C	3.00	1" W/1/4" KEY WAY	2.00	1.50
WFR-325-3	3.25	1" HEX	2.00	1.75
WFR-350-3	3.50	1" HEX	2.00	1.75



SECTION A-A



ROLLER ASSEMBLY WFR-XXX-X BUSHING W/ FLANGE BUSHINGS

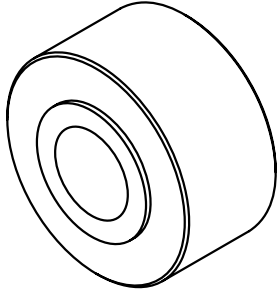


TOOL NAME
WFR ROLLER WITH DOUBLE FLANGE BUSHINGS

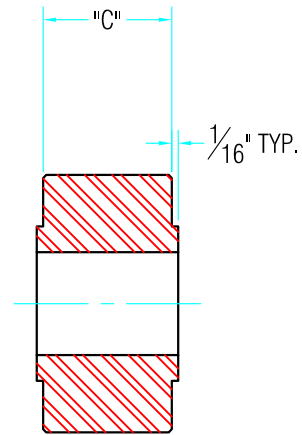
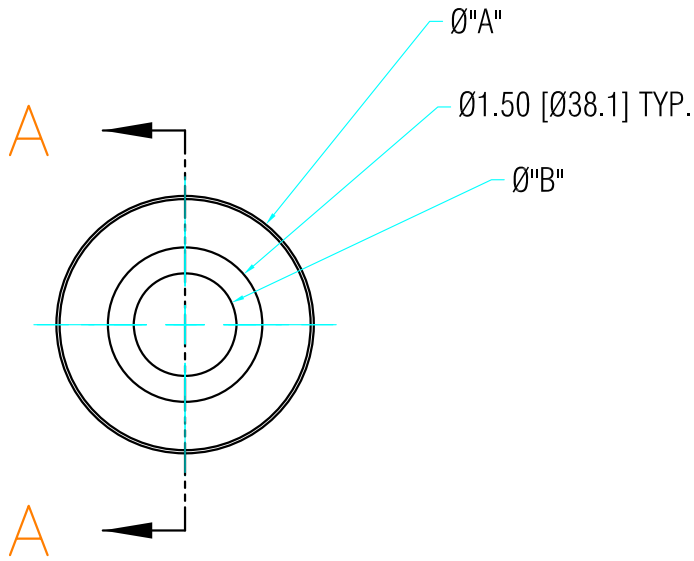
TEMPLATE

DATE 2/2/2005	STATUS Released	DRAWN BY RCA	DATE 2/11/2005	CHKD BY DAG	ENG. APPROVAL
SCALE		FILE NAME		WFR-XXX-3.dwg	

One Piece Roller



Part No.	"A"	"B"	"C"
WR250	2.50	1.001/1006	1 $\frac{1}{4}$
WR275	2.75	1.001/1006	1 $\frac{1}{4}$
WR300	3.00	1.001/1006	1 $\frac{1}{4}$
WR275-30mm	70mm	30mm	42mm
WR275-30mmX2	70mm	30mm	51mm
WR250-3-22	2.50	$\frac{7}{8}$ " HEX	2 $\frac{3}{4}$ "



SECTION A-A

FRICION ROLLER WR-XXX



TOOL NAME WF ONE PIECE ROLLER			
TEMPLATE			
DRAWN BY RCA	DATE 2/1/2005	CHKD. BY DAG	ENG. APPROVAL
SCALE None	FILE NAME WR-XXX.dwg		

Date 2/2/2005	Status Released
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