

# Type RBO/RBR/RBW/RBA/RBP Industrial Fans

## Industrial Fans for Efficiency, Dependability, and Versatility

The Series 900 Industrial Fans manufactured by Twin City Fan & Blower are well suited for installations involving exhaust, material conveying, pollution control, air circulation, and a variety of other industrial applications.

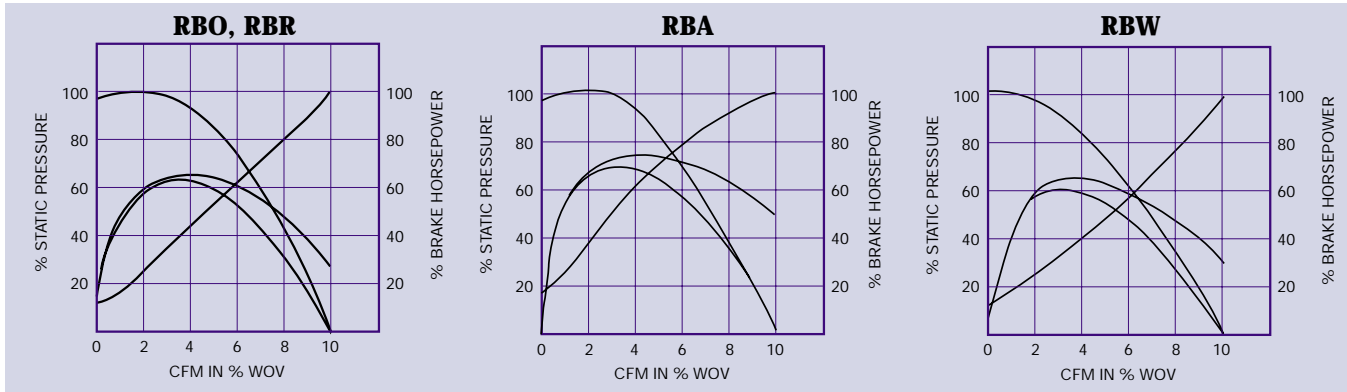
The typical performance characteristics for different wheels offered in Series 900 fans are illustrated below. It should be noted that all wheels essentially have over-loading characteristic type brake horsepower curves; however, type RBA wheels have this to a lesser degree than other types.

While the general pressure characteristic curve is

similar for all Series 900 wheels, the RBA type wheel is considerably more efficient than other Series 900 wheels. Therefore, the RBA wheel is the first choice where brake horsepower savings are important, but the RBA wheel is limited to handling relatively clean air or gases.

Efficiency is critical in most applications, and it is important that the fan size is selected so that it will operate at or near its maximum efficiency point. This is particularly important with the units that have lower efficiency in general, such as the RBO and RBW wheels.

## Typical Performance Characteristic Curves for Industrial Wheels



## RB Series Availability

SIZE	WHEEL TYPE	ROTATABLE HOUSING DISCHARGE	REVERSIBLE ROTATION	CLASS 22 ARRANGEMENTS	CLASS 32 ARRANGEMENTS
905	RBO	YES	YES	1,8,9A,9B,10	—
907-909	RBO RBA, RBW	YES YES	YES NO	1,4,8,9A,9B,9F,10 1,4,8,9A,9B,9F,10	— —
911-921	RBO RBA, RBW RBP	YES YES YES	YES NO NO	1,4,8,9A,9B,9F,10 1,4,8,9A,9B,9F,10 —	1,4,8,9,9F 1,4,8,9,9F 1,9,9F
923-926	RBO*, RBA, RBW RBP	NO NO	NO NO	1,8,9A,9B,9F,10 —	1,8,9,9F 1,9,9F
929	RBO*, RBA, RBW	NO	NO	1,8,9A,9B,9F	1,8,9,9F
933-949	RBO*, RBA, RBW	NO	NO	1,8,9,9F	1,8,9,9F
954-960	RBO, RBA, RBW	NO	NO	1,8,9,9F	—

\* Note: RBR is standard on size 926 and larger Class 32 fans.

Series 900 fan housings are constructed in all usual arrangements and conform to AMCA Standard 2404-72 (Drive Arrangements for Centrifugal Fans). The fan sizes and wheel diameters conform to AMCA Standard 2402-66 (Sizes for Industrial Centrifugal Fans).

AMCA does not have a standard for industrial fans designating class of operation. Twin City Fan & Blower offers three basic categories, based on performance, of industrial fans. Two of the categories are shown in this bulletin:

1. Class 22 – suitable for applications involving performance to approximately 22" SP; and
2. Class 32 – for performance to 32" SP.

Performances shown in the tables on pages 11 through 65 are shown in regular face type to indicate Class 22 fans and in bold face type to indicate Class 32 fans.

A separate supplemental bulletin (Bulletin 911) shows the third category: Class 45 – high pressure fans capable of reaching performance of approximately 45" SP.

Twin City Fan & Blower certifies that the Series 900 type RBO/RBR/RBA/RBW fans shown herein are licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and comply with the requirements of the AMCA Certified Ratings Program.



# Wheel Design

Twin City Fan & Blower offers a complete series of wheels to meet the needs of most industrial process handling applications. All wheels are statically and dynamically balanced on electronic equipment prior to

being assembled in the fan. In addition, all units are run at or near operating speed after assembly and the balance is fine-tuned as a complete assembly.



## **Type RBO Industrial Radial Paddle Wheel:**

The open type radial paddle wheel design is extremely rugged using heavy-gauge steel components which are jig assembled for accuracy and consistency. All wheels are welded with care to insure the maximum in strength and reliability. RBO wheels are suitable for general handling of coarse, sticky, heavy, and/or abrasive materials.

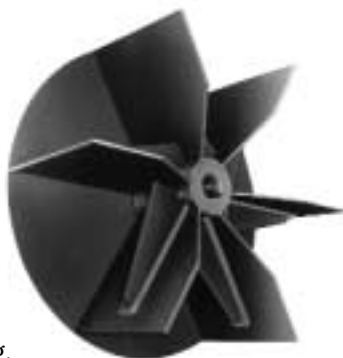
## **Type RBR Industrial Radial Paddle Wheel:**

The RBR wheel is similar to the RBO, with the addition of end rings. RBR construction is standard on size 926 and larger Class 32 fans. RBR wheels are suitable for general handling of coarse, sticky, heavy, and/or abrasive material



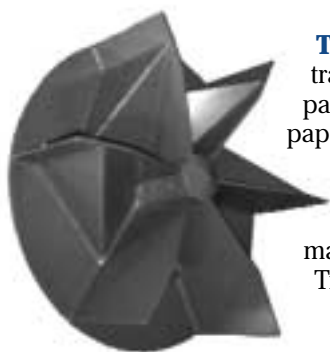
## **Type RBW Industrial Radial Backplate Wool Wheel:**

The RBW wheel is constructed to prevent paper shreadings, threads from buffing system exhaust, and other similar matter from hanging up on and wrapping around the spiders and blades. Applications include long, stringy or fibrous materials.



## **Type RBA Industrial Radial Air Handling Wheel:**

The RBA wheel is a more efficient type of wheel and is used when handling relatively clean air, fumes, vapor exhaust, and air with a light contaminant. The wheel is constructed with heavy-gauge blades welded to both backplate and front ring.



**Type RBP Industrial Radial Paper Handling Wheel:** This modified RBW wheel features trapezoidal gussets for the extra rugged construction necessary when handling corrugated paper trims, fibrous material, metal trim, and other high impact loading material. Note the paper deflector cone over the face of the hub which helps prevent wrapping of paper around the hub or leading edge of the blades.

All RBP fans are supplied with bearing stop blocks and a Relieved Inlet Transition. The relieved inlet transition smoothes the flow of paper trim and similar material through the fan. Breaker tabs are offered as an option on the Relieved Inlet Transition to assist in the breakup of material. Due to the nature of the applications, RBP Class 32 construction is limited to 22" SP and RBP Class 45 construction is limited to 32" SP only. Use RBW performance tables for RBP fans. The RBP fan is not AMCA licensed.

## **Rotatable and Reversible Configuration**

A fan available in a rotatable configuration indicates that the fan can be rotated in the field to any of the standard discharge locations. A fan available in a reversible configuration indicates that the wheel rotation can be changed in the field to run in either a clockwise or counterclockwise direction. This is possible only on rotatable housings and requires the wheel housing to be removed and reversed. Consult the factory before reversing a fan. See the chart on page 7 for specific configurations and their designations.

# Accessories

## Access Doors

Bolted and quick-opening access doors are available for easy access to the fan interior for inspection or cleaning. All access doors are gasketed and are constructed with either evenly-spaced studs or heavy duty hinges and handle-type nuts which require no tools to open. Raised bolted access doors are available for use where insulation is being applied to the outside of the fan.



*Bolted Access Door*



*Raised Bolted Access Door*

## Inlet Bell

On installations with an open inlet (no ductwork at the inlet of the fan), a streamlining inlet bell is required to achieve the catalog performance.



*Quick-Opening Access Door*

## Outlet Dampers

Due to the performance characteristics of industrial fans, a damper on the outlet of the fan is a very efficient way to control volume.

An outlet damper can be used to reduce the power consumption of a fan operating at high temperatures or a fan operating in low density gas streams. During a cold startup, the outlet damper begins in a closed position and is opened gradually as the fan reaches operating temperature. This allows for the use of a smaller motor sufficient to handle the duty at higher temperatures.

Twin City Fan & Blower offers two basic styles of outlet dampers: Type 1 is made of single surface blades suitable for clean air applications, pressures to 25" SP and temperatures to 300°F; Type 2 has double surface airfoil blades for abrasive type applications, pressures to 40" SP and temperatures to 800°F. Both types of dampers are available with opposed or parallel blades and can be manually operated or set up for automatic operation.



*Inlet Bell*



*Outlet Damper*

## Inlet Vanes

For reduced flow situations with relatively clean air, inlet vane type dampers are available to maintain fan efficiency. The inlet vanes are external type attached to the inlet of the fan. Standard construction inlet vanes are suitable in applications up to 300°F. High temperature inlet vanes are also available for temperatures up to 600°F.



*Inlet Vanes*

# Accessories

## Inlet Boxes

An inlet box is designed to minimize pressure drop and airflow losses. Inlet boxes are recommended for applications where uniform flow is difficult to obtain due to limited space or where the air must enter the fan at an angle. Inlet boxes can be either detachable or integral to the fan. This option is available with an inlet box damper to provide increased airflow control.

## Shaft Coolers

Where high temperatures are encountered, the aluminum shaft cooler is recommended for dissipating heat and protecting bearings from the high temperature atmosphere.

## Shaft Seals

The standard shaft seal is a non-asbestos type, sandwiched between two plates and the fan housing, providing a seal for most materials being handled. A variety of special seals, including mechanical type stuffing boxes, is available for gas-tight applications requiring more positive protection.

## Drains

A pipe coupling can be welded to the lowest point in the housing scroll to allow wash water or condensation to drain.

## Spark Resistant Construction

Three fan constructions are available for spark resistance. The materials used in the construction of these fans minimize the potential of sparks being generated by striking or rubbing components within the airstream.

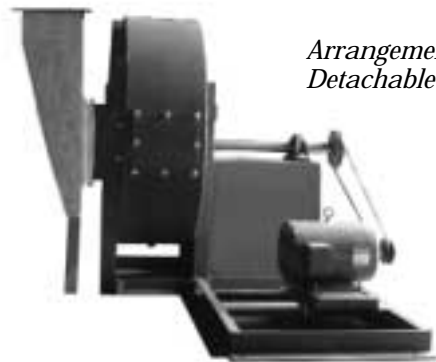
**Type A** – All parts of the fan in contact with the air or gas being handled are made of nonferrous material. (Aluminum wheel construction is limited to 250°F.)

**Type B** – The fan has an entirely nonferrous wheel and nonferrous ring around the opening through which the shaft passes. (Aluminum wheel construction is limited to 250°F.)

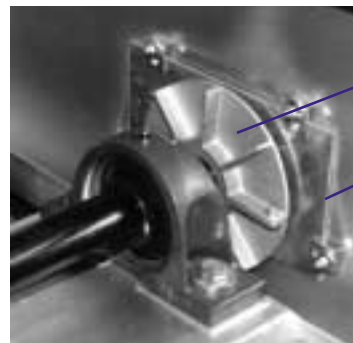
**Type C** – The fan is constructed so that a shift of the wheel or shaft will not permit two ferrous parts of the fan to rub or strike. In applications where aluminum is not suitable, wheels constructed of copper can be furnished for temperatures up to 1000°F.

**Notes:**

1. The user must electrically ground the fan.
2. Standard spark resistant alloy is aluminum.
3. Bearings must not be placed in the air or gas stream.



*Arrangement 1 Fan with Detachable Inlet Box*



*Shaft Cooler*

*Shaft Seal*

## Other Accessories

A large number of other appurtenances and accessories is available from Twin City Fan & Blower, including:

- Belt guards – standard and OSHA type
- Split housings
- Shaft and bearing guards
- Couplings and coupling guards
- Wheel liners
- Scroll liners
- Weather covers
- Inlet and outlet screen
- Special material construction (stainless steel, Monel, etc.)
- Special coatings and finishes
- Insulation pins
- Abrasion resistant construction
- Common bases with and without isolation
- Breaker tabs are offered on Series 900 RBP fans as an option on the relieved inlet transition. These tabs assist in the breakup of material as it enters the fan.

# Standard Fan Arrangements

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The Series 900 fan housings are constructed of heavy-gauge steel with side plates continuously welded to the scroll. Housings are securely braced to prevent vibration and pulsation. Wheel removal is accomplished through the large opening provided at the inlet side of the housing. Lifting lugs are standard on all units.

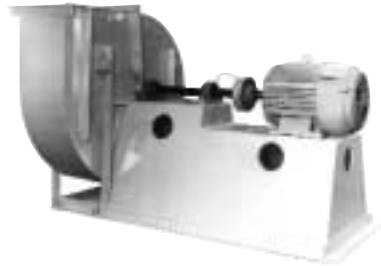
## Arrangement 1

Arrangement 1 fans are available in either direct drive (see Arrangement 8 below), or belt driven installations. The belt driven configuration allows the motor to be mounted in any of the four standard motor positions shown on page 7. The choice of a belt driven installation provides greater performance flexibility with the use of belts and sheaves of differing sizes.



## Arrangement 8

Arrangement 8 fans, as illustrated in this bulletin, show a fan shaft and motor direct coupled via a flexible coupling. The integral motor subbase is fabricated of heavy gauge steel and securely reinforced for rigidity. Twin City Fan & Blower can supply wheels in a variety of diameters and differing widths to give the greatest efficiency for any given application. If desired, an Arrangement 1 fan can be set up for direct drive. This requires a concrete motor pedestal to be built in the field.



## Arrangement 9

Arrangement 9 fans include a motor slide base mounted on the side of the motor pedestal. The motor and drive can be installed at the factory or field installed. Class 22 fans up to size 929 are offered in Arrangements 9A (shorter pedestal for small motors) and 9B (longer pedestals for larger motors). Maximum motor frame sizes for Arrangement 9A and 9B are listed in the table on page 7.

Unless otherwise specified, the motor will be installed on the left (L) side of the pedestal on CW fans and on the right (R) side on CCW fans.



## Arrangement 9F

Arrangement 9F (floor mount) fans are recommended when a packaged unit is desired, but required motors are too large to be mounted on the side of the bearing pedestal. In this arrangement, the base is extended to facilitate motor mounting in a horizontal position similar to an Arrangement 1 fan. This arrangement is preferred over Arrangement 9 when larger horsepower motors are being employed.

Unless otherwise specified, the motor will be installed on the left (L) side of the pedestal on CW fans and on the right (R) side on CCW fans. Arrangement 9F requires a separate subbase when vibration isolation is required.



## Arrangement 10

Arrangement 10 fans are suitable for roof or outdoor installations. A weather cover, as shown, provides complete weather protection for motor, shaft, bearings, and drives. This arrangement is limited to Class 22, sizes 905 through 919. Maximum motor sizes allowable in this arrangement are listed in the table on page 7. Larger fan sizes in this arrangement, or larger motor sizes for smaller fans, may be available on special request



# Typical Specifications

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Furnish and install as shown on the plans Type RBO/RBR/RBW/RBA/RBP Industrial Fans as manufactured by Twin City Fan & Blower, Minneapolis, Minnesota. Fan types RBO, RBR, RBW, and RBA shall be licensed to bear the AMCA Certified Ratings Seal for Air Performance. Twin City Fan & Blower will provide sound ratings based on tests in accordance with AMCA Standard 300-67 in decibels referenced 10<sup>-12</sup> watts. Wheel diameters and outlet areas are in accordance with AMCA Standard 2402-66 for industrial fans.

**HOUSINGS** — Housings shall be continuously welded heavy gauge steel, suitably braced to prevent pulsation. Housings with lock seams or partially welded construction are not acceptable. Class 22 housings shall be constructed of at least 12 gauge through 0.31" steel. Class 32 housings shall be constructed of at least 7 gauge through 0.31" steel. Units having wheel diameters of 33" (size 919) and smaller shall be built with adjustable discharge housings which can be field rotated to any of the eight standard positions. Fans with wheel diameters larger than 33" shall be built with a fixed discharge housing and have a flanged type discharge to provide unit rigidity.

**WHEELS** — All Class 22 fan wheels shall be constructed of a minimum 10 gauge through 0.75" thick steel. Class 32 fan wheels shall be constructed of a minimum 7 gauge through 0.75" thick steel. The spider hubs for RBO wheels shall be fabricated steel or cast steel material. All industrial fan wheels shall be continuously welded.

All wheels shall be statically and dynamically balanced and the complete fan assembly shall be test balanced at the operating speed prior to shipment.

**BEARINGS** — Bearings shall be heavy duty, grease lubricated, anti-friction, cast iron, precision, self-aligning ball or roller pillow block type and selected for a minimum average bearing life (AFBMA L-50) in excess of 200,000 hours at the maximum class RPM. Bearings are equipped with zerkl fittings.

**SHAFTS** — Shafts shall be AISI 1040 or 1045 hot rolled steel accurately turned, ground, polished, and ring gauged for accuracy. Class 45 shafts are sized from 2<sup>3</sup>/<sub>16</sub>" to 5<sup>7</sup>/<sub>16</sub>". Shafts shall be sized for first critical speed of at least 1.43 times the maximum speed for the class. All shafts shall be dial-indicated for straightness after the keyways are cut, and straightened as required.

**DRIVES & SHEAVES** — Cast iron, variable pitch motor sheaves are recommended for applications 20 HP and smaller, and fixed pitch for 25 HP and larger. Drives and belts are located external to the fan casing and rated for 150% of the required motor HP. The motor type and electrical characteristics are as scheduled and the HP indicated is maximum allowable.

**FINISH & COATING** — The entire assembly, excluding the shaft, is thoroughly degreased and deburred before application of a rust-preventative primer. After the assembly is complete, a finish coat of paint is applied to the entire assembly. The fan shaft is coated with a petroleum-based rust protectant.

**ACCESSORIES** — Accessories, such as inlet vanes, outlet dampers, companion inlet and outlet flanges, inlet bells, inlet boxes, shaft guards, and wheel and scroll liners as required, are provided by Twin City Fan & Blower maintaining one source responsibility.

**FACTORY TEST RUN UNITS** — All fans prior to shipment shall be completely assembled and test run as a unit at operating speed or maximum RPM allowed for the particular construction type. Each wheel shall be statically and dynamically balanced to balance grade G6.3 per ANSI S2.19. Balance shall be taken by electronic type equipment and records shall be maintained of the readings of axial, vertical, and horizontal direction on each of the bearings. A written copy of this record shall be available upon request.

'REO', 'RBA', & 'RBW' ARR. NO. 9A & 9B CLASS 22

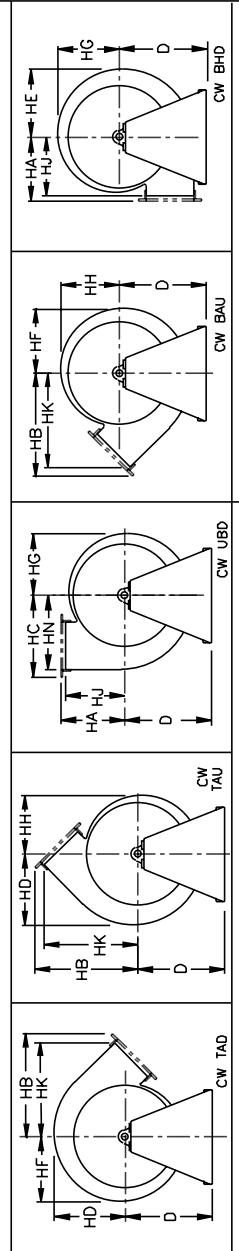
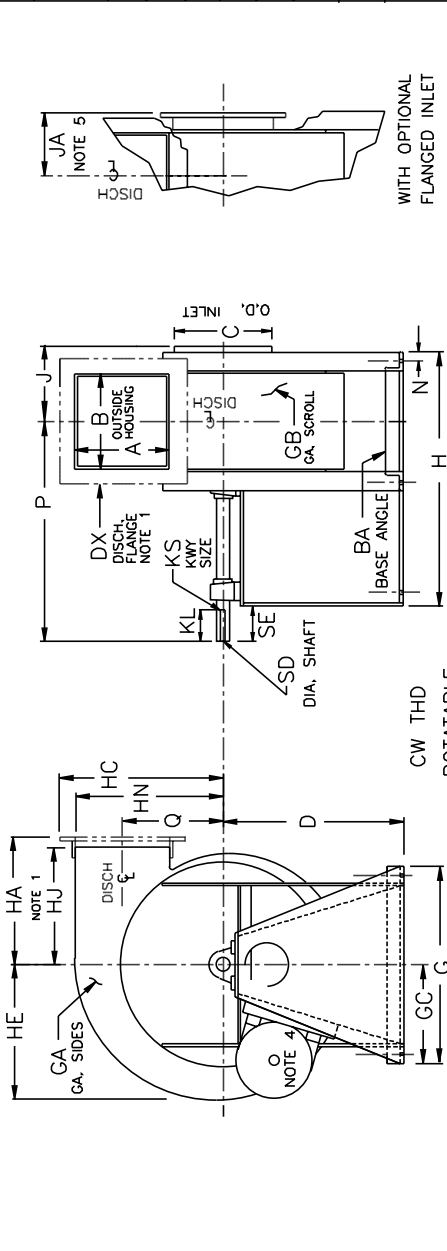
**TWIN CITY FAN & BLOWER**  
MINNEAPOLIS, MN 55442

DRAWN 8/10/94  
REVISED  
DWG NO AC-15074

JOB: \_\_\_\_\_  
LOC. \_\_\_\_\_  
ENG./ARCH. \_\_\_\_\_  
CERT. BY: \_\_\_\_\_  
S.O. NO. \_\_\_\_\_

SIZE	CLASS	DISCH	ROT.	MOTOR HP	MOT. LOC.	UNIT NO.
CFM	SP	RPM	BHP	OV	TS	

ACCESSORIES REQ'D



NOTES:  
1. OUTLET FLANGES ARE OPTIONAL. FLANGES ARE PUNCHED PER AC15146.  
2. 'CW' ROTATION IS SHOWN. 'CCW' IS SIMILAR BUT OPPOSITE.  
3. FOR 'DBD' (DOWNBLAST) SEE DRAWING AC15071.  
4. MOTOR LOCATION IS 'LEFT' FOR 'CW' ROT. AND 'RIGHT' FOR 'CCW' ROTATION. DIM. 'FR' IS MAX. MOTOR FRAME.  
5. OPTIONAL FLANGED INLET PER DRAWING AC15143.

SIZE	A	B	BA	BH	HC	HJ	HK	HN	J	JA	K	KL	KS	L	L 9A	L 9B	M	N	P	P 9A	P 9B	Q	SD	SE	WHL DIA	SIZE
907	6.81	6.06	1.5X1.5	0.44	7.00	18.50	21.50	1.25	184T	215T	14.25	12	12	7.13	24.81	28.44	8.81	14.63	11.81	10.13	9.69	907				
909	8.63	7.69	1.5X1.5	0.44	9.00	18.50	24.50	1.25	184T	256T	17.75	12	12	8.88	26.44	34.94	11.13	18.31	14.75	12.94	12.38	909				
911	10.56	9.44	2.0X2.0	0.56	11.00	21.50	25.00	1.50	215T	256T	20.25	10	10	10.13	32.81	37.69	13.50	22.25	17.94	15.75	15.06	911				
913	12.44	11.13	2.0X2.0	0.56	13.00	21.75	27.75	1.50	215T	286T	23.25	10	10	11.63	34.50	41.75	15.88	26.06	20.94	18.63	17.81	913				
915	14.31	12.81	2.5X2.5	0.56	15.00	25.25	28.25	1.50	256T	286T	26.25	10	10	13.13	42.06	44.44	18.25	29.81	23.88	21.44	20.50	915				
917	16.25	14.50	2.5X2.5	0.56	17.00	28.25	32.00	1.50	256T	326T	29.50	10	10	14.75	43.75	48.63	20.63	33.63	26.88	24.31	23.25	917				
919	18.06	16.13	2.5X2.5	0.56	19.00	31.25	35.50	2.00	286T	365T	31.25	10	10	15.63	47.75	51.75	22.94	37.63	30.25	27.06	25.88	919				