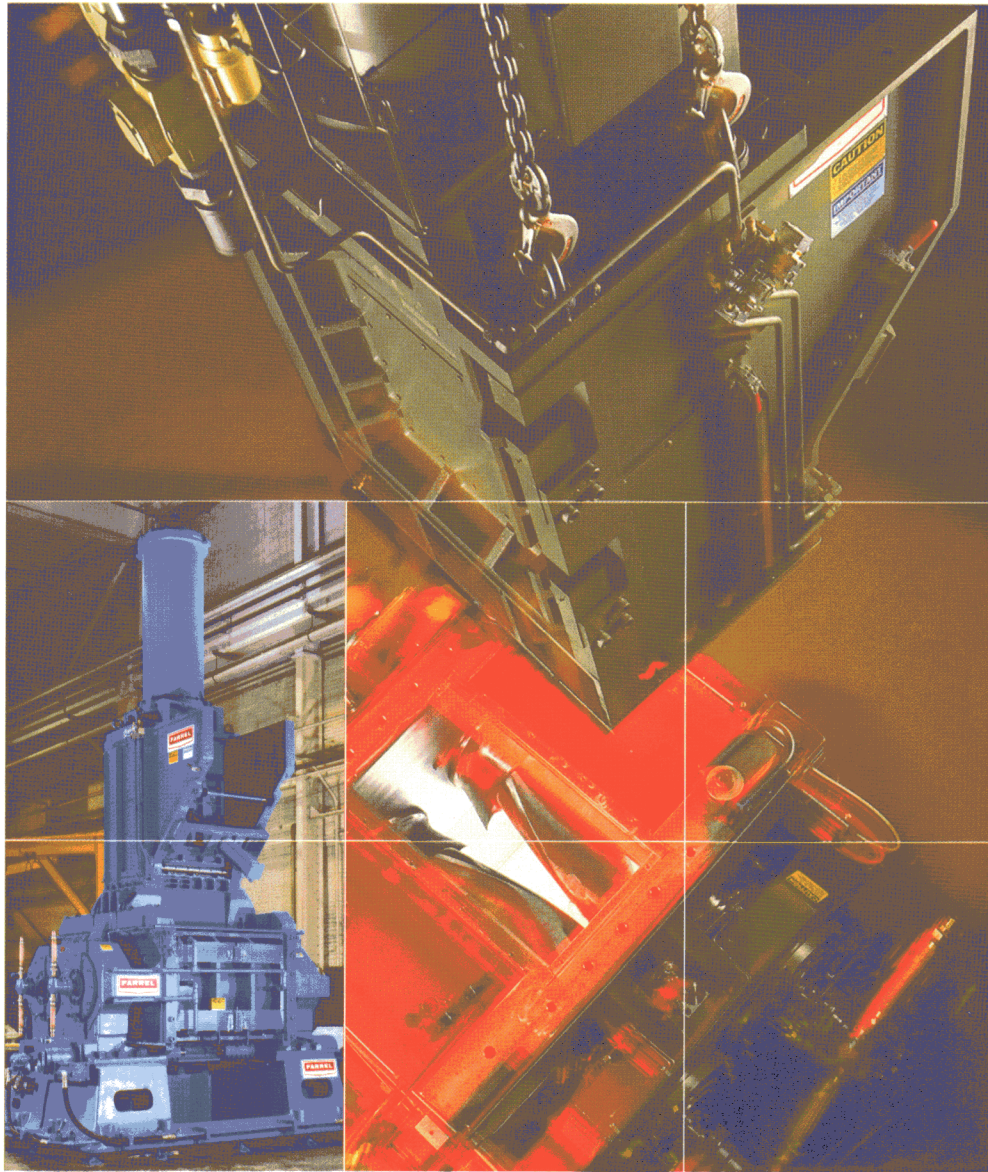


# FARREL



## Banbury® Mixer

Bulletin No. 224-C

# Farrel BANBURY® Mixer

Today's Banbury Mixer reflects the benefits of technology, innovation, and experience available only through Farrel Corporation. The Banbury Mixer represents over 75 years of evolution from the original concept and designs of its inventor, Fernley Banbury. Since its inception, the Banbury Mixer has been the single-most utilized and recognized polymer compounding device in the world.

The Banbury Mixer is most commonly used for incorporating and dispersing pigments and fillers into rubber and plastic materials. The Banbury Mixer is used worldwide to produce such goods as automobile tires and tubes, rubber mechanical goods, insulated wire, floor coverings, and speciality compounds.

Farrel Corporation was the first to patent numerous features that have become industry standards. In the United States and other countries, the Banbury Mixer is protected by patents covering its basic principles as well as special features and improvements. Among these are ST™ Rotors, heuristic control systems, and even-speed rotor alignment.

## Technology

The technology behind today's Banbury Mixer is the result of ongoing development by Farrel's engineers in various departments, including computer-aided design, computer-aided engineering, and research and development. Mechanical and process development projects involve in-house and field testing, where customers work with Farrel's engineering teams to evaluate new technology.

Every consideration is given to producing a Banbury Mixer that is reliable and capable of continuous operation with a minimum of attention and maintenance.

### Computer-Aided Design

Reliability and quality are assured using state-of-the-art computer-aided design. Flexible and accurate evaluations of different engineering configurations are also created with these tools.

### Finite Element Analysis

Experienced Farrel researchers utilize the latest finite element technology for design analysis of critical highly-stressed components in the Banbury Mixer.



## Innovation

Over the years, Farrel has made many improvements to the Banbury Mixer which have contributed to its reputation as the world's leading equipment supplier to the polymer processing industry. These innovative enhancements optimize the Banbury Mixer's performance by monitoring and refining the mixing process. Farrel's innovations keep pace with today's advancements in polymer science.

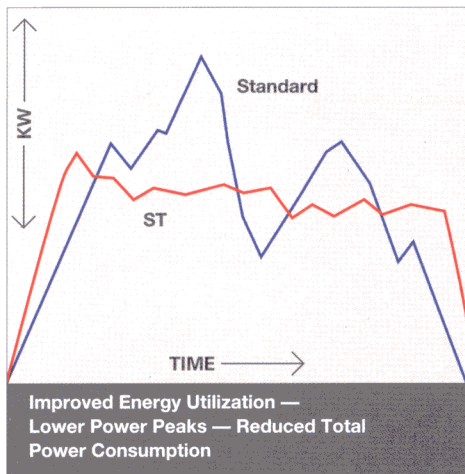
### ST™ Series Rotors

ST Rotors optimize uniformity, productivity and quality. Studies show that ST Rotors improve dispersive and extensive mixing at reduced mixing times while increasing product quality. ST Rotors feature temperature-controlled rotor tips, which improve material flow over the rotor tip, accomplishing intensive mixing with less temperature increase. The more effective heat transfer often permits two-stage mixing to be completed in one stage.

The development of the ST Rotor began at Farrel during the mid-1980's and continues today with its current four-wing, tip-cooled design. In manufacturing the ST Rotor, precision casting and new machining techniques are applied with stringent quality control.

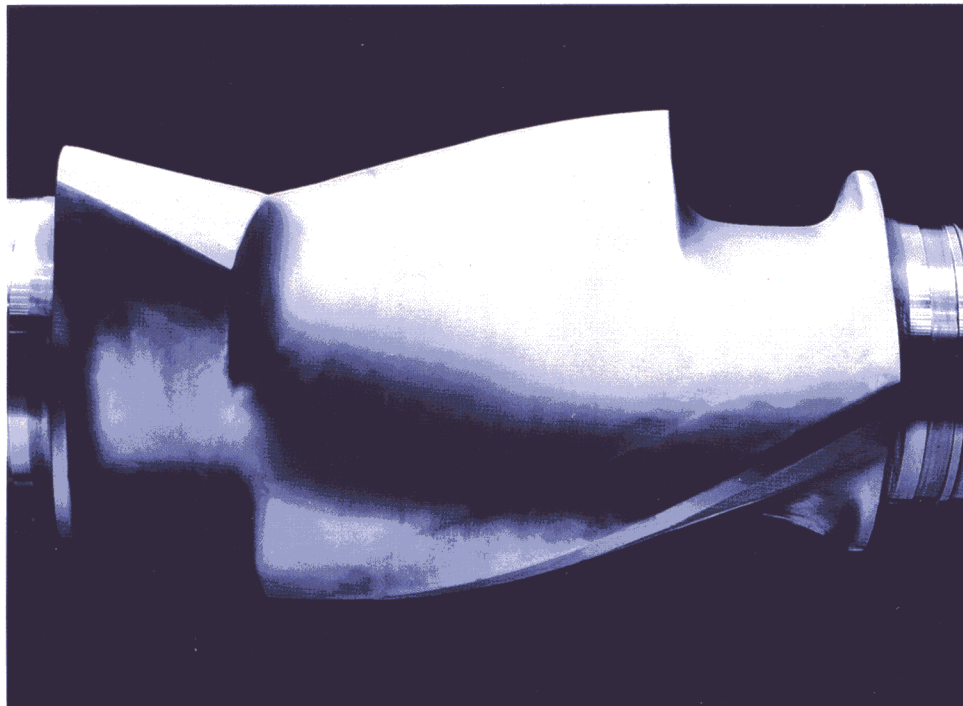
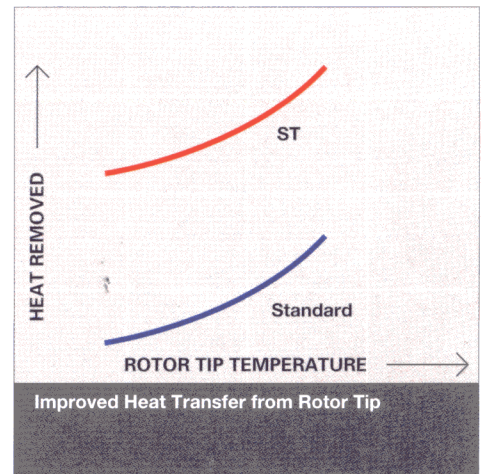
### Synchronous Rotor Speeds

The performance and productivity of two- and four-wing rotors is improved by synchronous speed and proper alignment. These improvements result from enforcing the order of flow patterns within the mixing chamber, which are repetitive and predictable. Material flow over the rotor tip is made more efficient, resulting in shorter mixing times and less consumed energy. Angular alignment of the rotors can be adjusted for specific mixing stages such as masterbatching, remilling, and finish mixing.



### Ram Position Indicator™ System

Monitoring and recording ram position during the mixing cycle optimizes product quality and productivity. Farrel's patented Ram Position Indicator System is designed to provide information on batch size and mixing action patterns. Monitoring of ram position also alerts the user to raw material variances, operator error, changes in productivity, and suggests changes in Banbury Mixer operating parameters such as rotor speed and ram pressure to remedy these faults.



### Heuristic Control System

A reactive feedback control system minimizes batch-to-batch variability and examines the "rate of change" in mixer control parameters. This information is used by the system to anticipate and adjust parameters to achieve predetermined setpoint values.

## Experience

As the originator of the Banbury Mixer, Farrel draws on decades of polymer processing applications experience. This background is utilized to support the customer decision-making process from selection to start-up and operation.

### Applications Engineering

In-house engineering expertise is provided to customers as they select Banbury Mixers for their specific applications.

### Process Laboratory

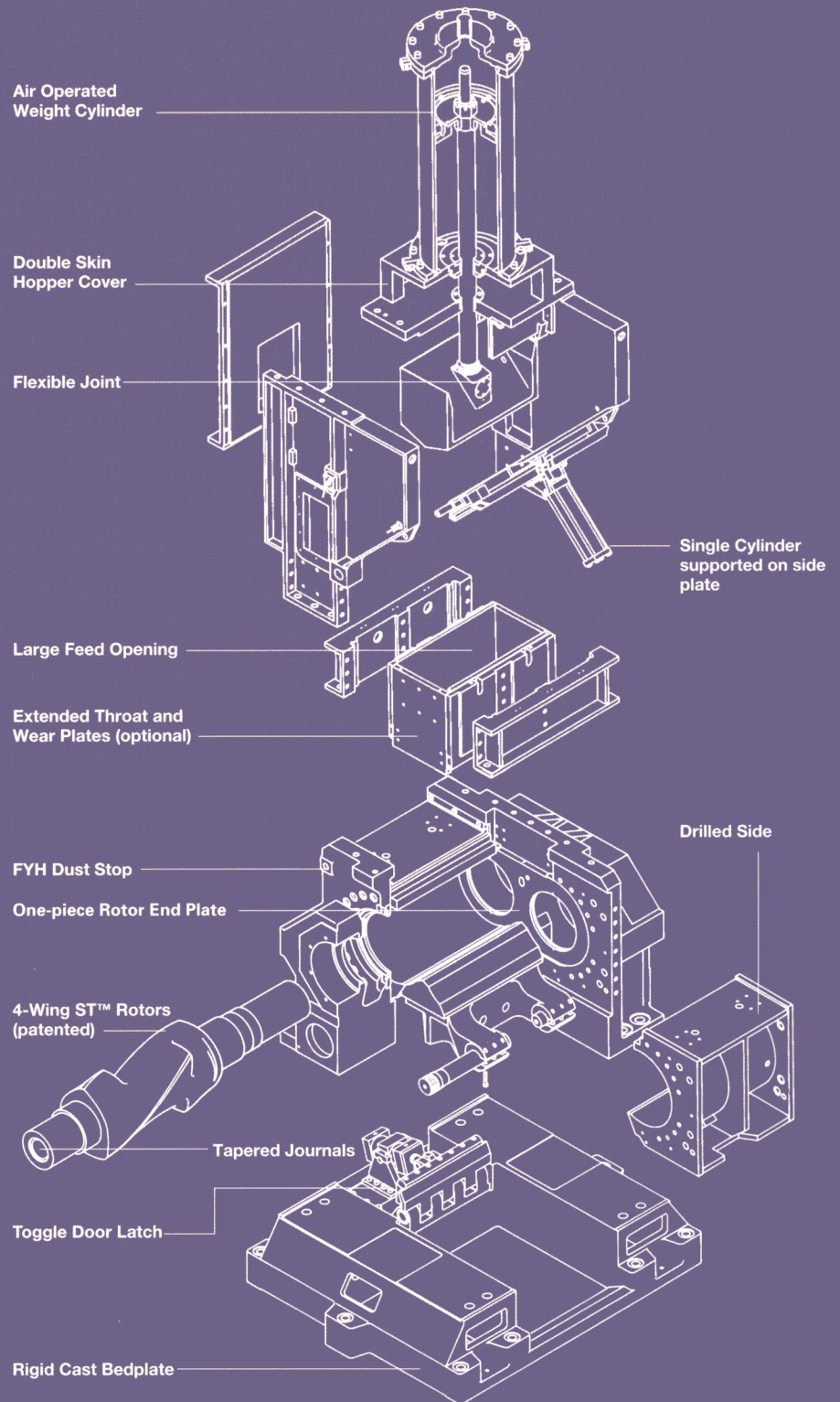
Production-scale facilities demonstrate and confirm that the appropriate Banbury Mixer and operating conditions have been selected for individual applications.

### Process Applications

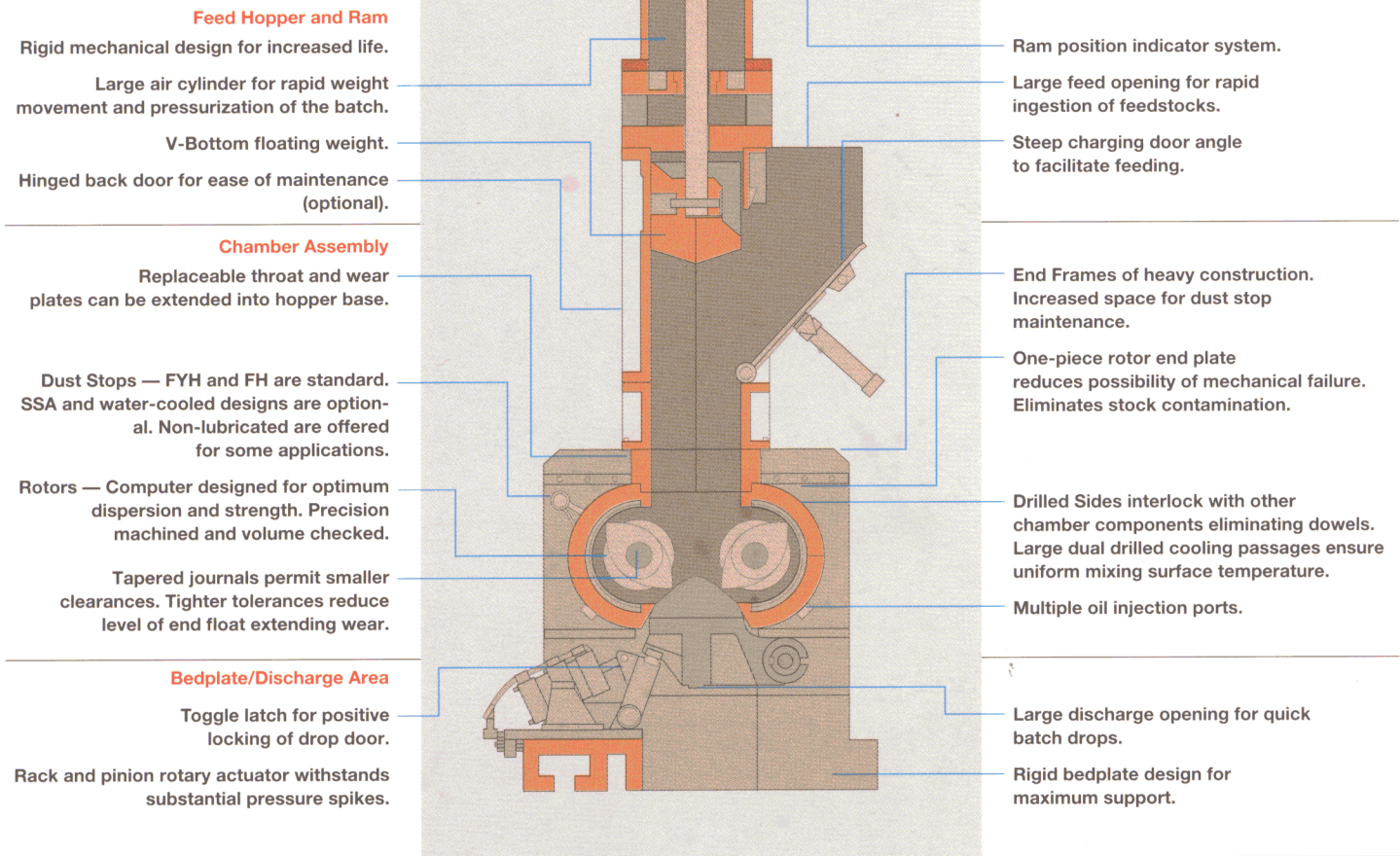
Technical support is available for the start-up and commissioning of Banbury Mixers. Farrel also provides support for optimizing mixer performance and desired batch characteristics.

### Service

Worldwide technical field service is available 24 hours a day. Farrel offers a complete inventory of critical Banbury Mixer spare parts to minimize downtime.



## Design Features of the Banbury Mixer



## Capacities of Mixers

Machine Size	Unit	Laboratory Mixers		Production Mixers								
		BR1600	00C	F50	F80	F120	F160	F200	F270	F370	F620	
Mixing Chamber	Cu. In.	97	258	3,050	4,480	7,320	9,760	13,420	16,470	25,250	39,650	
Net Volume	Liter	1.57	4.24	50	80	120	160	220	270	414	650	
Approx. Batch Weight @ 1.0 S.G. and .75 Fill Factor	Lbs.	2.6	7.0	84	132	199	265	365	446	685	1,076	
	Kg.	1.2	3.18	38	60	90	120	165	202	311	488	
Typical Mixing Speed	RPM	0-225	0-250	40-120	30-105	30-90	20-80	20-60	20-60	20-60	20-50	
Typical Torque Rating by Drive Arrangement	Compact Drive	HP/RPM	.13	.30	3.0	5.0	7.5	10.0	12.0	17.5	—	—
		KW/RPM	.10	.22	2.2	3.7	5.6	7.5	8.9	13.1	—	—
	Unidrive	HP/RPM	—	—	6.2	8.5	12.0	16.0	17.0	33.0	50.0	70.0
		KW/RPM	—	—	4.6	6.3	9.0	12.0	12.7	24.6	37.3	52.2
Approx. Dimensions	Length	Ft.: M	7.5:2.3	8.6:2.6	18.3:5.5	20.3:6.2	20.0:6.1	21.0:6.2	22.0:6.7	27.5:8.4	30.1:9.2	37.6:11.5
	Width	Ft.: M	3.3:1.0	4.6:1.4	5.0:1.5	7.9:2.4	8.5:2.6	13.0:4.0	14.0:4.3	15.1:4.6	14.0:4.3	17.4:5.3
	Height	Ft.: M	6.0:2.0	7.2:2.2	13.5:4.1	15.5:4.7	16.0:4.9	17.0:5.2	18.0:5.5	20.0:6.1	21.7:6.6	24.0:7.3
Approx. Weight	Lbs.	4,200	6,500	29,000	35,500	42,900	66,440	67,155	94,600	118,700	243,000	
	Tonnes	1.9	3.0	13.2	16.1	19.5	30.2	30.5	43.0	54.0	110.5	

- Net chamber volumes are based on two-wing rotors except for F370 and F620 models which are based on four-wing rotors.
- Batch capacities equals volume x specific gravity x fill factor. Fill factor is variable and dependent upon compound viscosity, speed, ram pressure and rotor type configuration.
- Torque values are typical and will vary depending upon application.

- Approximate dimensions are for unidrive arrangement and include gear reducer and motor.
- Approximate weights are for unidrive arrangement and exclude the motor (except for 00C and BR1600 models).
- Use of a tempered water system will reduce water consumption to 20%-50% of listed requirements.

# FARREL

**Knowledge, experience, service and the most comprehensive line of polymer processing equipment are applied to customer productivity and satisfaction.**

Farrel provides the Single Source Solution with an entire line of compound processing equipment.

## Principal Products

Banbury Mixers  
Calenders  
CP Compact Compounders  
FCM Continuous Mixers  
FTX Twin-Screw Extruders  
Gear Pumps  
Intermix Mixers  
Mills  
MVX Continuous Mixers  
Pelletizers  
Tecnolab Laboratory Processors  
Twin Screw Sheeters

## Trademarks

BANBURY®  
CARD®  
CP-SERIES II™  
FARREL®  
FTX™  
INTERMIX®  
MVX™  
MORIYAMA™  
QUICK DISCONNECT®  
ST™  
TECNOLAB®

Farrel Corporation has secured ISO 9001 registration in the United States and the United Kingdom.



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