

# DIE CASTING AUTOMATION AN INTEGRATED ENGINEERING APPROACH



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# COMPANY PROFILE

MOST OF THE FOUNDRIES TILL NOW WERE DOING DEFLASHING WORK MANUALLY. IT IS TIME CONSUMING PROCESS AS WELL AS VERY HAZARDOUS FOR THE WORKERS' HEALTH. WITH AUTOMATION REPLACING MANUAL PROCESS, FOUNDRIES ARE ACHIEVING BETTER PRODUCTIVITY ALONG WITH CONSISTENCY IN OUTPUT.

#### BUSINESS DRIVERS FOR DIE CASTING AUTOMATION

IN THE LAST 25 YEARS, THERE HAS BEEN A STEADY INCREASE IN THE ROLE OF INDUSTRIAL ROBOTS IN MANUFACTURING. WITH OVER

15,000 INDUSTRIAL ROBOTS SOLD EVERY YEAR, ROBOTS HAVE BECOME A MAINSTAY IN THE MANUFACTURING INDUSTRY. THEIR

FLEXIBILITY, RELIABILITY AND REPEATABILITY, TO NAME A FEW ADVANTAGES, HAVE MADE THEM A VITAL COMPONENT IN THE AUTOMATION PROCESS FOR DIE CASTING APPLICATIONS.

- SOME OF THE BUSINESS DRIVERS FOR AUTOMATION OF DIE CASTING OPERATIONS ARE:
- LOW COST OF ROBOTS LEADING TO COST EFFECTIVE AUTOMATION WITH QUICK RETURN ON INVESTMENT (ROI).
- INCREASED REQUIREMENTS FOR SYSTEM FLEXIBILITY TO PRODUCE MULTIPLE PARTS.
- EVER INCREASING FOCUS ON THE HUMAN FACTOR/ WORKCELL SAFETY.
- VARIETY OF PRODUCTION RATE REQUIREMENTS BASED ON MARKET FOR CAST PRODUCTS.
- CYCLE TIME REQUIREMENTS BY STATION OR OPERATION.
- LIFE CYCLE OF MANUFACTURED PRODUCT TO ENSURE ACCEPTABLE ROI.
- PRODUCT HANDLING REQUIREMENTS.
- MAINTENANCE REQUIREMENTS.
- SAFETY STANDARDS RELATED TO HEAT AND GAS EXPOSURE IN CASTING OPERATIONS.

- ENVIRONMENTAL FACTORS :

1. SAFETY IS A MAJOR ISSUE IN DIE CASTING OPERATIONS DUE TO THE EXTREME HEAT AND EMISSIONS THAT ARE GENERATED DURING
2. THE CASTING PROCESS. ROBOTS ARE USED PRIMARILY TO AVOID HUMANS FROM BEING EXPOSED TO THIS DANGEROUS ENVIRONMENT.

- PAYLOAD AND ROBOT SELECTION :

1. ROBOT SELECTION IS DRIVEN NOT ONLY BY ENVIRONMENTAL CONDITIONS BUT ALSO BASED ON PAYLOAD, REACH AND PART ACCESS WITHIN THE DIE. THE MASS, CENTER OF GRAVITY AND MOMENTS OF INERTIA ABOUT THE MOUNTING FACE OF THE ROBOT DETERMINES THE ROBOT MODEL BASED ON PAYLOAD CAPACITY.

# COMPANY PROFILE OF BORUNTE ROBOTS

- GUANGDONG BO LANGTE INTELLIGENT EQUIPMENT CO.,LTD. WAS FOUNDED IN 2008. THE REGISTERED CAPITAL IS 45MILLION RMB. CURRENTLY HAS ABOUT 400 EMPLOYEES. BO LANGTE IS ALSO ROBOT BACKBONE ENTERPRISES OF R&D, PRODUCTION, SALES, SERVICE OF INDUSTRIAL ROBOTS, LEVEL ROBOT, IMM ROBOT, STAMPING ROBOT, DIE CASTING ROBOT, INTELLIGENT EQUIPMENT SYSTEM IN GUANGDONG PROVINCE.
- GUANGDONG BO LANGTE INTELLIGENT EQUIPMENT CO.,LTD. BECAME THE FIRST LISTED COMPANY AFTER THE NEEQ NATIONAL EXPANSION ON JANUARY 24, 2014. BO LANGTE IS ALSO THE FIRST LISTED COMPANY THAT COMPLETES THE SHARE REGISTER SINCE THE NEEQ NATIONAL EXPANSION IN CHINA SECURITIES DEPOSITORY AND CLEARING CO., LTD. AT THE SAME TIME, WE ARE THE FIRST LISTED COMPANY IN LINEAR INDUSTRY.

# SILENT FEATURES OF BORUNTE

- FASTEST GROWING ROBOTIC COMPANY IN CHINA
- SOLD MORE THAN 15,000 ROBOTS WORLDWIDE IN LAST FINACIAL YEAR
- ALL SERVO MOTORS ARE USED FROM INOVANCE
- VERY HIGH REAPETABILTY
- MANY CRUCIAL ELECTRONIC PARTS ARE USED FROM JAPANESE COMPANY
- UNBELIVABLE CHEAPEST ROBOTS AVAILABLE IN MARKET WITH GAURANTEE SUCCESS
- PROMT AFTER SALES SERVICE



# BRTYZQJ Series

## 单轴伺服取件机

### One Axis Servo Extractor

#### 产品特点 Product Features

- 伺服马达驱动、配备谐波减速机，高速运行时依然能够保持定位准确、具备待机功能。
  - 可以单动，亦可与压铸机，喷雾机，给汤机连成全自动生产线。
  - 整体外形设计小巧、采用侧挂式，便于设备的清扫与保养。
  - 手臂可前进待机横行待机位置，减少夹取时间，提高生产率。
  - 可根据客户要求调节取出臂上升下降功能。
  - 多种取出先择模式，更能适应多样模具，达到自动化生产。
  - 所有时间参数及位置设定均可通过触摸式显示屏进行设定，具有操作提示及故障诊断功能，可对取件各动作状态进行监控。
- 
- AC Servo motor driver and Harmonic reducer, maintain accurate positioning in high-speed operation.
  - Side entry type, convenience for cleaning and maintaining.
  - The take-out arm can standby at the gate of security operation side of die casting machine which greatly shortens the pick-up time and increase productivity.
  - Self-diagnostic and monitor function, which make operation and maintenance extremely simple.





# BRTYZRQ Series

## 单轴热室取件喷雾机

### One Axis Servo Extractor and Sprayer Robot for Hot Chamber

#### 产品特点 Product Features

- 主臂直进直出式设计，采用伺服加行星减速机控制，全新钢丝皮带传动，超静音且无卡死结构，快速平稳。自动润滑装置，润滑磨合更稳定。
- 代替人工将压铸成品从模腔中取出，与压铸机完成自动生产。
- 可将成品放至传送带或与水口机、扳料机联线形成全自动生产。
- 降低劳动强度，提高生产效率，可提高单日成品产量约20-30%。
- 提高产品质量，降低生产成本。
- With single stage arm type, driven by the AC servo motor and gear box, running by the steel belt, with self-lubrication device, low voice and better running performance.
- Instead of manpower, equip with the die casting machinery to make the automation production.
- Loading the products into the belt conveyor, or working with the runner cutting machinery, can be make in-line production.
- Save the manpower, increase the production rate to be 20-30 %.
- Improve the products quality, and reduce the production costs.



# BRTYZQP Series

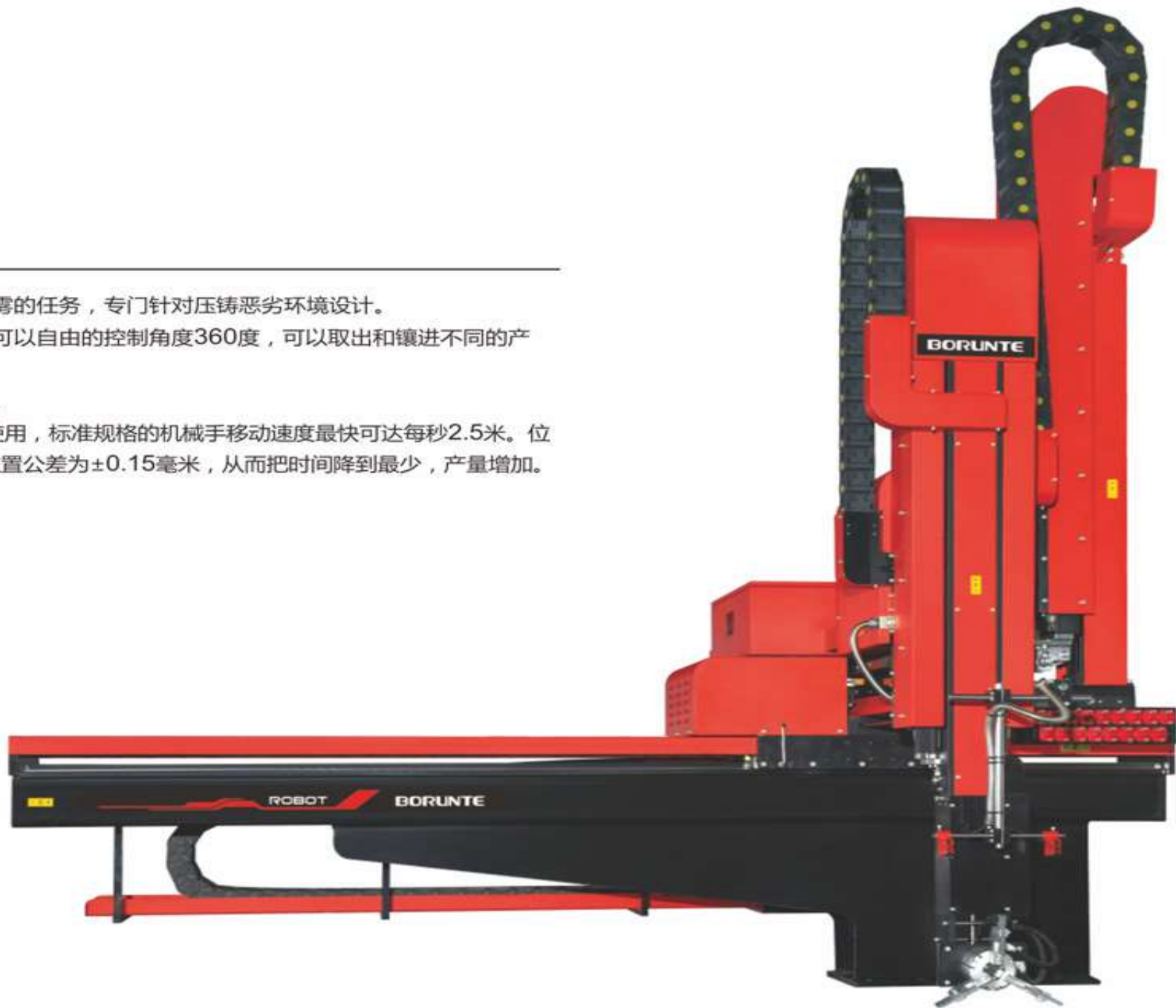
## 四轴伺服取件喷雾机

## Four Axis Servo Extractor and Sprayer Robot

### 产品特点 Product Features

- 本公司的全新四轴设计，可以完成多自由度的取件，镶件，喷雾的任务，专门针对压铸恶劣环境设计。
- 取件夹爪，取件夹爪由两个伺服马达控制不受空间条件限制，可以自由的控制角度360度，可以取出和镶进不同的产品，标配机型可适用多个不同尺寸产品的抓取。
- 喷雾由独立的喷嘴控制，可以实现多段，定点，前后独立喷雾。
- 全伺服动作控制，承载能力强，高速运转，适合中大型压铸机使用，标准规格的机械手移动速度最快可达每秒2.5米。位置公差为正负0.05毫米大型机器人移动速度最快可达1.5米，位置公差为 $\pm 0.15$ 毫米，从而把时间降到最少，产量增加。

- The new design of our company four-axis robot can perform multiple degrees of freedom, inserts, spray task, specially designed for the die casting in harsh environments.
- Pickup gripper is controlled by two servo motors without being limited by the space, it can freely control the angle of 360 degrees, and can be removed and inserted into different products, the standard model can be used to grab a number of different size products.
- Spraying controlled by the independent nozzles, it can achieve multi-segment, fix point, before and after independence spray.
- Full servo motor control minimizes the time and increases productivity which has good load capacity, high-speed operation, suitable for the high tonnage die-casting machine. The standard robot moves the fastest speed up to 2.5 M/S. Position tolerance is  $\pm 0.05$  mm. Large-scale type robot moves the fastest speed up to 1.5 M/S. The position tolerance is  $\pm 0.15$  mm.







双轴伺服式喷雾机  
Two-axis Servo Driven Sprayer

#### 产品特点 Product Features

1. 触摸式中文人机界面，自带故障诊断功能，操作和维护更简单。
  2. 喷头采用伺服驱动，可高速平稳的定位于X、Y轴的任意位置，可配合不同模具的需要进行喷涂作业。
  3. X、Y轴均采用直线导轨，高精密斜齿条传动，设备使用寿命更长。
  4. 雾化系统搭配BORUNTE专用集成式雾化装置，可任意调整脱模剂的吐出量，使雾化效果达到更佳状态，降低产品不良率。
1. Touched Chinese Human Machine interface with self-diagnostic function, which make operation and maintenance extremely simple.
  2. Sprayer driven by servo motor, located optional position of X-axis and Y-axis with speedy and steady.
  3. X-axis and Y-axis adopt the high precision linear rail, high precision helical pinion, increase the equipment working life.
  4. Atomization system match BORUNTE integrated spray devices can adjust the nozzle release agent freely, enable fog effect to achieve a better status, reduce the defective rate.



电动取出机  
Extractor Machine

#### 产品特点 Product Features

1. 触摸式中文人机界面，自带故障诊断功能，操作和维护更简单。
  2. 取件臂机构采用了独特的连杆设计，减小减速机的承载扭力，使得手臂高速运行时更加平稳。
  3. 横行采THK直线导轨承载，受力更大，使用寿命更长。
  4. 取件臂可在压铸机后安全门口待机，极大的缩短了取件时间。
1. Touched Chinese Human Machine interface with self-diagnostic function, which make operation and maintenance extremely simple.
  2. The take-out arm mechanism adopts the unique design of connecting rod reduce the load torque reducer.
  3. The traverse runs THK linear guide, bearing a larger, longer service life.
  4. The take-out arm can standby at the gate of security operation side of die casting machine which greatly shortens the pick-up time.

# BRTYZGT Series

## 两轴伺服给汤机

## Two Axis Servo Rod Ladler

### 产品特点 Product Features

- 采用全新的控制方式系统，搭配轻巧移动式手执示教器，便于检修及使用。
- 手执式示教器画面清晰，参数及功能的设定一目了然，并配有异常报警自诊断功能，使后期操作及维护都极为简便快捷。
- 多元化的功能选项及多方位的操作方式提高该机型的使用性能及通用性能。
- 整体结构采用伺服马达加蜗轮一体箱驱动、采用连杆式手臂，运行平稳精准高效、即使高速运动也能平稳刹车、铝液不溢出。

- Using new control system with light mobile hand-held controller, easy for maintenance.
- Self-diagnostic function, which make operation and maintenance extremely simple.
- A wide range of functional options and multi-directional operation mode to improve the performance and general performance
- Worm gear, connecting rod drive, make it working more smoothly and stably. Automatic control the accurate feeding volume by panel.







磕头式喷雾机  
Kowtow Servo Driven Sprayer

#### 产品特点 Product Features

1. 触摸式中文人机界面，自带故障诊断功能，操作和维护更简单。
2. 喷头采用伺服驱动，可高速平稳的定位于Y轴的任意位置，可配合不同模具的需要进行喷涂作业。
3. 机械结构采用连杆设计，相比其它种类整机高度更低，可适用于比较低矮的厂房。
4. 雾化系统搭配BORUNTE专用集成式雾化装置，可任意调整脱模剂的吐出量、使雾化效果达到更佳状态，降低产品不良率。
5. 本产品可以伺服喷头和铜管式喷头相互切换使用，更换喷头在10分钟之内完成，高效，实用，真正做到一机两用功能。

1. Touched Chinese Human Machine interface with self-diagnostic function, which make operation and maintenance extremely simple.
2. Sprayer driven by servo motor, located optional position of X-axis and Y-axis with speedy and steady.
3. Mechanical structure connecting rod, the overall dimension is lower than other species can be applied to the low workshop.
4. Atomization system match BORUNTE integrated spray devices can adjust the nozzle release agent freely, enable fog effect to achieve a better status, reduce the defective rate.





压铸六轴机械手  
Six-Axis Die-Casting Robot

## 产品特点 Product Features

1. 本公司的全新六轴设计，可以完成多自由度的取件，镶件，喷雾的任务，专门针对压铸恶劣环境设计。
2. 取件夹爪，取件夹爪由两个伺服马达控制不受空间条件限制，可以自由的控制角度360度，可以取出和镶进不同的产品，标配机型可适用多个不同尺寸产品的抓取。
3. 喷雾由独立的喷嘴控制，可以实现多段，定点，前后独立喷雾。
4. 全伺服动作控制，承载能力强，高速运转，适合中大型压铸机使用，标准规格的机械手移动速度最快可达每秒2.5米。位置公差为正负0.05毫米大型机器人移动速度最快可达1.5米，位置公差为 $\pm 0.15$ 毫米，从而把时间降到最少，产量增加。

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# VIDEOS OF BORUNTE ROBOTS WORKING IN DIE CASTING

[HTTPS://WWW.YOUTUBE.COM/WATCH?V= PLUAV-RVZW](https://www.youtube.com/watch?v=PLUAV-RVZW)

[HTTPS://WWW.YOUTUBE.COM/WATCH?V=GE894BXVVY8](https://www.youtube.com/watch?v=GE894BXVVY8)

[HTTPS://WWW.YOUTUBE.COM/WATCH?V=XDIK3A\\_QBUO](https://www.youtube.com/watch?v=XDIK3A_QBUO)

# ESTEEM CUSTOMER LIST OF BORUNTE



# COMMON INDUSTRIAL ROBOT APPLICATIONS

## 1. ARC WELDING

- ARC WELDING, OR ROBOT WELDING, BECAME COMMONPLACE IN THE 1980S. ONE OF THE DRIVING FORCES FOR SWITCHING TO ROBOT WELDING IS IMPROVING THE SAFETY OF WORKERS FROM ARC BURN AND INHALING HAZARDOUS FUMES.

## 2. SPOT WELDING

- SPOT WELDING JOINS TWO CONTACTING METAL SURFACES BY DIRECTING A LARGE CURRENT THROUGH THE SPOT, WHICH MELTS THE METAL AND FORMS THE WELD DELIVERED TO THE SPOT IN A VERY SHORT TIME (APPROXIMATELY TEN MILLISECONDS).

## 3. MATERIALS HANDLING

- MATERIALS HANDLING ROBOTS ARE UTILIZED TO MOVE, PACK AND SELECT PRODUCTS. THEY ALSO CAN AUTOMATE FUNCTIONS INVOLVED IN THE TRANSFERRING OF PARTS FROM ONE PIECE OF EQUIPMENT TO ANOTHER. DIRECT LABOR COSTS ARE REDUCED AND MUCH OF THE TEDIOUS AND HAZARDOUS ACTIVITIES TRADITIONALLY PERFORMED BY HUMAN LABOR ARE ELIMINATED.



- 4. MACHINE TENDING

ROBOTIC AUTOMATION FOR MACHINE TENDING IS THE PROCESS OF LOADING AND UNLOADING RAW MATERIALS INTO MACHINERY FOR PROCESSING AND OVERSEEING THE MACHINE WHILE IT DOES A JOB.

- 5. PAINTING

[ROBOTIC PAINTING](#) IS USED IN AUTOMOTIVE PRODUCTION AND MANY OTHER INDUSTRIES AS IT INCREASES THE QUALITY AND CONSISTENCY OF THE PRODUCT. COST SAVINGS ARE ALSO REALIZED THROUGH LESS REWORK.

- 6. PICKING, PACKING AND PALLETIZING

MOST PRODUCTS ARE HANDLED MULTIPLE TIMES PRIOR TO FINAL SHIPPING. [ROBOTIC PICKING AND PACKAGING](#) INCREASES SPEED AND ACCURACY ALONG WITH LOWERING PRODUCTION COSTS.

- 7. ASSEMBLY
- ROBOTS ROUTINELY [ASSEMBLE PRODUCTS](#), ELIMINATING TEDIOUS AND TIRESOME TASKS. ROBOTS INCREASE OUTPUT AND REDUCE OPERATIONAL COSTS.
- 8. MECHANICAL CUTTING, GRINDING, DEBURRING AND POLISHING
- BUILDING DEXTERITY INTO ROBOTS PROVIDES A MANUFACTURING OPTION THAT IS OTHERWISE VERY DIFFICULT TO AUTOMATE. AN EXAMPLE OF THIS IS THE PRODUCTION OF ORTHOPAEDICAL IMPLANTS, SUCH AS KNEE AND HIP JOINTS. BUFFING AND POLISHING A HIP JOINT BY HAND CAN NORMALLY TAKE 45-90 MINUTES WHILE A ROBOT CAN PERFORM THE SAME FUNCTION IN JUST A FEW MINUTES.
- 9. GLUING, ADHESIVE SEALING AND SPRAYING MATERIALS
- SEALER ROBOTS ARE BUILT WITH NUMEROUS ARM CONFIGURATIONS THAT ENABLE THE ROBOT TO APPLY ADHESIVES TO ANY TYPE OF PRODUCT. THE PRIMARY BENEFIT IN THIS APPLICATION IS INCREASED QUALITY, SPEED AND CONSISTENCY OF THE FINAL PRODUCT.



