BRUSH ENGINEERED MATERIALS INC

FORM 8-K
(Unscheduled Material Events)

Filed 2/8/2005 For Period Ending 2/8/2005

Address	17876 ST. CLAIR AVE.
	CLEVELAND, Ohio 44110
Telephone	216-383-4062
CIK	0001104657
Industry	Metal Mining
Sector	Basic Materials
Fiscal Year	12/31

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 8-K

CURRENT REPORT

Pursuant to Section 13 OR 15(d) of The Securities Exchange Act of 1934

Date of Report (Date of earliest event reported) February 8, 2005

Brush Engineered Materials Inc.

(Exact name of registrant as specified in its charter)

Ohio	001-15885	34-1919973
(State or other jurisdiction of incorporation)	(Commission File Number)	(IRS Employer Identification No.)
17876 St. Clair Avenue, Cleveland, Ohio		44110
(Address of principal executive offices)		(Zip Code)

Registrant's telephone number, including area code 216-486-4200

Not Applicable

(Former name or former address, if changed since last report.)

Check the appropriate box below if the Form 8-K filing is intended to simultaneously satisfy the filing obligation of the registrant under any of the following provisions (see General Instruction A.2. below):

☐ Written communications pursuant to Rule 425 under the Securities Act (17 CFR 230.425)

☐ Soliciting material pursuant to Rule 14a-12 under the Exchange Act (17 CFR 240.14a-12)

☐ Pre-commencement communications pursuant to Rule 14d-2(b) under the Exchange Act (17 CFR 240.14d-2(b))

☐ Pre-commencement communications pursuant to Rule 13e-4(c) under the Exchange Act (17 CFR 240.13e-4(c))

Item 8.01 Other Events.

On February 8, 2005, Brush Engineered Materials Inc., an Ohio corporation (the "Company"), updated the "Current Investor Update," a slide presentation on its website, a copy of which is attached hereto as Exhibit 99.1. This slide presentation shows the Company's corporate strategy and the financial results through the fourth quarter of 2004.

Item 9.01 Financial Statements and Exhibits

Exhibits:

Exhibit Number	**Description of Exhibit**
99.1	Current Investor Update

SIGNATURES

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned hereunto duly authorized.

February 8, 2005

Brush Engineered Materials Inc.

By: *Michael C. Hasychak*

Michael C. Hasychak
Vice President, Treasurer and Secretary

Brush Engineered Materials Inc. Profile

- Publicly traded since 1956: NYSE-listed since 1972.
- Founded 1931 as Brush Beryllium Company.
  - Building off earlier pioneering technical work at Brush Laboratories
  - Initial scope was development of commercial markets
- With onset of WW II and post war period, significant growth in defense and eventually, aerospace applications
- Mid-70s: major expansion of new commercial markets.
- Today, commercial markets represent 90% + of revenues

BRUSH ENGINEERED MATERIALS

Brush Engineered Materials Inc. Profile

- A leading manufacturer of high performance engineered materials
- Operations, service centers and major office locations in North America, Europe and Asia
- Serving long-term growth oriented global markets:
  - Telecommunications and computers
  - Automotive electronics
  - Optical media
  - Industrial components
  - Aerospace and defense
  - Appliance

BRUSH ENGINEERED MATERIALS

Brush Engineered Materials Inc.
"Advancing the World's Technologies"

- BEM Materials are found in a wide range of critical and demanding applications requiring:

- Strength	- Reliability
- Thermal & electrical conductivity	- Miniaturization
- Weight reduction	- Corrosion resistance
- Reflectivity	

BRUSH ENGINEERED MATERIALS

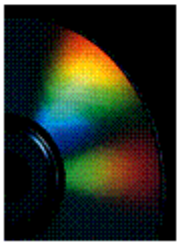
Brush Engineered Materials Inc.
End Uses

Cellular phones and other wireless communications

Notebook and network computers

Electronic components in cars and trucks

Life enhancing devices



Optical Media

Industrial products

BRUSH ENGINEERED MATERIALS

Investment Highlights and Strengths

- Unique Status as Fully Integrated Provider of Beryllium-Containing Products
- Global Sales and Distribution Network
- Sales Based on End User Specifications
- Strong Value Proposition in Served Markets
- Broad Metallurgical Capabilities in Precious and Non-precious Metals
- Global Leader in High Performance Engineered Materials
- Positive Market Trends
- Capacity to Support Profitable Market Growth
- Strategic Customer Relationships
- Strong and Improving Sales and Margins
- Significant Technical Capabilities
- High Barriers to Entry

BRUSH ENGINEERED MATERIALS

Brush Engineered Materials Inc.
Organized into Two Separate Reportable Segments

Metal Systems

Alloy Products

Beryllium Products

Technical Materials, Inc.

Microelectronics

Electronic Products

Williams Advanced Materials Inc.

Metal Systems Group (2004 Sales: $296.0 million)

Alloy Products

2004 Sales: $202.9

- Copper and nickel-based alloy materials, most of which incorporate beryllium
- Strip products are used in electronic connectors including PDA's, wireless communications equipment, notebook and network computers and automotive electronics that require high strength, formability and electrical conductivity
- Bulk products are rod, bar, tube and plate products for industrial and aerospace bushings and bearings, oil & gas components and plastic mold materials where strength, corrosion and wear resistance, thermal conductivity and lubricity are critical performance requirements

Technical Materials, Inc. (TMI)

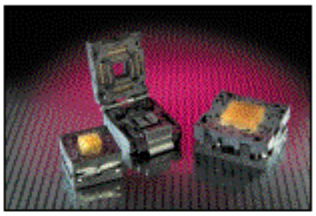
2004 Sales: $53.6 million

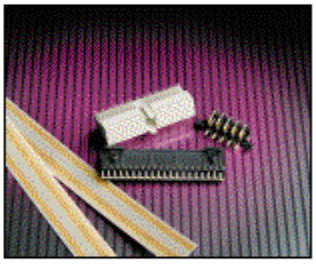
- Engineered material systems, including clad, plated and electron beam welded metals used in demanding connector applications
- Combines precious and non-precious metals in strip form for use in complex electrical components for telecommunications systems, computers and automotive electronics

Beryllium Products

2004 Sales: $39.5 million

- Pure beryllium and aluminum-beryllium composites for high-performance applications, principally for aerospace and defense applications where stiffness, strength, lightweight, dimensional stability and reflectivity are critical





BRUSH ENGINEERED MATERIALS

Microelectronics Group (2004 Sales: $195.6 million)

Williams Advanced Materials (WAM)

2004 Sales: $165.7 million

Precious metal and specialty alloys for high reliability applications

Products include precious and non-precious metal vapor deposition targets, frame lid assemblies, clad and precious metal preforms, high-temperature braze materials and ultra fine wire

Industries served include optical media, semi-conductor, data storage, performance film and wireless

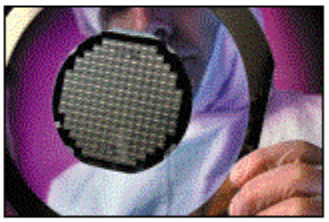
Electronic Products

2004 Sales: $29.9 million

Products include beryllia ceramic materials, electronic packaging and thick-film circuitry

Products designed to meet exacting performance requirements of target customers

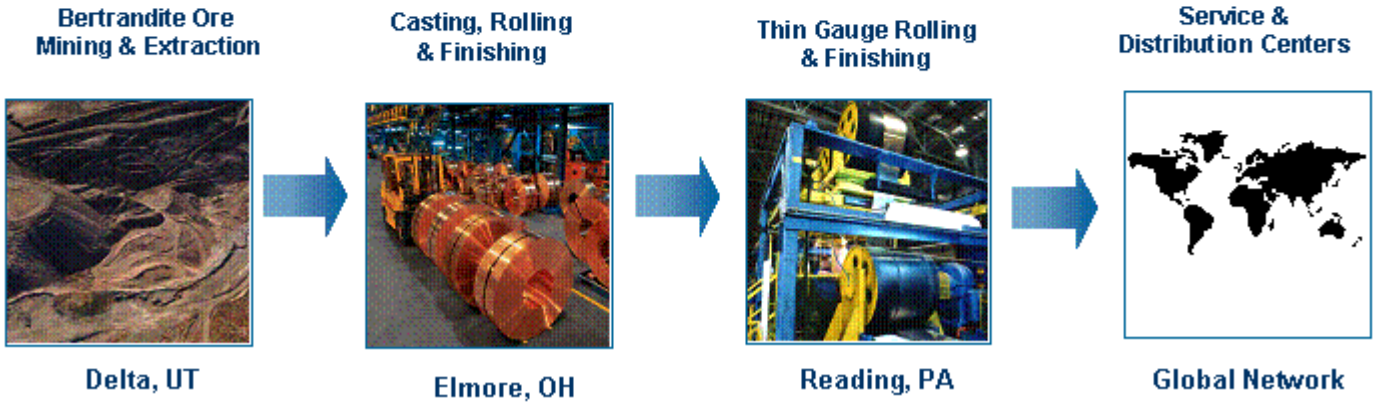
Industries served include wireless telecommunications, medical laser, aerospace, defense and automotive



BRUSH ENGINEERED MATERIALS

Fully Integrated Beryllium Producer

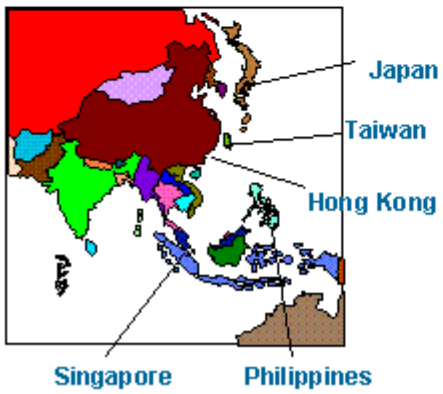
- Beryllium and beryllium alloys are critical to many high performance applications
  - Strong
  - Lightweight
  - Good formability
  - High reliability
  - Thermal and electrical conductivity
  - Corrosion and wear resistant
- Operate the only active bertrandite ore mine in the developed world
  - 7,500 acres in Juab County, Utah
  - Approximately 100 years of proven reserves



Global Sales and Distribution Network

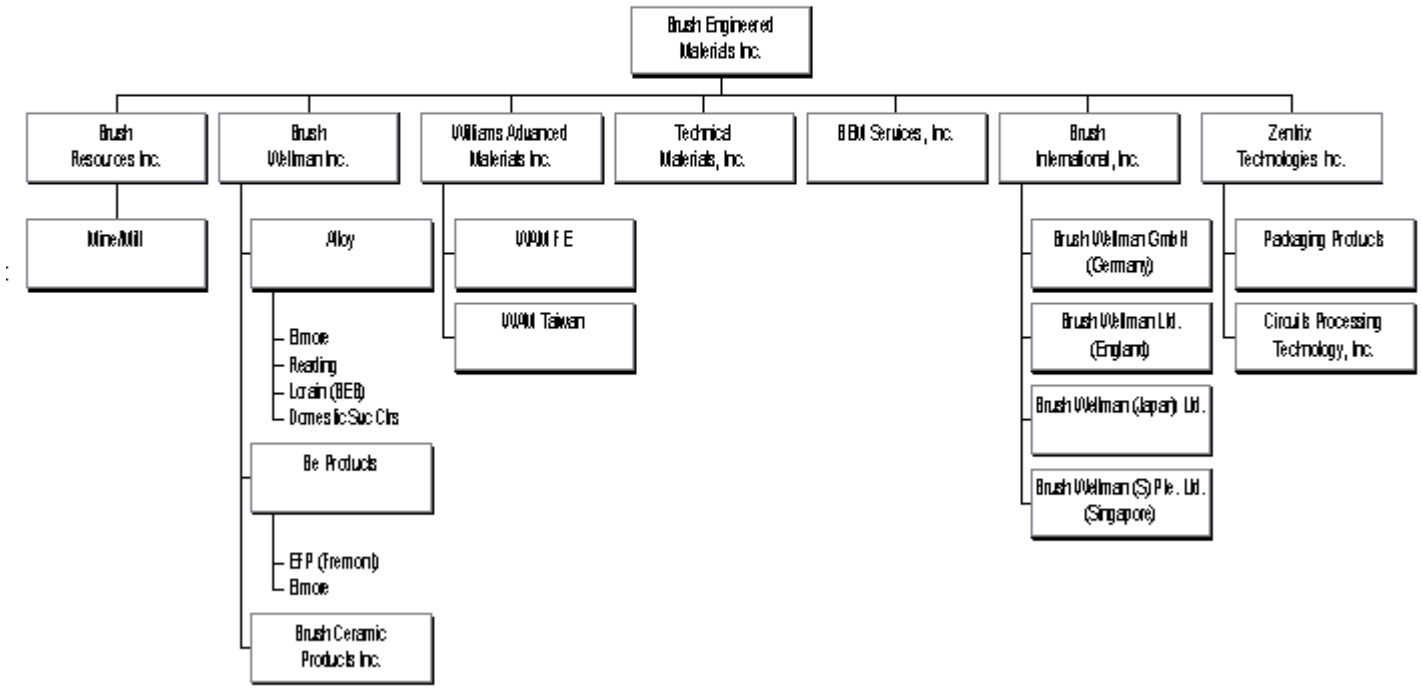
- Operations in the U.S. and seven foreign countries
- Significant recent expansion to China and Taiwan
- International sales are 33% and growing

◂ ---------- Asia / Pacific --------- ▸ ◂ ---------- Europe ---------- ▸ ◂ - Exports from USA - ▸



BRUSH ENGINEERED MATERIALS

Corporate Structure

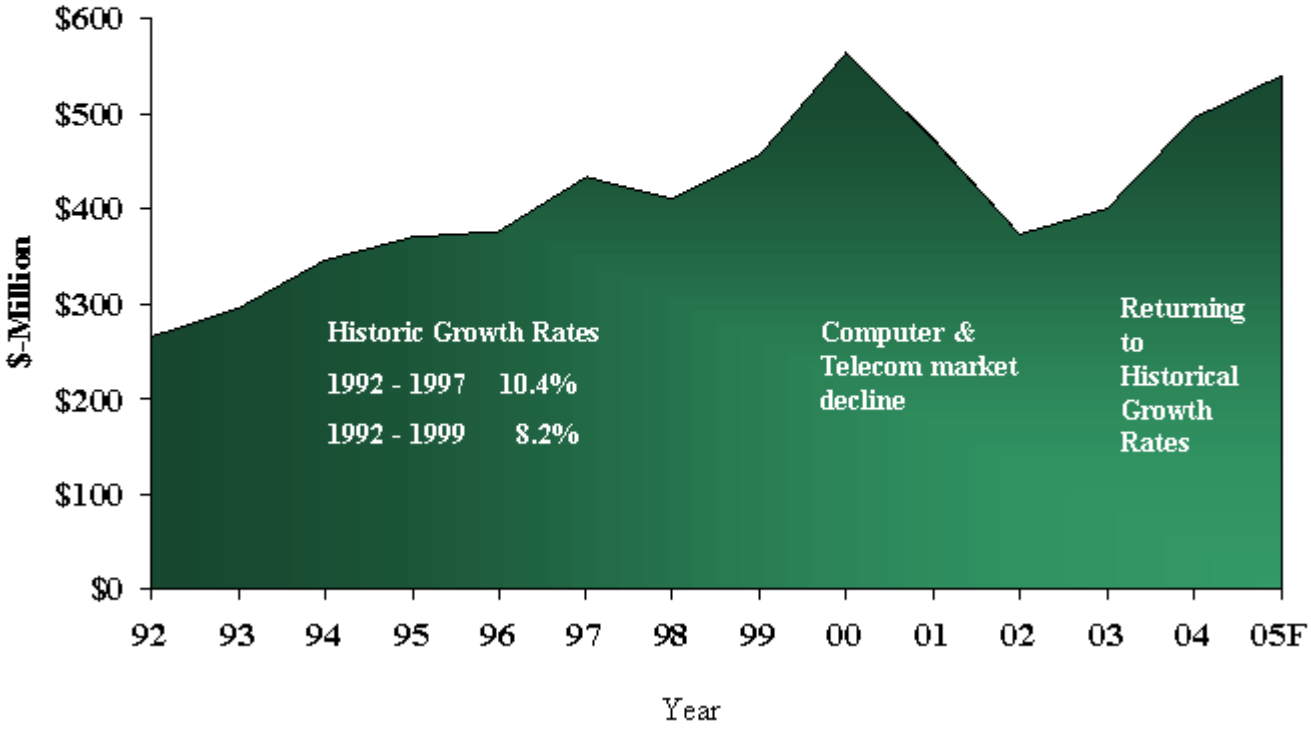


Significant Recent Progress in Key Financial Statistics

	2002	2003	2004
Sales	$372.8	401.1	496.3
EBIT	(22.6)	(8.9)	25.0
EPS	(2.15)	(.80)	.86
G.P.%	12.9%	18.2%	22.4%
O.P.%	(6.1%)	(2.2%)	5.0%
Depreciation	20.6	20.7	22.2
Capital Spending	5.4	6.3	10.1
Debt [1]	118.7	99.2	72.5
Cash	4.4	5.1	49.6
Debt/Total Cap.	43%	39%	26%

(1) Includes in 2002, synthetic lease

In 2001, the computer and telecom market decline drove sales back to mid-90's levels
In 2003, growth began to return to historical rates
In 2004, growth accelerated

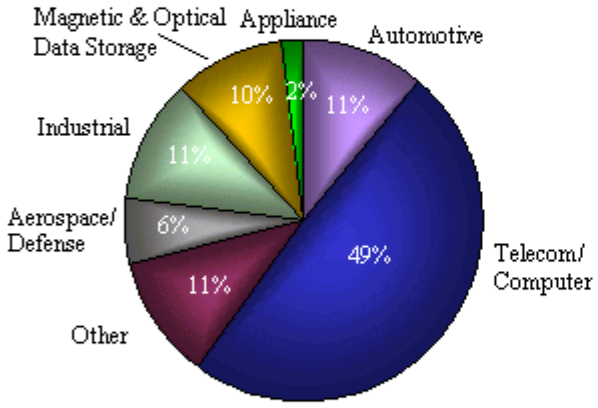


The decline in the telecom/computer market resulted in a 50% drop in the market segment's revenue comparing 2003 to 2000, in 2004, this segment started to grow

$ in millions

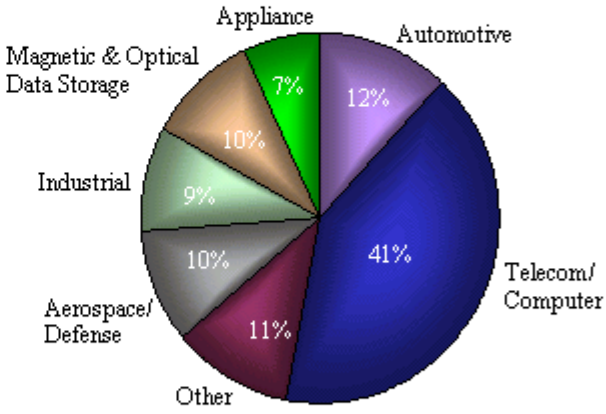
	2000	2003	2004	Change 03-04
Telecom/Computer	$277	$139	$206	67
Automotive	62	53	59	6
Industrial	62	42	43	1
Magnetic and Optical Data Storage	56	53	52	(1)
Defense/Aerospace	34	37	49	12
Appliance	19	27	33	6
All Other	54	50	55	5
	$564	$401	$497	96

Comparing 2003 to 2000, the portion of Brush's revenue from the telecom/computer market declined from nearly 50% to slightly more than 35%. In 2004, it improved to 41%



2000

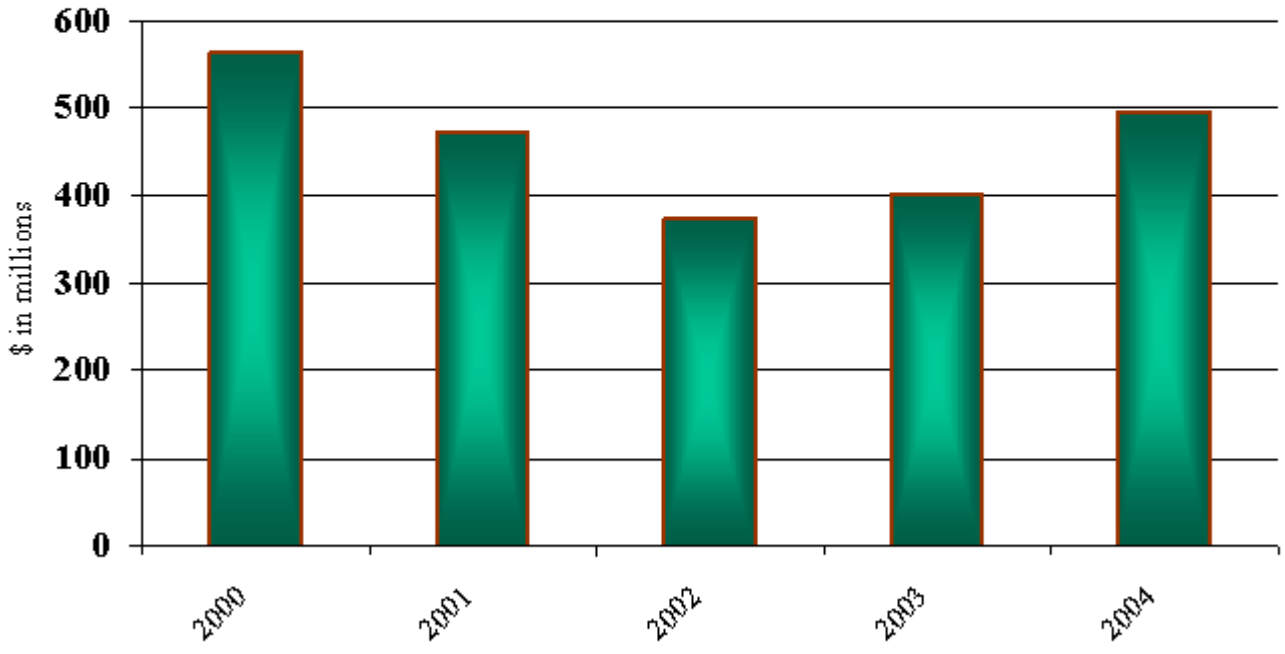
$564 Million



2004

$496 Million

Brush experienced a major downturn in mid 2001, with revenue remaining flat through 2002. 2003 was stronger than 2002, 2004 was stronger than 2003 and 2005 is expected to improve further



Positive Market Trends

- Electronic component manufacturers are being driven by end user demands to produce products that are smaller, lighter and faster
- Increased electronic component performance characteristics require materials that have enhanced mechanical, electrical and thermal properties
- Growing opportunity for thin film physical vapor deposition (PVD) products in the LCD, data storage and semiconductor markets
- Spending and conditions in the telecommunications and computer market have improved
- Conditions are improving in the oil and gas, undersea and heavy equipment markets.

Brush has generated year-over-year sales growth in eight consecutive quarters

Capacity to Support Profitable Market Growth

Well-positioned to support rapid sales growth without significant incremental cash investment

- $140 million invested between 1996 and 2000
- Operating with significant available excess capacity
- Significant productivity gains in recent years
- Capital spending in 2002, 2003 and 2004 averaged $7 million per year

Financial and Operational Initiatives

Our on-going performance improvement initiatives are focused on five key areas

- Expanding and diversifying the revenue base
  - New products
  - New applications
  - New markets
  - New geographies
- Improving margins through increased operating efficiency
  - Six Sigma and Lean Manufacturing
- Reducing overhead costs
- Reducing debt
- Positioning for global market growth and economic recovery
  - Improve quality, cost, speed and service

Expand and Diversify Revenue Base

Since 2000, BEM has aggressively worked to broaden its base with initiatives targeted at new products, new end use markets and new high-growth regions

New Products

- *Alloy 390* – Telecom & Auto
- *PM Plated Strip* – Telecom & Auto
- ***Toughmet*** – Bushings & Bearings
- *MoldMax XL* – Plastic Molds
- *Welded Tube* – Oil & Gas
- *Silver DVD Alloy (Silx)* - DVD
- *Visi-Lid* – Telecom & Military

New End Use Markets

- Alloy
  - Heavy Equipment
  - Oil & Gas Components
  - Plastic Tooling
- WAM
  - Semiconductors
  - Data Storage
  - Magnetic Media
  - Thin Film Transistor/Liquid Crystal Display

New High-Growth Regions

- Singapore
- Taiwan
- Hong Kong
- Korea
- China

Improving Margins Through Increased Operating Efficiency

Lean Manufacturing and Six Sigma initiatives enabled Brush's Alloy Products business to improve operational efficiency and reduce costs in 2004

- Improved distribution inventory turns 29%
- Improved manufacturing inventory turns 16%
- Raised yields 7%
- Shipped 13% more pounds per manufacturing employee
- Reduce mill distribution operating cost by 3%
- Reduce strip rework by 28%
- Reduced unplanned equipment downtime 45%
- Improved safety performance by 40%

Reduce Overhead

Brush has significantly reduced overhead

($ in millions)

	2001	2004
Sales	$ 473	$ 496
Contribution Rate	40.0%	41.2%
Overhead	208	180
Overhead Percent	44.0%	36.3%

Note: Total Overhead = Total fixed costs (manufacturing overhead + SG&A + interest).

Reduce Debt

A significant reduction in debt has occurred

($ in millions)

	2000	2004
Balance Sheet Debt & AEP Lease	$ 128.4	$ 72.5
Other Key Off-balance Sheet Leases	17.9	$ 13.1
Off-balance Sheet Inventory Financing	59.6	$ 17.1
Total	$205.9	$102.7
Debt to Debt Plus Equity	23%	26%

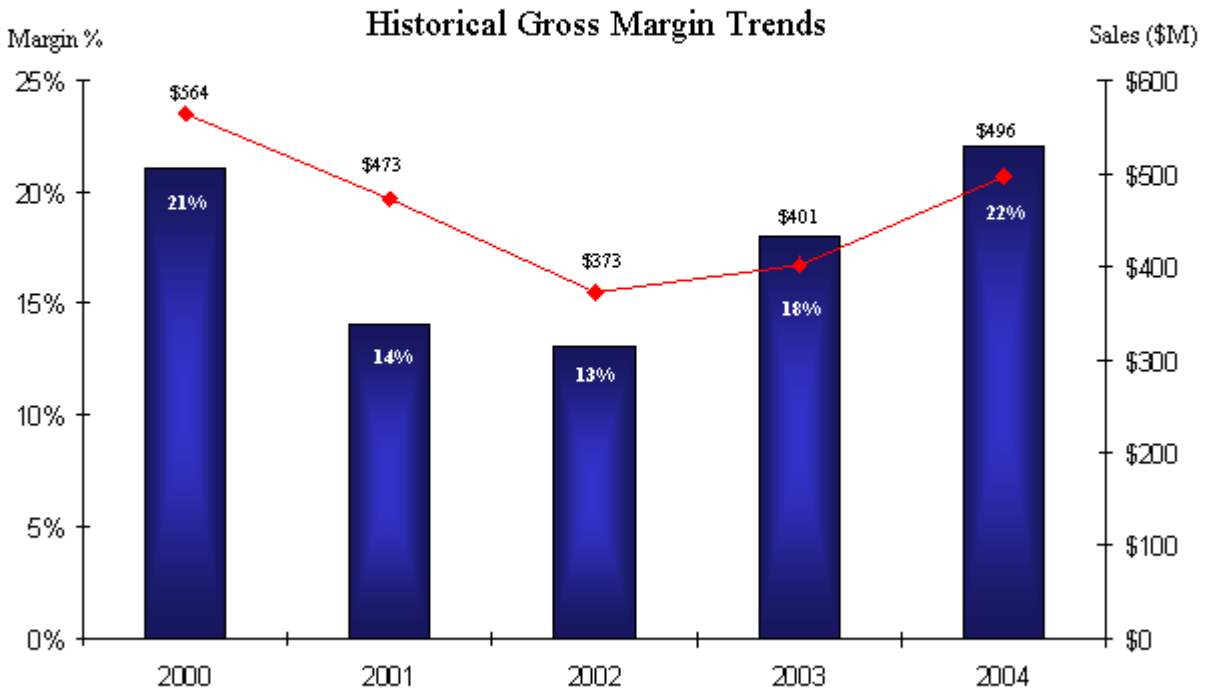
Improving Margins

Our efforts to improve margins have succeeded, despite the fall in revenue

Year	Gross Margin %	Sales ($M)
2000	21.0%	$564
2001	14.4%	473
2002	12.9%	373
2003	18.2%	401
2004	22.4%	496

Improved Margins

Margins have improved through cost reduction and productivity improvement initiatives



Programs to improve profitability had a significant impact in 2003 and in 2004

$ Millions

	2001	2002	2003	2004
Net Sales	$472.6	$372.8	$401.0	$496.3
Oper. Profit	(14.1)	(22.6)	(8.9)	25.0
Oper. %	(3.0)	(6.1)	(2.2)	5.0

2003 includes the impact of the $6.0 million refinancing charge. Excluding the charge operating profit would have been ($2.9) million.

Investment Highlights and Strengths

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Segment Sales Review

$ in millions

	2001		2002		2003		2004	
	sales	$	% sales	$	% sales	$	% sales	$	%
▪ **Metal Systems Group**	**295.7**	**63%**	**227.9**	**61%**	**239.4**	**60%**	**296.0**	**60%**
– Alloy	217.5	46%	151.9	41%	162.3	40%	202.9	41%
– Beryllium Products	27.7	6%	31.6	8%	35.2	10%	39.5	8%
– TMI	50.5	11%	44.4	12%	41.9	9%	53.6	11%
▪ **Microelectronics Group**	**169.6**	**36%**	**139.2**	**37%**	**157.3**	**39%**	**195.6**	**39%**
- WAM	135.3	29%	109.1	29%	127.8	32%	165.7	33%
– Electronic Products	34.3	7%	30.1	8%	29.5	7%	29.9	6%
▪ **Other**	**7.3**	**2%**	**5.7**	**2%**	**4.3**	**1%**	**4.7**	**1%**
TOTAL	472.6	100%	372.8	100%	401.0	100%	496.3	100%

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2004 new product and market share growth was 36% of 2004 sales growth

$ in millions

	Sales			New Product & Market Share Gain
	2003	2004	Growth	
▪ **Metal Systems Group**	**$239.4**	**$296.0**	**$56.6**	**$21.2**
– Alloy	162.3	202.9	40.6	10.5
– Beryllium Products	35.2	39.5	4.3	7.7
– TMI	41.9	53.6	11.7	3.0
▪ **Microelectronics Group**	**157.3**	**195.6**	**38.3**	**13.0**
- WAM	127.8	165.7	37.9	12.0
– Electronic Products	29.5	29.9	0.4	1.0
▪ **Other**	**4.3**	**4.7**	**0.4**	**0.0**
TOTAL	$401.0	$496.3	$95.3	**$34.2**

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Segment Earnings 2000 - 2004

$ in millions

	2000	2001	2002	2003	2004
Metal Systems	$10.2	$(20.1)	$(37.7)	$(16.6)	$2.7
Microelectronics	8.4	4.6	3.9	12.6	18.5
Other	4.4	1.4	11.2	(4.9)	3.8
Total Operating Profit	$23.0	$(14.1)	$(22.6)	$(8.9)	$25.0

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Brush Wellman Alloy Vision

Brush Wellman is the leading supplier of High Performance Copper Alloys worldwide, providing manufacturing excellence in the form of high reliability products and services to satisfy our customers' most demanding applications. We provide these services in a culture of local support and global teamwork.

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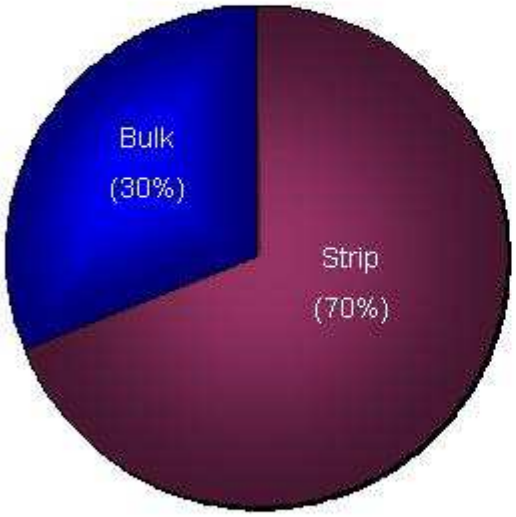
Alloy Products Markets



- *Strip Markets* (coils)
  - Telecommunications
  - Computers
  - Automotive Electronics
  - Appliance
- *Bulk Markets* (rod, bar, tube, plate)
  - Plastic molds
  - Undersea cable amplifiers
  - Aerospace landing gear bearings
  - Oil and gas drilling and completion equipment
  - Heavy Equipment - Emerging
  - Bearings - Emerging

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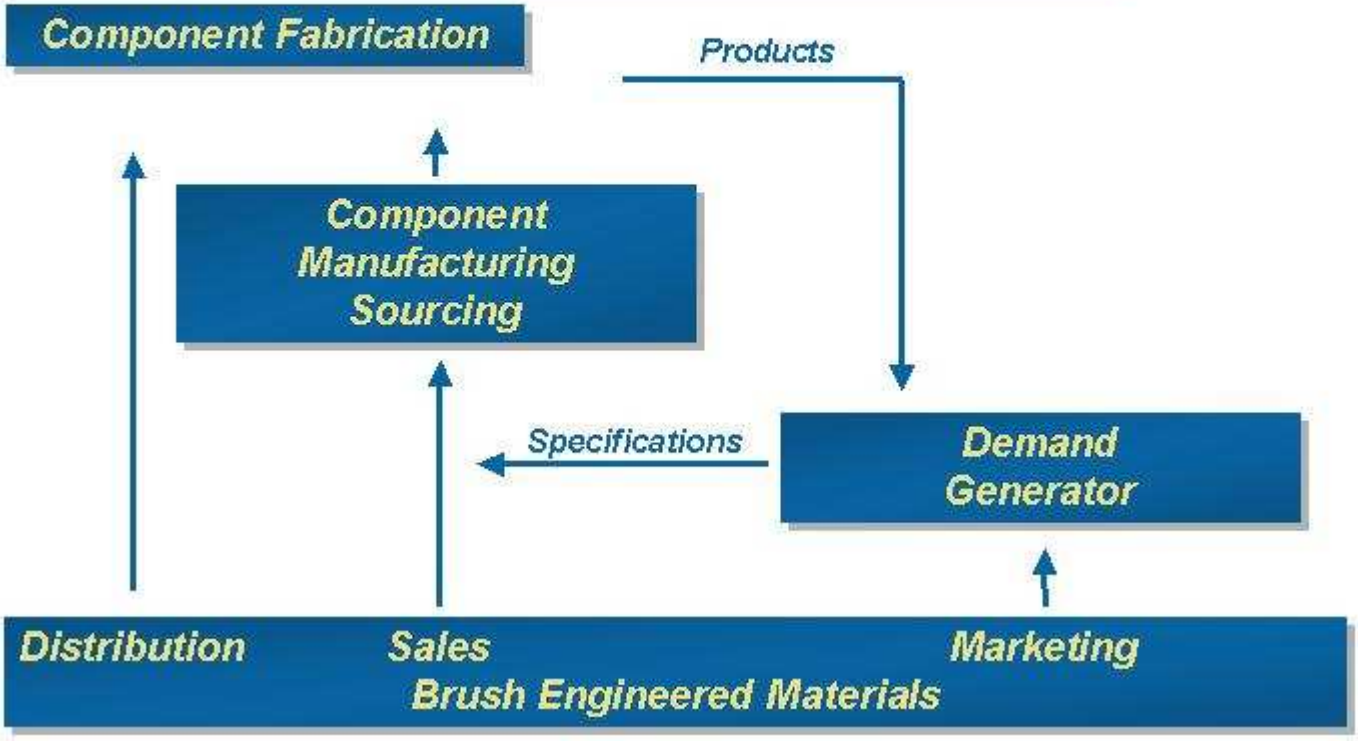
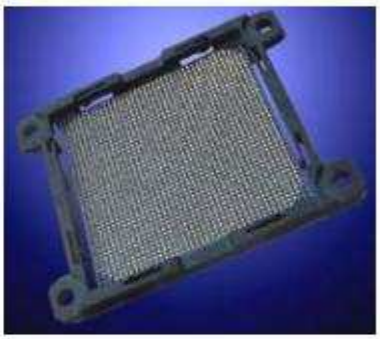
Sales Based on End User Specifications



Strip Alloy Applications

(strength, conductivity, spring characteristics)

- Current Carrying Springs and Relays
- Integrated Circuitry Sockets
- Electrical and Electronic Connectors
- Air Bag Sensors
- Pressure Responsive Devices
- Fire Extinguisher Sprinkler Heads



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Alloy Products
Strip Products - Strategy

- **Maintain focus on 4 major end-use markets**
  - Computer Telecommunications Automotive Appliance
- **Defend leadership in traditional alloy strip, rod & wire**
  - Reduce total cost of manufacture to allow penetration of mid-range alloy applications
  - Enhance product properties to provide additional value to customers
- **Introduce new alloys to meet needs of targeted market opportunities.**
  - Brush 60®, ToughMet® Strip, Alloy 390™, BrushForm™ 47, BrushForm™ 65
- **Focus on new non-connector markets**
  - Deep Offshore Oil and Gas, Bearings, Welded Tubing
- **Geographic Growth**
  - Expand commercial operations in Asia Pacific

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New Products - 2004/2005

- Launched 2004
  - Alloy 390 Strip - Electronics….numerous personal portable devices (i.e. cell phones), burn-in-test sockets, servers (high strength/cond.)
  - 310 Plate - resistance welding devices
  - Large Plate - Plastics…large injection molded parts requiring improved cooling
  - CD Tube (limited diameter) - Aerospace…landing gear and actuator equipment, Oil and Gas…Instrumentation Housing
- Developed in 2004 - Targeted for early 2005 launch
  - BrushForm 47 and BrushForm 65 - Electronics…same as 390 (however, further expanding property set, i.e. formability, conductivity and strength)
  - ToughMet AT110 Ring Rolled Forging - Heavy Equipment Applications…larger bushing applications in heavy mining equipment
  - T320 and TS 160U Rod (2.5") - Oil and Gas and Aerospace…expanding into Oil and Gas completion equipment applications with better toughness (T320), and landing gear bushings and actuator equipment with higher strength product (TS160U)

Strip Capacity Expansion
Elmore and Reading Facilities

- $140 Million (1996 - 1998)
- Added casting, hot rolling, annealing and cold rolling capacity at Elmore
- Added light gauge strip and mill hardening capacity at Reading
- 50% to 100% capacity increase depending upon product

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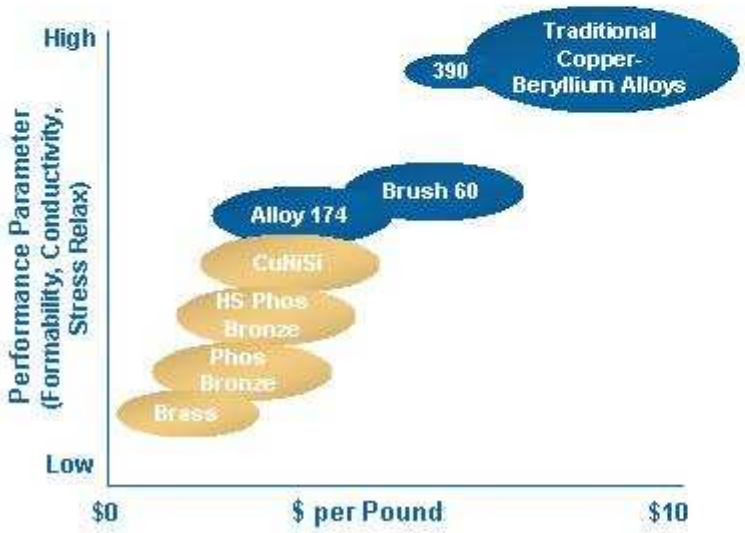
Strong Value Proposition in Served Markets

Copper-beryllium alloys, while premium priced, provide best-in-class performance

Competitive Alloy Comparison



Brush Value Proposition

- Unique, high-performance materials
- Technical design capabilities
- Outstanding service
- Global marketing, sales and distribution

Note: Blue denotes Brush Engineered Materials' alloys; beige represents competitive materials.

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Automotive Electronics

Definition: power and signal distribution in passenger cars and light trucks - connectors, switches and relays.

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Automotive Applications

Potential New Applications:

- Infotronics/telematics - in car multimedia systems and mobile communication systems, navigational, global positioning, internet based services
- Powertrain electronics - in vehicle networks, drive-by-wire systems, continuously variable transmission, intelligent braking
- Safety systems - intelligent air bag systems, driver alertness monitoring, adaptive cruise control, frontal collision warning, intelligent highway vehicle systems, automatic emergency notification

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Computer

Definition: Brush Wellman's high performance alloys are sold to the computer industry in strip and wire forms for connectors, contacts, and shielding. End use applications include servers, workstations, notebook and desk top computers, personal digital assistants (PDAs), data storage devices, and semiconductor testing.

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Computer Applications

Examples of specific end-use product applications

- Fingerstock shielding used in servers and data storage
- Power connectors used in server power supplies manufactured by Sun, HP, Compaq, and Intel
- Microprocessor socket connectors
- PDA ID connector and battery contacts
- VHDM connector system for data storage and server systems

Examples of future target product applications

- Microprocessor Burn-in and Test Sockets (BiTS)
- Power connectors for multi-chip module interfaces as well as backpanel power applications in high end servers
- High pin count and high density flex circuit interface connectors for high resolution flat panel displays

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Telecommunications

Definition: Brush Wellman's high performance alloys are sold to the telecommunications industry in strip and wire forms for connectors, contacts, shielding, switches and relays. End use applications include wireless base stations, cell phones, pagers, telecom switching equipment, transmission equipment, communication networks, and personal communication devices.

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Telecommunication Applications

Examples of specific end-use product applications

- Handheld and portable device battery clips, antenna clips, I.O. connectors, board to board connectors, SIM card connectors & display connectors
- Category 6 modular jacks for connecting data networks
- Shielding gaskets and clips for EMI protection
- Coaxial switches for cable company central office switches
- VHDM connector system used in backpanel connector systems for Gigabit Ethernet switches and routers

Examples of future target product applications

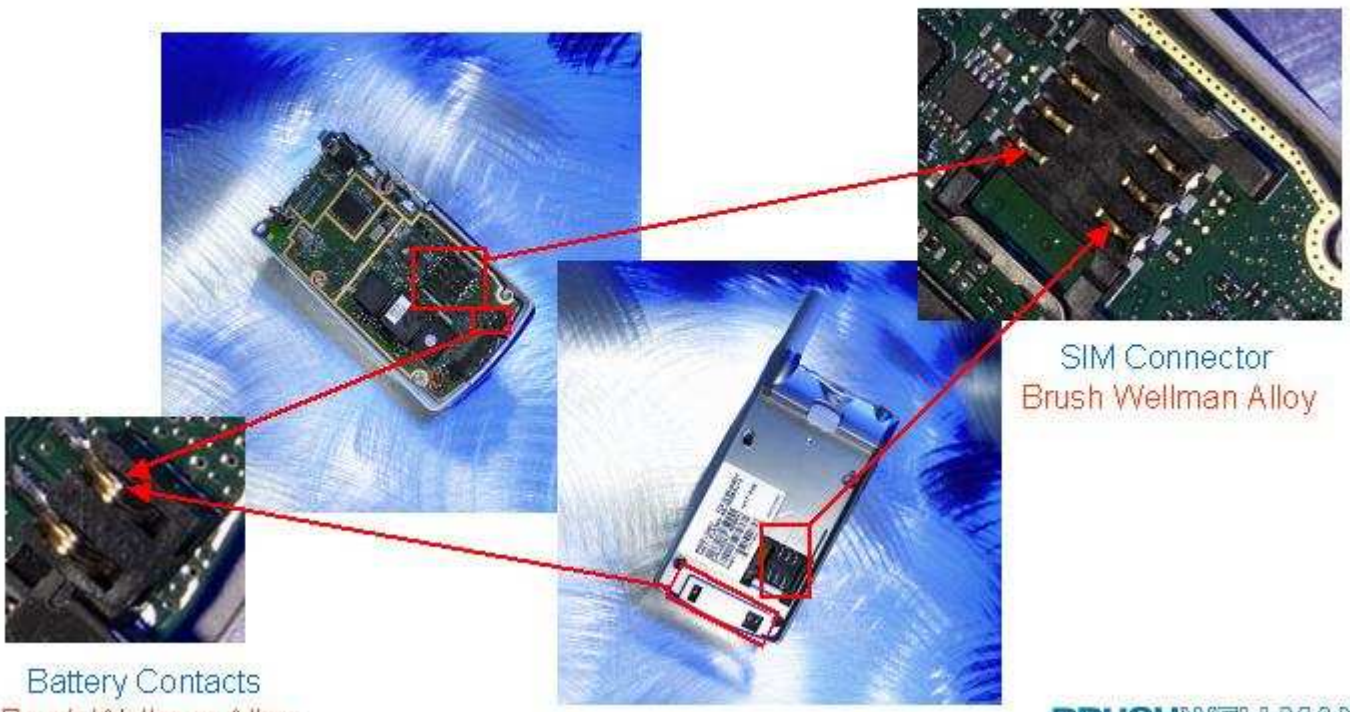
- Category 7 modular jacks for data networks
- Low profile board to board connectors for wireless handsets and high speed mezzanine connectors for network switches and routers

BRUSHWELLMAN
ENGINEERED MATERIALS

Cellphone Connector Applications

BRUSHWELLMAN
ENGINEERED MATERIALS

Rear of Circuit Board

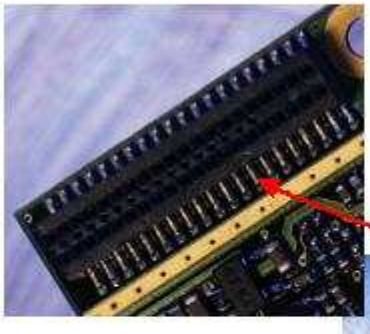


SIM Connector
Brush Wellman Alloy

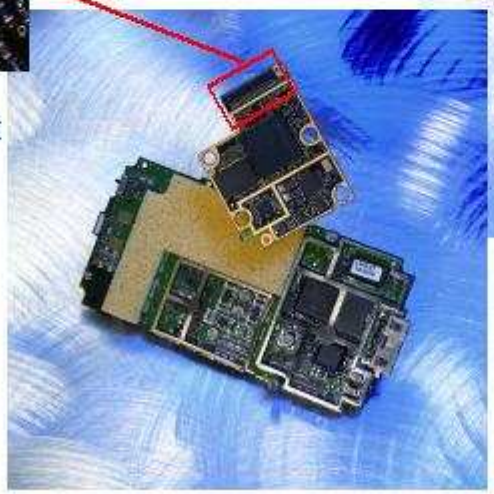
Battery Contacts
Brush Wellman Alloy

BRUSHWELLMAN
ENGINEERED MATERIALS

Front of Circuit Board



Board-to-Board Contact
Brush Wellman Alloy



Phone Charger
Connector
Brush
Wellman Alloy

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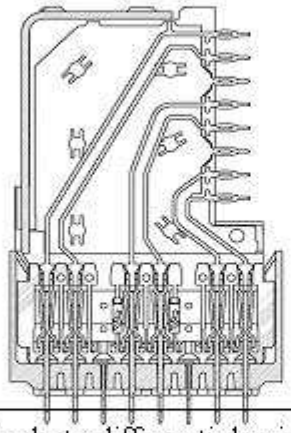
ENGINEERED MATERIALS

Level 3 (PCB to PCB) Enabling Technologies

Level 3 (PCB to PCB) Enabling Technologies

Compliant Grounds



VHDM HSD

High Conductivity

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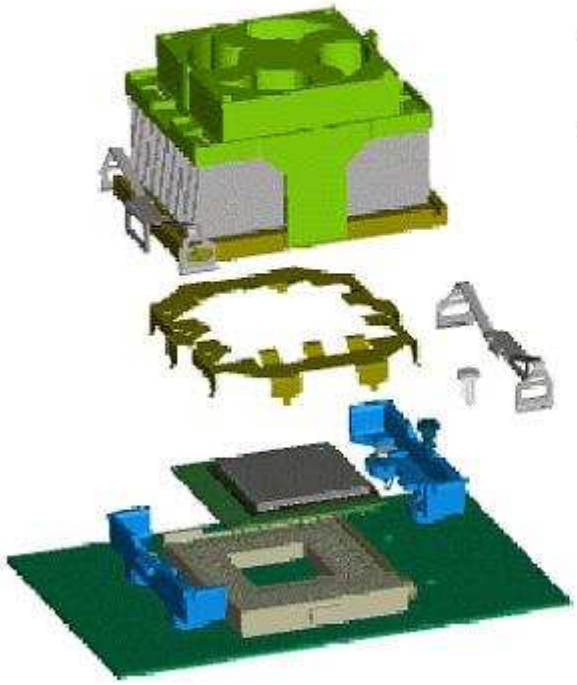
ENGINEERED MATERIALS

+ Move from single to differential pairs
+ Increased signal speeds
+ High pin count
+ Ground strips can be added between rows
- Weight
- Trace layout problems due to high density

EMI Shielding

EMI Shielding



- P4 processor uses an EMI shield for hi-end applications
- Shield is located between the processor and the heat sink exposing it to elevated temperatures

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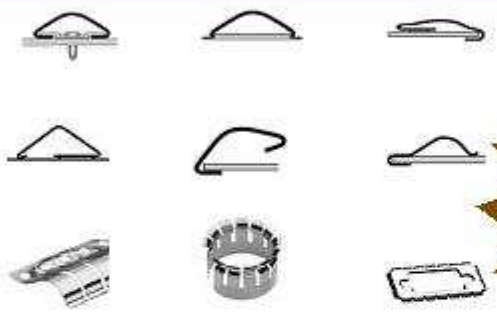
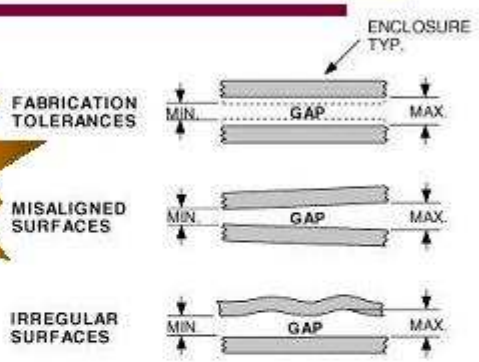
ENGINEERED MATERIALS

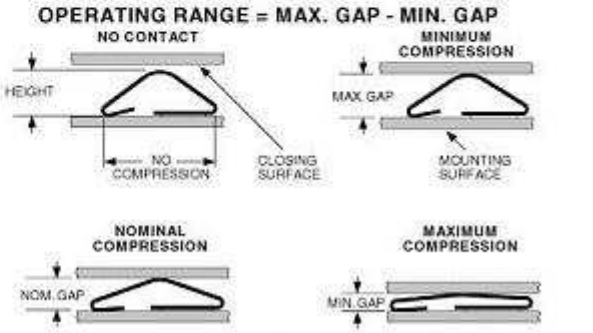
EMI Shielding



SFF Compliant Spring Material Ideal



RFI/EMI Shields



- The higher the operating frequency is driving the need for smaller form factor shielding
- Large operating ranges and smaller form factors drive the need for stronger alloys

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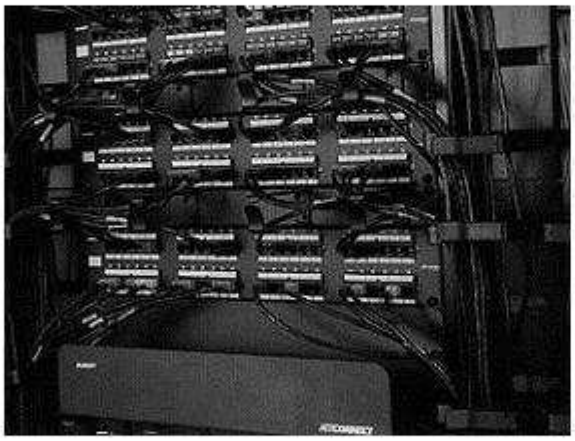
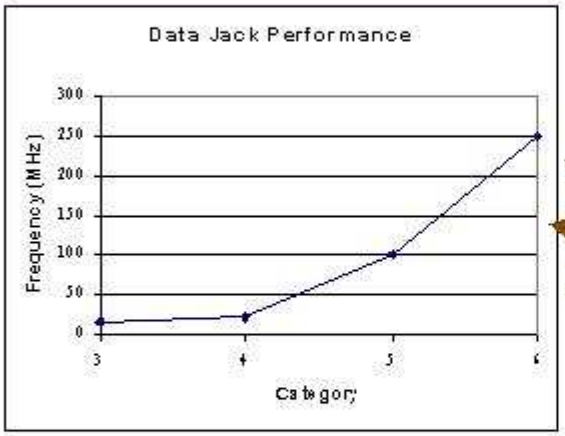
ENGINEERED MATERIALS

Modular Jacks

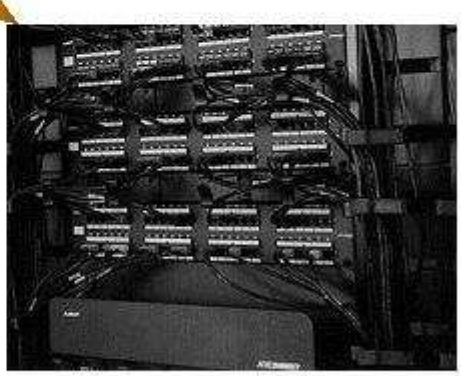


Level 6 (system to System) Enabling Technologies



Hi Reliability Jacks Use HPAs

Cat 6 data jacks



96 Port Cat 5 patch panel (SRP $396)

- Normal force
- IDC height
- Cross talk
- Attenuation
- Impedance
- Return loss
- Round vs. rectangular
- Reliability

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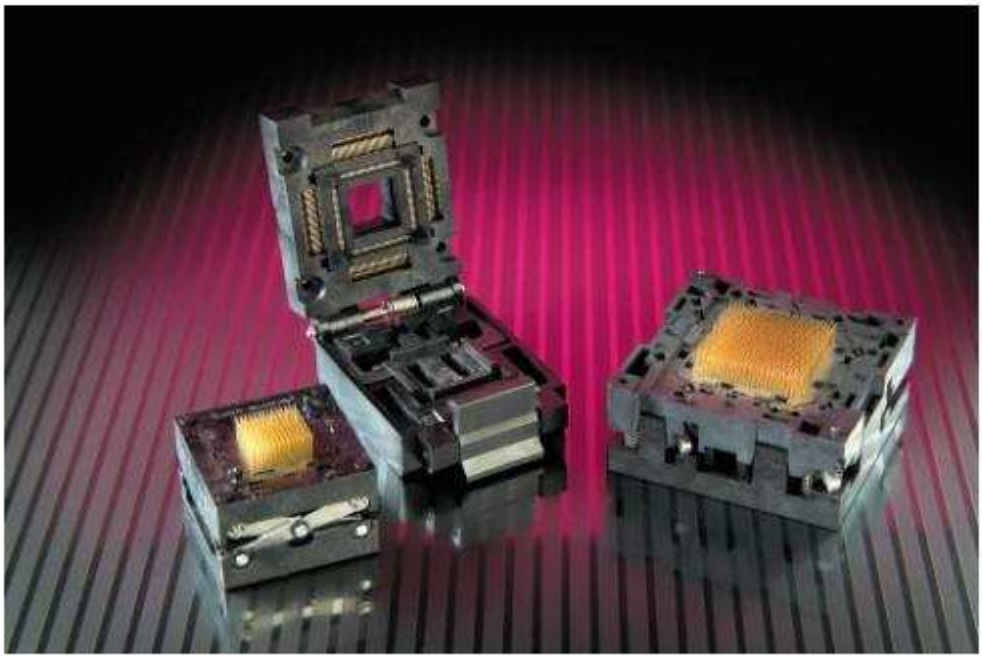
ENGINEERED MATERIALS

Level 2 Interconnects



Level 2 Interconnects

Clamshell Sockets - typically used for TSOP (thin small outline package) and QFP (quad flat package).

TSOP

QFP

Clamshell Burn-in Socket

BRUSHWELLMAN
ENGINEERED MATERIALS

Level 2 Interconnects

LIF Sockets - typically used for DIP (dual in-line package) and SOJ (small outline J-Lead).

DIP

SOJ

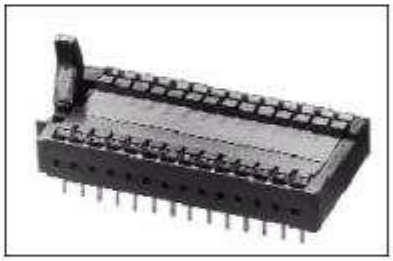
SOJ Burn-in Socket

BRUSHWELLMAN
ENGINEERED MATERIALS

Level 2 Interconnects

Clamshell Sockets - typically used for TSOP (thin small outline package) and QFP (quad flat package).

TSOP



ZIF Burn-in Socket

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Level 2 Interconnects

Contact Design Types:

Pogo Pin

- Made using high performance alloys materials for the spring and contact body

Cantilever Beams

- Made using high performance alloys where careful attention is given to stamping to get good edge quality

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Connectors in PDAs

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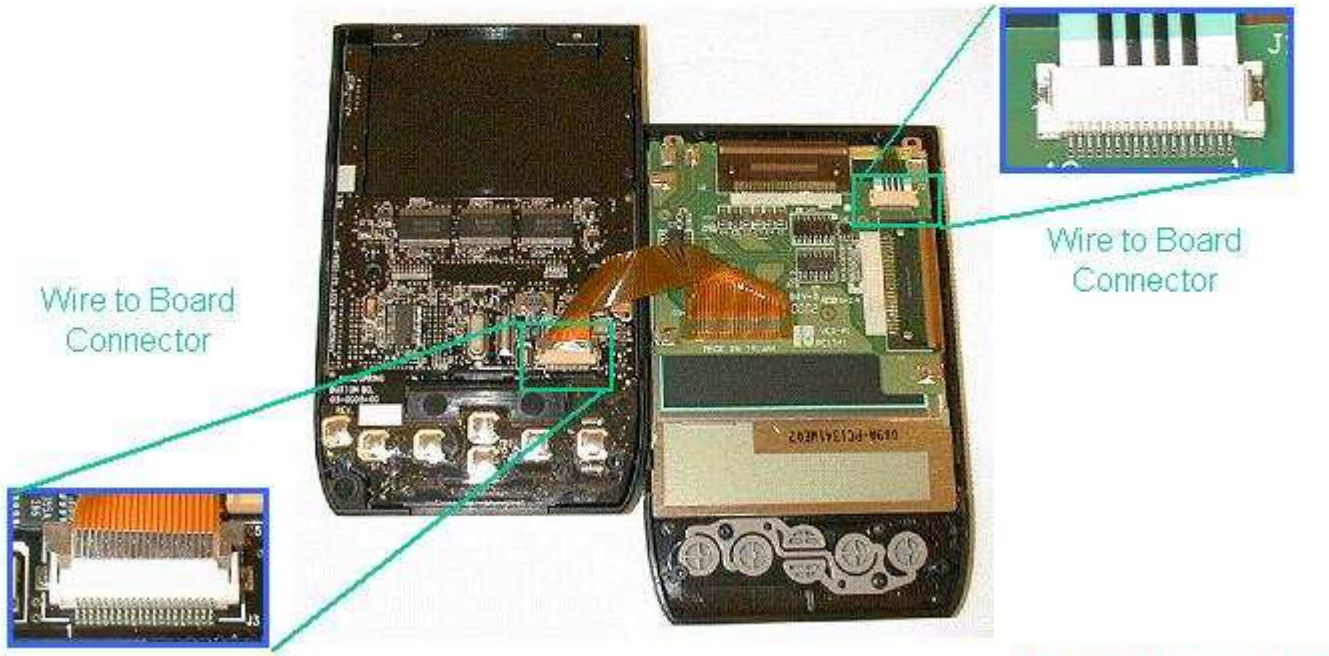
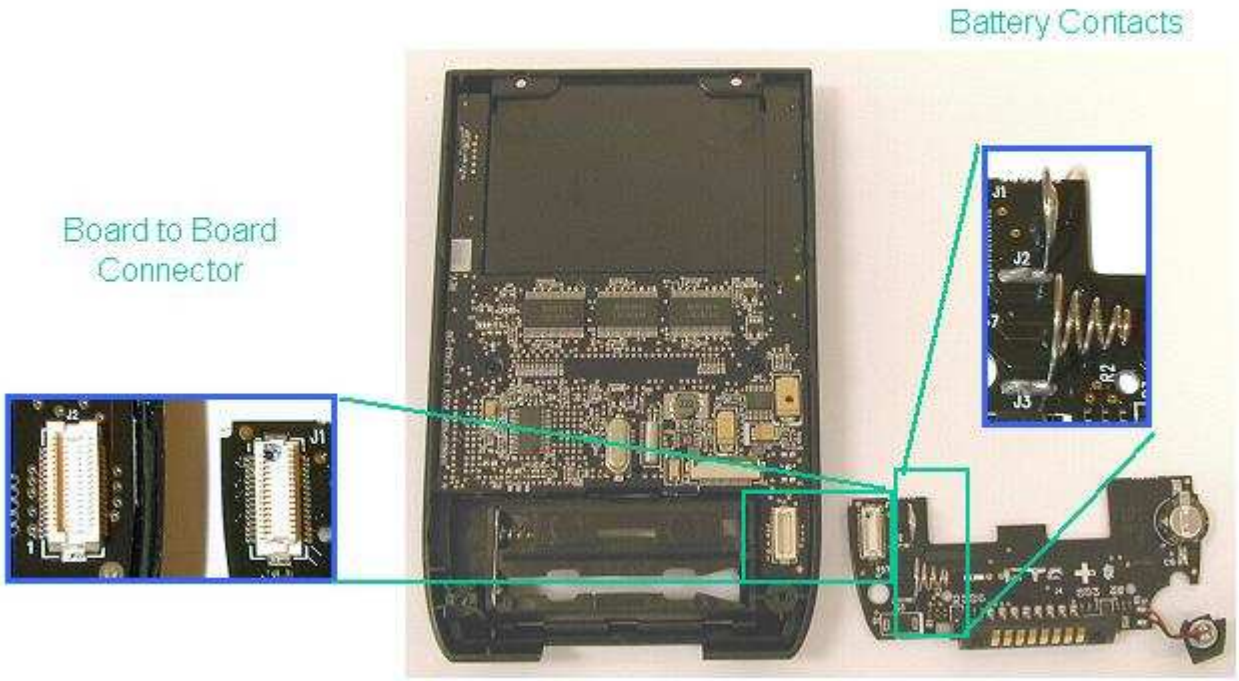
Connectors in PDAs



BRUSHWELLMAN
ENGINEERED MATERIALS

Main PCB from Back



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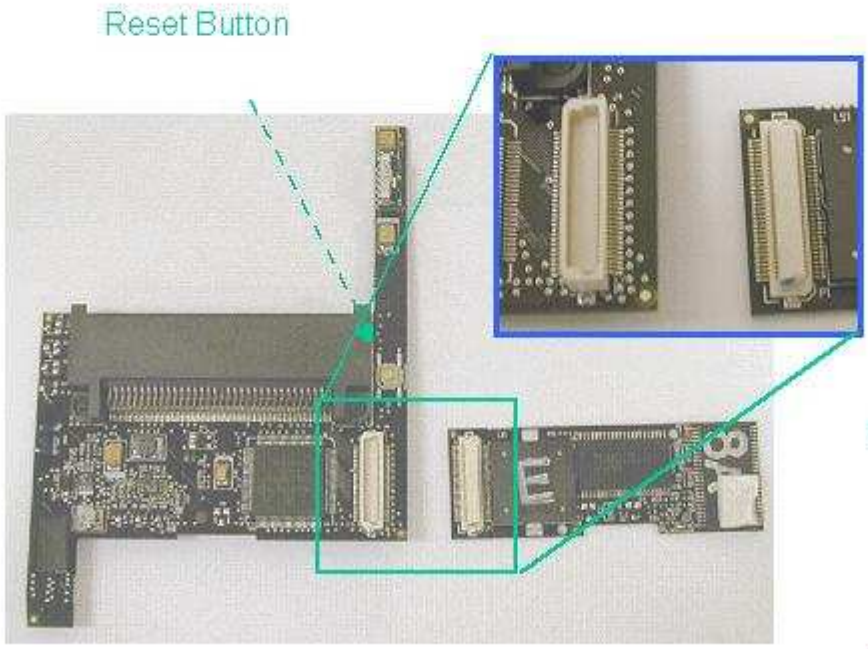
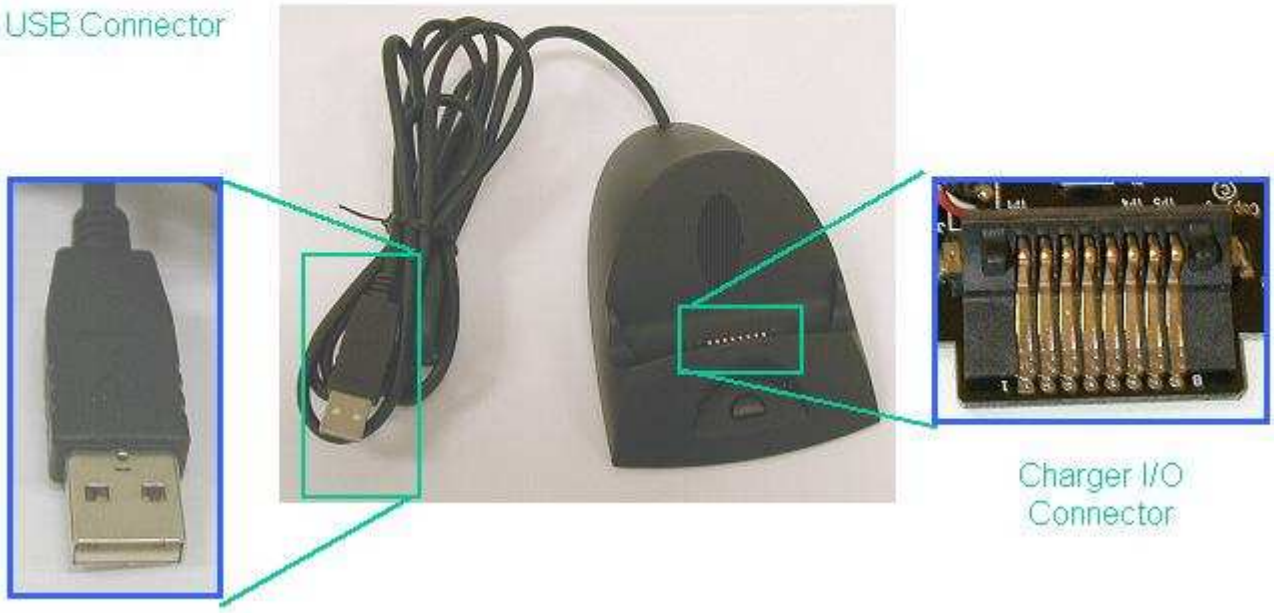
Main PCB from Front



BRUSHWELLMAN
ENGINEERED MATERIALS

Desktop Charger



BRUSHWELLMAN
ENGINEERED MATERIALS

Bulk Alloy Applications

(strength, corrosion resistance, non-galling, conductivity)

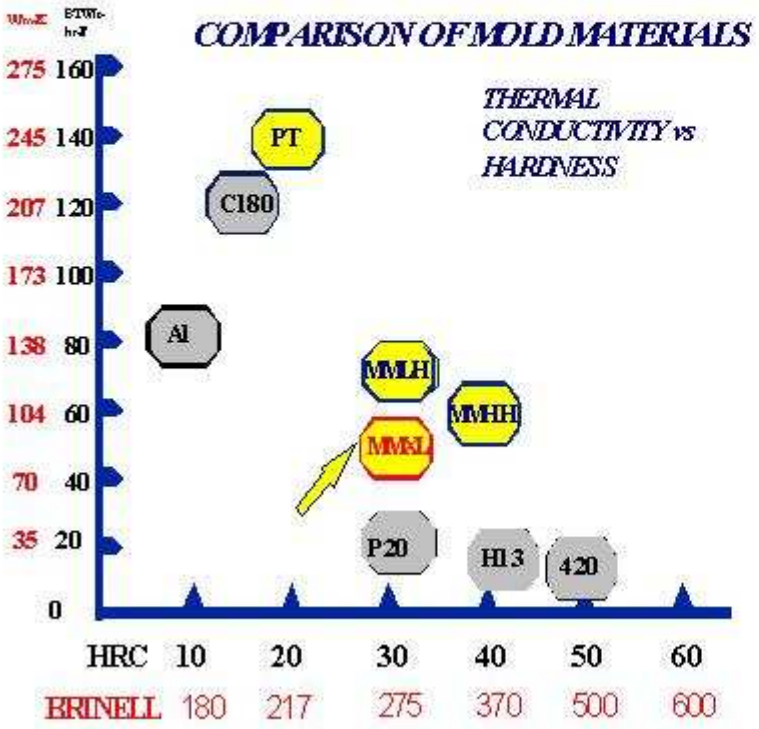
- Plastic Injection Molds
- Aircraft Landing Gear Bushings
- Undersea Repeater Housings - Telecom
- Oilfield Drill Collars & Anti-Friction Bushings
- Heavy Equipment Bearing and Wear Applications

Alloy Products
Bulk Products - Strategy

- **Maintain focus on traditional end-use markets**
  - Oil & Gas Aerospace Plastics Undersea
- **Introduce new alloys or product forms to meet needs of targeted market opportunities.**
  - MoldMAX® XL
  - ToughMet® and improved ToughMet® products (CF ToughMet®)
  - Alloy 310 RWMA class 3
  - Q-Max® Tube
- **Focus on new non-traditional growth markets**
  - Bearings, Oil & Gas completions, Heavy Equipment & Mining, Pumps, Marine
- **Geographic Growth**
  - Expand commercial operations in both Asia Pacific and Europe, improve customer awareness and distribution

BRUSHWELLMAN
ENGINEERED MATERIALS

Plastics – MoldMAX® XL



- Similar properties to dominant tooling materials and standard MoldMAX®
- Conductivity similar to MoldMAX® (CuBe) of 30%
- No EH&S issues
- Value proposition includes machinability >5X steels adding cost benefits to offset increased material costs

Value proposition - no added cost for faster cycles and lower cost manufacturing

BRUSHWELLMAN
ENGINEERED MATERIALS

Lorain Casting Facility
Spinodal and Equacast™ Technology-Winning!

High performance Copper based engineered materials (CuNiSn):

- Strength and hardness found in CuBe products
- Thermal conductivity

The value proposition differentiates:

- Corrosion resistance
- Superb tribological properties (low friction coefficient, excellent wear resistance - without lube) adding value in Reliability,Uptime, and Less Mtce.
- Machinability and Design Simplicity adding cost benefits to offset increased material costs
- Casting capability including size, shapes, tubes and quality

Developing Applications in the markets we are strong:

Mold Tooling, Aircraft Parts, Drilling Equipment

Developing markets/applications where technology is strong:

Oil Well Completion Equipment, Mining, Heavy Equipment, Hydraulic Systems, Marine Hardware, Engine Bearings.

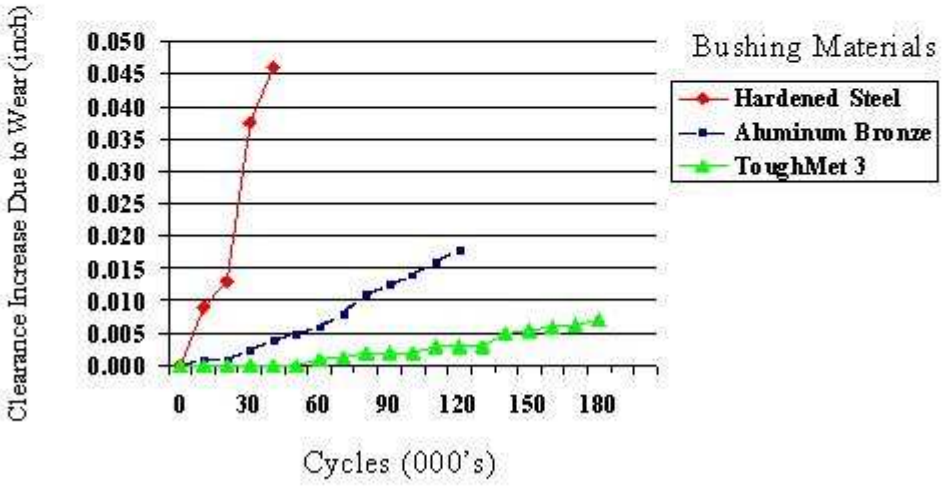
Lorain Technology Expanding Brush Wellman market and application reach

BRUSHWELLMAN
ENGINEERED MATERIALS

ToughMet® Industrial Components Results:

ToughMet® Alloy Bushings and Plain Bearings Provide Superior Durability

Allowing More Time Between Machine Lubrication and Overhaul Operations.

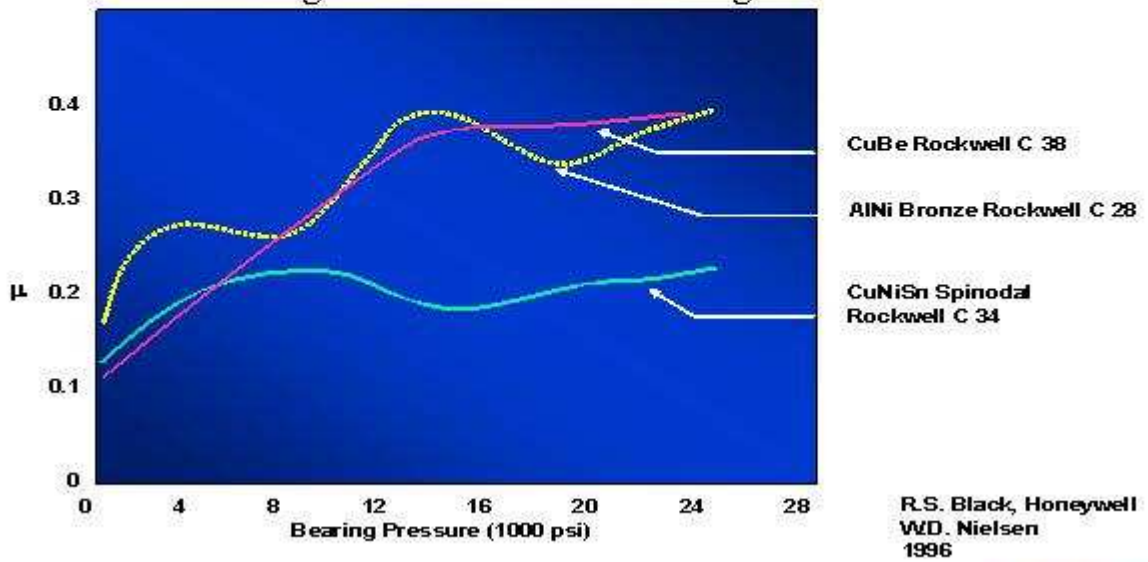


BRUSHWELLMAN
ENGINEERED MATERIALS

ToughMet® Industrial Components Results:

ToughMet® Alloy Bushings Provide Superior PowerEfficiency Performance

in a Comparison of Dynamic Coefficient of Friction μ vs Bearing Pressure for Three Bearing Materials

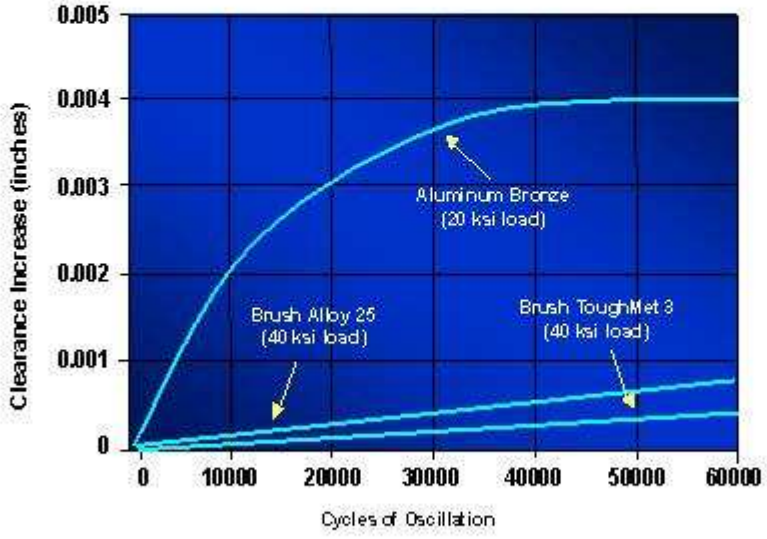


R.S. Black, Honeywell
W.D. Nielsen
1996

BRUSHWELLMAN
ENGINEERED MATERIALS

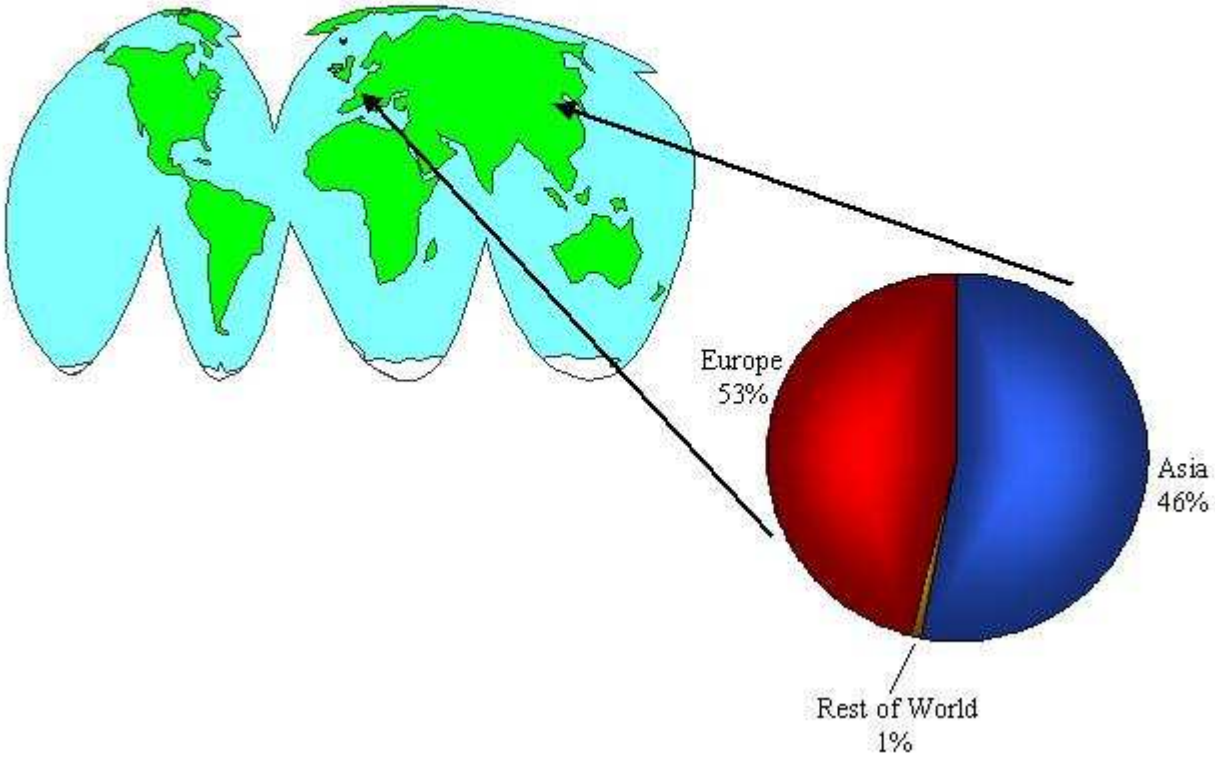
Significantly Higher Durability has been Confirmed for ToughMet®

Comparative Sleeve Bearing Wear Tests.



BRUSHWELLMAN
ENGINEERED MATERIALS

Brush International, Inc.
Alloy Sales by Region 2004



Brush Wellman Beryllium Products

Products

Beryllium Metal	-	One of the lightest metals known
	-	Family of vacuum hot and hot/cold isostatically pressed powder-derived metals
AlBeMet™	-	Family of lightweight alloy composites
	-	Extruded, rolled sheet and hot isostatically pressed powder-derived metals

BRUSHWELLMAN

Brush Wellman Beryllium Products

Products - Cont.

E-Materials	- Family of low expansion, lightweight electronic packaging materials - Composites of beryllium metal and beryllium oxide
Beryllium Oxide/ Chemicals	- Ceramic-grade beryllium oxide powder - Specialty beryllium-containing chemicals

BRUSHWELLMAN

Brush Wellman Beryllium Products

Facilities

Elmore, Ohio

Fremont, California

BRUSHWELLMAN

Key Product Attributes

- Be/AlBeMet™
  - Light Weight (Density)
  - High Stiffness (Elastic Modulus)
  - High Thermal Conductance/Capacity
  - Low Thermal Expansion
- Be
  - Transparent to X-Rays
  - Neutron Reflector

BRUSHWELLMAN

Brush Wellman Beryllium Products

Primary Competition... Alternative Materials

- Organic Composites (e.g. Carbon epoxy)
- Silicon carbide
- Metal Matrix Composites (e.g. Al - silicon carbide)
- Pyrolytic graphite
- Aluminum (high strength grades)

BRUSHWELLMAN

Major Defense/Aerospace Applications for Brush Wellman Beryllium Products

Optics

Optical substrate and support structure for visual and infrared target acquisition systems (fighter aircraft, helicopters, unmanned aerial vehicles, tanks), surveillance systems and astronomical telescopes.

Satellites

Structures and sensors for defense and commercial telecommunications satellites.

Electronics

Electronic packaging for defense avionics, radar and electronic countermeasures systems for helicopters and fighter aircraft. Applications include circuit boards, covers and packages.

BRUSHWELLMAN

Major Commercial Applications for Brush Wellman Beryllium Products

X-ray Windows

Radiographic tube components for ✶ medical diagnostic (x-ray, mammography, CAT-scan), ✸ industrial and (3) scientific equipment.

Optical Scanners

Mirrors for laser scanners used in reprographic and other high-performance laser applications.

Motion control

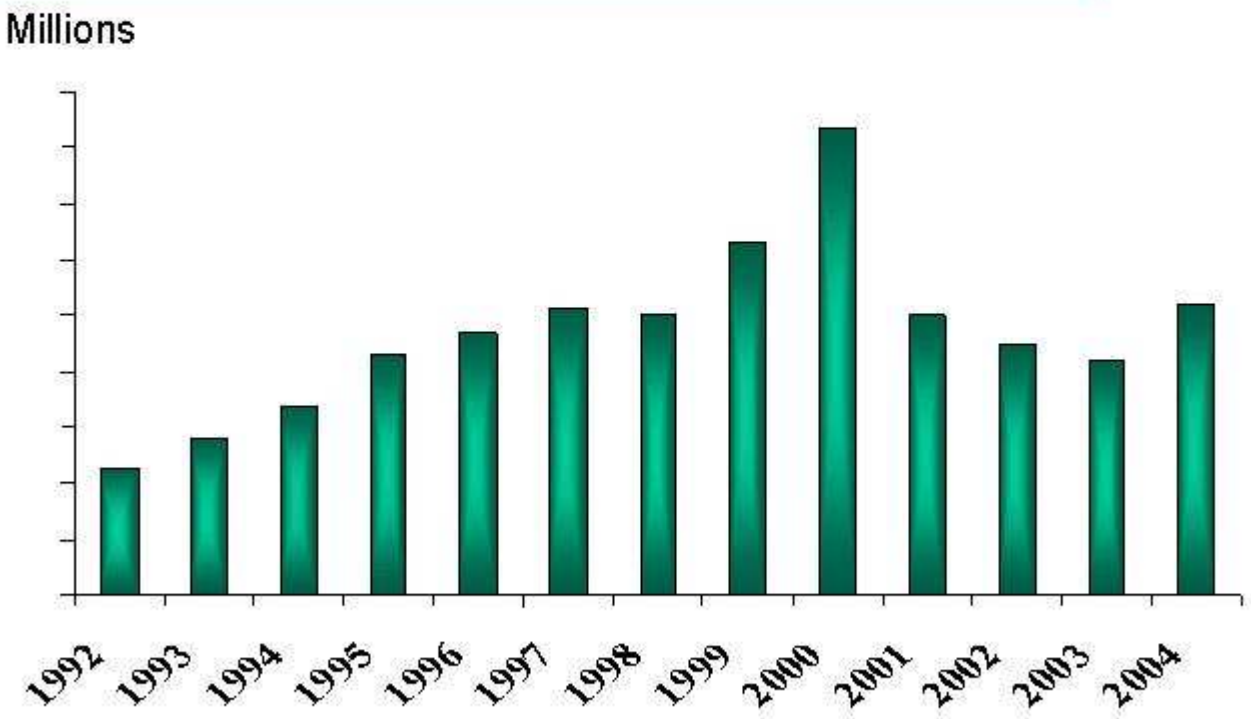
Structural components for high-precision semiconductor processing and industrial robotic equipment

BRUSHWELLMAN

TMI - From a Customer Perspective

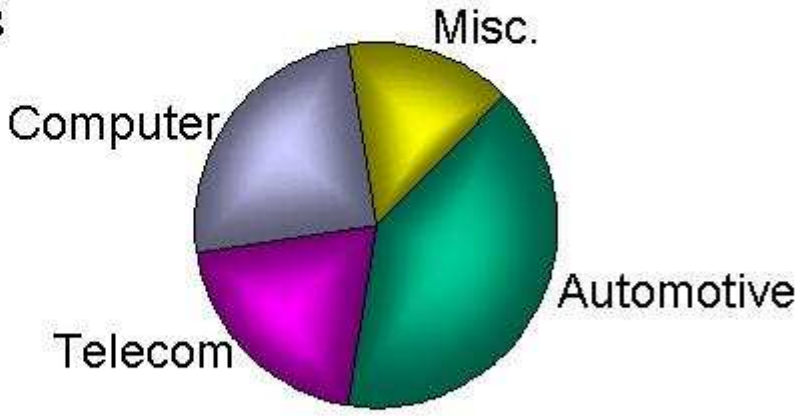
WHAT	TMI provides our customers the ability to demand varied performance (electrical, thermal, or mechanical) from a metal surface area or section.
WHO	We provide this "service" to the telecommunication, automotive, computer, semiconductor and other industries.
HOW	By offering various forms of strip metal products: clad metals, plated metals, electron beam welded, solder plated, reflowed or printed-on, milled and/or skived metal strip or various combinations of the above.

Sales Growth



Our Major Markets

- Automotive
- Telecommunications
- Computer
- Jewelry
- Semiconductor
- Appliances
- Medical
- Aircraft

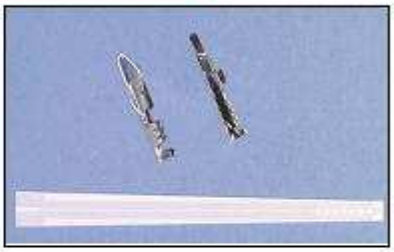


Our Major Applications

Leadframe

Air Bag Sensor

- Capacitors
- Coins and Tokens
- Connectors
- Contact Probes
- Fuses
- Leadframes
- Micro Motor
- Microwave
- Potentiometers
- Relays
- Sensors
- Solder Clips
- Switches



Connectors

Electroplating

- Precious and non-precious metals
- Overall and selective stripe capabilities
- Combination with current TMI technologies

Stripe Plating Application

Cellular Phone Battery Contact

Base Material

- Base Material: BeCu
- Overall Ni plating
- Selective Au (one side)
- Selective SnPb (both sides)

Competitive Advantage

- Quality
  - QS 9000 / ISO 9002 / ISO 14001
  - State-of-the-art equipment
  - Vision Systems / PLC Systems for consistent quality
- Design Support
  - Technical knowledge
  - Engineering expertise
- Overall Capabilities
  - Slitting and leveling
  - Inlay / Electron-Beam Welding / Solder / Milling / Skiving / Plating
  - Any combination of the above processes
  - Large coil handling capability

Strategic Concept

- Total capability under one roof
- Make it easy for our customers to get what they need to satisfy their customers' requirements
- Make our customers competitive with reliable products
- Solve problems for our customers with engineered strip metal solutions
- Explore and develop new markets and geographic regions for manufacturing *(China)*.

Growth in Electroplating

- Precious and non-precious metals
- Overall and selective stripe plating capabilities
- Combination with other TMI technologies
- Proprietary closed contact plating technology
- Building additional lines to further increase capacity

Summary

- From 1992-2000 TMI sales more than quadrupled.
- 2001 and 2003 proved to be extremely difficult years due to major served markets being severely depressed; however, TMI remained profitable all three years. 2004 has seen a marked increase in sales, but product mix has impacted overall profitability.
- We have added major new technical capabilities using state-of-the-art equipment in precious metal electroplating to better serve worldwide customer demand *(both technical & capacity)*.
- We are ISO and QS registered.
- We will add additional Plating technology and capacity to service market demand as required.
- We are making further inroads into new markets *(energy)* and other markets *(consumer, medical, appliance, construction)* in order to broaden our served market base and will have a much different served market profile by 2005/2006.

Williams Advanced Materials Overview

- Williams is a supplier of high-purity, specialty metals serving the wireless, photonics, data storage, high temperature joining, traditional microelectronics and performance film markets.
- Established 1918. Subsidiary of Brush Engineered Materials
- Business Groups
  - Packaging Material Products - Solder preforms, bonding wire, FLA's, clad material and refining. These materials are used in photonic, wireless, traditional semiconductor and hybrid microelectronic packaging applications.
  - Specialty Alloy Products - Braze materials and structural alloys. These materials are used in electron tube, photonic and aerospace applications.
  - PVD (Physical Vapor Deposition) products - Precious metal and non-precious metal sputtering and evaporation materials, refining and related services. These materials are used in wireless, photonic, magnetic media, thin film heads, optical media, hybrid microelectronic and performance film applications.

Williams
ADVANCED MATERIALS

WAM Headquarters

- Buffalo, NY USA - Manufacturing Facility
  - 100,000 sq. ft. overall, 6,500 sq. ft. of cleanroom, state-of-the-art machining/ milling/rolling/stamping/ cladding centers, hydrostatic wire extrusion, high purity refining/recycling, metals casting, automated plating, full analytical capabilities, product Research & Development

Williams
ADVANCED MATERIALS

Far East Operations

- Singapore - WAM Far East Pte. Ltd.
  - 5,000 sq. ft., 2,500 sq. ft. of cleanroom, automated assembly operations, hydrostatic wire process, product development. PVD bonding operation.

Williams ADVANCED MATERIALS

Far East Operations

- Subic Bay, Philippines
  - Combo-Lid®, low-cost lids and preform - assembly, inspection and packaging

Williams ADVANCED MATERIALS

Far East Operations

- Taiwan
  - Target bonding services.
  - Low cost production capabilities.

Williams ADVANCED MATERIALS

Specialty Alloys Operations

- Wheatfield, NY USA- Williams Specialty Alloys
  - 30,000 sq. ft. with volume vacuum casting, rolling, annealing, powder atomizing and machining. 10 acres for expansion

Williams ADVANCED MATERIALS

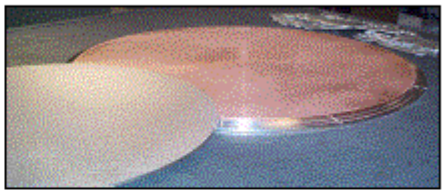
WAM Thin Film Products Operations

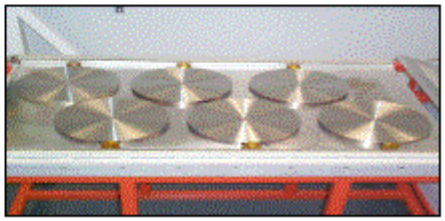
- Brewster, NY USA – WAM TFP
  - 35,000 sq. ft. with vacuum melting, hot-pressing, milling, Hot & cold rolling automated machining and target bonding capabilities.
  - Acreage to more than double our facility as needed.

Williams ADVANCED MATERIALS

Target Bonding Centers

- Buffalo, NY
- Brewster, NY
- Santa Clara, CA
- Limerick, Ireland
- Singapore
- Taiwan





Williams ADVANCED MATERIALS

Williams Advanced Materials Service and Support

- **Regional Offices (Sales and Applications Engineering support)**

Santa Clara, CA	Manila, Philippines
London, England	Buffalo, NY
Singapore	Philadelphia, PA
Taipei, Taiwan	Dallas, TX
Brewster, NY	Tucson , AZ

- **Worldwide Representatives**

Florida	France	Israel
Korea	India	China
Japan	Italy	Germany

Williams ADVANCED MATERIALS

Williams Advanced Materials
Packaging Material Products

Hybrid Microelectronic Device

Solder preforms and clad materials

- **Markets**
  Wireless, Photonics and Hybrid/ Traditional Microelectronic Devices
- **Typical End-uses**
  Cell phones, LEDs, fiber-optic networks, PC's, military electronics, avionics, medical electronics, appliances

- **Combo-Lids® - Frame/lid assembly**
  Hermetic sealing
- **Clad Materials**
  Thermal management
- **Bonding Wire**
  Electronic interconnect
- **Solder Preforms**
  Component attachment
- **Refining**
  Scrap recovery

Williams ADVANCED MATERIALS

Williams Advanced Materials
Specialty Alloy Products

Electron Tube

WAMBRAZE™ Materials

- **Markets**

  Electron Tube, Photonics, Aerospace, microelectronic packaging

- **Typical End-uses**

  Cellular base stations, lasers, x-ray machines, industrial microwaves

- **Braze materials**

  Powder, ribbon and preform

- **Structural Alloys**

  Monel

  Cupronickel

  Nickel Tunsten

Williams ADVANCED MATERIALS

Williams Advanced Materials
Physical Vapor Deposition(PVD) Products

Cellular Phone (wireless)

Sputtering Targets

- **Markets**

  Wireless microelectronics, semiconductor, optical media, photonics, magnetic media and heads and performance films

- **Typical End-uses**

  Wireless and fiber optic components, integrated circuits, recordable CDs, DVDs, hard disks and medical devices

- **Precious Metal Sputtering Targets and Evaporation Materials**
- **Precious Metal Refining Services**
- **Non-precious Metal Sputtering Targets and Evaporation Materials**

Williams ADVANCED MATERIALS

Williams Strategic Leverage

Ensuring Distinctive Abilities Translate to Maximum Returns

- Over 80 years of metal management and fabrication experience
  - Ability to efficiently manage precious metals critical to customers
- One-stop Shopping
  - Comprehensive product offering
  - Allows customer to reduce supplier base
- Industry leading lead times
  - Reduces Total Cost to Customer - Inventory turns
  - Alleviates planning "headaches"
- Fully Integrated Operations
  - In house fabrication, refining and analysis
  - Reduced cycle times and single point of contact for metal needs
- Service
  - WAM provides a unique, coordinated response to customers
  - We help our customers do their jobs - sales, engineering, accounting, etc.
  - We also prepare our customers for the future

Williams ADVANCED MATERIALS

Our focus is on materials, circuitry, subassemblies and packaging for the wireless and fiber-optic telecom market, military, medical and automotive applications

- Signal amplifiers transmit signals through air (wireless) or optical fiber media by boosting signal strength while maintaining integrity. Thermal management and reliability properties are of paramount importance.
- Signal amplifiers are critical active components located in base stations for wireless (cellular) and in regenerator stations along fiber-optic (Internet) links.

Our Overall Strategy

- Vertically integrate materials to subsystem assembly, providing customized solutions
- Meet the Customer's needs
  - Materials or subassemblies
- Fast Flexible Manufacturing Systems
  - Responsive to market needs

Business Groups

- Packaging
  - Electronic Packaging Products
- Circuitry
  - Circuits Processing Technology
- Materials
  - Brush Ceramic Products

Electronic Packaging Products

- Located in Newburyport, MA
- Products
  - RF Power Packages for base stations in cellular phone & wireless data networks, for cellular handsets, for military radar applications and for digital TV
  - Automotive Components for ignition systems in cars and trucks
  - Power Circuit Assemblies for DC motor controls

Circuits Processing Technology (CPT)

- Located in Oceanside, CA
- Products
  - High Frequency Military and Aerospace Circuitry used in military radar and missile guidance
  - High Frequency Wireless circuitry for satellite communications, flight hardware and other telecom applications
  - Fiber Optic Package components for amplifiers in fiber optic networks
  - Medical equipment and implant circuitry

Brush Ceramic Products

- Located in Tucson, AZ
- Products
  - RF Power Package Components in commercial and military applications
  - Laser Components for medical and research applications
  - Automotive components for ignition systems

Beryllium Health and Safety

Brush has continued to make progress on issues related to beryllium health and safety

- Improved worker protection programs in place
- Rates of sensitization down among new workers
- CBD litigation claims have declined to 11 cases
- Strong focus on regulations related to beryllium exposure

Litigation

	Total Cases Pending	Total Plaintiffs (including spouses)
12/31/02	33	70
12/31/03	15	33
10/01/04	13	60
12/31/04	11	55

Litigation

- In Q-4 2004, we settled or dismissed two additional cases, which resulted in a reduction in the number of plaintiffs corresponding to these cases in the quarter.
  - Our caseload and number of plaintiffs will vary from quarter to quarter depending on new cases, additional plaintiffs, settlements, dismissals, amendments to complaints, etc.
- The Company believes it has substantial defenses in pending cases