THE INDUSTRYWEEK BEST PLANTS

2014 Statistical Profile

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The information contained in this Statistical Profile presents a composite picture of INDUSTRYWEEK's Best Plants winners and finalists for the past five years from 2010 to 2014. During these years IndustryWeek selected 39 winning facilities and 41 finalists. This report was prepared from a database populated with information supplied by the manufacturing plants when responding to the IW Best Plants questionnaire in each year of the competition.

It must be noted that, because the facilities, products and processes represented by the winners and finalists are quite diverse, direct comparisons can be misleading. However, over the 25 years of the competition, the judges have found that a fairly reliable indicator of a factory's manufacturing leadership is how much progress it makes year in and year out. Plants that shorten changeover times, manufacturing cycle times, and customer-order lead times, and those that cut scrap rates, improve customer quality, reduce employee injuries, and improve profitability, have a strong culture of continuous improvement that gives them a distinct lead over their competitors. They are able to make progress because they never stop benchmarking against other top performers, "stealing" the best ideas that they can find, wherever they can find them.

Regardless of industry differences, the data in this profile serves as a useful general benchmarking reference. The benchmark numbers indicate the top performance levels and greatest quantum leaps in improvement and offer a glimpse at the potential for achievement in organizations that are committed to world-class competitiveness. In reviewing the data in this Statistical Profile, bear in mind that performance levels achievable in one industry may not be realistic goals for another. For example, while a high-volume repetitive manufacturing operation may surpass 200 WIP (work-in-process) turns annually, a much lower figure could conceivably represent world-class inventory management for a low-volume maker of complex, highly customized products.

The process of setting realistic improvement goals—even “stretch” goals—should take into account the nature of the industry, manufacturing process, and product characteristics. As many experienced benchmarkers will attest, the most meaningful “best practice” indicators for purposes of competitive benchmarking generally are those culled from a similar class of facilities and operations. Unfortunately, such data is frequently not available. Because “average” performance levels for a diverse group of plants can be distorted by anomalous data attributable to unique circumstances, the performance data in this report that are most likely to be useful for general benchmarking purposes are the “median” figures.

This is the 24rd year that INDUSTRYWEEK has compiled a Statistical Profile of its Best Plants winners and finalists. Because this year-by-year information is based on a database of original responses for each original application from finalists, please note:

• The Best Plants data cited here were reported by finalists and winners from 2010 to 2014, a total of 80 plants. Because finalists from one year occasionally become finalists or award winners in subsequent years, the composite data may include more than one occurrence of a particular facility, albeit at different points in time.

• This report was compiled using a database built from the original applications for each year, with alterations to correct original reporting errors revealed in follow-up questionnaires or through plant visits. Thus, the 2010-2014 metrics have been “cleaned.” In compiling the database, where responses were thoroughly implausible, they have not been included.

• Where the Statistical Profile lists frequencies (“yes” or “no” answers, etc.) the percentages will not necessarily be based on all finalist plants, since some plants may not have answered a particular question. **Additionally, throughout the report, some data have been rounded and as a consequence the total may not equal exactly 100%.** Any blanks in the tables indicate that a question was not asked, or not asked with the current phrasing on the Best Plants application in that particular year.

• The selection of the Best Plants finalists and winners is based on the subjective review by a panel of judges based on a comprehensive set of criteria and plant statements, not only the performance metrics reported here. Evaluations are based on statements of management practices, levels of employee involvement, and the implementation of various improvement programs, as well as quantifiable performance indicators and evidence of competitiveness. Thus, in a given category, the apparent “benchmark” performance may have been achieved by a plant that was not among the final winners.

2014 North American IW Best Plants Winners

- **Boston Scientific Maple Grove**
  Maple Grove, Minn.
  medical devices (catheters, stents)

- **Cessna Mexico**
  Chihuahua, Chihuahua, Mexico
  metal and composite aircraft structures
  wire harnesses

- **General Cable Corp. -- Marion Plant**
  Marion, Ind.
  industrial and specialty cables

- **L.B. Foster Rail Technologies Corp.**
  Vancouver, British Columbia, Canada
  friction management products (solid stick
  consumables and hardware)

- **The Raymond Corporation**
  Greene, N.Y.
  forklift trucks

- **T&S Brass and Bronze Works**
  Travelers Rest, S.C.
  commercial foodservice and plumbing products

2014 North American IW Best Plants Finalists

- **Bard Shannon Ltd.**
  Humacao, Puerto Rico
  medical devices

- **DePuy Synthes**
  Raynham, Mass.
  orthopedic and neurological implants and
  instrumentation

- **Douglas Dynamics -- Milwaukee Facility**
  Milwaukee, Wisc.
  snow and ice control products

- **Franklin Electric – Linares**
  Linares, Nuevo León, México
  submersible motors and pumps

- **Freudenberg-NOK Sealing Technologies, Lead Center Fluid Power Automotive -- Findlay**
  Findlay, Ohio
  thermoplastic seal rings, pistons, carriers, thrust washers and bearings

- **Intertape Polymer Group Inc.**
  Danville, Va.
  carton sealing tapes and stretch films

- **MasterCraft Boat Co.**
  Vonore, Tenn.
  wakeboard and ski boats

- **Sparton Medical Systems Colorado LLC**
  Frederick, Colo.
  sophisticated electromechanical medical products

2013 North American IW Best Plants Winners

- **Flextronics**
  Milpitas, Calif.
  telecom, aerospace, medical, energy and wearable technology products for OEMs
- **General Cable – Jackson, Tenn. Plant**
  Jackson, Tenn.
  copper premise communication cable
- **H.C. Starck Inc.**
  Newton, Mass.
  refractory metal plates, sheet, foil, rod, powder, wire
- **Harley-Davidson Motor Co., York Vehicle Operations**
  York, Pa.
  motorcycles
- **Lockheed Martin Missiles and Fire Control**
  Archbald, Pa.
  Paveway II Plus laser guided bomb and Paveway II enhanced laser guided training rounds; nuclear instrumentation and controls
- **Thermo Fisher Scientific (Asheville)**
  Asheville, N.C.
  scientific instruments, including freezers, laboratory furnaces and centrifuges
- **3M Aberdeen**
  Aberdeen, S.D.
  disposable respirators; filters; tape for automotive, industrial, aerospace, electronics and health care applications

2013 North American IW Best Plants Finalists

- **Baxter Healthcare Corp.**
  Cleveland, Miss.
  medical devices
- **CXT Concrete Buildings**
  Spokane, Wash.
  concrete buildings
- **3M Decatur Film**
  Decatur, Ala.
  specialty films
- **3M Edumex**
  Juarez, Chihuahua, Mexico
  healthcare, industrial and consumer products
- **3M Greenville Film**
  Greenville, S.C.
  coated polyester film
- **3M Knoxville**
  Knoxville, Iowa
  tape

2012 North American Best Plants Winners

- **CNH Wichita Product Center**
  Wichita, Kan.
  skid steer loaders and compact tract loaders

- **Ethicon LLC**
  San Lorenzo, Puerto Rico
  surgical sutures, meshes, hemostats and topical skins adhesives

- **Harris Products Group, a Lincoln Electric Co.,**
  Mason, Ohio
  brazing and soldering consumables

- **La-Z-Boy Tennessee**
  Dayton, Tenn.
  residential furniture

- **Lockheed Martin Missiles and Fire Control, Pike County Operations**
  Troy, Ala.
  missiles and weapons systems

- **Warren Rupp Inc.**
  Mansfield, Ohio
  air-operated double diaphragm pumps

2012 North American Best Plants Finalists

- **CXT Concrete Ties, an L.B. Foster Co.,** *Spokane, Wash.*
  concrete rail ties

- **Carrier Corp.**
  Indianapolis, Ind.
  gas furnaces and fan coils

- **Franklin Electric**
  Linares, Nuevo Leon, Mexico
  submersible motors and pumps

- **General Cable Automotriz S.A. de C.V.,** *Jiutepec, Morelos, Mexico*
  ignition wire sets

- **Greatbatch Medical Mexico**
  Tijuana, Baja California, Mexico
  feedthroughs, electrodes, subassemblies for implantable devices

- **H.C. Starck,** *Euclid, Ohio*
  fabricated products

- **Harley-Davidson Motor Co. Vehicle Operations,** York, Pa.
  motorcycles

- **Kelly Aviation Center, a Lockheed Martin Affiliate,**
  San Antonio, Texas,
  jet engine MRO

- **Meritor Inc.**
  Plainfield, Ind.
  remanufactured brake shoes, transmissions, differentials

- **Thermo Fisher Scientific Asheville LLC,** *Asheville, N.C.*
  lab equipment

- **Wabash National Corp.**
  Lafayette, Ind.
  semi trailers

2011 North American Best Plants Winners

- **Carrier Collierville**
  Collierville, Tenn.
  air conditioners and heat pumps

- **Ethicon Inc**.
  Ciudad Juarez, Chihuahua, Mexico
  medical devices (sutures)

- **General Cable Corp. -- Lawrenceburg Plant**, *Lawrenceburg, Ky.*
  telecom and datacom cables

- **General Cable Corp. -- Lincoln, Rhode Island**, *Lincoln, R.I.*
  rubber cord products

- **Klein Steel Service**
  Rochester, N.Y.
  metal processor, steel service center

- **L.B. Foster Co., Allegheny Rail Products**, *Pueblo, Colo.*
  insulated rail joints

- **Life Technologies**
  Austin, Texas; kits and reagents for biotechnology research

- **Lockheed Martin Missiles and Fire Control**, *Lufkin Operations*
  Lufkin, Texas; missile launcher electronics

- **Swagelok Co. Main Plant**
  Solon, Ohio; fittings

- **Toyota Industrial Equipment Mfg. Inc.**,
  Columbus, Ind.; fork lift trucks

2011 North American Best Plants Finalists

- **Boeing Philadelphia**
  Ridley Park, Pa.
  military rotorcraft

- **Carlisle Interconnect Technologies**
  Tukwila, Wash.; aerospace wire harnesses and cable assemblies

- **John Deere Horicon Works**
  Horicon, Wis.
  riding lawn equipment and utility vehicles

- **La-Z-Boy Tennessee**
  Dayton, Tenn.
  furniture

- **Madico Inc.**
  Woburn, Mass.
  photovoltaic backsheet

- **Snap-on Tools**
  Elkmont, Ala.
  hand tools

2010 North American Best Plants Winners

- **American Axle & Manufacturing-Three Rivers Manufacturing Facility**, *Three Rivers, Mich.;* automotive driveline products
- **Avery Dennison Office Products de Mexico S. de R.L. de C.V**., *Tijuana, Baja California,Mexico*; office products
- **Batesville Casket Co.-Vicksburg Operations,** *Vicksburg, Miss*.; wood component parts for caskets
- **Bunge Oakville**, *Oakville, Ontario, Canada;*packaged edible oils and shortening
- **Carrier Charlotte Chiller Operations,** *Charlotte, N.C.*; heavy-duty commercial chillers
- **General Cable Franklin Plant**, *Franklin, Mass*.; electronic/data communications/fiber optic cables
- **IEC Electronics Corp**., *Newark, N.Y.;* printed circuit boards and assemblies
- **Landis+Gyr,** *Reynosa, Tamaulipas, Mexico;* electricity meters
- **Raytheon Integrated Air Defense Center,** *Andover, Mass.;* Patriot missile defense systems
- **Snap-on Power Tools,** *Murphy, N.C.;* power tools

2010 North American Best Plants Finalists

- **Alcoa Mount Holly,** *Goose Creek, S.C.;* aluminum ingot
- **Alcoa Wheel Products Mexico,** *Cienega de Flores, Nuevo Leon, Mexico;* aluminum truck wheels
- **Carlisle Construction Materials,** *Greenville, Ill.;* EPDM roofing membrane
- **General Cable Corp.-Lawrenceburg Plant,** *Lawrenceburg, Ky.;* telecom and datacom wire/cable
- **Hearth & Home Technologies,** *Lake City, Minn.;* gas fireplaces and hearth accessories
- **L-3 SPD Electrical Systems,** *Philadelphia, Pa.;* circuit breakers and switchgear
- **La-Z-Boy Tennessee,** *Dayton, Tenn.;* furniture
- **Life Technologies,** *Austin, Texas;* kits, reagents for biotech research
- **Pratt & Whitney, North Berwick Parts Center,** *North Berwick, Maine*; gas turbine engine components
- **Swagelok Co. Main Plant,** *Solon, Ohio;* fittings

PLANT PROFILE

Private or public company—corporate parent (% of plants):

Year	***Private***	***Public***
2010	10	90
2011	19	81
2012	6	94
2013	8	92
2014	21	79
2010-2014	13	88

Number of plant employees (% of plants):

Year	***Less than 100***	***100-249***	***250-499***	***500-999***	***1,000 or more***
2010	5	35	20	25	15
2011	13	31	6	25	25
2012	12	18	18	29	23
2013	8	15	15	39	23
2014	7	29	21	21	21
2010-2014	9	26	16	28	21

Change in number of total employees over past 3 years, %:

Year	***Median***	***Mean***
2010	-8.0	-6.0
2011	6.8	6.1
2012	-5.0	12.8
2013	7.1	7.5
2014	12.5	19.3
2010-2014	2.3	7.0

Age of plant, years (% of plants):

Year	***3-5 years***	***6-10 years***	***11-20 years***	***20 or more years***
2010	0	10	35	55
2011	13	6	19	63
2012	0	24	24	53
2013	0	8	0	92
2014	0	7	21	71
2010-2014	3	11	21	65

Number of shifts (% of plants):

Year	***1 shift***	***2 shifts***	***3 shifts***	***4 shifts***	***5 shifts***	***6 shifts***
2010	5	25	45	25	0	0
2011	19	31	44	6	0	0
2012	6	47	47	0	0	0
2013	8	31	31	23	8	8
2014	21	29	43	7	0	0
2010-2014	10	33	43	13	1	1

Operational days per week (% of plants):

Year	***4 days***	***4.5 days***	***5 days***	***5.5 days***	***6 days***	***7 days***
2010	10	0	50	0	5	35
2011	13	0	63	0	0	25
2012	12	6	65	6	6	6
2013	8	0	39	0	0	54
2014	14	0	71	7	0	7
2010-2014	11	1	58	3	3	25

Workers represented by a union (% of plants):

Year	***Nonunion***	***Union***
2010	70	30
2011	63	38
2012	71	29
2013	77	23
2014	79	21
2010-2014	71	29

Product type* (% of plants):

Year	***Discrete***	***Process***	***Both***
2010	65	20	15
2011	50	25	25
2012	59	12	29
2013	31	31	39
2014	71	7	21
2010-2014	56	19	25

Square footage of plant (% of plants):

Year	***0-49,000***	***50,000-99,999***	***100,000-249,999***	***250,000-499,999***	***500,000-999,999***	***1,000,000 or more***
2010	0	10	35	25	15	15
2011	0	31	19	19	6	25
2012	0	12	18	41	18	12
2013	0	0	8	46	39	8
2014	7	21	21	7	36	7
2010-2014	1	15	21	28	21	14

MANAGEMENT PRACTICES

Benchmarking studies conducted in the past year:

Year	***Median***	***Mean***	***Minimum***	***Maximum***
2010	4	8	1	40
2011	4	5	0	12
2012	5	13	0	116
2013	6	14	2	98
2014	4	4	0	12
2010-2014	4	8	0	116

People exclusively dedicated to improvement programs and projects (% of total workforce):

Year	***Median***	***Mean***	***Minimum***	***Maximum***
2010	1.1	1.5	0.0	4.7
2011	0.8	1.7	0.0	9.0
2012	1.0	1.2	0.0	3.9
2013	1.0	2.0	0.0	12.3
2014	0.6	0.9	0	3.9
2010-2014	1.0	1.5	0.0	12.3

Total documented cost savings as a result of specific improvement programs and projects over the most recent calendar year per employee (include all employees):

Year	***Median***	***Mean***	***Minimum***	***Maximum***
2010	$8,555	$45,602	$458	$708,633
2011	$8,475	$8,581	$647	$22,581
2012	$5,082	$7,272	$314	$26,993
2013	$15,077	$19,770	$1,082	$71,232
2014	$6,694	$7,474	$206	$22,434
2010-2014	$7,757	$19,787	$206	$708,633

Please indicate the extent to which total quality management has been implemented:
(% of plants) *

Year	***None***	***Some***	***Significant***
2010	5	35	60
2011	0	31	69
2012	6	35	59
2013	8	31	62
2014	0	43	57
2010-2014	4	35	61

Please indicate the extent to which the theory of constraints has been implemented:

Year	***None***	***Some***	***Significant***
2010	15	45	40
2011	19	44	38
2012	18	47	35
2013	8	69	23
2014	14	50	36
2010-2014	15	50	35

Please indicate the extent to which the Toyota production system has been implemented:

Year	***None***	***Some***	***Significant***
2010	0	35	65
2011	0	44	56
2012	12	41	47
2013	0	54	46
2014	0	29	71
2010-2014	3	40	58

Please indicate the extent to which lean manufacturing has been implemented:

Year	***None***	***Some***	***Significant***
2010	0	5	95
2011	0	0	100
2012	0	0	100
2013	0	0	100
2014	0	0	100
2010-2014	0	1	99

Please indicate the extent to which Six Sigma has been implemented:

Year	***None***	***Some***	***Significant***
2010	15	50	35
2011	13	31	56
2012	0	59	41
2013	0	23	77
2014	21	14	64
2010-2014	10	38	53

Please indicate the extent to which agile manufacturing has been implemented:

Year	***None***	***Some***	***Significant***
2010	21	32	47
2011	25	31	44
2012	29	29	41
2013	31	39	31
2014	14	36	50
2010-2014	24	33	43

Management's number one indicator of plant performance:

- Cash flow
- Compliance to customer commit date
- Contribution percentage
- Conversion cost
- Converted cells per direct labor hour
- Cost absorption
- Cost performance index
- Customer and internal rejections (rejections x 1,000,000)/parts produced or sold)
- Customer complaints
- Customer delight (customer rating system)
- Customer experience
- Customer fill rate
- Customer loyalty index
- Customer on-time delivery (Units shipped on time to promise date)
- Customer order fill rates (orders filled and shipped within 24 hours)
- Economic profit (net operating profit after taxes minus capital charge)
- Customer satisfaction (quality, ppm)
- CV Uptime, bottleneck operation (percent of operating time compared to scheduled time)
- Cycle time (contract receipt to delivery)
- Delivered customer value (Throughput time, rework, prod., quality discrepancies, delivery)
- Dock-to-dock inventory turns
- EBITDA
- EBITDA per employee
- Gross profit
- Growth of revenue
- Hours per unit
- Individual productivity (Output/effort or (# of machines produced)/people)
- Line fill rate
- Linearity
- Lost cycles (number of missed opportunities to produce a product/total opportunities)
- Man hours per unit
- Manufacturing costs per finished goods production unit (operating expenses/total produced)
- Manufacturing sales per employee
- Mfg. conversion cost per unit of product shipped (Total mfg. Costs/finished goods prod.)
- Mfg. expense as % of sales
- Net operating profit
- NOP (net operating profit, annual value of shipments less material and mfg. Costs)
- Operating income (Sales - (cost of sales + selling and admin costs))
- OEE (machine availability x quality yield x % of optimal for equipment)
- On time delivery
- On time shipments
- Operating earnings
- Plant productivity factor
- PPM (total customer rejects/total shipped x 1,000,000)
- Pretax bottom line
- Prime tons produced
- Product unit cost
- Production volumes of key products (monthly, wkly, and daily prod. And shipping reports)
- Productivity (output/hour)
- Productivity improvements (productivity savings/standard cost of production)
- Profit
- Profit x quality x cycle time
- Profitability (earnings before income tax, depreciation & amortization (EBITA))
- Quality
- Quality (12 months rolling average confirmed quality returns/units shipped)
- Reliability (actual pounds produced to schedule (customer needs))

Management's number one indicator of plant performance, continued:

- Reliability (mean time between removals)
- Return and rejected ppm
- Return on assets
- Return on net assets (After tax profits divided by average assets)
- Return on sales (Net operating profit as a percentage of net sales)
- Safety
- Sales
- Sales per employee
- Scrap rate (monthly report)
- Scrap rate reductions
- Service call rate (number of service calls/units in warranty by production period)
- Shipping units completed by 2:00 pm (% that ship on that are completed by 2:00)
- Total hours per unit
- Total manufacturing cost
- Turnaround time and quality
- Units/employee/day
- Units/labor hour
- Value generated/associate (standard value of labor and expense divided by total associates)
- Variable margin
- Voice of the customer rate
- Yield (good pieces packed/total pieces fed)

QUALITY

Quality certifications (% of plants):

Year	***ISO 9001:2008***
2010	56
2011	75
2012	94
2013	92
2014	86
2010-2014	80

Quality techniques extensively implemented (% of plants):

Year	***Six Sigma***	***Quality function deployment***	***Poka-yoke (mistake-proofing)***	***Failure mode effect analysis (FMEA)***	***Total Quality Management***	***Employee problem-solving teams***
2010	55	10	90	70	50	100
2011	75	13	81	69	50	100
2012	71	12	71	88	59	88
2013	92	31	69	77	62	100
2014	64	7	86	86	50	93
2010-2014	70	14	80	78	54	96

Quality techniques extensively implemented (% of plants):

Year	***Plan/do/ check/act***	***Advanced product quality planning (APQP)***	***Manual SPC***	***Computerized SPC***	***Design of Experiments***	***Taguchi methods***
2010	90	40	55	60	55	5
2011	81	50	31	44	69	13
2012	71	41	53	35	35	6
2013	92	39	31	92	69	8
2014	93	43	50	50	43	21
2010-2014	85	43	45	55	54	10

Current first-pass yield, typical finished product (%):

Year	***Median***	***Mean***	***Minimum***	***Maximum***
2010	96.6	96.0	90.3	99.5
2011	98.4	97.0	91.6	99.8
2012	97.1	93.8	65.0	100.0
2013	98.3	95.4	80.1	99.7
2014	98.5	94.0	66.4	99.9
2010-2014	98.0	95.3	65.0	100.0

Average first-pass yield, all finished products (%):

Year	Median	Mean	Minimum	Maximum
2010	96.0	95.5	85.7	99.6
2011	98.9	97.4	92.0	99.7
2012	97.8	92.8	52.0	99.9
2013	96.8	93.6	76.4	99.7
2014	98.3	94.8	59.8	99.9
2010-2014	97.2	94.9	52.0	99.9

Average first-pass yield, all finished products (%):

Year	Less than 75%	75-89.9%	90-94.9%	95-96.9%	97-98.9%	99-100%
2010	0	6	28	39	17	11
2011	0	0	19	13	19	50
2012	6	13	6	13	38	25
2103	0	15	23	15	31	15
2014	8	0	8	8	33	42
2010-2014	3	7	17	19	27	28

In-plant defect rate (ppm):

Year	Median	Mean	Minimum	Maximum
2010	6,959	22,537	4	110,000
2011	14,730	32,396	202	127,250
2012	2,328	16,392	6	128,717
2013	13,037	12,801	36	37,000
2014	3,234	32,670	202	335,578
2010-2014	5,000	23,688	4	335,578

Reduction in in-plant defect rate, last three years* (%):

Year	Median	Mean	Minimum	Maximum
2010	44.8	35.0	29.8% increase	69.0
2011	30.8	1.6	241.2% increase	65.7
2012	47.0	39.5	66.8% increase	96.6
2013	36.1	33.5	11% increase	84.0
2014	56.6	57.9	10% reduction	97.0
2010-2014	44.8	33.2	241.2% increase	97.0

Customer reject rate on shipped products (ppm):

Year	*Median*	*Mean*	*Minimum*	*Maximum*
2010	329	9,131	0	71,142
2011	1,661	3,407	0	19,011
2012	90	2,722	0	25,963
2013	225	1443	0	5,112
2014	87	317	1	2,292
2010-2014	200	3,825	0	71,142

Reduction in customer reject rate, last three years* (%):

Year	*Median*	*Mean*	*Minimum*	*Maximum*
2010	24.0	21.4	156% increase	100
2011	33.0	34.0	2% increase	100
2012	15.3	12.2	100% increase	64.3
2013	34.2	6.7	374% increase	89.0
2014	63.8	48.9	100% increase	99.7
2010-2014	33.3	24.8	374% increase	100.0

Scrap/rework (% of sales):

Year	*Median*	*Mean*	*Minimum*	*Maximum*
2010	0.5	1.1	0.1	4.7
2011	0.6	0.9	0.0	3.1
2012	0.2	0.6	0.0	2.1
2013	0.8	1.7	0.1	4.7
2014	0.2	0.9	0.0	3.7
2010-2014	0.5	1.0	0.0	4.7

Scrap/rework (% of sales):

Year	*Less than 1%*	*1.0-1.9%*	*2.0-4.9%*	*5% or more*
2010	75	5	20	0
2011	63	19	19	0
2012	71	21	7	0
2013	54	8	39	0
2014	64	21	14	0
2010-2014	66	14	20	0

Reduction in scrap/rework, last three years* (%):

Year	*Median*	*Mean*	*Minimum*	*Maximum*
2010	43.0	40.6	23% increase	85.7
2011	27.7	31.4	65.6% increase	90.0
2012	45.9	11.0	200% increase	83.0
2013	20.0	18.9	50% increase	75.0
2014	25.5	33.8	2% reduction	91.0
2010-2014	36.3	27.8	200% increase	91.0

Warranty costs (% of sales):

Year	*Median*	*Mean*	*Minimum*	*Maximum*
2010	0.23	0.64	0.02	2.2
2011	1.05	1.06	0.00	2.56
2012	0.35	1.16	0.00	6.50
2013	0.17	0.67	0.00	4.80
2014	0.23	0.68	0.00	2.30
2010-2014	0.23	0.83	0.00	6.50

Warranty costs (% of sales):

Year	*Less than 0.5%*	*0.5-0.9%*	*1.0-1.9%*	*2-2.9%*	*3-9.9%*	*10% +*
2010	55	9	27	9	0	0
2011	33	17	33	17	0	0
2012	58	0	25	8	8	0
2013	67	17	8	0	8	0
2014	67	11	0	22	0	0
2010-2014	58	10	18	10	4	0

Reduction in warranty costs, last three years* (% of sales):

Year	*Median*	*Mean*	*Minimum*	*Maximum*
2010	3.1	1.7	100% increase	86.2
2011	4.0	21.3	24% increase	100.0
2012	43.5	36.8	86% increase	98.7
2013	21.5	21.5	67% increase	88.0
2014	25.0	33.1	0.0	77.0
2010-2014	22.0	23.2	100% increase	100%

Employee Involvement/Empowerment

Current annual labor-turnover rate (%):

Year	***Median***	***Mean***	***Minimum***	***Maximum***
2010	6.2	7.4	0.0	27.2
2011	5.9	6.6	0.0	27.3
2012	10.6	10.7	1.0	26.0
2013	4.3	5.0	.25	12.7
2014	5.4	7.3	.75	16.4
2010-2014	5.7	7.5	0.0	27.3

Current annual labor-turnover rate (% of plants):

Year	***10% or less***	***More than 10%***
2010	79	21
2011	94	6
2012	44	56
2013	85	15
2014	71	29
2010-2014	74	26

Frequency that employee satisfaction is formally measured (number of times per year):

Year	***Median***	***Mean***	***Minimum***	***Maximum***
2010	1.0	1.8	0.0	12.0
2011	1.0	1.4	0.0	4.0
2012	1.0	10.6	0.0	144.0
2013	1.0	1.1	0.0	4.0
2014	1.0	0.8	0.0	2.0
2010-2014	1.0	3.2	0.0	144.0

Production workers in self-directed or empowered work teams (% of production workforce):

Year	***Median***	***Mean***	***Minimum***	***Maximum***
2010	62.5	60.6	0.0	100.0
2011	85.0	72.6	17.6	100.0
2012	56.0	59.2	0.0	100.0
2013	100.0	67.7	0.0	100.0
2014	50.0	56.0	0.0	100.0
2010-2014	70.0	63.1	0.0	100.0

Production workers in self-directed or empowered work teams (% of production workforce):

Year	***0%***	***1-50%***	***More than 50%***
2010	11	39	50
2011	0	25	75
2012	18	24	59
2013	18	18	64
2014	14	43	43
2010-2014	12	30	58

Responsibilities/decisions handled by work teams (% of plants):

Year	***Production scheduling***	***Inter-team communications***	***Skills certification***	***Disciplinary actions***	***Safety review and compliance***	***Environmental compliance***
2010	30	85	45	10	80	45
2011	75	81	56	0	88	56
2012	35	71	47	0	71	59
2013	46	85	54	0	100	46
2014	50	79	57	0	64	43
2010-2014	46	80	51	3	80	50

Responsibilities/decisions handled by work teams (% of plants) continued:

Year	***Quality assurance***	***Firing of team members***	***Daily job assignments***	***Performance reviews (peer evaluation)***	***Training***
2010	85	0	60	15	85
2011	88	0	81	19	94
2012	71	0	65	18	77
2013	85	0	77	23	92
2014	93	0	57	14	93
2010-2014	84	0	68	18	88

Responsibilities/decisions handled by work teams (% of plants) *continued***:**

Year	***Hiring of team members***	***Vacation/work scheduling***	***Materials management***
2010	10	30	55
2011	13	38	69
2012	6	29	71
2013	15	31	54
2014	0	50	64
2010-2014	9	35	63

Layers of management below plant manager:

Year	***Median***	***Mean***	***Minimum***	***Maximum***
2010	3	3	1	6
2011	2	3	1	5
2012	3	3	1	4
2013	3	3	1	4
2014	2	2	1	3
2010-2014	2	3	1	6

Plant shares financial performance information with all employees (% of plants):

Year	***No***	***Yes***
2010	5	95
2011	6	94
2012	0	100
2013	0	100
2014	7	93
2010-2014	4	96

Suggestions per employee recorded last year:

Year	*Median*	*Mean*	*Minimum*	*Maximum*
2010	3.2	6.9	0.1	27.0
2011	1.8	25.0	0.3	250.0
2012	1.9	36.6	0.1	274.0
2013	1.8	159.5	0.3	1,882.0
2014	1.5	6.1	0.1	51.0
2010-2014	1.8	43.6	0.1	1,882.0

Suggestions per employee implemented last year:

Year	*Median*	*Mean*	*Minimum*	*Maximum*
2010	1.9	6.1	0.1	27.0
2011	1.0	20.7	0.2	244.0
2012	0.7	22.1	0.1	220.0
2013	1.3	159.2	0.0	1882.0
2014	0.6	5.3	0.1	51.0
2010-2014	1.0	39.5	0.0	1882.0

Average annual hours of formal classroom training per production employee:

Year	*Median*	*Mean*	*Minimum*	*Maximum*
2010	16.0	25.0	3.5	92.0
2011	20.0	29.6	3.5	156.0
2012	24.1	28.9	3.0	85.0
2013	25.0	38.9	1.0	120.0
2014	16.0	27.6	4.0	91.0
2010-2014	17.6	29.5	1.0	156.0

Average annual hours of on-the-job training per production employee:

Year	*Median*	*Mean*	*Minimum*	*Maximum*
2010	30.0	46.2	10.0	271.0
2011	40.0	40.5	0.7	120.0
2012	28.1	40.1	5.0	96.0
2013	67.5	74.5	1.9	246.0
2014	55.0	57.9	8.0	123.0
2010-2014	40.0	50.6	0.7	271.0

Annual labor costs budgeted to training (%):

Year	*Median*	*Mean*	*Minimum*	*Maximum*
2010	2.4	3.6	1.0	10.0
2011	2.1	3.1	0.4	16.0
2012	2.2	3.1	1.0	7.2
2013	2.7	3.7	0.4	11.0
2014	3.1	4.7	0.5	20.0
2010-2014	2.5	3.6	0.4	20.0

Annual labor costs budgeted to training (%):

Year	***0-3***	***4-5***	***6-10***	***More than 10%***
2010	74	11	16	0
2011	75	19	0	6
2012	57	29	14	0
2013	69	8	15	8
2014	57	21	14	7
2010-2014	67	17	12	4

Training curriculum established with local college (% of plants):

Year	***No***	***Yes***
2010	40	60
2011	50	50
2012	29	71
2013	46	54
2014	57	43
2010-2014	44	56

Emphasis on cross-training of production employees (% of plants):

Year	***No***	***Yes***
2010	0	100
2011	0	100
2012	0	100
2013	0	100
2014	0	100
2010-2014	0	100

Monetary awards for production employees (% of plants):

Year	***Rewards for individual performance***	***Rewards for team performance***	***Profit sharing***	***Gain sharing***	***Pay for knowledge***	***Pay for skills***
2010	85	75	55	15	25	60
2011	63	69	56	13	19	31
2012	82	71	41	12	29	58
2013	77	85	23	0	54	69
2014	64	86	43	0	50	36
2010-2014	75	76	45	9	34	50

Average wage of production employees (calculated as hourly rate without overtime):

Year	***Median***	***Mean***
2010	$17.54	$16.32
2011	$17.54	$17.60
2012	$16.50	$15.10
2013	$18.00	$18.88
2014	$15.91	$14.74
2010-2014	$17.14	$16.45

Plant employs seasonal/temporary workers (% of plants):

Year	*No*	*Yes*
2010	21	79
2011	31	69
2012	24	77
2013	8	92
2014	14	86
2010-2014	20	80

Average hours of overtime per week for production employees:

Year	*Median*	*Mean*	*Minimum*	*Maximum*
2010	2.1	2.8	0.0	8.0
2011	5.5	4.7	1.5	7.0
2012	4.5	4.6	1.2	10.0
2013	5.0	5.1	1.5	8.0
2014	3.9	3.6	0.9	10.0
2010-2014	3.8	4.1	0.0	10.0

SAFETY

Plant's OSHA-reportable incident rate per 100 employees (work-related injuries and illnesses per 100 employees), most recent calendar year:

Year	***Median***	***Mean***	***Minimum***	***Maximum***
2010	1.3	2.0	0.0	8.9
2011	1.5	2.1	0.0	5.3
2012	1.7	3.3	0.0	11.0
2013	1.8	1.9	0.4	5.6
2014	1.3	1.5	0.0	5.0
2010-2014	1.5	2.2	0.0	11.0

Change in OSHA-reportable incident rate within last three years (%):

Year	***Median***	***Mean***	***Minimum***	***Maximum***
2010	-52.1	-48.6	-100.0	33.0
2011	-37.0	-34.3	-75.0	5.0
2012	-21.0	-1.5	-100.0	299.0
2013	-41.0	-37.0	-87.0	82.0
2014	-41.0	-36.6	-100.0	47.0
2010-2014	-41.0	-31.7	-100.0	299.0

OSHA-reportable incident rate as a percentage of the industry average (%):

Year	***Median***	***Mean***	***Minimum***	***Maximum***
2010	39.7	48.3	3.7	171.1
2011	46.0	47.9	0.0	102.0
2012	39.7	62.9	0.0	152.5
2013	42.6	53.2	6.5	133.3
2014	35.1	37.9	0.0	84.4
2010-2014	39.6	50.6	0.0	171.1

Plant's OSHA-recordable injury and illness rate with days away from work, job transfer, or restriction per calendar year:

Year	***Median***	***Mean***	***Minimum***	***Maximum***
2010	0.6	0.8	0.0	2.7
2011	0.6	0.9	0.0	2.6
2012	1.0	1.9	0.0	7.0
2013	0.0	0.1	0.0	2.4
2014	0.0	0.5	0.0	2.5
2010-2014	0.50	1.0	0.0	7.0

Percentage change in OSHA-recordable injury and illness rate with days away from work rate within last three years:

Year	***Median***	***Mean***	***Minimum***	***Maximum***
2010	-51.0	-42.5	-100.0	100.0
2011	-39.4	-35.7	-100.0	10.0
2012	-21.0	19.2	-100.0	570.0
2013	-40.0	-27.5	-100.0	166.0
2014	0.0	-34.5	-100.0	50.0
2010-2014	-37.0	-23.8	-100.0	570.0

OSHA-recordable injury and illness rate with days away from work rate as a percentage of the industry average (lost-workday rate reported prior to 2004):

Year	***Median***	***Mean***	***Minimum***	***Maximum***
2010	39.5	51.2	8.1	151.7
2011	44.9	62.1	0.0	407.0
2012	45.8	78.8	0.0	256.3
2013	14.5	36.7	0.0	126.3
2014	0.0	21.8	0.0	87.8
2010-2014	32.1	52.1	0.0	407.0

Monitor and investigate near-misses as part of accident-prevention program (% of plants):

Year	***No***	***Yes***
2010	0	100
2011	0	100
2012	0	100
2013	0	100
2014	7	93
2010-2014	1	99

CUSTOMER RELATIONS

Formal customer-satisfaction program in place (% of plants):

Year	***No***	***Yes***
2010	25	75
2011	19	81
2012	12	88
2013	8	92
2014	14	86
2010-2014	16	84

Frequency of customer-satisfaction surveys (per year):

Year	***Median***	***Mean***	***Minimum***	***Maximum***
2010	1.0	1.8	0	4
2011	2.0	81.0	0	1,040
2012	3.0	8.0	0	60
2013	4.0	5.3	1	15
2014	1.0	2.5	0	12
2010-2014	2.0	19.3	0	1,040

Does the plant have access to and use real-time customer demand data to plan production:

Year	***No***	***Yes***
2010	25	75
2011	19	81
2012	0	100
2013	8	92
2014	29	71
2010-2014	16	84

JIT delivery offered to customers (% of plants):

Year	***No***	***Yes***
2010	21	79
2011	25	75
2012	35	65
2013	31	69
2014	36	64
2010-2014	29	71

Percentage of customers for which plant has adopted a continuous-replenishment or JIT delivery program:

Year	*Median*	*Mean*	*Minimum*	*Maximum*
2010	80.0	66.6	0.0	100.0
2011	76.0	59.0	2.9	90.0
2012	90.0	63.2	2.0	100.0
2013	30.0	37.9	0.0	90.6
2014	25.5	42.5	0.0	100.0
2010-2014	70.0	55.1	0.0	100.0

Opportunities created for employee contact with customers (% of plants):

Year	*None*	*Some*	*Wide*
2010	10	85	5
2011	6	69	25
2012	12	65	24
2013	0	69	31
2014	7	86	7
2010-2014	8	75	18

Percentage of production employees visiting customer locations in past year:

Year	*Median*	*Mean*	*Minimum*	*Maximum*
2010	5.0	4.9	0.0	17.0
2011	1.0	6.8	0.0	24.0
2012	5.0	4.1	0.0	10.0
2013	3.0	6.9	0.0	25.0
2014	2.0	10.3	0.0	100.0
2010-2014	3.0	6.5	0.0	100.0

Supplier Relations

Best describes site's relationship with suppliers (% of plants):

Year	Focused on delivery	Focused on quality	Focused on total cost	Focused on capabilities	Focused on price	Other
2010	10	20	50	0	10	10
2011	6	25	63	0	0	6
2012	12	29	53	6	0	0
2013	8	15	54	23	0	0
2014	7	50	36	7	0	0
2010-2014	9	28	51	6	3	4

JIT/kanban system with suppliers (% of plants):

Year	None	Some	Wide
2010	11	53	37
2011	6	50	44
2012	6	65	29
2013	8	54	39
2014	14	50	36
2010-2014	9	54	37

Percentage of key suppliers that provide JIT delivery (% of plants):

Year	Median	Mean	Minimum	Maximum
2010	30.0	46.7	0.0	100.0
2011	80.0	68.9	5.0	100.0
2012	20.0	34.4	0.0	100.0
2013	30.0	36.5	0.0	100.0
2014	50.0	56.5	5.0	100.0
2010-2014	50.0	49.4	0.0	100.0

Percentage of key suppliers formally certified:

Year	Median	Mean	Minimum	Maximum
2010	100.0	72.5	0.0	100.0
2011	100.0	81.3	0.0	100.0
2012	95.0	69.2	0.0	100.0
2013	50.0	51.5	0.0	100.0
2014	100.0	65.3	0.0	100.0
2010-2014	100.0	68.9	0.0	100.0

Point-of-use delivery in plant by high-volume suppliers (% of plants):

Year	*No*	*Yes*
2010	50	50
2011	69	31
2012	59	41
2013	31	69
2014	50	50
2010-2014	53	48

Cost savings shared with the supplier when supplier initiatives yield cost savings for the plant:

Year	*No*	*Yes*
2010	45	55
2011	31	69
2012	12	88
2013	46	54
2014	36	64
2010-2014	34	66

Supplier orders delivered on time (by the request date) (%):

Year	*Median*	*Mean*	*Minimum*	*Maximum*
2010	96.2	95.1	85.0	99.0
2011	96.0	95.1	80.0	99.7
2012	94.0	89.6	50.0	99.3
2013	91.0	90.0	75.0	99.5
2014	95.0	93.2	76.0	99.0
2010-2014	95.0	92.8	50.0	99.7

Percentage of purchased material not requiring incoming inspection:

Year	*Median*	*Mean*	*Minimum*	*Maximum*
2010	80.0	67.0	0.0	100.0
2011	90.0	72.6	3.0	100.0
2012	95.0	80.4	20.0	100.0
2013	85.0	66.9	0.0	100.0
2014	90.0	69.8	0.0	100.0
2010-2014	90.0	71.2	0.0	100.0

Typical leadtime on all class-A (high-cost) purchased materials (days):

Year	*Median*	*Mean*	*Minimum*	*Maximum*
2010	29.0	44.1	1.0	150.0
2011	25.5	59.5	1.5	300.0
2012	30.0	47.4	1.0	180.0
2013	25.0	38.4	0.5	160.0
2014	25.5	33.9	1.0	100.0
2010-2014	29.0	45.1	0.5	300.0

Reduction in leadtime on class-A materials, last three years* (%):

Year	***Median***	***Mean***	***Minimum***	***Maximum***
2010	7.5	17.4	10% increase	60.0
2011	6.0	14.1	31% increase	78.0
2012	4.5	9.6	95% increase	60.0
2013	16.7	20.1	5% increase	70%
2014	25.0	29.1	0.0	85.0
2010-2014	10.0	17.5	95% increase	85.0

MANUFACTURING OPERATIONS & FLEXIBILITY

Adoption of cellular-manufacturing practices (% of plants):

Year	***None***	***Some***	***Wide***
2010	10	30	60
2011	0	31	69
2012	0	29	71
2013	15	23	62
2014	7	43	50
2010-2014	6	31	63

Adoption of focused-factory production systems (% of plants):

Year	***None***	***Some***	***Wide***
2010	16	26	58
2011	19	25	56
2012	18	24	59
2013	0	8	92
2014	14	21	64
2010-2014	14	22	65

Adoption of JIT/continuous-flow production methods (% of plants):

Year	***None***	***Some***	***Wide***
2010	0	47	53
2011	0	31	69
2012	6	29	65
2013	0	46	54
2014	0	36	64
2010-2014	1	38	61

Adoption of internal pull system with kanban signals (% of plants):

Year	***None***	***Some***	***Wide***
2010	5	55	40
2011	0	38	63
2012	0	29	71
2013	0	46	54
2014	0	50	50
2010-2014	1	44	55

Adoption of standardized work (% of plants):

Year	***None***	***Some***	***Wide***
2010	0	15	85
2011	6	19	75
2012	0	18	82
2013	0	15	85
2014	0	29	71
2010-2014	1	19	80

Adoption of 5S (% of plants):

Year	***None***	***Some***	***Wide***
2010	0	15	85
2011	0	13	88
2012	0	6	94
2013	0	0	100
2014	0	21	79
2010-2014	0	11	89

Adoption of level scheduling (% of plants):

Year	***None***	***Some***	***Wide***
2010	0	50	50
2011	0	38	63
2012	6	18	77
2013	0	39	62
2014	0	21	79
2010-2014	1	34	65

Value-stream mapping (% of plants):

Year	***None***	***Some***	***Wide***
2010	5	25	70
2011	6	25	69
2012	6	18	77
2013	0	8	92
2014	0	36	64
2010-2014	4	23	74

Emphasis on lot-size reduction (% of plants):

Year	***No***	***Yes***
2010	5	95
2011	31	69
2012	12	88
2013	0	100
2014	14	86
2010-2014	13	88

Decrease in lot sizes past 3 years (%):

Year	*Median*	*Mean*	*Minimum*	*Maximum*
2010	30.0	29.9	0.0	53.0
2011	15.0	26.2	0.0	92.0
2012	38.5	44.9	10.0	99.0
2013	50.0	42.2	10.0	80.0
2014	31.5	35.6	10.0	66.0
2010-2014	30.0	35.8	0.0	99.0

Wide adoption of quick-changeover methods (% of plants):

Year	*No*	*Yes*
2010	5	95
2011	13	87
2012	18	82
2013	8	92
2014	21	79
2010-2014	13	87

Frequency that the master production schedule is updated (% of plants):

Year	*Daily*	*Weekly*	*Monthly*	*No production schedules, all work linked to customer orders*
2010	50	45	5	0
2011	44	44	6	6
2012	65	29	6	0
2013	39	54	8	0
2014	57	21	14	7
2010-2014	51	39	8	3

Approximate manufacturing cycle time, hours (hours: 24 hours = 1 day):

Year	*Median*	*Mean*	*Minimum*	*Maximum*
2010	48.0	103.6	1.5	1,032
2011	36.0	538.5	1.0	4,038
2012	39.5	266.7	2.0	2,160
2013	54.0	174.6	2.0	1,176
2014	40.0	157.9	0.2	840.0
2010-2014	48.0	246.0	0.2	4,038

Approximate manufacturing cycle time in hours (<u>hours</u>: 24 hours = 1 day):

Year	***Less than 5***	***5-24.9***	***25-99.9***	***100-999.9***	***1,000 hours or more***
2010	20	10	60	5	5
2011	19	31	25	19	6
2012	24	24	24	24	5
2013	15	15	39	23	8
2013	7	36	14	43	0
2010-2014	18	23	34	21	5

Decrease in manufacturing cycle times, last three years (%):

Year	***Median***	***Mean***	***Minimum***	***Maximum***
2010	23.0	26.4	0.0	66.0
2011	40.0	45.2	0.0	99.4
2012	26.3	30.8	0.0	76.0
2013	31.5	35.5	17.5	73.0
2014	30.2	27.8	0.0	55.0
2010-2014	30.0	32.9	0.0	99.4

Decrease in manufacturing cycle times, last three years (% of plants):

Year	***More than 40%***	***21-40%***	***1-20%***	***Stayed the same***
2010	35	18	18	29
2011	47	40	7	7
2012	24	35	29	12
2013	25	50	25	0
2014	36	29	21	14
2010-2014	33	33	20	13

Standard order-to-shipment leadtime, days (days: 1 day = 24 hours):

Year	***Median***	***Mean***	***Minimum***	***Maximum***
2010	4.0	11.1	0.9	43.0
2011	5.0	65.3	0.7	715.0
2012	13.0	25.7	1.5	98.0
2013	14.0	16.2	0.2	40.0
2014	4.3	8.9	0.1	40.0
2010-2014	6.0	25.6	0.2	715.0

Standard order-to-shipment leadtime (days: 1 day = 24 hours):

Year	Less than 5	5-19.9	20-49.9	50-99.9	100 days or more
2010	60	20	20	0	0
2011	50	31	0	6	13
2012	29	29	24	18	0
2013	25	33	42	0	0
2014	50	36	14	0	0
2010-2014	44	29	19	5	3

Reduction in order-to-shipment leadtime, last three years (%):

Year	Median	Mean	Minimum	Maximum
2010	22.5	24.3	0.0	80.0
2011	30.0	35.3	0.0	85.0
2012	32.5	26.4	0.0	50.0
2013	25.0	34.0	0.0	70.0
2014	20.7	24.9	0.0	88.0
2010-2014	25.0	28.5	0.0	88.0

Reduction in order-to-shipment leadtime, last three years (%):

Year	Decreased more than 40%	Decreased 21-40%	Decreased 1-20%	Stayed the same	Increased 1-20%	Increased more than 20%
2010	22	28	11	39	0	0
2011	33	27	20	20	0	0
2012	19	44	19	19	0	0
2013	40	30	10	20	0	0
2014	14	36	29	21	0	0
2010-2014	25	33	18	25	0	0

On-time delivery rate (% on time):

Year	Median	Mean	Minimum	Maximum
2010	98.4	95.1	71.0	100.0
2011	98.2	96.0	82.0	100.0
2012	97.2	96.7	92.0	100.0
2013	98.0	96.6	90.0	100.0
2014	95.9	95.4	87.0	100.0
2010-2014	97.2	95.9	71.0	100.0

Basis for on-time delivery rate calculation (% of plants):

Year	Date customer requested	Date promised to customer
2010	50	50
2011	44	56
2012	56	44
2013	46	54
2014	50	50
2010-2014	49	51

MAINTENANCE

Plant practices total productive maintenance (% of plants):

Year	No	Yes
2010	5	95
2011	0	100
2012	12	88
2013	0	100
2014	0	100
2010-2014	4	96

Machine operators perform preventive and routine maintenance (% of plants):

Year	No	Yes
2010	35	65
2011	0	100
2012	12	88
2013	8	92
2014	21	79
2010-2014	16	84

Average machine availability rate as a percent of scheduled uptime(%):

Year	Median	Mean	Minimum	Maximum
2010	95.0	92.1	61.2	99.9
2011	97.4	93.3	68.8	100.0
2012	95.5	94.1	77.0	99.9
2013	90.0	89.3	77.1	100.0
2014	95.9	94.4	80.0	99.2
2010-2014	95.0	92.7	61.2	100.0

Reactive maintenance work, in response to unexpected machine or equipment breakdown (%):

Year	Median	Mean	Minimum	Maximum
2010	33.0	27.8	2.0	70.0
2011	23.9	24.6	1.4	75.0
2012	10.0	20.5	0.8	80.0
2013	20.0	22.3	1.0	65.0
2014	15.5	23.7	1.0	75.0
2010-2014	18.4	24.0	0.8	80.0

Current operating equipment efficiency (OEE) for major product lines:

Year	Median	Mean	Minimum	Maximum
2010	77.6	74.1	42.0	90.0
2011	81.8	80.3	45.0	97.7
2012	81.6	81.6	60.4	98.8
2013	76.9	73.4	34.6	98.0
2014	83.2	75.6	44.0	91.8
2010-2014	79.0	77.0	34.6	98.8

INVENTORY MANAGEMENT

Change in total plant unit volume, last three years (%):

Year	*Median*	*Mean*	*Minimum*	*Maximum*
2010	-11.0	13.3	-62.0	143.0
2011	-2.5	8.1	-30.0	79.0
2012	19.5	21.1	-45.0	67.0
2013	25.0	39.2	-27.0	153.0
2014	13.0	33.0	-14.0	207.0
2010-2014	13.4	21.6	-62.0	207.0

Average days of raw-materials inventory:

Year	*Median*	*Mean*	*Minimum*	*Maximum*
2010	22.4	33.5	2.0	104.0
2011	21.9	33.5	3.2	138.0
2012	26.0	28.0	2.0	78.0
2013	34.5	39.4	7.5	80.0
2014	30.1	46.6	5.0	250.0
2010-2014	26.0	35.6	2.0	250.0

Change in raw-materials inventory, last three years* (%):

Year	*Median*	*Mean*	*Minimum*	*Maximum*
2010	-18.0	-13.6	-66.0	68.0
2011	-8.5	-21.4	-70.0	21.0
2012	-12.1	-11.6	-70.0	49.0
2013	-25.0	-12.3	-35.0	57.0
2014	-27.3	-27.8	-58.1	0.0
2010-2014	-17.0	-17.1	-70.0	68.0

Average days of WIP inventory:

Year	*Median*	*Mean*	*Minimum*	*Maximum*
2010	5.9	12.3	0.1	59.0
2011	5.9	9.1	0.2	50.5
2012	5.0	17.1	1.0	119.0
2013	7.4	20.3	0.0	112.0
2014	4.5	7.6	1.0	23.0
2010-2014	5.7	13.1	0.0	119.0

Change in WIP inventory, last three years (%):

Year	*Median*	*Mean*	*Minimum*	*Maximum*
2010	-18.0	-9.1	-60.0	85.0
2011	-12.0	-20.4	-50.0	8.0
2012	-16.0	-12.7	-67.0	60.0
2013	-21.5	-25.4	-91.9	5.0
2014	-21.2	-9.9	-60.0	100.0
2010-2014	-18.2	-14.8	-91.9	100.0

Average days of finished-goods inventory:

Year	*Median*	*Mean*	*Minimum*	*Maximum*
2010	5.0	14.3	0.0	63.0
2011	4.0	13.1	0.0	55.0
2012	14.1	26.8	0.0	121.0
2013	14.4	19.6	0.0	54.0
2014	7.1	30.0	0.0	209.0
2010-2014	6.7	20.4	0.0	209.0

Change in finished-goods inventory, last three years (%):

Year	*Median*	*Mean*	*Minimum*	*Maximum*
2010	-18.5	-26.9	-100.0	45.0
2011	0.0	48.3	-45.0	860.0
2012	-7.0	-1.3	-52.0	80.0
2013	-9.5	-5.5	-57.0	120.0
2014	-2.0	-13.2	-67.0	32.0
2010-2014	-7.0	0.2	-100.0	860.0

Average days of inventory (raw materials, WIP and finished goods:

Year	*Median*	*Mean*	*Minimum*	*Maximum*
2010	39.0	50.8	4.2	207.0
2011	32.4	51.2	6.9	161.0
2012	46.0	49.4	11.0	120.0
2013	38.4	64.3	13.0	215.0
2014	39.5	79.9	11.6	479.0
2010-2014	38.7	57.9	4.2	479.0

Change in total inventory, last three years* (%):

Year	*Median*	*Mean*	*Minimum*	*Maximum*
2010	-24.0	-17.9	-70.0	55.0
2011	-8.0	-16.6	-59.4	10.0
2012	-10.0	-7.1	-56.1	60.0
2013	-7.0	-7.2	-39.0	50.0
2014	-23.0	-16.9	-56.1	50.0
2010-2014	-11.3	-13.3	-70.0	60.0

ENVIRONMENTAL STEWARDSHIP

ISO 14001 certification (% of plants):

Year	***No***	***Yes***
2010	70	30
2011	69	31
2012	47	53
2013	15	85
2014	57	43
2010-2014	54	46

Toxic waste reductions, last three years (%):

Year	***Median***	***Mean***	***Minimum***	***Maximum***
2010	38.5	37.7	3% increase	100.0
2011	19.4	29.0	0.0	99.0
2012	36.3	38.4	0.0	69.0
2013	0.0	11.9	0.0	52.0
2014	10.9	19.0	0.0	92.2
2010-2014	25.0	28.1	3% increase	100.0

Cited for EPA violation, last five years (% of plants):

Year	***No***	***Yes***
2010	90	10
2011	94	6
2012	77	24
2013	85	15
2014	100	0
2010-2014	89	11

Three-year change in energy consumption per unit of production (%):

Year	***Median***	***Mean***	***Minimum***	***Maximum***
2010	-5.0	-4.0	-36.0	61.5
2011	-10.3	-16.8	-80.4	2.0
2012	-16.4	-19.2	-60.1	10.0
2013	-8.5	-12.4	-41.8	30.0
2014	-17.5	-17.6	-42.0	0.0
2010-2014	-10.0	-13.6	-80.4	61.5

Competitiveness and Market Results

Productivity improvement, last three years, value-added per employee (%):

Year	***Median***	***Mean***	***Minimum***	***Maximum***
2010	15.0	26.0	18% decrease	157.0
2011	18.9	42.4	7% decrease	325.5
2012	17.3	52.0	17.2% decrease	383.6
2013	12.0	20.6	27% decrease	146.9
2014	12.6	23.5	5.3	104.0
2010-2014	15.0	33.4	27.0% decrease	383.6

Productivity improvement, last three years, annual sales per employee (%):

Year	***Median***	***Mean***	***Minimum***	***Maximum***
2010	23.7	27.6	38% decrease	160.0
2011	28.9	49.3	11% decrease	292.0
2012	21.6	44.4	18% decrease	189.0
2013	25.0	68.6	27% decrease	453.0
2014	14.0	19.8	1.9	73.8
2010-2014	21.0	41.1	38% decrease	453.0

Three-year manufacturing cost change per unit of product, excluding purchased-materials costs (%):

Year	***Median***	***Mean***	***Minimum***	***Maximum***
2010	-2.6	-2.4	-49.0	33% increase
2011	-2.0	-4.6	-43.0	52.4% increase
2012	-15.9	-16.3	-40.1	13.6% increase
2013	-10.0	-13.3	-40.1	2% increase
2014	-3.6	-5.7	-42.5	37.0 increase
2010-2014	-6.0	-8.0	-49.0	52.4% increase

Three-year manufacturing cost change per unit, including purchased-materials costs (%):

Year	***Median***	***Mean***	***Minimum***	***Maximum***
2010	-0.1	6.2	-50.0	72.9% increase
2011	-3.5	-3.3	-43.0	41.0 % increase
2012	-4.3	1.7	-21.0	83.7% increase
2013	-10.0	-4.0	-24.0	45.0% increase
2014	-4.1	-5.4	-33.8	33.0% increase
2010-2014	-4.0	-0.4	-50.0	83.7% increase

Change in customer price of typical product, last three years (%):

Year	Median	Mean	Minimum	Maximum
2010	3.9	5.3	-15.0	44.0
2011	3.3	2.6	-18.8	20.0
2012	5.9	10.1	-11.1	106.7
2013	1.2	4.3	-23.0	49.0
2014	3.2	5.2	-24.0	42.0
2010-2014	3.4	5.7	-24.0	106.7

Customer-retention rate, last three years (%):

Year	Median	Mean	Minimum	Maximum
2010	100.0	96.3	73.0	100.0
2011	99.0	94.3	75.0	100.0
2012	90.0	88.7	58.3	100.0
2013	98.8	95.2	80.0	100.0
2014	99.5	97.7	85.1	100.0
2010-2014	99.3	94.4	58.3	100.0

Glossary

Below are working definitions referenced by Best Plants applicants in 2014:

Absenteeism: (Actual hours lost through unscheduled job absence ÷ actual hours worked) x 100. Include all unscheduled absences during normal work hours, including scheduled overtime.

Activity-based costing system: A system that tracks costs based on the activities that are responsible for driving costs in the production of manufactured goods

Advanced planning and scheduling system: Planning and optimization tool that balances demand with plant capacity, thus allowing manufacturers to identify bottlenecks and divert workload to alternative production cells.

Advanced product quality planning: A structured method of defining and establishing the steps necessary to ensure that a product satisfies the customer. By moving quality efforts into planning and prevention, this multistage process identifies and anticipates potential problem areas.

Agile manufacturing: Tools, techniques, and initiatives that enable a plant or company to thrive under conditions of unpredictable change. Agile manufacturing not only enables a plant to achieve rapid response to customer needs, but also includes the ability to quickly reconfigure operations—and strategic alliances—to respond rapidly to unforeseen shifts in the marketplace. In some instances, it also incorporates "mass customization" concepts to satisfy unique customer requirements. In broad terms, it includes the ability to react quickly to technical or environmental surprises.

Annual total inventory turns: A measure that is calculated by dividing the value of annual plant shipments at plant cost (for the most recent full year) by the total average daily inventory value at plant cost. Total average daily inventory includes raw materials, work in process, and finished goods. Plant cost includes material, labor, and plant overhead.

Asset turnover: A measure of how efficiently assets are used to produce sales. The ratio shows how many dollars of sales were generated by each dollar of assets. Calculate by dividing net sales by average total assets.

Benchmarking: Formal programs that compare a plant's practices and performance results against "best-in-class" competitors or against similar operations.

Bottleneck: Any point at which movement is slowed because demand placed on a resource is greater than capacity.

Cellular manufacturing: A manufacturing approach in which equipment and workstations are arranged to facilitate small-lot, continuous-flow production. In a manufacturing "cell," all operations necessary to produce a component or subassembly are performed in close proximity, thus allowing for quick feedback between operators when quality problems and other issues arise. Workers in a manufacturing cell typically are cross-trained and, therefore, able to perform multiple tasks as needed.

Changeover: the time required to modify a system or workstation, including teardown and setup time.

Computer-aided design (CAD): Computer-based systems for product design that may incorporate analytical and "what-if" capabilities to optimize product designs. Many CAD systems capture geometric and other product characteristics for engineering-data-management systems, producibility and cost analysis, and performance analysis. In many cases, CAD-generated data is used to generate tooling instructions for computer-numerical-control (CNC) systems.

Computer-aided manufacturing (CAM): Computerized systems in which manufacturing instructions are downloaded to automated equipment or to operator workstations.

Computer-aided process planning (CAPP): Software-based systems that aid manufacturing engineers in creating a process plan to manufacture a product whose geometric, electronic, and other characteristics have been captured in a CAD database. CAPP systems address such manufacturing criteria as target costs, target lead-times, anticipated production volumes, availability of equipment, production routings, opportunity for material substitution, and test requirements.

Computer-integrated manufacturing (CIM): A variety of approaches in which computer systems communicate or interoperate over a local-area network. Typically, CIM systems link management functions with engineering, manufacturing, and support operations. In the factory, CIM systems may control the sequencing of production operations, control operation of automated equipment and conveyor systems, transmit manufacturing instructions, capture data at various stages of the manufacturing or assembly process, facilitate tracking and analysis of test results and operating parameters, or a combination of these.

Computerized maintenance management systems (CMMS): Software-based systems that analyze operating conditions of production equipment—vibration, oil analysis, heat, etc.—and equipment-failure data, and apply that data to the scheduling of maintenance and repair inventory orders and routine maintenance functions. A CMMS prevents unscheduled machine downtime and optimizes a plant's ability to process product at optimum volumes and quality levels.

Computerized process simulation: Use of computer simulation to facilitate sequencing of production operations, analysis of production flows, and layout of manufacturing facilities.

Computerized SPC: See "statistical process control."

Concurrent engineering: A cross-functional, team-based approach in which the product and the manufacturing process are designed and configured within the same time frame, rather than sequentially. Ease and cost of manufacturability, as well as customer needs, quality issues, and product-life-cycle costs are taken into account earlier in the development cycle. Fully configured concurrent-engineering teams include representation from marketing, design engineering, manufacturing engineering, and purchasing, as well as supplier—and even customer companies.

Continuous-replenishment programs: Arrangement with supplier companies in which the supplier monitors the customer's inventory and automatically replaces used materials, eliminating the need for purchase orders and related paperwork.

Core competency: The processes, functions, and activities in a plant or company that are its "life blood"—typically those activities for which the enterprise derives the greatest return for its investments or those that intrinsically align the enterprise with its core market.

Cost of quality: The sum of all costs associated with conformance and nonconformance. Cost of conformance includes prevention costs (employee training, tooling maintenance, planned preventive maintenance, suggestion awards) and appraisal costs (inspection, testing, gages and instrumentation, audit expenses). The cost of nonconformance includes internal costs (unscheduled maintenance, pre-shipment scrap and rework, workers' compensation) and external costs (warranty, customer complaint investigation, rework of returned goods, and product liability insurance.)

Cpk: A statistical calculation of process capability based on the relationship between process variability and design specifications. A good Cpk value indicates that the process is consistently under control—i.e., within specification limits—and also is centered on the design target value. A Cpk value of 1.33 typically is considered a minimum acceptable process capability; as the Cpk value approaches 2.0, the process approaches Six Sigma capability (3.4 defective units per million).

Cross-functional teams: Teams of employees representing different functional disciplines and/or different process segments that tackle a specific problem or perform a specific task, frequently on an ad hoc basis.

Cross-training: Skill-development practices that require or encourage production workers and other employees to master multiple job skills, thus enhancing workforce flexibility.

Customer leadtime: The time elapsed from receipt of an order until the finished product is shipped to the customer.

Customer reject rate (ppm): A quality measure—expressed in parts per million—reflecting the number of completed units rejected or returned by external customers. Calculation should include parts reworked by customers. Applies to all shipped units, including parts.

Customer retention rate: the number of customers active three years ago and still active, divided by the total number of customers active three years ago.

Cycle time: See "manufacturing cycle time."

Days of inventory: Calculate days of inventory by dividing the average inventory on hand (raw-materials inventory, work-in-process inventory, finished-goods inventory, or total inventory) by average daily usage.

Demand flow scheduling systems: Software systems designed to optimize demand-based manufacturing techniques.

Design for assembly: The practice in which ease and cost of assembly is emphasized during the product-design stage.

Design for logistics: The practice in which physical handling and distribution of a manufactured product are emphasized during the product-design stage.

Design for manufacturability: The practice in which ease and cost of manufacturing, as well as quality-assurance issues, are emphasized during the product-design stage.

Design for procurement: A practice in which product designers work effectively with suppliers and sourcing personnel to identify and incorporate technologies or designs that can be used in multiple products, facilitating the use of standardized components to achieve economies of scale and assure continuity of supply.

Design for quality: The practice in which quality assurance and customer perception of product quality are emphasized as an integral part of the design process.

Design for recycling/disposal: The practice in which ultimate disposal and recycling of the manufactured product are considered during the product-design stage.

Design of experiments: An experimental design methodology that enables process designers to determine optimum product/process parameters by conducting a limited number of experiments involving combinations of variables. The usual objective is to determine which variables in a complex process are most critical for quality control—or those that can be most easily changed to reduce overall process variance.

Discrete manufacturing: The production or assembly of parts and/or finished products that are recognizable as distinct units capable of being identified by serial numbers or other labeling methods—and measurable as numerical quantities rather than by weight or volume.

Economic Value Added (EVA): a measurement of shareholder wealth created by an investment center. A trademark of Stern Stewart & Company, calculating EVA can be very complex but is basically net operating profit after taxes (NOPAT) minus an appropriate charge for the opportunity cost of all capital invested in an enterprise.

Electronic data interchange (EDI): Information-system linkages, based on communication protocols and document formats, that permit intercompany computer-to-computer communications. It not only speeds communication, but also eliminates re-keying of information and reduces the opportunity to introduce errors. A typical EDI application might speed information exchange between a customer and supplier company for purchase orders, invoices, or other transactions. EDI communications are often facilitated through "electronic mailbox" systems on third-party value-added networks or over the Internet.

Empowered natural work teams: Teams that share a common workspace and/or responsibility for a particular process or process segment. Typically such teams have clearly defined goals and objectives related to day-to-day production activities, such as quality assurance and meeting production schedules, as well as authority to plan and implement process improvements. Unlike self-directed teams, empowered work teams typically do not assume traditional "supervisory" roles.

Enterprise integration (EI): A broad implementation of information technology to link various functional units within a business enterprise; on a wider scale, it may also integrate strategic partners in an inter-enterprise configuration. In a manufacturing enterprise, EI may be regarded as an extension of CIM that integrates financial or executive decision-support systems with manufacturing tracking and inventory systems, product-data management, and other information systems.

Enterprise resource planning (ERP): An extension of MRP II software designed to operate on enterprise-wide computing platforms. ERP systems typically claim the ability to achieve tighter (or "seamless") integration between a greater variety of functional areas, including materials management, supply-chain management, production, sales and marketing, distribution, finance, field service, and human resources. They also provide information linkages to help companies monitor and control activities in geographically dispersed operations.

Expert systems: Software-based "artificial-intelligence" systems that capture the knowledge and experience of experts in a specialized field and make that expertise available to less-skilled personnel.

Extranet: An exclusionary Internet-like network that securely connects customers and suppliers to a corporate or plant intranet in order to access information deemed sharable by the intranet operators.

Finished-goods turn rate: A measure of asset management that typically is calculated by dividing the value of total annual shipments at plant cost (for the most recent full year) by the average finished-goods inventory value. Plant cost includes material, labor, and plant overhead.

Finite capacity scheduling: Software-based systems that enable simulation of production scheduling (and determination of delivery dates) based on actual unit/hour capacity at each step in the production routing. Finite scheduling systems, running on desktop computers, often compensate for the "infinite capacity" assumptions built into capacity-planning modules in traditional MRP II systems.

Finite element analysis (FEA): A mathematical method for analyzing stress. FEA is used in product-design software to conduct graphical on-screen analysis of a model's reactions under various load conditions.

First-pass yield: The percentage of finished products that meet all quality-related specifications at a final test point. When calculating yield for components, the percentage that meets all quality-related specifications at a critical test point without being scrapped, rerun or reworked. In process industries, yield often is calculated as the percentage of output that meets target-grade specifications (excluding saleable "off-grade" product).

5S: A method of creating a clean and orderly workplace that exposes waste and errors. Originally summarized by 5 Japanese words beginning with S, 5S is widely translated as Sort, Shine, Set in Order, Standardize and Sustain.

Flexible assembly systems: Automated assembly equipment and/or cross-trained work teams that can accommodate a variety of product configurations in small lots.

Flexible machining centers: Automated machining equipment that can be rapidly reprogrammed to accommodate small-lot production of a variety of product or component configurations.

Flexible manufacturing system (FMS): Automated manufacturing equipment and/or cross-trained work teams that can accommodate small-lot production of a variety of product or part configurations. From an equipment standpoint, an FMS is typically a group of computer-based machine tools with integrated material handling that is able to produce a family of similar parts.

Focused-factory production: A plant configuration and organization structure in which equipment and manpower are grouped to create essentially self-contained "mini-businesses," each with a specific product line or customer focus. A single plant may be divided into several focused-factory units, designed around process flows, each of which has control over such support activities as maintenance, manufacturing engineering, purchasing, scheduling, and customer service.

Forecast/demand management software: A class of software that provides front-end input to master production scheduling systems and helps optimize inventory planning. Such software not only takes into account historical demand trends, but also may calculate the impact of planned sales promotions, price reductions, and other factors that cause spikes in demand levels.

In-plant defect rate: The fallout rate, parts per million (ppm), of all components in manufacturing and assembly that fail quality tests at any point in the production process.

Intranet: A secure, internal, corporate Internet-based network.

Inventory turn rate: A measure of asset management capability (see "annual total inventory turns").

ISO 9000: An international quality-process auditing program, based on a series of standards published by the International Standards Organization in Geneva, Switzerland, through which manufacturing plants receive certification attesting that their stated quality processes are adhered to in practice.

ISO 14000: Standards and guidelines defined by the International Standards Organization for environmental management systems.

JIT/continuous-flow production: Implementation of "just-in-time" techniques to reduce lot sizes, reduce setup times, slash work-in-process inventory, reduce waste, minimize non-value-added activities, improve throughput, and reduce manufacturing cycle time. JIT production typically involves use of "pull" signals to initiate production activity, in contrast to work-order ("push") systems in which production scheduling typically is based on forecasted demand rather than actual orders. In many pull systems, a customer order/shipment date triggers final assembly, which in turn forces replenishment of component WIP inventory at upstream stages of production.

JIT delivery: Delivery of parts and materials in small lots—and on a frequent basis—timed to the needs of the production system.

Kaizen: The systematic, organized improvement of processes by those who operate them, using straightforward methods of analysis. It is a "do-it-now" approach to continuous improvement.

Kaizen event: A concentrated effort, typically spanning three to five days, in which a team plans and implements a major process change or changes to quickly achieve a quantum improvement in performance. Participants generally represent various functions and perspectives and may include non-plant personnel.

Kanban signal: A method of signaling suppliers or upstream production operations when it is time to replenish limited stocks of components or subassemblies in a just-in-time system. Originally a card system used in Japan, kanban signals now include empty containers and even electronic messages.

Labor turnover rate: A measure of a plant's ability to retain workers, expressed as a percentage of the production workforce that annually departs, regardless of reason (layoff, quit, retirement, buyout, transfers, etc.). High turnover rates often indicate employee dissatisfaction with either working conditions or compensation.

Machine availability rate: The percentage of time that production equipment is available for use, divided by the maximum time it would be available if there were no downtime for repair or unplanned maintenance.

Machine vision: Optical systems in which video equipment is used to guide robotic or automated equipment during production operations; also, computerized visual inspection systems used for quality control.

Manufacturing cost: Includes quality-related costs, direct and indirect labor, equipment repair and maintenance, other manufacturing support and overhead, and other costs directly associated with manufacturing operations. It does not include purchased-materials costs or costs related to sales and other non-production functions.

Manufacturing cycle time: The time of actual production from when a customer order is released to the plant floor for a particular product through to the completion of all manufacturing, assembly, and testing for that specific product. (Does not include front-end order-entry time or engineering time spent on customized configuration of nonstandard items, or time in finished goods inventory.)

Manufacturing execution system (MES): A software-based system that provides a link between planning and administrative systems and the shop floor. It can link MRP II-generated production schedules to direct process-control software. An element of computer-integrated manufacturing, MES encompasses such functions as planning and scheduling, production tracking and monitoring, equipment control, maintaining product histories (verifying and recording activities at each stage of production), and quality management.

Mean time between equipment failure: the mean (or average) time in hours expected between failures of a given device.

MRP II: Software-based Manufacturing Resources Planning systems that translate forecasts into master production schedules, maintain bills of material (lists of product components), create work orders for each step in the production routing, track inventory levels, coordinate materials purchases with production requirements, generate "exception" reports identifying expected material shortages or other potential production problems, record shop-floor data, collect data for financial reporting purposes, and other tasks depending on the configuration of the MRP II package.

NAICS: The North American Industry Classification System (NAICS) is a coding system of the U.S., Mexican, and Canadian governments that identifies specific economic sectors. It replaces the U.S. Standard Industrial Classification (SIC) system. Coding for most manufacturers encompasses the 6-digit subsets of numbers 31 through 33.

Natural work team: A team of employees, often hourly personnel, who share a common workspace and have responsibility for a particular process or process segment.

Online order entry system: A computer-based system that enables distributors, field-sales representatives, and even customers to place orders directly, over the Internet or a corporate intranet, without intervention by an inside salesperson. An Internet-based transaction might be initiated by accessing a Web page, then choosing a sales-order-entry option. The software often includes a product configurator and pricing "engine," and may be linked to production scheduling systems.

On-time delivery rate: The percentage of time that products ordered by customers are received by the specified time or date.

Operating equipment efficiency or effectiveness (OEE): The percentage of time that equipment, when running or required for production, is producing good-quality products at an acceptable rate. It is the product of three ratios, availability, performance and quality. OEE equals machine availability as a percentage of scheduled uptime x quality yield percentage of all products for a given line x percentage of optimal production rate at which equipment operates.

Order-to-shipment leadtime: The time from when a specific order is released to the shop floor until that order is shipped to the customer, including any storage time in finished goods inventory.

Order-to-delivery leadtime: The time from when a specific customer order is received by the plant until product is delivered to customer, including any warehousing, cross-docking and transportation time.

Order fill rate: Annual sales orders filled completely divided by the total annual number of sales orders.

OSHA-reportable incident rates: Should be calculated as the number of injuries (N) divided by total hours worked by all employees in a calendar year (EH) multiplied by 200,000 (base for 100 equivalent full-time employees working 40 hours per week, 50 weeks per year): (N divided by EH) x 200,000. A separate calculation must be made for more serious injuries and illnesses that result in employees taking time off from their jobs, being transferred to another job or doing lighter or re-stricted duties..

Pick-to-ship cycle time: Pick-to-ship begins when an order is released to be picked from inventory and ends at the time the order is shipped.

Planning and scheduling technologies: A variety of software-based advanced planning, scheduling, and optimization systems.

Poka-yoke: "Fail-safing" techniques to eliminate errors or quality-related production defects as far upstream in the process as possible. Example: requiring completed components to pass through a customized opening to ensure that dimensions do not exceed tolerance limits. Also includes methods to check equipment operating conditions prior to making a part. A major objective is to minimize the need for rework.

Predictive maintenance: Practices that seek to prevent unscheduled machinery downtime by collecting and analyzing data on equipment conditions. The analysis is then used to predict time-to-failure, plan maintenance, and restore machinery to good operating condition. Predictive maintenance systems typically measure parameters on machine operations, such as vibration, heat, pressure, noise, and lubricant condition. In conjunction with computerized maintenance management systems (CMMS), predictive maintenance enables repair-work orders to be released automatically, repair-parts inventories checked, or routine maintenance scheduled.

Premium freight: air or other expedited shipment method that increases the standard cost of filling a customer order.

Preventive maintenance: Maintenance activities, often performed by machine operators at regularly scheduled intervals, to keep equipment in good working condition.

Proactive environmental practices: The efforts of plant management to adopt, at its own fiscal and chronological pace, leading-edge environmental practices that reduce pollutants, emissions, etc., prior to regulatory actions that necessitate these actions.

Problem-solving methodologies: A variety of approaches to problem solving, including the Deming Circle (Plan-Do-Check-Act), used by all persons working in the same team or organization. Considered fundamental to teamwork.

Process manufacturing: The manufacture of products such as chemicals, gasoline, beverages, and food products that typically are produced in "batch" quantities rather than discrete units. Many process operations require inputs such as heat, pressure, and time (for thermal or chemical conversion).

Product data management (PDM): Enabling software-based systems that link, manage, and organize product-related data from various sources—both internally and externally with suppliers—across various computer platforms, divisions, departments, and geographic locations. PDM incorporates CAD files, manufacturing data, and documents to reduce engineering design times; ensures timely access to consistent, up-to-date product information; and improves information flow and cross-functional communications.

Product-development cycle: Sometimes called "time to market," this is the period of time from the start of design/development work to commercial product availability.

Productivity change: The plantwide change in annual value-added per employee, based on total employment in the plant, not just direct labor. Value-added should be calculated by subtracting cost of purchased materials, components, and services from value of shipments. The Best Plants entry form also includes a secondary calculation, which many manufacturers prefer to use: "increase in sales per employee."

Pull system: A system for controlling work flow and priorities whereby the processes needing materials (or attention) draw them from the feeding processes or storage areas as needed, typically using "kanban" signals—in contrast to "push" systems in which material is processed, then pushed to the next stage whether or not it is really needed.

Quality function deployment (QFD): A customer-focused approach to quality improvement in which customer needs (desired product or service characteristics) are analyzed at the design stage and translated into specific product- and process-design requirements for the supplier organization. Targeted customer needs may include product features, cost, durability, and other product characteristics.

Quick-changeover methods: A variety of techniques, such as SMED (single-minute exchange of dies), that reduce equipment setup time and permit more frequent setups, thus improving flexibility and reducing lot sizes and leadtimes.

QS 9000: A common quality certification program for auto industry suppliers that includes ISO 9000 as a baseline.

Rapid prototyping: A variety of techniques for quick conversion of CAD-generated product designs into useful, accurate physical models, typically using computer-controlled systems. In the stereolithography approach, controls based on CAD designs guide laser beams that create precise plastic models by polymerizing and fusing liquid resins into a laminated composite of very thin slices.

Raw-materials turn rate: A measure of asset management that typically is calculated by dividing the value of total annual shipments at plant cost (for the most recent full year) by the average raw-material value at plant cost. Plant cost includes material, labor, and plant overhead.

Real-time feedback: Instantaneous (or nearly instantaneous) communication of electronically captured data (typically quality data) to process operators or equipment to enable rapid or automated adjustments that keep production processes operating within quality parameters.

Return on invested capital (ROIC): A measure of how effectively a company uses the money (borrowed or owned) invested in its operations. ROIC = net operating profit after taxes (NOPAT) divided by capital invested (total assets less excess cash minus non-interest-bearing liabilities). Total assets = fixed assets + current assets + intangible assets + investments. For plants that are cost centers, net operating profits after taxes = annual value of shipments - direct costs, indirect costs, depreciation and taxes.

Rolled-throughput yield: Also known as "multiple-point yield," this measure is calculated by multiplying together quality yield values at various points in a production process, not only at the end of the line. The purpose is to make problem areas within a process more visible.

Safety-improvement programs: Practices intended to constantly improve safety within a plant or across a company, including, but not limited to, safety teams, safety awareness programs and communications, safety "days," safety training, and setting of continuous-improvement goals targeting safety metrics, such as OSHA incidents or lost-workday rates.

Scrap/rework costs: Parts or materials wasted in the production process, plus the cost of fixing defective products so that they pass final inspection.

Self-directed natural work teams: Nearly autonomous teams of empowered employees, including hourly workers, that share a common workspace and/or responsibility for a particular process or process segment. Typically such teams have authority for day-to-day production activities and many supervisory responsibilities, such as job assignments, production scheduling, maintenance, materials acquisition, training, quality assurance, performance appraisals, and customer service. Often called "self-managed" work teams. All self-directed teams are empowered.

Shop-floor data collection: Automated collection of data on factory-production activities, including units produced, labor hours per unit or customer order, time and date of specific production activities, and maintenance and quality data.

Six Sigma: A program that originated at Motorola where the objective is customer satisfaction through continuous improvement in quality. Six Sigma means products and processes will experience only 3.4 defects per million opportunities or 99.99966% good.

Statistical process control (SPC): Use of variation analysis, with manual or computerized control charts, to detect non-normal variations in a process as quickly as possible. Often, SPC charts display upper and lower limits for part characteristics or process parameters and show trends over time, indicating when the limits were exceeded or approached and corrective actions were needed. In some closed-loop systems, adjustments are made automatically when readings indicate that a control limit is being approached.

Supplier JIT deliveries: See "JIT delivery."

Supplier partnerships: Agreements with suppliers whereby operations are linked together, information is openly shared, problems and issues are commonly solved, and joint performance is mutually approved. They usually include multiyear purchase agreements.

Supply-chain/logistics systems: A class of manufacturing software designed to optimize scheduling and other activities throughout the supply chain—or "value chain"—including transportation and distribution functions.

Takt time: the optimum frequency at which product should be produced to meet customer demand, calculated by dividing available work time per shift by actual customer demand. For example, an 8-hour, one-shift operation might have 435 minutes of available time (480 minutes minus two 15-minute breaks and a 15-minute cleanup period). If daily demand is 1,305 products, then the takt time of the operation would be 20 seconds.

TL 9000: A quality system certification program developed by the Quality Excellence for Suppliers of Telecommunications Leadership Forum for the telecommunications industry. The requirements include the ISO 9000 family of standards as a base-line but add specific performance metrics and a formal benchmarking mechanism.

Total cost of quality: The aggregate cost of poor quality or product failures—including scrap, rework, and warranty costs—as well as expenses incurred to prevent or resolve quality problems (including the cost of inspection).

Total logistics costs: Total costs for inbound delivery and storage of material and parts, plus the total cost to store, transport and deliver (and possibly set up) product to the customer following final manufacture and assembly. That a manufacturer calculates and monitors such a measure indicates that management is not only focused on improving efficiencies within the walls of the factory, but also on the total order-fulfillment process.

Total productive maintenance (TPM): A comprehensive program to maximize equipment availability in which production operators are trained to perform routine maintenance tasks on a regular basis, while technicians and engineers handle more specialized tasks. The scope of TPM programs includes unscheduled maintenance prevention (through design or selection of easy-to-service equipment), equipment improvements, preventive maintenance, and predictive maintenance (determining when to replace components before they fail).

Total quality management (TQM): A multifaceted, company-wide approach to improving all aspects of quality and customer satisfaction—including fast response and service, as well as product quality. TQM begins with top management and diffuses responsibility to all employees and managers who can have an impact on quality and customer satisfaction. It uses a variety of quality tools, such as QFD, Taguchi methods, SPC, corrective-action response teams, cause-and-effect analysis, problem-solving methodologies, and fail-safing.

Transitional work program: A transitional work program offers various options to assist an injured worker in progressively performing the duties of a targeted job.

Value-added per employee: Calculate by subtracting cost of purchased materials, components, and services from value of shipments divided by number of employees. See "productivity change."

Vendor-managed inventory: Materials, components or subassemblies managed and replenished by on-site vendors "resident suppliers" with whom the plant has prearranged purchasing agreements. The supplier takes responsibility for the availability of supplies.

Visibility systems: Visual systems on the plant floor and design areas and elsewhere that enable anyone familiar with the work to understand its status and condition at a glance, or to respond to work priorities. This can be done with standard layouts, signal lights, kanban systems, or other methods. The distinguishing feature is that communication is rapidly executed by line of sight.

Voice recognition/response: Computerized systems capable of recognizing or synthesizing human voices. Such systems capture verbalized data for quality-control or inventory-tracking purposes (often when operators' hands are busy), recognize spoken commands that activate equipment, and convert computer data into audible information.

WIP turn rate: A measure of the speed with which work-in-process moves through a plant. Typically calculated by dividing the value of total annual shipments at plant cost (for the most recent full year) by the average WIP value at plant cost.

World-class manufacturer: A somewhat arbitrary designation that can be supported by performance results related to various manufacturing metrics. (World-class metrics may vary from one industry to another.) Typically, it denotes "best-in-class" producers on a worldwide basis. In the broadest sense, world-class manufacturers are those perceived to deliver the greatest value at a given price level.

Work-in-process inventory (WIP): The amount or value of all materials, components, and subassemblies representing partially completed production; and anything between the raw material/purchased component stage and finished-goods stage. Value should be calculated at plant cost, including material, direct labor, and overhead.

Yield improvement: Defined as the percentage reduction in rejects within a five-year period. Example: If yield improves from 95% to 98%, that means rejects have been reduced by 60%—from 5% to 2%. Therefore, yield improvement equals 60%.

IndustryWeek

BEST PLANTS

2014 Candidate Entry Form

Candidate facilities will be judged by a panel of INDUSTRYWEEK editors, who may solicit independent evaluations from manufacturing experts and other knowledgeable persons. The panel will look for evidence of:

- A comprehensive effort to achieve world-class manufacturing capability.
- Management practices geared to motivating achievement of breakthroughs in operating performance and customer satisfaction.
- Strong quality systems and results.
- Employee involvement and empowerment programs that drive continuous process improvement and superior customer relationships.
- A strong customer focus and effective supplier partnerships.
- Appropriate use of technology, as required by changing business needs.
- Flexible and/or agile production systems capable of responding quickly to customer needs and shifts in the marketplace.
- A record of operational improvement, including shortened manufacturing cycle time and order-to-ship lead time, productivity improvements, inventory reductions, and profitability improvement.
- Proactive environmental and safety practices.

ELIGIBILITY

Candidates for INDUSTRYWEEK's Best Plants must:

- Be a single manufacturing plant or a combination of related facilities within a specific geographic location (not to exceed a 25-mile distance from plant to plant) and under the direction of a single management team. To qualify as a manufacturing facility, the plant's output should be a physical product representing value-added.
- Have completed at least 3 years of operation as of Jan. 1, 2014. Plant startup on or before Jan. 1, 2011.
- Be located within the United States or its territories, Mexico, or Canada. Eligibility is not limited to plants owned by U.S.-based parent companies.
- Not have been honored as an INDUSTRYWEEK Best Plant in the previous two years.

SELECTION PROCESS

Entries will be reviewed by a judging panel of IW editors. The panel also may include knowledgeable industry consultants or other experts working under nondisclosure agreements. Using a weighted scoring system, the composite ratings of the judges will determine the Best Plants finalists. The finalists will receive a second questionnaire seeking documentation of achievements and presenting plant-specific follow-up questions.

After a subsequent review of the information submitted in the follow-up questionnaire, along with additional supporting materials, the IW judging panel will tentatively select the 2014 North American winners, pending validation during site visits that typically take place in mid-September through November. All finalists will be recognized in the pages of INDUSTRYWEEK.

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APPLICATION PROCESS

Return completed entry form, including the supporting statement and application fee no later than **June 16, 2014.** Do not submit any other additional material at this time. If your plant is selected as a finalist, supplementary information will be requested at a later date.

Please note that it is not mandatory to fill out every item in this entry form; however, completeness of an entry is considered by the judges.

Do not alter or revise this entry form. Responses to questions should be limited to the space provided. If clarification of an answer to explain unique circumstances or explanation as to why a question was left unanswered is necessary, you may attach up to **two pages** of single-spaced **endnotes** to the entry (each endnote should clearly reference a specific question and page number).

If this form is completed electronically, match the original on a page-for-page, question-for-question basis. When responding to an essay question, provide as much detail, metrics, and anecdotal support as possible **in the space provided**.

Please note the following recommendations:

- For questions where percentage reductions are requested, use 100% as the base level. **Nothing can be reduced more than 100%**, and, thus, no answer should be greater than or, in many cases, equal to 100%.
- If your plant uses metrics that differ from those requested, please attempt to convert to the requested metric, and also submit the actual plant metric (add an endnote if necessary). If still unknown, leave the space blank; do not answer "0."
- So that responses are comparable among applicants, **please report data for time frames indicated**. Three-year change or improvement metrics require four years of data, beginning with the base year of 2010.
- For clarification of terms and metrics used in this entry form, refer to the *Glossary* on the IndustryWeek.com Web site *(www.industryweek.com/manufacturing-glossary)*.

A Final Note: Don't understand a question? Need clarification about a definition? Uncertain about how data may be used? If you need assistance or have questions regarding ANY ASPECT of the IW Best Plants competition, do not hesitate to contact Jill Jusko, jjusko@industryweek.com, or call 216-931-9311.

APPLICATION FEE

A fee of $495 for small companies; $995 for medium companies; and $1,495 for large companies must be submitted along with the application. **Early Bird Discount: Return your completed application by April 30, 2014, and take 20% off the application fee.**

Fees will be accepted by check or credit card only. See form on the next page. Make checks payable to "IndustryWeek." Fee is based on **total company-wide employment**, not the number of employees at the specific manufacturing location entering the competition, **Small companies** are defined as independent corporations with fewer than 250 full-time and equivalent hourly and salaried employees. **Medium companies** are defined as corporations with 250-999 full-time and equivalent hourly and salaried employees**. Large companies** are defined as corporations with 1000 or more full-time and equivalent hourly and salaried employees.

There are no additional fees for the validation site visits. Companies that enter **three or more** plants in the competition receive a $300 discount off of the application fee for each facility. (The three-plant discount is not applicable to small companies with fewer than 250 employees.)

Return entry form (electronic files preferred) and application fee (under separate cover if returning entry form electronically) by June 16 to:

Jill Jusko, jjusko@industryweek.com
INDUSTRYWEEK, Penton Media Inc.
1300 E. 9th St., Cleveland, OH 44114-1503

If you have any questions, contact Jill Jusko at *jjusko@industryweek.com*, 216/931-9311.

Note: Data provided in this entry form will be used in the aggregate to compile a statistical profile and Best Plants database.

TIME TABLE

June 16	Deadline for return of completed entry forms with supporting statements.
On or about	
July	Selection of finalists
July	Second-round questionnaires mailed to finalists.
August	Deadline for return of second-round questionnaires.
On or about	
Sept.	Selection of IW Best Plants pending validation visits.
Sept.-Nov.	IW editors visit plants to validate selections and conduct interviews.
Jan. 2015	January issue publication date for the 2014 INDUSTRYWEEK's Best Plants winners.

APPLICATION FEE FORM

A fee of $495 for small companies; $995 for medium companies; and $1,495 for large companies must be submitted along with the application. Fees will be accepted by check or credit card only. See form on the next page. Make checks payable to "IndustryWeek." Fee is based on **total company-wide employment**, not the number of employees at the specific manufacturing location entering the competition, **Small companies** are defined as independent corporations with fewer than 250 full-time and equivalent hourly and salaried employees. **Medium companies** are defined as corporations with 250-999 full-time and equivalent hourly and salaried employees. Large companies are defined as corporations with 1000 or more full-time and equivalent hourly and salaried employees.

****Early Bird Discount: Return your completed 2014 application by April 30, 2014, and take $300 off the application fee.**

Company/Plant Name, Location ____

Make checks payable to "INDUSTRYWEEK."

Or to pay by credit card please complete the following information:

Amount to be charged $______________

Type of Card: Amex ___ Discover/Novus___ Mastercard___ Visa___

Credit card #_________________________________ Expiration Date________________

Card Member's Name: ____

Billing Address: ____

City:___________________________ State:_________________ Zip Code:__________

Phone:____________________________________ Fax:___________________________

Authorized Signature: ______________________________________Date____________

Send form by fax, or mail under separate cover to:

Attn: Jill Jusko
INDUSTRYWEEK
Penton Media Inc.
1300 E. 9th St.,
Cleveland OH 44114-1503
Fax: 913-514-6652

Penton Media, Inc.
Federal ID No.: 36-2875386
Duns Number: 08-015-3844

I. SUPPORTING STATEMENT

A supporting statement must be included with your entry (maximum four pages, minimum 10-point typeface). It should include essay responses covering the following areas. **Please have each response correspond to the boldface number and topic before each question.** Please describe achievements as well as obstacles overcome, and cite statistical results whenever possible. If space allows within the 4-page allotment, facility and product photos, process-flow diagrams, and performance graphs are encouraged.

1. **General Statement—**Explain why this facility should be considered one of IndustryWeek's Best Plants for 2014.

2. **History—**Give a brief description of the history and nature of the manufacturing operation.

3. **Products and Manufacturing Processes—**Describe the products and components manufactured or assembled in this plant. Describe the flow of material through the facility, outlining the various **manufacturing processes** (i.e. assembly, stamping, welding, full automation) and any unique challenges faced in producing these goods.

4. **Achievements**—Describe the key initiatives and programs, and performance results that distinguish this plant as a high-performance, world-class manufacturing operation. Include significant competitive improvements, and other achievements, recognitions, or awards the plant has received.

5. **Future Competitiveness—**What are the short- and long-term strategic goals for **this** operation, and how do they reflect corporate objectives? Describe current improvement projects and near-term plans and explain how they will ensure that your operation remains competitive in the future.

• GENERAL INFORMATION

FULL PLANT NAME:
Plant location (City, State/Prov., Country):
Primary product:
Name of parent company, if applicable:

Publicly held __________ Privately held __________

Year of plant start-up ________ Number of days operating per week ________ Number of shifts ________

Which criteria below best describe the volume and product mix of your plants operations:

_____High volume/high mix ______high volume/low mix _____low volume/high mix _low volume/low mix

Total square footage ________ Manufacturing square footage _________

Number of employees as of Jan 1, 2014* _______ Change in number of total employees over the past 3 years _______%**

*All full-time and equivalent contract (including temporary) hourly and salaried employees.

**Use + or – to indicate an increase or a decrease

Number of production employees (hourly or "touch" labor) as of Jan 1, 2014 _______ Change in number of production employees over the past 3 years _______%**

Anticipated employment change in 2014 _______%

Are plant workers represented by a union?________ None ________ Some ________ All

If some or all, which union(s)?
When does the current union contract expire?

Management

PLANT MANAGER (or equivalent):		Title:
Phone:	Years at facility:	Years in current position:

Contact Information for Person Submitting Entry

Name:		Title:	
Company:			
Street or P.O. Box:			
City:	State/Prov.	Postal Code:	Country:
Phone:	Fax:	E-mail:	

III. MANAGEMENT PRACTICES

• How does plant management communicate the plant's strategy and objectives among the entire workforce?

• Please indicate the extent to which the following improvement methodologies have been implemented:

Total Quality Management	____ None ____ Some ____ Significant
Theory of Constraints	____ None ____ Some ____ Significant
Toyota Production System	____ None ____ Some ____ Significant
Lean Manufacturing	____ None ____ Some ____ Significant
Six Sigma	____ None ____ Some ____ Significant
Agile Manufacturing	____ None ____ Some ____ Significant
Other (identify):	____ None ____ Some ____ Significant

• Number of major benchmarking studies conducted in the past year: ___________

• Number of people in plant exclusively dedicated to improvement programs and projects, e.g., continuous improvement, change management, lean manufacturing, Six Sigma black belts: ___________

• Total documented cost savings as a result of specific improvement programs and projects over the most recent calendar year? $__________

• Is this plant currently involved, as a defendant, in any product liability, environmental, or employee litigation? ______ Yes ______ No

If "yes," please explain:

• What is plant management's No. 1 indicator of plant performance? ________________________________

How is that indicator calculated? ____

How has that indicator changed over the past three years? ______ % increase or ______ % decrease

IV. QUALITY ACHIEVEMENTS

• Has the plant received ISO 9001:2008 certification? ____ No ____Yes

• Other quality certifications: ____

• Which of the following quality techniques have been extensively implemented at this facility?

______	Six Sigma	______	Total Quality Management (TQM)	_____	Manual SPC
______	Quality function deployment (QFD)	______	Employee problem-solving teams	_____	Computerized SPC
______	Poka-yoke	______	Plan/do/check/act	_____	DOE
______	Failure mode effect analysis (FMEA)	______	Advanced product quality planning (APQP)	_____	Taguchi methods

Other: ____

Quality indicators for a typical finished product (full-year averages)

• Finished product (type of product): ______________________________

• Current first-pass yield: __________%

• Yield improvement* over past three years: __________%

*Calculate yield improvement as a percentage reduction in rejects (*Example: If yield improves from 95% to 98%, that means rejects have been reduced by 60% -- from 5% to 2%. Therefore, yield improvement equals 60%.)*

Quality indicators for all products (full-year averages)

• First-pass yield for all finished products (use a weighted average that takes into account differences in product volumes or in value-added): __________%

• Does plant calculate rolled throughput yield? ____ Yes ____ No

If yes, what is rolled throughput yield for a major product line? __________ Number of inspection points: ________

• In-plant defect/fallout rate on all components, including products that fail finished product tests (ppm): __________ppm

• In-plant defect/fallout rate on all components three years ago: __________ppm

• Percentage reduction in in-plant defect rate within past three years: __________%

***Please Note: Nothing can be reduced more than 100%.**

• Customer reject rate on shipped products (ppm): __________ppm

$$\frac{\text{Number or amount of products returned or rejected}}{\text{Number or amount of products shipped}} \times 10^6 = \text{customer reject rate (ppm)}$$

• Customer reject rate on shipped products (ppm) three years ago: __________ppm

• Percentage reduction in customer reject rate within past three years: __________%

• Scrap/rework costs as a percentage of sales: __________%

• Scrap/rework costs as a percentage of sales three years ago: __________%

• Percentage reduction in scrap/rework as a percentage of sales in past three years: __________%

Note: A reduction in scrap/rework costs from 5% to 2% yields a 60% reduction.

• Warranty costs as a percentage of sales: __________%
• Warranty costs as a percentage of sales three years ago: __________%
• Percentage change in warranty costs as a percentage of sales within past three years: __________%

• What other measures of quality, if any, do you track across the plant? How have these measures changed over the past three years:

Measure	Percent Change
___________________________________	__________ %
___________________________________	__________ %

V. EMPLOYMENT PRACTICES

• What is the plant's current annual labor turnover rate (include all means of voluntary and involuntary separation: layoff, quit, retirement, buyouts, transfers, etc.)? __________%

• How often is employee satisfaction formally measured at this plant? __________times/year

• Do self-directed or empowered natural work teams at the plant-floor or production level make daily decisions on production operations? ____ Yes ____ No

• Percentage of plant's **production** workforce now participating in empowered or self-directed work teams: __________%

• Percentage of plant's **total** workforce now participating in empowered or self-directed work teams: __________%

• Which of the following responsibilities are handled by work teams, rather than supervisors, on the plant floor?

____ Production scheduling	____ Environmental compliance	____ Training
____ Interteam communications	____ Quality assurance	____ Hiring of team members
____ Skills certification	____ Firing of team members	____ Vacation/work scheduling
____ Disciplinary actions	____ Daily job assignments	____ Materials management
____ Safety review and compliance	____ Performance reviews (peer evaluations)	

• How many layers of management are there **below** the plant manager at this facility? __________

• Does plant share information about **plant** financial performance with all employees? ____ Yes ____ No

• How many improvement suggestions per employee did your plant record last year? ____ suggestions/employee
• How many improvement suggestions per employee were implemented last year? ____ suggestions/employee

• What were the total annual cost savings as a result of employee suggestions in 2013? $__________

• Average annual hours of formal classroom and/or online training per production employee: __________hours

• Average annual hours of formal on-the-job training per production employee: __________hours

• Percentage of annual labor costs budgeted to training: __________%

• Has plant established a training curriculum with a local education institution? ____ Yes ____ No

• Does plant emphasize cross-training of production employees? ____ Yes ____ No

• What monetary awards does the plant offer to production employees?

____ Rewards for individual performance ____ Profit sharing ____ Pay for knowledge

____ Rewards for team performance ____ Gain-sharing ____ Pay for skills

• Average wage (hourly rate without overtime) of production employees: $_________/hour

• Average wage of production employees in region: $ _______/hour

• Does the plant employ temporary or seasonal workers? ____ Yes ____ No

• Average hours of overtime per week *per production employee* over the most recent calendar year: ________ hours/week

• Has the plant recently laid off any employees (January 2013-April 2014)? ____ Yes ____ No

If "yes," how many? Please explain the circumstances.

VI. SAFETY

• Has plant experienced any work-related fatalities over the past three years? ____ Yes ____ No

• Has plant been cited for any OSHA violations over the past three years? ____ Yes ____ No

If "yes," please describe the violation, when it occurred, and if and how it has been resolved:

• For the most recent calendar year, what was the plant's **incidence rate** for total OSHA-recordable injury and illness cases?* ___________

**http://stats.bls.gov/iif/osheval.htm (online calculator available here)*

• For the most recent calendar year, what was the plant's **incidence rate** for OSHA-recordable injury and illness cases **with days away from work**, job transfer or restriction?* ___________

• What is the average incidence rate for total OSHA-recordable injury and illness cases for your <u>industry</u> as reported by the Bureau of Labor Statistics?* ___________

* http://www.bls.gov/iif/oshwc/osh/os/ostb3585.pdf

• What is the average incidence rate for OSHA-recordable injury and illness cases with **days away from work**, job transfer or restriction for your <u>industry</u> as reported by the Bureau of Labor Statistics?* ___________

* http://www.bls.gov/iif/oshwc/osh/os/ostb3586.pdf

• Percentage change in the plant's incidence rates for total OSHA-recordable injury and illness cases over the past three years: ______% increase ______% decrease

• Percentage change in the plant's **incidence rates** for OSHA-recordable injury and illness cases with **days away from work**, job transfer or restriction over the past three years: ______% increase ______% decrease

• As part of your accident prevention program, do you monitor and investigate near misses? ____ Yes ____ No

• Which of the following elements are an ongoing part of your plant's safety and health program's activities? (Check all that apply.)

_________ Active management by leadership of safety/health activities
_________ Safety teams led by plant-floor employees
_________ Safety and health integrated into change management of equipment or processes
_________ Safety training for orientation and new work assignments
_________ Routine safety refresher training
_________ Formal process to identify and eliminate or control workplace hazards
_________ Emergency planning and training
_________ Wellness and health promotion

VII. CUSTOMER FOCUS

• Does the **PLANT** have a formal customer-satisfaction program in place? ____ Yes ____ No

• How often are customer-satisfaction surveys conducted? ____ survey(s)/year

• Does the plant have access to and use real-time customer demand data to plan production? ____ Yes ____ No

• Does plant offer just-in-time (JIT) delivery to customers? ____ Yes ____ No

• Percentage of product on a dollar volume basis for which the plant has adopted
a continuous-replenishment or JIT delivery program: __________%

• To what extent has plant created opportunities for employee
interaction with customers? ____ None ____ Some ____ Wide

If some or wide, what percentage of **production** employees visited
customer locations in the past year? __________%

VIII. SUPPLY CHAIN AND LOGISTICS

• Which of the following best describes your site's relationship with suppliers? (Check one)

___ Focused on price ___ Focused on delivery ___ Focused on quality
___ Focused on total cost ___ Focused on capabilities Other ____________________________

• To what extent has plant adopted JIT/kanban systems with suppliers? ____ None ____ Some ____ Wide

• What percentage of key suppliers provide JIT delivery? __________%

• What percentage of key suppliers have been formally certified? __________%

• Does plant have consignment inventory (owned by on-site suppliers) on site? ____ Yes ____ No

• Do high-volume suppliers deliver to point-of-use in the plant? ____ Yes ____ No

• Do major suppliers contribute to cost-reduction and/or quality-improvement efforts in your plant?____ Yes ____ No

• When supplier initiatives yield cost savings for the plant,
are cost savings shared with the supplier? ____ Yes ____ No

• What percentage of supplier orders are delivered on-time (by the request date)? __________%

• What percentage of supplier orders were delivered on-time three years ago? __________%

• What percentage of purchased materials and components (dollar volume)
no longer requires incoming inspection? __________%

• Typical leadtime on class-A (high-cost) purchased materials: __________days

• Percentage change in average leadtime on class-A (high-cost) purchased materials over past three years: _____% increase or _____% decrease

• Has management undertaken a strategic sourcing initiative? ____ Yes ____ No

IX. TECHNOLOGY

• In terms of total cost, please list the largest investment in information technology at this facility over the past 3 years:

• In terms of total cost, please list the top investment in production equipment at this facility over the past 5 years:

• Provide an example of how your deployment of information technology or production equipment/technology **improves** this plant's **competitive position**.

X. MANUFACTURING & FLEXIBILITY

• To what extent has this plant adopted the following practices?

Practices	None	Some	Wide
Cellular manufacturing practices	________	_________	_________
Focused-factory production systems	________	_________	_________
JIT/continuous-flow production methods	________	_________	_________
Internal “pull” system with kanban signals	________	_________	_________
Standardized work	________	_________	_________
5S	________	_________	_________
Level scheduling	________	_________	_________
Value-stream mapping	________	_________	_________

• Has this plant emphasized lot-size reduction? ____ Yes ____ No

If yes, by approximately what percentage have lot sizes been reduced over the past three years? __________ %

• Have quick-changeover methods been widely adopted? ____ Yes ____ No

If yes, by what percentage have average changeover times been reduced over the past three years? __________ %

• How frequently is the master production schedule updated? ____ Daily ____ Weekly ____ Monthly

____ We don’t create production schedules; all work is linked directly to customer orders.

• Manufacturing cycle time for a typical finished product (the time of actual production, from when an order is released to the plant floor through to the final process within the plant, 1 day=24 hours): ____ days ____ hours

• By what percentage has manufacturing cycle time been reduced within the past three years? ____________ %

• Current standard **order-to-<u>shipment</u> leadtime** for a typical product (calculate as the time from when a specific order is re-leased to the shop floor until that specific order is shipped to the customer): ____ days ____ hours

• By what percentage has standard **order-to-shipment leadtime** been reduced within the past three years? __________ %

• Current standard **order-to-<u>delivery</u> leadtime** for a typical product (calculate as the the time from when a specific customer order is received by plant until product is delivered to customer, including any warehousing, cross-docking and transportation time): ____ days ____ hours

• By what percentage has standard order-to-delivery leadtime been reduced over the past three years? __________ %

• On-time delivery rate to customers (% on time): __________%

The above on-time delivery rate is based on (select one): ____ Date customer requested ____ Date promised

• Where does this plant directly ship its products? (i.e., retailers; other manufacturers’ plants; other company plants, etc.)

XI. MAINTENANCE

• What is average machine availability rate as a percentage of scheduled uptime? __________%

• For critical production equipment, does the plant calculate mean time between failures? ____ Yes ____ No

• What percentage of maintenance work is reactive (in response to unexpected machine or equipment breakdown)? __________%

• Operating equipment efficiency (OEE) for major production lines for the most recent calendar year. Please show calculation using the following formula:

OEE	=	*machine availability as a percentage of scheduled uptime*	**X**	*quality yield percentage of all products for given line*	**X**	*percentage of optimal production rate at which equipment operates*
_______	=	_________________	**X**	_________________	**X**	_________________

• To what extent does the plant practice total productive maintenance (TPM)? ____ None ____ Some ____ Wide

• Do machine operators regularly perform preventive and routine maintenance? ____ Yes ____ No

• Has plant implemented a computerized maintenance management (CMMS) system? ____ Yes ____ No

• Describe key elements of maintenance programs and practices, including the use of any predictive maintenance technologies:

XII. INVENTORY MANAGEMENT

• Percentage change in total plant unit volume within past three years: ______% increase <u>or</u> ______% decrease

• Average days of raw-materials inventory: __________days

• Percentage change in days of raw materials inventory within past three years: ____% increase <u>or</u> _____% decrease

• Average days of work-in-process (WIP) inventory: __________days

• Percentage change in days of work-in-process inventory within past three years: ______% increase <u>or</u> ______% decrease

• Average days of finished-goods inventory: __________days

• Percentage change in days of finished-goods inventory within past three years: ______% increase <u>or</u> ______% decrease

• Average days of inventory (raw material, WIP, and finished goods): __________days

• Percentage change in days of total inventory within past three years: ______% increase <u>or</u> ______% decrease

Calculate **days of inventory** by dividing the average inventory on hand (raw materials inventory, work-in-process inventory, or finished goods) by average daily usage.

• Number of SKUs (stock keeping units) in finished-goods inventory: __________SKUs

XIII. ENVIRONMENTAL STEWARDSHIP

• Has plant achieved ISO 14001 certification? ____ Yes ____ No

• Total on-site and off-site releases of toxic chemicals for the 2012 calendar year (from EPA Form R): _____________pounds

• How does this compare to other plants in your industry?

• By what percentage has the plant reduced toxic or hazardous-waste releases in the past three years? _____________%

• Have federal or state EPA authorities cited plant for any violations of environmental laws within the past five years? ____ Yes ____ No

If "yes," explain extent of violation and if and how it has been resolved:

• Has plant achieved ISO 50001 certification? ____ Yes ____ No

• By what percentage has energy consumption per unit of production increased or decreased in past three years? (mark only one)

__________% increase
__________stayed the same
__________% decrease

XIV. COMPETITIVENESS AND MARKET RESULTS

Productivity

• By what percentage has productivity changed within the past three years, annual value-added per employee (total employment, not just direct labor)? ______% increase or ______% decrease

• By what percentage has productivity changed within the past three years, annual sales per employee (total employment, not just direct labor)? ______% increase or ______% decrease

Cost Management

• Approximate manufacturing-cost change per unit of product shipped, excluding purchased-materials costs, within past three years: ______% increase ______% decrease

• Approximate cost change per unit of product shipped, including purchased-materials costs, within past three years: ______% increase ______% decrease

• Percentage change in customer price of a typical product within past three years: ______% increase ______% decrease

Market Results

• Annual change in total plant revenue for **2013** (vs. previous year): __________%

• Anticipated annual change in total plant revenue for **2014**: __________%

• What is plant's customer retention rate for the past three years? __________%

• What is the plant's return on invested capital (ROIC)*? __________%

*__Return on invested capital (ROIC)__— A measure of how effectively a company uses the money (borrowed or owned) invested in its operations. ROIC = net operating profit after taxes (NOPAT) divided by capital invested (total assets less excess cash minus non-interest-bearing liabilities). Total assets = fixed assets + current assets + intangible assets + investments.

For plants that are cost centers, net operating profits after taxes = annual value of shipments – direct costs, indirect costs, depreciation and taxes.

• Is plant currently profitable? ____ Yes ____ No

Change in **plant-level** profitability (EBIT) over the past three years: ______% increase or ______% decrease