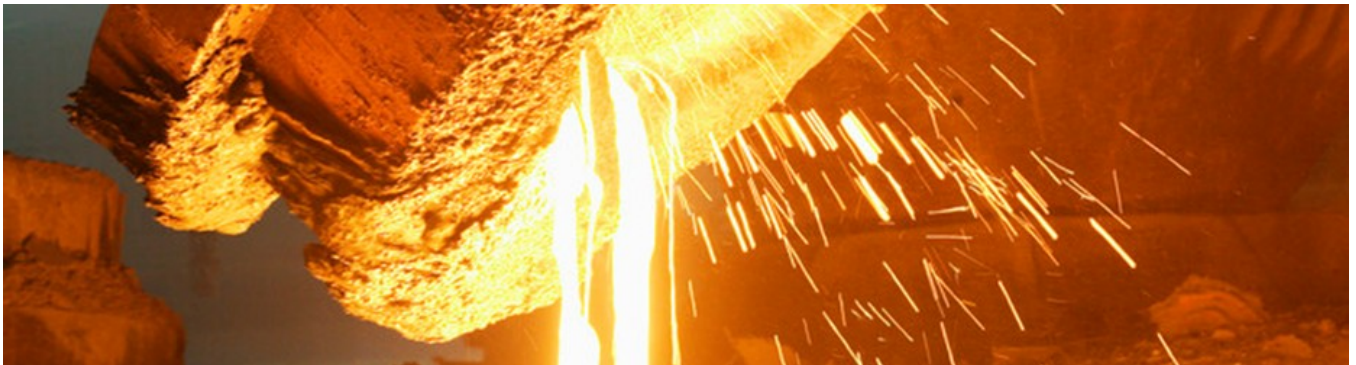


Asprova

Industry Solution

Catalogue with case study reports and samples



Material Industry
(Metal•Paper•Textile•Plastic)

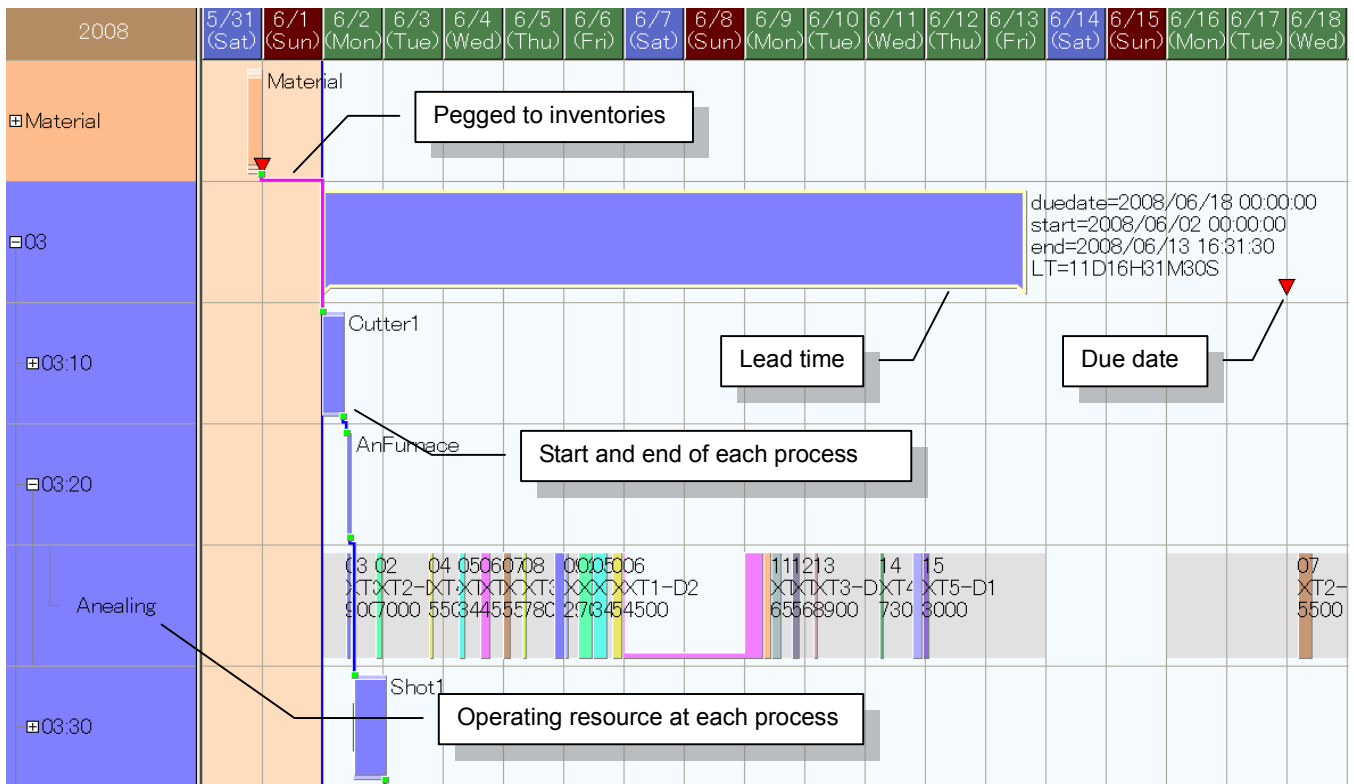
Five problems of Material industry

- ① Quality control ... Efficient scheduling is required, because in-progress goods have expiry dates
- ② Due dates ... As the production processes go farther from the material input phase, the in-progress goods become more diverged or complicated depending on their packing types, and factories do not know whether they can accept urgent orders and delivery date changes.
- ③ Cost and Profits ... Cost and profit per product should be visualized
- ④ Tank facilities ... Efficient allocation plans, which take care of tank facilities' complex constraints as well as cleaning maintenance, are needed
- ⑤ Globalization ... Close coordination with foreign factories is hardly maintained

Asprova's high speed production schedulers which enable "visualization" of schedules have served our clients' needs. The following is the introduction of Asprova's solution.

Finding the due date by finite capacity scheduling

Schedulers with finite capacity make production plans which can be directly used as work instructions. Schedulers can manage urgent orders and due date changes, allocating inventories.



◆ Order Gantt Chart: enables checking of overdue orders, wait times of each process, inventory allocation. The Order Gantt Chart's standard feature includes a Resource Gantt Chart, an Instruction Gantt Chart, an item Gantt Chart, overdue flags. The Order Gantt Chart is easily operated with the mouse.

Efficient load adjustment

Asprova is capable of efficient load allocation to multiple production lines. Asprova also manages to take into account facility investment simulations and manpower employment planning. Shift changes per facility or worker are easily operated with the mouse.

2008	Load average (evaluation result)	6/2 (Mon)	6/3 (Tue)	6/4 (Wed)	6/5 (Thu)	6/6 (Fri)	6/9 (Mon)	6/10 (Tue)	6/11 (Wed)	6/12 (Thu)	6/13 (Fri)
Cutter1	15.83	100%	100%	100%	100%	100%	100%	71%			
Forge1	11.93	21%	8%	43%	40%	56%	52%	21%			7%
Shot1	33.14	18%	66%	46%	76%	63%	69%	86%	97%	92%	89%
Lubrication1	61.18	9%	86%	96%	60%	84%	96%	109%	110%	78%	75%
Press1	25.7		52%	72%			99%	57%		13%	52%
Press2	21.49			42%	78%	93%	56%				
Press3	28.43				92%	81%	42%	28%	11%	98%	35%

◆ Load graph: current load status is recognizable in one view. Displayed periods, displayed resources, and text display are customizable at your will. In addition, inventory graphs and leading time graphs are included as a standard feature.

Skill map to manage workers capacity

The "Skill map", a table to set up process skill of employees, is provided as a standard feature. It enables managing of employees' capacity, ability/inability and processing speed, separate to integrated master tables such as the BOM(Bill of Materials) and resource capacities.

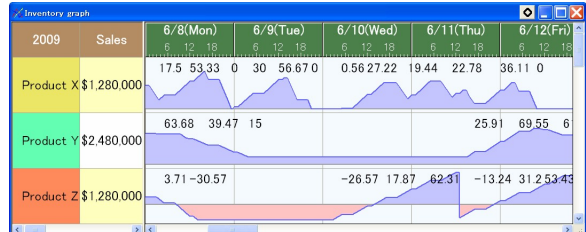
	Resource code	Resource name	Recieve	Inspect 1	Cut 1	Treat 1	Cut 2	Forge	Die	Fix 1	Join	Fix 2	Treat 2	Adjus t	Inspect 2	Deliver
1	0001489	Smith	○				○	○	○	○						
2	0001857	Johnson	○				○	○	○	○					○	
3	0001899	Williams														
4	0001945	Jones	○	○	○											○
5	0101938	Brown				○				○	○	○				
6	0101959	Davis											○	○		
7	0102848	Miller				○				○	○	○				
8	0102859	Wilson														○
9	0102933	Moore				○				○	○	○				

◆ Up to 999 skill types can be added. Displays and input means are also easily customized.

Production Scheduling pegged to inventories and order information

Registering orders not only per production lot but also per sales order lot is possible. Production schedules planning, eliminating unnecessary inventory, can be made while taking into account safety inventories.

Item	Mo	Customer	Type	Qty	Sum	1	2	3	4	5	6	7	8	9	10	11	12
AX100	6	ABC Ltd	Company forecast	600	600	24	23	23	23	23	23	23	23	23	23	23	23
			Customer forecast		720	24	23	23	20	30	30	30	30	30			30
			Firm orders		90	24	22	20									
			Production		920.4	0	20	60	0	59	40	40	49	50	40	0	40
			Remainder		200	12	70	55	55	35	15	5	-4	-24	-24	-24	-24
7		ABC Ltd	Company forecast	600		24		23	23	23	23	23	23	23	23	23	23

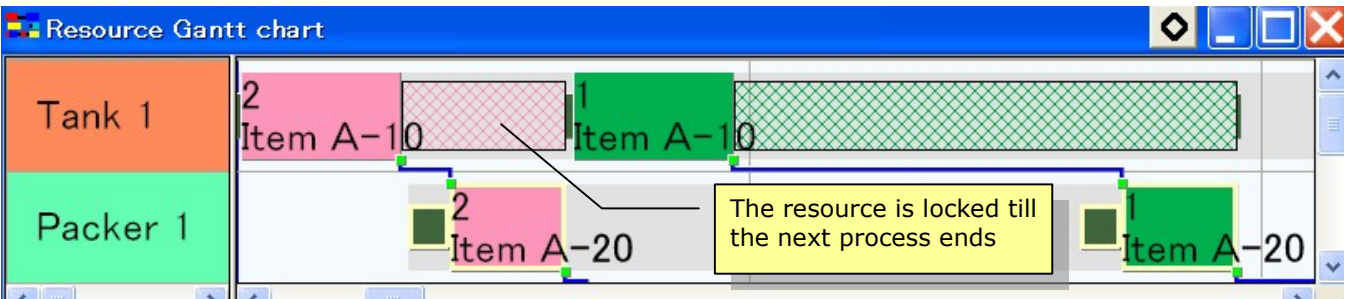


- ◆ Sales plan table: The information on orders for a certain period can be registered with the accuracy of company forecast, sales forecast, customer forecast, and confirmed orders.
- *Sales order option is required.

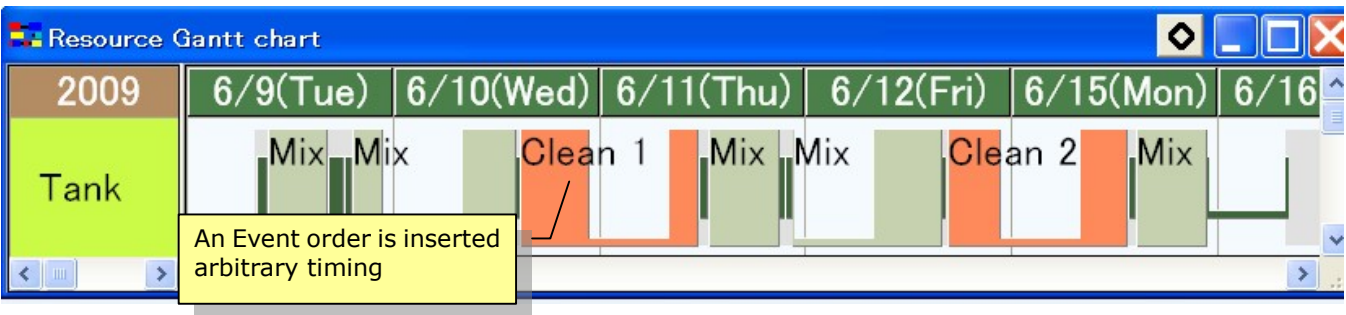
- ◆ Inventory graph: inventory changes and material requirement can be calculated at one view. In addition, production graphs and consumption graphs are available. Calculation functionality for each term is also included.

Scheduling which covers tank facility constraints and the expiry date

Asprova features an excellent lineup of logic options: the "resource lock time option" which covers the constraints specific to tank facilities, the "event option" which manages cleaning event scheduling, and "time constraint MAX option" which makes consumption deadline-adjusted schedules.



- ◆ Resource lock time option ... The constraint specific to tanks, in which materials cannot be input to tanks until the next process finishes because in-progress goods stay in the tanks.



- ◆ Event option: Event option generates events to occur. For example, one cleaning event is set to occur after machines are used three times in row, or one maintenance event is set to occur after machines deal with three tons of material, etc.

Evaluation of the result of scheduling and simulation by KPI

Key Performance Index ("KPI") including sales, profits, profit rates, the material cost can be calculated by cost per item and working cost per resource. Calculation formulae can be freely customized. Also, standard cost breakdown can be calculated. It can be used to verify the result of facility investment simulation as well.

* KPI option is required

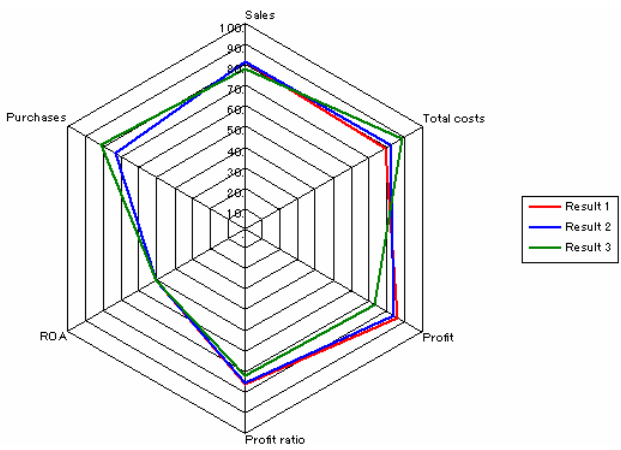
Edit KPI evaluation result

Property	Value	Description
Evaluate KPI(09/12/24)	Evaluate KPI	
- Earnings	\$16300000	Total monetary value of sales orders with
- Material cost	\$7400000	Total monetary value of purchase orders
- Outsourcing cost	\$1240000	Total outsourcing cost for resource durin
- Labor cost	\$3800710	Total labor cost for resource during the s
- Total cost	\$12440710	Total cost during the specified period.
- Profit	\$3859290	The profit during the specified period.
- Profit ratio	23.7%	The ratio of profit and earnings during the

KPI / Common / All properties /

OK Cancel

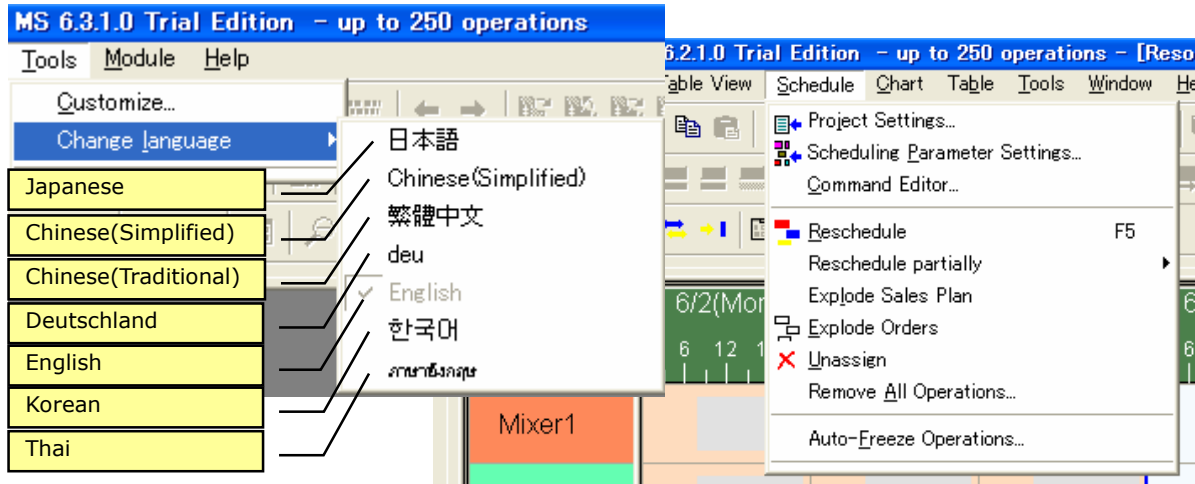
◆ KPI(Key Performance Index): KPI can evaluate the calculation result and keep records.



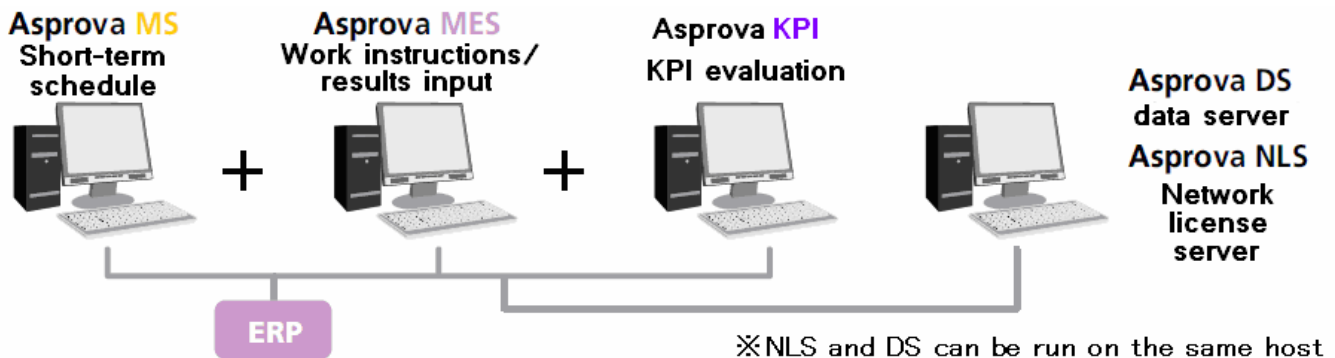
◆ KPI radar chart: KPI radar chart enables comparison of the simulation result by radar chart (with HTML View)

Adaptable to global networks

Asprova is available in Japanese, English, Chinese (Simplified Chinese and Traditional Chinese), Korean, German, Spanish, Portuguese, and Thai. Using the same package enables very close co-operation and understanding between different plants.



- ◆ Adaptable to Multi-languages: Displayed languages can be changed during running.



- ◆ Adaptable to Network: production scheduling is shared through the network.



Introduction to the case studies

To read our latest case study, please go to

<http://www.asprova.com/em/case/index.html>

Paper

Basic process flow	pulp manufacture => wire section=> wind and cut(to certain size)
Issues and conditions before installment	Making production plans manually with computer
Solutions to the issues	Making plans with Asprova
Reasons for choosing Asprova	Asprova's excellent features
Data volume	The number of orders:300 The number of operations:600 The number of main resources:7 The number of sub-main resources:4 The number of BOM items:100 The number of line in BOM:600
The role of install operator	Propose → realize
Year of the installment	2007
Difficulties of the installment	Little experience in dealing with systems
The devices of the installment	Visualization of specs
Current status and after effect	Effects have yet to be measured
SIer/Installer	Yamatake Corporation

Resin

Basic process flow	Mix=>Fill
Issues and conditions before installment	Making production plans manually
Solutions to the issues	Making plans with Asprova
Reasons for choosing Asprova	Asprova's excellent standard features
Data volume	The number of orders:70 The number of operations:2-10 The number of main resources:13 The number of sub-main resources:3 The number of BOM items:250 The number of line in BOM:1300
The role of install operator	Propose => realize
Year of the installment	2005
Difficulties of the installment	The person in charge of the installment had barely any time to work on installing Asprova because he had other work to do until two months prior to the completion day of installment
The devices of the installment	Gantt Chart displaying
Current status and after effect	Under operation
SIer/Installer	Yamatake Corporation



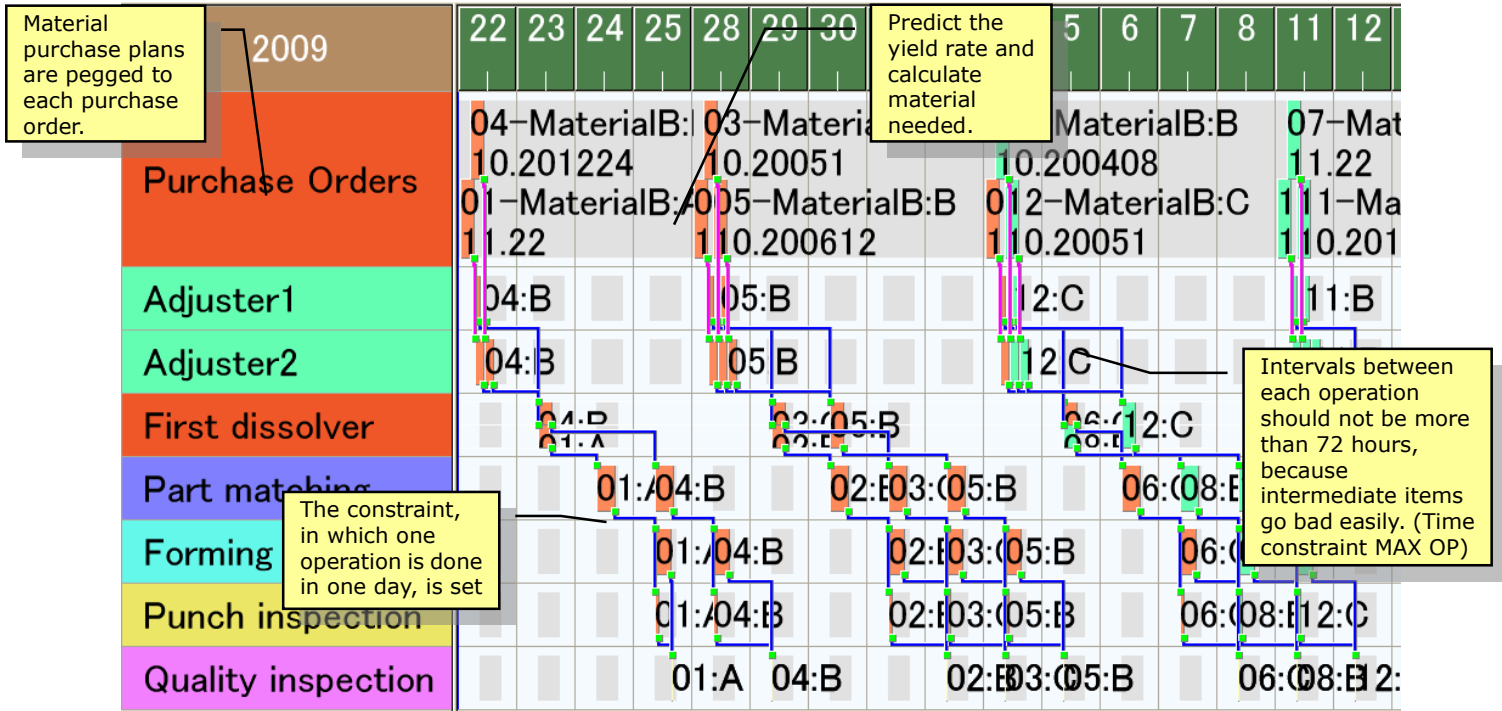
Introduction to the sample data

The sample data, the case studies of our clients who installed Asprova, is introduced here. If Industry sample data is needed, please sign up at the membership registration page of our website or at

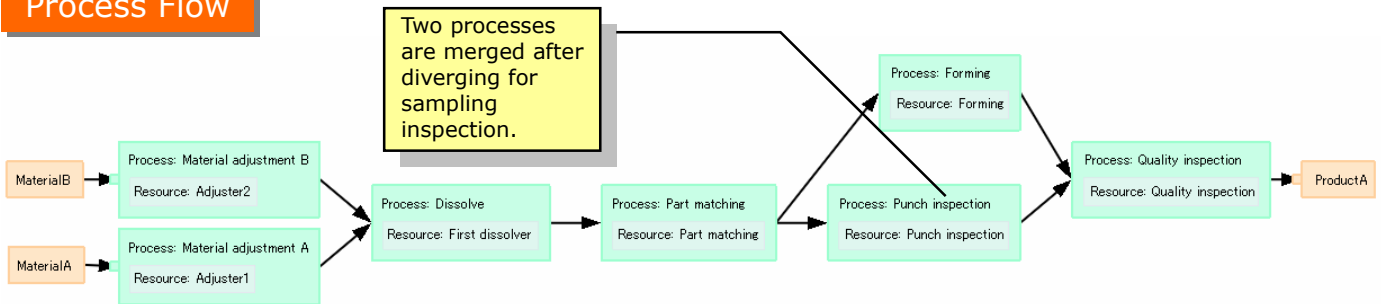
http://www.asprova.com/en/asprova/document_library.html

Material(No time between processes)

Asprova MS + Purchase OP+ Time constraint MAX option



Process Flow



Auto replenish setting of purchase order (Item table)

Item code	Auto-replenish flag	Obtain method
1 MaterialB	Yes (one-to-one production)	Prefer to purchase

purchase order option is required

product suspend time setting (Resource table)

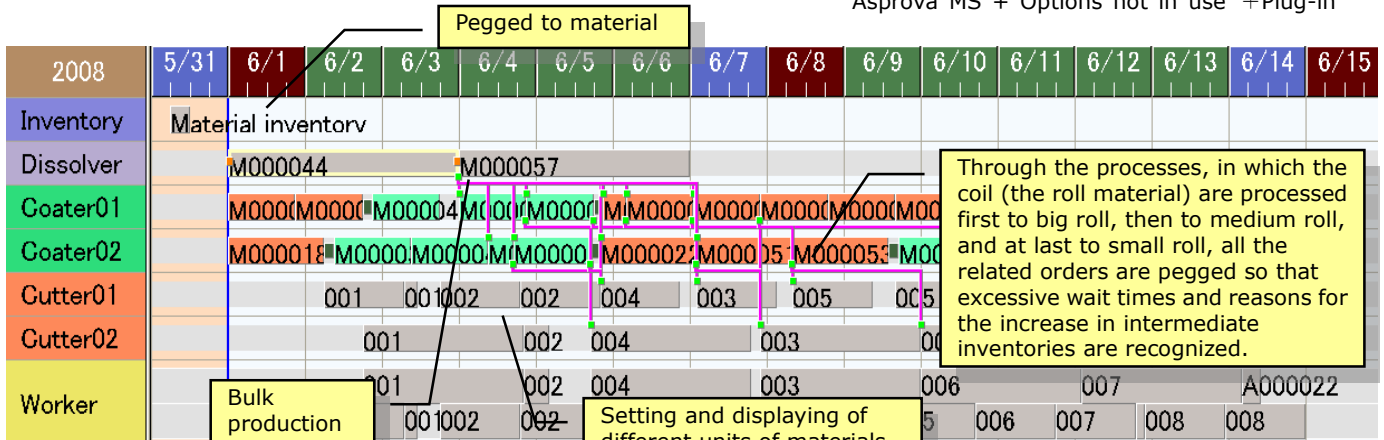
Resource code	Production suspend time MAX
1 Adjuster1	-1M
2 Adjuster2	-1M
3 Punch inspection	-1M
4 First dissolver	-1M
5 Quality inspection	-1M
6 Part matching	-1M
7 Forming	-1M

Data

12. Material.AR4

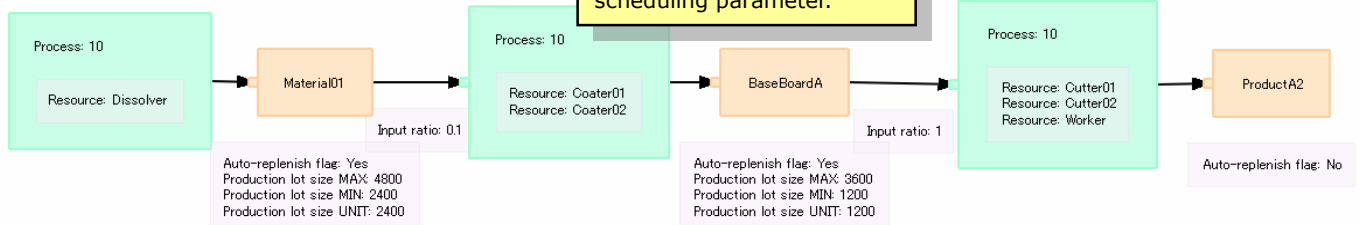
Roll/Coil/Tape

Asprova MS + Options not in use + Plug-in



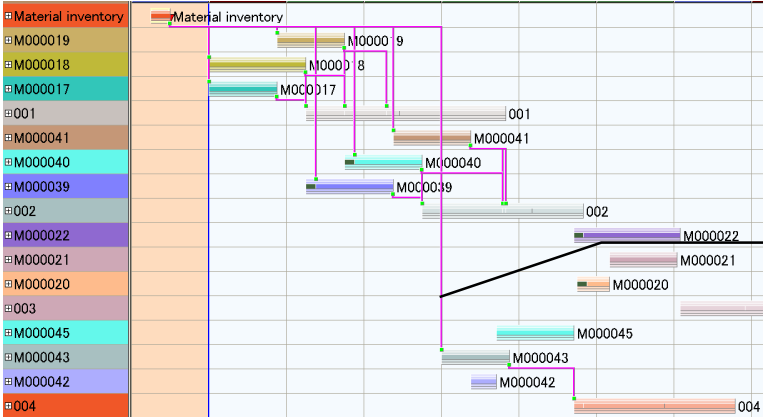
Through the processes, in which the coil (the roll material) are processed first to big roll, then to medium roll, and at last to small roll, all the related orders are pegged so that excessive wait times and reasons for the increase in intermediate inventories are recognized.

Flow chart



Pegging orders (Order Gantt Chart)

Auto-replenish setting of base board (Item table)



Item code	Auto-replenish flag	Lot sizing period	Lot sizing cycle	Production lot size MAX	Production lot size MIN	Production lot size UNIT
1 BaseBoardA	Yes	7D	Week	3600	1200	1200
2 BaseBoardB	Yes	7D	Week	3600	1200	1200
3 ProductA1	No					1

Inventories and orders of bulk produced big rolls and small rolls are pegged to each other. Too long lead times and unnecessary wait times are recognized at one view.

Expanding features with plug-ins

Deciding markup products by plug-ins

Big rolls (base boards) should be used up to make to stock.

The products of which many inventories are not left are chosen

Because the sizes of big rolls are mostly fixed at a certain unit, the reminders are left depending on the number of orders. Asprova's plug-ins realized that specific constraint, so the reminders are made to stock.

Item code	Safety inventory (for cache)	Safety inventory	Current inventory	Sales flag
4 ProductA1	-500	2000	1500	
5 ProductA2	-2000	2000	0	1
6 ProductB1	-500	2000	1500	
7 ProductB2	-2000	2000	0	1

Data

13 roll.ar4 / Plug-in source

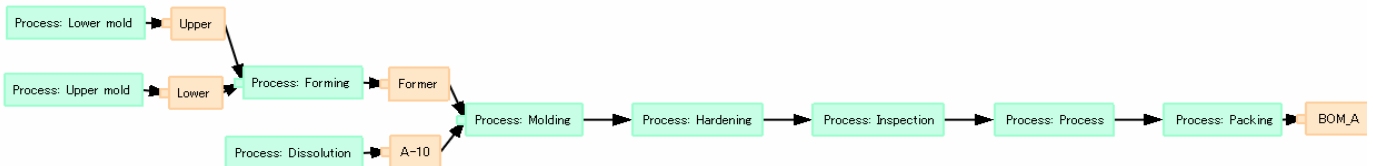
Molding(melting furnace/cast metal)

Asprova MS + Options not in use

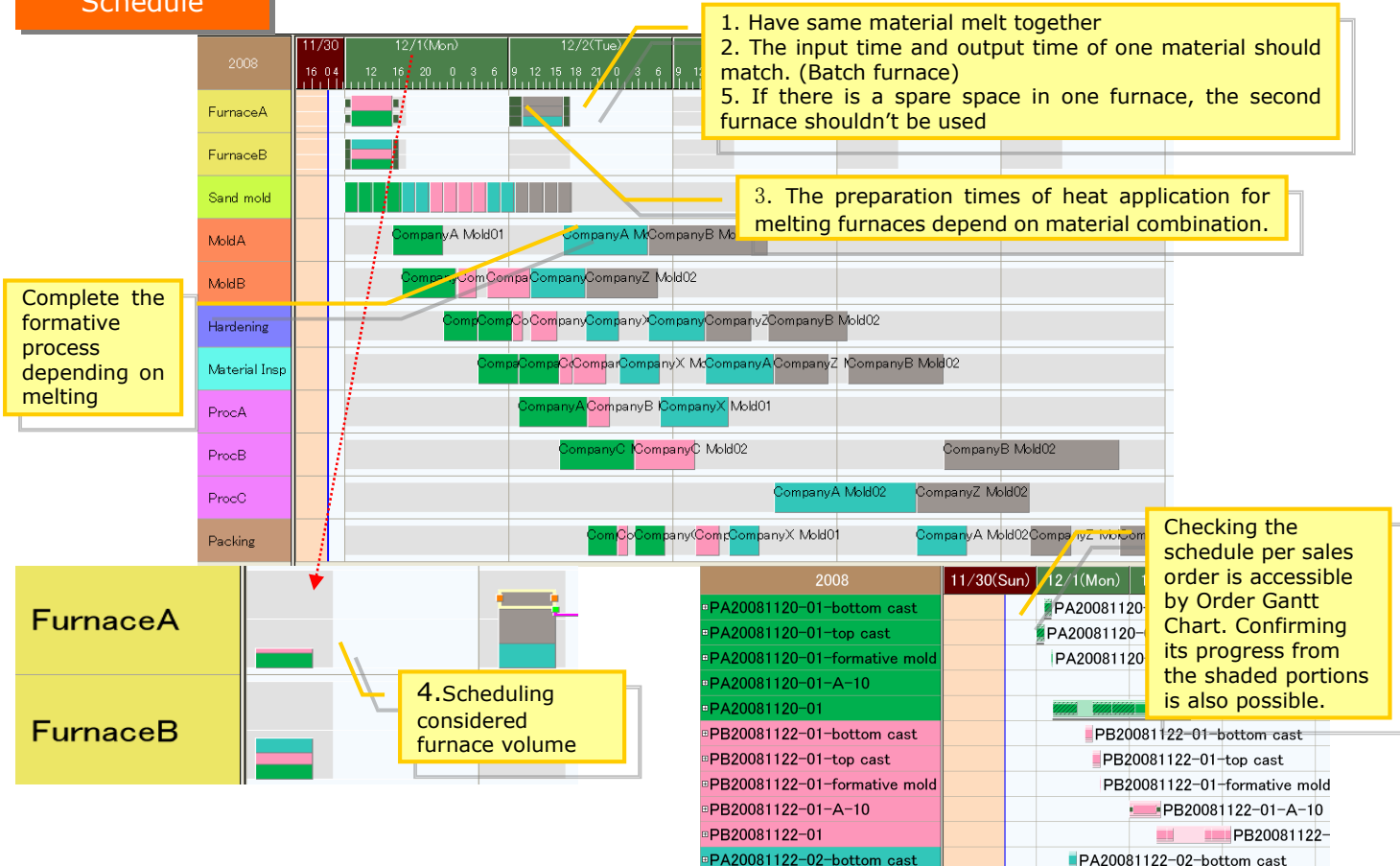
Issues and the solution

- ① [Melting furnace scheduling] Same material (same item) is melted at the same time (different materials are not put in one furnace).
⇒ realized by using the furnace resource assign feature
- ② [Melting furnace scheduling] The input time and output time of one material should match. (Batch furnace)
⇒ realized by using the furnace resource assign feature
- ③ [Melting furnace scheduling] The preparation times of heat application for melting furnaces differ depending on material combination.
- ④ Register setup time for each spec combination in the spec setup table
⇒ [Melting furnace scheduling] Scheduling considered furnace volume
⇒ Setting the "Assigned resource quantity flag" property enables scheduling, considering the furnace volume of furnace.
- ⑤ [Melting furnace scheduling] Scheduling in order to improve the filling rate of furnace
⇒ When there are several furnaces, the filling rate of furnace can be raised, minimizing wait time and improving load distribution.

Process Flow



Schedule



Data

Mining(Cokes oven)

Asprova MS + Resource lock time option

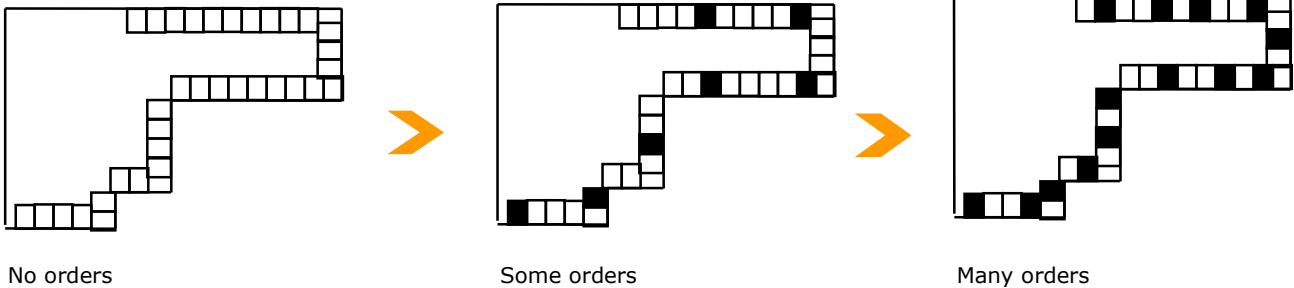
Problem and solutions

① [Scheduling problems of coke ovens]

One heating unit of cokes oven consists of a coke chamber where coal is input and carbonized, fuel rooms which burn fuels to heat the coke chamber from both sides, regenerative furnaces which collect and burn emission gases to preheat air. Normally, several dozen or several hundreds of heating units form one furnace group.

When there are not many orders and only some chambers are used, the imbalance of temperature occurs inside the cokes oven, deteriorating the quality. To avoid such deterioration, even intervals must be kept between operated chambers.

The below pictures are cokes ovens viewed from above. There are multiple chambers allocated, and using adjacent chambers, beyond necessity, is avoided.



⇒ Scheduling parameter setting realizes the above constraints with the standard features.

② [Scheduling problems of coke ovens]

Upon finishing heating, coke is extruded out of the chamber. Extruding machine extrudes cokes one by one. Consequently, if extruding machines are not operating, coke may not be able to come out of the chambers even after heating operation is done. Also next orders cannot get started.

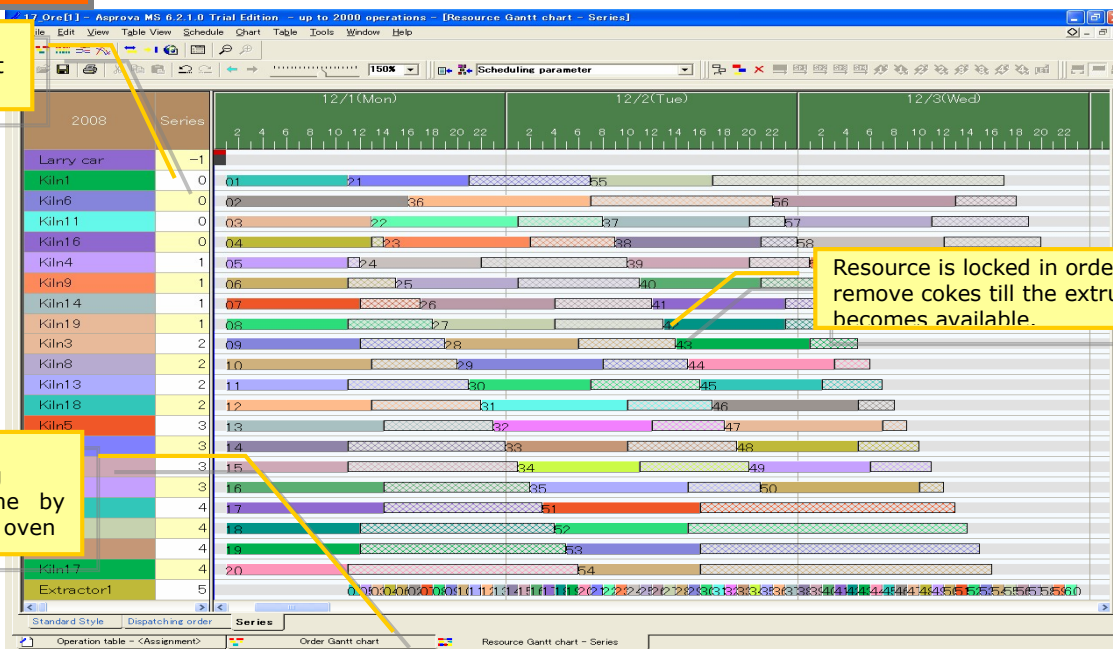
=>Resource lock time option is used

Flow Chart

Coke is inserted at intervals

Resource is locked in order not to remove cokes till the extruder becomes available.

Extruder: extruding cokes one by one from oven



データ

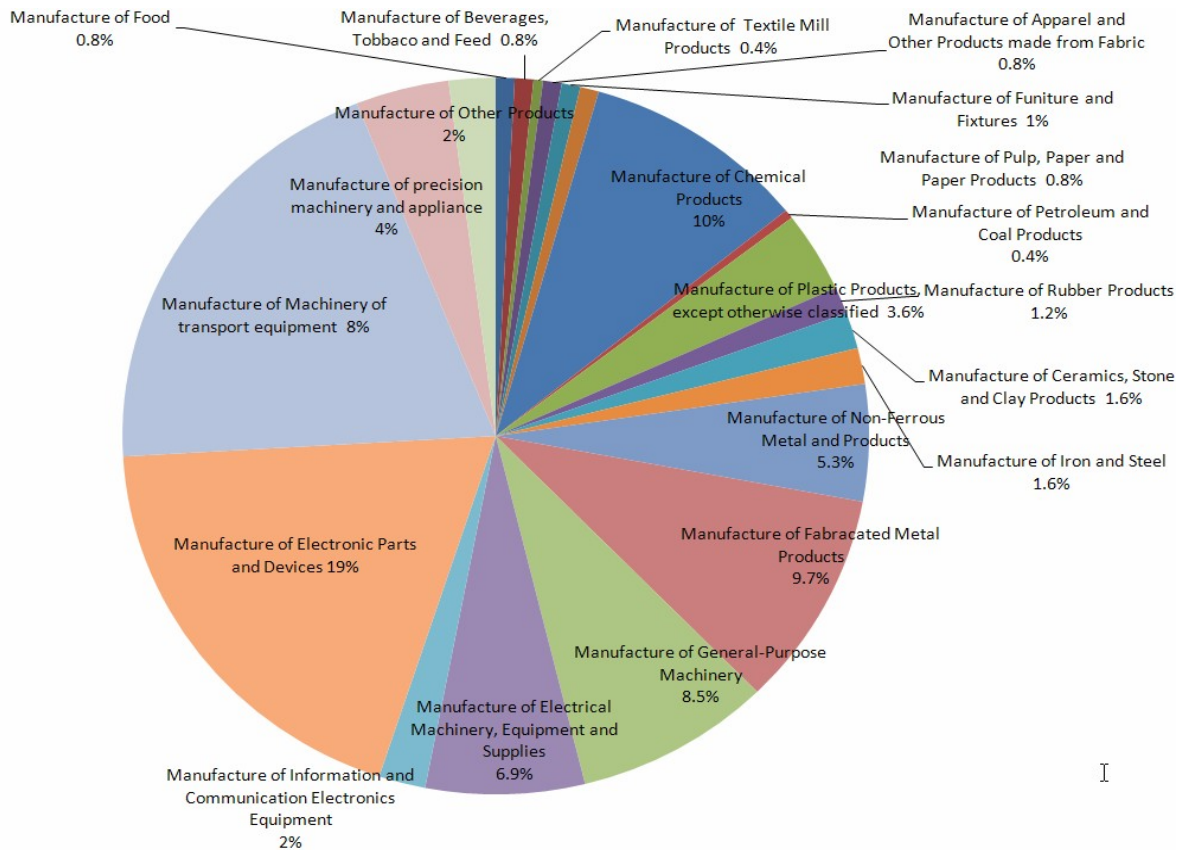
Key points of process Manufacturing

- 1 Manufacturing starts in the bulk production process and branches into more than one process to produce multiple products in most cases
- 2 In-process goods have little time to leave being unprocessed. (They must be put in the next process immediately)
- 3 Tank resources tend to become constraining factors: "The tanks are not available after next process gets done", "The tanks can deal with only certain items together", "Items wait for the orders coming in the tanks", and "Cleaning the tanks"
- 4 Dealing with piece goods: efficiency is needed.
- 5 Dealing with unaccountable units, such as kilogram, meter, and liter

Related features

Auto-replenish production, Time period grouping, Time constraint MAX option, Resource lock time option, Event option, Safety stock, Inventory constraints, Assigning workers, Skill map, Furnace resource, Inventory graphs, Load graphs, Production/purchase plans, Sequence control option, Evaluate schedule, Operation split

The fields of Asprova users



Electric Electronics	LEDs, connectors, solderless terminals, microprocessors, printed circuit boards, silicon wafers, air conditioner cases (plastic molding), speakers, ceramics, watches, semiconductors, lead frames, CD-ROMs, CD-R / DVD / CD-ROM drives, electric wire, LCDs, stereos, photo masks, WF cables, sockets, mobile phones, connectors for mobile-phones, IC packages, aluminum electrolytic capacitors, photoresist, TFT modules, piston rings, needles, piano wire, printer pins, automotive meters, photoelectric board, digital cameras, car navigation systems, refrigerators, light fixtures, sensors, signal controllers, solar-powered battery modules, vacuum fluorescent displays, batteries, multipolar connectors, power cables, mainframe computers, projection equipment, quartz transmission equipment, desktop PCs, carbon electrodes, projectors, printers, power boards, heating equipment controllers, solar cell wafers, medical electrical equipment, SD cards, portal media players, connectors, bar code readers...
Automotive	Engine parts, doors, chassis, interior (plastic molding), metal molds, shock absorbers, vehicle inspections, pipes, tubes, engines, cranes, rubber, aircraft parts, test bodies, brake parts, high-pressure hose, seat fabrics, wire rope, transmissions, camshafts, crankshafts, cases, wire harnesses, motorcycles, bicycles, railway carriages, external parts for ships, anti-vibration equipment for vehicles, tires, movable cranes...
Machinery	Looms, kitchen appliances, machine tools, agricultural machinery, industrial machinery, optical instruments, light fixtures, air conditioners, heating appliances, plastic parts for office equipment, control computers, material handling equipment, power transmission equipment, power-driven hand tools, internal combustion engines, in-line instrumentation systems, wafer visual inspection equipment, centrifuges, sewing machines, heat treatment equipment, tanks, water tanks, turbines, condensers, model engines, vacuum pumps, wafer precision equipment, food products machinery, electric facilities, gas and water-related tools, water supply-related instruments, electric welders, stage lighting fixtures, sewing machine parts, pumps, ultrasonic diagnosis equipment, CNC, robot transfer machines, nuclear equipment, crystal units, rubber hose. Fire alarm equipment...
Metal	Drills, screws, cannons, wire, plumbing fixtures, guard rails, pipes, magnet wire, steel, sheet metal parts, fences, metal bridge parts, blades, connecting rods, nuts, industrial precious metal products, drawing alloys, aluminum for beverage cans, blades for cutting machines, gears, metal springs, timer parts, precision gears, aluminum foil, sheet copper, ship plates, drawn copper products, specialty steel products, cutting tool tips, lubricating oil packaging, beverage cans, magnets, seamless pipes, large scale pumps, process pump, coupling, clad steel sheet, transmission gear...
Non-metal	Corks, packaging, textiles, paper, shipping blocks, camera films, rubber products, ABS resin, synthetic resin, UV ink, gravure ink, printing of packing materials, coated abrasives, resin hose, coating materials, dental materials, film sheets, ceramic base for electronic parts, tiles, firebricks, new ceramics, catalysts, paper clay, fasteners, glass for LCD displays, adhesives, packing tape, stencil paper for wigs, sensitized resin, natural resin, cosmetics materials, inorganic pigments, lenses for microscopes, nonwoven fabric, aluminum foil, man-made leather, aluminum cans, resin mold, silicon wafer...
Consumer goods	Fermented soybeans, detergent, flour, plastic bags, plastic food containers, plastic models, office goods, fishing reels, microwave dinners, wood processing, socks, cans, cosmetics, rubber stamps, ballpoint pens, shampoo, shopping bags, cardboard, home exterior products, drinking water, entranceways, underfloor storage units, fixture components, shoes, toy parts, necklaces, stockings, office furniture & fixtures, coffee beans. Labels, envelopes, stationery, candy, gummy, seasoning, steel furniture, toner cartridge, curtains, food trays...
Medical	Medical products, test drugs, medical equipment, laboratory testing reagents, granulated powder, pills, endoscope, dental materials, clinical test medicine, chemicals...
Chemical	Adhesives, plastic, asphalt, silicon, motor oil, polyethylene, polypropylene, molding materials, rubber, fluorine chemical products, polyvinyl chloride, polyvinyl chloride paste, plastic paint products, make up products, chemical substances...

System requirements

Item	Requirement
Memory	At least 1GB
Hard Disk space	At least 300MB hard disk space
CPU	Faster than 1GHz(If 64bit, it's compatible to x64)
OS	Windows Server 2003 Windows 2000 Server Windows Vista Windows XP Professional Windows 2000
Other	If using 64bit-CPU, compatible to x64

※The requirement of Memory, hard disk space, and CPU depends on its usage and the amount of data dealt with.



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※Product specs are sometimes changed upon version-ups.
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