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bulletin

NATE – nápojová technika a. s., Chotěboř company bulletin

editorial

Dear Reader,
the latest issue of the NATE Bulletin is here. We would like to update you about news of events in the field of beverage-bottling, which have occurred recently in our company. The year 2007 was very successful for NATE from a business point of view. Sales increased by more than 26 % on an annual basis. These sales were mainly in the supplying of parts for bottling lines for beer, water, soft drinks and milk in PET bottles and also in glass containers.

As an introduction a few sentences about Russian brewing industry in a successful brewery located in the ancient town Rjazaň.

We are happy to be able to inform you about some of the technical aspects of filling PET bottles with fresh milk in a semi-aseptic environment and about some technological aspects of milk preparation.

In addition we describe the options and possibilities for using checking devices for empty EXAN glass bottles, designated for brewery and mineral-water operations.

I hope that you will find the information useful and we are, of course, ready to supply you with further details in a potential consultation.

Wishing you a high level of business success,

Sincerely

Ing. Petr Papoušek
General Director

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- Fresh milk from Wallachia – filling PET bottles with dairy products



ОАО "Russian Brewing Company"

The brewery was founded in the city of Ryazan in 1950. In the 1990's, the property of the brewery passed in the ownership of a public limited company (ОАО). With its production of 700 000 hl of beer per year, the Company is one of the major breweries in Russia.

Beer is brewed from own excellent malt and is produced in a classical manner in fermentation tanks.

The Company produces several types of beer according to its own recipes. The beer is on the market in the area of cities of Ryazan and Moscow. The quantity of beer produced every year is increasing. Besides beer, the Brewing Company produces also drinking water. The whole production is bottled both in glass and PET bottles on bottling lines supplied by our company.

The brewery is a long-time user of bottling equipment produced by our company. The equipment was supplied through our long-time business partners, the OMNIPOL Company, a guarantor of the traditional general supplier. The supply of bottling lines is a tool of meeting the customer's needs and his response to market opportunities of distribution of non-alcoholic carbonated and non-carbonated unsweetened beverages. Production of non-alcoholic beverages has a long tradition inherited from original brewery and non-alcoholic combines of the former USSR era. The breweries grouped in multinational concerns deal in production of non-alcoholic beverages, except for non-alcoholic beer, not only on the Russian market.

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OAO "Russian Brewing Company"

The Brewing Company operates 3 complete glass bottling lines and three complete PET bottling lines supplied by NATE Company in the last nine years.

Line No. 1

Complete line for bottling beer in glass

- bottles – (0.5l bottles) – line output 24 000 bottles/hour
- Composition of the line: unloader of bottles from pallets – washer – inspector – filler – labeling machine – loader of bottles on pallets

Line No. 2

Complete line for bottling beer in glass

- bottles – (0.5l bottles) – line output 24 000 bottles/hour
- Composition of the line: unloader of bottles from pallets – washer – inspector – filler – labeling machine – loader of bottles on pallets

Line No. 3

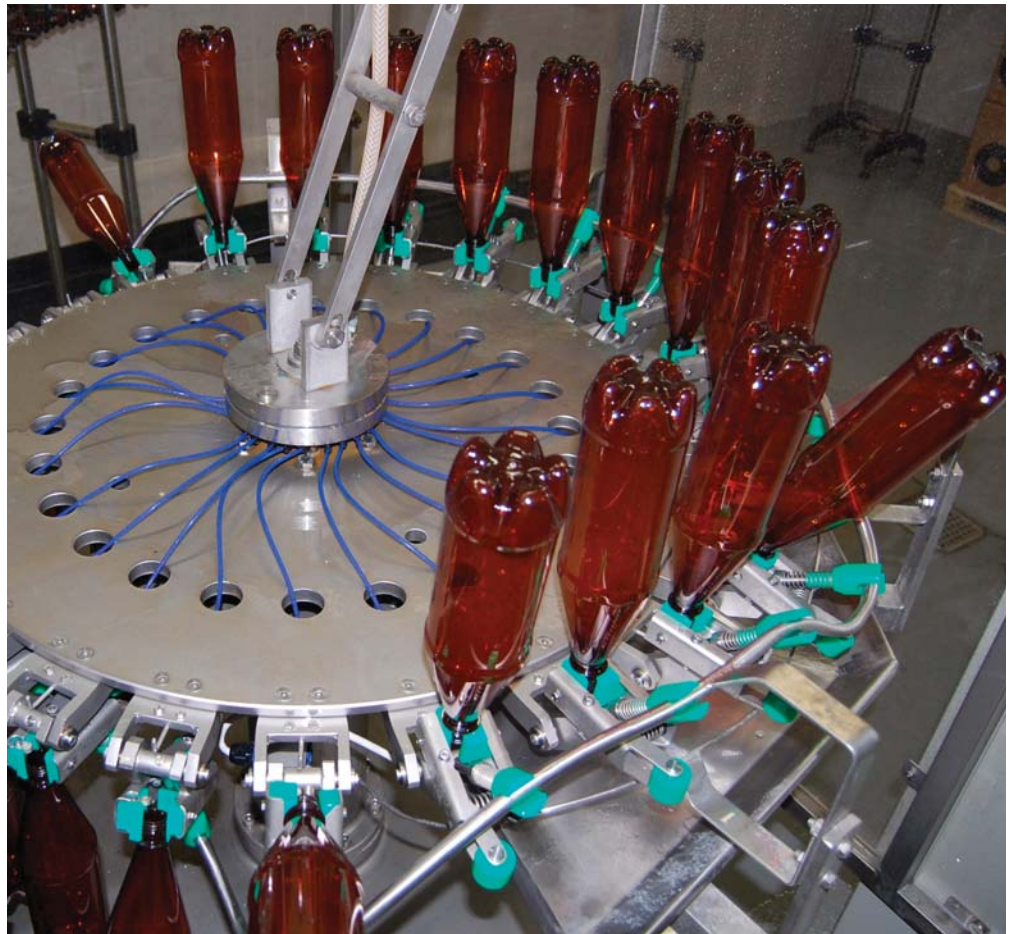
Complete line for bottling beer in glass

- bottles – (0.5l bottles) – line output 12 000 bottles/hour
- Composition of the line: unloader of bottles from pallets – washer – inspector – filler – labeling machine – loader of bottles on pallets

Line No. 4

Complete line for bottling beer (and drinking water) in PET

- bottles – (1.0l bottles) – line output 4 000 bottles/hour
- Composition of the line: blowing device – triblock – labelling machine – packing machine for packing 6 bottles in PET film with a paper pad



Line No. 4 – Rinsing device with 24 clamps and jets integrated in the triblock PETBLOK 24/24/6. Bottles turn up side down, they are rinsed with rinsing medium and perfect draining of the used medium is ensured by tilting of the bottle on the guiding track of clamps.

Line No. 5

Complete line for bottling non-carbonated drinking water in PET

- containers – (5.0l containers) – line output 1 000 bottles/hour
- Composition of the line: blowing device – triblock – label-lin machine – packing machine for packing 4 bottles in PET film

Line No. 6

Complete line for bottling non-carbonated drinking water in PET

- containers – (18.9l containers) – line output 400 bottles/hour
- Composition of the line: decapping machine – washer – filler – closing machine – hot tunnel for PET film for caps



The old city of Ryazan

The old city of Ryazan is situated in the centre of the European part of the Russian Federation approximately 200 km south-east to Moscow and is a key industrial centre of this area. The history of the city becomes in 1095 when Russian settlers came in the area and founded a fortification called Pereslavl-Ryazansky on the place of junction of the Trubezh and Lebed rivers before they enter the Oka river.

The independent Ryazan principality existed already from the 12th century of the last millennium. Its seat was however the Ryazan fortification, the today's Staraya Ryazan, located close to Spassk 50 km south-east from the actual city.

In 1198, Ryazan became the seat of an orthodox diocese. The city was devastated after bloody fight with Mongols in 1237 and even though it was soon restored, it has never reached its original beauty and importance anymore.

The diocese and later on also the prince's court moved in Pereslavl through which passed an important trade route.

The Ryazan principality reached the biggest importance in the middle of the 14th century of the last millennium in the reign of Oleg Ivanovic. At that time the principality competed with the neighbouring Moscow principality. However,

in the reign of Oleg's successors the Ryazan principality got under the Moscow influence and its independence definitely ended in 1521 by appointing of the Moscow governor in Pereslavl. In 1778, the Ryazan guberniya was established (the highest administrative unit in the tsarist Russia) and Pereyaslavl was renamed to Ryazan. In September 1937, the Ryazan oblast was established.



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OAO “Russian Brewing Company”

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LINE NO. 4 OUTPUT MEASUREMENT RECORD

Place of measurement: Ryazan
 Date of measurement: 24. 1. 2008
 Line limiting machine: Petblok 24/24/6
 Typ uzávěru: plastový
 Contractual effective output Q_{effA} : 4 000 bottles/hour
 Bottle type: 1.0 l PET
 Beverage type: beer

variable	variable definition (see enclosure)	value
Q_{estA} – Set filler output	Q_{estA} = number of pieces / time unit	4 700 bottles/hour
Q_{effA} – Line effective output (measured) [bottles/hour]	$Q_{\text{effA}} = N / T_2$	4 566 bottles/hour
Q_{practA} – Line practical (stock) output [bottles/hour]	$Q_{\text{practA}} = N / T_1$	4 099 bottles/hour
T_1 – Time of measuring of the line [hours (min, sec)]	Agreed time of measuring	4 hours 34 minutes
ηA – Line efficiency	$\eta A = (Q_{\text{effA}} / Q_{\text{estA}}) \cdot 100$	97,1 %

LINE NO. 6 OUTPUT MEASUREMENT RECORD

Place of measurement Ryazan
 Date of measurement: 23. 1. 2008
 Line limiting machine: MVP – B 400
 Cap type: plastic
 Contractual effective output Q_{effA} : 400 containers/hour
 Bottle type: 18.9 l PET container
 Beverage type: non-carbonated water

variable	variable definition (see enclosure)	value
Q_{estA} – Set filler output	Q_{estA} = number of pieces / time unit	410 containers/hour
Q_{effA} – Line effective output (measured) [bottles/hour]	$Q_{\text{effA}} = N / T_2$	396 containers/hour
Q_{practA} – Line practical (stock) output [bottles/hour]	$Q_{\text{practA}} = N / T_1$	376 containers/hour
T_1 – Time of measuring of the line [hours (min, sec)]	Agreed time of measuring	3 hours
ηA – Line efficiency	$\eta A = (Q_{\text{effA}} / Q_{\text{estA}}) \cdot 100$	97 %

Further information concerning line No. 5:

linear equipment is fully automatic in block arrangement where all cycles are fully automatic: decapping; surface and inner washing with chemical solution and drinking water; gravitational filling; closing using new mechanical and electronic components with simple functional design. Bottling equipment in lines no. 4 and 5 manufactured by NATE for completion of bottling lines:

- air conveyors type VDN
- triblock type PETBLOK 24/24/6 including two semi-automatic sanitation devices for the filler
- PET bottles conveyors type DLN including central lubrication of conveyors
- group packaging conveyors type DPN
- main distribution board

Completion of the project was realized with our sub-suppliers.



Line No. 5 – Entry of 18.9 l (5 gallons) containers in the washer



Line No. 5 – Conveying 18.9 l (5 gallons) containers to the washer

NATE – nápojová technika a.s. CCD systems

In the second half of 2007 several checking systems with CCD cameras were implemented for Czech customers (CCD - Charge-Coupled Device)

Equipment with bound charge, i.e. cameras containing photo-sensitive elements, which by transformation of luminous intensity to a digital form, generate a picture):

- EXAN 08 CCD for the Platan Protivín Brewery (the only one without the facility to check the sides of bottles; in operation since 30. 7. 2007)
- EXAN 08 CCD for the Korunní s.r.o. Mineral Water bottling plant at Stráž nad Ohří (in operation since 1st October)
- EXAN 08 CCD for the Litovel Brewery a.s. (in operation since 15th October)
- EXAN 08 CCD for the Pepsi Cola plant in Prague (assembled in January 2008)

All set-ups are equipped with a camera system with CCD checks on mouths and bases of bottles, in addition to 4 cameras checking the sides and shapes of the bottles (two cameras check cleanliness of the sides of the bottles at the entrance to the machine; inside the machine the bottles turn 90°, and on exit the checking of the sides is completed by two additional cameras). The systems are, by default, equipped to check for residual liquids via an infrared and high-frequency system (perhaps the most important check on the line - against the possible intrusion of a bottle with lye content into the filling device) and to check the height of the bottles entering, with an attached disposal device for irregular bottles (decreasing the number of stoppages of the machine on account of irregular

bottles). The mechanism disposes of defective bottles to a multi-line storage table placed behind the machine, using a pneumatic disposal device. Its operation is automatically regulated by optical sensors which are installed in the section between the checking equipment and the filling device and by signals from the bottle-filler or from the bottle-transport. The maximum output of this machinery currently exceeds 50,000 bottles/hour.

The set-ups are made-to-order and therefore

designed in accordance with the set-up of the line and according to the client's wishes and needs, i.e. made-to-measure in their placement and in the details of their fittings. They are usually equipped with two or three disposal points (to decrease demands on the attendance to sort the rejected bottles). In the Litovel brewery a check on the colour of the bottles is also installed. The set-up of the system also fully accords with the need to check different bottle types.

Table 1 – Reliability of disposal of referential bottles

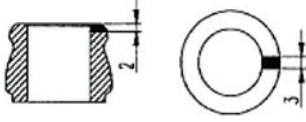
Detection	Mode of defect, dimension	[%] measured by NATE
Mouth check		99,9
Base check	Ø 2 mm in centre	100,0
	Ø 3 mm in outer area	99,8
Sides check	Ø 5 mm (upper conical area)	99,2
	Ø 11 mm (upper abrasion area)	100,0
	Ø 5 mm (cylindrical base area)	100,0

Table 2 – Percentage of unnecessary disposed bottles

Detection	[%] measured byNATE (completely unnecessary disposal)	[%] measured byNATE (unnecessary + minor defects)
Mouth check	0,01	0,04
Base check	0,04	0,14
Sides check	0,27	0,27
SUM	0,32	0,45

The value 0,45% of incorrectly rejected bottles also includes 0,13% of bottles on which, during close checks, minor defects were found and evaluated by the system as ineligible,; nevertheless these defects would not evidently have had an effect on the further correct processing of the bottle.



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NATE – nápojová technika a.s. CCD systems

(finish)

The checking parameters are automatically adjusted by changing the setting of the bottle on the machine control panel; mechanical adjustment of the machinery is simplified by the fact that there is no necessity to exchange the format template. A camera system is located according to the existing arrangements, based on an industrial computer which is equipped with custom-designed software that involves accurate processing of photos taken of the mouth, the base and the sides of the bottle. This software is continuously updated and modified according to the bottles which are being processed in the operation so that subsequent parameters of checking reliability are at the highest competitive level. Pictures of the eliminated bottles can be archived and re-analysed and on the basis of the resulting analyses the programming of the checking system can be modified. The system is organised to be linked to remote control ("teleservice") so that an operational solution of potential problems can be effected (via internet connection).

The machine is equipped with sensors which, in conjunction with the control system, allow the operation of the machinery without a full-time attendance. In this mode the checking device adjusts its output according to the status of the lines in front and behind and gives information about error conditions (e.g., a fallen bottle) to the attendant on the line. The number and activity of the line operators can be optimised in this way.

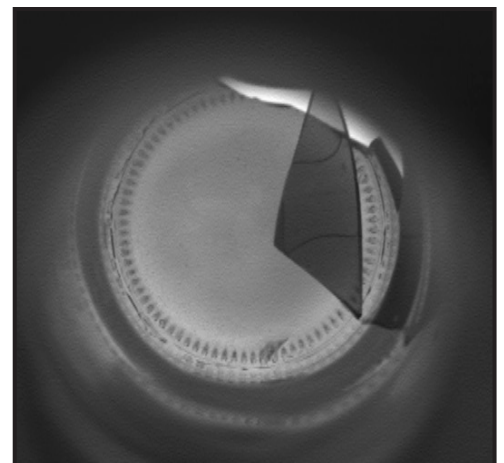
The delivered set-ups are usually put into operation very quickly as the machine is not delivered until



thorough testing of its functioning on a trial cycle at NATE – nápojová technika a.s. is performed.

We believe that the set-up supplied will serve its client well.

Measurements were established in the NATE testing laboratory in January 2007 on brown NRW test bottles with a capacity of 0,5 l and with referential defects. ■



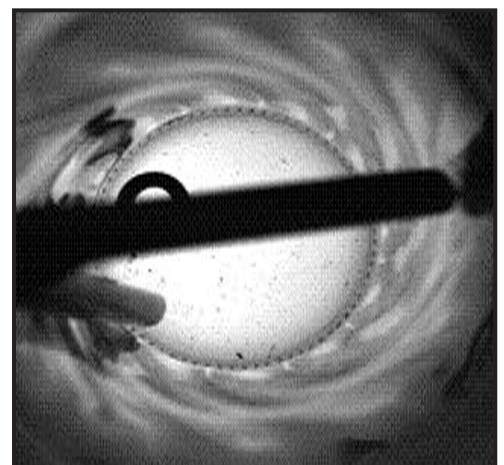
shard in a broken bottle



printed foreign bottle



straw in a bottle – side view



straw in a bottle – top view

Visit our websites www.nate.cz

Fresh milk from Wallachia filling PET bottles with dairy products



There is a very evident growth-trend of interest in drinks which support a healthy life style in the beverage market these days. Though this involves drinks of very varied types, such as juices, isotonic or multivitamin drinks, iced teas, still mineral waters or dairy drinks, they have one significant common feature. In order to be most beneficial to the human organism, they are produced without chemical preservatives. Considering that at the same time there is a demand by the commercial chains for sufficiently extended shelf-life for products, which can be as much as several months, this creates an intense demand for sterility of the entire production process up to and including bottling. This demand has created the need for a new generation of production lines for varied standards of aseptic filling.

Our company has also responded to this trend and has already been carrying out its own development in this area for about two years. The first significant task which NATE - nápojová technika a.s. undertook in this field was a line for the bottling of dairy products in PET bottles, which was installed in August 2007 at the Valašské Meziříčí Dairy. The Valašské Meziříčí Dairy emerged from the Beskydy Dairy in 1992 and today ranks among the most significant producers of milk and fermented milk products in the Czech Republic. They decided to enrich their product range by offering fresh and acidophilus milk in PET bottles.



As a partner for the implementation of this project they chose the NATE company. After mutual consultations about the client's concepts and options, the task was defined as a line with an output of 3,500 bottles per hour for the following drinks:

- Fresh milk – milk treated by pasteurization at a temperature up to 85°C to preserve maximum taste and nutritional quality, with a fat content of up to 1,5% and a shelf-life of 8 days at a storage temperature between 4 and 8°C. The manner and conditions of pasteurization do not affect its taste and nutritional quality.
- Low-fat kefir milk – a fermented dairy product with ABT culture and with a maximum 1,1 %



fat content; a shelf-life of 25 days at a storage temperature between 4 and 8°C.

- Full-cream acidophilus milk – a fermented dairy product with ABT culture and with a maximum 3,6 % fat content, a shelf-life of 25 days at a storage temperature between 4 and 8°C.

The filling line consists of PETBLOK 24/24/6 where bottles are cleaned, filled and capped. These bottles enter the Linesa 1 labelling machine and on exit from the line they are boxed in batches of 6 in the BSF 25B packer and then wrapped in a sealing foil. The basic machinery of the line is the filler which has the greatest responsibility for the preservation of the proper quality of drinks, i.e. it has to meet high demands for hygiene and microbiologically sterile conditions under which the filling of these drinks into bottles is carried out. In this case it is the PETBLOK 24/24/6 filler. This machine consists of a syringe with 24 grips, a filler with 24 supply valves and 6-headed capping unit.

This set-up is designed for filling PET bottles with a mouth diameter of 38 mm with non-carbonated, microbiologically sensitive drinks and by its functioning it offers the user the following benefits and advantages:

- The treatment of bottles is conducted by double spraying the inside of the bottles and rinsing the outside of the bottles. A disinfectant dose is added to the second spray medium.
- This filling method, with the assistance of inductive flow indicators, guarantees high accuracy of filling (standard deviation is 2 ml).
- The bottles do not come into contact with the supply valve, therefore the possibility of contamination of the supply valve and the basin of the filler by bottles cannot occur.
- Air from the bottles is conducted out of the filling system which means again that the risk of drink contamination is greatly decreased.
- A change in filling volume is provided from the machine control panel through the software and there is no necessity to interfere with the supply valve.
- The supply valve permits two speeds of filling; it is possible to set up the filling process according to the character of the drink (frothiness, temperature, viscosity).

- Treatment of the caps by UV radiation.
- Completely sealed PET BLOK with overpressure air transported by a ventilator over the HEPA H13 filters.
- Before initiation of an operation, during intermissions, and after its termination, foam-cleansing and disinfection of all surfaces in enclosed spaces are carried out without the physical intervention of the attendance.
- Irrigation and sanitation are handled by control software and guarantee the cleansing of all parts of the filler basin, the supply valves and the supply pipes.
- Utilising sensors in conjunction with the control system permits machinery to be operated without constant attendance. The filler independently adjusts its output according to the status of the lines in front and behind and provides the attendants on the line with information about error conditions (replenishment of caps, drop in the level of liquid, etc.). This permits the client to optimise the number and activity of the line operators.



The microbiological purity of the machinery and shelf-life of all filled products is continuously checked in the laboratory of Valašské Meziříčí Dairy with error-free results, which guarantees consumers a top-quality drink with appropriate taste and nutritive values during the whole period of its guaranteed shelf-life. ■

