Project review: Freeze Dryer +Auto Loading Systems+oRABS
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Happy New Year

Good luck and happiness to you

2013

Thanks, Cooperation, Breakthrough

Tofflon Held Lunar New Year Gala and Grand dinner
On the occasion of coming Chinese new Year of the Snake, Tofflon held 2013 New Year Gala themed “Thanks, Cooperation, Breakthrough” as the kickoff for Tofflon 20th anniversary.

Lunar New Year Gala
Zhang Weifeng, the organizer of the Gala Party, says “All people are passionate to this New Year gala. Lots of energy and time is spent on it when performers started the rehearsal. I believe we will present amazing performances to the audience. We have chorus, solos, dances, operas, bamboo flute display, Kongfu and fashion show …etc. About 200 performers display their talents here during the 3 hours’ gala. Besides, we will have lucky draw at regular intervals with good luck which all people anticipate.”

“I think our fashion show is most splendid on the gala. We displayed traditional costumes from England, Thailand, Malaysia, Spain, Korea …etc. Before we came to the stage, we had professional choreographer to coach us. The fashion show with dance is amazing.” Roolar Xiao said, the fashion show organizer from international business division.

The blessing from Tofflon GM
Happy new year to you all! On behalf of the board of directors, I would like to express my sincere gratitude and new year greetings to our 1500 employees who are working hard around the world and their families who have been giving great support to the company. I would also like to express my heartfelt thanks and New Year greetings to all our clients and partners who have given us enormous trusts and support.

In 2013, the year ahead will bring its own challenges but I’m sure by working together, keeping focus on our priorities and putting our customers first we can realize our ambitions.

The wishes from Tofflon (Indian)
Tofflon (Indian) team conveyed true thanks and best wishes to Shanghai Tofflon Science and Technology Co.,Ltd. and held a party on 5th Jan.2013.

We missed all other Staff who were not present & we anticipate their presence in the next get together.
Han Yue, a girl from service solution division presents the thrilled audiences a great belly dance. “I learned the belly dance from a professional teacher in the Gym, my initial expectation is to get some exercise from it, gradually I start to love dancing. It gives pleasure in my life”

**Tofflon Grand Dinner**
In addition to performances, Tofflon also hold the New Year Grand Dinner at the same time, nearly 1500 people were present in the dinner with round tables. “We celebrate the beginning of a lunar new year that is the most important traditional festival in China. At the same time, we are going to celebrate the upcoming 20th anniversary of Tofflon. From a small factory to be a public listed company, Tofflon is a legend” one employee who has been working in Tofflon for almost 10 years said.

**Tofflon (India) New Year Party**
Tofflon India Pvt Ltd celebrated its joyful movements on the vacation New Year eve. All people in India gathered at “Hotel Inchanra” in J.P. Nagar (Bangalore). Chinese colleagues and Indian colleagues shared their past year experience in Tofflon. Most of them have tanked New Year resolution to work hard for the betterment of the company. Apart from the all these, most of all colleagues enjoyed their New Year by participating in cultural programs organized by the company. New Year Eve remained as memorable movement in all employees of Tofflon Indian Pvt Ltd.
P-MEC India – 2012, the most well attended and talked about Pharmaceutical Machinery, Equipment and Technology event was held in Bombay Exhibition Centre on 21–23 November, 2012. On the stand I2 at entrance of Hall No 5, Tofflon India Pvt Ltd had attracted large number of visitors to its stand. Tofflon displayed its freeze drying system.
Tofflon India Pvt Ltd, subsidiary of Shanghai Tofflon Science and Technology, participated in P-MEC India 2012. Since its establishment, we have employed local service staff to provide local services to India clients. The exhibits not only showcased our stand-alone equipments, but to provide our clients whole system and solutions in pharmaceutical manufacturing process. Tofflon exhibited its freeze drying system, including Freeze Dryer, AGV Loading&Unloading Systems, and oRABS. Freeze drying system is geared to provide a better manufacturing solution for the pharmaceutical and biological company. Compared with the old pattern of manual handling, our AGV Loading&Unloading systems guarantee the aseptic environment for the pharmaceutical process, as well as to increase the productivity.

During the show days, Hundreds of visitors from India, Bangladesh, and other countries visit Tofflon stand booth. Especially when the freeze drying system started to run, the booth became crowded; the AGV drew lots of visitors' attention. Tofflon had the most wonderful time with our clients and business partners during the 4 days' show. Tofflon focuses on key challenges in freeze drying solutions and services. Tofflon, co-located with CPhI / ICSE / BioPh India, is to have the global Pharma fraternity networking at a single platform. This unique combination of different events will showcase manufacturing and product capabilities of high-value and is a convergence of companies investing in technology, applications development and sophisticated manufacturing capacities.
On 10th December, 2012, Tofflon held a seminar in Seoul, South Korea. More than 100 attendees from more than 50 companies attended this seminar. The customers mainly are the end user of freeze dryer. Most of them have many years of freeze dryer's using experience. They all have much interest in Tofflon, which is the biggest freeze dryer supplier.
Mr. Michael Chang, the marketing director addressed an opening speech under the topic: “Automation, Isolation and Systematic Integration”, which is becoming main stream for aseptic processing of lyophilized injectables. As the leading Freeze dryer manufacturer, Tofflon always in the forefront of Lyophilization science and technology.

During the whole speeches, five specialists from different Tofflon divisions and Tofflon USA prepared five topics: “Risks Analysis in Lyophilization Process and their Countermeasure”, “Freeze Dryer Design”, “Freeze Dryer Qualification”, “Freeze Dryer Auto Loading Systems for Vials”, “API Auto Loading Systems”, “Barrier & Isolator Technology and its Application in Aseptic Process”, to share with the present customers.

One of the attendee said, “It is the first time for me to realize that Tofflon has the branch office in USA. It seems much bigger than my imagined before. A gentleman from SK Group said “I am keenly interested in the Risks Analysis in Lyophilization Process. I really appreciate Tofflon’s specialist come to share the latest technology with us. As you know, I had come across some problem during the lyophilization process. Tofflon seminar is really helpful.”

As the leading Freeze dryer manufacturer, Tofflon will be more active in the international market. It will keep focusing on the pharmaceutical companies’ needs, and transforming into the solution provider from the equipment supplier to share its latest technology with its partners and clients.
On 14th November, 2012, International Lyophilization Seminar for Pharmaceutical And Biotechnology Industries was hold in Madrid, the capital of Spain. This seminar presented latest lyophilisation technology and advanced lyophilisation systems in the Pharmaceutical and Biotechnology industry. 9 topics covered freeze dryer design, maintenance, validation and solutions for filling, stoppering and capping of vials.
“Design and Maintenance of Industrial Freeze-dryers” and “Loading and Unloading Systems under Isolator for Lyophilization of High Potent Products” were addressed by Jackson Zhao and Mike Stella respectively, who are from Tofflon headquarters and Tofflon USA. Loading and unloading and Isolator as the integrated part of freeze drying system, it can provide the “High Potent Products” producers a more reliable and safer working environment, as well as increasing productivity of pharmaceutical manufacturers.

To provide informative content to 80 audiences, the topics of speeches delivered by Pharma Tech, MERIDION, AQUA NOVA and ROTA included “Freeze-dryers Validation, Cip and Other Possibilities of Sterilization by H2o2. Maintenance Of Validated Equipments,” “Development And Optimization Of Yophilization Cycles”, “Spray- Freeze Drying”, “Specific Solutions For Filling, Stoppering And Capping Of Vials In Lyophilization Process”, “Lyophilization Of Proteins And Biologic Products”. Speakers shared their professional knowledge on seminar and provided the newest information to local pharmaceutical and biological manufacturers, experts from college academies and relevant research institutes in Spain.

“This seminar is informative, professional and helpful, it does help me understand the relevant problems during the manufacturing process”. One of the audience said, who was from the local pharmaceutical company.
Pharmtech 2012, the 14th International Exhibition of Technologies for the Pharmaceutical Industry, took place from 26 to 29 November 2012 in Pavilion 75 of the VVC exhibition centre in Moscow. Tofflon and its representative in Russia “Holding Pharmtech” were invited as exhibitor to the gallery hall in Russian Exhibition center. Tofflon was the only exhibitor, who brought its own manufactured freeze dryer LYO-0.4 in the hall. It placed its booth in the middle of pharmaceutical equipment suppliers from west Europe. It’s high quality but with affordable price was going to change people’s mind about Chinese production. Affordable, flexible and reliable products made Tofflon a strong market player in Russia.

Topics of Pharmtech 2012 were innovations, technological development and a focus on the consumer. Pharmtech is the only exhibition in Russia and the CIS to present the full pharmaceutical production process - from developing ingredients, quality control of raw materials, production equipment for medicines and packaging technologies to storage and transportation of medicines and staff recruitment.

In 2013, Tofflon will celebrate its 20th anniversary and 5th year jubilation for entering Russian market. Events and market promotion could be expected from the young Chinese freeze dryer supplier, which however is fulfilled with west technology blood.

### Tofflon 2013 Trade Shows

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CROs as “change-makers” in the Pharma ecosystem

It has been widely recognized that the global pharmaceutical industry is currently experiencing dynamic change. Under high pressure to contain fixed costs, all drug companies are currently reducing their internal capacities in R&D, manufacturing, and even marketing and, instead, increasing their outsourcing. To a large extent, the drug companies, large or small, now rely on outsourcing service providers more than ever to fulfill their tasks, solve their problems, and improve their efficiency and productivity. Contract Research Organizations (CROs) have historically been sleepy fee-for-service partners for the drug industry, widely disregarded as not innovative, and their scientists certainly not treated with the same professional respect as their counterparts in Pharma R&D.

But this is clearly changing: CROs are now stepping up as important change-makers in the life science ecosystem and are helping drive the “Pharma R&D makeover”. The ecosystem is changing and CROs are both driving and benefiting from it.

Drivers of R&D outsourcing

Shrinking profit margins and increasingly heavy competition. Growing regulatory pressure due to highly publicized drug dangers. Recurring threats of litigation over real or perceived drug side effects. Shifting demographic trends in both western and emerging markets, driving the demand for more and better pharmaceuticals. Growing threats to intellectual property, weak pipelines for new drugs in many large firms, skyrocketing expenses. These are just some of the challenges the global pharmaceutical industry is facing today.

To address these issues and minimize their negative impact to the extent possible, pharmaceutical firms are proactively and significantly changing their business models. They are consolidating via mergers, acquisitions, and joint ventures to leverage economies of scale, capitalize on synergies, and expand their pipeline (or other lacking areas), into new markets and new product categories such as pharma plus biotech.

They are continuing to implement across the board cost reduction programs to grow profit and offset slowing sales growth by restructuring research and development (R&D) without impacting drug development programs, reducing clinical phase and early stage R&D costs, decreasing their sales forces and conducting internal audits when using a contract research organization (CRO).

New Trends in Each Service Sector

New outsourcing strategies and types of services are developing in almost every stage of the drug R&D and manufacturing process. For instance, in the sector of target identification and validation, genomics and proteomics research and gene-silencing technology have now been widely complex and structurally diverse disease targets. A variety of microarray technologies also are widely used to study the differences in gene expression patterns and gene interactions. Most of this type of work is now performed by either academic research organizations, specialty biotech companies, or professional CROs.

A virtually integrated, cross-functional outsourcing operation of drug discovery research is currently prevailing as the latest outsourcing model, especially for small molecule drug discovery. Chemical synthesis and biological testing work is now almost completely performed by CROs and, to a lesser extent, academic research organizations.

The worldwide outsourcing demand for preclinical research and development is, however, still soft at present. Almost all major pharma companies have publicly announced that their current and near future R&D focus will be on the late-stage drug candidates. Meanwhile, many drug companies also are shifting their research methodologies for toxicology (tox) studies to include molecular biomarkers, imaging, and companion diagnostics, as these new technologies are able to provide better safety profiles of trial compounds.

The clinical trial has now, indeed, become a global process. More and more trials now require the inclusion of global trial sites, with an increasing proportion of patients from the emerging countries participating in trials. Those CROs that are already well-established in these emerging countries appear to be well-positioned for success in the competitive global industry. Big Pharma has to varying extents embraced the global CRO industry over the past decade, especially for clinical development, one of the most interesting observations was the impressive number and scale of the recent strategic deals with Pharma they’ve inked recently. Here’s a subset:
• WuXi-BMS (Mar 2011): WuXi announced it will build and specifically dedicate a Shanghai-based facility GMP stability testing for BMS’ global NCE programs. A core part of an FDA-regulated process moving to China.

• Takeda takes on Covance & Quintiles (Feb 2011): Part of the former’s decision to “move toward a fully virtual outsourcing model”, Takeda will partner with Covance and Quintiles across all therapeutic areas except oncology (which will continue to be led via their Millennium organization). Takeda with its nearly $5B in R&D spend going virtual? Probably a directional rather than specific comment, but interesting nonetheless.

• Pfizer & chemistry (2011): Pfizer has recently decided to break up its medicinal chemistry teams into “designer chemists” (thinkers) vs “synthetic chemists” (do-ers), with the latter being split between existing sites and offshore CROs like WuXi. Wonder how long that cost differential for synthetic chemistry can be maintained.

• Covance-Sanofi (Sept 2010): As part of a 10-Year, ~$2B partnership, Sanofi will transfer a set of sites/assets to Covance in France & the UK, and get a set of outsourced functions in discovery support, tox, med chem, clinical, and central labs. Looks like a great deal for Sanofi: site rationalization and “synergy capture” in tough labor markets, while locking in a fixed deal for 10 years.

• CRL-Pfizer (Feb 2011): Earlier this year, Pfizer contracted CRL to distribute 11 lines of genetically modified animal models covering CNS, diabetes, and CV. Although a small deal, it’s interesting to see that Pfizer is actively monetizing its animal models.

Latest New Technologies And Services

It is intriguing to entertain the idea that putting CROs closer to the center of the pharma ecosystem could be a key ingredient in allowing the drug business to maintain its focus on innovating but doing it while reducing system costs. Today, major pharma companies are in desperate need to develop better drugs with high success rates. The key bottlenecks include selecting the right therapeutic targets and understanding the cause of severe side effects. That’s why pharma companies are focusing more on the basic type of research in genomics and proteomics, primarily through collaboration with academic research organizations, specialty biotech companies, and/or CROs.

To increase productivity and efficiency, both drug companies and outsourcing service providers have been striving to make improvements in every aspect of the drug R&D and manufacturing processes. Consequently, new technologies such as biomarkers, molecular imaging, and companion diagnostics as well as new services such as antibody library construction and screening, genomic testing, and cell-line development have been developed.

Focusing On Emerging Markets

CROs are likely to be change-makers for the drug industry by their culture: they are by nature cost-conscious businesses. The new model of “more achievements for less cost” has forced many drug companies to think about the possibility of moving some of their operations to low-cost emerging markets. These companies are focusing not only on expanding their market space in these regions, but also outsourcing more costly R&D and manufacturing work to these markets, especially for small molecule drugs. The recent financial crisis has further strengthened this trend. Most emerging markets possess a number of attractive factors to all global pharma companies. For instance, one such factor is the availability of a large talent pool that earns a wage still relatively low compared to Western countries but that has nearly comparable technical capabilities and skills. This situation is especially true in China and India.

Future Outlook

Based on the past growth trend and the future growth drivers of this industry, it is believed the global pharma outsourcing industry will still experience fast growth in the next five years (2011 to 2015). We forecast that the global pharma outsourcing market will likely grow in a CAGR of about 12% during this time period, and the market value will likely climb from about $55B to as much as $150B by 2015. The CROs and CMOs each presently make roughly equal contributions (CRO: CMO = 48:52) to the total global pharma
outsourcing market value. Of the total CRO market value, which is about $40.5B, chemistry-based drug discovery research service accounts for about 25% (about $10.7B), whereas the biology-related services, which include preclinical and clinical development, account for about 75%.

On average, the current R&D outsourcing penetration in the global pharmaceutical and biotech industries combined is estimated to be around 37%. Based on the current outsourcing strategies drug companies are taking, the outsourcing proportion will still rapidly grow and reach close to 67% by 2015 or so, representing a CAGR of about 12.5% between 2011 and 2015. In other words, by around 2015 the proportion of the fixed operation cost out of their total operation cost for most drug companies will be only about 1/3, decreasing from the current rate of about 2/3.

**The Evolution of the Networked Partnership**

All global pharma companies have realized that outsourcing is a successful and efficient way to operate R&D, manufacturing, and even marketing. It is also the best way to improve R&D productivity and work efficiency. As such, nowadays almost all major pharma companies have established special internal operation units specifically for managing partner relationships. Meanwhile, almost all small biotech companies have converted their previous full-scale R&D operations to integrated virtual operation models. To a large extent, they are now relying more on the outsourcing service to fulfill their tasks of both R&D and manufacturing. It is thus appropriate to say that today the outsourcing service industry is playing a significantly important role in moving the entire pharmaceutical industry forward. In fact, the term “outsourcing” now should include partnerships, collaborations, alliances, and any other similar relationships. Combined, they make up a “networked partnership.”
Chamber pressure control during the primary drying process(2)

The chamber pressure control

Within this whole primary drying period, heat input (heat transfer) and water sublimation (mass transfer) have to be adjusted to a correct balance, which guarantee drying can proceed without leading to product defects such as back melting, puffing, or collapse. Meanwhile, chamber pressure impacts both heat transfer and mass transfer, low to moderate pressure can result in increasing product temperature and drying rate while high pressure (i.e., above 0.267 mbar or higher) decreases drying rate. Therefore an adequate chamber pressure control is the essential part of process control, and it can be interlaced to the product temperature. Since increasing chamber pressure would result in considerably increasing heat transfer to the sublimation interface by gas conduction-convection as described above, the shelf temperature (Ts) could be reduced accordingly, see Eq. (2)(3)(4), which prevented product melt-back or collapse. Moreover, in the situation of product temperature exceeding the expected value, vacuum control is easier to be operated with an instantaneous result, whereas cooling the shelves requires a longer time. The chamber pressure control can be realized by two methods as summarized below:

1. The first approach is to control chamber pressure without introducing extra gas, while the gas in product is release during sublimation phase and used to control the vacuum. There are different methods assisted by different devices to achieve the adjustment of vapor pressure.
   1) Neumann and Oetjen et al. conducted vacuum control by throttling the water vapor flow between the chamber and the condenser to improve the speed and efficiency of the operations.
   2) The valve between condenser and vacuum pump is close before the meeting the expected pressure, and it will be open only if the pressure beyond the setting value.

Two advantages result in the above methods: the first one is using only the gases in the product, do not need to provide extra inert gases thereby reduce the possibility of contamination. The other is when primary drying finish, less and less dissolved gas will release, hence chamber pressure decrease automatically to facilitate secondary drying.

2. The second method called the “air bleed”. It has been used almost universally since a substantial rise in the pressure, by venting sufficient gas (normally inert gas such as nitrogen) into chamber through a switchable pin valve. Rieutord and Rey patented the air injection process, which could be applied to any equipment whether the condenser was separated from chamber or in the drying cabinet itself.

Pressure Gauge

In order to determine and control chamber pressure during drying process, many types of pressure gauges have been placed in different positions of the freeze-dryer to obtain accurate pressure measurements. The knowledge of product temperature and shelf temperature is most important during the pressure measurement, which provides assurance that the pressure gauge is operating within its specifications and the drying process is under control. However, the generally used thermal conductivity gauges such as thermocouple or Pirani gauge is indicated by many studies (Wutz M & Poulter KF & Jitschin W) to be not suitable for employing in production plants because they are not robust enough to withstand repetitive steam sterilization cycles due to the presence of water vapor, and, furthermore, the results of measurement with a range of 10~2~ 3 mbar (Oetjen GW, Haseley P) are not accurate enough for the controlling of lyophilization process.
results in the range 10−4 ~ 1 mbar or 10−3~10 mbar. There are several methods based in the partial pressure measurement of the vapor can be used to monitor the pressure of primary drying phase. At present, sublimation mass flow is able to be quantitatively measured by the TDLAS (tunable diode laser absorption spectroscopy) technique (Gieseler H et al.), based on the theoretical foundation of selective infrared absorption and the wavelength shift by Doppler, simultaneously measure the water vapor concentration and vapor velocity in the duct connecting the chamber and condenser.

Conclusion
The chamber pressure is a vital parameter to govern a successful primary drying stage and is deserved to be optimized before operating the whole freeze-drying process as well as to be monitored and controlled by appropriate measurements and methods.

Reference
Enjoy Freeze-drying, Enjoy life
---Excellent taste of strawberry never imagined after freeze-drying

1. A nutritious fruit-strawberry
Strawberry is heart-shaped and in red color with sweet aroma. The fresh pulp gives good smell delicious taste. The strawberry contains high content of nutrients including vitamin C, which is good for the digest of human. At the same time, strawberry shows the function of solidification for gum, improvement of air-in-mouth, and moisture-keep in throat.

2. How to preserve the strawberry
To enjoy strawberries at their fragrant, juicy and flavorful best, it is suggested to be eaten within a short time, because the unstable property in the preservation process. Many scientists try to solve the problem of how to preserve strawberry. They considered that the key-point of strawberry preservation is the water content as high as 90%, because the microorganisms grow rapidly in such sweet environment and they consume the well-taste pulp as food. Some scientist scattered strawberries on the floor in the sun, or baked the strawberries in an oven, but no good result was obtained because most of them lost their initial shapes and tastes. Scientists started to think of the technology of freeze-drying, which is popular in pharmaceutical industry. From then on, time has changed, as it gives amazing results which people had never thought.

3. The extraordinary experience and incomparable advantages of freeze drying strawberry
Freeze-drying strawberry has wonderful taste. Its taste is different from fresh fruit. The unfreeze-dried fruit gives sweet liquid to your tongue. However, the freeze-dried strawberry contains little water, which could be considered as the concentrated strawberry. It has very strong scent of sweetness and warmth. People may have a question that what is the benefit of freeze-dried strawberry besides the wonderful feeling. As we know, freeze-dried strawberries lost most of moisture, which are similar to freeze-dried drugs. And the advantages could be summarized as below:
(1) Denaturation or biological activity loss won’t happen in drying process, due to the low probability of chemical reactions (2) Microorganism’s growth and the enzyme catalysis are almost impossible in freeze-dried products. (3) The shape strawberry can be maintained well. (4) The oxidation in strawberry can be prevented easily. (5) It can be preserved for a long time. (6) It can be stored at room temperature without any preservative. (7) No toxic effect to human comparing with off-season fruits or preserved with preservatives.
4. The freeze drying process for strawberry

Similarly to pharmaceutical freeze-drying process, strawberry freeze-drying obeys all the rules of drugs, regard of proper freezing rate, proper vacuum, proper temperature and so on. The difference is that the product temperature could be set much higher with no consideration of collapse, due to strong structure. The temperature of freezing strawberry is lowered to -20 oC in the fridge for more than 8 hours. If the freezing phase is proceeded in the freeze dryer, much more energy would be consumed. Firstly, the shelf temperature would be turned down to -45 oC before the strawberries are loaded onto the freeze dryer shelves. Uniformity is the key point; all of the strawberries should be put on the shelf uniformly, to make sure the drying process happen simultaneously. During the drying phase, the temperature is set at 30 oC and the pressure is set at 20 Pa. There is unnecessary to consider the collapse, owing to the strong structure of strawberry. The water in strawberry can be removed continuously. After 40 hours, the whole strawberry lyophilization is completed. The detailed freeze-drying curve is shown as below:

In order to accelerate to freeze drying process, the alternative way is cutting the strawberries into pieces, and distributes the strawberries on the freeze-drier shelf to get a minimal cycle time. It is similar as the drug freeze-drying process. The height of the drug solution has to be considered, which could give not only the probability of good shape but also the shortest cycle time.
Service Story: Unexpected Journey to China

Service is the keg factor of Tofflon expand its business to worldwide 30 countries. We always focus on how to get excellent service engineer. For many years, we have successfully established well-running service engineer training system to cultivate qualified service professionals with thorough knowledge and varied practical experience.
Are you excited to come to China? Why you came to Tofflon headquarter?
After more than ten hours flight, I finally landed at Pudong Airport at 14:00 p.m and started my service training in Tofflon Headquarter with a lot of excitement and anticipation.
My first day in Tofflon was new and excited. I received a warm welcome and was able to learn from the many experiences of colleagues face to face instead of calls by telecommunication cables between China and India.
My training schedule was well planned. The training target is geared to improve service professional knowledge and skills and to provide better service to our clients.

What techniques related freeze dryer did you learn from Tofflon headquarter?
Tofflon have rich experience in lyophilizers with 20 years’ dedicated in engineering and manufacturing of freezer dryers. It granted me a great chance to learn freeze dryer manufacturing skills. In order to learn the lyophilizer assembly process and each component matching requirements thoroughly, I have learned along with technical master assembly one machine from starting to end. Such as how to fix the compressor, how to install the heater-exchanger, how to install the oil separator and valves.

The language may be obstacle of communication, is that right?
Sometimes we may use body language to communicate, however, technical master taught me with great patience.

What are the basic skills and knowledge as a service engineer?
Every service engineer must have the knowledge of both theory and practice. I was assigned to learn autoloading and unloading system electrical principles and troubleshooting according to electrical drawings. The new theory has broadened my vision and my practice was improved with professional experience from technical masters.
To learn welding technology of copper with stainless steel material is the key point of this training. However, August is the hottest time in Shanghai and the temperature is above 35°C. It was very hot in workshop. However, the high temperature can’t daunt us. I have worked with other colleagues in high spirits.

What impression of Tofflon and your Chinese colleagues to you?
Even though most of my time was spent in workshop, the morning meeting with office colleagues was impressed me most. Every morning, there was five to ten minutes morning meeting as the warm-up for the whole day’s work. There were lots of themes in morning meeting, such as speeches, games, riddles... etc. All the people were involved it and it was very interesting even though I can’t understand wholly what they talked about, and I enjoyed the special time in the morning.
During the 27 days’ training time, I have impressed with Tofflon’s mission “Heaven rewards the diligent” and its culture.

I heard you get some fun from Shanghai, the modern city in China, is it?
At weekend, it was free time. I took Shanghai city tour with Chinese colleagues. Shanghai is modern city with skyscrapers, convenient transportation systems and friendly people.