LCQ15: The reusable CuMask+[TM]

Following is a question by the Hon Charles Mok and a written reply by the Secretary for Innovation and Technology, Mr Alfred Sit, in the Legislative Council today (May 20):

Question:

In February this year, the Innovation and Technology Bureau was allocated $800 million under the Anti-epidemic Fund to subsidise the research and development (R&D) as well as the production of reusable masks (masks) for use by members of the public. In early May, the Government announced that it had earlier commissioned the Hong Kong Research Institute of Textiles and Apparel (HKRITA) to co-ordinate the production of the masks. In this connection, will the Government inform this Council:

(1) of the details of the R&D and intellectual property rights (IPR) of the masks, including (i) the expenditure initially incurred by HKRITA on developing the relevant technology, and how much of that amount was funded by public money, (ii) the names of the holders of the relevant IPR as well as the dates and places of application for the various patents, their inventors and details of the relevant technology, (iii) whether the IPR holders have sold the relevant IPR, and (iv) apart from the aforesaid development costs, whether the Government paid any fees to HKRITA or the IPR owners or their agencies for using the relevant technology to produce the masks; if so, of the amount of the fees;

(2) of the following information on the manufacturers undertaking the various production processes of the masks: (i) their names, (ii) the locations of their production lines, (iii) the processes undertaken, and (iv) the expenditures (if any) on acquiring production machinery and equipment for undertaking the relevant processes, as well as the manpower employed and the expenditures incurred for such purpose; given that the Government did not conduct any open tender exercise for the production of the masks, of the criteria adopted by the Government for selecting those manufacturers;

(3) as it has been reported that the manufacturing and transportation costs involved in producing 9 million masks have reached $360 million, of the details of a breakdown of such costs;

(4) of the schedule for the production processes of the masks (including the dates of finalising the technology to be used in the production of the masks, completing the various R&D projects and commissioning manufacturers to undertake the production work); as the Secretary for Innovation and Technology (the Secretary) has advised that the Government decided in February this year to directly award the contract for production of the masks to Crystal International Group Limited, of the reasons why the Government did not disclose the relevant details when responding to the questions raised by some Members at the relevant meetings of the Finance Committee of this

Council;

(5) of the amount of expenditure incurred so far in respect of the R&D and production of the masks and the estimated total expenditure;

(6) as the website set up by the Government for the masks indicates that the design of the mask was awarded a Gold Medal at the International Exhibition of Inventions of Geneva 2018, and the website of HKRITA indicates that the award-winning technology "embed[s] a magnetic field in a face mask in order to provide effective filtration … by changing the direction of movement of nature-charged PMs and micro-organisms", whether this technology has been used in the masks distributed by the Government;

(7) given that a testing report (No. TXB2386/2016/SP) issued by SGS Taiwan Ltd. in 2016 was originally provided on the website of the masks, of the reasons why subsequently another testing report (No. TXB1688/2018/SP) issued by the said company in 2018 is instead provided on the website, and how these two reports explain the functions of the masks respectively;

(8) whether the testing data published by the Government represent the results of tests conducted separately on the six layers of functional materials and on the copper filter of the masks; whether it has conducted tests on how the fact that the masks comprising six layers of materials has affected the functions of the masks in terms of pressure resistance and physical/magnetic filtration capability; if so, of the details; given the Secretary's remarks that "the CuMask+™ is an improved version of the award-winning design", of the details of the technical improvements made to the masks;

(9) as the Government has claimed that the masks, after 60 washes and uses, can still meet ASTM F2100 Level 1 protective standard, but some parts of the testing reports published on the aforesaid website have been redacted, whether the Government will release more information on the tests concerned or citing the data of other tests (e.g. the AATCC TM 100 tests conducted in the United States), so as to address the doubts of members of the public;

(10) of the name(s) of the supplier(s) of the mask filters and the unit cost of the filters; whether members of the public will be provided with replacement filters by the Government free of charge in future, or need to purchase the filters on their own; and

(11) as paragraph 4 under "Purpose of information collection" on the registration webpage for the masks indicates that "for the purposes stated in paragraph 1 above, or with your consent, or where disclosure is authorised or required by the law, personal data in this registration may be disclosed to the relevant government bureaux/departments/organisations", of a list of the government bureaux/departments/organisations involved?

Reply:

President,

The Government is handing out the CuMask+™ to Hong Kong residents for free, using local research and development results to help the community fight against the epidemic.

Having consulted the Hong Kong Research Institute of Textiles and Apparel (HKRITA), our reply to the different parts of the question is set out below:

(1) The HKRITA was granted funding under the Innovation and Technology Fund (ITF) in 2017 to conduct research on washable and reusable masks. The project commenced in March 2017 and was completed in January 2019. The total project cost was $1.5 million, of which around $1.28 million was funded under the ITF and the remainder was sponsored by the industry. Apart from the above-mentioned research expenditure, the Government has not made any payment to the HKRITA or its agents for the use of the relevant technologies for production of masks.

The HKRITA applied for patents in China and the United States (US) in January 2018. The inventors are Dr Yao Lei, Dr Liao Xiao, Dr Wang Yongli and Ms Lin Siyu. They were the employees of the HKRITA during the conduct of the research project. The HKRITA owns the intellectual property and the relevant patented technology is ''Method and facemask for decreasing the microorganism to be inhaled and the use and manufacturing method of the same''.

The HKRITA subsequently improved the technologies adopted for the mask, and applied for a US patent in respect of the technology of the CuMask+™ in March 2020. The relevant patented technology is ''Washable and reusable anti-microbial face mask''. The inventors are the Chief Executive Officer of the HKRITA, Professor Edwin Keh, and the Director, Research and Development of the HKRITA, Dr Ray Cheung. The HKRITA has not sold any of the above-mentioned intellectual properties.

(2) The Innovation and Technology Commission (ITC) under the Innovation and Technology Bureau (ITB) commissioned the HKRITA to co-ordinate the CuMask+™ project, with the HKRITA responsible for sourcing raw materials as well as co-ordinating production, sterilisation and packaging processes, etc.

The Government's Stores and Procurement Regulations allow direct purchase to be made under extreme urgency. The whole procurement process was conducted in accordance with the Government’s procurement regulations and procedures, and the approval of the Financial Services and the Treasury Bureau had been obtained. The ITC has also sought legal advice, and confirmed that the conditions under the Agreement on Government Procurement of the World Trade Organisation could be met.

The HKRITA is responsible for sourcing suitable raw material suppliers and making production arrangements. Based on the information provided by the HKRITA, the raw material suppliers are Action Nonwovens Company Limited, Argaman Technologies Limited, Esquel Enterprises Limited, and Y and K Textiles Limited.

The masks were produced in Hong Kong and Vietnam, with the Crystal

International Group Limited responsible for the major part of production; the Novetex Textiles Limited providing venue for setting up clean room for sterilisation; The Mills and the TAL Apparel Limited lending premises to set up workshops for sample development, improvement and testing, studying the production flow, staff training, using the right material pattern to reduce raw material consumption, and small batch production; the Kerry Logistics and Hongkong Post responsible for logistics and delivery.

(3) and (5) According to the latest estimate, taking into account the costs of raw materials, production, packaging, freight, logistics, manpower and delivery, etc, the cost of each mask is around $40. As the production, logistics and delivery work, etc, has not yet been completed, we do not have the final expenditure figure at the moment.

We have requested the HKRITA to submit to the Government a report and audited accounts for the entire project. We anticipate that we can make public the report and audited accounts this August. The amount payable to the HKRITA would be based on the actual expenditure where excess amount that has been paid to the HKRITA would be returned to the Government.

(4) Since late January this year, COVID-19 has started to spread rapidly. At that time, different places started to experience an acute shortage of disposable masks in the market. To help the public fight against the epidemic, the ITB started to contact various suppliers of reusable masks at that time so as to assess the feasibility of procuring reusable masks. However, most reverted that they had either stopped production, did not have enough stock, were unable to export materials due to export control or unable to provide testing certification, etc.

At that time, the ITB had reviewed the reusable mask developed by the HKRITA earlier, and considered that there were testing certifications proving its compliance with relevant international standards. The ITB therefore studied the feasibility of arranging direct manufacturing of sufficient reusable masks that would be up to standard for use by the community at the same time.

By mid February, the HKRITA was able to obtain raw materials for making a certain quantity of reusable masks, and was proactively looking for local production line. However, the HKRITA did not have the cash flow to purchase the materials. The ITC therefore made use of the internal resources of the Government to commission the HKRITA to co-ordinate the production of 2 million adult masks through direct engagement, so as to enable the HKRITA to procure the relevant materials from the market in time.

Given the acute shortage in the supply of raw materials at that time, coupled with export controls imposed by many places, the HKRITA could not secure sufficient raw materials. The ITB therefore continued to identify other manufacturers in the market which could supply reusable masks. At the same time, in the paper approved by the Legislative Council Finance Committee seeking funding approval of the Anti-epidemic Fund on February 21, it was stated clearly that the $800 million reserved thereunder is for consideration

of different technology applications relating to reusable masks, such as the production of reusable masks, etc.

As all raw materials had to be imported into Hong Kong from other places, we have not disclosed the names of the raw material suppliers of the HKRITA at that time for fear that the raw materials might be subject to sudden export controls or aggressive procurement actions from other buyers at high prices.

Until April, as the HKRITA had secured raw materials that were sufficient for the manufacturing of at least 9 million masks and the production line in Vietnam had started mass production, the ITB confirmed to ask the HKRITA to co-ordinate the production of all reusable masks.

(6) and (8) The mask which won a gold medal in the International Exhibition of Inventions of Geneva 2018 adopted a six-layer design with anti-bacterial materials containing micro-copper, filtration layer, supportive layer and the application of magnetic field. Afterwards, the HKRITA continued the research, and considered that the function of the magnetic field was not sustainable and the mask was only effective for 20 washes. Instead, the use of functional materials in the filtration layer and supportive layer could not only offer protection but also withstand multiple washes. Therefore, the CuMask+™ adopts an improved design and has not applied magnetic field, whilst continuing to use the six-layer structure and ergonomic design and improving the use of materials to achieve the result of being effective for 60 washes. The organiser of the International Exhibition of Inventions of Geneva also wrote to congratulate the HKRITA on commercialisation of the award-winning design to help Hong Kong people fight against the epidemic.

We have released the testing results of the CuMask+™ under the conditions of pre-wash, after 40 washes and after 60 washes, and the anti-microbial testing results of the anti-bacterial layer containing copper. The Differential Pressure of the mask is shown in the test reports, while the filtration performance is reflected by Particle Filtration Efficiency and Bacterial Filtration Efficiency. These functions have attained ASTM F2100 Level 1 standard. There is a slight decline in the performances of Particle Filtration Efficiency and Differential Pressure after 60 washes, and the filter should then be changed.

(7) The two anti-viral test reports uploaded onto the Government's CuMask+™ï¸ website were conducted by a laboratory at the commission of the HKRITA in 2016 and 2018 for the ITF-funded project of ''Development of a Reusable and Comfort Facemask as a Barrier to Microorganisms'' as mentioned in (1) and its preliminary work.

The materials tested in the reports were provided by the same supplier adopting the same technology, and are similar to the anti-bacterial layer used in the CuMask+™ï¸ filter. The two anti-viral test reports can be used as the reference for the anti-bacterial layer of the CuMask+™ï¸. The HKRITA indicated that they had tried to approach a number of laboratories in February to April to conduct anti-viral tests on the CuMask+™ï¸ but all

laboratories had suspended tests related to viruses because of the epidemic.

On the other hand, we have also uploaded the anti-bacterial reports of the materials containing copper used in the CuMask+™ï¸. Both materials passed the test.

(9) The information masked is the names of the raw material suppliers and commodity numbers. The original intention was to respect the will of individual suppliers, protect the supply of raw materials and avoid promoting any particular commodity. To address public concerns, the HKRITA has subsequently made public the names of the suppliers.

(10) Depending on the development of the epidemic and the supply of raw materials, the Government may consider distributing replacement filters to the public. In future, if the Government distributes anti-epidemic items again under the reusable mask project, including filters, the Government will make the procurement through open tender.

(11) As regards protection of personal data, relevant departments have been complying with the regulations under the Personal Data (Privacy) Ordinance, and have consulted the Privacy Commissioner for Personal Data. The Government will not use the information provided by citizens in obtaining the masks for purposes irrelevant to the distribution of masks. The Government will also ensure that the retention period of the personal data is not longer than the time required for the purposes for which the data is used.

The Government will disclose the personal data collected in the registration to departments or organisations related to the distribution of mask, only with the consent of the data subject, or where disclosure is authorised or required by the law. These departments or organisations include the ITC, which is responsible for co-ordinating production and distribution and handling complaints; the Office of the Government Chief Information Officer, which is responsible for developing the registration system and conducting procedures related to the system; the Efficiency Office, which is responsible for handling public enquiries; as well as Kerry Logistics and Hongkong Post, which are responsible for logistics and delivery, etc.