



Clingendael

Netherlands Institute of International Relations

APRIL 2020

Taking back responsibility

A joint effort to increase the production of medical masks in Europe

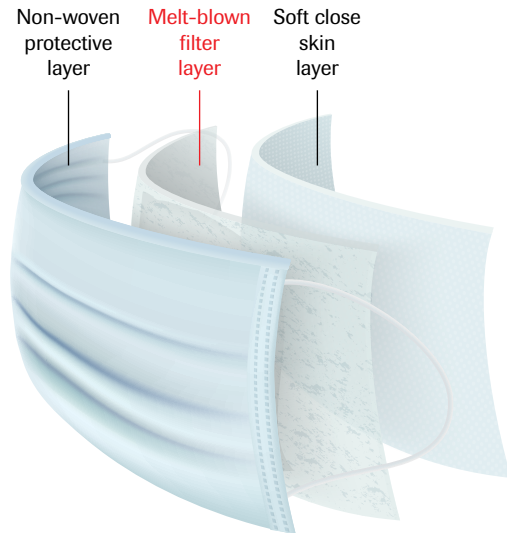


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Celebrities, athletes, and businesspersons all over the world are donating money to fight the coronavirus pandemic. However, even all the money in the world cannot solve the shortage of face masks for medical personnel. The reason for this shortcoming of the power of money is that global production of face masks is hampered by a global shortage of the crucial material “melt-blown filter media”. China scaled up its production

of this material as much as it could, but it is still nowhere near enough to produce face masks for China and the rest of the world. In fact, it is not even enough for China itself. The supply of face masks from China is therefore expected to dry up soon and Europe needs to act quickly to scale up its own production of melt-blown filter media in order to become self-sufficient in the production of masks.

Melt-blown filter media, a crucial material for the production of medical masks



Melt-blown filter media is a filter layer needed for the production of medical face masks, as this layer determines the level of protection the mask provides (see text box for the explanation of different medical masks and their levels of protection). Before the start of the coronavirus epidemic, China produced about 20 million face masks per day. In order to meet the rapidly growing demand for face masks in China because of the outbreak of the virus, the Chinese government ordered the industry to scale up. Car manufacturers and assemblers of smartphones adapted their assembly lines in order to produce face masks. According to official numbers, China can currently produce 116 million face masks per day. However, the massive production of face masks gave rise to another problem, namely a shortage of melt-blown filter media.

By the end of February, the price of melt-blown filter media in China jumped from 18,000 yuan (\$2,541) per ton to nearly 200,000 yuan (\$28,240) per ton.¹ Domestic supply could no longer meet demand and producers of face masks had stock for about one more month of production.

¹ Huaxia, [China's daily mask output exceeds 110 million units](#), Xinhua, March 2, 2020.

Therefore, Chinese businesses searched the global market for foreign suppliers. By the beginning of March, producers of melt-blown filter media in Germany were overwhelmed by demand from China. “You are not the only one asking, but we have no more stock and are no longer taking new orders.”²

Relying on China

In the meantime, Italian hospitals were running out of stock of medical protection gear and desperately asked their European partners for help. However, the first reaction from the rest of Europe was to stockpile face masks and other equipment to help their own citizens and not one European country came to the rescue.³ Instead, it was South Africa that sent the first batch of face masks to Italy.⁴ And as soon as the Chinese government had the crisis in China under control it followed suit and sent masks, respirators, and medical teams to Italy. On March 13 Italy received 500,000 masks from the Alibaba and Jack Ma foundations⁵ and the Chinese government sent nine medical staff members with 30 tons of medical equipment.⁶ As the virus spread throughout Europe, the support from China continued: the Alibaba and Jack Ma foundations sent 500,000 masks to Spain and 1.5 million masks to be shared between

- ² After I received phone calls from my network in China with the request to please check in Germany and the Netherlands for stock of melt-blown filter media, I called producers in Germany (as there is no melt-blown filter media production in the Netherlands) and this was the reply I received from numerous producers in Germany.
- ³ Michael Nienaber, [Germany bans export of medical protection gear due to coronavirus](#), *Reuters*, March 4, 2020; David M. Herszenhorn, Carmen Paun, and Jillian Deutsch, [Europe fails to help Italy in coronavirus fight](#), *Politico*, March 5, 2020.
- ⁴ [SA exports 800,000 masks to Italy, as the WHO warns of a global mask shortage due to Covid-19](#)
- ⁵ Philip Blenkinsop, [Jack Ma donates two million masks for coronavirus crisis in Europe](#), *Reuters*, March 14, 2020.
- ⁶ Crispian Balmer, [China sends medical supplies, experts to help Italy battle coronavirus](#), *Reuters*, March 13, 2020.

France, Slovenia, and Belgium.⁷ Furthermore, the Chinese government sent another batch of doctors and paramedics with 20 tons of medical equipment to Italy.⁸

There is currently growing unease in Europe about these gifts from China that come amid much publicity: what will China ask in return later for the support it provides now? However, before one criticizes the Chinese government for using face masks as a soft-power tool to change the narrative, it would be good to take some time to consider the hand you are about to bite.

The world's largest supplier of face masks is reaching its limits

After Chinese businesses realized that they could not source any more melt-blown filter media from other parts of the world, they tried to scale up the production of this material in China to its maximum. It is estimated that China will be able to produce 200 tons of melt-blown filter media per day by the end of March/beginning of April. With this amount, China will be able to produce 200 million disposable surgical masks or 60 million N95 respirators per day.⁹ However, this amount will not even meet current demand in China. When everyone in China is back at work, China will need at least 238 million face masks per day for the crucial sectors alone (medical personnel, industry, and transport).¹⁰ In other words, China will not be able to produce enough

masks for China and the rest of the world.¹¹ The few million masks that China is currently sharing with the hardest-hit countries in the world should therefore be seen as a quick fix, not a reliable supply line of the much-needed masks.

Irresponsible to rely on supplies from China

Reliance on China for the supply of a protective material that is indispensable for halting the pandemic makes us vulnerable and is irresponsible for two reasons. Firstly, because although China rapidly increased its capacity to produce face masks, it will not be able to keep up with skyrocketing demand as the virus spreads across the globe. The market for face masks in China is quite chaotic at the moment. The two largest producers of N95 respirators can each produce about 500,000 masks per day, some other large producers make about 200,000 masks per day and other producers far fewer.¹² However, nowadays countries from all over the world are desperately ordering tens of millions of N95 masks and are sending their orders to different suppliers in China to increase their chances of getting hold of the masks they need. To meet this massive demand, Chinese producers are ordering extra masks from their competitors, only to discover that they are working on the same order.¹³ There is no longer any oversight and since these factories also need to supply the Chinese state, it is highly likely that the Chinese government will at some point intervene to safeguard its own supply.

7 Tracy You, [Millions of face masks donated by China's richest man Jack Ma arrive in coronavirus-riddled Europe as the number of deaths on the continent overtakes the toll in China](#), MailOnline, March 18, 2020.

8 [Second Chinese medical team arrives in Milan](#)

9 Hou Ruining, [国内熔喷布日产能将达200吨 或很快实现供需平衡](#) (Domestic melt-blown filter media production will reach 200 tons per day: a tight balance between supply and demand), *Sina Corp*, March 13, 2020.

10 *Ibidem*.

11 The [WHO estimated](#) at the beginning of March that the world needs about 89 million N95 masks per month. With the [current rate of production](#) (less than 2 million N95 masks per day) China cannot meet that demand.

12 This is data I received from suppliers in China and it is in line with the [official information](#) that China produces 1.66 million N95 masks per day.

13 This description of the current situation of the medical mask market in China was given by a Chinese businessman who is trying to secure orders for some African countries; his name is known by the Clingendael Institute.

Besides the risk that this supply may be halted at any time, the risk of receiving poor-quality masks is also increasing as the stock of melt-blown filter media dwindles and the chaos grows.¹⁴

Secondly, Europe is currently competing for masks from China with poorer regions in the world. Countries like Iran and regions like Latin America and Africa are much more in need of external help as they are not as well equipped as Europe to set up their own production lines.

Taking on responsibility

Europe has lost some credibility as a responsible global leader in this crisis.¹⁵ However, there is still a chance (and an urge) to take responsibility. Europe needs to set up and scale up the production of melt-blown filter media as quickly as possible. Scaling up the production of masks is only possible once Europe has scaled up the production of melt-blown filter media. International cooperation can help.

There are various European countries that produce melt-blown filter media, that produce the machines that can produce this filter media and that produce face masks. This should be an urgent priority for the European Union. Every European country needs to take stock of how much melt-blown filter media, and how many masks, they currently produce and what these producers need in order to scale up. The countries that produce the machines that make either the filter media or the face masks need to assess how quickly their factories can produce new machines. This information should all be gathered at a central point.

A logical bottleneck for scaling up the production of melt-blown filter media seems to be the machines that can produce this

material, which are expensive and difficult to make.¹⁶ The European Commission should bring together a multidisciplinary group of engineers from the best universities and high-tech companies. These engineers should work together on finding solutions for building the machines that produce melt-blown filter media in a more cost- and time-efficient way, and to experiment with other materials that could be used as an effective filter media for medical masks. In a similar effort, a group of volunteers from Italy were able to make the much-needed ventilator valves with a 3D printer, while cutting the price by a factor of 10,000 in the process.¹⁷ Furthermore, the European Commission could task car manufacturers and industrial filter producers to collect the melt-blown filter media they still have in stock (since they were the main customers of the melt-blown filter media before the outbreak of the coronavirus).

Conclusion

This whole process will take months and Europe is behind the curve. However, it is still better late than never. The statistics show that the supply of face masks from China is not endless and European hospitals are already running out. Furthermore, experts are expecting new waves of this coronavirus (and other virus outbreaks) in the near future, which means that Europe needs to prepare itself to become self-sufficient in terms of medical protection gear. In the meantime, Europe is still dependent on China for the supply of its medical masks. European countries should focus all efforts on becoming self-sufficient instead of discussing the potential motives behind the support Europe currently receives from China and the soft power it generates. In order to protect its independence, Europe should focus on what it can control, namely scaling up its industries.

14 See for example the experience of [the Netherlands](#).

15 Steven Erlanger, [Coronavirus Tests Europe's Cohesion, Alliances and Even Democracy](#), *the New York Times*, March 12, 2020; Majda Ruge and Janka Oertel, [Serbia's coronavirus diplomacy unmasked](#), *European Council on Foreign Relations*, March 26, 2020.

16 Emily Feng and Amy Cheng, [COVID-19 Has Caused A Shortage Of Face Masks. But They're Surprisingly Hard To Make](#), *NPR*, March 16, 2020.

17 Chloe Kent, [Covid-19: start-up that saved lives with 3D-printed valve may face legal action](#), *Medical Device Network*, March 18, 2020.

Different types of face masks for different purposes in times of the COVID-19 pandemic

There are two types of medical masks that are used to protect doctors and nurses against the coronavirus: surgical masks and FFP respirators.

Surgical masks are the loose-fitting masks and are characterized by their folds. They are primarily intended to protect patients from healthcare workers by minimizing their exposure to saliva and respiratory secretions. A surgical mask is not recommended as protection for the user from airborne infectious diseases like the coronavirus.¹⁸

However, a (potential) patient can protect others at least partly by wearing such a mask. These masks can therefore be used by civilians on the street or by coronavirus patients in the hospital to protect others. Civilians could also use simple cloth masks (in this time of scarcity) to protect others (at least partly) from their droplets when coughing.



FFP respirators are tight-fitting preformed masks with a nose seal. FFP is a European standard and stands for 'filtering face piece'. There are three FFP classes: FFP1, FFP2, and FFP3. The higher the number, the smaller the particles that they can filter out. To protect oneself against the coronavirus one needs at least a level FFP2 respirator. FFP2 respirators are roughly equivalent to the US standard N95.¹⁹

The higher the protective level of the mask, the more melt-blown filter media is used to produce the mask. Therefore, with 200 tons of melt-blown filter media, China can produce 200 million surgical masks or 60 million N95 respirators. The masks that the Chinese government and Jack Ma have donated to European countries are a mix of these two types of masks and usually comprise more surgical masks than N95 respirators due to production capacity.








18 Shu-An Lee, Dong-Chir Hwang, He-Yi Li, Chieh-Fu Tsai, Chun-Wan Chen, and Jen-Kun Chen, [Particle Size-Selective Assessment of Protection of European Standard FFP Respirators and Surgical Masks against Particles-Tested with Human Subjects](#) Journal of Healthcare Engineering, March 7, 2016.

19 *Ibidem*.

About the Clingendael Institute

Clingendael – the Netherlands Institute of International Relations – is a leading think tank and academy on international affairs. Through our analyses, training and public debate we aim to inspire and equip governments, businesses, and civil society in order to contribute to a secure, sustainable and just world.

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