

**IN THE GENERAL DIVISION OF
THE HIGH COURT OF THE REPUBLIC OF SINGAPORE**

[2023] SGHC 23

Suit No 941 of 2018

Between

- (1) Trittech Water Technologies
Pte Ltd
- (2) Trittech Environmental Group
Co Ltd
- (3) Trittech Engineering & Testing
(Singapore) Pte Ltd

... Plaintiffs

And

- (1) Duan Wei
- (2) Luo Zhuobiao

... Defendants

JUDGMENT

[Tort — Misrepresentation — Fraud and deceit]

[Tort — Misrepresentation — Negligent misrepresentation]

[Tort — Negligence]

[Intellectual Property — Law of confidence — Breach of confidence]

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Tritech Water Technologies Pte Ltd and others
v
Duan Wei and another

[2023] SGHC 23

General Division of the High Court — Suit No 941 of 2018

Valerie Thean J

29, 30 September, 4–7, 11–13, 18–21 October, 2 December 2022.

22 February 2023

Judgment reserved.

Valerie Thean J:

1 Tritech Group Limited (“TGL”) is an engineering services provider listed on the Singapore Stock Exchange. It has two principal businesses: urban infrastructure, and water and environmental technology.¹ The three plaintiffs are subsidiaries of TGL. The first plaintiff (“TWT”) is incorporated in Singapore and is in the business of providing water and environmental solutions, specialising in the manufacture and supply of membranes, membrane-related products and services. It also serves as the research and development (“R&D”) centre for water treatment and environmental technologies of TGL in Singapore.² The second plaintiff (“TEG”) is incorporated in the People’s Republic of China. It is a one-stop water treatment solutions provider in China

¹ Wang Xiaoning’s Affidavit of Evidence-in-Chief (“AEIC”) (“WXN”) at para 3.

² WXN at para 4.

and the region.³ The third plaintiff (“TET”) is incorporated in Singapore. It is a provider of urban geotechnical instrumentation monitoring and site investigation services associated with tunnelling, deep excavation, underground construction, slope cutting, piling, settlement and other geotechnical problems.⁴ I refer to the three plaintiffs collectively as “Tritech”. Dr Wang Xiaoning (“Dr Wang”) is the managing director and chief executive officer of TGL.⁵

2 By this suit, Tritech brings action against two former employees who were integral to its China operations. The first defendant (“Dr Duan”) was employed by TWT from 1 August 2011, initially as a “Principal Engineer”.⁶ He subsequently became Chief Technical Officer of TWT and the Water & Environment Group of Tritech’s companies.⁷ He resigned on 12 March 2017 and left TWT’s employment on 31 March 2017.⁸

3 The second defendant (“Mr Luo”) was employed by TET as an engineer from 3 November 2006.⁹ His employment was transferred from TET to TWT by way of an internal memorandum in September 2011. From 2012, he was appointed to a series of key positions within Tritech’s companies, and by 2018, he was Chief Commercial Officer and Chief Supervisor of network marketing promotion at TEG.¹⁰

³ WXN at para 5.

⁴ WXN at para 7.

⁵ WXN at para 1.

⁶ WXN at para 29.

⁷ 3 JBOD 111; WXN at para 32.

⁸ WXN at para 36.

⁹ 3 JBOD 221.

¹⁰ WXN at paras 40-41; SOC at para 3B.

4 There are two parts to Tritech’s claim. The first is a claim for breach of confidence against the defendants. Near the end of 2017, Mr Luo was observed by staff to be unduly interested in operations that lay outside of his scope of work. Rumours began circulating that Mr Luo and Dr Duan, who had left by then, were working together. Dr Wang was informed at the beginning of 2018. Subsequently, Tritech discovered Dr Duan had incorporated another company, Dreamem, on 1 March 2017, before he resigned from Tritech. In June 2018, Tritech conducted a trap purchase of Dreamem’s products. Mr Luo represented Dreamem on that occasion, where Tritech obtained products which are alleged to be identical or substantially similar to Tritech’s. Tritech followed on to commence a suit in the PRC Guangdong Shenzhen Intermediate People’s Court. Court preservation proceedings were conducted on Dreamem’s premises on 31 August 2018. Mr Luo was summarily dismissed for misconduct on the same day.¹¹

5 The second aspect of Tritech’s claim relates to Dr Duan, who had worked on a series of unsuccessful projects during the period of his employment. Arising out of facts that emerged after investigations into the breach of confidence allegations began, Tritech now advances claims in breach of fiduciary duty, fraudulent misrepresentation, negligent misrepresentation and breach of Dr Duan’s implied contractual duty to exercise reasonable skill and care in the performance of his duties.

Facts

6 In 2009, the board of TGL decided to expand its water and environmental business. Membrane-related technology was new then, and the

¹¹ 3 JBOD 205.

plan was to conduct R&D before developing a manufacturing base in China to produce membrane-related products.¹²

7 The membrane-related technology that Tritech was exploring concerned artificial membranes, which are used for water filtration, and water and wastewater treatment. Depending on the specific purpose of the membrane, different types of membranes with different properties may be required. Two categories are pertinent to this case: hollow fibre membranes and flat sheet membranes. Typically, hollow fibre membranes are used for the process of ultrafiltration. Flat sheet membranes, on the other hand, are used for nanofiltration, forward osmosis (“FO”) and reverse osmosis (“RO”).¹³ Flat sheet membranes and hollow fibre membranes are fabricated using different production processes, with different equipment.¹⁴

8 Tritech’s R&D initially focused on hollow fibre membranes.¹⁵ Flat sheet membrane work started in 2010, when Dr Wang started a collaboration with Associate Professor Ng How Yong (“Prof Ng”) at the National University of Singapore (“NUS”). The collaboration was to conduct R&D on flat sheet membranes to be used in an FO process. A laboratory setting was used to determine the method and process of fabricating flat sheet membranes with the desired qualities.¹⁶

9 At the time, Dr Duan was a post-doctoral research assistant in Prof Ng’s team. His main scope of work was the R&D of novel membranes, including FO

¹² WXN at para 13.

¹³ Dr Tan Chien Hsiang’s AEIC (“TCH”) at para 16.

¹⁴ TCH at para 20.

¹⁵ WXN at para 14.

¹⁶ WXN at para 15.

membranes.¹⁷ As part of a plan to set up a commercial production line for FO membranes (the “FO Project”), Dr Wang invited Dr Duan to be the expert to lead the Tritech team. An agreement was reached with Dr Duan to allow him to complete his work with the NUS-Tritech collaboration before joining TWT as an employee. Dr Wang obtained Prof Ng’s permission for Dr Duan to start work on the FO Project during the interim period when he was still at NUS. Tritech paid him an allowance each month during this interim period.¹⁸ An exclusive licence agreement was also entered into with NUS in respect of the formula that was used within NUS, to be used in the planned commercial production line.¹⁹

10 In 2011, Tritech began to source for suppliers of the production line to be used in the FO Project.²⁰ Two Tritech employees, Mr Gong Zhao and Mr Xie, worked together with Dr Duan. Three companies were shortlisted: Shanghai Dahe New Material Technology Co Ltd (“Shanghai Dahe”), Changzhou Dongfeng Textile Machinery Factory and Dalian Kena Science Technology Development Co Ltd. Dr Wang was keen for Dr Duan to be involved in the vendor selection process as he was the only one who had technical expertise in FO membranes and was aware of the existing issues faced by the test equipment at NUS.²¹ Thus, Dr Duan participated in the second set of visits to the shortlisted companies which took place between 22 and 25 March 2011.²² After these visits, Mr Gong put together a summary of the three companies’ estimated fees and plans and sent them to Dr Wang, Dr Duan and Mr Xie, seeking their views.

¹⁷ WXN at para 20; Dr Duan Wei’s AEIC (“DW”) at para 7.

¹⁸ WXN at paras 22–23.

¹⁹ 8A JBOD 437.

²⁰ WXN at para 102.

²¹ WXN at paras 103–104.

²² WXN at para 108.

Dr Duan responded that “the one in Dalian [was] basically rejected” and “[t]he Wuxi one ... did not show a sincere desire to cooperate” and while “they probably have the best design and machining capabilities”, they had not given Tritech a basic sketch so one could not tell what their real processing capabilities were. As for Shanghai Dahe, Dr Duan said that their offer price was too high, but “[i]f they can quote a realistic price, [he thought] it would be ideal for them to do it” because “they [had] some experience in design and machining and have made some similar equipment”.²³

11 Tritech eventually agreed that Shanghai Dahe would supply the production line for the FO Project. This was completed in a two-stage process. On 8 May 2011, TEG first signed a “Film Manufacturing Equipment Design Commissioning Agreement” with Shanghai Dahe (the “Design Commissioning Agreement”).²⁴ Discussions then followed between Tritech and Shanghai Dahe about the specifics of the design of the production line. Subsequently, on 1 November 2011, TEG entered into a purchase agreement with Shanghai Dahe (the “FO Purchase Contract”) for the supply of the production line for the FO Project (the “FO Production Line”).²⁵

12 On 28 February 2012 and in May 2012, Dr Duan conducted pre-delivery inspections of the assembled equipment at Shanghai Dahe’s premises. He notified Dr Wang by e-mail of the following:²⁶

- (a) He had not been able to test the full production line. The workshop was too small and the production line could not be fully

²³ 1 JBOD 162.

²⁴ 3 JBOD 316.

²⁵ 3 JBOD 388.

²⁶ WXN at paras 124–125.

extended. Further, plumbing and wiring needed to be cut and installed according to the actual conditions of Tritech’s plant. It was not possible to test individual components separately as the entire production line was programmed for automatic control. Thus, the trials could only be carried out in Tritech’s factory.

(b) He had checked every part of the equipment from start to finish against the design drawings, and his conclusion was that the equipment was manufactured exactly according to the design drawings and was capable of meeting the technical requirements set out in the design. He qualified this by saying that the accuracy of the control could only be tested during commissioning.

13 Following this confirmation, Mr Gong arranged for delivery of the FO Production Line, which took place on 15 September 2012.²⁷ The FO Production Line was assembled in one of TEG’s factories in China (“Factory Three”). Dr Duan was appointed director of Factory Three once its construction was completed in the second half of 2012.²⁸

14 Upon delivery, Mr Gong realised that the FO Production Line contained various external defects.²⁹ After the installation and during the commissioning of the FO Production Line, further defects surfaced. Another list of defects was set out by Dr Duan, copying Mr Gong, on 25 October 2013 (the “25 October

²⁷ Gong Zhao’s AEIC (“GZ”) at para 56.

²⁸ WXN at para 31; 12 October 2022 Transcript, p 103 line 19 to p 104 line 3.

²⁹ GZ at para 56.

2013 List”).³⁰ Ultimately, the FO Production Line was, and remains, non-functional.³¹

15 On 4 November 2013, Dr Duan arranged the purchase of membrane-rolling machines (the “MR Machines”) from Shanghai Dahe.³² The MR Machines were complementary to the FO Production Line. Their function was to roll the flat sheet membranes produced by the FO Production Line.³³ Dr Duan was involved in reviewing the technical drawings for these machines.³⁴ He also conducted an inspection of the MR Machines and informed Dr Wang that the machines were manufactured in accordance with Tritech’s design and were satisfactory.³⁵

16 There were, however, defects present in the MR Machines. In an e-mail dated 24 April 2014, Dr Duan compiled a list of defects that were present in the MR Machines and sent it to Mr Gong.³⁶ On 28 September 2014, Mr Gong told Shanghai Dahe that the MR Machines were “basically non-functional”.³⁷ Later, in an e-mail to Shanghai Dahe with Mr Gong copied, on 4 November 2014, Dr Duan said that Tritech had solved the issues with the MR Machines

³⁰ 1 JBOD at 551.

³¹ WXN at para 132.

³² GZ at para 88.

³³ GZ at para 77.

³⁴ 1 JBOD 534–540, 543–567.

³⁵ 1 JBOD 594.

³⁶ 1 JBOD 634.

³⁷ 2 JBOD 67.

themselves.³⁸ Mr Gong’s evidence is that he has no knowledge of how this was done, and that the MR Machines are still unused.³⁹

17 Due to the failure to complete the FO Production Line, Dr Wang decided that a good back-up plan was to set-up an RO production line in Factory Three instead (RO membranes are the other type of flat sheet membranes, see [7] above). Dr Duan advised him that it was possible to adapt the FO Production Line into an RO production line.⁴⁰ Dr Duan was tasked to conceptualise an RO production line, conduct site visits of vendors, and select a vendor who would be able to put together an RO production line in accordance with Tritech’s technical requirements.⁴¹

18 On 5 July 2014, Dr Wang asked Dr Duan to inspect two potential vendors to assess their suitability, one of which was Zhejiang Shengshi Machinery Co Ltd (“Zhejiang Shengshi”).⁴² Dr Duan visited the site and confirmed that Zhejiang Shengshi had the capacity to design, manufacture and install an RO production line to produce RO membranes on a commercial scale; had prior experience in supplying production lines for RO membranes; and would be able to supply an RO production line using technical solutions which were its own technology.⁴³ On 30 July 2014, Dr Duan informed Mr Gong that Zhejiang Shengshi had provided a quotation with technical documents for an RO production line, and he had reviewed them and made some changes. He said

³⁸ 2 JBOD 72.

³⁹ GZ at para 95.

⁴⁰ WXN at paras 146–147.

⁴¹ WXN at para 149.

⁴² 1 JBOD 641.

⁴³ WXN at para 152.

that he hoped the goods could be supplied as soon as possible.⁴⁴ On 22 August 2014, TEG entered into an agreement (“RO Purchase Contract”) with Zhejiang Shengshi for the supply and manufacture of an RO production line (the “RO Production Line”).⁴⁵

19 Dr Duan inspected the RO Production Line prior to delivery alone at Zhejiang Shengshi’s factory and informed Dr Wang and Mr Gong of his findings on 1 December 2014.⁴⁶ He stated that the water and drying tank were finished, but it was impossible to conduct a site inspection to determine if they had been manufactured with the correct stainless steel. However, “[t]he appearance and the structure compl[ied] with the requirements described in the Contract” and it had a “beautiful appearance”. All the bearings for the water tank were ceramic bearings which satisfied the requirements described in the contract. There was some defect on the surface of the drying tank, and he had requested that it be rectified.

20 TEG accepted delivery of the RO Production Line, and it was delivered in batches between December 2014 and January 2015. Installation and commissioning then commenced. Similar to the FO Production Line, the RO Production Line was dogged by defects.⁴⁷ No RO membrane has been produced.⁴⁸

21 In the course of finding solutions to the problems with the RO Production Line, Dr Duan selected two companies to be technical consultants,

⁴⁴ 2 JBOD 10.

⁴⁵ 4 JBOD 185–207.

⁴⁶ 2 JBOD 80–81.

⁴⁷ WXN at para 159.

⁴⁸ WXN at para 160.

and sought Dr Wang's approval of payment of RMB400,000 to them.⁴⁹ The money was disbursed to Dr Duan in two debit cards on 19 August 2016. Tritech did not receive any technical consultancy services and TEG reported Dr Duan to the Chinese police when this discrepancy was discovered in July 2019, after Dr Duan had left Tritech's employment.⁵⁰ Dr Duan was subsequently convicted of bribery in China and sentenced to seven months' imprisonment with a fine of RMB100,000.⁵¹ The facts supporting his plea of guilt reflected that Dr Duan had paid the RMB400,000 to one Mr He. He agreed with Mr He that Tritech would engage Mr He to provide technical support to Tritech at RMB400,000, with Dr Duan receiving a kick-back of one-third of that sum (RMB149,800).⁵²

22 In the meanwhile, the commissioning of the FO Production Line continued. At Mr Gong's request, Dr Duan set out the full list of defects in a copy of the FO Purchase Contract containing annotations identifying various technical requirements that the FO Production Line did not satisfy. This annotated copy of the contract was prepared on 7 November 2016 (the "7 November 2016 List").⁵³ The contract with Shanghai Dahe was terminated four days later.

23 On 12 March 2017, Dr Duan resigned as an employee of Tritech. He told Dr Wang that the work was taking a toll on him, and he wanted to rest for some time.⁵⁴ He was still at this juncture a trusted employee despite the failure

⁴⁹ 2 JBOD 239.

⁵⁰ WXN at para 172.

⁵¹ 6 JBOD 187.

⁵² 6 JBOD 185.

⁵³ 2 JBOD 338.

⁵⁴ 3 JBOD 190.

of both the FO and RO Production Lines, and Dr Wang told him that he was always welcome to return.⁵⁵

24 The FO Production Line and RO Production Line were in Tritech’s Factory Three, which was focused on the production of flat sheet membranes. Tritech was producing hollow fibre membranes in “Factory One”.⁵⁶ I will refer to the hollow fibre membrane production line in Factory One as the “UF Production Line”. Tritech first launched hollow fibre membrane ultrafiltration products in April 2013 after approximately four years of R&D.⁵⁷ This area of work was under the purview of Dr Tan Chien Hsiang (“Dr Tan”), who was appointed Principal Membrane Engineer by Tritech in February 2013 and seconded to Tritech’s office in China to oversee the commissioning of the UF Production Line.⁵⁸

25 Tritech produced two hollow fibre membrane products: a curtain-style membrane and a column-style membrane. The column-style membrane was first launched in December 2013, and the curtain-style membrane was first launched in April 2013. The main difference between the two types of membrane lies in the way the fibres are packed, either as a column or as a curtain.⁵⁹ One of Tritech’s subsidiaries holds a patent in respect of these two products, which discloses a range of operating parameters that would allow replication of the production process to manufacture hollow fibre membranes. However, the precise combination of parameters and steps required to produce

⁵⁵ 2 JBOD 429.

⁵⁶ WXN at para 17.

⁵⁷ TCH at para 9.

⁵⁸ TCH at para 8.

⁵⁹ TCH at para 22.

the hollow-fibre membranes with uniform, desired properties and consistently on a commercial scale are confidential within Tritech and are not disclosed in the patent.⁶⁰

26 By 2017, Mr Luo held a number of key management and senior executive positions within Tritech.⁶¹ In November 2017, Dr Tan was informed by the lead of his production team (“Mr Xiao”) that Mr Luo had been at the UF Production Line a few times that month, observing the production process and taking detailed notes. Mr Luo had also asked members of the production team various technical questions. Because of Mr Luo’s seniority within Tritech, the production employees initially answered his queries. Eventually, they grew suspicious and thus reported Mr Luo’s behaviour to Dr Tan.⁶² Dr Tan told Mr Xiao that the production team should not be disclosing any information relating to the production of UF products to anyone not involved in the production process, including Mr Luo.⁶³ In December 2017, Mr Xiao told Dr Tan that Mr Luo still came to the production line and asked the production team questions. Around the same time, a research engineer in one of the R&D teams that reported to Dr Tan (“Ms Zhang”), told Dr Tan that Mr Luo had asked for a technical flowchart of Tritech’s production process.⁶⁴ Dr Tan reported Mr Luo’s behaviour to Dr Wang in January 2018.

27 This prompted an investigation into Mr Luo, which extended to Dr Duan because there were rumours that Mr Luo was working with Dr Duan.⁶⁵ It was

⁶⁰ TCH at para 29.

⁶¹ WXN at para 41.

⁶² TCH at para 77.

⁶³ TCH at para 78.

⁶⁴ TCH at para 79.

⁶⁵ WXN at paras 43–44.

then discovered that Dr Duan had incorporated a company, Dreamem, on 1 March 2017, before he resigned from Tritech. The shareholders of Dreamem were: Dr Duan (22.5%), Ms Chen Yu Lan (“Ms Chen”) (22.5%) and Mr Yang Han (55%).⁶⁶ It was also discovered that Ms Chen is Mr Luo’s mother.⁶⁷

28 Dr Wang instructed a Chinese law firm to conduct a trap purchase of Dreamem’s products. Ms Guo Ying (“Ms Guo”), a lawyer, contacted Dreamem as “Emily” from an advertising agency.⁶⁸ From 6 June 2018, she corresponded with Mr Luo at the e-mail address “luozhuobiao@dreamem.cn”.⁶⁹ She was able to obtain name cards bearing the Dreamem logo listing Dr Duan as “PhD” and Mr Luo as “Manager”,⁷⁰ and a copy of Dreamem’s brochure (the “Dreamem Brochure”).⁷¹ She also went to Dreamem’s premises and took a picture with Mr Luo.⁷² The Dreamem Brochure indicated that Dreamem was selling, amongst other things, a curtain-style UF membrane, a column-style UF membrane and a RO nanofiltration membrane.⁷³ Ms Guo purchased four curtain-style UF membranes and three column-style UF membranes from Dreamem.⁷⁴ Together with a notary public, she photographed and collected the goods on 22 June 2018 and these were later delivered to Mr Gong and Dr Tan at Tritech on 1 July 2018.⁷⁵ Dr Tan’s evidence is that the products purchased from Dreamem are

⁶⁶ WXN at para 45; 6 JBOD 600.

⁶⁷ WXN at para 48.

⁶⁸ WXN at para 49.

⁶⁹ 3 JBOD 18–32.

⁷⁰ 7 JBOD 7–9.

⁷¹ 5 JBOD 543–566.

⁷² 6 JBOD 540.

⁷³ WXN at para 51; 5 JBOD 546, 550 and 554.

⁷⁴ WXN at para 52.

⁷⁵ Guo Ying’s AEIC at para 8–9.

identical, or at least substantially similar to, the products sold by Tritech described at [25] above.⁷⁶

29 On 22 June 2018, the second plaintiff’s wholly owned subsidiary commenced an action against the defendants in the PRC Guangdong Shenzhen Intermediate People’s Court. An evidence preservation order was granted on 27 August 2018. The evidence preservation was conducted on 31 August 2018 at Dreamem’s premises. Ms Wu Ling, a Tritech representative at the raid, reported to Dr Wang that she saw Mr Luo run away from the premises.⁷⁷

30 Mr Luo was dismissed by Tritech on 31 August 2018.⁷⁸ Following this, investigations were carried out in relation to his Tritech e-mail account. It was discovered that on numerous occasions, he had forwarded e-mails containing documents with confidential information to his personal e-mail:⁷⁹

(a) On 13 March 2017, Mr Luo forwarded documents containing pricing information for some products manufactured by Tritech, which bore the name “VaVie”, to his personal e-mail.

(b) On 8 June 2017, Mr Luo forwarded documents containing pricing information for RO membrane products to his personal e-mail.

(c) On 28 September 2017, an employee of Tritech, Ms Zhang, sent Mr Luo a .rar folder containing various documents relating to Tritech’s ultrafiltration operating procedures and RO membrane quality control at his request. After the folder was sent to him, he asked Ms Zhang if there

⁷⁶ TCH at paras 61–73.

⁷⁷ WXN at para 54–55.

⁷⁸ WXN at para 56.

⁷⁹ WXN at para 57–59; TCH at para 81.

were any other inspection or operations procedures and guidelines, and she replied that there were none. He did not explain (in e-mail) what he wanted these documents for. He forwarded this e-mail chain to his personal e-mail address on 24 October 2017.

(d) On 24 October 2017, at Mr Luo’s request, assistant factory manager and head of the Quality Check (“QC”) centre, Ms Hou, sent him a .rar folder containing documents relating to the quality, environmental and safety (“QES”) management system and the “VaVie” products. He forwarded these e-mails to his personal e-mail that same day. There is no explanation in the e-mail chain as to why he required the documents.

(e) On 26 March 2018, Mr Luo forwarded to his personal e-mail documents relating to the hollow fibre manufacturing process.⁸⁰

31 Tritech commenced this suit on 25 September 2018.

Parties’ cases

Plaintiffs’ case

32 Tritech brings, broadly, three claims against Dr Duan: a claim in fraudulent or negligent misrepresentation; a claim in breach of contract involving an implied contractual duty to exercise reasonable skill and care in the performance of his duties; and a claim for RMB400,000.

33 Tritech claims that Dr Duan represented, expressly or impliedly, that Shanghai Dahe was a suitable vendor to supply the FO Production Line, that the

⁸⁰ 3 JBOD 11–13.

FO Production Line to be supplied by Shanghai Dahe was technically feasible, and that the FO Production Line met Tritech's technical requirements.⁸¹ These representations were false, and Tritech relied on them to its detriment by, amongst other things, entering into a contract for the supply of the FO Production Line with Shanghai Dahe, accepting delivery of the FO Production Line, and paying the sums due to Shanghai Dahe under the Design Commissioning Agreement and the FO Purchase Contract.⁸²

34 Tritech claims that Dr Duan misrepresented that the MR Machines satisfied Tritech's technical requirements and would properly function.⁸³ Relying on this, Tritech purchased the MR Machines from Shanghai Dahe and made payments to them.

35 As for the RO Production Line, prior to entering into the contract with Zhejiang Shengshi, Dr Duan orally informed Dr Wang that Zhejiang Shengshi had the capacity to design, manufacture and install an RO Production Line, it had prior experience in supplying production lines for RO membranes, and it would be able to supply the RO Production Line using technical solutions which were its own technology.⁸⁴ Later, after conducting the pre-delivery inspection alone, Dr Duan informed Dr Wang that the RO Production Line satisfied Tritech's technical requirements.⁸⁵ Induced by Dr Duan's representations, Tritech entered into the RO Purchase Contract, paid the sums required to

⁸¹ Plaintiffs' Closing Submissions dated 21 November 2022 ("PWS") at para 93.

⁸² PWS at para 105.

⁸³ PWS at para 120.

⁸⁴ PWS at para 67.

⁸⁵ PWS at para 80.

Zhejiang Shengshi, and entered into a contract for the manufacture of a cleanroom and partition to house the RO Production Line.⁸⁶

36 The representations were made by Dr Duan fraudulently, or at least recklessly.⁸⁷ Alternatively, Dr Duan’s conduct showed a lack of reasonable care, which gives rise to both a claim against him in tort and a claim against him for breach of his implied contractual obligation to use reasonable care and skill in the performance of his duties.⁸⁸

37 Tritech also claims that Dr Duan misappropriated RMB400,000 that was given to him by Tritech, in breach of his fiduciary duties and duties of good faith and fidelity.⁸⁹

38 As against Dr Duan and Mr Luo both, Tritech brings a claim in breach of confidence. Dr Duan, with the assistance of Mr Luo, took calculated steps to take Tritech’s confidential information for their own, and Dreamem’s, benefit. Dr Duan resigned on the same day he incorporated Dreamem together with Mr Luo’s mother and Mr Yang Han. He did not tell Tritech that he was leaving to set up a competitor business with Mr Luo. He retained vast amounts of information when he left Tritech, including archives of his Tritech e-mail account. Mr Luo stayed in Tritech’s employment and made use of his position to gather further confidential information for Dreamem. Through this collaboration, Dreamem was able to replicate Tritech’s UF production process seamlessly.⁹⁰

⁸⁶ PWS at para 145.

⁸⁷ PWS at paras 110, 123 and 146.

⁸⁸ PWS at paras 119, 124 and 150–152.

⁸⁹ PWS at para 264.

⁹⁰ PWS at para 153.

39 Thus, Tritech argues, Dr Duan and Mr Luo were in breach of both their equitable and contractual duties of confidence.⁹¹ They were also in breach of their duties of good faith and fidelity, as well as their fiduciary duties.⁹² Their collaboration to take Tritech’s confidential information for their own benefit also amounted to an unlawful means conspiracy.⁹³

Defendants’ case

40 Dr Duan’s defence is that he did not make the alleged misrepresentations.⁹⁴

41 Dr Duan contends he was not an expert on FO production equipment; he simply had expertise in FO membrane science.⁹⁵ The production line technology for manufacturing FO membranes was very complex, and in 2011 there was only one company in the world that was capable of industrially producing FO production lines: Hydration Technology Innovation LLT in the US. It was common knowledge that there was no company in China that produces FO membranes.⁹⁶ While Prof Ng’s team at NUS was able to produce FO membranes, they were only able to do so manually. Their production line never managed to successfully make an FO membrane because the commissioning and controlling of the machine was too difficult for the research team.⁹⁷ When Dr Wang approached Prof Ng and Dr Duan, they cautioned him

⁹¹ PWS at para 154.

⁹² PWS at paras 252–253; 262–263.

⁹³ PWS at para 275.

⁹⁴ Submissions for the 1st and 2nd Defendants dated 21 November 2022 (“DWS”) at p 2 paras 4(a)–(b).

⁹⁵ DW at paras 5, 7 and 12.

⁹⁶ DWS at p 8 paras 25–26.

⁹⁷ DW at para 21.

of the risks involved in attempting an FO project on an industrial scale. Dr Wang confirmed that he was prepared to take the risk.⁹⁸ He also argues that the claim relating to the FO Production Line is barred by the Limitation Act (Cap 163, 1996 Rev Ed).⁹⁹

42 As for the RO Production Line, he had attended Zhejiang Shengshi’s premises and saw similar equipment that was meant to be shipped to other companies.¹⁰⁰ When he conducted the pre-delivery inspection, all he was asked to do was to check on the state of assembly of the equipment and the number of spare parts. Overall, it was Mr Gong who was in charge of the purchase of the RO Production Line from Zhejiang Shengshi.

43 The RMB400,00 that Tritech wishes to recover was given to him to purchase an RO formula from one Mr He Guanghui.¹⁰¹ He duly purchased this formula and gave it to Tritech.

44 Regarding the confidential information, the defendants contend the information was not taken by them, nor was it used by Dreamem. While the confidential information that Tritech alleges was taken and used relates to hollow fibre membrane products, they assert that what Dreamem produced were “MBR reinforced hollow fibre membrane products”, which were something quite different.¹⁰²

⁹⁸ DWS at p 10 paras 33.1–33.2.

⁹⁹ DWS at p 15.

¹⁰⁰ DW at para 60.

¹⁰¹ DWS at p 39 paras 1 and 2.

¹⁰² DWS at p 43 at para 3.

Organisation of judgment

45 This suit covers three distinct factual areas. First, there is Dr Duan’s involvement in the FO Production Line (including the procurement of the MR Machines) and in the RO Production Line. Second, there is Dr Duan’s conduct in relation to the RMB400,000 that he received from Tritech. Finally, there is Dr Duan and Mr Luo’s involvement in Dreamem. I deal with Tritech’s claim in these three component parts.

46 Regarding the first and third components, the suit was bifurcated by consent on 5 September 2022 at a pre-trial conference and I deal only with the issue of liability in this judgment.

The FO Production Line, MR Machines and RO Production Line

Legal context and issues

47 Tritech’s claims in respect of the FO Production Line, MR Machines, and RO Production Line follow the same legal framework. Tritech’s primary case is that Dr Duan is liable for fraudulent misrepresentation. Alternatively, he is liable for negligent misrepresentation. As a second alternative, he is liable for failure to perform his duties with reasonable skill and care, in either contract or tort.

48 The requirements for a claim in fraudulent misrepresentation (also referred to as the tort of deceit) were set out by the Court of Appeal in *Panatron Pte Ltd and another v Lee Cheow Lee and another* [2001] 2 SLR(R) 435 at [13]–[14], citing *Derry v Peek* (1889) 14 App Cas 337 (“*Derry v Peek*”). The plaintiff must show that:

- (a) a false representation of fact has been made by words or conduct;

- (b) the plaintiff had acted upon the false statement;
- (c) the plaintiff suffered damage by so doing;
- (d) the representation was made with the intention that it should be acted upon by the plaintiff, or by a class of persons which includes the plaintiff; and
- (e) it was made with knowledge that it is false, or at least made in the absence of any genuine belief that it is true.

49 For a claim in negligent misrepresentation, the plaintiff must also prove the first, second and third elements above. Instead of the fourth and fifth elements, however, the plaintiff must establish that (see *Yong Khong Yoong Mark and others v Ting Choon Meng and another* [2021] SGHC 246 at [91]):

- (a) the representor owed the plaintiff a duty to take reasonable care in making the representation; and
- (b) the representor breached that duty of care.

50 Common to negligent and fraudulent misrepresentation is the requirement that a false statement of *fact* is made by the representor.

51 As an alternative, Tritech alleges that Dr Duan failed to perform his duties with reasonable skill and care. As established by the Court of Appeal in *Man Financial (S) Pte Ltd (formerly known as E D & F Man International (S) Pte Ltd) v Wong Bark Chuan David* [2008] 1 SLR(R) 663 (“*Man Financial*”) at [193], there is an implied term in an employment contract that the employee will use reasonable skill and care in the performance of his or her duties pursuant to the employment contract.

52 Thus, given the above legal context and the structure of Tritech’s claim, the following issues arise for my determination in respect of each of the FO Production Line, MR Machines and RO Production Line:

- (a) First, was there an actionable misrepresentation by Dr Duan; if so, was this misrepresentation made fraudulently or negligently?
- (b) Depending on the answer above, was this misrepresentation relied on by Tritech, and did Tritech suffer damage as a result of this misrepresentation?
- (c) As an alternative if the above is not established, did Dr Duan fail to exercise reasonable skill and care in the performance of his duties?

FO Production Line

Was there an actionable misrepresentation by Dr Duan?

53 Tritech must first show that Dr Duan made an actionable misrepresentation. Tritech contends that these are as follows:¹⁰³

- (a) Shanghai Dahe was a suitable vendor to supply the FO Production Line;
- (b) the FO Production Line to be supplied by Shanghai Dahe was technically feasible; and
- (c) the FO Production line met Tritech’s technical requirements and could produce FO membranes.

I deal with these in turn.

¹⁰³ PWS at para 93.

54 Regarding the first alleged misrepresentation, whether or not Shanghai Dahe was a “suitable” vendor to supply the FO Production Line, this would have been a matter of opinion. Statements of opinion are themselves not actionable (see *Goldrich Venture Pte Ltd and another v Halcyon Offshore Pte Ltd* [2015] 3 SLR 990 at [107]), but statements of opinion can involve implied statements of fact. A statement of opinion by one who knows the facts best often involves an implied statement that he knows facts which justify his opinion: *Smith v Land and House Property Corporation* (1884) 24 ChD 7 (“*Smith*”) at 15, cited in *Bestland Development Pte Ltd v Thasin Development Pte Ltd* [1991] SGHC 27. Whether or not the maker of the statement genuinely held the opinion at the time of expressing it is also a matter of fact: *Bisset v Wilkinson and another* [1927] 1 AC 177 at 182. Thus, an expression of an opinion that is not genuinely held may be an actionable misrepresentation.

55 The onus is on Tritech, then, to show that Dr Duan did not, or could not, genuinely believe Shanghai Dahe was a suitable vendor at the time the representation was made. Tritech has not identified any facts that would have made it apparent to Dr Duan *then* that would suggest that Shanghai Dahe was not a suitable vendor for the FO Production Line. Nor is there any expert evidence to show that a person of Dr Duan’s capabilities would have concluded that Shanghai Dahe was not suitable. It was not disputed that Shanghai Dahe had produced a coating machine (which was a machine used in NUS’s FO project) for another company, SAIC-GE.¹⁰⁴ There was then a plausible basis to consider that Shanghai Dahe would be suitable to supply related technology, in the light of the other checks that were made. The first representation is not shown to be false.

¹⁰⁴ GZ at para 13.

56 The second alleged representation pertains to whether or not the FO Production Line was technically feasible. Again, this is a matter of fact. However, Tritech has not established that the FO Production Line was not technically feasible. What they have established is that the FO Production Line was completely non-functional *after* attempts were made to use it, and that it failed to meet a number of the technical requirements specified by Tritech. This does not necessarily mean that the technical requirements were impossible to meet, or that Shanghai Dahe was incapable of meeting the technical requirements *from the outset*. It simply means that Shanghai Dahe ultimately failed to do so. Nor is there evidence before the court to suggest that, even if the technical requirements for the FO Production Line had been met, the FO Production Line would not be able to function. The provision of a defective FO Production Line by Shanghai Dahe does not mean that the FO Production Line, as designed, was not “technically feasible”. Thus, Tritech has not shown that the second alleged misrepresentation is false.

57 The third representation comprises two distinct parts, that the FO Production Line met Tritech’s technical requirements and that the FO Production Line could produce FO membranes. These concern facts that are undisputed, that the FO Production Line did not meet Tritech’s technical requirements and could not produce any FO membrane. The third representation alleged is therefore the only potentially actionable misrepresentation.

58 The issue that follows is whether Dr Duan made these representations. Tritech’s case is that Dr Duan made this representation in an e-mail after his second pre-delivery inspection of the FO Production Line.¹⁰⁵ After his second pre-delivery inspection in May 2012, Dr Duan informed Dr Wang that “the

¹⁰⁵ PWS at para 98.

equipment is manufactured exactly according to the design drawings; the equipment is capable of meeting the technical requirements set out in the design ...”.¹⁰⁶ However, he began the e-mail by telling Dr Wang that he had been unable to test the production line for various reasons provided by Shanghai Dahe (see [12] above). He also mentioned that the equipment was not completely assembled yet. He further concluded the quoted statement above with “but the accuracy of the control can only be tested during commissioning.” Dr Duan was clear that he had not tested the equipment. His conclusion was simply based on comparing the drawings with what he saw. Given the nature of the “technical requirements” of the FO Production Line, this cannot have been a representation that they were met. I explain by reference to some examples of the technical requirements that the FO Production Line did not meet, as identified in the 7 November 2016 List.¹⁰⁷

59 One such technical requirement was that “The deflection device must ensure that the non-woven fabric or mesh yarn does not deviate from the reference position when applying the film solution. The film does not deviate from the precise position when moving, the film does not deviate from the precise position during winding, the ends of the film roll are flat when winding and the film does not produce wrinkles.”¹⁰⁸ This requirement was not met because of “the lack of precision in the manufacture of the drive rollers themselves, the drive rollers cannot be adjusted precisely and the tension control system is not perfect, resulting in obvious wrinkling of the film when winding, which does not meet the production requirements”.¹⁰⁹ Evidently, this technical

¹⁰⁶ 1 JBOD 411.

¹⁰⁷ PWS at para 55.

¹⁰⁸ 2 JBOD 342.

¹⁰⁹ 2 JBOD 342.

requirement related to the *operation* of the FO Production Line. To assess whether this technical requirement was fulfilled, one would have to attempt winding, and to check whether the film produced wrinkles. Another example is that the temperature inside the oven was required to be uniform and not to fluctuate by more than one degree.¹¹⁰ This was not met because the temperature fluctuated by more than one degree.¹¹¹ Certainly, one could only determine that this was the case after turning on the oven, and testing it for some time. I do not see how one could determine that these problems existed simply by reference to the drawings. Dr Duan was clear that he had not done any testing at the pre-delivery inspection. Thus, when his update to Dr Wang is read in totality, he was *not* representing that all the technical requirements were met. He would have no way of knowing this until the equipment was tested.

60 At best, he was representing to Dr Wang that there was nothing that could be gleaned from a simple comparison of the drawings and the FO Production Line that would suggest that the technical requirements were not met. Tritech has not adduced evidence to show that a comparison of the drawings and the state of the FO Production Line in May 2012 would have suggested that the technical requirements were not met. All that Tritech has is the testimony of Mr Gong that, when the FO Production Line was delivered in September 2012, it contained various external defects. The first issue is that this was some four months after Dr Duan's pre-delivery inspection. The second issue is that these external defects were essentially scratches, dents, grease stains and corrosion.¹¹² Mr Gong's evidence is that, based on what Dr Duan had told him and his own engineering knowledge, these defects would affect the FO

¹¹⁰ 2 JBOD 344.

¹¹¹ 2 JBOD 344.

¹¹² GZ at para 56.

membrane production process.¹¹³ However, that does not mean that these external defects showed that the technical requirements were not met. It is Tritech’s case that Dr Duan would have been aware of many of these defects at the second pre-delivery inspection in May 2011, and Dr Duan could not have been honest when he notified Dr Wang by email that he had “checked every part from start to finish”. It was not, however, clear why, if there were so many defects that could not be rectified, Mr Gong, who photographed them, did not raise any alarm. Dr Duan’s case at trial was that these were caused by oil and dust at the Shanghai Dahe factory because of the delay in delivery that was caused by the tardy completion of the construction of Factory Three.¹¹⁴ While Dr Duan raised this for the first time at trial, the fact remains that there is no objective evidence as to the state of the products at the pre-delivery inspection, and the evidential onus on this issue is on Tritech.

61 Further, Dr Duan’s e-mail must be taken in the context of what he had said following his first pre-delivery inspection, which was three months prior. On 5 March 2012, shortly after he carried out his first pre-delivery inspection of the FO Production Line on 28 February 2012, he informed Dr Wang that “[b]asically, the equipment is manufactured according to the drawings we have discussed. The structure of the frame is relatively firm, and there should be no jerry-built ones.”¹¹⁵ This was a qualified statement. He said that the equipment *basically* had been built according to the drawings and that there *should* be no poorly built ones. That this statement was qualified is brought home by what Dr Duan said in the next line, which was that “[t]he structure of the membrane scraping machine is very complicated, and the actual situation is a bit beyond

¹¹³ GZ at para 60.

¹¹⁴ Transcript, 19 October 2022, pp 10–11.

¹¹⁵ 1 JBOD 400.

my expectations”.¹¹⁶ He then stated that “[t]he upper end of the device is fully covered with rollers and brackets. The space looks very crowded, and this may cause trouble for future operation and maintenance.” Dr Duan was clearly not representing that the FO Production Line was free of issues.

62 Following these two pre-delivery inspections, Tritech does not allege that Dr Duan made any further *positive* representations that the technical requirements were all met. Rather, the contention is that he did not disclose the full extent of the technical defects.¹¹⁷ This was not a representation that the FO Production Line complied with Tritech’s technical requirements. It was clear to everyone at Tritech that the FO Production Line could not produce FO membranes. When the full list of technical defects was finally compiled and sent to Mr Gong on 7 November 2016, no one complained that they were caught by surprise. Dr Wang gave evidence that he decided to pursue the RO Production Line because “there were so many issues with the FO Production Line and there was little hope of them being rectified in a short period of time”.¹¹⁸ Thus, by 2014, Dr Wang was aware of serious problems with the FO Production Line. While Dr Wang may not have known the precise nature of the problems, it is clear that Tritech was not labouring under the misapprehension that the FO Production Line complied with *all* the technical requirements and could produce FO membranes. There was no misrepresentation of this sort from Dr Duan.

¹¹⁶ 1 JBOD 400.

¹¹⁷ PWS at para 54.

¹¹⁸ WXN at para 146.

Was there a failure to exercise reasonable care and skill in the performance of his duties?

63 Tritech does not succeed on the misrepresentation claims. Nevertheless, it is plain from the correspondence and the course of trial that Dr Wang’s fundamental assumption that Dr Duan was doing his competent best was unfounded.

64 As a preliminary matter, Dr Duan’s role should be clarified. Dr Duan’s case was that he was not in charge of the FO Production Line. Rather, he took instructions from Dr Wang or even Mr Gong. This assertion is absurd. Dr Wang’s expertise was in geological and geotechnical engineering.¹¹⁹ Dr Duan was specifically hired to lead the team for FO flat sheet work. Nor is it believable that he took instructions from Mr Gong. Mr Gong’s assistance was of an administrative and contractual nature.¹²⁰

65 Dr Duan revealed the true state of the FO Production Line to Tritech on 7 November 2016, which led to the termination of the contract with Shanghai Dahe four days later. For reasons that follow, I find that between 25 October 2013 and 7 November 2016, Dr Duan continued to “work” on a project that he knew was bound to fail, with his employer none the wiser.

66 Following installation at Factory Three in December 2012, Dr Duan began commissioning the FO Production Line in early 2013. Defects emerged which Dr Duan did not promptly disclose to Tritech. Instead, from 22 April 2013, he started communicating privately with Shanghai Dahe. Tritech’s premise for the claim concerning the FO Production Line was a discovery after

¹¹⁹ WXN at para 9.

¹²⁰ GZ at para 4.

these proceedings began that Dr Duan was constantly in private communication with Shanghai Dahe's Mr Chen regarding serious defects with the FO Production Line that he concurrently hid from Mr Gong. Most of this correspondence was not copied to anyone else at Tritech. The first such e-mail was sent by Dr Duan to Mr Chen on 22 April 2013.¹²¹ On 16 August 2013, Dr Duan sent a list of defects (the "16 August 2013 List") arising from the August commissioning process. Many items were serious or basic, such as rust, motors that stopped suddenly, the absence of equipment manuals, mechanical or electrical drawings. Discussions took place between 16 August to 27 September 2013, with Mr Chen and technicians attending at the Factory Three. Tritech submits that Dr Duan did not involve Tritech in his communications with Mr Chen because he did not want the true state of the FO Production Line to come to light.¹²²

67 Dr Duan's intention in doing so is pivotal. While some of the contents of the emails could reflect an employee trying to troubleshoot problems on his own, such as the initial 22 April 2013 email about installing an air knife, that was not Dr Duan's explanation. When confronted with the question as to why he kept these emails private, Dr Duan's response was that he did *not* keep defects secret from Tritech and that Mr Gong was aware of the problems with the FO Production Line because he regularly visited Factory Three.¹²³ Notably, Dr Duan's response was not that there was no need to keep Mr Gong informed of all the specific details of the FO Production Line. Instead, he appeared to

¹²¹ 1 JBOD 492.

¹²² PWS at para 56.

¹²³ Transcript, 19 October 2022, p 35 line 9 to p 36 line 6.

recognise that the contents of his e-mails with Mr Chen should have been brought to Mr Gong and Dr Wang's attention when he testified that:¹²⁴

... these work emails between me and Chen Dahe, at this time, when you just see the email, it may not be sent to Gong Zhao and Jeffrey Wang *but, later, normally I will reattach these emails and communicate this content of the email to Gong Zhao and Jeffrey Wang.* Why I should keep these emails between only Chen Dahe and me? I would not do such a thing.

[emphasis added in italics]

This was a lie. Dr Duan did not produce any specific emails reattaching any of his communications with Mr Chen to either Mr Gong or Dr Wang. Further, it was the unchallenged evidence of Mr Gong that, other than through the e-mails in evidence on which he was copied, he was not made aware of the problems with the FO Production Line.¹²⁵ Thus, I am unable to accept Dr Duan's explanation. He did indeed keep the e-mails between him and Mr Chen from Mr Gong and Dr Wang. This raises the obvious question of *why* he did so.

68 Dr Duan's motivation becomes clear when one considers the contents of the correspondence that *was* copied to Mr Gong. The first time that Mr Gong was apprised of a detailed list of the defects present in the FO Production Line was through the 25 October 2013 List, in an email written to Mr Chen and copied to Mr Gong.¹²⁶ Tritech's submission is that, in the 25 October 2013 List, Dr Duan whitewashed the defects in the FO Production Line. He omitted certain key defects that had not been resolved, and downplayed others.

69 For example, the 25 October 2013 List referred to the following issue with oil leaking from bearings:

¹²⁴ Transcript, 19 October 2022, p 32 line 24 to p 33 line 5.

¹²⁵ GZ at para 62.

¹²⁶ GZ at para 64; 1 JBOD 551.

Roller bearing grease in all the tanks contaminate the water quality. Currently, there is a small amount of spilled grease, when the wear increases in the future, oil contamination will become a major problem and will lead to poor bearing lubrication. Is it possible to find an oil-free bearing alternative?

This description of the issue was quite different from reality. The true severity of the issue can be seen from Dr Duan’s private (and earlier) communications with Mr Chen regarding the same. On 26 July 2013, Dr Duan told Mr Chen that there was “oil leaking from another roller of the bearing inside the membrane scraping water tank ... causing oil to remain on the surface of the water, which made it impossible ... to scrape the membrane” and asked him to provide a solution as soon as possible.¹²⁷ In a later e-mail on 6 August 2013, Dr Duan told Mr Chen that he had found a bearing with a wide crack and that there was a serious oil leak.¹²⁸ Four days after the 25 October 2013 List, on 29 October 2013, Dr Duan described the true extent of the problem to Mr Chen privately:¹²⁹

The bearing posed a big hidden hazard. It is impossible for oil to evaporate because this is lubricating oil. If the oil leaks and there is no oil lubrication in the future, the bearings will wear out fast. After the oil seeps out, firstly, it cannot be guaranteed that the oil will float on the water surface. Secondly, the membrane at both ends of each water tank will come out of the water and pass through the pressure roller, where the oil will stick onto the surface of the membrane.

Crucially, Dr Duan was explaining that the oil leak would lead to problems with the membranes themselves, in that oil would stick to their surface. This echoed what he had said on 26 July 2013 about the impossibility of “scraping” the membranes. Dr Duan accepted during cross-examination that this was unacceptable and the issue of the oil leaks from the bearings was a serious

¹²⁷ 1 JBOD 516.

¹²⁸ 1 JBOD 518.

¹²⁹ 1 JBOD 566.

problem.¹³⁰ This was not, however conveyed in the 25 October 2013 List, which simply identified the problem as one that would become a major one in the future, and one that could lead to “poor bearing lubrication”. Dr Duan hid the fact that the oil leak issue was already hindering the production of membranes.

70 The oil leak was not the only significant defect that Dr Duan had raised privately with Mr Chen earlier. In the 16 August 2013 List, Dr Duan raised issues regarding a faulty tension control system, defective rollers and winders, and defective servo motors.¹³¹ These issues were not present in the 25 October 2013 List. Tellingly, correspondence after that list (private communication between Dr Duan and Mr Chen and the 7 November 2016 List) shows that these problems were not subsequently resolved.¹³² Dr Duan’s act of omitting serious issues from the 25 October 2013 List reflected the state of his knowledge at the time, and his intention to conceal the true gravity of the situation from Tritech.

71 The final piece of evidence is the 7 November 2016 List, prepared pursuant to a request by Mr Gong, who sought to avoid making payment to Shanghai Dahe because of the various defects.¹³³ The 7 November 2016 List highlighted 27 critical defects with the FO Production Line and formed the basis for Tritech’s termination of the Shanghai Dahe contract. Mr Gong’s evidence was that some of these issues were being raised for the first time, more than four years after the FO Production Line was delivered, and more than three years after the 25 October 2013 List.¹³⁴ Dr Duan did not offer any satisfactory

¹³⁰ Transcript, 19 October 2022, p 22 lines 13–14.

¹³¹ 1 JBOD 520.

¹³² PWS at para 56(b)(i).

¹³³ 2 JBOD 339.

¹³⁴ GZ at para 75.

explanation as to why this was the case. In his affidavit of evidence-in-chief (“AEIC”), when setting out the sequence of events, Dr Duan states that by May 2016, it became obvious that the FO Production Line would not be successful.¹³⁵ There is a failure to explain, however, how this became obvious to him only in May 2016, and why he still tarried thereafter until Mr Gong prompted him in November 2016.

72 The inference to be drawn from the above is that, between 22 April and 25 October 2013, Dr Duan formed the view that the FO Production Line that had been supplied by Shanghai Dahe was not viable. It was for this reason that he started a long chain of private communication with Mr Chen. While he was still taking steps to rectify issues, his concealment of serious defects from Trittech reflected a growing certainty that the FO Production Line was not viable. On 25 October 2013, he updated Mr Gong with a list that was not accurate. If Dr Duan were exercising reasonable care, he would have at the minimum kept Mr Gong properly informed through that list. Instead, he gave Trittech the impression that the issues with the FO Production Line could be resolved, and that there was a chance that the commissioning process would eventually be successful. This allowed him to continue working on the FO Production Line project for another three years, until he finally gave the full picture to Trittech on 7 November 2016. Dr Duan’s conduct amounted to a failure to perform his duties as the engineer in charge of the FO Production Line project with reasonable diligence, skill and care.

73 The assessment of damages arising from his failure to discharge his duty to exercise reasonable care and skill should therefore start from 25 October 2013. Trittech has sought to impose liability from the time that Shanghai Dahe

¹³⁵ DW at para 31(t).

was chosen. There is, nonetheless, insufficient evidence that Dr Duan was not taking reasonable care up to that point. It is not disputed that there was, at the time that Dr Duan commenced work with Tritech, no known FO production line producer in China, and the only known producer in the world was a company based in the US.¹³⁶ This aspect of the need for cutting edge innovation was not disputed. From Dr Wang's point of view, he was taking a reasonable risk, because the NUS laboratory-scale production line worked; Dr Duan was the person responsible for that pilot; and he was able to task the same person to commercialise the pilot.¹³⁷ This was consistent with Dr Wang's assumption throughout, despite the lack of success of the FO or RO Production Lines, that Dr Duan was indeed trying his level best. It was only after the private communication with Mr Chen emerged showing Dr Duan's state of mind, and subsequent events such as the bribery conviction, that Dr Wang suspected a different set of circumstances.¹³⁸ On a related note, the bribery conviction described at [21] above was not Dr Duan's only bribery conviction. There was another conviction involving a bribe from a vendor, Qingdao Danjia, where the PRC Criminal Court found that Dr Duan had received a kickback of RMB 100,000 on 26 January 2017. In 2016, Dr Duan had recommended Qingdao Danjia to TEG, and TEG had entered into three contracts with them. With the benefit of hindsight, Dr Wang was suspicious that, similarly, a bribe from Shanghai Dahe may have resulted in its selection. This is plausible. It is equally plausible, however, that the kickbacks, if any, started in the 22 April to 25 October 2013 period, rather than at the outset of Shanghai Dahe's selection. Dr Wang relies on incidents after 25 October 2013 when explaining his

¹³⁶ DWS at p 8 paras 25–26.

¹³⁷ Transcript, 7 October 2022, p 13 lines 19-22.

¹³⁸ WXN para 134.

suspicious:¹³⁹ the earliest being the inexplicable choice of Shanghai Dahe for the MR Machines, and subsequently, Dr Duan’s line to Mr Chen in a 7 July 2014 email in the context of payment for the defective MR Machines, “I have also discussed final payment with [Mr Gong] and asked him to apply for a portion of the money. The most important thing is that we work well together”.¹⁴⁰

74 In this context, I deal with a related point raised by Dr Duan for the first time in his AEIC. His evidence was that NUS’s laboratory-scale FO production line was a failure and that the only FO membranes successfully produced were produced by hand.¹⁴¹ I am sceptical that the NUS laboratory version was produced by hand. This deception on Dr Duan’s part would have been difficult in the light of the NUS supervision and specific oversight of Prof Ng. The formula that was said to have been used in the NUS laboratory production line was also verified by NUS and the subject of an exclusive licence agreement between Tritech and NUS. Because this contention was not pleaded, Tritech had no opportunity to address the allegation. Nor was it put to Tritech’s witnesses in cross-examination. I accept Dr Wang’s evidence that he was told the NUS laboratory-scale version was a working production line that possessed potential to be built on a commercial-scale; in his words, a “complete prototype” to “size-up, or commercialise”.¹⁴²

75 An associated issue is whether Dr Duan breached his duties to Tritech prior to 25 October 2013, for example, on 16 August 2013, when he sent a substantive list to Mr Chen privately, or on 27 September 2013, around the time

¹³⁹ WXN at para 182; 6 JBOD 185.

¹⁴⁰ 1 JBOD 643.

¹⁴¹ Transcript, 12 October 2022, p 80 line 17 to p 81 line 15.

¹⁴² Transcript, 7 October 2022, p 11 lines 20-22.

Mr Chen and his technicians visited at Factory Three. Nevertheless, Dr Duan was the Director of Factory Three. His role would have given him a measure of discretion in exercising his responsibility. While Mr Gong criticised some measures taken by Dr Duan as “stopgap”, such as a 28 June 2013 suggestion to use a vacuum pump, there was no expert evidence on the specific ad-hoc measures that Dr Duan employed to rectify issues as they arose. Dr Duan was expected to resolve issues on the ground and did not need to report every issue to management. That the accusation from Tritech now is that he only copied Mr Gong on 28 June 2013 and 25 October 2013 in the context of numerous communications with Mr Chen¹⁴³ lends weight to the view that Dr Duan was trusted to report as he saw fit. On 25 October 2013, he chose to update Mr Gong by copy in the context of the commissioning of the FO Production Line. Mr Gong was in charge of payment and contract issues. The onus was on Dr Duan to exercise due care and honesty in preparing the 25 October List that was copied to Mr Gong. As explained above, Dr Duan failed to do so.

MR Machines

Was there an actionable misrepresentation by Dr Duan?

76 Tritech’s case is that Dr Duan misrepresented that the MR Machines satisfied Tritech’s technical requirements and would properly function.¹⁴⁴ This representation was made in Dr Duan’s e-mail to Dr Wang on 18 December 2013 (“18 December E-mail”), where he stated that “[t]he acceptance of the film roller equipment is quite satisfactory”, “the equipment is manufactured in accordance with our design” and “The test run met the requirements we set

¹⁴³ Wong Partnership’s 7 December 2022 letter at para 10(b), PWS at para 56.

¹⁴⁴ PWS at para 120.

out”.¹⁴⁵ The only qualification in this e-mail was that it had been discovered that a further part was required, and Dr Duan had asked Shanghai Dahe to provide this part.

77 Dr Duan explained at trial that the test run conducted at Shanghai Dahe’s premises was simply starting the machine and letting it run. There was no product used to test how the machine would deal with the product. Based on the test run conducted, it would therefore be impossible to tell whether a successful product could be produced from the MR Machines.¹⁴⁶ Dr Duan’s e-mail does not imply that a product was used in the test run. Nor is there any evidence from Dr Wang or Mr Gong that Tritech expected Dr Duan to conduct a full test run with a product.

78 It then becomes clear that the defects with the MR Machines that Dr Duan later identified on 24 April 2014 were not defects that could have been ascertained during his pre-delivery inspection. As such, he could not have made any representation that they did not exist. His representation that all the contractual requirements were complied with only extended to those requirements that could have been checked. During cross-examination, Dr Duan was able to explain why it was not possible for him to identify the various defects during the test run. For example:¹⁴⁷

- Q. Item 4, whether the motor can be turned or not, that would be something you should have tested during the test run at Shanghai Dahe, correct?
- A. So when we don't use this motor to roll the membrane, the motor runs, and when we put membrane and start the motor to roll the membrane, the motor did not run.

¹⁴⁵ 1 JBOD 594.

¹⁴⁶ Transcript, 19 October 2022, p 39 lines 2–11; p 39 line 24 to p 40 line 1.

¹⁴⁷ Transcript, 19 October 2022, p 39 lines 12–19.

The problems resolved after we changed the motor to a more powerful motor.

79 Dr Duan's representation in his e-mail was not a confirmation that there were no issues with the MR Machines whatsoever. It was a confirmation that there were no issues with the MR Machines that could be detected from a visual inspection and a test run without product. Tritech has not shown that this confirmation was false. It was, rather, the assumption Dr Wang had, after receiving Dr Duan's news, that was false. Dr Wang's assumption was that Dr Duan had conducted a proper inspection, which cross-examination has shown Dr Duan wholly failed to do. While this may have been negligent (see [81] below), the fact remains that Dr Duan did not *represent* that he did so to Dr Wang.

Was there a failure to exercise reasonable care and skill in the performance of his duties?

80 Again, and more so as time went on, Dr Duan's emails were crafted with a view to mislead. While Tritech is not able to establish its case on misrepresentation, it is plain that Dr Duan's lack of care grew more audacious with time.

81 Dr Duan was, in the run-up to the 25 October 2013 List, aware of a number of serious defects with the FO Production Line. As I have found at [72] above, he had in fact come to the view that the FO Production Line was not viable. The MR Machines were supplied by Shanghai Dahe, the same company. A reasonable employee in Dr Duan's position would have been well aware of the risk that the MR Machines would also be non-functional. Despite this, Dr Duan chose to conduct the peremptory inspection that he did and thereafter to send the 18 December E-mail. While I have found that, strictly speaking, this e-mail was not factually inaccurate, it certainly conveyed the impression that

the MR Machines were acceptable. Giving Tritech this impression without fully testing the MR Machines, despite what he knew about the FO Production Line, was a breach of Dr Duan’s duty to perform his duties with reasonable care and skill.

82 There is a more fundamental reason why Dr Duan was in breach of duty. The MR Machines were ancillary to the FO Production Line. They were meant to configure membranes that were produced by the FO Production Line. Unless the FO Production Line was functional, they would be of no use at all.¹⁴⁸ On 9 October 2013, Dr Duan in a private email to Mr Chen stated in the context of the FO Production Line, “the rollers are not adjusted properly, and the cloth running generated wrinkles easily.”¹⁴⁹ Despite his knowledge that the FO Production Line was not going to be functional (and that the MR Machines would be superfluous), Dr Duan arranged for the purchase of the MR Machines in November 2013 and thereafter induced Tritech to accept the MR Machines in December 2013.

83 In doing so, Dr Duan fell short of the standards expected of a reasonable employee in his position. He failed to exercise reasonable skill and care in the performance of his duties.

RO Production Line

Was there an actionable misrepresentation by Dr Duan?

84 In respect of the RO Production Line, Tritech alleges that Dr Duan made four representations:¹⁵⁰

¹⁴⁸ GZ at para 77; Transcript, 19 October 2022, p 11 line 22 to p 12 line 20.

¹⁴⁹ 1 JBOD 541.

¹⁵⁰ SOC at para 43 and 46.

- (a) Zhejiang Shengshi had the capacity to design, manufacture and install the RO Production Line equipment of a quality that is fit for its intended purpose (ie. to produce RO Membranes on a commercial scale);
- (b) Zhejiang Shengshi had prior experience in supplying the RO Production Line equipment;
- (c) Zhejiang Shengshi's technical solutions were its own technology; and
- (d) the RO Production Line was free of defects and could be accepted by Tritech.

85 On the first alleged representation, Dr Wang's evidence is that Zhejiang Shengshi must have lacked the capability to deliver the RO Production Line because otherwise, it would not have delivered equipment that was so fundamentally defective that it would fail to function even after two years of trials and commissioning.¹⁵¹ Mr Gong's evidence is that in 2018, in anticipation of litigation with Zhejiang Shengshi, he discovered that the funds in Zhejiang Shengshi's bank account were almost zero, Zhejiang Shengshi did not own any land, and its factory premises were leased. Further, its factory was an old simple steel structure workshop that was unsuitable for manufacturing production line equipment such as the RO Production Line. The processing equipment there was also very simple. This was the factory that Dr Duan had visited twice: once before the contract with Zhejiang Shengshi was signed, and once more for the pre-delivery inspection.¹⁵² Thus, this sets the RO Production Line apart from the FO Production Line. I accept that when Dr Duan visited Zhejiang Shengshi's

¹⁵¹ WXN at para 160.

¹⁵² GZ at paras 121–123.

premises, he would have become aware that it was not going to be able to supply a viable RO Production Line. This means that, in July 2014, he misrepresented to Dr Wang that Zhejiang Shengshi had the capacity to design, manufacture and install a production line to produce RO Membranes on a commercial scale.¹⁵³

86 As for the second and third representations, Tritech has not produced clear evidence to prove that they were false, even if they were made. Tritech simply asserts in submissions that they were “unlikely” to be true.¹⁵⁴ This is not sufficient.

87 Regarding the fourth representation, I find that this was made by Dr Duan, and that it was false at the time it was made. In his e-mail dated 1 December 2014 to Dr Wang, Dr Duan confirmed that the “appearance and structure [of the water tank and drying tank] comply with the requirements described in the Contract.”¹⁵⁵ Nonetheless, like in his e-mail after the FO Production Line pre-delivery inspection, Dr Duan explained that he had not been able to test the machinery and that there were some issues with it. On the whole, I find that this amounted to a representation by Dr Duan that the water and drying tank of the RO Production Line complied with the contractual requirements. The only qualification to this was that he was unable to check if the correct material was used. As became evident once Dr Duan left Tritech, the water and drying tank did *not* meet the specifications in the contract – specifically, the thickness of the water tank was 2.75mm rather than the stipulated 4mm and the tank could deform under force.¹⁵⁶ At trial, Dr Duan

¹⁵³ WXN at para 152.

¹⁵⁴ PWS at para 148.

¹⁵⁵ 2 JBOD 80.

¹⁵⁶ GZ at para 119(d)(i).

explained that he had *not* checked the thickness of the water tank, because it would have been impossible to do so.¹⁵⁷ However, in his e-mail, he made a clear statement that the “structure” of the water tank complied with specifications. A reasonable interpretation of this statement was that “structure” would include the thickness of the walls. He did not expressly qualify his statement by saying that he was unable to check the thickness of the water tank, nor would this qualification be apparent from the rest of this e-mail. When Dr Duan represented that the water tank met the contractual requirements, he thus represented that the thickness of the water tank walls was 4mm. This was not true. Further, it is telling that, in this suit, Dr Duan does not even attempt to justify his statement by highlighting the contractual specifications that he checked and found the RO Production Line to comply with. Dr Duan’s defence was that he was not in charge of the RO Production Line, that he “worked under [Wang Bo]” in the context of the RO Production Line and was his “assistant”.¹⁵⁸ This was a repetition of a similarly absurd assertion made in the context of the FO Production Line. Dr Duan was by this time the Chief Technical Officer of TWT and the Water & Environment Group of Tritech’s companies, director of Factory Three and resident expert on flat sheet membranes.

Were the misrepresentations fraudulent?

88 For a representation to have been made fraudulently, it must have been made knowingly, without belief in its truth or recklessly: *Derry v Peek* as cited in *Wishing Star Ltd v Jurong Town Corp* [2008] 2 SLR(R) 909 at [16].

89 I begin with the fourth misrepresentation. In light of Dr Duan’s evidence that he omitted to check the structure of the water tank against all the

¹⁵⁷ Transcript, 19 October 2022, p 80 lines 4–11.

¹⁵⁸ Transcript, 19 October 2022, p 57 lines 16–23.

requirements in the contract, it cannot be said that he *knew* his representation was false. However, I find that he did not care whether it was true or false. In my view, it is telling that Dr Duan specifically attended the pre-delivery inspection alone despite the suggestion from Mr Wang Bo to bring an electrical engineer along because the equipment “has electrical and mechanical processing”.¹⁵⁹ Dr Duan said that the electrical engineer was not needed because the trip was just to check the state of assembly of the equipment and the number of spare parts, and the equipment was not electrically-operational.¹⁶⁰ Having seen what he had seen on his first inspection, Dr Duan knew that he could not bring an electrical engineer in the light of the report he would thereafter make. This is confirmed by the fact that Dr Duan’s report after the pre-delivery inspection was indeed inaccurate. He was not concerned with the truth of his report, but simply with securing Tritech’s acceptance of the RO Production Line.

90 Tritech also highlights that Dr Duan hid the defects in the RO Production Line from it for a significant period of time. Despite commissioning beginning in January 2015, he only made known some of the serious defects more than a year later in April 2016. After that, he falsely assured Dr Wang that “trial production was smooth” and that the RO Production Line was in a “relatively stable state” despite the fact that the RO Production Line was not producing membranes of good quality.¹⁶¹ Dr Duan was clearly being dishonest by this time. That Dr Duan was prepared to be dishonest to hide issues with the RO Production Line supplied by Zhejiang Shengshi lends support to my finding that he was being dishonest when he made the pre-delivery misrepresentation.

¹⁵⁹ 2 JBOD 76.

¹⁶⁰ 2 JBOD 78.

¹⁶¹ 2 JBOD 234; 19 October Transcript, p 99 lines 12–17.

91 Once this conclusion is reached, it follows that he was fraudulent when he made the first, pre-contractual, misrepresentation as well. The facts show that Zhejiang Shengshi could not and did not provide a satisfactory RO Production Line. And Dr Duan has not provided any explanation for why he thought otherwise.

Reliance and loss

92 Dr Duan's two representations were in his reports following his site visits to Zhejiang Shengshi's premises. They were undoubtedly intended to be relied on by Tritech and Tritech did rely upon them, to its detriment. Tritech entered into the contract with Zhejiang Shengshi for the purchase of the RO Production Line, and subsequently accepted delivery of the RO Production Line from Zhejiang Shengshi, in reliance on Dr Duan's representations that Zhejiang Shengshi was capable and that the RO Production Line was acceptable.¹⁶² Purchasing and accepting the defective and non-functional RO Production Line did cause Tritech loss, which should be subsequently assessed in accordance with the bifurcation order.

Conclusion

93 I summarise my conclusions in this section as follows:

- (a) For the FO Production Line, Dr Duan was in breach of his implied contractual duty to exercise reasonable skill and care in the performance of his duties from 25 October 2013 onwards.
- (b) For the MR Machines, Dr Duan was in breach of his implied contractual duty to exercise reasonable skill and care in the

¹⁶² WXN at para 159.

performance of his duties in ordering and accepting the machines.

- (c) For the RO Production Line, Dr Duan fraudulently misrepresented that Zhejiang Shengshi was capable of producing a suitable production line in July 2014, and fraudulently misrepresented that the RO Production Line was acceptable in December 2014.

94 Because the earliest breach occurred in 2013, and this suit commenced in 2018, I need not deal with the limitation issues raised by Dr Duan. Tritech is entitled to damages for loss suffered as a result of Dr Duan's breaches and fraudulent misrepresentations. The extent of these damages will be determined at the next stage of proceedings.

Breach of duty of good faith and fidelity

95 Employees are subject to a duty of good faith and fidelity to their employers as an implied term in their employment contracts: *Man Financial* at [193]. To determine whether there has been a breach of this duty, Lord Esher MR in *Robb v Green* [1895] 2 QB 315 (cited in *Smile Inc Dental Surgeons Pte Ltd v Lui Andrew Stewart* [2012] 4 SLR 308 at [64]), stated (at 316) that the appropriate question is whether:

... such conduct was not what any person of ordinary honesty would look upon as dishonest conduct towards his employer and a dereliction from the duty which the defendant owed to his employer to act towards him with good faith.

96 I find that Dr Duan was in breach of his duty of good faith and fidelity in relation to the RMB400,000 that he was given by Dr Wang in two debit cards on 19 August 2016. Dr Wang's evidence is that this sum was given to Dr Duan

as fees for two technical consultants which Dr Duan had selected.¹⁶³ This is confirmed by an e-mail from Dr Duan to Dr Wang the day prior, stating that he had selected two companies as technical consultants, and seeking Dr Wang’s approval of payment of RMB400,000 to them.¹⁶⁴ Dr Wang’s evidence is that Trittech never received any technical consultancy services. When this was discovered in July 2019, TEG reported Dr Duan to the Chinese police.¹⁶⁵

97 It is not disputed that Dr Duan had paid the RMB400,000 to one Mr He. He agreed with Mr He that Trittech would engage Mr He to provide technical support to Trittech at RMB400,000, with Dr Duan receiving a kick-back of one-third of that sum (RMB149,800).¹⁶⁶ He was convicted of bribery in China and sentenced to seven months’ imprisonment with a fine of RMB100,000.¹⁶⁷

98 Dr Duan now claims that the RMB400,000 was given to him to purchase a formula from one Mr He, which he did, and which formula he sent to Trittech on 25 August 2016.¹⁶⁸ I do not accept this new explanation. It wholly contradicts the 18 August 2016 e-mail, which makes no reference to a formula or Mr He. It also contradicts the PRC Criminal Court judgment, which reflects agreed facts that the RMB400,000 was paid for “technical support”. This reflects that Dr Wang approved the payment of RMB400,000 for consultancy services for Trittech. It is not disputed that the transaction involved a significant secret commission for himself. Dr Duan’s lawyer stated at trial that Dr Duan was in

¹⁶³ WXN at para 168–169.

¹⁶⁴ 2 JBOD 239.

¹⁶⁵ WXN at para 172.

¹⁶⁶ 6 JBOD 185.

¹⁶⁷ 6 JBOD 187.

¹⁶⁸ DWS at p 39 para 2 and p 40 para 6.

principle prepared to return the RMB149,000 commission.¹⁶⁹ This rendered his use of the RMB400,000 a breach of his duty of good faith and fidelity. It was dishonest.

99 Thus, Dr Duan used Tritech’s RMB400,000 for an unauthorised purpose. But for Dr Duan’s misappropriation, Tritech would still have this sum. There is no evidence that Tritech obtained anything of value in return for this RMB400,000 spent by Dr Duan. Consequently, Dr Duan’s breach of the implied term in his employment contract caused loss to Tritech amounting to RMB400,000. He is thus liable to return this sum: *Piattchanine, Iouri v Phosagro Asia Pte Ltd* [2015] 5 SLR 1257 (at [242] and [244]) and *Enjin Pte Ltd v Pritchard, Lilia* [2022] SGHC 201 (at [89]–[95]).

100 Tritech also submits that Dr Duan’s misappropriation of RMB400,000 was a breach of the fiduciary duties that he owed to Tritech.¹⁷⁰ Tritech argues that, by virtue of his position in “top management” with broad discretionary powers, he owed Tritech the same fiduciary duties ordinarily owed by a director to its company.¹⁷¹ In view of my earlier finding on Dr Duan’s contractual duty, it is not necessary for me to deal with this point, save to note that *Clearlab SG Pte Ltd v Ting Chong Chai and others* [2015] 1 SLR 163 (“*Clearlab*”) lists at [275] as a feature of a fiduciary the ability to unilaterally exercise the particular power or discretion under discussion. Dr Duan obtained Dr Wang’s authorisation for the expenditure in question.¹⁷² He was remiss in failing to carry out his specific duty, instead of wrongly exercising a discretion given to him.

¹⁶⁹ Transcript, 29 September 2022, p 46 lines 18–25.

¹⁷⁰ PWS at para 264.

¹⁷¹ PWS at para 260.

¹⁷² WXN at para 169.

While it could be argued that he was appointed as agent to use the RMB400,000 to purchase the consultancy services, Tritech has not put its case on this basis. In any event, the contractual duty of good faith and fidelity is sufficient to ground Dr Duan’s liability for the return of the RMB400,000.

Confidential information

Claim in equity

101 A claim in breach of confidence in equity comprises three elements (*I-Admin (Singapore) Pte Ltd v Hong Ying Ting and others* [2020] 1 SLR 1130 (“*I-Admin*”) at [43]):

- (a) The information is confidential in nature.
- (b) The information was imparted in circumstances of confidence.
- (c) The information has been used without authorisation and to the detriment of the plaintiff.

These requirements are satisfied for reasons that follow.

Necessary quality of confidence

102 Tritech identifies the following allegedly confidential information as having been taken and misused by the defendants:¹⁷³

- (a) the “Membrane Making Liquid Formula” for use in the production of ultrafiltration products;
- (b) the operating parameters for use in the production of ultrafiltration products;

¹⁷³ PWS at paras 156–157.

- (c) the operating procedures for use in the production of ultrafiltration products;
- (d) QES management system for use in the production of ultrafiltration products;
- (e) quality control information for RO membrane products;
- (f) production methodologies, operating procedures and quality control test methods for “VaVie” products;
- (g) pricing information relating to a number of TEG’s products; and
- (h) Tritech’s supplier and customer information.

103 In their defence, the defendants only assert that lists and identities of suppliers, vendors and customers, as well as price lists, are not confidential in nature.¹⁷⁴ They do not suggest that the other information is not confidential. In closing submissions, the defendants do not even pursue their objection to the confidentiality of Tritech’s pricing, supplier and customer information.

104 Information possesses the necessary quality of confidence so long as it remains relatively secret or relatively inaccessible to the public as compared to information already in the public domain: *Invenpro (M) Sdn Bhd v JCS Automation Pte Ltd and another* [2014] 2 SLR 1045 (“*Ivenpro*”) at [130(a)]. I am satisfied that all the information identified by Tritech possess the necessary quality of confidence. The documents that contained the information in question were created internally by Tritech, inaccessible to the public, and access to them was restricted even *within* Tritech.

¹⁷⁴ Defence (Amendment No 6) at paras 9–10.

105 The formula, operating parameters, operating procedures and QES management system were described by Dr Tan as being crucial to Tritech’s production of ultrafiltration products on a commercial scale.¹⁷⁵ As such, save for senior management of Tritech, no other employee would have access to the internally-created documents containing such information. The information would only be shared with production employees in so far as it was relevant to the specific step of production that they were involved in.¹⁷⁶ The documents containing the QES management system were also internally-created, and the handling of them was limited to authorised personnel only.¹⁷⁷ The RO QC information was contained in documents that were created by the production team and were accessible by them only.¹⁷⁸ The information relating to the “VaVie” products was stored in a .rar file and had been collated based on years of production tuning and continuous optimisation of the production process.¹⁷⁹ The documents which contained the pricing information were also kept strictly confidential to those involved in sales and marketing of the respective products.¹⁸⁰

Imparted in circumstances of confidence

106 Where there is a contract expressly or impliedly imposing an obligation of confidence, this element may be satisfied simply by reference to that contract: *Clearlab* at [65]. This is consistent with the general test articulated in *Adinop Co Ltd v Rovithai Ltd and another* [2019] 2 SLR 808 at [88], of whether a

¹⁷⁵ TCH at para 48.

¹⁷⁶ TCH at para 51.

¹⁷⁷ TCH at para 52–53.

¹⁷⁸ TCH at para 98.

¹⁷⁹ TCH at para 98.

¹⁸⁰ WXN at para 60.

reasonable person in the shoes of the recipient of the information would have known on reasonable grounds that the information was confidential and given to him in confidence.

107 Both Dr Duan and Mr Luo signed non-disclosure agreements with TWT (“NDAs”). Dr Duan’s was signed on 1 September 2011.¹⁸¹ Mr Luo’s was signed in 2010.¹⁸² Under the NDAs, the following are specifically stipulated to be confidential information:¹⁸³ “all financial, marketing, sales, technical, operational, commercial and human resource information, trade secrets, business plans ... models, product information, processes, formulae, designs, specifications, drawings, data, manuals and instructions, and product and service price information” and “customer lists and data”. This encompasses all the information set out at [103] above. Pursuant to the NDAs, the defendants were obliged to keep said information “in strict confidence”.

108 Further, Tritech’s Service Guidelines (“the Guidelines”), which were incorporated into both defendants’ employment contracts, stipulated that:¹⁸⁴

Employees should refrain from activities such as ... disclosing to unauthorised persons confidential information or company secrets, demanding or accepting bribes, personal gifts from subordinates, suppliers or customers, or committing other misconduct generally not accepted in work place. ...

And that:

Upon cessation of service:

a) Employees have to return all company properties and document to the company.

¹⁸¹ 3 JBOD 361.

¹⁸² 3 JBOD 273.

¹⁸³ 3 JBOD 274 and 362.

¹⁸⁴ 3 JBOD 308.

b) They have to keep company information and business contacts (including in-house software, worksheet, spread sheets, list of suppliers, list of vendors, and all other information) confidential and non-disclosure [sic] to any parties, except with the order form relevant Authorities. ...

109 Clause IV(2) of Mr Luo's Employment Contract stipulated that:¹⁸⁵

[Mr Luo] shall undertake not to privately disclose or transfer the technical achievements and technical data of [TET]. Upon termination or cancellation of the contract, [Mr Luo] shall return all experiment recordings, work reports and data to his Department.

110 It would therefore have been abundantly clear to Dr Duan or Mr Luo that they were subject to an obligation of confidence in respect of any of the confidential information that they acquired while working for Tritech.

Misuse of confidential information

111 The trap purchase evidence (summarised at [28] above) was not disputed by the defendants, whose counsel did not cross-examine Ms Guo. Tritech relies on the following key points to show that the defendants were able to manufacture the near-identical products at Dreamem by misusing Tritech's confidential information:¹⁸⁶

- (a) Dreamem sold products that were identical to, or at least substantially similar to, Tritech's products.
- (b) Dreamem was able to produce these membranes within a very short period of time, despite not having the requisite expertise.
- (c) The timing of Mr Luo's taking of confidential information coincided with the commencement of Dreamem's production.

¹⁸⁵ 3 JBOD 101.

¹⁸⁶ PWS at paras 178–243.

- (1) Dreamem sold products that were identical to, or at least substantially similar to, Trittech’s products.

112 After the trap purchase of Dreamem’s products, Dr Tan carried out various tests. His findings can be summarised as follows:

(a) First, the products were physically similar. The length of the fibres in Dreamem’s curtain-style membrane was very close to the length of the fibres in Trittech’s curtain-style membrane, with a deviation of only 0.33%. The length of fibres used in Trittech’s curtain-style membrane is not information that is disclosed to the public in Trittech’s brochure. Dreamem’s column-style membrane had the same length and diameter as Trittech’s column-style membrane.¹⁸⁷

(b) Second, the properties displayed by the Dreamem products were either identical to or closely similar to those of the Trittech products. Dr Tan’s evidence is that a substantial amount of R&D was conducted by Trittech over approximately a decade to determine how to achieve these properties through adjusting the various parameters and steps in the production process.¹⁸⁸ Dreamem’s products bore similar properties to Trittech’s even in specifications for which Trittech was class-leading in China. These properties could only be achieved if the parameters in the fabrication process were well-controlled. Any deviation from Trittech’s operating parameters and procedures would result in a difference in these properties.¹⁸⁹

¹⁸⁷ TCH at para 67.

¹⁸⁸ TCH at para 68.

¹⁸⁹ TCH at para 71.

(c) Third, the vessels and components of the casing used to house Dreamem’s curtain-style membrane were substantially similar to those used to house Trittech’s. While some of these vessels and components were simply bought off the shelf, some had been customised to fit Trittech’s product optimally.¹⁹⁰

113 Dr Tan’s explanation for the near-identical products was that Mr Luo had obtained and misused confidential information through his position at Trittech, as reported by staff nearer the end of 2017. Photographs taken at the evidence preservation process in Dreamem’s factory showed similarities between the production line at Factory One and Dreamem. Dr Duan, on his part, was one of two key verification engineers (the other being Dr Tan) who had access to the verification process used and reports generated in the R&D work for the hollow fibre membrane.

114 In response, the defendants asserted that their product, termed by Dr Duan as “MBR reinforced hollow fibre membrane” was different from Trittech’s. The defendants did not test the trap purchase products or deny that the specific products tested by Trittech were sold by Dreamem to Ms Guo. Nor does Dr Duan explain any difference. The defendants called as an expert witness Dr Yang Xinhao (“Dr Yang”). Expert witnesses owe a duty to the court to ensure the reliability and usefulness of their report: *Wong Tian Jun De Beers v Public Prosecutor* [2022] 4 SLR 805 (“*Wong Tian Jun*”) at [19]. It is also critical for an expert to provide the reasoning behind his or her conclusions; the mere stating of conclusions will be of little utility to the court: *Public Prosecutor v Chia Kee Chen and another appeal* [2018] 2 SLR 249 (“*Chia Kee Chen*”) at [118]. Notwithstanding, Dr Yang’s affidavit baldly stated that he was given two

¹⁹⁰ TCH at para 72–73.

test reports of Dreamem and Tritech products by the defendants, and that they show that there is no evidence of copying.¹⁹¹ Dr Yang does not provide any explanation for his conclusion. He did not conduct any tests, and the test reports (from an unknown third party source) enclosed within his affidavit are not self-explanatory. Therefore, on the key question of whether Dreamem’s products were similar to Tritech’s, Dr Yang’s report shed absolutely no light beyond its bare conclusion.

115 Dr Yang’s evidence is both irrelevant and non-compliant with the requirements for expert evidence. Under the O 40A r 3 of the Rules of Court (2014 Rev Ed), there are various requirements that an expert report must fulfil. These requirements include providing details of any literature or other material which the expert has relied on in making the report, and, crucially, confirming that the expert recognises that his duty is *to the court*, and that he complies with that duty. Dr Yang’s expert report is lacking on both these points. When it was put to Dr Yang that he is required to give details of the literature he relied on, he responded that he was “not obliged to support evidences” and he “can give [his] contribution according to [his] professional knowledge in these membrane products”.¹⁹²

116 Even more concerning was the fact that Dr Yang’s expert report was little more than a repetition of facts that came not from his experience as an expert in the field, but from Dr Duan. He admitted this in cross-examination:¹⁹³

Q. Let me put it to you that your evidence here for paragraphs 19.1 all the way to 21, under “RO component” is not your own opinion, but you are just

¹⁹¹ Dr Yang Xinhao’s AEIC (“YXH”) at para 13.

¹⁹² Transcript, 21 October 2022, p 25 lines 3–11.

¹⁹³ Transcript, 21 October 2022, p 21 lines 3–14.

simply giving evidence on Dr Duan’s behalf by repeating what he told you. Agree or disagree?

A. (Answer not yet interpreted).

Q. It’s agree or disagree.

A. (Through an interpreter) I agree, and some of the – most of the – some of the informations I checked online, for example, the manufacturers, so that part I contributed based on my own online search, and some of the informations [sic] were told by Duan to me.

On the topic of FO membranes, Dr Yang conceded that he had no experience whatsoever in its fabrication or production.¹⁹⁴ One portion of his expert report that dealt with FO membranes contained wording identical to that found in Dr Duan’s AEIC. Dr Yang explained that “things like the details of the research work they have done were told to me by [Dr Duan], and also I learnt some of the informations during the discussion with the lawyer.”¹⁹⁵ While an expert report could be premised on stipulated facts furnished by his instructions, the purpose of an expert would be to assess the conclusions to be drawn from those facts, and not to merely repeat them. Dr Yang’s evidence was therefore entirely unhelpful. The defendants do not attempt to explain Dr Yang’s performance on the stand in their closing submissions. Instead they state that Dr Yang “attested that the manufacturer or producer can commence business operation to manufacture membrane product within a short period of time if the said manufacturer or producer can buy the formula and production machines from a third party.”¹⁹⁶ Presumably this submission was made to bolster the argument I deal with at [123] below; nevertheless, it was not the object of calling Dr Yang as a witness and is not dealt with in his affidavit of evidence-in-chief (nor would it be necessary for an expert to make such a general assertion).

¹⁹⁴ Transcript, 21 October 2022, p 23 lines 2–6.

¹⁹⁵ Transcript, 21 October 2022, p 24 line 22 to p 25 line 2.

¹⁹⁶ DW at para 42.

117 In closing submissions, the defendants raise a new argument that was not pleaded but was referred to in Mr Luo’s AEIC.¹⁹⁷ They allege that the column-style membranes bought from Dreamem in the trap purchase were not in fact manufactured by Dreamem, but had been purchased by Dreamem from a third party, Zhejiang Dongyang Environmental Engineering Co Ltd.¹⁹⁸ No proper evidence was adduced; only untranslated Chinese invoices and a reference in a Chinese judgment were referred to in passing.¹⁹⁹ For the reasons that follow, I do not accept that this is true.

118 First, the Dreamem Brochure lists the column-style membrane as one of its products and describes it as being “[m]ade of superior Dreamem PVDF hollow fiber UF membrane”.²⁰⁰ Dreamem describes itself in the Dreamem Brochure as being a “high-tech enterprise committed to R & D and *production* of high quality separation membrane ... ultrafiltration(UF), nanofiltration(NF), reverse osmosis(RO) membranes and membrane related equipments ... ” [emphasis added]. It also states that “Dreamem uses the latest technologies to *manufacture* the different types of advanced separation membrane products ... ” [emphasis added] and that “Dreamem developed all the membrane products and owns their independent intellectual property rights”.²⁰¹ Dreamem therefore clearly purported to produce *and* sell the column-style membranes that were listed in that brochure. Dr Duan’s evidence is that this brochure was just for

¹⁹⁷ LZ at para 23.

¹⁹⁸ DWS at p 56 paras 51–52.

¹⁹⁹ LZ exhibits; DWS para 18(c).

²⁰⁰ 5 JBOD 550.

²⁰¹ 5 JBOD 545.

marketing purposes and that Dreamem did not actually produce or sell all the products in the said brochure.²⁰² I do not find this explanation to be credible.

119 Second, according to Dr Tan, a photograph taken of Dreamem’s premises during the trap purchase shows two structures hanging from the ceiling, which was part of the production process of porting the column-style membrane module into its casing.²⁰³ Dr Duan’s evidence was that this hanging structure was just a sample to be shown to customers.²⁰⁴ This evidence is unconvincing, as there would be no need to show customers part of the production process of column-style membranes.

120 Thus, I conclude that Dreamem did produce the column-style membranes that were purchased in the trap purchase. Dreamem was able to do so because Mr Luo and Dr Duan must have used Tritech’s confidential information to produce similar products.

(2) Dreamem was able to produce these membranes within a very short period of time, despite not having the requisite expertise.

121 Tritech launched its hollow fibre membrane products after approximately four years of R&D led by Dr Tan and three teams of engineers.²⁰⁵ Dreamem was incorporated on 1 March 2017 and was able to produce membranes by the end of the year.

122 Dreamem did not conduct any R&D into the design and production of membranes. In response to a request by Tritech for specific discovery of all

²⁰² DW at para 110.

²⁰³ Transcript, 29 September 2022 p 166 lines 3–23.

²⁰⁴ Transcript, 13 October 2022, p 82 line 22 to p 83 line 19.

²⁰⁵ TCH at para 8.

documents relating to such R&D, Dr Duan confirmed on affidavit that there were no such documents and that no R&D was conducted.²⁰⁶

123 The defendants’ explanation for Dreamem’s speed was that Dreamem purchased the membrane production line from one Huizhou Ruikeda Water Treatment Equipment Co Ltd (“Ruikeda”) and the membrane formula from one Mr Liao Nai Shang (“Mr Liao”). Having purchased these two things from third parties, Dreamem was able to produce its membranes. The formula that was purchased from Mr Liao included the operating procedures and parameters.²⁰⁷

124 This assertion is absurd. What was allegedly purchased from Mr Liao is not before the court. Mr Liao has not given evidence in these proceedings. All that is before the court is a purported agreement between Mr Liao and Dr Duan for the sale of “fabrication technology of hollow fibre MBR reinforcement membrane and hollow fibre UF membrane”.²⁰⁸ Dr Duan’s evidence was that this agreement obliged Mr Liao to hand over a formula along with operating procedures and parameters.²⁰⁹ Of course it is impossible to verify this because the defendants have not adduced anything which was allegedly given to them by Mr Liao. Moreover, the price that was paid to Mr Liao was allegedly RMB106,000.²¹⁰ For this sum, the defendants claim that they acquired *everything necessary* to produce reinforced hollow fibre membranes. Dr Tan’s evidence was that Tritech had spent approximately five years on R&D into the production of such membranes.²¹¹ Further, no one at Dreamem had any expertise

²⁰⁶ DW’s Affidavit dated 23 June 2022 at para A(a)–(c).

²⁰⁷ DWS at p 54 para 41.

²⁰⁸ 4 JBOD 652.

²⁰⁹ Transcript, 13 October 2022, p 52 lines 9–19.

²¹⁰ 4 JBOD 653.

²¹¹ Transcript, 29 September 2022, p 77 line 18 to p 78 line 1.

that could be used to integrate a production line and a formula to create, as the defendants suggested, hollow fibre membranes. Mr Yang Han's experience was in membranes for use in water dispensers, which were very different from the industrial membranes produced by Dreamem.²¹² It was not suggested that Mr Luo or Dr Duan had sufficient expertise in hollow fibre membrane production.

- (3) The timing of Mr Luo's taking of confidential information coincided with the commencement of Dreamem's production.

125 As set out at [30] above, Mr Luo forwarded some of Tritech's confidential documents to his personal e-mail around September 2017. Dr Tan explained that the information in these documents was enough to replicate Tritech's entire production process.²¹³ I have rejected Mr Luo's explanation that he asked for these documents and sent them to his personal e-mail address for Tritech work-related reasons. His taking of these documents therefore remains completely unexplained. Dreamem must have started production of its membranes sometime between the time of its incorporation on 1 March 2017 and the time when it sold UF membranes to customers in December 2017.²¹⁴ Mr Luo was clearly involved in Dreamem even before he was dismissed by Tritech; he was the one who liaised with Ms Guo during the trap purchase. In these circumstances, the most likely explanation for Mr Luo's taking of Tritech's confidential documents is that they were to be used by Dreamem for the production of its membrane products.

²¹² Transcript, 13 October 2022, p 42 line 21 to p 43 line 3.

²¹³ TCH at para 82.

²¹⁴ 6 JBOD 46.

Conclusion on the equitable claim

126 I therefore find that Dr Duan and Mr Luo were in breach of their equitable duty of confidence to Tritech. They took confidential information from Tritech, and used this confidential information in Dreamem to produce similar products. I have dealt with specific arguments raised by the defence above. In addition, when viewed holistically, the defendants' case lacks logical coherence. The assertion that Dreamem's products were wholly different from Tritech's was inconsistent with the argument that they were able to manufacture products similar to Tritech's through the purchase of production line information and formula from third parties. At the same time, no attempt was made to render these two arguments consistent with the assertion that the products sold in the trap purchase were procured from yet another third party.

Wrongful gain; wrongful loss

127 Tritech frames its case as being one involving both the wrongful loss interest and the wrongful gain interest.²¹⁵ In *I-Admin*, the Court of Appeal distinguished these two distinct interests at [50] and [53] and set out a modified approach easing the criteria for wrongful loss at [61]. As I have found that the (more stringent) criteria for wrongful gain are satisfied, it is not necessary for me to deal with the modified criteria for wrongful loss. The relevant remedy ought to be pursued by Tritech at the next stage of proceedings.

Contractual claim

128 Following from my finding above, the defendants were also in breach of their contractual duties of confidence, mentioned at [107]–[108] above. The defendants, in retaining Tritech's confidential information after their

²¹⁵ PWS pp 56–92.

employment and disclosing it to Dreamem, committed a breach of both the NDAs and their employment contracts.

Unlawful means conspiracy

129 For a conspiracy by unlawful means to arise, Tritech must establish that (per *EFT Holdings, Inc and another v Marinteknik Shipbuilders (S) Pte Ltd and another* [2014] 1 SLR 860 at [112]):

- (a) Dr Duan and Mr Luo combined to do certain acts;
- (b) they intended to cause damage to Tritech by those acts;
- (c) the acts were unlawful;
- (d) the acts were performed in furtherance of an agreement; and
- (e) Tritech suffered loss as a result of the conspiracy.

130 In *Clearlab* at [242], the court accepted that breach of confidence could form the requisite unlawful means for establishing unlawful means conspiracy. The court also accepted at [241] that by taking their employer's confidential information and using it in a separate company to set up a competing business in the same market, the employees intended to injure their employer. This followed from the finding of the Court of Appeal in *Chew Kong Huat and others v Ricwil (Singapore) Pte Ltd* [1999] 3 SLR(R) 1167 at [35] that damage to the plaintiff was a necessary corollary of the profit accruing to the defendant, a direct competitor.

131 In the present case, requirement (a) is made out as the defendants clearly acted in concert through Dreamem. Requirements (b), (c) and (d) are satisfied because Dreamem sold substantially the same products manufactured with the

confidential information that Mr Luo and Dr Duan obtained as a result of their employment at Tritech. I therefore find that the claim in unlawful means conspiracy succeeds against Dr Duan and Mr Luo.

Conduct of defence

132 This judgment has highlighted many issues raised by the defendants for the first time in their affidavits of evidence-in-chief, in the course of trial or in closing submissions. Various aspects of their case were not credible: see, for example, [64], [67], [74], [87], [98], [114]–[116], [124] and [126].

133 The reliability of the defendants' evidence is called into further doubt by the conduct of their counsel. While Dr Duan was on the stand, there were three occasions where his counsel spoke to him without seeking the permission of the court. The first incident, stopped by counsel for Tritech at the first break in Dr Duan's cross-examination, may have been innocuous if not for the second and third. Counsel for the defendants was in any event reminded at that point of the rule against discussing evidence with a witness giving evidence.²¹⁶ Second, an application was made, during Dr Duan's cross-examination, to amend the Defence.²¹⁷ No permission had been sought from the court to obtain instructions from Dr Duan for the purpose of the application. Third, after cross-examination, counsel for the defendants asked for re-examination to be adjourned to the next day. It was admitted the next day that the content of the re-examination was discussed during the adjournment.²¹⁸

²¹⁶ Transcript, 12 October 2022, p 90 line 3 to p 93 line 22.

²¹⁷ Letter to court dated 17 October 2022.

²¹⁸ Transcript, 20 October 2022, p 19 line 5 to p 21 line 12.

134 Rule 12(2) of the Legal Profession (Professional Conduct) Rules 2015 (“PCR”) provides that:

A legal practitioner must not, except with the permission of a court or tribunal, interview or discuss, with a witness whom the legal practitioner has called in proceedings before the court or tribunal, at any time after the start and before the end of the cross-examination of that witness, the evidence given or to be given by that witness or any other witness.

While Rule 12(2) refers to the period of cross-examination, its rationale – to maintain the integrity of evidence – would extend to discussion of evidence to be given in re-examination. The principle expressed in Rule 12(1) that guides the interpretation of the rule is that a legal practitioner must act in a manner consistent with the administration of justice. It would be clear by any reasonable expectation, and certainly to a practitioner with as many years at the Bar as the practitioner in this case, that discussing the content of proposed re-examination after cross-examination would detract from the integrity of proceedings and the administration of justice.

135 A similar disrespect for court rules and the basic principle of relevance was reflected in the choice of an expert who knew nothing about the tests which he was in court to testify about, and the filing of an incorrect form of affidavit with irrelevant content that obfuscated rather than aided the trial process: see [114]–[116] above. An expert’s failure to comply with his duties raises doubt as to the solicitors who have instructed the expert: *Wong Tian Jun* at [19]. Rule 9(1) of the PCR, moreover, points to the need for officers of the court to have respect for the efficacy of court processes and the administration of justice.

Conclusion

136 Accordingly, Dr Duan is liable for:

- (a) Damages to be assessed in respect of his breach of duty to exercise reasonable care and skill in the performance of his duties from 25 October 2013 for the FO Production Line, including the MR Machines;
- (b) Damages to be assessed in respect of his fraudulent misrepresentations regarding the RO Production Line; and
- (c) The return of RMB400,000, with interest at 5.33% from the date of the writ.

137 In respect of Dr Duan and Mr Luo, the following are ordered:

- (a) An injunction to restrain the defendants, and their servants or agents, from using any confidential information belonging to Tritech acquired by them during the course of or after their employment by Tritech;
- (b) Delivery up of all Tritech documents; and
- (c) Damages to be assessed and/or an account of profits for the breach of confidence, to be determined at the next stage of proceedings.

138 Parties are to write in within 14 days regarding with their submissions on costs.

Valerie Thean
Judge of the High Court

Lin Weiqi Wendy, Leow Jiamin, Leau Jun Li (WongPartnership
LLP) for the plaintiffs;
Leong Keng Kheong (Leong Chua & Wong) for the defendants.
