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The Corporate Village
Da Vincilaan 9, Box E.6
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MATERIALISE NV

Statutory auditor's report
to the general meeting
for the year ended 31 December 2019
(Consolidated financial statements)

Free translation

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Free translation

STATUTORY AUDITOR'S REPORT TO THE GENERAL MEETING OF MATERIALISE NV FOR THE YEAR ENDED 31 DECEMBER 2019 (CONSOLIDATED FINANCIAL STATEMENTS)

In the context of the statutory audit of the consolidated financial statements of Materialise NV ('the Company') and its subsidiaries (together referred to as 'the Group'), we hereby present our statutory auditor's report. It includes our report on the audit of the consolidated financial statements and the other legal and regulatory requirements. This report is an integrated whole and is indivisible.

We have been appointed as statutory auditor by the general meeting of 4 June 2019, following the proposal formulated by the board of directors and issued upon recommendation of the Audit Committee Our statutory auditor's mandate expires on the date of the General Meeting deliberating on the financial statements closed on 31 December 2021. We have performed the statutory audit of the consolidated financial statements of Materialise NV for seven consecutive years.

REPORT ON THE CONSOLIDATED FINANCIAL STATEMENTS

Unqualified opinion

We have performed the statutory audit of the Group's consolidated financial statements, which comprise the consolidated statement of financial position as at 31 December 2019, and the consolidated statement of income and other comprehensive income, the consolidated statement of changes in equity and the consolidated statement of cash flows for the year then ended, and notes to the consolidated financial statements, including a summary of significant accounting policies and other explanatory information, and which is characterised by a consolidated statement of financial position total of 349,294 thousand EUR and for which consolidated income statement and other comprehensive income shows a profit for the year of 1,724 thousand EUR.

In our opinion, the consolidated financial statements give a true and fair view of the Group's net equity and financial position as at 31 December 2019, as well as of its consolidated financial performance and its consolidated cash flows for the year then ended, in accordance with International Financial Reporting Standards (IFRS) as adopted by the European Union and with the legal and regulatory requirements applicable in Belgium.

Basis for unqualified opinion

We conducted our audit in accordance with International Standards on Auditing (ISA) as applicable in Belgium. Our responsibilities under those standards are further described in the 'Statutory auditor's responsibilities for the audit of the consolidated financial statements' section in this report. We have complied with all the ethical requirements that are relevant to the audit of consolidated financial statements in Belgium, including those concerning independence.

We have obtained from the administrative body and company officials the explanations and information necessary for performing our audit.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Key audit matters

Key audit matters are those matters that, in our professional judgment, were of most significance in our audit of the consolidated financial statements of the current year. These matters were addressed in the context of our audit of the consolidated financial statements as a whole, and in forming our opinion thereon, and we do not provide a separate opinion on these matters.

▶ *Ineffective Controls Related to Risk Assessment and Financial Reporting*

Description of the Matter

We obtained an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Group's internal control. This resulted in the identification of several deficiencies in relation to (i) ineffective control environment and control design, (ii) revenue recognition (iii) the financial reporting and closing process and (iv) access management controls. The deficiency in relation to access management controls prevented us from placing any reliance on underlying data and system reports used during our audit. We considered this issue as a key audit matter because the design and execution of extended substantive procedures to overcome the identified deficiencies in the internal control system, requires a high degree of auditor's judgment and efforts.

Procedures performed

- We tested the design and operating effectiveness of the IT General controls, assisted by our IT specialists who analyzed the impact of the different systems affected by the identified deficiencies on our audit.

- We used a lower level of thresholds for investigating differences between recorded amounts and independent expectations developed by us.

- The number of selections in our substantive testing we would have otherwise made if the Group's controls were designed and operating effectively have been increased.

- Original source documents for audit evidence have been used, rather than system reports or other information generated by the Group's IT systems and where this was not possible, we performed in depth substantive procedures on the system information, tracing it back to external source documents.

▶ *Revenue recognition*

Description of the Matter

As described in Note 3 and 22.1 to the consolidated financial statements, the Group's contracts with customers often contain multiple performance obligations, or promises to transfer multiple products and services to a

customer. To account for promised goods and services in accordance with IFRS 15, the Group allocates the transaction price to the distinct performance obligations on a relative standalone selling price basis and recognizes revenue when control of the distinct performance obligation is transferred. For example, the Group recognizes software license revenue at the time of delivery of the license and recognizes subscription and support revenue over time as the services are performed.
Auditing the Group's recognition of revenue in relation to contracts with multiple performance obligations is complex due to the effort required to analyze the effect of IFRS 15 on the Group's various product offerings both resulting from ongoing and new contracts. This involved assessing the terms and conditions of new or amended contracts with customers for new product or service offerings, assessing the Group's estimate of the variable considerations, the determination of the relative standalone selling prices for each distinct performance obligation and the timing of recognition of revenue.

Procedures performed-

We obtained an understanding, evaluated the design and tested the operating effectiveness of the Group's internal controls in relation to revenue recognition of non-standardized contracts with customers.

- For a sample of sales transactions we obtained the sales contracts and performed following audit procedures:
    - We read through executed contracts for a sample of sales transactions.
    - We evaluated the Group's identification and determination of the distinct performance obligations for these contracts as well as their determination of the transaction price.
    - We assessed the Group's calculation of the consideration expected to be received in exchange for the performance obligations including the Group's estimate of variable consideration based on historical data and external underlying information about forecasts.

- We have tested the Group's determination of the relative standalone selling price for each performance obligation by assessing the appropriateness of the methodology applied, testing mathematical accuracy of the underlying data and calculations, and testing selections to corroborate the data underlying the calculations.

- We evaluated the consistent application of the revenue recognition policy to the transactions.

- We assessed the appropriateness and completeness of the related disclosures in the consolidated financial statements.

▶ *Goodwill impairment*

Description of the Matter

The Group's evaluation of goodwill for impairment, as described in note 3 and 5, involves the comparison of the fair value of each cash generating unit ('CGU') to its carrying value. The

Group uses the discounted cash flow model to estimate fair value of each of the CGU identified, which requires management to make significant estimates and assumptions related to forecasts of future revenue, operating margins, discount and perpetual growth rates. Changes in these assumptions could have a significant impact on the fair value and potentially the amount of any goodwill impairment.
Given the significant judgments made by management to estimate the fair value contributed to each of the CGUs, including management's judgments in selecting significant business assumptions to forecast future revenue, a perpetual growth rate, and operating margin for a 5 year period as well as the determination of an appropriate discount rate, performing audit procedures to evaluate the reasonableness of management's estimates and assumptions required a high degree of auditor judgment and an increased extent of effort, including the need to involve our fair value specialists.

Procedures performed

Our audit procedures related to the determination of forecasts of future revenue and operating margin used by management to estimate the fair value of the CGUs, included the following:

- We tested the effectiveness of controls over management's goodwill impairment evaluation, including those over the determination of the fair value of the CGUs, such as controls related to management's review of forecasts of future revenue and operating margin.

- With the assistance of our fair value specialists, we evaluated the reasonableness of the valuation methodology, including testing the mathematical accuracy of the calculation.

- We evaluated management's ability to accurately forecast future revenue and operating margin by comparing actual results to management's historical forecasts.

- We also evaluated the reasonableness of management's revenue and operating margin forecasts by comparing the forecasts to (1) the historical operating results of the Company for each of the CGUs, (2) internal communications to management and the board of directors and (3) external communications made by management to analysts and investors.

- We verified the appropriateness and completeness of the goodwill impairment disclosures in the Company's financial statements.

Other statements

The consolidated financial statements, which are the basis of this audit report, are drawn up in English as the Dutch version is not yet available at the moment of this audit report. The Company will draw up a Dutch translation of the consolidated financial statements, to comply with the Belgian language legislation, and subsequently publish these with our Dutch audit report, which we issue today. We will verify at that moment whether the Dutch version of the consolidated financial statements corresponds with the English version, on which we issue our audit report today.

Responsibilities of the administrative body for the drafting of the consolidated financial statements

The administrative body is responsible for the preparation of consolidated financial statements that give a true and fair view in accordance with the International Financial Reporting Standards (IFRS) as adopted by the European Union and with the legal and regulatory provisions applicable in Belgium, and for such internal control as the administrative body determines is necessary to enable the preparation of consolidated financial statements that are free from material misstatements, whether due to fraud or error.

In preparing the consolidated financial statements, the administrative body is responsible for assessing the Group's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless the administrative body either intends to liquidate the Group or to cease operations, or has no realistic alternative but to do so.

Statutory auditor's responsibilities for the audit of the consolidated financial statements

Our objectives are to obtain reasonable assurance about whether the consolidated financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue a statutory auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but it is not a guarantee that an audit conducted in accordance with ISAs will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these consolidated financial statements.

When executing our audit, we respect the legal, regulatory and normative framework applicable for the audit of the consolidated financial statements in Belgium. However, a statutory audit does not guarantee the future viability of the Group, neither the efficiency and effectiveness of the management of the Group by the administrative body.

As part of an audit in accordance with ISAs, we exercise professional judgment and maintain professional skepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the consolidated financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control;

- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Group's internal control;

- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by the administrative body;

- Conclude on the appropriateness of the administrative body's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Group's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our statutory auditor's report to the related disclosures in the consolidated financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our statutory auditor's report. However, future events or conditions may cause the Group to cease to continue as a going concern;

- Evaluate the overall presentation, structure and content of the consolidated financial statements and whether the consolidated financial statements represent the underlying transactions and events in a manner that achieves fair presentation;

- Obtain sufficient appropriate audit evidence regarding the financial information of the entities or business activities within the Group to express an opinion on the consolidated financial statements. We are responsible for the management, the supervision and the performance of the Group audit. We assume full responsibility for the auditor's opinion.

We communicate with the Audit Committee regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control identified during the audit.

We also provide the audit committee with a statement that we respected the relevant ethical requirements relating to independence, and we communicate with them about all relationships and other issues which may influence our independence, and, if applicable, about the related measures to guarantee our independence.

From the matters communicated with the Audit Committee, we determine those matters that were of most significance in the audit of the consolidated financial statements of the current year, and are therefore the key audit matters. We describe these matters in our statutory auditor's report, unless law or regulation precludes public disclosure about the matter.

OTHER LEGAL AND REGULATORY REQUIREMENTS

Responsibilities of the administrative body

The administrative body is responsible for the preparation and the contents of the management report on the consolidated financial statements and for the other information included in the annual report on the consolidated financial statements.

Responsibilities of the statutory auditor

In the context of our mandate and in accordance with the Belgian standard (version revised in 2020) which is complementary to the International Standards on Auditing (ISA) as applicable in Belgium, it is our responsibility to verify, in all material aspects, the management report on the consolidated financial statements, as well as to report on this element.

Aspects relating to the management report on the consolidated financial statements

In our opinion, after having performed specific procedures in relation to the management report, this report is consistent with the consolidated financial statements for the same financial year, and it is prepared in accordance with article 3:32 of the Code of companies and associations.

In the context of our audit of the consolidated financial statements, we are also responsible for considering, in particular based on the knowledge we have obtained during the audit, whether the management report on the consolidated financial statements contains any material misstatements, i.e. any information which is inadequately disclosed or otherwise misleading. Based on the procedures we have performed, there are no material misstatements we have to report to you.

Statement concerning independence

- Our audit firm and our network did not provide services which are incompatible with the statutory audit of the consolidated financial statements and our audit firm remained independent of the Group during the terms of our mandate.

- The fees related to additional services which are compatible with the statutory audit as referred to in article 3:65 of the Code of companies and associations were duly itemised and valued in the notes to the consolidated financial statements.

Other statements

- This report is in compliance with the contents of our additional report to the Audit Committee as referred to in article 11 of regulation (EU) N° 537/2014.

Zaventem, 30 April 2020

Veerle Catry (Signature)

Digitally signed by Veerle Catry (Signature)
DN: cn=Veerle Catry (Signature), c=BE
Date: 2020.04.30 18:06:42 +02'00'

BDO Bedrijfsrevisoren CVBA
Statutory auditor
Represented by Veerle Catry

				1	EUR
NAT.	Filing Date	Nr.	P.	U.	D.

CONSO 1

CONSOLIDATED ANNUAL ACCOUNTS AND OTHER DOCUMENTS TO BE FILED UNDER BELGIAN COMPANY LAW

IDENTIFICATION DETAILS

NAME OF THE CONSOLIDATING COMPANY ~~OR THE CONSORTIUM~~ (1) (2) : MAterialise GROUP

Legal form: Public limited company

Address: Technologielaan Nr.: 15 Box:

Postal code: 3000 Municipality: Leuven

Country: Belgium

Register of Legal persons – commercial court

Website (3): http://www.

Company identification number: BE 0441.131.254

CONSOLIDATED ANNUAL ACCOUNTS: ANNUAL ACCOUNTS IN THOUSANDS OF EUROS

Presented tot he general meeting of: 27 / 04 / 2020

Regarding the period from: 01 / 01 / 2019 To 31 / 12 / 2019

Preceding period from: 01 / 01 / 2018 to 31 / 12 / 2018

The amounts for the preceding period are identical tot he ones previously published: **yes** / ~~no~~ (1)

Included with these consolidated accounts are:

- the consolidated annual report
- the auditors report on the consolidated annual accounts

IN CASE THE CONSOLIDATED ACCOUNTS OF A FOREIGN COMPANY ARE SUBMITTED BY A BELGIAN SUBSIDIARY

Name of the Belgian subsidiary which deposits the accounts (article 113, § 2, 4°a of the Company Law)

Company identification number of the belgian subsidiary which deposits the accounts

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Total number of pages deposited: ...... Number of sections of the standard form not deposited because they serve no useful purpose: 4, 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 5.8.1, 5.8.2, 5.8.3, 5.8.4, 5.8.5, 5.9.1, 5.9.2, 5.9.3, 5.9.4, 5.9.5, 5.9.6, 5.10.1, 5.10.2, 5.11, 5.12, 5.13, 5.14, 5.15, 5.16, 5.17, 5.18, 7, 8, 9

Signature (name and position)

Vancraen Wilfried
CEO

Signature (name and position)

Peter LEYS
BESTUURDER

(1) Strike out what is not applicable.

(2) A consortium has to fill in disclosure IV (page CONSO 5.4).

(3) Optional information.

OCR9002

LIST OF DIRECTORS AND MANAGERS OF THE CONSOLIDATING COMPANY AND OF THE AUDITORS REGARDING A COMPLIMENTARY REVIEW OR CORRECTION ASSIGNMENT OF THE CONSOLIDATED ANNUAL ACCOUNT

LIST OF THE DIRECTORS, MANAGERS AND AUDITORS

COMPLETE LIST with surname, first names, profession, place of residence (address, number, postal code and municipality) and position within the company

A Trec *Nr.: BE 0456.384.307* *Timmermansstraat 32, 8340 Damme, Belgium*	*Director* *03/06/2008 - 02/06/2020*
Represented by:	
Johan De Lille *Gaversesteenweg 604, 9820 Merelbeke, Belgium*	
Wilfried, Frans, Isidoor Vancraen *Jan Van der Vorstlaan 19, 3040 Huldenberg, Belgium*	*Managing director* *18/11/2003 - 02/06/2020*
Jos Van der Sloten *Langestraat 62, 3190 Boortmeerbeek, Belgium*	*Director* *03/06/2008 - 02/06/2020*
Pol Ingelaere *Hazegoedweg 13, 8800 Roeselaere, Belgium*	*Director* *07/06/2011 - 02/06/2020*
Peter Leys *Strooistraat 57, 1860 Meise, Belgium*	*Director* *28/11/2013 - 02/06/2020*
Jurgen Gino Ingels *Clemenceaustraat 117 box A, 2860 Sint-Katelijne-Waver, Belgium*	*Director* *28/11/2013 - 02/06/2020*
Lieve Verplancke *Dikkemeerweg 54, 1653 Dworp, Belgium*	*Director* *02/06/2015 - 02/06/2020*
Hilde Ingelaere *Jan van der Vorstlaan 19, 3040 Huldenberg, Belgium*	*Director* *18/11/2003 - 02/06/2020*
Bart Luyten *Hanswijkstraat 37 box A, 2820 Bonheiden, Belgium*	*Director* *06/06/2017 - 02/06/2020*
Volker Hammes *Altbachstrasse 25, 67435 Neustadt An der Weinstrasse, Germany*	*Director* *28/11/2018 - 02/06/2020*
BDO Bedrijfsrevisoren CVBA *Nr.: BE 0431.088.289* *Da Vincilaan 9 box E 6, 1930 Zaventem, Belgium* *Membership nr.: B00023*	*Auditor* *07/06/2016 - 07/06/2022*
Represented by:	
Veerle Catry *Da Vincilaan 9 box E 6, 1930 Zaventem, Belgium* *Membership nr.: A01868*	

Consolidated income statements

in 000€, except per share data	Notes	For the year ended December 31, 2019	2018	2017
Revenue	22.1	196,679	184,721	142,573
Cost of sales	22.2	(86,972)	(82,299)	(62,952)
Gross profit		**109,707**	**102,422**	**79,621**
Research and development expenses	22.3	(23,348)	(22,416)	(19,959)
Sales and marketing expenses	22.4	(52,989)	(46,303)	(38,935)
General and administrative expenses	22.5	(31,786)	(32,310)	(24,876)
Net other operating income	22.6	5,432	3,771	4,541
Operating profit		**7,016**	**5,164**	**392**
Financial expenses	22.8	(3,682)	(4,864)	(4,728)
Financial income	22.9	1,377	3,627	3,210
Share in loss of joint venture	8	(392)	(475)	(469)
Profit (loss) before taxes		**4,319**	**3,452**	**(1,595)**
Income taxes	22.10	(2,595)	(425)	(522)
Net profit (loss) for the year		**1,724**	**3,027**	**(2,117)**
Net profit (loss) attributable to:				
The owners of the parent		1,646	3,027	(2,117)
Non-controlling interest		78	—	—
Earnings per share attributable to the owners of the parent				
Basic	23	0.03	0.06	(0.04)
Diluted	23	0.03	0.06	(0.04)

The accompanying notes form an integral part of these consolidated financial statements.

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Consolidated statements of comprehensive income

in 000€	Notes	For the year ended December 31, 2019	2018	2017
Net profit (loss) for the year		**1,724**	**3,027**	**(2,117)**
Other comprehensive income (loss)				
Exchange differences on translation of foreign operations †		245	(47)	(691)
Other comprehensive income (loss), net of taxes		245	(47)	(691)
Total comprehensive income (loss) for the year, net of taxes		**1,969**	**2,980**	**(2,808)**
Total comprehensive income (loss) attributable to:				
The owners of the parent		2,102	2,980	(2,808)
Non-controlling interest		(133)	—	—

† May be reclassified subsequently to profit & loss

The accompanying notes form an integral part of these consolidated financial statements.

Consolidated statements of financial position

in 000€	Notes	As of December 31, 2019	2018	2017
Assets				
Non-current assets				
Goodwill	5	20,174	17,491	17,552
Intangible assets	6	27,395	26,326	28,600
Property, plant & equipment	7	90,331	92,537	87,065
Right-of-use assets	7	10,586	—	—
Investments in joint ventures	8	39	—	31
Deferred tax assets	22.10	192	315	304
Other non-current assets	10	9,391	7,237	3,667
Total non-current assets		**158,108**	**143,906**	**137,219**
Current assets				
Inventories and contracts in progress	9	12,696	9,986	11,027
Trade receivables	11	40,977	36,891	35,582
Other current assets	10	8,616	6,936	7,675
Cash and cash equivalents	12	128,897	115,506	43,175
Total current assets		**191,186**	**169,319**	**97,459**
Total assets		**349,294**	**313,225**	**234,678**

The accompanying notes form an integral part of these consolidated financial statements.

Consolidated statements of financial position

in 000€	Notes	As of December 31, 2019	2018	2017
Equity and liabilities				
Equity				
Share capital	13	3,066	3,050	2,729
Share premium	13	138,090	136,637	79,839
Consolidated reserves	13	(195)	(1,848)	(3,711)
Other comprehensive loss		(1,394)	(1,850)	(1,803)
Equity attributable to the owners of the parent		139,567	135,989	77,054
Non-controlling interest	13	3,107	—	—
Total equity		**142,675**	**135,989**	**77,054**
Non-current liabilities				
Loans & borrowings	15	104,673	92,440	81,788
Lease liabilities	15	6,427	—	—
Deferred tax liabilities	22.1	5,747	6,226	7,415
Deferred income	18	5,031	4,587	3,768
Other non-current liabilities	16	696	868	1,904
Total non-current liabilities		**122,574**	**104,121**	**94,875**
Current liabilities				
Loans & borrowings	15	13,389	13,598	12,769
Lease liabilities	15	3,449	—	—
Trade payables		18,517	18,667	15,670
Tax payables	17	3,363	2,313	2,023
Deferred income	18	27,641	23,195	18,791
Other current liabilities	19	17,686	15,342	13,496
Total current liabilities		**84,045**	**73,115**	**62,749**
Total equity and liabilities		**349,294**	**313,225**	**234,678**

The accompanying notes form an integral part of these consolidated financial statements.

Consolidated statements of changes in equity

in 000€	Notes	Attributable to the owners of the parent: Share capital	Share premium	Consolidated reserves	Other compre-hensive loss	Total	Non-controlling interest	Total equity
At January 1, 2019		**3,050**	**136,637**	**(1,848)**	**(1,850)**	**135,989**	**—**	**135,989**
Net profit for the year		—	—	1,646	—	1,646	78	1,724
Other comprehensive loss		—	—	—	456	456	(211)	245
Total comprehensive income (loss)		**—**	**—**	**1,646**	**456**	**2,102**	**(133)**	**1,969**
Capital increase through exercise of warrants	13	16	1,252	—	—	1,268	—	1,268
Acquisition Non-controlling interest Engimplan		—	—	—	—	—	3,240	3,240
Equity-settled share-based payment expense	14	—	201	7	—	208	—	208
At December 31, 2019		**3,066**	**138,090**	**(195)**	**(1,394)**	**139,567**	**3,107**	**142,675**

in 000€	Notes	Attributable to the owners of the parent: Share capital	Share premium	Consolidated reserves	Other compre-hensive loss	Total	Non-controlling interest	Total equity
At January 1, 2018		**2,729**	**79,839**	**(3,711)**	**(1,803)**	**77,054**	**—**	**77,054**
IFRS 15—impact on opening reserves (*)		—	—	(1,173)	—	(1,173)	—	(1,173)
Adjusted equity At January 1, 2018		**2,729**	**79,839**	**(4,884)**	**(1,803)**	**75,881**	**—**	**75,881**
Net profit for the year		—	—	3,027	—	3,027	—	3,027
Other comprehensive loss		—	—	—	(47)	**(47)**	—	(47)
Total comprehensive income (loss)		**—**	**—**	**3,027**	**(47)**	**2,980**	**—**	**2,980**
Capital increase in cash	12	312	59,575	—	—	**59,887**	—	59,887
Capital increase through exercise of warrants	12	9	593	—	—	602	—	602
Capital increase Rapidfit+		—	(4,003)	—	—	(4,003)	—	(4,003)
Equity-settled share-based payment expense	14	—	633	9	—	642	—	642
At December 31, 2018		**3,050**	**136,637**	**(1,848)**	**(1,850)**	**135,989**	**—**	**135,989**

in 000€	Notes	Attributable to the owners of the parent: Share capital	Share premium	Consolidated reserves	Other compre-hensive income (loss)	Total	Non-controlling interest	Total equity
At January 1, 2017		**2,729**	**79,019**	**(1,603)**	**(1,112)**	**79,033**	**—**	**79,033**
Net loss for the year		—	—	(2,117)	—	(2,117)	—	(2,117)
Other comprehensive loss		—	—	—	(691)	(691)	—	(691)
Total comprehensive income (loss)		**—**	**—**	**(2,117)**	**(691)**	**(2,808)**	**—**	**(2,808)**
Equity-settled share-based payment expense	14	—	820	9	—	829	—	829
At December 31, 2017		**2,729**	**79,839**	**(3,711)**	**(1,803)**	**77,054**	**—**	**77,054**

* The Goup initially adopted IFRS 15 using the cumulative effect method. Under this method, the comparative information is not restated.

The accompanying notes form an integral part of these consolidated financial statements.

Consolidated cash flow statements

in 000€	Notes	For the year ended December 31, 2019	2018	2017
Operating activities				
Net profit (loss) for the year		1,724	3,027	(2,117)
Non-cash and operational adjustments				
Depreciation of property, plant & equipment	7	14,339	12,223	8,754
Amortization of intangible assets	6	4,859	5,064	3,822
Share-based payment expense	14	302	1,075	1,033
Loss (gain) on disposal of property, plant & equipment	7	165	(83)	25
Movement in provisions		138	5	61
Movement in reserve for bad debt and slow moving inventory		121	1,293	502
Financial income	22.9	(1,377)	(581)	(381)
Financial expense	22.8	3,682	2,172	1,597
Impact of foreign currencies		(176)	(299)	302
Share in loss of joint venture (equity method)	8	392	475	469
Income taxes and deferred taxes	22.1	2,595	425	522
Fair value adjustment contingent consideration	4	—	(192)	—
Other		(245)	87	(22)
Working capital adjustment and income tax paid				
Decrease (increase) in trade receivables and other receivables		216	(3,156)	(4,973)
Decrease (increase) in inventories and contracts in progress		(745)	812	(417)
Increase in trade payables and other payables		4,196	7,341	2,343
Income tax paid		(2,139)	(1,368)	(1,569)
Interest received		355	—	—
Net cash flow from operating activities		**28,402**	**28,320**	**9,951**

The accompanying notes form an integral part of these consolidated financial statements.

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Consolidated cash flow statements

in 000€	Notes	For the year ended December 31, 2019	2018	2017
Investing activities				
Purchase of property, plant & equipment	7	(13,472)	(18,270)	(27,733)
Purchase of intangible assets	6	(2,193)	(1,836)	(4,345)
Proceeds from the sale of property, plant, equipment and intangibles (net)		278	281	221
Acquisition of subsidiary (net of cash)	4	(6,331)	—	(27,173)
Investments in joint-ventures	8	(875)	—	(500)
Convertible loan granted	10	(2,743)	—	—
Other equity investments in non-listed entities	10	(281)	(2,671)	—
Interest received		—	363	281
Net cash flow used in investing activities		**(25,617)**	**(22,133)**	**(59,249)**
Financing activities				
Proceeds from loans & borrowings	15	29,000	32,554	54,319
Repayment of loans & borrowings	15	(12,126)	(18,820)	(11,904)
Repayment of leases	15	(5,283)	(3,102)	(2,947)
Capital increase in parent company	13	1,268	60,489	—
Direct attributable expense capital increase	13	—	(4,003)	—
Interest paid		(2,286)	(1,733)	(955)
Other financial income (expense), net		208	(150)	(472)
Net cash flow from financing activities		**10,781**	**65,235**	**38,041**
Net increase/(decrease) of cash and cash equivalents		**13,566**	**71,422**	**(11,257)**
Cash and cash equivalents at beginning of the year	12	115,506	43,175	55,912
Exchange rate differences on cash and cash equivalents		(175)	908	(1,480)
Cash and cash equivalents at end of the year	12	128,897	115,506	43,175

The accompanying notes form an integral part of these consolidated financial statements.

Notes to the consolidated financial statements

1 Corporate information

Materialise NV is a limited liability company with its registered office at Technologielaan 15, 3001 Leuven, Belgium. The consolidated financial statements comprise Materialise NV (the "Company" or "Parent") and its subsidiaries (collectively, the "Group"). See Note 28 for a list of subsidiaries of the Company.

The Group is a leading provider of additive manufacturing (AM) software and of sophisticated 3D printing services. The products and services of the Group are organized in the three segments: Materialise Medical, Materialise Software and Materialise Manufacturing. The Group sells its products in Europe, the Americas, Africa and Asia-Pacific.

The consolidated financial statements of the Group for the year ended December 31, 2019 were approved and authorized for issue on April 30, 2020 in accordance with a resolution of the Parent's Board of Directors.

2 Basis of preparation

The consolidated financial statements of the Group for the three years ended December 31, 2019, 2018 and 2017 were prepared in accordance with the International Financial Reporting Standards (IFRS) as issued by the International Accounting Standards Board (IASB) (collectively "IFRS") and with International Financial Reporting Standards (IFRS) as adopted by the European Union ("EU-IFRS").

These consolidated financial statements have been prepared on a historical cost basis, except for the assets and liabilities that have been acquired as part of a business combination, which have been initially recognized at fair value, and certain financial assets such as the non-listed equity instruments and the convertible loan receivable which are both included in the other non-current assets, the share appreciation rights, and the written put option of Rapidfit which are measured at fair value.

The financial statements are prepared on a going concern basis considering the COVID-19 impact as disclosed in Note 27.

The consolidated financial statements are presented in thousands of euros (K€ or thousands of €) and all "currency" values are rounded to the nearest thousand (€000), except when otherwise indicated.

The preparation of financial statements in compliance with adopted IFRS requires the use of certain critical accounting estimates. It also requires Group management to exercise judgment in applying the Group's accounting policies. The areas where significant judgment and estimates have been made in preparing the financial statements and their effect are disclosed in Note 3.

New standards, interpretations and amendments adopted by the Group

The Group has adopted the following new and revised standards and interpretations issued by the IASB and IFRIC that are relevant to its operations and effective for accounting periods beginning on January 1, 2019.

- *IFRIC 23 Uncertainty over income tax treatments*
- *IFRS 16 Leases*

Several other amendments and interpretations apply for the first time in 2019, but do not have an impact on the consolidated financial statements of the Group. The Group has not early adopted any standards, interpretations or amendments that have been issued but are not yet effective.

The application of the above relevant new standards and interpretations are explained below.

IFRIC 23 Uncertainty over income tax treatments

Uncertainty over income tax treatments has been applied as from January 1, 2019. The adoption of this new interpretation did not have an impact.

IFRS 16 Leases

The Company has applied IFRS 16 as from January 1, 2019 by using the modified retrospective approach, not restating comparatives for the 2018 reporting period. The reclassifications and the adjustments arising from the new leasing standard are recognized in the opening balance sheet on January 1, 2019.

On the adoption of IFRS 16, the Company recognized lease liabilities in relation to leases which had previously been classified as "operating leases" under the IAS 17 Leasing standard. These leases were measured at the present value of the remaining lease payments, using a discount rate based on the incremental borrowing rate as of January 1, 2019. The weighted average discount rate applied to the lease liabilities at January 1, 2019 was 2.99%.

The Company had leases classified as finance leases under IAS 17 for an amount of K€5,886 net book value for which the carrying amount has not been reassessed consistent with the transition requirements.

The table below shows the reconciliation of the IAS 17 operating lease commitments disclosed in the 2018 consolidated financial statements with the IFRS 16 lease liability at January 1, 2019:

(in 000€)	As at January 1, 2019
Non-cancellable operating lease commitments disclosed at December 31, 2018	5,442
Discounted using the company's incremental borrowing rate	(268)
Add: finance lease liabilities recognized at December 31, 2018	6,809
(Less) short-term/low-value leases recognized on a straight-line basis as an expense	(88)
Add/(Less) adjustments related to different treatment extension and termination options	(101)
Lease liability recognized as at January 1, 2019	11,794

The right-of-use assets for all assets were measured at the amount equal to the lease liability and relate to the following assets:

(in 000€)	As at December 31, 2019	As at January 1, 2019
Buildings	3,843	3,255
Vehicles	882	849
Other materials	301	880
Total right-of-use assets	**5,026**	**4,984**
Total lease liabilities	**5,026**	**4,984**

The impact on the consolidated statement of profit and loss for the year ended December 31, 2019 and the basic and diluted loss per share is not significant. There was no impact on the retained earnings as per January 1, 2019.

In applying IFRS 16 at January 1, 2019, the company has used the following practical expedients permitted by the standard:

- The use of a single discount rate to a portfolio of leases with similar characteristics;
- The accounting for operating leases with a remaining lease term of less than 12 months as at January 1, 2019 as short-term leases;
- The accounting for operating leases with a low value (less or equal to $5,000) as low-value leases; and
- The use of hindsight in determining the lease term where the contract contains options to extend or terminate the lease.

The other new standards and interpretations effective as of January 1, 2019 did not have any impact on the statement of financial position and the statement of profit and loss.

3 Summary of significant accounting policies

Basis for consolidation

The consolidated financial statements comprise the financial statements of the Group and its subsidiaries.

Entities are fully consolidated from the date of acquisition, which is the date when the Group obtains control, and continue to be consolidated until the date when such control ceases. The financial statements of the entities are prepared for the same reporting period as the parent company, using consistent accounting policies. All intra-Group balances, transactions, unrealized gains and losses resulting from intra-Group transactions and dividends are fully eliminated.

The Group attributes profit or loss and each component of other comprehensive income to the owners of the parent company and to the non-controlling interest based on present ownership interests, even if the results in the non-controlling interest have a negative balance.

A change in the ownership interest of a subsidiary, without a loss of control, is accounted for as an equity transaction. If the Group loses control over the subsidiary, it will derecognize the assets (including goodwill) and liabilities of the subsidiary, any non-controlling interest and the other components of equity related to the subsidiary. Any surplus or deficit arising from the loss of control is recognized in profit or loss. If the Group retains an interest in the previous subsidiary, then such interest is measured at fair value at the date the control is lost.

The proportion allocated to the parent and non-controlling interests in preparing the consolidated financial statements is determined based solely on present ownership interests.

In 2019, Engimplan entered into the consolidated scope – see note 28.

Non-controlling interests

The Group has the choice, on a transaction by transaction basis, to initially recognize any non-controlling interest in the acquiree which is a present ownership interest and entitles its holders to a proportionate share of the entity's net assets in the event of liquidation at either acquisition date fair value or, at the present ownership instruments' proportionate share in the recognized amounts of the acquiree's identifiable net assets. Other components of non-controlling interest such as outstanding share options are generally measured at fair value. The Group has not elected to take the option to use fair value in acquisitions completed to date. Currently the only non-controlling interest resulting from business combinations coming from Engimplan.

Foreign currency translation

The Group's consolidated financial statements are presented in euros, which is also the parent company's functional currency. For each entity, the Group determines the functional currency, and items included in the financial statements of each entity are measured using the functional currency.

Financial statements of foreign subsidiaries

Foreign subsidiaries use the local currencies of the country where they operate. The statement of financial position is translated into euro at the closing rate on the reporting date and their income statement is translated at the average exchange rate at each month-end. Differences resulting from the translation of the financial statements of said subsidiaries are recognized in other comprehensive income as "exchange differences on translation of foreign operations".

Foreign currency transactions

Transactions denominated in foreign currencies are translated into euro at the exchange rate at the end of the previous month-end. Monetary items in the statement of financial position are translated at the closing rate at each reporting date and the relevant translation adjustments are recognized in financial or operating result depending on its nature.

Business combinations and goodwill

Business combinations are accounted for using the acquisition method at the acquisition date, which is the date at which the Group obtains control over the entity. The cost of an acquisition is measured as the amount of the consideration transferred to the seller, measured at the acquisition date fair value, and the amount of any non-controlling interest in the acquiree.

The Group measures goodwill initially at cost at the acquisition date, being:

- the fair value of the consideration transferred to the seller, plus
- the amount of any non-controlling interest in the acquiree, plus
- if the business combination is achieved in stages, the fair value of the existing equity interest in the acquiree re-measured at the acquisition date, less
- the fair value of the net identifiable assets acquired and assumed liabilities

Goodwill is recognized as an intangible asset with any impairment in carrying value being charged to the consolidated income statement. Where the fair value of identifiable assets, liabilities and contingent liabilities exceed the fair value of consideration paid, the excess is credited in full to the consolidated income statement on acquisition date.

Acquisition costs incurred are expensed and included in general and administrative expenses.

Any contingent consideration to be transferred by the acquirer will be recognized at fair value at the acquisition date. Subsequent changes to the fair value of the contingent consideration, which is deemed to be an asset or liability, will be recognized either as a profit or loss or as a change to other comprehensive income. If the contingent consideration is classified as equity, it should not be re-measured until it is finally settled within equity.

Acquisition of non-controlling interests are accounted for as an equity transaction.

Investments in joint ventures

The Group carries investment in a joint venture (RS Print NV). The Group’s investments in its joint venture is accounted for using the equity method. Under the equity method, the investment in the joint venture was initially recognized at cost. The carrying amount of the investment is adjusted to recognize changes in the Group’s share of net assets of the joint venture since the acquisition date. Goodwill relating to the joint venture is included in the carrying amount of the investment and is not tested for impairment individually.

The income statement reflects the Group’s share of the results of operations of the joint venture. Any change in other comprehensive income of the joint venture is presented as part of the Group’s other comprehensive income. In addition, when there has been a change recognized directly in the equity of the joint venture, the Group recognizes its share of the change in the statement of changes in equity. Unrealized gains and losses resulting from transactions between the Group and the joint venture are eliminated to the extent of the interest in the joint venture.

After application of the equity method, the Group determines whether it is necessary to recognize an impairment loss on its investment in its joint venture. At each reporting date, the Group determines whether there is objective evidence that the investment in the joint venture is impaired. If there is such evidence, the Group calculates the amount of impairment as the difference between the recoverable amount of the Group’s interest in the joint venture (higher of value in use and fair value less costs to sell), and then recognizes the loss as ‘Share of profit or loss of joint ventures’ in the income statement.

Property, plant & equipment

Property, plant and equipment is stated at cost, net of accumulated depreciation and/or accumulated impairment losses, if any. Such cost includes borrowing costs directly attributable to construction projects if the asset necessarily takes a substantial period of time to get ready for its intended use, it is probable that they will result in future economic benefits to the group and the cost can be measured reliably. When significant parts of property, plant and equipment are required to be replaced at intervals, the Group recognizes such parts as individual assets with specific useful lives and depreciates them accordingly. Likewise, when a major inspection is performed, its cost is recognized in the carrying amount of the property, plant and equipment as a replacement if the recognition criteria are satisfied. All other repair and maintenance costs are recognized in the income statement as incurred.

Depreciation is calculated on a straight-line basis over the estimated useful lives of the assets as follows:

• Buildings:	20-30 years
• Machinery:	5-12 years
• IT assets:	3-5 years
• Fixtures & Furniture:	10-15 years
• Vehicles:	2-4 years
• Leasehold Building Improvements:	10 years

Land is not depreciated.

An item of property, plant and equipment and any significant part initially recognized is derecognized upon disposal or when no future economic benefits are expected from its use or disposal. Any gain or loss arising on derecognition of the asset (calculated as the difference between the net disposal proceeds and the carrying amount of the asset) is included in the income statement when the asset is derecognized.

The assets’ residual values, useful lives and methods of depreciation are reviewed at each financial year-end and adjusted prospectively, if appropriate.

Right-of-use assets and related liabilities

Right-of-use assets:

The Company recognizes right-of-use assets at the commencement date of the lease (i.e., the date the underlying asset is available for use). Right-of-use assets are measured at cost, less any accumulated depreciation and impairment losses, and adjusted for any remeasurement of lease liabilities. The cost of right-of-use assets includes the amount of lease liabilities recognized, initial direct costs incurred, and lease payments made at or before the commencement date less any lease incentives received. Unless the Company is reasonably certain to obtain ownership of the leased asset at the end of the lease term, the recognized right-of-use assets are depreciated on a straight-line basis over the shorter of its estimated useful life and the lease term:

1. Property leased Assets:	Lease terms up to 10 years or useful life of 10 - 15 years when reasonable certain ownership will be obtained at the end of the lease
2. Leased machines:	Lease terms up to 10 years or useful life of 5 - 10 years when reasonable certain ownership will be obtained at the end of the lease
3. Leased vehicles:	Lease terms up to 4 years or useful life of 4 years when reasonable certain ownership will be obtained at the end of the lease

Right-of-use assets are subject to impairment.

Lease liabilities:

At the commencement date of the lease, the Company recognizes lease liabilities measured at the present value of lease payments to be made over the lease term. The lease payments include fixed payments (including in substance fixed payments) less any lease incentives receivable, variable lease payments that depend on an index or a rate, and amounts expected to be paid under residual value guarantees. The lease payments also include the exercise price of a purchase option reasonably certain to be exercised by the Company and payments of penalties for terminating a lease, if the lease term reflects the Company exercising the option to terminate. The variable lease payments that do not depend on an index or a rate are recognized as expense in the period on which the event or condition that triggers the payment occurs. In calculating the present value of lease payments, the Company uses the incremental borrowing rate at the lease commencement date if the interest rate implicit in the lease is not readily determinable. After the commencement date, the amount of lease liabilities is increased to reflect the accretion of interest and reduced for the lease payments made. In addition, the carrying amount of lease liabilities is remeasured if there is a modification, a change in the lease term, a change in the in-substance fixed lease payments or a change in the assessment to purchase the underlying asset.

Short-term leases and leases of low-value assets:

The Company applies the short-term lease recognition exemption to its short-term leases of machinery and equipment (i.e., those leases that have a lease term of 12 months or less from the commencement date and do not contain a purchase option) however this exemption is not applied for property leases. It also applies the lease of low-value assets recognition exemption to leases of office equipment that are considered of low value (i.e., below k€5). Lease payments on short-term leases and low-value assets are recognized in the income statement when incurred.

Borrowing costs

Borrowing costs directly attributable to the acquisition, construction or production of a qualified asset that necessarily takes a substantial period of time to prepare for its intended use or sale are capitalized as part of the cost of the respective assets. All other borrowing costs are expensed in the period they occur. Borrowing costs consist of interest and other costs that an entity incurs in connection with the borrowing of funds.

Research and development

Research and development includes the costs incurred by activities related to the development of software solutions (new products, updates and enhancements), guides and other products.

Development activities involve the application of research findings or other knowledge to a plan or a design of new or substantially improved (software) products before the start of the commercial use.

Development expenditures on an individual project are recognized as an intangible asset when the Group can demonstrate:

- the technical feasibility of completing the intangible asset so that the asset will be available for use or sale;
- its intention to complete and its ability to use or sell the asset;
- how the asset will generate future economic benefits;
- the availability of resources to complete the asset; and
- the ability to measure reliably the expenditure during development.

The Group has determined that the conditions for recognizing internally generated intangible assets from proprietary software, guide and other product development activities are not met until shortly before the products are available for sale, unless either (i) the Group has strong evidence that the above criteria are met and a detailed business plan is available showing the asset will on a reasonable basis generate future economic benefits or (ii) the development is done based upon specific request of the customer, it is highly likely that the Group will be able to market the product also to other parties than the customer, the development is subject to an agreement and the substance of the agreement is that the customer reimburses the Group for a significant portion, but not all, of the development expenses incurred. As such, development expenditures not satisfying the above criteria and expenditures on the research phase of internal projects are recognized in the consolidated income statement as incurred. Internally generated intangible assets from proprietary software are amortized over their useful lives, starting from the moment they are ready for use/available for sale.

Following initial recognition of the development expenditure as an asset, the asset is carried at cost less any accumulated amortisation and accumulated impairment losses. Amortisation of the asset begins when development is complete and the asset is available for use. It is amortised over the period of expected future benefit, which is determined on a project-by-project basis. Amortisation is recorded in cost of sales. During the period of development, the asset is tested for impairment at least annually or whenever there is an indication of impairment.

Intangible assets other than goodwill and capitalized development expenditures

Intangible assets comprise acquired technology and customer portfolio, patents and licenses and technology and customers acquired in connection with business combinations. Those intangible assets are measured on initial recognition at cost, except for the acquired technology and customers arising from business combinations, which are measured initially at fair value. Following initial recognition, intangible assets other than goodwill are carried at cost less any accumulated amortization and accumulated impairment losses, if any.

The useful life of the intangible assets is as follows:

• Software:	3 years;
• Patents and licenses:	10 years;
• Acquired customers and Technology:	5-20 years;
• Order Backlog:	Period over which orders will be completed.

The intangible assets with finite lives are amortized over their useful economic life and assessed for impairment whenever there is an indication that the intangible asset may be impaired. The amortization period and the amortization method for an intangible asset with a finite useful life are reviewed at least at the end of each reporting period. The amortization expense on intangible assets with finite lives acquired through business combination is recognized in the consolidated income statement in the line “net other operating income”.

Impairment of goodwill and other non-financial assets (excluding inventories and deferred tax assets)

Impairment tests on goodwill and other intangible assets with indefinite useful economic lives, assets under construction or capitalized development expenses which are not amortized yet, are undertaken annually at the financial year end. Other non-financial assets and goodwill are subject to impairment tests whenever events or changes in circumstances indicate that their carrying amount may not be recoverable. Where the carrying value of an asset exceeds its recoverable amount (i.e. the higher of value in use and fair value less costs to sell), the asset is written down accordingly.

Where it is not possible to estimate the recoverable amount of an individual asset, the impairment test is carried out on the smallest Group of assets to which it belongs for which there are separately identifiable cash flows: its cash generating units (CGUs). Goodwill is allocated on initial recognition to each of the Group’s CGUs that are expected to benefit from the synergies of the combination giving rise to the goodwill.

The Group bases its impairment calculation on detailed budgets and forecast calculations, which are prepared separately for each of the Group's CGUs to which the individual assets are allocated. These budgets and forecast calculations generally cover a period of five years. For longer periods, a long-term growth rate is calculated and applied to future cash flows projected after the fifth year.

Impairment charges are included in profit or loss, except, where applicable, to the extent they reverse gains previously recognized in other comprehensive income. An impairment loss recognized for goodwill is not reversed.

Where goodwill forms part of a cash-generating unit and part of the operation within that unit is disposed of, the goodwill associated with the operation disposed of is included in the carrying amount of the operation when determining the gain or loss on disposal of the operation. Goodwill disposed of in this circumstance is measured based on the relative values of the operation disposed of and the portion of the cash-generating unit retained.

Inventories and Contracts in progress

Inventories are valued at the lower of cost and net realizable value. Costs incurred in bringing each product to its present location and condition are accounted for as follows:

- Raw materials: purchase cost on a first in, first out basis; and
- Finished goods and work in progress: cost of direct materials and labor and a proportion of manufacturing overheads based on the normal operating capacity, but excluding borrowing costs.

Net realizable value is the estimated selling price in the ordinary course of business, less estimated costs of completion and the estimated costs necessary to make the sale.

A write-off of inventories is estimated based on an ageing or rotation analysis.

Work in progress relates to production of inventory for which a customer has not yet been secured, while contracts in progress are contract assets that relate to production for specific customers in performance of a signed contract. We refer also to the accounting policy on revenue recognition.

Financial assets

Financial assets are classified at initial recognition, and subsequently measured at amortised cost, fair value through other comprehensive income (OCI), and fair value through profit or loss.

The classification of financial assets at initial recognition depends on the financial asset's contractual cash flow characteristics and the Group's business model for managing them. With the exception of trade receivables that do not contain a significant financing component or for which the Group has applied the practical expedient, the Group initially measures a financial asset at its fair value plus transaction costs, in the case of a financial asset not at fair value through profit or loss or OCI. Trade receivables that do not contain a significant financing component or for which the Group has applied the practical expedient are measured at the transaction price.

For purposes of subsequent measurement, financial assets are classified in four categories:

- Financial assets at amortised cost;
- Financial assets at fair value through OCI with recycling of cumulative gains and losses (debt instruments);
- Financial assets designated at fair value through OCI with no recycling of cumulative gains and losses upon derecognition (equity instruments); and
- Financial assets at fair value through profit or loss.

Financial assets measured at amortized cost

This category is the most relevant to the Group. The Group measures financial assets at amortised cost if both of the following conditions are met:

- The financial asset is held within a business model with the objective to hold financial assets in order to collect contractual cash flows; and
- The contractual terms of the financial asset give rise on specified dates to cash flows that are solely payments of principal and interest on the principal amount outstanding.

Financial assets, trade and other receivables, cash and cash equivalents at amortised cost are subsequently measured using the effective interest rate (EIR) method and are subject to impairment. Gains and losses are recognised in profit or loss when the asset is derecognised, modified or impaired.

Financial assets at fair value through OCI with recycling of cumulative gains and losses (debt instruments)

The Group currently does not have financial assets at fair value through OCI with recycling of cumulative gains and losses.

Financial assets designated at fair value through OCI with no recycling of cumulative gains and losses upon derecognition (equity instruments)

The Group has irrevocably elected at initial recognition to classify the minority interest in the non-listed equity investment Essentium Inc, as disclosed in Note 10 and Note 20, as a financial asset designated at fair value through OCI as this measurement is most representative of the business model for this asset. Gain and losses on these financial assets are never recycled to profit and loss. Dividends are recognised as other operational income in the consolidated income statement when the right of payment has been established, except when the Group benefits from such proceeds as a recovery of part of the cost of the financial asset, in which case, such gains are recorded in OCI. Equity instruments designated at fair value through OCI are not subject to impairment assessment.

Financial assets measured at fair value through profit or loss

The Group does have the following financial assets classified as financial assets at fair value through profit or loss:

- a call option on non-controlling interests in RapidFit+ as disclosed in Note 13;
- derivatives,
- a convertible loan granted to a company as disclosed in Note 10;.

Those financial assets are carried in the statement of financial position at fair value with changes recognized in the income statement in the lines financial income/expense.

Derecognition

A financial asset is derecognized when:

- The rights to receive cash flows from the asset have expired, or
- The Group has transferred its rights to receive cash flows from the assets.

Impairment of financial assets

Further disclosures relating to impairment of financial assets are also provided in Note 3 Significant accounting judgments, estimates and assumptions.

The Group recognises an allowance for expected credit losses (ECLs) for all debt instruments not held at fair value through profit or loss.

For trade receivables and contract assets, the Group applies a simplified approach in calculating ECLs. A loss allowance is recognized at each reporting date based on lifetime ECLs. The Group established a provision matrix that is based on its historical loss experience, adjusted for forward-looking factors specific to the debtors and the economic environment.

For all other receivables, ECLs are based on the difference between the contractual cash flows due in accordance with the contract and all the cash flows that the Group expects to receive, discounted at an approximation of the original effective interest rate. The expected cash flows will include cash flows from the sale of collateral held or other credit enhancements that are integral to the contractual terms. ECLs are recognised in two stages. For credit exposures for which there has not been a significant increase in credit risk since initial recognition, ECLs are provided for credit losses that result from default events that are possible within the next 12-months (a 12-month ECL). For those credit exposures for which there has been a significant increase in credit risk since initial recognition, a loss allowance is required for credit losses expected over the remaining life of the exposure, irrespective of the timing of the default (a lifetime ECL).

Financial liabilities

All financial liabilities are recognised initially at fair value and, in the case of loans and borrowings and payables, net of directly attributable transaction costs.

The Group’s financial liabilities include trade and other payables, loans and borrowings including bank overdrafts and derivative financial instruments including written put options over non-controlling interests.

Financial liabilities at amortized cost

The trade and other payables, and loans and borrowings are classified as financial liabilities at amortized cost.

Those financial liabilities are measured at amortized cost using the effective interest rate method. Gains and losses are recognized in the income statement when the liabilities are derecognized as well as through the effective interest rate method amortization process.

Financial liabilities at fair value through profit and loss

The derivative financial instruments are classified as financial liabilities at fair value through profit and loss except for the written put options on non-controlling interests which is disclosed below.

Written put options on non-controlling interest

The Group recognizes a financial liability for the written put options on non-controlling interest. The written put options have a variable redemption price based on a formula as specified in the contract (see Note 13).

- The financial liability is initially recognized at fair value and the fair value is reclassified from non-controlling interest and, for any amount higher than the non-controlling interest, from consolidated reserves.
- The fair value is determined as the present value of the redemption amount.
- Any change in the fair value as a result of a change in the estimated redemption price is recognized directly in consolidated reserves. Any unwinding effect of the present value of the redemption price is recognized directly in profit and loss (financial cost).
- No share of profit is allocated to the non-controlling interest.
- Upon exercise of the written put option, the carrying value will be offset with the cash payment received. When the written put option is not exercised, the carrying value of the financial liability is derecognized against non-controlling interest with the difference going to consolidated reserves.

Compound financial instruments

The Group has issued convertible debt which is accounted for as a compound financial instrument. For those instruments, the Group determines the carrying amount of the liability component by measuring the fair value of a similar liability (including any embedded non-equity derivative features) that does not have an associated equity component. The carrying amount of the equity instrument is then determined by deducting the fair value of the financial liability from the fair value of the compound financial instrument as a whole.

Derecognition

A financial liability is derecognized when the obligation under the liability is discharged or cancelled or expires.

Offsetting

Financial assets and financial liabilities are offset and the net amount is reported in the consolidated statement of financial position if there is a currently enforceable legal right to offset the recognized amounts and there is an intention to settle on a net basis, or to realize the assets and settle the liabilities simultaneously.

Share capital

Financial instruments issued by the Group are classified as equity only to the extent that they do not meet the definition of a financial liability or financial asset. The Group's ordinary shares are classified as equity instruments.

Provisions

Provisions are recognized when the Group has a present obligation (legal or constructive) as a result of a past event, it is probable that an outflow of resources embodying economic benefits will be required to settle the obligation and a reliable estimate can be made of the amount of the obligation.

Pensions benefits

The Group has a defined contribution obligation where the Group pays contributions based on salaries to an insurance company, in accordance with the laws and agreements in each country.

The Belgian defined contribution pension plans are by law with variable minimum returns based on the Belgian government bonds, with a minimum of 1.75% and a maximum of 3.75%, effective for contributions paid as from 2016. For contribution paid until 2015, the minimum guaranteed return is 3.25% on employer contributions and 3.75% on employee contributions.

These plans qualify as defined benefit plans. Contributions are recognized as expenses for the period in which employees perform the corresponding services. Outstanding payments at the end of the period are shown as other current liabilities.

Those plans are accounted for as a defined benefit plan however are considered not material.

Share based payments

Directors and employees (including senior executives) of the Group receive remuneration in the form of share-based payments, whereby employees render services as consideration for equity instruments (equity-settled transactions). The Group currently has only warrants and share-appreciation rights as share-based payments.

Equity-settled transactions

Equity-settled share-based payments to employees and others providing similar services are measured, indirectly, at the fair value of the equity instruments granted. The cost of equity-settled transactions is recognized, together with a corresponding increase in other capital reserves in equity, over the period in which the performance and/or service conditions are fulfilled. The cumulative expense recognized for equity-settled transactions at each reporting date until the vesting date reflects the extent to which the vesting period has expired and the Group's best estimate of the number of equity instruments that will ultimately vest. The income statement expense or credit for a period represents the movement in cumulative expense recognized at the beginning and end of that period and is recognized as employee benefits expense.

The Group does currently only have equity-settled share-based payments that have service-based vesting conditions and no instruments with market vesting conditions.

No expense is recognized for awards that do not ultimately vest.

When the terms of an equity-settled award are modified, the minimum expense recognized is the expense as if the terms had not been modified, if the original terms of the award are met. An additional expense is recognized for any modification that increases the total fair value of the share-based payment transaction, or is otherwise beneficial to the employee as measured at the date of modification.

When an equity-settled award is cancelled, it is treated as if it vested on the date of cancellation, and any expense not yet recognized for the award is recognized immediately. This includes any award where non-vesting conditions within the control of either the entity or the employee are not met. However, if a new award is substituted for the cancelled award, and designated as a replacement award on the date that it is granted, the cancelled and new awards are treated as if they were a modification of the original award, as described in the previous paragraph.

Cash-settled transactions

The Group has cash-settled share-based payment transaction for certain employees in certain countries due to legal requirements (in the form of share-appreciation rights). The cost of cash-settled transactions is measured initially at fair value at the grant date. This fair value is expensed over the period until the vesting date with recognition of a corresponding liability. The liability is remeasured to fair value at each reporting date up to, and including the settlement date, with changes in fair value recognized in employee benefits expense.

Revenue from contracts with customers

The Group's revenue, which is presented net of sales taxes, is primarily generated by the sale of our software and 3D printed products and services. Software revenue is comprised of perpetual and periodic licenses, maintenance revenue and software development service fees. Perpetual license holders may opt to take an annual maintenance contract, which leads to annual fees. Periodic licenses entitle the customer to maintenance, support and product updates without additional charge. Revenue from prototypes and end products involving 3D printing technology is derived from our network of production centers and may include support and services such as pre-production collaboration prior to the actual production.

The Group sells its products and software through its direct sales force and through authorized distributors.

Software license revenue, maintenance and/or software development service fees may be bundled in one arrangement, or may be sold separately.

The Group recognizes revenue for goods including software based on the five-step model as a result of the application of IFRS 15 since January 1, 2018.

- Identify the contract(s) with a customer;
- Identify the performance obligations in the contract;
- Determine the transaction price;
- Allocate the transaction price to the performance obligations in the contract; and
- Recognize revenue when (or as) the entity satisfies a performance obligation.

Revenue from contracts with customers is recognized when control of the goods or services are transferred to the customer at an amount that reflects the consideration to which the Group is expected to be entitled in exchange from those goods and services.

If the consideration in a contract includes a variable amount, the Group estimates the amount of consideration to which it will be entitled in exchange for transferring the goods to the customer. The variable consideration is estimated at contract inception and constrained until it is highly probable that a significant revenue reversal in the amount of cumulative revenue recognised will not occur when the associated uncertainty with the variable consideration is subsequently resolved. Variable consideration is mainly related to quantities sold, volume (step-based) rebates and development time spend.

Prototypes and end products involving 3D printing technology

The Group recognizes revenue on the sale of goods to the customer or distributor at a point in time when control of the asset is transferred, generally upon shipment or delivery taking into account the shipment terms (usually Ex-works or FOB Time of Shipment Incoterms (International Commercial Terms)).

Perpetual licensed software

The sale and/or license of software products is deemed to have occurred at a point in time, i.e. when a customer either has taken possession of or has the ability to take immediate possession of the software and the software key.

Perpetual software licenses can include one year maintenance and support services as a separate performance obligation. The Company sells these maintenance services also on a stand-alone basis and is therefore capable of determining their stand-alone selling price. On this basis, the amount of the embedded maintenance is separated from the fee for the perpetual license and is recognized ratably over the period to which they relate.

Time-based licensed software

The time-based license agreements include the use of a software license for a fixed term and maintenance and support services during the same period. The Company does not sell time-based licenses without maintenance and support services and therefore revenues is satisfied over time for the entire arrangements and is recognized ratably over the term.

Maintenance and support services

Maintenance and support services are satisfied over time and as such, the Group recognizes this revenue ratably on a straight-line basis over the term that the maintenance service is provided. In general, maintenance services are not automatically renewed.

A maintenance and support contract may include a reinstatement for previous years when the customer did not have a maintenance and support contract previously. Revenue from reinstatements are recognized immediately when the maintenance and support services commence.

Software development services (SDS)

SDS include customized development of software components for customers. Revenue from SDS agreements when distinct from other performance obligations is satisfied over time. Revenue is then recognized either on time and material basis or on the stage of completion of each service contract and when the stage of completion can be measured reliably.

The Company determines the percentage-of-completion by comparing labor hours incurred to-date to the estimated total labor hours required to complete the project. The Company considers labor hours to be the most reliable available measure of progress on these projects. Adjustments to the Company’s estimates of the time to completion are made when facts resulting in a change become known. When the estimate indicates that a loss will be incurred, such loss is recognized immediately.

Contracts with multiple performance obligations

The Group has entered into a number contracts with multiple performance obligations, such as when selling perpetual licenses that may include maintenance and support (included in price of perpetual licenses) and time-based licenses (that include embedded maintenance and support, both of which may be sold with software development services, training, and other product sales). In some cases, the Group delivers software development services bundled with the sale of the software.

The Group evaluates whether each performance obligation is distinct from each other, i.e. the customer can benefit from the good or service on its own, or with readily available resources. Certain development services significantly modify and/or enhance the software license and as such are not considered distinct and combined with the software license.

In those contracts, whether sold to end-customers or to collaboration partners, the Group uses either price list, historical pricing information or management’s best estimate of selling prices (e.g. also using a cost-plus method) to determine the stand-alone selling price for each distinct performance obligation, including software and software-related services such as maintenance and support. In general, elements in such arrangements are also sold on a stand-alone basis and stand-alone selling prices are readily available.

Revenue is allocated to each distinct performance obligation (“PO”) based on the relative percentage of the stand-alone selling price for each PO compared to the total of stand-alone selling prices for all PO over the total transaction price and is recognized when the revenue recognition criteria described above are met.

Contracts with collaboration partners in the medical segment also include multiple elements such as software, maintenance and support services, training, software development services, 3D printed products and royalties. Revenue from those contracts is determined and recognized consistent with other multiple element arrangements.

For certain contracts with collaboration partners, the Company also receives up-front fees, paid by customers for certain exclusivity rights granted only on previously acquired perpetual software licenses, which may be bundled with transfer of title, rights and ownership of certain software products and maintenance and support services. In case the up-front fees do not relate to already delivered good or services, the Group include the up-front fees in the total transaction price which is then allocated to all the distinct performance obligations. Other contracts with collaboration partners include prepaid fees to purchase a maximum number of “Plan Only” cases during a 12-month period. In this case, the prepaid fees are recognized over the period of 12 months based on the expected number of “Plan Only” cases that will be purchased.

Contract assets

A contract asset is the right to consideration in exchange for goods or services transferred to the customer. If the Group performs by transferring goods or services to a customer before the customer pays consideration or before payment is due, a contract asset is recognised for the earned consideration that is conditional. Contract assets are only contracts in progress that are disclosed with the line inventory and contracts in progress in the statement of financial position. We refer to our accounting policies regarding Inventories and Contracts in Progress

Contract liabilities

A contract liability is the obligation to transfer goods or services to a customer for which the Group has received consideration (or an amount of consideration is due) from the customer. If a customer pays consideration before the Group transfers goods or services to the customer, a contract liability is recognised when the payment is made or the payment is due (whichever is earlier). Contract liabilities are recognised as revenue when the Group performs under the contract. Contract liabilities are presented as deferred income in the statement of financial position.

Contract costs

The Group does not have significant costs to obtain contracts and those costs are expensed as incurred.

The Group may have costs incurred in fulfilling contracts that are accounted for as intangible assets. When those costs are not in scope of another standards, these costs are accounted for under contracts in progress (see contract assets). For certain contracts, the Group may have significant software development expenses that are not considered a "distinct performance obligation" which are accounted for as an intangible assets. The Group evaluates whether those costs meet the recognition criteria for an intangible assets and when criteria are not met, expenses those costs as incurred.

Government grants

Government grants are recognized when there is reasonable assurance that the grant will be received and all attached conditions will be complied with. When the grant relates to development costs or another expense, it is recognized as income over the grant period necessary to match the income on a systematic basis to the costs that it is intended to compensate. When the grant relates to the construction of buildings, it is recognized as income over the depreciation period of the related building.

Such grants have been received from the federal and regional governments and from the European Union in the forms of grants linked to certain of its research and development programs, reduced payroll taxes and the financing of the construction of an office building in Leuven (Belgium) and in Freiberg (Germany).

Where retention of a government grant related to assets or to income, is dependent on the Company satisfying certain criteria, it is initially recognized as deferred income. When the criteria for retention have been satisfied, the deferred income balance is released to other operating income in the consolidated income statement on a systematic basis over the periods in which the entity recognizes as expenses the related costs for which the grants are intended to compensate.

Any government grants recognized as income do not have any unfulfilled conditions or other contingencies attached to them, as otherwise we would not be recognizing income for such.

Other financial income and expenses

Other financial income and expenses include mainly foreign currency gains or losses on financial transactions and bank related expenses.

Taxes

Current income tax

Income tax assets and liabilities for the current period are measured at the amount expected to be recovered from or paid to the taxation authorities. The tax rates and tax laws used to compute the amount are those that are enacted or substantively enacted, at the reporting date.

Current income tax relating to items that are recognized directly in equity is recognized in equity and not in the income statement. Management periodically evaluates positions taken in the tax returns with respect to situations in which applicable tax regulations are subject to interpretation and establishes provisions where appropriate.

Deferred tax

Deferred tax is calculated using the liability method on temporary differences at the reporting date between the tax bases of assets and liabilities and their carrying amounts for financial reporting purposes.

Deferred tax liabilities are recognized for all taxable temporary differences. Deferred tax assets are recognized for all deductible temporary differences, carry forward of unused tax credits and unused tax losses, to the extent that it is probable that taxable profit will be available against which the deductible temporary differences, and the carry forward of unused tax credits and unused tax losses can be utilized.

The carrying amount of deferred tax assets is reviewed at each reporting date and reduced to the extent that it is no longer probable that sufficient taxable profit will be available to allow all or part of the deferred tax asset to be utilized. Unrecognized deferred tax assets are reassessed at each reporting date and are recognized to the extent that it has become probable that future taxable profits will allow the deferred tax asset to be recovered.

Deferred tax assets and liabilities are measured at the tax rates that are expected to apply in the year when the asset is realized or the liability is settled, based on tax rates (and tax laws) that have been enacted or substantively enacted at the reporting date.

Deferred tax assets and deferred tax liabilities are offset, if a legally enforceable right exists to set off current tax assets against current income tax liabilities and the deferred taxes relate to the same taxable entity and the same taxation authority.

Sales tax

Revenue, expenses and assets are recognized net of the amount of VAT, except:

- Where the sales tax incurred on a purchase of assets or services is not recoverable from the taxation authority, in which case the sales tax is recognized as part of the cost of acquisition of the asset or as part of the expense item as applicable; and
- Receivables and payables that are stated with the amount of sales tax included.

The net amount of sales tax recoverable from, or payable to, the taxation authority is included as part of receivables or payables in the statement of financial position.

New and revised standards not yet adopted

The standards, interpretations and amendments issued by the IASB and relevant for the Group, but not yet effective are not expected to have a material impact on the Group’s future consolidated financial statements:

- Amendments to IAS 1 and IAS 8 Definition of Material (applicable for annual periods beginning on or after January 1, 2020)
- Amendments to IAS 1 Presentation of Financial Statements: Classification of Liabilities as Current or Non-current (applicable for annual periods beginning on or after January 1, 2022)
- Amendments to IFRS 3 Business Combinations (applicable for annual periods beginning on or after January 1, 2020)
- Amendments to IFRS 9, IAS 39 and IFRS 7 Interest Rate Benchmark Reform (applicable for annual periods beginning on or after January 1, 2020)
- Amendments to references to the Conceptual Framework in IFRS standards (applicable for annual periods beginning on or after January 1, 2020)
- IFRS 17 Insurance Contracts (applicable for annual periods beginning on or after January 1, 2021)

Significant accounting judgments, estimates and assumptions

The preparation of the Group's consolidated financial statements requires management to make judgments, estimates and assumptions that affect the reported amounts of revenue, expenses, assets and liabilities, and the accompanying disclosures. Uncertainty about these assumptions and estimates could result in outcomes that require a material adjustment to the carrying amount of assets or liabilities for future periods.

On an ongoing basis, the Group evaluates its estimates, assumptions and judgments, including those related to revenue recognition, development expenses, share-based payment transactions, income taxes, impairment of goodwill, intangible assets and property, plant & equipment and business combinations, provisions for expected credit losses, convertible loans, useful lifes of certain assets and IFRS 16.

The Group based its assumptions and estimates on parameters available when the consolidated financial statements were prepared. Existing circumstances and assumptions about future developments, however, may change due to market changes or circumstances arising beyond the control of the Group. Such changes are reflected in the assumptions when they occur.

Revenue recognition

Our revenue recognition policies require management to make significant estimates. Management analyzes various factors, including a review of specific transactions, historical experience, creditworthiness of customers and current market and economic conditions. Changes in judgments based upon these factors could impact the timing and amount of revenue and cost recognized and thus affects our results of operations and financial condition. The significant estimates and judgments relate to:

- The assessment whether a performance obligation is distinct in a bundled sales transactions;
- Estimates of the variable considerations and the assessment of the revenue constraint limitation;
- Estimates of the stand-alone selling prices for each distinct performance obligation; and
- The stage of completion of our customized development of software components for customers when revenue is satisfied over time.

The Group is making significant judgments when performing the assessment of whether a performance obligation is distinct from the other performance obligations in a contract, i.e. whether the good or service has a benefit for the customer in its own or together with readily available resource and/or whether the good or service is highly interrelated or a significant input with another good or service delivered, or whether it significantly modifies or customizes another good or service. The relevant judgments include the following:

- Whether the software license is distinct from the 3D printed guides — in most cases with contracts with collabroration partners in the Materialise Medical segment, the software licenses is combined with the manufacturing of the 3D printed guides as the software license has no benefit for the customer without the manufacturing services. Note that the Group is implementing a new feature "Plan Only" which where the collaboration partners could benefit from the software license on its own.
- Whether the development services are distinct from other performance obligations — in most cases, those performance obligations are distinct however for one contract with a collaboration partner in the Materialise Medical segment, the software license is combined with the license and the 3D printed guides as one "distinct" performance obligation

For the stand-alone selling prices, the Group is using prices from price list or historical prices for similar transactions. However, in certain cases, such information is not immediately available and in such cases, the Group estimates the stand-alone selling price by using a cost-plus or another estimate. In addition, for certain performance obligations such as development services, stand-alone selling prices also require an estimate of the time to complete the development.

Certain contracts include estimates of variable considerations within the transaction price and assessing the revenue constraint, such as:

- Quantities/volume sold for fixed prices in relation to, but not limited to, manufacturing of 3D printed products, software licenses sold, maintenance renewals;
- Contractual prices may be different based on volume purchased during a certain period;
- FTE spend for development or other services billed on a time and material basis; and
- Volume rebates.

The method applied to estimate the variable consideration is dependent on the number of possible scenarios and the probability of each scenario. In case there are many possible scenarios with a wide range of probabilities (each less than 50%), the Group will use the expected value method while the most likely method is used when there is a scenario with a higher probability (more than 50%).

Variable consideration is not constrainted when, based on historical experience, high reliable business forecast and/or the timeframe of the estimates, the Group determines that there is a high probability that this will not result in a future revenue reversal.

We determine the stage of completion for development contracts satisfied over time by comparing labor hours incurred to-date to the estimated total labor hours required to complete the project. We consider labor hours to be the most reliable, available measure of progress on these projects. Adjustments to estimates to complete are made in the periods in which facts resulting in a change become known. When the estimate indicates that a loss will be incurred, such loss is recorded in the period identified. Significant judgments and estimates are involved in determining the percent complete of each contract. Different assumptions could yield materially different results.

Development expenses

Under IAS 38, internally generated intangible assets from the development phase are recognized if certain conditions are met. These conditions include the technical feasibility, intention to complete, the ability to use or sell the asset under development, and the demonstration of how the asset will generate probable future economic benefits. The cost of a recognized internally generated intangible asset comprises all directly attributable cost necessary to make the asset capable of being used as intended by management. In contrast, all expenditures arising from the research phase are expensed as incurred.

Determining whether internally generated intangible assets from development are to be recognized as intangible assets requires significant judgment, particularly in determining whether the activities are considered research activities or development activities, whether the product enhancement is substantial, whether the completion of the asset is technical feasible considering a company-specific approach, the probability of future economic benefits from the sale or use including an assessment whether FDA approval will be obtained.

The Group has determined that the conditions for recognizing internally generated intangible assets from proprietary software, guide and other product development activities are not met until shortly before the products are available for sale, unless either (i) the Group has strong evidence that the above criteria are met and a detailed business plan is available showing the asset will on a reasonable basis generate future economic benefits or (ii) the development is done based upon specific request of the customer, the Group has the intention to market the product also to other parties than the customer, the development is subject to an agreement and the substance of the agreement is that the customer reimburses the Group for a significant portion of the development expenses incurred. As such, development expenditures not satisfying the above criteria and expenditures on the research phase of internal projects are recognized in the consolidated income statement as incurred. This assessment is monitored by the Group on a regular basis.

We have determined that the criteria for internally generated intangible assets were met for two projects in 2018: (1) the software development of a new planner for hospitals within the cardiovascular field and (2) the process to obtain FDA and E.U. approval for a 3D printed tracheal splint within the Materialise Medical segment. The first development is finished and amortization has started in 2019. For the latter, we determined that there is a low risk that FDA approval will not be obtained although clinical trials have to be started and commercialization is not expected before 2022. This assessment was made by management based on several factors including the developed product itself, the exclusive patent rights obtained on the developed product, the successful application of the product on a number of patients as part of the emergency exception use obtained from the FDA and the continued discussions to speed up the trial duration and commercialization. The product is also expected to receive E.U. approval for commercialization by the end of 2020. The amount capitalized for the tracheal splint amounted to K€1,376 as of December 31, 2019 the amount capitalized for the software development of a new planner for hospitals amounted to K€461 as per December 31, 2019.

Share-based payment transactions

The Group measures the cost of equity-settled transactions with employees by reference to the fair value of the equity instruments at the date at which they are granted and measured the cost of cash-settled transactions by reference to the fair value of the equity instrument at the date of reporting. The Group has applied the Black-Scholes valuation model to estimate fair value. Using this model requires management to make assumptions with regards to volatility and expected life of the equity instruments. The assumptions used for estimating fair value for share-based payment transactions are disclosed in Note 14 and are estimated as follows:

- Volatility is estimated based on the average annualized volatility of the Group;
- Estimated life of the warrant is estimated to be until the first exercise period which is typically the month after their vesting;
- Fair value of the shares is determined based on the share price of the Group on Nasdaq at the date of issuance. For the grants prior to the initial public offering, the fair value of the shares was estimated based on a discounted cash flow model with 3-year cash flow projections and a multiple of EBITDA determined based on a number quoted peers in the 3D printing industry; and
- The dividend return is estimated by reference to the historical dividend payment of the Group. Currently, this is estimated to be zero as no dividends have been paid since inception.

Income taxes

Deferred tax assets are recognized for unused tax losses to the extent that it is probable that taxable profit will be available against which the losses can be utilized. Significant management judgment is required to determine the amount of deferred tax assets that can be recognized, based upon the likely timing and the level of future taxable profits together with future tax planning strategies.

As at December 31, 2019, the Group had K€37,440 (2018: K€25,285; 2017: K€11,948) of tax losses carry forward and other tax credits such as investment tax credits and notional interest deduction, of which K€25,172 related to Materialise NV (2018: K€15,592; 2017: K€4,581). These losses relate to the parent and subsidiaries that have a history of losses, in countries where these losses do not expire (except for the notional interest deduction 2019: K€0; 2018: K€0; 2017: K€315) and may not be used to offset taxable income elsewhere in the Group.

With respect to the unused tax losses of Materialise NV, no deferred tax assets have been recognized in 2019, 2018 and 2017, given that in view of the Belgian Patent Income Deduction and Innovation Income Deduction there is an uncertainty to which extent these tax losses will be used in future years. As from July 1, 2016, the new Innovation Income Deduction replaces the former Patent Income Deduction. Under the grandfathering rule the Patent Income Deduction system can still be applied until June 30, 2021. The Belgian Patent Income Deduction allows companies to deduct 80% of the qualifying gross patent income from the taxable basis. Under the Innovation Income Deduction system, companies can deduct up to 85% of their net innovation income from the taxable basis. Based on its analysis in 2019 the Company has assessed that no deferred tax asset should be accounted for with respect to its unused tax losses in Belgium.

With respect to the unused tax losses of the other entities, no deferred tax assets have been recognized in 2019 (2018: K€0; 2017: K€0). The Group has not recognized deferred tax assets on unused tax losses totaling K€10,737 in 2019 (2018: K€11,906; 2017: K€7,904) given that it is not probable that sufficient positive taxable base will be available in the foreseeable future against which these tax losses can be utilized.

If the Group was able to recognize all unrecognized deferred tax assets, net profit would have increased by K€6,855 in 2019 during which K€23,141 of tax losses were utilized. Further details on taxes are disclosed in Note 22.10.

Impairment of goodwill, intangible assets and property, plant & equipment and determination of the cash-generating-unit.

The Group has goodwill for a total amount of K€20,174 as at December 31, 2019 (2018: K€17,491; 2017: K€17,552) which has been subject to an impairment test. The goodwill is tested for impairment based on a discounted cash flow model with cash flows for the next five years derived from the budget and a residual value considering a perpetual growth rate. The value in use is sensitive to the discount rate used for the DCF model as well as the expected future cash-inflows and the growth rate used for extrapolation purposes.

Also, as part of the impairment analysis, the Group need to determine the different CGUs at the lowest non-aggregated level which include judgments about application of the criteria to determine the CGUs based on the facts and circumstances how the entities and business units within the CGU and within the Group operate and are monitored. The level of CGU may also have an impact on certain assumptions to make with regard to transfer pricing.

The key assumptions used to determine the value in use for the different CGUs are disclosed and further explained in Note 5.

The Group capitalized development expenses in 2019 for a total amount of K€1,328 which are not in the condition as intended by management and as such not amortized. Those development expenses have been subject to an impairment test based on a discounted cash flow model with cash flows derived from the latest business plan. The value in use is sensitive to the discount rate used for the DCF model as well as the expected commercialization date for the products and the expected future cash inflows after commercialization. We refer to the section on development expenses above for further explanations.

The Group is in progress of building or refurbishing a number of machines that allow to use recycled powder and reduce the scrap rate, which will bring significant benefits in the production for the Group. The project aims a completion date in 2020. The total carrying value of these assets under construction is K€1,804 as at December 31, 2019. Those assets under construction have been subject to an impairment test based on a discounted cash flow model using five years of projected cash flows. The present value is sensitive to the discount rate (10.0% applied) used for the DCF model, when the assets are in the state intended by management to use in the production as well as the expected future net cash inflows (revenue minus production costs). We refer to Note 7.

When events or changes in circumstances indicate that the carrying amount of the intangible assets and property, plant and equipment may not be recoverable, we estimate the value in use for the individual assets, or when not possible, at the level of CGUs to which the individual assets belong.

No impairment charges have been recorded during 2019 (2018: K€0; 2017: K€0).

Business combinations

We determine and allocate the purchase price of an acquired business to the assets acquired and liabilities assumed as of the business combination date. Business combinations are discussed further in Note 4. The purchase price allocation process requires us to use significant estimates and assumptions, including

- estimated fair value of the acquired intangible assets;
- estimated fair value of property, plant and equipment; and
- estimated fair value of the contingent consideration.

The contingent consideration as included in the financial statements is recorded at fair value at the date of acquisition and is reviewed on a regular basis. The fair value of the contingent consideration is based on risk-adjusted future cash flows of different scenarios discounted using appropriate interest rates. The structure of the possible scenarios and the probability assigned to each one of them is reassessed by management at every reporting period and requires judgement from management about the outcome and probability of the different scenarios as well as the evolution of the variables.

While we are using our best estimates and assumptions as part of the purchase price allocation process to accurately value assets acquired and liabilities assumed at the date of acquisition, our estimates and assumptions are inherently uncertain and subject to refinement. Examples of critical estimates in valuing certain of the intangible assets we have acquired or may acquire in the future include but are not limited to:

- future expected cash flows from customer contracts and relationships, software license sales and maintenance agreements;
- the fair value of the plant and equipment
- the fair value of the deferred revenue; and
- discount rates.

Provision for expected credit losses of trade receivables and contract assets

The Group uses a provision matrix to calculate ECLs for trade receivables and contract assets. The provision rates are based on days past due for groupings of various customer segments that have similar loss patterns (i.e., by legal entity).

The provision matrix is initially based on the Group's historical observed default rates. The Group will calibrate the matrix to adjust the historical credit loss experience with forward-looking information. For instance, if forecast economic conditions (i.e., gross domestic product) are expected to deteriorate over the next year which can lead to an increased number of defaults, the historical default rates are adjusted. At every reporting date, the historical observed default rates are updated and changes in the forward-looking estimates are analyzed.

The assessment of the correlation between historical observed default rates, forecast economic conditions and ECLs is a significant estimate. The amount of ECLs is sensitive to changes in circumstances and of forecast economic conditions. The Group's historical credit loss experience and forecast of economic conditions may also not be representative of customer's actual default in the future.

Convertible loan granted to Fluidda

The Group accounts for the convertible loan granted to Fluidda in January 2019, with a notional amount of K€2,500, at fair value. The carrying value of the convertible loan amounts to K€2,750 at December 31, 2019. Fluidda is a private start-up company which delivers CRO services for drug development and develops medical devices which require EMA/FDA approvals. Fluidda is currently loss-making. In determining the fair value, the Group consider different contractual parameters such as the repayment and conversion scenario's and dates. In addition, the Group needs to make significant estimates such as (i) the discount rate, (ii) the probabilities for each repayment and conversion scenario, (iii) the amount of a qualified capital increase that will determine the conversion factor and (iv) the timing for each repayment and conversion scenario. The convertible loan has a duration of 7 years with a 10% annual interest rate which are capitalized. The Group has applied a discount factor of 13.88% that is based on the estimated WACC of Fluidda reflecting the uncertainty in relation to the success of the company and the applied estimates by the Group.

At December 31, 2019, the Group determined that the fair value is not significantly different than its carrying value. Changes in the significant assumptions may lead to a significant increase/decrease in the fair value of the convertible loan. A increase/decrease in the applied discount rate by 2% would lead to a change in fair value by K€-267 / K€298.

Changes in useful life for certain assets

We review the useful life of our definite lived intangible assets and property, plant and equipment on an annual basis considering the current facts and circumstances available. This review has resulted in 2019 in a re-assessement of the useful life for certain specific assets in the categories buildings, fixtures, vehicles and machinery. We refer to Note 7 for the impact of the change in useful lifes during the year 2019.

Leases IFRS 16 – estimating the discount rate and probability of exercisting extension options/termination options and purchase options

The Group can not always determine the interest rate implicit in the lease contract and therefore, the Group has to estimate the incremental borrowing rate to measure certain lease liabilities such as buildings. The Group uses for buildings the property yield as reference to determine the incremental borrowing rate. For other assets, the Group generally uses the interest rate implicit in the lease contract or applies the incremental borrowing rate for a portfolio of similar assets. The incremental borrowing rate reflects what the Group "would have to pay", which requires estimation when no observable rates are available or when they need to be adjusted to reflect the terms and conditions of the lease.

In addition, certain lease contracts may have extension options, termination options in case of property leases and/or purchase options in case of leases. The Group estimates whether it is reasonable certain or not, whether those options will be exercised or not, which impact the lease term in case of extension options and termination options and the period over which the lease assets are depreciated in case of purchase options.

4 Business Combinations

Acquisitions in 2019

Engimplan

The Group executed a share purchase agreement dated August 6, 2019 and acquired 40% of the shares and voting interest of Engimplan Engenharia de Implante Indústria e Comércio Ltda (referred to as "Engimplan") for a total purchase consideration in cash of K€6,647.

As part of this transaction, the Group increased its shareholding in Engimplan to 75% with a capital increase of K€5,750 in cash in Engimplan.

The Brazilian-based company is specialist in manufacturing of orthopaedic and cranio-maxillofacial (CMF) implants and instruments. Engimplan will be part of the Medical segment.

The preliminary fair value of the identifiable assets and liabilities at the date of acquisition were:

in 000€	Carrying value at acquisition date	Fair value adjustments	Fair value at acquisition date
Assets			
Software	214	—	214
Customer relations	—	2,530	2,530
Trademarks	—	556	556
Other intangible assets	9	—	9
Property, plant & equipment	2,268	101	2,369
Right-of-use assets	633	—	633
Deferred tax assets	—	—	—
Other non-current financial assets	3	—	3
Inventory	2,084	96	2,180
Trade receivables	1,802	—	1,802
Other current assets	391	—	391
Cash from capital increase	5,750	—	5,750
Cash & cash equivalents	316	—	316
Total Assets	**13,470**	**3,283**	**16,753**
Liabilities			
Deferred tax liabilities	—	—	—
Deferred income	(83)	—	(83)
Loans & borrowings	(1,443)	—	(1,443)
Lease liabilities	(633)	—	(633)
Trade payables	(271)	—	(271)
Tax payables	(100)	—	(100)
Payroll related payables	(298)	—	(298)
Other liabilities	(914)	—	(914)
Total Liabilities	**(3,742)**	**—**	**(3,742)**
Total identified assets and liabilities	**9,728**	**3,283**	**13,011**
Goodwill	—	—	2,639
Non-controlling interest	—	—	(3,253)
Acquisition price	**—**	**—**	**12,397**

The cash flow from the business combination is as follows:

Cash & cash equivalents acquired	(316)
Cash from capital increase	(5,750)
Acquisition price in cash	12,397
Total cash flow	**6,331**

The preliminary fair value of the identifiable assets and liabilities are included in our consolidated financial statements per December 31, 2019. We have performed a preliminary fair value analysis of the Engimplan business combination, with corresponding adjustments to the intangible assets, property, plant and equipment and inventories. The full fair value exercise for plant, property & equipment is not yet finalised.

The accounting for the business combination resulted in fair values at date of acquisition of K€2,530 for customer relationships, K€556 for trademarks. Fair value analysis with respect to property, plant and equipment led to a preliminary fair value of K€2,369. A fair value adjustment was identified of K€96 for the inventory.

There are no contingent considerations payable.

The goodwill recognized is primarily attributable to the trained and knowledgable workforce and to the expected synergies that will be realized at level of manufacturing and existing customer base. The goodwill is not deductible for income tax purposes.

The total acquisition-related costs recognized as an expense in the general & administration costs are K€140.

The contribution of the acquired business to the revenue and net profit of the Group for the year ended December 31, 2019 were, respectively, K€2,437 and K€315. The pro forma revenue and the pro forma net profit of the acquired business would have been K€5,710 and K€(1,258), respectively, if the business would have been acquired on January 1, 2019.

Acquisitions in 2018

The Group has not completed any Business Combinations during the year 2018.

Acquisitions in 2017

ACTech

The Group has signed a share and purchase agreement on October 4, 2017 to acquire all of the shares and voting interest of ACTech Holding Gmbh, an entity incorporated in Germany, and its subsidiaries ACTech Gmbh and ACTech North America Inc. (together referred to as “ACTech Group”) for a total purchase consideration in cash of K€28,907 (net of indemnification asset).

The German-based ACTech Group is specialist in producing limited runs of highly complex cast metal parts in a short timeframe. ACTech Group will be part of the Manufacturing segment.

The fair value of the identifiable assets and liabilities at the date of acquisition were:

in 000€	Carrying value at acquisition date	Fair value adjustments	Fair value at acquisition date
Assets			
Technology	—	515	515
Customer relations	—	17,092	17,092
Other intangible assets	6,330	(5,345)	985
Property, plant & equipment	19,986	243	20,229
Deferred tax assets	503	(415)	88
Other non-current financial assets	56	—	56
Inventory	2,356	433	2,789
Trade receivables	5,176	—	5,176
Cash & cash equivalents	2,244	—	2,244
Other assets	542	—	542
Total Assets	**37,193**	**12,523**	**49,716**
Liabilities			
Deferred tax liabilities	(47)	(5,977)	(6,024)
Deferred income	(1,298)	1,298	—
Loans & borrowings	(11,308)	—	(11,308)
Trade payables	(777)	—	(777)
Tax payables	(3,664)	1,214	(2,450)
Other liabilities	(9,062)	—	(9,062)
Total Liabilities	**(26,156)**	**(3,465)**	**(29,621)**
Total identified assets and liabilities	**11,037**	**9,058**	**20,095**
Goodwill	—	—	8,812
Acquisition price	—	—	**28,907**

The cash flow from the business combination is as follows:

Cash & cash equivalents acquired	(2,244)
Acquisition price in cash including escrow	29,417
Total cash flow	**27,173**

The fair value of the identifiable assets and liabilities as included in our consolidated financial statements per December 31, 2017 were provisional as the final valuation had not been completed by the date these consolidated financial statements were approved for issue by the board of directors. As of October 4, 2018, we have completed the fair value analysis of the ACTech business combination, which corresponding adjustments to the intangible assets, property, plant and equipment, inventories and contracts in progress, other current assets, investment grants and tax payables. The fair value of the identified assets and liabilities were K€2,432 higher than the provisional value at date of acquisition, with a corresponding reduction in goodwill.

The accounting for the business combination resulted in fair values at date of acquisition of K€17,092 for customer relationships, K€515 for patented technology, K€826 for order backlog, and K€222 for tax contingencies subject to an indemnification asset. The fair value of the receivables is K€5,176 which equals the gross contractual amounts receivable. Fair value analysis with respect to property, plant and equipment led to a fair value of K€20,229. A fair value adjustment was identified of K€433 for the inventory. The deferred tax liabilities comprise the tax effect of the fair value adjustments for the above described items.

The purchase price paid at the acquisition date amounted to K€29,417. The share and purchase agreement foresees that the Sellers will indemnify the Group for certain tax payables and contingencies that may occur in the period between 2018 and 2021. An amount of K€3,788 has been paid in an escrow account which can be applied against the indemnification asset. The Group has estimated that the fair value of the indemnification asset is K€222 which has been applied against the acquisition price. The indemnification asset will be paid out of the escrow account when the related tax payables and contingencies are paid.

There are no contingent considerations payable.

The goodwill recognized is primarily attributable to the trained and knowledgable workforce and to the expected synergies that will be realized at level of software platforms, manufacturing and existing customer base. The goodwill is not deductible for income tax purposes.

The total acquisition-related costs recognized as an expense in the general & administration costs were K€609 in 2017.

The contribution of the acquired business to the revenue and net profit of the Group for the year ended December 31, 2017 were, respectively, K€9,965 and K€275. The pro forma revenue and the pro forma net profit of the acquired business would have been K€37,096 and K€2,060, respectively, if the business would have been acquired on January 1, 2017.

Changes in the measurement of the contingent consideration for previous acquisitions

Cenat

The Group has settled it contingent consideration in relation to the sale and purchase agreement of Cenat BVBA, signed on March 10, 2015, on January 21, 2019 for a total amount of K€450. No remeasurement gain or loss has been recorded during 2019 (2018: gain of K€192). No remeasurement has been recorded at December 31, 2017.

5 Goodwill

The goodwill has been allocated to the cash generating units ("CGU") as follows:

	As of December 31,		
in 000€	2019	2018	2017
CGU: MAT NV SAM BE	3,241	3,241	3,241
CGU: e-Prototypy	800	794	818
CGU: ACTech	8,812	8,812	8,812
CGU: OrthoView	4,683	4,467	4,504
CGU: MAT NV Manufacturing (Metal)	177	177	177
CGU: Engimplan	2,461	—	—
Total	**20,174**	**17,491**	**17,552**

The changes in the carrying value of the goodwill can be presented as follows for the years 2019, 2018 and 2017:

in 000€	Gross	Impairment	Total
At January 1, 2017	**8,964**	**(104)**	**8,860**
Additions	8,812	—	8,812
Impairment	—	—	—
Currency translation	(120)	—	(120)
At December 31, 2017	**17,656**	**(104)**	**17,552**
Additions	—	—	—
Currency translation	(61)	—	(61)
At December 31, 2018	**17,595**	**(104)**	**17,491**
Additions	2,639	—	2,639
Currency translation	44	—	44
At December 31, 2019	**20,278**	**(104)**	**20,174**

The goodwill of Orthoview (UK), e-Prototypy (PL) and Engimplan (BR) include respectively K€216, K€6 and K€-178 impact of currency translation in 2019.

The Group has performed an impairment test based on a discounted cash flow model with cash flows for the next five years derived from the budget and a residual value considering a perpetual growth rate. The MAT NV SAM BE and Cenat are included in the reportable segment "Materialise Software". The CGU ACTech, e-Prototypy (PL) and MAT NV Manufacturing (Metal) are included in the reportable segment "Materialise Manufacturing". The CGU Orthoview (UK) and Engimplan (BR) are included in the reportable segment "Materialise Medical".

CGU: MAT NV SAM (BE)

The goodwill allocated to the CGU MAT NV SAM (BE) relates to the goodwill from the acquisition of CENAT in 2015 and the goodwill related to the acquisition of Marcam in 2011 (DE-3D Printing Software).

The impairment test is based on the projected discounted cash flows resulting from the CGU MAT NV SAM BE, considering a period of five years. The main assumptions for goodwill impairment testing include a discount rate (based on WACC) of 10.96% and a perpetual growth rate of 5.00%. Other assumptions include the year-on-year growth rate of the revenue, gross margin and the operating costs which has been determined by management based on past experience. It was concluded that the value in use is higher than the carrying value of the cash generating unit of K€39,132 There are no reasonable changes in assumptions that would reduce the value in use below its carrying value of the cash generating unit.

CGU e-Prototypy

The goodwill relates to the acquisition of the Polish entity e-Prototypy . The impairment test on the CGU e-Prototypy is based on the projected discounted cash flows considering a period of five years. The main assumptions include a discount rate (based on WACC) of 14.52% and a perpetual growth rate of 2.00%. Other assumptions include the year-on-year growth rate of the revenue, gross margin and the operating costs which has been determined by management based on past experience and continued investments in capex in new 3D printing equipment. It was concluded that the value in use is significantly higher than the carrying value of the cash generating unit K€3,940. Based on the sensitivity analysis where discount rate would increase with 1%, the value in use would still be significantly higher than the carrying value of the cash generating units.

CGU Orthoview

The goodwill relates to the acquisition of Orthoview. The impairment test on the CGU Orthoview is based on the projected discounted cash flows considering a period of 5 years .The main assumptions include a discount rate (based on WACC) of 11.97% and a perpetual growth rate of 1.00%. Other assumptions include the year-on-year growth rate of the revenue, gross margin and the operating costs which have been determined by management based on past experience. It was concluded that the value in use is higher than the carrying value of the cash generating unit of K€9,269. Based on the sensitivity analysis where discount rate would increase with 1%, the value in use would still be higher than the carrying value of the cash generating unit. A perpetual growth of 0% still result in a value in use that is higher than the carrying value of the cash generating unit.

The Orthoview business is being integrated further in the existing software business within our Materialise Medical segment. Synergies that are expected from joined product lines are not taken into account in the current impairment review as management believes that Orthoview can still be considered a separate cash generating unit in 2019.

CGU ACTECH

The impairment test on the CGU ACTech is based on the projected discounted cash flows, considering a period of 5 years. The main assumptions include a discount rate (based on WACC) of 9.40% and a perpetual growth rate of 1.00%. Other assumptions include the year-on-year growth rate of the revenue, gross margin and the operating costs which have been determined by management based on past experience. It was concluded that the value in use is higher than the carrying value of the cash generating unit of K€26,284. Based on the sensitivity analysis where discount rate would increase with 1% or other reasonable changes in the 5-year projected cash flows (such as lower EBITDA) and perpetual growth rate, the value in use would be higher than the carrying value of the cash generating unit.

CGU ENGIMPLAN

The impairment test on the CGU Engimplan is based on the projected discounted cash flows, considering a period of 5 years. The main assumptions include a discount rate (based on WACC) of 17.05% and a perpetual growth rate of 3.00%. Other assumptions include the year-on-year growth rate of the revenue, gross margin and the operating costs which have been determined by local & new management based on past experience. It was concluded that the value in use is higher than the carrying value of the cash generating unit of K€15,710. Based on the sensitivity analysis where discount rate would increase with 1 % or other reasonable changes in the 5-year projected cash flows (such as lower EBITDA) and perpetual growth rate, the value in use would be higher than the carrying value of the cash generating unit.

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6 Intangible assets

The changes in the carrying value of the intangible assets can be presented as follows for the years 2019, 2018 and 2017:

in 000€	Patents and licenses	Software	Acquired customers, technology and backlogs	Developed technology and software under construction	Total
Acquisition value					
At January 1, 2017	**3,788**	**3,769**	**7,596**	**—**	**15,153**
Additions	749	3,718	—	—	4,467
Acquisition of a subsidiary	115	242	18,433	—	18,790
Disposals	(159)	(143)	—	—	(302)
Transfer between accounts	—	(98)	—	—	(98)
Currency translation	—	(5)	(183)	—	(188)
Other	4	155	(251)	—	(92)
At December 31, 2017	**4,497**	**7,638**	**25,595**	**—**	**37,730**
Additions	554	807	32	951	2,344
Acquisition of a subsidiary	—	—	—	—	—
Disposals	(759)	(221)	—	—	(980)
Transfer between accounts	2	—	—	364	366
Currency translation	—	—	(48)	—	(48)
Other	—	17	—	—	17
At December 31, 2018	**4,294**	**8,241**	**25,579**	**1,315**	**39,429**
Additions	209	656	—	1,328	2,193
Acquisition of a subsidiary	38	214	3,048	9	3,309
Disposals	—	(45)	(32)	—	(77)
Transfer between accounts	(109)	1,601	—	(988)	504
Currency translation	1	(10)	86	20	97
Other	3	10	—	(32)	(19)
At December 31, 2019	**4,436**	**10,667**	**28,681**	**1,652**	**45,436**

in 000€	Patents and licenses	Software	Acquired customers, technology and backlogs	Developed technology and software under construction	Total
Amortization					
At January 1, 2017	**(2,042)**	**(1,251)**	**(2,095)**	**—**	**(5,388)**
Amortization charge for the year	(609)	(1,634)	(1,579)	—	(3,822)
Disposals	2	77	—	—	79
Transfer between accounts	—	98	—	—	98
Currency translation	—	4	45	—	49
Other	(117)	(279)	250	—	(146)
At December 31, 2017	**(2,766)**	**(2,985)**	**(3,379)**	**—**	**(9,130)**
Amortization charge for the year	(749)	(2,310)	(2,005)	—	(5,064)
Disposals	854	206	—	—	1,060
Transfer between accounts	—	—	—	—	—
Currency translation	—	1	22	—	23
Other	—	8	—	—	8
At December 31, 2018	**(2,661)**	**(5,080)**	**(5,362)**	**—**	**(13,103)**
Amortization charge for the year	(246)	(2,582)	(2,031)	—	(4,859)
Disposals	—	23	—	—	23
Transfer between accounts	109	(96)	—	—	13
Currency translation	—	(25)	(126)	—	(151)
Other	—	20	16	—	36
At December 31, 2019	**(2,798)**	**(7,740)**	**(7,503)**	**—**	**(18,041)**
Net carrying value					
At December, 31 2019	1,638	2,927	21,178	1,652	27,395
At December, 31 2018	1,633	3,161	20,217	1,315	26,326
At December 31, 2017	1,731	4,653	22,216	—	28,600
At January, 1 2017	1,746	2,518	5,501	—	9,765

Patent and licenses include only the direct attributable external costs incurred in registering the patent and obtaining the license. Software relates to purchased software for internal use only except for software development on certain application interfaces that were almost fully funded by a third party. Apart from the developed technology and software under construction that was capitalized per end of 2019 for the amount of K€1,652, no other software development was capitalized in 2019 (2018: K€1,315, 2017:€86). The remaining amortization period is 1.5 years for the main software purchases and 7.7 years for the main patents and licenses.

The 'Acquired customers and technology' have been recognized as part of the acquisition of Engimplan, ACTech, E-Prototypy, OrthoView, and Cenat (see Note 4). At December 31, 2019, the remaining amortization period for the acquired customers is 9.58 years for Engimplan, 17.75 years for ACTech, 4.75 years for OrthoView, fully amortized for E-Prototypy and 5.25 years for Cenat (2018: 18.75 years for ACTech, 5.75 years for OrthoView and 6.25 years for Cenat).

The developed technology and software relate to one project (Tracheal Splint Project) that meet the criteria for recognition as internally developed intangible asset (see also Note 3: significant accounting judgments, estimates and assumptions). This asset is still being developed and consequently is not amortized. The Group has performed an impairment analysis on this asset which resulted in no impairment. The key assumptions used are:

- Discount rate of 11.38%;
- Periods of cash flows: 6
- No perpetuity

The total amortization charge for 2019 is K€4,859 (2018: K€5,064; 2017: K€3,822). As from 2017 the amortization of intangible assets from business combinations is mainly included in the line net operating income of the consolidated income statement.

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7 Property, plant & equipment

The changes in the carrying value of the property, plant & equipment can be presented as follows for the year 2019 and 2018:

in 000€	Land and buildings	Plant and equipment	Right-of-use assets	Construction in progress	Total
Acquisition value					
At January 1, 2018	**40,184**	**67,117**	**14,303**	**3,754**	**125,358**
Additions	3,079	9,476	792	5,210	18,557
Disposals	(99)	(1,882)	(17)	(387)	(2,385)
Transfers	2,728	2,953	(732)	(5,547)	(598)
Currency Translation	(119)	(25)	(19)	(26)	(189)
Other	4	(82)	—	(2)	(80)
At December 31, 2018	**45,777**	**77,557**	**14,327**	**3,002**	**140,663**
Impact of adoption of IFRS 16	—	—	4,984	—	4,984
Additions	302	7,363	3,429	5,807	16,901
Acquired from business combinations	61	2,291	633	17	3,002
Disposals	(37)	(6,091)	(753)	—	(6,881)
Transfers	(3,360)	7,077	117	(4,338)	(504)
Currency Translation	150	199	8	6	363
Other*	—	(73)	(1,099)	(80)	(1,252)
At December 31, 2019	**42,893**	**88,323**	**21,646**	**4,414**	**157,276**
Depreciation					
At January 1, 2018	**(4,504)**	**(27,166)**	**(6,623)**	**—**	**(38,293)**
Depreciation charge for the year	(1,560)	(8,010)	(2,346)	(307)	(12,223)
Disposals	26	2,102	6	—	2,134
Transfers	(18)	(253)	514	—	243
Currency Translation	(15)	(53)	8	—	(60)
Other	—	73	—	—	73
At December 31, 2018	**(6,071)**	**(33,307)**	**(8,441)**	**(307)**	**(48,126)**
Depreciation charge for the year	(1,199)	(9,082)	(4,058)	—	(14,339)
Disposals	36	5,704	359	—	6,099
Transfers	200	(1,551)	1,031	307	(13)
Currency Translation	(25)	(190)	(2)	—	(217)
Other	220	(34)	51	—	237
At December 31, 2019	**(6,839)**	**(38,460)**	**(11,060)**	**—**	**(56,359)**
Net book value					
At December 31, 2019	36,054	49,863	10,586	4,414	100,917
At December 31, 2018	39,706	44,250	5,886	2,695	92,537
At January 1, 2018	35,680	39,951	7,680	3,754	87,065

* “Other” includes modification of Right-of-use assets for an amount of K€(554) as disclosed in the Right-of-use assets table below.

The changes in the carrying value of the property, plant and equipment can be presented as follows for the year 2017:

in 000€	Land and buildings	Plant and equipment	Right-of-use assets	Construction in progress	Total
Acquisition value					
At January 1, 2017	**19,797**	**40,199**	**11,241**	**4,652**	**75,889**
Additions	377	10,560	2,246	17,334	30,517
Acquired from business combinations	9,362	10,318	136	414	20,230
Disposals	(31)	(1,046)	(39)	218	(898)
Transfers	11,527	7,439	(425)	(18,914)	(373)
Currency Translation	(185)	(118)	5	88	(210)
Other	(663)	(235)	1,139	(38)	203
At December 31, 2017	**40,184**	**67,117**	**14,303**	**3,754**	**125,358**
Depreciation					
At January 1, 2017	**(5,093)**	**(22,263)**	**(3,470)**	**—**	**(30,826)**
Depreciation charge for the year	(831)	(5,531)	(2,327)	—	(8,689)
Disposals	15	842	18	—	875
Transfers	521	(444)	296	—	373
Currency Translation	31	166	(1)	—	196
Other	853	64	(1,139)	—	(222)
At December 31, 2017	**(4,504)**	**(27,166)**	**(6,623)**	**—**	**(38,293)**
Net book value					
At December 31, 2017	35,680	39,951	7,680	3,754	87,065
At January 1, 2017	14,704	17,936	7,771	4,652	45,063

Certain prior year amounts have been reclassified to conform to the current year presentation with no impact on previously reported net loss, financial position or cash flows.

The investments in property, plant & equipment and right-of-use assets in 2019 amounted to K€16,901 (2018: K€18,557; 2017: K€30,517). They are mainly related to new machines and installations (K€7,757), land and buildings (K€4,865), IT equipment (K€1,268) and leased vehicles (K€1,118). The investments in 2018 related to new machines and installations in Belgium and Germany (K€10,747), land and buildings in Germany (K€2,491), IT equipment (K€1,781) and lease vehicles (K€792). The investments in 2017 related to the building constructions in Leuven and Poland (K€12,762), the investments into new machines and installations (acquired and leased – K€11,947) and the investment in motor vehicles (K€1,444).

The Group realized a net loss on disposal of property, plant and equipment of K€165 in 2019 (2018: a net loss of K€83; 2017: a net loss of K€25).

No impairment of property, plant and equipment was recorded.

The transfers in 2019 within property, plant and equipment are mainly related to

- the transfers from assets under construction towards plant and equipment of K€4,031, mainly the finalization of the cleanroom and self-constructed built machines;
- the gross up of the net amount of the PPA of ACTech of K€2,050;
- the transfer from Right-of-Use of assets to Plant and Equipment due to the exercise of purchase options at the end of the lease agreement for a net book value of K€362;
- a transfer from Plant and Equipment to Right-of-Use assets for leases with a net book value of K€1,510 which were incorrectly classified in prior year.

Assets under construction

Per end of 2019 the main assets under construction are related to our “Green Machine” project for an amount of K€1,870 located in Belgium and buildings located in Germany for an amount of K€1,464.

Changes in useful life for certain assets

The Group reviews the useful life for the intangible assets and property, plant and equipment on an annual basis considering the current facts and circumstances available. This review has resulted in 2019 in a re-assessment of the useful life for certain specific assets in the categories buildings, fixtures, vehicles and machinery. The impact of the change in useful life during the year 2019 resulted in a decrease of the depreciation charges by K€1,147 In 2020 and 2021 the depreciation charge will be less for respectively K€478 and K€276. The effect will be neutralized in 2028 for machines, in 2033 for fixtures and in 2048 for buildings.

The right of use assets can be presented as follows:

The carrying value of Right-of-Use assets at December 31, 2019 was K€10,586 (2018: K€5,886; 2017: K€7,680). Right-of-Use assets are mainly related to 3D printing machines with a carrying value of K€3,048 at December 31, 2019 (2018: K€4,608; 2017: K€6,613) and for which depreciation of K€1,045 was recorded in 2019 (2018: K€1,745; 2017: K€1,864). New leases in 2019 amount to K€4,062 of which K€1,119 relate to leased motor vehicles (2018: K€792; 2017: K€1,596).

in 000€	Buildings	Vehicles	Equipment	Total
Acquisition value				
At January 1, 2019 before adoption IFRS 16	935	2,542	10,850	14,327
Impact of adoption of IFRS 16	3,255	849	880	4,984
At January 1, 2019 after adoption IFRS 16	4,190	3,391	11,730	19,311
Additions	2,222	1,118	89	3,429
Acquired from business combinations	633	—	—	633
Modifications	(9)	(40)	(496)	(545)
Disposals	(550)	(147)	(56)	(753)
Currency Translation	4	—	4	8
Transfers	—	(47)	164	117
Other	(2)	—	(552)	(554)
At December 31, 2019	**6,488**	**4,275**	**10,883**	**21,646**
Depreciation				
At January 1, 2019	**(1,011)**	**(1,189)**	**(6,241)**	**(8,441)**
Depreciation charge for the year	(1,953)	(1,060)	(1,045)	(4,058)
Acquired from business combinations	—	—	—	—
Modifications	—	—	—	—
Disposals	257	147	56	460
Currency Translation	(1)	—	(1)	(2)
Transfers	—	41	990	1,031
Other	3	31	(84)	(50)
At December 31, 2019	**(2,705)**	**(2,030)**	**(6,325)**	**(11,060)**
Net book value				
At December 31, 2019	3,783	2,245	4,558	10,586
At January 1, 2019 before adoption IFRS 16	(76)	1,353	4,609	5,886
At January 1, 2019 after adoption IFRS 16	3,179	2,202	5,489	10,870

The following amounts related to leases are recognized in profit & loss

(in 000€)	2019
Depreciation expense	(4,058)
Interest expense on lease liabilities	(204)
Expenses related to short-term leases/ low-value assets/ variable lease payments	(725)

The Group has negotiated several contracts with extension and termination options because of common practice in the country or for the asset. Management has exercised significant judgments in determining whether these extension and termination options are reasonable certain to be exercised.

The potential future cash flows beyond the period following the exercise of the extension and termination option that are not included in the lease term are presented in the following table:

(in 000€)	2019
Potential cash flows for extension options that are not reasonably certain to be exercised:	843
Potential cash flows for termination options that are reasonably certain to be exercised	174

Pledges

Land and buildings (including buildings under construction) with a carrying amount of K€26,270 (2018: K€27,319; 2017: K€28,526) are subject to pledges to secure several of the Group's bank loans. In addition, pledges have been given on machines with a total carrying amount of K€2,884 (2018: K€3,533; 2017: K€13,340) (Note 24).

8 Investments in joint ventures

The Group has one investment in the joint venture RSPrint NV (Belgium).

The summarized financial information of RSPrint NV can be presented as follows:

in 000€	2019	2018	2017
Joint venture's statement of financial position			
Current assets	1,546	850	1,256
Non-current assets	93	114	212
Goodwill	—	—	—
Current liabilities	(1,114)	(756)	(692)
Non-current liabilities	(448)	(1,096)	(788)
Shareholders' deficit (surplus)	(77)	888	12
The joint venture income (loss)			
Revenue	1,736	1,186	817
Profit (loss)	(785)	(876)	(723)

Total current assets include cash and cash equivalents for a total amount of K€247 per December 31, 2019 (2018: K€175; 2017: K€128). Profit (loss) include total deprecations and amortization for a total amount of K€25 in 2019 (2018: K€30; 2017: K€50).

The movement of the carrying value of the joint venture is as follows:

	in 000€
Carrying value as of January 1, 2017	**—**
Additional investment	500
Transfer from receivables	—
Share in loss	(469)
Carrying value as of December 31, 2017	**31**
Additional investment	—
Transfer from receivables	444
Share in loss	(475)
Carrying value as of December 31, 2018	**—**
Additional investment	875
Transfer to receivables	(444)
Share in loss	(392)
Carrying value as of December 31, 2019	**39**

9 Inventories and contracts in progress

Inventories and contracts in progress include the following:

	As of December 31,		
in 000€	2019	2018	2017
Raw materials	7,400	5,616	4,970
Work in progress	2,805	2,151	3,377
Finished goods	1,996	1,390	1,414
Contracts in progress	495	829	1,266
Total inventories and contracts in progress	**12,696**	**9,986**	**11,027**

The amount of the inventory written-off as an expense is K€526 (2018: K€229; 2017: K€48). The expenses are booked in Cost of Sales.

The group has contracts in progress and advances from customers. The total costs incurred is K€366 and the profit recognized is K€129 as per December 31, 2019. Advances were received for the amount of K€22 with respect to contracts in progress per end of 2019 (2018: K€370; 2017: K€0).

10 Other assets

Other non-current assets

Other non-current assets include the following:

	As of December 31,		
in 000€	2019	2018	2017
Tax credits	3,015	3,006	2,446
Guarantees and deposits	415	405	362
Non-current receivable on joint venture	138	1,096	804
Non-listed equity investments	3,046	2,701	—
Convertible loan	2,750	—	—
Other	27	29	55
Total non-current assets	**9,391**	**7,237**	**3,667**

The non-current tax credits relate to tax credits that will be realized over more than one year.

The non-listed equity investments mainly consist of the investment in equity shares of the non-listed company Essentium Inc. The Group holds a non-controlling interest of 5% in this company. The increase is primarily to an additional investment in Essentium Inc at the same conditions as the initial investment. This investment was irrevocably designated at fair value through OCI as the Group considers these investments to be strategic in nature. We refer to Note 3 and Note 20.

The Group has granted a convertible loan to Fluidda in January 2019, with a notional amount of K€2,500. The converible loan is accounted for as a financial asset measured at fair value with changed in fair value through the income statement. The carrying value of the convertible loan amounts to K€2,750 at 31 December 2019. The convertible loan has a duration of 7 years with a 10% annual interest rate which is capitalized. We refer to Note 3 and Note 20.

Other current assets

Other current assets include the following:

in 000€	As of December 31, 2019	2018	2017
Deferred charges	2,632	2,046	2,021
Tax credits	695	185	219
Accrued income	486	958	524
Other tax receivables	3,127	2,286	2,910
Other non-trade receivables	1,676	1,461	2,001
Total current assets	**8,616**	**6,936**	**7,675**

The other tax receivables include Value Added Tax (VAT) receivables and corporate tax receivables. The non-trade receivables for the year ending December 31, 2019 include the indemnification asset for the amount of K€222 as referred to in Note 4. Business Combinations related to ACTech. Also please note that a receivable related to factoring was accounted for under the non-trade receivables in the year ending December 31, 2017 (K€646). In the year ending December 31, 2019 this receivable related to factoring has been recorded under the trade receivables for the amount of K€362 (2018: K€445).

11 Trade receivables

The trade receivables include the following:

in 000€	As of December 31, 2019	2018	2017
Trade receivables	42,509	38,764	36,572
Write off receivables	(1,532)	(1,873)	(990)
Total	**40,977**	**36,891**	**35,582**

Trade receivables are non-interest bearing and are generally on payment terms of 30 to 90 days.

As at December 31, 2019, trade receivables of an initial value of K€1,532 (2018: K€1,873; 2017: K€990) were impaired as part of the expected credit losses analysis. Impairment is accounted for under the other operating expenses. See below for changes in the impairment of receivables.

in 000€	
At January 1, 2017	**(511)**
Addition	(620)
Usage	12
Reversal	129
At December 31, 2017	**(990)**
At January 1, 2018	**(990)**
Addition	(1,284)
Usage	182
Reversal	219
At December 31, 2018	**(1,873)**
Addition	(141)
Usage	131
Reversal	351
At December 31, 2019	**(1,532)**

12 Cash and cash equivalents

Cash and cash equivalents include the following:

in 000€	As of December 31, 2019	2018	2017
Cash at bank	123,337	105,846	33,611
Cash equivalents	5,560	9,660	9,564
Total	**128,897**	**115,506**	**43,175**

Cash at banks earns interest at floating rates based on daily bank deposit rates. Short-term deposits are made for varying periods between one day and three months, depending on the immediate cash requirements of the Group, and earn interest at the respective short-term deposit rates.

In connection with the exercise of warrants payments have been received in 2018 from employees for a total amount of K€209, not converted into shares before year-end. In line with regulations the amount of K€209 was posted on a restricted bank account per December 31, 2018. There were no restrictions on cash at December 31, 2019 or 2017.

13 Equity

Share capital

The share capital of the parent company Materialise NV consists of 53,172,513 ordinary nominative shares at December 31, 2019 (2018: 52,890,761; 2017: 47,325,438) with no nominal but par value of €0.058 in 2019 (2018: €0.058; 2017: €0.058) for a total amount of K€3,066 at December 31, 2019 (2018: K€3,050; 2017: K€2,729).

in 000€, except share data	Total number of founder shares	Total number of ordinary shares	Total share-holders' capital	Total share-premium
Outstanding at January 1, 2017	**—**	**47,325,438**	**2,729**	**79,019**
Transfer share capital to share premium	—	—	—	—
Capital increase in cash - public offering	—	—	—	—
Expenses directly attributable to public offering	—	—	—	—
Capital increase via exercise of warrants	—	—	—	—
Equity settled share-based payments expense	—	—	—	820
Outstanding at January 1, 2018	**—**	**47,325,438**	**2,729**	**79,839**
Transfer share capital to share premium	—	—	—	—
Capital increase in cash - public offering	—	5,403,125	312	59,575
Expenses directly attributable to public offering	—	—	—	(4,003)
Capital increase via exercise of warrants	—	162,198	9	593
Equity settled share-based payments expense	—	—	—	633
Outstanding at January 1, 2019	**—**	**52,890,761**	**3,050**	**136,637**
Capital increase in cash - public offering and private placement	—	—	—	—
Expenses directly attributable to public offering	—	—	—	—
Capital increase via exercise of warrants	—	281,752	16	1,252
Equity settled share-based payments expense	—	—	—	201
Outstanding on December 31, 2019	**—**	**53,172,513**	**3,066**	**138,090**

The shareholders' capital increased by K€16 in 2019 as a result of the exercise of warrants outstanding and fully vested. The number of new shares issued was 281,752 at an average price of €4.5 per share, including share premium.

Share premium

In Belgium, the portion of the capital increase in excess of par value is typically allocated to share premium.

The carrying value of the share premium is K€138,090 at December 31, 2019 (2018: K€136,637; 2017: K€79,839). The change in 2019 is the result of:

- The capital increase via exercise of warrants of K€1,252; and
- the share-based payment expense of K€201.

The change in 2018 is the result of the share-based payment K€633, the capital increase via exercise of warrants of K€593 and the capital increase in cash-public offering and private placement of K€55,572. The change in 2017 is the result of the share-based payment expense of and K€820.

Reserves

The nature and purpose of the reserves is as follows:

in 000€	As of December 31, 2019	2018	2017
Legal reserve	279	279	279
(Accumulated deficit)	(474)	(2,127)	(3,990)
Reserves	**(195)**	**(1,848)**	**(3,711)**

Based on the statutory result and after final result allocation approved by the annual shareholders meeting the legal reserve is increased by reserving 5% of the yearly statutory profit until the legal reserve reaches at least 10% of the shareholders' capital. The legal reserve cannot be distributed to the shareholders.

The Group did not pay any dividend during 2019, 2018 and 2017.

Non-controlling interest

The non-controlling interest has been recognized for 25% held by third party in Engimplan for an amount of K€3,107 per end of 2019. In 2018 and 2017 there were no non-controlling interest. No non-controlling interest is recognized for the 17% held by a third party in RapidFit+ as the amount is presented as a financial liability.

RapidFit+

The Group has purchased a call option and written a put-option on the non-controlling interest in Rapidfit+. The call option is accounted for in accordance with IFRS 9 and has an exercise price which is calculated according to a specified contractual formula based on the following parameters: invested capital, multiple of EBITDA minus net financial debt. Based on our analysis the call option remains out of the money and as such the fair value is estimated at zero at December 31, 2019. The call option is exercisable between June 30, 2015 and June 27, 2020.

The written put option has been recognized as a financial liability and measured at the fair value of the redemption amount and amounts to K€875 at December 31, 2019 (2018: K€845; 2017 K€788). The undiscounted estimated redemption amount totals K€875 at December 31, 2019 (2018: K€875; 2017: K€875). The redemption price has an exercise price according to a specified contractual formula based on the following parameters: invested capital, multiple of EBITDA minus net financial debt. The initial recognition resulted in a reclassification of K€264 from non-controlling interest and K€64 from consolidated reserves. The parameter "invested capital" of the contractual formula has been adjusted in December 2014 to reflect the impact of the capital increase and the exercise period has been extended with one year. As a result, the estimated redemption amount of the written put option has increased by K€273 which has been recorded in diminution of the consolidated reserves. The written put option is exercisable between June 27, 2019 and June 27, 2021 and it is management's estimate that the put option will be exercised within 12 months. As such, the written put option is presented as an other current liability.

In addition, RapidFit+ has issued 10 dilution warrants to the non-controlling interest which are exercisable upon occurrence of certain specified events. The fair value of the dilution warrants is zero per end of 2019 (2018: zero; 2017: zero).

14 Share-based payment plans

Share-based payment plans of the parent

The changes of the year for the warrant plans are as follows:

	2019	2018	2017
Outstanding at January 1*	**1,318,049**	**1,458,360**	**1,681,000**
Granted	—	2,000	—
Forfeited / Cancelled	(42,952)	(69,104)	(119,784)
Exercised	(310,045)	(73,207)	(102,856)
Outstanding at December 31*	**965,052**	**1,318,049**	**1,458,360**
Exercisable at December 31	**296,859**	**252,793**	**—**

* The Group's share-based payment plans are all equity-settled except for the IPO warrants that have been granted to certain employees in certain countries due to legal requirements which are cash-settled. The outstanding amount includes number of stock appreciation rights ("SARs") issued under cash-settled share-based payment plans.

The number of outstanding warrants has been adjusted to reflect the 1-to-4 stock split decided in June 2014. The 2013 warrant plan gives a right to four shares for each warrant, whereas under all other warrant plans one warrant gives a right to one share. For presentation purposes the tables reflect the number of shares the warrants give right to across all plans.

Equity-settled share-based payment plans

The Group has several plans in place (2013 warrant plan, IPO warrant plan and 2015 warrant plan) which have similar terms except for the exercise price, except for the 2015 warrant plan.

2013 warrant plan

Each warrant gives the right to the holder to four ordinary shares of the parent Company. The warrants have a contractual term of ten years and vest for 25% in the fourth year; 25% in the fifth year; 25% in the sixth year; and 25% in the seventh year. Warrants are exercisable as from the month after they have vested and in the subsequent exercise periods. There are no cash settlement alternatives and the Group does not have a practice of cash settlement for these warrants. The warrants have a contractual term of ten years.

Under the 2013 warrant plan 301,096 warrants were effectively granted in October 2013 and 166,800 warrants were granted to certain employees and to certain members of our board of directors and senior management on November 28, 2013 with an exercise price ranging from €7.86 to €8.54.

The status of the 2013 warrant plan at December 31 is as follows:

	2019	2018	2017
Outstanding at January 1	**300,040**	**320,640**	**435,096**
Granted	—	—	—
Forfeited / Cancelled	(3,500)	(1,500)	(11,600)
Exercised	(178,164)	(19,100)	(102,856)
Outstanding at December 31	**118,376**	**300,040**	**320,640**
Exercisable at December 31	**15,300**	**89,892**	**—**

With respect to the warrants exercised in 2019, a total of 44,541 warrants representing 178,164 shares were exercised in the last quarter. The average share price during that quarter was $ 18.40. Since the 2013 warrant plan prescribes that each warrant gives right to four shares and our table above presents the impact on the number of shares, the actual remaining number of warrants as per December 31, 2019 equals 29,594.

IPO warrant plan

Each warrant gives the right to the holder to one ordinary share of the parent Company. The warrants have a contractual term of 10 years and vest for 25% in the fourth year; 25% in the fifth year; 25% in the sixth year and 25% in the seventh year. Warrants are exercisable as from the month after they have vested and in the subsequent exercise periods. There are no cash settlement alternatives and the Group does not have a practice of cash settlement for these warrants. The warrants have a contractual term of 10 years.

The Group granted 979,898 warrants in July 2014 and 36,151 warrants in November 2014 in the context of the initial public offering to the employees of the Group with an exercise price of €8.81 ("IPO warrant plan"). The Group granted an additional 18,180 warrants to employees in July 2015 under the IPO warrant plan.

The status of the IPO warrant plan at December 31 is as follows:

	2019	2018	2017
Outstanding at January 1	**589,052**	**671,503**	**727,599**
Granted	—	—	—
Forfeited / Cancelled	(20,252)	(42,209)	(56,096)
Exercised	(103,588)	(40,242)	—
Outstanding at December 31	**465,212**	**589,052**	**671,503**
Exercisable at December 31	**169,071**	**114,012**	**—**

With respect to the warrants exercised in 2019, a total of 103,588 warrants representing 103,588 shares were exercised in the last quarter. The average share price during that quarter was $ 18.40.

Warrant plan 2015

The board of directors decided on December 18, 2015 on a new plan ("2015 warrant plan") by which it can grant up to 1,400,000 warrants to employees. Each warrant gives the right to the holder to one ordinary share of the parent Company. The warrants vest for 10% on the second anniversary of the granting; 20% on the third anniversary of the granting; 30% on the fourth anniversary of the granting; and 40% on the fifth anniversary of the granting, unless otherwise decided by the board of directors or one or more of its representatives granted powers thereto. Warrants are exercisable only after they have vested and only during a period of (i) four weeks following the publication of the results of the parent Company of the second and fourth quarter, or (ii) if no quarterly results are published, during the month March and the month September of every year. There are no cash settlement alternatives and the Group does not have a practice of cash settlement for these warrants. The warrants have a term of ten years.

The Group granted 350,000 warrants in July 2016 to the employees of the Group with an exercise price of €6.45. The Group granted 2,000 warrants to an employee in May 2018 with an exercise price of €0.08.

The status of the 2015 warrant plan at December 31 is as follows:

	2019	2018	2017
Outstanding at January 1	**325,200**	**329,000**	**350,000**
Granted	—	2,000	—
Forfeited / Cancelled	(14,800)	(5,800)	(21,000)
Exercised	—	—	—
Outstanding at December 31	**310,400**	**325,200**	**329,000**
Exercisable at December 31	**96,500**	**32,700**	**—**

Fair value

The fair value of the warrants is estimated at the grant date using the Black-Scholes option pricing model, taking into account the terms and conditions upon which the warrants were granted.

The following table provides the input to the Black-Scholes model for the 2013 warrant plan, IPO warrant plan and 2015 warrant plan:

	2015 (Sept 16)	2015 (Nov)	IPO 2014 (Nov)	IPO 2014 (June)	2013 (Dec) *	2013 (Oct) *
Return dividend	0%	0%	0%	0%	0%	0%
Expected volatility	47%	47%	50%	46%	50%	53%
Risk-free interest rate	0.24%	1.17%	1.12%	1.70%	2.56%	2.43%
Expected life	4.30	5.50	5.50	5.50	5.50	5.50
Exercise price (in €)	6.45	8.81	8.81	8.81	8.54	7.86
Stock price (in €)	6.42	8.08	8.67	8.81	18.09	18.09
Fair value SAR (in €)	2.41	3.30	3.94	3.83	12.23	12.77

(*) Exercise price, stock price and fair value are not adjusted for the 1 to 4 stock-split completed in June 2014.

The above input for the Black-Scholes model have been determined based on the following:

- The dividend return is estimated by reference to the historical dividend payment of the Group. Currently, this is estimated to be zero as no dividend have been paid since inception;
- Expected volatility is estimated based on the average annualized volatility of the volatility of the Group's stock (until September 2016: of a number of quoted peers in the 3D printing industry and the volatility of the Group's stock);

- Risk-free interest rate is based on the interest rate applicable for the 10Y Belgian government bond at the grant date;
- Estimated life of the warrant is determined to be until the first exercise period which is typically the month after vesting; and
- Fair value of the shares is determined based on the share price of the Group on Nasdaq at the date of valuation. For the grants prior to the initial public offering, the fair value of the shares was estimated based on a discounted cash flow model with 3-year cash flow projections and a multiple of EBITDA determined based on a number of quoted peers in the 3D printing industry.

The expense arising from share-based payment transactions for the warrants plans mentioned above was K€401 (2018: K€640; 2017: K€819)

The weighted average remaining estimated life of the warrants outstanding as of December 31, 2019 is 5.20 years (2018: 5.95 years; 2017: 5.62 years). The weighted average fair value for the warrants outstanding at the end of 2019 was €4.48 (2018: €5.62; 2017: €5.60). The weighted average exercise price for the warrants outstanding at the end of 2019 was €7.88 (2018: €7.99; 2017: €8.05).

Cash-settled share-based payment plans

The Group has issued 215,688 SARs in July 2014 towards certain employees in certain countries due to legal requirements with similar terms and conditions as the IPO warrant plan except that the SAR will be settled in cash. The exercise price of the SAR is €8.81.

The status of this plan is as follows:

	2019	2018	2017
Outstanding at January 1	**103,757**	**137,217**	**168,305**
Granted	—	—	—
Forfeited / Cancelled	(4,400)	(19,595)	(31,088)
Exercised	(28,293)	(13,865)	—
Outstanding at December 31	**71,064**	**103,757**	**137,217**
Exercisable at December 31	**15,988**	**16,189**	**—**

The SAR plan grants the bearer the right to a cash payment equal to the difference between the exercise price and the stock price at the exercise date. This plan is considered a cash settled shared based payment and is as such recorded as liability (see Note 16).

The SAR's have a contractual term of ten years and vest for 25% in the fourth year; 25% in the fifth year; 25% in the sixth year and 25% in the seventh year. SAR's are exercisable as from the month after they have vested and in the subsequent exercise periods.

The fair value of the SAR is estimated at each reporting date using the Black-Scholes option pricing model, taking into account the terms and conditions upon which the warrants were granted.

The following table lists the input used for the Black-Scholes model:

	2019	2018	2017
Return dividend	0%	0%	0%
Expected volatility	49%	49%	49%
Risk-free interest rate	0.10%	0.77%	0.73%
Expected life	0.25	1.25	2.25
Exercise price (in €)	8.81	8.81	8.81
Stock price (in €)	16.32	17.49	10.61
Fair value SAR (in €)	7.52	9.09	3.85

The expense arising from share-based payment transactions for the SAR's plan was K€(11) in 2019 (2018: K€435; 2017: K€204). The carrying value of the liability at December 31, 2019 amounts to K€574 (2018: K€786; 2017: K€351). The total intrinsic value of the liability for warrants currently exercisable at December 31, 2019 amounts K€120 (2018: K€141; 2017: K€0).

Share-based payment plans of RapidFit+

The subsidiary RapidFit+ has issued a warrant plan on August 23, 2013 where a maximum of 300 warrants can be offered to management with an exercise price of €553.92. In January 2014, a total of 199 warrants were granted and accepted.

The changes for the year for the RapidFit+ warrant plan are as follows:

	2019	2018	2017
Outstanding at January 1	199	199	199
Granted	—	—	—
Forfeited / Cancelled	(13)	—	—
Exercised	—	—	—
Outstanding at December 31	**186**	**199**	**199**
Exercisable at December 31	**184**	**—**	**—**

The following table lists the input to the Black-Scholes model for the RapidFit+ warrant plan:

	2014
Return dividend	0%
Expected volatility	50%
Risk-free interest rate	2.29%
Expected life	5.5
Exercise price	553.9
Fair value option	262.7

The expense arising from share-based payment transactions for RapidFit+ warrant plan was K€2 in 2019 (2018: K€7; 2017: K€10)

15 Loans and borrowings

The loans and borrowings include the following:

in 000€	As of December 31 2019	2018	2017
K€35,000 EIB bank loan	35,000	10,000	—
K€28,000 acquisition bank loan	21,612	24,576	27,513
K€18,000 secured bank loans	17,429	17,739	17,575
K€12,300 bank loans ACTech	11,850	12,300	9,247
K€8,750 other facility loans	3,599	4,299	4,982
Bank investment loans—top 20 outstanding	22,132	23,801	21,441
Bank investment loans—other	4,429	3,808	2,289
Lease liabilities (2018 and 2017: Finance leases)	9,876	6,809	9,164
Institutional loan	824	1,492	1,105
Convertible bonds	1,000	1,000	1,000
Related party loan	187	214	241
Total loans and borrowings	**127,938**	**106,038**	**94,557**
Current	16,838	13,598	12,769
Non-Current	111,100	92,440	81,788

K€35,0000 EIB bank loan

On December 20, 2017 the Group entered into a finance contract with the European Investment Bank, or EIB, to finance future research and development programs. As part of a first tranche, an amount of K€10,000 was drawn in the course of 2018. The agreement foresees a first two-years period without loan reimbursements. Loans under the contract are made at a fixed rate, based on the Euribor rate at the time of the borrowing, plus a variable margin. The interest rate for this loan is 2.40%. The contract contains customary security, covenants and undertakings. A second tranche of K€25,000 was drawn in the course of 2019 with an interest rate of 2.72%.

K€28,000 Acquisition loan

This bank loan has been concluded in October 2017 to finance the acquisition of ACTech. The loan includes a portion of K€18,000 reimbursable monthly during seven years, and a bullet portion of K€10,000, reimbursable at once in October 2024. The interest rate is fixed for the duration of the loan, and amounts to 1.1% on average for both portions. The bank loans are secured with a business pledge mandate, a share pledge on Materialise Germany GMBH, and debt covenants.

K€18,000 secured bank loans

The K€18,000 loan has been concluded in 2016 in two agreements to finance the construction of new facilities in Leuven (Belgium) and in Poland, both maturing in 2032. The agreement for the Belgian facility financing amounts to K€12,000 (drawn per end 2018: K€11,739; per end 2017 K€11,739), and with reimbursements only starting in December 2022. The agreement for the Polish facility financing amounts to K€6,000 (fully drawn per end of 2017), and reimbursements have started in June 2019. The average interest rate of both agreements amounts to 1.2%. The bank loan is secured with a mortgage mandate on the Belgian facility buildings.

K€12,300 bank loans

In March 2018, three bank loans originating from the acquired ACTech Group were refinanced entirely for the amount of K€9,300, with adjusted maturity to May 2025 and first reimbursements in August 2020. The interest rate has been fixed at approximately 1.6%, and pledges including a K€4,650 mortgage on ACTech's facilities and a guarantee of Materialise NV. In addition, a new investment credit of K€3,000 was obtained in June 2018, repayable as from January 2019 and with a fixed interest rate of 1.5%.

K€8,750 - Other facility loans

Three facility loans were contracted in 2005, 2006 and 2012 for the construction of Leuven office and production facilities (K€2,000, K€300 and K€5,000, respectively) and another loan for the Czech Republic offices in 2008 (K€1,750). The balance of the four loans amounts to K€3,599 per December 31, 2019. All loans have a repayment schedule of 15 years and interest rates are fixed between 4.3% and 5.4% for the four loans.

Miscellaneous investment loans

The 20 largest of these loans outstanding as at December 31, 2019 amount to a balance of K€22,132. They have been agreed in 2019 and in the years before to finance various investments in machinery, printers, equipment, and software tools. The vast majority of the loans have a reimbursement period over seven years, and are at fixed interest rates with weighted average below 1%.

K€9,876 Lease liabilities included lease with related party

The Group has several lease obligations mainly with financial institutions and related to the financing of buildings and various other items of plant and equipment such as 3D printers. As at December 31, 2019 the balance of these lease agreements amounts to K€9,876, and are mostly at fixed interest rates with weighted average below 2%. The subsidiary Engimplan rents the office and production building from its non-controlling shareholders for a initial term of 10 years, with an extension option for an additional 10 years (assessed not to be reasonable certain to be exercised).. The lease has been accounted for under IFRS 16 resulting in a lease liability at December 31, 2019 of K€617.

K€2,000 institutional loan

This loan was contracted with a governmental institution in Germany to finance the production operations of Materialise Germany for a maximum amount of K€2,000. The loan is repayable over a four year period, starting as of September 2017 with a fixed interest rate of 0.25% payable per quarter. As at December 31, 2019 K€2,000 has been drawn with an outstanding balance of K€824.

K€1,000 convertible bond with related party

We issued, on October 28, 2013, 1,000 convertible bonds with a related party for a total amount of K€1,000. The bonds have been fully subscribed by a member of our senior management.

The conditions of the convertible bond can be summarized as follows:

- Number of convertible bonds: 1,000
- Nominal value per bond: €1,000
- Contractual life: 7 years
- Interest: 3.7% per year
- Conversion period: from January 1, 2017 until maturity
- Conversion price: €1.97 per share

The maximum number of ordinary shares that can be issued upon conversion is 508,904.

The Group has estimated the fair value of a similar liability however without any conversion option by reference to a number of quoted peers in Belgium. The fair value was estimated at K€907. Upon initial recognition, an amount of K€93 was recognized in consolidated reserves reflecting the fair value of the conversion option.

Related party loan

Ailanthus NV has granted us one other loan at fixed interest rate of 4.23% that matures in 2025. The purpose of the loan is to finance the purchase of a building in France. The amounts outstanding as of December 31, 2019 is K€187 (2018: K€214; 2017: K€241). The interest expense for the year ended December 31, 2019 is K€9 (2018:K€10; 2017: K€11).

Changes of liabilities for financing activities:

The following table presents the changes of the liabilities for financing activities:

	For the year ended December 31		
in 000€	2019	2018	2017
At January 1,	**106,038**	**94,557**	**33,806**
Proceeds from loans & borrowings	29,000	32,554	54,319
Repayment of loans & borrowings	(12,126)	(18,820)	(11,904)
New leases	8,326	792	2,906
Repayment of leases	(5,283)	(3,102)	(2,947)
Loans acquired from business combination	2,076	—	18,205
Net foreign exchange movements	(92)	57	172
At December 31,	**127,938**	**106,038**	**94,557**

16 Other non-current liabilities

The other non-current liabilities consist of the following:

in 000€	As of December 31, 2019	2018	2017
Written-put option RapidFit+	—	—	788
Contingent consideration	—	—	648
Provisions	122	82	109
Other	574	786	359
Total	**696**	**868**	**1,904**

We refer to Note 13 for a description of the written-put options RapidFit+.

With respect to the contingent consideration, related to the CENAT acquisition, we refer to Note 4 on business combinations. At December 31, 2018 only a consideration of K€450 remains, recorded under the other current liabilities (see Note 19). Per end of 2018 and 2017 the non-current part of the CENAT contingent consideration amounted to K€0 and K€648, respectively.

The other items in the above table include a liability of K€574 per December 31, 2019 related to the cash settled shared based payment plan as referred to in Note 14 (2018: K€786; 2017: K€351).

The impact of the accounting treatment of the Belgian contribution plans with a minimal guarantee is not material as only a limited number of people can benefit. No provisions have been recognized as of December 31, 2019, 2018 and 2017. As such, no further disclosures have been provided.

17 Tax payables

The tax payables amount to K€3,363 as per December 31, 2019 (2018: K€2,313; 2017: K€2,023) and is mainly related to the tax payables of the entities located in Germany. In Germany a tax unity was set-up in 2018 between Materialise Germany and ACTech.

18 Deferred income

Deferred income consists of the following:

in 000€	As of December 31		
	2019	**2018**	**2017**
Deferred maintenance & license	27,667	22,606	18,723
Deferred (project) fees	4,647	4,838	3,765
Deferred government grants	359	338	71
Total	**32,672**	**27,782**	**22,559**
current	27,641	23,195	18,791
non-current	5,031	4,587	3,768

The deferred maintenance and license consist of maintenance fees paid up-front which are deferred and amortized over the maintenance period. The deferred (project) fees consist of one-time and advance payments received which are deferred in accordance with the revenue accounting policies. The deferred government grants are recognized as income under “other operating income”.

We refer to Note 22.1.2 for more detail on the contract liabilities.

19 Other current liabilities

Other current liabilities include the following:

in 000€	As of December 31 2019	2018	2017
Payroll-related liabilities	10,281	10,111	9,274
Non-income tax payables	2,262	2,175	2,063
Accrued charges	1,080	789	769
Advances received	715	713	870
Other current liabilities	3,348	1,554	520
Total	**17,686**	**15,342**	**13,496**

The other current liabilities as per December 31, 2019 include an amount of K€0 (2018: K€450; 2017: K€257) payable in connection with the CENAT business combination (see also Note 4 and Note 16), and a payable for the amount of K€875 (2018: K€845; 2017: K€0) in connection with the written-put options RapidFit+ (see also Note 13 and Note 16), various accruals for K€1,110 and financial liabilities at fair value in respect of the foreign exchange hedges on GBP and JPY and interest rate swaps for K€478.

The non-income tax payables mainly relate to VAT payables and payroll taxes.

20 Fair value

Financial assets

The carrying value and fair value of the financial assets as of December 31, 2019, 2018 and 2017 can be presented as of:

	Carrying value			Fair value		
in 000€	2019	2018	2017	2019	2018	2017
Financial assets						
Debt instruments measured at amortized cost						
Trade receivables (current)	40,977	36,891	35,582	40,977	36,891	35,582
Other financial assets (non-current)	580	1,530	1,221	580	1,530	1,221
Other current non-trade receivables	1,676	1,461	2,001	1,676	1,461	2,001
Cash & cash equivalents	128,897	115,506	43,175	128,897	115,506	43,175
Total debt instruments	**172,130**	**155,388**	**81,979**	**172,130**	**155,388**	**81,979**
Financial assets at fair value through profit or loss						
Derivatives	9	117	218	9	117	218
Convertible loan	2,750	—	—	2,794	—	—
Total financial assets measured at fair value	2,759	117	218	2,803	117	218
Equity instruments designated at fair value through OCI						
Non-listed equity investments	3,046	2,701	—	3,047	2,701	—
Total Equity instruments designated at fair value through OCI	**3,046**	**2,701**	**—**	**3,047**	**2,701**	**—**

The fair value of the financial assets has been determined on the basis of the following methods and assumptions:

- The carrying value of the cash and cash equivalents and the current receivables approximate their fair value due to their short term character;
- The fair value of the derivatives has been determined based on a mark-to-market analysis prepared by the bank based on observable market inputs (level 2 inputs);
- Other current non-trade receivables are being evaluated on the basis of their credit risk and interest rate. Their fair value is not different from their carrying value on December 31, 2019, 2018 and 2017
- The non-listed equity investments, mainly representing the investment in Essentium Inc, are measured at fair value. As of December 31, 2019, management considers that currently the cost is an appropriate estimate of fair value (level 2 input) because a recent capital increase indicated that the market valuation of Essentium Inc. has not changed and because of the followings reasons:
  - Essentium Inc is a non-listed entity;
  - The Group only has an insignificant interest in Essentium Inc (5% of the shares);
  - The Group has no representatives in the Board of Directors of Essentium Inc; and
  - Insufficient more recent information is available to measure fair value;
- The convertible loan granted to Fluidda is measured at fair value. As of December 31, 2019, management considers that the fair value is close to the carrying value (level 3 input). In assessing the fair value, the Group has made significant estimates with regard to the discount rate, the probability of each repayment and conversion scenario and related timing, the amount of the qualified capital increase. Changes in the significant assumptions may lead to a significant increase/decrease in the fair value of the convertible loan. A increase/decrease in the applied discount rate by 2% would lead to a change in fair value by K€-267 / K€298.

Financial liabilities:

The carrying value and fair value of the financial liabilities as of December 31, 2019, 2018 and 2017 can be presented as follows:

in 000€	Carrying value 2019	Carrying value 2018	Carrying value 2017	Fair value 2019	Fair value 2018	Fair value 2017
Financial liabilities measured at amortized cost						
Loans & Borrowings including lease liabilities	127,939	106,037	94,557	128,930	105,026	95,351
Trade payables	18,517	18,667	15,670	18,517	18,667	15,670
Other liabilities excl. written put option on NCI	3,187	778	1,133	3,187	778	1,133
Total financial liabilities measured at amortized cost	**149,643**	**125,482**	**111,360**	**150,634**	**124,471**	**112,154**
Financial liabilities measured at fair value						
Contingent consideration	—	450	905	—	450	905
Cash settled share based payments	—	786	351	—	786	351
Written put option on NCI	875	845	788	875	845	788
Derivatives	478	194	8	478	194	8
Total financial liability measured at fair value	**1,353**	**2,275**	**2,052**	**1,353**	**2,275**	**2,052**
Total non-current	112,549	94,521	85,276	112,288	93,289	85,890
Total current	38,447	33,236	28,136	39,699	33,457	28,316

The fair value of the financial liabilities has been determined on the basis of the following methods and assumptions:

- The carrying value of current liabilities approximates their fair value due to the short term character of these instruments;
- Loans and borrowings are evaluated based on their interest rates and maturity date. Most interest bearing debts have fixed interest rates and their fair value is subject to changes in interest rates and individual creditworthiness. Their carrying value approximates their fair value;
- The fair value of the derivatives has been determined based on a markt-to-market analysis prepared by the bank based on observatable marketinputs (level 2 inputs);
- The fair value of the written put option on non-controlling interest has been determined based on the present value of the redemption amount (level 3 inputs);
- The fair value of the cash-settled sharebased payments has been determined based on a black-scholes model using inputs that are level 1 (stock-price and risk-free interest rate) as well as level 2 (e.g. volatility). We refer to Note 14.
- The fair value of the (contingent) consideration has been determined based on the latest long-term business plans of the Cenat business (level 3 inputs). Note that the consideration is no longer contingent as per end 2018.

Fair value hierarchy

The Group uses the following hierarchy for determining and disclosing the fair value of financial instruments by valuation technique:

- Level 1: quoted (unadjusted) prices in active markets for identical assets and liabilities;
- Level 2: other techniques for which all inputs which have a significant effect on the recorded fair value are observable, either directly or indirectly; and
- Level 3: techniques which use inputs that have a significant effect on the recorded fair value that are not based on observable market data.

The Group has the following financial instruments carried at fair value in the statement of financial position on December 31, 2019, 2018 and 2017: the derivatives related to interest rate and foreign currency swaps as included in the above tables, a call option and written put option on non-controlling interest, the (contingent) consideration for the acquisition of Cenat and the non-listed equity investments.

21 Segment information

For management purposes, the Group is organized into segments based on their products, services and industry and has the following three reportable segments:

- The Materialise Medical segment, which develops and delivers medical software solutions, medical devices and other related products and services;
- The Materialise Manufacturing segment, which delivers 3D printed products and related services; and
- The Materialise Software segment, which develops and delivers additive manufacturing software solutions and related services.

The measurement principles used by the Group in preparing this segment reporting are also the basis for segment performance assessment and are in conformity with IFRS. The Chief Executive Officer of the Group acts as the chief operating decision maker. As a performance indicator, the chief operating decision maker controls the performance by the Group's revenue and adjusted EBITDA.

The following table summarizes the segment reporting for each of the reportable periods ending December 31. Corporate research and development, headquarters' function, financing and income taxes are managed on a Group basis and are not allocated to operating segments. As management's controlling instrument is mainly revenue-based, the reporting information does not include assets and liabilities by segment and is as such not available per segment.

in 000€	Materialise Software	Materialise Medical	Materialise Manufacturing	Total segments	Unallocated	Consolidated
For the year ended December 31, 2019						
Revenues	41,654	60,808	94,156	196,618	61	196,679
Segment Adjusted EBITDA	13,812	10,774	12,154	36,740	(10,084)	26,656
Segment Adjusted EBITDA %	33.2%	17.7%	12.9%	18.7%	—	13.6%
For the year ended December 31, 2018						
Revenues	37,374	52,252	94,956	184,582	139	184,721
Segment Adjusted EBITDA	11,536	10,252	10,785	32,573	(9,047)	23,526
Segment Adjusted EBITDA %	30.9%	19.6%	11.4%	17.6%	—	12.7%
For the year ended December 31, 2017						
Revenues	35,770	42,841	63,712	142,323	250	142,573
Segment Adjusted EBITDA	13,926	4,400	4,439	22,765	(8,155)	14,610
Segment Adjusted EBITDA %	38.9%	10.3%	7.0%	16.0%	—	10.2%

The segment Adjusted EBITDA is reconciled with the consolidated net profit (loss) for the year as follows:

	For the year ended December 31,		
in 000€	2019	2018	2017
Segment Adjusted EBITDA	**36,740**	**32,573**	**22,765**
Depreciation, amortization and impairment	(19,198)	(17,287)	(12,576)
Corporate research and development	(1,859)	(1,913)	(2,017)
Corporate headquarter costs	(11,077)	(10,358)	(9,690)
Other operating income (expense)	2,410	2,149	1,910
Operating profit	**7,016**	**5,164**	**392**
Financial expenses	(3,682)	(4,864)	(4,728)
Financial income	1,377	3,627	3,210
Income taxes	(2,595)	(425)	(522)
Share in loss of joint venture	(392)	(475)	(469)
Net (loss) profit	**1,724**	**3,027**	**(2,117)**

The Group has no customers with individual sales larger than 10% of the total revenue in 2019 (2018: none; 2017: none).

Entity-wide disclosures

The revenue by geographical areas is as follows.

	As of December 31,		
in 000€	2019	2018	2017
United States of America	56,235	42,217	32,926
Americas other than USA	3,395	1,700	2,194
Belgium	7,917	9,350	8,145
Germany	31,185	30,436	27,011
France	20,110	22,282	18,737
Switzerland	14,907	13,135	7,782
United Kingdom	13,804	11,946	10,911
Italy	6,707	4,392	4,224
Netherlands	5,825	7,382	7,986
Other Europe	17,329	21,455	3,144
Asia Pacific	19,265	20,426	19,513
Total	**196,679**	**184,721**	**142,573**

The total revenue realized in the country of domicile (Belgium) in 2019 amounts to K€7,917(2018: K€9,350; 2017: K€8,145).

The total non-current assets, other than financial instruments, deferred tax assets, by geographical area is as follows:

in 000€	As of December 31, 2019	2018	2017
United States of America (USA)	4,194	3,953	3,880
Americas other than USA	8,374	62	29
Belgium	49,426	48,873	46,573
Germany	57,918	56,096	56,410
Poland	15,506	16,206	15,441
Rest of Europe	10,410	10,125	10,140
Asia-Pacific	2,658	1,039	744
Total	**148,486**	**136,354**	**133,217**

The totals of the above table includes goodwill, intangible assets and property, plant & equipment and Right-of-Use Assets as disclosed in the consolidated statements of financial position.

22 Income and expenses

22.1 Revenue

22.1.1 Disaggregated revenue information

	For the year ended December 31, 2019					
in 000€	Materialise Software	Materialise Medical	Materialise Manufacturing	Total segments	Unallocated	Consolidated
Geographical markets						
United States of America (USA)	11,188	29,100	15,947	56,235	—	56,235
Americas other than USA	487	2,071	837	3,395	—	3,395
Europe (without Belgium) & Africa	18,767	21,356	69,744	109,867	—	109,867
Belgium	183	2,101	5,572	7,856	61	7,917
Asia Pacific	11,029	6,180	2,056	19,265	—	19,265
Total revenue from contracts with customers	41,654	60,808	94,156	196,618	61	196,679
Type of goods or service						
Software revenue (non-medical)	41,654	—	—	41,654	—	41,654
Software revenue (medical)	—	19,407	—	19,407	—	19,407
Medical devices and services	—	41,401	—	41,401	—	41,401
Manufacturing	—	—	94,156	94,156	—	94,156
Other	—	—	—	—	61	61
Total revenue from contracts with customers	41,654	60,808	94,156	196,618	61	196,679
Timing of revenue recognition						
Goods/Services transferred at a point in time	21,190	45,730	88,988	155,908	61	155,969
Goods/Services transferred over time	20,464	15,078	5,168	40,710	—	40,710
Total revenue from contracts with customers	41,654	60,808	94,156	196,618	61	196,679

in 000€	Materialise Software	Materialise Medical	Materialise Manufacturing	Total segments	Unallocated	Consolidated
	For the year ended December 31, 2018					
Geographical markets						
United States of America (USA)	8,804	23,940	9,439	42,183	34	42,217
Americas other than USA	193	1,404	101	1,698	2	1,700
Europe (without Belgium) & Africa	17,026	19,073	74,852	110,951	77	111,028
Belgium	155	1,824	7,364	9,343	7	9,350
Asia Pacific	11,196	6,011	3,200	20,407	19	20,426
Total revenue from contracts with customers	37,374	52,252	94,956	184,582	139	184,721
Type of goods or service						
Software revenue (non-medical)	37,374	—	—	37,374	—	37,374
Software revenue (medical)	—	17,045	—	17,045	—	17,045
Medical devices and services	—	35,207	—	35,207	—	35,207
Complex metal parts production (ACTech)	—	—	43,438	43,438	—	43,438
Other	—	—	—	—	139	139
Total revenue from contracts with customers	37,374	52,252	94,956	184,582	139	184,721
Timing of revenue recognition						
Goods/Services transferred at a point in time	20,326	39,682	90,614	150,622	139	150,761
Goods/Services transferred over time	17,048	12,570	4,342	33,960	—	33,960
Total revenue from contracts with customers	37,374	52,252	94,956	184,582	139	184,721

The revenue per type of good or service including the previous years is as follows:

in 000€	For the year ended December 31 2019	2018	2017
Software revenue (non-medical)	41,654	37,374	35,770
Software revenue (medical)	19,407	17,045	15,619
Medical devices and services	41,401	35,207	27,222
Manufacturing	94,156	94,956	63,712
Other	61	139	250
Total	**196,679**	**184,721**	**142,573**

22.1.2 Contract balances

The following table provides information about receivables, contracts in progress (contract assets) and deferred income (contract liabilities) from contracts with customers.

in 000€	As of December 31, 2019	2018
Trade receivables, included in 'trade and other receivables'	42,509	38,764
Contract assets / contracts in progress	495	829
Contract liabilities / deferred income	32,314	27,444
Total	**75,318**	**67,037**

We refer to note 18 for a detail of the deferred income. Note 18 include split of the deferred income in current and non-current. Non-current deferred income, representing mainly maintenance contracts with terms more than one year and certain contracts with up-front fees which are allocated to performance obligations that will be satisfied over more than one year, may be recognized as revenue between one to three years. Total revenue recognized during 2019 that was included in the contract liability at the beginning of the year amounts to K€27,444. There is no revenue recognized during 2019 from performance obligations that were satisfied in the previous years.

The relation between the timing of satisfaction of the performance obligations and the timing of billing resulting in contract assets and liabilities is as follows:

- Maintenance services: maintenance services are typically billed at the beginning of the maintenance period resulting in deferred income that is recognized on a straightline basis over the maintenance period.

- Software licenses: certain software licenses may have been billed prior to the delivery of the software key resulting in a deferred income balance.
- Certain agreements in the medical segment include up-front fees such as step-in fees or milestone payments which are billed at inception of the contract but which are allocated to performance obligations which are satisfied at a later time in the contract term or which have not been recognized considering the revenue contraint (i.e. may have to be credited when customer achieves certain volume targets). In addition, certain contracts include prepaid fees for volume “Plan Only” purchases for which the purchased services are only delivered during a one year period. Those fees result in deferred income which are recognized as revenue when services/products are delivered and revenue is not constrainted.
- Certain development services are satisfied while the services can only billed at certain pre-defined points in time or when the services are fully satisfied resulting in contracts in progress / contract assets.

22.2 Cost of sales

Cost of sales include the following selected information:

	For the year ended December 31		
in 000€	2019	2018	2017
Purchase of goods and services	(37,870)	(39,114)	(34,480)
Amortization and depreciation	(10,837)	(9,910)	(7,560)
Payroll expenses	(37,715)	(33,036)	(20,806)
Other expenses	(550)	(239)	(106)
Total	**(86,972)**	**(82,299)**	**(62,952)**

22.3 Research and development expenses

Research and development expenses include the following selected information:

	For the year ended December 31		
in 000€	2019	2018	2017
Purchase of goods and services	(2,583)	(3,590)	(3,140)
Amortization and depreciation	(1,483)	(830)	(686)
Payroll expenses	(19,219)	(17,935)	(16,054)
Other	(63)	(61)	(79)
Total	**(23,348)**	**(22,416)**	**(19,959)**

22.4 Sales and marketing expenses

Sales and marketing expenses include the following selected information:

	For the year ended December 31		
in 000€	2019	2018	2017
Purchase of goods and services	(9,228)	(9,775)	(8,035)
Amortization and depreciation	(1,346)	(725)	(505)
Payroll expenses	(42,055)	(35,585)	(30,175)
Other	(360)	(218)	(220)
Total	**(52,989)**	**(46,303)**	**(38,935)**

22.5 General and administrative expenses

General and administrative expenses include the following selected information:

	For the year ended December 31		
in 000€	2019	2018	2017
Purchase of goods and services	(9,856)	(9,892)	(7,053)
Amortization and depreciation	(3,630)	(3,828)	(2,761)
Payroll expenses	(18,078)	(18,442)	(14,858)
Other	(222)	(148)	(204)
Total	**(31,786)**	**(32,310)**	**(24,876)**

22.6 Net other operating income

The net other operating income can be detailed as follows:

in 000€	For the year ended December 31 2019	2018	2017
Government grants	5,263	4,658	4,342
Amortization intangibles purchase price allocation	(2,013)	(1,994)	(1,064)
Allowance for doubtful debtors	210	(1,065)	(454)
Capitalized expenses (asset construction)	166	16	123
Net foreign currency exchange gains / (losses)	—	246	(235)
Tax Credits	665	706	899
Fair value adjustment Cenat liability	—	192	—
Personnel related income	37	168	—
Other	1,104	844	930
Total	**5,432**	**3,771**	**4,541**

The Company has received government grants from the Belgian federal and regional governments and from the European Community in the forms of grants linked to certain of its research and development programs and reduced payroll taxes.

22.7 Payroll expenses

The following table shows the breakdown of payroll expenses for 2019, 2018 and 2017:

in 000€	For the year ended December 31 2019	2018	2017
Short-term employee benefits	(87,775)	(76,023)	(60,195)
Social security expenses	(15,647)	(14,139)	(11,200)
Expenses defined contribution plans	(1,033)	(936)	(926)
Other employee expenses	(12,612)	(13,900)	(9,572)
Total	**(117,067)**	**(104,998)**	**(81,893)**
Total registered employees at the end of the period	2,177	2,009	1,862

22.8 Financial expenses

Financial expenses includes the following selected information:

in 000€	For the year ended December 31 2019	2018	2017
Interest expense	(2,146)	(1,747)	(1,026)
Foreign currency losses	(832)	(2,748)	(3,131)
Other financial expenses	(704)	(369)	(571)
Total	**(3,682)**	**(4,864)**	**(4,728)**

22.9 Financial income

Financial income includes the following selected information:

in 000€	For the year ended December 31 2019	2018	2017
Foreign currency exchange gains	955	3,047	2,830
Amortization discount interest free loans	—	—	6
Other finance income	422	580	374
Total	**1,377**	**3,627**	**3,210**

22.10 Income taxes and deferred taxes

Current income tax

The following table shows the breakdown of the tax expense for 2019, 2018 and 2017:

	As of December 31,		
in 000€	2019	2018	2017
Estimated tax liability for the year	(2,926)	(1,216)	(1,530)
Tax adjustments to the previous year	—	—	412
Deferred income taxes	331	791	596
Total income taxes for the period	**(2,595)**	**(425)**	**(522)**

The current tax expense is equal to the amount of income tax owed to the tax authorities for the year, under the applicable tax laws and rates in effect in the various countries. The estimated tax liability is mainly due in Germany.

Deferred tax

Deferred tax is presented in the statement of financial position under non-current assets and non-current liabilities, as applicable. The following table shows the breakdown of the deferred tax assets, deferred tax liability and the deferred tax expense for 2019, 2018 and 2017:

	Asset/(liability)			Income/(expense)		
in 000€	2019	2018	2017	2019	2018	2017
Tax losses, notional interest deduction and other tax benefits	—	26	—	—	—	—
Amortization development assets and other intangible assets	38	224	304	—	—	—
Depreciation property, plant & equipment	70	30	—	—	—	—
Other items	84	35	—	—	—	—
Total deferred tax assets	**192**	**315**	**304**	**(124)**	**11**	**(32)**
Property, plant & equipment	(403)	(694)	(698)	—	—	—
Intangible assets	(4,937)	(5,370)	(6,656)	—	—	—
Investment grants	(301)	(312)	—	—	—	—
Inventory valuation	(89)	141	—	—	—	—
Other items	(17)	9	(61)	—	—	—
Total deferred tax liabilities	**(5,747)**	**(6,226)**	**(7,415)**	**455**	**780**	**628**
Total deferred tax income (loss)	**—**	**—**	**—**	**331**	**791**	**596**

The Group has unused tax losses, tax credits and notional interest deduction available in an amount of K€37,440 for 2019 (2018: K€25,285; 2017: K€11,948) of which K€25,172 for 2019 (2018: K€15,592; 2017: K€4,581) relating to Materialise NV. As at December 31, 2019 no unused notional interest deduction remains (2018: K€0; 2017: K€315), the amount remaing from previous periods has expired.

With respect to the unused tax losses of Materialise NV, no deferred tax assets have been recognized given that in view of the Belgian Patent Income Deduction and Innovation Income Deduction there is an uncertainty to which extent these tax losses will be used in future years. As from July 1, 2016, the new Innovation Income Deduction replaces the former Patent Income Deduction. Under the grandfathering rule the Patent Income Deduction system can still be applied until June 30, 2021. The Belgian Patent Income Deduction allows companies to deduct 80% of the qualifying gross patent income from the taxable basis. Under the Innovation Income Deduction system, companies can deduct up to 85% of their net innovation income from the taxable basis. Based on its analysis, in 2019 the Company has assessed that no deferred tax asset should be accounted for with respect to its unused tax losses in Belgium.

With respect to the net tax losses of the other entities in the Group no deferred taxes have been recognized in 2019 (2018: K€26; 2017: K€0). The deferred tax liability of K€5,747 in the year ending December 31, 2019 mainly relates to the intangibles that have been recognized as part of the purchase price allocation (ACTech).

Relationship between Tax Expense and Accounting Profit

	For the year ended December 31		
in 000€	**2019**	**2018**	**2017**
Profit (loss) before taxes	4,319	3,452	(1,595)
Income tax at statutory rate of 29.58% (2017: 33.99%)	(1,278)	(1,021)	542
Effect of different local tax rate	63	166	433
Tax adjustments to the previous period	(367)	80	412
Non-deductible expenses	(554)	(1,141)	(818)
Capitalized initial public offering transaction costs	—	—	—
Research and development tax credits & patent income deduction	179	337	44
Notional interest deduction Belgium	—	—	—
Non recognition of deferred tax asset	(1,579)	(546)	(1,505)
Recognition of deferred tax assets on previous years tax losses	119	653	—
Non-taxable income	925	606	556
Use of previous years tax losses and tax credits for which no deferred tax assets was recognized	—	—	12
Taxes on other basis	—	280	(117)
Other	(103)	161	(81)
Income tax expense as reported in the consolidated income statement	**(2,595)**	**(425)**	**(522)**

23 Earnings per share

Basic earnings per share amounts are calculated by dividing the net profit (loss) for the year attributable to ordinary equity holders of the parent company by the weighted average number of ordinary shares outstanding during the year.

Diluted earnings per share amounts are calculated by dividing the net profit (loss) attributable to ordinary equity holder of the parent company by the weighted average number of ordinary shares outstanding during the year plus the weighted average number of ordinary shares that would be issued on conversion of all warrants.

The net profit (loss) for the year used for the basic and diluted earnings per share are reconciled as follows:

	For the year ended December 31		
in 000€	**2019**	**2018**	**2017**
Net profit attributable to ordinary equity holders of the parent for basic earnings	**1,646**	**3,027**	**(2,117)**
Interest on convertible bonds	50	50	—
Net profit attributable to ordinary equity holders of the parent adjusted for the effect of dilution	**1,696**	**3,077**	**(2,117)**

The convertible bond and the warrants are dilutive as per December 31, 2019 and 2018 but are anti-dilutive as per December 31, 2017. We refer to Notes 14 and 15 for information on the number of instruments that could potentially be dilutive but which were not considered in the calculation above.

The following reflects the share data used in the basic and diluted earnings per share computations:

in 000	For the year ended December 31 2019	2018	2017
Weighted average number of ordinary shares for basic earnings per share	**52,915**	**49,806**	**47,325**
Effect of dilution:			
Share options	563	382	—
Convertible loan	509	509	—
Weighted average number of ordinary shares adjusted for effect of dilution	**53,987**	**50,697**	**47,325**

The earnings per share are as follows:

	For the year ended December 31 2019	2018	2017
Earnings per share attributable to the owners of the parent			
Basic	0.03	0.06	(0.04)
Diluted	0.03	0.06	(0.04)

24 Commitments and contingent liabilities

Operating lease commitments

The Group has operating lease commitments mainly related to cars and equipment as follows:

in 000€	As of December 31, 2019	2018	2017
Within one year	28	2,053	1,721
Between one and three years	49	2,302	1,504
Between four and five years	—	785	406
More than five years	—	302	77
Total	**77**	**5,442**	**3,708**

The total lease payments recognized in the consolidated income statement are K€725 in 2019 (2018: K€2,956; 2017: K€2,909).

Finance lease commitments (only valid for 2017 and 2018)

The Group has finance leases for the building and various other items of plant and equipment. Future minimum lease payments under finance lease with the present value of the net minimum lease payments are as follows:

	December 31, 2019		December 31, 2018		December 31, 2017	
in 000€	Minimum lease payments	Present value of payments	Minimum lease payments	Present value of payments	Minimum lease payments	Present value of payments
Within one year	—	—	2,876	2,829	3,179	3,034
Between two and three years	—	—	3,398	3,236	5,017	4,643
Between four and five years	—	—	655	604	1,361	1,269
More than five years	—	—	149	140	285	218
Total	**—**	**—**	**7,078**	**6,809**	**9,842**	**9,164**
Less finance charges	—	—	(269)	—	(678)	—
Present value of minimum lease payments	—	—	6,809	6,809	9,164	9,164

Mortgages and pledges

The Group has several loans secured by a mortgage on the building. The carrying value of related property, plant & equipment (including buildings under construction) is K€29,154 (2018: K€30,853; 2017: K€28,526). The total outstanding mortgages and pledges are K€77,849 in 2019 (2018: K€124,428; 2017: K€85,186).

Included in the above, the Group also has pledges on the business goodwill ("fonds de commerce") of the Company for a total amount of K€36,992 in 2019 (2018: K€70,300; 2017: K€29,000) and pledges on other fixed assets for a total amount of K€3,301 (2018: K€21,142; 2017: K€6,383).

Other commitments

The Group has outstanding non-cancellable contracts with a future commitment of K€11,640 at December 31, 2019 (2018: K€6,383; 2017: K€7,638), mainly related to purchase commitment for raw materials. For property, plant & equipment, we have no committed expenditures as per December 31, 2019 (2018: K€0; 2017: K€672).

Contingent liabilities

The Group is currently involved in a legal proceeding with Dentsply Implants NV regarding the alleged wrongful termination of a supply agreement between the Company and Dentsply Implants NV entered into in 2010. The court of first instance ruled in favor of Dentsply Implants NV, that we have wrongfully terminated the relationship. We have appealed this decision before the court has pronounced itself on the monetary damages. The amount of damages which Dentsply Implants NV is claiming is K€2,700. While we are confident that the first instance decision will be overruled, we believe that, in the event that the first instance decision would be confirmed, the amount of monetary damages that we would be exposed to will not have a material impact on our business, financial conditions or result of operations. We are currently not a party to, and we are not aware of any threat of, any other legal proceedings, which, in the opinion of our management, is likely to have or could reasonably possibly have a material adverse effect on our business, financial condition or results of operations. As a result management concluded that no provision is required.

25 Risks

The Group is mainly exposed to liquidity risk, interest rate risk and credit risk.

Foreign exchange risk

The Group transacts business globally and is subject to risks associated with fluctuating foreign exchange rates. The geographic areas outside of the Eurozone to which it sells its products and services are generally not considered to be highly inflationary. In the years ended December 31, 2019, 2018 and 2017, 29%, 30% and 31% of our revenue, respectively, was derived from sales in a currency different from the euro. Receivables denominated in a foreign currency are initially recorded at the exchange rate at the transaction date and subsequently remeasured in euro based on period-end exchange rates. Transaction gains and losses that arise from exchange rate fluctuations are charged to income.

The Group has primarily exposure to the USD, GBP, BRL and JPY as foreign currency.

During 2019 the impact of changes in foreign currency rates on the cash and term accounts held in USD funded through the initial public offering proceeds was positive for an amount of K€553.

If the USD (rate for 1 EUR) would have appreciated by 10%, the net result would have been K€895 higher, excluding the effect of the cash and term accounts held in USD. If the USD (rate for 1 EUR) would have depreciated by 10%, the net result would have been K€780 lower, excluding the effect of the cash and term accounts held in USD.

To limit the exposure to foreign currency rate fluctuations on GBP and JPY, the Group has entered into currency rate swaps as of 2017. We refer to note 20.

Liquidity risk

The liquidity risk is that the Group may not have sufficient cash to meet its payment obligations. This risk is countered by day-by-day liquidity management at the corporate level. The Group has historically entered into financing and lease agreements with financial institutions to finance significant projects and certain working capital requirements. The Group has no longer undrawn lines of credit at December 31, 2019 (2018: K€26,040; 2017: K€4,473).

On September 29, 2017 KBC Bank and Materialise agreed on a credit facility, mainly related to the financing of the ACTech acquisition, in which debt covenants were determined based on the ratio of the Group's total net financial debt over EBITDA.

On December 20, 2017, the European Investment Bank (EIB) and Materialise entered into a finance contract to support Materialise's ongoing research and development programs for growth from 2017 to 2020. The contract provides a credit of up to €35.0 million drawable in two tranches. The first tranche could not exceed €25.0 million and could be drawn during the first year of the contract. The Group actually has drawn €10.0 million of this first tranche in the course of 2018. The second tranche of €25.0 million was drawn in July 2019. The duration of the loan will be between six to eight years starting from the disbursement of the respective tranches, and includes a two-year loan reimbursement grace period. Loans under the contract will be made at a fixed rate, based on the Euribor rate at the time of the borrowing, plus a variable margin. The interest rate for the first tranch is initially equal to 2.4% . The interest rate for the second tranch is initially 2.72% and varies in function of certain EBITDA levels and debt ratios. The contract contains customary security, covenants and undertakings.

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The range of contracted obligations are as follows:

in 000€	Less than 1 year	2 to 3 years	4-5 years	More than 5 years	Total
At December 31, 2019					
Loan & borrowings	14,300	33,034	41,672	34,447	123,453
Lease liabilities	3,685	4,907	1,040	720	10,352
Trade payables	18,517	—	—	—	18,517
Other current liabilities and advances received	4,063	—	—	—	4,063
Total	**40,565**	**37,941**	**42,712**	**35,167**	**156,385**

	Less than 1 year	2 to 3 years	4-5 years	More than 5 years	Total
At December 31, 2018					
Loan & borrowings	14,491	42,100	33,636	23,870	114,097
Trade payables	18,667	—	—	—	18,667
Other current liabilities	2,267	—	—	—	2,267
Total	**35,425**	**42,100**	**33,636**	**23,870**	**135,031**

	Less than 1 year	2 to 3 years	4-5 years	More than 5 years	Total
At December 31, 2017					
Loan & borrowings	14,331	37,933	22,286	32,699	107,249
Trade payables	15,670	—	—	—	15,670
Other current liabilities	1,390	—	—	—	1,390
Total	**31,391**	**37,933**	**22,286**	**32,699**	**124,309**

Interest rate risk

Although the Group mainly has loans outstanding with a fixed interest rate, some of the loans have been contracted with variable interest rates. The most significant loans with variable interest rates have been secured by means of a variable to fixed interest rate swap. We therefore believe that the Group is not subject to immediate changes in interest rates. With respect to the interest rate swaps, we refer to note 20.

Credit risk

Credit risk is the risk that third parties may not meet their contractual obligations resulting in a loss for the Group. The Group is exposed to credit risk from its operating activities (primarily trade receivables) and from its financing activities, which are mainly deposits with financial institutions. The Group limits this exposure by contracting with credit-worthy business partners or with financial institutions which meet high credit rating requirements. In addition, the portfolio of receivables is monitored on a continuous basis.

Trade receivables and contracts in progress

Customer credit risk is managed by each business unit subject to the Group's established policy, procedures and controls relating to customer credit risk management.

An impairment analysis is performed at each reporting date per company and using a provision matrix per company to measure expected credit losses. The provision rates are based on days past due for groupings of various customer segments with similar loss patterns (i.e., by legal entity).

The calculation reflects the probability-weighted outcome, the time value of money and reasonable and supportable information that is available at the reporting date about past events, current conditions and forecasts of future economic conditions. Generally, trade receivables are written-off if past due for more than one year and are not subject to enforcement activity. The maximum exposure to credit risk at the reporting date is the carrying value of each class of financial assets at amortized cost or fair value through OCI as disclosed in Note 20. The Group does not hold collateral as security.

The Group evaluates the concentration of risk with respect to trade receivables as low, as its customers are located in several jurisdictions and industries and operate in largely independent markets.

Set out below is the information about the credit risk exposure on the Group's trade receivables using a provision matrix:

in 000€	Total	Non-due	Less than 30 days	31-60 days	61-90 days	91-180 days	More than 181 days
December 31, 2019	40,977	31,528	4,924	2,094	733	981	717
December 31, 2018	36,891	26,208	5,395	1,479	931	1,512	1,366
December 31, 2017	35,582	21,630	6,920	1,765	1,526	1,614	2,127

Capital management

The primary objective of the Group's shareholders' capital management strategy is to ensure it maintains healthy capital ratios to support its business and maximize shareholder value. Capital is defined as the Group shareholder's equity.

The Group consistently reviews its capital structure and makes adjustments in light of changing economic conditions. The Group made no changes to its capital management objectives, policies or processes during the years ended December 31, 2019, 2018 and 2017.

26 Related party transactions

The compensation of key management personnel of the Group is as follows:

in 000€	For the year ended December 31 2019	2018	2017
Short-term employee benefits	2,394	2,334	2,190
Post-employment benefits	85	80	80
Total	**2,479**	**2,414**	**2,270**
Warrants granted	—	—	—
Warrants outstanding	359,266	557,935	573,980

The amounts disclosed in the table are the amounts recognized as an expense during the reporting period related to key management personnel (senior management and executive committee members). In the year ending December 31, 2019 the compensation to key management by means of share based payments amounts to K€214.

The following table provides the total amount of transactions that have been entered into with related parties for the relevant financial year:

in 000€	Sale of goods to	Purchases from	Depreciation	Interest expense	Right-of-Use Assets	Receivables	Lease liabilities	Other liabilities
Non-executive directors of the group								
2019	—	128	—	37	—	—	—	1,053
2018	—	123	—	51	—	—	—	1,038
2017	—	96	—	50	—	—	—	965
Shareholders of the group								
2019	—	113	—	9	—	—	—	131
2018	—	123	—	10	—	—	—	261
2017	—	172	—	11	—	—	—	371
Joint ventures								
2019	1,431	—	—	—	—	1,279	—	—
2018	1,156	241	—	—	—	1,281	—	22
2017	714	23	—	—	—	804	—	28
Non-controlling interests								
2019	—	—	26	9	617	—	652	—
2018	—	—	—	—	—	—	—	—
2017	—	—	—	—	—	—	—	—

Related party – Ailanthus NV

Ailanthus is a shareholder and director of the group. The Group rent apartments on a regular basis from Ailanthus NV in order to host our employees from foreign subsidiaries who are visiting our headquarters in Leuven. The total amount paid to Ailanthus NV for rent in 2019 was K€113 (2018: K€123; 2017: K€172).

Related party – shareholders of Engimplan (non-controlling interest)

The subsidiary Engimplan rents the office and production building from its non-controlling shareholders for a initial term of 10 years, with an extension option for an additional 10 years (assessed not to be reasonable certain to be exercised). The monthly lease payment amount to K€7. The lease has been accounted for under IFRS 16 resulting in a lease liability at December 31, 2019 of K€617.

Related party – Convertible debt

The Group has issued on October 28, 2013 1,000 convertible bonds for a total amount of K€1,000. The bonds have been fully subscribed by a member of our senior management. We refer to Note 15 for more details.

Joint ventures

The receivable for the amount of K€1,279 is accounted for under the other non-current assets and trade receivables and relates to the services and goods delivered to the joint venture RSPRINT. In the course of 2018 the Group also purchased a 3D printer from RSPRINT for the amount of K€200.

27 Events subsequent to the statement of financial position date

Impact of coronavirus

The outbreak of a novel coronavirus, was first identified in December 2019 in Wuhan, China, and has since spread globally. In response to the pandemic, governments worldwide have closed business, restricted travel and implemented emergency quarantines, and businesses and individuals have reduced travel, cancelled meetings and events and implemented of work-from-home policies, which have caused significant disruption to the global economy and normal business operations. The coronavirus public health crisis is expected to have broader macroeconomic implications, including a decrease in or halt to economic growth, the effects of which could be long lasting.

In an effort to protect the health and safety of employees, we, and many of our customers, partners, suppliers and other counterparties, currently require that employees work from home and restrict travel as much as possible, which affects, amongst other things, their ability to attend industry events and to engage in commercial visits. In the event we or our customers, partners, suppliers and other counterparties maintain or expand these restrictions, we may suffer disruptions to business operations including the closure of manufacturing facilities, warehouses and logistics supply chains worldwide. Furthermore, the coronavirus and the responses thereto could have a range of other effects on us. For example, the implementation of business continuity plans in a fast-moving public health emergency could have an adverse effect on our internal controls (potentially giving rise to significant deficiencies or material weaknesses) and increase our vulnerability to information technology and other systems disruptions.

As of April 30, 2020, we are unable to predict the duration and severity of the spread of the coronavirus and the political and economic responses thereto and as a result, we are unable to assess with certainty its impact on our business and operations, results of operations, financial condition, cash flows and liquidity. The coronavirus and related responses are developing rapidly, making their impact highly uncertain, and are subject to many factors beyond our control, such as the speed of contagion, the implementation of effective preventative and containment measures, the development of effective medical solutions, the timing and scope of governmental restrictions on public gatherings, mobility and other activities, financial and other market reactions, and reactions and responses of the public. While we expect we will suffer adverse effects, the more severe the outbreak is and the longer it lasts, the effects on us and our business will be more materially adverse.

Based on our current assessment of the COVID-19 pandemic, we have considered various hypothetical scenarios on how our business, results of operations, and financial condition could be impacted during the year 2020. In these scenarios we take the general view, but without any certainty as we are reviewing the situation constantly, that our business will be impacted very significantly in the second quarter of 2020, and will subsequently continue to be weak for the rest of the year, although that our current assessment of the situation is that our business may gradually improve during the remainder of 2020. However, in the current situation, in view of the many uncertainties of this unprecedented crisis, we find it very hard to gain any visibility beyond the second quarter.

The Materialise software segment, represented 24% of the total sales exiting 2019 and had an Adjusted EBITDA margin of 33.2% in 2019. We believe that an important part of the software sales of our Materialise software segment are, at least temporarily, at risk. A significant portion of the sales of this segment comes from parties that either sell or use 3D printing systems. The weakness of the 3D printing industry in general is expected to weigh very negatively on 3D printing system sales and thus also on our software sales, definitely in the second quarter of 2020 with a possible extension into the second half of 2020.

The Materialise medical segment, which represented 34% of the total sales exiting 2019 and had an Adjusted EBITDA margin of 17.7% in 2019, designs, produces and sells customized implants, surgical guides and models as well as visualization and planning software to research institutes, universities, medical device companies and hospitals. A significant percentage of this segment's revenue stems, directly or indirectly, from elective surgeries, almost all of which are now being postponed due to the U.S. Centers for Disease Control and Prevention, or CDC, guidelines, which require hospitals to prioritize preparation for and response to the pandemic. As a result, these revenues (and at least the timing thereof) become uncertain, which will result in a significant reduction of sales of our Materialise medical segment, definitely in the second quarter of 2020, and possibly in the next quarters as well, depending on how the pandemic evolves.

The remaining 42% of the total sales exiting 2019 comes from the Materialise manufacturing segment, which operates as part of the overall manufacturing sector in Europe, which includes subsectors such as automotive, aviation, machine parts and consumer products, all of which are heavily impacted by the coronavirus crisis. The European automotive market was particularly weak before the COVID-19 outbreak, and we now expect an even slower recovery than previously estimated. Other European industrial subsectors are not faring much better in this market and will likely face larger declines than previously expected. Order intake within the Materialise manufacturing segment has been slowing down, which will significantly impact the segment's second quarter results and which may impact the results beyond this quarter, as a function of how the crisis develops in general and how the industry as a whole, and our customers in particular, subsequently recover from the situation.

We also expect an increase of bad debt, delay in trade payments, and that we will not be able to adjust and align all of our costs according to the expected decrease of revenue. We experienced the first negative effects of this crisis on our revenues in the first quarter of 2020. In these analyses, we considered a major negative impact in the second quarter, and only a gradual and partial recovery in the third and fourth quarter of this year. From these analyses, we conclude that (according to the currently most likely scenarios), the going concern principle should be maintained, and that the principle covenants of our credit facilities (at EIB and KBC), ‘minimum cash’ and ‘Net Debt / Adjusted EBITDA’, will not be violated. We believe that the expected situation does not impact the current valuation of our inventories, investments, intangible assets (including goodwill), long-lived assets, or our debt.

While we continue to monitor the situation regularly, we believe that eventually the 3D printing industry will recover and may even come out of this crisis stronger, as the crisis appears to be underscoring certain advantages of the 3D printing technology, in particular its flexibility in terms of part design, speed, production of smaller strategic batches and localization. Therefore, while we try to adjust our costs and capital spending in proportion to the short term reduction of our revenues, we currently take the view that these cost and spending reductions should, where possible, be as moderate and temporary as possible, since we believe that continued innovation during the current crisis may give us a competitive advantage going forward. This strategy involves significant risks, including risks in terms of its impact on our cash position, and as the crisis lasts longer, we may not be able to sustain this strategy and it might have negative implications for our long term competitive position.

Warrant exercises

In connection with the exercise of 21,750 warrants, representing 21,750 shares, from the 2015 warrant plan in the course of March 2020, the share capital was raised for the amount of K€1 and the share premium was raised for the amount of K€140 by deed before the notary on April 16, 2020 (we refer to Note 14 for further information about the share based payment plans). As per April 16, 2020 the funds received in connection with the exercise of the warrants (K€140) were accounted for on a restricted bank account classified under the Cash and Cash Equivalents.

There are no other significant events subsequent to the statement of financial position date that would require adjustments or disclosures to the financial statements.

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28 Overview of consolidated entities

Name	Country of incorporation	% equity interest 2019	2018	2017
Materialise NV	Belgium	100%	100%	100%
Materialise France SAS	France	100%	100%	100%
Materialise GmbH	Germany	100%	100%	100%
Materialise Japan K.K.	Japan	100%	100%	100%
Materialise Czech Republic SRO	Czech Republic	100%	100%	100%
Materialise USA, LLC	United States	99%	99%	99%
Materialise UK Limited	United Kingdom	100%	100%	100%
OBL SAS	France	100%	100%	100%
Materialise Austria GmbH	Austria	100%	100%	100%
Materialise Malaysia SDN. Bhd.	Malaysia	100%	100%	100%
Materialise Ukraine LLC	Ukraine	100%	100%	100%
RapidFit NV	Belgium	83%	83%	83%
Meridian Technique Limited	United Kingdom	100%	100%	100%
OrthoView Holdings Limited	United Kingdom	100%	100%	100%
Meridian (Corporate Trustee) Limited (liquidated)	United Kingdom	—	—	100%
OrthoView Limited (liquidated)	United Kingdom	—	—	100%
Materialise SA	Poland	100%	100%	100%
Materialise Colombia SAS	Colombia	100%	100%	100%
RSPRINT powered by Materialise NV (joint venture)	Belgium	50%	50%	50%
Materialise Shanghai Co.Ltd	China	100%	100%	100%
Engimplan Engenharia de Implante Industria & Comércio Ltda	Brazil	75%	—	—
Engimplan Holding Ltda	Brazil	100%	—	—
Materialise Australia PTY Ltd	Australia	100%	100%	100%
Materialise S.R.L.	Italy	100%	100%	100%
ACTech GmbH	Germany	100%	100%	100%
ACTech Holding GmbH	Germany	100%	100%	100%
ACTech, Inc	United States	100%	100%	100%

The entities Materialise GmbH, Gilching, Germany, ACTech Holding GmbH, Freiberg / Saxony, Germany and ACTech GmbH, Freiberg / Saxony, Germany, have taken advantage of the exemption regulations of § 264 (3) HGB (German Commercial Code) for the financial year ending December 31, 2019.

29 Non-GAAP Measures

EBITDA and Adjusted EBITDA is used in the Note 21 Segments as one of the basis of the Segments performance measurement. We calculate EBITDA as net profit plus income taxes, financial expenses (less financial income), depreciation and amortization, and share in loss of joint venture. We calculate Adjusted EBITDA by adding non-recurring initial public offering related expenses, non-cash share-based compensation expenses and acquisition-related expenses of business combinations to EBITDA.