



TSO3 Inc.  
| TSX: TOS / OTC: TSTIF |  
INVESTMENT RESEARCH REPORT  
*"Infected Investment Opportunity"*  
RECOMMENDATION: *Strong Sell*



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# About Spruce Point Capital Management

## Spruce Point Capital Is An Industry Recognized Research Activist Investment Firm Founded In 2009

- Founded by Ben Axler, a former investment banker with 17 years experience on Wall Street
- Ranked the #1 Short-Seller in the world by [Sumzero](#) after a comprehensive study of 12,000 analyst recommendations dating back to 2008 (March 2015)
- Ranked the #13 Most Influential FinTweeter on Twitter according to [Sentieo analysis](#) (Dec 2016)

## Spruce Point's Recent Small Cap Stock Activist Success Stories

	Echo Global Logistics (Nasdaq: ECHO)	CECO Environmental (Nasdaq: CECE)
<b>Report Date</b>	<a href="#">9/8/16</a>	<a href="#">7/13/17</a>
<b>Market Cap</b>	\$820 million	\$430 million
<b>Company Promotion</b>	An effective roll-up acquirer in the third party logistics sector capable of extracting significant operating leverage and \$200-\$300m of revenue synergies from the Command Transportation deal	An effective roll-up acquirer serving the environmental, energy, fluid handling and filtration industrial segments. Its largest PMFG acquisition would be a success and allow for rapid delivering of its balance sheet, and renewed organic growth opportunities
<b>Our Criticism</b>	Echo's management team has a history of value destruction, its roll-up strategy was ineffective, its organic growth was approaching zero, and its GAAP/Non-GAAP accounting was signaling financial strain. We argued it paid a peak multiple for Command and would never hit its synergy targets. We estimated 50%-60% downside risk in ECHO's shares	A poorly constructed roll-up. Based on our forensic analysis, we argued CECO was forestalling a goodwill impairment, its cash flow would fall significantly in 2017, and it could come under covenant pressure. We argued the company was misportraying its true leverage, and facing significant employee turnover and changes to its end markets which would pressure future earnings expansion. We estimated downside risk of 30-60%
<b>Successful Outcome</b>	In Q2'17 ECHO cut its FY17 revenue outlook and suspended longer-term guidance given changes in its end market and failure to hit synergy targets with Command. ECHO Sell-side brokers have finally downgraded their recommendations from Buy to Hold. ECHO's shares fell to a 52 week low of \$13, or nearly 50%	CECO took a goodwill impairment in Q1 as predicted, and changed its presentation of its financial leverage in its investors presentation - implicitly acknowledging our criticism. Q1 and Q2 2017 results were significantly below expectations, it admitted continuing challenges in its end markets, and its YTD operating cash flow has evaporated. CECO's shares were downgraded, and are at 52 week lows haven fallen >40%





## *Executive Summary*



## *Spruce Point Is Short TSO3 (TSX: TOS / OTC: TSTIF) For The Following Reasons, Sees >80% Downside:*

TSO3 Inc. (“TSO3” or “the Company”) makes low-temperature sterilization systems to eliminate microbial contaminants that cause infection. Founded in 1998, TSO3 is a regular stock promotion that has repeatedly disappointed investors by failing to broadly commercialize its product and show a profit. Déjà vu, now on its 3<sup>rd</sup> attempted generation STERIZONE VP4 and its 3<sup>rd</sup> sales/distribution partner Getinge (previous partner 3M sued it), TSO3 is again baiting investors, who’ve bid its share price up 6x since 2014. Our fundamental and forensic analysis suggests investors should brace for disappointment and >80% downside risk.

- 1 TSO3 Is Just Another Canadian Healthcare Promotion:** The Canadian markets are littered with recent examples of healthcare stocks in need of urgent medical attention, wounded from over-promotion, questionable practices, and poor performance. Short sellers made early warning calls on many names down >80%: Valeant, Concordia, Nobilis, CRH Medical
- 2 Disclosure Issues & Obfuscating Its Actual End Market Sales:** TSO3 is not disclosing its installed base and the reason is obvious – if it did, investors might see just how poor its product’s end market acceptance actually is. In Q3’16, TSO3 suggested it would provide clarity on its installed base in early 2017 – investors are still waiting.... TSO3 even stopped disclosing consumables sales in Q2’16. It currently recognizes as revenues shipments to Getinge, its 3<sup>rd</sup> party distributor (183 units since Q1’16). However, **our math and field checks suggest at best 10 units are actually installed at end customers (95% difference to shipments)**
- 3 TSO3 Using the “Partnership” Playbook To Hype Its Potential:** Déjà vu, TSO3 is repeating a twice failed playbook. Recently from 2009-2013, alongside of 3M: TSO3’s single product cycle ended with no material sales, termination of their partnership, and a legal settlement in favor of 3M. TSO3’s prior two generations of this product also failed (the current 3<sup>rd</sup> generation VP4 appears eerily similar to the 2<sup>nd</sup> generation – not surprising given the low R&D spend)
- 4 TSO3 Overstating Its Total Addressable Market (TAM):** All good promotions involve baiting investors with big addressable market opportunities. TSO3 appears to have overstated its true market potential by >30% units and C\$170m. We provide evidence of the Company playing fast and loose with its numbers
- 5 Getinge Is Not The Solution To TSO3’s Problems:** Bulls think the new Getinge sales partnership is the catalyst needed to spark a run towards C\$87m in sales and C\$0.22c of EPS in 2020. In reality, Getinge can walk away from the partnership for various reasons, and owns competing sterilizers that likely generate better margins. Getinge has actually purchased 9 sterilization companies prior to this glorified agreement with TSO3, including a low temperature solution called Stericool. Meanwhile Getinge has its own problems: its stock is down to multi-year lows, it has been forced to restructure, and churn through various CEOs, It is also going through an FDA investigation into quality control at its plants, and a regulatory inquiry by Brazilian authorities for alleged cartel activities



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**Outclassed By Larger, Better Capitalized Incumbent Competition, TSO3 Stands Little Chance:** Sterrad, owned by Johnson and Johnson (J&J), is the industry leader with a product that is cheaper, better on functionality and maintains a market leading installed base for >20 years. TSO3's has hyped investors on the potential of solving the superbug issue at hospitals – FDA presumably disagrees as it has recommended four potential solutions, none of which include TSO3's product (VP4). TSO3's markets that its key value add is the VP4's ability to sterilize scopes that no other device can; **except it quietly recognizes that the VP4 may be damaging the medical devices being sterilized** – an admission that the current generation may be doomed

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**Mgmt & Employment Issues:** TSO3 management owns less than 1% of the company's shares, and has no alignment with investors. Their main incentive is to collect bloated salaries, and care little if TSO3 continues to stuff shareholders with losses. Management itself is quite poor: its last CFO (Benoit Deschamps) left after its apparently pivotal 510k approval – another ominous sign. TSO3's new CFO Glen Kayll was a board member at Argex Titanium (a failed stock promotion). CEO Ric Rumble was director at Bioexx which is now delisted. Employees typically know best: we estimate almost one third of TSO3 employees have left the Company since early 2015. The majority of employees that left lasted less than 18 months

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**Everything Must Be Executed Perfectly For TSO3 To Hit Lofty Analyst Goals And Price Target:** To be long shares of TSO3, investors are ascribing a near certain likelihood that it will (i) displace current technology and entrenched incumbents, (ii) Getinge will win sales and push TSO3 ahead of competitive products (some that it owns), (iii) It will capture >30% of the market; (iv) it will surpass an 18 year track record of failure, and (v) it will achieve margins that no one else has in the space. Investors must also gain comfort around TSO3 specific risks: that it is a one product company that could be damaging medical devices, has a history of failed partnerships, no meaningful sales or evidence it can turn a profit in its long history, questionable disclosure practices, and limited alignment with insiders which own <1% of stock

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**Valuation Downside Risk Potential 80%+:** Our downside scenario likely plays out with Getinge walking away from TSO3, and not being willing to purchase anything further. In the absence of additional sales growth, TSO3 will continue to accumulate losses (cumulative life-to-date losses are \$128m given it has spent 2x as much on SG&A than R&D over the same time period). TSO3 currently trades at a preposterous 15x LTM sales and 19x book value, but bulls point to it being “cheap” at 2.7x and 12x sales and EPS in 2020. We believe that TSO3 is nothing more than a stock promotion, and it cannot generate a profit. Investors wanting exposure to sterilization products are better served owning a basket of peers which are profitable, pay dividends, and trade around 2x sales and book value on average. Ascribing a similar multiple range to TSO3 would result in 80%+ downside risk

# Canadian Healthcare Companies In Need of Medical Attention

Highly promoted Canadian healthcare names often run into problems. Activist Short Sellers have played an early role in resetting market expectations around these stocks.

Company	Exchange/ Ticker	Peak Share Price	Current Share Price	Respective Price Decline	Criticism
Valeant Pharmaceuticals	TSX / NYSE: VRX	C\$346.32 (Aug 5, 2015)	C\$19.15	(94%)	Accounting issues, end markets in secular decline, questionable organic growth, insiders sales, undisclosed distributors, significant financial leverage, price gouging, questionable roll up strategy
Concordia International Corp	TSX: CXR Nasdaq: CXRX	C\$110.60 (Sep 4, 2015)	C\$1.78	(83%)	Accounting issues, price gouging, poor management, generics business fundamentals in trouble, questionable roll up strategy
Nobilis Health	TSX: NHC AMEX: HLTH	\$7.60 (April 16, 2015)	\$1.55	(80%)	Accounting issues, overvalued, insider selling, questionable management history and organic growth
CRH Medical	TSX: CRH NYSE: CRHM	C\$12.20 (Apr 19, 2017)	C\$3.14	(86%)	Accounting issues, overvalued, insider selling, poor management, wrongful billing practices; <b>also in the colonoscopy space (like TSO3)</b>
TSO3 Inc.	TSX: TOS	C\$3.73 (Jul 27, 2016)*	C\$2.60	Spruce Point expects an <b>&gt;80%</b> decline in TOS's stock	Significant stock promotion for a company with a poor history of execution and limited transparency

Source: Public information

\*Recent peak share price (since 2015 – current iteration of product)



# *TSO3's Dirty Little Secret: Limited End Customers Actually Buying Its Product*

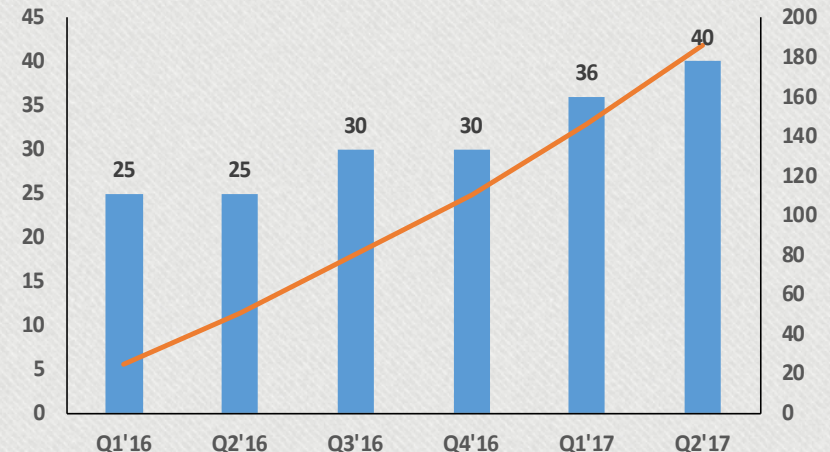
Be wary of TSO3 disclosures of units shipped to its marketing partner Getinge vs. units sold/installed to end customers. Spruce Point estimates max 10 units installed to end customers vs. 183 shipped to Getinge: A 95% Difference

- **TSO3 doesn't disclose units installed at end customers, and we think we know why.** Our math suggests 5% of units shipped have been installed by Getinge; the VP4 has been approved since 2014 and been shipping since Q1'16!
- Recall that prior life cycles of this same product yielded less than 50 installs. TSO3 points to its arrangement with Getinge for not disclosing the information, but our review of the agreement doesn't indicate to us they would be precluded from disclosing
- Until Q1 2016, TSO3 disclosed consumable sales which could provide a proxy of installed base, even this was removed in Q2 2016. **Don't worry, if the company won't provide the info, Spruce Point's math and channel checks will help shed light.** Note: TSO3 stated it stopped disclosing consumables because they were immaterial, does this imply the **installed base is immaterial?**
- TSO3 itself tells you that the middle man, aka Getinge, is buying this product to sit on it: *"Additionally in the quarter we shipped our proprietary consumables to Getinge, who warehouses these along with sterilizers for resale to end customer healthcare institutions."* ([Q2 2017 CEO Commentary](#))

## Spruce Point Estimated Units Installed At End Customers

Key Assumptions	Low Est.	High Est	Note
Shipments of STERIZONE VP4 (Q2'17)	40	40	A=Reported By TOS3
Unit Price	\$106,625	\$106,625	B (Consensus)
<b>Spruce Point Est. Sales</b>	<b>\$4,265,000</b>	<b>\$4,265,000</b>	<b>C=AxB</b>
Reported Sales (Q2'17)	\$4,630,000	\$4,630,000	D=Reported By TOS3
Getinge License Fee (Amortized)	\$200,000	\$200,000	E=Reported By TOS3
Accessories, Consumables, Service Sales	\$165,000	\$165,000	F=Estimated as D-C-E
Cycles Per Day	12	8	G (US Hospitals)
Number of Days Per Quarter	91	91	H
Total Cycles Per Quarter	1092	728	I=GxH
Avg. Cost Per Cycle	\$20.0	\$25.0	J=TOS3/Research
<b>Implied TSO3 Machines in Service</b>	<b>8.0</b>	<b>10.0</b>	<b>K= F / (IxJ)</b>

## Quarterly and Cumulative Units Shipped To Getinge



Source: TSO3 Financial Reports



# Déjà Vu: We've Seen TSO's Partnership Hype Story Before

**TSO3 is repeating a playbook from its past, the promotion of a key partnership that will result in millions of dollars in product sales. In the recent past it was 3M, and today it is Getinge.**  
**TSO3's previous deal with 3M resulted in a terminated agreement, a lawsuit, and no installed base!**

Round 1: Partnership with 3M (2009-13)	Round 2: Partnership with Getinge (2015-current)	Spruce Point Commentary
<a href="#">Sep 2, 2009</a> : TSO3 entered into a 90 days exclusive negotiation period with 3M, for the distribution of the STERIZONE® 125L Sterilizer	<a href="#">Mar 6, 2015</a> : TSO3 enters into first non-exclusive commercial agreement for Sterizone VP4 Sterilizer with Getinge	<b>Step 1</b> : Sign on a big partner
<a href="#">Dec 16, 2009</a> : TSO3 and 3M announced 3M as exclusive supplier of Sterizone 125L+ Sterilizer	<a href="#">Nov 25, 2015</a> : TSO3 and Getinge sign exclusive global distribution agreement	<b>Step 2</b> : Sign an exclusive agreement with that big partner
<a href="#">Dec 17, 2009</a> : 3M marketing supervisor: "3M Canada looks forward to expanding its product offering with TSO3's new sterilizer to better meet <b>customer needs</b> "	<a href="#">Nov 25, 2015</a> : Joacim Lindoff (Pres of Getinge Infection) "The STERIZONE® VP4 Sterilizer uniquely addresses an <b>unmet global need</b> "	<b>Step 3</b> : Get your big partner to state the world needs your product
<a href="#">Dec 29, 2009</a> : TSO3 files supporting documentation for exporting Sterizone 125L+ to US and Europe	<a href="#">Dec 17, 2014</a> : TSO3 receives 510k approval from FDA	<b>Step 4</b> : Expand the capabilities of your product
<a href="#">Mar 17, 2010</a> : TSO3 received initial purchase commitment from 3M	<a href="#">Jul 24, 2015</a> : TSO3 receives purchase orders for VP4	<b>Step 5</b> : Get initial purchase orders and announce them as a key moment
<a href="#">Mar 2010</a> : 3M Optreoz 125-Z exhibited at tradeshow AORN gathering 7k healthcare decision makers	<a href="#">Mar 6, 2015</a> : VP4 sterilizer showcased at AORN Surgical conference which brings together 6k registrants	<b>Step 6</b> : Pay to have a booth at a big conference (even if it's the same conference), but tell the world your product is being exhibited there!
<a href="#">Sep 30, 2011</a> : Customers report high satisfaction with new sterilizer	<a href="#">Aug 3, 2016</a> : From Q2 2016 results: "initial feedback from end customers has been strong"	<b>Step 7</b> : State high customer satisfaction with your product
<a href="#">Aug 2, 2012</a> : TSO3 terminates agreement with 3M <a href="#">Jul 2, 2013</a> : TSO3 settles dispute with 3M paying 3M \$2m in settlement fees and other	To be determined, see Spruce Point commentary →	Will TSO's fate suffer the same end twice?



# *Open Questions For Management*

After conducting our due diligence, Spruce Point believes the following questions need to be addressed.

- **Why doesn't TSO3 disclose end user installations. Are we right that there have been <10 installations?**
  - How many of these installations received full pricing in accordance with advertised rate by TSO3/Getinge?
  - How many of the installations were provided on a complimentary basis?
  - How many installations have been returned by customers?
- **Does the VP4 cause damage to medical devices it sterilizes? Is the VP4 untested?**
- How many more IFUs (Indications for Use) do competitors have versus the VP4?
- What portion of sterilization machines last 15 years if properly maintained? (reduces annual replacements)
- How much did Mount Sinai and other strategic installations pay for the VP4?
- It is generally understood that Europeans regulation allows for use of high level disinfectant (thus low temperature sterilization isn't the norm) – how do you combat this?
- Why does the Company have an office in Myrtle Beach? Is this advantageous to shareholders or so that C-level employees can conveniently golf?
- Where does the Getinge agreement say that TSO3 cannot disclose its installed base?
  - Why can it disclose cycles but not installed base?





## *Brief Overview of TSO3*



# Failure Is In TSO3's DNA!

TSO3's share price has been driven by repeated high expectations, met with subsequent product and partnership failures. Its share price is up 6x since 2014 by stoking hopes that its latest product can succeed, but Spruce Point believes disappointment looms large

- **Generation one product was well received...until it wasn't**
  - The [2006 Annual Report](#) included the following statements about the first generation of the STERIZONE 125L Sterilizer: *"addresses perfectly the evolving needs in sterilization...buyers express total satisfaction...ability to reduce sterilization costs and its fast instrument turnaround time...Manufacturers impressed with compatibility between their instruments and the 125L Ozone Sterilizer"*
  - The [2009 Annual Report](#) painted a sharply contrasting picture: *"it became obvious that the first generation of the STERIZONE 125L Sterilizer had not fully achieved the customers' needs for cycle speed and material compatibility."*
- **Between 2009 and 2012 TSO3 failed with its 2<sup>nd</sup> generation 125L sterilizer with 3M**
- **The failures are stacking up**
  - TSO3 has failed with 2 partners in selling its product
  - TSO3 tried doing it with its own sale force of 25+ people, once again – failure!
  - Then 3M tried and failed!
  - Can Getinge, a company that recently fired its CEO and is restructuring, really do a better job of selling TSO3's only product?
- **Two generations up, two generations the stock price precipitously declined, will generation 3 be any different?**





# *TSO3 Has A Challenged Product Offering and Suboptimal Distribution Partner*

TSO3's Product Challenges	
Description	Comments
Breadth of Devices That Can Be Sterilized	Sterrad lists 20,000 devices that can be sterilized while TSO3 lists approximately 3,000
Compatibility With Instruments	Management acknowledges that most devices are designed for liquid disinfection, implying the TSO3 process results in additional device service and repair (read costs)
Technology User Experience	Competitors products have state of the art displays, TSO3 technology is dated due to lengthy approval process
Product Maintenance	Competitors employ extensive network of ready to be deployed technicians, TSO3 lacks this critical support
Pricing / Discounting	TSO3 product has list price in line with competitors, but isn't in a financial position to offer comparable discounts

TSO3's Distribution Partner Getinge Has Challenges	
Description	Comments
Overlapping Offering	Gentige owns Stericool, a direct competitor to the TSO3 offering
Relationship Structure	Gentige opted for a distribution agreement with TSO3, a weak commitment compared to the nine acquisitions it has done in the space
Relationship Continuity	The TSO3 deal's architect Andrew Ray, President / CEO Genitige Infection Control NA, left the company within a year of signing
Management Turnover	Alex Meyer, Getinge CEO, ousted after 18 months (3rd CEO in 3 years)
Financial Performance	Appointed new CFO in July 17 as company struggles with financial performance, regulatory investigations and multi-year low stock price
Corporate Restructuring	Three business areas merged to form a single group unit per country
FDA Matters	Reached consent decree with FDA over manufacturing issues. FDA matters still ongoing as of July '17



# *In Our View, TSO3 Is A Failed Business Model That Will Never Earn A Profit*

**TSO3 has generated just \$38m of sales since inception and \$128m of operating losses.**

**Selling, general and administrative expenses are >2x research and development costs >a big red flag.  
The result: corporate insiders benefit while the public shareholders and healthcare industry are no better off.**

	Revenue	R&D	SG&A	Operating Losses
1998	-	(\$0.4)	(\$0.2)	(\$0.9)
1999	-	(\$1.4)	(\$0.6)	(\$1.8)
2000	\$0.1	(\$1.2)	(\$0.8)	(\$2.0)
2001	-	(\$1.0)	(\$1.7)	(\$2.7)
2002	-	(\$1.5)	(\$2.8)	(\$4.3)
2003	-	(\$1.6)	(\$4.6)	(\$6.2)
2004	-	(\$1.5)	(\$5.2)	(\$6.7)
2005	\$0.2	(\$1.9)	(\$5.3)	(\$7.0)
2006	\$1.1	(\$1.7)	(\$7.9)	(\$8.5)
2007	\$1.7	(\$1.8)	(\$9.3)	(\$11.1)
2008	\$2.2	(\$2.4)	(\$10.5)	(\$12.8)
2009	\$1.3	(\$3.4)	(\$7.6)	(\$11.0)
2010	\$0.9	(\$3.3)	(\$5.9)	(\$9.2)
2011	\$3.4	(\$4.0)	(\$7.2)	(\$7.7)
2012	\$2.9	(\$2.9)	(\$5.9)	(\$5.8)
2013	\$0.3	(\$3.5)	(\$4.3)	(\$9.3)
2014	\$0.4	(\$2.3)	(\$4.1)	(\$5.9)
2015	\$1.2	(\$2.2)	(\$3.9)	(\$6.3)
2016	\$13.3	(\$3.5)	(\$6.5)	(\$4.3)
YTD 2017	\$8.8	(\$2.9)	(\$4.6)	(\$4.2)
<b>Cumulative</b>	<b>\$37.9</b>	<b>(\$44.3)</b>	<b>(\$99.0)</b>	<b>(\$127.6)</b>

Source: Company filings



# Capital Structure and Valuation

**TSO3 has never made money, yet this time around, analysts see substantial revenue and earnings leverage resulting in a modest valuation on 2020 estimates. TSO3 is now priced for perfection! By this time, Spruce Point believes investors will realize they would have been better off selling today to avoid substantial risk of disappointment**

*in millions, except per share amounts*

	<u>C\$</u>	<u>US\$</u>	<u>Street Valuation</u>	<u>LTM 6/30</u>	<u>2017E</u>	<u>2018E</u>	<u>2019E</u>	<u>2020E</u>
Stock Price	\$2.60	\$2.07	EV / Sales	14.4x	11.2x	5.4x	3.4x	2.7x
Diluted Shares Outstanding	95.3	95.3	EV / EBITDA	NM	NM	50.0x	11.9x	7.9x
<b>Market Capitalization</b>	<b>\$247.9</b>	<b>\$197.2</b>	Price / EPS	NM	NM	136.8x	19.7x	11.8x
Debt Outstanding	\$0.0	\$0.0	Price / Tangible Book	18.9x	--	--	--	--
<b>Total Debt Outstanding</b>	<b>\$0.0</b>	<b>\$0.0</b>	<b>Street Estimates</b>					
Cash and equivalents	\$6.3	\$4.8	Sales	\$16.0	\$20.6	\$42.4	\$68.5	\$86.9
Short Term investments	\$10.5	\$8.1	% growth	--	28.8%	106.0%	61.5%	26.8%
<b>Enterprise Value</b>	<b>\$231.2</b>	<b>\$184.3</b>	EBITDA	(\$4.9)	(\$5.2)	\$4.6	\$19.4	\$29.2
			% margin	-30.3%	-25.4%	10.9%	28.3%	33.6%
			Earnings Per Share	(\$0.07)	(\$0.07)	\$0.02	\$0.13	\$0.22

*Source: Company financials and Canadian broker consensus estimates*





*Déjà vu: TSO3 Hying Another Partnership Deal Likely To Fail*



# The Failed Partner Tally Is High

Multiple commercialization failures coupled with top notch partners remind us of MannKind, which once boasted Sanofi as its distributor. MannKind's stock eventually collapsed down 95%.

## SKYTRON Was TSO3's First "Exclusive" Distribution Agreement

- *"In 2003, TSO3 signed an exclusive distribution agreement with an American partner, SKYTRON. The Company began negotiating a new agreement in late 2005 and signed it in early 2006, under which TSO3 and SKYTRON agree to a transition period that will let TSO3 profit from any sales to accounts already contacted by this distributor, and using the Company's own sales force, immediately assume the responsibility for managing all sales with new customers, now and in the future. The original agreement with the distributor included arrangements whereby TSO3 would transfer the product to the distributor with a 25% discount on the suggested retail price." (2007 AIF)*
- *"We realized in 2005 that **our distributor was not going to reach the sales objectives that we had set.** To remedy this situation, we decided to utilize our own sales force to commercialize our products." (2005 Annual Report)*
- *Four years later, TSO3 did a complete about face on its sales channel, just as it had done on its claims about the product advantages. The 2009 Annual Report blamed the internal sales force for failure: "it was equally clear that we would continue to face the challenge of gaining significant traction in the global market, based on our sales channel. Quite simply put, **we did not have the breadth and scale of organization required for global distribution of our single product.**"*

## Another Partnership Touting Potential With Little Tangible Outcome

- *"October 9, 2008 the Company announced the **signing of an agreement with Mid-Atlantic Group Network of Shared Services (MAGNET).** MAGNET, serves 11,000 healthcare providers by offering access to a contract portfolio of high-quality capital equipment and services. As a vendor partner, the Company will supply MAGNET's members with its low temperature ozone sterilization system for hospital environments." (Mar 30, 2009 AIF)*

## And Let's Not Forget The Hype Around Global Giant 3M Which Resulted In Failure

- *"In the quarter ended June 30, 2013, **the Company recorded a \$1,923,398 cost in connection with the settlement that it reached with the 3M Company** over the termination rights of the distribution agreement signed in December 2009. TSO3 has always maintained, and still maintains, that both parties had the right to terminate that distribution agreement. However, the 3M Company was disputing that right and a protracted litigation may have caused the Company to incur legal expenses and may have impacted its ability to obtain the right terms with a potential strategic partner. Therefore, the Company decided to incur the Settlement Cost in order to achieve a definitive conclusion of any dispute over the terminated agreement." (Aug 5, 2014 PR for Q2 2014 Results)*



# Déjà Vu: We've Seen TSO's Partnership Hype Story Before

**TSO3 is repeating a playbook from its past, the promotion of a key partnership that will result in millions of dollars in product sales. In the recent past it was 3M, and today it is Getinge.**  
**TSO3's previous deal with 3M resulted in a terminated agreement, a lawsuit, and no installed base!**

Round 1: Partnership w/ 3M (2009-13)	Round 2: Partnership w/ Getinge (2015-current)	Commentary
<a href="#">Sep 2, 2009</a> : TSO3 entered into a 90 days exclusive negotiation period with 3M, for the distribution of the STERIZONE® 125L Sterilizer	<a href="#">Mar 6, 2015</a> : TSO3 enters into first non-exclusive commercial agreement for Sterizone VP4 Sterilizer with Getinge	<b>Step 1:</b> Sign on a big partner
<a href="#">Dec 16, 2009</a> : TSO3 and 3M announced 3M as exclusive supplier of Sterizone 125L+ Sterilizer	<a href="#">Nov 25, 2015</a> : TSO3 and Getinge sign exclusive global distribution agreement	<b>Step 2:</b> Sign an exclusive agreement with that big partner
<a href="#">Dec 17, 2009</a> : 3M marketing supervisor: <i>"3M Canada looks forward to expanding its product offering with TSO3's new sterilizer to better meet customer needs"</i>	<a href="#">Nov 25, 2015</a> : Joacim Lindoff (Pres of Getinge Infection) <i>"The STERIZONE® VP4 Sterilizer uniquely addresses an unmet <b>global need</b>"</i>	<b>Step 3:</b> Get your big partner to state the world needs your product
<a href="#">Dec 29, 2009</a> : TSO3 files supporting documentation for exporting Sterizone 125L+ to US and Europe	<a href="#">Dec 17, 2014</a> : TSO3 receives 510k approval from FDA	<b>Step 4:</b> Expand the capabilities of your product
<a href="#">Mar 17, 2010</a> : TSO3 received initial purchase commitment from 3M	<a href="#">Jul 24, 2015</a> : TSO3 receives purchase orders for VP4	<b>Step 5:</b> Get initial purchase orders and announce them as a key moment
<a href="#">Mar 2010</a> : 3M Optreoz 125-Z exhibited at tradeshow AORN gathering 7k healthcare decision makers	<a href="#">Mar 6, 2015</a> : VP4 sterilizer showcased at AORN Surgical conference which brings together 6k registrants	<b>Step 6:</b> Pay to have a booth at a big conference (even if it's the same conference), but tell the world your product is being exhibited there!
<a href="#">Sep 30, 2011</a> : Customers report high satisfaction with new sterilizer	<a href="#">Aug 3, 2016</a> : From Q2 2016 results: <i>"initial feedback from end customers has been strong"</i>	<b>Step 7:</b> State high customer satisfaction with your product
<a href="#">Aug 2, 2012</a> : TSO3 terminates agreement w/ 3M <a href="#">Jul 2, 2013</a> : TSO3 settles dispute with 3M paying 3M \$2m in settlement fees and other	To be determined, see Spruce Point commentary →	Will TSO's fate suffer the same end twice?

# Strike One + Two + Three = You're Out!

*"Insanity Is Doing the Same Thing Over and Over Again and Expecting Different Results" ~Albert Einstein.*

After 18 years, TSO3 goes to market with similar technology to its 2<sup>nd</sup> generation product. J&J has been selling and improving similar tech for >20 years. Spruce Point's prediction: Failure

## ▪ **Strike One: Generation One Product**

- It took five years (1998-2003) to develop the STERIZONE 125L, which used ozone as the main disinfectant
- In 2003, TSO3's initial sterilizer was approved by the FDA. TSO3 described the STERIZONE 125L Sterilizer as *"a unique new sterilization process that uses ozone as the sterilizing agent."* The theory was that ozone would work better than hydrogen peroxide for low temperature sterilization in order to take market share from Sterrad and Steris. Ozone sterilization clearly did not work, as sales fizzled with only 38 units sold over a period of five years – **gen one FAIL!**

## ▪ **Strike Two: Generation Two Product**

- TSO3 launched the STERIZONE 125L+, an overhauled sterilization technology to incorporate hydrogen peroxide sterilization prior to ozonation to remove excess hydrogen peroxide, in 2008. While Health Canada cleared the STERIZONE 125L+ in 2009, the FDA required changes and did not approve a revamped product, the STERIZONE VP4, until Dec 2014
- It took another five years (2003-2008) to add hydrogen peroxide sterilization, which competitors already used, to produce the second generation sterilizer, the STERIZONE 125L+. The FDA did not approve the product, **so it could not be sold in the US – gen two FAIL!**

## ▪ **Strike Three: Generation Three Product, Evidence Suggests Limited End Customer Installations To Date**

- The STERIZONE 125L+ was tweaked in order to obtain FDA approval and became the STERIZONE VP4. It took about five years (2009 to 2014) to get FDA approval and another two years to get expanded FDA approval. Talk about launching outdated technology
- Recall that a prior version of this product was approved in Canada for a number of years and yielded no material sales. YTD, virtually all sales are in the United States and 98% are through Getinge





There are limited differences between TSO3's current generation product vs. prior versions that failed with other marketing partners. However, TSO3's promoters would like you to believe it has no drawbacks

Device	125L	125L+	VP4
Approved	2002 (Canada); 2003 (US)	2009 (Canada); 2010 (Europe)	2014 (US); 2015 (Canada & Europe)
Technology	Ozone	Hydrogen peroxide + ozone	Hydrogen peroxide + ozone
Amount of ozone	~80mg/L	~2mg/L	~2mg/L
Capacity	125L	125L	125L
Cycle mass	Up to 47 lb.	Up to 47 lb.	Up to 75 lb.
Cycle time	~ 4 hours	~46-60 mins	~46 mins
Temperature (°C)	~30-36	~38-44	~38-44
Load flexibility	High	High	High
Flexible endoscopes	Yes	Yes	Yes
Material compatibility	Moderate, the high amount of ozone tended to destroy instruments	Broad range	Broad range
Safety	Safe	Safe	Safe
# of cycles	1	3	1
List price of sterilizer	~US\$110,000 (2002)	~US\$150,000	~US\$150,000
Cost per cycle	~US\$1.00/cycle (for sterilant only)	~US\$25/cycle (sterilant + indicators)	~US\$25/cycle (sterilant + indicators)
Partner	SKYTRON (2003-2006)	3M (2009-2012)	Getinge (2015-present)
Pros	<ul style="list-style-type: none"> <li>• Cost savings compared to other low temperature sterilizers (~US\$125,000k per device; US\$8-15/cycle for sterilant)</li> <li>• Safety compared to ethylene oxide</li> <li>• 2009 - approved for a wider range of complex instruments</li> </ul>	<ul style="list-style-type: none"> <li>• Shorter cycle time</li> <li>• Low amount of ozone does not destroy medical devices</li> <li>• Large load capacity</li> <li>• Wide range of compatible instruments including complex, multi-chamber devices</li> </ul>	<ul style="list-style-type: none"> <li>• Shorter cycle time</li> <li>• Low amount of ozone does not destroy medical devices</li> <li>• Large load capacity</li> <li>• Wide range of compatible instruments including complex, multi-chamber devices</li> <li>• Single cycle</li> </ul>
Cons	<ul style="list-style-type: none"> <li>• Long cycle time compared to hydrogen peroxide competitor (&lt;1 hour)</li> <li>• Limited material compatibility</li> <li>• Restrictions on the number of devices/load size</li> </ul>	<ul style="list-style-type: none"> <li>• Multiple cycles depending on load type</li> </ul>	

Isn't It Ironic That  
TSO3's Stock  
Promoters See No  
Cons In This  
Product Iteration





## *A Close Look At The Players Behind TSO3, The Latest Canadian Healthcare Stock Promotion*





**TSO's initial founders have largely cashed out and left the Company in the hands of a CEO and CFO with a mixed track record of value creation**

## Richard Rumble (CEO of TSO3)

- Was director at BioExx Specialty Proteins (Aug 2011-Oct 2013) which was delisted in Nov 2013
- Worked at 3M in various capacities including Global Business Unit Manager for Sterile Processing. Worth noting that he oversaw a failed business relationship with TSO3 that ended in a financial settlement
- Rick has sold C\$3m of stock in the last 12 months

## Glen Kayll (CFO of TSO3)

- Prior to TSO3, he was CFO and board member at Argex Titanium Inc. from Nov 2013 through Jun 2015 ([source](#)), over this time, the stock fell 78%
- We believe Argex was a stock promotion (similar to TSO3), that [boasted an agreement w/PPG](#) to legitimize itself
- Glen was also a board member at Brixton Metals which is down roughly 50% from the date he joined the company to current
- It is noted that Glen was involved with Coastal Contacts which was acquired

### BioExx Specialty Proteins



Source: Bloomberg

### Argex Titanium

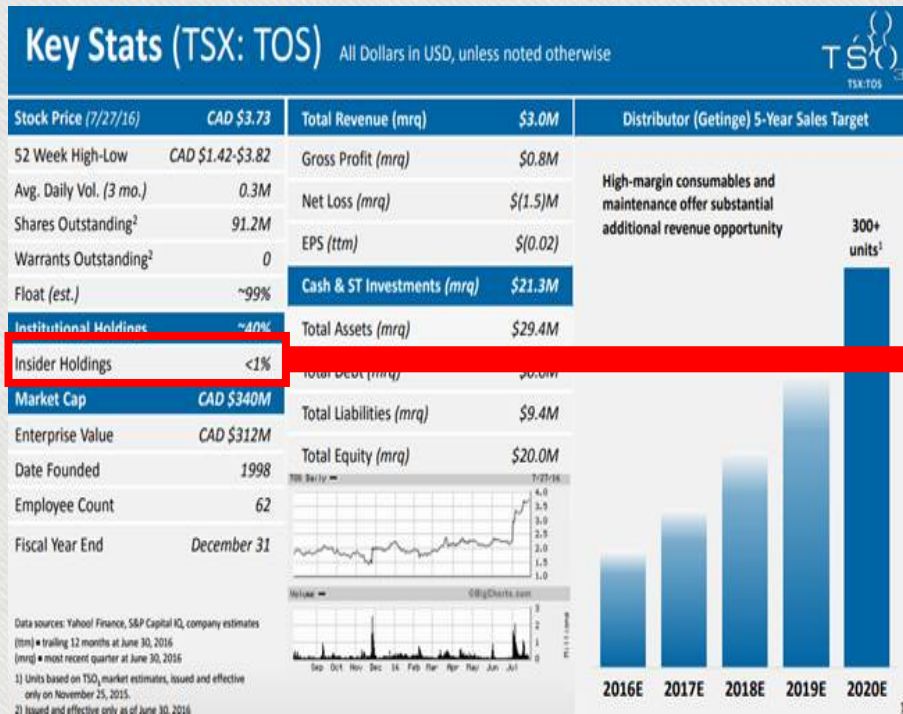




# Like Most Stock Promotions, Insider Alignment With Shareholders = 0

**TSO3 insiders own virtually no stock, which means they have nothing at risk if the Company fails. Furthermore, the CEO discretely signaled to the market that he plans to liquidate his miniscule position!**

- **CEO reducing already small position:** *“With all that in mind, and exactly when I am the most excited I have ever been about our future, I must begin exercising and selling a portion of soon-to-expire stock options that I have held since I joined the Company. I expect to be exercising them in an orderly fashion over the next 18 months”*
- Ric Rumble has sold C\$3.3 million worth of stock in the last year
  - This represents over 90% of the common shares he holds and 1/3 of total options he held prior to these sales



## CEO Rumble Recent Stock Sales

Date	Shares Sold	Price	Amount
8/5/16	2,900	C\$3.60	C\$10,400
8/8/16	497,100	C\$3.60	C\$1,789,560
5/23/17	500,000	C\$3.00	C\$1,500,000

Source: [Canadian Insider](#)



## *Bloated Management Compensation*

**TSO3's executive compensation is bloated and its top 5 executives account for 56% of SG&A. If management cut its salary and took all equity, TSO3 might have a chance at profitability! With nothing at stake or at risk, we expect management salaries to remain bloated and be the principal driver of management's motivation, not necessarily to turn a profit for shareholders**

C\$ in millions

Executive	Title	Executive Pay
Ric Rumble	CEO	\$1.6
Harold Tessman	COO	\$1.1
Glen Kayll	CFO	\$0.7
J Ralph Mills	VP HR	\$0.8
Anan Natarajan	SVP, Commerce	\$0.5
	<b>Total Mgmt Comp</b>	<b>\$4.7</b>
	% of Total SG&A (\$8.3)	56%
	% of R&D (\$3.5)	134%
	% of Net Loss (-\$4.4)	106%

Management Info Circular at SEDAR



# *Is TSO3 Myrtle Beach, South Carolina Office: For Golf or Business?*

Dovetailing our concerns about management using TSO3 to milk compensation and perks from shareholders, we note that in July 2015 TSO3 announced intentions to open a Myrtle Beach, South Carolina location of 6,000 sqft for customer service, clinical education, warehousing and servicing. (1) Myrtle Beach is known more for its beaches and golf courses, than for its hub in the sterilization industry. Naturally, we were curious to see what was there so did some investigating but didn't find much activity.

**We Found Limited Activity**



**Limited Kitchen**



**Front of the Property**



**Back of the Property**





## Almost 1/3 of Employees Have Left TSO3

TSO3 is a small company of approximately 77 people where human capital is critically important to its success. Spruce Point finds it troubling that TSO3 experiences such high turnover.

- TSO3 has turned over 30% of its employees since late 2015 that we can identify (note: this is understated by turnover Spruce Point was unable to find)
  - We estimate TSO3 has turned over 25 employees since late 2015 (15 of these employees left in under 18 months)
  - Notice TSO3's recent Aug 2017 corporate presentation now omits employee count ([source](#), slide 30) vs. May 2017 presentation ([source](#), slide 27)
- Key employee Dr. Mark Pasmore, VP of R&D, left within just 6 months on the job
- TSO3 has cycled through 3 CFOs since mid-2015 ([Current Glenn Kayll](#), [Former Interim Elena Simard-Veilleux](#), [Former Benoit Deschamps](#)) – note: Benoit Deschamps left TSO3 to become a financial advisor and left after the Company's pivotal 510k approval – seems ominous for a one product company. He was also director of a company that filed for CCAA in 2009

Key Employee	Position	Departure Date
<a href="#">Dr. Mark Pasmore</a>	VP – R&D	<a href="#">Jun 14, 2017</a> (lasted less than 6 months)
<a href="#">Elena Simard-Veilleux</a>	VP Finance & Director	May 2017
<a href="#">Sylvie Dufresne</a>	R&D Director	Jun 2017
<a href="#">Daniel Rivard</a>	VP – Ops and Development	Jul 2016 (lasted 16 months)
<a href="#">Nathalie Racette</a>	Leader, ops and quality control	Apr 2016 (lasted 12 months)
<a href="#">Francois Thiboutot</a>	Supply Chain Manager	Sep 2016 (lasted 12 months)
<a href="#">Paule De Blois</a>	General Manager, Admin	Jun 2015 (lasted 8 months)
<a href="#">Ken Grenier</a>	Electrical Engineer	Mar 2016 (lasted 17 months)
<a href="#">Marc Chaunet</a>	Regulatory Affairs Director	Apr 2015
<a href="#">Benoit Deschamps</a>	VP Finance & CFO	Jul 2015



# A Closer Look At TSO3's Shareholders

As part of proper investment due diligence, we believe it is prudent to analyze and study the behavior of institutional investors behind a stock.

- Sprott Canadian Equity Fund (and related Sprott funds) own 13% of TSO3 stock outstanding; TSO3 is its largest current fund holding
- Sprott's Fund is down over 13.4% year-to-date in 2017 ([source](#)), was down 1.6% in 2016 ([source](#)), and down 15.2% in 2015 ([source](#))
  - **Even Eric Nuttall, a Sprott Portfolio Manager disagrees with his colleagues and has long since sold TSO3 ([source](#))**
- TSO3's 5<sup>th</sup> largest holder is mutual fund IG Investment Management; IG has 46 positions; TSO3 is the smallest market cap of the top 20 holdings which have an average market cap of over US\$100bn
- **Peter Imhof from AGF as to why he sold TSO3 ([Dec 20, 2016](#)):** *"I just thought that there **wasn't a lot of visibility in terms of what the sell through** was with their partner, they said they've bought them but we don't actually know if they've been deployed into the hospitals for sterilization. I think in this environment with biotechs, you know, you want make sure you got the visibility"*

Sprott: Selected Equity Positions	Commentary
TSO3 Inc.	<ul style="list-style-type: none"> <li>• As extensively described in this report</li> </ul>
Intertain Group	<ul style="list-style-type: none"> <li>• As extensively described in prior <a href="#">Spruce Point report</a> from Dec 2015</li> </ul>
Nobilis Health	<ul style="list-style-type: none"> <li>• Fell under harsh criticism from an <a href="#">anonymous blogger</a> and shares have not recovered</li> </ul>
Asanko Gold	<ul style="list-style-type: none"> <li>• Stock is down 85% from highs (70% from Mar 31, 2017), first targeted by <a href="#">K2 &amp; Associates</a></li> <li>• On Mar 31, 2017, Muddy Water's highlighted the stock "is highly likely to end up a zero" while also calling the stock "a Ponzi scheme" (<a href="#">source</a>)</li> </ul>
AutoCanada Inc.	<ul style="list-style-type: none"> <li>• Stock down over 70% from highs due to accounting issues, lack of free cash flows, poor business model and management concerns</li> </ul>
Patient Home Monitoring & Convalo Health	<ul style="list-style-type: none"> <li>• Stock down almost 80% due to aggressive roll up strategy, poor underlying assets, and questionable management</li> </ul>
Concordia International	<ul style="list-style-type: none"> <li>• Stock down over 80% due to poor accounting, aggressive pricing tactics, poor management, troubled generics business and subpar acquisition strategy</li> </ul>



# A Closer Look At TSO3's External IR Firm

**TSO3 engaged Liolios to help promote its story to the public. Spruce Point believes it's instructive to evaluate other investments that Liolios (and CMA the successor and related firm) has represented. Many of its clients are speculative companies and have destroyed shareholder value**

Liolios Selected Names	
Name	Result
Redknee Solutions Inc. (TSX: RKN)	Stock down >85% from highs
Imageware Systems Inc. (OTC: IWSY)	Stock down >85% from highs
Ibio Inc. (NYSE/MKT: IBIO)	Stock down >90% from highs
Performance Sports Group (TSX: PSG)	Stock down >90% over life
Burcon NutraScience (TSX: BU / Nasdaq: BUR)	Stock Down >90% over life
Real Goods Solar Inc. (Nasdaq: RGSE)	Stock down >95% over life

Note: The above are selected names, Liolios' full client list can be found [here](#)

CMA Selected Names*	
Name	Result
Fision (OTC: FSSN)	Stock down >70% from highs**
Global Water Resources (Nasdaq: GWRS)	Stock up 13% since Liolios involvement
OptimizerRX Corp (OTC: OPRX)	Stock down ~10% from highs**
Real Goods Solar Energy (Nasdaq: RGSE)	Stock down >90% from highs**
TSO3 Inc (TSX: TOS, OTC: TSTIF)	Stock +45% since Liolios hired ( <a href="#">Sept 2015</a> )

\*CMA was started by former Liolios employees and have transitioned over various clients to the new platform

\*\*since earlier of Liolios or CMA involvement

CMA [Source](#)





## *TSO3 Outclassed By Larger Competitors With Better Products*



# TSO3 Outclassed By The Competition

- Competitor products even look materially better than the newer TSO3 product with a more up to date touch screen
- **Technology** - One aspect of the VP4 that stands out is the tiny monochrome screen. The VP4 screen looks like the same vintage of technology as the STERIZONE 125 and STERIZONE 125L+, which begs the question of how old is the VP4 technology? For comparison, the latest model of the STERRAD 100NX has a much larger, modern screen inside a machine that looks like it has evolved over the past decade. **Johnson and Johnson's STERRAD 100NX ALLClear is like a new Apple computer, while the VP4 is like a 10 year old PC.**

TSO3 | Sterizone VP4

Machine



Screen



Sterrad (J&J) | 100NX ALLClear





# *Cheaper Competing Products With Greater Functionality*

The VP4 does not appear to hold a candle to competing products

- **J&J's Sterrad brand has had a hydrogen peroxide sterilizer in the market since 1993**
  - The main difference is TSO3 product use ozone vs. Sterrad which uses plasma to that same end
  - J&J's market cap is 80+ times larger than Getinge
  - J&J is rumoured to have over 60% of the market installed base and annual resales
  - TSO3 going up against giant J&J: who do you think wins that battle?
- **Comparison on Price:** Sticker price is equal for all three. However, with Sterrad and Steris discounting, they can come in at the US\$100k price whereas TSO3 comes in slightly higher. TSO3 appears to have negative margins on the device, making it more difficult for them to compete here
- **Functionality and Service:** TSO3 also can't compete on functionality or service. The VP4 (TSO3 product) is untested and rumoured to damage equipment through sterilization (caused by ozone). STERRAD has an [online resource](#) that lists over 20,000 devices that can be sterilized with its equipment. TSO3's also provides an [online sterility matrix](#), but it only lists approximately 3,000 products. Sure, the STERIZONE VP4 can handle more equipment weight than a STERRAD NX100, but who cares if you can't readily tell if the equipment can't safely be sterilized by the VP4? Furthermore, what happens if the sterilizer breaks down? Competitors like STERRAD and STERIS employ an extensive network of technicians that can be deployed quickly. If a STERIZONE VP4 breaks, repairs will take much longer and that means a facility's ability to sterilize equipment grinds to a halt, impacting patients, surgeons and revenues.



# Superbug Promotion

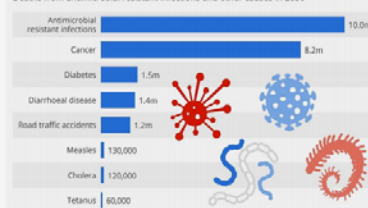
Just like the Zika virus caused a media stir and prompted a multitude of companies claiming to have a solution in order to promote their speculative stocks (eg. XON, INO) we find that TSO3 has latched on to the story of the Superbug as a reason why its product is critically important.

## TSO3 Slide – May 2017

### The Problem: Endoscopes & Superbugs

- **SUPERBUG** = Antimicrobial Resistant Bacteria
- **2 million+** Americans suffer from antibiotic-resistant bacteria annually – **23,000 die**<sup>1</sup>
- **CRE is resistant to most available antibiotics** - up to 50% of infected patients die<sup>2</sup>
- **CRE infections growing and linked to endoscope use:** seven incidents and two deaths at UCLA Medical Center<sup>3</sup>
- ECRI Institute's 2016 Top 10 Health Technology Hazards List: **No. 1 concern is inadequately-cleaned endoscopes**<sup>4</sup>

#### Deaths From Drug-Resistant Infections Set To Skyrocket



#### NATION WORLD

### FDA links "superbug" to key medical device

Advisory: Germs may linger in endoscopes, even when cleaned properly

By Alicia Chang The Associated Press

POSTED: 05/04/17 10:09 AM PST

LOS ANGELES — A "superbug" outbreak suspected in the deaths of two Los Angeles hospital patients is raising disturbing questions about the design of a hard-to-clean medical instrument used on more than half a million people in the U.S. every year.

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<sup>1</sup> Centers for Disease Control (CDC)  
<sup>2</sup> CDC Carbapenem-resistant Enterobacteriaceae in Healthcare Settings  
<sup>3</sup> Associated Press, February 20, 2015, and Los Angeles Times, January 26, 2016  
<sup>4</sup> ECRI Institute

## TSO3 Slide – August 2017

### A New Problem: Endoscopes and Superbugs

#### "Deaths from Drug-Resistant Infections Set to Skyrocket"

Deaths from antimicrobial resistant infections and other causes in 2050<sup>1</sup>



Two million+ Americans suffer annually from antibiotic-resistant bacteria, aka "Superbugs," with 23,000 deaths.<sup>2</sup>

Carbapenem-resistant Enterobacteriaceae (CRE) are resistant to most antibiotics, and 50% of infected patients die.<sup>3</sup>

CRE infections are linked to endoscopic devices, with seven incidents and two deaths at UCLA Medical Center.<sup>4</sup>

Inadequately-cleaned endoscopes are number one on ECRI Institute Top 10 Health Technology Hazards List.<sup>5</sup>

<sup>1</sup> Studies & Review on Antimicrobial Resistance  
<sup>2</sup> Centers for Disease Control (CDC) <sup>3</sup> CDC Carbapenem-resistant Enterobacteriaceae in Healthcare Settings  
<sup>4</sup> Associated Press, February 20, 2015 and Los Angeles Times, January 26, 2016 <sup>5</sup> ECRI Institute

TSO3 TSX:TOS

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Source: [TSO3 Presentation](#)

Source: [TSO3 Presentation](#)



# *FDA Guidance On Potential Superbug Solutions Don't Include TSO3 Approach*

Despite TSO3 suggestions, there are various ways the superbug problem can be solved.  
TSO3 is not the only game in town when it comes to solutions

- **The FDA has suggested possible solutions for solving the superbug problem and does not contemplate TSO3's form of low temperature sterilization. The four suggestions are (note that hydrogen peroxide or ozone are not mentioned as solutions but the VP4 by TSO3 does not offer this):**
  - Microbiological Culturing
  - Ethylene Oxide Sterilization (not TSO3 solution but rather a 3M approved product called the Steri-Vac)
  - Use of a Liquid Chemical Sterilant Processing System
  - Repeat High-Level Disinfection
- **The sterilization market is split into various types implying there are many ways for the superbug problem to be solved ([Markets and Markets Research Report](#))**
  - Heat Sterilization/High-temperature Sterilization
    - Moist Heat Sterilization
      - By Product: Traditional Sterilizers, Tabletop Sterilizers
      - By Technology: Gravity, Pre-vacuum, Steam-flush Pressure-pulse
    - Dry Heat sterilization
  - Low-temperature Sterilization
    - Ethylene Oxide Sterilization, Vaporized hydrogen peroxide Sterilization, Hydrogen Peroxide Gas Plasma Sterilization, Nitrogen Dioxide (NO<sub>2</sub>) Sterilization, **Ozone-based Medical Sterilization**, Superheated Water Spray Sterilization, Low-temperature Steam Formaldehyde Sterilization
  - Filtration Sterilization
  - Ionizing Radiation Sterilization: E-beam, X-ray, Gamma

TSO3's VP4 fits in here, but a small part of a much larger sterilization universe (and even smaller part given its just one piece of the low temp sterilization market)



# *Is TSO3's Marketed Product Value-Add Or Really Smoke And Mirrors?*

TSO3 has spent time marketing that their VP4 can sterilize scopes that other devices cannot. Read the following paragraph carefully – it implies that the VP4 damages scopes and that scopes were not built for low temperature sterilization

## **From The Q3 2016 Earnings Conference Call:**

*“Our testing will continue through the end of the year and we will advise when we are ready to approach the US market sometime early in 2017. Now, as previously stated, these **multi-channel flexible endoscopes or instruments were not designed or produced with terminal sterilization** in mind. The manufacturers either did not contemplate that a sterilization technology would be robust enough to create a sterilization event or we believe that the liquid process could in fact produce a contaminant-free scope between patient cases. Either way, **these devices were made for liquid disinfection** between users. As such, **when we sterilize a device**, we see that selective components have increased where -- which **can cause an increased need for service and repair.**”*





## *The Untold Story With The Getinge Relationship*



**News Flash: TSO3 doesn't have its numbers straight! They cited 3,000 units at C\$450m annually whereas Getinge cites 2,300 units at C\$278m (SEK1.7bn) annually. Who do you think has a better view of marketing demand, the manufacturer, or the marketing agent out speaking with customers?**

- In [November 2015](#), TSO3 expanded its partnership with Getinge

Wednesday, November 25, 2015

## **TSO<sub>3</sub> and GETINGE Infection Control Sign Exclusive Global Distribution Agreement**

### *US\$7.5 Million Up-Front License Fees and Performance Minimums Highlights of Agreement*

**Québec City, Québec – November 25, 2015** – TSO<sub>3</sub> Inc. (TSX: TOS), an innovator in sterilization technology for medical devices in healthcare settings, has granted Getinge Infection Control AB, a global leader in infection control solutions, exclusive global distributor rights to its FDA-cleared, STERIZONE® VP4 Sterilizer for US\$7.5 million, plus performance minimums.

The performance requirements are multi-year and based on a formula for minimum unit shipments, with the minimum annual commitments reaching in excess of 10% of the estimated annual global replacement market within the first five years. **TSO<sub>3</sub> estimates the annual replacement market worldwide totals more than 3,000 units or \$450 million annually.** Getinge will also receive ongoing technical support from TSO<sub>3</sub> as part of the Agreement.

- In [December 2015](#), Getinge stated their view of the entire low temperature sterilization market as 23%:

## **Getinge Infection Control Enters into Low Temperature Market with Acquisition of Stericool and Exclusive Distribution Agreement with TSO3**

December 14, 2015 11:39 AM Eastern Standard Time

GÖTEBORG, Sweden--([BUSINESS WIRE](#))--Regulatory News:

Getinge (STO:GETIB): Getinge Group's business area Infection Control, a global leader in infection control and contamination prevention solutions, has acquired Stericool, a Turkish company specializing in low temperature sterilization, and also signed an exclusive global distribution agreement with Canadian company TSO3 Inc., an innovator in sterilization technology for medical devices. The acquisition and distribution agreement are in line with Getinge's strategy to strengthen customer offerings with new innovations and to offer a product range for different markets.

"Today's announcement marks a major milestone in Getinge's latest offerings to our customers. As a global leader in infection control, Getinge has a unique opportunity not only to enter into the fast growing low temperature sterilization market, but also to leverage our legacy of excellence as a complete solutions provider," says Joacim Lindoff, Executive Vice President of Infection Control.

The minimally invasive surgery (MIS) market is a leading indicator of growth for the low temperature sterilization market. The instruments used in such surgeries are extremely sensitive to the high temperatures and pressure of a steam sterilization process. As the minimally invasive surgery market continues to grow at an expected compound annual growth rate of 10 %\*, demands for alternatives to steam sterilizers will also increase thereby providing great potential for accelerated business growth within infection control. **Estimation on the annual replacement and new business worldwide for low temperature sterilizers totals more than 2,300 units or approximately 1,7 BSEK.**



## How strong a commitment did Getinge really make to TSO3?

- **Getinge acquired Stericool and signed a glorified sales agreement with TSO3**
  - TSO3 appears to be a low cost call option to Getinge, which spent just 4% of its cash for an upfront, one-time licensing fee of US\$7.5m for the IP
  - If TSO3 were so promising, why not just buy the whole company on the cheap?
  - Getinge paid SEK 56m (US\$6.5m) for Stericool which had SEK 20m (\$2.3m) of sales > 1.8x sales multiple
- Getinge's reference of 2,300 units annually for market size must relate to both Stericool and TSO3's product, which may imply that the market is even smaller for TSO3
- These figures cite global market potential, so the US and Europe market where TSO3/Getinge are currently focused, could be much smaller (note: TSO3 is only approved for sale in the US/Europe/Canada)

### **Getinge Infection Control Enters into Low Temperature Market with Acquisition of Stericool and Exclusive Distribution Agreement with TSO3**

December 14, 2015 11:39 AM Eastern Standard Time

GÖTEBORG, Sweden--([BUSINESS WIRE](#))--Regulatory News:

Getinge (STO:GETIB):Getinge Group's business area Infection Control, a global leader in infection control and contamination prevention solutions, has acquired Stericool, a Turkish company specializing in low temperature sterilization, and also signed an exclusive global distribution agreement with Canadian company TSO3 Inc., an innovator in sterilization technology for medical devices. The acquisition and distribution agreement are in line with Getinge's strategy to strengthen customer offerings with new innovations and to offer a product range for different markets.

Source: [Getinge Press Release](#), December 2015



Getinge has even more similar low-temperature products, even products it markets under its own brand name. It is clear from the placement on its website that Getinge gives TSO3 STERIZONE product the lowest priority placement. It is likely Getinge's salesforce also gives lower priority to selling third party products vs. its own by receiving less sales commission.

## Low-Temp Sterilizers

Our range of sterilizers also combines high-capacity routine steam sterilization with the unique option of low-temperature sterilization of heat-sensitive items. These sterilizers offer great flexibility and are manufactured to meet the world's toughest standards of quality and safety.



### Getinge HS66 Turbo Combi

High- and low-temperature sterilization in one machine! Chamber volume up to 595 litres.



### Getinge HS66 LTSF

Low-temperature sterilizer with a chamber volume of up to 595 litres.



### Getinge GSS67F

Getinge GSS67F performs chemical sterilization using steam and formalin (formaldehyde dissolved in water) – a very safe and well-proven method. Having both high- and low-temperature sterilization in one machine offers great opportunities to save space and money.



### Stericool

Stericool low-temp sterilizers employ patented technologies to deliver rapid and safe sterilization for delicate, heat and moisture-sensitive instruments.



### STERIZONE® VP4 Sterilizer

STERIZONE® VP4 is a low temperature sterilizer that utilizes dual-sterilants to achieve terminal sterilization of heat and moisture sensitive medical devices.

Notice Its  
Placement At  
Bottom



# Getinge Is Very Active In The Sterilization Market

Getinge has made many acquisitions in the infection control and sterilization market in the past few decades. It had many opportunities to acquire all of TSO3 at a fraction of the current valuation, but instead opted for a low commitment distribution agreement.

We believe its recent acquisition of Stericool at just 1.8x sales validates TSO3's overvaluation.

Getinge Infection Control / Sterilization Deals				
Year	Agreement	Country	Price	Details
2015	TSO3 Distribution Agreement	Canada	65M SEK	Low temperature sterilization technology
2015	<b>Acquired</b> GOA Teknoloji Danismanlik Elektronik (Stericool)	Turkey	56M SEK	Low temperature sterilization technology
2014	<b>Acquired</b> Altrax Group Ltd	UK	35M SEK	Systems for traceability and quality assurance for sterilization
2014	<b>Acquired</b> Austmel Pty Ltd	Australia	80M SEK	Sterilization and thermal processes
2013	<b>Acquired</b> Trans Medikal Devices Inc.	Turkey	55M SEK	Manufacture of sterilizers and distribution of disinfectors
2012	<b>Acquired</b> Steritec Products Mfg Inc.	US	70M SEK	Consumables
2005	<b>Acquired</b> La Cahlene	France	40M EUR	Isolator technology and electron sterilization technology
1999	<b>Acquired</b> MPT Corp.	US	35M SEK	Washer disinfectors for the Life Science market
1999	<b>Acquired</b> Lunatronic Aps	Denmark	15M DKK	Comprehensive IT solutions for the maintenance of sterilization departments
1993	<b>Acquired</b> British Sterilizer	UK	15M SEK	Sterilizers

Source: [Getinge Disclosure](#), [Getinge Financials](#), [Getinge PYFS](#)



## *Getinge Has Had A Tumultuous Few Years, Poor TSO3 Transaction and Lack of Interest*

With the original architect behind the TSO3/Getinge deal having departed, the company going through a large restructuring program, declining financial performance, and broadening regulatory investigations, we wonder how focused Getinge can be on promoting TSO3's products given that it may never be a material driver to its bottom-line.

- The Getinge agreement with TSO3 came at a time when the Company was clearly under stress and turmoil, and its share price has subsequently been under severe pressure ([source](#)):
  - The original architect of the deal, Mr. Andrew Ray, President and CEO of Getinge Infection Control North America subsequently departed. Mr. Ray promoted the initial announcement of the deal in March 2015 ([source](#)). He later left Getinge and joined Nilfisk in 2016 as EVP Americas ([source](#))
  - The Company went through a broader restructuring program with three business areas merged to form a single group-wide unit per country ([2015 Annual Report](#))
  - Managerial changes reached the highest level of the organization with Alex Myers (CEO of Getinge) being ousted after just 18 months on the job (3<sup>rd</sup> CEO in 3 years)
  - Getinge investigated by the FDA related to manufacturing issues and reached a consent decree ([source](#)). FDA matters continue to weigh on Getinge through July 2017 ([source](#))
  - Getinge's share price hits multi-year lows in July 2017 as it [appoints new CFO](#), struggles with [declining financial performance](#), and discloses regulatory [investigations by Brazilian authorities](#)



# *Will Getinge Stop Purchase Orders?*

With sell through as weak as it is based on Spruce Point's research, will Getinge terminate the contract, return products or stop ordering at some point? We don't believe Getinge sales have been higher than its Minimum Annual Purchase Commitments (recall 186 units shipped vs. 10 units estimated to be installed)

- Despite a heavily redacted agreement between TSO3 and Getinge filed at SEDAR, it appears clear that Getinge can walk away whenever they please under a broadly defined clause:

4.3 Getinge shall have the right to immediately terminate this Agreement by written notice to TSO<sub>3</sub> if Getinge believes in good faith and upon commercially reasonable grounds that this Agreement or its performance hereunder would result in serious infringement risks or other serious risks to its corporate reputation.

## **18. Marketing Plans and Forecasts**

18.1 As part of the activities, Getinge and TSO<sub>3</sub> shall review and monitor the marketing of the Products so as to enable TSO<sub>3</sub> to plan adequately for the production of the Products and to measure the effectiveness of marketing by Getinge. Both parties shall mutually agree on reasonable sales targets for each region of the world. It is expected that such reasonable sales targets shall be higher than the corresponding Minimum Annual Purchase Commitments agreed by the parties each year.



# Unusual Accounts Receivable Factoring

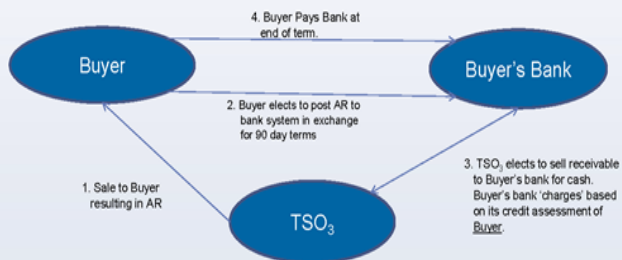
Spruce Point is perplexed as to why TSO3 would need to factor its Getinge receivables at a discount, when its balance sheet has nearly C\$17m of cash and short-term investments, its counter-party is a large and global corporation, and the outlook for the relationship is supposedly bright according to TSO3

- On Dec 22, 2016, TSO3 entered a receivables factoring arrangement with Getinge:
  - “Under this program, TSO3 may factor up to 100% of the outstanding receivables that Getinge posts to the program in exchange for a small discount.”
  - “We anticipate substantially all Getinge receivables will flow through this program”
  - “Payment terms for Getinge under this structure are 90 days from invoice date, rather than standard 45 day terms.”
- Spruce Point exercises significant skepticism here:
  - Why does Getinge not disclose this program (or programs of similar arrangements with other partners) in its financial filings?
  - Why does a large multinational corporation such as Getinge need to extend payment terms to TSO3?
  - Why go through the effort of arranging this program given how small the financial amounts actually are
  - If you’re TOS, why take a discount on the receivable when there’s no obvious liquidity need for accelerated cash flow

## Receivables Factoring Strategy



TSO<sub>3</sub> entered into an arrangement with Getinge’s bank in late Q4 2016



## TSO3's Quarterly Accounts Receivables

C\$ mm	Q4'15	Q1'16	Q2'16	Q3'16	Q4'16	Q1'17	Q2'17
A/R	\$0.4	\$0.4	\$3.5	\$3.6	\$2.3	\$0.5	\$0.6
% from Getinge	0%	74%	N/A	N/A	87%	42%	21%

Source: TSO3 Financial Statements





## *Valuation and Price Target*



## *Unanimous Optimism in TSO3's Share Price Likely To Meet With Disappointment*

Canadian analysts have a resounding “Buy” endorsement on TSO3 and somehow turn a blind eye to many signs that its product is likely to fail (yet again) and disappoint lofty expectations. Analysts entice investors with an expected 90% upside from its current price, but Spruce Point believes >80% downside is more likely.

Analyst	Recommendation	Price Target (C\$)
National Bank	Outperform	\$5.50
Echelon Wealth	Buy	\$5.50
Paradigm Capital	Buy	\$5.50
Canaccord	Buy	\$5.25
Laurentian Bank	Speculative Buy	\$5.00
Scotia Bank	Sector Outperform	\$4.50
RBC Capital	Outperform	\$4.25
GMP	Buy	\$4.00
1) Upside based on C\$2.60 share price Average Price Target % Implied Upside (1)		\$4.95 90%





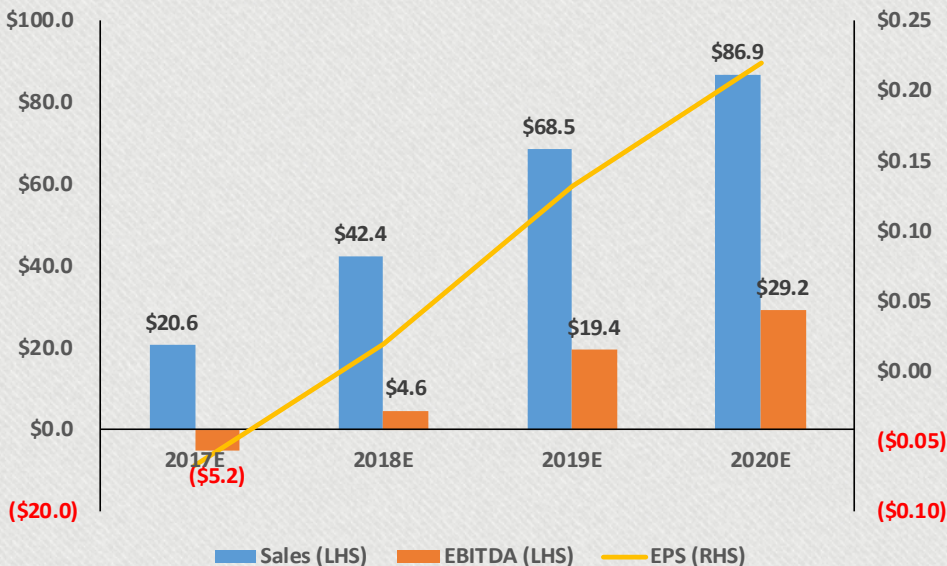
# Disappointment Looms Large

In the best case, TSO3 continues receiving orders from Getinge over the 5 year life of the agreement that ends in 2020, in which case sales continue to grow, but even this case we don't believe TSO3 turns a profit. As the table below shows, TSO3 has shown zero earnings leverage to rising sales. We believe investors are underestimating the scenario where Getinge stops buying the VP4 due to public awareness that suggests its inability to sell through. If Getinge ceases purchases, then TSO3's sales collapse and EPS remains negative.

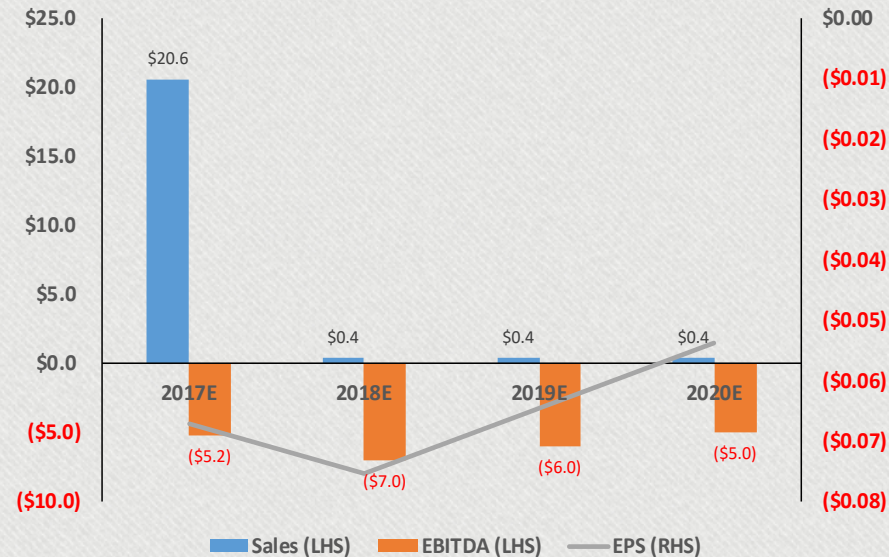
C\$ mm	Q1'16	Q2'16	Q3'16	Q4'16	Q1'17	Q2'17
TSO3 Sales	\$3.1	\$3.0	\$3.5	\$3.7	\$4.2	\$4.6
QoQ Growth	1,934%	-3.1%	17.8%	6.8%	12.4%	10.0%
TSO3 EPS	(\$0.01)	(\$0.02)	(\$0.02)	(\$0.02)	(\$0.02)	(\$0.02)

## Bullish Canadian Stock Promoter View

C\$ in mm



## Spruce Point Underappreciated Downside View





Spruce Point believes that investors wanting exposure to the sterilization and infection control market are better served by avoiding TSO3 and instead investing in a combination of Steris and Getinge, which can be purchased at significantly cheaper valuations and offer dividends. TSO's current valuation of nearly 15x sales and 19x book value discount nearly perfect execution of its business plan through 2020, which we believe is likely to sorely disappoint.

US\$ in mm	Getinge (Sweden/GETI)	Steris (UK/STE)	Stericool (Private)	TSO3 (Canada/TOS)
Description	<i>Provides products / services for intensive care units, sterilization centers, elderly care and companies and life sciences firms</i>	<i>Provides infection prevention and other procedural products and services</i>	<i>Acquired by Getinge in Dec 2015. Provider of low-temp sterilization solutions</i>	<i>The Company designs products for sterile processing areas in the hospital environment</i>
LTM Sales	\$3,450	\$2,610	\$2	\$12.2
QoQ growth	4.5%	-0.50%	--	10.0%
Gross Margin	47.5%	39.6%	N/A	34.1%
LTM EBITDA	\$530	\$519	N/A	(\$3.7)
% margin	15.2%	19.8%		(30.6%)
Dividend Yield	1.4%	1.3%	--	--
EV / Sales	1.1x	3.2x	1.8x	14.4x
EV / EBITDA	16.0x	11.9x	--	NM
Price / Book	1.7x	2.5x	--	18.9x
Price / EPS	12.0x	18.7x	--	NM

# Strong Sell with 80%+ Downside Risk

Even in a best case scenario, TSO3 shareholders are likely to yield limited value by holding the stock until 2020. Investors are underestimating the risk that TSO3 never turns a profit (even if its wildly optimistic revenue targets are hit) or that Getinge terminates its distribution agreement and sales plummet.

## Spruce Point Valuation Reference Range

C\$ in millions, except per share amounts

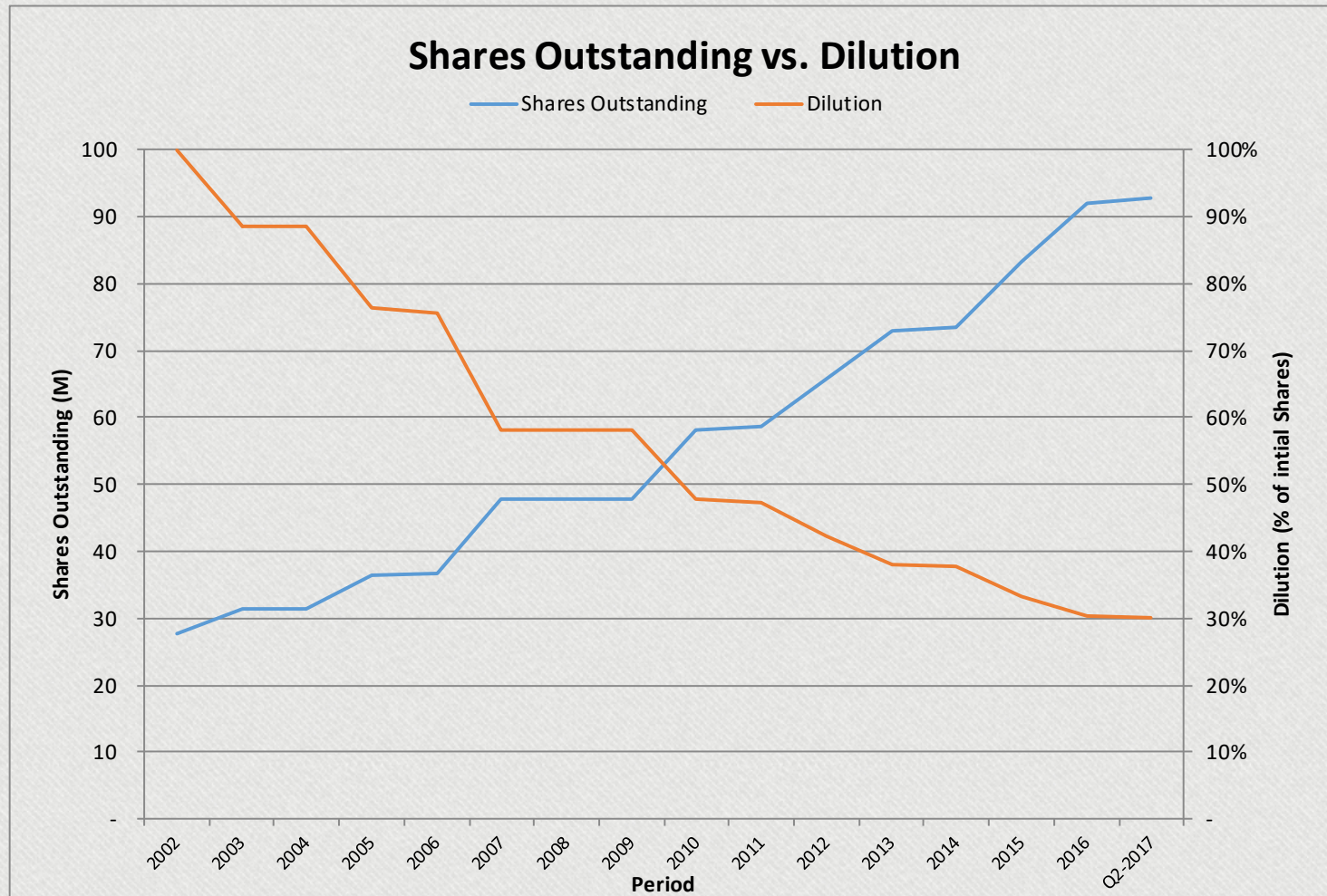
Valuation	Low Price	High Price	Note
<b>Revenue Multiple</b> <b><u>2017E Sales</u></b> <b>Enterprise Value</b> <b>Plus: Cash and Investments</b> <b><u>Diluted Shares</u></b> <b>Price Tgt.</b> <b>% Downside</b>	2.0x <u>\$16.0</u> \$16.0 \$16.7 <u>95.8</u> <b>\$0.34/sh</b> <b>-87%</b>	3.0x <u>\$16.0</u> \$48.0 \$16.7 <u>95.8</u> <b>\$0.64/sh</b> <b>-75%</b>	TSO3's growing sales have yet to translate into a profit, may never do so, and can abruptly be cut to zero if Getinge balks at more purchases from an inability to sell through its growing inventory. Getinge and Steris trade near 2x – 3x sales and Stericool was purchased at 1.8x sales
<b>Price / Book Value</b> <b><u>TSO3 Tangible Book Value</u></b> <b>Equity Value</b> <b><u>Diluted Shares</u></b> <b>Price Target</b> <b>% Downside</b>	2.0x <u>\$13.1</u> \$26.3 95.8 <b>\$0.27/sh</b> <b>-90%</b>	3.0x <u>\$13.1</u> \$39.5 95.8 <b>\$0.41/sh</b> <b>-84%</b>	It's preposterous that TSO3 trades at 22x tangible book value given its history of losses, weak market position, and limited chance of being a takeover target. Applying a generous 2x-3x book equity multiple derived from peers, we arrive at a similar price target range using the revenue multiple method

Downside based on C\$2.60 share price



# A Long History of Destroying Shareholder Value

In the absence of success, investors should expect more share dilution to fund continuing losses







## *Appendix | TSO3 FDA Filings Illustrate How The Incumbents are in a Better Position*






# TSO3 FDA Filing Tables

**TSO3 has no real competitive advantages over the incumbents, its own FDA filings confirm!**

- A comparison of the STERIZONE VP4, STERRAD 100NX, and STERIS V-PRO maX was provided to the FDA in December 2014 in this [filing](#). According to the FDA filing, *"the STERIZONE® VP4 Sterilizer is substantially equivalent to the STERRAD® 100NX® Sterilizer (K111377) and to the Amsco® V-PRO® maX Low Temperature Sterilization System (K131120) with respect to intended use, mode of action, performance and safety characteristics."*




**Table 4. General comparison of technical specifications, technology, and indications for the subject device and predicate devices.**

	<b>Subject Device:</b> <b>STERIZONE® VP4</b> 	<b>Predicate Device:</b> <b>STERRAD 100NX</b> <b>K111377</b> 	<b>Predicate Device:</b> <b>STERIS V-PRO maX</b> <b>K131120</b> 
Intended Use	Terminal sterilization of reusable medical devices in health care facilities	Same	Same
General Indications for Use	The STERIZONE® VP4 Sterilizer is intended for use in terminal sterilization of cleaned, rinsed, and dried metal and non-metal reusable medical devices in health care facilities.	The STERRAD® 100NX® Sterilizer is designed for sterilization of both metal and nonmetal medical devices at low temperatures. The STERRAD sterilization process is a multiphase sterilization process that utilizes a combination of exposure to hydrogen peroxide vapor and plasma to safely sterilize medical instruments and materials without leaving toxic residue.	The Amsco V-PRO maX Low Temperature Sterilization System, with VAPROX® HC Steriant, is a vaporized hydrogen peroxide sterilizer intended for use in the terminal sterilization of cleaned, rinsed, and dried reusable metal and non-metal medical devices used in health care facilities.
Sterilant	Vaporized Hydrogen Peroxide / Ozone	Vaporized Hydrogen Peroxide	Vaporized Hydrogen Peroxide
H <sub>2</sub> O <sub>2</sub> Concentration by Weight	50%	59-94% Depending on Cycle	59%
Post H <sub>2</sub> O <sub>2</sub> injection step	Ozone injection / Dwell	Air pulse / Dwell / Plasma	Air pulse / Dwell
Number Pulses	2	2	4

# TSO3 FDA Filing Tables (cont'd)

Marketing gimmicks won't displace the larger, better funded and better capitalized J&J / Steris

- Tables 4 and 5 from the FDA Filing confirms that all three machines rely on low temperature hydrogen peroxide sterilization. In the opinion of industry observers, the ozone isn't a key differentiator, just marketing spin. A [blog](#) by chemDAQ Incorporated, which produces gas detection systems for these sterilizers, confirms that "*the VP4 is primarily a hydrogen peroxide sterilizer similar to the Steris V-Pro and ASP's Sterrad line of sterilizers.*" and that the plasma and ozone is unlikely to have much effect. And, in terms of cycle time, chemDAQ points out that TSO3's VP4 sterilizer cycle time of 46 minutes (minimum) is not as short as the STERRAD NX's 24 minute cycle time.

	Subject Device: STERIZONE® VP4	Predicate Device: STERRAD 100NX K111377	Predicate Device: STERIS V-PRO maX K131120
			
Dimensions	H: 75.5 in (191.8 cm) W: 30.5 in (77.5 cm) D: 48.6 in (123.5 cm)	H: 70.5 in (179.1 cm) W: 30.5 in (77.5 cm) D: 40.0 in (102 cm)	H: 75.1 in (190.8 cm) W: 33.0 in (83.8 cm) D: 37.6 in (95.4 cm)
Weight	1,245 lb (565 kg)	938-1,006 lb (425-457 kg)	788-910 lb (357-413 kg)
Chamber Volume	125 L	152 L	136 L
Equipment Operating Temperature	20-26 °C Same as Load Temp	18-35 °C (64-95 °F)	5-40 °C (41-104 °F)
Chamber (Wall) Temperature	41 °C	<55 °C	50 °C
Load Temperature	20-26 °C	Not Specified	Not Specified
H <sub>2</sub> O <sub>2</sub> Vaporizer Temperature	120 °C (under vacuum)	75 °C (under vacuum)	60 °C (under vacuum)
Number of Pre-Programmed Cycles	1	4 <ul style="list-style-type: none"> <li>Standard</li> <li>Flex Scope</li> <li>Express</li> <li>DUO</li> </ul>	3 <ul style="list-style-type: none"> <li>Non Lumen</li> <li>Lumen</li> <li>Flexible</li> </ul>
Key Critical Process Parameters	Differential Chamber Pressure (ΔP) & Load Temperature	H <sub>2</sub> O <sub>2</sub> Dose & Exposure Time	H <sub>2</sub> O <sub>2</sub> Dose & Exposure Time
Use of Pre-Conditioning Step	YES	YES	YES
Use of Secondary Step to Remove Residual H <sub>2</sub> O <sub>2</sub> (technology)	YES (ozone, acts as a sterilant)	YES (plasma)	NO
Use of Aeration Step	YES	YES	YES



# TSO3 FDA Filing Tables (cont'd)

The incumbent products are even technically equivalent and / or superior!

*“The differences between the subject device and predicates are not critical to the intended use of the device and do not raise new questions of safety and effectiveness when the device is used as labeled.”*

Source: [FDA filing](#)

**Table 5. Comparison between the intended use and claims for the STERIZONE<sup>®</sup> VP4 Sterilizer, the STERRAD<sup>®</sup> 100NX<sup>®</sup> Sterilizer and the Amsco<sup>®</sup> V-PRO<sup>®</sup> Sterilizer**

Feature	STERIZONE <sup>®</sup> VP4			STERRAD <sup>®</sup> 100NX <sup>®</sup> (K111377)			Amsco <sup>®</sup> V-PRO <sup>®</sup> maX (K131120)		
Intended use	Terminal sterilization of reusable medical devices in health care facilities			Terminal sterilization of reusable medical devices in health care facilities			Terminal sterilization of reusable medical devices in health care facilities		
Labeling/ Indications for use	Sterilization of both metal and nonmetal medical devices. Sterilization of instruments which have diffusion-restricted spaces, such as hinged portions of forceps and scissors. Processing of medical devices having rigid and flexible channels with limitations in materials, dimensions and number of devices.			Sterilization of both metal and nonmetal medical devices. Sterilization of instruments which have diffusion-restricted spaces, such as hinged portions of forceps and scissors. Processing of medical devices having rigid and flexible channels with limitations in materials, dimensions and number of devices.			Sterilization of both metal and nonmetal medical devices. Sterilization of instruments which have diffusion-restricted spaces, such as hinged portions of forceps and scissors. Processing of medical devices having rigid and flexible channels with limitations in materials, dimensions and number of devices.		
Lumen claims*		I.D. (mm)	Lumen (mm)		I.D. (mm)	Lumen (mm)		I.D. (mm)	Lumen (mm)
	Rigid	≥ 0.7	≤ 500	Rigid	≥ 0.7	≤ 500	Single Rigid	≥ 0.77	≤ 500
	Double Rigid	≥ 0.7	≤ 500	-	-	-	Double rigid	≥ 0.77	≤ 500
	Flexible	≥ 1	≤ 850	Flexible	≥ 1	≤ 850	Flexible	≥ 1	≤ 1050
					≥ 1	≤ 875*			

\*Lumen claims for the DUO Cycle of the STERRAD<sup>®</sup> 100NX Sterilizer.