

NEW ACCELERATOR BEAM CENTERLINE (ABC) PRODUCTION LINE AT VAREX IMAGING CORPORATION



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RADMEDEX LLC designs electron beam accelerators and components to customer specifications and runs production at low cost.
It is as simple as ABC™.

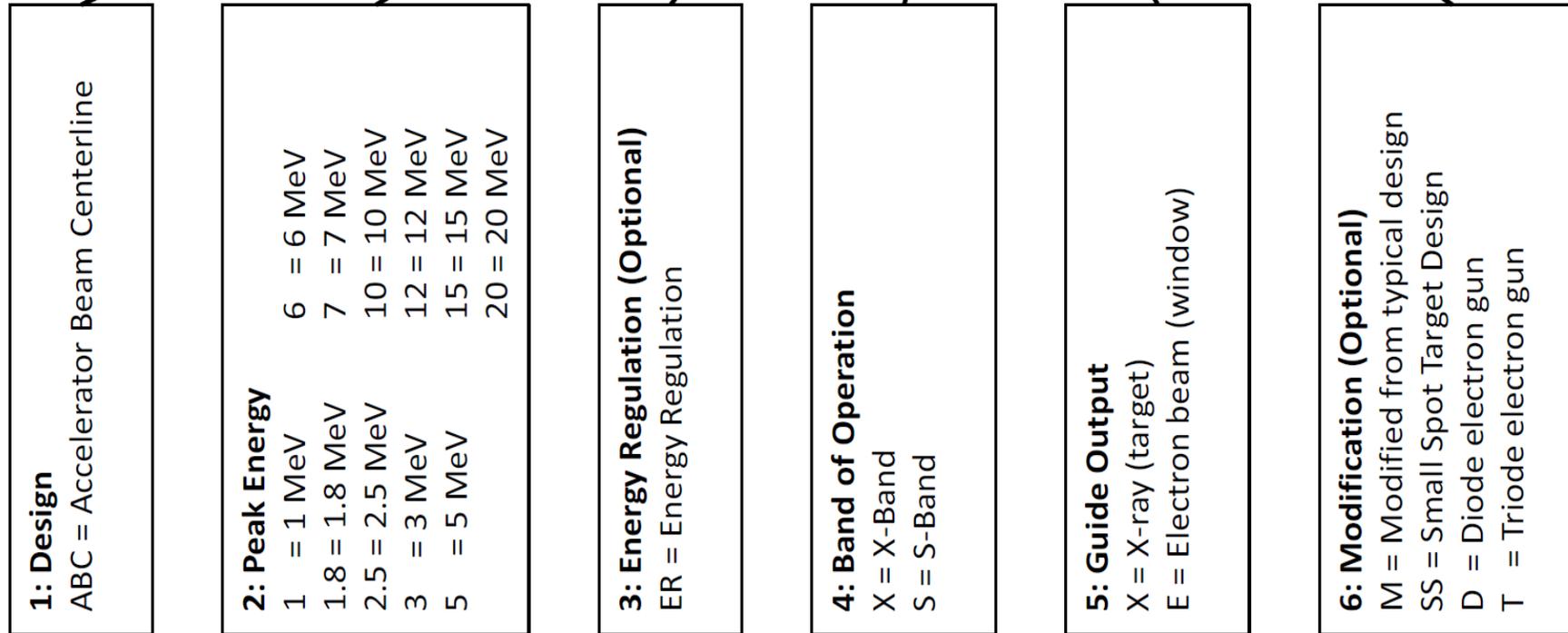


THOUGHT ONE LLC +

Abstract

- In January 2017, former component division of Varian Medical in Salt Lake City becomes independent public company, Varex Imaging Corp.
- Separation from Varian required establishing Accelerator Beam Centerline Production (ABC) on premises of HQ in Salt Lake City.
- In May 2016, 8 months prior to Varian spinning off Varex, it acquired assets of two small companies that I had founded in 2008 and 2011 and was running at the time (see picture) .
- After 5 years since the acquisition, we are reporting on the key results.

ABC-12ER-X-E-M

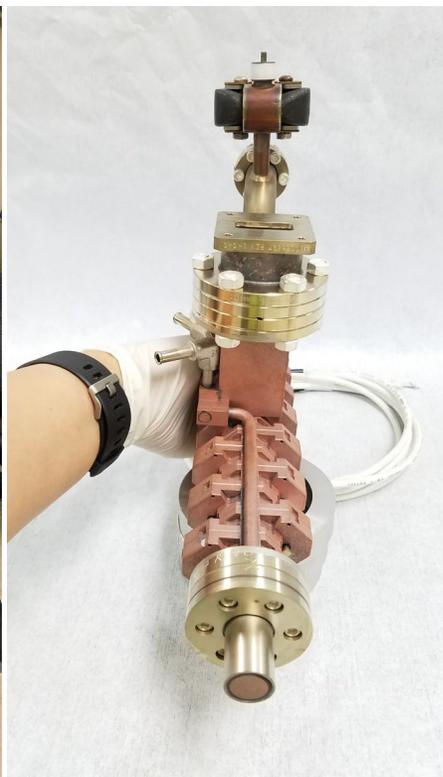


Establishing New Product Line at Varex

Part Number	Model	Operating Energy Range, MeV	Max Dose Rate @1 m from tungsten target	Electron Beam Current, peak, mA	Description
140439	ABC-3-S-X-D	1.7-3.9	500	0-310	For 3 MeV linac, diode or triode e-gun options fully tested
145686	ABC-3-S-X-T	1.7-3.9	400	0-310	
137034	ABC-5-S-X-T	3.5-6.4	700	0-260	For 4 or 5 MeV linac, triode e-gun
145266	ABC-5-S-E-T	3.5-6.4	N/A	0-260	
139853	ABC-7ER-S-X	3.2-8.0	1300	0-280	For 6 or 7 MeV linac
145268	ABC-7ER-S-E	3.2-8.0	N/A	0-280	
145262	ABC-9-S-X	7.0-11.5	2500	N/A	For 9 MeV linac, e-beam tested, dose rate estimated, TBD
145261	ABC-9-S-E	7.0-11.5	N/A	0-75	
145269	ABC-10-S-E	10	N/A	230	For high power e-beam (15-20 kW) 10 MeV linac
146601	ABC-15-S-X	15	TBD	N/A	Replacements for Varian K-series, 15-20 MeV, design data only
146602	ABC-20-S-X	20	TBD	0-30	
142873	ABC-1-X-X	0.9-1.3	10	0-150	Measured data with lower power magnetron at 300 kW peak
136813	ABC-1.8-X-X	1.8	14	0-100	
146603	ABC-2.5-X-E	1.5-2.9	100	0-100	Design data for higher power magnetron
145270	ABC-6-X-X	5-6.5	TBD	0-150	Design data for higher power magnetron
145271	ABC-6-X-E	5-6.5	N/A	0-150	
136775	ABC-12ER-X-E	4-12	N/A	10	Intraoperative application, mature product

- “It is as simple as ABC” - Varex now owns this Trademark!
- All who are present are well aware - it isn't so simple, really, but with a great team and a strong, competent leadership it is much easier. 😊
- During the first couple years, Varex continued production of the ABCs on premises of Bodycote in Fremont, CA.
- Varex has completed integration of ABC design and production at its Salt Lake Facility in 2018-2021, and we continuing to expand the capabilities.
- Presently, we have established a pilot design and production line at Varex; successfully produced, tuned and fully tested a number of new linacs; and continuing to design exceptional, “state-of-the-art” ABC models.

Developed Key X-Band ABC Models



LEFT to RIGHT

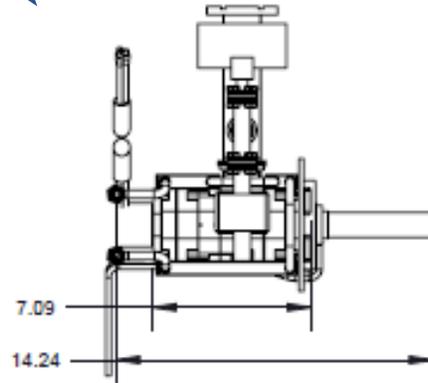
- ABC-12ER-X-E for electron beam radiation therapy, a mature product for intraoperative and some other applications;
- ABC-1.8-X-X for security and NDT, a fully qualified unit (also tested at 2.5 MeV with higher power magnetron);
- ABC-2.5-X-X-DI two section 2.5 MeV linac with a symmetrical input through an integrated 3 dB coupler, a fully tested prototype, delivered up to 50 R/min@ 1 m, pulse rate 100 pps-800 pps.

Developed Key S-Band ABC Models

ABC-3ER-S-X



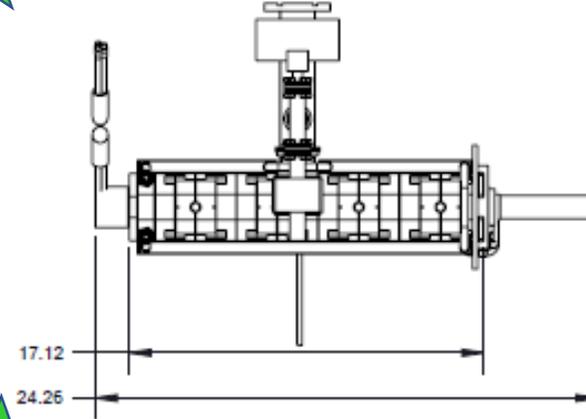
- 3 MeV, 300 R/min@1m
- 1-3 MeV
- 0-300 R/min@1m



ABC-7ER-S-X



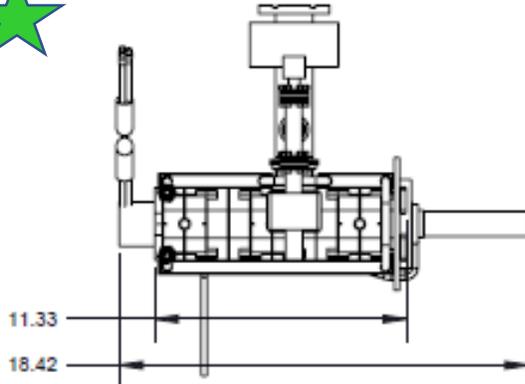
- 7 MeV, 500 R/min@1m
- 3-8 MeV
- 0-1000 R/min@1m



ABC-5ER-S-X



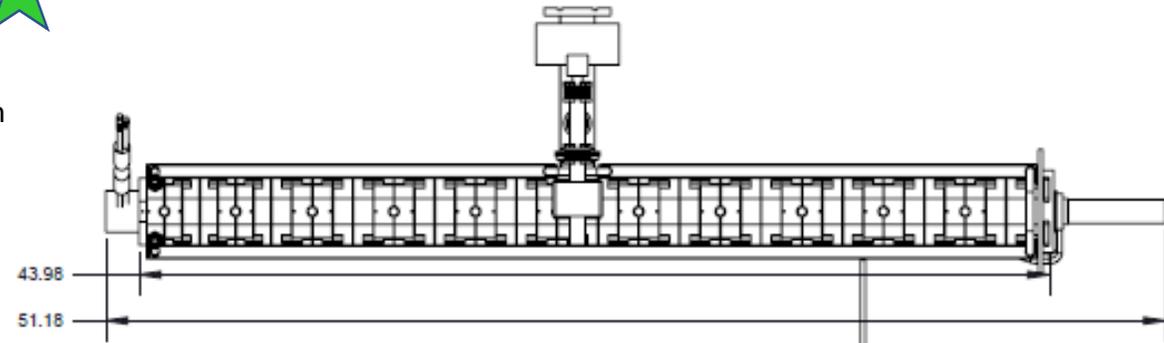
- 5 MeV, 700 R/min@1m
- 3-6 MeV
- 0-800 R/min@1m



ABC-9ER-S-X



- 9 MeV, 3000 R/min@1m
- 6-12 MeV
- 0-3200 R/min@1m

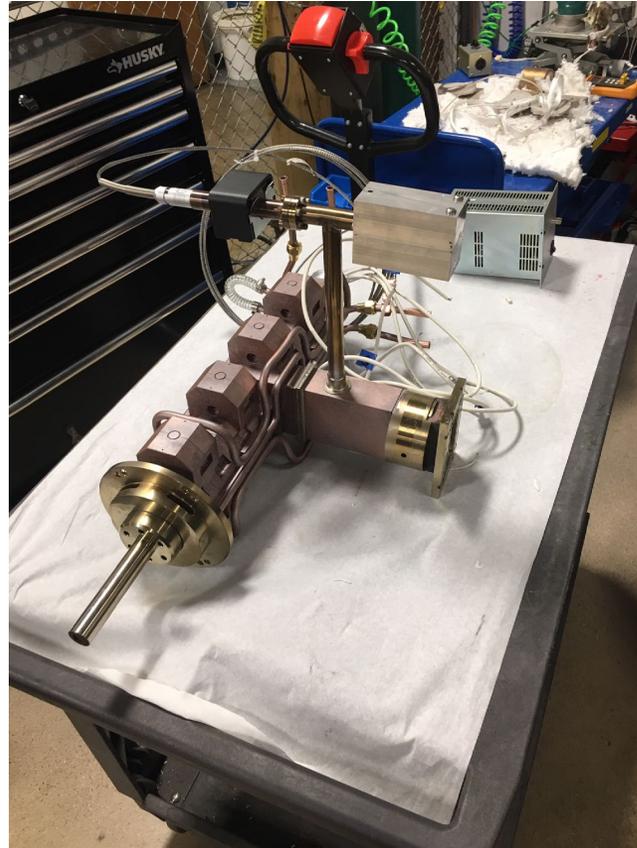
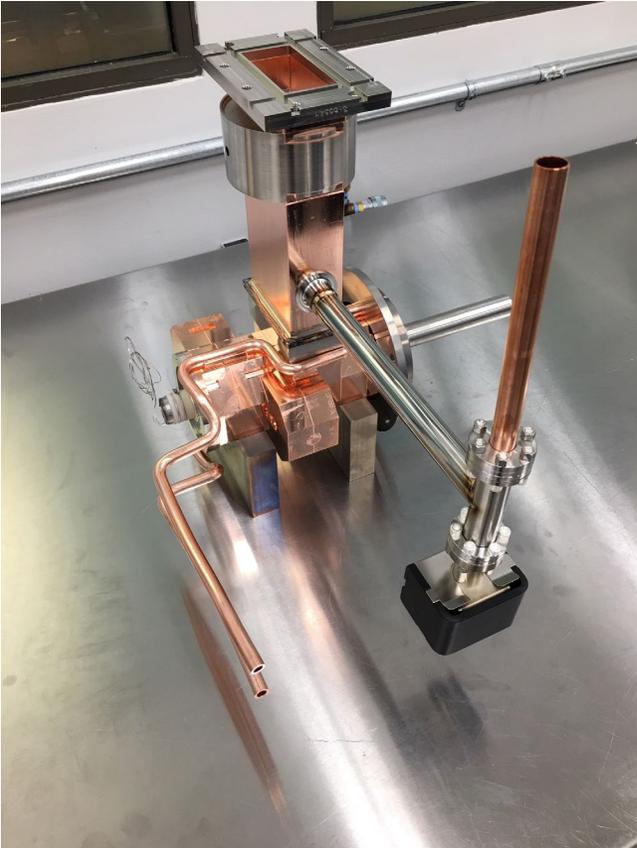


- successfully tested at full power, ready for production

All units have broad energy, current, and dose rate regulation, upgraded and with some new features. Triode e-gun allows for complete beam shut down. Multiple energy mode in broad energy range.

LEFT to RIGHT

- ABC-3-S-X for NDT and security screening;
- ABC-7ER-S-X, a 3-8 MeV energy regulated linac for security and NDT, smaller beam spot options are in works;
- ABC-10-S-E for a high power e-beam linac designed for sterilization (successfully tested without focusing system, now focusing coils being added).



THANK YOU FOR YOUR ATTENTION!

WITH GREAT APPRECIATION AND IN HONOR OF EVERLASTING MEMORY OF MY LATE MENTORS, COLLEAGUES, AND FRIENDS:

DR. IGOR SHCHEDRIN, MR. RUSSELL SCHONBERG, DR. THEODOR ROUMBANIS, MR. HANK DERUYTER, AND MANY OTHERS

