

ORBIT 8 SERIES
NEW BITZER COMPRESSORS FOR R410A

PROGRAM 2010



BITZER ORBIT 8 Scroll Compressors Program 2010

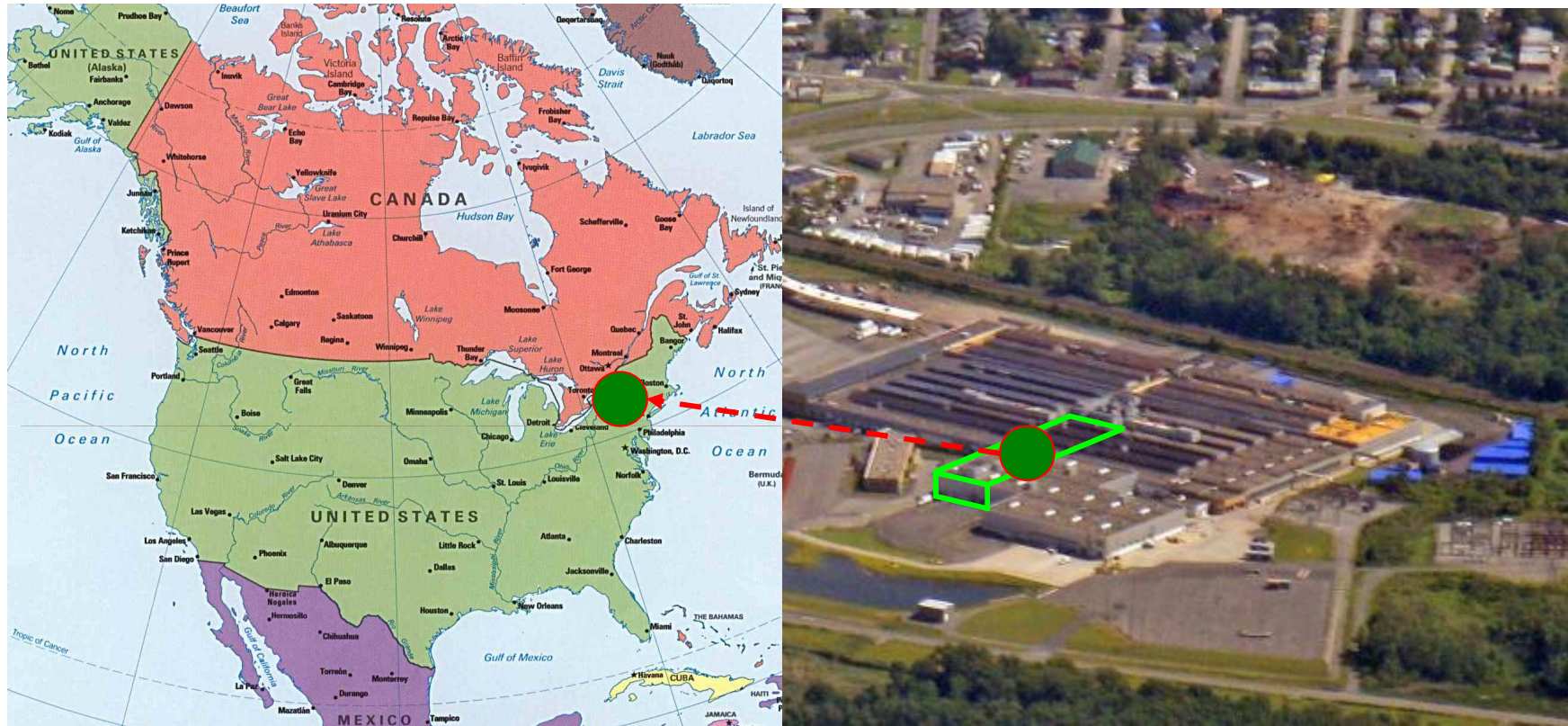
/ BITZER Scroll Inc. & Grand Opening Ceremony

/ ORBIT 8 Series: Main Features & Competitive Advantages

/ Availability and Ordering Information



BITZER Scroll Inc. Syracuse / NY (USA)



- / Salina Industrial Powerpark
- / 5600 sq. m. (60.000 sq. ft)

BITZER Scroll Inc. / Grand Opening Ceremony

- / 2nd BITZER company in USA - 4th in North America
- / Compressor design and manufacturing center
for commercial scroll compressors
- / Capacity up to 30.000 scroll compressors (or more)
- / Grand Opening in October 2009



BITZER Scroll Inc. / Grand Opening Ceremony

/ Local media in Syracuse, NY
Reporting on Grand Opening Ceremony



/ US Congressman Dan Maffei congratulates
Mr. Schaufler and the Chief Officers

BITZER Scroll Inc. / Design Center - Expertise

- / Design leadership has 105+ US patents combined, not included European, Asian & South American
- / Authors of numerous technical papers
 - ❑ ASME International Mechanical Engineering Congress
 - ❑ Purdue University Compressor Conference
- / Developers of numerous BITZER proprietary design tools & methods
 - ❑ Virtual Scroll Meshing

4767293	4827174	4850819
4877382	4893044	4927341
4992033	5088905	5114322
5141417	5141421	5156539
5174738	5178526	5197868
5219281	5281114	5295813
5318424	5330334	5391054
5427511	5482450	5511389
5582512	5745992	5758404
5762483	5772416	5823755
5857844	5869914	5911563
5931649	5996364	6074186
6089839	6113372	6120189
6120268	6139299	6142753
6146119	6149411	6167771
6168248	6168403	6171086
6174149	6196816	6217302
6257851	6280146	6293776
6309194	6309197	6309198
6345966	6352417	6354821
6354822	6364619	6368065
6386847	6397614	6406265
6413058	6416301	6418740
6422847	6439261	6464470
6468060	6506037	6517332
6540492	6558126	6565336
6566841	6571576	6595763
6599109	6634874	6641368
6658866	6698232	6736622
6826926	6881026	6887052
6893240	6953490	6964558
6966759	6986652	6988877
7153111	RE36053	RE35216
RE36053	200200644721	
200200644731	200201053011	
200201463391	200502715301	



New ORBIT 8 Scroll BITZER Series

Introduction of the new series BITZER ORBIT 8

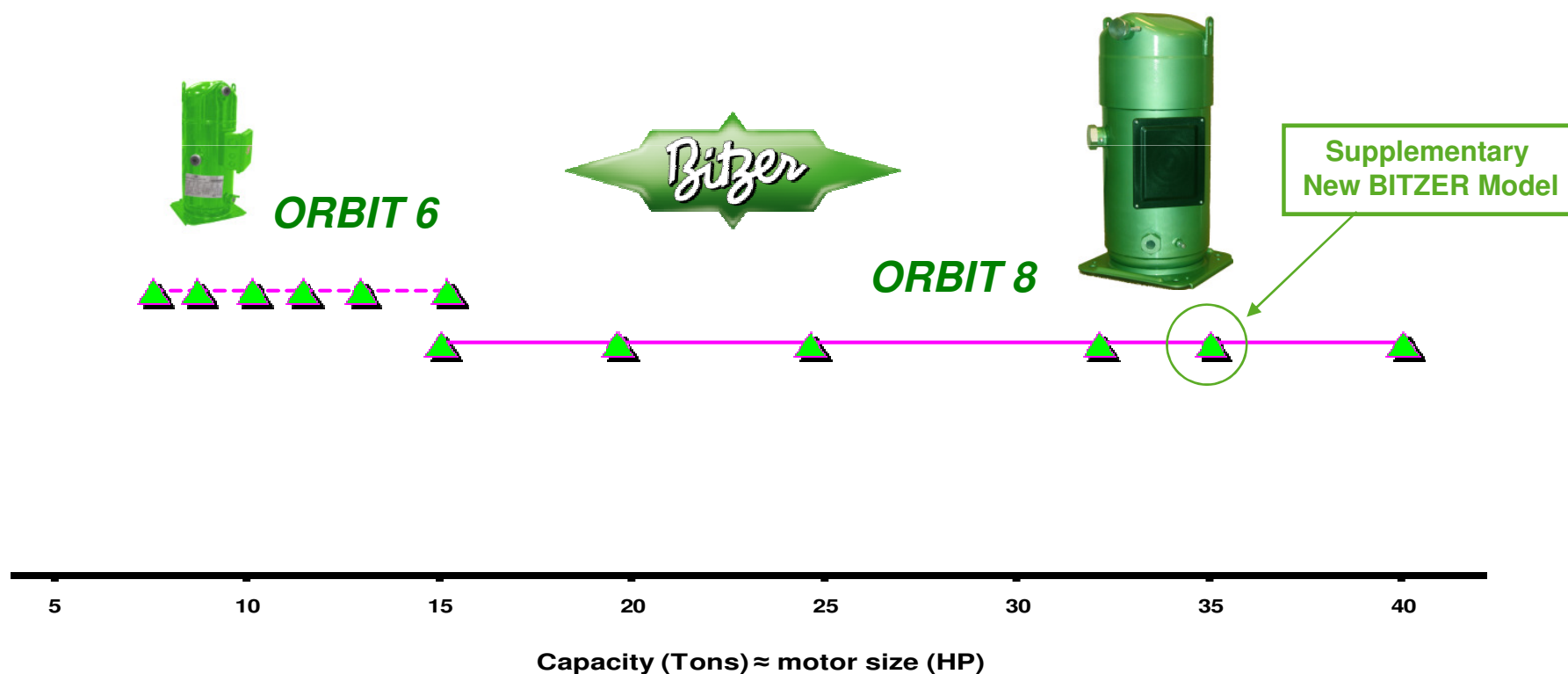
/ Why the name "ORBIT"?



- ❑ "Orbit" is the geometrical path described by the moving (or "orbital") spiral around the fixed spiral. This word is often used associated with the scroll technology.
- ❑ Further in BITZER another product exists expressing with its name the geometry linked to its shape: "OCTAGON", so that both product designations were born under the same BITZER philosophy.
- ❑ The number 8 is linked to the housing size.

ORBIT Series / Product Portfolio for R410A

- / ORBIT 8 series in serial production since Jan 2010
- / 5 model size corresponding to the industry standard + one new additional size
- / ORBIT 6 with 6 additional models: upcoming



BITZER ORBIT 8 Scroll Compressors Implementation & Program 2010

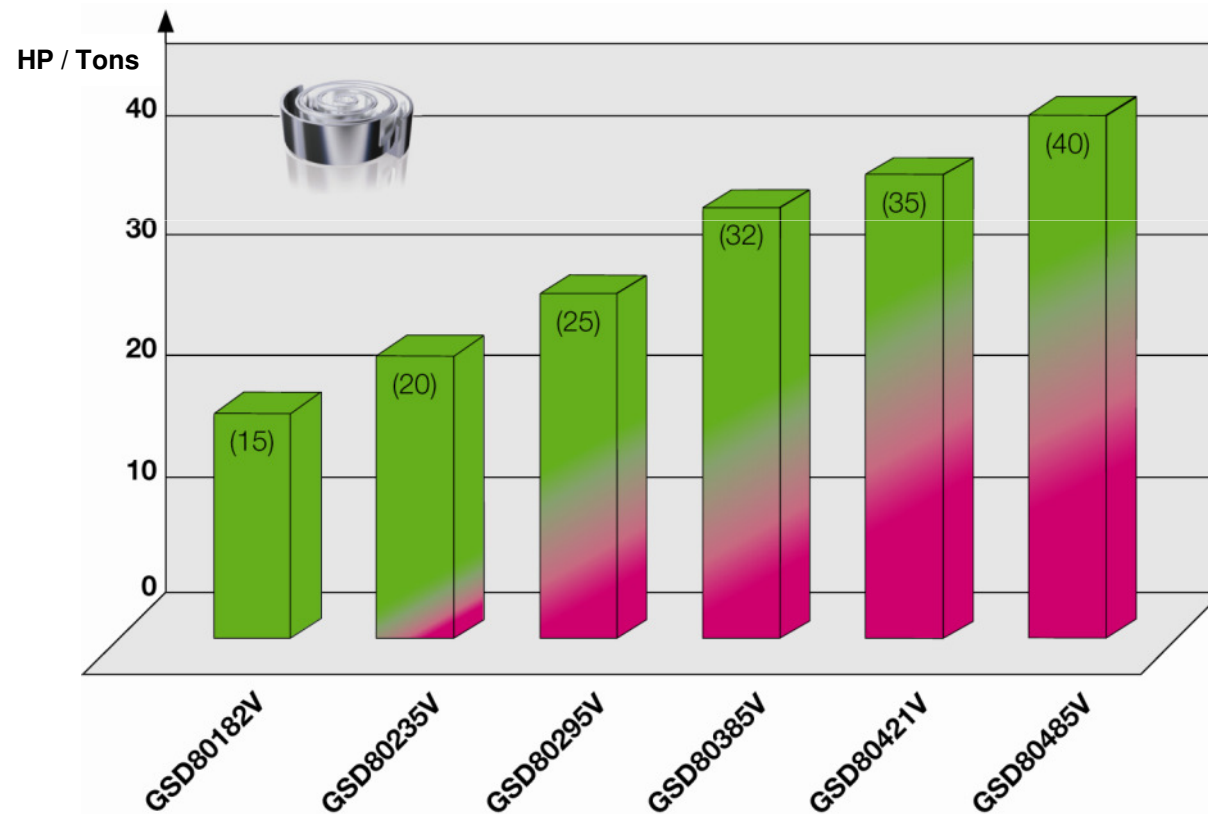
AGENDA

- / BITZER Scroll Inc. & Grand Opening Ceremony
- / ORBIT 8 Series: Main Features & Competitive Advantages
- / Availability and Ordering Information



ORBIT 8 Series / Capacity Range

- / *Optimized for R410A – Air / Water Cooled Chiller and Rooftop applications!*
- / *Product portfolio includes 6 capacities between 39 kW and 101 kW @ 50hz (EN) between 15 and 40 tons @ 60 Hz (ARI) → motors between 15 and 40 HP*



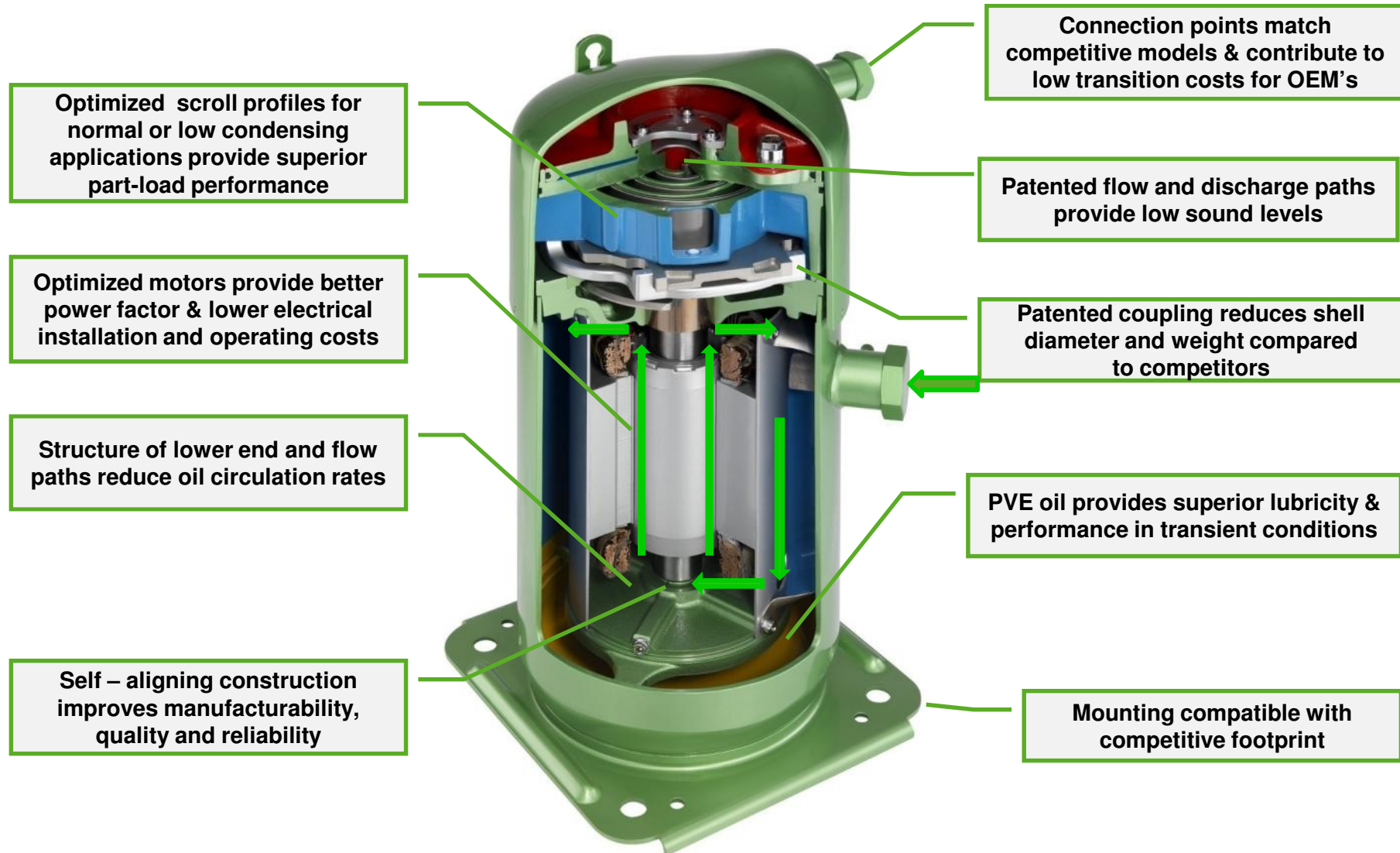
ORBIT 8 / Main Features

Main Product Features

- / Superior Seasonal Efficiency
- / Market Leading sound: 3 dB(A) lower than competition
- / Industrially low oil circulation rate
- / Compact size and reduced weight
(up to 10 % lighter than competition for the 25, 32, 35 and 40 HP)
- / Industry standard interchange ability
 - ☐ Capacity ratings
 - ☐ Footprint
 - ☐ Fittings and connection

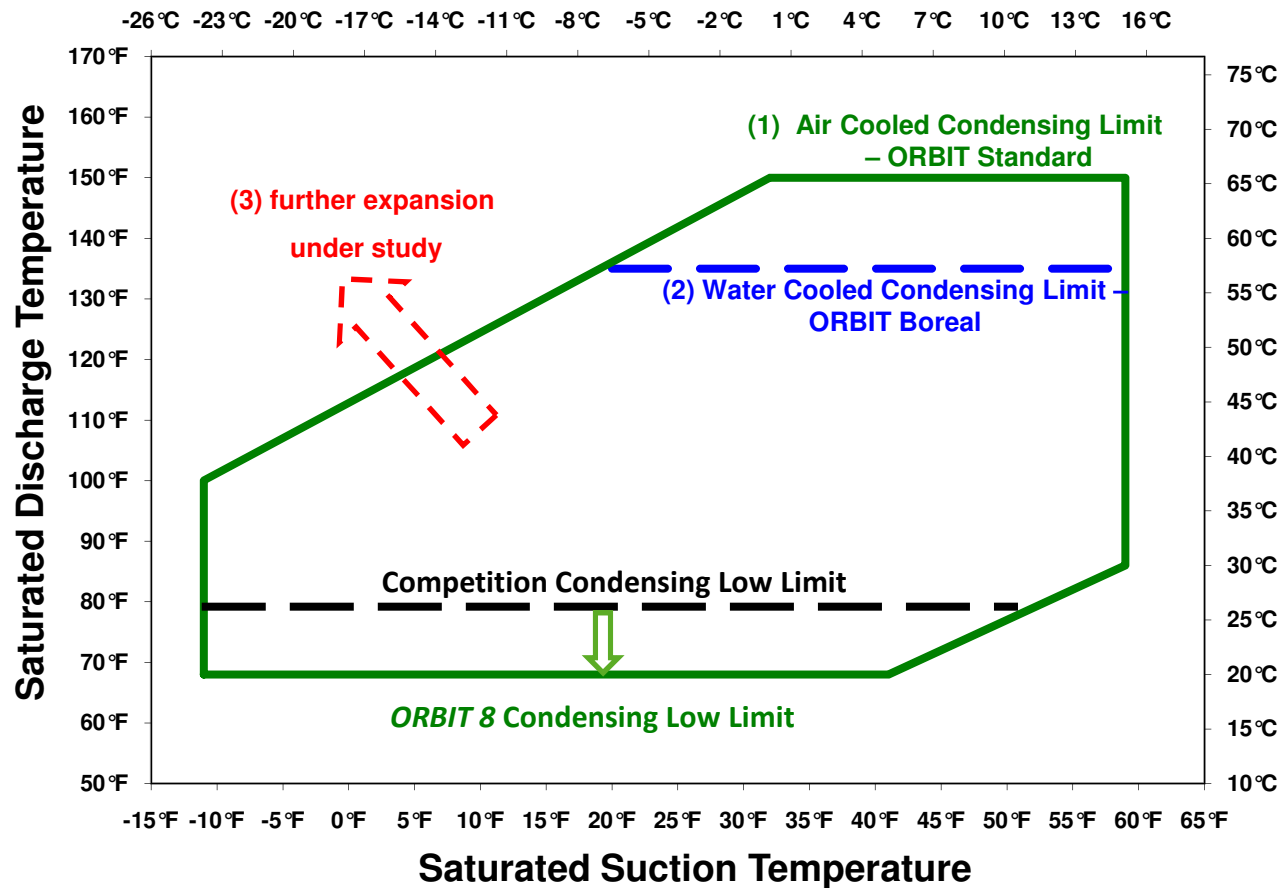


ORBIT 8 Series / Main Features



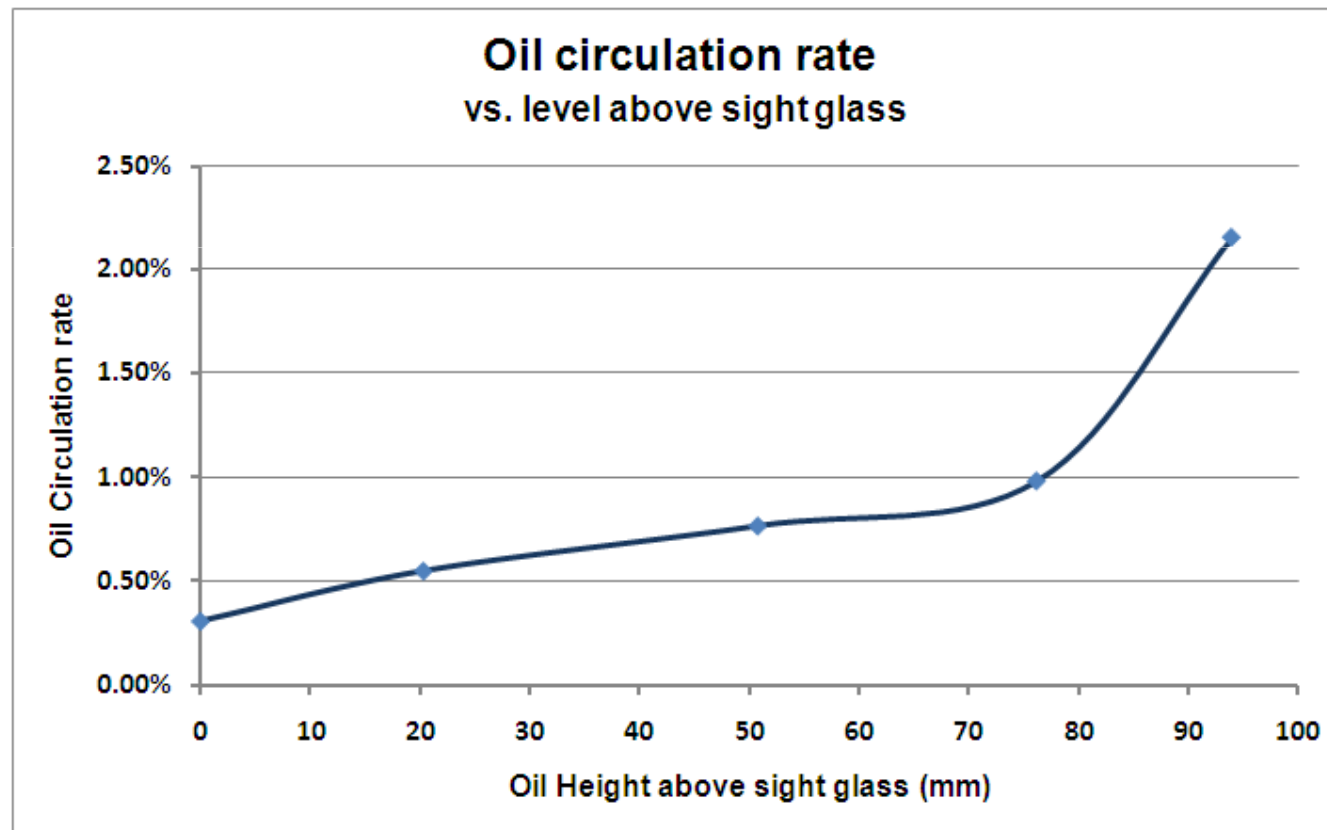
ORBIT 8 Series / Operating Envelope

- ❑ Fully Competitive Application Envelope
 - Lower SCT limit
 - No superheat restrictions with *ORBIT 8*















Competitive Advantages / Low Oil Circulation

- / **Low oil Circulation rate → higher efficiency and reliability**
 - ❑ 32 HP confirmed by testing at levels well above sight glass
 - ❑ Oil Circulation Rate mostly below 1%



New Feature / Special Oil for Highest Reliability

Best Choice of Oil – PVE

Feature	PVE	POE	PAG	Mineral Oil
Chemical Stability				
Tribology (Anti-Wear)				
Miscibility				

/ Polyvinylether Oil (PVE)

- ☐ Non hydrolytic → doesn't break down in presence of water
- ☐ Compatible with all HFC refrigerants & POE oil
- ☐ Better solubility with process fluids → promotes oil return
- ☐ Adopted by Major OEMs: Carrier, Hitachi, LG, Daikin, Mitsubishi, Panasonic, Sanyo



ORBIT 8 Boreal Series

Unique Offer / Water Cooled Version

Two different versions of the ORBIT 8 series are available:

- / **ORBIT Standard**: high cond. temperatures optimized → *Air cooled chillers*
- / **ORBIT Boreal**: low cond. temp optimized → *Water cooled chillers*

ORBIT 8 is *First Scroll Optimized for Water Cooled Chiller Operations*

Efficiency Increase

→ ***over + 5% per compressor!***

→ ***up to +15% for the whole chiller! (IPLV / ESEER)***

- / Further the Boreal version can be advantageously used in areas with cooler climates (Canada, Northern USA, Center / Northern Europe): the boreal regions, from which the name of this compressor version derives

ORBIT 8 Series

Competitive Advantages / Best ESEER - IPLV

European Seasonal Energy Efficiency Ratio

Integrated Part Load Value

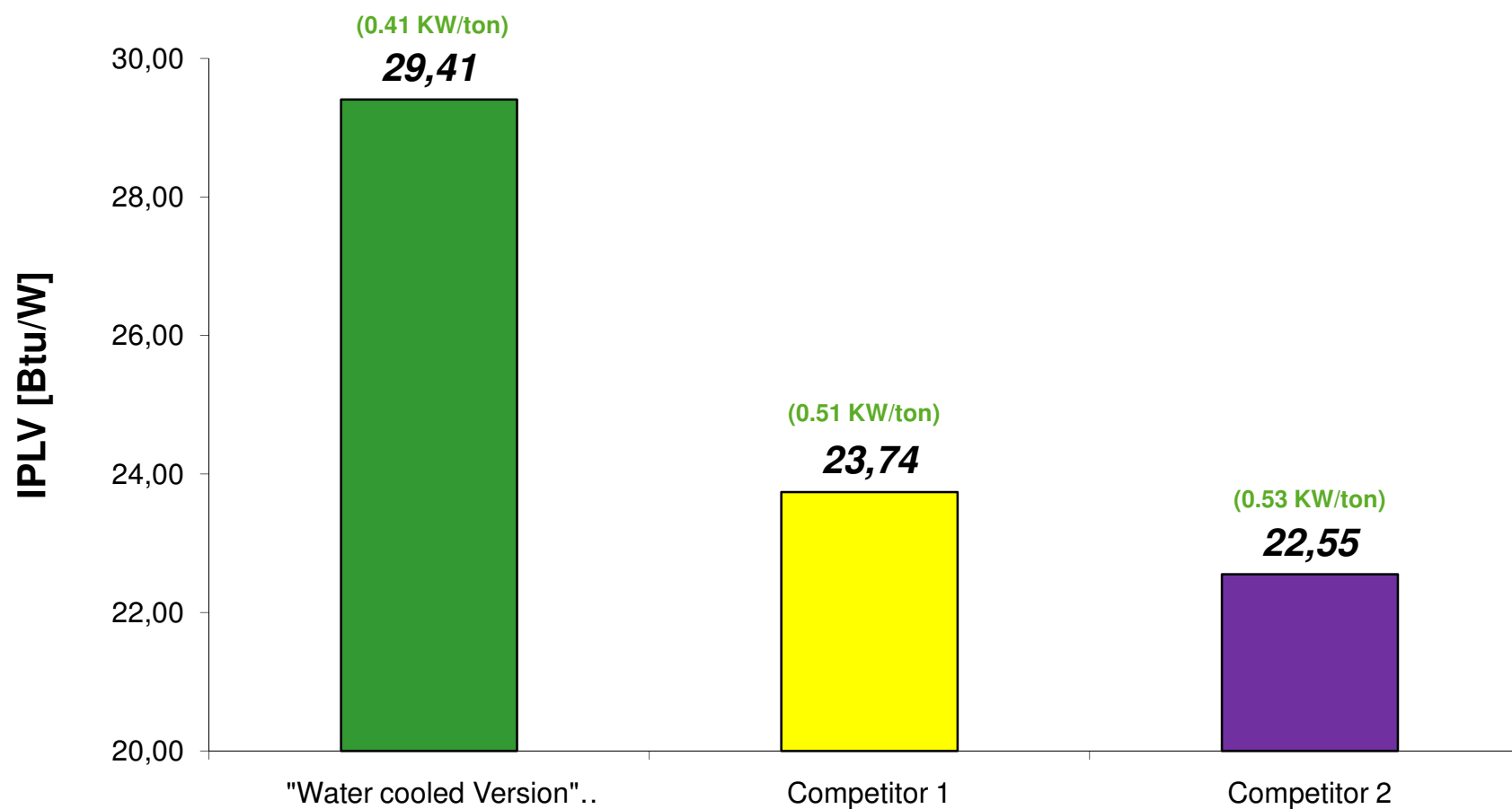
/ They take in account the yearly working conditions of the unit,
weighting key operating points differently

→ Energy consumption approach closer to the reality !

Load	Weighting ARI - IPLV	Weighting Eurovent ESEER	Air Cooled		Water Cooled	
			ARI Ambient (EDB)	ESEER Ambient (EDB)	ARI Ambient (EWT)	ESEER Ambient (EWT)
100%	1%	3%	35 °C (95F)	35 °C	29.4 °C (85F)	30 °C
75%	42%	33%	26.7 °C (80F)	30 °C	23.9 °C (75F)	26 °C
50%	45%	41%	18.3 °C (65F)	25 °C	18.3 °C (65F)	22 °C
25%	12%	23%	12.8 °C (55F)	20 °C	18.3 °C (65F)	18 °C
Evaporator: ARI: 44 °F (6.7C), 2.4 gpm/ton (0.043 L/s per kW) ESEER: 7 °C, Mfr's rated flow rate						

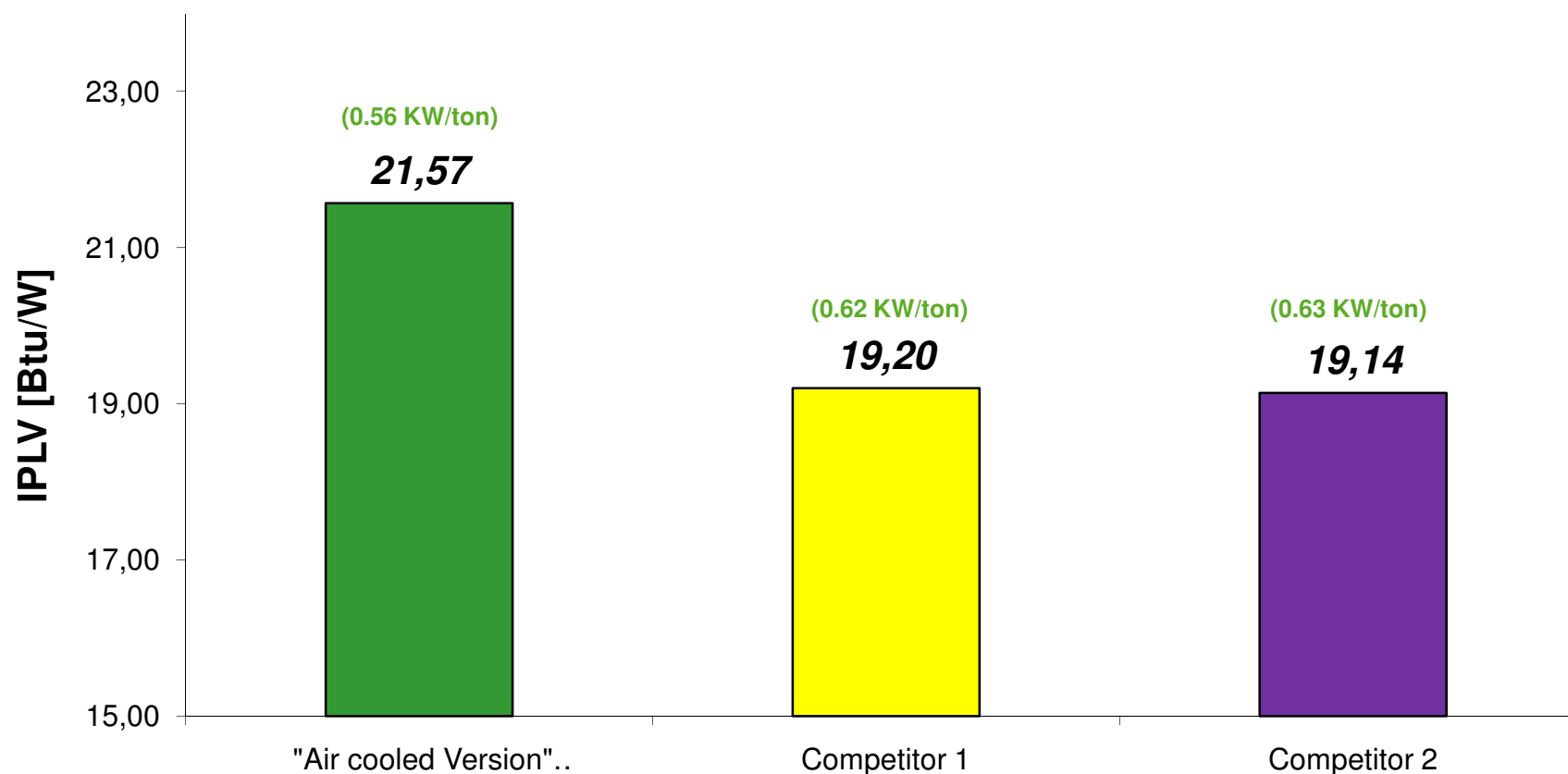
ORBIT 8 Boreal - IPLV

IPLV – ORBIT 8 Boreal (Water Cooled Applications)



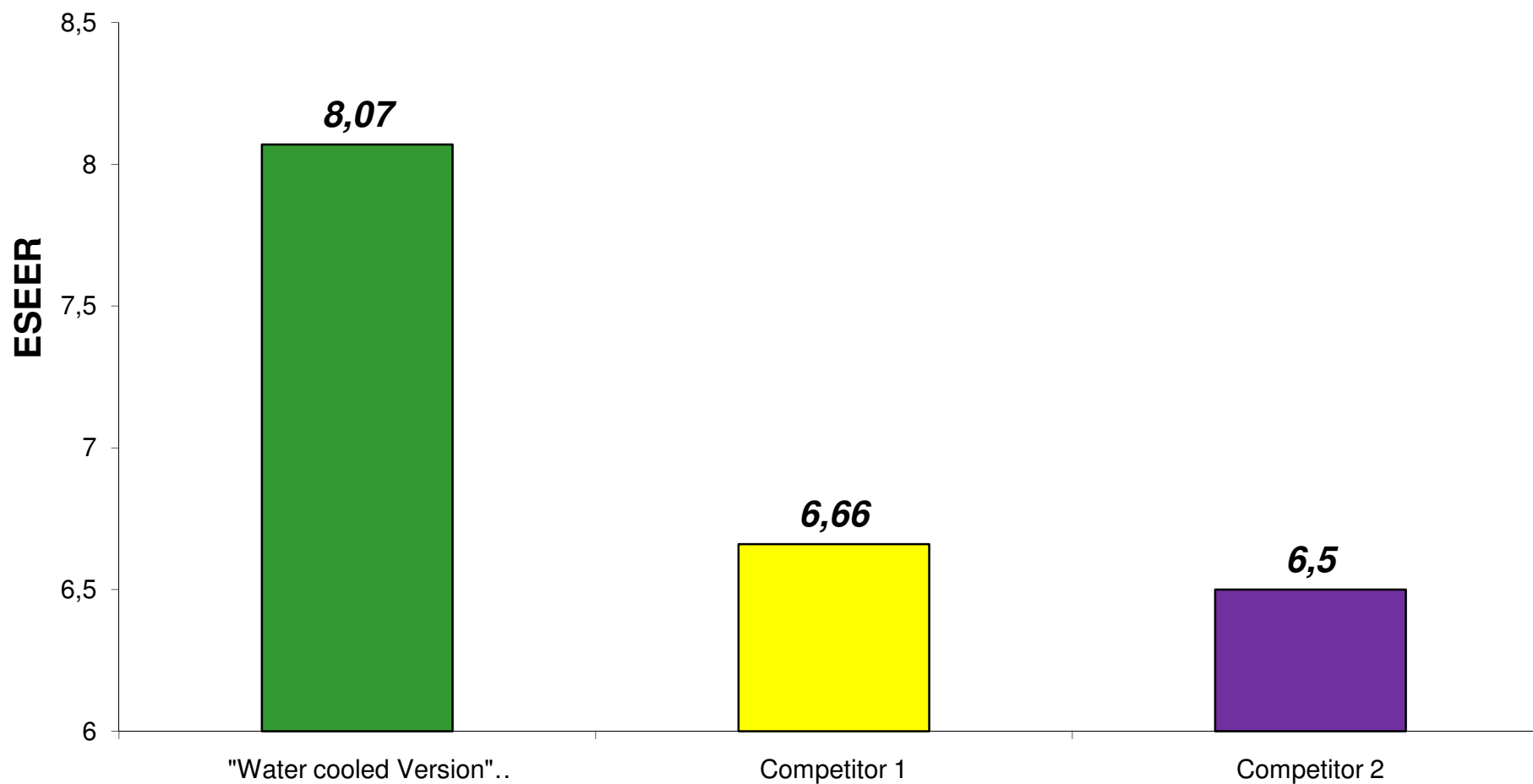
ORBIT 8 Standard - IPLV

IPLV – ORBIT 8 Standard (Air Cooled Applications)



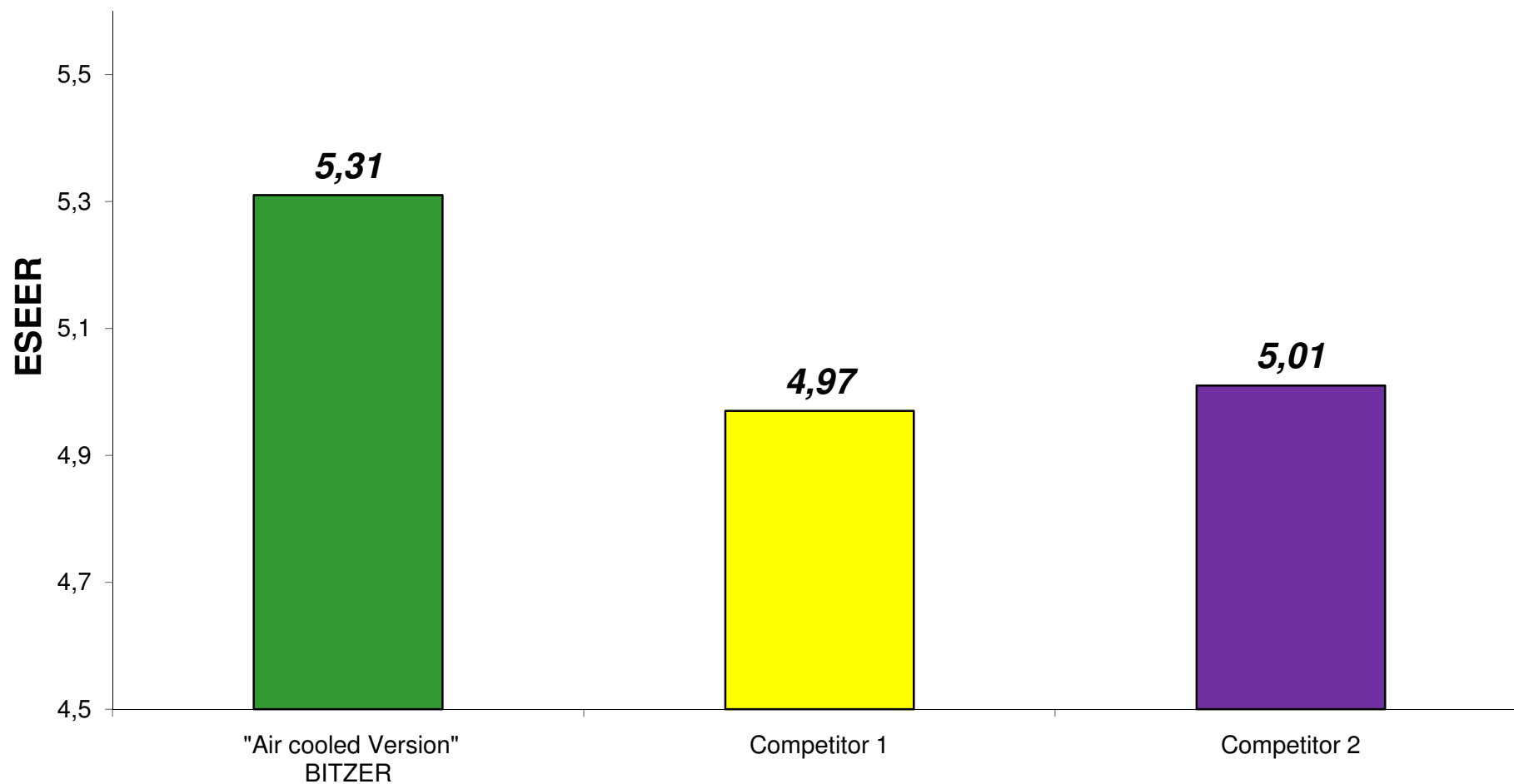
ORBIT 8 Boreal - ESEER

ESEER – ORBIT 8 Boreal (Water Cooled Applications)



ORBIT 8 Standard - ESEER

ESEER – ORBIT 8 Standard (Air Cooled Applications)



BITZER ORBIT 8 Scroll Compressors Implementation & Program 2010

AGENDA

- / BITZER Scroll Inc. & Grand Opening Ceremony
- / ORBIT 8 Series: Main Features & Competitive Advantages
- / Availability and Ordering Information



ORBIT 8 / Product Availability

/ Following models are available

- ☐ 15, 20, 25, 32, 35 and 40 HP ORBIT 8 standard version
- ☐ 20, 25, 32, 35 and 40 HP ORBIT 8 Boreal version
- ☐ Standard Motor: 400/3/50 & 460/3/60,
- ☐ Optional Motors: 200/3/50 & 230/3/60, 380/3/60, 575/3/60
- ☐ Brazed or Rotolock connections
- ☐ All necessary accessories
- ☐ All products CE & UL marked



ORBIT 8 / Product Portfolio 2010

Product released for worldwide sales

Compressor type	Motor size (HP)	Nominal Cooling Capacity @ 60 Hz* (tons)	Displacement @ 50 Hz (m³/h)	Cooling Capacity @ 50 Hz* (kW)	Connections	Motor Versions
GSD80182...A	15	15	29,6	37,6	stub tube (standard) or rotolock (optional)	(200V-3/50Hz)
GSD80235...A & W	20	20	39,4	50,4		230V-3-60Hz
GSD80295...A & W	25	25	48	63,2		380V-3-60Hz
GSD80385...A & W	32	32	62	81,1		400V-3-50Hz
GSD80421...A & W	35	35	67,6	88,6		460V-3-60Hz
GSD80485...A & W	40	40	77,2	101		575V-3-60Hz
		* ARI conditions		*EN conditions		

- / Additional motors and certification upon request (market potential provided)
- / Standard scope of delivery: motor (400/3/50 or 460/3/60), protection module (SE-B3), mounting grommets, oil charge (5.3 L), inert gas charge
- / Optional: different motors voltages, different protections modules, crankcase heater, discharge gas sensor, tandem / trio kits, etc.
- / External check valve will be replaced by integrated check valve at the end of Q2

ORBIT 8 / Model Number Significance

- / Basic ordering code is 14 characters.
- / Additional options may be added based on demand.
- / Customer specific configurations by request.

Model	Configur.	Refrigerant	Series	Capacity	Oil	Application	Connection	Nominal Voltage	Motor Protection	Variable
G	S	D	8	0385	V	W	B	4	3	0

G: indicates the new BITZER scroll compressor series

S: means single unit

D: identifies the refrigerant: R410A (currently only this refrigerant available)

8: identifies the housing size

0385: is the cooling capacity in thousand BTU at 60 Hz (6 sizes: 0182, 0235, 0295, 0385, 0421 and 0485)

Notice: dividing by 12 you get the refrigeration tons (coincident with motor HP); i.e. $385/12 = 32$, $180/12 = 15$

V: indicates the oil: PVE (currently the compressor is also delivered with oil): “V” always present!

A or **W:** indicates the application: Air cooled (standard) or **Water** cooled (optional)

B or **R:** indicates the connection sort: Brazing (standard) or **Rotalock** (optional)

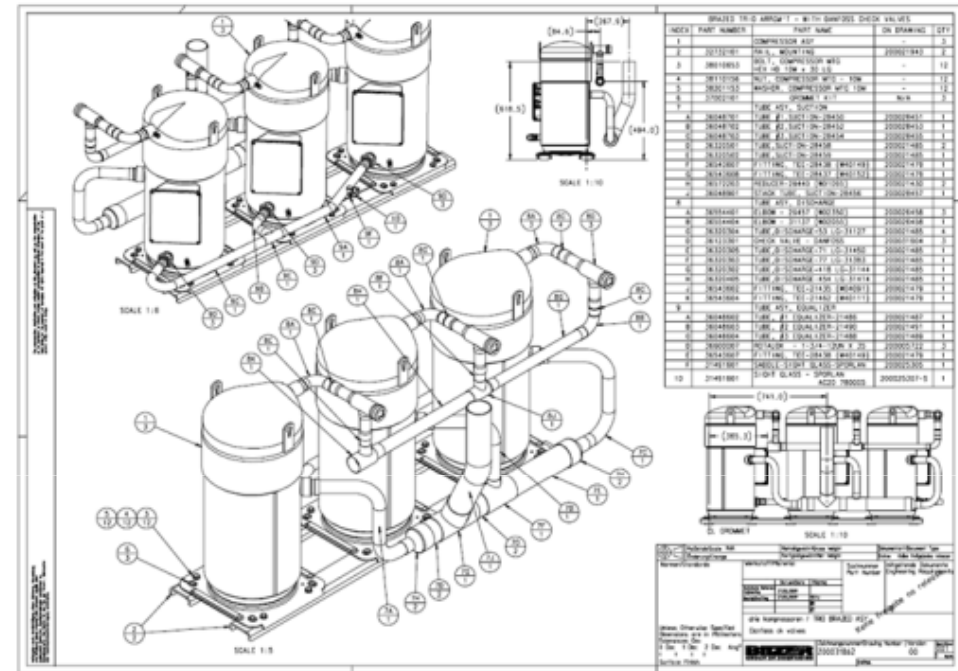
4: standard motor 400V/3/50Hz or 460/3/60; optional: **5:** → 575/3/60, **3:** → 380/3/60, **2:** → 208-230/3/60 or 200-230/3/50

3: standard motor protection SE-B3 (115/230V); optional **1:** SE-E1(115/230V), **5:** Discharge gas sensor installed, **6=** 1+5, **8=** 3+5

0: design variable (for specific customer variations); 0 = standard

BITZER Scroll

ORBIT 8 Series: Accessories



Tandem & Trio

- / Drawing for OEM Fabrication
- / Kits (for OEM assembly), including:
 - Piping: Suction and discharge line, oil equalization line (through sight glass)
 - Mounting rails, mounting grommets and hardware

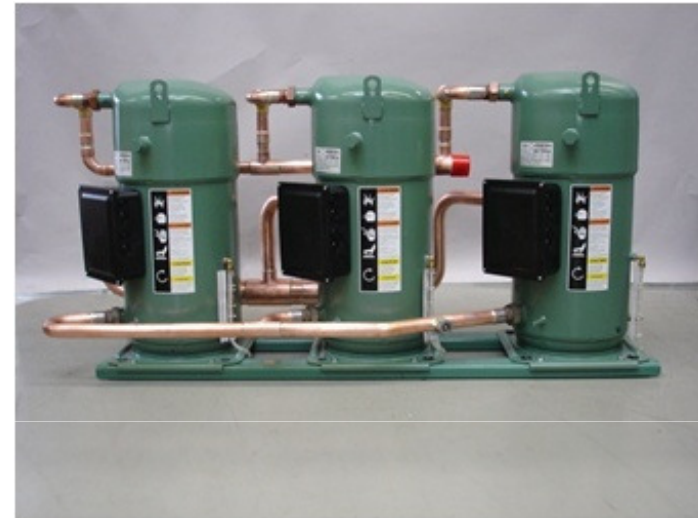
ORBIT 8

Compound Systems / Tandem & Trio

ORBIT 8 - Tandem



ORBIT 8 - Trio



Multiplex Compressors

- / It fits same space envelope and configuration than existing standards
- / Consistent base plate mounting with competition
- / Future revision will eliminate external check valve

ORBIT 8

Compound Systems / Tandem & Trio

/ Current availability and short-term plan

Version	Compressor Size (HP)			Status as per 11.03.2010
Standard / Boreal	20	20		technically released and currently available
Standard / Boreal	20	20	20	technically released and currently available
Standard / Boreal	25	25		technically released and currently available
Standard / Boreal	25	25	25	technically released and currently available
Standard / Boreal	32	32		technically released and currently available
Standard / Boreal	32	32	32	technically released and currently available
Standard / Boreal	35	35		technically released and currently available
Standard / Boreal	35	35	35	technically released and currently available
Standard / Boreal	40	40		technically released and available from Q2 - 2010
Standard / Boreal	20	25		technically released and available from Q2 - 2010
Standard / Boreal	20	32		technically released and available from Q2 - 2010
Standard / Boreal	20	35		technically released and available from Q2 - 2010
Standard / Boreal	25	32		technically released and available from Q2 - 2010
Standard / Boreal	25	35		technically released and available from Q2 - 2010
Standard / Boreal	15	20		technically released and available from Q2 - 2010
Standard / Boreal	15	25		technically released and available from Q2 - 2011
Standard / Boreal	15	32		test planned in Q2 and available from Q2 - 2010
Standard / Boreal	15	15		test planned in Q2 and available from Q2 - 2010
Standard / Boreal	15	15	15	test planned in Q2 and available from Q2 - 2010
Standard / Boreal	40	40	40	test planned in Q2 and available from Q2 - 2010

/ Further models may be available (upon customer request and/or projects)



THE HEART OF FRESHNESS