

יישומים של קירור בחינם- *Free Cooling Applications*



תוכן העניינים-

1. שיטות קירור בחינם
2. יישום 1- בית קירור תפ"א בדרום רוסיה
3. יישום 2- מרכז מערכות מידע במישור החוף

מהנדס יוני מלאכי

חשמל 2018- WAM 8.1

כנס מהנדסי קירור ומיזוג אוויר, אילת 7.11.2018

מתכננים-
אסא אהרוני
הרואק





שיטות קירור בחינם

FREE COOLING STRATEGIES

Depending upon ambient temperature and humidity, optimize power and water consumption by combining three embedded technologies:
Adiabatic, free-cooling and mechanical cooling.

- ➡ • Free Cooling
 - ✓ Airside Economizer
 - ✓ Waterside Economizer
 - ✓ Pumped Refrigerant

- ➡ • Adiabatic Cooling

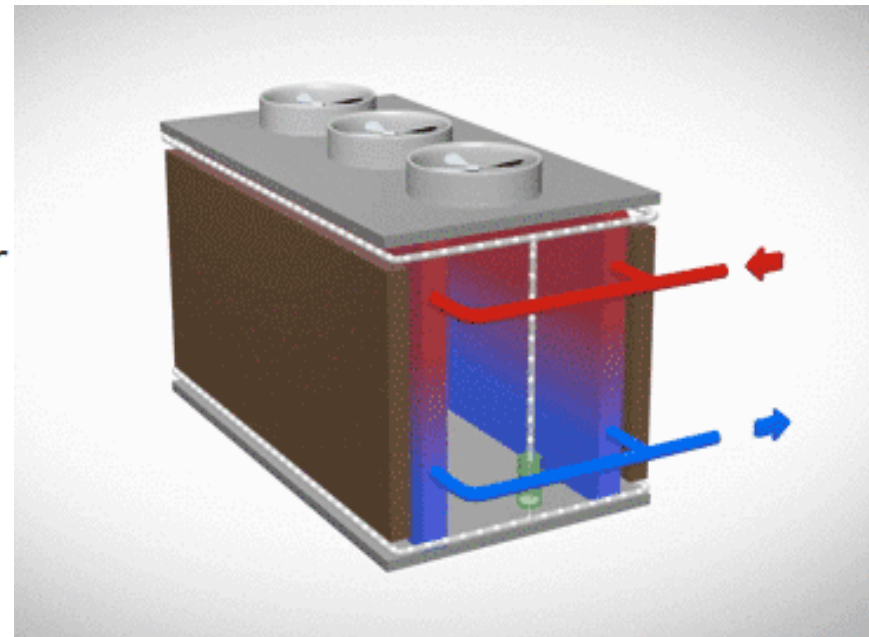


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שיטות קירור בחינם

FREECOOLING

Only fans are needed to operate: direct exchange between water and air.



ADIABATIC FREECOOLING

The adiabatic system allows freecooling to operate at higher ambient temperatures.



HYBRID COOLING

Adiabatic freecooling is the primary cooling source, multiple scroll compressors are used as back up.



ADIABATIC MECHANICAL COOLING

Compressor's efficiency is increased by the adiabatic system.



SAFE MODE

100% availability also during water shortages; the sole mechanical cooling system will guarantee full load.



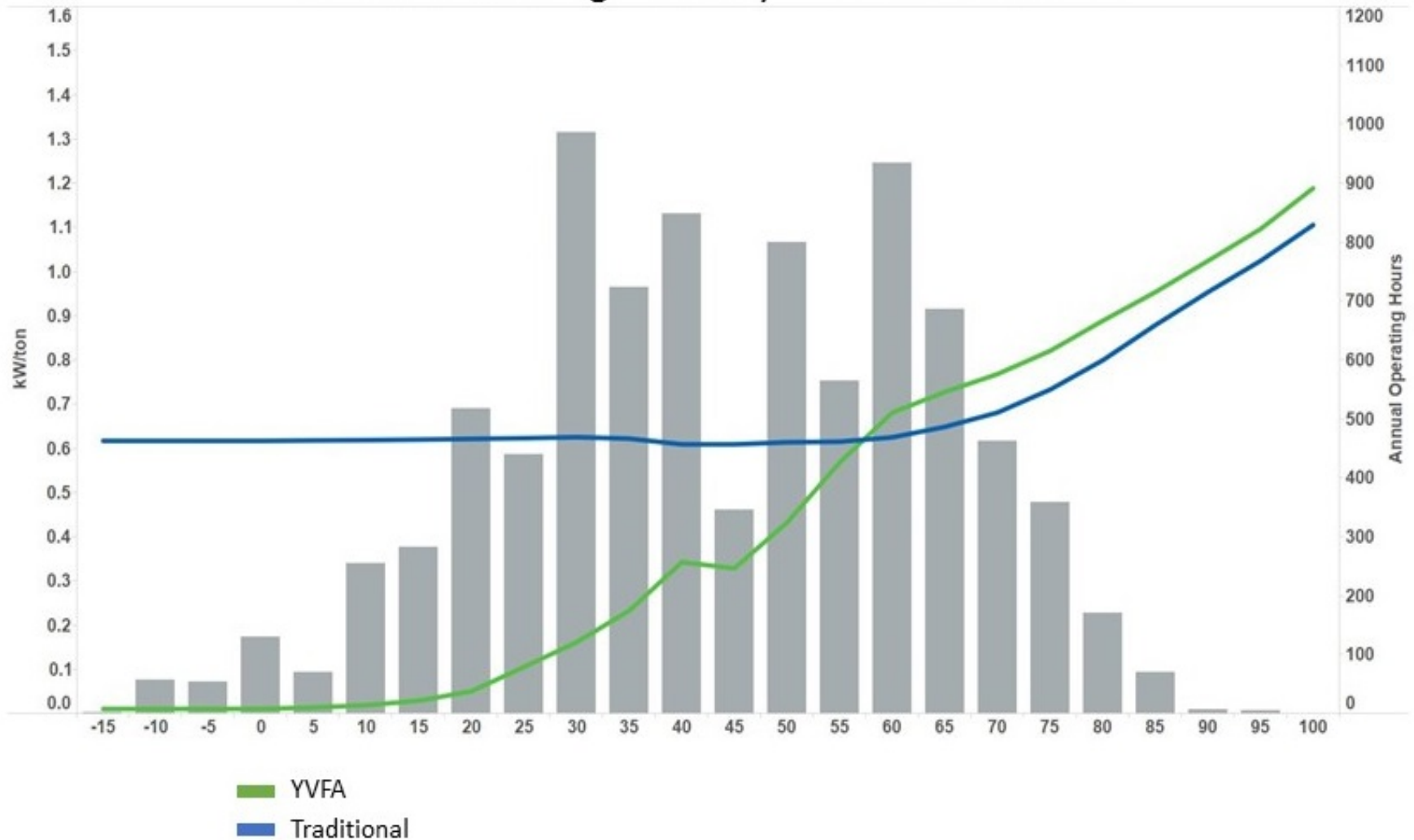


בחינת כדאיות לקירור בחינם

POTENTIAL FOR FREE COOLING

- Influence of different wet bulb temperatures
- Benefit of using elevated chilled water temperatures
- Chilled beams/ceiling systems make this possible & increase free cooling period

YVFA Free-Cooling Efficiency vs Traditional Chiller





שיטות קירור אוויר בחינם

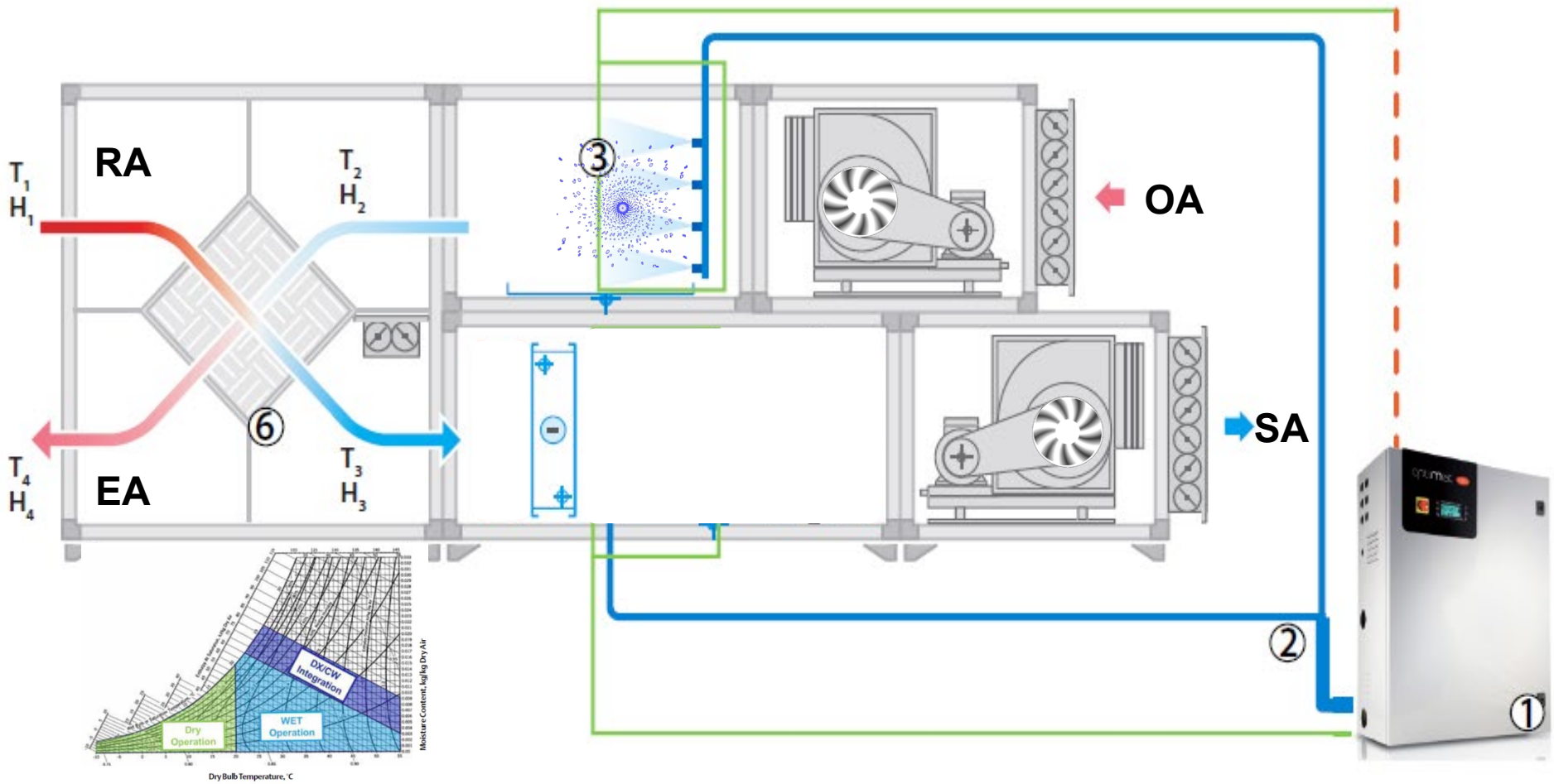
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קירור עקיף בחינם של אוויר חוזר





שיטות קירור מים בחינם

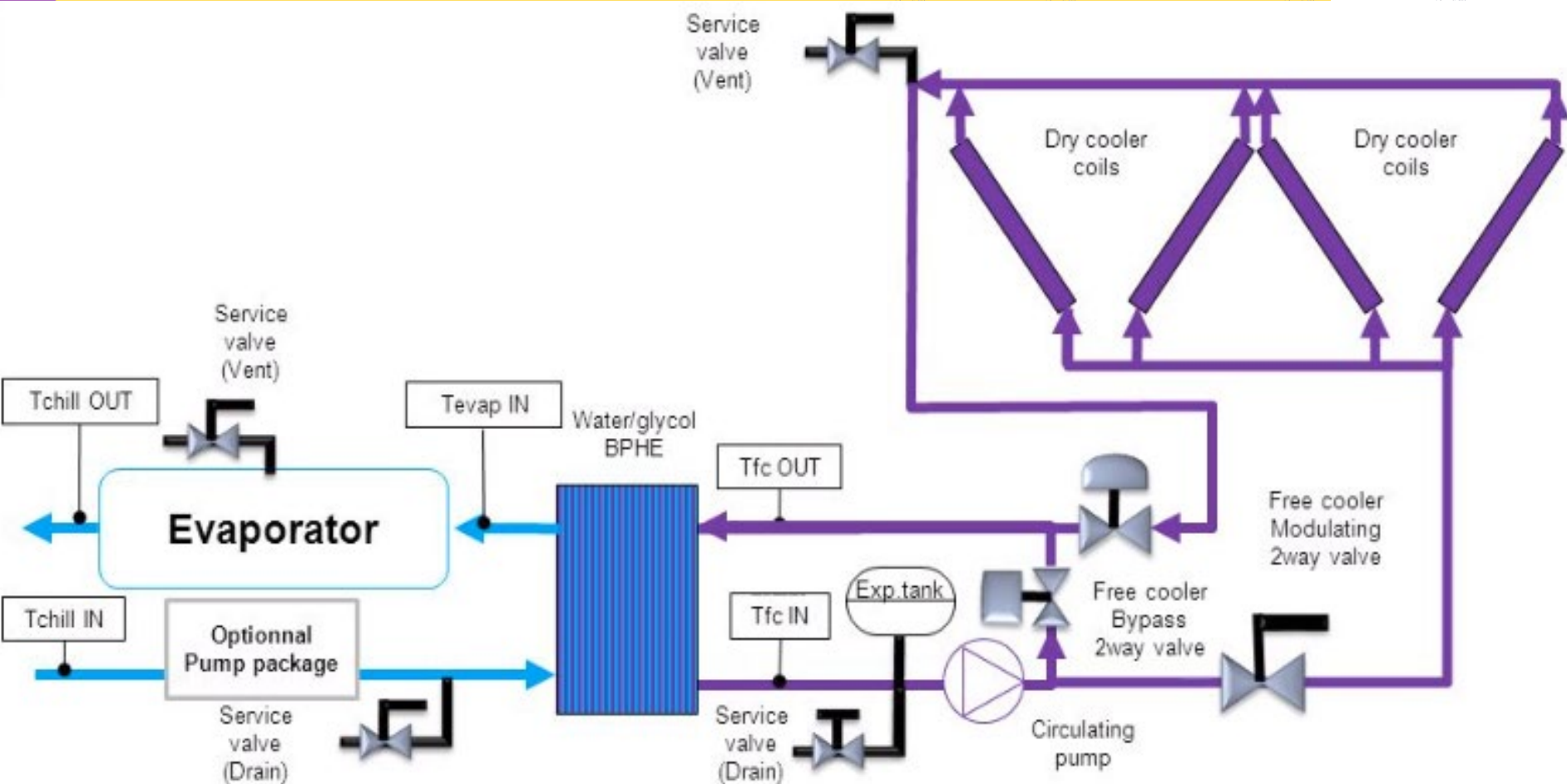
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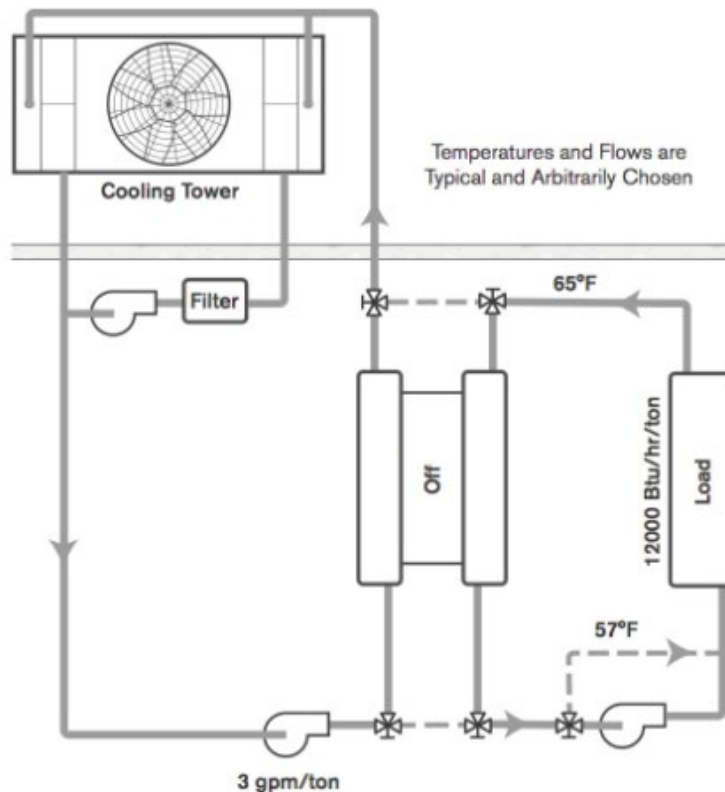
'קירור יבש' של מים בחינם



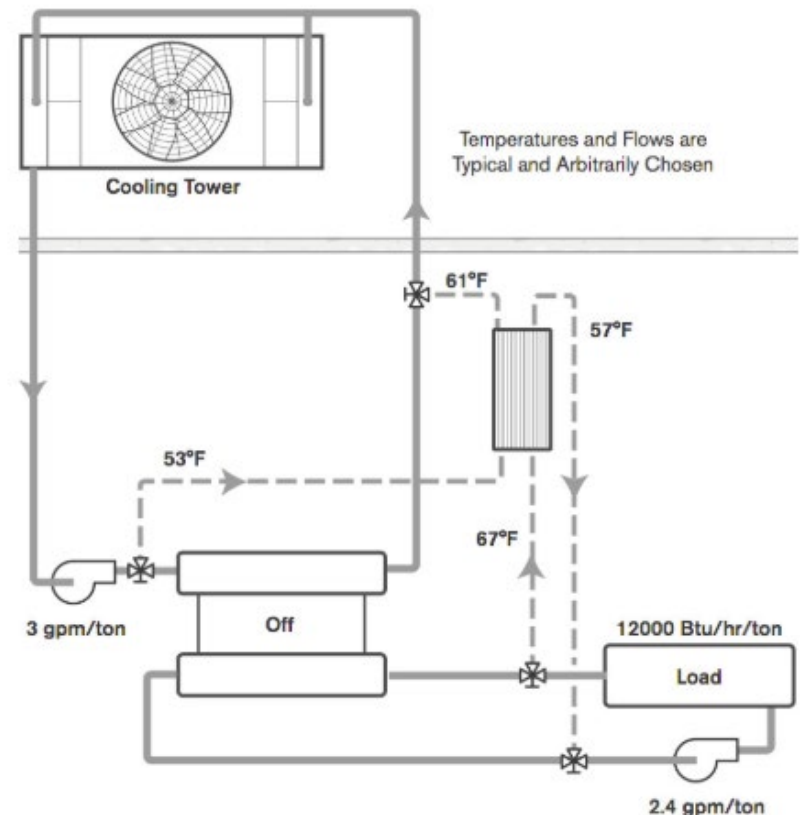


'קירור אדיאבטי' של מים בחינם

Direct Free Cooling



Indirect Free Cooling





Now

29 °C

Sunny.



Location:

Current Time:

Latest Report:

Dov Airport

Sep 13, 2018 at 13:52:07

Sep 13, 2018 at 12:50

Visibility:

16 km

Pressure:

1011 mbar

Humidity:

62%

Dew Point:

21 °C



Place or country...



Search

Time/General

Weather

Time Zone

DST Changes

Sun & Moon

Weather Today/Tomorrow

Hour-by-Hour Forecast

14 Day Forecast

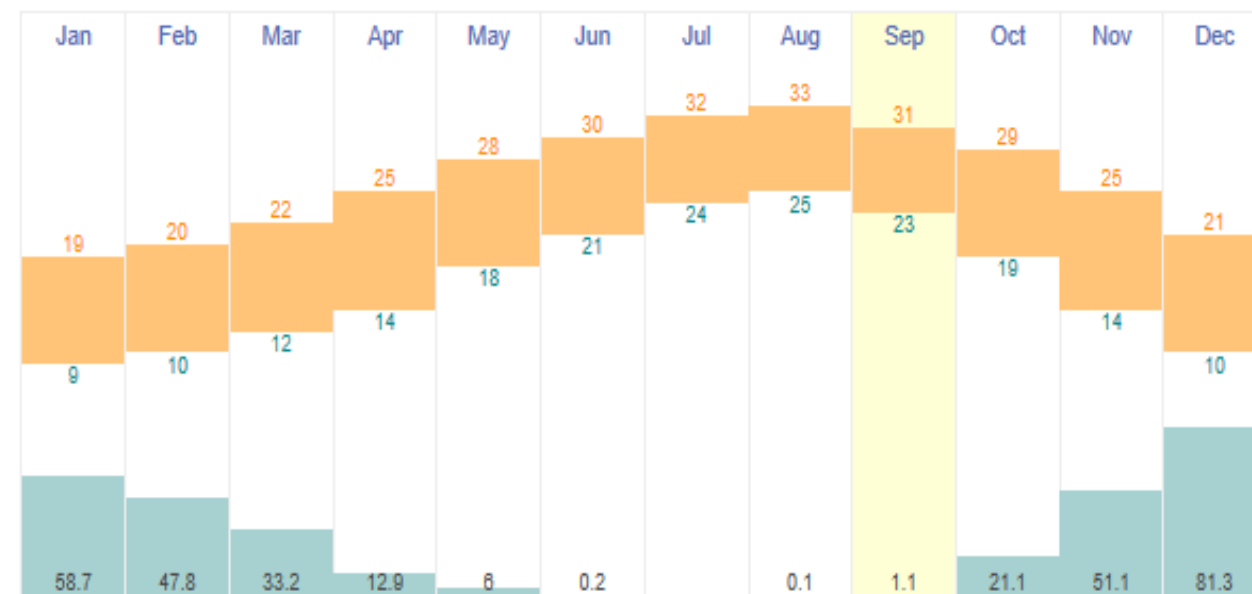
Yesterday/Past Weather

Climate (Averages)

Annual Weather Averages Near Netanya

Averages are for Dov Airport, which is 25 kilometers from Netanya.

Based on weather reports collected during 2005–2015.



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Quick Climate Info

Hottest Month [August](#) (29 °C avg)

Coldest Month [January](#) (14 °C avg)

Wettest Month [December](#) (81.3 mm avg)

Windiest Month [July](#) (12 km/h avg)



שיטות קירור בחינם

FREE COOLING STRATEGIES

Free Cooling- The amount of cooling which can be obtained to wholly or partially offset the load on mechanical refrigeration plant (CIBSE, 2004)

- Free Cooling
 - ✓ Airside Economizer
 - ✓ Waterside Economizer
 - ✓ Pumped Refrigerant
- Adiabatic Cooling

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