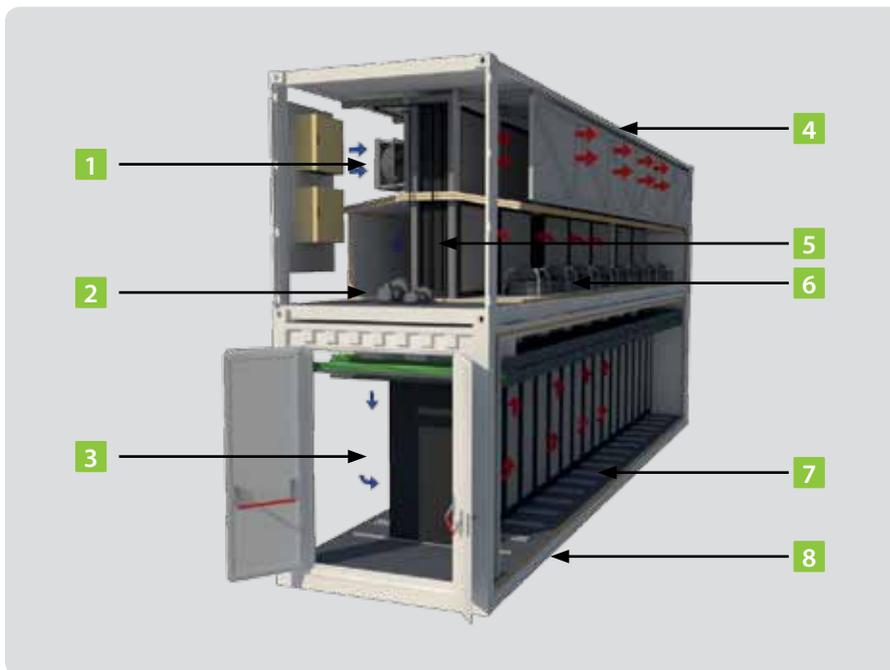




MODULAR NATURAL FREE COOLING MNFC - PUE 1.07

Cut Energy Consumption in Your Datacenter



Modular Natural FreeCooling is one of the latest AST Modular's innovations in the use of free cooling within datacenters. MNFC is a solution which dramatically reduces the energy consumption within the datacenter, generates savings and helps your organization be energy efficient. MNFC allows the use of free cooling with temperatures up to 24° C without any external chiller and without any input from outside air. This provides dramatic energy savings with a ROI of less than 18 months.

1. Fans 2. Pumps for Adiabatic Cooling 3. Cold Corridor 4. Mnfc Container
5. Exchanger 6. Fans 7. Hot Corridor 8. It Container

BENEFITS

- Ultra Energy Efficient
- Constant PUE across different IT loads
- Guaranteed ROI
- Reduce Carbon Footprint
- Deploy additional IT resources by reducing your cooling costs
- No Cross Contamination
- Suitable for both warm and cold climates
- Protection from Humidity
- Low maintenance level
- Suitable for high density environments
- Low pressure drop
- Minimum redundancy (N+1)
- Fast Deployment
- Highly Modular, Security

IDEAL FOR



Ultra Energy Efficient



Fast ROI

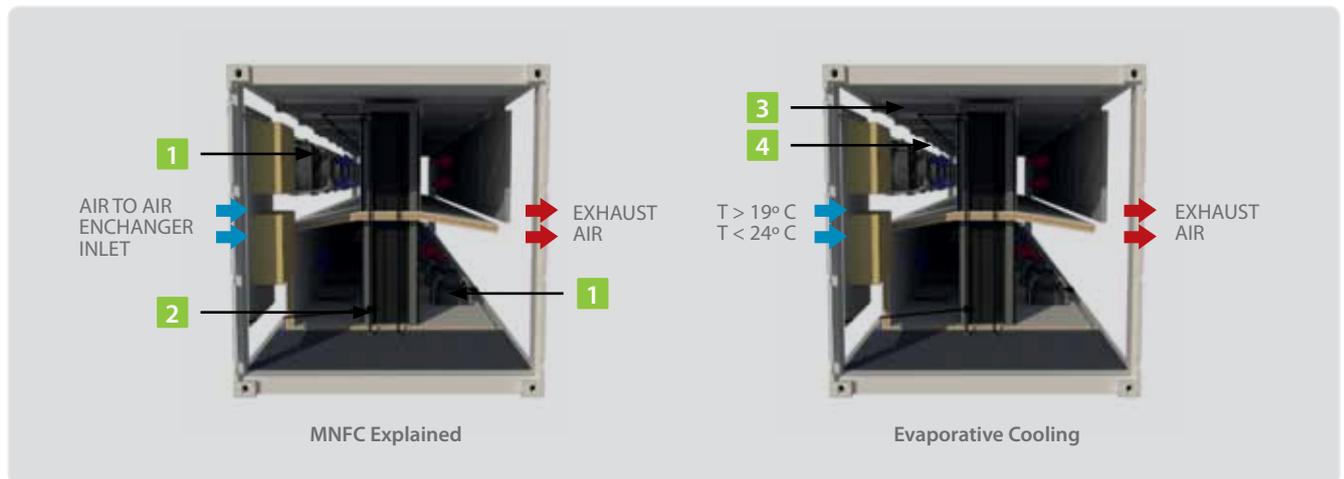


Warm Climates



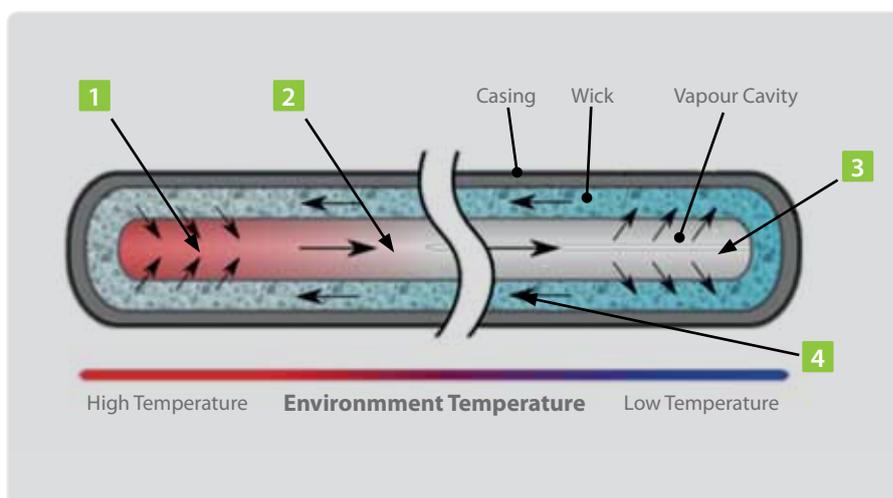
Low Maintenance

MODULAR NATURAL FREE COOLING - MNFC - PUE 1.07



COOL IT THE NATURAL WAY!

MNFC reduces the use of traditional datacenter chillers through the deployment of a passive air to air exchanger inside specially engineered chambers. This AST Modular's globally patented heat pipe based technology represents an improvement to direct free cooling systems. MNFC exchanges air – both hot and cold – avoiding cross contamination. Therefore, the interior of the data center remains as an airtight enclosure unaffected by external environmental conditions such as humidity, pollution, corrosive gases and particles. It exclusively uses free cooling with temperatures $< 19^{\circ}\text{C}$ (66.2°F), evaporative cooling with temperatures ranging from 19°C to 24°C (66.2°F to 72.2°F) and traditional datacenter chillers with temperatures $> 25^{\circ}\text{C}$ (77°F). Watch our demo at <http://www.youtube.com/watch?v=IKJv8nDg-fw>





ASTModular

SOLUTIONS

MODULAR NATURAL FREE COOLING - MNFC - PUE 1.07

PUEs IN THE WORLD

Take full advantage of free cooling at different latitudes: depending upon the location of your datacenter and the available hours of free cooling MNFC can help you achieve a stunning PUE ranging between 1.07 and 1.37, making MNFC suitable for every climate.



London PUE 1.07



New York PUE 1.11



Rome PUE 1.08



Seoul PUE 1.16



Sao Paulo PUE 1.10



Sidney PUE 1.13



Tokyo PUE 1.20



Frankfurt PUE 1.18



Moscow PUE 1.08

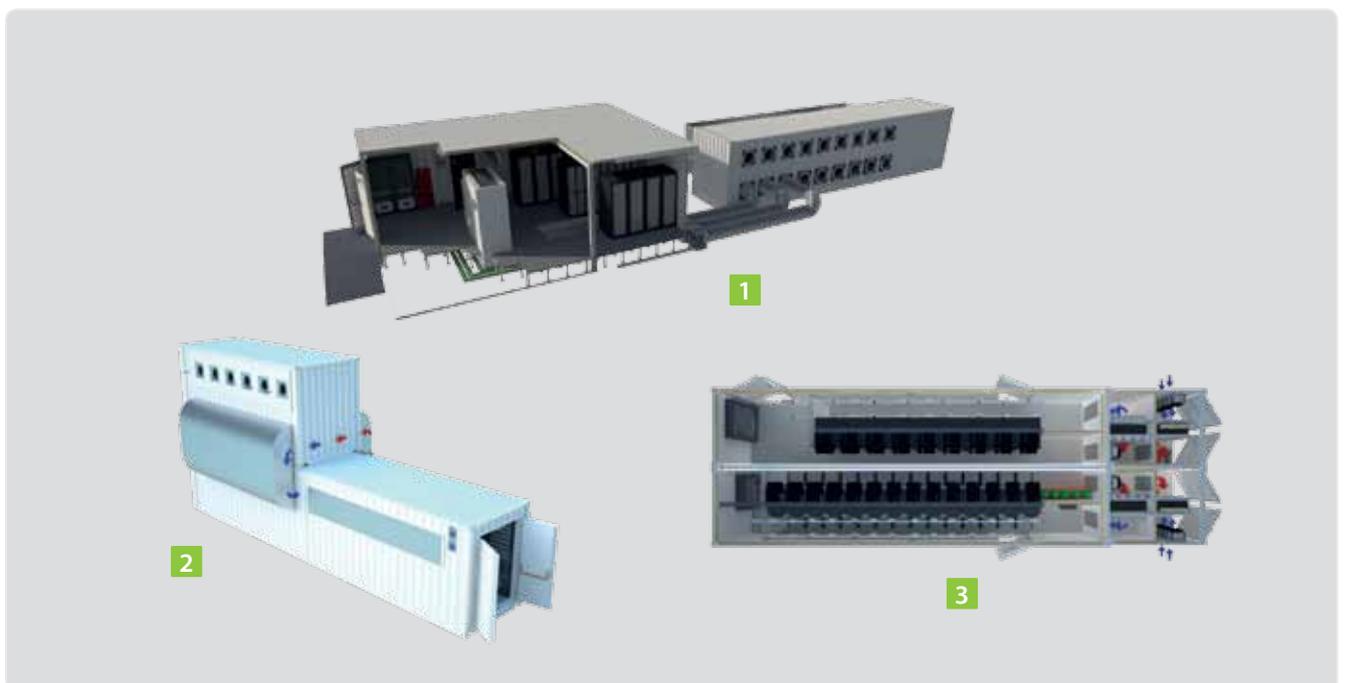


Mumbai PUE 1.24

CONFIGURATIONS

MNFC is a fully customizable solution that can be delivered in both new and existing traditional and containerized datacenters with or without raised floor. The flexibility of MNFC allows us to adapt it to the layout of almost any datacenters with several configurations available.

1. Ducting Configuration with raised floor
2. Top configuration
3. Side Configuration





ASTModular

SOLUTIONS

FROM SKETCH TO REALITY



THOR DATA CENTER

Thor Data Center selected AST Modular to implement one of most energy efficient datacenter in the world. Thor's facility in Reykjavik features a Modular Natural FreeCooling container. MNFC cools the Data Center "the natural way" using its ultra efficient air to air heat exchangers when the outside air temperature does not exceed 24° C, therefore overcoming the need for traditional Data Center mechanical cooling systems. Iceland's peculiar climate conditions enable Thor's Datacenter to run under Free Cooling 24/7, 365 days per year. AST Modular and Thor have achieved an outstanding 1.07 PUE. For more information on Thor Data Center please visit <http://www.thordc.com/technology/> or watch our live tour at <http://www.youtube.com/watch?v=qWktldzVSjE>



IBM FOR A LEADING DANISH BANK

AST Modular have currently completed the first stage of the project pictured below for IBM Strategic Outsourcing in Denmark. IBM SO needed additional capacity in order to accommodate a request from a leading Danish Bank within a very limited execution time. The solution which features two 10' Modular Natural Free Cooling Containers is ultra energy efficient





MNFC's YEARLY SAVINGS IN 250 KW DC COMPARED TO ALTERNATIVE COOLING SYSTEMS

	at 0,1 € / kWh		at 0,12 € / kWh	
	NFC vs EFFICIENT COOLING	NFC vs CONVENTIONAL CRAC COOLING	NFC vs EFFICIENT COOLING	NFC vs CONVENTIONAL CRAC COOLING
Reykjavik	29.779,00 €	49.051,00 €	35.734,80 €	58.861,20 €
Copenhagen	75.089,31 €	103.974,75 €	90.107,17 €	124.769,70 €
Oslo	75.089,31 €	103.974,75 €	90.107,17 €	124.769,70 €
Stockholm	74.697,17 €	103.582,61 €	89.636,61 €	124.299,14 €
Amsterdam	74.513,62 €	103.399,06 €	89.416,34 €	124.078,88 €
London	74.221,51 €	103.106,95 €	89.065,81 €	123.728,34 €
Moscow	77.321,86 €	103.340,82 €	92.786,23 €	124.008,99 €
Paris	77.321,86 €	107.372,86 €	92.786,23 €	128.847,43 €
Geneva	77.922,51 €	104.679,16 €	93.507,02 €	125.614,99 €
Zurich	76.633,18 €	105.294,90 €	91.959,82 €	126.353,88 €
Madrid	75.209,11 €	108.338,10 €	90.250,94 €	130.005,72 €
Milan	75.209,11 €	101.917,09 €	90.250,94 €	122.300,51 €
Casablanca	89.739,99 €	135.690,34 €	107.687,98 €	162.828,41 €