

Read: Application dt.23.04.2014 (received on dt.18.06.2014) by M/s. Ensys Engineers Pvt. Ltd.
Heard: Sh. G.Y. Patwardhan, Advocate, Sh. Aditya Lalit [Director].

PROCEEDINGS

(under section 56 (1) (e) & (2) of the Maharashtra Value Added Tax Act, 2002)

No.DDQ/11/2014/Adm-6/15/B - I

Mumbai, dt. 30/04/2015

M/s. Ensys Engineers Pvt. Ltd, having address as flat no. A-6, Omkarpuram, S.No.87/1/1A, Azadnagar, Kothrud, Pune 411 038, and holder of TIN 270855270800V, request for determination of the question : "Whether "Heat Pumps" (sold under invoice no.7, dt.08.01.2014) are solar energy devices covered by entry 56 of Schedule A of MVAT Act and is taxable at Nil rate?"

02. FACTS AND CONTENTION

The facts and contention in the application are reproduced verbatim thus -

"The Appellant is manufacturer of Heat Pumps. The solar energy latent in air is the main source of energy used in heat pumps. The solar energy in the form of heat in air is released into water circuit through heat pumps which is used to heat the water. The heat pump consists of an evaporator, a compressor, a condenser and a expansion device. Solar energy in air is collected by evaporator and then transferred to compressor where the heat is upgraded to higher temperature. Then it is transferred to condenser where the heat is transferred to water.

Our Contention:

The main utility of the heat pump is to use solar energy for heating water. It is a system used for heating water by transferring the solar energy present in hot air and therefore it is a solar energy device.

A Technical Note on Heat Pump

Heat Pumps use basic thermodynamic principles to convert latent/sensible heat (contained within the ambient air) into heat energy that can be used to provide heating the water. In this respect the device can be classified as a renewable energy source because the solar energy in the form of heat in the air surrounding the equipment is replenished by the sun.

Air to water heat pumps employ the dynamics of the vapour compression cycle used for many years in the basic refrigeration process. A low pressure, low boiling point liquid (refrigerant) is exposed to a higher temperature in the coil of the evaporator (Solar Passive Heat Collector). The liquid boils off to a gas and in doing so, absorbs energy. The refrigerant gas is then compressed to a higher pressure and temperature before passing through a heat exchanger where it gives its heat energy to water. The heated water is then delivered to a cylinder or heating system. After passing through the heat exchanger the refrigerant condenses back into a liquid before starting the process again.

Schematic Representation of Heat Pump Working

The EVAPORATOR collects heat from the outside ambient air, pre-heated by the sun. With Ensys, heat pumps high volumes of outside air are drawn into the unit by the fan and expelled through the evaporator fins. The evaporator has liquid refrigerant passing through it, which is at a considerably lower temperature than the ambient air, therefore the air gives up its heat to the refrigerant, which then vaporizes. This pre-heated vapour now travels to -

The COMPRESSOR where it is compressed and upgraded to a much higher temperature. The hot vapour now enters-

The CONDENSER where it is surrounded by water from the heating systems. The heat is given up to the cold water thus making it hot water and the now cooler refrigerant returns to its former liquid state but still under high pressure from the compressor. This pressure is released by passing the liquid through-

The EXPANSION DEVICE and from there, now at low pressure, it is returned to the evaporator and the cycle starts again."

03. HEARING

A hearing in the matter was taken earlier on dt.03.12.2014 by my predecessor. Sh. G.Y. Patwardhan [Advocate], Sh. Dinesh Shah [Director] and Sh. Aditya Lalit [Director] attended the

hearing. During the hearing, it was submitted thus -

- It is claimed that the 'Heat Pump' operates on solar energy and is therefore covered by the schedule entry A-56 for 'Solar energy devices as may be notified from time to time by the State government in the Official Gazette and spare parts thereof'. The notification for the aforesaid entry specifies thus -
 - (4) Solar water heaters and systems.
 - (8) Solar pumps based on solar thermal and solar photovoltaic conversion.
- Since it was seen that the product uses electrical energy for the compressor, one of the parts of the product, the claim under the entry for solar energy devices was questioned in terms of whether there are pumps which operate solely on solar energy. To this, it was stated that there are pumps which run on electrical energy generated from solar energy whereas the present product directly uses solar energy to heat gas for the heating of water. It was informed that the ratio of electricity to air is 1:3 i.e. 1 unit of electricity with 3 units of solar energy and total 4 units are given to heat water.
- They were asked about Excise classification. It was informed that they are not covered under Excise for turnover reasons. However, it was submitted that classification by other manufacturers would be submitted within 15 days.
- They were also asked regarding certification as a 'solar energy device' by any authority.
- They requested for prospective effect to the determination order if their contention is not applicable. The applicant is presently charging tax @ 12.5%.

With reference to the queries raised during hearing, a submission dt.10.12.2014 (received on dt.22.12.2014) is reproduced verbatim thus :

1. **"Operation of pump in evenings or when sun light is poor:** The sun energy is patent in the air which is absorbed in the pump. The pump is designed with reference to normal Indian climate. The Heat Pump in question operates at full capacity to absorb solar energy in the form of heat in air upto 15 degree centigrade. In most part of India and most part of the year the minimum temperature is above 15 degree centigrade. The air temperature is due to solar energy received from the sun. The solar energy is retained in air even after sun set. Even when the temperature drops below 15 degree centigrade the heat pump operates on solar energy however it's efficiency gets reduced. Thus during day or after sun set the heat pump operates on solar energy. We would like to reiterate that it is a system used for heating water by transferring the solar energy present in hot air and therefore it is a solar energy device.
2. **Central Excise tariff entry:** During the discussion we have informed that our company is not liable for excise till this date hence we do not know the excise tariff code. We have consulted excise consultant. He has informed that there is no specific entry for heat pumps manufactured by our company. In his opinion it will be covered by Central Entry tariff entry 8418 61 00 i.e. heat pumps other than air conditioning machines of heading 8415.
3. **It's use:** Use of water heating systems with use of solar panels is widely known and is popular. However, during last decade in urban areas many high rise buildings are constructed. The solar panels require large area to absorb the solar energy. High rise building do not have sufficient space to use solar panels. Our heat pump requires much less space than solar panels but does the same work (i.e. heating water) by using different technology."

A re-hearing in the matter was held on dt.18.04.2015 when Sh. G.Y. Patwardhan and Sh. Aditya Lalit [Director] attended the hearing. The submissions as made earlier were reiterated.

04. OBSERVATIONS

I have gone through the facts of the case. The product for determination is described as a 'Heat Pump'. I have reproduced the applicant's description about the product and the

submission as to the applicable schedule entry under the Maharashtra Value Added Tax Act, 2002 (MVAT Act). The said entry 56 under Schedule A reads thus :

Solar energy devices as may be notified, from time to time, by State Government in the Official Gazette, and spare parts thereof.

Under the notification dt.29.06.2009 for the purposes of the aforesaid entry, the applicant has laid claim in respect of the following products as enumerated therefor :

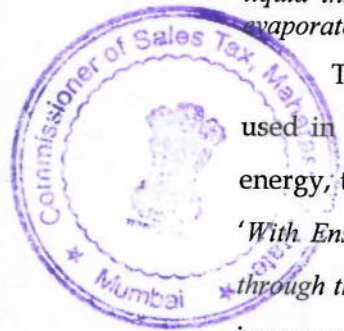
(4) Solar water heaters and systems.

(8) Solar pumps based on solar thermal and solar photovoltaic conversion.

The entry as can be seen is for solar energy devices. No other form of energy as in electrical or mechanical energy is mentioned herein. Thus, the devices as understood to be falling in the entry would be using solar energy and not any other form of energy. Now, a solar energy device is one which uses solar energy, an important source of renewable energy. We have seen that the impugned product comprises of 4 components - an Evaporator, a Compressor, a Condenser and an Expansion device. The applicant has explained the working of the pump. However at the cost of repetition but for immediate reference, I reproduce the same herein thus -

"The EVAPORATOR collects heat from the air, pre-heated by the sun. High volumes of outside air are drawn into the unit by the fan and expelled through the evaporator fins. The evaporator has liquid refrigerant passing through it, which is at a considerably lower temperature than the ambient air, therefore the air gives up its heat to the refrigerant, which then vaporizes. This pre-heated vapour now travels to the COMPRESSOR where it is compressed and upgraded to a much higher temperature. The hot vapour now enters the CONDENSER where it is surrounded by water from the heating systems. The heat is given up to the cold water thus making it hot water and the now cooler refrigerant returns to its former liquid state but still under high pressure from the compressor. This pressure is released by passing the liquid through the EXPANSION DEVICE and from there, now at low pressure, it is returned to the evaporator and the cycle starts again"

The applicant contends that the solar energy latent in air is the main source of energy used in heat pumps. However, it is also seen and informed that the heat pump uses electric energy, too. The Compressor and the fan runs on electric energy. The applicant describes thus - 'With Ensysis, heat pumps high volumes of outside air are drawn into the unit by the fan and expelled through the evaporator fins'. Thus, the fan working on electricity helps in drawing the air into the impugned heat pump. And as we see the working of the pump, it needs no big thought process to infer that the Compressor of this heat pump is the core part of the pump. The pump uses the heat from the air to vaporize the refrigerant, a substance or mixture, usually a fluid, used in a heat pump and refrigeration cycle undergoing phase transitions from a liquid to a gas and back again. But to actually heat, the role of the Compressor is pivotal as it is at this stage that the vapour is compressed and upgraded to a much higher temperature. The next stage is the Condenser where the heat is given to the water. Considering all this, a question comes but naturally to mind and which is - The facts being so, could then it be said that solar energy is the main source of energy? Or as differently put - Could it be said that the impugned product works only on solar energy? The answer would not be in the affirmative as the device does not operate solely on solar energy. It needs electric energy to perform a process to complete the product design cycle. The schedule entry is



for 'Solar energy devices'. The applicant contends that the impugned product is a solar energy device, an air to water heat pump. The information as on the Internet reveals that air source heat pumps are another electric heating option. The air to water heat pump uses a refrigeration cycle to pull heat out of the outdoor air and uses that to heat the water which is then circulated through the floor and radiators. As observed above, the impugned product uses electricity which plays a pivotal role in the working of the pump. The applicant himself describes the product as thus - "*En-Saver is a fully automated Air Source Heat Pump which generates Hot Water with a very High Efficiency. It takes heat from the ambient air & electricity given to the Compressor and gives combined heat to cold water to heat it.*". Therefore, I am of the considered view that the impugned product is not a solar energy device and thereby not a solar water heater or system or a solar pump as notified under the entry.

The applicant has laid claim to the impugned product being covered under the description 'solar water heater and systems'. My understanding of the impugned product not being a solar water heater is fortified when I take recourse to the website of the Ministry of New and Renewable Energy (MNRE) under the Government of India (GOI) to ascertain as to what is understood by a solar water heater. The various articles and reports published therein bring out the following :

FREQUENTLY ASKED QUESTIONS (SOLAR WATER HEATER)

Q.No.1 What is Solar Water Heater?

Ans. A Solar Water Heater is a device which provides hot water for bathing, washing, cleaning, etc. using solar energy. It is generally installed at the terrace or where sunlight is available and heats water during day time which is stored in an insulated storage tank for use when required including mornings.

Q. No. 2 How does it work?

Ans. A Solar Water Heater comprises of a or an array of solar collectors to collect solar energy and an insulated tank to store hot water. Both are connected to each other. During the day time, water in solar collectors gets heated which is either pumped or flown automatically on thermosyphon principle to the storage tank. Hot water then stored in the tank can be used for various applications.

Q. No. 3 What are different types of Solar Water Heaters?

Ans. Two types of Solar Water Heaters are available; one based on flat plate collectors and the other based on evacuated tube collectors. Flat plate collector (FPC) based systems are of metallic type and have longer life as compared to Evacuated tube collector (ETC) based system because ETCs are made of glass which are of fragile in nature.

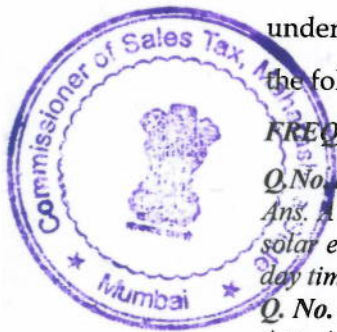
Both these systems are available with and without heat exchanger. They can also work with and without pump. Systems without pump are known as thermosyphon systems and those with pump are known as forced circulation systems.

Q. No. 4. Which type of solar water heater is suitable for different places/ category of users?

Ans. ETC based systems are cheaper than FPC based system. They perform better in colder regions and avoid freezing problem during sub-zero temperature. FPC based systems also perform good with anti-freeze solution at sub zero temperature but their cost increases. In other regions, both perform equally good.

Systems working on thermosyphon principle are simple and relatively inexpensive. They are suitable for domestic and small institutional applications, provided water quality is good and it doesn't have large chlorine contents. Forced circulation systems are generally preferred in industries or large establishments.

At places where water is hard and have larger chlorine content, if FPC based system is being installed, it must be with heat exchanger as it will avoid scale deposition in copper tubes of solar collectors which can block the flow of water as well reduce its thermal performance. ETC based systems will not block the flow of water but its performance may go down due to deposition of salt contents on



inner surface of glass tubes, which could be cleaned easily once in a year or so.

Q.No. 8 Why should I go for a Solar Water Heater? What do I save from it?

Ans. A 100 litre per day capacity system suitable for 3-4 people can save upto 1500 units of electricity in a year, depending on hot water used. It can also save around 140 litres of diesel in an establishment using oil fired boiler besides reducing green house gas emissions in the atmosphere. Higher capacity systems will save higher amount of electricity/fuel oil besides reducing higher amount of GHG emissions.

Electricity is expensive and is not available due to power cuts in many areas when required for heating water. Solar Water Heater, since it stores hot water in an insulated tank, provides water all the time when required. Fuel oil is also expensive and creates pollution. Storing the fuel oil for long term use in commercial establishments is another problem.

The table below gives approximate likely electricity and money savings for a typical 100 liters per day system located in different parts of the country.

	Northern Region	Eastern Region	Southern Region*	Western Region*
Expected no. of days of use of hot water per year	200 days	200 days	300 days	250 days
Expected yearly electricity saving on full use of solar hot water (units of electricity)	1000	1000	1500	1250
Monetary savings at different prices of electricity, Rs/year				
Rs. 4/kwh	4000	4000	6000	5000
Rs. 5/kwh	5000	5000	7500	6250
Rs. 6/kwh	6000	6000	9000	7500

Since the aforesaid article refers to 'thermosiphon principle', I refer to the Net to understand the same in the context of solar water heaters. It comes out thus -

"Thermosiphons are used in some liquid-based solar heating systems to heat a liquid such as water. The water is heated passively by solar energy and relies on heat energy being transferred from the sun to a solar collector. The heat from the collector can be transferred to water in two ways: directly where water circulates through the collector, or indirectly where an anti-freeze solution carries the heat from the collector and transfers it to water in the tank via a heat exchanger. Convection allows for the movement of the heated liquid out of the solar collector to be replaced by colder liquid which is in turn heated. Due to this principle, it is necessary for the water to be stored in a tank above the collector"

After referring to the **FREQUENTLY ASKED QUESTIONS** and the understanding of the principle on which the solar water heater works, an observation cannot escape being easily inferred that a solar water heater nowhere uses any other additional or complementary source of energy such as electric energy and further does not need the support of a fan or a compressor working by using electric energy. I would also refer to other articles as published by the Government -

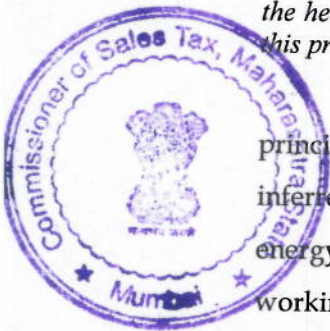
Solar Water Heating Systems

We are blessed with Solar Energy in abundance at no cost. The solar radiation incident on the surface of the earth can be conveniently utilized for the benefit of human society. One of the popular devices that harness the solar energy is solar hot water system (SHWS).

A solar water heater consists of a collector to collect solar energy and an insulated storage tank to store hot water. The solar energy incident on the absorber panel coated with selected coating transfers the heat to the riser pipes underneath the absorber panel. The water passing through the risers get heated up and is delivered to the storage tank. The re-circulation of the same water through absorber panel in the collector raises the temperature to 80° C (Maximum) in a good sunny day. The total system with solar collector, storage tank and pipelines is called solar hot water system.

Broadly, the solar water heating systems are of two categories. They are : closed loop system and open loop system. In the first one, heat exchangers are installed to protect the system from hard water obtained from borewells or from freezing temperatures in the cold regions. In the other type, either thermosiphon or forced circulation system, the water in the system is open to the atmosphere at one point or other. The thermosiphon systems are simple and relatively inexpensive. They are suitable for domestic and small institutional systems, provided the water is treated and potable in quality. The forced circulation systems employ electrical pumps to circulate the water through collectors and storage tanks.

The choice of system depends on heat requirement, weather conditions, heat transfer fluid quality, space availability, annual solar radiation, etc. The SHW systems are economical, pollution free and easy



for operation in warm countries like ours.

Based on the collector system, solar water heaters can be of two types.

Flat Plate Collectors (FPC) based Solar Water Heaters

The solar radiation is absorbed by Flat Plate Collectors which consist of an insulated outer metallic box covered on the top with glass sheet. Inside there are blackened metallic absorber (selectively coated) sheets with built in channels or riser tubes to carry water. The absorber absorbs the solar radiation and transfers the heat to the flowing water. There are 60 BIS approved manufacturers of Solar Flat Plate Collectors.

Evacuated Tube Collectors (ETC) based Solar Water Heaters

Evacuated Tube Collector is made of double layer borosilicate glass tubes evacuated for providing insulation. The outer wall of the inner tube is coated with selective absorbing material. This helps absorption of solar radiation and transfers the heat to the water which flows through the inner tube. There are 44 MNRE approved ETC based solar water heating suppliers.

Solar water heating is now a mature technology. Wide spread utilization of solar water heaters can reduce a significant portion of the conventional energy being used for heating water in homes, factories and other commercial and institutional establishments. Internationally the market for solar water heaters has expanded significantly during the last decade.

Salient Features of Solar Water Heating System

Solar Hot Water System turns cold water into hot water with the help of sun's rays.

- Around 60 deg. – 80 deg. C temperature can be attained depending on solar radiation, weather conditions and solar collector system efficiency
- Hot water for homes, hostels, hotels, hospitals, restaurants, dairies, industries etc.
- Can be installed on roof-tops, building terrace and open ground where there is no shading, south orientation of collectors and over-head tank above SWH system
- SWH system generates hot water on clear sunny days (maximum), partially clouded (moderate) but not in rainy or heavy overcast day
- Only soft and potable water can be used
- Stainless Steel is used for small tanks whereas Mild Steel tanks with anticorrosion coating inside are used for large tanks
- Solar water heaters (SWHs) of 100-300 litres capacity are suited for domestic application.
- Larger systems can be used in restaurants, guest houses, hotels, hospitals, industries etc.

Fuel Savings :

A 100 litres capacity SWH can replace an electric geyser for residential use and saves 1500 units of electricity annually.

Avoided utility cost on generation

The use of 1000 SWHs of 100 litres capacity each can contribute to a peak load shaving of 1 MW.

Environmental benefits

A SWH of 100 litres capacity can prevent emission of 1.5 tonnes of carbondioxide per year.

Life : 15-20 years

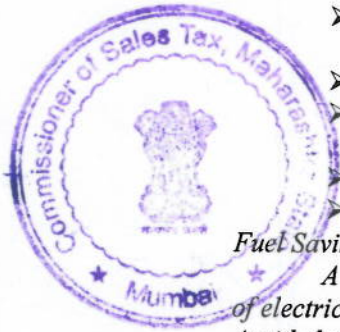
Approximate cost : Rs.15000- 20,000 for a 100 litres capacity system and Rs.110-150 per installed litre for higher capacity systems

Payback period :
3-4 years when electricity is replaced
4-5 years when furnace oil is replaced
5-6 years when coal is replaced

Though the initial investment for a solar water heater is high compared to available conventional alternatives, the return on investment has become increasingly attractive with the increase in prices of conventional energy. The pay back period depends on the site of installation, utilization pattern and fuel replaced."

As can be seen, the solar water heater or the total system with solar collector, storage tank and pipelines called solar hot water system bears no resemblance to the product in the present proceedings before me. The description in the 'Introduction' given under the website about 'Solar Energy Systems' describes thus -

"India is endowed with abundant of solar radiation. The country receives solar radiation equivalent to more than 5,000 trillion kWh/year, which is far more than its total annual energy requirement. The radiation available could be utilized for thermal as well as for photovoltaic applications. Solar thermal technologies have already found ready acceptance for a variety of decentralized applications in domestic, indus-



trial and commercial sectors of the country. The most widely acceptable application is the solar water heating technology. However, solar steam generating and air heating technologies and energy efficient solar buildings are also attracting attention in urban and industrial areas. Among solar photovoltaic technologies, there are some devices/ systems such as solar lanterns, solar home systems, solar street lights, solar pumps, solar power packs, roof top SPV systems etc which could be useful both in rural and urban areas for the purpose of reducing burden on conventional fuels."

It may be noted that the product pictures shown below the aforesaid heading are of Solar lanterns, Solar Cooker, Solar Power Plant and Solar Water Heating System. Yet another Report says thus -

Solar Water Heaters In India: Market Assessment Studies And Surveys For Different Sectors And Demand Segments - Submitted To Project Management Unit Global Solar Water Heating Project Ministry Of New And Renewable Energy - 20th January 2010

"Use of solar energy for heating water is one of the oldest and most mature renewable energy technologies. The two predominant technologies that are used are Flat Plate Collectors (FPC) and Evacuated Tube Collectors (ETC)2. A FPC consists of a weatherproofed, insulated box covered with glass sheet, containing a black metal absorber sheet with built in pipes. An ETC has multiple evacuated glass tubes. The working fluid flows in the inner tube; the vacuum within the evacuated tubes reduces convection and conduction heat losses.

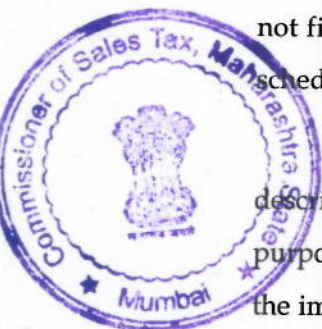
The present product does not have the mechanism of plate collectors. The conventional heat pump system also employs a mechanism which involves an evaporator, a compressor and a condenser. We have seen the design or mechanism of a solar water heater which does not have the aforementioned features. Therefore, no parity exists between a solar water heater and the impugned product. The above literature as obtained from the Government database serves well to strengthen my observation that the impugned product, operating on electricity as well, does not fit into the description of 'Solar water heaters and systems' as notified for the purposes of the schedule entry for *Solar energy devices* as appearing under the MVAT Act, 2002.

The other claim of the applicant is as regards the impugned product being covered by the description 'Solar pumps based on solar thermal and solar photovoltaic conversion' as notified for the purposes of the impugned entry. During the course of the hearing, the applicant has admitted to the impugned product not being a pump as it heats water but does not pump the water. In view thereof, I need not enter into any exercise of ascertaining whether the impugned product fits into the aforesaid description as notified.

It is seen that there is no specific schedule entry under the MVAT Act, 2002 which covers the impugned product. The product, therefore, gets placed in the residuary schedule entry E-1, thereby taxable @12.5%.

05. PROSPECTIVE EFFECT

The applicant has requested for prospective effect to the determination order if their contention is not applicable. I have elaborately discussed above as to how the impugned 'heat pump' does not fit into the description 'solar water heater and systems' as notified under the schedule entry A-56 for 'solar energy devices'. The impugned product does not employ the



mechanism of plate collectors as is contemplated in a solar water heating system. As regards claim to the description '*Solar pumps based on solar thermal and solar photovoltaic conversion*', then the applicant himself admits to the impugned product not being a pump to pump water. And even assuming that it is a pump then we have seen that the impugned product does not employ the mechanism of plate collectors or photovoltaic cells as is understood by the notified description. Thus, the applicant is aware, by all means, with the information being so easily available that the 'heat pump' in the present proceedings would not fit into the aforesaid schedule entry. And therefore, it could be understood that the applicant has been rightly charging of tax @ 12.5% on the sale of the impugned product. A request for prospective effect is to be weighed in terms of any attending inconsistencies or ambiguity of provisions as also statutory misguidance of any sort. None of these situations are found in the present case. In the circumstances, I do not find that a case for positive consideration of the request for prospective effect is made out by the applicant.

In the circumstances, it is determined thus -

ORDER

(under section 56 (1) (e) & (2) of the Maharashtra Value Added Tax Act, 2002)

No.DDQ/11/2014/Adm-6/15/B - I

Mumbai, dt. 30/04/2015

1. For reasons as discussed in the body of the order,
 - a. the claim for coverage of the "Heat Pump" under schedule entry A-56 of the MVAT Act, 2002 is not found proper.
 - b. the request for prospective effect is rejected.
2. The rate of tax on the said product sold under invoice no.7, dt.08.01.2014 is 12.5% being covered by the residuary schedule entry E-1 of the MVAT Act, 2002.


(RAJIV JALOTA)

COMMISSIONER OF SALES TAX,
MAHARASHTRA STATE, MUMBAI