Table 4 The Best Available Techniques Which Shall Be Applied in Processing Techniques for Semi-Conductor and Panel Industries

Energy users shall meet the requirements and values of energy efficiency-related processing techniques listed in the following "the best available techniques" for specific industries.

1. The best available techniques which shall be applied in processing techniques for semi-conductor industries

The best available techniques for semi-conductor industries	
（1）	Option of Ancillary Devices on Equipment: Choice of ancillary devices with high energy efficiency (such as vacuum pump, local scrubber, chiller, heater etc.).
（2）	Energy-Saving Design: (1) Assessing and measuring the energy consumption on primary and secondary equipment (such as the energy sources, electricity, saving benchmark of raw materials or the other approaches for the manufacturing equipment of SEMI S23- semiconductor). Select the most appropriate measurement on energy saving. (2) Electrical components conform to the latest international energy saving specifications for equipment (similar to or better than IE3 grade - ultra-high efficiency); Electrical equipment will use the variable frequency drive controller (such as the pump installed with the Variable Frequency Drive (VFD) or the energy saving devices etc.). (3) The hardware and control software design among the primary and ancillary devices should be considered adopting energy saving functions, such as the various standby modes (sleep mode, idle mode etc.). (4) Optimization of the energy saving for utilities: The design and control mechanism for the using adjustment of exhaust, cooling system, compressed air, and inertia gas (such as nitrogen) etc.

（3）

Energy Usage Intensity of Processing Techniques:

The processing techniques for foundry below 6- inch, 8-inch foundry , and 8-inch DRAM shall meet the milestone of the top 10% (top 10) energy usage intensity in Taiwan shown as below:

Unit: kilowatt hour/silicon wafer area - cm^2

	Wafer Foundry Below 6-inch(1)	8-inch Wafer Foundry (2)	8-inch DRAM (3)
Energy Usage Intensity	0.756	0.876	0.930

Note 1：Applicable for the 6-inch with average mask layer below 14.

Note 2：Applicable for the 8-inch with average mask layer below 15.

Note 3：The 6- inch with average mask layer over 14 layers, the 8- inches with average mask layer over 15 layers, or where due to the legitimation restrictions, patents protection, international trade barriers, or other causes not be attributable to the applicants, the given evidences should be submitted by the applicants.

Note 4：Equation for calculating energy usage intensity:

$$\text{Energy Usage Intensity} = \frac{\text{Annual electricity (kwh) used in the whole plant for an unique sized wafer with the dedicated process}}{\text{The quantity of annual production being normalized wafer size (m2) with the dedicated process}}$$

The quantity of annual production being normalized wafer size (m2) with the dedicated process calculated such as: $A=\pi \times r2 \times$Pieces of Silicon Wafer Produced yearly, where π is 3.1415926, and r is the radius of silicon wafer (in centimeter).

2. Best Available Techniques Which Shall Be Applied in Processing Techniques for Panel Industries

II. The Best Available Techniques for Panel Industries	
（1）	Selection of Ancillary Devices for Equipment: (1) Assess its energy efficiency as much as possible. (2) Adopt a higher energy efficiency or variable frequency controller (such as the pump installed on equipment with a variable frequency drive or an energy saving device, etc.).

<table>
<tr><td>（2）</td><td><u>Energy-Saving Design:</u>

The devices for equipment shall conform to the following:

(1) Idle mode with the considered of energy saving; or alternative designs of energy saving mode with the same function.

(2) The corresponding software with automatic or manual control to perform the energy saving control of the energy consuming ancillary devices under the standby mode such as a vacuum pump and an oven etc.</td></tr>
<tr><td>（3）</td><td><u>Energy Usage Intensity of Processing Techniques:</u>

The processing techniques for the plants of the 5th generation and before , as well as the 5.5th generation to 8th generation plants must follow to the top 10’s (top 10%) benchmark of energy usage intensity which is shown as below:

Unit: kilowatt hour/input glass substrate area m²

<table><tr><td></td><td>5th Generation and before Plant(1)</td><td>The 5.5th Generation Plant to the 8th Generation Plant(1)</td></tr><tr><td>Energy Usage Intensity</td><td>148</td><td>110</td></tr></table>
Note 1：Applicable for the mask layer processing of amorphous LCD less than 5 PEP process, with the actual input capacity per month of both TFT-Array glass substrate and the color filter (CF) exceeded 120K (thousand pieces).

Note 2：Those due to the legitimation restrictions, patents protection, international trade barriers, or other causes not be attributable to the applicants, the given evidences should be submitted by the applicants.

Note 3：Equation for calculating energy usage intensity:

$$\text{Energy Usage Intensity} = \frac{\text{Annual electricity (kwh) used in the whole plant for an unique generation}}{\text{Annual quantity (m²) of glass substrate input for the unique generation}}$$

The previous annual input quantity of various sized glass substrate and color filters, are calculated by: color filter (m²/pc) × pieces of each size of glass substrate (piece).</td></tr>
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