ENERGY STAR Imaging Equipment
Specification Revision
Stakeholder Meeting
March 16, 2005
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Today's Agenda (1)

- 9:15 a.m. **Welcome and Introductions**
- 9:30 a.m. **ENERGY STAR Update**
- 9:45 a.m. **Meeting Goals**
- 9:55 a.m. **TEC TP Overview**
- 10:05 a.m. **TEC TP Demonstration & Explanation of Accuracy**
- 10:40 a.m. **TEC TP Comments by the European Commission ENERGY STAR Board**

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Today's Agenda (2)

- 10:55 a.m. **Imaging Discussion Topics**
  - TEC Test Procedure
  - Operational Mode (OM) Test Procedure
  - Producing a First Draft Specification
- 3:30 p.m. **Conclusion**
  - Summary of Discussion
  - Next Steps and Timeline
- 4:00 p.m. **Meeting Adjourn**

- *Break for lunch as needed*
- *Demos of APEC external power supplies design contest winners on breaks*

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ENERGY STAR Update

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ENERGY STAR Update

- Product Specifications in Development
  - Craig Hershberg, US EPA
- Marketing and Promotional Activities
  - Jill Abelson, US EPA
- Program Administration: OPS
  - Robin Shudak, US EPA

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PD Update: New Specifications

- New products launched over last year:
  - External Power Supplies: January 2005
  - Room Air Cleaners: July 2004
  - Vending Machines: April 2004
- Specifications under development
  - Battery Chargers
  - Commercial Dishwashers
  - Digital Television Adapters (DTA)
  - Pre-Rinse Spray Valves

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PD Update: Product Revisions

- In addition to imaging equipment, EPA is revising the following specifications:
  - Dehumidifiers
  - HVAC (Central Air Conditioners/Air Source Heat Pumps)
  - Computers
  - Programmable Thermostats
  - Roof Products
  - Telephony
- Suspended specifications
  - Set-top Box

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ENERGY STAR Future Direction

1990's → *2000's*

Off (Standby) and Sleep Power ⟶ *Active Power*

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Reasons to Pursue Active Power in Office Equipment and Consumer Electronics

- Additional savings opportunity
  - Picked low fruit
  - Focus on most energy intensive mode
  - Challenges associated with enabling / power management
  - Power supplies are viable; high potential savings
- Product usage patterns and designs changing
  - Higher active use for longer periods of time, less time in sleep
    - Products trending toward always on, increased networking
    - Identify & promote models that scale total power use closely to workload
- Holistic approach
  - Consistent with consumer views of product efficiency
  - Promote products that save $ and KWh all of the time, not just some of the time

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EPA Power Management Outreach - Million Monitor Drive (MMD)

- Launched in late 2001 to address low enabling rates for monitors
- Estimated that office computers and monitors use 1% of the nation's electricity
- Focused on monitors to facilitate success and achieve greatest energy savings
- More than half of electricity used to power monitors is wasted:
  - 60 percent left on at night
  - 45 percent not enabled for power management
- MPM places active monitors (60 to 90 watts) in low-power sleep mode(2 to 10 watts) after a period of inactivity

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Million Monitor Drive (cont.)

- Campaign to address power management (activating sleep settings) on at least 1 million computer monitors annually.
- Promotes network tools and technical assistance that make monitor power management quick and easy
- Largest corporations in US have participated:

• Cisco Systems	• Nike
• Ford	• Pitney Bowes
• GE	• WalMart
• GM	• Wells Fargo

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Million Monitor Drive: Results

- As of January 2005, 6.4 million monitors have become part of the MMD.
- Estimated savings of 660 million kWhr and $50 million:
  - Enough electricity to light all the homes in Hawaii
  - Equivalent to preventing 470,000 tons of CO_2 emissions
- Have begun next phase -- computer (hard drive, CPU) power management (CPM) -- through:
  - Pilot implementations at universities and schools
  - New network tool that activates CPM
  - Working with industry to make CPM technical improvements

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ENERGY STAR and Microsoft are discussing how to improve Windows CPM

- ES team and Longhorn development managers met in Redmond in March 2005
- Longhorn managers are committed to removing computer power management (CPM) "adoption blockers"
- ES will provide Microsoft with information about CPM utilization in the field
- ES and Microsoft will explore ways to jointly educate organizations and end-users about CPM

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Online Product Information

Robin Shudak, US EPA
Darcy Martinez, ICF Consulting

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Why Online Product Information (OPI)?

- Better information accuracy
- Allows partners direct access to modify their own data
- Paperless
- More cost-effective
- A single data entry point for multiple international interests
- More consumer-oriented information - Think Amazon.com for energy-efficient products

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How it All Works

- **Partners** enter, manage, and track information into temporary data tables.
- **ENERGY STAR (ICF)** reviews it using the Data Review Application (DRA) tool. Qualified products are then shifted into our database.
- **Consumers** view information about qualified products sold in the US using the Find A Product (FAP) feature of the ENERGY STAR Web site.
- **International Partners** can develop their own web-based tools for their own markets using a subset of the same data, if desired.

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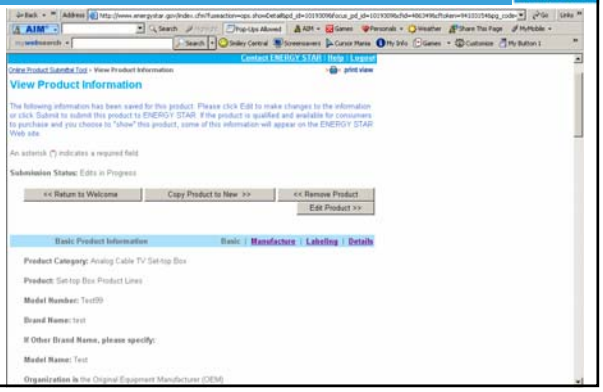
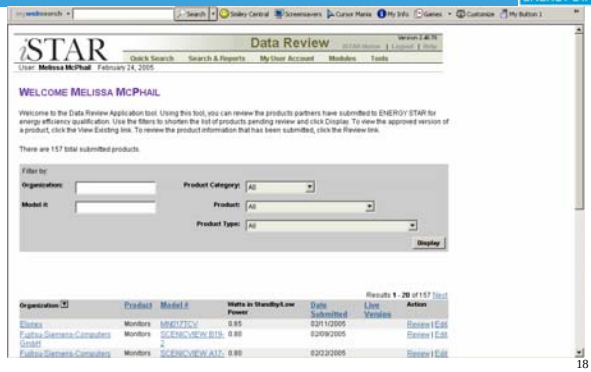
OPS View Product Information



DRA Welcome Screen



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FAP Product Details

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Timeline

- Home Electronics
  - OPS initiated September 2003
    - All HE partners
    - ~55 products/month
  - FAP online November 2003
    - 1 in 3 visitors to HE pages use FAP
- Office Equipment
  - OPS initiated May 2004
    - All OE partners
    - ~190 products/month
  - FAP online March 2005
- International Coordination
  - Started in 2003 with EU, New Zealand
  - Monthly data downloads

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Plans for 2005

- Trial stabilization to interface
  - No changes for 3 months
    - Batch importing
    - "Family" submittals
  - Beginning with monitors in May
- Continue working on OPS/FAP for other products
  - EPS
  - Lighting

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Imaging Equipment Discussion

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Meeting Goals

- **Meeting Goals:**
  - Ensure full understanding of the Typical Electricity Consumption (TEC) TP and what it accomplishes
  - Obtain comments on the TEC TP measurements and calculations so that these pieces may be finalized
  - Identify any additional elements necessary to create the First Draft Specification
  - Convey next steps and timeline and confirm timeframe feasibility

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TEC Test Procedure Overview

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Imaging Equipment (IE) Spec Development History

- EPA Visits Japan – Feb. 2003
- ITI ImTech Proposal Submitted – March 2003
- ENERGY STAR IE Industry Meeting – April 2003
- IE Directional Draft Distributed – Feb. 2004
- IE Discussion in Frankfurt – April 2004
- TEC and OM TPs Distributed – June 2004
- ENERGY STAR IE Industry Meeting – July 2004
- Clarified TEC TP Distributed – Sept. 2004
- Revised TEC TP Distributed – Feb. 2005
- **ENERGY STAR IE Industry Meeting** – March 2005

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Key TEC TP Concepts

- The TEC method is not meant to precisely replicate average operating patterns.
- The key result of the TEC test procedure is a value for typical weekly electricity consumption.
- The revisions in the latest TEC test procedure are the culmination of careful consideration of all stakeholder feedback received to date.
- The TEC test procedure does not replace the usefulness or need for more sophisticated measurements such as ASTM.

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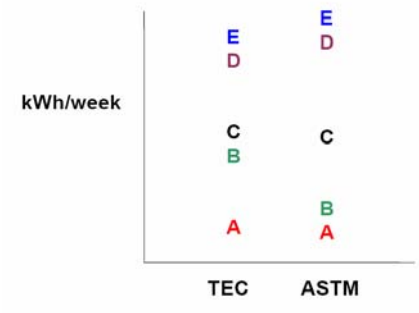
TEC as a Ranking Mechanism



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Products Covered by TEC

- The TEC test procedure is to be used to evaluate the TEC of the following **standard-size** imaging equipment products and marking technologies:

Products	Marking Technologies
Digital Duplicators	Direct Thermal
Stand-alone copiers	Dye Sublimation
Stand-alone printers	EP (Laser, LED, LCD)
Stand-alone fax machines	Solid Ink
Multifunction Devices (MFDs)	Thermal Transfer

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TEC TP Components

- **TEC Test Procedure**
  1. Test parameters
  2. Job structure
  3. Measurement procedures
  4. Calculation method
  5. A request for additional interim testing
- **TEC Data Worksheet**
- **IE Test Conditions**

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TEC TP Demonstration and Explanation of Accuracy

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TEC TP Measurement Procedure (Printers)

Step	Initial State	Action	Record (at end of step)	Possible States Measured
1	Off	Plug the unit into meter. Zero the meter; wait test period (five minutes or more).	Off *energy* Testing Interval *time*	Off
2	Off	Turn on unit. Wait until unit indicates it is in ready mode.	-	-
3	Ready	Print one job per Job Table. Record time (in seconds) to first sheet exiting unit. Wait until the meter shows that the unit has entered its final sleep mode.	Active0 *time*	-
4	Sleep	Zero meter; wait one hour.	Sleep *energy*	Sleep
5	Sleep	Zero meter and timer. Print one job per Job Table. Record time (in seconds) to first sheet exiting unit. Wait until timer shows that 15 minutes has elapsed.	Job1 *energy* Active1 *time*	Recovery, Active, Ready, Sleep
6	Ready	Repeat step 5 (without Active time measurement).	Job2 *energy*	*Same as above*
7	Ready	Repeat step 5 (without Active time measurement).	Job3 *energy*	*Same as above*
8	Ready	Repeat step 5 (without Active time measurement).	Job4 *energy*	*Same as above*
9	Ready	Zero meter and timer. Wait until meter and/or unit shows that unit has entered its final sleep mode.	Final *time* Final *energy*	Ready, Sleep -

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TEC TP Measurement Procedure (Printers)

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1	Off	Plug the unit into meter. Zero the meter; wait test period (five minutes or more).	Off *energy* Testing Interval *time*	Off
2	Off	Turn on unit. Wait until unit indicates it is in ready mode.	-	-
3	Read			
4	Slee			
5	Slee			
6	Read			
7	Read			
8	Read			
9	Read			

- Step 1 produces Off power (not used for TEC but needed for FEMP and compatibility with OM)
- Allowed to measure > 5 minutes if this provides greater accuracy
- Copier procedure measures Off at end since Auto-off may be different from "regular off".
- Step 2/3 produce First Copy Time from Ready and starts consistent thermal state for Step 5.

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TEC TP
Measurement Procedure (Printers)

Step	Initial State	Action	Record (at end of step)	Possible States Measured
1	Off	Plug the unit into meter. Zero the meter; wait test	Off *energy*	Off
2	Off			
3	Rea			
4	Sleep	Zero meter; wait one hour.	Sleep *energy*	Sleep
5	Sleep	Zero meter and timer. Print one job per Job Table. Record time (in seconds) to first sheet exiting unit. Wait until timer shows that 15 minutes has elapsed.	Job1 *energy* Active1 *time*	Recovery, Active, Ready, Sleep
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8	Ready	Repeat step 5 (without Active time measurement).	Job4 *energy*	*Same as above*
9	Ready	Zero meter and timer. Wait until meter and/or unit shows that unit has entered its final sleep mode.	Final *time* Final *energy*	Ready, Sleep -

- Sleep power: used in calculation and for OM result (copier may have Off power in this period)
- Job 1 Energy includes recovery from Sleep) First Copy Time from Sleep recorded

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TEC TP
Measurement Procedure (Printers)

Step	Initial State	Action	Record (at end of step)	Possible States Measured
1	Off			
2	Off			
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7	Ready	Repeat step 5 (without Active time measurement).	Job3 *energy*	*Same as above*
8	Ready	Repeat step 5 (without Active time measurement).	Job4 *energy*	*Same as above*
9	Ready	Zero meter and timer. Wait until meter and/or unit shows that unit has entered its final sleep mode.	Final *time* Final *energy*	Ready, Sleep -

- Jobs 2/3/4: measured to account for potential variability
- Final Time and Energy includes all modes from end of 15-minute period to beginning of final stable mode
- Key Feature: Unnecessary to measure power levels or times of each mode covered — only the total time and total energy

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TEC TP
Schematic of TEC Measurement

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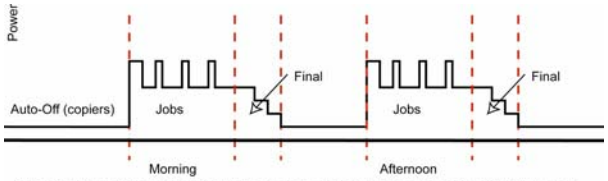
TEC TP - Daily Schematic



Schematic example of 8 ipm copier with 4 jobs in morning, 4 in afternoon, two "final" periods, and Auto-Off between the morning and afternoon and overnight. Lunchtime is implied but not explicit. Drawing **not** to scale. Jobs are always 15 minutes apart and in two clusters. There are always two full final periods regardless of their length. Printers (and MFDs with print capability) use Sleep rather than Auto-Off as the base mode but are otherwise treated the same as copiers.

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TEC TP Accuracy (1)

- **Issue**: ENERGY STAR test procedures must address meter accuracy to assure fairness and validity of results.
- **Traditional Solution**: Specify rigid, absolute requirements.
  - E.g., meter accuracy better than 0.1 W (power) or 1 Wh (energy)
- **Problem**: Large range in power levels among products *and* among modes for one product make this unrealistic.
  - E.g., a product may have Off power levels less than 1 W and active imaging levels greater than 1 kW.

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TEC TP Accuracy (2)

- **Alternate Solution** (existing MOUs):
  Add potential error to measured result before checking for qualification.
  - E.g., for 30 W power level and 0.5 W meter accuracy, assure that measured result < 29.5 W.
  - I.e., if measured result is 28.3 W, add 0.5 W meter accuracy to get 28.8 W and compare to 30 W limit.

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TEC TP Accuracy (3)

- **Typical Meter Accuracy:**
  Expressed as: (% of full range) + (% of reading)
  - E.g., (0.1% of range) + (0.1% of reading)
  - Reading of 60 W measured with 200 W range on meter
  - Potential error = 0.1% x 60 + 0.1% x 200 = 0.06 + 0.2 = 0.26 W
  - 0.26 W is 0.43% of 60 W reading
  - Actual power is no greater than 60.26 W

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TEC TP Accuracy (4)

- Application of Alternate Solution to TEC
  - Calculate potential error of *each* energy component of TEC (based on meter accuracy including range used)
  - Sum these to get potential error of TEC
  - Add total potential error to TEC to get **Adjusted TEC**
- Benefits
  - Flexibility in meter choice
  - Requirements scale with TEC value =no excessive stringency or leniency
- Expectation
  - Most measurements <2% potential error

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Comments from the European Commission ENERGY STAR Board

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Discussion Topic 1 – TEC TP

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Manufacturer Statements on Default Settings

- "This product automatically lowers its power consumption 15 minutes after the last copy or print job has finished."
- "To conserve energy, this product automatically turns off 90 minutes after the last copying or printing job has been completed."

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Digital Duplicators

- **Issue:** Many digital duplicators have variable speed.
- **Industry proposal:** Test all products at 200 images per job.
- **EPA:** Continue to test products at speed advertised and as shipped.
  - This allows inclusion of digital duplicators in categories with other product types; otherwise, they could only be compared to other digital duplicators.

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Basis Weight

- **Issue:** TEC TP specifies paper basis weight no less than 75 g/m^2 and no greater than 80 g/m^2
- **Industry Comments:**
  - Be consistent across tests
  - Recognize use of 60 or 64 g/m^2 paper in Japan
- **EPA**: Basis weight should vary with the voltage and paper size for the intended market
  - For North America, 75 g/m^2 (8.5" x 11")
  - For Japan, 60 or 64 g/m^2 (A4)
  - For the rest of the world, 80 g/m^2 (A4)

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Standard Test Image: TEC

- **Issue:**
  - Some manufacturers state that the content of the image for TEC-covered products is not relevant
  - Others insist that the content should be specified
- **EPA:** EPA has not determined that a standard test image is necessary, but would like manufacturers to propose standard images in case EPA decides that one is required

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Speed Ratings

- **Issue:** For some products, the rated speed may differ depending on whether A4 or 8.5 x 11" paper is used
  - This could imply that the images/job should be different depending on the market, possibly adding unnecessary confusion
- **EPA:** For simplicity, best to use a single speed to determine job number and size
  - This shall be the speed while making 8.5" x 11" copies

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Calculation Method

- **Issue:** A few stakeholders commented that an explicit lunch break as the calculations now embody is unrealistic for some products (e.g., high-speed products)
- **Background:** EPA added the lunch break to the latest version based on manufacturer input that more daytime sleep time was needed
- **EPA:** This issue does not affect testing, only calculations, and will not likely change the ranking of products

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Recovery Time: Existing Requirements

Standard Size Copiers, MFDs, and UDCs

MFD & UDC Speed	30-Second Recovery Time from Low Power
0 < ipm ≤ 10	NA
10 < ipm ≤ 20	NA
20 < ipm ≤ 44	**Yes**
44 < ipm ≤ 100	Recommended
100 < ipm	Recommended

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Recovery Time: Measurement and Requirements

- TEC now measures:
  - First Copy Time (FCT) from Sleep
  - FCT from Ready (from 15 minutes past last job)
  - Incremental Recovery Time (difference of above)
- Specification could address:
  - FCT from Sleep
  - Incremental Recovery Time
- Options:
  - FCT from Low Power ≤ 30 seconds (existing MOUs)
  - Default time to Sleep (minutes) no less than Incremental Recovery Time (seconds)

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Duplexing Overview

- **Problem:** Many copiers and MFDs make duplex copies much more slowly than simplex. This discourages duplexing, which increases paper use
  - Paper in U.S. embodies ~16 Wh/sheet of electricity equivalent energy (and more on a dollar basis)
  - This works against ENERGY STAR goals for energy and money savings.
- **Solution:** Ensure that ENERGY STAR products are "good duplexers"
- **Question**: How to embody this in requirements?

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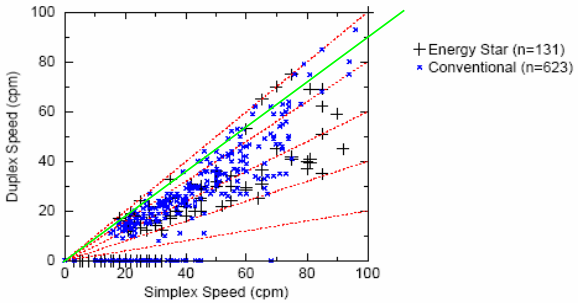
Duplex and Simplex Speeds for Copiers



These data from 1990s; Many current machines are still "slow duplexers"

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Duplex Efficiency in BLI Tables

PRODUCTIVITY CHART EFFICIENCY RATING (%) - BY MULTICOPY SPEED

		1:1				1:2				2:2				2:1			
SPEED*	FCT**	1	5	10	20	1	5	10	20	1	5	10	20	1	5	10	20
25	13.6	84%	92%	100%	100%	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
25	9.1	68%	96%	96%	100%	48%	64%	64%	64%	56%	64%	64%	68%	76%	96%	96%	—
25	8.5	80%	92%	96%	100%	60%	84%	92%	96%	64%	88%	92%	96%	80%	96%	96%	100%
25	8.5	80%	92%	96%	100%	60%	84%	92%	96%	64%	88%	92%	96%	80%	96%	96%	100%
25	11.5	52%	84%	88%	92%	40%	48%	48%	48%	INA	INA	INA	INA	INA	INA	INA	INA
25	9.1	68%	96%	96%	100%	48%	64%	64%	64%	56%	64%	64%	68%	76%	96%	96%	—
25	7.7	72%	68%	76%	80%	48%	60%	68%	72%	56%	60%	68%	72%	60%	68%	76%	80%
25	7.3	84%	96%	96%	100%	44%	88%	96%	100%	60%	84%	92%	100%	84%	96%	100%	100%
27	6.1	81%	93%	96%	96%	63%	89%	93%	96%	52%	85%	89%	93%	56%	85%	93%	93%
27	6.1	81%	93%	96%	96%	63%	89%	93%	96%	52%	85%	89%	93%	56%	85%	93%	93%
27	9.4	70%	93%	96%	100%	41%	52%	52%	52%	41%	52%	52%	52%	44%	81%	89%	96%
27	9.3	63%	89%	96%	96%	48%	76%	81%	85%	41%	74%	81%	85%	44%	81%	89%	96%
28	11.3	64%	93%	96%	100%	50%	82%	86%	89%	46%	79%	86%	89%	50%	86%	93%	96%
30	4.9	90%	97%	100%	103%	77%	73%	77%	80%	73%	77%	80%	80%	77%	97%	100%	103%
30	6.2	80%	93%	97%	97%	43%	63%	70%	73%	43%	67%	70%	73%	53%	83%	90%	93%
30	10.2	100%	90%	97%	100%	50%	83%	93%	97%	53%	83%	93%	97%	67%	90%	97%	NA
30	10.2	100%	90%	97%	100%	50%	83%	93%	97%	53%	83%	93%	97%	67%	90%	97%	NA

Buyers Laboratory, Inc. (USA) - BLI is an independent testing laboratory focusing on imaging equipment.

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Testing Options (Duplex vs. Simplex)

- **Approach A:** Do all TEC testing in duplex, when possible
  - Current method in TEC TP
  - Expect bad duplexers to use relatively more energy and fall above TEC specification line
- **Approach B:** Test in simplex and measure simplex and duplex speed per ASTM (and as reported by BLI)
  - Set a limit, e.g., duplex/simplex speed ≥ 95%
  - May require extra testing

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Duplexing Summary

- **Issue:** Imaging products without duplex capability increase paper use. Above some level, it is unreasonable to consider simplex-only products energy efficient
- **Question:** At what ipm value should duplex capability be required?
- **Related Issue:** The TEC TP currently requires products of the same speed to be tested differently based on duplex capability
- **Options:**
  - Retain current testing guidance
  - Perform all testing in simplex, even at speeds where duplex capability is required

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Selected Observations from TEC Data Submitted To Date (1)

Multiple Jobs after Job1
Range in Job 2/3/4 as % of Average and % Effect on TEC

	Speed*	# Jobs	Job	TEC (weekly)	Comment
Printer	20+	3	11%	9%	Daily TEC
Printer	20+	3	1.5%		
Printer	20+	3	4.1%	2.8%	
Printer	20+	3	4.8%	2.8%	Color, parallel
Printer	20+	3	1.9%	1.0%	Color, parallel
Printer	30+	3	3.5%	2.1%	Color, parallel
Printer	30+	4	2.3%	1.5%	>15 minute Sleep Delay; daily TEC
Printer	30+	4	5.4%	3.7%	Same Printer – 1 min.; daily TEC
Printer	50+	3	1.9%	1.4%	
MFD	60+	3	7.7%	6.7%	

* *Speeds are approximate*

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Selected Observations from TEC Data Submitted To Date (2)

Interim Additional Testing — Job Energy
Color — % more than Mono
Simplex — % more than Duplex
Copying — % more than Printing

	Speed	Color	Simplex	Copying
Printer	20+	0%	–4%	
Printer	20+	–1%	–3%	
Printer	30+	1%	4%	
MFD	60+		2%	

- On the high speed MFD: Controller is over a quarter of TEC.
- Accuracies varied from 0.5% to 1% of TEC

Interim Additional Testing (1)

- **Background:** Response to several proposed changes to the TEC TP. To determine if these changes were warranted, EPA proposed extra testing to produce the necessary empirical data.
- **Topics**
  Color vs. Mono for color products
  Simplex vs. Duplex for duplex-capable products
  Printing vs. Copying for MFDs

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Interim Additional Testing (2)

- **Comments:** Several stakeholders expressed the desire to not do additional testing.
- **Status**: In the absence of data indicating otherwise, EPA will maintain the current treatment of these issues within the TEC TP.

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Plan for TEC Testing

- Initial TEC data due March 2 – 5 submissions received
- *Anticipated* TEC testing from Feb. to June/July
- Analysis of TEC test data over the summer
- EPA expects each manufacturer to test products which cover the range of efficiency of current products
- Products must be tested at appropriate voltage, paper size, etc.

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Discussion Topic 2 – OM Mode TP

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Operational Mode (OM) Test Procedure

- The existing OM procedures measure only Sleep and Off power levels.
- Measurement methods allowed include:
  - instantaneous power
  - short-term (e.g. <5 minutes)
  - long-term (1 hour)
- Levels are intended for long-term stable modes (Sleep for some products and Auto-off for others).
- It is clear that when power consumption in a mode varies, the measurement period should be long enough to capture the long-term average.
- IEC 62301 on Standby Power is an important reference.

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Standard Test Image: OM

- **Issue:** In previous comments, stakeholders suggested Ink Jet products need a standard test-page for fair comparison.
- **EPA:** Was this only a TEC concern, or is this still a concern under OM? If still a concern, EPA asks manufacturers to suggest candidates for this standard image.

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Discussion Topic 3 – Producing a First Draft Specification

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First Draft Specification

- First draft will contain:
  - Placeholders for specification limits
  - Draft categorization (grouping) of products for specification-limit setting
  - Test Conditions common to all products
  - Terminology/definitions list
  - Misc. (User Interface, user education, etc.)

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Off (Standby) Power - FEMP

Product Category	Recommended Standby (W)
	Jan. 2005
Printer*	1
Fax	2
Copier	1
Multifunction Device*	1
Scanner	1

**If this product will be connected to a local area network and operated continuously, then buyers should select an Energy Star product with the lowest possible sleep power level. If the intended use is unknown, consider both the product's sleep and standby power usage.*

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Test Conditions

- **Issue:** Comments have indicated that some of the meter requirements are problematic for devices that use more than 15A of AC 115V power. THD was specifically mentioned
- **EPA:** The proposed modifications seem reasonable. Manufacturers should raise any additional modifications to the test conditions
- **Issue**: Some products are shipped in the U.S. to use 208 V (60Hz) and some in Japan require 200 V (50/60 Hz)
- **EPA**: These values will be added to test conditions table. EPA seeks comments on whether a single test can cover the 60 Hz 200 V and 208 V conditions.

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DFEs - Key Elements

- A "Digital Front End" (DFE) is a high-capability controller.
- EPA recognizes that:
  - All imaging products contain a print controller which enables speed and functionality
  - For higher speed products, a variety of configurations exist, from custom controllers to integrated PC-based controllers, to external units (with or without a separate power cord)
  - The PC "network problem" constrains the ability of systems to reduce DFE power when the system as a whole is asleep

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DFEs – Categorization

- For purposes of our discussion, EPA considers DFEs in two separate groups:
  - External or Functionally Integrated – DFE has its own DC power supply, separate from the imaging product and is AC mains connected.
  - Internal (embedded) – DFE draws its DC power from the imaging technology product.
- External DFEs will be addressed by computer specifications.
- Internal DFEs are considered part of the IE product.

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Conclusion

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Next Steps and Timeline (1)

Activity	Dates
Deadline for TEC TP comments and initial TEC data	Mar. 2
Industry meeting	Mar. 16
Finalize TEC and OM TPs and test conditions	Mar. – Apr.
1st draft spec. – no power/energy levels	May
Deadline for final TEC and OM data	Jun./July
Deadline for comments on 1st draft spec.	Jun.

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Next Steps and Timeline (2)

Activity	Dates
EPA analysis	Jun. – Aug.
Industry meeting	Jun. – Aug.
2nd draft spec. with power/energy levels	Sept.
Deadline for comments on 2nd draft spec.	Nov.
EPA finalizes spec.	Nov. – Dec.
Final spec.	Jan. 1, 2006
Spec. effective date	Jan. 1, 2007

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