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# **Technical Specifications for Imaging Equipment**



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**Meeting of the European Community  
Energy Star Board  
24 May 2006**

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# **Current Specifications for Imaging Products**

**Products and most recent version:**

- **Printers (2001)**
- **Copiers (1997 / 1999)**
- **MFD (multifunction devices) (1999)**
- **Fax machines (2000)**
- **Scanners (1997)**
- **Mailing machines (2000)**

**Very high compliance rate**

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# Main Framework of the New Specification

- **All imaging products in one specification**
    - Convergence of copy, print, fax, scan
  - **Two main groups:**
    - TEC – Typical Electricity Consumption  
(weekly consumption for typical use)
    - OM – Operational modes (standby, sleep)
  - **Two tiers:**
    - Tier I: 1 April 2007 – 31 March 2009  
Digital duplicators when agreement is in force
    - Tier II: 1 April 2009 →
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# TEC Typical Electricity Consumption – Concept

- **Weekly electricity consumption for simulated typical use of products**
  - **Advantages:**
    - All modes are included
    - One consumption figure - easy to understand
    - Easy to compare different products
  - **Disadvantages:**
    - For use different from typical, product ranking could be different
    - Measurement method more extensive
  - **All data reported – to be monitored**
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# TEC – Measurement Procedure



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# TEC – Products Comprised

- "Typical office workgroup machines"
  
  - Standard-size (A4, A3 & similar)
  - Heat intensive technology (electro-photography, solid ink etc.)
    - high consumption in active, ready, sleep modes
  
  - Categories according to functionality – not technology
  - Groups:
    - Copiers, printers, fax machines, digital duplicators (monochrome / color)
    - Multifunction devices (two or more functions) (monochrome / color)
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# TEC Requirements – kWh / week

- **Mono copiers, printers, fax, digital duplicators**  
< 12 / 12-50 / >50 ipm:  
 $1.5 / 0.2 * \text{ipm} - 1 / 0.8 * \text{ipm} - 31$
  - **Color copiers, printers, fax, digital duplicators**  
< 50 / >50 ipm:  
 $0.2 * \text{ipm} + 2 / 0.8 * \text{ipm} - 28$
  - **Mono MFDs**  
< 20 / 20-69 / >69 ipm:  
 $0.2 * \text{ipm} + 2 / 0.44 * \text{ipm} - 2.8 / 0.8 * \text{ipm} - 28$
  - **Color MFDs**  
< 32 / 32-61 / >61 ipm:  
 $0.2 * \text{ipm} + 5 / 0.44 * \text{ipm} - 2.8 / 0.8 * \text{ipm} - 25$
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# TEC Requirements – kWh / week

## Example

Typical colour MFD, 50 ipm

Colour MFDs formula:

< 32 / 32-61 / >61 ipm:

$0.2 * \text{ipm} + 5$  /  $0.44 * \text{ipm} - 2.8$  /  $0.8 * \text{ipm} - 25$

### ■ Calculation:

- $0.44 * 50 - 2.8 = 19.2$  kWh / week
  - 998 kWh / year
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# **TEC – Compliance level**

- **158 test products (excl. dig. dupl)**
  - **Most sold products from manufacturers**
  - **Overall: 41% pass**
  
  - **Colour MFD (common product in offices): 29% pass**
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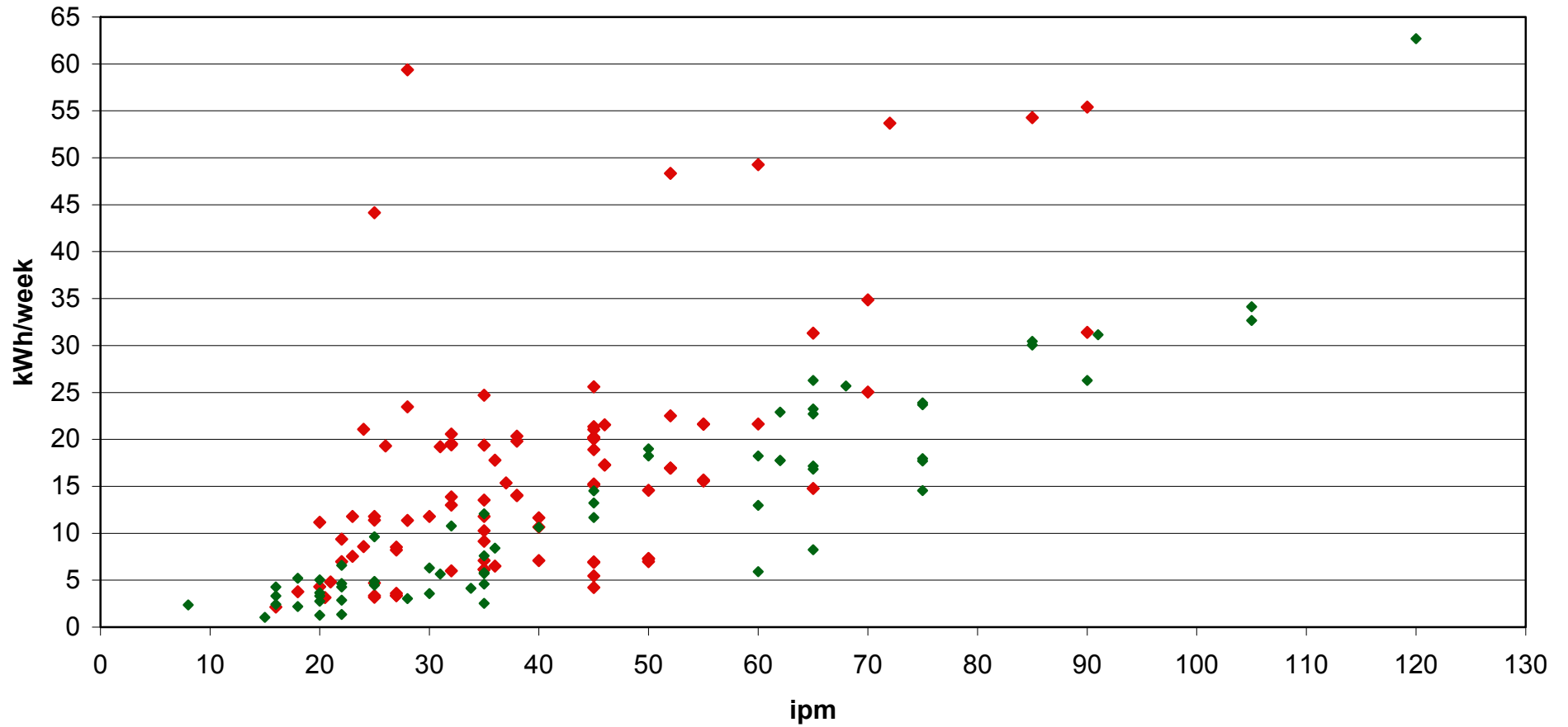
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# TEC – How reached levels

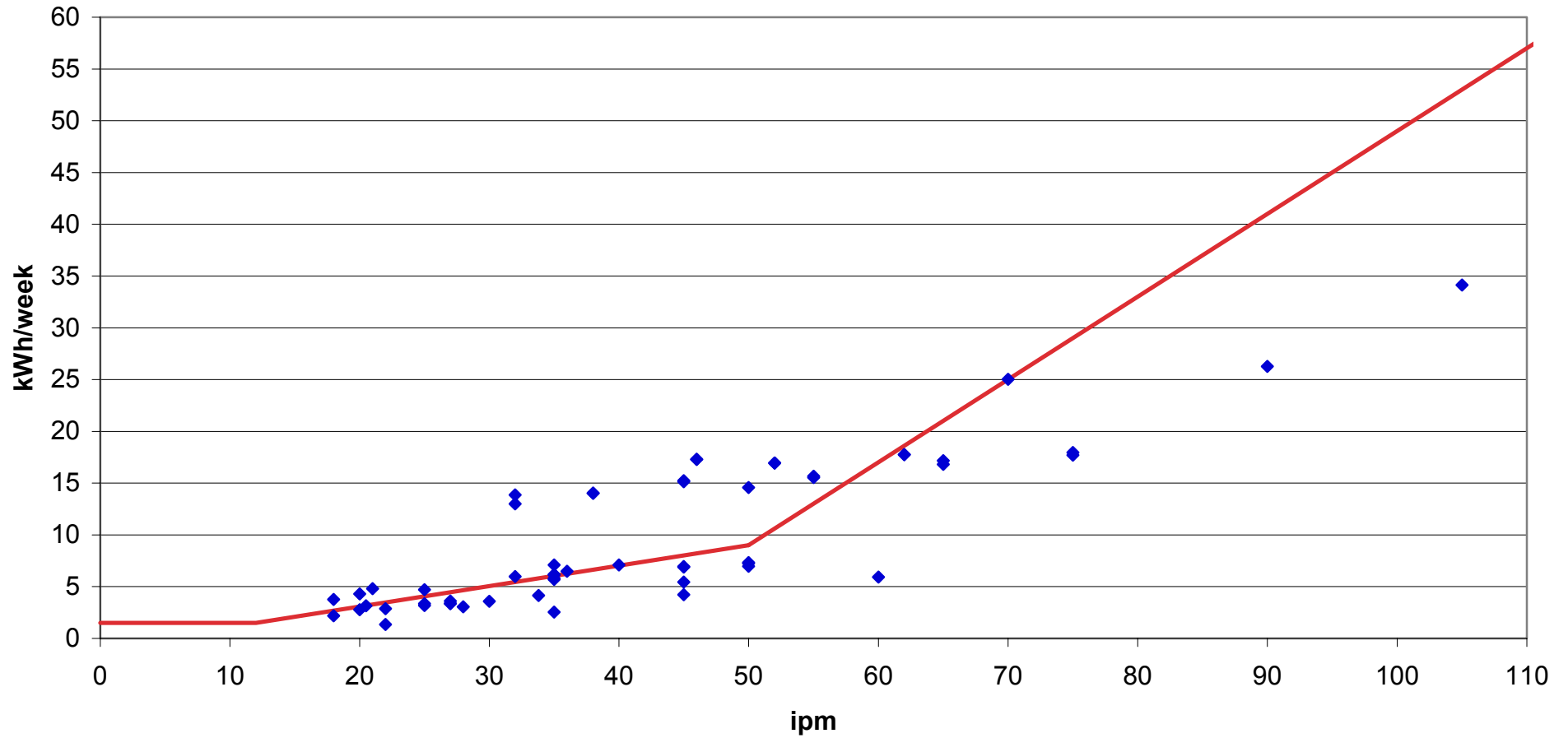
## ■ Considerations:

- ❑ Clear and simple formulas with a few straight lines
  - ❑ New concept, limited data available
  - ❑ Impact other requirements (EPS, tel., DFE) – not taken into account
  - ❑ Efficiency due to proprietary technology
  - ❑ Qualifying products should be available for all product types and speed ranges – also high capability
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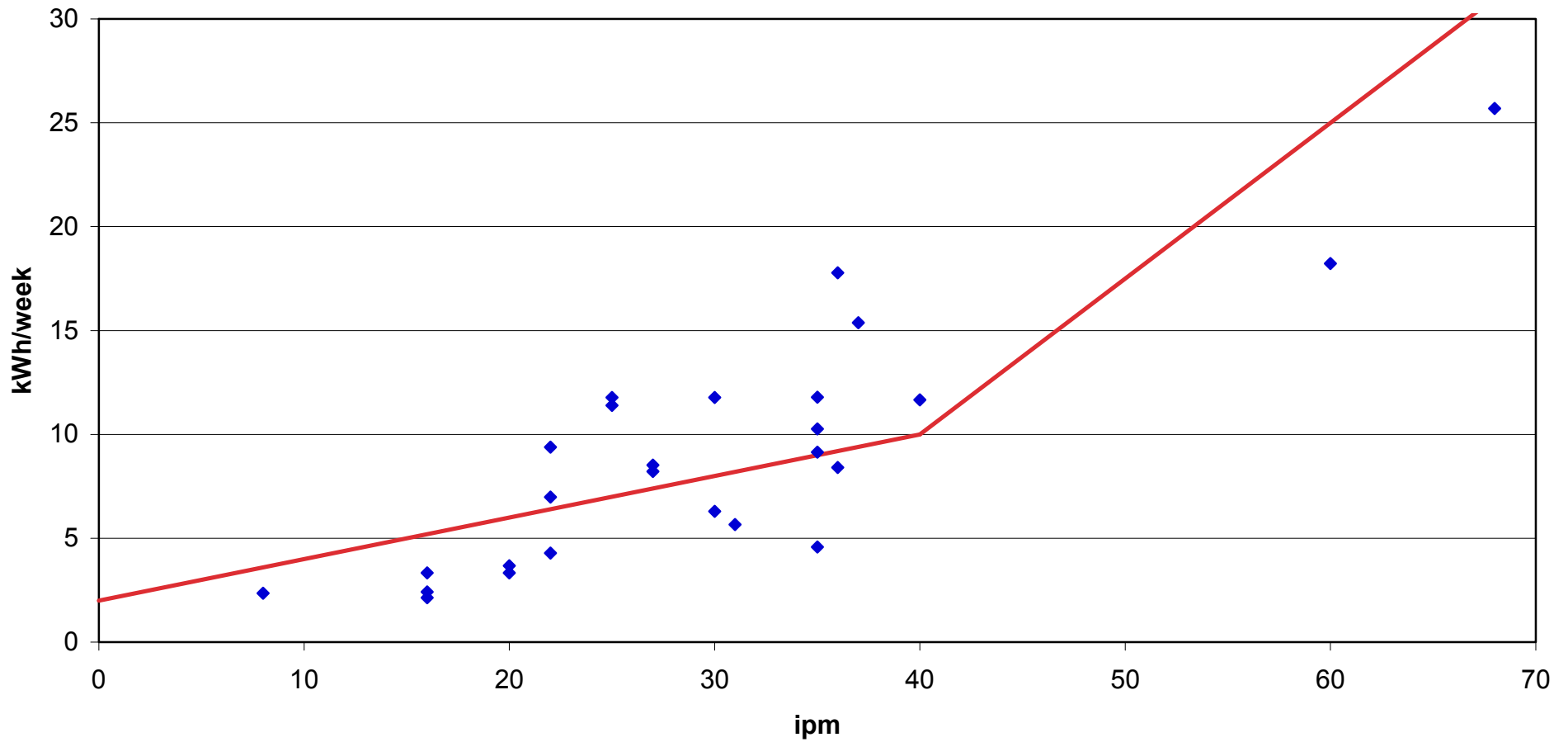
**TEC without internal DFE Table 1-4**  
**Products: All**  
**Size Format: All**  
**Marking Technology: All**



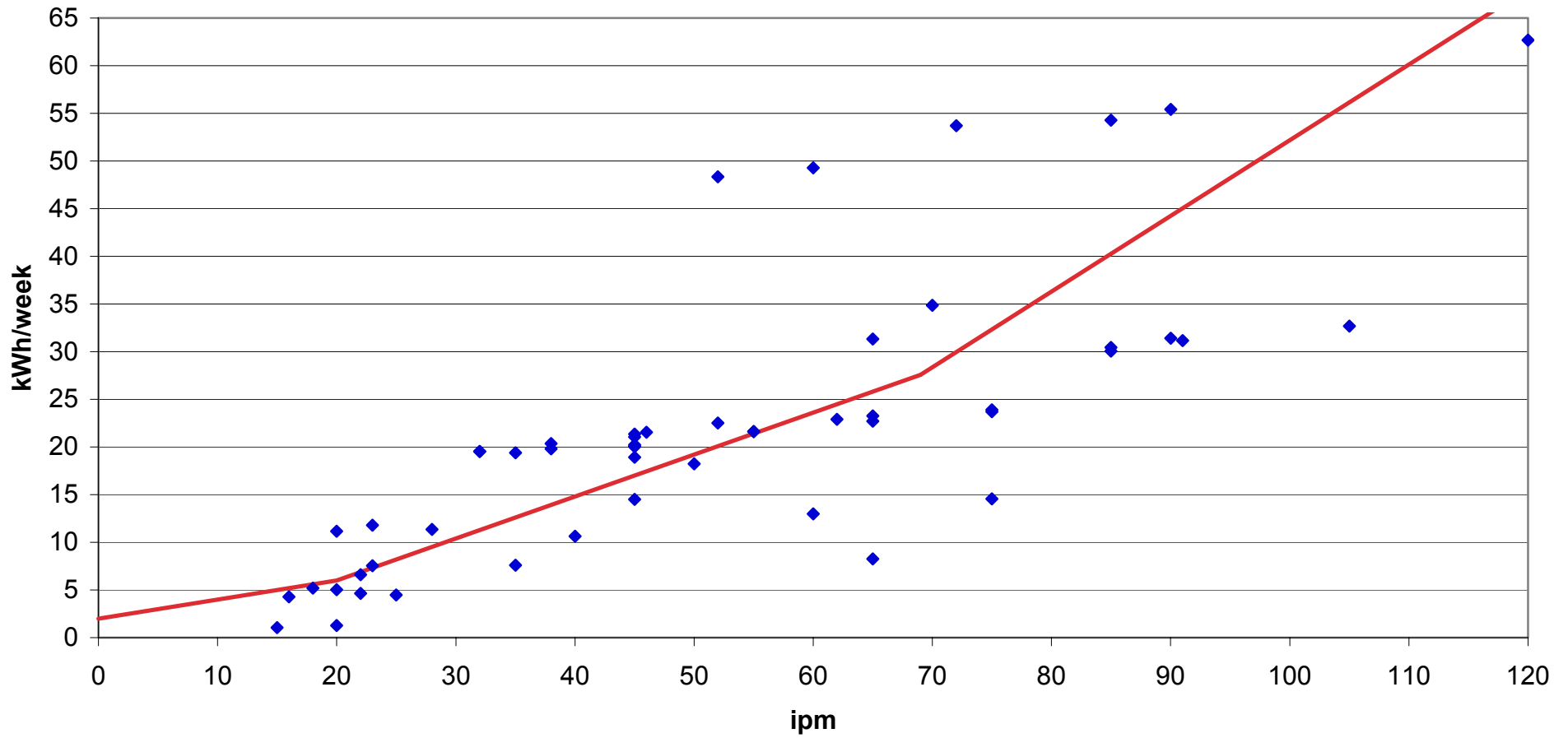
**TEC without internal DFE Table 1**  
**Products: Copiers, Digital Duplicators, Fax Machines, Printers**  
**Size Format: Standard-size**  
**Marking Technologies: DT, Mono DS, Mono EP, Mono Stencil, Mono TT**



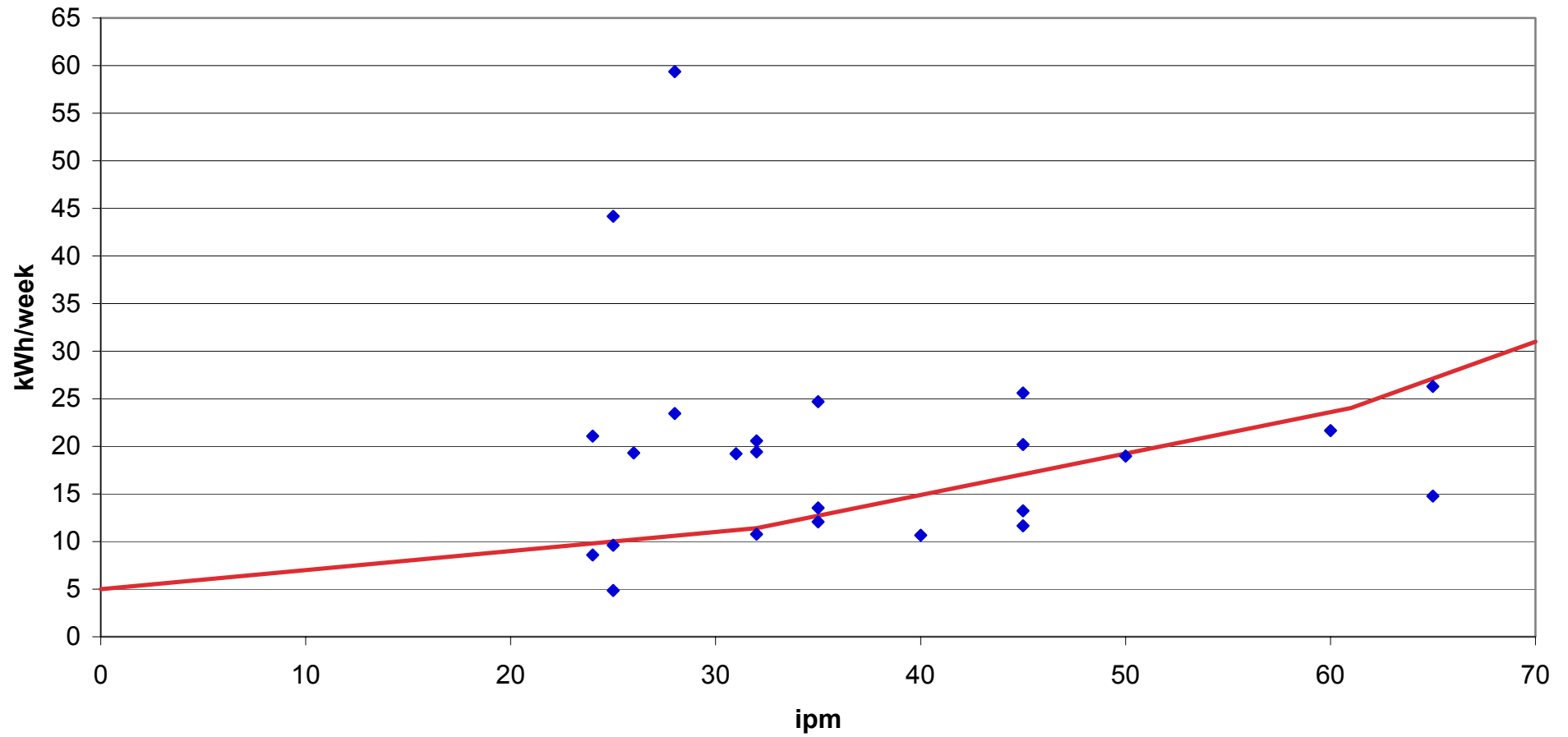
**TEC without internal DFE Table 2**  
**Products: Copiers, Digital Duplicators, Fax Machines, Printers**  
**Size Format: Standard-size**  
**Marking Technologies: Color DS, Color Stencil, Color TT, Color EP, SI**



**TEC without internal DFE Table 3**  
**Products: MFDs**  
**Size Format: Standard-size**  
**Marking Technologies: DT, Mono DS, Mono EP, Mono TT**



**TEC without internal DFE Table 4**  
**Products: MFDs**  
**Size Format: Standard-size**  
**Marking Technologies: Color DS, Color TT, Color EP, SI**



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# OM Operational Mode

## – Concept and Products Comprised

- The traditional concept specifying each mode
  - For products:
    - With low ready & active mode consumption
    - With small market and few product data
  - Products comprised:
    - Standard format inkjet products
    - Other products:
      - large format
      - small format
      - mailing machines
      - scanners
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# **OM Standby (off)**

- **Standard-size & small format without fax: 1 W**
  - **Standard-size & small format with fax: 2 W**
  - **Current spec: No requirement**
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# OM Sleep

- **Standard-size:**
    - Inkjet fax, MFDs, printers (table 2): 3 W
      - Current spec: 10-75 W
    - Impact printers (table 6): 6 W
      - Current spec: 28 W
  
  - **Small format printers (table 5): 3 W**
  
  - **Large format:**
    - Inkjet MFDs, printers (table 3): 13 W
    - Copiers, MFDs (table 1): 58 W
    - Printers (table 8): 54 W
  
  - **Scanners (table 7): 5 W**
    - Current spec: 12 W
  
  - **Mailing machines (table 4): 3 W (stamping letters)**
    - Current spec: 10-85 W
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# OM Power Adders to Sleep

Add power according to functionalities:

- Interfaces: 0.1 – 3.0 W
  - Storage: 0.2 W
  - Scanner lamps: 0.5 – 2.0 W
  - Need of PC system: - 0.5 W (subtract)
  - Cordless handset: 0.8
  - Memory: 1.0 W / GB
  - Power supply size:  
0.05 \* (rating – 10 W) (larger than 10 W)
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# OM – Compliance level

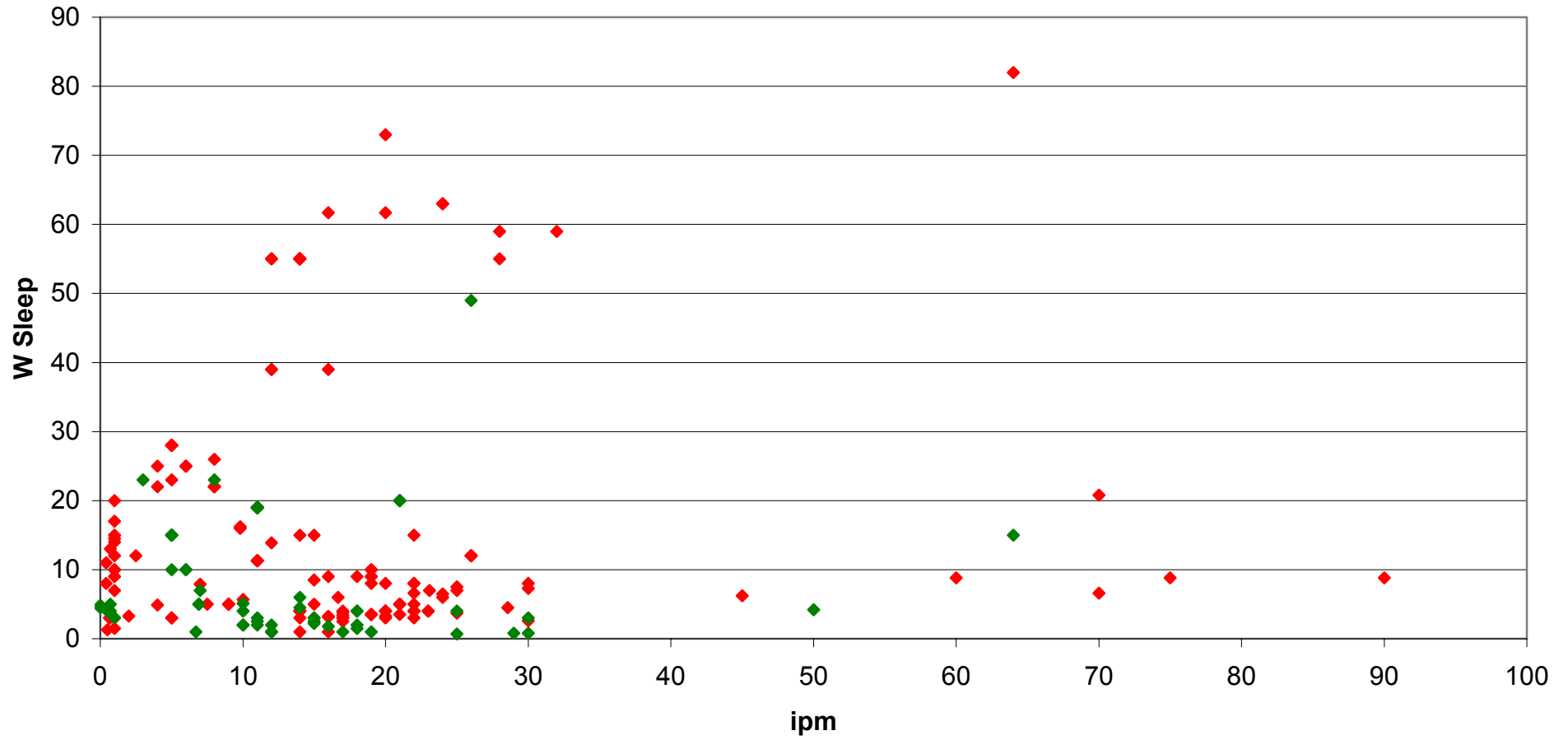
- 242 test products – 216 full dataset
  - Most sold products from manufacturers
  - Not sufficient data for existing products in database
  - Overall: 29% pass
  
  - Standard-size inkjets: 29% pass
  
  - Printers in EU Energy Star database (many uncertainties, lack of details): 18%
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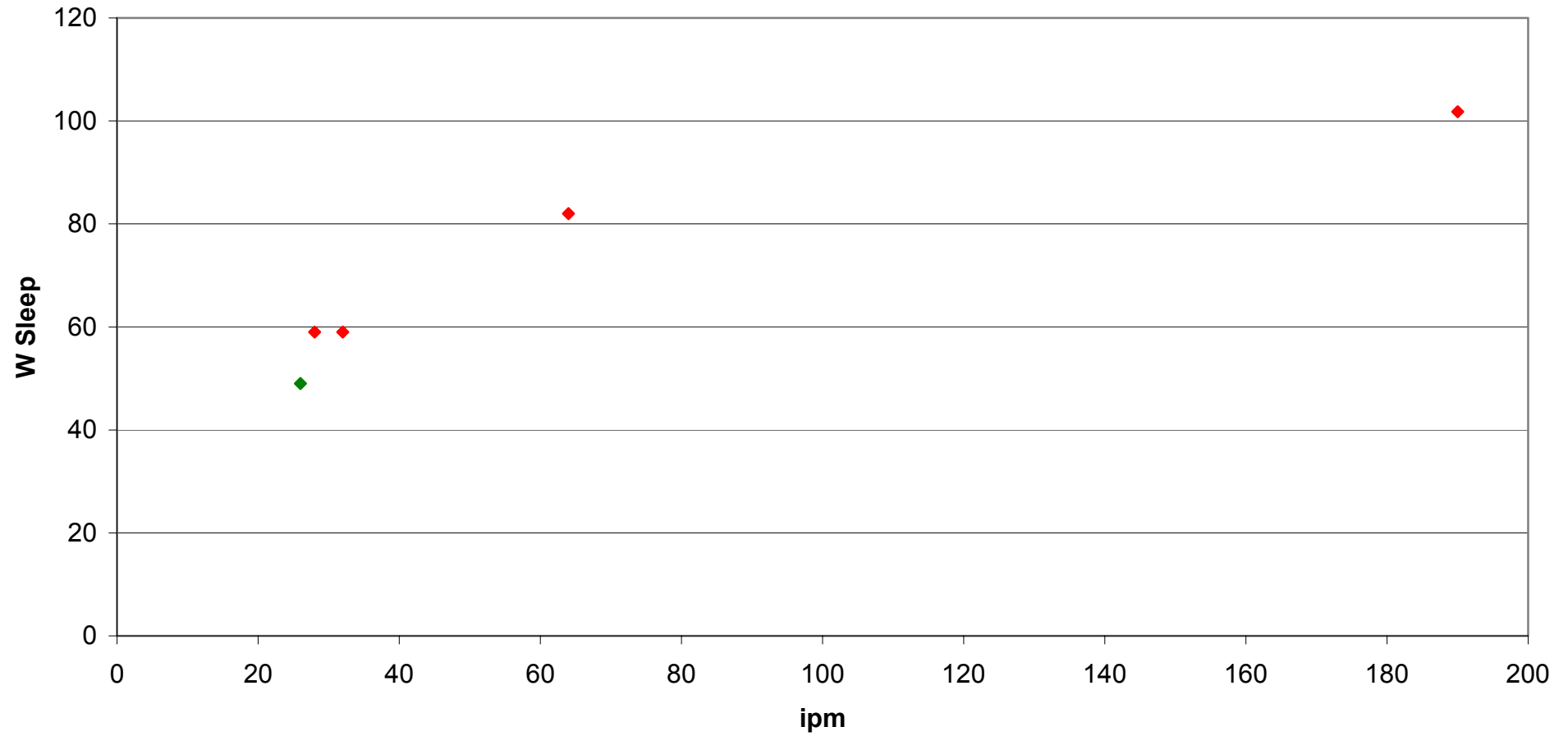
## **OM – How reached levels**

- **Aimed at 25% compliance for each table**
  - **For tables with few products, need to aim above**
  - **Efficiency due to proprietary technology**
  - **Qualifying products should be available for all product types and speed ranges – also high capability**
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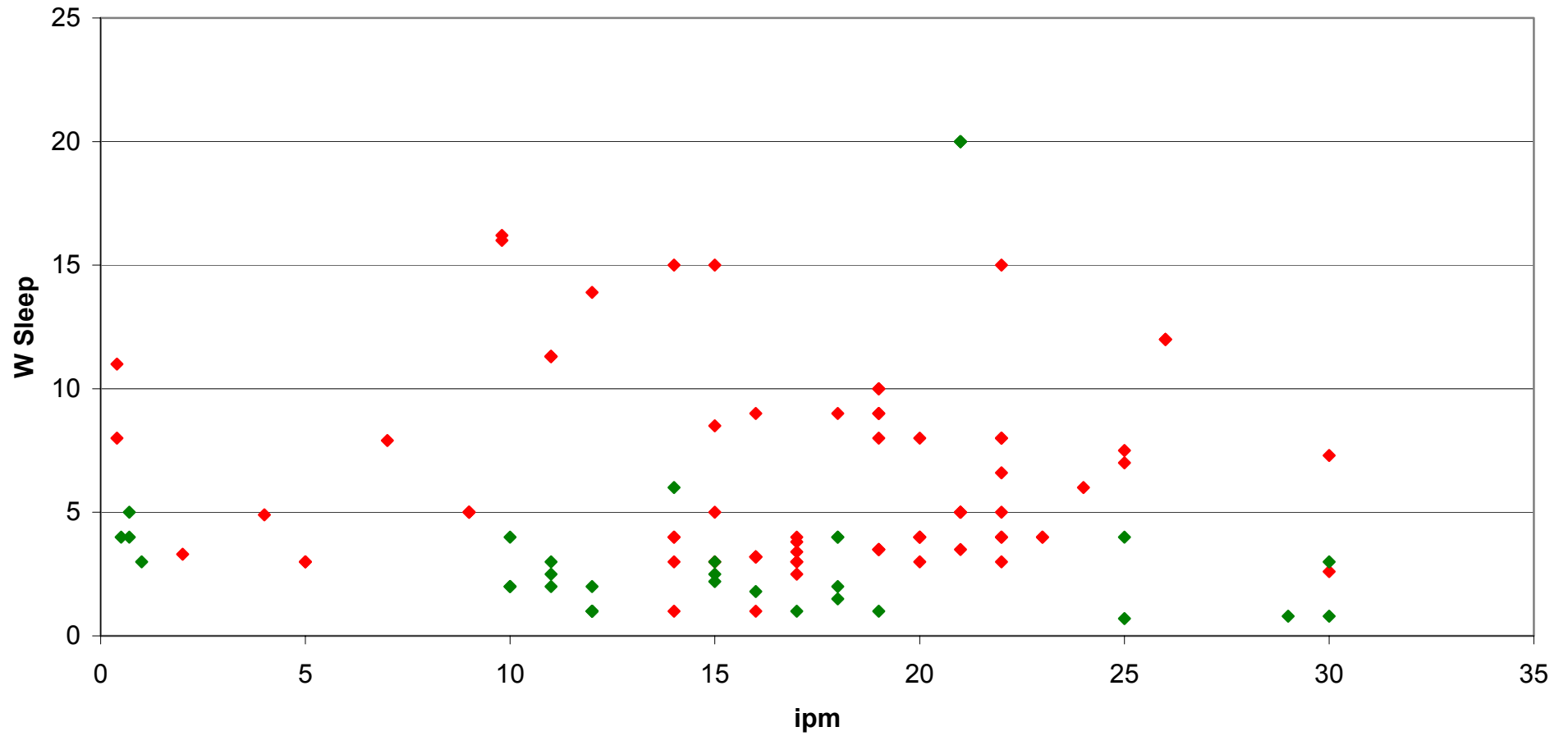
OM Table 1-8  
Product: All  
Size Format: All  
Marking Technology: All



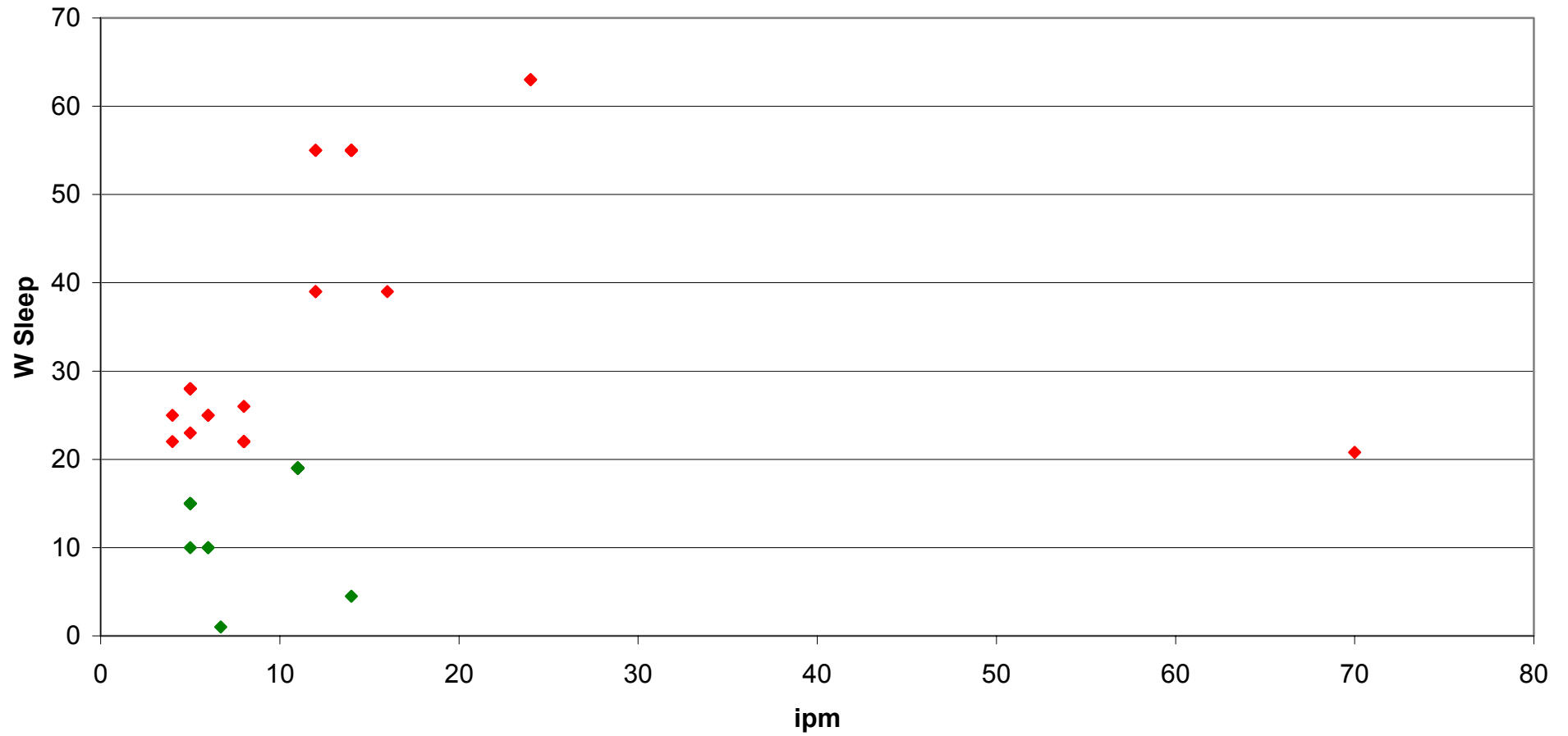
**OM Table 1**  
**Products: Copiers, MDFs**  
**Size format: Large Format**  
**Marking Technology: Color DS, Color TT, DT, Mono DS, Mono EP, Mono TT, Color EP, SI**



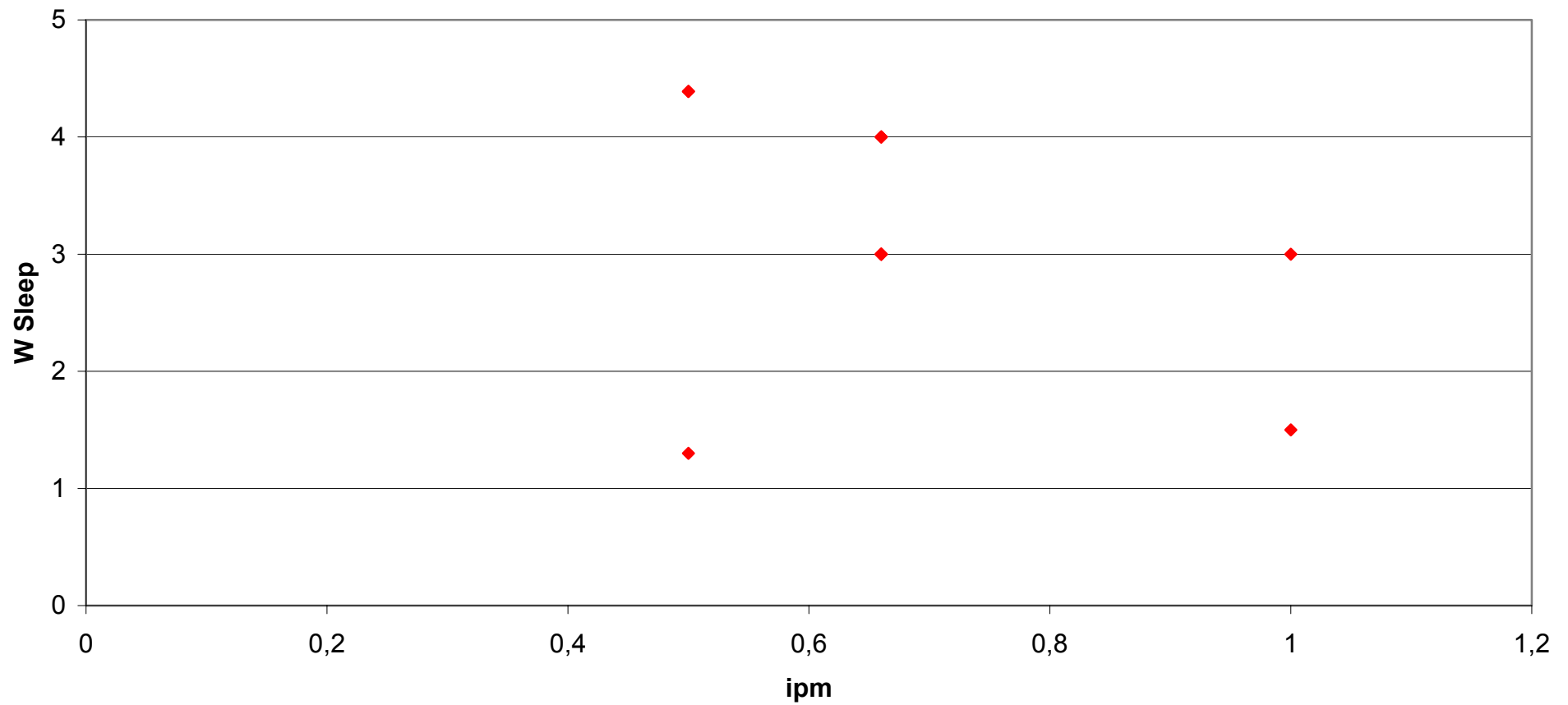
**OM Table 2**  
**Products: Fax Machines, MDFs, Printers**  
**Size Format: Standard Format**  
**Marking Technology: Color IJ, Mono IJ**



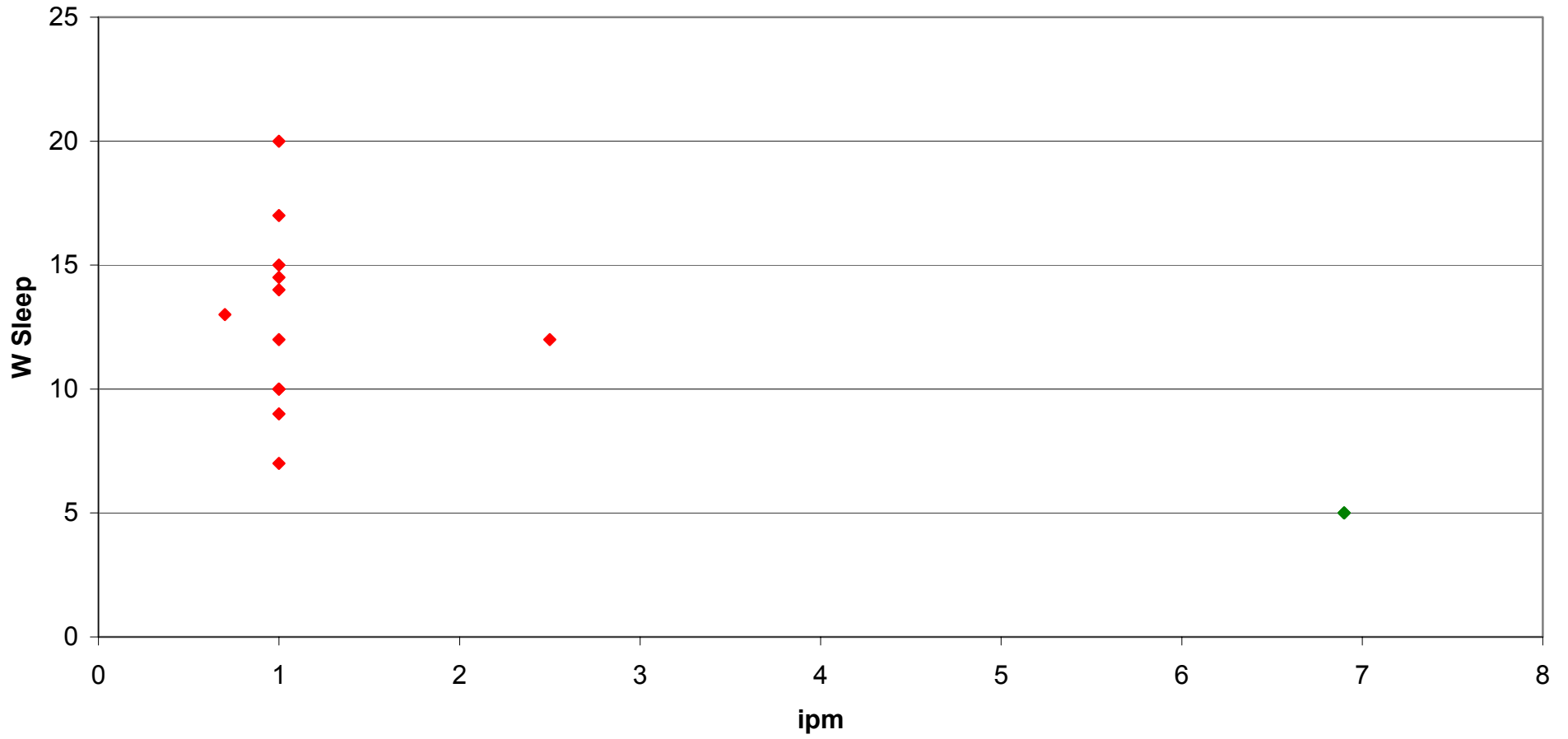
**OM Table 3**  
**Products: MDFs, Printers**  
**Size Format: Large Format**  
**Marking Technology: Color IJ, Mono IJ**



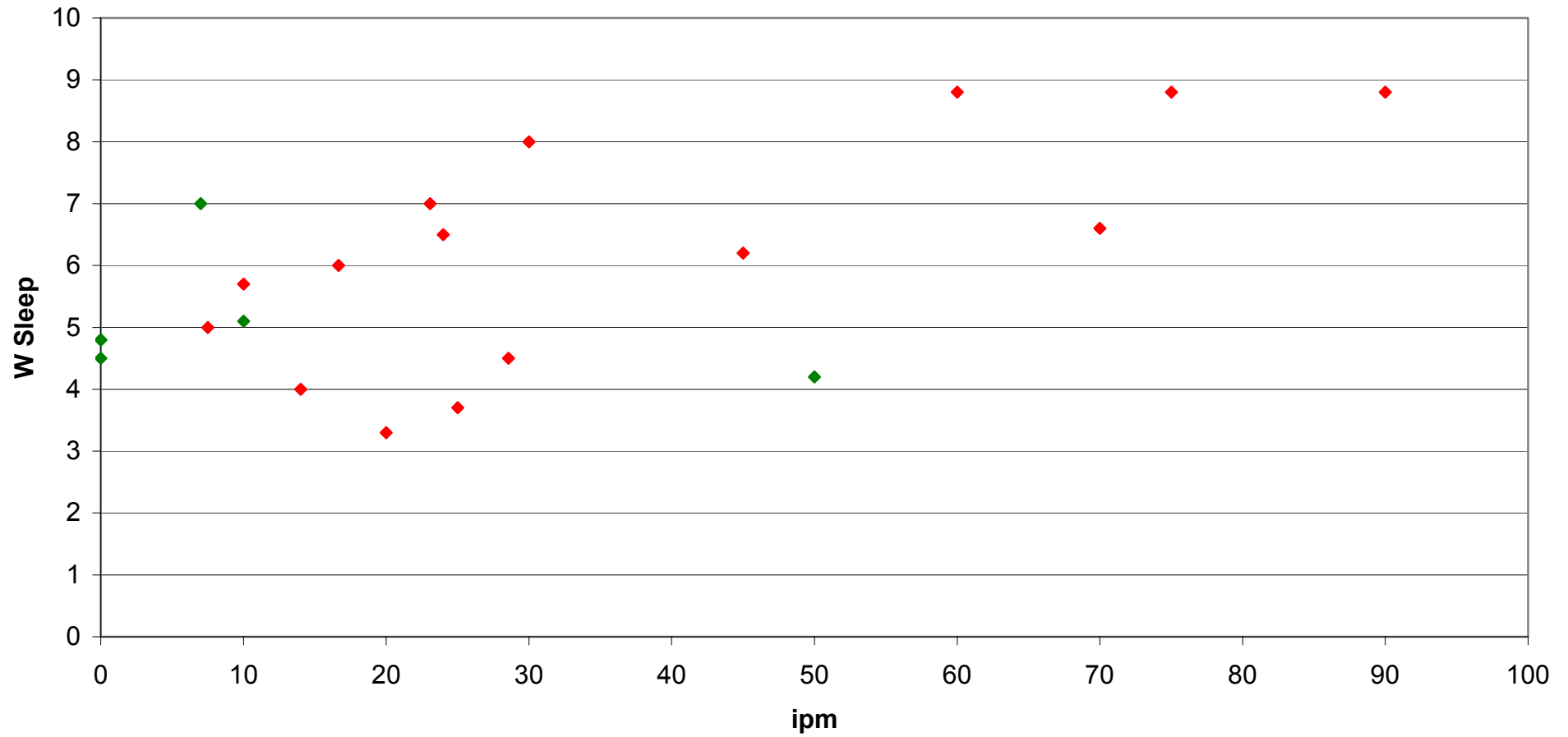
**OM Table 5**  
**Products: Printers**  
**Size Format: Small Format**  
**Marking Technology: Color DS, DT, Color IJ, Color Impact, Color TT, Mono DS, Mono EP, Mono IJ, Mono Impact, Mono TT, Color EP, SI**



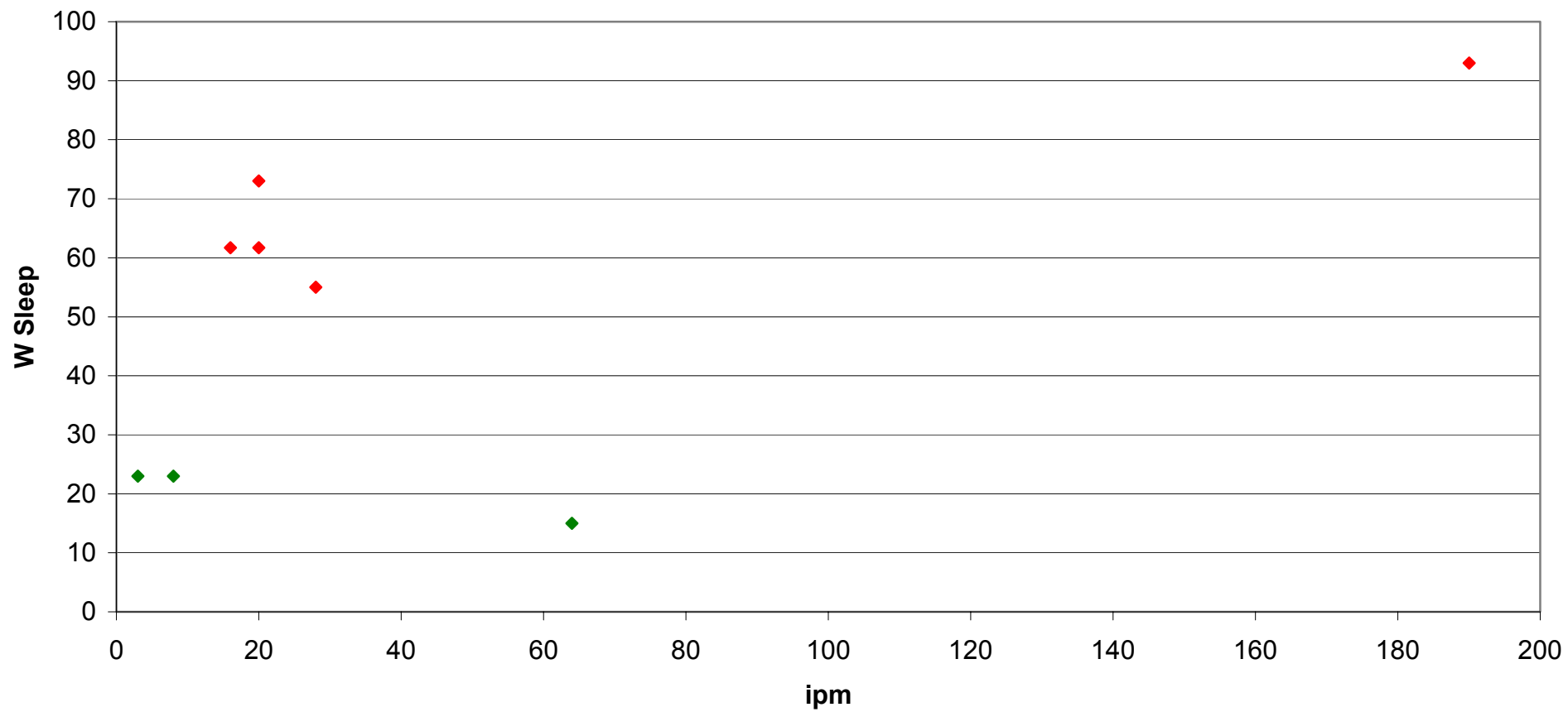
**OM Table 6**  
**Products: Printers**  
**Size Format: Standard Size**  
**Marking Technologies: Color Impact, Mono Impact**



**OM Table 7**  
**Products: Scanners**  
**Size Format: Large Format, Standard Format**  
**Marking Technologies: N/A**



**OM Table 8**  
**Products: Printers**  
**Size Format: Large Format**  
**Marking Technologies: Color DS, Color Impact, Color TT, DT, Mono DS, Mono EP, Mono Impact, Mono TT, Color EP, SI**



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# **Additional Criteria – TEC & OM**

**Comply with Energy Star requirements:**

- **External power supplies**
  - **External digital front ends**
  - **Additional cordless handset**
  
  - **Duplexing – required by larger TEC products**
  - **Default delay times to sleep**
  
  - **No “grandfathering” – Any product must meet the current spec at the time of manufacture**
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# **Tier II from 1 April 2009**

**Possible issues to consider:**

- **TEC levels**
  - **Standby for large format and mailing machines**
  - **OM products under TEC**
  - **Colour testing of products (now monochr.)**
  - **Recovery time**
  - **All definitions, products, levels etc.**
  
  - **Criteria in line with 25%**
  
  - **Base on data received and further assessment and comments**
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# Saving potential

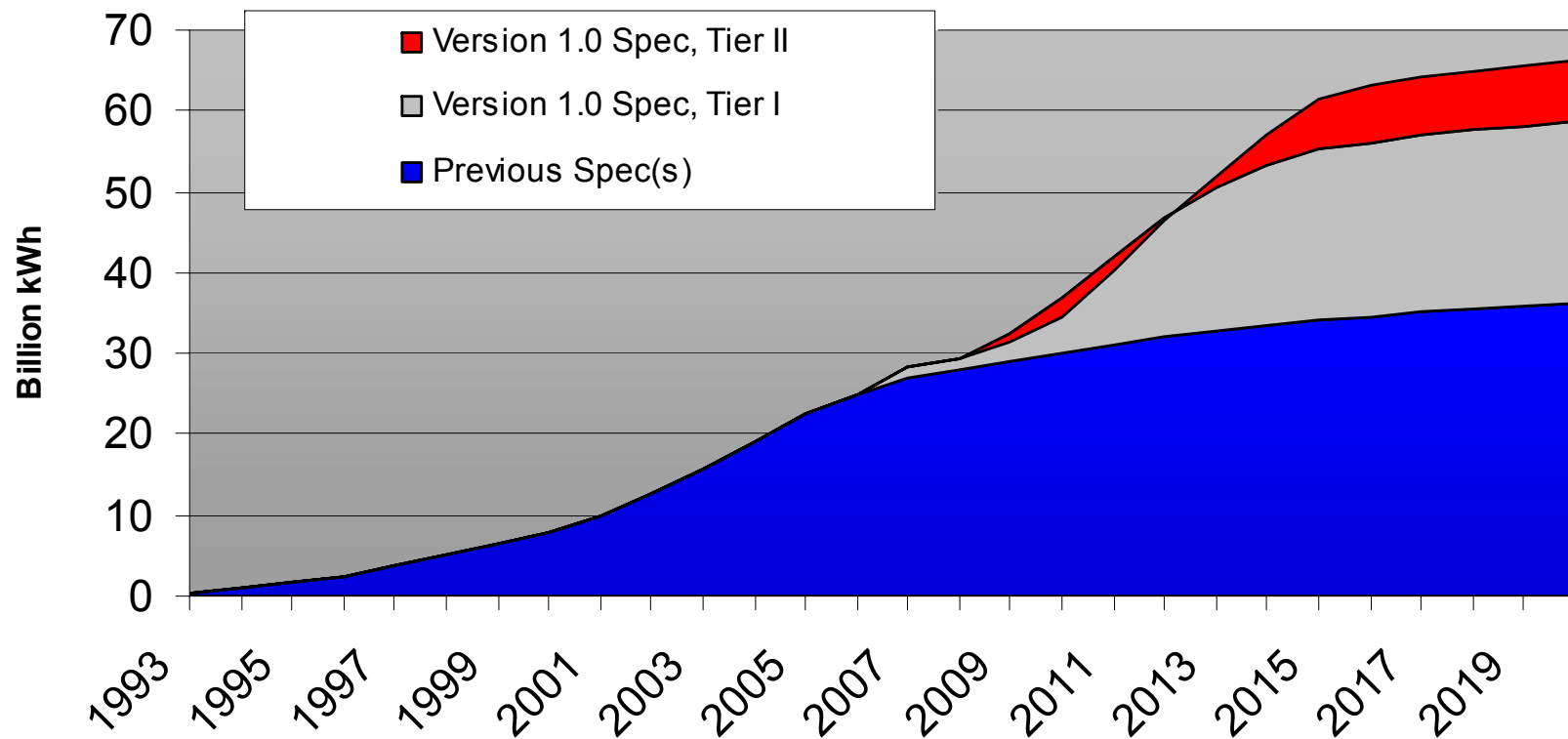
- Data from EPA for the unit annual electricity consumption of imaging products

	<b>kWh/yr (spec launch)</b>	<b>kWh/yr (2008)</b>	<b>% Reduction</b>
Facsimile	321	156	<b>51%</b>
Scanner	172	84	<b>51%</b>
Printers	245	111	<b>54%</b>
Copiers	1,111	558	<b>50%</b>
MFD	1,089	305	<b>72%</b>

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# Imaging Equipment Savings in USA

Imaging Equipment Savings (1993-2020)



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# Conclusions

- **New measurement method with all modes included for typical high consuming office IE products**
  - **Modes requirement for other products covering most consuming modes**
  - **Levels which are as close to 25% as possible**
  - **Planning for Tier II revision**
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# TEC Categorisation

- High degree of product convergence  
– copy, print, fax, scan
  - Categories according to functionality – not technology
  - Table 1 - 2: Production of hard copy images from electronic input over the network or the fax line and from hard copy originals and production of fax from hard copies. In monochrome (1) or colour (2).
  - Table 3 - 4: Production of hard copy or electronic images from electronic input over the network or the fax line and from hard copy originals in monochrome (3) or colour (4). Two or more functions are available (copy, print, scan, fax).
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