TACOMA POWER
TACOMA PUBLIC UTILITIES

Customer Requirements
Voltage Flicker Limits

C-SV-5100

Scope

This standard addresses the requirements for limiting voltage flicker caused by customers on Tacoma Power's electrical transmission, distribution, and secondary systems.

In This Standard

The following table lists the location of different parts of this standard.

Definitions

These are Definitions of Terms and Abbreviations used in this Standard

Abbreviations The following abbreviations will be used in this standard

Abbreviation	Definition
NEMA	National Electrical Manufacturers Association

Purpose

The purpose of this standard is to define the limits of voltage flicker imposed on the electrical system by customer processes and activities. These limits vary by the frequency of incidents and their magnitude.

Voltage Flicker

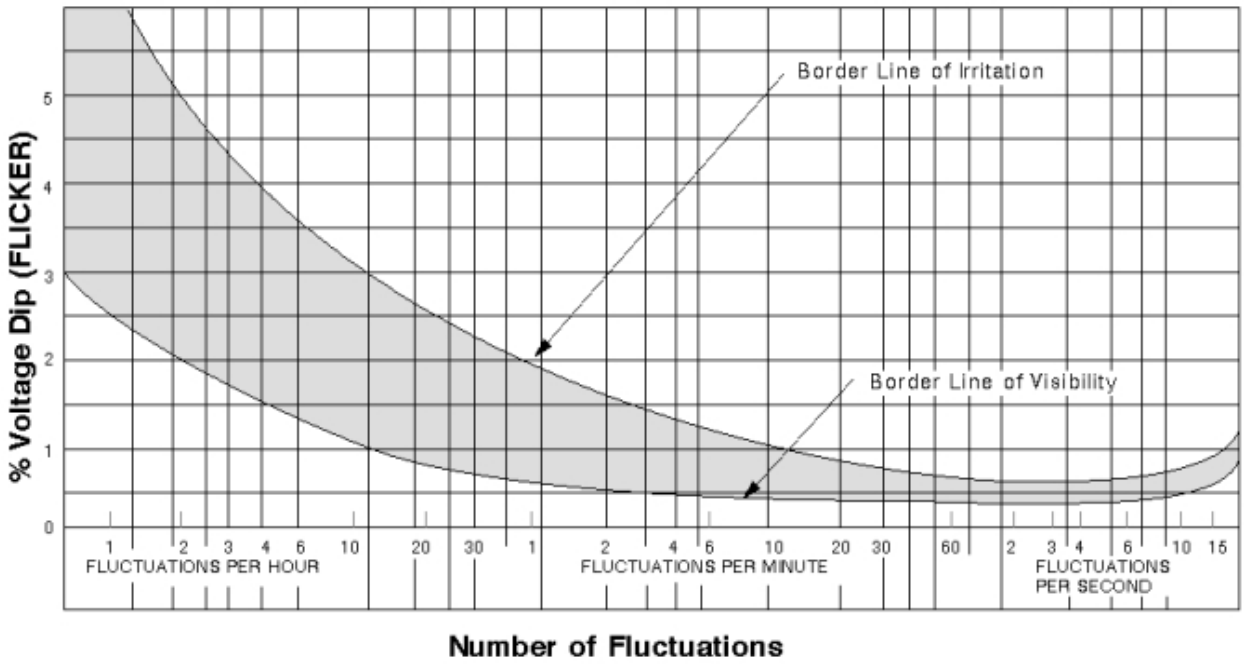
Causes

Voltage flicker may be caused by any of the following devices:

Type of Flicker	Characteristics	Usual Causes
Continuous	Lights that flicker several times a second	• Florescent lights • Welders • Arc Furnaces
Cyclic	Lights that flicker one to two times per minute	• Laser Printers • Copiers • Bad Breakers • Bad Connections
Intermittent	Lights that flicker infrequently, typically once or more per hour	• Motor(s) Starting

Figure 1
Flicker Limits

1. Voltage flicker imposed at Tacoma Power's transformer shall be limited to the "***Border Line of Visibility***" as shown below.
2. Voltage flicker imposed at the customer's panel owning the motor shall be limited to the "***Border Line of Irritation***" as shown below.



Customer Requirements

Notification Requirements

Customers must notify the ***New Services Engineering Department*** at Tacoma Power of any changes to their services that include the following:

- Upsizing the service panel
- The installation of motors equal or greater than:

Motors 600 Volts or Less		**Motors over 600 Volts –**
Single Phase Motors	Three Phase Motors	Single Phase and Three Phase
7½ hp	**7½ hp**	**All hp**

Motor Information

When adding motor load to a service the following information is required by Tacoma Power engineering to evaluate the potential for voltage flicker problems:

- Horsepower (hp) of motor(s)
- Across the line starting amperages (amps)
- Operating voltage of the motor(s)
- NEMA motor rating
- Description of any additional starting aids and how the motor(s) will be operated.

Engineering Assistance

Tacoma Power will assist with the sizing and selection of the transformer and service conductors when requested.

Customer Engineered Systems

Customer engineered systems must include the transformer characteristics, and, secondary conductors that precede the electrical service panel.

NOTE: If the customer designs a system that exceeds the limits shown in Figure #1 it is at their own risk and may be subject to the consequences listed below.

Excessive Voltage Flicker

Excessive Voltage Flicker

For customer electrical systems that exceed the voltage flicker limits of this standard Tacoma Power may take the following action per the Customer Service Policy:

New Load	Existing Load
If a new load is found to exceed the voltage flicker limits of this standard Tacoma Power reserves the right to deny service until the problem is addressed	If an existing load is found to exceed the limits of this standard the Tacoma Power may disconnect service until the problem is addressed

References and Sources

Reference

The following Tacoma Power documents are referenced in this standard:

- Tacoma Power Customer Service Policy

Sources

The following documents were used as sources of technical information for this standard:

- General Electric Review, August 1995 (Incandescent Lamps)