DIFFERENCES
CSA Z462, 1ST EDITION TO CSA Z462, 2ND EDITION

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DOCUMENT REVISION HISTORY

REVISION	REVISION DESCRIPTION	BY	DATE	APPROVED	DATE
Rev 1.0	Issued for Use	TWB	Oct 21, 2011	TWB	
Rev 2.0	Updated	TWB	Oct 27, 2011	TWB	
Rev 3.0	Updated	TWB	Oct 31, 2011	TWB	
Rev 4.0	Updated	JDP/ TWB	Nov 13, 2011	TWB	
Rev 4.2	Minor Revisions	TWB	Sept 24, 2012	TWB	

The following list of differences may not be complete, but highlights some of the key differences that you need to review and decide on what revisions may be required to your Electrical Safety Program, supporting Electrical Hazard Analysis Documentation and related Electrical Safe Work Practices and Procedures, etc.

Notes:

Some key changes are: the term FR (Flame Resistant) is removed and we now refer to arc flash protective clothing and equipment as arc-rated or AR. The Arc Flash Protection Boundary is now the Arc Flash Boundary. DC Arc Flash & Shock Tables are NOW included and Annex D includes a formula for calculation. For Arc Flash Hazard Analysis the less than 240V, single transformer not greater than 125kVA in size requires no arc flash hazard analysis language has been removed, adding a reference to see the IEEE 1584 Standard for this information. This information is still included in the current edition of IEEE 1584.

Factors in the selection of arc-rated PPE now states that non arc-rated garments shall not be used to increase the arc rating of a garment or clothing system.

Selection based on incident energy analysis; an arc-rated balaclava is required when the back of the worker's head is within the Arc Flash Boundary. A new threshold for protection has been established requiring workers to wear an arc-rated hood when the anticipated exposure exceeds 12 cal/cm^2.

Selection based on Hazard/Risk Categories; arc-rated balaclava is required to be worn underneath the arc-rated face shield for Hazard/Risk Category 2.

New Head Protection section defining that only arc-rated face shields with a wrap-around guarding protecting the worker's face, chin, forehead, ears and neck area shall be used.

Tables 4A and 4B now include the Arc Flash Boundary distance directly, calculated based on the Parameters now imbedded in the table. The assumed default Working Distances are now included in Tables 4A and 4B Parameters as well. Note that the 600V Switchgear Working Distance listed is 18" and is not harmonized with IEEE 1584 which is 24."

Table 6 is deleted and Table 5 updated. Table 5 still includes the cross reference to the H/RC # and H/RC 2* is removed.

In Annex D the incident energy analysis and arc flash boundary calculations methods related to IEEE 1584 the "2 Second Rule" for maximum fault clearing time has now been included and referenced in several sections, this is quoted directly from the IEEE 1584 Standard.

Annex F Hazard identification and risk assessment procedure has been completely changed and now provides a very comprehensive description of risk assessment based on the parallel application of appropriate preventive and protective control measures.

Annex H Guidance on the selection of protective clothing and other personal protective equipment is changed substantially and now includes a new Table H.2 which provides guidance on what arc-rated clothing can be applied against the "incident energy" listed on detailed Arc Flash & Shock Warning labels.

Table 1 – Differences Table

CSA Z462, 1st Edition DIFFERENCES to CSA Z462, 2nd Edition CLAUSE 1 - SCOPE		
Clause	**CSA Z462, 1st Edition**	**CSA Z462, 2nd Edition**
Clause 1.2	Workplaces Excluded	Application Wording changes, Marine, Utilities, Railways, Telecomm still excluded
Clause 1.3	Purpose	Suitability Wording changes. Users judge suitability.
CLAUSE 3 - DEFINITIONS		
Clause	**CSA Z462, 1st Edition**	**CSA Z462, 2nd Edition**
	Arc Flash Protection Boundary changed throughout the document. The word Protection has been deleted.	**Arc Flash Boundary** This actually isn't a "protection" boundary, you can still sustain the onset of a 2nd Degree burn at this Boundary.
	Arc Rating	**Arc Rating** The two applicable ways that clothing can be arc-rated has been moved from the Notes to Table 6 to the definition, ATPV and E_{BT}. The ASTM F1959 Standard dictates how the ATPV and E_{BT} are achieved under arc flash testing in an approved lab.
	Boundary, Arc Flash Boundary	Text added to explain the amount of incident energy at this Boundary that will result in the onset of a second degree burn which is 1.2 cal/cm^2.
	FR deleted throughout the entire document.	**AR** added, indicating "arc-rated." The use of FR was incorrect, the flash fire and arc flash are two distinct hazards. Arc flash protective clothing is "Arc-rated" or AR.
	New	**Incident Energy Analysis**

		Definition added. Engineering calculations using IEEE 1584 or other acceptable formulas and methods.
	Working On	The words “Intentionally coming” in contact have been added.
CLAUSE 4 – SAFETY RELATED WORK PRACTICES		
Clause	**CSA Z462, 1st Edition**	**CSA Z462, 2nd Edition**
Clause 4.1.6.4.1	Qualified person	Added text to advise that employer must check through supervision or inspections on an annual basis that each employee is complying with work practices of this Standard.
Clause 4.1.6.4.3	Training	Retraining frequency added, 3 years indicated.
	Electrical safety program Hazard identification and risk assessment procedure	Text modified and added to clarify that there are two separate requirements. An electrical hazard analysis and a risk assessment should be completed separately and identified in the Electrical Safety Program. New Annex F provides detailed guidance on risk assessment.
Clause 4.1.7.8	Electrical safety program Electrical safety auditing	Additional language adding indicating that auditing is required for the Electrical Safety Program to ensure that the principles and procedures of the ESP are in compliance with CSA Z462. Field work should be audited to verify workers are in compliance with the ESP and audit findings may require retraining of workers and revisions to the ESP.
Clause 4.1.8.3	GFCIs	Additional language added, GFCIs used as required by Codes and Standards. GFCIs used outdoors. An Assured Equipment Grounding Conductor Program may be required.
Claus 4.3.2	Electrically Safe Work Conditions	Language added to clarify.
Clause 4.3.2.3.2	Energized Electrical Work Permit	Reorganization of how electrical hazard analysis information is presented. See Annex J for revised example.
Table 1A	Was Table 1	Approach boundaries to energized electrical conductors or

		circuit parts for shock protection for AC systems.
Table 1B	NEW – DC Shock	Approach boundaries to energized electrical conductors or circuit parts for shock protection for DC systems.
Clause 4.3.5	Arc flash hazard analysis	The 240V, single transformer, 125kVA text has been deleted and a Note added to refer to IEEE 1584 (this information is still in the current revision of IEEE 1584, it is subject to update September 2012). Additional notes added re lower and higher fault currents and impact on incident energy. As well Note added with respect to arcing fault inside enclosure and preventive control options of arc resistant switchgear, remote racking, remote opening and closing, HRG, current limitation and specification of insulated bus to reduce the hazard of the system.
Clause 4.3.5.4	Equipment labeling	Updates added outlining additional information required on detailed Arc Flash & Shock Warning labels. Three pieces of information should be on the label: 1. Incident energy at working distance, or min AR of clothing, or level of PPE, or highest H/RC # for the equipment. 2. Voltage 3. Arc Flash Boundary Also refer to Annex Q for revised examples.
Clause 4.3.7.1 Notes <u>This text is not included in CSA Z462, but is</u>	Personal and other protective equipment. Additional note added. This would indicate the no PPE is required for less than or equal to 600V equipment operation under “Normal” conditions.	“It is the collective experience of the Technical Committee on Workplace electrical Safety that normal operation of enclosed electrical equipment operating at 600 volts or less that has been properly installed and maintained by qualified persons is not likely to expose the employee to an electrical hazard.”

included in NFPA 70E, Article 130.7(A) IN No.2		
Clause 4.3.7.3.5	Hearing protection. New Clause.	Workers shall wear hearing protection whenever working within the arc flash boundary.
Clause 4.3.7.3.9	Factors in the selection of protective clothing and equipment. Added Text.	Garments that are not arc-rated shall not be permitted to be used to increase the arc rating of a garment or of a clothing system.
Clause 4.3.7.3.10(a)	Arc flash suits Revised Text.	"When exterior air is supplied into a hood, by a hood ventilation system, all ventilation system components shall be (i) covered by arc-rated materials with an arc rating equivalent to the suit; or (ii) constructed of non-melting, non-flammable materials"
Clause 4.3.7.3.10(b)	Head protection New clause.	(i) Requires an arc-rated balaclava with an arc-rated face shield or arc-rated hood to protect the back of the workers head "(ii) An arc-rated hood shall be used when the anticipated incident energy exposure exceeds 12 cal/cm^2"
Clause 4.3.7.3.10(c)	Face protection Added text.	"(ii) Face shields shall have a wrap-around guarding to protect the face, chin, forehead, ears and neck area."
Clause 4.3.7.3.10(d)	Hand protection Added text.	New text added indicating a certain thickness of leather work gloves can have an ATPV in excess of 10 cal/cm^2.
Table 4A	Was Table 4 which is updated and changed to Table 4A	Hazard/risk category classifications and use of rubber insulating gloves and insulated and insulating hand tools — AC equipment
Table 4A	Maximum equipment voltage and work tasks	Table 4A is only applicable to work tasks for up to 15kV electrical equipment now. Table content for higher voltages than 15kV has been removed.
Table 4B	NEW for DC Voltages	Hazard/risk category classifications and use of rubber insulating gloves and insulated and insulating hand

		tools – DC equipment
Table 5	Hazard/Risk Category 0 Added Text.	Fabric weight at least 4.5 oz/yd^2
	Hazard/Risk Category 1, 2, 3 & 4 Added Text.	Arc-rated hard hat liner (as needed)
	Hazard/Risk Category 2 Added Text.	Arc-rated arc flash suit hood; or Arc-rated face shield (Note 2) and arc-rated balaclava.
	Hazard/Risk Category 2*	**Deleted.** Was redundant due to the changes made to H/RC2.
Table 6	Protective clothing characteristics	**Table is Deleted.** Was redundant information from Table 5.
ANNEXES		
Annex A	Aligning implementation of this Standard with occupational health and safety management Standards Additions.	Added additional wording to emphasize the application of preventive and protective control measures in a hierarchal approach. 1. De-energize; 2. Substitute; 3. Safety by Design; 4. Warning signs and barricading; 5. Training and procedures; 6. PPE LAST! Care, use and maintenance direction provided to workers. Point to revised Annex F for guidance on risk assessment.
Annex D	Incident energy and arc flash boundary calculation methods Deletions and additions.	The “2 Second” maximum fault clearing time rule has been included in several locations, extracted from the IEEE 1584 Standard. Deleted existing D.8 …live line work and overhead open air systems Added new D.8 DC incident energy calculations.

		D.9 Tables moved to Annex H.
Annex F	Hazard identification and risk assessment Procedure Completely revised.	Significantly different than the previous Annex. Excellent content!!
Annex H	Guidance on selection of protective clothing and other personal protective equipment	Significant changes, new Table H.2 added to be used when deciding on what arc-rated clothing required when detailed Arc Flash & Shock Warning label is available.
Annex J	Energized Electrical Work Permit	Minor format change.
Annex O	Safety related design	Arc energy reduction content added for circuit breaker greater than or equal to 1000A: 1. Zone interlocking; 2. Differential relaying; 3. Arc reduction maintenance switch; 4. Arc flash relay.
Annex Q	Arc flash and shock warning labels	Labels updated to reflect Clause changes. H/RC removed from the detailed label example as H/RC # should not be on a label when engineering incident energy has been calculated.
Annex R NEW	High voltage substations	New Annex added to provide guidance on HV substations.
Annex S NEW	Guidance for preventing shock injuries from electrostatic discharges in manufacturing operations	New Annex added based on emerging research in this area.