Ontario

Guidelines for Pre-Start Health and Safety Reviews: How to Apply Section 7 of the Regulation for Industrial Establishments

April 2001

Health and Safety Guidelines

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Guidelines for Pre-Start Health and Safety Reviews: How to Apply Section 7 of the Regulation for Industrial Establishments

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1. Introduction

These guidelines provide information on the levels of diligence, methodology and reporting required to comply with section 7 of the *Regulation for Industrial Establishments.* In addition to these guidelines, the Ministry is producing a "Frequently Asked Questions" document to assist employers in conducting a Pre-Start Health and Safety Review. This document will be made available through the Ministry of Labour's Publications Office.

The employer, owner, lessee or reviewer needs to consider the following points:

- The employer is responsible for ensuring that all requirements of the *Occupational Health and Safety Act* and regulations are complied with in the workplace. Even where a Pre-Start Health and Safety Review is not required or an exemption from the requirements of section 7 applies, the employer must ensure that workers will be protected when they use any apparatus, structure, protective element or process in the workplace.

- The section 7 Table (Table 1) in Appendix I specifies the provisions of the regulation that apply and circumstances under which a Pre-Start Health and Safety Review is required. There may be other compliance requirements that need to be met before any apparatus, protective elements, structures, and/or processes are used. Even if a Pre-Start Health and Safety Review is not required, it is still the employer's responsibility to meet these requirements. To avoid a costly retrofit the employer may broaden the scope of a regulated Pre-Start Health and Safety Review to include these requirements. The details outlined in Table 2 Appendix I may provide an effective way to help ensure compliance.

- Integrating health and safety at the design stage and before operations begin is a cost-effective and proactive way to prevent workplace illness or injury. The benefits are numerous. They include direct savings from minimizing retrofitting; less downtime and replacement of equipment; savings in workplace insurance claims due to fewer illnesses and injuries; and, most important, maintaining productivity, health and safety in the workplace.

- These guidelines do not prescribe how a Pre-Start Health and Safety Review (PSR) is to be done, and the regulation allows for flexibility in that it does not specify any one report format. Where employers have existing review systems and processes to comply with health and safety requirements prior to start-up, they may use them to satisfy PSR requirements, provided that the evaluation, review and written report are done by an appropriate person as required in subsections 7 (11) and (12). The report or reports must indicate that the apparatus, structure, protective element or process complies with the applicable sections of the *Regulation for Industrial Establishments* referenced in section 7.

2. Purpose of these Guidelines

The purpose of these guidelines is to clarify the intent and requirements of section 7 of the *Regulation for Industrial Establishments* regarding Pre-Start Health and Safety Reviews.

Within the guidelines, the term "Pre-Start Health and Safety Review" includes a written report as required by Regulation 528/00, which amends section 7 of the *Regulation for Industrial Establishments*, Regulation 851.

Adhering to the guidelines complies with the intent of section 7 of the *Regulation for Industrial Establishments*. However, the guidelines are not intended to replace section 7. In any case where these guidelines may differ from section 7, the section 7 provisions prevail.

Intent

The intent of section 7 of the *Regulation for Industrial Establishments* is to ensure that a timely professional review identifies specific hazards, or hazards associated with exposure to chemicals and other designated substances, in certain circumstances. Section 7 is intended to ensure that such hazards are removed or controlled before the apparatus or process is started up. The Pre-Start Health and Safety Review ends when the apparatus or process is put into production.

The Pre-Start Health and Safety Review is intended to ensure worker protection as required under the applicable provisions of the *Regulation for Industrial Establishments*.

Effective Date

The amended section 7 became effective October 7, 2000. If a review was done prior to the effective date, then another review is not necessary, unless modifications[1] to an existing machine, equipment, device, structure, protective element or process are to be undertaken. These guidelines will assist in making that determination. If the installation of any new equipment, machine, or device is planned for after October 7, 2000, then a review will be required prior to start-up for production, if section 7 applies.

For projects initiated before October 7, 2000 but not yet started up and to which the amended section 7 applies, a review completed under either the terms of the previous section 7 or the current section 7 will be acceptable.

[1] Not all modifications require review. For details, refer to Flow Chart 2, Existing Equipment.

3. The Pre-Start Health and Safety Review

What is a Pre-Start Health and Safety Review?

A Pre-Start Health and Safety Review includes a written report on the construction, addition or installation of a new [2] apparatus, structure, protective element or process[3], or modifications to an existing apparatus, structure, protective element or process. The report details the measures (steps, actions or engineering controls) necessary to bring the construction, addition, installation or modification into compliance with the applicable provisions of the *Regulation for Industrial Establishments* as listed in the section 7 Table (Table 1) in Appendix I.

The Pre-Start Health and Safety Review is undertaken before start-up and ideally at the design stage. The employer must address any measures necessary to bring the construction, addition, installation or modification into compliance before production begins.

When is a Pre-Start Health and Safety Review required?

The requirements for a Pre-Start Health and Safety Review are triggered when the applicable sections of the *Regulation for Industrial Establishments* and their circumstances as listed in Table 1 apply.

Subsection 7 (2) of the *Regulation for Industrial Establishments* requires a Pre-Start Health and Safety Review for the construction, addition or installation of a new apparatus, structure, protective element or process, or the modification to an existing apparatus, structure, protective element or process. Please refer to Flow Chart 1, "When Is a Pre-Start Health and Safety Review Required?"

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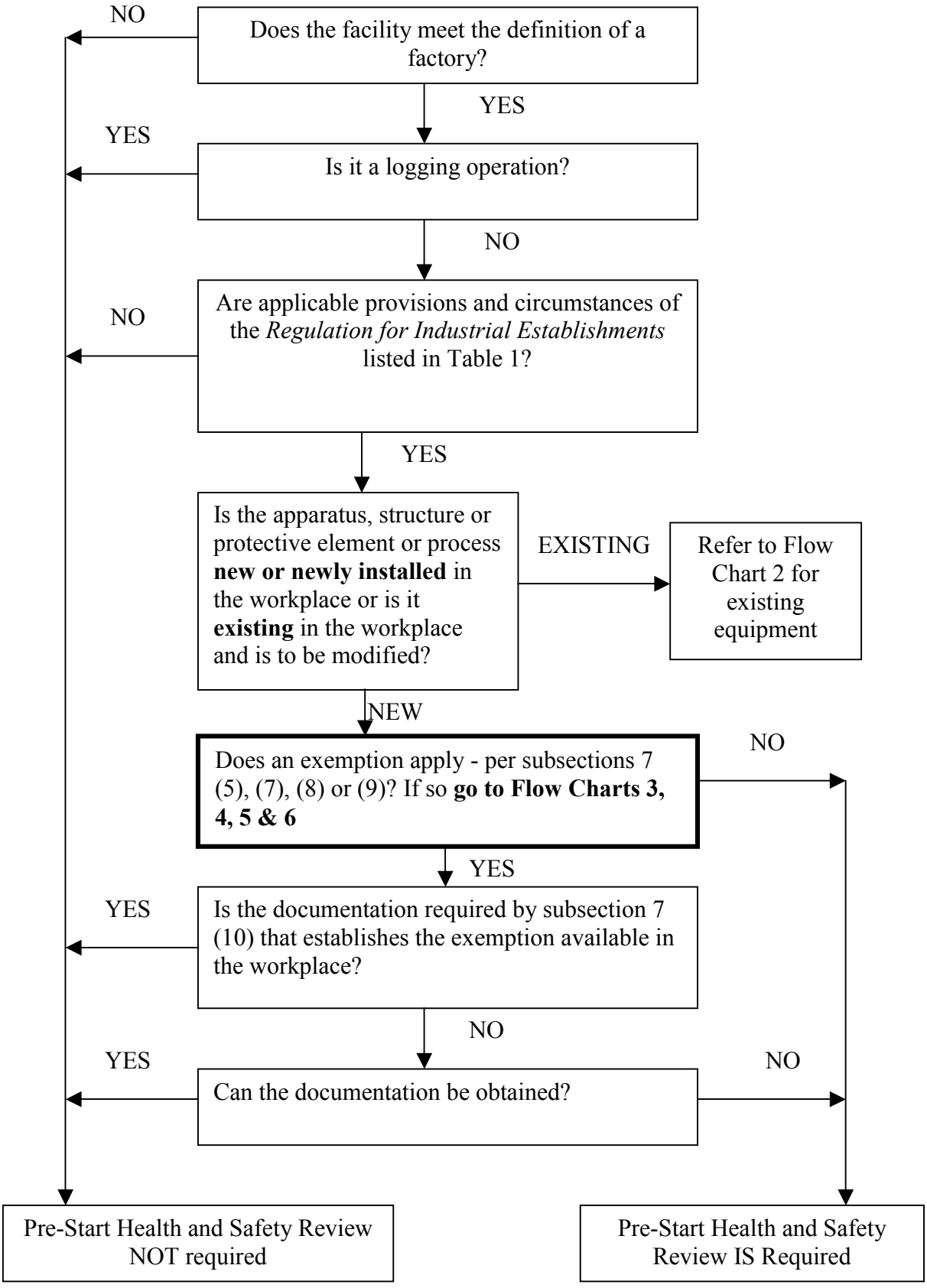
[2] A new apparatus, structure, protective element or process includes newly installed or added apparatus, structure, protective element or process in the workplace.

[3] For the purpose of this section, the term "process" refers only to those processes listed and identified in Table 1 under items 4 and 8.

Flow Chart 1 - When Is a Pre-Start Health and Safety Review Required?



What about modifications to existing equipment?

There are several steps to consider if the employer is planning modifications to an existing apparatus, structure, protective element or process and the provisions and circumstances in Table 1, Appendix I apply. If one of the three steps described in subsection 7 (2) (b) of the *Regulation for Industrial Establishments* must be taken to achieve compliance, a Pre-Start Health and Safety Review is required.

Note that if there is a lack of compliance due to intended modifications, but engineering or other control measures would restore compliance, a Pre-Start Health and Safety Review would still be required before an apparatus, structure, protective element or process is used. This requirement is subject to the exemptions specified in the regulation.

The shaded boxes in Flow Chart 2, Existing Equipment, are to be evaluated by a person familiar with the *Regulation for Industrial Establishments*. Note that an evaluation is not a Pre-Start Health and Safety Review, but merely a way of determining whether a Pre-Start Health and Safety Review is required. For this reason, the person is not required to be a professional engineer.

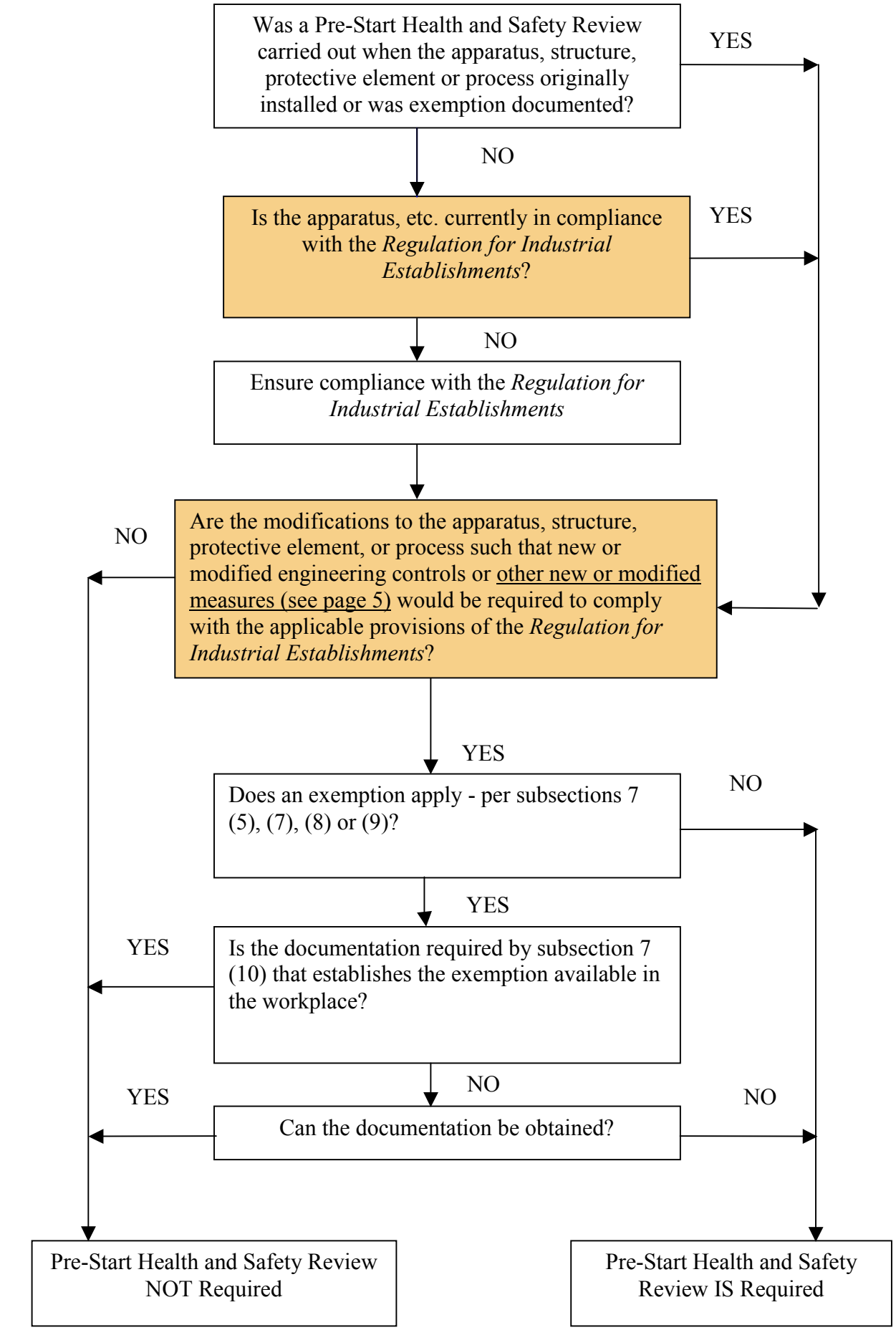
The employer should have a process in place to ensure that an evaluation is conducted to determine whether a Pre-Start Health and Safety Review is required on the modification, or establish the process through documentation.

What are "new or modified measures"?

New or modified measures are those measures referred to in section 87.3 of the *Regulation for Industrial Establishments* regarding molten material. These measures are to be used in a foundry if engineering controls to prevent spillage are not reasonably possible in the circumstances.

The term "measures" is also used in the *Regulation Respecting Control of Exposure to Biological or Chemical Agents* (Regulation 833), and regulations respecting designated substances such as Regulations 835 through 846 of the *Revised Regulations of Ontario,* 1990. For the purposes of section 7 of the *Regulation for Industrial Establishments*, however, "measures" do not include respirators, work practices, hygiene facilities and practices, or administrative controls.

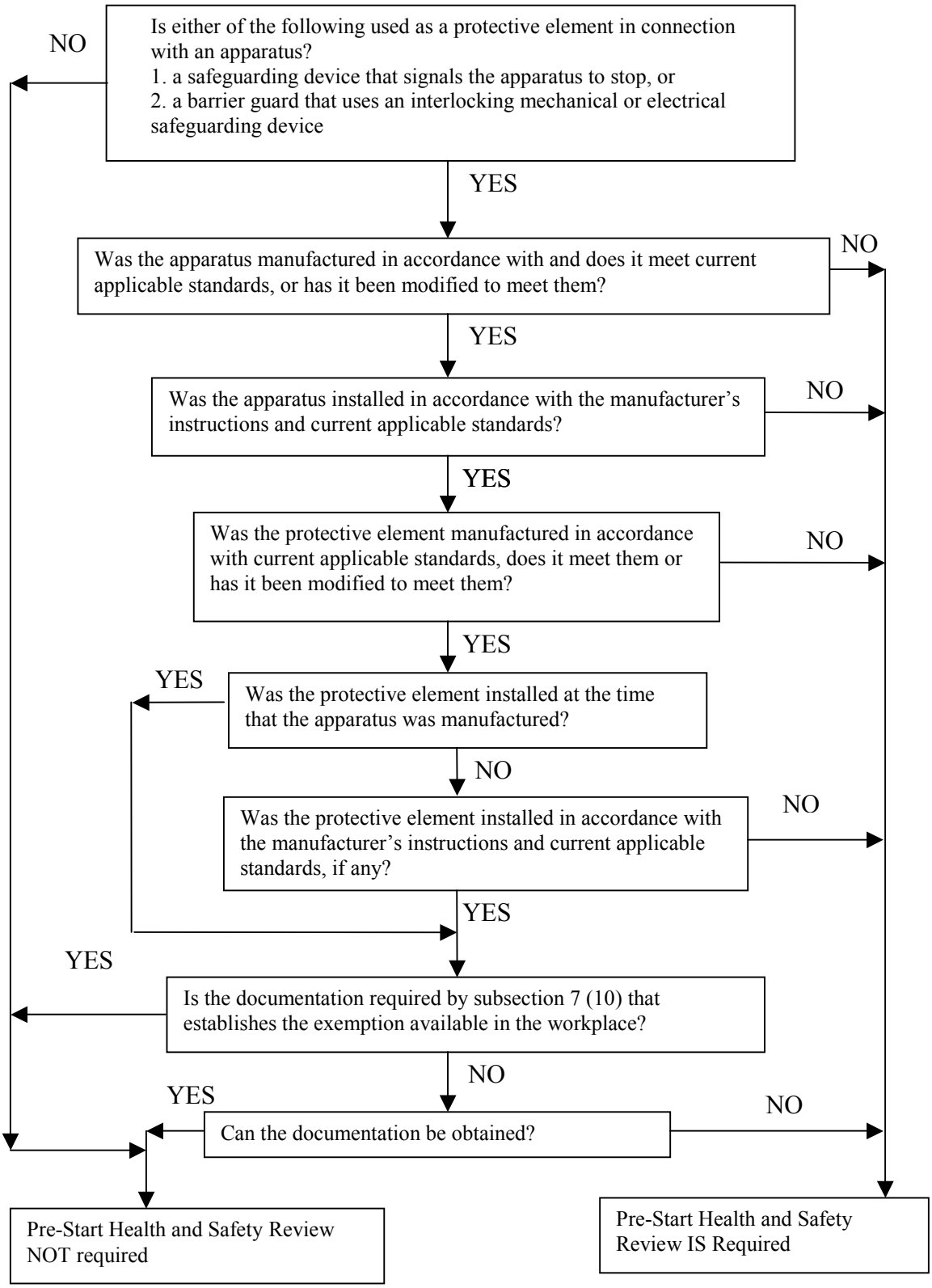
Flow Chart 2 - Existing Equipment



Are there "exemptions" from the Pre-Start Health and Safety Review requirement?

Even where there is a new apparatus, structure, protective element or process, or one intended to be modified, a Pre-Start Health and Safety Review may not be required depending on certain criteria. Refer to the following Flow Charts 3, 4, 5 and 6.

Flow Chart 3 - Guarding Provisions Exemptions



Guarding Provisions and Standards

Item	Applicable provisions of this regulation	Circumstances	Other Ontario codes for exemption or to support compliance	Generic standards ('A' & 'B') for exemption or to support compliance	Machine-specific standards 'C' for exemption or to support compliance	Other codes, and standards, for reference
2	Sections 24, 25, 26, 28, 31 and 32	Any of the following are used as protective elements in connection with an apparatus: 1. Safeguarding devices that signal the apparatus to stop, including but not limited to safety light curtains and screens, area scanning safeguarding systems, radio frequency systems, two-hand control systems, two-hand tripping systems and single or multiple beam systems 2. Barrier guards that use interlocking mechanical or electrical safeguarding devices	Ontario Electrical Safety Code	CSA-Z432* ANSI B11.19 ISO 14121 ISO 12100 Parts 1 & 2 ISO 13851 ISO 13852 ISO 13853 ISO 13854 ISO 13855 ISO 13856 ISO 14119 ISO 14120 IEC 61496 Parts 1, 2, 3 ISO 4413 ISO 4414	CSA Z142* CSA Z434* CSA Z615* ANSI B11.1* ANSI B11.2 ANSI B11.3 ANSI B11.6 ANSI B11.8 ANSI B11.10 ANSI B11.20 ANSI B11.21 ANSI B65.1 ANSI B65.2 ANSI B65.5 ANSI 15.06 ANSI B151.1 ANSI Z245. 1 +MOL Guide ANSI Z245.2 ANSI Z245.5	See listings of codes, standards, manuals and handbooks in Appendix II

* Standard is under review, revised standard to be released shortly

A & B standards are generic safety standards that give basic concepts and principles for design and general aspects, or deal with one safety aspect or one type of safety related device that can be applied to machinery/processes

C standards are safety standards that deal with detailed safety requirements for a particular machine or group of machines or processes

Please note that the use of generic machine guarding standards type A and B shown above requires that a risk assessment be conducted as part of this exemption. Should a dispute or uncertainty arise regarding the applicability of standards listed, a Ministry of Labour engineer may be contacted for clarification.

For the purpose of this section, a manufacturer is:

1. The original equipment manufacturer; and/or

2. An employer (systems integrator) who is responsible for integrating equipment/a group of machines or safety devices that have been procured to comply with current applicable standards, and/or items manufactured in house to those standards. Such equipment integration shall be subject to a documented risk assessment review if required by the applicable standard.

If no Pre-Start Health and Safety Review is required due to the guarding provisions exemption, the owner, lessee or employer must keep documentation supporting the exemption.

The following documents are acceptable to establish such an exemption:

1. A notice in writing

    a) from the manufacturer declaring that the apparatus and protective element have been manufactured or modified to meet current applicable standards. (Procurement/purchasing documentation verifying that the apparatus and protective element have been manufactured or modified to meet current applicable standards may be acceptable.)

    and

    b) from the installer stating that the apparatus and protective element were installed in accordance with the manufacturer's instructions and current applicable standards, if applicable; and

2. If the protective element was not installed when the apparatus was manufactured, a notice in writing from the installer stating that the protective element is installed in accordance with the manufacturer's instructions and current applicable standards, if any.

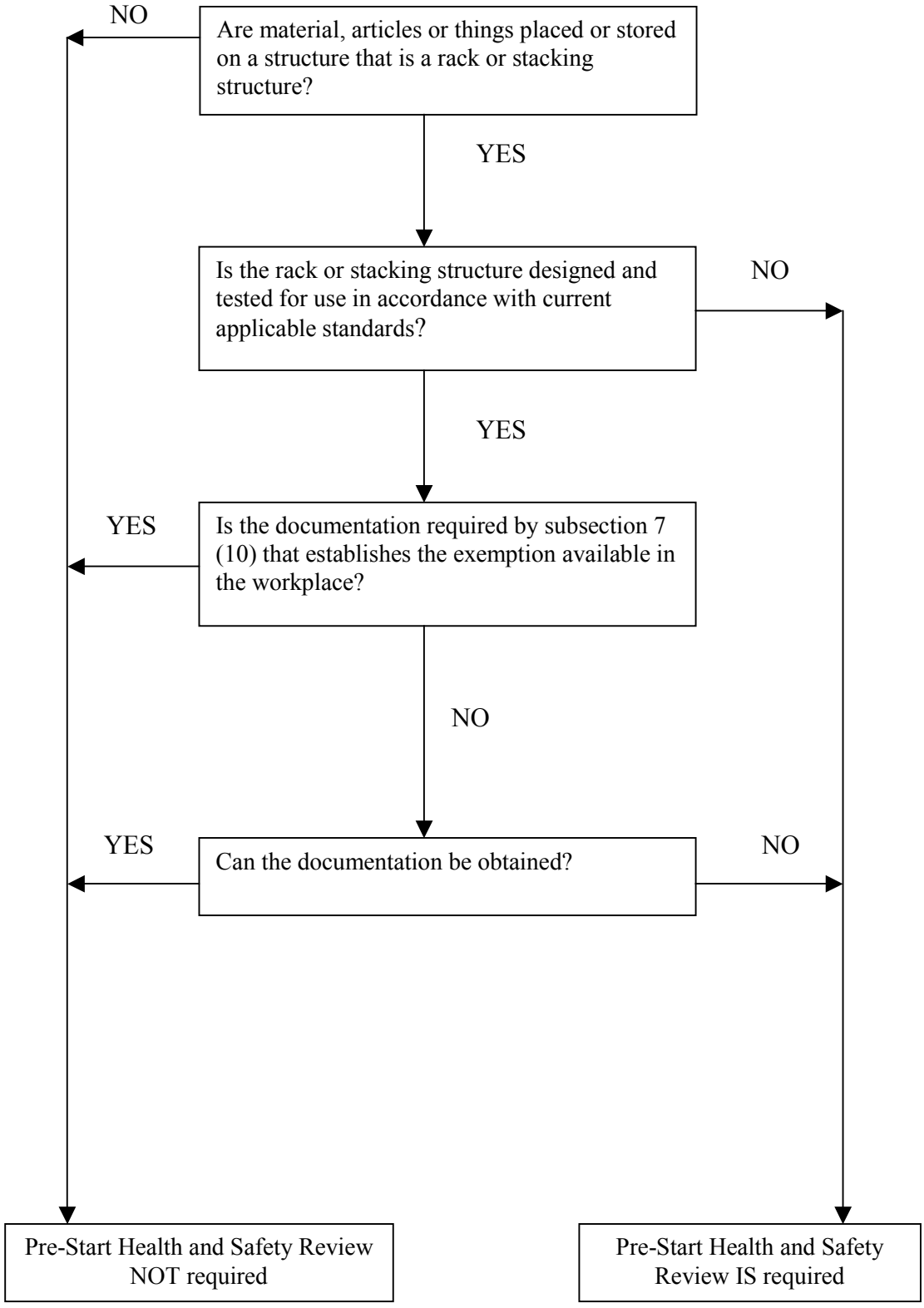
    or

    Certification from an accredited organization verifying that the apparatus and protective element have been manufactured or modified to meet current applicable standards may be acceptable, where such organizations are available.

    Such accredited organizations include:

    - Standard Council of Canada - (CANADA)
    - National Recognized Testing Laboratory (NRTL) – (USA)
    - Approved Body for EC Type Examination (as listed in the European Community (EC) Machine Directive) – (EUROPE)

Flow Chart 4 – Rack & Stacking Structure Exemptions



Item	Applicable provisions of this regulation	Circumstances	Standards for exemption or to support compliance	Other codes, standards and practices for reference
3	Clause 45 (b)	Materials, articles or things are placed or stored on a structure that is a rack or stacking structure	RMI-Specification for the design, testing and utilization of industrial steel storage racks	• Steel storage racking As 4084-1993 • SEMA Code of Practice for the design of static racking • Pallet racks JIS Z 0620 • See listings of codes, standards, manuals and handbooks in Appendix II

For the purpose of section 7, rack and stacking structures are industrial pallet racks, moveable shelf racks, stacker racks, drive-in and drive-through racks and cantilever racks. They are made of cold-formed, hot-rolled steel, wood, aluminum or concrete structural members. They are not other types of racks, such as portable racks or containers, or racks made of materials other than steel, wood, aluminum or concrete.

In the case where a Pre-Start Health and Safety Review would be triggered by item 3 of the Table above (i.e. a rack), a Pre-Start Health and Safety Review would not be required if the rack or stacking structure is designed and tested for use in accordance with current applicable standards.

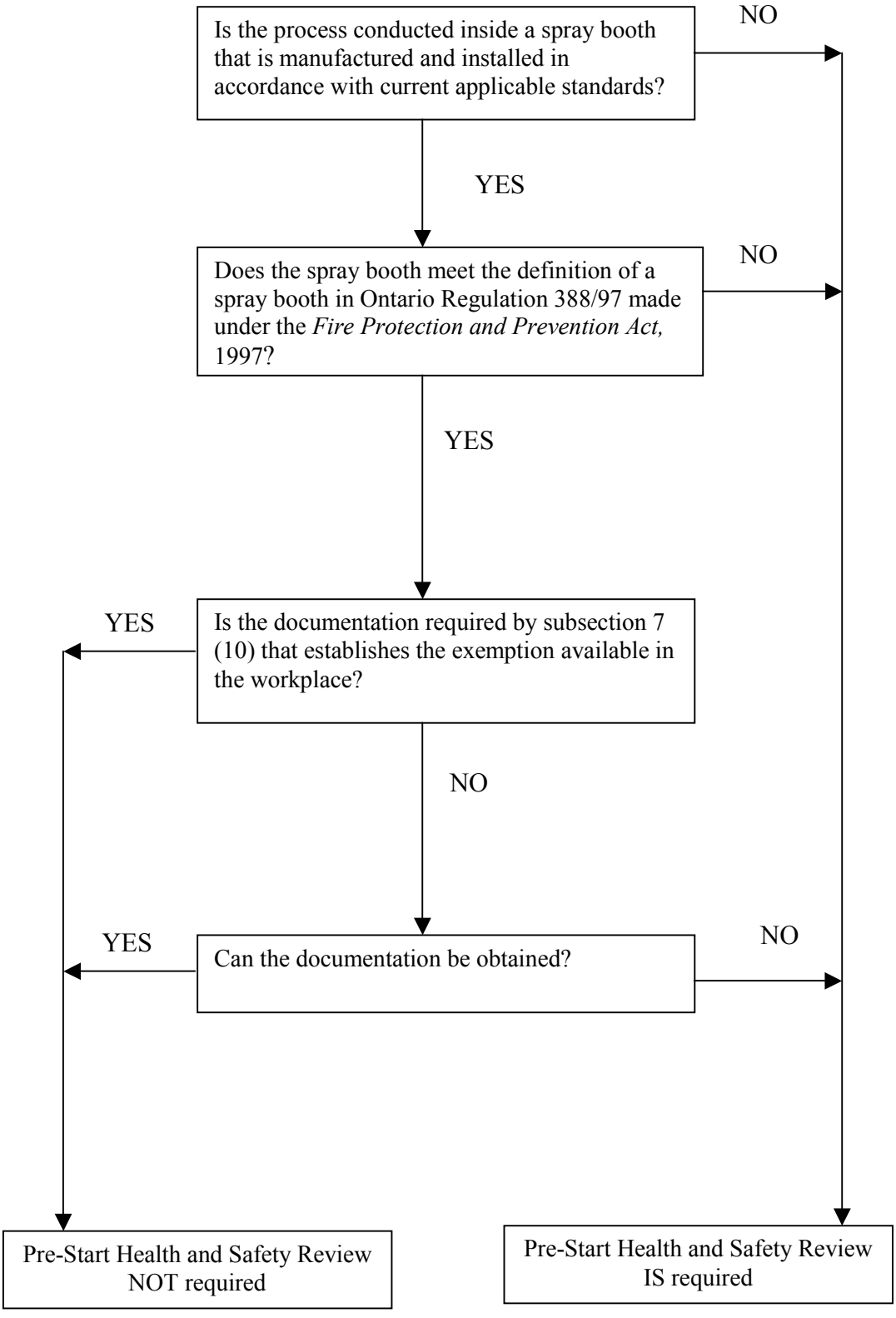
If no Pre-Start Health and Safety Review is required due to the rack exemption, the owner, lessee or employer must keep documentation supporting the exemption. The following documents are acceptable to establish such an exemption:

1. A document from the manufacturer, supplier or vendor of the rack or stacking structure that indicates the requirements for its safe use, and contains a statement outlining the loading conditions and design standards used to design and build the rack or stacking structure. The requirements can take the form of, but are not limited to, capacity tables, capacity charts, structural drawings or a written statement specifying the capacity. The document must bear the seal and signature of a professional engineer,

   or

2. A notice in writing from the manufacturer declaring that the rack or stacking structure is designed and tested for use in accordance with current applicable standards.

Flow Chart 5 - Spray Booth Exemption - Subsection 7 (8)



What is a spray booth?

A spray booth as defined in the *Ontario Fire Code* "means a power-ventilated structure that encloses or accommodates a spraying operation so that spray vapour and residue can be controlled and exhausted."

Item	Applicable provisions of this regulation	Circumstances	Other Ontario legislation for compliance	Standards for exemption or to support compliance	Other codes, standards, practices for reference, see listings in Appendix II
4	Section 63	A process involves a risk of ignition or explosion that creates a condition of imminent hazard to a person's health or safety	OFC, OBC, ON-Gasoline Handling Act/Code; ON- Energy Act Propane Codes, Natural Gas Codes; ON-Mechanical Refrigeration Code; ON-Boiler, Pressure Vessel, and Pressure Piping Code; ON-Electrical Safety Code	NFPA-33 for spray booth exemptions. MOL-EDS 4-12 Wood working operations	NFC Part 4 & 5 NFPA-30 NFPA-34 NFPA-68 & 69 NFPA-86 NFPA-497 NFPA-499 NFPA-505 NFPA-820 ANSI/API 500 ANSI/ASHRAE 15 Factory Mutual Industrial Ventilation Manual (ACGIH)

In the case where a Pre-Start Health and Safety Review would be triggered by item 4 of the Table above (i.e., a potentially explosive process), a Pre-Start Health and Safety Review would not be required if the process is conducted in a spray booth manufactured and installed in accordance with current applicable standards. It should be noted that this exemption does not apply to equipment installed inside the spray booth (e.g. robots).

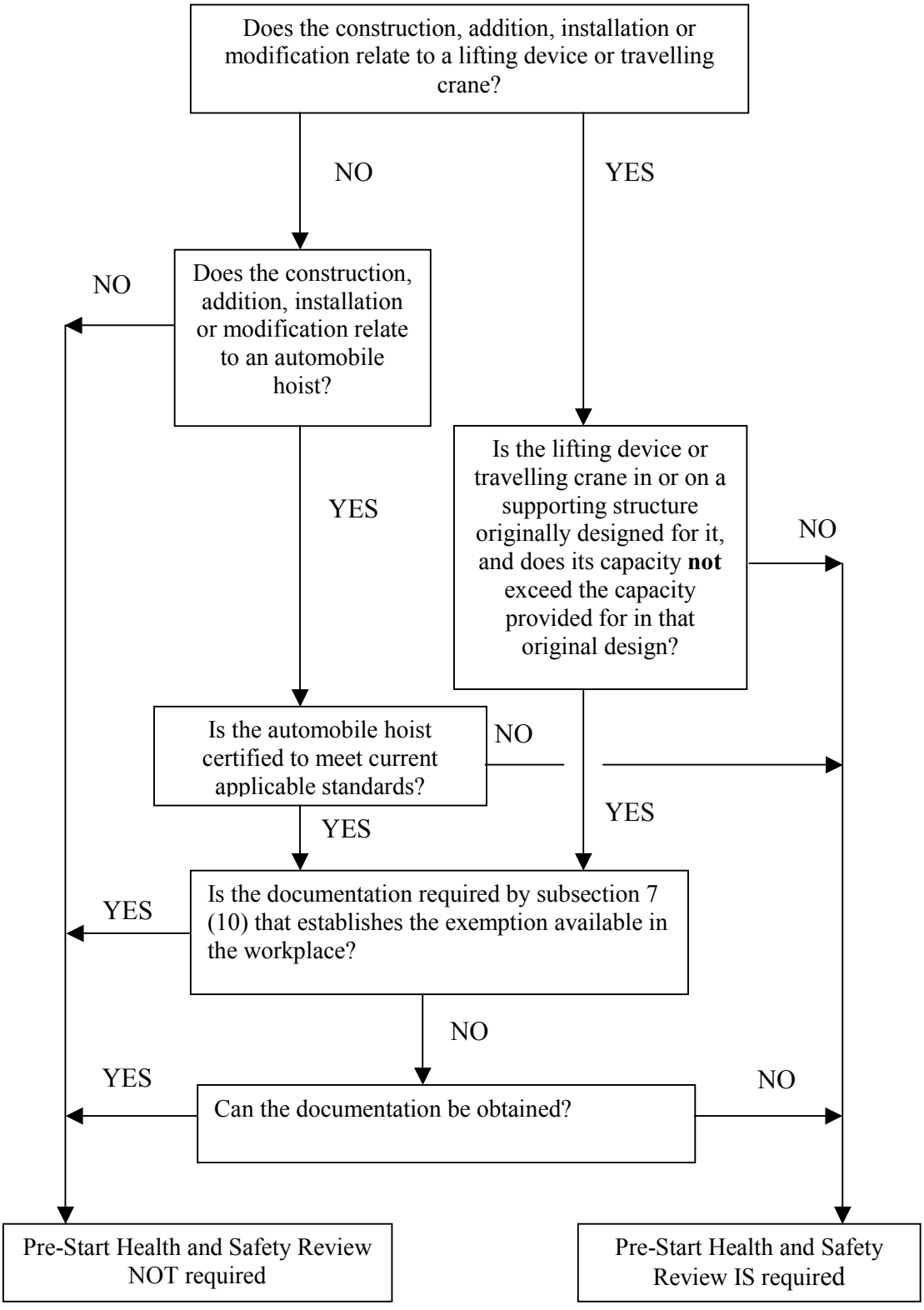
If no Pre-Start Health and Safety Review is required due to the above exemption, the owner, lessee or employer must keep documentation supporting the exemption. The following documents are acceptable in establishing such an exemption:

1. A notice in writing from the manufacturer, or certification from an accredited organization, declaring that the spray booth is manufactured to current applicable standards,

   and

2. A notice in writing from the installer stating that the spray booth is installed in accordance with the manufacturer's instructions and current applicable standards.

Flow Chart 6 - Lifting Device Exemption - Subsection 7 (9)



Item	Applicable provisions of this regulation	Circumstances	Machine-specific standards ('C') for exemption or to support compliance
7	Sections 51 and 53	The construction, addition, installation or modification relates to a lifting device, travelling crane or automobile hoist	ANSI-ALI ALCTV-1998, Exemption, third-party certification for automobile hoists

In the case where a Pre-Start Health and Safety Review would be triggered by item 7 of the Table above, a Pre-Start Health and Safety Review would not be required:

1. If the lifting device or travelling crane is in or on a supporting structure originally designed for it, and its capacity does not exceed the capacity provided for in that original design.

2. For an automobile hoist, if it is certified that it meets current applicable standards.

If no Pre-Start Health and Safety Review is required due to the above exemption, the owner, lessee or employer must keep documentation supporting the exemption. The following documents are acceptable in establishing such an exemption:

1. Design drawings or a report containing the design loading capacity of the original support structure for the lifting device or travelling crane. The design drawings or report must bear the signature and seal of a professional engineer,

   or

2. Certification from an accredited organization declaring that the automobile hoist meets current applicable standards,

   and

3. A notice in writing from the installer stating that the automobile hoist is installed in accordance with the manufacturer's instructions.

What is a "process that involves a risk of ignition or explosion"?

A process that involves a risk of ignition or explosion is a process that is likely to produce a hazardous gas, vapour, dust or fume to such an extent as to be capable of forming an explosive mixture with air.

Processes involving flammable liquids, flammable gases or combustible dusts are potentially explosive processes.

What is an "easily ignitable dust" in the text of section 65 of the *Regulation for Industrial Establishments*?

Whether a dust would be classified as "easily ignitable" can normally be determined by making reference to the Material Safety Data Sheet (MSDS) for the product.

An easily ignitable dust also means a "combustible dust" as listed in Table 2-5 of National Fire Protection Association (NFPA) 499-97.

If a dust is not listed in Table 2-5, classify it as a combustible dust if it has been group-classified by the supplier as in the *Ontario Electrical Safety Code* or if tested for ignition sensitivity and severity. Classification is not considered necessary for dusts having an ignition sensitivity of less than 0.2 and an explosion severity of less than 0.5 (ref. 3-6.2.5. and A-1-3 of NFPA 499-97).

What must the Pre-Start Health and Safety Review report include?

When a Pre-Start Health and Safety Review is carried out, a written report is required that must contain the following:

1. Details of measures that must be taken to bring the apparatus, structure, protective element or process into compliance with the specified provisions of the *Regulation for Industrial Establishments* listed in Table 1.

   Note: If the reviewer has used standards, specifications, calculations, risk analyses or other parameters other than the requirements of the *Regulation for Industrial Establishments*, he or she must list the details of all those references or parameters, upon which the Pre-Start Health and Safety Review is based.

2. If testing is required before the apparatus, or structure can be operated or used or before the process can be used, details of measures to protect the health and safety of workers that are to be taken before testing is carried out.

   Note: For the purposes of this section, "testing" includes debugging, commissioning and similar operations prior to production.

3. Details of the structural adequacy of the apparatus or structure if item 3 or 7 of Table 1 applies.

4. The date and signature of the person performing the Pre-Start Health and Safety Review (see subsection 7(13)).

5. If a professional engineer performed the Pre-Start Health and Safety Review, his or her seal.

6. If the person performing the Pre-Start Health and Safety Review is not a professional engineer, details of his or her special expert knowledge or qualifications.

Where do I keep the Pre-Start Health and Safety Review Report?

Subsection 7(14) requires that the report:

1. Be kept readily accessible in the workplace together with any supporting documents

   and

2. Be provided to the Joint Health and Safety Committee or Health and Safety Representative, if any, before the apparatus, structure, protective element or process is operated or used.

For example, if the paper copy of the report were located at head office in another city, and could not be sent by fax, there might not be compliance with this provision, since the report would not be readily available. However, if the report were available electronically at the workplace where the machine, equipment, device or process is located, there would be compliance as long as it is accessible, and sealed where required.

The Pre-Start Health and Safety Review report and supporting documentation should be kept readily accessible in the workplace for as long as the apparatus, structure, protective element or process remains in the workplace.

What do I do with the documentation establishing an exemption?

Subsection 7(15) requires the documents to be made available for review, upon request, to the Joint Health and Safety Committee or Health and Safety Representative, if any, or to a Ministry of Labour inspector. Also, subsection 7(10) requires that the documents establishing the exemption be kept readily accessible in the workplace for as long as the protective element, rack or stacking structure, or lifting device, travelling crane or automobile hoist remains in the workplace or the process is used.

Do I have to address all the measures identified in the Pre-Start Health and Safety Review?

Subsection 7(3)(a) requires that all the measures identified in the Pre-Start Health and Safety Review for compliance with the *Regulation for Industrial Establishments* must be taken before the apparatus, structure, protective element or process is used or

operated. Measures to protect the health and safety of workers are also required before testing and troubleshooting are carried out.

If some or all of the measures required by the Pre-Start Health and Safety Review are not taken, however, subsection 7(3)(b) provides the owner, lessee or employer an opportunity to use other measures, provided the alternate measures comply with the regulation's applicable provisions, as specified in Table 1. This means that the alternate measures are to be the same type, since the objective is the same: to comply with the applicable provisions of the regulations.

For this purpose, apply the section 2 (equivalency) provision of the *Regulation for Industrial Establishments.* Section 2 refers only to the substitution of a physical device with another physical device; it does not allow the substitution of a physical device with a procedure or any other type of administrative control.

Section 2 of the *Regulation for Industrial Establishments* states:

In applying this Regulation, the composition, design, size and arrangement of any material, object, device or thing may vary from the composition, design, size or arrangement prescribed in this Regulation where the factors of strength, health and safety are equal to or greater than the factors of strength, health and safety in the composition, design, size or arrangement prescribed.

In the case of item 2 (guarding) of Table 2, deviation from the equivalency requirement would require a risk assessment to be carried out in accordance with ISO 14121 and in compliance with the type A and B standards listed in Table 2 in Appendix I.

The appropriate measures identified must be implemented to ensure the safety of workers.

What is the role of the Joint Health and Safety Committee?

The Joint Health and Safety Committee or the Health and Safety Representative must be provided with the following:

1. The report of the Pre-Start Health and Safety Review before the apparatus, structure, protective element is operated or the process is used

2. Upon request, documents establishing an exemption to the requirement to conduct a Pre-Start Health and Safety Review

3. If some or all of the measures required by the Pre-Start Health and Safety Review are not taken, written notice of the measures that will be taken to comply with the applicable provisions of the *Regulation for Industrial Establishments*.

Providing documents to the Joint Health and Safety Committee or the Health and Safety Representative as required under section 7 is for information and review purposes only. The apparatus, structure, or protective element may be operated or the

process used once the Pre-Start Health and Safety Review report, if required, is provided to the Joint Health and Safety Committee or the Health and Safety Representative.

What about other compliance issues?

If the employer does not have an effective process in place to assess other compliance issues and incorporate them into design and installation, broadening the scope of the regulated Pre-Start Health and Safety Review to include these issues would help ensure compliance and avoid costly retrofit. In such cases, the reviewer should identify requirements to comply with all related sections of the *Regulation for Industrial Establishments* not specified in Table 1. A related section is one that directly relates to the particular circumstance listed in Appendix I. Organizations that do not have processes to assess and manage these other compliance issues should refer to Table 2 in Appendix I.

4. The Reviewer Carrying Out a Pre-Start Health and Safety Review

Who can perform a Pre-Start Health and Safety Review?

Subsections 7(11) and (12) of the *Regulation for Industrial Establishments* specify the qualifications of the person performing the Pre-Start Health and Safety Review. For details see Appendix III: The Reviewer.

Who is a "knowledgeable person"?

A knowledgeable person is a person who, in the opinion of the owner, lessee or employer, possesses special expert or professional knowledge or qualifications appropriate to assess any potential or actual hazard. Under item 8 of the section 7 Table, a professional engineer and/or a knowledgeable person can perform the review. An example of a knowledgeable person, in this instance, who is qualified in the review of occupational exposure, is a person with professional credentials such as a Certified Industrial Hygienist (CIH) or Registered Occupational Hygienist (ROH).

What about a process that may be both explosive and toxic?

In the case of a process that may contain explosion and toxicity hazards, there likely would be more than one person conducting the Pre-Start Health and Safety Review. One of these people must be a professional engineer (see below for team of reviewers).

Can the Pre-Start Health and Safety Review involve more than one person?

It is very likely that a team of reviewers will carry out the Pre-Start Health and Safety Review, since more than one discipline may be required. The names and disciplines of the people involved should be included in the report.

Who signs the Pre-Start Health and Safety Review Report?

If a professional engineer conducts the review, she or he must sign, seal and date the report. If a team of engineers is involved in the review, then either the lead engineer or each member of the team must sign, seal and date the report.

If a person other than a professional engineer produces the report, she or he must sign and date the report. If a team is involved in the review, either the team leader or each member of the team must sign and date the report.

5. Applicable Regulations, Codes and Standards

Please note that for the purpose of these guidelines, the term "standards" includes standards, codes and other legislation.

The *Regulation for Industrial Establishments* is, to a large measure, a performance-based standard. This means that the regulation defines what level of protection is to be provided and the objective to be achieved, but does not state how to achieve the required level of protection.

The provisions and circumstances of section 7 of the *Regulation for Industrial Establishments* listed in Table 1 act as triggers to determine whether a Pre-Start Health and Safety Review is required.

Section 7 refers to current applicable standards only in the context of exemptions. To comply with the requirements of section 7, it is necessary to refer to other recognized applicable detailed codes and standards, such as the *Ontario Fire Code*, *National Fire Code*, NFPA codes and standards, CSA codes and standards, ANSI standards, etc.

Appendix II provides a partial list of standards that the reviewer may use.

In relying on a standard for exemption, the reviewer must consider the applicable sections of the current applicable standards. The same principle may apply when using a standard to support compliance.

Standards legislated in Ontario are shown in (1) below, and some of the standards shown in (2) are listed in Appendix I as meeting the intent for compliance with the *Regulation for Industrial Establishments.* Those not listed require additional review or assessment to ensure compliance (see Appendix II: Recognized Standards for acronyms and full names of standards including codes):

1. **Ontario Legislation**, for example
   - Ontario Fire Code
   - Ontario Electrical Safety Code
   - Gasoline Handling Act/Code
   - Ontario Building Code
   - Ontario Energy Act, Natural Gas and Propane Code
   - Ontario Mechanical Refrigeration Code

2. **Canadian, North American, European and World Standards,** for example
   - National Fire Code
   - National Building Code
   - CSA - International (CSA) standards
   - National Fire Protection Association (NFPA) standards

- American Conference of Governmental Industrial Hygienists (ACGIH) guidelines
- American National Standards Institute (ANSI) standards
- American Petroleum Institute (API) standards
- International Standards Organisation (ISO) standards
- International Electrotechnical Commission (IEC) standards
- European Norm (EN) standards

What if "current applicable standards" change in 5 years – would another Pre-Start Health and Safety Review be required?

No. A Pre-Start Health and Safety Review is required only when a new apparatus, structure, protective element or a new process is constructed, added or installed, or when the apparatus, structure, protective element or process is modified.

A Pre-Start Health and Safety Review would not be required if the apparatus, structure, protective element or process were not to be installed or modified, even if the current applicable standards change.

Appendix I: Tables

Table 1 - Section 7 Table

Item	Applicable Provisions of this Regulation	Circumstances
1	Subsections 22 (1), (2) and (4)	Flammable liquids are located or dispensed in a building, room or area.
2	Sections 24, 25, 26, 28, 31 and 32	Any of the following are used as protective elements in connection with an apparatus: 1. Safeguarding devices that signal the apparatus to stop, including but not limited to safety light curtains and screens, area scanning safeguarding systems, radio frequency systems and capacitance safeguarding systems, safety mat systems, two-hand control systems, two-hand tripping systems and single or multiple beam systems 2. Barrier guards that use interlocking mechanical or electrical safeguarding devices
3	Clause 45 (b)	Materials, articles or things are placed or stored on a structure that is a rack or stacking structure
4	Section 63	A process[4] involves a risk of ignition or explosion that creates a condition of imminent hazard to a person's health or safety.
5	Section 65	The use of a dust collector involves a risk of ignition or explosion that creates a condition of imminent hazard to a person's health or safety
6	Sections 87.3, 87.4, 87.5 and 88, subsections 90 (1), (2) and (3), and sections 91, 92, 94, 95, 96, 99, 101 and 102	A factory produces aluminum or steel or is a foundry that melts material or handles molten material
7	Sections 51 and 53	The construction, addition, installation or modification relates to a lifting device, travelling crane or automobile hoist
8	Sections 127 and 128	A process[4] uses or produces a substance that may result in the exposure of a worker in excess of any occupational exposure limit set out in Regulation 833, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845 or 846 of the Revised Regulations of Ontario, 1990

[4] For the purpose of this section, the term "process" refers only to those processes listed and identified in Table 1 under items 4 and 8.

Table 2 - Applicable Standards for Exemption or Review

Item	Applicable provisions of this regulation	Circumstances	Other Ontario legislation for exemption or to support compliance	Generic standards ('A' & 'B') for exemption or compliance	Machine - specific standards ('C') for exemption or compliance	Other codes, standards, practices for reference, see listings in Appendix II	Related sections that may affect design criteria
1	Subsections 22 (1), (2) and (4)	Flammable liquids are located or dispensed in a building, room or area.	OFC Part 4 Gasoline Handling Act/Code Ontario Electrical Safety Code			NFC Part 4 NFPA-30 NFPA-68 & 69 NFPA-505 Factory Mutual	121, 122, 61
2	Sections 24, 25, 26, 28, 31 and 32	Any of the following are used as a protective element in connection with an apparatus: 1. Safeguarding devices that signal the apparatus to stop, including but not limited to safety light curtains and screens, area scanning safeguarding systems, radio frequency systems, two hand control systems, two hand tripping systems and single or multiple beam system. 2. Barrier guards that use interlocking mechanical or electrical safeguarding devices	Ontario Electrical Safety Code	CSA-Z432*[5] ANSI B11.19 ISO 14121 ISO 12100 Part 1&2 ISO 13851 ISO 13852 ISO 13853 ISO 13854 ISO 13855 ISO 13856 ISO 14119 ISO 14120 IEC 61496 Parts 1, 2, 3 ISO 4413 ISO 4414	CSA Z142*[5] CSA Z434* CSA Z615* ANSI B11.1* ANSI B11.2 ANSI B11.3 ANSI B11.6 ANSI B11.8 ANSI B11.10 ANSI B11.20 ANSI B11.21 ANSI B65.1 ANSI B65.2 ANSI B65.5 ANSI 15.06 ANSI B151.1 ANSI Z245. 1 MOL Guide ANSI Z254.2 ANSI Z245.5	See listings of standards in Appendix II	2 40 (Ontario Electrical Safety Code) 75, 76
3	Clause 45 (b)	Materials, articles or things are placed or stored on a structure that is a rack or stacking structure			RMI-Specification for the design, testing and utilization of industrial steel storage racks, Parts 1, 2, 3	Steel storage racking As 4084-1993 SEMA Code of Practice for the design of static racking Pallet racks JIS Z 0620	
4	Section 63	A process involves a risk of ignition or explosion that creates a condition of imminent hazard to a person's health or safety	OFC, OBC, ON-Gasoline Handling Act/Code; ON-Energy Act Propane Codes, Natural Gas Codes; ON-Mechanical Refrigeration Code; ON-Boiler, Pressure Vessel, and Pressure Piping Code; ON-Electrical Safety Code.		NFPA-33 for spray booth exemptions; MOL-EDS 4-12 Wood working operations	NFC Parts 4 & 5 NFPA-30 NFPA-34 NFPA-68 & 69 NFPA-86 NFPA-497 NFPA-499 NFPA-505 NFPA-820 ANSI/API 500 ANSI ASHRAE 15 Factory Mutual Industrial Ventilation Manual (ACGIH)	121, 122

[5] Refer to applicable section of standard (point of operation guarding) only for compliance with section 7 requirements

Item	Applicable provisions of this regulation	Circumstances	Other Ontario legislation for exemption or to support compliance	Generic standards ('A' & 'B') for exemption or compliance	Machine - specific standards ('C') for exemption or compliance	Other codes, standards, practices for reference, see listings in Appendix II	Related sections that may affect design criteria
5	Section 65	The use of a dust collector involves a risk of ignition or explosion that creates a condition of imminent hazard to a person's health and safety				Applicable NFPA Standards	64
6	Sections 87.3, 87.4, 87.5, and 88 subsections 90(1), (2) and (3) and sections 91, 92, 94, 95, 96, 99, 101 and 102	A factory produces aluminum or steel or is a foundry that melts material or handles molten material			.		
7	Sections 51 and 53	The construction, addition, installation or modification relates to a lifting device, travelling crane or automobile hoist			ANSI- ALI ALCTV- 1998, exemption , third party certification for automobile hoists		52, 54
8	Sections 127 and 128	A process uses or produces a substance that may result in the exposure of a worker in excess of any occupational exposure limit set out in Regulations 833and 835 through 846 of the Revised Regulations of Ontario, 1990	833, 3(1), (2) 835, 4(1), (2), (3) 836, 4(1), (2), (3) 837, 4(1), (2), (3), (4) 839, 4(1), (2), (3) 840, 4(1), (2) Schedule 2,1. 841, 4(1), (2), (3) 842, 4(1), (2), (3) 843, 4(1), (2), (3) 844, 4(1), (2), (3) 845, 4(1), (2), (3) 846, 4(1), (2), (3)		MOL-EDS-4-05 Chlorine MOL-EDS 4-04 Ammonia	NFC Part 3 Industrial Ventilation Manual, ACGIH	

* Standard is under review, revised standard to be released shortly

A & B standards are generic safety standards that give basic concepts and principles for design and general aspects, or deal with one safety aspect or one type of safety related device that can be applied to machinery/processes

C standards are safety standards that deal with detailed safety requirements for a particular machine or group of machines or processes

Any reference in the listed standards to other regulations (standards) should be ignored, other than those in compliance with applicable Ontario regulations

Item 2: For compliance with sections 24, 25, 26, 28, 31 and 32 refer to applicable sections of listed standards

Appendix II: Recognized Standards

The following partial list of standards, including codes and legislation, is provided to assist professional engineers and others responsible for conducting Pre-Start Health and Safety Reviews. Professional engineers are responsible for familiarizing themselves with these and any other relevant documents. Where reference is made to a specific act, code or regulation, the version effective at the time these guidelines were published has been used. Those performing Pre-Start Health and Safety Reviews are advised to contact the appropriate ministry to ensure that they are using the latest versions of these documents.

A. Occupational Health and Safety Act and Regulations

B. Other acts that may apply

- *The Building Code Act* and *Ontario Building Code* (as amended), Ministry of Municipal Affairs and Housing, Housing Development and Buildings Branch.

  The *Building Code* establishes minimum provisions for the safety of new or altered buildings regarding to public health, fire protection and structural adequacy.

- *The Fire Marshals Act* and *Ontario Fire Code* (as amended), Ministry of the Solicitor General, Office of the Fire Marshal.

  The *Fire Code* establishes a standard for fire prevention, fire fighting and fire safety in buildings that are in use. Part IV applies to flammable and combustible liquids, and Part V to hazardous materials, processes and operations.

- *The Electricity Act* and *Ontario Electrical Safety Code* (as amended). Section 18 of the *Ontario Electrical Safety Code* applies to hazardous locations. Section 20 applies to flammable liquid and gas dispensing, and to service stations, garages, bulk storage plants, finishing processes and aircraft hangars.

- *Gasoline Handling Act*, Ministry of Consumer and Business Services.

- *Ontario Energy Act*, the *Propane Storage, Handling and Utilisation Code* and *Natural Gas Code*, Ministry of Consumer and Business Services, Technical Standards and Safety Authority.

- *National Building Code* (NBC) and Commentaries, Federal Government.

- *National Fire Code* (NFC) and Commentaries, Federal Government.

C. Canadian, American, European and World Standards

Note: Standards listed in **bold** are accepted by the Ministry as good engineering practice in complying with the *Regulation for Industrial Establishments*. Standards not listed in bold have **not** been reviewed by the Ministry but are considered good practice. Such standards must be reviewed by a professional engineer to ensure that adherence to them would satisfy all the requirements of the *Regulation for Industrial Establishments.*

CSA - International (CSA) publications that may apply are referenced in many codes, and provide guidance on the acceptable means of safeguarding of specific equipment and processes. Telephone: (416) 747-4044 or 1-800-463-6727 (Canada and the United States).

Table 3 - CSA Standards

Standard	Subject
CAN/CSA-Z142-M90	**Code for Punch Press and Brake Press Operation: Health, Safety, and Guarding Requirements (under review)**
CAN/CSA-Z434-94	**Industrial Robots and Robot Systems-General Safety (under review)**
CAN/CSA-Z615-87	**Code for Hot Forging Producers, Health and Safety Requirements**
CAN3-Z180.1-00	**Compressed Breathing Air and Systems**
CSA-B51-97	**Boiler, Pressure Vessel, and Pressure Piping Code**
CSA-B52-99	**Mechanical Refrigeration Code**
CSA-W117.2-94	**Safety in Welding, Cutting and Allied Processes**
CSA-Z432-94	**Safeguarding of Machinery (under review)**

American National Standards Institute (ANSI) publications that may apply are referenced in many codes, and provide guidance on the acceptable safeguarding of specific equipment and processes.

Table 4 - ANSI Standards

Standard	Subject
ANSI/B11.1-1988 (R94)	**Mechanical Power Presses (under review)**
ANSI/B11.2-1995	**Hydraulic Power Presses**
ANSI/B11.3-1982 (R94)	**Power Press Brakes (OSHA-CPL 2-1.25)**
ANSI/B11.4-1993	**Shears**
ANSI/B11.5-1988 (R94)	Iron Workers
ANSI/B11.6-1984 (R94)	**Lathes**
ANSI/B11.7-1995 (R00)	Cold Headers & Cold Formers
ANSI/B11.8-1983 (R94)	**Drilling, Milling, and Boring**
ANSI/B11.9-1975 (R97)	Grinding Machines
ANSI/B11.10-1990 (R98)	Sawing Machines (under review)
ANSI/B11.11-1985 (R94)	Gear Cutting Machines
ANSI/B11.12-1996	Roll Forming & Roll Bending (under review)
ANSI/B11.13-1992 (R98)	Automatic Screw/Bar and Chucking Machines
ANSI/B11.14-1996	Coil Slitting Machines
ANSI/B11.15-1984 (R94)	Pipe, Tube, and Shape Bending Machines (under review)
ANSI/B11.16-1988	Metal Powder Compacting
ANSI/B11.17-1996	Horizontal Hydraulic Extrusion Presses (under review)
ANSI/B11.18-1997	Coil Processing Systems
ANSI/B11.19-1990 (R97)	**Safeguarding Methods**
ANSI/B11.20-1991	**Manufacturing Systems/Cells**
ANSI/B11.21-1997	**Machines Using Lasers**
ANSI/B65.1-1995	**Printing Press Systems**
ANSI/B65.2 -1999	**Binding and Finishing Systems**
ANSI/B65.5-1996	**Stand Alone Platen Presses**
ANSI/01.1-1992	Woodworking Machinery-Safety Requirements
ANSI/Z244.1-1982	Lockout/tagout of Energy Sources (under review)
ANSI/Z268.1-1982	Metal Scrap Processing Equipment
ANSI/ALI ALCTV-1998	**Automotive Lifts-Safety Requirements for Construction, Testing and Validation**
ANSI/ALI ALOIM-2000	**Automotive Lifts-Safety Requirements for Operation, Inspection and Maintenance**

Standard	Subject
RIA/ANSI/15-06 – 1999	**Industrial Robots and Robot Systems**
ANSI/SPI B151.1 – 1998	**Horizontal Injection Moulding Machines**
ANSI/SPI B151.27 – 1998	Robots Used with Horizontal Injection Moulding Machines
ANSI/Z245.1-1999	**Mobile Wastes and Recyclable Materials Collection, Transportation, and Compacting Equipment Safety Requirements (Note: See additional requirements issued by MOL)**
ANSI/Z245.2-1997	Refuse Collection, Processing, and Disposal Equipment- Stationary Compactors - Safety Requirements
ANSI/Z245.5-1990	Baling Equipment

International Standards Organisation (ISO) and European Norm (EN) Standards, **International Electrotechnical Commission (IEC)** publications that may apply are referenced in many codes. They provide guidance on acceptable safeguarding of specific equipment and processes.

Table 5 - World Standards

Standard	Subject
Type A Standards:	Define fundamental concepts and general design principles that apply to all types of machinery
ISO-12100-1&2	**Safety of Machinery: Basic Concepts, General Principles for Design**
ISO-14121	**Safety of Machinery – Principles of Risk Assessment**
IEC-61508 (parts 1, 2, 3, 4, 5)	Functional safety of electrical/electronic/programmable electronic safety related systems
Type B Standards:	Are concerned with a particular aspect of safety and apply to most machinery
ISO-13852	**Safety distances to prevent danger zones from being reached by upper limbs**
ISO-13854	**Minimum gaps to avoid crushing of parts of the human body**
ISO-13853	**Safety distances to prevent danger zones from being reached by lower limbs**
ISO-13855	Hand/arm speed – approach speeds of the human body for positioning protective equipment
ISO-13851	**Two hand control devices**
ISO-14120	**General requirements for the design and construction of guards**
ISO 14118	Prevention of unexpected start up
ISO-14119	**Interlocking devices with and without guard locking**
ISO 13856 (4 parts)	**Pressure sensitive protective devices**
IEC 60947 5; 5-1; 5-2; 5-3	Low voltage switch gear and control gear; Electromechanical control circuit devices; Proximity devices; Proximity devices with defined behaviour under fault conditions
ISO 4413	**Safety requirements for fluid power systems and components - Hydraulics**
ISO 4414	**Safety requirements for fluid power systems and components - Pneumatics**

Standard	Subject
IEC/EN 61496 Parts 1 & 2	**Part 1: Electro sensitive protective equipment - Sensing Safeguards** **Part 2: Active opto-electronic protective devices - Light Curtains**
Type C Standards:	Give minimum safety instruction for a specific group of machinery.
Machines for cold working of metals	
EN 692	Mechanical presses
EN 693	Hydraulic presses, press-brakes, pneumatic presses
Rubber and plastic machines	
EN 201	Injection moulding machines
EN 289	Compression and transfer moulding presses
EN 422	Blow moulding machines intended for the production of hollow articles
EN 1114	Extruders and extrusion lines
EN 1417	Two roll mills
EN 1612-1	Reaction moulding machines
Packaging machines	
EN 415-1	Common requirements
EN 415-2	Machines for preformed rigid packaging
EN 415-3	Form, fill and seal machines
EN 415-4	Palletisers and depalletisers
EN 415-5	Wrapping machines
EN 415-6	Machines to form collective packaging
EN 415-7	Machines to ensure cohesion of load units
Food processing machines	
EN 1978	Vegetable cutting machines
EN 1974	Slicing machines
Wood working machines	
EN 848	One-side moulding machines with rotating tool
EN 859	Handfed surface planing machines
EN 860	One side thickness planing machines
EN 861	Surface planing and thicknessing machines
EN 940	Combined wood working machines
Tannery machines	
EN 972	Reciprocating roller machines
EN 930	Roughing, scouring, polishing, and trimming machines
EN 931	Footwear manufacturing machines. Lasting machines
EN 1035	Moving Plate Machines

Standard	Subject
EN 1845	Footwear moulding machines
Miscellaneous	
EN 775	Manipulating industrial robots
EN 1525	Industrial trucks – driverless trucks and their systems
EN 10472	Industrial laundry machinery
EN 11111	Textile machinery
EN 12626	Laser processing machines

Codes, Standards, Manuals and Handbooks

The codes, standards, manuals and handbooks listed below may be referred to during a Pre-Start Health and Safety Review.

1. American Conference of Governmental Industrial Hygienists (ACGIH), *Industrial Ventilation, A Manual of Practice*.
2. American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) handbooks.
3. CAN3-S16.1, *Steel Structures for Buildings – Limit States Design*.
4. CAN3-S136, *Cold Formed Steel Structural Members*.
5. CAN3-S157, *Strength Design in Aluminum*.
6. Civil Engineering Handbook.
7. CAN3-O86, *Engineering Design in Wood.*
8. Factory Mutual Systems *Industrial Loss Prevention.*
9. Matheson, a division of Searle Medical Products *Matheson Gas Data Book.*
10. National Fire Protection Association (NFPA) *NFPA Standard and Codes of Practice and Fire Protection Handbook.*
11. National Institute for Occupational Safety and Health (NIOSH) *Industrial Environment, its Evaluation and Control.*
12. Ontario Ministry of Labour Health and Safety Guidelines and Engineering Data Sheets and Hazard Alerts.
13. John Wiley & Sons *Patty's Industrial Hygiene and Toxicology*.
14. *Perry's Chemical Engineers' Handbook*.
15. Irving Sax *Dangerous Properties of Industrial Materials.*
16. *Standard Handbook for Electrical Engineers*.
17. *Standard Handbook for Mechanical Engineers*.
18. Underwriters Laboratories Canada (ULC) Standards.
19. PLUS 2203 HAZLOC-94, *Hazardous Locations: A Guide for the Design, Construction and Installation of Electrical Equipment in Explosive Atmospheres.*

Appendix III: The Reviewer

Table 6 - Reviewer Requirements

Table Item	Brief Description of Circumstance	Reviewer
1	Storing or dispensing flammable liquids	Professional Engineer
2	A machine required to be provided with a guard per item 2 of Table 1	Professional Engineer
3	Storage rack or stacking structure that is not designed to an applicable standard	Professional Engineer
4	Process that may produce explosive gas, vapour, dust or fumes	Professional Engineer
5	A dust collector collecting an easily ignitable (combustible) dust	Professional Engineer
6	A factory producing aluminum or steel or that is a foundry that melts or handles molten material	Professional Engineer
7	Constructing, adding, installing or modifying a lifting device, travelling crane or automobile hoist	Professional Engineer
8	Process uses or produces a toxic substance that may result in exposure above the occupational exposure limits	Professional Engineer and/or Knowledgeable Person

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