

## CCIL CONCRETE TESTING LABORATORY

DATE: INSPECTION TYPE: CCIL Lab ID:

Company Name:	Y = Satisfactory/N = Not Satisfactory or N/A = Not Applicable	Υ	N	Notes
	· · · · · · · · · · · · · · · · · · ·			
Laboratory Address:		ļ	†	
"	Relocation since last inspection?	ļ	ļ	
Supervising Prof.:				
"	Change of Supervising professional since last inspection?	1	·····	
Lab Certificaiton Type:				
Additional Tests: Q		1		
R				
s				
Tests to be Added:				
Tests to be Removed:		ļ	Ī	
	Upgrade requested?			
	New Laboratory?			
Do the the laboratory	records match the portal profile and the website?		[	
if there are any change	es or discrepancies, was an application submitted thru the portal?		<u> </u>	
did you notify Emily of	the change or discrepancy and your inspection findings at ewordenkwok@ccil.com?			
Did the lab submit an	application for Annual Audit thru the portal?			
INS	PECTION DOCUMENTS TO BE UPLOADED TO THE PORTAL BY THE INSPECTOR			
Letter of Undertaking	(2020 version and current date) - CSA A283 Cl 5.4.1 a)			
Organization Chart (hi	erarchy chart, dated with lab name & address) - CSA A283 Cl 5.2.1.3	]		
List of Certified Techs.	Lab to provide a list of all current technicians, to verify the accuarcy of the portal - printed $\&$	]	[	
signed portal list may l	be used if verified correct. Cl 5.2.1.3 (Manual list is required for ACI, remote & shared techs)	]	<u> </u>	
Compression Machine	Calibration Certificate			
<b>Equipment List,</b> (curre	nt date, Lab name & location, list all equipment required for certified test, quantity)		<u> </u>	
	(if applicable - Send Gigi new updated form for lab move, company name chage, new SP)		Ī	
CCIL Concrete Checklis	t		<u> </u>	
Signed CCIL Concrete (	Compliance Report (must be signed by the Supervising Professional) - CSA A283 CI 5.2.2.2 k)		<u> </u>	
Lab to email all attach	ments to inspector as part of response - to be uploaded to portal		<u> </u>	
<u>Tec</u>	hnician Certification Documents to be Uploaded to the Portal, (if applicable):			
File Na	mes: lab name, location, date and abbreviation e.g. Wood Burlington July 3 FEC	Ī	[	
Did the lab submit an	application for Annual Audit thru the portal?	Ī	Ī	
<b>FEC</b> FEC Field Exam Covers		Ī	Ī	
FPR Field Practical Results	Type QF - Basic Concrete		<u> </u>	
TTC Technician Temporary	Cards, (n/a unless requested by the lab) - only issue to labs with existing certification		[	
<b>LEC</b> Laboratory Exam Cove			[	
LPR Lab Practical Results	Type QL - Basic Concrete			
LFN Lab Flactical Nesults				1

		ALL CONCRETE LABORATORIES	La	b IE	):
		Y = Satisfactory/N = Not Satisfactory or N/A = Not Applicable			
Item	Reference	Documentation/Equipment Calibration/verification requirements	٦y	N	Notes
1	CSA A283-19	a. <u>Traceability</u> - Lab has established Traceability = ability to trace history & condition of	+	T	
	Clause 5.1.1.2 b)	samples, chain of custody, unique sample ID, unbroken records, CSA A283 (clause 5.1.1.2 b))			
	Traceability	Examples: Sample labels, use pen not pencil, no white out, legible, year on all records			
	,	- <u>Digital records</u> traceable to data collection. (keep original copies unless direct entry)		†····	1
		For A283 Clause 8.6 how many years does lab keep records? (Information only) Years:		.I	•
2	CSA A283-19	a. <u>Training records</u> - laboratory shall demonstrate that it has trained staff Cl. 5.2.1.1 b)	+	Т	
	Clause 5.1 & 5.2	Verify the competence of personnel to perform tests; Clause 5.1.1.2 a) & 5.2.1.4		· <del> </del> ·····	•
	Training	Example: Failed Tech Exams, observed deficiency during audit, or standard unavailable			
3	CSA A283-19	-Full Time Supervising Professional 5.2.1.1 a) - Report any issues to Emily	+	$\vdash$	
•	Clause 5.2 Cont.	a. Responsibilities Clause 5.2.2.2		· <del> </del> ·····	•
	Clause 3.2 Cont.	- Log of Supervising Professional visits min. monthly (req. if not full time in office) (a & c)			
		- Training Records, signed by Supervising Professional (e)		· <del> </del>	
	Cunomising			. <b>.</b>	
	Supervising	- SP to review test methods with Techs doing testing semi-yearly (f) (suggest Internal Audit)		·	
	Professional's	- SP to ensure equipment is within tolerance and calibrated (g) (suggest CCIL Checklist)		<b></b>	
	qualifications	- Reports reviewed by Supervising Professional (h) (regularly signed or initialed)			
	responsibilities	(Not all reports require SP's signature just enough to show on going review)		<b></b>	
		- Intra-lab (within lab) Proficiency proof of weekly review by SP (i) & Cl 5.4.1 b)		<b></b>	
		- Non-Compliance, must include section for investigation by Supervising Professional (j)			
		include how issue addressed, who was impacted by and who notified (I) & (Clause 8.6)		ļ	
		- <b>Complaint forms</b> , must include section for investigation by Supervising Professional (j)			
		include how issue addressed, who was impacted by and who notified (I)		ļ	
		- Copies of CCIL <u>Compliance Reports</u> signed by Supervising Professional (k)		<u> </u>	
		- <u>Current membership card</u> from applicable engineering body (m)		<u> </u>	
		- Supervising Professional's Monthly sign-off (not yearly form) Clause 5.2.2.2. n), a) thru m)			
		checkmarks not accepted, need detail to verify that the responsibilities are being met		<u> </u>	
4	CSA A283-19	-laboratory has personnel certified to perform all tests listed on the Certification (Cl 6)	Τ'''	Ī	
	Clause 5.2.1.4	-records kept minimum five years (Technician Certification Results Letters and Cards)	T	Ī	
	Certified Techs	-testing only done by certified personnel (Clause 5.2.1.4) includes all certified tests	T	Ť	
5	CSA A283-19	a. Change in Personnel - Check Lab Profile and Active Techs in Portal against lab records			
	Cl 5.2.1.5 & 6.1.2	-CCIL advised of Supervising Professional or testing personnel change < 30 d (CI 5.2.1.5)			
	Personnel	- if ACI certified technician hired (Clause 6.1.2) copies to be available during audit		†	1
		- Obsolete laminated field cards returned to CCIL (A283 Clause 8.3.3)		†	
		- Application filed on portal for transfer of technician certification, if applicable		†	1
		- Application filed on portal to remove technicians no longer with the company, if applicable		†	•
6	CSA A283-19	a. Facility Maintenance (Clause 5.3.1)	T	T	
	Clause 5.3.1	-Equipment and facilities maintained in a manner to ensure that all tests comply			
	Maintenance	with CSA. Examples: contamination (dusty), temp, ID of samples (over crowding, mixed)			
	& Equipment	<b>b.</b> Equipment (Clause 6) CCIL requires labs to own all equipment necessary to perform each		†····	1
	1. 1.	test as per the test method on their certification.			
		c. Shared Equipment (Clause 5.3.5) Does this lab share or use shared equipment?		†····	1
		- Is the shared equipment included on Equipment list?	-+	┼	•
		- Was the shared equipment, calibration and COC records available during the audit?	-+	┼	•
7	CSA A283-19	a. Specimens Prepared by Others	+	$\vdash$	
•	Clause 5.4.2 & .3	-Reports for specimens not prepared, handled or stored by laboratory	ı	1	
	Deviations	shall indicate and identify deviations and the origin of the specimens (Clause 5.4.2)		1	
	Deviations	b. Deviations Known on any samples reported, (tested, handled, or stored) (Cl 5.4.3)		·	
0	Document Control	a. Reference Documents	+	⊢	
8	Document Control			1	
		- CSA A23.2-19 accessible to staff performing tests			
		- <u>CSA A283-19</u> accessible to staff performing tests		<b></b>	
		- Certificate displayed (Clause 8.3.1)		ļ	
		- <u>Calibration records</u> include method of calibration or reference to method	$\perp$	1_	
9	CCIL Memorandum	a. CCIL Logo Use Agreement	ı	1	
	of Understanding	-Confirm proper use of Logo if used Report issues to the program office	- 1	1	I and the second

of Understanding

-Confirm proper use of Logo if used. Report issues to the program office

		TYPE Q - BASIC CONCRETE	La	b IC	D:
		Y = Satisfactory/N = Not Satisfactory or N/A = Not Applicable			
*If t	he calibration freque	ency is not listed in the standards, a one time record is required, annual checks recommended.			
Item	Reference	Documentation/Equipment Calibration/verification requirements	Υ	N	Notes
Q1	CSA-A23.2-1C	a. <u>Sampling</u> (sieve required <i>if large-sized aggregate concrete tested</i> (Cl 5.1, 5.2 & 7.9))	ļ	ļ	
		-Sampling container large enough to accommodate 20 L sample (Clause 7.5.1)	ļ	ļ	
	Sampling	-Shovel for remixing samples (Clause 7.6.2)	ļ	ļ	
		b. Report 3C & Cl 8 e) sampling location if other than point of discharge, g) sample tech			
		a. Scale: Scale required to weigh cylinders – suggest 16kg capacity with 1g accuracy		_	
Q2	CSA-A23.2-3C	b. <u>Site Curing Boxes:</u> rigid horizontal surface free from vibration/disturbance (Cl 9.3.2.1)	ļ	ļ	
	Malina Comina	- initial curing temperatures of specimens, lab has method of achieving controlled environment that maintains <b>15 to 25 °C</b> , must include ambient temperature (Cl 9.3.2.1)			
	Making & Curing	- Records of the max & min temperatures within curing enclosure (clause 9.3.2.1)	ļ	ļ	
	Concrete	- calibration of site curing boxes semi-yearly, summer & winter (A283 Table 1) - freshly cast	1		
	Compression	set of cylinders, recorded method of heating/cooling, max/min ambient & internal temps			
	Test Specimens	c. Single Use Moulds (CSA A23.2-1D, Clauses 6 & 7):	$\vdash$	┢	
	. cot opcomicio	- <u>dimensional verification checks</u> performed on <b>min 3 moulds/shipment</b> (A283 Table 1)			
	Item "b" includes	- if Cardboard moulds < 35 MPa - documentation of suitability (Clause 5.1. b))	†····	†····	
	CSA-A23.2-1D	<b>Reusable Moulds</b> (CSA A23.2-1D): Cl 7 avg diam <1%, diam <2%, avg h < 2%, perp 0.5°			
		- dimensional verification checks performed upon purchase and then yearly (A283 Tbl 1)	1	†	1
		- limited-use moulds used a <b>maximum of 5 times</b> (1D Cl 6.5), marked for each use	ļ	1	1
		- Check condition to confirm stored properly to eliminate deformation (1D Clause 6.5)		L	<u> </u>
		d. <u>Tamping Rods (clause 5.3)</u>	Γ		
	Item "c" also req.	- 16mm ± 1mm dia. (450 to 600mm long) - 10 mm ± 1mm dia (450 to 600mm long)	ļ	<u> </u>	.
	for CSA-A23.2-4C	- <u>dimensional verification</u> (16 & 10mm) performed <b>every 3 months</b> (CSA A283 Table 1)			
	(Air Meters), and	e. <u>Strike-off Bar:</u> (3C Clause 5.7 "shall be provided")			
	5C (Slump Cones)	- steel, approx 6 x 25 x 450mm, <u>one time record</u> , dimensions checked for compliance	_	_	
	" " "	f. <u>Vibrators:</u> Clause 5.4 internal required for certification			
	Item "e" also req.	- Internal, min 120 Hz, dia 20 to 40mm, min length of vibrating element (3C cl 5.4.1)			
	for CSA-A23.2-4C	50 mm less than height of mould. <u>one time record</u> , dimensions checked for compliance	ļ	ļ	
	(Air Meters)	- External, if required, min 60 Hz, secure clamping device (3C clause 5.4.2)  g. Specimen transport:	-	-	
		- protected during transport from shock or exposure to adverse conditions (Clause 9.4)			
		h. Water-storage Tanks (Clause 5.8):		1	
		- Constructed of non-corroding materials (Clause 5.8.1)			
		- Automatic control of water temperature (except in a room controlled at 23 ± 2°C)	†····	†····	
		- Temperature records: continuous recorder checked weekly or manual readings	†	†····	1
		twice daily, 5 days/week with accuracy of 0.5°C; records since last audit available			
		- Saturated with high-calcium hydrated lime, 3 g/L (Cl 5.8.1) Verify package or doc. source	T	†	1
		- <u>Record</u> of water tank being stirred monthly, (Cl 5.8.1)	I	I	
		-Record of cleaning and replacing at least every 24 months (Cl 5.8.1)	ļ	ļ	.
		- no continuously running fresh water, re-circulating may be used (Clause 5.8.2)	<u> </u>		
		i. Moist Cabinets (MC) and Moist Rooms (MR) (Clause 5.9)			
		-atmosphere maintained at temp 23 ± 2°C and relative humidity >95% (Cl 5.9.1.1)	ļ	<b>.</b>	
		-test specimens saturated, exposed surfaces appear & feel moist (Cl 5.9.1.1)	ļ	ļ	.
		- <u>Temperature records</u> : continuous recorder checked weekly or manual readings		1	
		twice daily, 5 days/week with accuracy of 0.5°C; records since last audit available	ļ	<b></b>	.
		- Thermostatic control: within MC or MR, or surrounding space (Clause 5.9.1.2) - MC constructed from durable materials with tight-fitting doors and equipped with	ļ	<del> </del>	.
		fog sprays, water sprays or water curtains (Clause 5.9.2)			
		Indig sprays, water sprays or water curtains (clause 5.5.2)  I-MR constructed from durable materials with tight-fitting doors & windows; (Cl 5.9.3.1)	<del> </del>	ł	·
		-specimens appear and feel moist but not exposed to dripping or running water (5.9.3.2)		1	
		j. Temperature Measuring Devices for Curing (Clause 5.10)	t	H	
		-Temperature measuring device with range 0°C to 50°C, accurate to 0.5°C (Cl 5.10.1)		1	
		-if Temperature recorder: accurate to 1°C, record min every 15 min, (Cl 5.10.2.1)	ļ	t	1
		-Record temp recorder data evaluate <b>weekly,</b> in spec, include reviewer name (5.10.2.1)	t	†	1
		-Temp recorder or manual verified <b>every six months</b> (Cl. 5.10.2.2 & A283 Tbl 1)	†	<b>†</b>	1
		-Calibrated as described in 5.10.2.3, 5.10.2.4, and 5.10.2.5	1	<b>†</b>	1
		-Reference device for calibration readable & accurate to 0.2°C, at min 2 temps (Cl 5.11)	1	1	]
		-A certificate or report of calibration available for review. Traceable to NIST (CI 5.11)		<u> </u>	]
		-liquid glass devices verified once, direct reading resistance devices semi annually (5.11)	[	[	

Y   Notes	
Item	
Continued    Std/Field cure, g) Mould date Rime, h) Mould type, i) Initial cure location, j) max/min k) Depart date &time, l) Lab Receipt date & time, m) demoulding mass, n) non-Std curing, o) cast tech, first & last, p) cast lab, q) test lab, r) Reviewer name & signature, s) & deviation. Review 1 completed report form (not template) for each test method the lab is certified for.    Air Content by the Pressure Method	es
k) Depart date &time, I) Lab Receipt date & time, m) demoulding mass, n) non-std curing, o) cast tech, first & last, p) cast lab, q) test lab, r) Reviewer name & signature, s) & deviation.  Review 1 completed report form (not templote) for each test method the lab is certified for.  a. Air Meters:  ———————————————————————————————————	
o) cast tech, first & last, p) cast lab, q) test lab, r) Reviewer name & signature, s) & deviation.  Review 1 completed report form (not template) for each test method the lob is certified for.  Air Content by the Pressure Method  Air Content by the Pressure Method  Maintained free of hardened concrete from interior & exterior of meter (A283 ct 3.1)  Condition check, initial pressure, date of calibration, monthly (A283 Table 1)  Colibration records clearly show when equipment is not in use or lob not in operation  B. Report 3 cinfo & Cl 11 e) air technician, if different 4; time of Least g) is content  Slump of Concrete  Item "o" also  applies to additional test  CSA A23.2-19C  OS CSA-A23.2-9C  CSA-A23.2-9C  Compressive  Compressive  Compressive Strength of Cylindrical  Cylindrical  Concrete  Specimens  Compressive Strength of Cylindrical  Concrete Specimens  Compressive Strength of Cylindrical  Concrete Specimens  Compressive Strength of Cylindrical Concrete  Compressive Strength of Cylindrical  Concrete Specimens  Compressive Strength of Cylindrical Concrete Specimens  Compressive Strength of Cylindrical Concrete Specimens  Compressive Strength of Cylindrical Cylindrical Cylindrical Cylindrical Cylindrical Cylindrical Cylindrical C	
Review 1 completed report form (not template) for each test method the lab is certified for.  Air Content by the Pressure Method  Air Content Content Content Content from Interior & exterior of meter (A281 CS 43)  Air Content Cont	
Review 1 completed report form (not template) for each test method the lab is certified for.  Air Content by the Pressure Method  Air Content Content Content Content from Interior & exterior of meter (A281 CS 43)  Air Content Cont	
measuring bowl, cylindrical metal, inside machined smooth (not pointed) (Clause 5.2)  - Manufacturer's instruction for each air meter available during audit (Clause 8)  - Maintained free of hardened concrete from interior & exterior of meter (A283 cl 5.3.1)  - Condition check, initial pressure, date of calibration, monthly (A283 Table 1)  - Colibration records clearly show when equipment is not in use or lab not in operation  - B. Report 3 clin (b. Cl 11 e) air technician, if different 1 times of the post	
Air Content by the Manufacturer's instruction for each air meter available during audit (Clause 8)  direct reading to a minimum of 0.2% for air volumes in the range 0 to 8% (Clause 5.4)  -Maintained free of hardened concrete from interior & exterior of meter (A283 cl 5.3.1)  -Condition check, initial pressure, date of calibration, monthly (A283 Table 1)  -Colibration records clearly show when equipment is not in-use or lob and in operation  D. Report 3C info & Cl 11 e) air technician, if different # Lime of test g) air content  -Concrete	
Pressure Method  direct reading to a minimum of 0.2% for air volumes in the range 0 to 8% (Clause 5.4)  Maintained free of hardened concrete from interior & exterior of meter (A283 cl 5.3.1)  Condition check, initial pressure, date of calibration, monthly (A283 Table 1)  Colibration records clearly show when equipment is not in use or lab not in operation  B. Report 3 clin 6 & Cl 11 e) air technician, if different 1 times of test et et e) air content  a. Slump Cones:	
Maintained free of hardened concrete from interior & exterior of meter (A283 cl 5.3.1)  Condition check, initial pressure, date of calibration, monthly (A283 Table 1)  Colibration records clearly show when equipment is not in-use or lab not in operation  B. Report 3C info & Cl 11 e) air technician, if different 1} time-of-test-(1) air content  Slump of Blump Cones:  - metal mould, >1.5 mm thick, 200 x 100 x 300 mm (Cl 6.1 & fig 1)  - slump cone dimensional verification, minimum of every 3 months (A283 Table 1)  B. Test Surface (Clause 6.3)  - slump cone dimensional verification, minimum of every 3 months (A283 Table 1)  B. Test Surface (Clause 6.3)  - slump cone dimensional verification, minimum of every 3 months (A283 Table 1)  B. Test Surface (Clause 6.3)  - surface maintained to ensure test comply with requirements (CSA A283 cl 5.3.1)  C. A A23.2-19C  C. A A23.2-19C  C. Measuring Tape (Clause 6.4)  - not less than 300mm in length with 1mm graduations  d. Report 3 Clin 6 & Cl 10 d}+test-time f) slump to 5mm e) slump technician if different  - compressive  Strength of Cylindrical  Concrete  Specimens  Compression Machine:  - apply a continuous load (not manual) conforming to ASTM E74 Model / SN:  - Certificate of Calibration by independent service provider, performed yearly,  at current location, max every 13 months (CSA A283 Clause 5.3.3 & Table 1)  - Testing machine parts in Clause 4.1: dimensions checked yearly (A283 Table 1)  - in in diam of bearings surfaces 30 sig regater than cylinder diam (Cl 4.1.2.3.1 a), b)  - if shearing diam > cylinder plus 13 mm, concentric rings (required on upper) (Cl 4.1.2.3.1 a), b)  - if shearing diam > cylinder plus 13 mm, concentric rings (required on upper) (Cl 4.1.2.3.2 a);  - planeness verification of bearings surfaces 50 (250 mm monthly) (Cl 4.1.2.1 & A283 Table 1)  - 0.025 mm feeler gauge available during audit  - rate of loading verification of bearing surfaces 40.025 mm monthly (Cl 4.1.2.1 & A283 Table 1)  - (One in ten cylinders tested, minimum of 3 cylinders per d	
Condition check, initial pressure, date of Calibration, monthly (A283 Table 1)  Calibration records clearly show when equipment is not in-use or lab not in operation  b. Report 3C info & Cl 11 e) air technician, if different \$\frac{2}{1}\text{time of test E}\$ air content  a. Slump Cones:  metal mould, >1.5 mm thick, 200 x 100 x 300 mm (Cl 6.1 & fig 1)  metal mould, >1.5 mm thick, 200 x 100 x 300 mm (Cl 6.1 & fig 1)  metal mould, >1.5 mm thick, 200 x 100 x 300 mm (Cl 6.1 & fig 1)  metal mould, >1.5 mm thick, 200 x 100 x 300 mm (Cl 6.1 & fig 1)  slump cone dimensional verification, minimum of every 3 months (A283 Table 1)  b. Test Surface (Clause 6.3)  Rigid, flat and non-absorbent. Sealed plywood, plastic, or a steel plate  Plywood, if used, min thickness 19mm and a medium density overlay (Clause 6.3)  surface maintained to ensure test comply with requirements (CSA A283 cl 5.3.1)  c. Measuring Tage (Clause 6.4)  c. Measuring Tage (Clause 6.4)  compressive  Compressive  Compressive  Strength of  Cylindrical  Concrete  Specimens  Cylindrical  Conc	
Calibration records clearly show when equipment is not in-use or lab not in operation b. Report 3C info & Ci 11 e) air technician, if different 1 time of test g) air content  Slump of Concrete Slump of Concrete  Item "a" also applies to additional test CSA A23.2-19C  CSA A23.2-19C  CSA CSA-23.2-9C  Compressive Strength of Cylindrical Concrete Specimens  Concrete Specimens  Compressive Strength of Cylindrical Concrete Specimens  Concrete S	
Description of Cylindrical Concrete Specimens  Compressive Strength of Cylindrical Concrete Specimens  Compressive Strength of Cylindrical Concrete Specimens  Compressive Strength of Cylindrical Concrete Specimens  Cylind	
As Slump Cones: - metal mould, >1.5 mm thick, 200 x 100 x 300 mm (Cl 6.1 & fig 1) - maintained free of hardened concrete from interior & exterior of cone (A283 cl 5.3.1) - slump cone dimensional verification, minimum of every 3 months (A283 Table 1) - Test Surface (Clause 6.3) - Rigid, flat and non-absorbent. Sealed plywood, plastic, or a steel plate plywood, if used, min thickness 19mm and a medium density overlay (Clause 6.3) - Rigid, flat and non-absorbent. Sealed plywood, plastic, or a steel plate plywood, if used, min thickness 19mm and a medium density overlay (Clause 6.3) - Available of the plywood, if used, min thickness 19mm and a medium density overlay (Clause 6.3) - not less than 300mm in length with 1mm graduations d. Report 3C info & Cl 10 dy Hest time f) slump to 5mm e) slump technician if different  a. Compressive Strength of Cylindrical Concrete Specimens - compression Machine: - apply a continuous load (not manual) conforming to ASTM E74 Model / SN: - certificate of Calibration by independent service provider, performed yearly, at current location, max every 13 months (CSA A283 Clause 5.3.3 & Table 1) - copy of calibration certificate provided conforms to 9C (Cl 4.1.4 & 4.1.5) & ASTM E4-16 - Testing machine parts in Clause 4.1: dimensions checked yearly (A283 Table 1) - min diam of bearing surfaces 3% greater than cylinder diam (Cl 4.1.2.1) - in thickness of bottom block 25 mm (Cl 4.1.2.2 c) - upper bear block diam meets Tbl 1 (100d=165mm), sphere centered (Cl 4.1.2.3.1 a), b)) - if sphere radius < cylinder radius, overhang thickness > diff of radii (Cl 4.1.2.3.1 a), b) - if sphere radius < cylinder radius, overhang thickness > diff of radii (Cl 4.1.2.3.1 a), b) - if sphere radius < cylinder language varilable during audit - rate of loading verification of bearing surfaces <0.025mm monthly (Cl 4.1.2.1 & A283 Table 1) - 0.025 mm feeler gauge available during audit - rate of loading verification weekly (A283 Table 1) for each size of specimen  b. Method of End Preparation: (Clause 7.1.1 other cap	
- metal mould, >1.5 mm thick, 200 x 100 x 300 mm (Cl 6.1 & fig 1)  - maintained free of hardened concrete from interior & exterior of cone (A283 cl 5.3.1)  - slump cone dimensional verification, minimum of every 3 months (A283 Table 1)  b. Test Surface (Clause 6.3)  - Rigid, flat and non-absorbent. Sealed plywood, plastic, or a steel plate  - Plywood, if used, min thickness 19mm and a medium density overlay (Clause 6.3)  - Surface maintained to ensure test comply with requirements (CSA A283 cl 5.3.1)  - CSA A23.2-9C  - Measuring Tape (Clause 6.4)  - not less than 300mm in length with 1mm graduations  - d. Report 3C info & Cl 10 el) test time f) slump to 5mm e) slump technician if different  - apply a continuous load (not manual) conforming to ASTM E74 Model / SN:  - certificate of Calibration by independent service provider, performed yearly,  - at current location, max every 13 months (CSA A283 cl 5.3.1)  - copy of calibration certificate provided conforms to 9C (Cl 4.1.4 & 4.1.5) & ASTM E4-16  - copy of calibration certificate provided conforms to 9C (Cl 4.1.4 & 4.1.5) & ASTM E4-16  - rising machine parts in Clause 4.1: dimensions checked yearly (A283 Table 1)  - in in clause of bearing surfaces 3% greater than cylinder diam (Cl 4.1.2.1)  - in thickness of bottom block 25 mm (Cl 4.1.2.2 c)  - if spener calius < cylinder radius, overhang thickness of diff or fail (Cl 4.1.2.3.2 & Fig 1)  - if spener adjus < cylinder radius, overhang thickness of diff or fail (Cl 4.1.2.3.2 & Fig 1)  - if bearing diam > cylinder plus 13 mm, concentric rings (required on upper) (Cl 4.1.2.1)  - planeness verification of bearing surfaces <0.025mm monthly (Cl 4.1.2.1 & A283 Table 1)  - 0.025 mm feeter gauge avoidable during audit  - rate of loading verification weekly (A283 Table 1) for each size of specimen  b. Method of End Preparation; (Clause 7.1.1 other capping shall conform to ASTM C617)  Select Method:  - Suplane company (Clause 7.1.1 capping up to 70MPa then grinding)  - (Cylinders kept most until testing (Clause 6.2.1)  - (C	
Slump of Concrete Simp cone dimensional verification, minimum of every 3 months (A283 Table 1)  Item "a" also applies to additional test CSA A23.2-19C  CSA A23.2-19C  CSA-A23.2-9C  CSPA-CSSIVE Strength of Cylindrical Concrete Specimens  Compressive Strength of Cylindrical Concrete  Specimens  Concrete  Specimens  Compressive Strength of Cylindrical Concrete Specimens  Compressive Strength of Cylindrical Concrete Specimens  Compressive Specimens  Compressive Strength of Cylindrical Concrete Specimens  Compressive Specimens  Compressive Specimens  Compressive Specimens  Compressive Strength of Cylindrical Concrete Specimens  Compressive Strength of Cylindrical Concrete Specimens  Compressive Strength of Cylindrical Concrete Specimens  Compressive Strength of Cylindrical Concrete Specimens  Compressive Specimens  Compr	
Concrete   Sump cone dimensional verification, minimum of every 3 months (A283 Table 1)	
Item "a" also applies to additional test   CSA A23.2-19C   C	
Plywood, if used, min thickness 19mm and a medium density overlay (Clause 6.3)  additional test CSA A23.2-19C  C. Measuring Tape (Clause 6.4) -not less than 300mm in length with 1mm graduations d. Report 3C info & Cl 10 ethest time f) slump to 5mm e) slump technician if different  a. Compressive Strength of Cylindrical Concrete Specimens  Concrete Specimens  - Certificate of Calibration by independent service provider, performed yearly, at current location, max every 13 months (CSA A283 Clause 5.3.3 & Table 1) - copy of calibration certificate provided conforms to 9C (Cl 4.1.4 & 4.1.5) & ASTM E4-16  - Testing machine parts in Clause 4.1. dimensions checked yearly (A283 Table 1) - min thickness of bottom block 25 mm (Cl 4.1.2.2 c) - upper bear block diam meets Tbl 1 (100d=165mm), sphere centered (Cl 4.1.2.3.1 a), b)) - if sphere radius < cylinder plus 13 mm, concentric rings (required on upper) (Cl 4.1.2.1) - planeness verification of bearing surfaces <0.025mm monthly (Cl 4.1.2.1) - planeness verification of bearing surfaces <0.025mm monthly (Cl 4.1.2.1) - planeness verification of bearing surfaces <0.025mm monthly (Cl 4.1.2.1 & A283 Table 1) - 0.025 mm jeeler gauge available during audit - rate of loading verification weekly (A283 Table 1) for each size of specimen  b. Method of End Preparation: (Clause 7.1.1 other capping shall conform to ASTM C617) Select Method:    Select Method:	
additional test CSA A23.2-19C  C. Measuring Tape (Clause 6.4) -not less than 300mm in length with 1mm graduations d. Report 3C info & Cl 10 d) test time f) slump to 5mm e) slump technician if different  a. Compressive Strength of Cylindrical Concrete Specimens  Concrete Specimens  Compressive Streing than 300mm in length with 1mm graduations at current location, max every 13 months (CSA A283 Clause 5.3.3 & Table 1) - copy of calibration by independent service provider, performed yearly, at current location, max every 13 months (CSA A283 Clause 5.3.3 & Table 1) - copy of calibration certificate provided conforms to 9C (Cl 4.1.4 & 4.1.5) & ASTM E4-16 - Testing machine parts in Clause 4.1. dimensions checked yearly (A283 Table 1) - min thickness of bottom block 25 mm (Cl 4.1.2.2 c) - upper bear block diam meets Tbl 1 (100d=165mm), sphere centered (Cl 4.1.2.3.1 a), b)) - if sphere radius < cylinder radius, overhang thickness > diff of radii (Cl 4.1.2.3.2 & Fig 1) - if bearing diam > cylinder plus 13 mm, concentric rings (required on upper) (Cl 4.1.2.1) - planeness verification of bearing surfaces <0.025mm monthly (Cl 4.1.2.1 & A283 Table 1) - 0.025 mm feeler gauge available during audit - rate of loading verification weekly (A283 Table 1) for each size of specimen  b. Method of End Preparation: (Clause 7.1.1 other capping shall conform to ASTM C617) Select Method:	
CSA A23.2-19C  C Measuring Tape (Clause 6.4) -not less than 300mm in length with 1mm graduations  d. Report 3C info & CI 10 d.) test time f) slump to 5mm e) slump technician if different  a. Compression Machine: - apply a continuous load (not manual) conforming to ASTM E74 Model / SN: - Certificate of Calibration by independent service provider, performed yearly, at current location, max every 13 months (CSA A283 Clause 5.3.3 & Table 1) - Copy of calibration certificate provided conforms to 9C (CI 4.1.4 & 4.1.5) & ASTM E4-16 - Testing machine parts in Clause 4.1: dimensions checked yearly (A283 Table 1) - min thickness of bottom block 25 mm (CI 4.1.2.2 c) - upper bear block diam meets Tbl 1 (100d=165mm), sphere centered (CI 4.1.2.3.1 a), b)) - if sphere radius < cylinder plus 13 mm, concentric rings (required on upper) (CI 4.1.2.1) - planeness verification of bearing surfaces < 0.025mm monthly (CI 4.1.2.1 & A283 Table 1) - 0.025 mm feeler gauge available during audit - rate of loading verification weekly (A283 Table 1) for each size of specimen  b. Method of End Preparation: (Clause 7.1.1 other capping shall conform to ASTM C617) - Select Method:	
-not less than 300mm in length with 1mm graduations d. Report 3C in fo & Cl 10 dł test time f) slump to 5mm e) slump technician if different a. Compressive Strength of Cylindrical Concrete Specimens  Compressive Specimens  Concrete Specimen  Concrete Specime	
d. Report 3C info & Cl 10 d) test time f) slump to 5mm e) slump technician if different a. Compressive Strength of Cylindrical Concrete Specimens  - an in diam of bearing surfaces 3% greater than cylinder radius (Cl 4.1.2.2 t) - upper bear block diam meets Tbl 1 (100d=165mm), sphere centered (Cl 4.1.2.1) - planeness verification of bearing surfaces 3% greater than cylinder diam (Cl 4.1.2.1) - planeness verification of bearing surfaces 0.025mm monthly (Cl 4.1.2.1 & A283 Table 1) - o.025 mm feeler gauge available during audit - rate of loading verification weekly (A283 Table 1)  - Dianeness verification of bearing surfaces 0.025mm monthly (Cl 4.1.2.1 & A283 Table 1) - planeness verification of bearing surfaces 0.025mm monthly (Cl 4.1.2.1 & A283 Table 1) - 0.025 mm feeler gauge available during audit - rate of loading verification weekly (A283 Table 1) for each size of specimen  b. Method of End Preparation: (Clause 7.1.1 other capping shall conform to ASTM C617) Select Method: Sulphur capping rinding bonded caps - Planeness/Perpendicularity/Diameter - checks performed dally (A283 Table 1) (one in ten cylinders tested, minimum of 3 cylinders per day) (Cl 6.1.1, 6.1.3, 6.1.4) - Cylinders kept moist until testing (Clause 6.1.4)  c. Cylinders sulphur capping (Clause 4.1.1 capping up to 70MPa then grinding) - capping equipment dimensional verification monthly when in use (A283 Table 1) - capping compound Temperature checks performed daily when in use (A283 Table 1)	
CSA-A23.2-9C   a. Compression Machine:	
- apply a continuous load (not manual) conforming to ASTM E74 Model / SN:  Compressive Strength of Cylindrical Concrete Specimens  - Testing machine parts in Clause 4.1: dimensions checked yearly (A283 Table 1) - min diam of bearing surfaces 3% greater than cylinder diam (Cl 4.1.2.1) - min thickness of bottom block 25 mm (Cl 4.1.2.2 c)) - upper bear block diam meets Tbl 1 (100d=165mm), sphere centered (Cl 4.1.2.3.1 a), b)) - if sphere radius < cylinder radius, overhang thickness > diff of radii (Cl 4.1.2.1) eplaneness verification of bearing surfaces <0.025mm monthly (Cl 4.1.2.1 & A283 Table 1) - 0.025 mm feeler gauge available during audit - rate of loading verification weekly (A283 Table 1) for each size of specimen  b. Method of End Preparation: (Clause 7.1.1 other capping shall conform to ASTM C617) Select Method: Sulphur capping Trinding bonded caps - Planeness/Perpendicularity/Diameter - checks performed daily (A283 Table 1) (one in ten cylinders tested, minimum of 3 cylinders per day) (Cl 6.1.1, 6.1.3, 6.1.4) - Cylinder sulphur capping (Clause 6.1.4)  c. Oylinder sulphur capping (Clause 7.1.1 capping up to 70MPa then grinding) - capping compound Temperature checks performed daily when in use (A283 Table 1) - capping compound Temperature checks performed daily when in use (A283 Table 1)	
Compressive Strength of Cylindrical Concrete Specimens  - Certificate of Calibration by independent service provider, performed yearly, at current location, max every 13 months (CSA A283 Clause 5.3.3 & Table 1) - copy of calibration certificate provided conforms to 9C (Cl 4.1.4 & 4.1.5) & ASTM E4-16 - Concrete Specimens  - Testing machine parts in Clause 4.1: dimensions checked yearly (A283 Table 1) - min diam of bearing surfaces 3% greater than cylinder diam (Cl 4.1.2.1) - min thickness of bottom block 25 mm (Cl 4.1.2.2 c)) - upper bear block diam meets Tbi 1 (100d=165mm), sphere centered (Cl 4.1.2.3.1 a), b)) - if sphere radius < cylinder plus 13 mm, concentric rings (required on upper) (Cl 4.1.2.1) - planeness verification of bearing surfaces <0.025mm monthly (Cl 4.1.2.1 & A283 Table 1) - 0.025 mm feeler gauge available during audit - rate of loading verification weekly (A283 Table 1) for each size of specimen  b. Method of End Preparation: (Clause 7.1.1 other capping shall conform to ASTM C617) Select Method:	
Strength of Cylindrical Concrete Specimens  - copy of calibration certificate provided conforms to 9C (Cl 4.1.4 & 4.1.5) & ASTM E4-16  - copy of calibration certificate provided conforms to 9C (Cl 4.1.4 & 4.1.5) & ASTM E4-16  - Testing machine parts in Clause 4.1: dimensions checked yearly (A283 Table 1)  - min diam of bearing surfaces 3% greater than cylinder diam (Cl 4.1.2.1)  - min thickness of bottom block 25 mm (Cl 4.1.2 cl)  - upper bear block diam meets Tbl 1 (100d=165mm), sphere centered (Cl 4.1.2.3.1 a), b))  - if sphere radius < cylinder radius, overhang thickness > diff of radii (Cl 4.1.2.3.2 & Fig 1)  - if bearing diam > cylinder plus 13 mm, concentric rings (required on upper) (Cl 4.1.2.1)  - planeness verification of bearing surfaces <0.025mm monthly (Cl 4.1.2.1 & A283 Table 1)  - 0.025 mm feeler gauge available during audit  - rate of loading verification weekly (A283 Table 1) for each size of specimen  b. Method of End Preparation: (Clause 7.1.1 other capping shall conform to ASTM C617)  Select Method:	
Cylindrical Concrete Specimens  - copy of calibration certificate provided conforms to 9C (CI 4.1.4 & 4.1.5) & ASTM E4-16  - Testing machine parts in Clause 4.1: dimensions checked yearly (A283 Table 1)  - min diam of bearing surfaces 3% greater than cylinder diam (CI 4.1.2.1)  - min thickness of bottom block 25 mm (CI 4.1.2.2 c))  - upper bear block diam meets Tbl 1 (100d=165mm), sphere centered (CI 4.1.2.3.1 a), b))  - if sphere radius < cylinder radius, overhang thickness > diff of radii (CI 4.1.2.3.2 & Fig 1)  - if bearing diam > cylinder plus 13 mm, concentric rings (required on upper) (CI 4.1.2.1)  - planeness verification of bearing surfaces <0.025mm monthly (CI 4.1.2.1 & A283 Table 1)  - 0.025 mm feeler gauge available during audit  - rate of loading verification weekly (A283 Table 1) for each size of specimen  b. Method of End Preparation: (Clause 7.1.1 other capping shall conform to ASTM C617)  Select Method: sulphur capping frinding bonded caps  - Planeness/Perpendicularity/Diameter - checks performed daily (A283 Table 1)  (one in ten cylinders tested, minimum of 3 cylinders per day) (CI 6.1.1, 6.1.3, 6.1.4)  - Cylinders kept moist until testing (Clause 6.1.4)  c. Cylinders kept moist until testing (Clause 7.1.1 capping up to 70MPa then grinding)  - capping equipment dimensional verification monthly when in use (A283 Table 1)  - capping compound Temperature checks performed daily when in use (A283 Table 1)	
Testing machine parts in Clause 4.1: dimensions checked yearly (A283 Table 1)  - min diam of bearing surfaces 3% greater than cylinder diam (Cl 4.1.2.1)  - min thickness of bottom block 25 mm (Cl 4.1.2.2 c))  - upper bear block diam meets Tbl 1 (100d=165mm), sphere centered (Cl 4.1.2.3.1 a), b))  - if sphere radius < cylinder radius, overhang thickness > diff of radii (Cl 4.1.2.3.2 & Fig 1)  - if bearing diam > cylinder plus 13 mm, concentric rings (required on upper) (Cl 4.1.2.1)  - planeness verification of bearing surfaces <0.025mm monthly (Cl 4.1.2.1 & A283 Table 1)  - 0.025 mm feeler gauge available during audit  - rate of loading verification weekly (A283 Table 1) for each size of specimen  b. Method of End Preparation: (Clause 7.1.1 other capping shall conform to ASTM C617)  Select Method: □ sulphur capping □ bonded caps  - Planeness/Perpendicularity/Diameter - checks performed daily (A283 Table 1)  (one in ten cylinders tested, minimum of 3 cylinders per day) (Cl 6.1.1, 6.1.3, 6.1.4)  - Cylinders kept moist until testing (Clause 6.1.4)  c. Cylinder sulphur capping (Clause 4.2) (Clause 7.1.1 capping up to 70MPa then grinding)  - capping equipment dimensional verification monthly when in use (A283 Table 1)  - capping compound Temperature checks performed daily when in use (A283 Table 1)	
- min thickness of bottom block 25 mm (Cl 4.1.2.2 c))  - upper bear block diam meets Tbl 1 (100d=165mm), sphere centered (Cl 4.1.2.3.1 a), b))  - if sphere radius < cylinder radius, overhang thickness > diff of radii (Cl 4.1.2.3.2 & Fig 1)  - if bearing diam > cylinder plus 13 mm, concentric rings (required on upper) (Cl 4.1.2.1)  - planeness verification of bearing surfaces < 0.025mm monthly (Cl 4.1.2.1 & A283 Table 1)  - 0.025 mm feeler gauge available during audit  - rate of loading verification weekly (A283 Table 1) for each size of specimen  b. Method of End Preparation: (Clause 7.1.1 other capping shall conform to ASTM C617)  Select Method: □ sulphur capping □ bonded caps  - Planeness/Perpendicularity/Diameter - checks performed daily (A283 Table 1)  (one in ten cylinders tested, minimum of 3 cylinders per day) (Cl 6.1.1, 6.1.3, 6.1.4)  - Cylinder sulphur capping (Clause 6.1.4)  c. Cylinder sulphur capping (Clause 4.2) (Clause 7.1.1 capping up to 70MPa then grinding)  - capping equipment dimensional verification monthly when in use (A283 Table 1)  - capping compound Temperature checks performed daily when in use (A283 Table 1)	
- upper bear block diam meets Tbl 1 (100d=165mm), sphere centered (Cl 4.1.2.3.1 a), b))  - if sphere radius < cylinder radius, overhang thickness > diff of radii (Cl 4.1.2.3.2 & Fig 1)  - if bearing diam > cylinder plus 13 mm, concentric rings (required on upper) (Cl 4.1.2.1)  - planeness verification of bearing surfaces < 0.025mm monthly (Cl 4.1.2.1 & A283 Table 1)  - 0.025 mm feeler gauge available during audit  - rate of loading verification weekly (A283 Table 1) for each size of specimen  b. Method of End Preparation: (Clause 7.1.1 other capping shall conform to ASTM C617)  Select Method: □ sulphur capping □ trinding □ bonded caps  - Planeness/Perpendicularity/Diameter - checks performed daily (A283 Table 1)  (one in ten cylinders tested, minimum of 3 cylinders per day) (Cl 6.1.1, 6.1.3, 6.1.4)  - Cylinders kept moist until testing (Clause 6.1.4)  c. Cylinder sulphur capping (Clause 4.2) (Clause 7.1.1 capping up to 70MPa then grinding)  - capping equipment dimensional verification monthly when in use (A283 Table 1)  - capping compound Temperature checks performed daily when in use (A283 Table 1)	
- if sphere radius < cylinder radius, overhang thickness > diff of radii (Cl 4.1.2.3.2 & Fig 1) - if bearing diam > cylinder plus 13 mm, concentric rings (required on upper) (Cl 4.1.2.1) - planeness verification of bearing surfaces <0.025mm monthly (Cl 4.1.2.1 & A283 Table 1) - 0.025 mm feeler gauge available during audit - rate of loading verification weekly (A283 Table 1) for each size of specimen  b. Method of End Preparation: (Clause 7.1.1 other capping shall conform to ASTM C617) Select Method: □ sulphur capping □ trinding □ bonded caps - Planeness/Perpendicularity/Diameter - checks performed daily (A283 Table 1) (one in ten cylinders tested, minimum of 3 cylinders per day) (Cl 6.1.1, 6.1.3, 6.1.4) -Cylinders kept moist until testing (Clause 6.1.4) c. Cylinder sulphur capping (Clause 4.2) (Clause 7.1.1 capping up to 70MPa then grinding) - capping equipment dimensional verification monthly when in use (A283 Table 1) - capping compound Temperature checks performed daily when in use (A283 Table 1)	
- if bearing diam > cylinder plus 13 mm, concentric rings (required on upper) (Cl 4.1.2.1) - planeness verification of bearing surfaces <0.025mm monthly (Cl 4.1.2.1 & A283 Table 1) - 0.025 mm feeler gauge available during audit - rate of loading verification weekly (A283 Table 1) for each size of specimen  b. Method of End Preparation: (Clause 7.1.1 other capping shall conform to ASTM C617) Select Method: □ sulphur capping □ trinding □ bonded caps - Planeness/Perpendicularity/Diameter - checks performed daily (A283 Table 1) (one in ten cylinders tested, minimum of 3 cylinders per day) (Cl 6.1.1, 6.1.3, 6.1.4) -Cylinders kept moist until testing (Clause 6.1.4)  c. Cylinder sulphur capping (Clause 4.2) (Clause 7.1.1 capping up to 70MPa then grinding) - capping equipment dimensional verification monthly when in use (A283 Table 1) - capping compound Temperature checks performed daily when in use (A283 Table 1)	
- planeness verification of bearing surfaces <0.025mm monthly (Cl 4.1.2.1 & A283 Table 1)  - 0.025 mm feeler gauge available during audit  - rate of loading verification weekly (A283 Table 1) for each size of specimen  b. Method of End Preparation: (Clause 7.1.1 other capping shall conform to ASTM C617)  Select Method: □ sulphur capping □ bonded caps  - Planeness/Perpendicularity/Diameter - checks performed daily (A283 Table 1)  (one in ten cylinders tested, minimum of 3 cylinders per day) (Cl 6.1.1, 6.1.3, 6.1.4)  -Cylinders kept moist until testing (Clause 6.1.4)  c. Cylinder sulphur capping (Clause 4.2) (Clause 7.1.1 capping up to 70MPa then grinding)  - capping equipment dimensional verification monthly when in use (A283 Table 1)  - capping compound Temperature checks performed daily when in use (A283 Table 1)	
- 0.025 mm feeler gauge available during audit - rate of loading verification weekly (A283 Table 1) for each size of specimen  b. Method of End Preparation: (Clause 7.1.1 other capping shall conform to ASTM C617)  Select Method: □sulphur capping □trinding □bonded caps - Planeness/Perpendicularity/Diameter - checks performed daily (A283 Table 1) (one in ten cylinders tested, minimum of 3 cylinders per day) (Cl 6.1.1, 6.1.3, 6.1.4) -Cylinders kept moist until testing (Clause 6.1.4)  c. Cylinder sulphur capping (Clause 4.2) (Clause 7.1.1 capping up to 70MPa then grinding) - capping equipment dimensional verification monthly when in use (A283 Table 1) - capping compound Temperature checks performed daily when in use (A283 Table 1)	
- rate of loading verification weekly (A283 Table 1) for each size of specimen  b. Method of End Preparation: (Clause 7.1.1 other capping shall conform to ASTM C617)  Select Method: □sulphur capping □trinding □bonded caps  - Planeness/Perpendicularity/Diameter - checks performed daily (A283 Table 1)  (one in ten cylinders tested, minimum of 3 cylinders per day) (Cl 6.1.1, 6.1.3, 6.1.4)  -Cylinders kept moist until testing (Clause 6.1.4)  c. Cylinder sulphur capping (Clause 4.2) (Clause 7.1.1 capping up to 70MPa then grinding)  - capping equipment dimensional verification monthly when in use (A283 Table 1)  - capping compound Temperature checks performed daily when in use (A283 Table 1)	
b. Method of End Preparation: (Clause 7.1.1 other capping shall conform to ASTM C617)  Select Method:	
Select Method:	
- Planeness/Perpendicularity/Diameter - checks performed daily (A283 Table 1) (one in ten cylinders tested, minimum of 3 cylinders per day) (Cl 6.1.1, 6.1.3, 6.1.4) -Cylinders kept moist until testing (Clause 6.1.4)  c. Cylinder sulphur capping (Clause 4.2) (Clause 7.1.1 capping up to 70MPa then grinding) - capping equipment dimensional verification monthly when in use (A283 Table 1) - capping compound Temperature checks performed daily when in use (A283 Table 1)	
(one in ten cylinders tested, minimum of 3 cylinders per day) (Cl 6.1.1, 6.1.3, 6.1.4)  -Cylinders kept moist until testing (Clause 6.1.4)  c. Cylinder sulphur capping (Clause 4.2) (Clause 7.1.1 capping up to 70MPa then grinding)  - capping equipment dimensional verification monthly when in use (A283 Table 1)  - capping compound Temperature checks performed daily when in use (A283 Table 1)	
-Cylinders kept moist until testing (Clause 6.1.4)  c. Cylinder sulphur capping (Clause 4.2) (Clause 7.1.1 capping up to 70MPa then grinding)  - capping equipment dimensional verification monthly when in use (A283 Table 1)  - capping compound Temperature checks performed daily when in use (A283 Table 1)	
c. Cylinder sulphur capping (Clause 4.2) (Clause 7.1.1 capping up to 70MPa then grinding) - capping equipment dimensional verification monthly when in use (A283 Table 1) - capping compound Temperature checks performed daily when in use (A283 Table 1)	
- capping equipment dimensional verification monthly when in use (A283 Table 1) - capping compound Temperature checks performed daily when in use (A283 Table 1)	
- capping compound Temperature checks performed daily when in use (A283 Table 1)	
compressive strength of comping compound wealth when in use (A202 Table 1)	
- melting pot thermostat checks performed <b>yearly</b> (A283 Table 1)	
- capping compound time/temp strength correlation <b>yearly when in use</b> (A283 Tbl 1)	
d. <u>Unbonded Caps</u> (ASTM C617-15, C1231-15 & C39-21) (C1231 1.1 for 10 and 80 MPa)	
- Dimension checks yearly	
- pad size, 13 ± 2mm thick, diam <2 mm smaller than ring (C1231 Clause 5.2.1) - retainers, metal, 25 ± 3 mm height, diam 102 to 107% of cylinder (C1231 Clause 5.3)	
- retainers, metal, 25 ± 3 mm neight, diam 102 to 107% of cylinder (C1231 Clause 5.3) - for 100mm cyl, base 8mm thick, wall 9mm thick, planeness <0.25mm (C1231 Cl 5.3)	
- pad records include manufacturer's or supplier's name, Shore A hardness /durometer	
of the elastomer & applicable range of concrete compressive strength (C1231 Cl 5.2.4)	
- Copy of qualification testing report, if applicable (ASTM C1231 Clauses 5.2.2 & 5.2.3)	
- Records of date pads placed in service and the number of uses (C1231 Clause 5.2.5)	
- Verification of alignment checked with 0 to 10% load (ASTM C39 clause 8.4.2)	

TYPE Q - BASIC CONCRETE (continued)					Lab ID:					
		Y = Satisfactory/N = Not Satisfactory or N/A = Not Applicable								
Item	Reference	Documentation/Equipment Calibration/verification requirements	1γ	N	Notes					
Q5	CSA-A23.2-9C	e. Concrete Test Report (Clause 9.1) a) Spec ID b) Lab name& address c) Cast date&time								
	Continued	d) Min/max temp, e) Date & time if cored, see 14C Req. f) Test date g) Test age h) Age for Spec								
		Mpa i) Non-std cure, j) Diam 0.5mm, k) Strength 0.1MPa, l) Failure type if not 1, m) Test tech								
		first & last name, n) Reviewer name & signature o) Location in structure p) Deviations								
		Review 1 completed report form (not template) for each test method the lab is certified for.								
		f. Low Strength Cylinders and Abnormal Results (Clause 9.3)	T							
		- records of appearance, defects of cylinder or capping, for strength less than specified								
		g. Inter-lab correlation: participation in interlab correlation currently optional.								
Q6	CSA-A23.2-17C	a. Temperature Measuring Device for Fresh Concrete								
		-temperature measuring device with range between 0.5 to 50°C, accurate to ± 0.5°C								
	Temperature of	and provide immersion to at least 75mm (Clause 4 (b))								
	Fresh Concrete	-Calibration of temperature measuring devices (Clause 7.1) min 2 temps within range	Ī	Ī						
		performed yearly (A283 Table 1)								
		b. Reference Temperature Measuring Device: Serial #:								
		- Readable and accurate to ± 0.2°C at two temperatures; traceable to NIST	ļ	ļ						
		- Certificate or report of calibration available (Clause 4 d)	ļ	ļ						
		- Liquid glass calibrated once, direct reading resistance device calibrated <b>yearly</b> (Cl 4 d)	ļ	ļ						
		c. Report 3C info & Cl 9 d) test time e) temperature reading e) temp tech if different	1	_						
Q7	All Basic Concrete	k. Tech with Type QF Name and Expiry	<u> </u>							
		I. Tech with Type QL Name and expiry								
Q8	CSA A283-19	a. Within Laboratory Proficiency:								
	Clause 7	- Records updated on a weekly basis & current?	ļ	ļ						
	Intra-Lab	- exclude results for cylinders cast by others (A283 clause 5.4.1 b))	ļ	ļ						
	Proficiency	- Compliance with Clauses 7.2.1, 7.2.2, V<10%, ∇<5%, if not records of investigation								
		findings and actions available for review (Clause 7.2.1 & 7.2.2)	. <b>.</b>	ļ						
COM	NAFNITC: /:maldo.mas:	Raw data available for at least last 5 weeks of tests used, traceable (Clause 7.2.3) tive comments and details about what was observed and reviewed to confirm compliance)								

		TYPE Q ADDITIONAL TESTS - BASIC CONCRETE	Lal	b II	D:
		Y = Satisfactory/N = Not Satisfactory or N/A = Not Applicable			
Item	Reference	Documentation/Equipment Calibration/verification requirements	Y	N	Notes
Q9	CSA A23.2-8A	a. Equipment: (Clause 4 & CSA A3005-18)			
		- Cube molds, New must be acid resistant stainless steel, continued use of existing			
	REPEATED IN	moulds permitted provided they meet requirements, (A3005 Cl 4.7.1)			
	TYPE S	- Cube 50 ±0.5mm or 2" ±0.02", 49.62 to 50.25 mm, planeness, 0.05mm, (A3005 Tbl 4)	l	Ī	
		- Cube base 10mm thick, gap between mold and base < 0.10 mm (A3005 Cl 4.7.2)	l	T	
	Mortar Strength	- Mixer, 140±5 & 285±10 r/min, gap paddle to bowl 2.5 to >0.8mm (A3005 4.8.1 Fig 1)	ļ	1	"
	Properties of	- Paddle, removable, stainless steel, basic design in Fig 2 (A3005 CI 4.8.2)		Ī	
	Fine Aggregate	- Bowl 4.5L, dimension in Fig 3, stainless, steel (A3005 Cl 4.8.3)	l	1	"]
		- Flow table, cast iron frame, circular brass top 254 ± 2.5 mm diam, 7.5 ± 1.25mm thick,	l	Ī	
		drop height 12.5 $\pm$ 0.375 mm, weigh 4.1 $\pm$ 0.05 kg (A3005 Cl 4.9.1 Fig 4)			
		- Flow table pedestal, cast inverted, bolted to cast iron plate >25 mm thick, and 250 cm <sup>2</sup> ,	l	T	
		top 250 to 280 cm <sup>2</sup> , bottom 380 to 400 cm <sup>2</sup> , height 650 to 750 mm,			
		cork pad 12.5mm thick, 100mm2 under corners (A3005 Cl 4.9.4) level checked (Cl 4.9.5)		l	
		- Mould, bronze/brass, top 70±1 mm inside diam, wall >5 mm thick (A3005 4.9.8 & fig 4)		I	
		- Flow table caliper, able to set zero at 100mm gap between jaws. (A3005 Cl 4.9.9)	l	Ι	
		- Calibration of flow table by use of suitable calibration material (A3005 Clause 4.9.7)	l	T	
		calibration flow value not to differ by > 5 percentage points from the assigned flow value			
		- Calibration material available at www.ccrl.us, CCRL, Cement & Concrete Reference Laboratory		l	
		- Flow table dimension, weight & cube molds verification <b>yearly</b> (A283 Table 1)		I	
		- Upper bearing surface, only slightly > than cube or use centering device (A3005 4.12.1.3)	l	Ι	
		- Tamper non-absorptive 13 x 25 mm x 150 mm (8A, Clause 5 c))	l	T	
		b. Report (Clause 14.1) a) Source b) Sample id c) name of certified tech			
		d) Mix proportions e) flow results f) individual strength h) mean strength per set			
		i) name and address of certified lab j) any deviations			
		c. <u>Tech</u> with Additional QL 8A Name and Expiry			

10 CSA A23.2-1B	a. Viscosity (Clause 8):			
	- Flow cone conforming to Figure 1 (Clause 8.2 a))		Ţ	
Properties of	- Stop Watch accurate to ± 0.2 seconds (Clause 8.2 b))		1	"
Flowable Grout	- Calibration of flow cone to be performed <b>yearly</b> (A283 Table 1)		1	
	- Report (Clause 8.6) a) name & address of certified lab b) Sample id c) mix proportions		1	"]
	d) time of efflux e) avg time of efflux f) temperature of grout g) ambient temperature			
	h) name of certified tech i) name & signature of reviewer j) any deviations			
	b. Bleeding and Expansion (Clause 9)			
	- Cylinder, glass or plastic, graduated to 250mL in 2mL increments (Clause 9.2)		1	
	- Report (Clause 9.4) a) name & address of certified lab b) Sample id c) mix proportions		1	"]
	d) specified bleeding & expansion e) average bleeding & expansion f) temp of grout			
	g) ambient temp h) name of certified tech i) name & signature of reviewer j) deviations			
	c. Compressive Strength (Clause 10)			
	- Cube molds, New must be acid resistant stainless steel, continued use of existing			
	moulds permitted provided they meet requirements, (Cl 10.2.1 & A3005 Cl 4.7.1)			
	- Cube 50 ±0.5mm or 2" ±0.02", 49.62 to 50.25 mm, planeness, 0.05mm, (A3005 Tbl 4)		1	
	- Cube base 10mm thick, gap between mold and base < 0.10 mm (A3005 Cl 4.7.2)		Ţ	
	- Dimensional verification of cube molds <b>yearly</b> (A283 Table 1)		1	ï
	- metal cover plate 6mm thick and a clamping device (expansive grouts only)	I	T	
	- Upper bearing surface, only slightly > than cube or use centering device (A3005 4.12.1.3)		1	Ï
	- Report (Clause 10.5) a) name & address of certified lab b) Sample id c) mix proportions			
	d) specified strength e) individual and average strength f) age at test g) temp of grout			
	h) ambient temp i) name of certified tech j) name & signature of reviewer k) deviations			
	d. Tech with Additional QF 1B Name and Expiry			
	e. Tech with Additional QL 1B Name and Expiry			

		TYPE Q ADDITIONAL TESTS - BASIC CONCRETE	Lal	bΙ	D:	·
		Y = Satisfactory/N = Not Satisfactory or N/A = Not Applicable				
Item	Reference	Documentation/Equipment Calibration/verification requirements	٦٧	N	N	Notes
Q11	CSA A23.2-6B	a. Pulloff Calibrated load cell, bourdon tube gauge, or a dynometer: (Clause 5.1.1)		Т		
	Procedure A	- calibration to be performed <b>yearly</b> (A283 Table 1)				
		b. Mechanical or Hydraulic pullout device (Clause 5.1.1)	1	1		
	Bond Strength of	c. Rigid plate with pullout attachment, machined smooth and shoulder-cut (Cl 5.1.2)	1	1		
		d. Coring Drill, 3 times the maximum aggregate or >60 mm (clause 5.1.3)	1	1		
	Overlays and	e. Rapid-curing epoxy compound adhesive satisfies the tensile requirement (Cl 5.1.4)		1		
	Tensile Strength	f. Report (Clause 11) a) name & address of certified lab b) name of certified tech		†		
	of Concrete,	c) core diam, depth, and location on structure d) date and time of sampling e) max load				
	Mortar and Grout	f) area g) stress, location & mode of failure h) name & signature of reviewer i) deviations				
		g. Tech with Additional QF 6B(A) Name & Expiry	<b>T</b>	1		

Q12 CSA A23.2-3C/8C	a. Moulds (3C Clauses 5.2 and 10.1): Dimensional verification yearly (A283 Table 1)	
	- rigid, watertight, non-absorbent, > 150 x 150mm, > 50mm longer than 3 x depth	
Flexural Strength	b. Tamping rod & Vibrator - see Item 11 c & e in Basic concrete	
of Concrete	c. <u>Testing Machine</u> (8C Clause 5(a)): - see Item Q5 a. in Basic concrete	
	Testing machine as described in item Q5 a. or other conforming to 8C 5a)	
	Calibration of flexural strength testing apparatus yearly (A283 Table 1)	
	d. Third-point loading apparatus (Clause 5(b)) one time record of dimensions	
	e. Report (see item 11J & 8C Clause 11.1) a) name & address of lab b) sample id	
	c) date and time casting d) min/max initial curing e) location in structure f) date received	
	g) date tested h) age at test i) avg dimensions j) flexural strength k) specified strength	
	m) curing if non-standard n) fracture location o) appearance of concrete if < specified	
	p) defects q) name of certified tech r) name & signature of reviewer s) any deviation	
	f. Tech with Add QF 3C (flexural) Name & Expiry	
	g. Tech with Additional QL 8C Name and Expiry	

COMMENTS: (include positive comments and details about what was observed and reviewed to confirm compliance)

Q13	CSA A23.2-7C	a. Air meter: Conforming to 7C Clause 5:		
		- Calibration yearly (3 years if not used since last calibration) (A283 Table 1)		
	Air Content by	b. Defoaming Agent as described in Clause 5 k)		
	the Volumetric	c. Report (Clause 11) a) source b) location in structure c) location and time of sampling		
	Method	d) name & address of lab e) name of certified tech f) age at test g) air content		
		h) name & signature of reviewer i) any deviations		
		b. Tech with Additional QF 7C Name and Expiry		

COMMENTS: (include positive comments and details about what was observed and reviewed to confirm compliance)

1	Q14	CSA A23.2-11C	a. Equipment: (Clause 5)	
l		Water Content,	- Scale sensitive to 0.025% of mass of specimen or to 0.2g or less,	
ı		Density,	see R 2a. for other balance, and R 2d for oven requirements	
		Absorption and	- Controlled humidity enclosure at 50 ± 5% RH and 23 ± 2°C	 
		Voids in Hardened	- Desiccator, container for immersing the specimens	 
		Concrete, Grout	- Boiling water tank conforming to CSA A23.2-10C	 
		or Mortar	b. Report (Clause 10) a) location date & time of sampling b) sample id	
l		REPEATED IN	c) water content & absorption d) density e) volume permeable pore space f) tech name	
		TYPE S	g) name & address of lab h) name & signature of reviewer i) any deviations	
			c. Tech with Additional QF 11C Name and Expiry	

		TYPE Q ADDITIONAL TESTS - BASIC CONCRETE	Lal	b II	D:
		Y = Satisfactory/N = Not Satisfactory or N/A = Not Applicable			
tem	Reference	Documentation/Equipment Calibration/verification requirements	Υ	N	Notes
Q15	CSA A23.2-14C	a. Equipment:		T	
`		- Core Drill and diamond tipped, thin-walled core drill bits (Clause 5 a))			
	Obtaining and	- Saw for trimming (Clause 5 b))	ļ	†····	··· <mark> </mark>
	Testing	- Compression machine, curing, & end preparation conforming to CSA A23.2-9C (CI 5 c))	ļ	<del> </del>	··· <mark> </mark>
	Drilled Cores for	b. Report (Clause 9) a) sample id b) sample date (& time, 9C Cl 9) c) test age d) diameter	$\vdash$	┢	-
		e) tested length f) moisture condition at test g) abnormalities h) corrected strength i) certified			
	Compressive	, , , , , , , , , , , , , , , , , , , ,			
	Strength	tech name, full j) name & address of lab k) name & signature of reviewer l) any deviations	_	L	
		c. Tech with Add QF 14C(field) Name and Expiry			
		d. Tech with Add QL 14C(lab) Name and Expiry			
OM	MENTS: (include posi	tive comments and details about what was observed and reviewed to confirm compliance)			
016	ICCA A22 2 15C	la Chandaud incont (Clauca E 1)			
Υтр	CSA A23.2-15C	a. Standard insert (Clause 5.1) b. Load test apparatus, (Clause 5.2)	$\vdash$	$\vdash$	4
	In-place Concrete	- calibrated <b>yearly</b> (A283 Table 1)	1		
	Strength	c. Centering plate and hardware (Clauses 5.3 and 5.4)	$\vdash$	⊢	-
		d. Correlation Curves between pullout and compressive strengths (Clause 8)	$\vdash$	$\vdash$	-
	Comig the Full-Out	e. Report (Cl 10.1) a) location of insert b) number of inserts c) type of insert d) mix id	$\vdash$	$\vdash$	-
		e) equivalent strength f) placement date, start & end time g) test date, start & end time	1		
		h) type of failure i) other curing info j) name of certified tech			
		k) name & address of lab l) name & signature of reviewer m) any deviations			
		f. Tech with Additional QF 15C Name and Expiry	$\vdash$	┝	-
MO	MENTS: (include nosi	tive comments and details about what was observed and reviewed to confirm compliance)		<u></u>	
.0141	MENTS. (Meidde posi	tive comments and details about what was observed and reviewed to commit compliance,			
Q17	CSA A23.2-16C	a. Scales sensitive to 0.05kg and 1g, (cl 5 a)) calibration performed yearly (A283 Table 1)		Г	
		b. 15L cylindrical bowl, (Cl 5 c)) calibration yearly or 3 years if not in use (A283 Table 1)		T	1
	Steel or Synthetic	c. Glass plate (Clause 5(g))		T	1
	Fibre Content in	d. Tamping rod, strike-off bar, mallet - conforming to CSA A23.2-3C			1
	Plastic Concrete	e. Report (Cl 10.1) a) mix id b) source c) producer info d) project e) sampling date & time		T	7
		f) location in structure g) flooring contractor h) type of fibers and info i) fiber dosage			
		j) certified tech k) name & address of lab l) name & signature of reviewer m) deviations			
		f. Tech with Additional QF 16C Name and Expiry			7
	COMMENTS: (include	le positive comments and details about what was observed and reviewed to confirm compliance	)	-	
	1001 100 0 100				
718	Ι (	Slump Flow Board (Clause 6(c)): Condition check on going during use (A283 Table 1)	$\overline{}$	П	
Q18	CSA A23.2-19C	a. <u>Slump Flow Board</u> (Clause 6(c)): Condition check <b>on going during use</b> (A283 Table 1) - non-absorbent smooth plastic surface			
Q18		- non-absorbent smooth plastic surface		ļ	
Q18	Slump Flow	- non-absorbent smooth plastic surface > 800mm square and 12mm thick, Dimension check <b>upon purchase</b> (A283 Tbl 1)		ļ	 
Q18		- non-absorbent smooth plastic surface > 800mm square and 12mm thick, Dimension check <b>upon purchase</b> (A283 Tbl 1) clearly marked with 2 concentric circles 200mm and 500mm in diameter			 
Q18	Slump Flow	- non-absorbent smooth plastic surface > 800mm square and 12mm thick, Dimension check <b>upon purchase</b> (A283 Tbl 1) clearly marked with 2 concentric circles 200mm and 500mm in diameter  b. <u>Stopwatch</u> (Clause 6(d))			
Q18	Slump Flow	- non-absorbent smooth plastic surface > 800mm square and 12mm thick, Dimension check <b>upon purchase</b> (A283 Tbl 1) clearly marked with 2 concentric circles 200mm and 500mm in diameter  b. <u>Stopwatch</u> (Clause 6(d)) c. <u>Measuring Tape</u> graduated in mm (Clause 6(e))			
Q18	Slump Flow	- non-absorbent smooth plastic surface > 800mm square and 12mm thick, Dimension check upon purchase (A283 Tbl 1) clearly marked with 2 concentric circles 200mm and 500mm in diameter b. Stopwatch (Clause 6(d)) c. Measuring Tape graduated in mm (Clause 6(e)) d. Report (Clause 10) a) mix id b) source c) project info d) testing date & time			  - - -
Q18	Slump Flow	- non-absorbent smooth plastic surface > 800mm square and 12mm thick, Dimension check upon purchase (A283 Tbl 1) clearly marked with 2 concentric circles 200mm and 500mm in diameter b. Stopwatch (Clause 6(d)) c. Measuring Tape graduated in mm (Clause 6(e)) d. Report (Clause 10) a) mix id b) source c) project info d) testing date & time e) slump flow f) VSI g) T50 h) certified tech i) name & address of lab			
Q18	Slump Flow	- non-absorbent smooth plastic surface > 800mm square and 12mm thick, Dimension check upon purchase (A283 Tbl 1) clearly marked with 2 concentric circles 200mm and 500mm in diameter b. Stopwatch (Clause 6(d)) c. Measuring Tape graduated in mm (Clause 6(e)) d. Report (Clause 10) a) mix id b) source c) project info d) testing date & time			
	Slump Flow of Concrete	- non-absorbent smooth plastic surface > 800mm square and 12mm thick, Dimension check upon purchase (A283 Tbl 1) clearly marked with 2 concentric circles 200mm and 500mm in diameter b. Stopwatch (Clause 6(d)) c. Measuring Tape graduated in mm (Clause 6(e)) d. Report (Clause 10) a) mix id b) source c) project info d) testing date & time e) slump flow f) VSI g) T50 h) certified tech i) name & address of lab j) name & signature of reviewer k) deviations			
ЮМ	Slump Flow of Concrete MENTS: (include posi	- non-absorbent smooth plastic surface > 800mm square and 12mm thick, Dimension check upon purchase (A283 Tbl 1) clearly marked with 2 concentric circles 200mm and 500mm in diameter  b. Stopwatch (Clause 6(d)) c. Measuring Tape graduated in mm (Clause 6(e)) d. Report (Clause 10) a) mix id b) source c) project info d) testing date & time e) slump flow f) VSI g) T50 h) certified tech i) name & address of lab j) name & signature of reviewer k) deviations e. Tech with Additional QF 19C Name and Expiry tive comments and details about what was observed and reviewed to confirm compliance)			
ЮМ	Slump Flow of Concrete	- non-absorbent smooth plastic surface > 800mm square and 12mm thick, Dimension check upon purchase (A283 Tbl 1) clearly marked with 2 concentric circles 200mm and 500mm in diameter  b. Stopwatch (Clause 6(d)) c. Measuring Tape graduated in mm (Clause 6(e)) d. Report (Clause 10) a) mix id b) source c) project info d) testing date & time e) slump flow f) VSI g) T50 h) certified tech i) name & address of lab j) name & signature of reviewer k) deviations e. Tech with Additional QF 19C Name and Expiry tive comments and details about what was observed and reviewed to confirm compliance)  a. J-ring (Clause 6(a) and Fig 1(c)) Check yearly or 3 years when not in use (A283 Tbl 1)			
ЮМ	Slump Flow of Concrete  MENTS: (include posi	- non-absorbent smooth plastic surface > 800mm square and 12mm thick, Dimension check upon purchase (A283 Tbl 1) clearly marked with 2 concentric circles 200mm and 500mm in diameter  b. Stopwatch (Clause 6(d)) c. Measuring Tape graduated in mm (Clause 6(e)) d. Report (Clause 10) a) mix id b) source c) project info d) testing date & time e) slump flow f) VSI g) T50 h) certified tech i) name & address of lab j) name & signature of reviewer k) deviations e. Tech with Additional QF 19C Name and Expiry tive comments and details about what was observed and reviewed to confirm compliance)  a. J-ring (Clause 6(a) and Fig 1(c)) Check yearly or 3 years when not in use (A283 Tbl 1) b. Rigid non-absorbent smooth plastic surface not less than 800mm square (Cl 6d))			
ЮМ	Slump Flow of Concrete  MENTS: (include posi  CSA A23.2-20C  Passing Ability of	- non-absorbent smooth plastic surface > 800mm square and 12mm thick, Dimension check upon purchase (A283 Tbl 1) clearly marked with 2 concentric circles 200mm and 500mm in diameter  b. Stopwatch (Clause 6(d)) c. Measuring Tape graduated in mm (Clause 6(e)) d. Report (Clause 10) a) mix id b) source c) project info d) testing date & time e) slump flow f) VSI g) T50 h) certified tech i) name & address of lab j) name & signature of reviewer k) deviations e. Tech with Additional QF 19C Name and Expiry tive comments and details about what was observed and reviewed to confirm compliance)  a. J-ring (Clause 6(a) and Fig 1(c)) Check yearly or 3 years when not in use (A283 Tbl 1) b. Rigid non-absorbent smooth plastic surface not less than 800mm square (Cl 6d)) c. Slump Cone - conforming to CSA A23.2-5C (foot pieces optional)			
ЮМ	Slump Flow of Concrete  MENTS: (include posi CSA A23.2-20C  Passing Ability of Self-consolidating	- non-absorbent smooth plastic surface > 800mm square and 12mm thick, Dimension check upon purchase (A283 Tbl 1) clearly marked with 2 concentric circles 200mm and 500mm in diameter  b. Stopwatch (Clause 6(d)) c. Measuring Tape graduated in mm (Clause 6(e)) d. Report (Clause 10) a) mix id b) source c) project info d) testing date & time e) slump flow f) VSI g) T50 h) certified tech i) name & address of lab j) name & signature of reviewer k) deviations e. Tech with Additional QF 19C Name and Expiry tive comments and details about what was observed and reviewed to confirm compliance)  a. J-ring (Clause 6(a) and Fig 1(c)) Check yearly or 3 years when not in use (A283 Tbl 1) b. Rigid non-absorbent smooth plastic surface not less than 800mm square (Cl 6d)) c. Slump Cone - conforming to CSA A23.2-5C (foot pieces optional) d. Report (Clause 10) a) mix id b) source c) project info d) sampling date & time			
ЮМ	Slump Flow of Concrete  MENTS: (include posi  CSA A23.2-20C  Passing Ability of	- non-absorbent smooth plastic surface > 800mm square and 12mm thick, Dimension check upon purchase (A283 Tbl 1) clearly marked with 2 concentric circles 200mm and 500mm in diameter  b. Stopwatch (Clause 6(d)) c. Measuring Tape graduated in mm (Clause 6(e)) d. Report (Clause 10) a) mix id b) source c) project info d) testing date & time e) slump flow f) VSI g) T50 h) certified tech i) name & address of lab j) name & signature of reviewer k) deviations e. Tech with Additional QF 19C Name and Expiry tive comments and details about what was observed and reviewed to confirm compliance)  a. J-ring (Clause 6(a) and Fig 1(c)) Check yearly or 3 years when not in use (A283 Tbl 1) b. Rigid non-absorbent smooth plastic surface not less than 800mm square (Cl 6d)) c. Slump Cone - conforming to CSA A23.2-5C (foot pieces optional) d. Report (Clause 10) a) mix id b) source c) project info d) sampling date & time e) name of certified tech f) J ring flow g) slump flow h) passing ability			
СОМ	Slump Flow of Concrete  MENTS: (include posi CSA A23.2-20C  Passing Ability of Self-consolidating	- non-absorbent smooth plastic surface > 800mm square and 12mm thick, Dimension check upon purchase (A283 Tbl 1) clearly marked with 2 concentric circles 200mm and 500mm in diameter  b. Stopwatch (Clause 6(d)) c. Measuring Tape graduated in mm (Clause 6(e)) d. Report (Clause 10) a) mix id b) source c) project info d) testing date & time e) slump flow f) VSI g) T50 h) certified tech i) name & address of lab j) name & signature of reviewer k) deviations e. Tech with Additional QF 19C Name and Expiry tive comments and details about what was observed and reviewed to confirm compliance)  a. J-ring (Clause 6(a) and Fig 1(c)) Check yearly or 3 years when not in use (A283 Tbl 1) b. Rigid non-absorbent smooth plastic surface not less than 800mm square (Cl 6d)) c. Slump Cone - conforming to CSA A23.2-5C (foot pieces optional) d. Report (Clause 10) a) mix id b) source c) project info d) sampling date & time			

	TYPE R - CONCRETE AGGREGATE				D:
		Y = Satisfactory/N = Not Satisfactory or N/A = Not Applicable			
Item	Reference	Documentation/Equipment Calibration/verification requirements	Y	N	Notes
R1	CSA A23.2-1A	a. Equipment: tools & containers to accommodate samples & prevent contamination	Ė	H	110100
	Sampling	b. Sample ID: (Clause 7.1) a) sampled by name b) submitted by name c) source	H	H	1
	Sumpling	d) proposed use e) sample ID f) sample date			
		c. Tech with Type RF Name and Expiry	$\vdash$	$\vdash$	1
R2	CSA A23.2-2A & 5A	a. Balances & Scales:	┢	╁	
'`-	COX ( X 2 3 ) ( )	- Balance or scale sensitive to 0.1% of sample mass (Clause 6 a))			
	Sieve Analysis of	- Calibration performed <b>yearly</b> (A283 Table 1)	ł	ł	
	CA & FA	- Standard weights if used calibrated <b>every five years</b> (A283 Table 1)	<del> </del>	<del> </del>	
	CAGTA	b. Sieve Shaker:	┢	╁	1
	Item a applies	- Coarse Aggregate Shakers <i>on equipment List</i>			
	all tests unless	- Fine Aggregate Shakers on equipment List	<del> </del>	ł	
	otherwise noted	- CA & FA Sieve Shaker Efficiency Check (Clause 9.4) performed <b>yearly</b> (A283 Table 1)	ł	ł	
	Strict wise noted	c. Sieves: (Clause 6 b) - (ISO 3310-1 standard with tighter tolerances than ASTM E11)	ł	<del> </del>	.
	Item c includes	- Complete metric set as per A23.2 requirements include each sieve on equipment list			
	CSA A23.2-2A	- Sieve checks for embedded particles, slackness of fabric and	<del> </del>	<del> </del>	.
	to 5A, 9A, 10A,	damaged frames and/or sieve cloth - performed <b>ongoing during use</b> (A283 Table 1)			
	12A & 13A	d. Ovens:	<del> </del>	ł	
	12/ 0 13/	- Ovens appropriate size (Clause 6 c), on equipment list			
	Item d includes	- Thermostat calibration (setting vs. actual), capable of maintaining 110 ± 5 °C	<del> </del>	<del> </del>	
	2A to 6A &12A	performed <b>yearly</b> (Clause 6 c) & A283 Table 1)			
	2A 10 0A Q12A	once temperature is set record every 15 min for 2 hr show it is maintaining ± 5C			
		e. Sample Splitter or suitable method of quartering: (Clause 8.1 b))	┢	<del> </del>	
		f. Report: (2A Cl 11.1) a) total % passing b) total % retained c) % retained between sieves	$\vdash$	$\vdash$	-
		(5A Cl 11.1) a) sample id b) % material finer than 80 um c			
		c) name of tech d) name & address of lab e) name & signature of reviewer f) deviations			
		g. <u>Tech</u> with Type RL Name and Expiry		$\vdash$	1
R3	CSA A23.2-3A	a. sample container: to permit spreading of the sample in a thin layer (Clause 6 b))	H	H	
	Clay Lumps	See R 2a. For scale, see R 2c. for sieve, see R 2d. For oven requirements as appropriate	<del> </del>	†····	·
	J,p.	b. Report: (Cl 11.1) a) source b) sample id c) sieve size and mass of test sample	$\vdash$	t	-
		d) % of clay lumps per sieve size e) weighted average mass of clay lumps			
		f) name of tech g) name & address of lab h) name & signature of reviewer i) deviations			
R4	CSA A23.2-4A	a. Skimmer:	H	t	
		- 315µm sieve cloth, containers (Clause 6 a) & b))			
	Low Density	- Heavy liquid ZnCl2 with relative density 2.0 (Clause 7.1) documented available source	t	†····	"
	Granular Material	-Hydrometer or other apparatus, capable of measuring 2.0 ± 0.01 relative density (C 6 f))	†	†····	"
	in Aggregate	See R 2a. For scale, see R 2c. for sieve, see R 2d. for oven requirements as appropriate	t	t	"
		b. Report: (Cl 12.1) a) sample id b) nominal max size c) mass of test sample	T	T	1
		d) type and specific gravity of heavy liquid e) % light weight particles			
		f) name of tech g) name & address of lab h) name & signature of reviewer i) deviations			
R5	CSA A23.2-6A	a. Mould: dimensional verifications documented yearly (A283 Table 1)		T	
		$-40 \pm 3$ mm top (inside) 90 $\pm 3$ mm bottom (inside) (Clause 5.3 a, b)			
	Relative Density &	- 75 ± 3mm in height and 0.8 thick metal (Clause 5.3 c, d)	ļ	<b>†</b>	 
	Absorption of	b. Tamper: dimensional verifications documented yearly (A283 Table 1)		T	1
	Fine Aggregate	- non-corroding metal; 325 g to 355g (Clause 5.4)	ļ	<b>†</b>	[
		- Face 25 ± 3mm diameter (Clause 5.4)	ļ	†	"
	(see 12A for CA)	c. Pycnometer 500 ml capacity, accurate to ± 0.1 mL, 50% > sample volume (Clause 5.2)	Ī	T	1
	,	See R 2a. For scale, see R 2c. for sieve, see R 2d. for oven requirements as appropriate	ļ	<b>†</b>	 
		d. Report: (Cl 10.1) a) sample id b) tech name c) test sample mass d) BRD e) BRD (SSD)		Γ	1
		f) apparent relative density g) absorption h) notation re moisture condition if required			
1		i) name of toch i) name & address of lab k) name & signature of reviewer I) deviations	1	1	

i) name of tech j) name & address of lab k) name & signature of reviewer l) deviations

COMMENTS: (include positive comments and details about what was observed and reviewed to confirm compliance)

		TYPE R - CONCRETE AGGREGATE (Continued)	La	b ID:	
		Y = Satisfactory/N = Not Satisfactory or N/A = Not Applicable	T	П	
Item	Reference	Documentation/Equipment Calibration/verification requirements	۱,	N N	Notes
	CSA A23.2-7A	a. Organic Impurities Kit:	Ė	<del>  ``   -</del>	
		- Glass bottles - 300ml, with a rubber or other non-reactive stopper (Clause 4 a))			
	Organic	I-Reference Standard Colour Plate (Cl 4b)) check condition <b>ongoing during use</b> (A283 T1)	+	<del> </del>	
	Impurities in FA	- Sodium Hydroxide Solution (3%) (Clause 5) documented available source	+	t·····l	
		b Report: (Cl 9.1) a) color plate value b) source c) sample id	$\vdash$	H	
		d) name of tech e) name & address of lab f) name & signature of reviewer g) deviations			
R7	CSA A23.2-10A	a. Measure for Density (dimensional checks yearly / 3 yrs when not in use (A283 Tbl 1)	$\mathbf{T}$	$\vdash$	
		- 7L, 15L and 30L measures (14L & 28L accepted, air meter bowl 7L measure) (10A Table 1)	+	t·····l	
	Bulk Density	- Top rim to be plane to 0.25mm, parallel to bottom within 0.5° (Clause 6 d))	+	tl	
	of Aggregate	- 15L & 30L measures reinforced to >5mm thickness at top 40mm of the rim (Cl 6 d))	†	tl	
	00 -01	b. <u>Tamping Rod</u> - 16 ± 1mm diameter, 450 to 600mm long	1	H	
		See R 2a. For scale, see R 2c. for sieve, see R 2d. for oven requirements as appropriate	†····	<del> </del>	
		c. Report: (Cl 11.1) a) sample id b) bulk densities for compaction procedure used, as applicable	1	Н	
		c) name of tech d) name & address of lab e) name & signature of reviewer f) deviations			
R8	CSA A23.2-12A	a. <u>Scale:</u> balance or scale, capacity of 5 kg sensitive to 0.5 g (0.05% )of sample (Cl 5.1)		$\vdash$	
		b. Wire Basket or Bucket: with < 2.5 mm mesh, Equal height and breadth with capacity			
	Relative	of 4-7L (maximum 40mm aggregate) and 8-16L for larger size aggregate) (Clause 5.2)			
	Density and	c. Report: (Cl 10.1) a) sample id b) max size of test sample c) BRD d) BRD (SSD)		П	
	Absorption of CA	e) apparent relative density f) absorption g) individual & avg c, d, e if separate sizes			
	(see 6A for FA)	h) note if tested without dried i) note if avg determined without drying			
		j) name of tech k) name & address of lab l) name & signature of reviewer m) deviations			
R9	CSA A23.2-13A	a. Equipment:			
		- Suitable length to width equipment (caliper in Fig 1) dimension checks <b>yearly</b> (A283 T1)	ļ	<u> </u>	
		- Thickness gauge (may be Fig 2) (Clause 5.3.3)	ļ	<u> </u>	
	Flat & Elongated	See R 2a. For scale, see R 2c. for sieve, see R 2d. for oven requirements as appropriate	_	Ш	
	Particles	b. Report: (Cl 7.1) a) sample id b) test date c) Procedure used d) length/width ratio used			
		e) % Flat, % elongated and % flat and elongated f) individual % of each size if required			
	INACNITO: /:makeda maai	g) name of tech h) name & address of lab i) name & signature of reviewer j) deviations itive comments and details about what was observed and reviewed to confirm compliance)			
COIV	iivieiv i 3. (iiicidde posi	tive confinents and details about what was observed and reviewed to commit compliance)			
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		TYPE R ADDITIONAL TESTS - CONCRETE AGGREGATE	La	b	ID:	
		Y = Satisfactory/N = Not Satisfactory or N/A = Not Applicable		Γ		_
Item	Reference	Documentation/Equipment Calibration/verification requirements	٦٧	h	N	Notes
R10	CSA A23.2-9A	a. MgSO <sub>4</sub> Solution: documented available source		T		
		- Record of Solution (MgSO <sub>4</sub> ) maintained at 23 ± 2.0°C (Clause 7 d))				
	Soundness of Fine	- Record of Specific Gravity of solution (MgSO <sub>4</sub> ) maintained at 1.295 to 1.308 (Cl 7 e, f))		T		
	& Coarse	b. Ovens:		Γ		
	Aggregate by	- Oven with rate of evaporation 25 g/h for 4 hr checked <b>yearly</b> - Clause 5(e))		<u>l</u> .		
	use of Magnesium	see R 2d. for other oven requirements		Γ		
	Sulphate	c. <u>Baskets</u> (wire mesh) and containers for immersing samples in solution (Clause 5 b))				
		d. <u>Balances:</u> FA capacity > 500 g sensitive to 0.1g, CA capacity > 5kg sensitivity 1 g		ļ.,		
		see R 2a. For other balance and see R 2c. for sieve requirements as appropriate		L		
		e. Report: (Cl 13.1) a) sample id b) mass /fraction before c) % loss except for ledge rock				
		d) weighted average loss e) for >20mm number of particles before and number affected				
		f) ledge rock % loss, & # affected g) characteristics of MgSO <sub>4</sub> solution (temp, SG, color)				
		h) name of tech i) name & address of lab j) name & signature of reviewer k) deviations		Ļ		
0014	145NTC /:	f. Tech with Additional test RL 9A Name & Expiry		L		
COM	MENTS: (include pos	tive comments and details about what was observed and reviewed to confirm compliance)				
				_		
R11	CSA A23.2-11A	a. Equipment :				
		- Balance > 2kg sensitive to < 0.5 g (clause 5 a) see R 2a. For other balance requirements		ļ.,		
		- suitable container, pycnometer or flask, graduated markings, accuracy 1.0 mL (Cl 5 b))				
	Surface Moisture	if alternate method, a special graduate flask in Fig 1 or volumetric flask (Cl 10.2.2 b))		╀	_	
	in FA & CA	b. Report: (Cl 11.1) a) sample id b) % moisture c) BRD (SSD) used				
		d) name of tech e) name & address of lab f) name & signature of reviewer g) deviations	+	╀		
COM	MENTS: /include nec	c. Tech with Add test RL 11A Name and Expiry itive comments and details about what was observed and reviewed to confirm compliance)		L		
COIVI	WEIVIS. (Illelade pos	tave comments and details about what was observed and reviewed to commit compliance,				
R12	CSA A23.2	a. Los Angeles Machine: check all every 3 month or 3 yrs when not is use (A283 Tbl 1)		Γ		
	-16A & 17A	- Steel shelf, full length projecting 89 ± 2 mm (16A Clause 6.1.1, Fig 1)				
		- Machine speed and revolution counter, 30 to 33 rev/min (17A Cl 9)		Ι.		
	Los Angeles	- Steel drum inside diam 711 $\pm$ 5 mm inside length 508 $\pm$ 5 mm (16A Clause 6.1.1, Fig 1)		Ι		
	Abrasion Method	see R 2a. For other balance and see R 2c. for sieve requirements as appropriate (6.2 & 6.3)		Ϊ		
		b. <u>Steel Spheres: mass</u> 390 to 445g, averaging approximately 47mm diam (16A Cl 6.4.1)		Γ		
		- Individual weight and diameter check performed every 3 months		<u>l.</u>	]	
		- Cumulative weights for 12, 11, 9, 8, & 6 spheres (A, B, C, D, E) (16A Clause 6.4.2 Tbl 1)				
		(5000 ± 25g / 4584 ± 25g / 3750 ± 25g / 3330 ± 30g / 2500 ± 15g)				
		for 17A 12 spheres having a total mass of 5000g ± 25g (17A Clause 6.4)		L		
		c. Report: (16A & 17A 11.1) a) sample id b) max aggregate size c) test grading d) % loss e) date				
		f) name of tech g) name & address of lab h) name & signature of reviewer i) deviations		L		
		d. Tech with Add test RL 16A & 17A Name & Expiry		L		
сом	MENTS: (include posi	itive comments and details about what was observed and reviewed to confirm compliance)				

	TYPE R ADDITIONAL TESTS - CONCRETE AGGREGATE	La	b I	ID:				
	Y = Satisfactory/N = Not Satisfactory or N/A = Not Applicable							
Item Reference	Documentation/Equipment Calibration/verification requirements	<b></b>	N	N Notes				
R13 CSA A23.2	a. Rolling Mill:		Т					
-23A & 29A	- Rolling mill capable of rotating jar at 100 ± 5 rpm (Clause 6.1)							
	- Rolling mill rotation & counter check performed every 3 months (A283 Table 1)		1					
Micro-Deval	b. <u>Jars:</u> 5L capacity, outside diam 194 - 202 mm, internal height 170 - 178 mm (Cl 6.2)		1					
Abrasion Test for	- Visual assessment of jars performed every 3 months (A283 Table 1)							
FA (23A) CA (29A)	- inside & outside of jar shall be smooth, no observable ridges or indentations (Cl 6.2)							
	c. <u>Steel Balls:</u> 9.5 ± 0.5mm Diameter (Clause 6.3)		1					
	- Measurement of steel ball diameters performed every 3 months (A283 Table 1)							
	see R 2a. for balance, R 2c. sieve & R 2d. oven requirements (23A 6.4, 6.5 & 6.6, 29A 6.1)		T					
	d. Reference material: companion testing with calibration aggregate until last 10		T					
	samples show mean loss within tolerance, (23A Cl 6.7 & 11.1, 29A 6.2)							
	e. Calibration material: every 10 samples until 20, then 1/month (Cl 6.8 & 11.3, 29A 6.3)		Т	7				
	- plotted on a trend chart (Clause 11.4)		1					
	f. Report: (23A 12.1) a) sample id b) prep information c) % loss d) % loss of control		T					
	e) chart % loss of last 20 calibration agg (29A 12.1) a) max aggregate and grading used							
	f) name of tech g) name & address of lab h) name & signature of reviewer i) deviations							
	g. Tech with Add test RL 23A & 29A Name & Expiry			$\neg$				
OMMENTS: (include positive comments and details about what was observed and reviewed to confirm compliance)								

R14 CSA A23.2-24A	a. Freezing equipment:			
	- Freezer capable of maintaining temperature of -18 $\pm$ 2.0 $^{\circ}$ C & a fan for adequate air			
Resistance of	circulation to provide maximum variation of 2 °C within 25 mm (Clause 6 a))			
Unconfined CA to	- Calibration of freezer <b>yearly</b> (A283 Table 1)		 1	
Freezing and	- Record of freezer temperature at a min of two points (continuous Record) (Clause 6 a))	1 1	 1	
Thawing	b. <u>Autoclavable Plastic Containers:</u>		1	
	- With air tight screw-on caps that can withstand 110°C (Clause 6 d))			
	c. <u>Thermometers:</u>			
	- Thermometer with range of -25 to 30°C readable to 0.5 °C (Clause 6 c))			
	- Calibration of thermometers <b>yearly</b> (A283 Table 1)		 ]	
	- Referenced calibrated thermometer		 ]	
	see R 2a. for balance, R 2c. sieve & R 2d. oven requirements	- T T		
	d. Reagents: 3% Sodium chloride solution (Clause 7) documented available source		 .]	
	e. Reference Aggregate: (from a stocked supply): (Clause 7.2)			
	- Companion testing with calibration aggregate until last 10 samples show mean loss			
	variation is within tolerance			
	f.Calibration Aggregate: every 10 samples or 1/weeks until 20, then 1/mon (7.3 & 10.2)			
	- plotted on a trend chart (Clause 10.4)			
	g. <u>Determination of Sieving Time:</u> A1, Sieving time from 3 control samples plotted, Fig. A1.1			
	h. Report: (13.1) a) sample id b) freeze-thaw % loss c) weighted loss			
	d) plotted weighted loss of last 20 calibration aggregate			
	e) name of tech f) name & address of lab g) name & signature of reviewer h) deviations			
	i. Tech with Additional test RL 24A Name & Expiry			
COMMENTS: (include pos	itive comments and details about what was observed and reviewed to confirm compliance)			

		TYPE R ADDITIONAL TESTS - CONCRETE AGGREGATE	Lab	ID:	
		Y = Satisfactory/N = Not Satisfactory or N/A = Not Applicable			
Item	Reference	Documentation/Equipment Calibration/verification requirements	اγ ا	N	Notes
	CSA A23.2-25A	a. Mixing Equipment: (Clause 5 b)) ASTM C305-20			
		- Mixer, 140±5 & 285±10 r/min, verification req. every 2.5 yrs (ASTM C305 Clause 5.6)			
		- Paddle, removable, stainless steel, basic design in Fig 2 (ASTM C305 Clause 4.2)			
		- Bowl 4.73L, dimension in Fig 3, stainless, steel (ASTM C305 Clause 4.3)			
		- space between paddle and the bottom of the bowl shall be 5.1 ± 0.3mm (Clause 5. b))			
		- dimensional verification <b>yearly</b> (A283 Table 1)			
		- Tamper non-absorptive 13 x 25 mm x 120 to 150 mm (ASTM C109, Clause 5 c))			
		b. Cement (Cl. 7.4) Supply of Type GU as CSA A3001, total alkali content 0.90% ±0.10% &	+	_	
		autoclave expansion less than 0.20% verified specific to source not composite sample  c. Solution (Cl 7) 0.99N to 1.0N Sodium Hydroxide Solution documented available source	+	_	
	Allani: Cilian				
	Alkali-Silica	- <u>Containers</u> that have a tight fitting cover and can withstand prolonged exposure			
	Reactive	to 80°C and the 1 N NaOH solution (Clause 5 d))	+	_	
	Aggregate by	d. Moulds: dimensional checks yearly (A283 Table 1)			
	Accelerated	- Shall produce 25 x 25 x 285mm prisms, 250mm length with stainless steel studs,			
	Expansion of	dimensional and condition checks upon fabrication and ongoing during use (A283 Tbl 1)	$\perp \perp$	_	
	Mortar Bars	e. <u>Length Change measuring device</u> calibrated yearly (A283 Table 1)	$oldsymbol{\perp}$	_	
		f. Convection Oven: Temperature control maintained at 80 ± 2.0°C verified annually			
		- Suggest to record with max/min thermometer every 2 hrs. or with automatic chart			
		see R 2a. for balance, R 2c. sieve & R 2d. Other oven requirements (Cl 5 a), e))			
		g. <u>Jaw Crusher:</u> (Clause 9.1.3 & 9.2b) or other suitable equipment for processing coarse agg.			
		h. Control Aggregate (Clause 7.5 & 12.1)			
		- to be conducted at time of tests or at least <b>every 6 months</b> (A283 Table 1)			
		i. Report: (13.1) a) sample id b) aggregate source type c) portal cement source type			
		d) cement alkali content e) avg length change f) preparation information			
		g) sample and solution info after test h) water to cement ratio i) length change graph			
		j) length change graph of control aggregate k) expansion of Spratt aggregate samples			
		I) name of tech m) name & address of lab n) name & signature of reviewer o) deviations			
		i. Tech with Additional test RL 25A Name & Expiry			
				'	
R16	CSA A23.2-26A	a. <u>Jaw crusher and a shatter box</u> or other suitable grinding equipment (Clause 4)			
		b. Reagents, supplies, equipment and instruments applied to the analytic method			
	Alkali-Carbonate	chosen and qualified for such analysis (Clause 8.2.4) documented available source			
	Reactivity by	c. Qualification of method of analysis (Clause 8.2)			
	Chemical	d. Report: (9.1) a) sample id b) aggregate source type c) sample location description			
	Composition	d) max agg size e) % mass of various oxides f) description of analytical method used			
		and data to show that method used meets precision and accuracy limits			
		g) name of tech h) name & address of lab i) name & signature of reviewer j) deviations			
		e. Tech with Additional test RL 26A Name & Expiry			
R17	CSA A23.2-2B	a. Reagents (Clause 7): documented available source			
		- ammonia hydroxide (relative density of 0.9) (Clause 7 a))			
	Determination	- barium chloride (100 g/L of BaCl <sub>2</sub> ) (Clause 7 b)) - hydrochloric acid (one volume of HCl and nine volumes of water) (Clause 7 c))			
	of Sulphate				
	Ion Content in	- hydrofluoric acid (48% to 51%) (Clause 7 d)) - methyl orange Indicator (1 g/L of methyl orange) (Clause 7 e))			
	Ground Water	- metnyl orange indicator (1 g/L of metnyl orange) (clause 7 e)) - silver nitrate (0.1g AgNO3/mL) (Clause 7 f))			
		- sulphuric acid (relative density 1.84) (Clause 7 g))			
		b. Equipment: Beakers (as required) see R2a. balance, R2c. sieve & R2d. oven requirmts	+	$\dashv$	
		c. Report: (10) a) name & address of lab b) water sample id c) water sample source	+	$\dashv$	
		d) date of sampling e) date of testing f) % of water soluble sulphate ions			
		g) name & signature of reviewer h) deviations  d. Tech with Additional test RL 2B Name & Expiry	+	_	
	A5NTC /: : :		Ш		
COM	MENTS: (include posi	itive comments and details about what was observed and reviewed to confirm compliance)			

TYPE R ADDITIONAL TESTS - CONCRETE AGGREGATE					ID:	
		Y = Satisfactory/N = Not Satisfactory or N/A = Not Applicable				
Item	Reference	Documentation/Equipment Calibration/verification requirements	٦ ٢	ı	N	Notes
R18	CSA A23.2-3B	a. <u>Testing Equipment</u> (Clause 5):		T	T	
		- 315 μm sieve				
	Determination	- hotplate	T	T		
	of Total or	- magnetic stirrer and TFE-coated stirring bar	1	T		
	Water-Soluble	- Whatman Nos 40 or 41 filter paper, or equivalent	T	T		
	Sulphate Ion	- balance, sensitive to 0.1% of mass of sample	T	T		
	Content of Soil	- agate mortar and pestle	T	T		
		b. Reagents conforming to CSA A23.2-2B documented available source				
		c. Report: (10.1) a) name & address of lab b) sample id c) test date				
		d) % total sulphate content or water-soluble ions e) reviewer name & signature				
		f) deviations				
		d. Tech with Additional test RL 3B Name and Expiry				

R19	CSA A23.2-4B	a. <u>Drill</u> (Clause 5.1):
		- rotary-impact or core drill
	Determination of	b. Testing Equipment (Clause 5.2):
	Water-Soluble	- silver, chloride/sulphide selective electrode
	Chloride Ion	- potentiometer readable to 1 mV or better
	Content of	- burette, 10mL capacity with 0.05mL divisions
	Hardened	- magnetic stirrer and TFE-coated stirring bar
	Grout or Concrete	- hotplate
		- agate mortar and pestle
		- 315 µm and 160 µm sieves
		- Whatman Nos 40 or 41 filter paper, or equivalent
		- balance, 100g capacity sensitive to 100 μg
		c. Reagents (Clause 7): documented available source
		- sodium chloride
		- silver nitrate
		- potassium chloride
		- reagent water conforming to ASTM D1193 Type 3
		- ethyl alcohol
		d. Report: (12.1) a) name & address of lab b) sample id c) test age
		d) % water-soluble chloride ions e) reviewer name & signature f) deviations g) optional
		e. Tech with Additional test RL 4B Name and Expiry
COM	MENITC: /include peci	tive comments and details about what was observed and reviewed to confirm compliance)

COMMENTS: (include positive comments and details about what was observed and reviewed to confirm compliance)

R20 CSA A23.2-8B	a. Apparatus, Reagents and Materials (Clause 5):
	- 5mm sieve
Determination of	of - scale, 1kg capacity accurate to 0.1g
Water-Soluble	- hotplate to maintain water temperature 60 ± 5°C and a magnetic stirrer
Sulphate Ion	- pH measuring device
Content of	- nitric acid
Recycled	- glassware (as required)
Aggregates	b. Report: (10) a) sample id b) source c) sampling date d) test date
Containing	d) % water-soluble chloride ions e) name & address of lab f) name of tech
Crushed Concre	g) reviewer name & signature h) deviations
	c. Tech with Additional test RL 8B Name and Expiry

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		TYPE S - ADVANCED CONCRETE	Lal	bΙ	D:	
		Y = Satisfactory/N = Not Satisfactory or N/A = Not Applicable	]			
Item		Documentation/Equipment Calibration/verification requirements	Υ	ľ	٧	Notes
S1	CSA A23.2-8A	a. Equipment: (Clause 4 & CSA A3005-18)				
	05054750 (4)	- Cube molds, New must be acid resistant stainless steel, continued use of existing				
	REPEATED IN	moulds permitted provided they meet requirements, (A3005 Cl 4.7.1)	ļ	<del> </del>		
	Q ADDITIONAL	- Cube 50 ±0.5mm or 2" ±0.02", 49.62 to 50.25 mm, planeness, 0.05mm, (A3005 Tbl 4)  - Cube base 10mm thick, gap between mold and base < 0.10 mm (A3005 Cl 4.7.2)	ļ	<del> </del>		
	Mortar Strength	- Mixer, 140±5 & 285±10 r/min, gap paddle to bowl 2.5 to >0.8mm (A3005 4.8.1 Fig 1)	ł	ł		
	Properties of	- Paddle, removable, stainless steel, basic design in Fig 2 (A3005 Cl 4.8.2)	<del> </del>	╁┈		
	Fine Aggregate	- Bowl 4.5L, dimension in Fig 3, stainless, steel (A3005 Cl 4.8.3)	<del> </del>	<del> </del>		
	00 -01-1	- Flow table, cast iron frame, circular brass top 254 ± 2.5 mm diam, 7.5 ± 1.25mm thick,	†····	†···		
		drop height 12.5 ± 0.375 mm, weigh 4.1 ± 0.05 kg (A3005 Cl 4.9.1 Fig 4)				
		- Flow table pedestal, cast inverted, bolted to cast iron plate >25 mm thick, and 250 cm <sup>2</sup> ,	†	†		
		top 250 to 280 cm <sup>2</sup> , bottom 380 to 400 cm <sup>2</sup> , height 650 to 750 mm,				
		cork pad 12.5mm thick, 100mm2 under corners (A3005 Cl 4.9.4) level checked (Cl 4.9.5)	<u> </u>	<u>l</u>		
		- Mould, bronze/brass, top 70±1 mm inside diam, wall >5 mm thick (A3005 4.9.8 & fig 4)	<u> </u>	Ι		
		- Flow table caliper, able to set zero at 100mm gap between jaws. (A3005 Cl 4.9.9)	ļ	ļ		
		- Calibration of flow table by use of suitable calibration material (A3005 Clause 4.9.7)				
		calibration flow value not to differ by > 5 percentage points from the assigned flow value				
		- Calibration material available at www.ccrl.us, CCRL, Cement & Concrete Reference Laboratory	ļ	ļ		
		- Flow table dimension, weight & cube molds verification <b>yearly</b> (A283 Table 1) - Upper bearing surface, only slightly >than cube or use centering device (A3005 4.12.1.3)	ļ	<del> </del>		
		- Tamper non-absorptive 13 x 25 mm x 150 mm (8A, Clause 5 c))	<del> </del>	<del> </del>		
		b. Report (Clause 14.1) a) Source b) Sample id c) name of certified tech		╁	+	
		d) Mix proportions e) flow results f) individual strength h) mean strength per set				
		i) name and address of certified lab j) any deviations				
		c. <u>Tech</u> with SL Name and Expiry		t	1	
СОМ	MENTS: (include posi	itive comments and details about what was observed and reviewed to confirm compliance)		_		
S2	CSA A23.2-2C	a. Concrete Mixer:	Π	Π	Т	
		- Power driven, revolving drum, tilting mixer or pan mixer				
	Making Concrete	- Sampling and mixing pan - heavy gauge metal, watertight	†	t		
	Mixes in the	see R 2a. for balance, R 2c. sieve & R 2d. oven requirements	†	†	"	
	Laboratory	b. Other Equipment:		Г		
		- Moulds and other equipment conforming to CSA A23.2-3C				
		c. Report (Clause 12.1) a) names & source of ingredients b) individual ingredients mass				
		c) chemical admix dosage d) date & time of sampling e) BD of cementitious materials				
		f) moisture content and absorption of aggregates g) slump h) air content				
		i) plastic concrete temperature j) yield of mix m) converted mass of mix ingredients				
		n) compressive strength o) chemical admixture dosage rates				
		p) tech name who performed plastic concrete tests q) name of tech who prepared mix				
COM	  MENTS: (include nosi	r) name and address of certified lab s) name & signature of reviewer t) any deviations itive comments and details about what was observed and reviewed to confirm compliance)	<u> </u>	<u> </u>		
20141		said sections and details about what was observed and reviewed to commit compliance				
				••••		

		TYPE S - ADVANCED CONCRETE (continued)	La	b II	D:
		Y = Satisfactory/N = Not Satisfactory or N/A = Not Applicable			
Item	Reference	Documentation/Equipment Calibration/verification requirements	Y	N	Notes
S3	CSA A23.2-6C	a. <u>Container:</u> volume and dimension check <b>yearly</b> /every 3 yr if not in use (A283 Table 1)			
		- cylindrical, metal, rigid, watertight,			
	Density, and Yield,	b. Glass or Acrylic Plate (Clause 5(g)):			]
	of Plastic Concrete	- of required dimensions with straight and smooth edges within a tolerance of 1.5mm			
		c. Other Equipment:			
		- tamping rod, strike-off bar and vibrators conforming to CSA A23.2-3C			
		see R 2a. for balance requirements			
		d. Report (Clause 11.1) a) name and address of certified lab b) name of technician			
		c) source of sample d) sampling location, date & time e) location of concrete in structure			
		f) test date & time g) density of concrete h) yield of concrete, if requested			
		i) relative yield, if requested j) cementitious factor, if requested k) concrete type id			
		I) mix ingredients and mass of each m) name & signature of reviewer n) any deviations			
		e. <u>Tech</u> with Type SF cert Name and Expiry			
СОМ	MENTS: (include posi	tive comments and details about what was observed and reviewed to confirm compliance)			
<b>S4</b>	CSA A23.2-11C	a. Equipment: (Clause 5)	1	Π	
	Water Content,	- Scale sensitive to 0.025% of mass of specimen or to 0.2g or less,			
	Density,	see R 2a. for other balance, and R 2d for oven requirements			
	Absorption and	- Controlled humidity enclosure at 50 ±5% RH and 23 ± 2°C		†···	··· <mark> </mark>
	Voids in Hardened	- Desiccator, container for immersing the specimens		†····	··· <mark> </mark>
	Concrete, Grout,	- Boiling water tank conforming to CSA A23.2-10C		†···	··· <mark> </mark>
	or Mortar	b. Report (Clause 10) a) location date & time of sampling b) sample id		Т	7
	REPEATED IN	c) water content & absorption d) density e) volume permeable pore space f) tech name			
	Q ADDITIONAL	g) name & address of lab h) name & signature of reviewer i) any deviations			
сом	MENTS: (include posi	tive comments and details about what was observed and reviewed to confirm compliance)		_	

		TYPE S ADDITIONAL TESTS - ADVANCED CONCRETE	Lab ID:					
		Y = Satisfactory/N = Not Satisfactory or N/A = Not Applicable						
Item	Reference	Documentation/Equipment Calibration/verification requirements	Υ	N	Notes			
S5	CSA A23.2-14A	a. Equipment:						
		- moulds 75x75 ± 1 mm x (275 to 405) mm, (Cl 5.1 & Fig 1) checked <b>yearly</b> (A283 Tbl 1)	ļ	ļ				
	Potential	- stainless steel studs 5 to 7 mm diam 25 ± 1mm, length comparator, (Cl 5.2)						
	Expansivity	dimensional verification upon fabrication and ongoing during use (A283 Table 1)		L	_			
	of Aggregate	b. Length Change comparator (Fig 2), ref. bar & dial gauge/ micrometer 0.002mm, (CI 5.3)						
	Using Concrete	- calibrated <b>yearly</b> (A283 Table 1), dial gauge setting checked with ref bar each use (Cl 5.3)						
	Prisms	(Cl 13.1) all measurements & calculations as per (ASTM C490 Cl 6 & 7)	<u> </u>		_			
		c. Storage Containers 22 to 25 L plastic pails, with airtight lids, perforated rack in the						
		bottom 30 to 40 mm, water 20 ± 5 mm. a wick around the inside wall. (Clause 5.4)  d. Storage Environment (Clause 5.5):	┢	┝	-			
		- Sealed space insulated to minimize heat loss and with fan to provide heat distribution						
		- temperature maintained at 38 ± 2.0°C, < 2.0 variation from top to bottom of space	ł	<del> </del>	··· <mark>·</mark>			
		- automatic recording of storage room temperature	ł	· <del> </del> ····	··· <mark> </mark>			
		see R 2a. for balance, R 2c. sieve & R 2d. oven requirements	<del> </del>	†···	·· <del>·</del>			
		e. Cement Supply of Type GU as CSA A3001, total alkali content 0.90% ±0.10%	H	H	†			
		determined by chemist of from manufacturer specific to source not composite (Cl 8.1)						
		<b>f. Non-reactive aggregate</b> as required, 25A < 0.1% @ 14 day & < 0.15% @ 1 year. (Cl 8.2)	†	†···	·· <mark> </mark>			
		Record results of qualification test on control aggregate (Clause 12)						
		g. Known Reactive Aggregate (Clause 12.1)		T				
		- to be conducted at time of tests or at least <b>every 6 months</b> (A283 Table 1)						
		h. Report: (15.1) a) sample id b) type of aggregate source c) location within source		Г				
		d) cement source e) cement's alkali content f) mix proportions g) amount of alkali added						
		h) effective w/c ratio i) cast date j) average and individual length change at each reading						
		k) significant features I) container type m) Spratt prism expansion						
		n) tech name o) name and address of lab p) name & signature of reviewer q) deviations		L	_			
		e. Tech with Additional test SL 14A Name & Expiry	_	╙				
56	CSA A23.2-6B Procedure B	a. Load Measuring Device (Clause 5.2.1) - rate of loading (Clause 8.2.2)						
	Procedure B	- callibration ASTM E4 upon installation/relocation (Cl 5.2.1 b)) and yearly (A283 Table 1)	ł	· <del>-</del>	<mark>.</mark>			
	Bond Strength	b. Fastening Devices (Clause 5.2.2)	ł	<del> </del>	··· <mark>·</mark>			
	of Toppings and	- grips or epoxy-bonded caps						
	Overlays & Tensile	- linkage system at each end at least twice the diameter of the end caps or grips	1	İ				
	Strength of	- no bending or torsional stresses on specimen	ļ					
	Concrete Mortar	c. Report (Clause 11) a) name & address of certified lab b) name of certified tech						
	and Grout	c) core diam, depth, and location on structure d) date and time of sampling e) max load f) area g) stress, location & mode of failure h) name & signature of reviewer i) deviations						
		d. Tech with Additional test RL 6B (B) Name & Expiry	H	+	-			
<b>S7</b>	CSA A23.2-10C (A)	PROCEDURE A - BOILING METHOD:	$\vdash$	+				
		a. Boiling Water Tank: (Clause 5.2 & Figure 1)						
	Boiling Test	- water temperature recorded continuously or periodically measured (Clause 8.1.1.2)	L					
	CSA A23.2-10C (B)	PROCEDURE B - AUTOGENOUS METHOD:						
	Accelerating	a. Autogenous Curing Container (Clause 5.3.1):						
	Curing Autogenous	- able to withstand temperature s of -30 or 60 for 72 hr (Clause 5.3.3.1) <b>b. heat retention</b> : water tight 150 mm diam x 300 mm high insert, sealable (Cl 5.3.2)	$\vdash$	$\vdash$	-			
	Autogenous	- Calibration <b>yearly</b> or 3 years when not use (A283 Table 1)	<del> </del>	<del> </del>	·· <mark>·</mark>			
		c. Max/Min Thermometer (Clause 8.2.1.2) with temperature recording (Clause 8.2.1.6)	$\vdash$	+	†			
	CSA A23.2-10C ( C)	PROCEDURE C - WARM WATER METHOD: Indicate which procedure lab is certified for	T	t				
		a. Warm Water Tank (Clause 5.4 & Figure 1)						
	Warm Water	- water temperature recorded continuously or periodically measured (Clause 8.3.1.3)	L	┖				
	CSA A23.2-	d. Report: (9.1) a) specimen id b) sampling location, date & time c) lab name & address						
	-10C (A, B or C)	d) casting date & time e) test procedure used f) ambient or container temperature						
		g) max/min curing temperatures for autogenous h) test date i) age at test j) tech name						
		k) specified age to achieve specified strength I) curing history if non-standard						
		m) sample diameter n) strength o) type of failure if not Type 1						
		p) name & signature of reviewer q) deviations	Ͱ	╁	-			
ı		e. Tech with Additional test QL 10C Name and Expiry	1	1	1			

		TYPE S ADDITIONAL TESTS - ADVANCED CONCRETE	La	bΙ	D:	
		Y = Satisfactory/N = Not Satisfactory or N/A = Not Applicable				
tem	Reference	Documentation/Equipment Calibration/verification requirements	Y	N	ı	Notes
S11 (	CSA A23.2-12C	a. Requirement for certification of 12C - Is the lab certified for 18C?				
		b. Reusable Cylindrical moulds: (Clause 7 a) or b))		Г		
		- metal 150 x 300mm with wall thickness not < 6mm thick & minimum metal base				
	(CSA A23.2-18C	thickness of 10mm meeting CSA A23.2-1D requirements, verified <b>yearly</b> (A283 Table 1)				
	certification is	c. Compaction device:				
	required with 12C	- capable of producing concrete cylinder specimens with densities comparable to the				
	cert., see S13)	mix design density specified by the concrete supplier (Clause 7 c))				
		d. Metal Compaction Plate:		Г		
	Making, Curing	- For compacting the top thin layer to form a smooth cylinder finish (Clause 7 g))				
	& Testing	e. <u>Scales:</u>				
	Compression Test	- 50kg capacity, 0.05kg sensitivity (Clause 7 d))		<u>.</u>		
	Specimens of No	- 5kg capacity, 1g sensitivity (Clause 7 e))				
	Slump Concrete	f. Report: (13.1) a) mix id b) sampling source c) sampling date & time d) project				
		e) specified target water content range f) cast date & time g) specimen id				
		h) water content of field samples i) plastic density / cylinder j) specified target density				
		k) avg plastic density I) age of tested specimen m) specified strength				
		n) curing history if non-standard o) diam (& length if outside 1.8 to 2.2) p) strength				
		q) type of failure if not Type 1 r) field tech name, first & last s) name & address of lab				
		t) name & signature of reviewer u) deviations				
		g. <u>Tech</u> with Addtest SF 12C (field) Name & Expiry				
		h. <u>Tech</u> with Add test SL 12C (lab) Name & Expiry		$\mathbb{L}$		

S12	CSA A23.2-13C	a. Compression Machine detailed in Q5 except Cl 8.5 rate of loading (Clause 5 a)):
		b. Bearing Bar or Plate (Clause 5 b)):
		- machined to ± 0.025mm of planeness and of dimensions that cover the length
	Splitting Tensile	of the cylinder, at least 50mm wide and thickness of not less than the distance
	Strength of	from end of cylinder to edge of the bearing block
	Cylindrical	- dimensional verification to be performed <b>yearly</b> or 3 years when not in use (A283 Tbl 1)
	Concrete	c. Bearing Strips: (Clause 5 c)):
	Specimens	- two 3mm thick; approximately 25mm wide; length equal to, or slightly longer
		than that of the specimen and free from imperfections (not to be reused)
		d. Aligning Jig (Optional) (Clause 8.1 & Figure 1)
		e. Report: (10.1) a) mix id b) sampling source c) sampling date & time d) project id
		e) structure location f) sampling location date & time g) sample id h) specimen type
		i) diameter & Length j) maximum load k) tensile strength l) % fracture coarse aggregate
		m) test age n) curing history o) defects p) type of fracture q) tech name
		r) name & address of lab s) name & signature of reviewer t) deviations
		f. <u>Tech</u> with Additional test SL 13C Name and Expiry
CON/	NATNITC: /:malda maa:	itive comments and details about what was absorbed and reviewed to confirm compliance)

		TYPE S ADDITIONAL TESTS - ADVANCED CONCRETE	Lal	bΙ	D:
		Y = Satisfactory/N = Not Satisfactory or N/A = Not Applicable			
Item	Reference	Documentation/Equipment Calibration/verification requirements	Υ	N	Notes
S13	CSA A23.2-18C	a. <u>Scale</u> 5kg capacity, sensitive to 1g, (Clause 5) calibration <b>yearly</b> (A283 Table 1)			
		b. <u>Pestle</u> 50mm dia porcelain grinding head & sharp <b>metal scraper</b> approx. 25mm wide (Cl 5)		Т	
	Water Content of	c. <u>Heating Equipment</u>		П	
	Normal Weight	- Hotplate (Clause 5.1(d)) and shallow pan (Clause 5.1(b)) OR			
	Fresh Concrete	- for Microwave oven (Clause 5.2(a)), glass tray (Clause 5.2(b)) and	T	1	···
		fiberglass cloth (Clause 5.2(f)).			
		d. Report: (12.1) a) mix id b) sampling source c) project Id & Structure location		Γ	7
		d) total water content e) tech name, first & last f) name & address of lab			
		g) reviewer name & signature h) deviations g) optional	Ţ	T	`` <u> </u>
		e. <u>Tech</u> with Additional test SF 18C Name and Expiry			7

	<del></del>	
S14 CSA A23.2-210	a. <u>Drying Room</u> maintained at 23°C ± 2°C, RH of 50% ± 4% and rate	
	of evaporation 13mL ± 5mL/24h. Temperature and RH measured	
Length Chang	ge of <b>twice daily</b> , evaporation measured <b>daily</b> using Griffin low form beaker (Clause 4.6)	
Hardened	b. Moulds and length comparator - conforming to CSA A23.2-14A except 21C Clause 6)	
Concrete	- moulds when aggregate passing 56 mm sieve prism 100mm x 100mm x 285 mm,	
	aggregate passing 28 mm sieve 75 mm x 75 mm x 285 mm. (Clause 6)	
	- prism mould dimensional verification yearly (A283 Table 1)	
	- stainless steel studs 5 to 7 mm diam 25 ± 1mm, length comparator, (Cl 5.2)	
	dimensional verification upon fabrication and ongoing during use (A283 Table 1)	
	b. Length Change comparator (14A Fig 2), ref. bar & dial gauge/micrometer	
	0.002mm, (Cl 4.1 & 6), (14A Cl 5.3) calibrated yearly (A283 Table 1), dial gauge setting	
	checked with ref bar each use (Cl 10.3.6)	
	c. <u>Tamping rod, strike-off bar and small tools</u> (Clause 4)	
	d. Report: (12.1) a) mix id b) sampling source c) name & address of lab	
	d) location in structure e) cast date f) slump or slump flow g) air content	
	h) concrete and ambient temperature i) avg and individual strength j) specimen id	
	k) avg and individual length change at each reading I) tech name, first & last	
	m) reviewer name & signature n) deviations	
	e. <u>Tech</u> with Additional test SL 21C Name and Expiry	

COMMENTS: (include positive comments and details about what was observed and reviewed to confirm compliance)

S15 CSA A23.2-22C	a. Cold Room or Cabinet (Clause 5.1)	T	
	-maintained at -18 ± 3°C and 23 ± 2°C OR two distinct apparatus		
Scaling Resistance	- record of temperature at saline solution/concrete interface	T	†
of Concrete	b. Oven or other device (Clause 5.2)		
Exposed to	- maintained at 110 ± 5°C		
Deicing Chemicals	- thermostat and rate of evaporation calibrated <b>yearly</b>	T	Ι
	c. <u>Moulds</u> (Clause 5.3) min depth 75mm and surface area		
	min 0.045 m² excluding dyke		
	d. Balance 500g minimum capacity, accuracy 0.1g calibrated yearly		
	e. Other apparatus (Clause 5) conforming to applicable Standard		
	f. Reagents and Materials (Clause 6) documented available source		
	g. <u>Inter-lab correlation</u> Due to the nature of this test CCIL requires participation <b>every 3yrs</b>		
	i) MTO Correlation - Participation in program (results available for review), web		
	https://www.library.mto.gov.on.ca/SydneyPLUS/TechPubs/Portal/tp/CAQViews.aspx		
	"Materials", "List of Qualified Labs for Testing of Scaling Resistance To Conc." to confirm		
	ii) Interlab correlations at own cost with other cert. labs. CCIL website has List of Cert. labs		
	h. Report: (12.1) a) specimen id b) slump or slump flow c) type of surface treatment		
	d) type of deicer e) curing history f) mass loss /reading g) visual rating / reading		
	h) size and shape if cut i) photographs j) name & address of lab k) tech name, first & last		
	I) field tech name, first & last m) reviewer name & signature n) deviations		
	i. Tech with Additional test SL 22C Name and Expiry		

			-		
		TYPE S ADDITIONAL TESTS - ADVANCED CONCRETE	La	b ID	):
		Y = Satisfactory/N = Not Satisfactory or N/A = Not Applicable			
Item	Reference	Documentation/Equipment Calibration/verification requirements	<b>∀</b> γ	N	Notes
S16	CSA A23.2-23C	a. Applied voltage cell (Clause 5.1)			
		b. Voltage application and data readout apparatus (Clause 5.3)			
	Electrical	calibrate voltage and current yearly		†	
	Indication	c. Vacuum saturation apparatus (Clause 5.4)			
	of Concrete	d. Coating apparatus and materials (Clause 5.5)			
	to Resist	e. Reagents, materials and test cell (Clause 6) documented available source			
	Chloride Ion	f. <u>Inter-lab correlation</u> Due to the nature of this test CCIL requires participation <b>every 3yrs</b>			
	Penetration	i) MTO Correlation - Participation in program (results available for review), web			
		https://www.library.mto.gov.on.ca/SydneyPLUS/TechPubs/Portal/tp/CAQViews.aspx			
		"Materials", "List of Qualified Labs for testing Rapid Chloride Permeability" to confirm <b>OR</b>			
		ii) Interlab correlations at own cost with other cert. labs. CCIL website has List of Cert. labs			
		g. Report: (11.1) a) specimen id b) location in structure c) type of specimen	$\top$		
		d) curing history e) specimen location in cylinder or core f) concrete and composition			
		g) specimen prep h) test result, avg total charge i) qualitative chloride ion penetrability			
		J) tech name, first & last k) lab name & address l) reviewer name & signature m) deviations			
		h. Tech with Additional test SL 23C Name & Expiry	+		
COM	l IMENTS: (include no	sitive comments and details about what was observed and reviewed to confirm compliance)			
0011	iiii Liiii S. (iiiciaac po.	state comments and details about what was observed and reviewed to commit compliance,			
S17	CSA A23.2-26C	a. Bulk resistivity device: (Clause 7 a)) with manufacture's instructions			
317	C3A A23.2-20C	- supplying voltage across cross section and measure electrical current and voltage drop		<del> </del>	
	Bulk Electrical			<del> </del>	
		- meet the verification requirements in Clause 10.4.3		ļ	
	Resistivity of Concrete	- accuracy of measurements verified prior to testing on a given day. (Clause 10.4.1)		<del> </del>	
	or concrete	- verification cylinder with fixed values, switchable to cover expected range (Cl 10.4.2)	+		
		b. Electrically conductive plate electrodes: (Clause 7 b))		ļ	
		- non corroding, end diameter same or greater than sample	+		
		c. Other equipment: (Clause 7 c, d, e))		ļ	
		- sponges, plastic or non-conductive material specimen holder, non-conductive surface	+		
		d. Reagents: (Clause 8) documented available source		ļ	
		- conductive fluid as per the manufacture's instructions			
		e. <u>Report:</u> (13.1) a) source b) sample id c) type of concrete, mix proportions			
		d) description of specimen, diameter, length, steel, overlay, surface treatment			
		e) curing history and age f) test date g) bulk electrical resistivity			
		h) type of device, current frequency i) name & address of lab j) tech name, first & last			
		k) reviewer name & signature I) deviations			
		f. <u>Tech</u> with Additional test SL 26C Name and Expiry			
COM	IMENTS: (include po	sitive comments and details about what was observed and reviewed to confirm compliance)			

	TYPE S ADDITIONAL TESTS - ADVANCED CONCRETE	La	bΙ	D:	
	Y = Satisfactory/N = Not Satisfactory or N/A = Not Applicable				
m Reference	Documentation/Equipment Calibration/verification requirements	<b>∀</b> γ	N	ı	Notes
18 ASTM C457	a. ASTM C457-16 copy of current standard		T	十	
(A, B, & C)	b. Apparatus & material for sample preparation as per ASTM C457 (Clause 6.1.1)		T	7	
	- Diamond Saw large enough to make a 7-in. (175-mm) cut in one pass. (C856 6.2.1)				
Microscopical	- Horizontal Lap Wheels, preferably at least 16 in. (400 mm) in diameter, large enough		†	"	
Determination of	to grind at least a 4 by 6-in. (100 by 152-mm) area. (C856 6.2.3)				
Parameters of	- Free Abrasive Machine, using abrasive grit in lubricant, with sample holders rotating		1		
Air-Void System	on a rotating table. (C856 6.2.4)				
in Hardened	- Polishing Wheel, at least 8 in. (200 mm) in diameter (C856 6.2.5)		1	"]	
Concrete	- Abrasive -Silicon carbide grits, No. 100 (150-μm), No. 220 (63-μm), No. 320 (31-μm),		1	"]	
	No. 600 (16-μm), No. 800 (12-μm); optical finishing powders, as needed. (C856 6.2.8)				
	Due to the nature of this test CCIL requires participation in an interlab correlation every 2yrs		Γ	7	
	1) MTO Correlation (2-3 yrs) - Participation in program (results available for review), web				
	https://www.library.mto.gov.on.ca/SydneyPLUS/TechPubs/Portal/tp/CAQViews.aspx				
	"Materials", "List of Qualified Labs/Operators for testing AVS" to confirm on MTO List <b>OR</b>				
	2) Interlab correlations at own cost with other cert. labs. CCIL website-List of Cert. labs OR				
	3) CCIL Correlation, (contact the Assistant Program Manger of Concrete to request)		Г		
	c. Report: (18.1) .1 method used .2 sample id .3 Location and orientation				
	.4 Surface orientation & position .5 length of traverse, area traversed, & for B # of stops				
	.6 air content & if measured paste content, void frequency, specific surface				
	spacing factor and paste-air ratio .7 paste content method .8 magnification				
	d. <u>Tech</u> with Additional test SL C457 Name & Expiry				
Procedure A	Procedure A - Linear-Traverse Method:			Т	
	e. <u>Linear-Traverse Device</u> : A platform that can carry specimen with lead screws for				
	movement in the N-S direction (with a capacity of at least 75mm) the E-W (capacity				
	of at least 100mm for the main lead screw and 65mm for the other lead screw) (9.1.1).				
	Verification of distance travelled between stops - yearly (A283 Tabl1 1)				
	f. <u>Stereoscopic microscope &amp; support,</u> magnification in the range of 50x to 125x (9.1.2)				
	g. Spotlight type microscope lamp & leveling device (9.1.3 & .5)		Ι		
	- rotation counter readable to 0.01 revolution & tally counter				
Procedure B	Procedure B - Modified Point-Count Method:				
	h. <u>Point-count Device</u> : a stage or platform connected to E-W and N-S lead screws for				
	turning specimen smoothly and uniformly through equal distance. Total translation of				
	the stage is at least 100mm in each direction.				
	Verification of distance travelled - <b>yearly</b>		ļ		
	i. <u>Equipment</u> f, g, & h in Procedure A		ļ		
	- At least four digital counters		L	$\perp$	
Procedure C	Procedure C—Contrast enhanced method				
	j. Apparatus & material for sample preparation (Clause 6.2)				
	- opaque permanent black ink, white powder, light oil.		ļ		
	k. Specimen stage & Illumination Source (15.1.1 & 3)		ļ		
	I. Image capture, storage and processing devices (15.1.24 & .5)	- 1	1		

S1	P ASTM C666	a. <u>ASTM C666-15</u> copy of current standard		
		b. Freezing-and-thawing apparatus (Clause 4.1)		
		- calibration of apparatus (Clause 5), <b>yearly</b> in use, every 3 years if not in use A283 (Tbl 1)		
		c. <u>Temperature-Measuring Equipment</u> (Clause 4.2) accuracy 1 °C		
	Rapid Freeze/	d. <u>Dynamic testing apparatus</u>		
	Thaw of Concrete	- Forced resonance apparatus (Clause 6.1 of ASTM C215) calibration performed <b>yearly</b>		
		OR		
		- Impact resonance apparatus (Clause 6.2 of ASTM C215), calibration performed <b>yearly</b>		
		e. Scales (Clause 4.5) capacity 50% > than mass accuracy 10% of specimen mass		
		f. <u>Tempering Tank</u> (Clause 4.6)		
		g. Report: (10.1) .1 mix proportions .2 admixture .3 air content (fresh) .4 density (fresh)		
		.5 consistency (fresh) .6 air content (hardened) when available		
		.7 type of samples (cut or cast) .8 curing period		
		h. <u>Tech</u> with Additional test SL C666 Name & Expiry		