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About this Course

- This course is approved for ASPE CEU credits only
- This course is not approved for PDHs for PEs
- CPDs (Certified in Plumbing Design) or CPDTs (Certified Plumbing Design Technician) can use this course towards their recertification
 - aspe.org/CPD
 - aspe.org/CPDT
- This course may or may not be accepted for PE renewal
- Individuals must inquire with their state to determine if this is eligible for PE renewal or PDH credits

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Lunch and Learn Objectives

At the end of this course you will be able to:

- Understand the history and necessity of detector assemblies, Type I and II
- Understand the hydraulics of detector assemblies, Type I and II
- Understand the benefits of Type II detector assemblies
- Assess the approval of a Type II detector assembly
- Understand how to test and report on a Type II detector assembly

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Discussion Topics

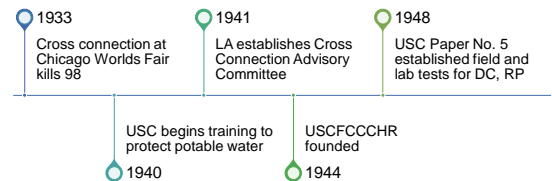
- History of Backflow Innovation and Detectors
- Basic Hydraulics of DC, DCDA, RP, & RPDA
- Detector assemblies, what are they used for?
- Are they legal?
- What is a Type II Detector Assembly
 - Safe enough?
- Questions

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History of Backflow at USC

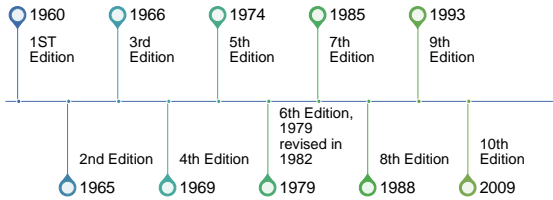


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History of Backflow at USC



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Most important question...



Why Detector Assemblies?

To respond to water authority's concerns over loss of water ("non-revenue" water) in unmetered fire connections.

- Leakage
- Theft



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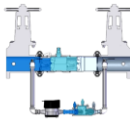
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Cross Connections



- Definition of a Cross Connection
 - From the ABPA FAQ's. A cross-connection is any temporary or permanent connection between a public water system or consumer's potable water system and any source or system containing non-potable water or other substances.
- Detector Assemblies are Cross Connections
 - Monitors accidental or unauthorized water use



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Double Check Valve Assembly



ASSE 1015



- Non-health hazard protection
- Testable
- Allow adequate space for testing and repair
- Horizontal or vertical flow-up installations
- Typical use:
 - Where health hazards do not exist (irrigation with no chemicals, fire protection system, check with AHJ)

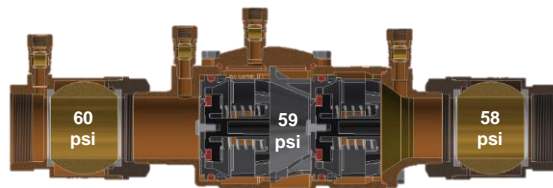


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DC Static – No Flow

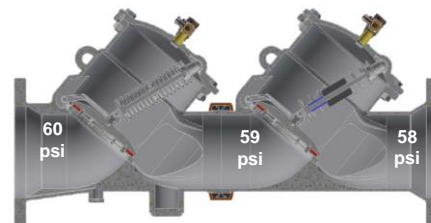


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DC Static – No Flow



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Double Check Detector Assembly 2 – 12"



ASSE 1048



- Backsiphonage / backpressure application
- Non-health hazard
- Continuous pressure
- Testable
- Monitors unauthorized water usage
- Install allowing for normal testing and maintenance
- Typical use:
 - Non health hazard fire protection systems or where AHJ requires

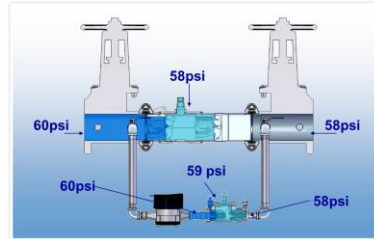


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DCDA – Static Flow

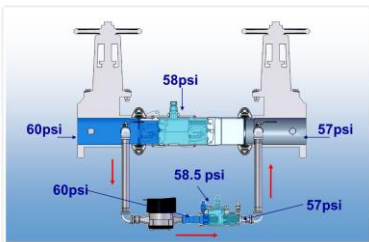


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DCDA – 2gpm

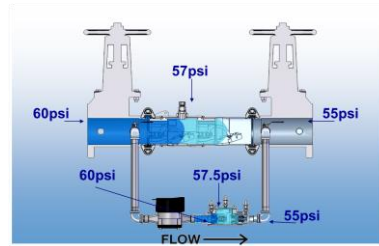


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DCDA - Fire Flow



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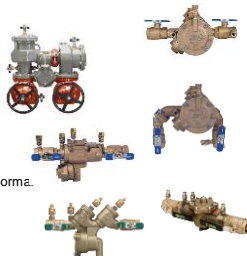
Reduced Pressure Zone Assembly



ASSE 1013



- Backsiphonage / backpressure protection
- Health hazard application
- Continuous pressure
- Occasional water discharge
- Install 12" above grade and allow space for normal testing and maintenance
- Typical Use:
 - Everywhere – Check with local AHJ

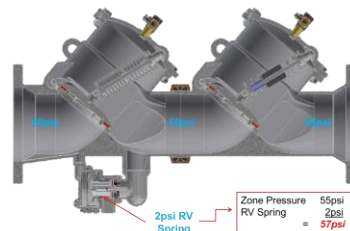


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RP – Static Flow

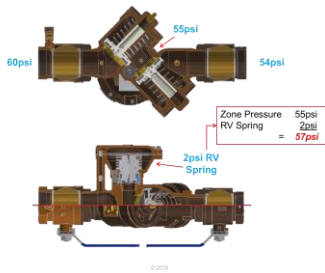


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RP – Static Flow



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Reduced Pressure Principle Detector Assembly



ASSE 1047



- Backsiphonage / backpressure application
- Health hazard application
- Continuous pressure application
- Testable
- Occasional water discharge
- Install 12" above grade and allow space for normal testing and maintenance
- Monitors unauthorized water usage
- Typical Use:
 - Fire Protection Systems where health hazards exist and the AHJ requires.

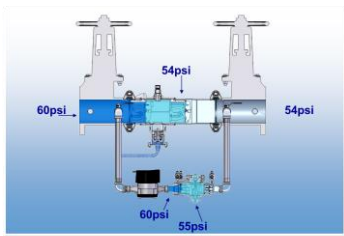


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RPDA – Static Flow

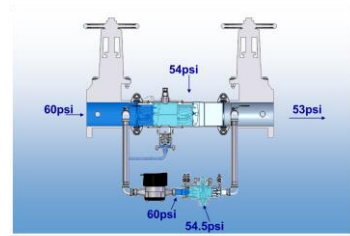


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RPDA – 1st 2 GPM

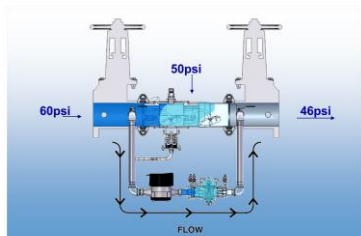


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RPDA – Fire Flow

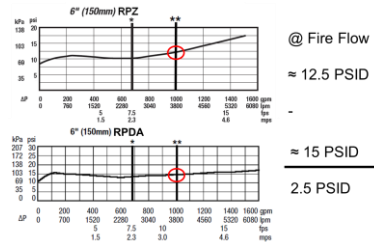


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Pressure Loss RPZ vs. RPDA



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Allowable Pressure Loss (ASSE)



Size	DC	DCDA	RP	RPDA
2	8	10	14	18
2 1/2	8	10	14	18
3	8	10	13	17
4	8	10	12	16
6	8	10	12	16
8	8	10	12	16
10	8	10	12	16

DCDAs allowed 2 more psi!

RPDAs allowed 4 more psi!

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Why the added pressure drop?



DCDA DCDA-II

- Two checks, each 1.5-2psi
- Main valve pressure loss must be INCREASED to ensure first 2 GPM go through bypass
- Increased by how much?

WORST CASE:
Main valve: 2 x 1.5psi checks = 3psi
Bypass: 2 x 2psi checks = 4psi
Increase: 4psi-3psi = 1psi minimum

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Why the added pressure drop?



RPDA RPDA-II

- Two checks: 1st 6-8psi, 2nd 1.5-2psi
- Main valve pressure loss must be INCREASED to ensure first 2 GPM go through bypass
- Increased by how much?

WORST CASE:
Main valve: 6psi + 1.5psi = 7.5psi
Bypass: 8psi + 2psi = 10psi
Increase: 10psi-7.5psi = 2.5psi minimum

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Most important question...



Why Type II?

To respond to the fire protection industry's concerns over the use of detector assemblies



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ASSE Workgroup 1999



- ASSE workgroup reviewed fire industry concerns
 - Cost
 - Size
 - Ease of installation
 - Pressure Drop
 - Reliability after long static periods
- Solution: Type II detectors



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So what is a Type II?

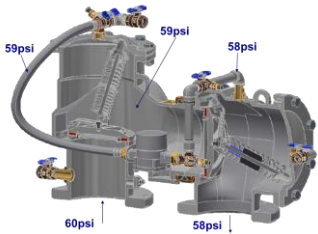


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DCDAI - Static Flow

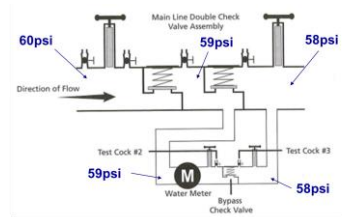


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DCDAI - Static Flow

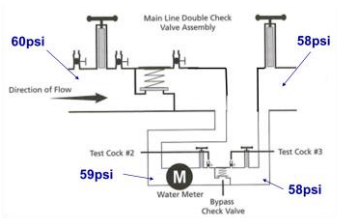


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DCDAI - Static Flow

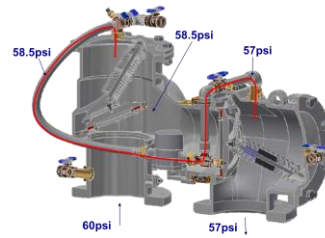


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DCDAI - 1st 2 GPM

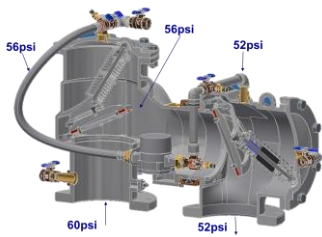


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DCDAI - Fire Flow

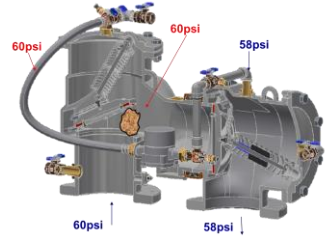


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DCDAI - Fouled First Check



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Why the added pressure drop?



DCDA	DCDA-II
<ul style="list-style-type: none"> - Two checks, each 1.5-2psi - Main valve pressure loss must be INCREASED to ensure first 2 GPM go through bypass - Increased by how much? 	<ul style="list-style-type: none"> - 2nd check bypassed, 1.5-2psi - Main valve pressure loss must be INCREASED to ensure first 2 GPM go through bypass - Increased by how much?
<p>WORST CASE: Main valve: 2 x 1.5psi checks = 3psi Bypass: 2 x 2psi checks = 4psi Increase: 4psi-3psi = 1psi minimum</p>	<p>WORST CASE: Main valve: 1 x 1.5psi checks = 1.5psi Bypass: 1 x 2psi checks = 2psi Increase: 2psi-1.5psi = 0.5 psi minimum</p>

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RPDAII – Still safe?

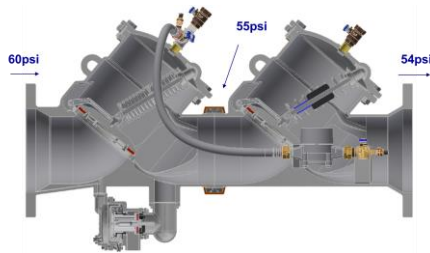


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RPDAII – Static Flow

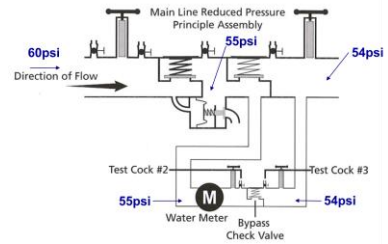


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RPDAII – Static Flow

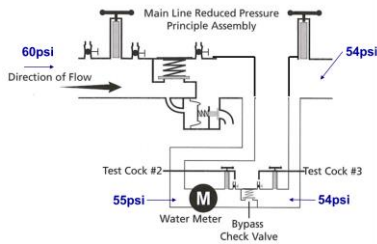


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RPDAII – Static Flow

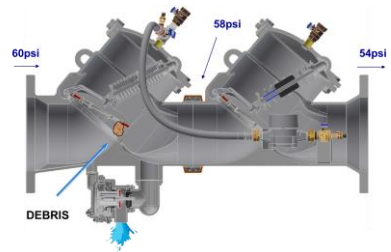


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RPDAII - Fouled



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Why the added pressure drop?

RPDA	RPDA-II
<ul style="list-style-type: none"> - Two checks: 1st 6-8psi, 2nd 1.5-2psi - Main valve pressure loss must be INCREASED to ensure first 2 GPM go through bypass - Increased by how much? <p>WORST CASE: Main valve: 6psi + 1.5psi = 7.5psi Bypass: 8psi + 2psi = 10psi Increase: 10psi-7.5psi = 2.5psi minimum</p>	<ul style="list-style-type: none"> - 2nd check bypassed, 1.5-2psi - Main valve pressure loss must be INCREASED to ensure first 2 GPM go through bypass - Increased by how much? <p>WORST CASE: Main valve: 1 x 1.5psi checks = 1.5psi Bypass: 1 x 2psi checks = 2psi Increase: 2psi-1.5psi = 0.5 psi minimum</p>

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Questions on Type II DA's?



- Why is it called a building if it is already built?
- Why does round pizza come in a square box?
- Why doesn't glue stick to its bottle?
- *Are they approved and how do you test them?*

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How do you know they are approved?

- Check the name plate
- Verify on manufacturers website
- Or Verify on approval agencies website

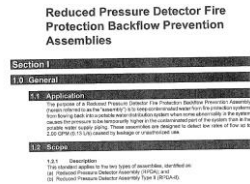
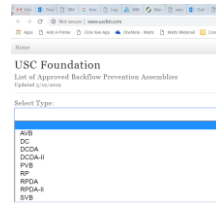


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How do you know they are approved?



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Testing of Type II's

1. Different organization testing procedures cover Type II's
2. Software manufacturer's have Type II options now
3. Type II's have two serial numbers just like traditional DA's
4. Always check with the authority having jurisdiction

Sample test form

BACKFLOW PREVENTION ASSEMBLY FIELD TEST FORM											
Device Name/Model:		Serial Number:		Check Valve/Device:		<input type="checkbox"/> RPDA <input type="checkbox"/> RPDA II <input type="checkbox"/> RPDA-6 <input type="checkbox"/> RPDA-8 <input type="checkbox"/> RPDA-9		<input type="checkbox"/> RPDA <input type="checkbox"/> RPDA II <input type="checkbox"/> RPDA-6 <input type="checkbox"/> RPDA-8 <input type="checkbox"/> RPDA-9		<input type="checkbox"/> RPDA <input type="checkbox"/> RPDA II <input type="checkbox"/> RPDA-6 <input type="checkbox"/> RPDA-8 <input type="checkbox"/> RPDA-9	
Manufacturer:		Model:		Size:		Orientation:		Serial Number:		<input type="checkbox"/> RPDA <input type="checkbox"/> RPDA II <input type="checkbox"/> RPDA-6 <input type="checkbox"/> RPDA-8 <input type="checkbox"/> RPDA-9	
<input type="checkbox"/> RPDA <input type="checkbox"/> RPDA II <input type="checkbox"/> RPDA-6 <input type="checkbox"/> RPDA-8 <input type="checkbox"/> RPDA-9		<input type="checkbox"/> RPDA <input type="checkbox"/> RPDA II <input type="checkbox"/> RPDA-6 <input type="checkbox"/> RPDA-8 <input type="checkbox"/> RPDA-9		<input type="checkbox"/> RPDA <input type="checkbox"/> RPDA II <input type="checkbox"/> RPDA-6 <input type="checkbox"/> RPDA-8 <input type="checkbox"/> RPDA-9		<input type="checkbox"/> RPDA <input type="checkbox"/> RPDA II <input type="checkbox"/> RPDA-6 <input type="checkbox"/> RPDA-8 <input type="checkbox"/> RPDA-9		<input type="checkbox"/> RPDA <input type="checkbox"/> RPDA II <input type="checkbox"/> RPDA-6 <input type="checkbox"/> RPDA-8 <input type="checkbox"/> RPDA-9		<input type="checkbox"/> RPDA <input type="checkbox"/> RPDA II <input type="checkbox"/> RPDA-6 <input type="checkbox"/> RPDA-8 <input type="checkbox"/> RPDA-9	
Check Valve 1		Check Valve 2		Bypass Valve		Check Valve 1		Check Valve 2		Bypass Valve	
<input type="checkbox"/> RPDA <input type="checkbox"/> RPDA II <input type="checkbox"/> RPDA-6 <input type="checkbox"/> RPDA-8 <input type="checkbox"/> RPDA-9		<input type="checkbox"/> RPDA <input type="checkbox"/> RPDA II <input type="checkbox"/> RPDA-6 <input type="checkbox"/> RPDA-8 <input type="checkbox"/> RPDA-9		<input type="checkbox"/> RPDA <input type="checkbox"/> RPDA II <input type="checkbox"/> RPDA-6 <input type="checkbox"/> RPDA-8 <input type="checkbox"/> RPDA-9		<input type="checkbox"/> RPDA <input type="checkbox"/> RPDA II <input type="checkbox"/> RPDA-6 <input type="checkbox"/> RPDA-8 <input type="checkbox"/> RPDA-9		<input type="checkbox"/> RPDA <input type="checkbox"/> RPDA II <input type="checkbox"/> RPDA-6 <input type="checkbox"/> RPDA-8 <input type="checkbox"/> RPDA-9		<input type="checkbox"/> RPDA <input type="checkbox"/> RPDA II <input type="checkbox"/> RPDA-6 <input type="checkbox"/> RPDA-8 <input type="checkbox"/> RPDA-9	
Check Valve 1		Check Valve 2		Bypass Valve		Check Valve 1		Check Valve 2		Bypass Valve	
<input type="checkbox"/> RPDA <input type="checkbox"/> RPDA II <input type="checkbox"/> RPDA-6 <input type="checkbox"/> RPDA-8 <input type="checkbox"/> RPDA-9		<input type="checkbox"/> RPDA <input type="checkbox"/> RPDA II <input type="checkbox"/> RPDA-6 <input type="checkbox"/> RPDA-8 <input type="checkbox"/> RPDA-9		<input type="checkbox"/> RPDA <input type="checkbox"/> RPDA II <input type="checkbox"/> RPDA-6 <input type="checkbox"/> RPDA-8 <input type="checkbox"/> RPDA-9		<input type="checkbox"/> RPDA <input type="checkbox"/> RPDA II <input type="checkbox"/> RPDA-6 <input type="checkbox"/> RPDA-8 <input type="checkbox"/> RPDA-9		<input type="checkbox"/> RPDA <input type="checkbox"/> RPDA II <input type="checkbox"/> RPDA-6 <input type="checkbox"/> RPDA-8 <input type="checkbox"/> RPDA-9		<input type="checkbox"/> RPDA <input type="checkbox"/> RPDA II <input type="checkbox"/> RPDA-6 <input type="checkbox"/> RPDA-8 <input type="checkbox"/> RPDA-9	

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* University of Southern California Foundation for Cross-Connection Control and Hydraulic Research

Type's and who uses them?



- Who has used or tested a Type I?
- Who has used or tested a Type II?
- Who has read and registered the meter reading?

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Lunch and Learn Objectives



You should now be able to:

- Understand the history and necessity of detector assemblies, Type I and II
- Understand the hydraulics of detector assemblies, Type I and II
- Understand the benefits of Type II detector assemblies
- Assess the approval of a Type II detector assembly
- Understand how to test and report on a Type II detector assembly

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Questions?



Feel free to contact me!

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