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| **ABO/Rh Confirmation of Red Cell Products** |
| **Purpose** | This procedure provides instructions for the mandatory confirmation of the ABO group of all red cell components received from blood centers into inventory. Donor retyping is performed to detect any labeling errors. |
| **Policy Statements** | * The ABO group of all red cell products must also be confirmed using Anti-A and Anti-B reagent (front grouping) upon receipt into inventory.
* The Rh type of all red cell products labeled Rh negative must also be confirmed upon receipt into inventory
* Confirmatory testing for weak D is not required.
 |
| **Related****Documents** | [TS 7.13 Making a 3% Donor Unit Cell Suspension](http://khan.childrensmn.org/Manuals/Lab/SOP/TS/BPOrd/202475.pdf)[TS 4.8 Grading and Interpretation of Tube Reactions](http://khan.childrensmn.org/Manuals/Lab/SOP/TS/PatTest/202225.pdf) |
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| **Materials** | **Equipment** | **Reagents** | **Supplies** |
| * IH-Centrifuge L
* Agglutination viewer
* IH-Reader 24-STP only
 | * BioRad Anti-A
* BioRad Anti-B
* BioRad Anti-D (Rh1) Blend
* IH-Card ABD (DVI+)-Conf
 | * 10 x 75 mm test tubes
* BB pipettes
* 10 μL pipette
* 1000 μL pipette
* Saline
* Hematype Segment device
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| **Procedure** |  |
|  | **Step** | Action |
|  | 1 | Label gel card and 10 x 75 mm test tubes with a minimum of the last three digits of the donor number or with label printed for IH-Com (Labels from the unit may be used for unit identity.) |
| Gel Testing | 2 | Prepare a 1% suspension of the donor cells in IH-Liss solution by pipetting 1000 μL into the appropriately labeled test tube and adding 10 μL of donor packed red blood cells. Mix gently. |
|  | 3 | Inspect the IH-Card for evidence of damage to the foil or drying of the gel. Do not use if such evidence is observed. IH-Cards with splashed of gel in the reaction area may be centrifuged prior to use. |
|  | 4 | Carefully peel back the foil seal from the individual microtubes of the IH-Card being used for the testing, leaving the seal in place for microtubes not being used. Note: Once the foil has been removed from the microtubes, testing must be initiated as soon as possible, (recommended within 20 minutes) to prevent drying of the microtube(s). The number of the wells used per sample will vary by the type of IH-Card being used |
|  | 5 | Pipette 50 μL of the 1% donor red cell suspension into each of the gel microwell reaction chambers needed for the test being performed, taking care to maintain an air gap between the upper reaction chamber containing the cells and the gel column below containing the antisera. |
|  | 6 | Centrifuge the IH-Card(s) in the centrifuge for the pre-programmed time and speed for the 24-card IH-Centrifuge L head (10 minutes at 910 x G). |
|  | 7 | When the centrifugation cycle is complete grade and record the results either the IH-Reader 24 will read or remove the cards and read the reactions according to IH-Gel Interpretation Chart |
|  | 8 | Evaluate result entry

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| --- | --- |
| **If** | **Then** |
| Interpretation matches unit label | Enter unit into active inventory |
| Discrepancies in ABO/Rh from donor retype to unit label | * Repeat testing using a new segment and cell suspension
* Report unresolved discrepancies to the collection facility and quarantine unit
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|  | **Step** | Action |
| Tube Testing | 1 | Label donor retyping tubes with antisera ID and a minimum of the last three digits of the donor number. (Labels from the unit may be used for unit identity.) |
|  | 2 | Prepare a 3-5% cell suspension of unit red cells per procedure. |
|  | 3 | Pipette reagent antisera to the corresponding labelled tube in the amounts specified in [Appendix A](#appendix). |
|  | 4 | Add 1 drop of 3-5% suspension of the unit red cells to tubes as specified in [Appendix A](#appendix)and mix all tubes. |
|  | 5 | Centrifuge for the posted optimal time in a calibrated serologic centrifuge.  |
|  | 6 | Remove the tubes from the centrifuge and check that unique number on each tube is comparable with the unique number on the computer screen or downtime worksheet.  |
|  | 7 | Gently resuspend the cell button and examine macroscopically for hemolysis and agglutination per established procedure. |
|  | 8 | Grade and record the results and interpretation in the computer or on the downtime worksheet. |
|  | 9 | Evaluate result entry

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| --- | --- |
| **If** | **Then** |
| Interpretation matches unit label | Enter unit into active inventory |
| Discrepancies in ABO/Rh from donor retype to unit label | * Repeat testing using a new segment and cell suspension
* Report unresolved discrepancies to the collection facility and quarantine unit
 |

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| **Interpretation** | Agglutination or hemolysis of the donor red blood cells in the presence of anti-sera reagent is a positive test result and indicates the presence of the corresponding antigen or antibody.No agglutination or hemolysis of the donor red cells is a negative test result and indicates that the absence of the corresponding antigen.0 = No agglutination+ = Graded agglutinationUse the following table to interpret ABO grouping results:Note: Positive reactions with Anti-A and Anti-B characteristically show 3+ to 4+ agglutination.

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| **If the forward grouping reaction of unit cells with** |
| **Anti-A is** | **Anti-B is** | **Then interpret the ABO as** |
| 0 | 0 | O |
| + | 0 | A |
| 0 | + | B |
| + | + | AB |

Use the following table to interpret Rh typing results:

|  |  |
| --- | --- |
| **Anti-D** | Interpretation |
| 0 | Negative |
| + (Note: Positive donor units do not require Rh confirmation.) | Positive |

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| **Limitations** | Erroneous and Abnormal results may be caused by:* Bacterial or chemical contamination of the blood specimens, reagents, supplementary materials and/or equipment
* A red blood cell concentration or suspension medium different from that recommended.
* Incomplete re-suspension of the red blood cells.
* Sample or reagent red blood cell hemolysis prior to testing
* Contamination between microtubes through pipetting errors.
* Grossly icteric blood samples, blood samples with abnormal high concentrations of protein, or blood samples from patients who have received plasma expanders of high molecular weight may give false positive results.
* Fibrin, clots, particulates or other artifacts may cause some red blood cells to be trapped at the top of the gel and causes an anomalous result. They may appear as a pinkish layer. In a negative reaction the false appearance of a mixed field could lead to misinterpretation.
* If red blood cells (pellet at the bottom of the microtube) are too low in concentration they become difficult to visualize and in certain cases, a weak positive reaction can fail to be detected.
* Very weak ABO subgroups may not be detected with the Anti-A and Anti-B reagents used in this IH-Card.
* The Anti-B reagent does not react with the acquired B antigen.
* Very weak expressions of the D antigen may not be detected.
* The performance Characteristics of this product with chemically modified, frozen/thawed or enzyme-treated red blood cells have not been established.
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| **Result****Reporting** |  |
| **Step** | Action |
| 1 | Log into the Sunquest Gateway with User ID (Employee Number) and password1. Choose Location: R for Mpls, SP for STP
2. On the All tab or the Blood Bank tab, double-click on the Blood Product Testing folder.
 |
| 2 | To enter by single Unit:1. In the Unit # box, type or scan the unit number.
2. In the Component box, select or scan the component type code, if necessary.
3. Click Add. The unit appears in the Unit List with the check box selected.
4. Repeat steps a trough c to add additional units. NOTE: To exclude units from result entry at this time, in the Unit List, clear the check boxes next to the units to exclude.
5. Verify that the first unit to process is highlighted and that the check box in the Unit Number column is selected.
6. Click Continue. The information for the first unit appears on the right side of the window in the unit header.
 |
| 3 | To enter a unit worklist created in BPE:1. In the Worklist box, do one of the following:
	* Type the worklist code. e.g. WL01112
	* To look up one or more worklists, click  or press F3.
2. Tab
3. Click Add Worklist. The units for the selected worklist appear in the Unit List on the Unit List tab.
4. Repeat steps a and b to add additional worklists.
5. To add individual units to the worklist, see Step 2.
6. To exclude a unit from result entry, in the Unit List, clear the check box next to the unit number.
7. Click Continue. The information for the first unit appears on the right side of the window in the unit header.
 |
| 4 | Press the Home key or Click in the first cell of the ABO/RH(D) Recheck grid entry field. |
| 5 | Enter the grading of the donor unit tube agglutination reading in the appropriate grid cell. Enter NT (key N) if tube/phase is Not Tested.**GRID CELL**A = Anti-A tubeB = Anti-B tube D= Anti D tubeDIN=Anti D tube after incubation DIA =Anti D tube at AHGDCC= Anti D tube with Coombs Control CellsRHC=Rh ControlA1C= A1 cells tube BC= B cells tube* To temporarily save the reaction results without entering an interpretation click Accept.

NOTE: Modification of a reaction grading will delete the interpretation. |
| 6 | The interpretation cell is selected automatically when all reaction results have been entered.1. Record the ABO group in the Interpretation cell
2. Press the TAB key. A new line appears.
3. Enter the Rh interpretation code into the second cell.

 Interpretation entries:* ABO: O = O key A = A key B = B key AB = L key
* Rh(D): Positive = P key Negative = N key
* Enter ;ICL (Inconclusive) as the interpretation if an inconclusive reaction pattern for.
 |
| 7 | The interpretation appears in the result entry cell and the system performs unacceptable result and quality assurance checking ABO and/or Rh testing occurs |
| **If** | **Then** |
| Results and interpretation are acceptable | Click Save then click OK |
| Results are unacceptable | Recheck tube readings, result entries, and interpretation entry.1. Retest donor unit with new tube set-up as needed.
2. Re-enter tube reading results and/or interpretation.

To delete reaction results:* In the reaction result grid, click the cell that contains the grading to delete.
* Press DELETE or enter another reaction grading

To delete an interpretation* Click the Interpretation box.
* Press DELETE or enter another interpretation.
 |
| 8 | Click Continue and repeat result additional units from the unit list. |
| 9 | When all units have been tested, Click **NO** for Update Unit Locaiton. |
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| **References** | 1. AABB Technical Manual, current edition
2. AABB Standards for Blood Banks and Transfusion Services, current edition
3. Product Insert, Blood Grouping Reagents, BioRad Reagents, current edition
4. Product Insert, Blood Grouping Reagents, IH-Card ABD(DVI+)-Conf, current edition
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| **Appendices** | [Appendix A:Tube Set-up](#appendix) |
| **Approval****Workflow** | Transfusion Service/Technical Specialist |
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| **Historical Record** | **Version** | **Written/Revised by:** | **Effective Date:** | **Summary of Revisions** |
| 1 | D. Hansen | 1995 | Initial Version |
| 2 | D. Hansen | 1996 |  |
| 3 | J. Wenzel | 1/1997 | Merger-document standardization |
| 4 | J. Wenzel | 8/99 |  |
| 5 | J. Wenzel | 5/19/01 | Sunquest result entry |
| 6 | P. Kerlin | 3/06/07 | New Sunquest grid format |
| 7 | J. Wenzel | 2/3/2009 | On line format |
| 8 | S Cassidy/ J. Wenzel | 4/17/2012 | Merged TS 7.17 and TS 7.18BioRad Reagents |
|  | 9 | S. Cassidy | 07/12/2021 | Added step for Update Unit Location for one HID |
|  | 10 | S. Cassidy | 02/17/2023 | Added steps for new IH-Card ABD (DVI+)-Conf |

**Appendix A: ABO/Rh Tube Labeling and Set-Up**

 **Tubes, Reagents, and Volumes**

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| **Tube labeled as:** | **Tests for the presence of :** | **Contents:** |
| Last three digits of the donor number or labels from the unit | N/A-test setup | 3-5% patient red cell suspension |
| Donor unit ID last three digits of the donor number or labels from the unitA | A antigen | 1 drop BioRadt **Anti-A** antiserum AND 1 drop donor 3-5% red cell suspension |
| Donor unit ID last three digits of the donor number or labels from the unitB | B antigen | 1 drop BioRad **Anti-B** antiserum AND 1 drop 3-5% donor red cell suspension |
| **Units labeled as** **Rh Negative** Donor unit ID last three digits of the donor number or labels from the unitD | D antigen | 1 drop BioRad **anti-D** antiserum AND 1 drop 3-5% donor red cell suspension |

IH-Card ABD (DVI+)-Conf

1. Label test tube with 3 digits of donor or labels of unit
2. Make 1% red cell suspension
3. Label gel card with 3 digits of donor or labels of unit
4. Pipette 50μL to each well (A, B, DVI+)

