AVK is globally renowned for being the leading innovator and manufacturer of high quality valves and fittings for the water, gas, waste water and fire fighting industries worldwide.

Design and development is carried out by product specialists at our state-of-the-art technology center in Denmark. Customer feedback, local market intelligence, component quality and environment considerations are at the forefront of our design processes. These considerations ensure that AVK are, at all times, proactively providing technically advanced products.

Our products comply with, and often exceed, the highest standards of safety and durability and are in accordance with all common national and international standards such as BS, EN, ISO, CEN, DIN, GB, AWWA, JWWA and many more.

As well as air valves, we manufacture gate valves, butterfly valves, knife gate valves, penstocks, float valves, hydrants, check valves, couplings, flange adaptors, dismantling joints, repair clamps, tees, end caps and a wide range of accessories to suit.

All AVK products are supplied under the commitments made in our Customer Service Charter and encompass the four fundamental product values identified in our Vision 4 programme.

**QUALITY**  All AVK products are designed, built and 100% tested to the relevant standards. All quality processes are audited by BSI.

**RELIABILITY**  All AVK products are designed for a long asset life and come with a robust manufacturer’s warranty.

**INNOVATION**  All AVK products are designed to give added value, reduce true-life cost and utilise the most modern materials.

**ENVIRONMENT**  A full carbon reduction policy is in place allowing carbon content measurement.

This brochure is a guide to our extensive range of air valves for use in water and waste water, and provides the necessary information to enable our customers to select the right product for their application. Our technical team are also available to provide product support and selection recommendation.

Further information about all the products in the AVK portfolio is available on our website:  
[www.avkuk.co.uk](http://www.avkuk.co.uk)
AVK UK offer a range of water and waste water air valves with a solid pedigree that stretch back over 40 years.

The valves on offer to our customers in the UK and Ireland are installed in virtually every country in the world, providing bespoke solutions to various air management projects.

The correct air valve use provides protection from transit pressures and entrapped air in pipelines, the main causes for the bursting, collapsing, and fracturing of pipelines. These negative effects on the pipeline assets can be directly associated with reduced pipeline efficiency, premature failure and reduced whole life costs.

A.R.I Flow Control Accessories, working in partnership with AVK UK has developed an extensive range of products applicable to the water and waste water industries along with specialized software for pipeline analysis. Ongoing research and development, responding to customer feedback, results in continual product development and improvements.

The AVK offer includes commitment to service that has won the confidence and loyalty of customers worldwide and provides:

- Established quality of design through build and test;
- Fully compliant with British Standards and WRAS approvals;
- Pressure ranges from 0.03 bar to 100 bar;
- Customer support incorporating project analysis, product selection and technical application;
- Efficiencies in pipeline operation, including
  - Energy savings
  - Improving asset life
  - Reduction in leakage
  - Maximising pipeline performance
  - Ongoing product development
An innovative design with a large air gap between liquid and sealing system ensures top performance, even when used with an impure or particularly aggressive medium.

The valve combines large volume air discharge/intake whilst filling/drainage a pipeline, with automatic release of air/gas liberated from the fluid.

Other design features and benefits
- Funnel-shaped lower body prevents accumulation of deposits at the bottom of the valve.
- Spring between the stem and upper float compensates for slight pressure changes in the line and maintains the air gap.
- Large orifice in the automatic valve releases large volume of air or gas when the line is under pressure.
- Lightweight construction offers easy handling.
- Drain in the valve’s side gives possibility of drainage and flushing from external clean water source.
- Stainless steel and polypropylene float system provides high corrosion resistance.
- Threaded opening on top of air valve enables mounting of exhaust pipe.

During the charging of the line, air is released at a high flow rate through the orifice of the kinetic valve until the line is full.

During normal operation the kinetic orifice remains closed, and the automatic orifice releases trapped air in the line.

* The spring prevents unnecessary opening of the automatic valve, thus the water level will not rise up to the sealing system and discharge into the open.

During emptying of the line, the kinetic orifice admits air at a high flow rate to prevent vacuum damage to the system.
Freely dissolved air exists in all fluid transmission systems.

The principal sources for this air are:

1. Incomplete filling of the line - which leaves air pockets in high places and in different accessories.
2. Air dissolved in the fluid that is released when the pressure drops and/or there is a rise in temperature.
3. Vortexes in the fluid, at the points where it is pumped, introduce air into the system.
4. Air is sucked into the system through openings and accessories.

The lack of control over the air present in a fluid system can result in damage:

1. If destructive vacuum conditions are created.
2. The presence of air can have a detrimental effect on system drainage efficiency.
3. Reduced air pockets in the system cross sectional area, higher energy losses, tremors in the systems and in extreme conditions; the entire stoppage of flow.
4. High pressure surge.
5. Metal parts in the system and system accessories corrode at higher rate.
7. Physical risk - when large volumes of air under pressure are released at high velocities.
8. Inaccuracies in the measurement of fluid volumes.
10. Cavitation damage.

Control of air in potable water systems using air valves supplied by AVK UK

There are many types of air valves installed in potable water supply systems: air and vacuum, automatic air release and combination (double) valves.

Air and Vacuum valves discharge large quantities of air from non-pressurised pipes and are used mainly when filling a line. Air and vacuum valves also make it possible to admit large quantities of air when lines are drained and when the pressure drops suddenly. Air and vacuum valves are also known as: kinetic valves, large orifice air valves, vacuum breakers, low pressure air valves and air relief valves.

Automatic air release valves continuously release relatively small quantities of air from a pressurized line. The automatic air release valve is also known as a small orifice air valve and as a pressure air valve.

Combination air valves fulfil the tasks required of both types of valve - air and vacuum and automatic. They discharge or intake large volumes of air when filling or emptying a system and continuously release small volumes of air when the line is pressurised.

Combination air valves are also known as double orifice air valves, double acting or dual orifice.
## Water Air Valves

<table>
<thead>
<tr>
<th>Series Number</th>
<th>Description</th>
<th>Application</th>
<th>Main Features</th>
<th>Main Options</th>
<th>Size</th>
<th>Max Working Pressure</th>
<th>Temperature Range</th>
<th>Body Material</th>
<th>Applicable Standards</th>
<th>Product Picture</th>
</tr>
</thead>
<tbody>
<tr>
<td>701/10</td>
<td>AVK Composite Material Automatic Air Relief Valve, PN16</td>
<td>For use with potable and filtered water</td>
<td>• Air release capability 10 times greater than a conventional valve</td>
<td>• 50 and 80mm NP 16 mounting flange</td>
<td>½&quot; ¾&quot; 1&quot; inlet</td>
<td>16 Bar</td>
<td>-10°C to +70°C</td>
<td>Grey Cast Iron</td>
<td>BS EN 1561 GJL-HB-195</td>
<td>![Image 1]</td>
</tr>
<tr>
<td>701/13</td>
<td>AVK Cast Iron Body Automatic Air Relief Valve, PN16</td>
<td>For use with potable and filtered water</td>
<td>• Air release capability 10 times greater than a conventional valve</td>
<td>• 50 and 80mm NP 16 mounting flange</td>
<td>½&quot; ¾&quot; 1&quot; inlet</td>
<td>16 Bar</td>
<td>-10°C to +70°C</td>
<td>WRAS Approved</td>
<td>![Image 2]</td>
<td></td>
</tr>
<tr>
<td>701/30</td>
<td>AVK Large Single Orifice Air Relief Valve, PN16</td>
<td>For use with potable and filtered water</td>
<td>• Releases large volumes of air from pipelines up to 0.9 bar</td>
<td>• Butterfly isolating valve 2&quot; - 6&quot; sizes</td>
<td>DN50-300mm</td>
<td>16 Bar</td>
<td>-10°C to +70°C</td>
<td>WRAS Approved</td>
<td>![Image 3]</td>
<td></td>
</tr>
</tbody>
</table>
# Water Air Valves

## 701/40
AVK Double Orifice Composite Material Air Relief, PN16

- For use with potable and filtered water
- Large orifice will discharge air to over 1 bar pipeline pressure
- Small orifice 10 times more efficient
- Suitable for pipelines up to and including 350mm
- Reinforced nylon body
- DN 1/2", 3/4", 1" & 2"
- 50 or 80mm NP 16 mounting flange
- Isolating stainless steel ball valve
- Vented non-return valve (DN2" only)
- Cast iron body
- Low pressure 0.1 bar sealing
- Options 3/4" BSP inlet nipple
- VNR available on all sizes
- ½" - 2" inlet
- 16 Bar
- -10°C to +70°C
- Reinforced Nylon
- WRAS Approved

## 701/50
AVK Double Orifice Air Relief Valve, PN16

- For use with potable and filtered water
- Releases large volumes of air from pipelines up to 0.9 bar
- Discharge from the small orifice is 10 times greater than from conventional units
- Lightweight design
- Corrosion resistant construction
- Butterfly isolating valve 2-6" sizes
- Gate valve isolating 8" - 12"
- Bevel gearbox
- Test point
- Ductile iron small orifice
- PN25 & PN40 versions
- Vented non-return valves
- Low pressure 0.12 bar and 0.03 bar sealing
- DN50-300mm
- 16 Bar
- -10°C to +70°C
- Ductile Iron
- BS EN 1561 GJL-HB-195
- WRAS Approved

## 701/60
AVK Combination Air Valve for High Flow Non Slam

- For use with potable and filtered water
- Working pressure range 0.2-16 bar
- Test pressure for the air valve is 1.5 times its working pressure
- Aerodynamic design enables high in flow rates and controlled outflow rates of air
- Discharge from the small orifice is 10 times greater than from conventional units
- Corrosion resistant construction
- Non slam facility
- Butterfly Isolating valve
- Isolating gate valve
- Bevel Gearbox
- PN25 and PN40 available
- DN25-250mm
- 16 Bar
- -10°C to +60°C
- Ductile Iron
- ASTM A-536 60-40-18
- WRAS approved

## 701/84
AVK Combination Air Valve Underground Chamber

- For use with potable and filtered water
- Working pressure range 0.2-16 bar
- Test pressure for the air valve is 1.5 times its working pressure
- Integral isolation valve
- Suitable for pipelines up to and including DN350
- Reinforced nylon body, PVC chamber
- 0.1 bar low pressure
- Variable lengths: 500, 755, 1055, 1305, 1555, 1830, 2135 and 2440mm
- "non-slam" system
- Underground valve for aggressive media
- External/internal freezing protection
- DN50-100
- 16 Bar
- -10°C to +90°C
- Reinforced Nylon
- WRAS approved
## Waste Water Air Valves

<table>
<thead>
<tr>
<th>Series Number</th>
<th>Description</th>
<th>Application</th>
<th>Main Features</th>
<th>Main Options</th>
<th>Max Working Pressure</th>
<th>Temperature Range</th>
<th>Body Material</th>
<th>Applicable Standards</th>
<th>Product Picture</th>
</tr>
</thead>
<tbody>
<tr>
<td>701/70</td>
<td>AVK Combination Air Relief Valve, PN16</td>
<td>For use with waste water, raw water, brine and sludge</td>
<td>• Only 17kg in weight</td>
<td>• Isolating gate valve</td>
<td>16 Bar. (1.6 mpa)</td>
<td>-10°C to+70°C</td>
<td>Cast Aluminium LM6</td>
<td>BS EN 1092-2: 1997</td>
<td>![Product Picture](AVK Combination Air Relief Valve)</td>
</tr>
<tr>
<td>701/73</td>
<td>AVK Automatic Air Relief Valve, PN16</td>
<td>For use with waste water, raw water, brine and sludge</td>
<td>• Only 17kg in weight</td>
<td>• Isolating gate valve</td>
<td>16 Bar. (1.6 mpa)</td>
<td>-10°C to+70°C</td>
<td>Cast Aluminium LM6</td>
<td>BS EN 1092-2: 1997</td>
<td>![Product Picture](AVK Automatic Air Relief Valve)</td>
</tr>
<tr>
<td>701/74</td>
<td>AVK Squat Combination Air Relief Valve, PN16</td>
<td>For use with sewage, raw water, brine and sludge</td>
<td>• Only 10kg in weight</td>
<td>• Isolating gate valve</td>
<td>16 Bar. (1.6 mpa)</td>
<td>-10°C to+70°C</td>
<td>Cast Aluminium LM6</td>
<td>BS EN 1092-2: 1997</td>
<td>![Product Picture](AVK Squat Combination Air Relief Valve)</td>
</tr>
</tbody>
</table>
# Waste Water Air Valves

## 701/75
**Squat Combination Air Relief Valve**
- For use with waste water, raw water, brine and sludge
- Under 6kg in weight
- VN body & flange
- Large orifice will discharge air from pipelines to over 1 bar
- Highly corrosive resistant
- Minimal height for installation
- Isolating gate valve
- Bevel gearbox
- DZR brass ball drain valve
- Vented non-return valve
- 0.1 bar option
- Threaded Inlets VNR

- **DN50-100**
- **10 Bar**
- **-10°C to +60°C**
- Reinforced Nylon
- BS EN 1092-2

## 701/78
**High Performance Combination Air Relief Valve**
- For use with waste water, raw water, brine and sludge
- Small orifice discharge 10 times greater than from conventional turns
- Reduction in hammer and surge in systems
- Highly corrosive resistant
- Minimal height for installation
- Isolating gate valve
- Bevel gearbox
- Vented non-return valve
- Stainless Steel body
- 0.1 Bar sealing pressure

- **DN80-200**
- **16 Bar**
- **-10°C to +60°C**
- Epoxy coated steel
- ASTM A-536-60-40-18

## 701/79
**Underground Air Valve System for waste water**
- For use with waste water, raw water, brine and sludge
- Small orifice discharge 10 times greater than from conventional turns
- Reduction in hammer and surge in systems
- Highly corrosive resistant
- Integral isolating valve
- No chamber entry required
- Quick installation
- Vented non-return valve
- Stainless Steel body
- 0.1 Bar sealing pressure
- 16 Bar versions available
- High performance version
- Variable heights: 970 & 1170mm

- **DN80**
- **10 Bar**
- **-10°C to +60°C**
- Reinforced Nylon

---

**Series Number**

**Description**

**Application**

**Main Features**

**Main Options**

**Size**

**Max Working Pressure**

**Temperature Range**

**Body Material**

**Applicable Standards**

**Product Picture**
AIR RELEASE FLOW CHARTS - WATER VALVES

701/13  701/10

AUTOMATIC AIR RELEASE FLOW RATE

701/30

AIR & VACUUM FLOW RATE

701/40

AUTOMATIC AIR RELEASE FLOW RATE

NOTE: All charts provided by courtesy of A.R.I. Flow Control Accessories
AIR RELEASE FLOW CHARTS - WATER VALVES

NOTE: All charts provided by courtesy of A.R.I. Flow Control Accessories
AIR RELEASE FLOW CHARTS - WASTE WATER VALVES

**701/70**

**AIR & VACUUM FLOW RATE**

<table>
<thead>
<tr>
<th>Differential Pressure [Bar]</th>
</tr>
</thead>
<tbody>
<tr>
<td>-0.4</td>
</tr>
<tr>
<td>-0.2</td>
</tr>
<tr>
<td>0</td>
</tr>
<tr>
<td>0.2</td>
</tr>
<tr>
<td>0.4</td>
</tr>
<tr>
<td>0.6</td>
</tr>
<tr>
<td>0.8</td>
</tr>
<tr>
<td>1.0</td>
</tr>
</tbody>
</table>

-200 -100 0 100 200 300

Flow Rate [m³/h]

**AUTOMATIC AIR RELEASE FLOW RATE**

<table>
<thead>
<tr>
<th>Differential Pressure [Bar]</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
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<tr>
<td>4</td>
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<tr>
<td>5</td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td>7</td>
</tr>
</tbody>
</table>

0 10 20 30 40 50 60

Flow Rate [m³/h]

**701/73**

**AUTOMATIC AIR RELEASE FLOW RATE**

<table>
<thead>
<tr>
<th>Differential Pressure [Bar]</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
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<tr>
<td>3</td>
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<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>6</td>
</tr>
</tbody>
</table>

0 10 20 30 40 50 60

Flow Rate [m³/h]

NOTE: All charts provided by courtesy of A.R.I. Flow Control Accessories.
AIR RELEASE FLOW CHARTS - WASTE WATER VALVES

NOTE: All charts provided by courtesy of A.R.I. Flow Control Accessories
ASSOCIATED AVK PRODUCTS

Series 21
Resilient Seated Gate Valves
Cap Top Operation, Ductile Iron, EPDM Rubber Wedge, PN16, Epoxy Coated
DN50-600mm

Series 37
Metal Faced Gate Valves
Cap Top Operation, Ductile Iron, Metal Faced, PN16, Epoxy Coated
DN50-300mm

Series 41 & 641
Recoil Check Valves
Metal Faced or Resilient Seated, Ductile or Cast Iron
DN50 - 1600mm

Series 75 & 756
Butterfly Valves
Various Materials and Connections
DN50 - 2200mm

Series 600
Flange Adaptors and Couplings
Ductile Iron Construction, EPDM Gaskets, Epoxy Coating, PN16
DN32 - 400mm

Series 265
Dismantling Joint
Mild Steel Construction, EPDM Gaskets, PN10/16
DN50 - 600mm

Series 712
Ductile Iron Flanged Fittings
BS EN545, PN10/16, Epoxy Coating, Various Fittings
DN50 - 600mm

Series 702
Knife Gate Valve
Non-rising Stem and Handwheel, Grey Cast Iron, Epoxy Coating, Flange drilling options available
DN50 - 1000mm
The following pages give guidance to the operational requirements of air valves and allows the user to select, size and locate the most efficient air valve design for the application.

1. **Functions you wish to be achieved by the air valves in this project:**
   a. Fill rate analysis: Discharging air when the system is under pressure and when filling the line (minimum requirement – always included).
   b. Burst analysis: Air intake into the system for vacuum protection at full diameter pipe bursts, when water drains in full diameter free flow (unrealistic - not recommended). Uses the Hazen Williams Equation to determine required air intake capacity, equal to full diameter free water flow at possible full diameter, unrestricted (above ground) pipe burst.
   c. Drainage analysis: Air intake into the system for vacuum protection at pipe drainage through drain valves of known size.
   d. Virtual drainage analysis: Air intake into the system for vacuum protection at partial pipe breaks, up to a defined size (diameter). (The diameters of partial breaks represented by virtual drain valves is defined by percentage of the pipe's diameter).
   e. Water column separation: Air intake into the system during water column separation (at sudden pump trips, sudden isolating valve closure etc.).

Function (a) is assumed to always be required and its analysis is always activated by ARlavCAD. A number of functions are most likely to be desired in a single project.

2. Longitudinal pipe profile tables in excel or line profile drawings in AutoCAD always required.
3. In AutoCAD profiles, the line representing the pipeline must be a continuous Polyline for the full pipeline section to be analyzed. The Polyline should be drawn in the direction of flow (first the pump or reservoir, etc., then the following segments of the pipeline, in order, from upstream to down-stream), but if not, this should be made known before analysis is run. Flow can be from left to right, or from right to left, but, direction must be indicated. If not indicated, we assume flow from left to right. Distance and elevation values must appear in the bottom and side of the profile plot (numbers, not just lines).
4. Excel pipeline profiles must include a Distance column (accumulated distance or sectional distance – for location) and an Elevation column. A Station ID column is needed for identifying the different stations along the pipeline, but if this item is not included in the submitted data, a local station ID can be created.
5. Fluid type must be stated to allow correct air valve type (Water – clear liquid, or Wastewater – liquid with suspended particles and/or aggressive elements)
6. Initial working pressure or head at the pipe segment's first station/beginning (a must). If there are pressure increases or reductions along the line (not including frictional head losses), booster pumps and pressure release valves, for instance, they should also be given.
7. Initial flowrate (a must). If there are flowrate increases or reductions along the pipeline, connections to other supply or distribution lines, for instance, they should be included.
8. Pipe size for every section of the line (a must).
9. Pipe material for every section of the line (a must). For a more exact analysis, the Hazen-Williams coefficient and the Celerity (pressure wave velocity), of each pipe section, could be included.
10. Filling velocity (not a must for multi-purpose analyses, is a must for fill rate analysis only).
11. Maximum air valve spacing. It is usually recommended to limit air valve spacing to no more than 500-750mtr. For larger diameter pipes, DN250 and higher, it is recommended to limit spacing to less than that.
12. Manifold size preference (if preference for fewer air valves in a single location/installation (manifold), please advise.
13. Air valve material preference (epoxy coated cast or ductile iron, re-inforced epoxy coated steel, reinforced nylon, stainless steel);
*In what form is the pipe profile submitted*  
Excel table spreadsheet  
AutoCAD Polyline profile drawing  

*Liquid type*  
Clear water  
Wastewater (solids or aggressive elements)  

Pipe filling velocity (including units, default 1.5 ft/s)  

Preferred maximum spacing between air valves (including units, default 500 m.)  

Preferred air valve body material (default stainless steel for wastewater)  

Should manifolds (multiple air valve in a single installation) be avoided if possible?  
Yes  
No  

**Pipeline section data** (section starting point must be described – pump station, reservoir, elevated reservoir, middle of the pipeline, etc)  

**Section:** If there are no changes in pipe material, pipe diameter, and/or flow rate, and there are no booster pumps along the line, the whole project is one pipe section. Different sections are determined by pipe characteristics, flow changes and pressure enhancement. Most pipelines analyzed consist of only one section.  

<table>
<thead>
<tr>
<th>From station</th>
<th>To station</th>
<th>Pipe diameter (including units)</th>
<th>Pipe material *</th>
<th>Flow rate (including units) *</th>
<th>Pressure or head at the beginning of the section (including units) *</th>
<th>Pressure wave velocity (celerity) (not a must)</th>
<th>Hazen Williams coefficient not a must</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

**For AutoCAD profiles** (Profile plots must include elevations on the x-axis and distance on the y-axis)  

The line representing the pipeline must be a continuous (all line sections connected) polyline.  

*Flow direction*  
Left to right (default)  
Right to left  

*Line drawing direction*  
Left to right (default)  
Right to left
For Excel profile tables  *(Profile table must include, at least, a distance column and an elevation column)*

<table>
<thead>
<tr>
<th>Flow direction in the table</th>
<th>From top to bottom (default)</th>
<th>From bottom to top</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**Analysis preferences in addition to fill rate analysis** *(can be more than one)*

<table>
<thead>
<tr>
<th>Analysis type</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real Drainage analysis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(drainage valve locations and sizes required)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Virtual Drainage analysis (default)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Virtual drain size relative to pipe diameter (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(default-33%, higher value not recommended)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Burst analysis (not recommended)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percentage of calculated air intake requirement (because burst calculation is very extreme)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water column separation (recommended)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Analysis type to be determined by A.R.I.</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

**Comments, special requests, special explanations, etc:**

________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
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________________________________________________________________________________________
________________________________________________________________________________________

*All items marked with the red star must be entered for us to perform analysis*