

Project

Modify

Preview

Run Solver

Results

Diagnostics

Exit

FLOW-3D[®]

Excellence in Flow Modeling Software

FLOW SCIENCE

软件界面

Version 8.2

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Project

Modify

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Exit

- New
- Open
- Examples
- Save
- Save as...
- Cleanup

新建一个分析项目

新建一个分析项目

打开一个已有的项目



Global Physics Props Meshing & Geometry Boundaries Initial Output Numerics

Finish Time

Restart

分析结束条件

Finish Condition

- Finish Time
- Fill Fraction
- Solidified Fluid Fraction

Finish Fraction

Interface Tracking

- Free Surface or Sharp Interface
- No Sharp Interface

Number of Fluids

- One Fluid
- Two Fluids

Flow Mode

- Incompressible
- Compressible
- Steady State Accelerator
(Non-Physical Transients)

Mentor Options

- No Mentor Help
- Offer Suggestions
- Offer Suggestions and
Take Action

充填率100%，完全充满

Notes

Title

This is a sample input file

设置分析结束条件

Save As...

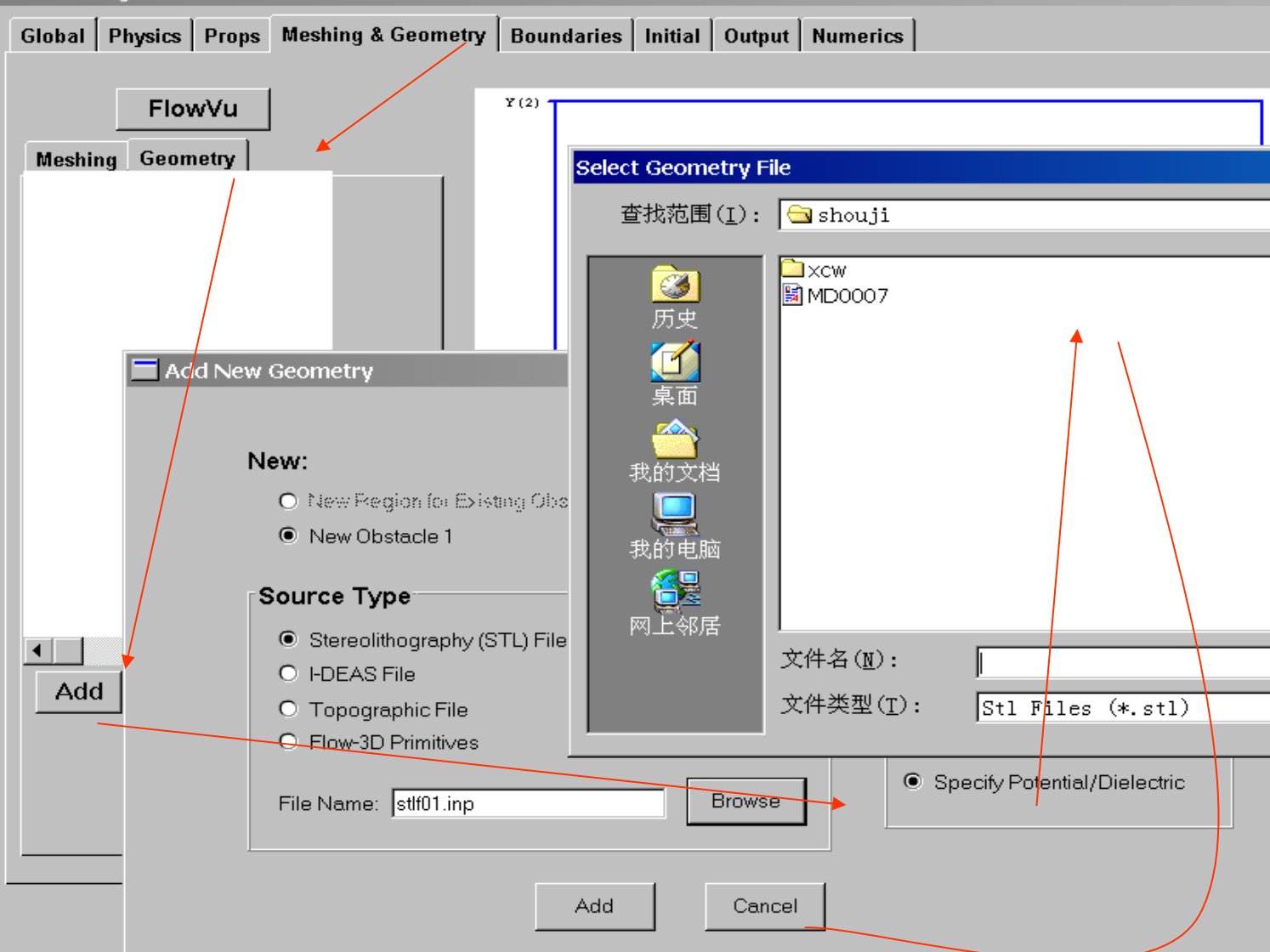
Save

Ok

Cancel

Edit File

Help



导入STL模型，方式：mesh—geometry—add—browse—选择STL文件—OK—ADD跳出另外界面，如下：

Region 1 Obstacle 1

Region Transformations

Region Magnification	<input type="text" value="0.1"/>				
X Magnification	<input type="text"/>	X Rotation	<input type="text"/>	X Translation	<input type="text"/>
Y Magnification	<input type="text"/>	Y Rotation	<input type="text"/>	Y Translation	<input type="text"/>
Z Magnification	<input type="text"/>	Z Rotation	<input type="text"/>	Z Translation	<input type="text"/>

设置转换比例，一般产品单位为MM，此处转为cm

Region Limiters

X Low	<input type="text"/>	X High	<input type="text"/>	Cylinder Inner Radius	<input type="text"/>
Y Low	<input type="text"/>	Y High	<input type="text"/>	Cylinder Outer Radius	<input type="text"/>
Z Low	<input type="text"/>	Z High	<input type="text"/>	Sphere Inner Radius	<input type="text"/>
				Sphere Outer Radius	<input type="text"/>

Solid Hole Complement

此处设为可充填型腔

FlowVu

Y (2)

Solids Database

Obstacle 1

carbon steel at 1473 K		CGS
CB Furan Molding Sand (Fine) 1773 K		SI
CB Furan Molding Sand (Fine) 773 K		SI
CB Shell Sand - Mold (Coarse) 1773 K		SI
CB Shell Sand - Mold (Coarse) 773 K		SI
CB Urethane Molding Sand (Coarse) 1773 K		SI
CB Urethane Molding Sand (Coarse) 773 K		SI
generic silica sand at 1000 K		CGS
High Pressure Molding Green Sand, 1773 K		SI
High Pressure Molding Green Sand, 773 K		SI

Load

Edit

Add

Display

Delete

Close

Add Solids Database

加入模壁材料：solids database—load—ok—选择CGS单位。

做压铸分析好像就碳钢一种材料，其他都是砂型铸造用。谁手中有更多材料库的，可以分享么？

黏性

模壁切应力

Viscosity

Wall Shear

Particles

能量方程

重力方向

Energy Equation

Gravity

Surface Tension

Shallow Water

Drift-Flux

Cavitation

卷气设置

Density Evaluation

Porous Media

Bubble Models

缺陷设置

Defect Tracking

Thermal Die Cycling

Solidification

Scalars

Electro-mechanics

Compressibility

Sediment Scour

Sand Core Blowing

Non-Inertial RF

Elastic Stress

Viscosity Options



Inviscid Flow

Viscous Flow

Laminar

紊流模型

Turbulence Models

Prandtl Mixing Length

Turbulent Energy Model

Two-Equation (k-e) Turbulence Model

Renormalized Group (RNG) Model

Large Eddy Simulation Model

Advanced Viscosity

OK

Cancel

Viscosity

Energy Equation

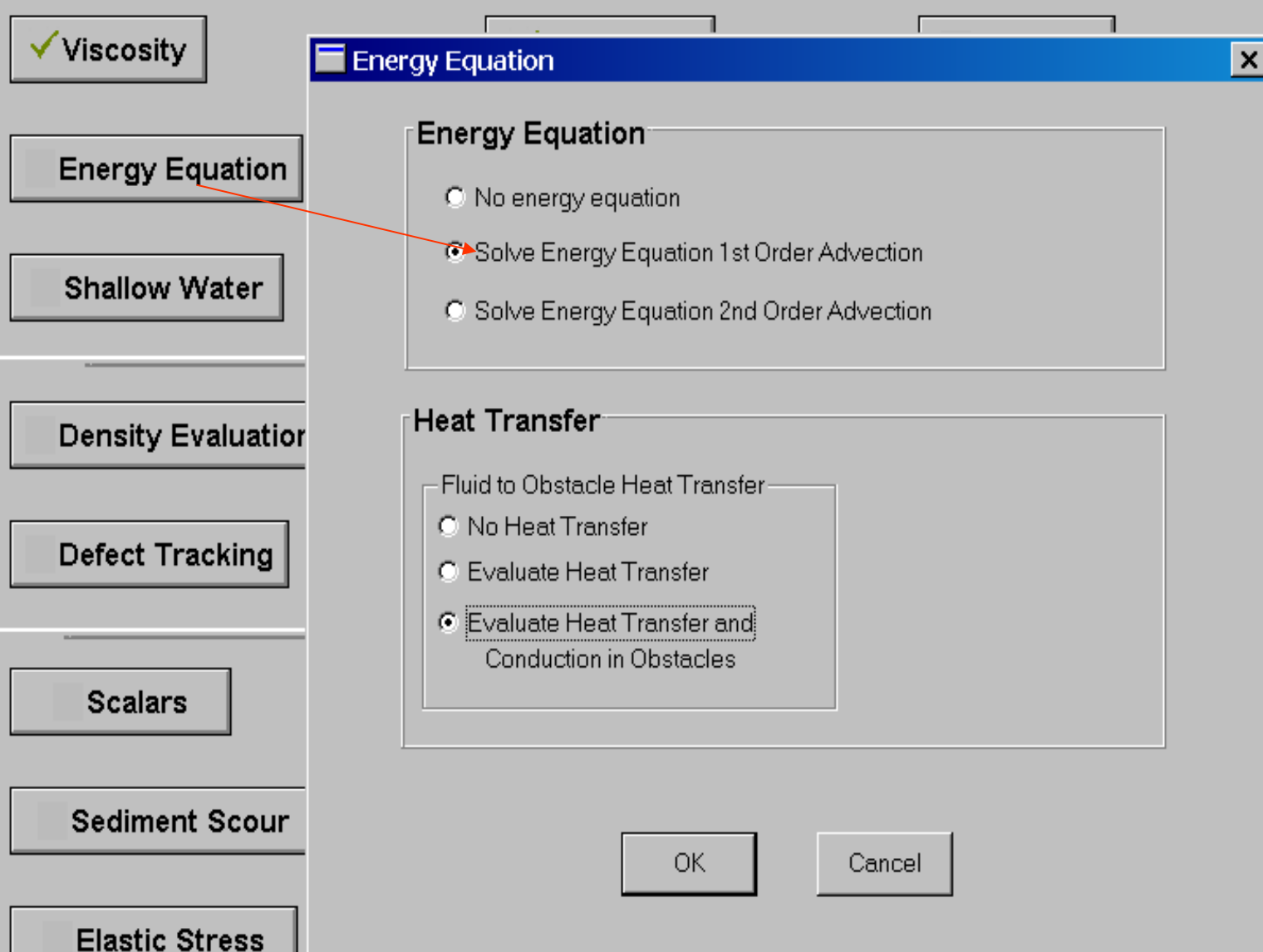
Shallow Water

Density Evaluati

Defect Tracking

Scalars

Sediment Scou



能量方程设置，考虑熔汤与模壁之间的热传导

Gravity

Surface Tension

Gravitational Acceleration

Gravity Component in the X-direction

Gravity Component in the Y-direction

Gravity Component in the Z-direction

OK

Cancel

设置重力的方向，根据实际压铸的入水口方向来确定重力方向，单位CGS

Shallow Water

Density Evaluation

✓ Defect Tracking

Scalars

Sediment Scour

Elastic Stress

Save A

Defect Tracking Options [X]

Activate Defect Tracking

Defect Tracking Options

Free Surface Defects
Free Surface Defect Generation Rate

Lost Foam Defects
Foam Surface Defect Generation Rate

Activate Mold Wall Defects
Mold Wall Defect Generation Rate

OK Cancel

设置缺陷产生的速率

Fluids Database

0.2% Carbon steel, (AISI 1026)	CGS
1% Cr Steel	SI
1.2% Carbon Steel	SI
1.5% Manganese Steel	SI
2% Si Steel	SI
60 Cu-40 Ni	SI
60 Cu-40 Zn	SI
70 Cu-30 Ni	SI
70 Cu-30 Zn	SI
85 Al-15 Cu	SI
86 Al-14 Mg	SI
90 Cu-10 Al	SI
Air at 15 degrees C	CGS

Fluid 1

Load Edit Add Display

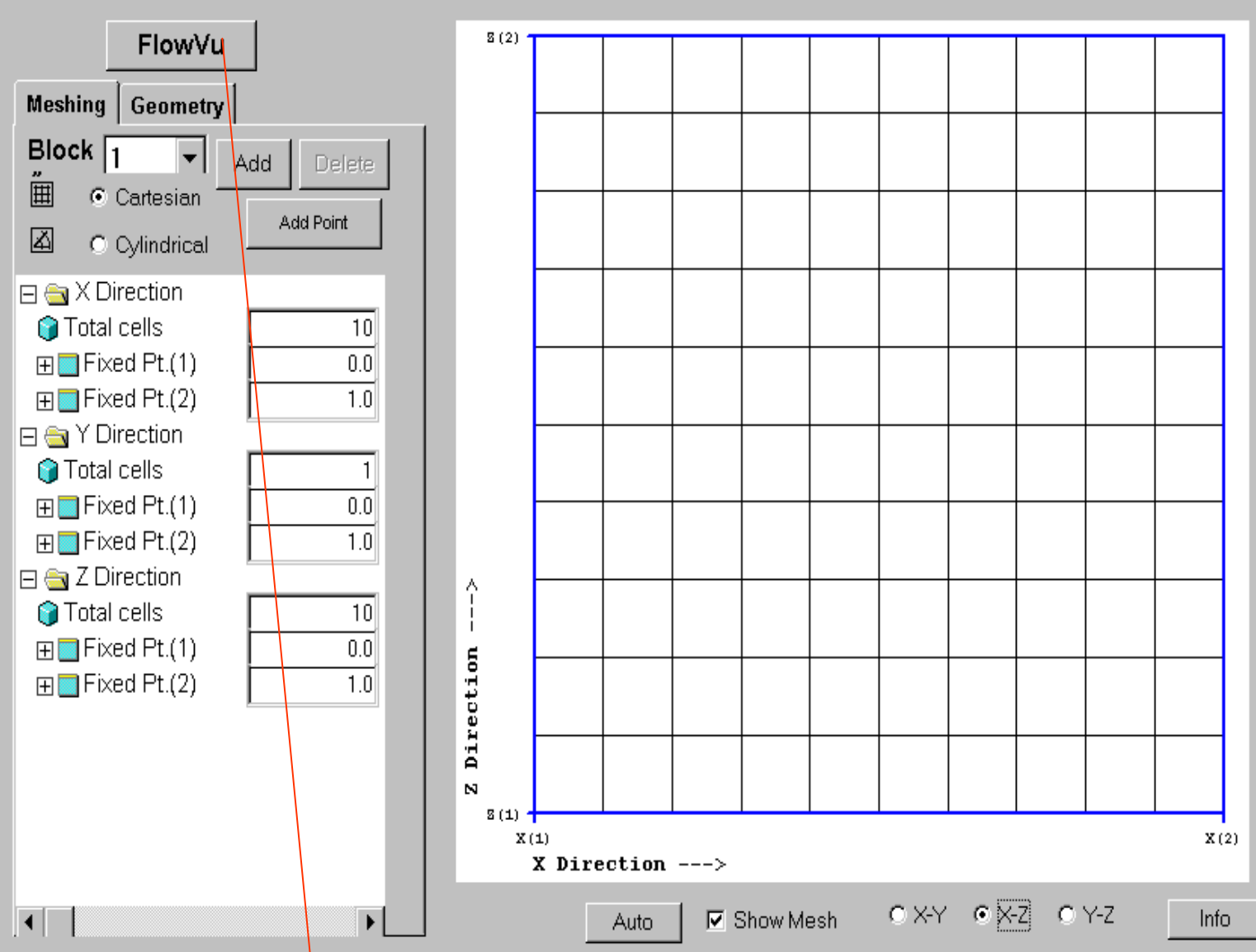
Fluid 2

Load

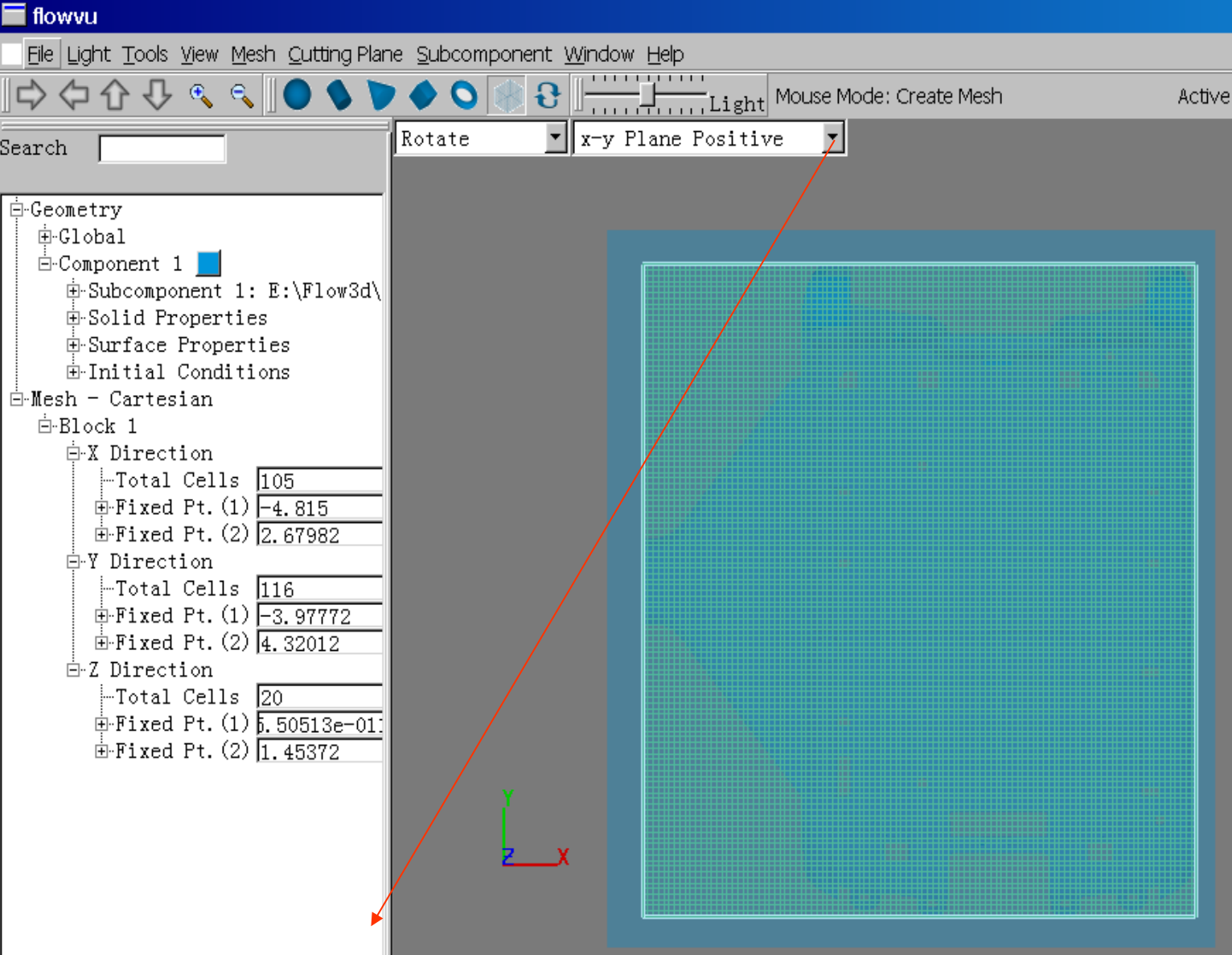
Delete Close

Units: CGS Units Name Fluids Database

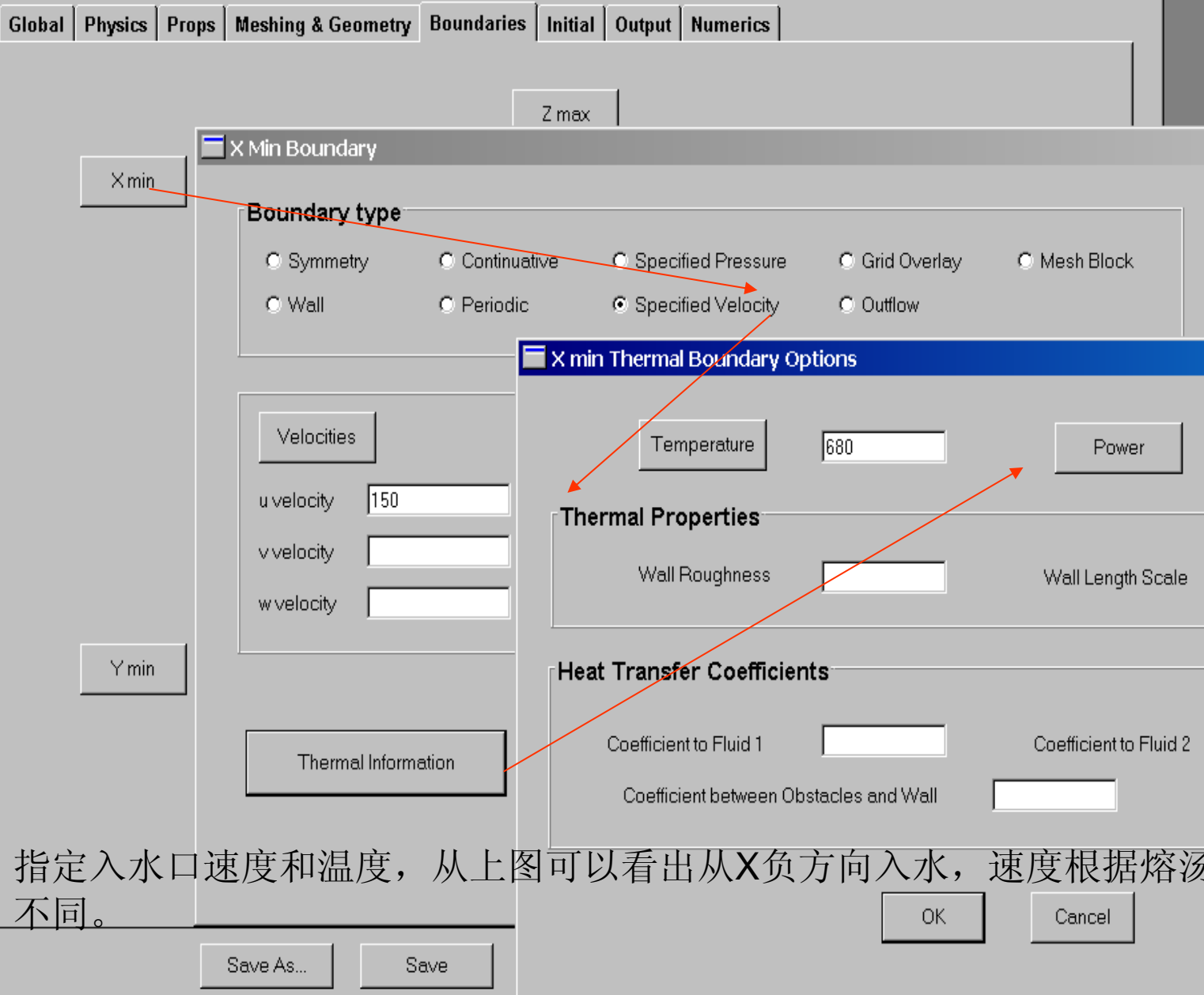
加入熔汤的材质，铝合金或者镁合金等。注意单位为CGS



点击flowVu进入网格划分界面，如下：



将模型转为xy平面显示，在图形区画出图示矩形框包围产品，然后弹出网格总数输入框，输入总数即可自动划分网格，删除block1即可。



指定入水口速度和温度，从上图可以看出从X负方向入水，速度根据熔汤种类而不同。

Fluid Initial State

U velocity

V velocity

W velocity

Temperature

Turbulent k.e.

Fluid rotation

Electric Field

Initial Solute

Initial Pressure Field

Uniform Pressure

Hydrostatic pressure in x-direction

Hydrostatic pressure in y-direction

Hydrostatic pressure in z-direction

Volume

Height
(z direction is vertical)

Volume

Void Initial State

Pressure

Temperature

熔汤初始温度和速度

大气压强

Plot Output Controls

Restart Data

Restart Data

Time Interval

History Data

History Data

Time Interval

Solidification Data

Time Interval

Fractional Data

Fraction Interval

Do Not Write Initial State

Fill Time

Record First Fill Time

Record Last Fill Time

Selected Data

Fluid Fraction
Pressure
Fluid Velocities
Fluid Temperature
Wall Temperature
Dynamic Viscosity
Density
Heat Flow Rate
Internal Energy
Mass Source Rate
Phantom Obstacle Volume Fraction
Particle Information
Drag Function

Selected Data

Time Interval

Estimated Results File Size: 85.84 Kb

Record Residence Time

Basis for Output

Time

Fill Fraction

Solidified Fraction

File Control

Delete Startup File after it is Read by the Solver

Delete Restart Startup File after it is Read by the Solver

Print Output Controls

Short Prints

Short Prints

Time Interval

Long Prints

Long Prints

Time Interval

Fractional Prints

Fraction Interval

Debug Level

Minimal

Standard

Expanded

Maximum

输出时间步距

以充填百分比为输出基准

Time Step Size

Initial Time Step

Minimum Time Step

Maximum Time Step

Pressure Iterations

SOR

Line Implicit

X-direction

Y-direction

Z-direction

Convergence Adjustment

1.0

Implicit Options

Viscous Stress Evaluation

- Explicit
- Jacobi Implicit
- ADI

Heat Transfer

- Explicit
- Implicit

Shallow Water Options

- Explicit Pressure Calculation
- Implicit Pressure Calculation

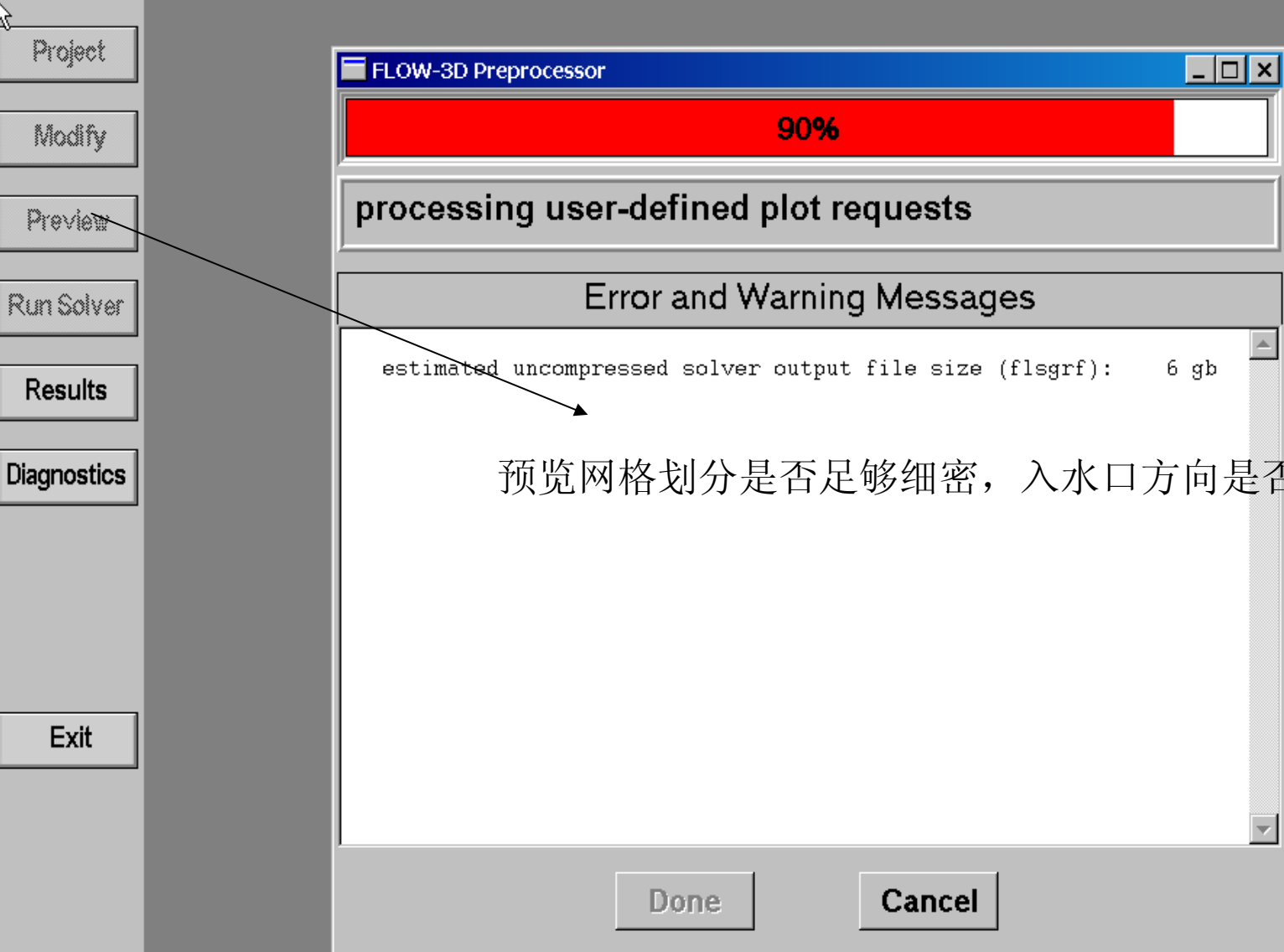
Momentum Advection

- First Order
- Second Order
- Monotonicity Preserving Second Order

Fluid Flow Solver Options

- Solve All Fluid Transport Equations
- Assume Constant Velocity Field
- Assume Zero Velocity Field
- Solve Conduction and Heat Transfer in Obstacles Only

收敛级数，对计算时间，分析结果都有影响



预览网格划分是否足够细密，入水口方向是否正确，

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FLOW-3D Solver

Messages Restart Times Status Spatial Data History Data Run post Terminate

stability limit & dt
 stability limit & dt
 time step size
 epsi & max. residual
 iteration count
 fill fraction
 volume error (%)
 volume of fluid 1
 fluid 1 surface area
 mean kinetic energy
 fluid thermal energy

6% Done

0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00

0.00E+00 5.00E-01 1.00E+00

restart and spatial data available at t= 0.000000E+00

 t cycle iter dtstbl/code delt vl epsi cpu clock
 --- ---- -

t	cycle	iter	dtstbl/code	delt	vl	epsi	cpu	clock
0.00E+00	0	0	3.30E-04/cz	1.00E-04	0.00E+00	-1.0E+00	1.2E+00	16:05

 restart and spatial data available at t= 2.36575E-03

 restart and spatial data available at t= 4.71905E-03

开始进行分析计算

