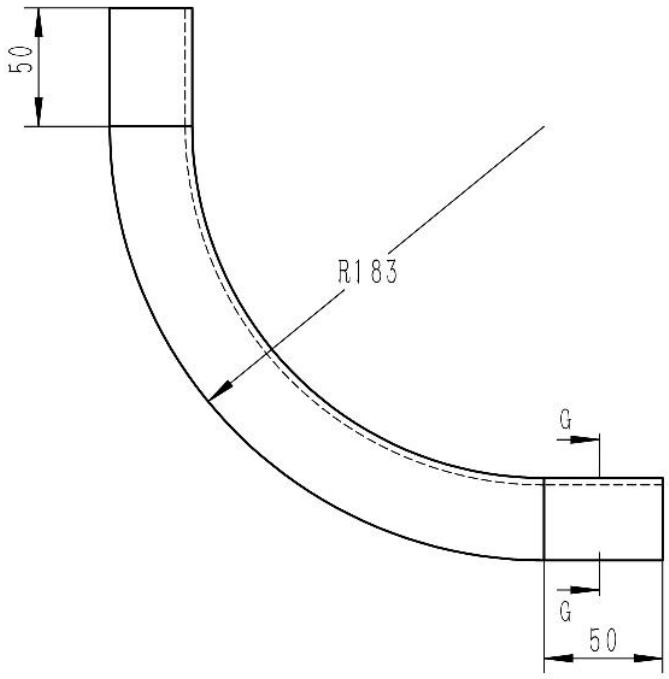
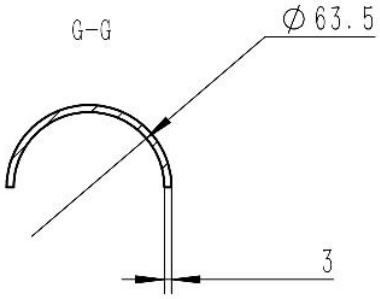
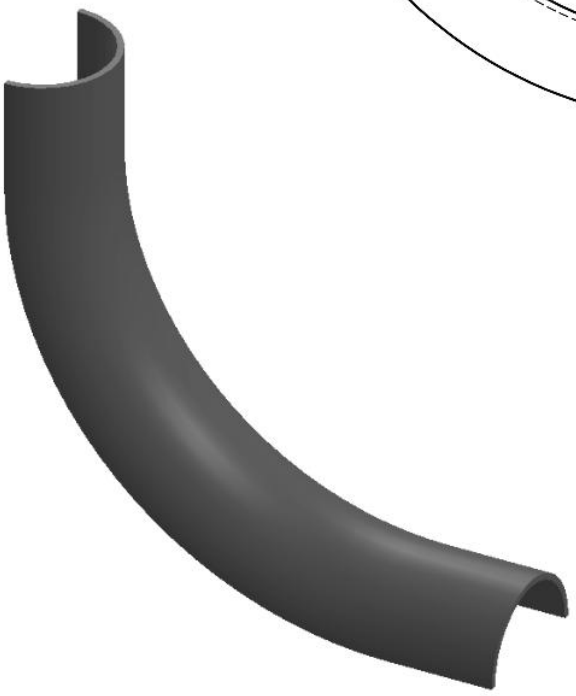
1Cr6Si2Mo Tube Shield

Medium Temperature Sulfur Resistant Heat Resistant Alloy Erosion Shield

1Cr6Si2Mo tube shield is a medium-temperature chromium-silicon-molybdenum martensitic heat resistant alloy anti-abrasion protective fitting, specially developed for coal-fired power plant, CFB circulating fluidized bed boiler tail heating surface.







Core Performance Advantages

1. Excellent sulfur flue corrosion resistance: Si + Cr compound elements form compact high-temperature anti-oxidation film, resist sulfur ash corrosion unique to coal-fired boiler tail flue
2. Stable medium temperature long-term operation: Continuous safe service under ≤600℃ flue temperature, no rapid strength attenuation or creep deformation
3. Economical raw material cost: Zero high-nickel composition, 40%~60% lower material cost compared with 309S stainless steel tube shield
4. Superior stamping & welding machinability: Low carbon base material greatly reduces cold crack risk during on-site repair welding after standard preheating treatment
5. Anti-fatigue vibration resistance: Molybdenum element inhibits matrix brittleness, adapt long-term alternating flue gas vibration of tube bundles
6. Full-size customizable: Support all mainstream boiler heat exchange tube outer diameters, custom plate thickness, length and arc radian per construction drawings
7. Complete matching system: Compatible with C/U snap rings, cast pipe clamps and full series boiler tube erosion shields to form integrated tube anti-wear protection solution

Material Chemical Composition & Classification

Standard Chemical Composition (GB/T 1221 Heat Resistant Steel Standard)

Element	Mass Fraction Range (%)	Core Material Function
C (Carbon)	≤0.15	Low carbon design to eliminate welding cold crack tendency
Si (Silicon)	1.5 ~ 2.0	Reinforce high temperature anti-oxidation & sulfur corrosion resistance
Cr (Chromium)	5.0 ~ 6.5	Form dense Cr_2O_3 protective layer against flue particle erosion
Mo (Molybdenum)	0.45 ~ 0.60	Improve high temperature creep strength, avoid permanent deformation
Mn (Manganese)	≤0.70	Deoxidize molten steel, stabilize internal impurity structure
S / P (Sulfur / Phosphorus)	≤0.03 / ≤0.035	Strict limit impurity to prevent grain boundary high-temperature brittleness

Standard Dimension Specifications

Mass stock semi-circular tube shields match conventional economizer heat exchange tubes; flat & wave fin plates support full drawing customization

Matched Boiler Tube OD (mm)	Alloy Plate Thickness (mm)	Shield Total Length Range (mm)	Common Structural Form
32 / 38 / 42	6 / 8	100 ~ 1200	Semi-circular single tube shield
51 / 57 / 60	8 / 10	150 ~ 1800	Semi-circular shield / Flat fin plate
76 / 89	10 / 12	200 ~ 2500	Wave shaped water wall baffle

Note: Ultra-thick plate, extra-long size and non-standard arc radian can be fully customized according to power plant boiler overhaul technical drawings.

Multi Boiler Shield Material Comparative Table

Material Grade	Material Category	Max Continuous Working Temp	Core Applicable Boiler Zone
Q235	Ordinary Carbon Steel	≤400℃	Low-temperature waste heat boiler light abrasion zone
1Cr13	Martensitic Stainless Steel	≤550℃	Mild abrasion low-temperature flue area
1Cr6Si2Mo	Cr-Si-Mo Heat Resistant Alloy (Non Stainless)	≤600℃	Economizer / Low Superheater sulfur-containing ash flue
309S	Austenitic Stainless Steel	≤850℃	Medium-high temperature superheater tube bundle
310S	Austenitic Stainless Steel	≤1050℃	Furnace arch dense phase high-temperature severe scouring zone

Select 1Cr6Si2Mo tube shield when flue operating temperature ⩽600℃ and medium contains sulfur ash particles, effectively control overall boiler maintenance project cost while guaranteeing anti-corrosion & anti-wear performance.

Complete Manufacturing Production Process

1. Raw Material Incoming Inspection: Spectral composition test for 1Cr6Si2Mo alloy plate, verify C/Si/Cr/Mo element compliance with GB/T 1221
2. CNC Blanking Cutting: Automatic plasma cutting according to customer specified size parameters
3. Hydraulic Stamping Forming: One-time bending molding for semi-circle / flat / wave structural blanks
4. Edge Deburring Polishing: Remove cutting sharp burrs to avoid scratch damage to boiler tube outer wall
5. Sand Blasting Treatment: Clean stamping surface high-temperature oxidation scale
6. Optional Anti-rust Coating: High-temperature anti-rust paint for long-term finished product stock storage
7. Full Dimensional Inspection: Calibrate arc radian, total length, plate thickness tolerance
8. High Temperature Aging Sampling Test: Simulate economizer flue working environment to verify long-term stability

Matching Supporting Boiler Anti-wear Components

Product Name	Core Function	Matching Application Scene
1Cr6Si2Mo Tube Shield	Semi-circular tube surface anti-abrasion protective cover	Economizer low-temperature heat exchange tube bundle
C / U Shaped Snap Rings	Small fastener for fixing single tube erosion shield	Small-diameter economizer tube bundle assembly
Cast Pipe Clamp	Heavy-duty saddle type fixing clamp	Large-size tube shield overall locking installation
Wave Water Wall Anti-wear Plate	Fin buffer anti-scour baffle	Water wall fin transition severe abrasion zone

Applicable Boiler Types & Installation Zones

Applicable Boiler Equipment

1. Coal-fired thermal power station boiler
2. Circulating Fluidized Bed (CFB) boiler
3. Biomass fuel combustion boiler
4. MSW waste incineration waste heat boiler
5. Chemical industrial waste heat furnace

Fixed Installation Flue Zones

- Horizontal / vertical boiler economizer tube bundle outer wall protection
- Low-temperature superheater flue abrasion reconstruction project
- Tail flue sulfur ash corrosion heating surface anti-wear renovation

Performance Contrast: 1Cr6Si2Mo VS 309S

Contrast Item	1Cr6Si2Mo Tube Shield	309S Stainless Steel Tube Shield
Max Continuous Service Temperature	≤600℃	≤850℃
Sulfur-containing Flue Corrosion Resistance	Excellent, special Si-Cr alloy formula	General, easy sulfide corrosion failure
Raw Material Procurement Cost	Low, no nickel alloy element	High, high nickel austenitic base material
Standard Boiler Application Scope	Economizer, low temperature superheater tail flue	High-temperature superheater, furnace outlet area
Long-term Project Comprehensive Operation Cost	Low initial investment, stable service life	High one-time purchase cost

On-site Welding, Installation & Maintenance Guide

Welding Mandatory Operation Standard

- Preheat alloy workpiece to 300~400℃ before welding operation
- Select matched dedicated heat resistant alloy welding rod
- Slow cooling treatment after welding to eliminate internal welding stress, prevent cold crack generation

Snap Ring Fixed Installation Steps

- Buckle semi-circular 1Cr6Si2Mo shield closely fit boiler tube outer surface
- Lock C / U shaped snap rings at both ends of shield
- Ensure tight clamping to avoid shield displacement under long-term flue gas impact

Daily Overhaul Maintenance Requirements

- Inspect shield wall thickness thinning degree and welding crack condition during annual boiler shutdown maintenance
- Replace severely abraded thin shields in advance to prevent heat exchange tube leakage accident
- Forbid violent hammer knocking during hoisting, avoid hidden stamping cracks on alloy plate body

Alloy Structural Design Optimization Points

1. Silicon-chromium composite alloy formula targeted for coal-fired boiler sulfur tail flue, solve premature thinning failure of ordinary carbon steel shields
2. Molybdenum element optimize high temperature creep resistance, no permanent deformation under long-term tube bundle alternating vibration
3. Low-carbon matrix greatly reduce on-site random repair welding crack risk, adapt boiler overhaul temporary cutting & modification construction
4. Three interchangeable structural forms (semi-circle / flat / wave) fully cover straight tubes and fin transition zones of all heating surfaces

Factory Full Inspection Quality Standards

1. Incoming alloy plate spectral element composition test
2. Stamping forming dimensional full tolerance inspection (arc, length, thickness)
3. Surface visual defect inspection: eliminate stamping cracks, cutting burrs, oxide pits
4. Sampling high temperature oxidation aging simulation test
5. Welding performance spot check, verify anti-crack capacity under standard preheating process
6. Surface anti-rust coating appearance inspection for stocked finished goods