

PRODUCT CATALOGUE

Round & Hex Bars

Free-Cutting & Engineering Steel

AVAILABLE GRADES

SAE 1018

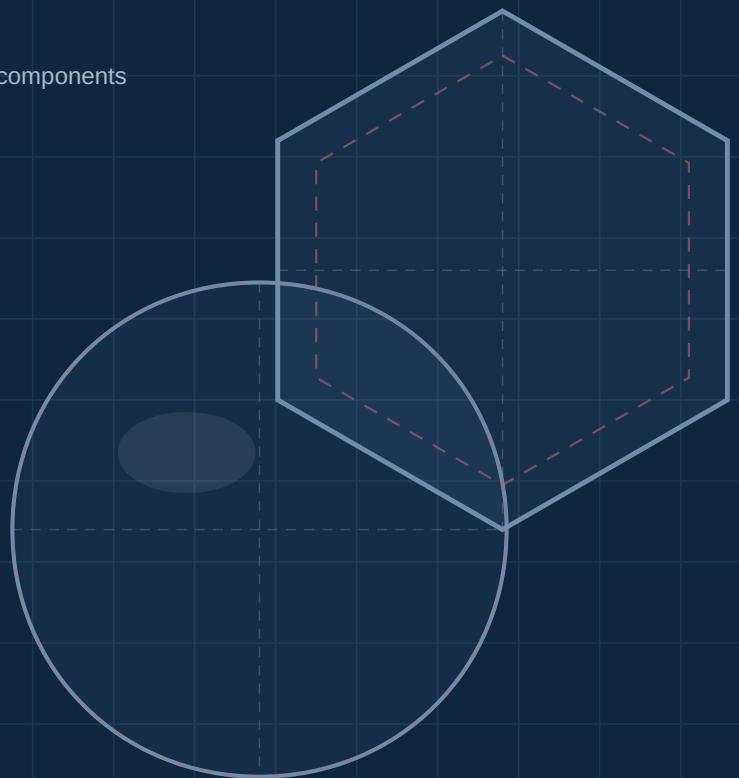
C20

CK45

EN1A · 230M07

EN1A Leaded · 230M07 Pb

Engineered for hydraulic fittings, adapters, unions & ORFS components



"Precision in every bar. Integrity in every deal."

Distributor & stockist serving OEMs & fabricators worldwide

sales@usapipingsolution.com
www.usapipingsolution.com

CATALOGUE

Contents & Quick Reference

This catalogue presents our stocked range of round and hexagon steel bars across five grades, selected for the precision-machining demands of hydraulic fitting, adapter and union manufacturers.

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CORE GRADES

2

BAR PROFILES

100%

MILL TRACEABLE

COMPANY OVERVIEW

Precision Steel Bars for Fitting Manufacturers

USA Piping Solution LLC is a distributor, stockist and exporter of carbon steel, alloy steel and stainless steel products, serving OEMs, fabricators and EPC contractors across the United States and worldwide. This catalogue covers our dedicated range of **Round Bars** and **Hexagon Bars** in free-cutting and engineering grades, stocked for the high-volume precision machining of hydraulic fittings, adapters and unions.

Every bar we supply is selected for consistent chemistry, dependable machinability and tight dimensional tolerances — the three properties that matter most when components are turned in large batches on automatic and CNC lathes. We hold inventory across popular diameters and across-flats sizes, and we arrange cut-to-length, bright-drawn, peeled and precision-ground finishes to suit your production process.

Round Bars

Cold-drawn, peeled & ground rounds for shafts, bodies, adapters and turned components needing concentricity and a clean surface.

Hexagon Bars

Bright-drawn hex stock (across-flats) — the natural profile for nuts, hydraulic fitting bodies, unions and ORFS components.

Stocked & Processed

Cut-to-length, special tolerances, heat treatment, certification and export packing arranged to your specification.

WHY FITTING MANUFACTURERS CHOOSE OUR BARS

- Controlled, repeatable chemistry batch-to-batch
- Excellent free-cutting performance — faster cycle times
- Small, manageable swarf to prevent machine blockage
- Tight diameter / across-flats tolerances
- Full traceability with mill test certificates (EN 10204 3.1)
- Lead and non-lead free-cutting options

Application focus: purpose-stocked for hydraulic fitting manufacturers, adapter and union makers, and producers of all hex-bodied fittings including ORFS (O-Ring Face Seal) connectors, JIC, BSP and NPT adapters, bulkheads, tees, crosses and run tees.

PRODUCT RANGE

Grades at a Glance

The five grades span the full spectrum — from easy-machining, low-strength bodies through to high-strength, through-hardenable components. Use the matrix and selector below to match each part you produce.

Grade	Nearest Equivalents	Type	Carbon %	Machinability	Strength	Hardenable
SAE 1018	AISI 1018 · G10180	Low-carbon	0.15–0.20	Good	Low–Med	Case-harden
C20	1.0402 · AISI 1020	Low-carbon	0.17–0.24	Good	Low–Med	Case-harden
CK45	C45E · 1.1191 · 1045	Medium-carbon	0.42–0.50	Fair	High	Through-harden
EN1A	230M07 · 1.0715	Free-cutting	0.07–0.15	Excellent	Low	Case-harden
EN1A Pb	230M07 Pb · 1.0718	Free-cutting	0.07–0.15	Superior	Low	Case-harden

Equivalents are nearest-match cross references for guidance; exact specification is confirmed at order.

GRADE SELECTOR

Fastest machining

High-volume hex fittings, adapters & unions where speed and finish lead.

→ **EN1A Leaded (230M07 Pb)**

Lead-free, intricate

ORFS & precision-turned bodies where lead must be avoided.

→ **EN1A Non-Leaded (230M07)**

Weldable bodies

General fitting bodies needing weldability & case-hardening.

→ **SAE 1018 or C20**

High pressure / load

Fittings & parts needing strength and wear resistance.

→ **CK45 (through-hardenable)**

Rule of thumb: the lower the carbon and the more sulphur/lead, the faster it machines; the higher the carbon, the stronger and more hardenable the part.

GRADE 01 OF 05

SAE 1018 Round & Hex Bars

01
/ 05

LOW-CARBON MILD STEEL

Equivalents: AISI/SAE 1018 · UNS G10180 · comparable to general-purpose mild steel

A versatile low-carbon mild steel offering a dependable balance of strength, ductility, weldability and machinability. A workhorse for fitting bodies, adapters and general turned components, and it responds well to case-hardening where a hard, wear-resistant surface over a tough core is needed.

PERFORMANCE PROFILE

Machinability		Good
Strength		Low-Med
Weldability		Good

KEY FEATURES

- Good weldability by common methods
- Responds well to case-hardening
- Consistent, predictable machining
- Cost-effective for medium volumes

TYPICAL APPLICATIONS

- Hydraulic fitting bodies & adapters
- Union nuts, sleeves & couplings
- Pins, shafts, spacers & bushings
- General case-hardened parts

Best for: general fitting bodies where weldability and case-hardening matter more than peak machining speed.



ROUND Ø



HEX A/F

CHEMICAL COMPOSITION (%)

Element	Min	Max
Carbon (C)	0.15	0.20
Manganese (Mn)	0.60	0.90
Phosphorus (P)	—	0.040
Sulphur (S)	—	0.050

MECHANICAL PROPERTIES

Property	Typical
Tensile strength	440–470 MPa
Yield strength	~370 MPa
Elongation	~15%
Hardness	~126 HB

Typical values for guidance; confirmed at order.

GRADE 02 OF 05

C20 Round & Hex Bars

02
/ 05

LOW-CARBON ENGINEERING STEEL

Equivalents: Werkstoff 1.0402 · AISI 1020 · UNS G10200 · close to 050A20

A low-carbon, un-alloyed engineering steel — the metric counterpart to AISI 1020. It combines good cold-forming and machining with sound strength and an excellent case-hardening response, making it a reliable choice for adapters, unions and a broad range of turned fitting components.

PERFORMANCE PROFILE

Machinability		Good
Strength		Low-Med
Weldability		Good

KEY FEATURES

- Good machinability & cold formability
- Excellent case-hardening response
- Weldable using standard procedures
- Reliable, widely-specified metric grade

TYPICAL APPLICATIONS

- Hydraulic adapters & fitting bodies
- Unions, couplings & connectors
- Bolts, studs, pins & small shafts
- Case-hardened wear components

Best for: metric-standard fitting and adapter production needing a balance of strength, forming and case-hardening.



ROUND Ø



HEX A/F

CHEMICAL COMPOSITION (%)

Element	Min	Max
Carbon (C)	0.17	0.24
Silicon (Si)	—	0.40
Manganese (Mn)	0.30	0.60
Phosphorus (P)	—	0.045
Sulphur (S)	—	0.045

MECHANICAL PROPERTIES

Property	Typical
Tensile strength	410–490 MPa
Yield strength	≥ 245 MPa
Elongation	≥ 25%
Hardness	120–160 HB

Typical values for guidance; confirmed at order.

GRADE 03 OF 05

CK45 Round & Hex Bars

03
/ 05

MEDIUM-CARBON ENGINEERING STEEL

Equivalents: C45E · Werkstoff 1.1191 · AISI 1045 · 080M46 · S45C

A medium-carbon, quality engineering steel with controlled low phosphorus and sulphur. It delivers substantially higher strength and hardness than the low-carbon grades and can be through-hardened and tempered — the grade of choice for higher-pressure fittings and load-bearing components.

PERFORMANCE PROFILE

Machinability		Fair
Strength		High
Weldability		Fair*

* Free-cutting / higher-carbon grades have reduced weldability.

KEY FEATURES

- High strength & good wear resistance
- Through-hardenable by quench & temper
- Clean chemistry (low P & S)
- Good machinability when normalised

TYPICAL APPLICATIONS

- High-pressure hydraulic fittings
- Load-bearing adapters & bodies
- Shafts, axles, spindles & gears
- Bolts, studs & fasteners

Best for: components that must carry pressure or load — the strongest grade here, with through-hardening.



ROUND Ø



HEX A/F

CHEMICAL COMPOSITION (%)

Element	Min	Max
Carbon (C)	0.42	0.50
Silicon (Si)	—	0.40
Manganese (Mn)	0.50	0.80
Phosphorus (P)	—	0.035
Sulphur (S)	—	0.035

MECHANICAL PROPERTIES

Property	Typical
Tensile strength	600–750 MPa
Yield strength	≥ 340–490 MPa
Elongation	≥ 14%
Hardness (norm.)	170–210 HB
Hardness (hard.)	up to ~55 HRC

Typical values for guidance; confirmed at order.

GRADE 04 OF 05

EN1A Non-Leaded Round & Hex Bars

04
/ 05

FREE-CUTTING MILD STEEL

Equivalents: 230M07 · Werkstoff 1.0715 · AISI 1213 · (220M07 / 1.0711)

The classic free-cutting, re-sulphurised mild steel engineered for high-speed, high-volume machining on automatic and CNC lathes. Added sulphur breaks chips into small, manageable swarf and delivers the best machinability of any plain carbon steel — the default for repetition-turned fittings, nuts and unions.

PERFORMANCE PROFILE

Machinability		Excellent
Strength		Low
Weldability		Limited*

* Free-cutting / higher-carbon grades have reduced weldability.

KEY FEATURES

- Excellent machinability — best of carbon steels
- Small chips prevent machine blockage
- Superior surface finish on turned parts
- Suitable for case-hardening & plating

TYPICAL APPLICATIONS

- Repetition-turned hydraulic fittings
- Hex-bodied adapters & unions
- Nuts, bolts, studs & connectors
- ORFS, JIC, BSP & NPT components

Best for: high-volume repetition turning of hex fittings and unions where machinability is the priority.



ROUND Ø



HEX A/F

CHEMICAL COMPOSITION (%)

Element	Min	Max
Carbon (C)	0.07	0.15
Silicon (Si)	—	0.10
Manganese (Mn)	0.80	1.20
Sulphur (S)	0.20	0.30
Phosphorus (P)	—	0.07

MECHANICAL PROPERTIES

Property	Typical
Tensile strength	370–480 MPa
Yield strength	~215 MPa+
Elongation	~14% min
Hardness	150–210 HB

Typical values for guidance; confirmed at order.

GRADE 05 OF 05

EN1A Leaded Round & Hex Bars

05
/ 05

FREE-CUTTING LEADED STEEL (+PB)

Equivalents: 230M07 Pb · Werkstoff 1.0718 · AISI 12L13

Takes the free-cutting performance of standard EN1A and adds controlled lead (0.15–0.35%) that acts as an internal lubricant during cutting — giving the easiest chipping, the longest tool life and the finest surface finish in a mild steel. The premium choice for intricate, high-speed precision turning and ORFS.

PERFORMANCE PROFILE

Machinability		Superior
Strength		Low
Weldability		Poor*

* Free-cutting / higher-carbon grades have reduced weldability.

KEY FEATURES

- Superior machinability vs. standard EN1A
- Easiest chipping & longest tool life
- Finest achievable surface finish
- Ideal for intricate drilling & multi-tool turning

TYPICAL APPLICATIONS

- ORFS (O-Ring Face Seal) fittings
- Complex hex fitting bodies & adapters
- High-volume precision-turned unions
- Control linkages & intricate parts

Best for: the fastest, most intricate precision turning — when cycle time and finish on hex/ORFS parts come first.



ROUND Ø



HEX A/F

CHEMICAL COMPOSITION (%)

Element	Min	Max
Carbon (C)	0.07	0.15
Silicon (Si)	—	0.10
Manganese (Mn)	0.80	1.20
Sulphur (S)	0.20	0.30
Phosphorus (P)	—	0.07
Lead (Pb)	0.15	0.35

MECHANICAL PROPERTIES

Property	Typical
Tensile strength	370–480 MPa
Yield strength	~215 MPa+
Elongation	~14% min
Hardness	150–210 HB

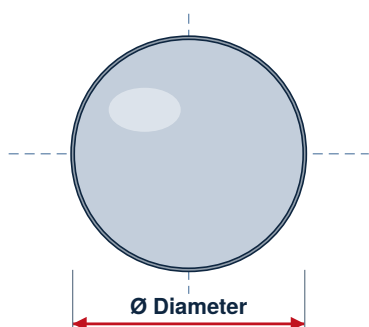
Typical values for guidance; confirmed at order.

SIZES & SUPPLY CONDITIONS

Dimensions, Forms & Tolerances

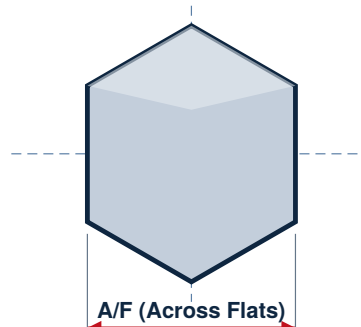
Bars are stocked across a wide range of diameters and across-flats sizes. The profiles below show how each is measured — round bar by diameter (Ø), hexagon bar by across-flats (A/F), which corresponds to wrench size.

ROUND BAR — DIAMETER



Form	Typical Range
Bright / cold drawn	5 – 80 mm
Peeled & polished	20 – 150 mm
Precision ground	4 – 50 mm
Hot rolled	60 – 250 mm

HEXAGON BAR — ACROSS FLATS



Form	Typical Range
Bright drawn (metric)	5 – 75 mm A/F
Bright drawn (imperial)	3/16" – 3"
Common fitting sizes	12,14,17,19,22,24,27,30,36 mm

STANDARD SUPPLY CONDITIONS

Parameter	Options
Surface condition	Bright drawn · Cold drawn · Peeled (turned) · Precision ground · Hot rolled
Diameter tolerance	h9 / h10 / h11 (cold drawn); precision ground to h6/h7 or tighter on request
Standard lengths	3 m & 6 m (random / fixed); cut-to-length to your drawing
Heat treatment	Annealed, normalised, or quench & temper (CK45) on request
Ends & finish	Saw cut, chamfered, deburred; protective oiling for export

Why hex for fittings? Hexagon bar is supplied to its across-flats (A/F) dimension — the same dimension as a spanner/ wrench — which is why it is the preferred profile for fitting bodies, union nuts and adapters that must be tightened with a tool.

APPLICATION GUIDE

Built for Hydraulic Fitting Manufacturers

This bar range is stocked around the needs of fitting, adapter and union manufacturers. Below are the principal applications and the grades that suit each.



Hydraulic Fittings

Fitting bodies, ports and connectors turned in high volume. EN1A leaded/non-leaded for speed; CK45 where pressure demands strength.



Adapters

Straight, elbow, tee & reducing adapters across JIC, BSP, NPT and metric threads. C20 & SAE 1018 give weldable, case-hardenable bodies.



Unions

Union bodies, nuts and sleeves — typically hex-bodied. Hex bar in EN1A delivers clean threads and tool-flat finish at speed.



ORFS Fittings

O-Ring Face Seal connectors need intricate, precise machining. Leaded EN1A is preferred for the finest finish and tightest features.



Hex-Bodied Fittings

Tees, crosses, run tees, bulkheads, plugs and caps — any fitting that 'looks like a hex' — produced from hexagon stock.



Nuts, Studs & Couplings

Repetition-turned fasteners and couplings. Free-cutting EN1A maximises throughput; CK45 for high-strength fasteners.

THREAD & CONNECTOR STANDARDS SERVED

ORFS

JIC 37°

BSP / BSPP

BSPT

NPT / NPTF

Metric DIN

SAE O-Ring Boss

Flareless / Bite-type

Bulkhead

Grade selection summary: EN1A Leaded → fastest & finest finish | EN1A Non-Leaded → weldable free-cutting | C20 / SAE 1018 → weldable, case-hardenable bodies | CK45 → high-strength / high-pressure parts.

QUALITY & ORDERING

Quality Assurance & How to Order

Consistency is everything when components are machined in large batches. As a distributor we source only from audited mills and provide full traceability, so your production runs stay predictable from the first bar to the last.

QUALITY & DOCUMENTATION

- Mill Test Certificates to EN 10204 3.1 on request
- Chemical & mechanical test reports
- Dimensional & straightness inspection
- Full heat / batch traceability
- Third-party inspection on request

VALUE-ADDED SERVICES

- Cut-to-length & sawing to your bar list
- Centreless grinding & polishing
- Heat treatment (anneal / normalise / Q&T)
- Chamfering, deburring & bundling
- Export packing & worldwide logistics

INFORMATION TO INCLUDE WITH YOUR ENQUIRY

Detail	Example
Grade	EN1A Leaded (230M07 Pb)
Profile	Hexagon bar / Round bar
Size	24 mm A/F (hex) or 25 mm dia (round)
Condition / finish	Bright drawn, h11
Length	3 m random or cut to 145 mm
Quantity	Weight (kg / MT) or piece count
Certification	EN 10204 3.1 required

Fast quotes: email your bar list to sales@usapipingsolution.com and our team will respond with availability, pricing and lead time. Custom grades and sizes outside this catalogue are available on request.



Let's Build Your Next Order

A trusted distributor, stockist and exporter of carbon, alloy and stainless steel products — supplying the bars that fitting manufacturers rely on, with full traceability and on-time delivery.

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HEADQUARTERS

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