

FREE TECHNICAL RESOURCE · ไทย / ENGLISH

Metal Finishing Specification Pack

เทมเพลตสำหรับงานอบชุบโลหะ ชุบซิงค์ ฟอสเฟต การตรวจความแข็ง และการวิเคราะห์งานเสีย

Purchasing, engineering and QC templates for heat treatment, zinc plating, phosphate coating, hardness and failure investigation.

01 · Zinc plating

Coating system, thickness, passivation, salt spray, hydrogen relief and threads.

02 · Phosphate coating

Purpose, phosphate type, coating mass, oil/sealer and acceptance.

03 · Heat treatment

Material, initial condition, process, hardness, case depth and distortion.

04 · Failure investigation

Evidence checklist for low hardness, cracks, distortion and coating failure.

05 · Hardness reference

Approximate HRC–HV–HB values for non-austenitic steel.

06 · Steel-grade reference

S45C, SCM435/440, SCM415/SCr420, SK5 and SUP9 quick selection.

สำคัญ / Important: เอกสารนี้เป็นแบบช่วยรวบรวมข้อกำหนด ไม่แทนแบบลูกค้า มาตรฐานฉบับเต็ม หรือการอนุมัติทางวิศวกรรม / This pack organizes requirements; it does not replace the customer drawing, full standard or engineering approval.

01 · Zinc Plating Specification

สเปกซุมซิงค์

COMPANY / บริษัท

PART NO. / รหัสชิ้นงาน

MATERIAL / วัสดุ

Grade, property class, hardness

QUANTITY & LOT WEIGHT / จำนวนและน้ำหนัก

GOVERNING STANDARD / มาตรฐาน

ISO 4042 / ASTM B633 / drawing / other

ZINC THICKNESS / ความหนาซิงค์

Min/range μm + significant surface

PASSIVATION / ชั้นแปลงสภาพ

Cr3+ / Cr(VI)-free + colour

SEALER, TOPCOAT, LUBRICANT

Product/system or approved source

SALT SPRAY ACCEPTANCE

Method, white/red corrosion hours

THREADS / เกลียว

Class, GO/NO-GO, mating part, friction

HYDROGEN MANAGEMENT

Pre-treatment limits, baking condition/timing

MASKING / พื้นที่ห้ามชุบ

Mark on drawing

INSPECTION DOCUMENTS / เอกสารตรวจรับ

☐ thickness ☐ appearance ☐ adhesion ☐ salt spray ☐ thread ☐ lot traceability ☐ restricted substances

DRAWING NOTES, MEASUREMENT POINTS AND PASS/FAIL CRITERIA

Do not specify colour alone. State chemistry, thickness, supplementary treatment, corrosion criterion and thread acceptance.

03 · Heat-Treatment Purchase Specification

ใบสั่งงานอบชุบ

PART NO. / รหัสชิ้นงาน

DRAWING REVISION / ฉบับแบบ

MATERIAL / วัสดุ

Grade + certificate / chemistry

INITIAL CONDITION / สภาพก่อนชุบ

As-machined, cold formed, annealed, etc.

PROCESS REQUESTED / กระบวนการ

Q&T, carburize, carbonitriding, anneal, normalize

FINAL HARDNESS / ความแข็ง

Range + HRC/HV/HB + measurement locations

CASE DEPTH / ความลึกชั้นแข็ง

Effective/total, range, threshold/test force

CORE/SURFACE REQUIREMENT

Core hardness, surface hardness, microstructure

DIMENSIONAL CONTROL / มิติ

Datum, before/after values, distortion limit

SAMPLING / การสุ่ม

Parts per lot, traverses, test locations

REQUIRED REPORT / รายงาน

☐ lot ID ☐ furnace record ☐ hardness ☐ case profile ☐ microstructure ☐ dimensions ☐ disposition

CRITICAL GEOMETRY, SHARP CORNERS, THREADS AND HANDLING NOTES

Never assume a process from hardness alone. Material, section size, toughness, case/core requirement and distortion limit must agree.

04 • Failure-Investigation Checklist

เช็กลิสต์วิเคราะห์งานเสีย

Evidence / หลักฐาน	Record before cleaning, cutting or rework	Ready?
Drawing and revision	Material, hardness/case/coating requirement and measurement points	☐ Yes ☐ No
Lot identity	Lot no., quantity, load weight, dates and supplier/process route	☐ Yes ☐ No
Measured results	Every value, scale/test force, instrument, location and acceptance range	☐ Yes ☐ No
Photos	As-found condition, fracture origin, corrosion/coverage and packaging	☐ Yes ☐ No
Timing	After quench, temper, plating, assembly, loading or storage	☐ Yes ☐ No
Dimensions	Same datum/method before and after treatment	☐ Yes ☐ No
Process records	Furnace/load, quench, bath, pickling, plating and baking history	☐ Yes ☐ No
Comparison samples	Passing and failed parts from the same lot, stored separately	☐ Yes ☐ No

Symptom definition / ระบุอาการ

HARDNESS

☐ low all lot ☐ scattered ☐ soft surface ☐ soft core

CRACK/FRACTURE

☐ immediate ☐ delayed ☐ after load ☐ after plating

DISTORTION

Direction, magnitude, datum and percentage affected

COATING

Coverage, adhesion, corrosion, thickness and thread fit

CONTAINMENT AND REQUESTED DECISION / การควบคุมและสิ่งที่ต้องการให้ตัดสินใจ

Do not destroy evidence before agreeing the investigation plan. Extra tempering cannot repair an existing crack.

05 • Hardness Quick Reference

ค่าโดยประมาณสำหรับเหล็ก non-austenitic

HRC	HV	HB	Typical interpretation
20.3	238	226	Lower end of the published HRC conversion range
30	302	286	Moderately hardened/tempered steel
35	345	327	Tempered structural component range
40	392	371	Hardened and tempered steel
45	446	421	Wear-resistant tempered steel
50	513	481	High-hardness fastener/tool range
52	544	512	Typical lower S45C hardened range
55	595	560	Hardened steel
58	653	615	High hardness; verify toughness and section
60	697	654	Carburized/tool-steel surface range
62	746	688	Very hard surface/tool range
65	832	739	Extreme hardness; published HB correlation limit area

Conversion limitation: Values are approximate correlations for non-austenitic steel based on published ASTM E140 / ISO 18265 tables. Do not substitute a converted result for the scale required by the drawing.

Measurement selection

HRC

Fast routine measurement on sufficiently thick hardened steel.

HV

Small parts, thin layers, microstructure locations and case-depth traverses.

HB

Softer-to-medium bulk material, forgings and castings; larger impression.

Before testing

Confirm surface preparation, thickness, spacing, curvature and coating effects.

06 · Steel Grade and Hardening Reference

แนวทางเลือกเบื้องต้น

Grade	Typical route	Approximate result	Selection note
S45C	Quench + temper	~52–58 HRC	General pins, small shafts and bolts; section size matters.
SCM435 / SCM440	Quench + temper	~55–60 HRC	Higher hardenability and more uniform response in thicker sections.
SCM415 / SCr420	Carburize + quench + temper	Surface ~58–62 HRC	Hard wear surface with a tougher low-carbon core.
SK5	Harden + temper	~58–62 HRC	Carbon tool steel; thin springs and wear parts.
SUP9	Harden + temper	~44–50 HRC	Spring performance, fatigue and resilience take priority.

These are orientation ranges, not guaranteed values. Chemistry, prior condition, section size, quench severity, temper and required toughness determine the final process window.

RFQ minimum information / ข้อมูลขั้นต่ำสำหรับขอราคา

MATERIAL CERTIFICATE

Grade, chemistry and prior condition

DRAWING

Dimensions, tolerances and critical locations

TARGET PROPERTIES

Hardness, case depth, toughness and microstructure

PRODUCTION

Quantity, lot weight, frequency and packaging

APPLICATION AND FAILURE RISK / การใช้งานและความเสี่ยง

V.S. HEAT TREATMENT CO., LTD.

53/4 Moo 5, Setthakit Road, Nadi, Mueang Samut Sakhon, Samut Sakhon 74000, Thailand

Tel: 034-831-065 · 089-391-9662 **Email:** vsheat1994@gmail.com

Web: <https://vsheattreatment.com> **LINE:** @995vmisk