RENOLD

LIFTING CHAIN

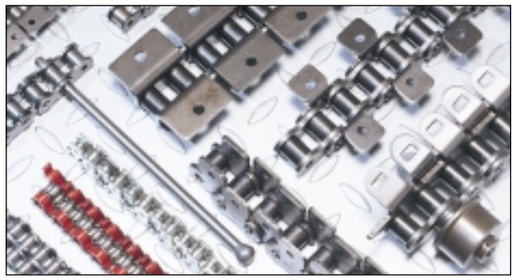
www.renold.com

Transmission Chain

- **British, ANSI, API, DIN, ISO and Works Standard Chains**
- **Adapted Chains**
- **Extended Pitch Chains**
- **Hollow Bearing Pin Chains**
- **Made to Order, Special Chains**
- **Mini Pitch Chains**
- **Motorcycle Chains**
- **Nickel Plated Chains**
- **Oilfield Chains**
- **Plastic Bush Chains**
- **Power and Free Chains**
- **Polymer Block Chains**
- **Side Bow Chains**
- **Stainless Steel Chains**
- **Timing Chains**

Applications

■ Abattoirs ■ Air Conditioning ■ Aircraft - Civil & Military ■ Automotive ■ Bakery Machines ■ Battery Manufacturing ■ Brewing ■ Canning ■ Carpet Machines ■ Chart Tables/Marine ■ Chocolate Manufacturing ■ Concrete Moulding Equipment ■ Copying Machines ■ Dairy Machinery ■ Drying Machinery ■ Earth Moving Equipment ■ Extrusion Machines ■ Filtration Plants ■ Food and Drink Manufacture ■ Glass Manufacture ■ Health Care Equipment ■ Hydraulic Components ■ Ice-Cream Manufacture ■ In-Flight Refueling ■ Ingot Casting + Scrap Metal Processing ■ Latex Machinery ■ Laundry Machinery ■ Lawnmower Manufacture ■ Mill Machinery ■ Mining ■ MOT Brake Testing Machinery ■ Motorcycles ■ Nuclear Power ■ Off Road Vehicles ■ Oil Industry ■ Packaging Machines ■ Paper and Card Making ■ Paper Shredders ■ Plastic Machinery ■ Potato Grading Machinery ■ Power Generation ■ Printing Machines ■ Quarry Plant ■ Road Making/Plant Machinery ■ Robotic Systems ■ Roof Tile Manufacture ■ Ship's Engines ■ Silkscreen Machinery ■ Ski-Lifts ■ Soot Blowers ■ Steel Making ■ Straddle Carriers ■ Sugar Beet Machines ■ Sun-Blinds ■ Telecommunications ■ Textile Machinery ■ Timber and Woodworking Machines ■ Tin Printer Ovens ■ Tobacco/Cigarette Machinery ■ Tunnelling Machines ■ T.V. and Audio Equipment ■ Tyre Manufacture ■ Waste Handling ■ X-Ray Equipment

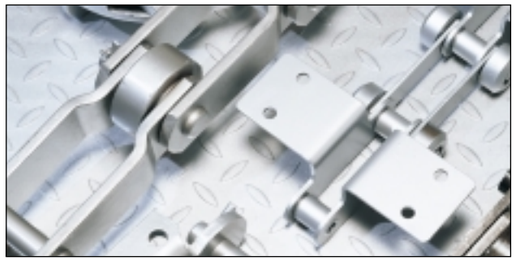


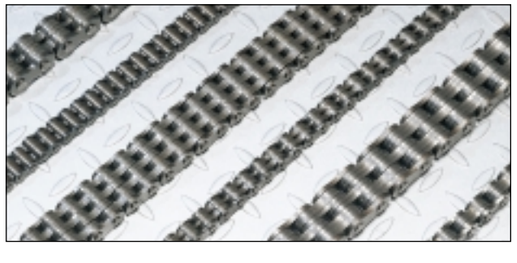
Conveyor Chain

- **British, DIN, ISO and Works Standard Chains**
- **Adapted Chains**
- **Agricultural Chains**
- **Bakery Chains**
- **Deep Link Chains**
- **Escalator Chains**
- **Made to Order, Specials**
- **Stainless Steel Chains**
- **Sugar Cane Chains**
- **Tool Changer Chains**
- **Zinc Plated Chains**

Applications

■ Abattoirs ■ Agricultural Machines ■ Automotive ■ Bakery Machines ■ Bottle Washing Plants ■ Brick & Tile Machinery OEM ■ Car Plants ■ Cement Plants ■ Chemical Plants ■ Chicken Process Equipment ■ Cigarette/Tobacco Machinery ■ Dust Filters ■ Egg Sorting Conveyors ■ Electrical Switchgears ■ Escalators ■ Extrusion Machines ■ Feed Mill Machines ■ Feed Silo Equipment ■ Fibreglass Industry ■ Filtration Plants ■ Fish Conveyor ■ Food Sterilisation ■ Food Processing ■ Freezing Equipment ■ Freezing Tunnels ■ Glass Manufacturing ■ Grain Conveyor ■ Harvesting Machines ■ Ice Cream Machines ■ Induction Furnaces ■ Ingot Casting + Scrap Metal Processing Mfr ■ Latex Machinery ■ Leisure Rides ■ Luggage & Parcel Handling ■ Machine Tools ■ Mail Sorting ■ Metal Casting ■ Mushroom Compost Machinery ■ Nuclear ■ Ovens/Provers ■ Potato Grading Machinery ■ Potting Machinery ■ Quarries ■ Radio Astronomy ■ Roof Tile Manufacture ■ Rope Machinery ■ Saw Mill Equipment ■ Sewage Plants ■ Shaker Conveyors ■ Ski-Lifts ■ Sluice Gates ■ Steel Making ■ Sugar Factories ■ Swarf Conveyors ■ Textile Machinery ■ Timber and Woodworking Machines ■ Tool Changer ■ Tunnelling Machines ■ Tyre Manufacture ■ Washing/Sterilising Machines ■ Water Treatment ■ Wire Belts





LEAF CHAIN

- **LH(BL), AL, LL and Works Standard Chains**
- **Renold STANZA**

Applications

■ Bottle Washing Plants ■ Car Plants ■ Cement Plants ■ Chemical ■ Counterbalance Sets ■ Cranes ■ Dust/Swarf Conveyors ■ Elevators ■ Food Processing ■ Food Sterilisation ■ Fork Lift Trucks ■ Pipe Line Valves/Taps ■ Printing Machines ■ Rock Drilling ■ Straddle Carriers ■ Sun-Blinds ■ Tail Lifts

Re-writing the rule book.
Re-engineering the performance of Mast chain

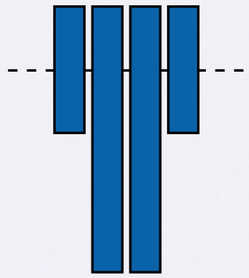
RENOLD STANZA™ I, II & III replaces 26 BL chains

Time for Innovation

Renold Stanza™ is the first new chain designed and developed in the last 60 years specifically for use on Fork Lift Trucks.

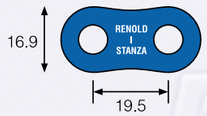
Fork Lift Truck OEM's are looking for significant improvements in cost/ performance ratios and Renold has taken the lead in partnering a new solution.

AN ECONOMY OF PURPOSE



3 CHAINS COVER THE COMPLETE RANGE OF ISO CHAINS UP TO 1" PITCH.

STANZA I

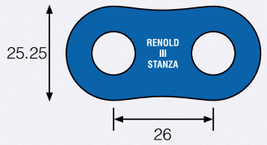


Fatigue Endurance Limit: 15 000N
Breaking Load min: 75 000N

STANZA II

Fatigue Endurance Limit: 22 000N
Breaking Load min: 110 000N

STANZA III

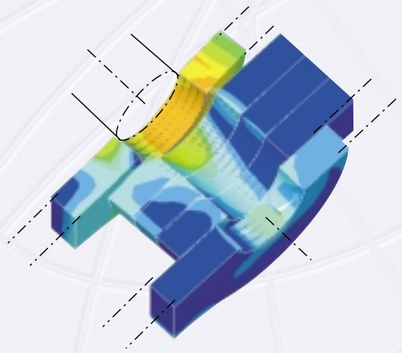


Fatigue Endurance Limit: 34 000N
Breaking Load min: 170 000N

Computer Modelled Analysis

Renold Stanza™ has evolved from a rigorous analysis of the loads and pressures on individual parts of the FLT chain system.

Using the latest computer modelling and FEA techniques, and over one hundred years of experience, Renold has developed a design to give optimum performance at minimum cost.



Two by Two - The Breakthrough

Increased strength profiles for FLT chains have previously been achieved by adding inner plates to the chain design. Renold Stanza™ uses a 2x2 plate profile, optimized to carry load and handle wear. Load bearing characteristics are increased by simply running two chains side by side, a harmonious solution which is compact by design yet capable of handling higher breaking loads with greater reliability and improved safety.

RENOLD Stanza Fork Truck Mast Chain

The Optimum Profile

Detailed stress analysis investigation showed that current chain configurations (BL & AL) used in Fork Lift Trucks are inefficient. By optimising stress distribution evenly over all parts of the chain, the maximum amount of work (fatigue endurance limit) per unit of weight has been achieved, while economising wear and significantly improving visibility.

The chain profile is optimised for fatigue and wear over the sheave, so that just 3 chains can now do the work of 26 different BL chains – and they will do it more cost efficiently.

A Winning Arrangement

Innovative engineering, with the experience that comes from years of technical leadership make Renold Stanza a complete answer to the operational needs of all fork lift truck manufacturers.

COMPONENTS DIMENSIONS

	Bearing Pin Diameter	Bearing Pin Length	Pitch	Chain Weight	Length Tolerance
STANZA I	7.39	17.8	19.5	1.58kg/m	± 0.25%
STANZA II	8.5	21.6	20.77	2.31kg/m	± 0.25%
STANZA III	11.44	25.4	26	3.82kg/m	± 0.25%
	Inner Plate Thickness	Inner Plate Link Depth	Path Depth		
STANZA I	4.00	16.9	min.: 17.4		
STANZA II	5.00	18.9	min.: 19.4		
STANZA III	6.00	25.25	min.: 25.75		
	Outer Plate Thickness	Outer Plate Link Depth	Width over outer plates		
STANZA I	3.11	16.9	max. w : 14.9		
STANZA II	4.20	18.9	max. w : 18.9		
STANZA III	5.00	25.25	max. w : 22.4		

BL CHAINS COVERED BY

STANZA I	BL	422	423	434	444	446	488
SINGLE	BL	523	534	544	546		
	BL	623					
	BL	822					
STANZA II	BL	566					
SINGLE	BL	634	644				
	BL	823					
STANZA III	BL	646	666				
SINGLE	BL	834	844	846			
STANZA III	BL	866					
DOUBLE	BL	1023	1034	1044	1046		

For more information about how Renold Smartlink® can be used to improve safety in fork lift truck applications, please contact enquiry@renold.com

Renold Stanza™ and Smartlink – The Ideal Partnership

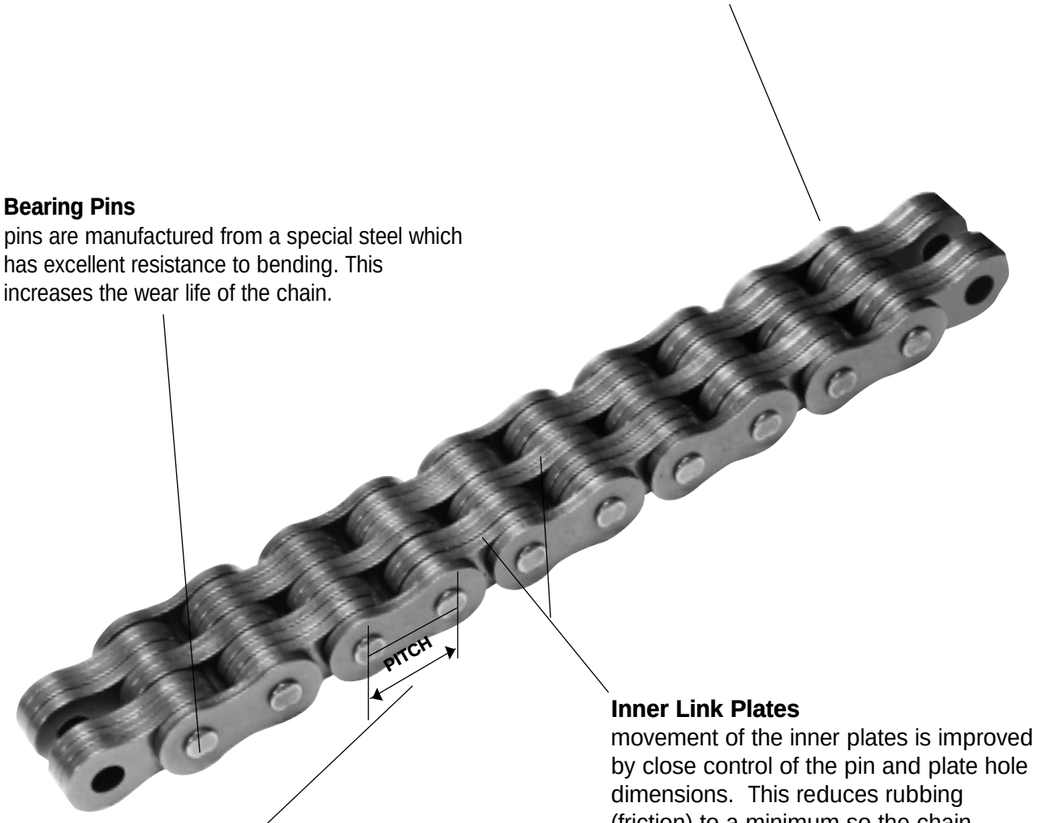
With demands in Health and Safety legislation increasing all the time, industries can now benefit from monitoring their chain with this hi-tec solution. The innovative device, Renold Smartlink®, has been designed to help identify and record impulsive loads in all types of chain systems, and can be used as an early warning system and to determine the required maintenance schedule of a fork lift truck.

Special design features

- High Fatigue Strength
- Long Service Life
- Maximum Resistance to wear
- Compact Design

Link Plates
plates are made from a special steel which can withstand sudden loads and provides maximum resistance to breakage

Bearing Pins
pins are manufactured from a special steel which has excellent resistance to bending. This increases the wear life of the chain.



Inner Link Plates
movement of the inner plates is improved by close control of the pin and plate hole dimensions. This reduces rubbing (friction) to a minimum so the chain operates more economically and efficiently.

Chain pitch
pitch (distance between each pin or plate hole) accuracy and pin hole diameters (holes in link plates) are maintained on every component during manufacture. This ensures consistent precision performance and good movement of the chain joints.

Benefits

INCREASED WEAR RESISTANCE
For longer life and maintenance savings.

HIGHER BREAKING LOADS
Giving greater safety factors and more reliability

IMPROVED FATIGUE RESISTANCE
Greater durability cutting replacement costs.

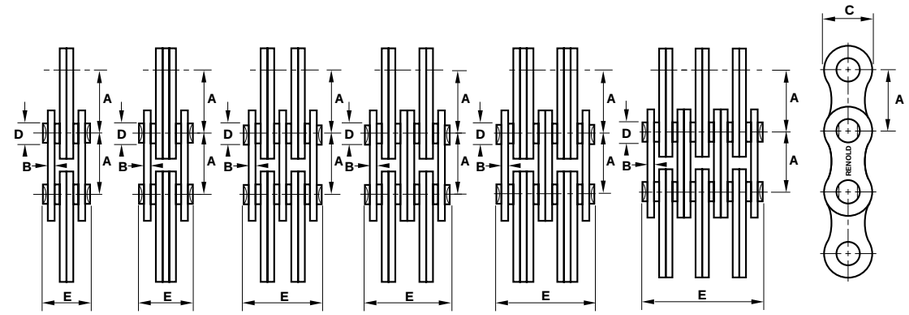


Plate Combination

2x2 2x3 3x4 4x4 4x6 6x6

Chain Technical Details

ISO No	ANSI No	Renold Chain No	Nominal Pitch Inch A	Nominal Pitch mm A	Plate Combination	Chain Length over 100 pitches (± 0.25%)	Plate Width B	Plate Depth C	Pin Dia D	Width Over Pin E	F_B N min	Weight kg/m
LH0822	BL 422	1400779	.500	12.7	2x2	1270	2.06	12.1	5.08	10.9	27800	0.60
LH0823	BL 423	1400702	.500	12.7	2x3	1270	2.06	12.1	5.08	13.0	27800	0.75
LH0834	BL 434	1400703	.500	12.7	3x4	1270	2.06	12.1	5.08	17.2	42500	1.04
LH0844	BL 444	1400704	.500	12.7	4x4	1270	2.06	12.1	5.08	19.3	58000	1.20
LH0846	BL 446	1400705	.500	12.7	4x6	1270	2.06	12.1	5.08	23.5	58000	1.46
LH0866	BL 466	1400706	.500	12.7	6x6	1270	2.06	12.1	5.08	27.8	90000	1.74
LH0888	BL 488	1400772	.500	12.7	8x8	1270	2.06	12.1	5.08	36.3	110000	2.56
LH1023	BL 523	1400707	.625	15.875	2x3	1587	2.46	15.1	5.95	15.0	40100	1.05
LH1034	BL 534	1400708	.625	15.875	3x4	1587	2.46	15.1	5.95	19.9	60000	1.47
LH1044	BL 544	1400709	.625	15.875	4x4	1587	2.46	15.1	5.95	22.4	78000	1.69
LH1046	BL 546	1400710	.625	15.875	4x6	1587	2.46	15.1	5.95	27.3	78000	2.07
LH1066	BL 566	1400711	.625	15.875	6x6	1587	2.46	15.1	5.95	32.3	120000	2.67
LH1223	BL 623	1400713	.75	19.05	2x3	1905	3.23	18.2	7.93	20.0	60000	1.84
LH1234	BL 634	1400714	.75	19.05	3x4	1905	3.23	18.2	7.93	26.3	101500	2.58
LH1244	BL 644	1400715	.75	19.05	4x4	1905	3.23	18.2	7.93	29.6	126000	2.95
LH1246	BL 646	1400716	.75	19.05	4x6	1905	3.23	18.2	7.93	36.5	126000	3.70
LH1266	BL 666	1400717	.75	19.05	6x6	1905	3.23	18.2	7.93	43.0	190000	4.30
LH1623	BL 823	1400719	1.0	25.4	2x3	2540	4.06	23.9	9.53	24.2	100000	2.55
LH1634	BL 834	1400720	1.0	25.4	3x4	2540	4.06	23.9	9.53	32.6	152000	3.56
LH1644	BL 844	1400721	1.0	25.4	4x4	2540	4.06	23.9	9.53	36.7	186000	4.10
LH1646	BL 846	1400722	1.0	25.4	4x6	2540	4.06	23.9	9.53	45.0	186000	5.10
LH1666	BL 866	1400723	1.0	25.4	6x6	2540	4.06	23.9	9.53	53.2	285000	6.20
LH2023	BL 1023	1400724	1.25	31.75	2x3	3175	4.88	29.6	11.10	28.7	142000	4.25
LH2034	BL 1034	1400725	1.25	31.75	3x4	3175	4.88	29.6	11.10	38.6	244000	6.01
LH2044	BL 1044	1400726	1.25	31.75	4x4	3175	4.88	29.6	11.10	43.6	284000	6.8
LH2046	BL 1046	1400727	1.25	31.75	4x6	3175	4.88	29.6	11.10	53.5	305000	8.4
LH2066	BL 1066	1400728	1.25	31.75	6x6	3175	4.88	29.6	11.10	63.4	417000	10.20
LH2434	BL 1234	1400688	1.5	38.1	3x4	3810	5.68	35.9	12.71	45.1	245000	8.70
LH2446	BL 1246	1400689	1.5	38.1	4x6	3810	5.68	35.9	12.71	62.5	371500	12.40
LH2466	BL 1266	1400690	1.5	38.1	6x6	3810	5.68	35.9	12.71	74.2	454000	14.80
LH2834	BL 1434	1400559	1.75	44.45	3x4	4445	6.38	41.9	14.28	51.2	316000	11.00
LH2846	BL 1446	1400557	1.75	44.45	4x6	4445	6.38	41.9	14.28	71.0	427500	15.20
LH3234	BL 1634	1400646	2	50.8	3x4	5080	7.18	47.8	17.46	58.5	530000	14.00
LH3244	BL 1644	1400691	2	50.8	4x4	5080	7.18	47.8	17.46	66.00	579000	17.40
LH3246	BL 1646	1400647	2	50.8	4x6	5080	7.18	47.8	17.46	81.00	579000	21.60
LH3266	BL 1666	1400692	2	50.8	6x6	5080	7.18	48.3	17.46	96.00	868000	25.9
LH3288	BL 1688	1400648	2	50.8	8x8	5080	7.18	48.3	17.46	125.00	1157000	34.50

OTHER SIZES AVAILABLE ON REQUEST. ## STANDARD END LINKS AND FIXINGS ARE AVAILABLE. DETAILS ON REQUEST. F_B = AXIAL BREAKING FORCE

ANSI B29.8

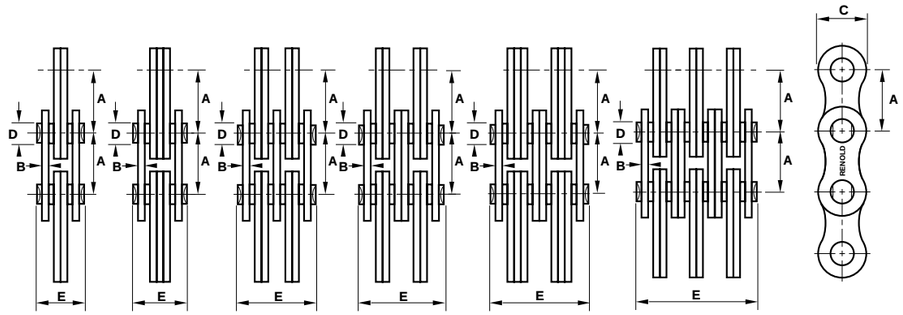


Plate Combination

2x2 2x3 3x4 4x4 4x6 6x6

Chain Technical Details

ISO No	ANSI No	Renold Chain No	Nominal Pitch Inch A	Nominal Pitch mm A	Plate Combination	Chain Length over 100 pitches (± 0.25%)	Plate Width B	Plate Depth C	Pin Dia D	Width Over Pin E	F_B N min	Weight kg/m
-	AL 422	1400464	.500	12.7	2x2	1257	1.55	9.7	3.97	8.0	17000	0.35
-	AL 444	1400465	.500	12.7	4x4	1257	1.55	9.7	3.97	14.8	34000	0.68
-	AL 466	1400466	.500	12.7	6x6	1257	1.55	9.7	3.97	21.1	51000	1.01
-	AL 544	1400396	.625	15.875	4x4	1578	2.06	12.8	5.08	18.8	58000	1.20
-	AL 566	1400397	.625	15.875	6x6	1578	2.06	12.8	5.08	27.2	90000	1.79
-	AL 622	1400642	.75	19.05	2x2	1893	2.45	15.3	5.95	12.6	40000	0.88
-	AL 644	1400273	.75	19.05	4x4	1893	2.45	15.3	5.95	22.4	80000	1.73
-	AL 666	1400285	.75	19.05	6x6	1893	2.45	15.3	5.95	32.5	120000	2.57
-	AL 822	1400643	1.0	25.4	2x2	2525	3.06	20.2	7.93	15.6	70000	1.45
-	AL 844	1400210	1.0	25.4	4x4	2525	3.06	20.2	7.93	28.2	145000	2.84
-	AL 866	1400262	1.0	25.4	6x6	2525	3.06	20.2	7.93	40.8	200000	4.24
-	AL 1044	1400286	1.25	31.75	4x4	3165	4.02	25.3	9.53	36.7	200000	4.68
-	AL 1066	1400263	1.25	31.75	6x6	3165	4.02	25.3	9.53	53.2	300000	6.99
-	AL 1244	1400287	1.5	38.1	4x4	3808	4.88	30.7	11.10	43.4	245000	6.65
-	AL 1266	1400269	1.5	38.1	6x6	3808	4.88	30.7	11.10	63.5	368000	9.94

END FIXINGS AVAILABLE. DETAILS ON REQUEST. F_B = AXIAL BREAKING FORCE

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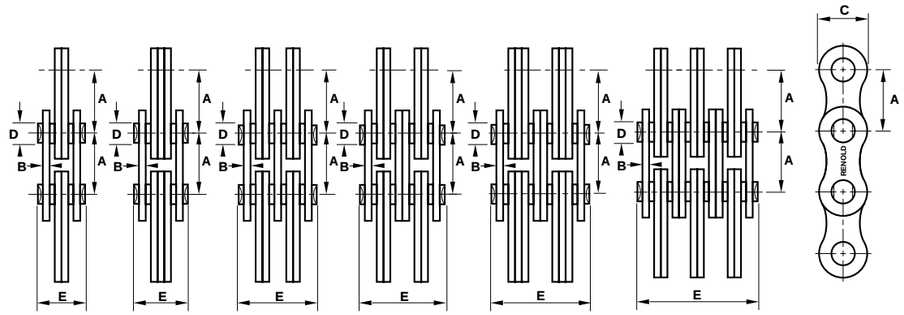


Plate Combination

2x2 2x3 3x4 4x4 4x6 6x6

Chain Technical Details

ISO No	ANSI No	Renold Chain No	Nominal Pitch Inch A	Nominal Pitch mm A	Plate Combination	Chain Length over 100 pitches (± 0.25%)	Plate Width B	Plate Depth C	Pin Dia D	Width Over Pin E	F_B N min	Weight kg/m
LL 0822	-	1400021	.500	12.7	2x2	1259	1.69	10.7	4.45	8.9	21000	0.44
LL 0844	-	1400024	.500	12.7	4x4	1259	1.69	10.7	4.45	15.9	42000	0.87
LL 0866	-	1400027	.500	12.7	6x6	1259	1.69	10.7	4.45	22.8	64000	1.30
LL 1022	-	1400369	.625	15.875	2x2	1577	1.55	12.8	5.08	8.9	22700	0.47
LL 1044	-	1400370	.625	15.875	4x4	1577	1.55	12.8	5.08	15.6	45400	0.92
LL 1066	-	1400371	.625	15.875	6x6	1577	1.55	12.8	5.08	22.2	68100	1.36
LL 1222	-	1400372	.75	19.05	2x2	1892	1.81	14.8	5.72	10.0	32000	0.62
LL 1244	-	1400373	.75	19.05	4x4	1892	1.81	14.8	5.72	17.8	64000	1.21
LL 1266	-	1400374	.75	19.05	6x6	1892	1.81	14.8	5.72	24.8	96000	1.79
LL 1622	-	1400057	1.0	25.4	2x2	2532	3.06	20.2	8.27	15.5	72000	1.42
LL 1644	-	1400060	1.0	25.4	4x4	2532	3.06	20.2	8.27	28.1	144000	2.79
LL 1666	-	1400063	1.0	25.4	6x6	2532	3.06	20.2	8.27	40.5	216000	4.15
LL 2022	-	1400375	1.25	31.75	2x2	3157	3.56	25.3	10.17	18.2	95000	2.03
LL 2044	-	1400376	1.25	31.75	4x4	3157	3.56	25.3	10.17	33.4	190000	4.00
LL 2066	-	1400377	1.25	31.75	6x6	3157	3.56	25.3	10.17	47.9	285000	5.96
LL 2422	-	1400378	1.5	38.1	2x2	3797	5.08	30.7	14.63	25.4	170000	3.60
LL 2444	-	1400379	1.5	38.1	4x4	3797	5.08	30.7	14.63	46.8	340000	7.07
LL 2466	-	1400380	1.5	38.1	6x6	3797	5.08	30.7	14.63	68.2	510000	10.53

END FIXINGS AVAILABLE. DETAILS ON REQUEST. F_B = AXIAL BREAKING FORCE

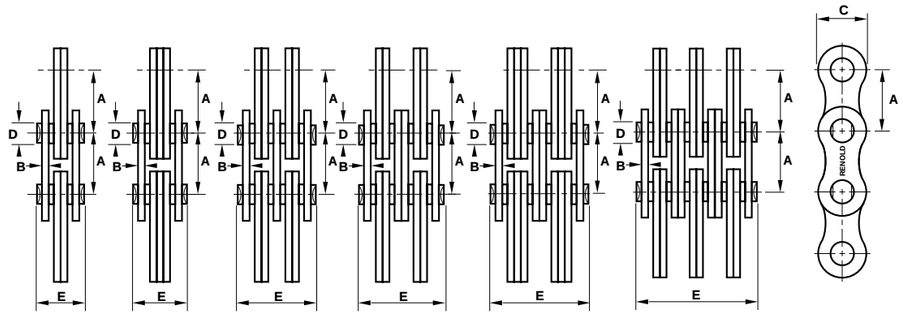


Plate Combination

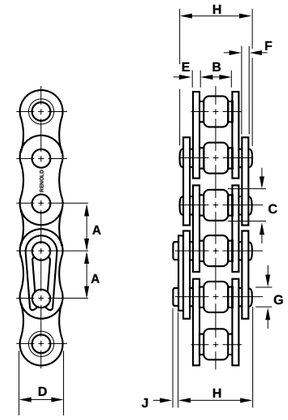
2x2 2x3 3x4 4x4 4x6 6x6

Chain Technical Details

ISO No	ANSI No	Renold Chain No	Nominal Pitch Inch A	Nominal Pitch mm A	Plate Combination	Chain Length over 100 pitches (± 0.25%)	Plate Width B	Plate Depth C	Pin Dia D	Width Over Pin E	F_B N min	Weight kg/m
-	1234	1400023	.500	12.7	3x4	1259	1.69	10.7	4.45	14.2	31000	0.71
-	1256	1400026	.500	12.7	5x6	1259	1.69	10.7	4.45	21.1	53000	1.10
-	1288	1400030	.500	12.7	8x8	1259	1.69	10.7	4.45	30.0	85000	1.60
-	1523	1400034	.625	15.875	2x3	1580	1.94	12.7	5.08	12.1	29000	0.69
-	1534	1400035	.625	15.875	3x4	1580	1.94	12.7	5.08	16.0	46000	0.94
-	1544	1400036	.625	15.875	4x4	1580	1.94	12.7	5.08	18.1	58000	1.07
-	1545	1400037	.625	15.875	4x5	1580	1.94	12.7	5.08	20.3	58000	1.22
-	1556	1400039	.625	15.875	5x6	1580	1.94	12.7	5.08	24.0	72000	1.47
-	1566	1400040	.625	15.875	6x6	1580	1.94	12.7	5.08	25.9	87000	1.60
-	1567	1400041	.625	15.875	6x7	1580	1.94	12.7	5.08	27.8	90000	1.74
-	1578	1400042	.625	15.875	7x8	1580	1.94	12.7	5.08	32.5	101000	2.00
-	1588	1400043	.625	15.875	8x8	1580	1.94	12.7	5.08	34.0	115000	2.15
-	LL1223	1400606	.75	19.05	2x3	1892	1.81	14.8	5.72	12.0	32000	0.82
-	LL1234	1400548	.75	19.05	3x4	1892	1.81	14.8	5.72	16.0	48000	1.14
-	LL1245	1400607	.75	19.05	4x5	1892	1.81	14.8	5.72	19.7	64000	1.47
-	LL1256	1400608	.75	19.05	5x6	1892	1.81	14.8	5.72	22.9	80000	1.70
-	LL1267	1400609	.75	19.05	6x7	1892	1.81	14.8	5.72	26.7	96000	2.00
-	LL1278	1400610	.75	19.05	7x8	1892	1.81	14.8	5.72	30.3	112000	2.30
-	1944	1400048	.75	19.05	4x4	1891	2.29	14.8	5.72	21.3	73000	1.20
-	1966	1400051	.75	19.05	6x6	1891	2.29	14.8	5.72	30.3	110000	1.78
-	1988	1400054	.75	19.05	8x8	1891	2.29	14.8	5.72	40.0	140000	2.40
-	2523	1400058	1.0	25.4	2x3	2532	3.06	20.2	8.27	18.6	72000	1.65
-	2534	1400059	1.0	25.4	3x4	2532	3.06	20.2	8.27	25.3	108000	2.27
-	2545	1400061	1.0	25.4	4x5	2532	3.06	20.2	8.27	31.6	144000	2.93
-	2556	1400062	1.0	25.4	5x6	2532	3.06	20.2	8.27	37.2	180000	3.54
-	2567	1400064	1.0	25.4	6x7	2532	3.06	20.2	8.27	43.6	216000	4.20
-	2578	1400065	1.0	25.4	7x8	2532	3.06	20.2	8.27	50.0	252000	4.47
-	2588	1400066	1.0	25.4	8x8	2532	3.06	20.2	8.27	52.8	290000	5.20
-	3144	1400071	1.25	31.75	4x4	3154	4.16	22.80	10.17	37.90	214000	4.05
-	3166	1400074	1.25	31.75	6x6	3154	4.16	22.80	10.17	55.00	304000	6.04
-	3844	1400082	1.50	38.10	4x4	3806	5.55	30.70	14.63	49.10	360000	7.37
-	-	160244	2.00	50.80	4x4	5077	7.14	47.63	20.32	73.66	667200	17.58
-	-	160266	2.00	50.80	6x6	5077	7.14	47.63	20.32	103.38	934100	26.00
-	-	160288	2.00	50.80	8x8	5077	7.14	47.63	20.32	133.10	1245000	34.32
-	-	160388	3.00	76.20	8x8	7617	7.14	73.03	34.67	160.02	1842000	61.02
-	-	160300	3.00	76.20	10x10	7617	7.14	73.03	34.67	189.61	2342000	74.41

OTHER SIZES AVAILABLE ON REQUEST.
MANY STANDARD END LINKS AND FIXINGS ARE AVAILABLE. DETAILS ON REQUEST.
F_B = AXIAL BREAKING FORCE.

ISO606 A Series / ANSI B29.1



Chain Technical Details Connecting Links

ANSI No	Renold Chain No	Pitch Inch A	Pitch mm A	Inside Width B	Roller Dia C	Plate Height Max D	Plate Width Inner E	Plate Width Outer F	Pin Dia G	Pin Len H1	Con Link Extra J	Trans Pitch K	F_B N min	Weight kg/m	No 4	No 107	No 11	No 26	No 58	No 12	No 30
25	129023*	0.25	6.35	3.10	3.3*	6.27	0.76	0.76	2.3	8.6	0.8	-	4000	0.13	✓	✓	-	✓	-	-	✓
35	129033*	0.375	9.525	4.68	5.08*	9.30	1.3	1.3	3.59	15.5	3.3	-	10000	0.33	✓	✓	-	✓	-	✓	✓
40	119043	0.50	12.7	7.85	7.92	12.07	1.55	1.55	3.98	17.8	3.9	-	16900	0.63	✓	✓	✓	✓	-	✓	✓
50	119053	0.625	15.875	9.4	10.16	15.35	2.03	2.03	5.07	21.8	4.1	-	27800	1.05	✓	✓	✓	✓	-	✓	✓
60	119063	0.75	19.05	12.58	11.91	18.34	2.39	2.39	5.96	26.9	4.6	-	37800	1.55	✓	✓	✓	✓	-	✓	✓
80	119083	1.00	25.4	15.75	15.88	24.39	3.25	3.25	7.93	33.5	5.4	-	64500	2.80	✓	✓	✓	-	✓	✓	-
100	119103	1.25	31.75	18.9	19.05	30.48	4.06	4.06	9.54	41.1	6.1	-	104500	4.20	✓	✓	✓	-	✓	✓	-
120	119123	1.50	38.1	25.23	22.23	36.55	4.8	4.8	11.11	50.8	6.6	-	142000	5.70	✓	✓	✓	-	✓	✓	-
140	119143	1.75	44.45	25.23	25.4	42.67	5.61	5.61	12.71	54.9	7.4	-	191000	7.80	✓	✓	✓	-	✓	✓	-
160	119163	2.00	50.8	31.55	28.58	48.74	6.35	6.35	14.29	65.5	7.9	-	244500	10.40	✓	✓	✓	-	✓	✓	-
180	119183	2.25	57.15	35.48	35.71	54.86	7.11	7.11	17.46	73.9	9.1	-	324700	13.94	✓	✓	✓	-	✓	-	-
200	119203	2.50	63.5	37.85	39.67	60.93	8.13	8.13	19.85	80.3	10.2	-	422500	17.30	✓	✓	✓	-	✓	✓	-

* BUSH CHAIN F_B = AXIAL BREAKING FORCE

■ DETACHABLE COTTERED CHAIN AVAILABLE ON REQUEST

■ MULTIPLEX VERSIONS AVAILABLE ON REQUEST.

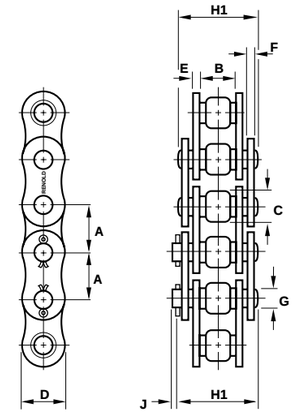

No4


No107


No11/58

Part Number: See technical data below.

Application: ANSI XTRA roller chain is specifically designed and manufactured for arduous applications where frequent, impulsive or heavy loads are involved, or where operating conditions are severe as in the mining, quarrying, rock drilling, forestry and construction industries. This chain is interchangeable with our standard ANSI range and can be used to upgrade the performance of existing applications subject to normal design and installation checks. Multiplex versions are also available on request.



Chain | Technical Details | Connecting Links

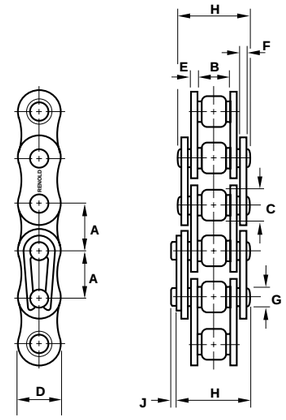
ANSI No	Renold Chain No	Pitch Inch A	Pitch mm A	Inside Width B	Roller Dia C	Plate Height Max D	Plate Width Inner E	Plate Width Outer F	Pin Dia G	Pin Len H1	Con Link Extra J	FB N min	Weight kg/m	No 4	No 107	No 58
60H	187661	0.75	19.05	12.57	11.91	17.50	3.17	3.17	5.94	28.6	4.6	40000	1.80	✓	✓	✓
60HV	187666	0.75	19.05	12.57	11.91	17.50	3.17	3.17	5.94	28.6	4.6	55000	1.80	✓	✓	✓
80H	189531	1.00	25.4	15.75	15.88	24.39	4.06	4.06	7.93	36.1	5.4	70000	3.30	✓	✓	✓
80V	189546	1.00	25.4	15.75	15.88	24.39	3.25	3.25	7.93	32.7	5.4	75000	2.80	✓	✓	✓
80HV	189541	1.00	25.4	15.75	15.88	24.39	4.06	4.06	7.93	36.1	5.4	87000	3.30	✓	✓	✓
100H	188556	1.25	31.75	18.90	19.05	30.48	4.8	4.8	9.54	44.1	6.1	104500	4.80	✓	✓	✓
100V	188576	1.25	31.75	18.90	19.05	30.48	4.06	4.06	9.54	41.1	6.1	122000	4.20	✓	✓	✓
100HV	188566	1.25	31.75	18.90	19.05	30.48	4.8	4.8	9.54	44.1	6.1	133450	4.80	✓	✓	✓
120H	188661	1.50	38.1	25.23	22.23	36.55	5.61	5.61	11.11	54.1	6.6	142000	6.30	✓	✓	✓
120V	188676	1.50	38.1	25.23	22.23	36.55	4.8	4.8	11.11	50.8	6.6	169000	5.70	✓	✓	✓
120HV	188671	1.50	38.1	25.23	22.23	36.55	5.61	5.61	11.11	54.1	6.6	182400	6.30	✓	✓	✓
140H	188716	1.75	44.45	25.23	25.4	42.67	6.35	6.35	12.71	57.9	7.4	191000	8.60	✓	✓	✓
140V	188736	1.75	44.45	25.23	25.4	42.67	5.61	5.61	12.71	54.9	7.4	235000	7.80	✓	✓	✓
140HV	188726	1.75	44.45	25.23	25.4	42.67	6.35	6.35	12.71	57.9	7.4	258000	8.60	✓	✓	✓
160H	188731	2.00	50.8	31.55	28.58	48.74	7.11	7.11	14.29	68.5	7.9	244500	11.20	✓	✓	✓
160V	188746	2.00	50.8	31.55	28.58	48.74	6.35	6.35	14.29	65.5	7.9	289000	10.40	✓	✓	✓
160HV	188741	2.00	50.8	31.55	28.58	48.74	7.11	7.11	14.29	68.5	7.9	311400	11.20	✓	✓	✓
180H	188761	2.25	57.15	35.48	35.71	53.51	8.13	8.13	17.46	77.94	9.1	324700	15.21	✓	✓	✓
180V	188756	2.25	57.15	35.48	35.71	53.51	7.11	7.11	17.46	73.90	9.1	382500	13.94	✓	✓	✓
180HV	188771	2.25	57.15	35.48	35.71	53.51	8.13	8.13	17.46	77.94	9.1	422500	15.21	✓	✓	✓
200H	188781	2.50	63.5	37.85	39.67	60.93	9.65	9.65	19.85	86.4	10.2	422500	19.50	✓	✓	✓
200V	188776	2.50	63.5	37.85	39.67	60.93	8.13	8.13	19.85	80.3	10.2	445000	17.30	✓	✓	✓
200HV	188791	2.50	63.5	37.85	39.67	60.93	9.65	9.65	19.85	86.4	10.2	600500	19.50	✓	✓	✓

F_B = AXIAL BREAKING FORCE.

No4

No107

No58



Chain | Technical Details | Connecting Links

ISO No	Renold Chain No	Pitch Inch A	Pitch mm A	Inside Width B	Roller Dia C	Plate Height Max D	Plate Width Inner E	Plate Width Outer F	Pin Dia G	Pin Len H1	Con Link Extra J	Trans Pitch K	F_B N min	Weight kg/m	No 4	No 107	No 11	No 26	No 58	No 12	No 30
-	1141*	-	4.0	2.7	2.5	4.1	0.57	0.57	1.65	6.8	1.2	-	1800	0.07	✓	✓	✓	-	-	-	
03	1151	-	5.0	2.5	3.2	4.1	0.57	0.57	1.49	7.4	2.5	-	2200	0.08	✓	✓	-	✓	-	✓	
04	1161	-	6.0	2.8	4.0	5.0	0.57	0.57	1.85	7.4	2.9	-	3000	0.12	✓	✓	-	✓	-	✓	
05B-1	110500	0.315	8.0	3.0	5.0	7.11	0.73	0.73	2.31	8.6	3.1	-	5000	0.18	✓	✓	-	✓	-	✓	
-	110037	0.375	9.525	3.94	6.35	8.26	1.3	1.04	3.28	10.9	3.3	-	11100	0.34	✓	✓	-	✓	-	✓	
06B-1	110038	0.375	9.525	5.72	6.35	8.26	1.3	1.04	3.28	13.5	3.3	-	11100	0.39	✓	✓	-	✓	-	✓	
-	111044	0.50	12.7	3.3	7.75	9.9	1.1	0.95	4.09	9.8	3.9	-	8900	0.30	✓	✓	-	✓	-	✓	
-	111046	0.50	12.7	4.88	7.75	9.9	1.1	0.95	4.09	11.4	3.9	-	8900	0.35	✓	✓	-	✓	-	✓	
-	110044	0.50	12.7	5.21	8.51	11.81	1.55	1.55	4.45	14.2	3.9	-	19000	0.62	✓	✓	-	✓	-	✓	
08B-1	110046#	0.50	12.7	7.75	8.51	11.81	1.55	1.55	4.45	17.0	3.9	-	19000	0.70	✓	✓	-	✓	-	✓	
-	110054	0.625	15.875	6.5	10.16	14.7	1.55	1.55	5.08	16.0	4.1	-	23000	0.81	✓	✓	-	✓	-	✓	
10B-1	110056#	0.625	15.875	9.65	10.16	14.73	1.55	1.55	5.08	18.8	4.1	-	23000	0.92	✓	✓	-	✓	-	✓	
12B-1	110066#	0.75	19.05	11.68	12.07	16.13	1.8	1.8	5.72	22.7	4.6	-	30500	1.20	✓	✓	-	✓	-	✓	
16B-1	110088#	1.00	25.4	17.02	15.88	21.08	4.12	3.1	8.28	36.1	5.4	-	67000	2.80	✓	✓	-	✓	✓	-	
20B-1	110106	1.25	31.75	19.56	19.05	26.42	4.62	3.61	10.19	43.2	6.1	-	98070	3.85	✓	✓	-	✓	✓	-	
24B-1	110127	1.50	38.1	25.4	25.4	33.4	6.1	5.08	14.63	53.4	6.6	-	166700	7.45	✓	✓	✓	-	✓	-	
28B-1	110147	1.75	44.45	30.99	27.94	37.08	7.62	6.35	15.9	65.1	7.4	-	200000	9.35	✓	✓	✓	-	✓	-	
32B-1	110166	2.00	50.8	30.99	29.21	42.29	7.11	6.35	17.81	67.4	7.9	-	255000	10.10	✓	✓	✓	-	✓	-	
40B-1	110206	2.50	63.5	38.10	39.37	52.96	8.64	8.13	22.89	82.6	10.2	-	372700	16.50	✓	✓	✓	-	✓	-	
-	180709	3.00	76.2	45.72	48.26	63.88	12.19	10.16	29.24	99.1	10.5	-	578266	25.80	✓	✓	✓	-	-	-	
-	180781	3.50	88.9	53.34	53.98	77.85	13.72	12.45	34.3	114.6	11.7	-	778435	35.20	✓	✓	✓	-	-	-	
-	110325=	4.00	101.6	60.96	63.50	90.17	15.24	13.72	39.4	130.9	13.0	-	711800	49.30	✓	✓	✓	-	-	-	
-	180807	4.50	114.3	68.58	72.39	104.14	17.27	16.0	44.48	147.4	14.3	-	137894	263.40	✓	✓	✓	-	-	-	

= CHAINS TO BS 228:1984 * BUSH CHAIN F_B = AXIAL BREAKING FORCE

THESE CHAINS CAN BE SUPPLIED NICKEL PLATED

NOTE: MULTIPLEX VERSIONS AVAILABLE ON REQUEST STRAIGHT SIDE PLATES

SECTION 2

LIFTING CHAIN INSTALLATION AND MAINTENANCE

Correct Inspection

Detect Excessive Chain Wear

Proper inspection and maintenance will provide the most efficient operation and service life for your chain. Each lift chain should be inspected, cleaned and lubricated after every 100 hours of use. Where the truck and hence the chain is operating in a corrosive or cold environment, the chains should be inspected, cleaned and lubricated after every 50 hours.

Inspect for all of the following conditions.

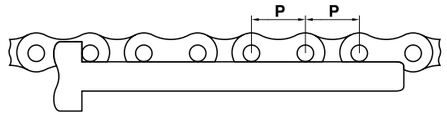
1. WEAR.

Chains wear due to normal flexing between the pin and plates when running over the sheaves and from corrosion from lack of lubrication between the joints. A RENOLD wear guide for roller and leaf chain is available to measure chain wear or ‘stretching’. Chain should be replaced when it elongates by more than 3% (Leaf Chain) or 2 % (Roller Chain) from its original measurement. Always measure the portion of chain running over the sheaves to ensure correct inspection.

Do not repair sections of a worn out chain, splice new chain portions or used chain portions into a worn out chain, but replace the whole chain. When inspecting a truck with more than one chain, FIT NEW CHAINS AS A PAIR, never replace just one.

Renold Chain Wear Guide

A simple to use chain wear guide is available from Renold for most popular sizes of chain pitch.



WHEN THE PIN CENTRE COMES TO OR PAST THE INDICATED POINT, THE CHAIN IS WORN OUT: IT IS TIME TO CHANGE THE CHAIN.

2. CORROSION.

Rust corrosion occurs when a chain is inadequately lubricated or incorrectly lubricated. Chain is a precision product, highly stressed, produced to resist fatigue. Cracked side plates and reduced load carrying will occur due to rust corrosion. Every RENOLD chain is pre-lubricated to resist rust corrosion.

When lubricating chain it is important to ensure the complete chain has a thin film of lubricant, side plates being susceptible to stress-corrosion cracking. Replace the entire chain when a cracked plate is discovered.

3. CRACKED PLATES.

Cracked plates normally occur due to fatigue failure.
The crack will be seen from the pitch hole, perpendicular to the pitch line. Repetitive shock loads at the chain’s maximum capacity may cause plates to crack resulting in the chain eventually breaking. When a cracked plate is discovered, replace the entire chain or chains.

4. CHAIN TENSILE FAILURE

Overloads above the recommended maximum working load capacity will cause this type of failure.

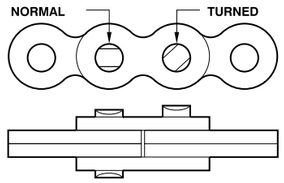
Tensile failure

5. TIGHT JOINTS.

Tight joints may be caused in chains by bent pins or plates, rusty joints or peened plate edges. All chains should run freely without tension to prevent this problem. Increased tension will accelerate wear and fatigue problems in a chain. Replace the entire chain when tight joints are found.

6. PROTRUDING PINS.

Any chain with protruding pins should be replaced immediately. The cause of this problem is a lack of lubrication causing friction between the pin and plate or the pin and bush in a roller chain allowing the pin to turn in the plate and protrude from the chain, resulting in chain failure.



7. SIDE PLATE WEAR.

Side plate wear normally results from chain misalignment over the sheaves damaging pin heads and plates. The added friction from this problem can also cause protruding pins. Replace the chain or chains when a wear pattern is found.

8. CHAIN ANCHORS AND SHEAVES.

Improperly adjusted anchors may cause twisting and misalignment of the chain. When anchors are worn or broken, they must be replaced. Sheaves with worn flanges caused by misaligned chain must always be replaced.

Correct Lubrication

Every RENOLD chain is pre-lubricated at the factory for a protected shelf life and from initial wear in use.
Chains are lubricated to ensure that all mating parts have reduced friction and so longer service life.
When inspecting a chain, the lubricant is removed and correct re-lubrication must therefore be re-applied before use.

After solvent cleaning the chain should be immersed in a multigrade SAE 20/50 oil ensuring the mating parts are fully covered. Both chain and sheave life will be enhanced with correct and regular lubrication. I.E. Renold Chain Lubricant pt No. 611124.

For more details request a copy of the RENOLD INSTALLATION AND MAINTENANCE GUIDE.

The frequency of lubrication depends on the environment in which the chains are working. The chain should be inspected every 100 hours when working in normal conditions. When operating in harsh environments such as outdoors, dusty conditions or the extreme cold, it is recommended that the chain be inspected and re-lubricated every 50 hours.

Leaf chain by its design of multiple plates on a single pin allows easier lubrication of the bearing area compared to roller chain. When operating in a dusty or dirty environment, roller chain may produce a 'PASTE' made up of dirt and oil, that will accelerate chain wear. When such a condition is found, the chain must be cleaned and re-lubricated immediately.

Chain Replacement

SOME REASONS TO REPLACE BOTH CHAINS AT THE SAME TIME, NOT JUST ONE.

1. Used chain may have sustained fatigue cracking that will eventually cause failure.
2. The anchors holding the used chain may be at the limit of their adjustment causing misalignment of both the used and new chain.
3. Even when anchors 'APPEAR' to be adjusted, the used chain may cause the carriage rollers to wear unevenly into the inner channel, (off centre loading).
4. Fork Lift and chain manufacturers recommend that both chains be changed at the same time to enhance service life, with increased safety for the users.
5. A new chain will have less rolling resistance causing stress on cylinder cross-heads and sheaves.
6. Where the chains were subject to shock loads, both used chains may have fatigue cracks. The used chain is therefore the 'weak link' and could fail in a very short period of time.
7. A mixture of used and new chain will cause the new chain to wear out quicker, resulting in more expense by replacing the new chain prematurely.
8. The time and labour cost to change the second chain is minimal once the truck is stripped down.

Introduction

Renold Chain has over 100 years experience in the operation and maintenance of lifting chain. Involvement with designers, manufacturers and users of all types of equipment has enabled Renold to develop this concise manual for chain lifting applications.

This definitive manual is designed to pass on the preferred methods of correct handling, adjustment, installation and maintenance of lifting chain systems resulting in maximum
chain life.

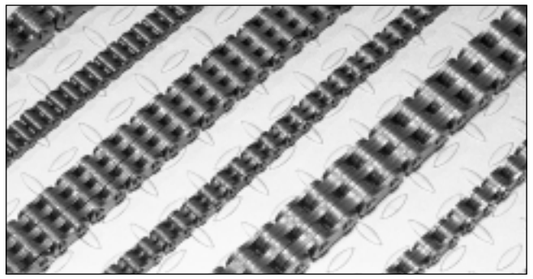
If further information is required, please contact our technical sales staff.

Types of Lifting Chain

There are three main categories of lifting chain covered by this guide. Of these the most popular is leaf chain also referred to as Fork Lift Truck (FLT) chain since it is used in large quantities on this type of application.

LEAF CHAIN

Made from interlaced plates connected with a hardened pin. Defined in ISO4347 latest edition.



These chains cannot be used with sprockets since there is no means of engagement. Leaf chains have a greater strength/weight ratio than Roller chains.

ROLLER CHAIN

Conventional pin, roller and bush construction normally used for transmission applications but easily adapted for lifting purposes. Defined in ISO 606 latest edition.

Heavy duty ANSI chains with thick side plates are particularly suitable for lifting applications.

BUSH CHAIN

Identical to roller chain but with the omission of the roller. The main disadvantage is that sprocket/ bush wear can be rapid in highly loaded applications.

Chain Numbering

LEAF CHAIN

Renold chain conforms to International standards and can be ordered using the ISO or ANSI Part Number.

The letters prefixing the part number refer to the root transmission chain standard, as shown below:

LH = Chain based on ISO4347 (ANSI Chain)
BL = Identical to LH (North American terminology)
LL = Chain based on ISO4347 (European Type)
AL = Obsolescent standard. No longer covered by ISO or ANSI standards.

Example BL646. (or LH1246.)

The left hand numbers refer to the chain pitch size in 1/8 (or 1/16 for LH) inch units i.e. 3/4" pitch. The right hand numbers refer to the chain lacing i.e. 4 x 6.

ROLLER CHAIN

The ANSI standard number system consists of at least two or three digits and possibly a suffix. The left hand digit or digits refer to the pitch size in 1/8 inch units. The right hand number refers to the chain style. For multiple strand chains a dash and a number is added.

Example ANSI 60H

i.e. 3/4" pitch roller chain - heavy series.

The ISO standard number system consists of at least two or three digits and a suffix. The digits refer to the pitch size in 1/16 inch units. The right hand number refers to the chain style.

For example:

1" Pitch ISO 16B - European Type

For Multiple Strand chains, add a dash and the number of strands, e.g. 16B-3.

Equipment Needed

The breaking of roller and bush chain can be achieved by using a Renold Chain Extractor, these being:-

- 311015 for light industrial chains up to 0.5” pitch.
- 10101 for chains from 0.375” to 0.625” pitch.
- 10102 for chains from 0.75” to 1.25” pitch European and 0.75” to 1” ANSI.

Pin heads will need to be removed using a hand grinder on all types of leaf chain and larger roller and bush chains.

For joining any chain up to 2.5” pitch, a drift punch will be required. Note however that it is not recommended that the user attempts to join lengths of FLT chain.

Erection of medium or heavy chain systems requires millwrighting equipment such as lifting tackle, slings, wedges, packing etc.

OTHER USEFUL EQUIPMENT

Straight edges and/or strong, fine line.

Spirit level.

Plumb line.

Selection of hammers, files, key blanks, etc.

Hand Grinding Machine.

Preparation

Check equipment to ensure that general requirements are correct (e.g. sprockets, sheaves, means of adjustment).

Check condition and rigidity of the shafts and bearings, particularly if there has been considerable previous service. Replace or rectify if necessary.

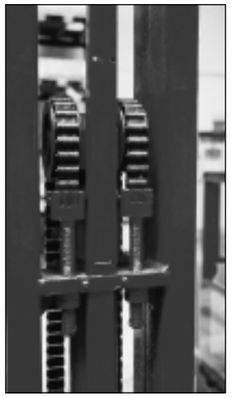
Drive/headshaft/sprockets should be checked to ensure they are level, parallel and square with any slides or bearings.

Use a spirit level and adjustable comparator bar or micrometer between shafts at extreme points on each side of the drive. Rectify any parallelism error present.

Place sprockets or respective shafts in approximate alignment and fit the keys in accordance with correct engineering practice. Do not finally secure keys at this stage.
Care must be taken with sprockets of split design to ensure perfect abutting of the faces of each half. Proceed with the key fitting after the halves are finally bolted together, otherwise the key can prevent correct assembly and subsequently result in malgearing.

It should be verified that key heads will not project beyond the width of any cases, guards or guides.

Checking Alignment



Accurate alignment of shafts, sheaves and sprocket tooth faces provides a uniform distribution of load across the entire chain width and contributes substantially to maximum drive life.

Use a straight edge in several different positions, if possible, as a check against wobble. A nylon or similar line is a good substitute for a straight edge particularly on longer centre distances.

Installation of Chain

Should endwise float of shafts be present, make due allowances so that alignment is correct at the mid position of float.

When alignment is correct within closest practical limits, drive any keys home and take a final check.

When sheaves are used it should be checked that the chain sits comfortably between the flanges with equal clearance on both sides. Pins should not rub on the sheave flanges.
Renold Chain should not be assembled into the system until attention has been paid to cleanliness of the sprocket teeth and sheave working area, particularly if debris of an abrasive nature (cement dust, weld spatter etc.) has been prevalent whilst work was in progress.

Ensure the chain is clean and free from debris and place around the sprockets or sheave, observing instructions where matched strands are involved. Ensure that the strength of tackle is sufficient to hold the chain. Chain weights are shown in the Renold catalogue. Do not detach any tackle until the chain is completely assembled.

Never paint a chain since this will prevent the penetration of maintenance lubricant.

RENOLD
Lifting Chain Installation and Maintenance

ADJUSTMENT

After chain installation ensure that all fastenings have been properly tightened.

Carry out any adjustment operations to ensure that all chains are equally loaded.

Test Run

It is advisable to give the system a short test run for the following reasons:

To check for correct operation.

To ensure there is no cross binding and all chains are carrying an equal load.

To check for any unusual noise or vibration.

Maintenance Schedule

Regular chain maintenance is important if maximum life is to be achieved. In a correctly sized and installed system with adequate maintenance lubrication, the chain is expected to last for approximately 6,000 hours or 3 years whichever is shorter.

The following maintenance schedule is suggested.

REGULARLY

- Check chain adjustment/load sharing and rectify if necessary.
- Check for smooth operation while under load in both lifting and lowering directions.
- Check for wear on side plates. (Max 5% of plate height).
- Check for evidence for twist or side bow.
- Check for damaged or cracked plates.
- Check for chain elongation. (Max 3% FLT chain, 2% Roller chain).
- Check for turned or protruding pins.
- Check for cleanliness of components.
- Check for shaft and sprocket or sheave alignment.
- Check for wear on sprockets or sheaves.
- Check the condition of the lubricant.
- Relubricate if necessary.
- Check the lubrication system if present.

The frequency of maintenance checks depends upon environmental conditions such as presence of moisture, temperature extremes, corrosive atmospheres, abrasive contamination etc. The presence of shock or overloads will also reduce life expectancy and increase the requirement for regular checks.

AT LEAST EVERY SIX MONTHS

Carry out the above checks and procedures on the entire chain. If all parts of the chain cannot be accessed remove it and replace in accordance with manufactures instructions.

Chain Protection

A new Renold chain should always be stored in its original packing until installation. Renold chain is lubricated at the factory, but this lubrication will not stand up to outdoor conditions for prolonged periods particularly where there is a salt water atmosphere.

Unprotected, lubricated chains will become contaminated with grit and other materials which will harm the chain.

Lubrication

Renold Chain should be protected against dirt and moisture and be lubricated with good quality, non-detergent petroleum based oil. A periodic reoiling is desirable as already outlined. Heavy oils and greases are generally too stiff to enter the chain working surfaces and should not be used.

Care must be taken to ensure that the lubricant reaches the bearing area of the chain. This can be done by directing the oil into the clearances between the inner and outer link plates.

The table below indicates the correct lubricant viscosity for various ambient temperatures.

Ambient Temperature	Lubricant Viscosity Rating (cSt)	
°Celsius	SAE	BS4231
-5 to +5	20	46 to 68
5 to 40	30	100
40 to 50	40	150 to 220
50 to 60	50	320

For the majority of applications in the above temperature ranges, a multigrade SAE 20/50 oil would be suitable.

USE OF GREASE

As mentioned, the use of grease is not recommended. However, if grease lubrication is essential it should be noted that applying normal greases to the outside surfaces of a chain only seals the bearing surfaces and will not work into them. This causes premature failure. Grease has to be heated until fluid and the chain immersed and allowed to soak until all air bubbles cease to rise. If this system is used the chains need regular cleaning and regreasing at intervals, depending on the loads in the lifting system.

ABNORMAL AMBIENT TEMPERATURES

For elevated temperatures up to 250°C, dry lubricants, such as colloidal graphite or MoS2 in white spirit or poly-alkaline glycol carriers are most suitable.

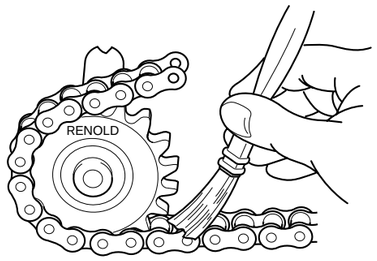
Conversely, at low temperatures between -5° and -40°C, special low temperature initial greases and subsequent oil lubricants are necessary. Lubricant suppliers will give recommendations.

LUBRICATING METHODS

There are two basic methods of lubricating lifting systems.

TYPE 1, Manual Lubrication.

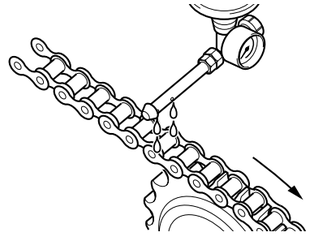
Oil is applied periodically with a brush or oil can, preferably once every 8 hours of operation. Volume and frequency should be sufficient to just keep the chain wet with oil and allow penetration of clean lubricant into the chain joints.



Applying lubricant by aerosol can be satisfactory under some conditions, but it is important that the aerosol lubricant is of an approved type for the application, such as that supplied by Renold. This type of lubricant penetrates into the pin/ bush/roller clearances resisting both the tendency to drip or drain when the chain is stationary and dripping when the chain is moving.

TYPE 2, Drip or Pressurised Lubrication

Oil drips or jets are directed between the link plate edges from a lubricator. Volume and frequency should be sufficient to allow penetration of lubricant into the chain joints.



Environmental Factors

EFFECT OF TEMPERATURE

During operation an important factor to control in a drive system is the chain temperature. Depending on the severity of the drive service, continuity of use, etc., special attention to the lubrication method may be required.

Chain temperature above 100°C should be avoided if possible due to lubricant limitations, although chain can generally give acceptable performance up to around 250°C in some circumstances.

Low temperatures reduce chain strength by embrittlement. Going in and out of cold storage can result in moisture from condensation.

CHEMICAL SOLUTIONS OR VAPOURS

Corrosive attack on the chain components can cause microscopic cracking. This can lead to progressive deterioration followed by dramatic failure.

ABRASIVES

These will cause accelerated wear and is difficult to detect at an early stage.

DYNAMIC/SHOCK LOADS

These can lead to early fatigue failure of pins and plates.

All of the above conditions make it very difficult to predict chain life. It is therefore important to monitor chain performance closely until a proper schedule is established.

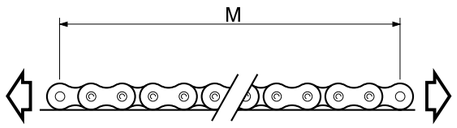
To Measure Chain Wear

Chain wear can be ascertained by length measurement as follows:

Lay the chain on a flat surface and, after anchoring it at one end, attach to the other end a turnbuckle and a spring balance suitably anchored.

Apply a tension load by means of the turnbuckle amounting to approximately 5% of the chain breaking load.

As an alternative to the use of turnbuckle and spring balance, the chain may be measured in-situ with a nominal weight in the lifting system.



Measure length 'M' (see diagram) in millimetres from which the percentage extension can be obtained from the following formula.

$$\textbf{Percentage extension} = M - \frac{(X \times p) \times 100}{X \times p}$$

Where X = number of pitches measured

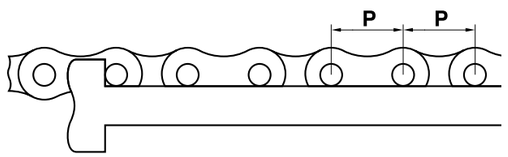
p = pitch in mm

- As a general rule, the useful life of the chain is terminated and the chain should be replaced when the percentage extension reaches 3% (FLT chain) 2% (other chain).

It is not satisfactory to determine the elongation of a chain by checking its overall length against the nominal length of a new chain. Worn chains must be examined over their full length and then measured on that portion of the chain which has obviously had the most wear. Maximum wear occurs generally to those sections which articulate under load i.e. where the chain passes over a sprocket or sheave.

RENOLD CHAIN WEAR GUIDE

A simple to use chain wear guide is available from Renold for most popular sizes of chain pitch.

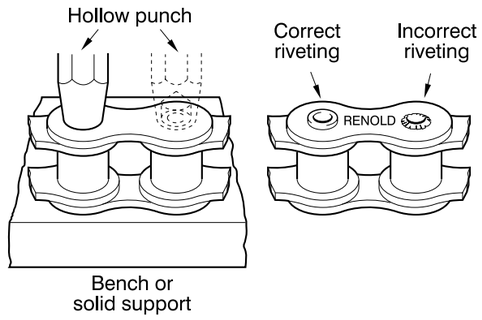


WHEN THE PIN CENTRE COMES TO OR PAST THE INDICATED POINT, THE CHAIN IS WORN OUT: IT IS TIME TO CHANGE THE CHAIN.

Riveting Chain

ROLLER CHAINS UP TO 63.5mm (2.5") pitch.

- Insert the bearing pins of the outer link (No. 107) through the inner links of the chain to be joined. If multiplex chain, assemble intermediate plates at the same time.
- Provide support for the outer link (No.107) while assembling the separate outer plate. This has a force fit and is driven onto the bearing pins using a hollow punch alternatively on each pin. The plate should be driven to the point of similar clearance between outer and inner links as with the adjacent chain.



- Still supporting the outer link (No.107), rivet the bearing pin ends, taking care to finish with a neat uniform spread having a similar appearance to the pins in the adjacent chain. The force required to spread the pin end will vary with the pitch of the chain, excessive riveting force should always be avoided. Except where final chain joining in-situ is necessary, the work should be carried out on a bench.
- Check that the newly fitted link articulates freely.

Chain Matching

Any application in which two or more strands of chain are required to work side by side would benefit from special matching procedures. These procedures only apply to roller chain and can be summarised as follows:

Length Matching

Chains are accurately measured in handling lengths between 3m and 8m and selected to give overall length uniformity of two (or more) strands.

Pitch Matching

Pitch matched chains are made from shorter subsections around 0.3 to 0.6m in length, graded and joined to give even greater accuracy on both pitch to pitch dimensions and overall lengths.

Colour Coding

The above two methods are factory applied. It is also possible to receive chain coded to give a graded length tolerance within the normal manufacturing limits of 0 to +0.15%.

Contact Renold Chain for further details.

Repair and Replacement

GENERAL

A correctly installed chain will enhance service life and ensure safe operation.

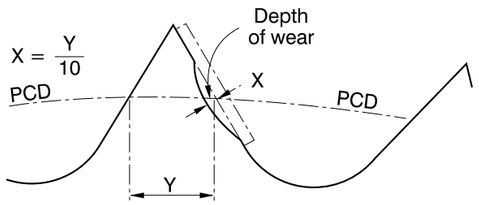
When ordering replacement chains consult your operating/service manual to ensure that the new chain or chains will be supplied to the correct size, length and configuration.

Where a lift truck has a pair of chains, a new pair should always be ordered and replaced. The replacement of only one chain will lead to premature failure of both the new and used chain.

SPROCKETS

Examination of the tooth faces will give an indication of the amount of wear which has occurred. Under normal circumstances this will be evident as a polished worn strip about the pitch circle diameter on each of the sprocket teeth as shown.

If the depth of this wear 'X' has reached an amount equal to 10% of the 'Y' dimension, then steps should be taken to replace the sprocket. Running new chain on sprockets having this amount of tooth wear will cause rapid chain wear.



It should be noted that in normal operating conditions, with correct lubrication the amount of wear 'X' will not occur until several chains have been used.

SHEAVES

Check the running diameter and side faces of the flanges of sheaves. There should be no evidence of side wear on the flanges (indicating malalignment). The sheave diameter should not be excessively worn.

CHAIN

Chain repair should not as a rule be undertaken. A correctly selected and maintained chain should gradually wear out over a period of time, but it should not fail. A length extension check will give an indication of the service life remaining.

Renold chain is prelubricated at the factory to ensure good corrosion resistance and wear properties. If a chain is dry of this lubricant due to cleaning, the chain must be relubricated before fitting to the system.

OTHER POINTS

Before refitting the chain check that the chain anchors and sheaves are undamaged. Broken, damaged or worn out anchors and sheaves must be replaced before fitting the chain or chains.

Never fit a chain with a used anchor pin. Pins may have been bent or damaged or have fatigue cracks that cannot be seen by the naked eye. Your operating/service manual will give full and detailed instructions on fitting and adjusting the chain.

Never paint chain or clean chain using steam or high pressure water jets.

If a lifting chain sustains damage due to an overload, jam-up, or by riding over the sprocket teeth or sheave flanges, it should be carefully removed from the drive and given a thorough visual examination. Remove the lubricating grease and oil to make the task easier.

Depending on the damage, it may be practicable to effect temporary repairs using replacement links. It is not, however, a guarantee that the chain has not been overstressed and so made vulnerable to a future failure.
The best policy therefore is to remove the source of trouble and fit a new chain.

REPLACING CHAIN SETS

When replacing chain in multiple point lifting systems the entire chain set should be replaced for the following reasons:

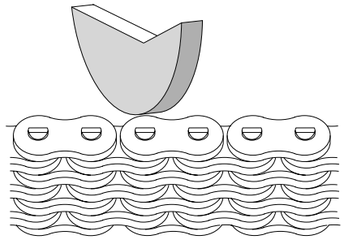
- Used chain may have sustained fatigue cracking that will eventually cause failure.
- Used chain may have elongated which will lead to a premature replacement of a new chain running in parallel.
- The anchors holding the used chain may be at the limit of their adjustment causing misalignment of both the used and new chain.
- A new chain will have a lower rolling resistance than its mating chain causing stress on cylinder cross-heads and sheaves.
- The time and labour cost to change the second chain is minimal once the truck is stripped down ready.

RENOLD
Lifting Chain Installation and Maintenance

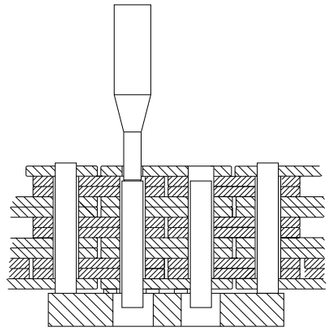
Disconnecting Chain

DISCONNECTING LEAF CHAIN

- Two pins need to be removed from one joint. Both pins should be in the same outside plate. With a grinding wheel, grind the heads of both pins flush with the pin link plate. This prevents scoring damage to inside link holes during disassembly. If chain is exposed to grinding dust, chain should be cleaned and relubricated.



- Position a support ring in a clearance hole in the work surface. The support ring serves to support the bottom pin link plate and avoid damage to chain components while driving the pin through the chain.
- Drive the pin through the chain with a hammer and punch. The punch should have a diameter slightly less than the pin link plate aperture. Use a series of small blows rather than a few heavy ones.
- Repeat the above steps with the other pin in the same link.



DISCONNECTING ROLLER CHAIN

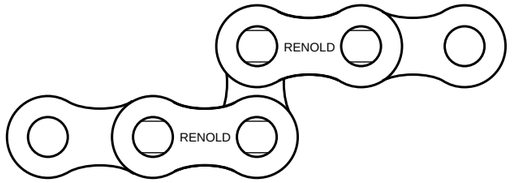
Renold Chain has end softened pins and for chain up to 1" pitch the pin may be removed using a suitable chain extractor. Otherwise follow the above procedure.

In order to obtain the longest life from a leaf chain, Renold recommends the following procedures for cutting short chain lengths from a new coil or shortening an existing leaf chain.

Method 1 - Grinding

Two pins need to be removed. Both pins should be in the same outer link plate. With a grinding wheel, grind the heads of both pins flush with the outer link plate. This will ensure that the pin when pushed out will not damage the portion of the inner link plate holes noted in Fig 2. The joint may now be easily removed with a suitable hammer and punch. If the chain is contaminated with grinding dust, it should be cleaned and re-lubricated before use.

Method 2 - Pressing



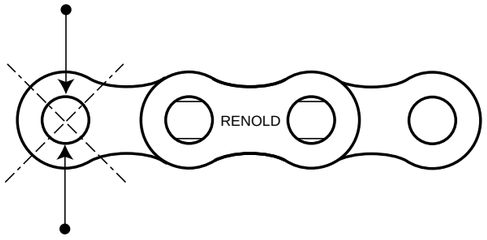
Two pins need to be removed. Both pins should be in the same outer link plate. Arrange the joint, which is to be removed as shown in Fig. 1 such that it is at right angles to the line of the chain. This will ensure that the riveted wedge of the pin head when pushed out will not damage the portion of the inner link plate holes noted in Fig. 2. Push the pins directly through the inner link plates using a suitable hydraulic or manual press. The movement of the pin through the outer link plate will tend to collapse the riveted end of the pin and allow it to pass freely through the inner link plate holes.

General

When using either of the above methods ensure that:

1. The outer plates are not reused.
2. The portion of the inner link plate holes noted in Fig. 2 are not damaged.

Pin removal



To remove the pins, position the chain on a solid support with a clearance hole corresponding to the pin positions. Drive the pin through the first outer link plate using a suitable hammer and punch, with a series of light blows rather than one heavy blow (Method 1) or with a suitable hydraulic or manual press (Method 2).
Once the pin is clear of this outer link plate, carry out the same operation on the second adjacent pin. At this point the pins may be removed by hand or with minimal additional force and should pass unimpeded through the inner link plates. If the pin has to be forced through the inner link plates, due to insufficient collapse of the pin head or poor grinding, excessive damage can occur to the holes of the inner link plates. Inner link plate holes should be visually checked on each cutting operation. Excessively damaged holes will have one or more very discernible grooves running in the direction of the pin removal. If excessive damage is noticed in the portion of the inner link plate holes noted in Fig. 2, the chain should not be used.

Safety Warnings

HEALTH AND SAFETY WARNING

The following precautions must be taken before disconnecting and removing a chain from a system prior to replacement.

1. Always isolate the power source from the drive or equipment.
2. Always wear safety glasses.
3. Always wear appropriate protective clothing, hats, gloves and safety shoes as warranted by the circumstances.
4. Always ensure tools are in good working condition and used in the proper manner.
5. Ensure there is no residual load in the system by supporting hung weights etc.
6. Always support the chain to avoid sudden unexpected movement of chain or components.
7. Never attempt to disconnect or reconnect a chain unless the correct procedure is fully understood.
8. Ensure that directions for the correct use of any tools are followed.
9. Never reuse individual components.
10. Never reuse a damaged chain or chain part.

GENERAL ADVICE

- Never mix chain from various manufacturers.
- Never build chain from individual components.
- If a chain has been damaged it is likely that parts not obviously damaged are also affected. Replace the entire chain.
- Do not electroplate chain, this can only be accomplished at the factory by plating individual components before assembly. Post electroplated chain will fail due to hydrogen embrittlement.
- Do not carry out welding operations on chain.
- Do not paint chain.
- Do not anneal or otherwise heat chain above 250ºC. If a torch is used to cut chain, the chain should be discarded.
- Do not join lengths of chain together, particularly in safety critical applications.
- Note that the minimum tensile strength quoted in catalogues does not refer to the working load. Designers generally use a factor of at least 5:1 on lifting applications.

Safety Warning FLT Chain

Never use a connecting link in any lifting application to join leaf or roller chain lengths together, in any manner that does not have the truck manufacturers approval. Misuse of connecting links will render your chain warranty void and subject the user to a safety hazard. Renold Distributors will not supply connecting links for this purpose.

When chains are sold as assemblies, the connecting pins must be fitted to the chain anchor and chain using the approved method outlined by the truck manufacturer.

If you are unsure about the correct method, contact your local Renold Chain Representative or the Truck Manufacturer direct.

The following notes highlight the common modes of failure in lifting chain.

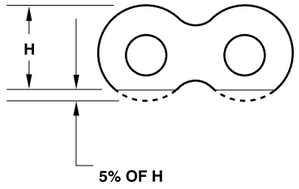
Modes of Failure

NORMAL WEAR

When the chain reaches the end of its normal wear life it should be replaced. It is important to measure the chain in the section that moves over the sprockets or sheaves which do the greater amount of work.

PLATE EDGE WEAR

Plate edge wear occurs where the chain runs over the sheave. This can be compared to a normal plate height by measuring an unworn portion.

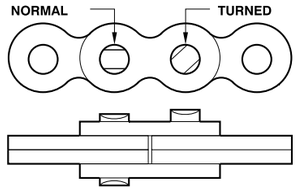


DISTORTED OR DAMAGED PLATES

These can cause tight joints and prevent chain articulation.

TURNED OR PROTRUDING PINS

Inadequately lubricated or highly loaded chain generates high frictional load between pin and plates. In extreme cases the torque exceeds interference fit between the pin and the outer plates, resulting in pin turning. This ultimately causes the pin to screw out of the plates resulting in failure.
The pin head rivets should be examined to determine if the “VEE” flats are still in correct alignment. Chain with rotated/displaced heads or abnormal pin protrusion should be replaced immediately. Do not attempt to repair the chain by welding or driving the pin(s) back into the chain. Once the press fit integrity between outside plates and pins has been altered it cannot be restored.

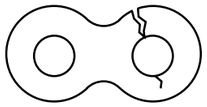


WEAR ON THE PIN HEADS

Caused by chain misalignment. This condition damages the chain and should be corrected.

CRACKED PLATES

Cracked plates can have a number of causes. In any event any cracks discovered in a chain will render it unsafe. Chain should be immediately replaced.



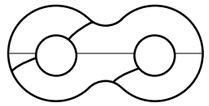
Reasons for Plate Cracking

- **Fatigue cracks** caused by cyclic loading beyond the chain’s endurance limit, which normally start at the plate hole (point of highest stress) and perpendicular to the chain pitch line.

  There is no noticeable yielding (stretch) of the material.

- **Stress corrosion cracking** due to the presence of harsh environmental conditions. These also start at the plate hole but tend to extend in an arc-like path between the plate holes.

  More than one crack can often appear on a plate. This can be caused by the presence of acid or caustic fluids or vapours in combination with a static stress. The interference fit between a pin and plate gives sufficient static stress. This means that in the right environmental conditions, the chain can crack even if under no load. For example, the presence of battery acid fumes in a warehouse could cause cracking in a chain stored on the shelf.



- Never electroplate a chain or its components. This process liberates hydrogen, and hydrogen embrittlement cracks will appear. These are similar in appearance to stress corrosion cracks.

  Plated chains have to be produced by Renold Chain under controlled conditions which ensure no embrittlement takes place.

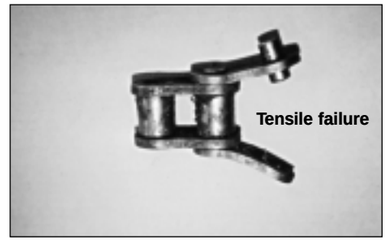
  Corrosion fatigue cracks are in appearance very similar to normal fatigue cracks.

- Corrosion fatigue results from an aggressive environment combined with a cyclic stress. (Stress corrosion cracks are caused by a static stress).

TENSILE FAILURE

Tensile failure results from repeatedly loading the chain above its elastic limit. (Approximately 65% of breaking load).

Side plates appear stretched and distorted and plate holes often elongate and break out.

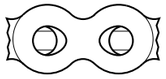


TIGHT JOINTS

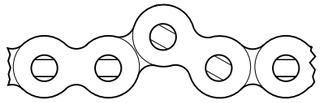
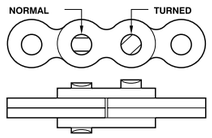
Tight joints do not rotate freely, resulting in high friction. This means that the lifting mechanism becomes less efficient and accelerates the onset of wear and fatigue related problems.

TROUBLESHOOTING

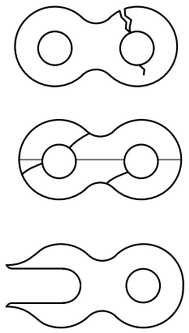
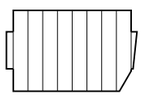
PROBLEM	PROBABLE CAUSE	SOLUTION
ANCHOR FAILS	■ HIGH OVERLOAD	■ REPLACE ANCHOR AND CHAIN SET. ■ CORRECT CAUSE OF OVERLOAD.
CHAIN CLIMBING OR JUMPING OFF THE SPROCKET OR SHEAVE	■ CHAIN OR SPROCKETS WORN ■ FOREIGN BUILD UP IN THE TOOTH GAP (sprockets only)	■ REPLACE THE CHAIN AND SPROCKETS/SHEAVE IF NECESSARY. ■ CLEAN THE SPROCKET TEETH OF ALL MATERIAL SO THAT THE CHAIN ENGAGES CORRECTLY.
CHAIN ELONGATION (A GRADUAL INCREASE OVER ITS LIFE IS NORMAL)	■ LUBRICATION FAILURE ■ OVERLOAD CONDITIONS	■ REPLACE CHAIN AND SPROCKETS OR SHEAVES. ■ CHECK LUBRICATION FAILURE. ■ CHECK LUBRICATION, DRIVE CONFIGURATION AND LOADINGS. ■ REPLACE CHAIN.

PROBLEM	PROBABLE CAUSE	SOLUTION
CHAIN RUNNING HOT	■ LUBRICATION METHOD OR TYPE OF LUBRICATION IS UNSUITABLE FOR THE OPERATING SPEED AND THE LOAD BEING TRANSMITTED	■ INCREASE THE LUBRICATION FREQUENCY AND QUANTITY ■ CONSIDER CHANGING LUBRICANT
	■ INSUFFICIENT LUBRICATION	■ INCREASE THE FREQUENCY OF LUBRICATION IN LINE WITH GOOD MAINTENANCE PRACTICE
	■ CHAIN CONTINUALLY HITTING AN OBSTRUCTION	■ REMOVE THE OBSTRUCTION
	■ INCORRECT CHAIN SIZE SELECTED FOR THE SPEED AND LOAD	■ CHECK THE CHAIN SELECTION AS A LARGER PITCH OR MULTISTRAND CHAIN OF EQUIVALENT CAPACITY MAY BE REQUIRED
CORROSION PITTING	■ EXPOSURE TO CORROSIVE ENVIRONMENT	■ REPLACE CHAIN SET AND PROTECT FROM HOSTILE ENVIRONMENT
ENLARGED HOLES 	■ CHAIN MISALIGNED	■ REPLACE CHAIN SET AND CORRECT CAUSE OF OVERLOAD
EXCESSIVE NOISE	■ MISALIGNMENT OF SPROCKETS/SHEAVES	■ MISALIGNMENT INTRODUCES ABNORMAL LOADING AND WEAR RECHECK ALIGNMENT TO MAINTAIN NORMAL DRIVE CONDITIONS
	■ INADEQUATE LUBRICATION	■ IMPROVE THE LUBRICATION METHOD TO ENSURE THE PROPER AMOUNT OF LUBRICATION IS AVAILABLE IN THE BEARING AREAS
	■ WORN OR INCORRECTLY FITTED BEARINGS	■ REPLACE OR CORRECT THE BEARINGS AS THESE WILL MALIGN THE ENTIRE DRIVE
	■ WORN CHAIN OR SPROCKETS/SHEAVES	■ REPLACE THE CHAIN AND, WHERE NECESSARY, THE SPROCKETS/SHEAVES
	■ TIGHT JOINTS	■ REPLACE CHAIN SET
	■ HEAVY IMPULSIVE LOADS	■ REDUCE THE LOAD
	■ OBSTRUCTION IN THE CHAIN PATH	■ REMOVE THE OBSTRUCTION

RENOLD
Lifting Chain Installation and Maintenance
Troubleshooting
2

PROBLEM	PROBABLE CAUSE	SOLUTION
HEAVY WEAR ON SPROCKET TEETH WORKING FACES. (A BRIGHT POLISHED APPEARANCE IS NORMAL)	■ POOR LUBRICATION	■ IMPROVE THE METHOD OF LUBRICATION, (SEE LUBRICATION SECTION).
	■ PRESENCE OF ABRASIVE	■ CHECK FOR PRESENCE OF FOREIGN MATERIALS AND ELIMINATE THE SOURCE. ■ REPLACE SPROCKETS AND CHAIN IF NECESSARY.
KINKS IN CHAIN (JOINTS TIGHT) 	■ WORN CHAIN OR SPROCKETS/SHEAVES	■ REPLACE CHAIN SETS AND SPROCKETS/SHEAVES.
	■ BENT PINS DUE TO OVERLOAD ■ CHAIN CORRODED	■ CHECK LUBRICATION. ■ CORRECT OVERLOAD CONDITION, REPLACE CHAIN SET.
	■ PEENED PLATE EDGES	■ CLEAN CHAIN WITH WIRE BRUSH AND RELUBRICATE. REPLACE CHAIN SET AS SOON AS POSSIBLE.
	■ DIRT OR FOREIGN SUBSTANCE IN JOINTS	■ MECHANICAL DAMAGE, REMOVE CAUSE. REPLACE CHAIN SET AS SOON AS POSSIBLE. ■ CLEAN CHAIN AND RELUBRICATE.
PIN FAILS 	■ SYSTEM LOADING IS GREATER THAN THE CAPACITY OF THE CHAIN	■ CHECK THE SAFETY FACTOR TO DETERMINE IF THE CHAIN CAPACITY HAS BEEN EXCEEDED. ■ REDUCE HIGH LOAD CONDITION. ■ REPLACE WITH CHAIN OF LARGER CAPACITY.
PROTRUDING OR TURNED PINS	■ LACK OF LUBRICATION	■ REPLACE CHAIN SET IMMEDIATELY. ENSURE PROPER LUBRICATION REGIME.
	■ HIGH LOADS	■ REPLACE CHAIN SET.
RUST PRESENT ON CHAIN	■ INADEQUATE LUBRICATION. THIS WILL ALSO AFFECT THE JOINTS WHICH WILL BE DISCOLOURED, (LIGHT TO DARK BROWN) AND COULD BE ROUGH, GROOVED OR GALLED	■ REMOVE SEVERAL JOINTS AND CHECK THAT THE COMPONENTS ARE NOT SEVERELY DAMAGED. REPLACE CHAIN AND SPROCKETS AS NECESSARY ■ IMPROVE LUBRICATION METHOD
SHEAVE WORN	■ CHAIN MISALIGNED	■ REPLACE CHAIN AND SHEAVE. ■ CORRECT MISALIGNMENT.

Troubleshooting

PROBLEM	PROBABLE CAUSE	SOLUTION
SIDE PLATES ARE WORN	■ WEAR ON THE INSIDE OF THE PLATE IS CAUSED BY SPROCKET MISALIGNMENT ■ WEAR ON THE TOP OF THE SIDE PLATE IS CAUSED BY THE CHAIN RUBBING AGAINST SOME OBSTRUCTION ■ NORMAL WEAR ON LEAF CHAIN AGAINST SHEAVE ■ ABNORMAL WEAR ON LEAF CHAIN RUBBING AGAINST GUIDES	■ CHECK AND ADJUST SPROCKET AND SHAFT ALIGNMENT ■ REMOVE SOURCE OF RUBBING BY REMOVING THE OBSTRUCTION ■ REPLACE CHAIN AT 5% WEAR ■ CHECK ALIGNMENT, INCREASE CLEARANCE.
SIDE PLATE FAILS 	■ FATIGUE CRACKS DUE TO HIGH DYNAMIC LOAD ■ STRESS CORROSION DUE TO SEVERE RUSTING OR EXPOSURE TO ACIDIC OR CAUSTIC MEDIUM ■ TENSILE FAILURE DUE TO HIGH OVERLOAD	■ REDUCE LOADS ■ REPLACE CHAIN WITH HIGHER CAPACITY ■ REPLACE CHAIN SET AND PROTECT FROM HOSTILE ENVIRONMENT ■ REPLACE CHAIN SET AND CORRECT CAUSE OF OVERLOAD
TWISTED CHAIN 	■ LUBRICATION FAILURE ■ OVERLOAD CONDITIONS	■ REPLACE CHAIN AND SPROCKETS OR SHEAVES ■ CHECK LUBRICATION FAILURE ■ CHECK LUBRICATION, DRIVE CONFIGURATION AND LOADINGS ■ REPLACE CHAIN
WEAR ON THE SIDES OF THE SPROCKET TEETH	■ DRIVE MISALIGNMENT	■ CHECK AND CORRECT SPROCKET AND SHAFT ALIGNMENT
WORN SURFACES ON OUTSIDE LINKS OR PIN HEADS	■ MISALIGNMENT RUBBING ON GUIDES	■ CHECK ALIGNMENT AND CORRECT

Renold Chain, a worldwide supplier to NACCO Materials Handling Group for the production of their materials handling equipment, supplies Leaf Chain manufactured in the U.K. and Germany.

Renold heavy duty large pitch transmission chains are used on straddle carriers transporting ocean going containers on docks worldwide.

Reliability and performance with safety built in as standard.

Side loading fork lift trucks run on Renold leaf chain are used to store and pick products in warehouses worldwide.

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Notes

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SAFETY WARNING

Outer Link: for high speed drives or drives operating in arduous conditions a properly riveted outer link (No 107) must always be used for optimum security, in preference to any other form of chain joint. The use of other connectors and cranked links (No 12 and No 30) must always be restricted to light duty, non-critical applications, in drives where an odd number of pitches is absolutely unavoidable. Wherever possible, drives should have sufficient overall adjustment to ensure the use of an even number of pitches throughout the useful life of the chain. A cranked link joint should only be used as a last resort.

HEALTH AND SAFETY AT WORK

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CHAIN PERFORMANCE

The performance levels and tolerances of our product stated in this catalogue (including without limitation, serviceability, wear life, resistance to fatigue, corrosion protection) have been verified in a programme of testing and quality control in accordance with Renold, independent and/or international standard recommendations. No representations or warranties are given that our product shall meet the stated performance levels or tolerances for any given application outside the performance levels and tolerances for the product's own specific application and environment.

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